APPENDIX 13

ASSESSMENT OF WETLANDS RESOURCES AND EVALUATION OF FLOOD CONTROL ALTERNATIVES FOR THE YAZOO BACKWATER PROJECT

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Assessment of Wetland Resources and Evaluation of Flood Control Alternatives for the Yazoo Backwater Project

by

Carolyn B. Schneider

U.S. Army Corps of Engineers
Waterways Experiment Station
Environmental Laboratory

1 March 2000

Prepared for the U.S. Army Engineer District, Vicksburg
Vicksburg, MS 39180-5191

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Preface

This study was conducted by the Wetland Branch (CEERD-ER-W), Ecological Research Division, Environmental Laboratory, U.S. Army Engineer Research and Development Center (ERD), at the request of the U.S. Army Engineer District, Vicksburg (CEMVK). The objectives of this study were as follows: (1) evaluate the short-term water storage, long-term water storage, sediment detention, on-site erosion control, nutrients and dissolved substance removal, and organic carbon export functions associated with farmed and forested wetlands within the project area; and (2) assess the potential hydrologic and conversion impacts resulting from each project alternative plan on wetland functions.

This report was prepared by Carolyn B. Schneider of CEERD-ER-W and is based on prior work completed by Dr. William E. Spencer (formerly of CEERD-ER-W) and Linda Winfield (CEERD-ES-F). Information from previous evaluation projects done in CEERD-ER-W by Dr. Hans Williams and draft copies of wetland function models by Mr. Dan Smith, CEERD-ER-W, were also used in preparing this report. Project oversight and assistance was provided by Mr. Gary Young (CEMVK).

The work was designed and conducted under the direct supervision of Mr. Morris Mauney, Chief, Wetlands Branch, and under the general supervision of Dr. Conrad J. Kirby, Jr., Chief, Ecological Research Division, and Dr. John Keeley, Acting Chief, Environmental Laboratory. Commander and Acting Director of ERD was COL Robin Cababa.

CONTENTS

CONVERSION FACTORS
Non-SI to SI (Metric) Units of Measurement

Non-SI units of measurement used in this report can be converted to SI (metric) units as follows:

Multiply	By	To Obtain
acres	0.405	hectares
cubic yards	0.7645	cubic meters
feet	0.305	meters

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Assessment of Wetland Resources and Evaluation of Flood Control Alternatives for the Yazoo Backwater Project

PART I: INTRODUCTION

The Yazoo Basin Reformulation Study is a review of the uncompleted portions of the authorized Federal flood control project for the Yazoo Basin. The reformulation study contains four distinct phases: (1) the Upper Yazoo Project, (2) the Steele Bayou Project, (3) the Yazoo Backwater Project, and (4) the Tributaries Project. Reformulation of the Steele Bayou and Upper Yazoo Projects has been completed and construction initiated on the reformulation projects. Reformulation of the Tributaries Project is continuing. The Yazoo Backwater Project (YBP) is the third phase addressed by the Yazoo Basin Reformulation Study. The purpose of the YBP is to determine a plan to best address the area's remaining water resource, flood control, and environmental needs.

Completed flood control features in the YBP Area include a levee system approximately 27 miles in length, extending from the Mississippi River east-bank levee to the southern end of the Will M. Whittington Auxiliary Channel east-bank levee. This levee system was completed in 1978 to a grade of 107 feet, NGVD, and includes two drainage structures (one at the mouth of the Steele Bayou with a design capacity of 19,000 cfs, and one at the mouth of the Big Sunflower River with a design capacity of 8,000 cfs). A channel was completed in 1978 from the Big Sunflower River to the Little Sunflower River and from there to Steele Bayou, connecting the Sunflower River and Steele Bayou Basins. The Little Sunflower River drainage structure was completed in 1969. The entrance and exit channel for the authorized pumping station at Steele Bayou was completed in 1987.

Environmental impacts from the completed flood control features of the YBP have already been mitigated. The completion of the Muddy Bayou Structure in 1978 mitigated the projected backwater project impacts to the fishery resources. Four greentree reservoirs and five slough control structures have been constructed on Delta National Forest lands to mitigate waterfowl losses resulting from the completed levees, drainage structures, and connecting channels. Additionally, reforestation of 8,800 acres of frequently flooded agricultural lands to mitigate terrestrial losses (Lake George Wildlife/Wetland Restoration Project) was completed in FY97.

The YBP area is located north of Vicksburg in west-central Mississippi. It lies between the east bank Mississippi River levee on the west, and the Yazoo Basin escarpment on the east. The YBP is approximately 926,000 acres and includes portions of Humphreys, Issaquena, Sharkey, Warren, Washington, and Yazoo Counties, Mississippi, and a portion of Madison

Parish, Louisiana. It is subject to headwater flooding from the Yazoo River, Sunflower River, and Steele Bayou, as well as backwater flooding from the Mississippi River.

Approximately 64% of the project is cleared and 30% is forested. Large portions of the area are in public ownership. These include: 59,000 acres in Delta National Forest; 28,600 acres in Panther Swamp National Wildlife Refuge; 12,900 acres in Yazoo National Wildlife Refuge; 8,800 acres in Lake George Wildlife Wetland Restoration Project; 5,800 acres in Twin Oaks Mitigation Area; 2,000 acres in Mahannah Mitigation Area; and 6,600 in Big Twist Property.

The Big and Little Sunflower Rivers, Deer Creek, and Steele Bayou flow through the Yazoo Backwater area. The high ground along Deer Creek forms a natural divide between the Steele Bayou and the Sunflower River Basins.

The Yazoo Basin is a physiographic sub-province of the Mississippi Alluvial Valley, which is in the Central Gulf Coastal Plain. The basin is in a large flood plain that contains oxbow lakes, swales, backswamps, and meander scars from the ancient Ohio and Mississippi Rivers and other smaller rivers. An average slope of 0.5 foot per mile from north to south is found in the relatively flat terrain of the basin. Although the terrain is typically flat, natural levees and alluvium from existing and previous river meanders provide some local relief.

Soils in the Yazoo Basin are depositional and are classified geologically as Pre-recent and Recent. The Pre-recent soils form the hills bordering the Yazoo Delta, occur at irregular depths beneath the Recent soils, and are of relatively ancient age. Pre-Recent deposits are of two types: 1) loessial silts, sands, and gravel of Quaternary age (600,000 years old); or 2) a variety of lithologic types with distinctive formational strata. The older Tertiary deposits are 600,000 to 65,000,000 years old.

Only the Yazoo Area of the Yazoo Backwater Project is considered in this analysis. The Yazoo area is divided into four reaches. Reach 1 is the largest, at 257,209 acres. It extends the entire length of the project from north to south and occupies the most western portion of the project area. Reach 2 also extends from the northern to the southern border of the project area. It occupies the middle section of the project, just east of Reach 1, and is 125,466 acres. Reach 3 is in the southeastern portion of the project area and is 106,830 acres in size. Reach 4 is in the northeastern portion of the project and is 145,779 acres.

The objective of this study is to assess project impacts on these four reaches by: a) assessing the short- and long- term water storage capacity, sediment detention, on-site erosion control, nutrient and dissolved substance removal, and organic carbon export wetland functions, b) assessing wetland impacts resulting from the proposed project activities, and c) suggesting general mitigation options to compensate for unavoidable wetland impacts, where appropriate.

Thirty-five plans were considered in this evaluation (Table 1). For a detailed description of the features of each plan considered, see the main report.

Table 1. Alternative Project Plans, Yazoo Backwater Project				
	Features			
		Easement		
Plan	Structural	Existing Woodlands	Existing Open Lands	Water Management
1	N/A	Preserve below 100.3 ft NGVD	Use retained	N/A
2	N/A	Preserve below 100.3 ft NGVD	Reforest below 90 ft NGVD	N/A
3	14,000-cfs pump[a]	Preserve below 85 ft NGVD	Use retained below 85 ft NGVD	N/A
4	14,000-cfs pump[a]	Preserve below 85 ft NGVD	Use retained below 85 ft NGVD	Below 80 ft NGVD[b]
5	4,000-cfs pump[a]	Preserve below 85 ft NGVD	Use retained below 85 ft NGVD	Below 85 ft NGVD[c]
6	14,000-cfs pump[a]	Preserve below 85 ft NGVD	Reforest below 85 ft NGVD	Between 70 and 73 ft NGVD[d]
7	14,000-cfs pump[a]	Preserve below 85 ft NGVD	Reforest below 85 ft NGVD	Below 80 ft NGVD[b]
8	14,000-cfs pump[a]	Preserve below 85 ft NGVD	Reforest below 85 ft NGVD	Below 85 ft NGVD[c]
9	14,000-cfs pump[a]	Preserve below 90 ft NGVD	Use retained below 90 ft NGVD	N/A
10	14,000-cfs pump[a]	Preserve below 90 ft NGVD	Use retained below 90 ft NGVD	Below 80 ft NGVD[b]
11	14,000-cfs pump[a]	Preserve below 90 ft NGVD	Use retained below 90 ft NGVD	Below 85 ft NGVD[c]
12	14,000-cfs pump[a]	Preserve below 90 ft NGVD	Reforest below 90 ft NGVD	N/A
13	14,000-cfs pump[a]	Preserve below 90 ft NGVD	Reforest below 90 ft NGVD	Below 80 ft NGVD[b]
14	14,000-cfs pump[a]	Preserve below 90 ft NGVD	Reforest below 90 ft NGVD	Below 85 ft NGVD[c]
15	17,500-cfs pump[a]	Preserve below 85 ft NGVD	Use retained below 85 ft NGVD	N/A
16	17,500-cfs pump[a]	Preserve below 85 ft NGVD	Use retained below 85 ft NGVD	Below 80 ft NGVD[b]
17	17,500-cfs pump[a]	Preserve below 85 ft NGVD	Use retained below 85 ft NGVD	Below 85 ft NGVD[c]
18	17,500-cfs pump[a]	Preserve below 85 ft NGVD	Reforest below 85 ft NGVD	N/A
19	17,500-cfs pump[a]	Preserve below 85 ft NGVD	Reforest below 85 ft NGVD	Below 80 ft NGVD[b]
20	17,500-cfs pump[a]	Preserve below 85 ft NGVD	Reforest below 85 ft NGVD	Below 85 ft NGVD[c]

Table 1. Concluded.

Plan	Features			
	Structural	Easement		
		Existing Woodlands	Existing Open Lands	Water Management
21	17,500-cfs pump[a]	Preserve below 90 ft NGVD	Use retained below 90 ft NGVD	N/A
22	17,500-cfs pump[a]	Preserve below 90 ft NGVD	Use retained below 90 ft NGVD	Below 80 ft NGVD[b]
23	17,500-cfs pump[a]	Preserve below 90 ft NGVD	Use retained below 90 ft NGVD	Below 85 ft NGVD[c]
24	17,500-cfs pump[a]	Preserve below 90 ft NGVD	Reforest below 90 ft NGVD	N/A
25	17,500-cfs pump[a]	Preserve below 90 ft NGVD	Reforest below 90 ft NGVD	Below 80 ft NGVD[b]
26	17,500-cfs pump[a]	Preserve below 90 ft NGVD	Reforest below 90 ft NGVD	Below 85 ft NGVD[c]
27	14,000-cfs pump[d]	N/A	N/A	Between 70 and 73 ft. NGVD[d]
28	17,500-cfs pump[d]	N/A	N/A	N/A
29	Levee	N/A	N/A	N/A
30	14,000-cfs pump	Preserve below 100.3 ft NGVD	N/A	N/A
31	14,000-cfs pump	N/A	Reforest below 87 ft NGVD and south of Highway 14	Below 75 ft NGVD[e]
32	14,000-cfs pump	N/A	Reforest below 87 ft NGVD	Between 70 and 73 ft. NGVD[d]
33	14,000-cfs pump	N/A	Reforest below 91 ft NGVD	Between 70 and 73 ft. NGVD[d]
34	14,000-cfs pump	N/A	Reforest below 91 ft NGVD	Between 70 and 73 ft. NGVD; Reintroduce up to 87 ft NGVD[g]
35	14,000-cfs pump	N/A	Reforest below 88.5 ft NGVD	Between 70 and 73 ft. NGVD; Reintroduce up to 87 ft NGVD[g]

[a] Pump would be operated to provide flood damage reduction for cleared lands above the easement elevation.
[b] 1 December to 1 March.
[c] 80 ft, 1 December to 1 January and 15 February to 1 March; 85 ft, 1 January to 15 February.
[d.] Operation of Steele Bayou would be modified to maintain 70- to 73-ft elevation at Steele Bayou during low water periods
[e] Pump would be operated to provide flood damage reduction for cleared lands above elevation 80 ft NGVD, except during 1 December to 1 March when pump would be operated at 85 ft NGVD.
[f] Year round.
[g]. Operation of Steele Bayou would be modified to maintain 70- to 73-ft elevation at Steele Bayou during low-water periods and to reintroduce Mississippi River flows up to 87 ft NGVD.

PART II: METHODS

Project impacts were evaluated using the same semi-quantitative method used in the wetland functional analysis portion of the Big Sunflower River Maintenance Project report (U.S. Army Engineer District, Vicksburg 1996) and the Mississippi River Mainline Levee Enlargement and Seepage Control project report (U.S. Army Engineer District, Vicksburg 1998). The method uses changes in hydrology, vegetation cover, roughness coefficients, and other parameters to determine: 1) the difference in wetland functional capacity between existing farmed and forested wetlands, 2) the impacts of hydrologic changes upon functions, 3) land use conversion impacts upon functions, 4) loss of wetland functional units, and 5) calculation of mitigation acreage. Some modifications were made to the Functional Capacity Index values used in this study based on discussions with U.S. Fish and Wildlife Service.

A Geographic Information System (GIS) was used to determine the percentages of forested wetlands and farmed wetlands for each Reach (see attachments 1 and 2 for wetland delineation and mapping information). These percentages were applied to the average daily flooded acres (based on a period of record from 1943-1997) to determine wetland acreage for with- and without-project conditions. The net impact by wetland type for hydrologic and conversion impacts is presented in Table 2. Farmed wetlands are defined as those lands cropped before December 1985, but which still exhibit important wetland functions. GIS information was supplied by CEMVK personnel. Each hydrologic reach was visited to aid in identification of wetland type, and assessment of wetland functional capacity.

A functional capacity index (FCI) for each wetland function was determined for farmed and forested wetlands using the following formula:

FCI = Functional Capacity under Existing Conditions / Functional Capacity under Optimal Conditions

Wetlands with a functional capacity index of 1.0 exhibit conditions similar to "reference standard" wetlands which are considered to have the optimum functional capacity possible for wetlands in the area. Reference standard wetlands used in this study were the Cache River basin in northeastern Arkansas and the 15 mile Island section of the Delta National Forest in west central Mississippi. The index value decreases as conditions in the wetland deviate from these reference standard wetlands (Smith et al. 1995). In this application, an FCI of 1.0 is associated with existing forested wetlands within the project area only for those functions where the existing functions are comparable to the reference standard wetland. The FCI values for farmed wetlands are less than the FCI values associated with forested wetlands for all functions considered in this analysis.

An important feature of this method is that wetland functional capacity is reported in units that can be used to determine both mitigation acreage and the benefit of reforestation as a non-structural flood damage reduction measure. Functional capacity units (FCU) are calculated for each wetland function by multiplying the FCI value and the associated acreage impacted for either farmed or forested wetlands. Total FCUs lost for each function are determined by summing the FCUs lost from conversion and hydrologic impacts within each reach.

Table 2. Wetland acres impacted for each plan for the Yazoo Backwater Project. Numbers in parentheses represent wetland acres lost. All other values represent a net gain of wetland acres above the baseline acreage shown.

Plan	Reach 1		Reach 2		Reach 3		Reach 4		Total for all Reaches		Overall Total
	Forested	Farmed	Forested	Farmed	Forested	Farmed	Forested	Farmed	Forested	Farmed	
Baseline	15,658	5,592	2,160	5,684	14,106	1,587	3,210	535	35,134	13,398	48,532
Plan 1	0	0	0	0	0	0	0	0	0	0	0
Plan 2	0	0	0	0	0	0	0	0	0	0	0
Plan 3	(2,365)	(845)	(516)	(1,358)	(2,790)	(314)	(567)	(94)	(6,238)	(2,610)	(8,848)
Plan 4	220	78	(284)	(748)	(1,017)	(114)	(163)	(27)	(1,244)	(811)	(2,055)
Plan 5	986	352	(117)	(308)	(64)	(7)	15	2	819	39	858
Plan 6	(2,365)	(845)	(516)	(1,358)	(2,790)	(314)	(567)	(94)	(6,238)	(2,610)	(8,848)
Plan 7	220	78	(284)	(748)	(1,017)	(114)	(163)	(27)	(1,244)	(811)	(2,055)
Plan 8	986	352	(117)	(308)	(64)	(7)	15	2	819	39	858
Plan 9	(1,025)	(366)	(232)	(612)	(992)	(112)	(275)	(46)	(2,524)	(1,135)	(3,659)
Plan 10	1,561	558	0	0	785	88	130	22	2,476	667	3,143
Plan 11	2,329	832	167	439	1,738	195	307	51	4,540	1,517	6,057
Plan 12	(1,025)	(366)	(232)	(612)	(992)	(112)	(275)	(46)	(2,524)	(1,135)	(3,659)
Plan 13	1,561	558	0	0	785	88	130	22	2,476	667	3,143
Plan 14	2,329	832	167	439	1,738	195	307	51	4,540	1,517	6,057
Plan 15	(2,538)	(906)	(580)	(1,527)	(3,174)	(357)	(633)	(105)	(6,924)	(2,896)	(9,820)
Plan 16	48	17	(348)	(917)	(1,400)	(158)	(229)	(38)	(1,930)	(1,096)	(3,025)
Plan 17	783	280	(182)	(480)	(451)	(51)	(52)	(9)	98	(259)	(161)
Plan 18	(2,538)	(906)	(580)	(1,527)	(3,174)	(357)	(633)	(105)	(6,924)	(2,896)	(9,820)
Plan 19	48	17	(348)	(917)	(1,400)	(158)	(229)	(38)	(1,930)	(1,096)	(3,025)
Plan 20	783	280	(182)	(480)	(451)	(51)	(52)	(9)	98	(259)	(161)
Plan 21	(1,090)	(389)	(251)	(660)	(1,082)	(122)	(295)	(49)	(2,719)	(1,220)	(3,939)
Plan 22	1,496	534	(18)	(49)	694	78	108	18	2,280	582	2,862
Plan 23	2,264	808	148	390	1,647	185	286	48	4,345	1,431	5,776
Plan 24	(1,090)	(389)	(251)	(660)	(1,082)	(122)	(295)	(49)	(2,719)	(1,220)	(3,939)
Plan 25	1,496	534	(18)	(49)	694	78	108	18	2,280	582	2,862
Plan 26	2,264	808	148	390	1,647	185	286	48	4,345	1,431	5,776
Plan 27	(3,101)	(1,108)	(698)	(1,836)	(3,793)	(427)	(749)	(125)	(8,341)	(3,495)	(11,836)
Plan 28	(3,731)	(1,332)	(828)	(2,179)	(4,424)	(498)	(865)	(144)	(9,848)	(4,153)	(14,001)
Plan 29(H) *	(2,040)	(723)	(689)	(1,828)	(819)	(89)	755	132	(2,793)	(2,508)	(5,301)
Plan 29(C) *			(400)	(2,013)			(300)	(336)	(700)	(2,349)	(3,049)
Plan 29 (H&C) *	(2,040)	(723)	(1,089)	(3,841)	(819)	(89)	455	(204)	(3,493)	(4,857)	(8,350)
Plan 30	(3,101)	(1,108)	(698)	(1,836)	(3,793)	(427)	(749)	(125)	(8,341)	(3,495)	(11,836)
Plan 31	2,402	858	(197)	(518)	(226)	(25)	70	12	2,049	327	2,376
Plan 32	(1,172)	(418)	(256)	(675)	(1,183)	(133)	(304)	(51)	(2,915)	(1,277)	(4,191)
Plan 33	(77)	(28)	(22)	(58)	(102)	(12)	(25)	(4)	(227)	(101)	(328)
Plan 34	2,487	888	185	488	1,303	147	1,048	175	5,023	1,697	6,720
Plan 35	1,861	665	48	127	1,620	182	162	27	3,691	1,000	4,691

* H = Hydrologic impacts; C = Conversion (fill) impacts

Mitigation acreage was determined by dividing the total FCUs lost by the total FCI of the desired mitigation wetland acreage. This simple mathematical operation caused the FCI in both the numerator and denominator to cancel out leaving acres as the result. This method provided an objective approach for determination of mitigation acreage based on the anticipated magnitude of project impacts.

Forested wetlands within the alluvial floodplains of the Lower Mississippi River delta were assessed for the following wetland functions: short- and long-term water storage, sediment detention, nutrient and dissolved substance removal, on-site erosion control, and export of organic carbon to downstream aquatic ecosystems (Taylor, Cardamone, and Mitsch 1990). The degree to which existing forested wetlands and farmed wetlands perform these functions is related to the degree that hydrology has been altered in the past. Generally, farmed wetlands in delta areas have greater hydrologic alteration than forested wetlands. The proposed plans will alter the hydrology and land use, and modify the capacity of forested wetlands and farmed wetlands to perform these wetland functions.

Certain assumptions were made during the evaluation of project impacts which affect how the FCI values were determined. Those assumptions are:

1) Deposition of fill is expected to remove wetland hydrology, soils, and vegetation.
2) All farmed wetlands have been altered in the past to improve conveyance of water off of farmed land.

Wetland functions evaluated in this study include: 1) short-term water storage, 2) long-term water storage, 3) sediment detention, 4) on-site erosion control, 5) nutrient and dissolved substance removal, and 6) organic carbon export.

SHORT-TERM WATER STORAGE

Short-term water storage (STWS) is the ability of wetlands to store water during flood events. Short-term water storage protects downstream areas from flooding by attenuating and/or delaying flood peaks (Carter et al. 1979; Wharton et al. 1982). The amount of flood protection provided is a function of the amount of water that can be stored by the wetland and the duration that floodwaters stay on the wetland (Adamus et al. 1991; Taylor, Cardamone, and Mitsch 1990). Both forested and farmed wetlands in the project area provide short-term water storage by providing space for water storage and friction or roughness which delays the downstream movement of floodwater.

Calculations of the FCI values for short-term water storage (FCI_{STWS}) within the study area were made using storage index values. Storage index is the relative ability of a wetland to receive water from overbank and/or backwater flooding. Forested and farmed wetlands were assigned index values according to their capacity to receive water on a per-acre basis of wetland area. Forested wetlands were assigned a storage index value of 1.0 because they are not filled or leveed and have a higher roughness coefficient than farmed wetlands (Taylor, Cardamone, and Mitsch 1990; Shen and Julien 1993). Farmed wetlands were assigned a Storage Index of 0.9, only slightly less than the forested wetlands. An area that has been cleared of all trees could be expected to hold a larger volume of water than the same area with its forests still in tact. However, because farmed wetlands may contain fill and be partially contained by channel excavation material piles/levees, which would adversely affect their ability to receive flood water, a slightly lower Storage Index value was assigned to farmed wetlands in the project area.

Using the following formula, FCI_{STWS} values were calculated to be 1.0 for forested wetlands and 0.9 for farmed wetlands.

$$FCI_{STWS} = SI$$

LONG-TERM WATER STORAGE

Long-term water storage (LTWS) is the ability of wetlands to store water in depressions between flood events. Long-term water storage is a function of the capacity of the wetland to receive water during overbank and/or backwater flooding events, and the topographic character of the floodplain (Taylor, Cardamone, and Mitsch 1990). Bottomland hardwood forests (BLHW) provide long-term water storage because they contain oxbows, sloughs and swales that have surface hydrologic connections with the river (Mitsch and Gosselink 1986). The long-term water storage function is important for detention of sediment and for the removal of dissolved substances from floodwater.

The FCI (FCI_{LTWS}) for this function is the product of the Storage Index (SI) and the Ponding Index (PI). The SI is a measure of the ability of the wetland to receive overbank and/or backwater flooding. The PI is an estimate of the ability of the wetland to retain floodwater in topographic depressions.

Forested wetlands were assigned a PI value of 1.0 because they have a high capacity for storage of floodwater. Forested wetlands generally contain fewer drainage ditches, levees, and less fill than farmed wetlands. Farmed wetlands are projected to have a PI of 0.5 because of increased floodwater conveyance. Using the following formula, FCI_{LTWS} values were calculated to be 1.0 for forested wetlands and 0.45 for farmed wetlands.

$$FCI_{LTWS} = SI \times PI$$

SEDIMENT DETENTION

Sediment detention (SD) is the ability of a wetland area to remove suspended organic and inorganic material from floodwaters as they flow over the wetland surface. The capacity of the wetland to remove suspended sediment is related to the ability of the wetland to receive floodwater (Storage Index - SI) and the ability of the wetland to slow the movement of water (Roughness Index - RI) across the wetland (Scott et al. 1990). Forested wetlands within the YBP area have the capacity to detain sediments in floodwaters because the wetland roughness reduces flow velocity and the energy required to maintain particles in suspension is decreased. Farmed wetlands have a lower capacity for sediment removal because they have a lower capacity to store water and less ability to slow water velocity than forested wetlands. The FCI (FCI_{SD}) for this function is the product of the SI and RI.

The roughness index is calculated using the Manning's *n* roughness coefficient values as found in Chow (1959). The 0.12 value assigned to forested wetlands is assumed to be the maximum (optimum) Manning's *n* value that occurs within the project area. Roughness index values were then calculated using the formula:

Roughness Index = Manning's n_{Fo} / Manning's n_{Fo}, and Manning's n_{Farm} / Manning's n_{Fo}
Where:
Manning's n_{Fo} = .12 (forested)
Manning's n_{Farm} = .035 (farmed)

Roughness index values were then calculated to be 1.0 for forested wetlands and 0.29 for farmed wetlands. Using the following formula, FCI_{SD} values were calculated to be 1.0 for forested wetlands and 0.26 for farmed wetlands.

$$FCI_{SD} = SI \times RI$$

ON-SITE EROSION CONTROL

On-site erosion control (OSEC) is the capacity of a wetland to reduce shoreline loss and bank erosion resulting from kinetic forces of moving water. The dense, shallow root systems and large volume of surface vegetation of forested wetlands within the YBP area serve to reduce the kinetic energy of flowing water and bind soil particles (Bailey and Copeland 1961; Wharton et al. 1982; Scott et al. 1990).

The FCI (FCI_{OSEC}) for this function is the product of SI, PI, RI, and the Disturbance Index (DI). The disturbance index is most closely related to the level of human activity that has occurred within the wetland. Increased disturbance results in reduced root biomass, removal of litter, and reduction in surface roughness (Scott et al. 1990). Increased disturbance reduces the ability of the wetland to provide on-site erosion control. Forested wetlands within the project area were assigned a disturbance index value of 0.67. Farmed wetlands were assigned a value of 0.33. Because most BLHW in the project area have experienced some degree of impact, no 1.0 values were assigned.

Using the following formula, FCI_{OSEC} values were calculated to be 0.67 for forested wetlands and 0.04 for farmed wetlands.

$$FCI_{OSEC} = SI \times PI \times RI \times DI$$

NUTRIENT AND DISSOLVED SUBSTANCE REMOVAL

Nutrient and dissolved substance removal (NDSR) is the capacity of a wetland to remove dissolved compounds by plant assimilation, sediment absorption, or transformation of inorganic nitrogen into gaseous forms which escape into the atmosphere (Blood 1980; Kuenzler at al. 1980). Persistent, woody vegetation of forested wetlands provides for long-term removal of nutrients from the sediment and ultimately the water (Lowrance, Todd, and Asmussen 1984). Nutrients are retained in the sediments by adsorption on clay micelles and may be released into solution depending upon the nutrient concentration gradient between the sediment and overlying water (Kadlec and Kadlec 1979; Fisher, Carlson and Barber 1982; Nichols 1983). Greater primary productivity requires greater nutrient assimilation to maintain assimilatory enzymes. Forested wetlands provided litter surface area for the biochemical conversions of inorganic nitrogen.

The FCI (FCI_{NDSR}) for this function is a product of the SI, PI, primary productivity index (PPI), and surface area index (SAI). The PPI ranks the primary productivity of forested and farmed wetlands (Taylor, Cardamone, and Mitsch 1990). PPI values for forested and farmed wetlands were 1.0 and 0.67 respectively.

The SAI is the relative litter surface area available for important inorganic nitrogen transformations to take place. SAI values for forested and farmed wetlands were 0.67 and 0.33, respectively.

Using the following formula, FCI_{NDSR} values were calculated to be 0.67 for forested wetlands and 0.10 for farmed wetlands.

$$FCI_{NDSR} = SI \times PI \times PPI \times SAI$$

<u>ORGANIC CARBON EXPORT</u>

Organic carbon export (OCE) is the capacity of wetlands to transfer the degradation products of primary productivity to downstream aquatic ecosystems by floodwater transport (Taylor, Cardamone, and Mitsch 1990). Exported organic carbon is an important energy source for aquatic food webs (de la Cruz 1979; Taylor, Cardamone, and Mitsch 1990). Many invertebrate aquatic organisms rely entirely upon particulate organic matter as an energy source (de la Cruz 1979). Dissolved organic carbon is used primarily by microorganisms which form the basis of aquatic food webs (Correll 1978). BLHW are important sources of organic carbon because the fluctuating hydrologic regime permits export of organic carbon from decaying litter (de la Cruz 1979).

The FCI (FCI_{OCE}) for organic carbon export is a function of the SI and PPI. The PPI provides information on the amount of carbon produced by the vegetation, and the SI provides information on the capacity of the floodwaters to enter the system and flush organic carbon to downstream aquatic ecosystems.

Using the following formula, FCI_{OCE} values were calculated to be 1.0 for forested wetlands and 0.60 for farmed wetlands.

$$FCI_{OCE} = SI \times PPI$$

PART III: RESULTS AND DISCUSSION

Most of the plans considered would have a hydrologic impact on wetlands in the project area. Plan 29, the levee construction plan, would have both hydrologic impacts and conversion (fill) impacts. That is, there would be an alteration of the hydrology of the project area so that fewer wetland acres are flooded, and there would be some filling of wetland acreage so that it is converted to non-wetland acreage. Plans 1 and 2 would have no hydrologic or conversion impacts. The other plans would impact the wetland hydrology and would have conversion impacts at the pump site. Conversion impacts from the pump site are addressed in the Supplemental Environmental Impact Statement. Some of the plans would actually increase the number of acres of wetland habitat. In Table 2 the loss of wetland acres are shown in parentheses. All the other values represent an increase in wetland acreage. These values were calculated using the baseline (existing) wetland acreage data and projected losses/gains in wetland acreage data provided by CEMVK.

FUNCTIONAL CAPACITY INDICES

The types of wetlands and their functions are fairly uniform throughout the project area. Because of the uniformity of wetland function, all forested wetlands within the study area were assigned the same index values for ponding, roughness, storage, disturbance, surface area, and primary productivity. Likewise for all farmed wetlands in the study area, appropriate values were assigned for each parameter and were consistent for all reaches. The use of these parameters in determining the Functional Capacity Index (FCI) for each of the 6 functions is explained in the methods section of this report. Table 3 below summarizes the FCI values for impacts to farmed and forested wetlands for all 4 reaches.

Table 3. Functional Capacity Index (FCI) values for Forested (Fo) and Farmed (Farm) Wetlands for all 7 functions.

Function	FCI_{Fo}	FCI_{Farm}	FCI_{AA}
STWS	1.0	0.90	0.08
LTWS	1.0	0.45	0.44
SD	1.0	0.26	0.59
OSEC	0.67	0.04	0.50
NDSR	0.67	0.10	0.46
OCE	1.0	0.60	0.32

FCI_{AA} (Table 3) is the average annualized Functional Capacity Index for mitigation acreage. It assumes a linear recovery of full functional capacity of acquired mitigation lands over a 20-year period. These values, which are used in calculating both mitigation acreages and reforestation benefits of non-structural measures, are more fully explained in Part IV of this document.

FUNCTIONAL CAPACITY UNITS

Functional capacity units (FCU) were calculated for each wetland function by multiplying the FCI value (Table 3) and the associated impacted wetland acreage for either farmed or forested wetlands from Table 2. For plan 29 which has both hydrologic and conversion impacts in two reaches, the total FCU impacted is equal to the sum of FCUs impacted for both hydrologic and conversion impacts. Tables showing the calculations of FCUs impacted for each plan in all four reaches are found in Tables A1-A4 at the end of this Appendix.

PART IV: MITIGATION FOR PROJECT IMPACTS

The Council on Environmental Quality (CEQ) defines mitigation as: avoiding impacts, minimizing impacts, rectifying impacts, reducing or eliminating impacts over time, and compensating for impacts (40 CFR 1508.20). The types of mitigation outlined by CEQ are applicable to both the Corps of Engineers' regulatory functions (as specified in the Clean Water Act, Section 404(b)(1) Guidelines) and all CE water resource project activities. The 1990 Memorandum of Agreement (MOA) between the Department of the Army and the Environmental Protection Agency (see attachments 3 and 4) states that for all practical purposes, "the five types of mitigation can be combined to form three general types: avoidance, minimization and compensatory mitigation."

AVOIDANCE

Avoidance requires consideration of practicable plans to circumvent wetland impacts. Because flood control projects are water-associated activities, all wetland impacts cannot be avoided.

MINIMIZATION

Minimization of project impacts includes levee realignment, siting of borrow areas, and modified pump operation to minimize impacts to wetlands.

COMPENSATION

Compensatory mitigation is addressed after completing efforts to avoid and minimize impacts. The MOA recommends that mitigation be at a 1-to-1 functional replacement. Therefore, high value forested wetlands cannot be replaced 1-for-1 with lower value farmed wetlands. Conversely, replacement of lower value farmed wetlands with higher value forested wetlands may result in a ratio of less than 1-for-1.

The procedure used to evaluate project impacts upon wetlands within the project area expresses wetland functions in terms of functional capacity units that can be used for determination of mitigation acreage. Negative project impacts upon the capacity of a wetland to perform a function are expressed as a reduction in the FCI. When the FCI is multiplied by the acreage impacted, FCUs are derived. Projected loss in FCUs can then be used to determine the compensatory mitigation acreage.

Acreage to compensate for a loss in wetland function may vary with function. A range of mitigation acres was determined. No attempt was made to determine the relative importance of the six wetland functions in the study area. Therefore, the recommended mitigation acreage represents the average acreage required to mitigate for all the impacted functions.

For this project, it is assumed that the target for mitigation will be forested wetlands. However, the land purchased for mitigation of wetland losses will most likely be farmed wetlands that will then be reforested with bottomland hardwoods. Functional capacity will not be restored immediately, however, but will increase with time as the reforested area develops into a mature forest community. Therefore, the FCI used to determine mitigation acreage was annualized over 50 years even though this land is expected to exist in perpetuity. The average annualized FCI (FCI_{AA} found in Table 3) assumes a full recovery of functional value for reforested wetlands over 20 years.

REFORESTATION FEATURE

Seventeen of the plans have a proposed reforestation feature. The feature involves the reforestation of agricultural lands below a given elevation for the purpose of providing nonstructural flood damage reduction. The proposed reforestation acreages (based on average annual acres) are found in Table 4. The FCUs attributed to these acres are calculated in Table 5 and are based on the same 3 assumptions made when calculating the FCI_{AA}. The assumptions are: 1) the acreage to be acquired for the reforestation is frequently flooded agricultural land which will be planted with forest vegetation and allowed to grow and develop into mature forested wetland habitat; 2) the development of a mature forested wetland habitat is expected to take approximately 20 years; and 3) that the project life for which the FCU is calculated is 50 years even though the wetlands are to remain in perpetuity. The fact that the FCUs will not be maximized until approximately 20 years into the project life is factored into the calculations for FCUs.

Calculations of the FCU for the reforestation acres were similar to the calculations for the impacted acres. The number of reforestation acres was multiplied by the FCI values for farmed wetlands to get reforestation FCU values.

CALCULATION OF MITIGATION ACREAGE

To determine the number of mitgation acres required for each of the plans being considered, the FCU value for the impacted acres was added to the reforestation FCU value to get a net change in FCU. If there was a net loss of FCU, the resulting number was then divided by the total FCI_{AA} to get the net acreage required for mitigation. Calculations of mitigation acreages for those plans with a net loss of FCU are found in Table 5.

Table 4. Average Annual Reforestation Acres.					
Plans	Reach 1	Reach 2	Reach 3	Reach 4	Total
Baseline	0	0	0	0	0
Plan 1	0	0	0	0	0
Plan 2	9,786	9,208	3,174	10,434	32,602
Plan 3	0	0	0	0	0
Plan 4	0	0	0	0	0
Plan 5	0	0	0	0	0
Plan 6	8,308	7,009	2,546	8,592	26,455
Plan 7	9,924	7,997	2,945	9,904	30,770
Plan 8	10,402	8,709	3,159	10,428	32,698
Plan 9	0	0	0	0	0
Plan 10	0	0	0	0	0
Plan 11	0	0	0	0	0
Plan 12	9,146	8,217	2,951	9,542	29,856
Plan 13	10,762	9,208	3,350	10,855	34,175
Plan 14	11,242	9,918	3,565	11,432	36,157
Plan 15	0	0	0	0	0
Plan 16	0	0	0	0	0
Plan 17	0	0	0	0	0
Plan 18	8,200	6,734	2,460	8,378	25,772
Plan 19	9,816	7,804	2,859	9,690	30,169
Plan 20	10,276	8,431	3,072	10,265	32,044
Plan 21	0	0	0	0	0
Plan 22	0	0	0	0	0
Plan 23	0	0	0	0	0
Plan 24	9,105	8,140	2,930	9,474	29,649
Plan 25	10,721	9,130	3,330	10,787	33,968
Plan 26	11,201	9,840	3,544	11,363	35,948
Plan 27	0	0	0	0	0
Plan 28	0	0	0	0	0
Plan 29	0	0	0	0	0
Plan 30	0	0	0	0	0
Plan 31	0	0	0	0	0
Plan 32	9,054	8,115	2,908	9,447	29,524
Plan 33	9,738	9,114	3,151	10,352	32,355
Plan 34	11,341	9,998	3,467	13,839	38,645
Plan 35	10,949	9,413	3,538	10,961	34,861

SUMMARY OF FCU CALCULATIONS

Of the 35 plans considered, 23 are projected to cause either no net loss of wetland functional value, or would result in an increase in wetland functional value (based on hydrologic change) and would therefore require no mitigation to offset wetland losses. The remaining 12 plans would cause a loss of wetland functional value.

The 12 plans, 2, 3, 9, 15-17, 21 and 26-31, would result in a net loss of wetland FCUs and would require the purchase of mitigation acreage to compensate for the loss of wetlands. The mitigation acreages calculated range from 37 acres for plan 17, to 26,102 acres for plan 28. See Table 5 for a summary of FCUs impacted, reforestation FCUs, net change in FCU, and the resulting mitigation acreage requirements.

POTENTIAL OPTIONS FOR MITIGATION

Restoration should involve the reforestation of existing farmed wetlands with flood-tolerant hardwood species that produce mast for wildlife. Successful mitigation will require that the acquired sites have the similar hydrology as the lands impacted. Previous reforestation efforts in the region have shown that a 100% survival rate across all species is not necessary to produce a functioning BLHW wetland area.

Use of containerized seedlings would improve survival during inundation (Humphrey, Kleiss, and Williams 1993; Humphrey, Williams, and Kleiss 1994). If possible, mitigation sites should connect with existing BLHW to reduce forest fragmentation and improve wildlife habitat. It is suggested that a long-term monitoring program be established to verify the return of wetland functions.

Table 5. Wetland Resource Impact Summary for the Yazoo Backwater Reformulation Study.							
Plans	Impacted Acres	Total Impacted FCU	Reforestation Acres	Total Reforestation FCU	Total FCU change	Total FCU / Total FCI_{AA}	Mitigation Acres Required
Plan 1	0	0	0	0	0	0	
Plan 2	0	0	32,602	77,919	77,919	32,602	
Plan 3	(8,848)	(39,468)	0	0	(39,468)	(16,514)	16,514
Plan 4	(2,055)	(8,557)	0	0	(8,557)	(3,581)	3,581
Plan 5	858	4,467	0	0	4,467	1,869	
Plan 6	(8,848)	(39,468)	26,455	63,227	23,759	9,941	
Plan 7	(2,055)	(8,557)	30,770	73,540	64,983	27,189	
Plan 8	858	4,467	32,698	78,148	82,615	34,567	
Plan 9	(3,659)	(16,153)	0	0	(16,153)	(6,759)	6,759
Plan 10	3,143	14,795	0	0	14,795	6,190	
Plan 11	6,057	27,825	0	0	27,825	11,642	
Plan 12	(3,659)	(16,153)	29,856	71,356	55,203	23,097	
Plan 13	3,143	14,795	34,175	81,678	96,473	40,365	
Plan 14	6,057	27,825	36,157	86,415	114,240	47,799	
Plan 15	(9,820)	(43,808)	0	0	(43,808)	(18,330)	18,330
Plan 16	(3,025)	(12,891)	0	0	(12,891)	(5,394)	5,394
Plan 17	(161)	(89)	0	0	(89)	(37)	37
Plan 18	(9,820)	(43,808)	25,772	61,595	17,787	7,442	
Plan 19	(3,025)	(12,891)	30,169	72,104	59,213	24,775	
Plan 20	(161)	(89)	32,044	76,585	76,496	32,007	
Plan 21	(3,939)	(17,395)	0	0	(17,395)	(7,278)	7,278
Plan 22	2,862	13,549	0	0	13,549	5,669	
Plan 23	5,776	26,578	0	0	26,578	11,121	
Plan 24	(3,939)	(17,395)	29,649	70,861	53,466	22,371	
Plan 25	2,862	13,549	33,968	81,184	94,733	39,637	
Plan 26	5,776	26,578	35,948	85,916	112,494	47,069	
Plan 27	(11,836)	(52,787)	0	0	(52,787)	(22,087)	22,087
Plan 28	(14,001)	(62,384)	0	0	(62,384)	(26,102)	26,102
Plan 29	(8,350)	(30,096)	0	0	(30,096)	(12,592)	12,592
Plan 30	(11,836)	(52,787)	0	0	(52,787)	(22,087)	22,087
Plan 31	2,376	11,713	0	0	11,713	4,901	
Plan 32	(4,191)	(18,575)	29,524	70,562	51,987	21,752	
Plan 33	(328)	(1,451)	32,355	77,328	72,878	31,748	
Plan 34	6,720	30,824	38,645	92,362	123,186	51,542	
Plan 35	4,691	22,072	34,861	83,318	105,389	44,096	

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Table A1. Total FCU impacted in Reach 1 (Hydrologic impacts only) for farmed and forested wetlands. Numbers in parentheses represent FCU lost. All other values represent a gain of wetland function.

Functions	STWS		LTWS		SD		OSEC		NDSR		OCE		Total		Overall Total
Plans	Forested	Farmed	Forested	Farmed	Forested	Farmed	Forested	Farmed	Forested	Farmed	Forested	Farmed	Forested	Farmed	
FCI	1.0	0.9	1.0	0.45	1.0	0.26	0.67	0.043	0.67	0.0995	1.0	0.603			
Plan 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Plan 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Plan 3	(2,364.9)	(760.1)	(2,364.9)	(380.1)	(2,364.9)	(219.6)	(1,584.5)	(36.3)	(1,584.5)	(84.0)	(2,364.9)	(509.3)	(12,628.5)	(1,989.5)	(14,617.9)
Plan 4	219.5	70.6	219.5	35.3	219.5	20.4	147.1	3.4	147.1	7.8	219.5	47.3	1,172.2	184.7	1,356.9
Plan 5	985.6	316.8	985.6	158.4	985.6	91.5	660.4	15.1	660.4	35.0	985.6	212.3	5,263.1	829.1	6,092.2
Plan 6	(2,364.9)	(760.1)	(2,364.9)	(380.1)	(2,364.9)	(219.6)	(1,584.5)	(36.3)	(1,584.5)	(84.0)	(2,364.9)	(509.3)	(12,628.5)	(1,989.5)	(14,617.9)
Plan 7	219.5	70.6	219.5	35.3	219.5	20.4	147.1	3.4	147.1	7.8	219.5	47.3	1,172.2	184.7	1,356.9
Plan 8	985.6	316.8	985.6	158.4	985.6	91.5	660.4	15.1	660.4	35.0	985.6	212.3	5,263.1	829.1	6,092.2
Plan 9	(1,024.8)	(329.4)	(1,024.8)	(164.7)	(1,024.8)	(95.2)	(686.6)	(15.7)	(686.6)	(36.4)	(1,024.8)	(220.7)	(5,472.4)	(862.1)	(6,334.5)
Plan 10	1,561.3	501.8	1,561.3	250.9	1,561.3	145.0	1,046.1	24.0	1,046.1	55.5	1,561.3	336.2	8,337.2	1,313.4	9,650.7
Plan 11	2,329.0	748.6	2,329.0	374.3	2,329.0	216.3	1,560.5	35.8	1,560.5	82.8	2,329.0	501.6	12,437.1	1,959.3	14,396.4
Plan 12	(1,024.8)	(329.4)	(1,024.8)	(164.7)	(1,024.8)	(95.2)	(686.6)	(15.7)	(686.6)	(36.4)	(1,024.8)	(220.7)	(5,472.4)	(862.1)	(6,334.5)
Plan 13	1,561.3	501.8	1,561.3	250.9	1,561.3	145.0	1,046.1	24.0	1,046.1	55.5	1,561.3	336.2	8,337.2	1,313.4	9,650.7
Plan 14	2,329.0	748.6	2,329.0	374.3	2,329.0	216.3	1,560.5	35.8	1,560.5	82.8	2,329.0	501.6	12,437.1	1,959.3	14,396.4
Plan 15	(2,537.9)	(815.8)	(2,537.9)	(407.9)	(2,537.9)	(235.7)	(1,700.4)	(39.0)	(1,700.4)	(90.2)	(2,537.9)	(546.6)	(13,552.5)	(2,135.0)	(15,687.5)
Plan 16	47.6	15.3	47.6	7.7	47.6	4.4	31.9	0.7	31.9	1.7	47.6	10.3	254.2	40.0	294.2
Plan 17	783.4	251.8	783.4	125.9	783.4	72.7	524.9	12.0	524.9	27.8	783.4	168.7	4,183.6	659.1	4,842.6
Plan 18	(2,537.9)	(815.8)	(2,537.9)	(407.9)	(2,537.9)	(235.7)	(1,700.4)	(39.0)	(1,700.4)	(90.2)	(2,537.9)	(546.6)	(13,552.5)	(2,135.0)	(15,687.5)
Plan 19	47.6	15.3	47.6	7.7	47.6	4.4	31.9	0.7	31.9	1.7	47.6	10.3	254.2	40.0	294.2
Plan 20	783.4	251.8	783.4	125.9	783.4	72.7	524.9	12.0	524.9	27.8	783.4	168.7	4,183.6	659.1	4,842.6
Plan 21	(1,090.3)	(350.5)	(1,090.3)	(175.2)	(1,090.3)	(101.2)	(730.5)	(16.7)	(730.5)	(38.7)	(1,090.3)	(234.8)	(5,822.3)	(917.2)	(6,739.5)
Plan 22	1,495.8	480.8	1,495.8	240.4	1,495.8	138.9	1,002.2	23.0	1,002.2	53.2	1,495.8	322.1	7,987.4	1,258.3	9,245.7
Plan 23	2,263.5	727.6	2,263.5	363.8	2,263.5	210.2	1,516.6	34.8	1,516.6	80.4	2,263.5	487.5	12,087.2	1,904.2	13,991.4
Plan 24	(1,090.3)	(350.5)	(1,090.3)	(175.2)	(1,090.3)	(101.2)	(730.5)	(16.7)	(730.5)	(38.7)	(1,090.3)	(234.8)	(5,822.3)	(917.2)	(6,739.5)
Plan 25	1,495.8	480.8	1,495.8	240.4	1,495.8	138.9	1,002.2	23.0	1,002.2	53.2	1,495.8	322.1	7,987.4	1,258.3	9,245.7
Plan 26	2,263.5	727.6	2,263.5	363.8	2,263.5	210.2	1,516.6	34.8	1,516.6	80.4	2,263.5	487.5	12,087.2	1,904.2	13,991.4
Plan 27	(3,101.3)	(996.8)	(3,101.3)	(498.4)	(3,101.3)	(288.0)	(2,077.9)	(47.6)	(2,077.9)	(110.2)	(3,101.3)	(667.9)	(16,560.8)	(2,609.0)	(19,169.8)
Plan 28	(3,730.7)	(1,199.2)	(3,730.7)	(599.6)	(3,730.7)	(346.4)	(2,499.6)	(57.3)	(2,499.6)	(132.6)	(3,730.7)	(803.4)	(19,922.0)	(3,138.5)	(23,060.5)
Plan 29(H)	(2,040.0)	(650.7)	(2,040.0)	(325.4)	(2,040.0)	(188.0)	(1,366.8)	(31.1)	(1,366.8)	(71.9)	(2,040.0)	(436.0)	(10,893.6)	(1,703.0)	(12,596.6)
Plan 30	(3,101.3)	(996.8)	(3,101.3)	(498.4)	(3,101.3)	(288.0)	(2,077.9)	(47.6)	(2,077.9)	(110.2)	(3,101.3)	(667.9)	(16,560.8)	(2,609.0)	(19,169.8)
Plan 31	2,402.4	772.2	2,402.4	386.1	2,402.4	223.1	1,609.6	36.9	1,609.6	85.4	2,402.4	517.4	12,828.8	2,021.0	14,849.8
Plan 32	(1,171.5)	(376.6)	(1,171.5)	(188.3)	(1,171.5)	(108.8)	(784.9)	(18.0)	(784.9)	(41.6)	(1,171.5)	(252.3)	(6,255.9)	(985.5)	(7,241.5)
Plan 33	(77.3)	(24.8)	(77.3)	(12.4)	(77.3)	(7.2)	(51.8)	(1.2)	(51.8)	(2.7)	(77.3)	(16.6)	(412.7)	(65.0)	(477.7)
Plan 34	2,487.0	799.4	2,487.0	399.7	2,487.0	230.9	1,666.3	38.2	1,666.3	88.4	2,487.0	535.6	13,280.4	2,092.2	15,372.5
Plan 35	1,860.9	598.1	1,860.9	299.1	1,860.9	172.8	1,246.8	28.6	1,246.8	66.1	1,860.9	400.8	9,937.1	1,565.5	11,502.6

Table A2. Total FCU impacted in Reach 2 (Hydrologic (H) and Conversion (C) impacts) for farmed and forested wetlands. Numbers in parentheses represent FCU lost. All other values represent a gain of wetland function.

Functions	STWS		LTWS		SD		OSEC		NDSR		OCE		Total		Overall Total
Plans	Forested	Farmed	Forested	Farmed	Forested	Farmed	Forested	Farmed	Forested	Farmed	Forested	Farmed	Forested	Farmed	
FCI	1.0	0.9	1.0	0.45	1.0	0.26	0.67	0.043	0.67	0.0995	1.0	0.603			
Plan 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Plan 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Plan 3	(515.9)	(1,221.8)	(515.9)	(610.9)	(515.9)	(353.0)	(345.6)	(58.4)	(345.6)	(135.1)	(515.9)	(818.6)	(2,754.6)	(3,197.6)	(5,952.2)
Plan 4	(284.1)	(672.8)	(284.1)	(336.4)	(284.1)	(194.4)	(190.3)	(32.1)	(190.3)	(74.4)	(284.1)	(450.7)	(1,516.8)	(1,760.7)	(3,277.6)
Plan 5	(117.0)	(277.2)	(117.0)	(138.6)	(117.0)	(80.1)	(78.4)	(13.2)	(78.4)	(30.6)	(117.0)	(185.7)	(625.0)	(725.5)	(1,350.5)
Plan 6	(515.9)	(1,221.8)	(515.9)	(610.9)	(515.9)	(353.0)	(345.6)	(58.4)	(345.6)	(135.1)	(515.9)	(818.6)	(2,754.6)	(3,197.6)	(5,952.2)
Plan 7	(284.1)	(672.8)	(284.1)	(336.4)	(284.1)	(194.4)	(190.3)	(32.1)	(190.3)	(74.4)	(284.1)	(450.7)	(1,516.8)	(1,760.7)	(3,277.6)
Plan 8	(117.0)	(277.2)	(117.0)	(138.6)	(117.0)	(80.1)	(78.4)	(13.2)	(78.4)	(30.6)	(117.0)	(185.7)	(625.0)	(725.5)	(1,350.5)
Plan 9	(232.4)	(550.4)	(232.4)	(275.2)	(232.4)	(159.0)	(155.7)	(26.3)	(155.7)	(60.8)	(232.4)	(368.7)	(1,240.9)	(1,440.4)	(2,681.2)
Plan 10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Plan 11	166.6	394.7	166.6	197.3	166.6	114.0	111.6	18.9	111.6	43.6	166.6	264.4	889.8	1,032.9	1,922.7
Plan 12	(232.4)	(550.4)	(232.4)	(275.2)	(232.4)	(159.0)	(155.7)	(26.3)	(155.7)	(60.8)	(232.4)	(368.7)	(1,240.9)	(1,440.4)	(2,681.2)
Plan 13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Plan 14	166.6	394.7	166.6	197.3	166.6	114.0	111.6	18.9	111.6	43.6	166.6	264.4	889.8	1,032.9	1,922.7
Plan 15	(580.3)	(1,374.3)	(580.3)	(687.2)	(580.3)	(397.0)	(388.8)	(65.7)	(388.8)	(151.9)	(580.3)	(920.8)	(3,098.6)	(3,596.8)	(6,695.4)
Plan 16	(348.5)	(825.3)	(348.5)	(412.7)	(348.5)	(238.4)	(233.5)	(39.4)	(233.5)	(91.2)	(348.5)	(553.0)	(1,860.8)	(2,160.0)	(4,020.8)
Plan 17	(182.2)	(431.6)	(182.2)	(215.8)	(182.2)	(124.7)	(122.1)	(20.6)	(122.1)	(47.7)	(182.2)	(289.1)	(973.0)	(1,129.5)	(2,102.5)
Plan 18	(580.3)	(1,374.3)	(580.3)	(687.2)	(580.3)	(397.0)	(388.8)	(65.7)	(388.8)	(151.9)	(580.3)	(920.8)	(3,098.6)	(3,596.8)	(6,695.4)
Plan 19	(348.5)	(825.3)	(348.5)	(412.7)	(348.5)	(238.4)	(233.5)	(39.4)	(233.5)	(91.2)	(348.5)	(553.0)	(1,860.8)	(2,160.0)	(4,020.8)
Plan 20	(182.2)	(431.6)	(182.2)	(215.8)	(182.2)	(124.7)	(122.1)	(20.6)	(122.1)	(47.7)	(182.2)	(289.1)	(973.0)	(1,129.5)	(2,102.5)
Plan 21	(250.6)	(593.6)	(250.6)	(296.8)	(250.6)	(171.5)	(167.9)	(28.4)	(167.9)	(65.6)	(250.6)	(397.7)	(1,338.3)	(1,553.5)	(2,891.7)
Plan 22	(18.4)	(43.7)	(18.4)	(21.8)	(18.4)	(12.6)	(12.3)	(2.1)	(12.3)	(4.8)	(18.4)	(29.2)	(98.4)	(114.2)	(212.7)
Plan 23	148.2	351.0	148.2	175.5	148.2	101.4	99.3	16.8	99.3	38.8	148.2	235.2	791.4	918.6	1,710.0
Plan 24	(250.6)	(593.6)	(250.6)	(296.8)	(250.6)	(171.5)	(167.9)	(28.4)	(167.9)	(65.6)	(250.6)	(397.7)	(1,338.3)	(1,553.5)	(2,891.7)
Plan 25	(18.4)	(43.7)	(18.4)	(21.8)	(18.4)	(12.6)	(12.3)	(2.1)	(12.3)	(4.8)	(18.4)	(29.2)	(98.4)	(114.2)	(212.7)
Plan 26	148.2	351.0	148.2	175.5	148.2	101.4	99.3	16.8	99.3	38.8	148.2	235.2	791.4	918.6	1,710.0
Plan 27	(697.7)	(1,652.4)	(697.7)	(826.2)	(697.7)	(477.4)	(467.4)	(78.9)	(467.4)	(182.7)	(697.7)	(1,107.1)	(3,725.6)	(4,324.7)	(8,050.3)
Plan 28	(827.8)	(1,960.7)	(827.8)	(980.3)	(827.8)	(566.4)	(554.6)	(93.7)	(554.6)	(216.8)	(827.8)	(1,313.6)	(4,420.6)	(5,131.5)	(9,552.1)
Plan 29(H)	(689.0)	(1,645.2)	(689.0)	(822.6)	(689.0)	(475.3)	(461.6)	(78.6)	(461.6)	(181.9)	(689.0)	(1,102.3)	(3,679.3)	(4,305.9)	(7,985.1)
Plan 29(C)	(400.0)	(1,811.7)	(400.0)	(905.9)	(400.0)	(523.4)	(268.0)	(86.6)	(268.0)	(200.3)	(400.0)	(1,213.8)	(2,136.0)	(4,741.6)	(6,877.6)
Plan 30	(697.7)	(1,652.4)	(697.7)	(826.2)	(697.7)	(477.4)	(467.4)	(78.9)	(467.4)	(182.7)	(697.7)	(1,107.1)	(3,725.6)	(4,324.7)	(8,050.3)
Plan 31	(196.7)	(465.8)	(196.7)	(232.9)	(196.7)	(134.6)	(131.8)	(22.3)	(131.8)	(51.5)	(196.7)	(312.1)	(1,050.1)	(1,219.0)	(2,269.1)
Plan 32	(256.3)	(607.1)	(256.3)	(303.5)	(256.3)	(175.4)	(171.7)	(29.0)	(171.7)	(67.1)	(256.3)	(406.7)	(1,368.7)	(1,588.8)	(2,957.5)
Plan 33	(22.0)	(52.2)	(22.0)	(26.1)	(22.0)	(15.1)	(14.8)	(2.5)	(14.8)	(5.8)	(22.0)	(35.0)	(117.7)	(136.6)	(254.3)
Plan 34	185.3	438.8	185.3	219.4	185.3	126.8	124.1	21.0	124.1	48.5	185.3	294.0	989.2	1,148.3	2,137.5
Plan 35	48.1	113.9	48.1	56.9	48.1	32.9	32.2	5.4	32.2	12.6	48.1	76.3	256.7	298.0	554.7

Table A3. Total FCU impacted in Reach 3 (Hydrologic impacts only) for farmed and forested wetlands. Numbers in parentheses represent FCU lost. All other values represent a gain of wetland function.

Functions	STWS		LTWS		SD		OSEC		NDSR		OCE		Total		Overall Total
Plans	Forested	Farmed	Forested	Farmed	Forested	Farmed	Forested	Farmed	Forested	Farmed	Forested	Farmed	Forested	Farmed	
FCI	1.0	0.9	1.0	0.45	1.0	0.26	0.67	0.043	0.67	0.0995	1.0	0.603			
Plan 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Plan 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Plan 3	(2,790.4)	(282.5)	(2,790.4)	(141.3)	(2,790.4)	(91.0)	(1,869.6)	(13.5)	(1,869.6)	(31.2)	(2,790.4)	(189.3)	(14,900.7)	(748.9)	(15,649.6)
Plan 4	(1,016.8)	(103.0)	(1,016.8)	(51.5)	(1,016.8)	(33.2)	(681.3)	(4.9)	(681.3)	(11.4)	(1,016.8)	(69.0)	(5,429.7)	(272.9)	(5,702.6)
Plan 5	(64.0)	(6.5)	(64.0)	(3.2)	(64.0)	(2.1)	(42.9)	(0.3)	(42.9)	(0.7)	(64.0)	(4.3)	(341.8)	(17.2)	(358.9)
Plan 6	(2,790.4)	(282.5)	(2,790.4)	(141.3)	(2,790.4)	(91.0)	(1,869.6)	(13.5)	(1,869.6)	(31.2)	(2,790.4)	(189.3)	(14,900.7)	(748.9)	(15,649.6)
Plan 7	(1,016.8)	(103.0)	(1,016.8)	(51.5)	(1,016.8)	(33.2)	(681.3)	(4.9)	(681.3)	(11.4)	(1,016.8)	(69.0)	(5,429.7)	(272.9)	(5,702.6)
Plan 8	(64.0)	(6.5)	(64.0)	(3.2)	(64.0)	(2.1)	(42.9)	(0.3)	(42.9)	(0.7)	(64.0)	(4.3)	(341.8)	(17.2)	(358.9)
Plan 9	(992.0)	(100.4)	(992.0)	(50.2)	(992.0)	(32.4)	(664.6)	(4.8)	(664.6)	(11.1)	(992.0)	(67.3)	(5,297.3)	(266.2)	(5,563.5)
Plan 10	784.8	79.5	784.8	39.7	784.8	25.6	525.8	3.8	525.8	8.8	784.8	53.2	4,190.8	210.6	4,401.4
Plan 11	1,737.6	175.9	1,737.6	88.0	1,737.6	56.7	1,164.2	8.4	1,164.2	19.5	1,737.6	117.9	9,278.8	466.3	9,745.1
Plan 12	(992.0)	(100.4)	(992.0)	(50.2)	(992.0)	(32.4)	(664.6)	(4.8)	(664.6)	(11.1)	(992.0)	(67.3)	(5,297.3)	(266.2)	(5,563.5)
Plan 13	784.8	79.5	784.8	39.7	784.8	25.6	525.8	3.8	525.8	8.8	784.8	53.2	4,190.8	210.6	4,401.4
Plan 14	1,737.6	175.9	1,737.6	88.0	1,737.6	56.7	1,164.2	8.4	1,164.2	19.5	1,737.6	117.9	9,278.8	466.3	9,745.1
Plan 15	(3,173.6)	(321.3)	(3,173.6)	(160.7)	(3,173.6)	(103.5)	(2,126.3)	(15.4)	(2,126.3)	(35.5)	(3,173.6)	(215.3)	(16,947.0)	(851.7)	(17,798.7)
Plan 16	(1,400.0)	(141.8)	(1,400.0)	(70.9)	(1,400.0)	(45.7)	(938.0)	(6.8)	(938.0)	(15.7)	(1,400.0)	(95.0)	(7,476.0)	(375.7)	(7,851.7)
Plan 17	(451.2)	(45.7)	(451.2)	(22.8)	(451.2)	(14.7)	(302.3)	(2.2)	(302.3)	(5.1)	(451.2)	(30.6)	(2,409.4)	(121.1)	(2,530.5)
Plan 18	(3,173.6)	(321.3)	(3,173.6)	(160.7)	(3,173.6)	(103.5)	(2,126.3)	(15.4)	(2,126.3)	(35.5)	(3,173.6)	(215.3)	(16,947.0)	(851.7)	(17,798.7)
Plan 19	(1,400.0)	(141.8)	(1,400.0)	(70.9)	(1,400.0)	(45.7)	(938.0)	(6.8)	(938.0)	(15.7)	(1,400.0)	(95.0)	(7,476.0)	(375.7)	(7,851.7)
Plan 20	(451.2)	(45.7)	(451.2)	(22.8)	(451.2)	(14.7)	(302.3)	(2.2)	(302.3)	(5.1)	(451.2)	(30.6)	(2,409.4)	(121.1)	(2,530.5)
Plan 21	(1,082.4)	(109.6)	(1,082.4)	(54.8)	(1,082.4)	(35.3)	(725.2)	(5.2)	(725.2)	(12.1)	(1,082.4)	(73.4)	(5,780.0)	(290.5)	(6,070.5)
Plan 22	694.4	70.3	694.4	35.2	694.4	22.7	465.2	3.4	465.2	7.8	694.4	47.1	3,708.1	186.4	3,894.5
Plan 23	1,647.2	166.8	1,647.2	83.4	1,647.2	53.7	1,103.6	8.0	1,103.6	18.4	1,647.2	111.7	8,796.0	442.1	9,238.1
Plan 24	(1,082.4)	(109.6)	(1,082.4)	(54.8)	(1,082.4)	(35.3)	(725.2)	(5.2)	(725.2)	(12.1)	(1,082.4)	(73.4)	(5,780.0)	(290.5)	(6,070.5)
Plan 25	694.4	70.3	694.4	35.2	694.4	22.7	465.2	3.4	465.2	7.8	694.4	47.1	3,708.1	186.4	3,894.5
Plan 26	1,647.2	166.8	1,647.2	83.4	1,647.2	53.7	1,103.6	8.0	1,103.6	18.4	1,647.2	111.7	8,796.0	442.1	9,238.1
Plan 27	(3,792.8)	(384.0)	(3,792.8)	(192.0)	(3,792.8)	(123.7)	(2,541.2)	(18.3)	(2,541.2)	(42.5)	(3,792.8)	(257.3)	(20,253.6)	(1,017.9)	(21,271.4)
Plan 28	(4,424.0)	(447.9)	(4,424.0)	(224.0)	(4,424.0)	(144.3)	(2,964.1)	(21.4)	(2,964.1)	(49.5)	(4,424.0)	(300.1)	(23,624.2)	(1,187.3)	(24,811.4)
Plan 29(H)	(819.0)	(80.1)	(819.0)	(40.1)	(819.0)	(25.8)	(548.7)	(3.8)	(548.7)	(8.9)	(819.0)	(53.7)	(4,373.5)	(212.3)	(4,585.8)
Plan 30	(3,792.8)	(384.0)	(3,792.8)	(192.0)	(3,792.8)	(123.7)	(2,541.2)	(18.3)	(2,541.2)	(42.5)	(3,792.8)	(257.3)	(20,253.6)	(1,017.9)	(21,271.4)
Plan 31	(226.4)	(22.9)	(226.4)	(11.5)	(226.4)	(7.4)	(151.7)	(1.1)	(151.7)	(2.5)	(226.4)	(15.4)	(1,209.0)	(60.8)	(1,269.7)
Plan 32	(1,183.2)	(119.8)	(1,183.2)	(59.9)	(1,183.2)	(38.6)	(792.7)	(5.7)	(792.7)	(13.2)	(1,183.2)	(80.3)	(6,318.3)	(317.5)	(6,635.8)
Plan 33	(102.4)	(10.4)	(102.4)	(5.2)	(102.4)	(3.3)	(68.6)	(0.5)	(68.6)	(1.1)	(102.4)	(6.9)	(546.8)	(27.5)	(574.3)
Plan 34	1,303.2	131.9	1,303.2	66.0	1,303.2	42.5	873.1	6.3	873.1	14.6	1,303.2	88.4	6,959.1	349.7	7,308.8
Plan 35	1,620.0	164.0	1,620.0	82.0	1,620.0	52.9	1,085.4	7.8	1,085.4	18.1	1,620.0	109.9	8,650.8	434.8	9,085.6

Table A4. Total FCU impacted in Reach 4 (Hydrologic (H) and Conversion (C) impacts) for farmed and forested wetlands. Numbers in parentheses represent FCU lost. All other values represent a gain of wetland function.

Functions	STWS		LTWS		SD		OSEC		NDSR		OCE		Total		Overall Total
Plans	Forested	Farmed	Forested	Farmed	Forested	Farmed	Forested	Farmed	Forested	Farmed	Forested	Farmed	Forested	Farmed	
FCI	1.0	0.9	1.0	0.45	1.0	0.26	0.67	0.043	0.67	0.0995	1.0	0.603			
Plan 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Plan 2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Plan 3	(566.6)	(85.0)	(566.6)	(42.5)	(566.6)	(24.6)	(379.6)	(4.1)	(379.6)	(9.4)	(566.6)	(56.9)	(3,025.9)	(222.5)	(3,248.3)
Plan 4	(163.0)	(24.4)	(163.0)	(12.2)	(163.0)	(7.1)	(109.2)	(1.2)	(109.2)	(2.7)	(163.0)	(16.4)	(870.2)	(64.0)	(934.2)
Plan 5	14.6	2.2	14.6	1.1	14.6	0.6	9.8	0.1	9.8	0.2	14.6	1.5	78.2	5.7	83.9
Plan 6	(566.6)	(85.0)	(566.6)	(42.5)	(566.6)	(24.6)	(379.6)	(4.1)	(379.6)	(9.4)	(566.6)	(56.9)	(3,025.9)	(222.5)	(3,248.3)
Plan 7	(163.0)	(24.4)	(163.0)	(12.2)	(163.0)	(7.1)	(109.2)	(1.2)	(109.2)	(2.7)	(163.0)	(16.4)	(870.2)	(64.0)	(934.2)
Plan 8	14.6	2.2	14.6	1.1	14.6	0.6	9.8	0.1	9.8	0.2	14.6	1.5	78.2	5.7	83.9
Plan 9	(274.6)	(41.2)	(274.6)	(20.6)	(274.6)	(11.9)	(184.0)	(2.0)	(184.0)	(4.6)	(274.6)	(27.6)	(1,466.2)	(107.8)	(1,573.9)
Plan 10	129.6	19.4	129.6	9.7	129.6	5.6	86.8	0.9	86.8	2.1	129.6	13.0	692.1	50.9	742.9
Plan 11	307.2	46.1	307.2	23.0	307.2	13.3	205.8	2.2	205.8	5.1	307.2	30.9	1,640.4	120.6	1,761.0
Plan 12	(274.6)	(41.2)	(274.6)	(20.6)	(274.6)	(11.9)	(184.0)	(2.0)	(184.0)	(4.6)	(274.6)	(27.6)	(1,466.2)	(107.8)	(1,573.9)
Plan 13	129.6	19.4	129.6	9.7	129.6	5.6	86.8	0.9	86.8	2.1	129.6	13.0	692.1	50.9	742.9
Plan 14	307.2	46.1	307.2	23.0	307.2	13.3	205.8	2.2	205.8	5.1	307.2	30.9	1,640.4	120.6	1,761.0
Plan 15	(632.6)	(94.9)	(632.6)	(47.4)	(632.6)	(27.4)	(423.9)	(4.5)	(423.9)	(10.5)	(632.6)	(63.6)	(3,378.3)	(248.4)	(3,626.7)
Plan 16	(229.0)	(34.3)	(229.0)	(17.2)	(229.0)	(9.9)	(153.4)	(1.6)	(153.4)	(3.8)	(229.0)	(23.0)	(1,222.6)	(89.9)	(1,312.5)
Plan 17	(52.1)	(7.8)	(52.1)	(3.9)	(52.1)	(2.3)	(34.9)	(0.4)	(34.9)	(0.9)	(52.1)	(5.2)	(278.1)	(20.4)	(298.6)
Plan 18	(632.6)	(94.9)	(632.6)	(47.4)	(632.6)	(27.4)	(423.9)	(4.5)	(423.9)	(10.5)	(632.6)	(63.6)	(3,378.3)	(248.4)	(3,626.7)
Plan 19	(229.0)	(34.3)	(229.0)	(17.2)	(229.0)	(9.9)	(153.4)	(1.6)	(153.4)	(3.8)	(229.0)	(23.0)	(1,222.6)	(89.9)	(1,312.5)
Plan 20	(52.1)	(7.8)	(52.1)	(3.9)	(52.1)	(2.3)	(34.9)	(0.4)	(34.9)	(0.9)	(52.1)	(5.2)	(278.1)	(20.4)	(298.6)
Plan 21	(295.4)	(44.3)	(295.4)	(22.2)	(295.4)	(12.8)	(197.9)	(2.1)	(197.9)	(4.9)	(295.4)	(29.7)	(1,577.6)	(116.0)	(1,693.6)
Plan 22	108.5	16.3	108.5	8.1	108.5	4.7	72.7	0.8	72.7	1.8	108.5	10.9	579.3	42.6	621.9
Plan 23	285.8	42.9	285.8	21.4	285.8	12.4	191.5	2.0	191.5	4.7	285.8	28.7	1,526.4	112.2	1,638.6
Plan 24	(295.4)	(44.3)	(295.4)	(22.2)	(295.4)	(12.8)	(197.9)	(2.1)	(197.9)	(4.9)	(295.4)	(29.7)	(1,577.6)	(116.0)	(1,693.6)
Plan 25	108.5	16.3	108.5	8.1	108.5	4.7	72.7	0.8	72.7	1.8	108.5	10.9	579.3	42.6	621.9
Plan 26	285.8	42.9	285.8	21.4	285.8	12.4	191.5	2.0	191.5	4.7	285.8	28.7	1,526.4	112.2	1,638.6
Plan 27	(749.3)	(112.4)	(749.3)	(56.2)	(749.3)	(32.5)	(502.0)	(5.4)	(502.0)	(12.4)	(749.3)	(75.3)	(4,001.2)	(294.2)	(4,295.3)
Plan 28	(865.2)	(129.8)	(865.2)	(64.9)	(865.2)	(37.5)	(579.7)	(6.2)	(579.7)	(14.3)	(865.2)	(87.0)	(4,620.2)	(339.7)	(4,959.8)
Plan 29(H)	755.0	118.8	755.0	59.4	755.0	34.3	505.9	5.7	505.9	13.1	755.0	79.6	4,031.7	310.9	4,342.6
Plan 29(C)	(300.0)	(302.4)	(300.0)	(151.2)	(300.0)	(87.4)	(201.0)	(14.4)	(201.0)	(33.4)	(300.0)	(202.6)	(1,602.0)	(791.4)	(2,393.4)
Plan 30	(749.3)	(112.4)	(749.3)	(56.2)	(749.3)	(32.5)	(502.0)	(5.4)	(502.0)	(12.4)	(749.3)	(75.3)	(4,001.2)	(294.2)	(4,295.3)
Plan 31	70.1	10.5	70.1	5.3	70.1	3.0	47.0	0.5	47.0	1.2	70.1	7.0	374.2	27.5	401.7
Plan 32	(303.6)	(45.5)	(303.6)	(22.8)	(303.6)	(13.2)	(203.4)	(2.2)	(203.4)	(5.0)	(303.6)	(30.5)	(1,621.2)	(119.2)	(1,740.4)
Plan 33	(25.2)	(3.8)	(25.2)	(1.9)	(25.2)	(1.1)	(16.9)	(0.2)	(16.9)	(0.4)	(25.2)	(2.5)	(134.6)	(9.9)	(144.5)
Plan 34	1,047.6	157.1	1,047.6	78.6	1,047.6	45.4	701.9	7.5	701.9	17.4	1,047.6	105.3	5,594.2	411.3	6,005.5
Plan 35	162.0	24.3	162.0	12.2	162.0	7.0	108.5	1.2	108.5	2.7	162.0	16.3	865.1	63.6	928.7

MISCELLANEOUS PAPER EL-91-___

DELINEATION OF WETLANDS OF THE YAZOO RIVER BASIN IN NORTHWESTERN MISSISSIPPI

by

William N. Kirchner
US Environmental Protection Agency
Dallas, Texas 75202-2733

Barbara A. Kleiss, Ellis J. Clairain, Jr.

Environmental Laboratory

DEPARTMENT OF THE ARMY
Waterways Experiment Station, Corps of Engineers
3909 Halls Ferry Road, Vicksburg, Mississippi 39180-6199

W. Blake Parker
Hydricsoils, Inc.
Woodland, Alabama 32680

and

Charles J. Newling
Wetlands Science Applications, Inc.
Poolesville, Maryland 20837-0099

October 1991

Final Report

Prepared for US Army Engineer District, Vicksburg
Vicksburg, MS 39181-0060

Attachment 1

PREFACE

This study was conducted by the Wetlands Research Team (WRT), Environmental Laboratory (EL), US Army Engineer Waterways Experiment Station (WES), at the request of the US Army Engineer District (USAED), Vicksburg. The objectives of the study were to delineate general wetland boundaries within the 4.2-million acre Yazoo River Basin in northwestern Mississippi and to estimate the acreage and location of wetlands and other waters of the United States.

Subsequent to the completion of the preliminary data collection for the study (Summer 1989), the US Army Corps of Engineers issued regulatory guidance (Regulatory Guidance Letter 90-7) that clarifies the concept of "normal circumstances", a phrase used in the Corps and Environmental Protection Agency's definition of wetlands to describe the conditions under which wetlands are normally found.

The 1989 Federal Manual for Identifying and Delineating Jurisdictional Wetlands defines "normal circumstances" in a manner consistent with the definition used by the Soil Conservation Service (SCS) in its administration of the Swampbuster provisions of the Food Security Act. Both the SCS and the 1989 Manual interpret "normal circumstances" as the soil and hydrologic conditions that are normally present, without regard to whether the vegetation has been removed. The regulatory guidance referenced above states that prior converted croplands generally do not support a prevalence of hydrophytic vegetation and as such are not subject to regulation under section 404 of the Clean Water Act. Prior converted cropland is defined by the SCS as wetlands which were both manipulated (drained or otherwise physically altered to remove excess water from the land) and cropped before 23 December 1985, to the extent that they no longer exhibit important wetland values. Specifically, prior converted cropland is inundated for no more than 14 consecutive days during the growing season.

In addition, due to provisions of the 1992 Energy and Water Development Appropriations Act, the 1989 Federal Manual for Identifying and Delineating Jurisdictional Wetlands is no longer used by the Corps of Engineers for wetland identification and delineation. On August 14, 1991, the Environmental Protection Agency published in the Federal Register proposed revisions to the 1989 Manual. Until such time that a new Federal wetland delineation manual is adopted, the Corps of Engineers is using the 1987 Corps of Engineers Wetlands Delineation Manual for wetland jurisdictional determinations. With the normal circumstance guidance (Regulatory Guidance Letter 90-7) in place, the 1987 manual yields similar wetland determinations as the 1989 manual.

Users of the information in this report should note that much of the land identified as wetland would qualify as prior converted wetland and as such, is not subject (in most cases) to regulation under Section 404 of the Clean Water Act. Other subsequent policy changes with regard to Federal wetland delineation methods should also be taken into consideration if the information contained in this report is used to calculate the extent of wetlands. However, for planning purposes (the intent of this study) the information contained in this paper is applicable with the exceptions noted above.

This report was prepared by many people representing a number of Federal agencies and private organizations. Those individuals primarily responsible for report writing include Mr. William N. Kirchner, while on detail to the WRT from Region 6 of the US Environmental Protection Agency; Ms. Barbara A. Kleiss and Mr. Ellis J. Clairain, Jr., of the WRT, EL; and Messrs. W. Blake Parker and Charles J. Newling, private consultants to the WRT, representing Hydricsoils, Inc., and Wetlands Science Applications, Inc., respectively. Technical review was provided by Dr. Thomas H. Roberts of the Resource Analysis Group (RAG), and Mr. James W. Teaford, Dr. Steven W. Sprecher, and Dr. James S. Wakeley of the Wetlands and Terrestrial Habitat Group (WTHG), Environmental Resources Division (ERD), EL. Ms. Karen Dove, ERD, formatted the tables.

Personnel of the WTHG and the RAG, ERD, implemented the study. The wetlands delineation was a coordinated Federal effort conducted by representatives of the USAED, Vicksburg, Regulatory Branch; the US Fish and Wildlife Service, Vicksburg Field Office; the US Department of Agriculture, Soil Conservation Service; and the US Environmental Protection Agency, Regions 4 and 6. Technical support and quality control were provided by Mr. Russell F. Theriot, Environmental Effects of Dredging Programs, EL, and by consultants Mr. Newling and Mr. Parker.

The work was designed and conducted under the technical supervision of Mr. Ellis J. Clairain, Jr., Leader, WRT; under the direct supervision of Mr. Edward C. Brown, Chief, WTHG; and under the general supervision of Dr. Conrad J. Kirby, Jr., Chief, ERD, and Dr. John Harrison, Chief, EL. Commander and Director of WES was COL Larry B. Fulton, EN. Dr. Robert W. Whalin was Technical Director.

This report should be cited as follows:

Kirchner, W. N., Kleiss, B. A., Clairain, E. J., Jr., Parker, W. B., and Newling, C. 1991. "Delineation of Wetlands of the Yazoo River Basin in Northwestern Mississippi," Miscellaneous Paper El-91-, US Army Engineer Waterways Experiment Station, Vicksburg, MS.

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LIST OF TABLES

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CONVERSION FACTORS, NON-SI TO SI (METRIC) UNITS OF MEASUREMENT

Non-SI units of measurement used in this report can be converted to SI (metric) units as follows:

Multiply	By	To Obtain
acres	4,046.873	square meters
feet	0.3048	meters
inches	2.54	centimeters
miles (US statute)	1.609347	kilometers
square miles	2.589998	square kilometers

I: INTRODUCTION

1. This study was conducted in response to a request from the US Army Engineer District (USAED), Vicksburg, to delineate approximate wetland boundaries as part of the reevaluation of engineering, economic, and environmental aspects of the unconstructed features of the Upper Yazoo River and Steele Bayou Projects.

2. The study was designed to delineate wetlands using as a technical basis the recently published "Federal Manual for Identifying and Delineating Jurisdictional Wetlands" (Federal Interagency Committee for Wetland Delineation (FICWD) 1989). The Manual describes technical criteria, field indicators and methods for identifying and delineating jurisdictional wetlands in the United States. Although the Manual is for the delineation of jurisdictional wetlands, this study was designed to delineate wetlands only for planning purposes, <u>not</u> for jurisdictional purposes. Jurisdictional delineations must be done on a case-by-case basis by careful onsite inspections.

Objectives

3. The objectives of this study were to:

a. Delineate approximate wetland boundaries within the study area using the procedures as outlined in the new "Federal Manual for Identifying and Delineating Jurisdictional Wetlands."

b. Estimate wetland acreage within the study area.

4. This study considered only wetlands and did not address other categories of "special aquatic sites" covered under the Clean Water Act of 1977. Wetlands are defined by the US Environmental Protection Agency (EPA) and the US Army Corps of Engineers (CE) as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (33 USC 1344).

Description of the Yazoo River Basin and Study Area

Yazoo River Basin

5. The Yazoo River Basin is a broad drainage area comprising a physiographic subdivision of the lower Mississippi River Alluvial Valley. The Basin covers 13,400 square miles* (8.6 million acres) in the northwestern quarter of Mississippi (USAED, Vicksburg 1975). It is bordered on the north and east by the Coldwater and Tippah River watersheds and on the west by the Mississippi River main-line levee. The southern boundary is formed by the drainage divide of the Big Black River.

Study Area

6. The study area encompasses 6,600 square miles (4.2 million acres) including all or part of 20 counties within the Yazoo River Basin (Figure 1) in an area commonly referred to as the "Delta". It extends from just below Memphis, TN, to Vicksburg, MS. The eastern boundary is formed by an abrupt hill line (the loessial bluff escarpment) and includes valley areas leading up to the dams of four CE lakes (Arkabutla, Sardis, Enid, and Grenada). Terrain in the Delta is flat with an average slope from north to south of 0.5 ft per mile. While in general the Delta is typically flat, some local relief ranging from 5 to about 25 ft is provided along **point bars,**** **meander scars**, and **natural levees**. Elevations in the northern portion of the study area range from 205 to 210 ft, mean sea level (MSL), and fall to 85 to 90 ft, MSL, in the southern end near Vicksburg. Significant topographic features characteristic of the Delta, in addition to existing riverine systems, are the many abandoned channels, **channel scars** and **oxbow remnants** of earlier Mississippi River beds (USAED, Vicksburg 1975).

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*A table of factors for converting non-SI units of measurement to SI (metric) units is presented on page 4.

**See *Glossary (Appendix A)* for definitions of terms printed in boldface.

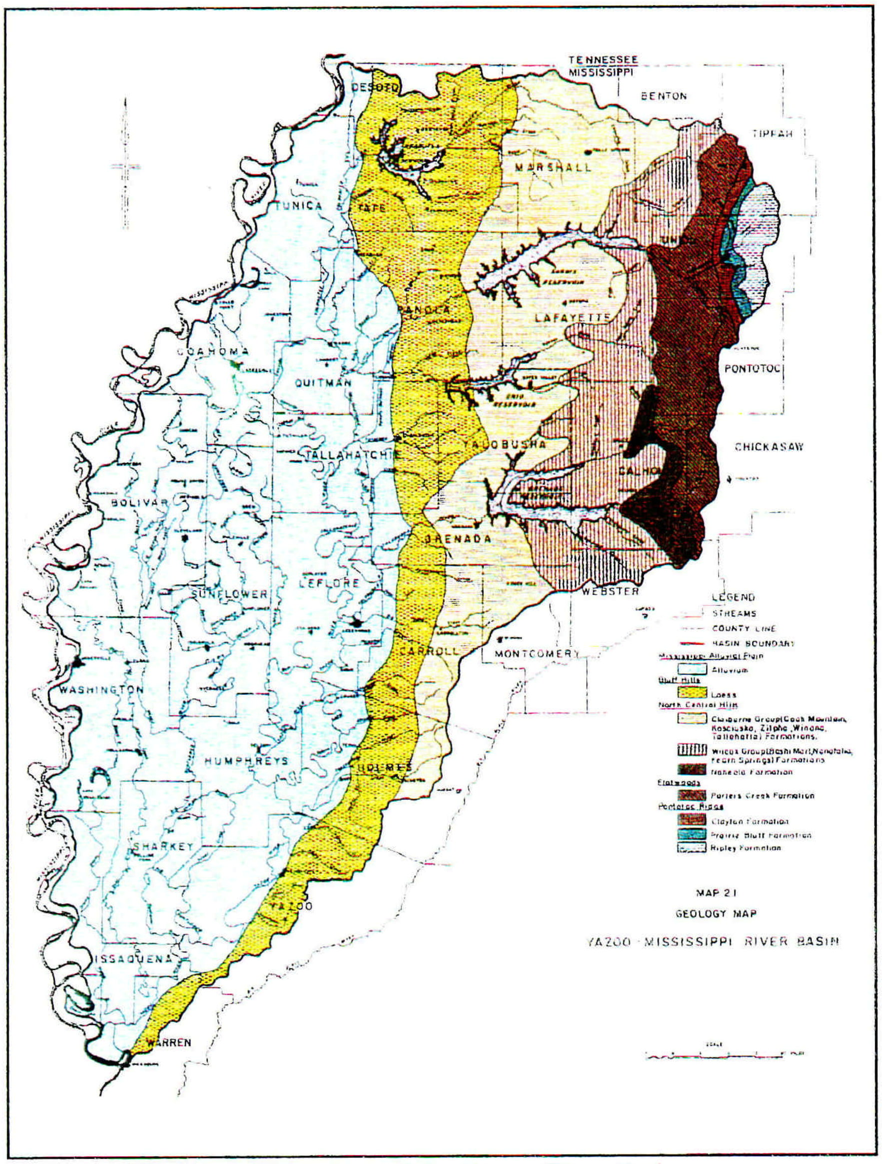

Figure 1. Physiographic regions of the Yazoo River Basin.

Modification of the original hydrology of the river systems in the Basin has been followed by increased flood protection, intensification of agriculture, and clearing of marginal land for crops, especially soybeans. Consequently, by 1975, 55 percent of the Yazoo Basin was intensively cultivated for row crops. The intensively farmed cropland is found primarily in the Delta and, by 1975, approximately 70 percent of that land had been committed to agricultural use (USAED, Vicksburg 1975). Between 1975 and 1985, additional low-lying wetlands and wooded areas were cleared for soybean production. However, such clearing declined sharply following the decline in soybean prices in the late 1970's.

7. Anthropogenic alterations (constructed levees, channel modifications, water control structures and pumping plants) have modified the hydrologic regime of the Basin, directly impacting principal geological forces that shape the land.

8. The climate of the study area is hot and humid. Summers are long and hot with relative humidities averaging 75 percent. Annual precipitation averages 52 in. for the study area, with winter and spring rains (November through April) contributing over 30 in. to the total. Recorded extremes in annual precipitation have ranged from a minimum of 38 in. to a maximum of 70 in. (USAED, Vicksburg 1975). The area falls within the thermic soil temperature regime and the growing season, based on soil temperature, extends from February through October (USDA Soil Survey Staff 1975).

II: METHODS

Background

9. The "Federal Manual for Identifying and Delineating Jurisdictional Wetlands" describes technical criteria, field indicators, and methods for determining the upper boundary of a wetland. For an area to be considered a wetland, it must possess three essential characteristics: (1) hydrophytic vegetation (i.e., plant species typically adapted for life in saturated soils), (2) hydric soils (i.e., soils showing evidence of development under anaerobic conditions that occur during prolonged soil saturation), and (3) wetland hydrology (i.e., periodic or permanent inundation or saturation) (FICWD 1989). Technical criteria (Table 1) are mandatory and must be met for an area to be considered a wetland. The Manual provides methods for determining whether field indicators of hydrophytic vegetation, wetlands hydrology and hydric soils are present in an area. In general, if indicators of all three parameters are present, the area is designated a wetland. Under most circumstances, if any of the three parameters is absent, the area is designated a nonwetland.

Assumptions

10. Early in the planning stages of the study representatives from all of the participating state and federal agencies discussed assumptions about the vegetation, hydrology and soils of the Delta. These assumptions were based on the combined knowledge and field experience of the participants. The assumptions were used to help focus the field sampling effort in order to extract the most useful information from the limited time period available to perform field work. The four primary federal agencies, the US Army Corps of Engineer, the US Environmental Protection Agency, the US Fish and Wildlife Service and the Soil Conservation Service agreed to these assumptions during a meeting held on 5 June 1989.

Vegetation

11. Based on the indicator status listed in the "National List of Plant Species That Occur in Wetlands: Southeast (Region 2)" (Reed 1988), it was agreed that virtually all dominant, native plants that are presently growing in the Delta would be listed as "facultative," "facultative wetland," or "obligate." Therefore, virtually the entire Basin would qualify as having hydrophytic vegetation, and detailed examination of the vegetation would not yield a significant amount of information useful for the delineation of wetlands. This assumption was tested and verified by a cursory examination of the vegetation during the field sampling phase.

12. Although the interagency group agreed that the remaining natural vegetation in the Delta was hydrophytic, it was recognized that cleared agricultural land would be the most prevalent or normal condition for the majority of the study area. Therefore, in accordance with the disturbed area criteria in the Manual, in areas where indicators of hydrology and hydric soils were present, it was necessary to assume that the typical plant community on the cropland prior to agricultural conversion would have met the criteria for hydrophytic vegetation. Observation of wooded areas in close proximity to cleared agricultural land supported this assumption.

Hydrology

13. It was also recognized early in the study that quantitative hydrologic data (such as measurements from ground-water wells, direct evidence of soil saturation, soil oxygen content, redox potential, etc.) were virtually nonexistent for the Delta. Furthermore, given the time constraints of this study, it was not possible to collect quantitative data. Therefore, it was necessary in most situations to use field indicators to determine whether the wetland hydrology criteria were met. The field indicators often noted in the Delta included visual observation of soil saturation, surface water ponding, depth to water tables, water marks on trees, and drift lines.

Table 1

Wetland Criteria

A. The criterion for hydrophytic vegetation is met when, under normal circumstances:

1. more than 50 percent of the composition of dominant species from all strata are **obligate** (OBL), **facultative wetland** (FACW), and/or **facultative** (FAC) species, or

    2. a frequency analysis of all species within the community yields a prevalence index value of less than 3.0 (where OBL = 1.0, FACW = 2.0, FAC = 3.0, **facultative upland** (FACU) = 4.0, and **upland species** (UPL) = 5.0).

B. The criterion for hydric soils is met when the National Technical Committee for Hydric Soils (US Department of Agriculture 1987) criteria for hydric soils are met. These criteria are:

1. all Histosols except Folists; or

2. soils in Aquic suborders, Aquic subgroups, Albolls suborder, Salorthids great group, or Pell great groups of Vertisols that are:

    a. somewhat poorly drained and have a water table less than 0.5 ft from the surface for a significant period (usually a week or more) during the **growing season**, or

    b. poorly drained or very poorly drained and have either:

        (1) water table at less than 1.0 ft from the surface for a significant period (usually a week or more) during the growing season if permeability is equal to or greater than 6.0 in./hr in all layers within 20 in., or
        (2) water table at less than 1.5 ft from the surface for a significant period (usually a week or more) during the growing season if permeability is less than 6.0 in./hr in any layer within 20 in., or

3. soils that are ponded for long duration or very long duration during the growing season; or

4. soils that are frequently flooded for long duration or very long duration during the growing season.

C. Wetland hydrology criterion is met when an area is saturated to the surface or inundated at some point in time during an average rainfall year, as defined below.

1. Saturation to the surface normally occurs when soils in the following natural drainage classes meet the following conditions:

    a. in somewhat poorly drained mineral soils, the water table is less than 0.5 ft from the surface for usually a week or more during the growing season, or

    b. in low permeabilities (<6.0 in./hr), poorly drained or very poorly drained mineral soils, the water able is less than 1.5 ft from the surface for usually a week or more during the growing season, or

    c. in more permeable (greater than or equal to 6.0 in./hr), poorly drained or very poorly drained mineral soils, the water table is less than 1.0 ft from the surface for usually a week or more during the growing season, or

    d. in poorly drained or very poorly drained organic soils, the water table is usually at a depth where saturation to the surface occurs more than rarely.

2. An area is inundated at some time if ponded or frequently flooded with surface water for 1 week or more during the growing season.

Source: Federal Manual for Identifying and Delineating Jurisdictional Wetlands (FICWD 1989).

14. A confounding factor influencing the hydrology was the existence of extensive drainage and flood protection works, both Federal and private. It was agreed that surface waters could often be managed adequately to reduce the duration of inundation from ponding or flooding. However, due to the high annual rainfall and the low natural permeability of the alluvial soils, it was suspected that some surface water ponding would still occur, even with drainage projects. It was also believed that surface drainage systems would not have a significant impact on ground-water hydrology in sites with heavy clay soils that usually have poor internal drainage (i.e., "tight" soils). Therefore, as quantitative hydrology information was not available, a conservative approach was taken and it was assumed that wetland hydrology continued to exist in most of the "tight" alluvial soils, despite recent changes in hydrology due to drainage projects.

Soils

15. Given the scope of the project (4.2 million acres) and the recognized limitations of using vegetation and hydrology for wetland delineation purposes, it was suggested that the most expeditious and accurate means to locate and estimate the acreage of wetlands was to use Soil Conservation Service (SCS) county soil maps. Information on the hydric status of soil series was available from "Hydric Soils of the United States" (US Department of Agriculture 1987), and maps and information on acreages were available through the local SCS office. However, field sampling was needed to verify the concept that soil mapping delineations were good indicators of wetland boundaries in the Delta.

16. To facilitate and focus the field effort, soil capability subclasses were used to establish three soil groups: nonwetland soils, wetland soils, and undetermined soils. Nonwetland soils were those soils with a capability class of 1 or 2 or capability subclass of e or s. Wetland soils were those soils with a capability subclass of 4w or 5w. Soils with a capability subclass of 3w were put in the undetermined group. These undetermined units were assumed to include both hydric and nonhydric soils and were, therefore, the primary focus of the sampling effort. The agencies involved also thought that as the sampling effort focused on these soils, patterns would develop to split the 3w soils into their hydric and nonhydric components, and the sampling effort would be adjusted as the data became available.

Preliminary Data Collection

17. Preliminary identification of areas with hydric soils was made by comparing the SCS's soil survey for each of the 20 counties within the study area with "Hydric Soils of the United States" (US Department of Agriculture 1987). Topographic maps, soil surveys, and color and infrared aerial photography were used in conjunction with field reconnaissance to develop familiarity with the hydrology, soil types, and vegetation in the study area. Based on this preliminary characterization, a delineation approach was selected and a sampling protocol was finalized.

18. Eight counties (Bolivar, Coahoma, Humphrey, Leflore, Quitman, Sharkey, Tallahatchie, and Washington) were selected for sampling. These counties reflected hydrologic characteristics of both the northern and southern portions of the study area. As these counties contained almost all the soil mapping units found in the Delta, results on the relationship between soil type and wetland occurrence were extrapolated to the remainder of the study area.

19. Four field teams were formed from an interagency group of trained and experienced wetland specialists, wetland ecologists, and soil scientists. In addition to the four teams, a quality control team was assembled to provide oversight responsibility, analyze results, and ensure consistency among the four teams. A listing of the field teams, quality control staff, and their agency affiliations is given in Appendix B.

Collection of Field Data

20. Field data were collected by (1) using point samples placed within specific soil mapping units or (2) establishing transects that crossed several different soil mapping units. The sampling points were located in areas representative of the different soil mapping units. Where mapping units were homogeneous along transects, sampling intensity was reduced.

21. At each observation point, the vegetation, soils, and hydrology were characterized and documented on a data form. Vegetation was sampled by visually selecting the dominant species. Hydrologic field indicators were noted and recorded when present. Soil mapping units were verified by the SCS soil scientists by observing soil profiles in holes 48 to 60 inches deep. When soil scientists were unavailable, soils were examined for hydric soil indicators by digging a hole approximately 18 inches deep or by using a soil auger.

III: RESULTS AND DISCUSSION

22. Wetland boundary determinations were made on 275 sites distributed among the eight counties. Based on this sample the quality control team compared soil characteristics with field determinations of wetland and nonwetland areas and determined that utilization of SCS soil map units for wetland delineation in the Delta was adequate. Results were extrapolated to other counties in the study area, and wetland acreage was calculated based on soil mapping units.

Vegetation

23. The assumptions concerning hydrophytic vegetation were found to be valid. In no instance where natural vegetation was still present was an area determined to not be a wetland based on vegetation; all naturally vegetated sites supported a prevalence of hydrophytic vegetation. However, subtle differences were noted in many plant communities from site to site. For example, wetland plant communities on ridges and well-drained areas were different from those found in lower, less well-drained areas, but they still satisfied the criteria for hydrophytic vegetation.

Hydrology

24. Assumptions concerning hydrology in the study area, specifically, whether ground water levels have been impacted significantly by drainage projects, could not be addressed conclusively. An effort was made to obtain quantitative information, but only one site was located which had a ground water well in a wetland area. This well had only recently been installed, so it could not be used to determine long-term impacts of drainage projects. Although casual observations suggested that the water table has been lowered in portions of the Delta, there was no strong evidence (i.e., plant succession progressing toward upland species, development of bright mottles, etc.) suggesting that the wetland hydrology criteria are no longer met. The conclusion of the interagency group was to assume that in areas with heavy clay soil, ground water continues to be at or very near the surface for a considerable period of the growing season.

25. It was evident that ditching and grading have altered the duration of inundation, especially on the higher areas. The effect of these activities in lower areas was less obvious; however, evidence suggested that these lands have retained their wetland hydrology characteristics. Long-term quantitative data from ground water wells and water level recorders in many wetlands in several different soil types are needed to resolve the uncertainty concerning hydrology in the study area.

Soils

26. Supported by field observation, a rationale was developed for classifying the soils within the Delta as hydric or nonhydric. A list of hydric soil mapping units by county for the entire Yazoo Basin, including those listed in "Hydric Soils of the United States" (US Department of Agriculture 1987), was furnished by the SCS along with data on capability class and subclass, flooding, slope, and depth to water table. Each mapping unit was reviewed according to the criteria (flooding, ponding, and depth to high water table) listed in the Manual (FICWD 1989) and was assigned a wetland or nonwetland classification. Most of the soils examined in the Delta clearly fit into either the hydric or nonhydric classification presented in "Hydric Soils of the United States" (US Department of Agriculture 1987).

27. All soils with capability class and subclass of 1 or 2, meeting all other nonhydric soil criteria, were placed in the nonwetland category. Examples of nonhydric soil series in the Basin were Beulah, Bosket, Bowdre, Commerce, Crevasse, Dubbs, Dundee, Falaya, Ina, Pearson, and Robinsonville. Although these soil series are considered nonhydric, an onsite inspection of any area mapped as these series might disclose localized conditions such as hydric inclusions or incorrect mapping that would justify calling that site a jurisdictional wetland for regulatory purposes.

28. Those soil series that were considered hydric in all phases and all mapping units were Alligator, Calhoun/Bonn Complex, Dowling,

Rosebloom, Sharkey, Souve, and Waverly. Sites with these soil series were considered wetlands. Again, it was recognized that an onsite inspection of any area with these soil series might disclose localized conditions such as nonhydric inclusions or incorrect mapping that would justify calling that site a nonwetland for regulatory purposes.

29. From the outset of the field investigation, however, it was clear that certain soil series did not always support wetlands, even though they were classified as hydric in "Hydric Soils of the United States" (USDA 1987). The Forestdale, Tunica, and Brittain series presented the most problems. As anticipated, these soils have a 3w capability subclass. They occupy large acreages, and were all mapped prior to the publication of Soil Taxonomy (US Department of Agriculture Soil Survey Staff 1975). Furthermore, the series covered two drainage classes, poorly drained and somewhat poorly drained.

30. Forestdale mapping units were examined at 86 sites in eight counties; Tunica at 25 sites in four counties; and Brittain at 7 sites in one county. Each of the mapping units within these series was reviewed and a decision was made whether it should be considered hydric. Decisions were made in coordination with SCS soil scientists and were based on data collected during this study. Sloping phases with coarser or better drained surface textures were found to be nonhydric for the purposes of this study. Finer textured, level to nearly level phases of soils generally were found to be hydric. Accordingly, the Forestdale silt loams and coarser textured phases and all sloping phases of Forestdale were listed as nonhydric. All Forestdale mapping units with silty clay loam and finer textures on level and nearly level slopes were listed as hydric. Sloping phases of Tunica with surface textures of silty clay loams and coarser were listed as nonhydric. The silty clay and finer textured phases of Tunica on level and nearly level slopes were listed as hydric. Brittain mapping units on level and nearly level slopes were listed as hydric. Sloping phases of Brittain were listed as nonhydric. A summary of these divisions is given in Table 2.

31. Field observations revealed several major reasons for the presence of both hydric and nonhydric mapping units within a soil series with the 3w capability subclass. First, in the period of over two decades during which most of the soil mapping was completed in the Yazoo Basin, soil science has progressed in its understanding of soil morphology and classification. With this progress, revisions have been made continuously in the classification and mapping of these soils. Each revision improved the understanding of the soils, but has tended to render earlier mapping efforts obsolete to one degree or another. Thus, the results of onsite inspections based on current soil science were not always consistent with the soil map of the site. Correct interpretation of these situations has to be based on actual site conditions viewed from the current understanding of soil taxonomy.

32. The Forestdale series is an example of a soil that has seen substantial revision. Originally, the series encompassed two drainage classes, poorly drained and somewhat poorly drained. Soils series are now mapped only within a single drainage class. What is particularly difficult in this case is that the split between poorly drained and somewhat poorly drained is normally an excellent break between those soils that are hydric and those that are not. According to current, revised concepts all Forestdale soils are poorly drained and in the Delta are hydric. Those somewhat poorly drained areas previously mapped as Forestdale would now be some other series and would, for the most part, be classified as nonhydric.

33. Brittain is also an example of a Yazoo Basin soil series that originally was described across two drainage classes, poorly drained and somewhat poorly drained. In this case, however, the Brittain description was so broad and the two extremes were of sufficient difference that Brittain was dropped as an active series, and any areas so mapped would now be reclassified to totally different series. The poorly drained portion of Brittain would now likely be classified as Amagon, which is hydric. The somewhat poorly drained portion was nonhydric.

34. A second major reason for the presence of hydric and nonhydric phases of the same series was drainage efforts. As noted previously, surface drainage or agricultural water management systems have had the desired effect of removing excess water, particularly from soils with somewhat coarser

Table 2

Soil Series in the Yazoo Basin Determined to Have Internal Separations Between Hydric and Nonhydric Mapping Units

Soil Mapping Unit	Status	Basis for Decision
Brittain silt loam, nearly level phase	Hydric	D
Brittain silt loam, gently sloping phase	Non-hydric	C
Brittain silty clay loam, nearly level phase	Hydric	D
Brittain silty clay loam, gently sloping phase	Non-hydric	C
Forestdale very fine sandy loam, nearly level phase	Non-hydric	A
Forestdale silt loam, level phase	Non-hydric	A
Forestdale silt loam, 0-2% slopes	Non-hydric	A
Forestdale silt loam, nearly level phase	Non-hydric	A
Forestdale silty clay loam, 0-2% slopes	Hydric	B
Forestdale silty clay loam, nearly level phase	Hydric	B,D
Forestdale silty clay loam, gently sloping phase	Non-hydric	C
Forestdale silty clay, nearly level phase	Hydric	B,D
Forestdale silty clay, gently sloping phase	Non-hydric	C
Tunica silty clay loam, 0-2% slopes	Non-hydric	A
Tunica silty clay, 0-2% slopes	Hydric	B,D
Tunica silty clay, gently sloping phase	Non-hydric	C
Tunica clay, 0-2% slopes	Hydric	B,D

A = non-hydric due to coarser surface texture.
B = hydric due to finer surface texture.
C = non-hydric due to slope.
D = hydric due to lack of slope.

or better drained surface horizons. In some cases, the land surface had been physically levelled. Land leveling makes soil interpretation very difficult due to altered horizons (e.g., shaving off or burying the original surfaces); in combination with well-positioned ditches it is also effective in removing surface water from soils that historically were probally quite wet. What must be considered in these situations is whether or not the changes have altered the hydrology such that the hydrology criteria are no longer met. It was considered that those mapping units with coarser surface textures were most likely to be influenced by these drainage projects.

IV: CONCLUSIONS

35. Based on field observations at 275 sites and extrapolation from soil survey maps, approximately 69 percent (2,922,962 acres) of the study area was determined to be wetlands. Acreage by county is shown in Table 3. Additional data and research are needed to characterize certain physical parameters (e.g., elevation, hydroperiod, and depth to water table) and correlate these physical parameters to soil type. Such additional data could lead to further refinement of the wetland acreages and provide more effective and consistent wetland boundary determinations in the Delta. Soils information is being digitized as part of another study for inclusion in a geographic information system. The digitized information will provide map displays of wetland locations and refined wetland acreages. These maps will be useful for project planning but will not substitute for field inspection for regulatory decisions.

36. Appendix C includes information for all soil types mapped in each of the 20 counties. Table 4 contains baseline data including soil series name, capability class, flooding potential, range in depth to water table, and acreage, for each hydric mapping unit in the Delta and should prove to be useful in wetland inventories throughout the Mississippi River Alluvial Plain. It is based on the rationale developed from the field work and the combined expertise of the participants.

Table 3

Wetland Acreage by County

County	Wetland Acres	Total Acres	Percent of County*
Bolivar	382,089	586,880	65.1
Carroll	18,520	408,320	4.5
Coahoma	168,397	364,800	46.2
DeSoto	11,990	283,520	4.2
Grenada	34,133	277,120	12.3
Holmes	67,527	139,126	48.5
Humphreys	212,287	262,400	80.9
Issaquena	182,070	265,240	68.6
Leflore	237,139	376,320	63.0
Panola	31,288	438,400	7.1
Quitman	186,209	263,680	70.6
Sharkey	221,130	279,040	79.2
Sunflower	272,775	443,520	61.5
Tallahatchie	147,025	412,160	35.7
Tate	9,111	245,120	3.7
Tunica	144,687	293,120	49.4
Warren	121,360	362,240	33.5
Washington	300,160	465,520	64.5
Yalobusha	13,405	315,520	4.2
Yazoo	159,900	600,320	26.6
TOTAL	2,921,202		

*Based on the total county area and not the area confined to the study area (4.2 million acres).

Table 4

USDA, Soil Conservation Service
Hydric Soils Information Summary

Map Symbol	Soil Series Map Unit Name	Capability Class	Annual Flood	Range of Depth to Seasonal High Water Table (feet)	Acres	Percent
Bolivar County:						
Aa	Alligator clay, level phase	3W	Rare	0.50-2.00	810	0.1
Ab	Alligator clay, nearly level phase	3W	Rare	0.50-2.00	28,593	4.9
Ac	Alligator clay, gently sloping phase	3E	Rare	0.50-2.00	1042	0.2
Ad	Alligator silty clay, level phase	3W	Rare	0.50-2.00	227	<0.1
Ae	Alligator silty clay, nearly level phase	3W	Rare	0.50-2.00	7104	1.2
Ag	Alligator silty clay, gently sloping phase	3E	Rare	0.50-2.00	337	0.1
Ah	Alligator silty clay loam, nearly level phase	3W	Rare	0.50-2.00	1311	0.2
Bd	Brittain silty loam, nearly level phase (Forestdale)	3W	Rare	0.50-2.00	14,840	2.5
Dc	Dowling clay (Sharkey)	5W	Freq	0.00-2.00	80,563	13.7
Dd	Dowling soils, overwash phases (Sharkey)	5W	Freq	0.00-2.00	23,698	4.0
Fc	Forestdale silty clay, nearly level phase	3W	Rare	0.50-2.00	3198	0.5
Fe	Forestdale silty clay loam, nearly level phase	3W	Rare	0.50-2.00	27,136	4.6
Fh	Forestdale soils, nearly level phase	3W	Rare	0.50-2.00	1244	0.2
Sa	Sharkey clay, level phase	3W	Rare	0.00-2.00	10,619	1.8
Sb	Sharkey clay, nearly level phase	3E	Rare	0.00-2.00	106,490	18.1
Sc	Sharkey clay gently sloping phase	3E	Rare	0.00-2.00	604	0.1
Sd	Sharkey silty clay, level phase	3W	Rare	0.00-2.00	484	0.1
Se	Sharkey silty clay, nearly level phase	3E	Rare	0.00-2.00	47,893	8.2
Sg	Sharkey silty clay, gently sloping phase	3E	Rare	0.00-2.00	490	0.1
Sh	Sharkey silty clay loam, nearly level overwash phase	3E	Rare	0.00-2.00	1545	0.3
Sk	Sharkey very fine sandy loam, nearly level, overwash phase	3E	Rare	0.00-2.00	824	0.1
Sm	Sharkey-Clack soils, nearly level phases (Sharkey, Crevasse)	3E	Rare	0.00-2.00	3242	0.6
Sm	Sharkey-Clack soils, nearly level phases (Sharkey, Crevasse)	4S	Rare	3.50-6.00	*	*
Sn	Sharkey-Clack soils, gently sloping phase (Sharkey, Crevasse)	3E	Rare	0.00-2.00	847	0.1
Sn	Sharkey-Clack soils, gently sloping phase (Sharkey, Crevasse)	4S	Rare	3.50-6.00	*	*
So	Souva Soils (Sharkey)	5W	Freq	0.00-2.00	1163	0.2
Ta	Tunica silty clay, nearly level phase	3W	Rare	1.50-3.00	16,086	2.7
Wa	Waverly silt loam, local alluvium phase (Sharkey)	5W	Freq	0.00-2.00	1699	0.3
	Total				382,089	65.1%
Carroll County:						
17	Chenneby-Arkabutla Association, frequently flooded	4W	Freq	1.00-2.50	5300	1.3
20	Alligator silty clay	3W	Rare	0.50-2.00	770	0.2
22	Arkabutla silt loam, frequently flooded	4W	Freq	1.00-1.50	1960	0.5
23	Chenneby silt loam, frequently flooded	4W	Freq	1.00-2.50	2150	0.5
27	Sharkey clay, frequently flooded	5W	Freq	0.00-2.00	2340	0.6
300	Sharkey clay, ponded	5W	Freq	0.00-2.00	6000	1.5
	Total				18,520	4.5%
Coahoma County:						
Aa	Alligator clay, level phase	3W	Rare	0.50-2.00	7070	1.9
Ab	Alligator clay, nearly level phase	3W	Rare	0.50-2.00	30,432	8.3
Ac	Alligator clay, gently sloping phase	3E	Rare	0.50-2.00	362	0.1

Ad	Alligator silty clay, level phase	3W	Rare	0.50-2.00	379	0.1
Ae	Alligator silty clay, nearly level phase	3W	Rare	0.50-2.00	2163	0.6
Ck	Crevasse soils, nearly level phases (Bruno)	5W	Freq	4.00-6.00	525	0.1
Da	Dowling clay (Sharkey)	4W	Occas	0.00-2.00	34,689	9.5
Db	Dowling soils (Sharkey)	4W	Occas	0.00-2.00	18,475	5.1
Fc	Forestdale silty clay, level phase	3W	Rare	0.50-2.00	1349	0.4
Fd	Forestdale silty clay, nearly level phase	3W	Rare	0.50-2.00	13,539	3.7
Fg	Forestdale silty clay loam, level phase	3W	Rare	0.50-2.00	540	0.1
Fh	Forestdale silty clay loam, nearly level phase	3W	Rare	0.50-2.00	17,325	4.8
Sa	Sharkey clay, level phase	3W	Rare	0.00-2.00	7613	2.1
Sb	Sharkey silty clay, nearly level phase	3E	Rare	0.00-2.00	21,658	5.9
Sb	Sharkey clay, nearly level phase	3E	Rare	0.00-2.00	1792	0.5
Sb	Sharkey silty clay, nearly level phases	3E	Rare	0.00-2.00	*	*
Sb	Sharkey clay, nearly level phase	3E	Rare	0.00-2.00	*	*
Sc	Sharkey clay, nearly level phase, shallow over sand	3E	Rare	0.00-2.00	120	<0.1
Sd	Sharkey silty clay, gently sloping phase	3E	Rare	0.00-2.00	679	0.2
Sd	Sharkey clay, gently sloping phase	3E	Rare	0.00-2.00	147	<0.1
Sd	Sharkey silty clay, gently sloping phase	3E	Rare	0.00-2.00	*	*
Sd	Sharkey clay, gently sloping phase	3E	Rare	0.00-2.00	*	*
Se	Sharkey silt loam, nearly level overwash phase	3E	Rare	0.00-2.00	267	0.1
Sg	Sharkey silty clay, level phase	3W	Rare	0.00-2.00	196	0.1
Sm	Sharkey-Clack soils, nearly level phase (Sharkey, Bruno)	4W	Occas	0.00-2.00	679	0.2
Sm	Sharkey-Clack soils, nearly level phase (Sharkey, Bruno)	3S	Occas	4.00-6.00	*	*
Sn	Sharkey-Clack soils, gently sloping phase (Sharkey, Bruno)	4W	Occas	0.00-2.00	366	0.1
Sn	Sharkey-Clack soils, gently sloping phases (Sharkey, Bruno)	3S	Occas	4.00-6.00	*	*
So	Souva silt loam (Forestdale)	3W	Rare	0.50-2.00	1645	0.5
Ta	Tunica silty clay, nearly level phase	3W	Rare	1.50-3.00	6387	1.8
	Total				168,397	46.2%

De Soto County:

Aa	Alligator clay, nearly level phase	3W	Rare	0.50-2.00	466	0.2
Da	Dowling clay (Sharkey)	4W	Occas	0.00-2.00	1930	0.7
Db	Dowling soils (Sharkey)	4W	Occas	0.00-2.00	2171	0.8
Fc	Falaya and waverly silt loams, local alluvium phases (Arkabutla and Rosebloom)	4W	Freq	1.00-1.50	358	0.1
Fc	Falaya and waverly silt loams, local alluvium phases (Arkabutla and Rosebloom)	5W	Freq	0.00-1.00	*	*
Fd	Forestdale silty clay loam, nearly level phase	3W	Rare	0.50-2.00	1476	0.5
Sa	Sharkey clay, nearly level phase	3E	Rare	0.00-2.00	3066	1.1
Sb	Sharkey clay, level phase	3W	Rare	0.00-2.00	1697	0.6
Sc	Sharkey very fine sandy loam, very gently sloping overwash phase	3E	Rare	0.00-2.00	234	0.1
Wa	Waverly silty clay loam (Rosebloom)	5W	Freq	0.00-1.00	592	0.2
	Total				11,990	4.2%

Grenada County:

AT	Alligator association	5W	Freq	0.50-2.00	2790	1.0
Ac	Alligator clay	3W	Rare	0.50-2.00	416	0.1
Ad	Alligator clay, depressional	5W	Freq	0.50-2.00	381	0.1
As	Alligator silty clay loam	3W	Rare	0.50-2.00	1389	0.5
FC	Falaya-Collins Association	4W	Freq	1.00-2.00	6220	2.2
Fo	Forestdale silty clay loam	3W	Rare	0.50-2.00	337	0.1
WF	Waverly-Falaya Association	5W	Freq	0.50-1.00	12,900	4.7
WF	Waverly-Falaya Association	4W	Freq	1.00-2.00	*	*
Ws	Waverly silt loam	3W	Occas	0.50-1.00	9700	3.5
	Total				34,133	12.3%

Holmes County:

14	Sharkey clay, occasionally flooded	4W	Occas	0.00-2.00	14,484	11.0
16	Sharkey clay, depressional	4W	Occas	0.00-2.00	7635	5.8

17	Sharkey silty clay loam, occasionally flooded	4W	Occas	0.00-2.00	5147	3.9
21	Sharkey clay, frequently flooded	5W	Freq	0.00-2.00	25,748	19.6
28	Forestdale silty clay loam, 0 to 2 percent slopes	3W	Rare	0.50-3.50	10,279	7.8
45	Adler and Bruno soils, frequently flooded	4W	Freq	2.00-3.00	4234	3.2
	Total				67,527	51.4%

Humphreys County:

	Swamp	5W	Freq		2871	1.1
Aa	Alligator clay, level phase	3W	Rare	0.50-2.00	16,016	6.1
Ab	Alligator clay, level overflow phase	5W	Freq	0.50-2.00	1586	0.6
Ac	Alligator clay, nearly level phase	3W	Rare	0.50-2.00	68,045	25.9
Ad	Alligator clay, nearly level overflow phase	5W	Freq	0.50-2.00	5247	2.0
Ae	Alligator clay, gently sloping phase	3E	Rare	0.50-2.00	1546	0.6
Ag	Alligator silty clay loam, nearly level phase	3W	Rare	0.50-2.00	9594	3.7
Ah	Alligator silty clay loam, nearly level overflow phase	5W	Freq	0.50-2.00	1495	0.6
Ak	Alligator silty clay loam, gently sloping phase	3E	Rare	0.50-2.00	224	0.1
Am	Alligator-Dowling clays, overflow phase (Alligator, Alligator)	5W	Freq	0.50-2.00	11,056	4.2
An	Alligator, Dowling, and Forestdale soils, overflow phases (Alligator, Alligator, Forestdale)	5W	Freq	0.50-2.00	20,398	7.8
Da	Dowling clay (Alligator)	4W	Occas	0.50-2.00	21,914	8.3
Db	Dowling clay, overflow phase (Alligator)	5W	Freq	0.50-2.00	6317	2.4
Dc	Dowling soils (Alligator)	4W	Occas	0.50-2.00	8378	3.2
Dd	Dowling soils, overflow phases (Alligator)	5W	Freq	0.50-2.00	1420	0.5
Fa	Forestdale silty clay, nearly level phase	3W	Rare	0.50-2.00	5275	2.0
Fc	Forestdale silty clay loam, level phase	3W	Rare	0.50-2.00	1017	0.4
Fd	Forestdale silty clay loam, nearly level phase	3W	Rare	0.50-2.00	24,008	9.2
Fe	Forestdale silty clay loam, nearly level overflow phase	5W	Freq	0.50-2.00	2679	1.0
Fg	Forestdale silty clay loam, nearly level shallow phase	3W	Rare	0.50-2.00	893	0.3
Fk	Forestdale silty clay loam, gently sloping overflow phase	5W	Freq	0.50-2.00	1291	0.5
Fn	Forestdale silt loam, nearly level overflow phase	5W	Freq	0.50-2.00	747	0.3
Ia	Iberia clay (Sharkey)	3E	Rare	0.00-2.00	270	0.1
	Total				212,287	80.9%

Issaquena County:

Da	Dowling clay (Sharkey)	4W	Occas	0.00-2.00	31,813	12.0
Db	Dowling soils (Sharkey)	4W	Occas	0.00-2.00	1485	0.6
Fd	Forestdale silty clay loam, 0 to 2 percent slopes	3W	Rare	0.50-2.00	380	0.1
Sa	Sharkey clay, 0 to 1 percent slopes	3W	Rare	0.00-2.00	740	0.3
Sb	Sharkey clay, 0 to 2 percent slopes	3E	Rare	0.00-2.00	23,375	8.8
Sc	Sharkey clay, 2 to 5 percent slopes	3E	Rare	0.00-2.00	910	0.3
Se	Sharkey silty clay loam, 0 to 2 percent slopes	3E	Rare	0.00-2.00	9025	3.4
Sf	Sharkey fine sandy loam, overwash, 0 to 2 percent slopes	3E	Rare	0.00-2.00	865	0.3
Sk	Sharkey silt loam, overwash, 0 to 2 percent slopes	3E	Rare	0.00-2.00	2380	0.9
Sr	Sharkey and Dowling clays (Sharkey, Sharkey)	5W	Freq	0.00-2.00	95,177	35.8
Sr	Sharkey and Dowling clays (Sharkey, Sharkey)	5W	Freq	0.00-2.00	*	*
Ta	Tunica clay, 0 to 2 percent slopes	3W	Rare	1.50-3.00	15,920	6.0
	Total				182,070	68.6%

LeFlore County:

Aa	Alligator clay, level phase	3W	Rare	0.50-2.00	7983	2.1
Ab	Alligator clay, level overflow phase	5W	Freq	0.50-2.00	66	<0.1
Ac	Alligator clay, nearly level phase	3W	Rare	0.50-2.00	61,955	16.5
Ad	Alligator clay, nearly level overflow phase	5W	Freq	0.50-2.00	8772	2.3
Ae	Alligator clay, gently sloping phase	3E	Rare	0.50-2.00	3536	0.9
Af	Alligator silt loam, overwash phase	5W	Freq	0.50-2.00	694	0.2

Ag	Alligator silty clay loam, nearly level phase	3W	Rare	0.50-2.00	17,545	4.7
Ah	Alligator silty clay loam, gently sloping phase	3E	Rare	0.50-2.00	836	0.2
Ak	Alligator and Dowling clays, overflow phases (Alligator, Alligator)	5W	Freq	0.50-2.00	21,611	5.7
Am	Alligator, Dowling, and Forestdale soils (Alligator, Alligator, Forestdale)	3E	Rare	0.50-2.00	5094	1.4
An	Alligator, Dowling, and Forestdale soils, overflow phases (Alligator, Alligator, Forestdale)	5W	Freq	0.50-2.00	2338	0.6
Ao	Alligator-Forestdale soils, gently sloping phase	3E	Rare	0.50-2.00	1103	0.3
Ap	Alligator-Forestdale soils, sloping phases	3E	Rare	0.50-2.00	228	0.1
Ar	Alligator-Forestdale soils, strongly sloping phases	3E	Rare	0.50-2.00	95	<0.1
Da	Dowling clay (Alligator)	4W	Occas	0.50-2.00	37,793	10.0
Db	Dowling soils (Alligator)	3W	Rare	0.50-2.00	19,604	5.2
Fd	Falaya-Ina-Collins soils (Falaya, Adler, Adler)	4W	Freq	1.00-2.00	5217	1.4
Fg	Forestdale silty clay, nearly level phase	3W	Rare	0.50-2.00	76	<0.1
Fh	Forestdale silty clay loam, nearly level phase	3W	Rare	0.50-2.00	28,967	7.7
Fk	Forestdale silty clay loam, nearly level moderately shallow phase	3W	Rare	0.50-2.00	817	0.2
Fm	Forestdale silty clay loam, nearly level overflow phase	5W	Freq	0.50-2.00	1178	0.3
Sa	Sandy alluvial land (Crevasse)	5W	Freq	3.50-6.00	1358	0.4
Sb	Swamp	5W	Freq		10,178	2.7
Wa	Waverly soils, local alluvium phases	3W	Occas	0.50-1.00	95	<0.1
	Total				237,139	63.0%

Panola County:

Aa	Alligator clay, 0 to 1/2 percent slopes	3W	Rare	0.50-2.00	7470	1.7
Ab	Alligator clay, 1/2 to 2 percent slopes	3W	Rare	0.50-2.00	1145	0.3
Ac	Alligator silt loam, overwash, 1/2 to 2 percent slopes	3W	Rare	0.50-2.00	530	0.1
Ad	Alligator silty clay loam, 0 to 1/2 percent slopes	3W	Rare	0.50-2.00	7935	1.8
Ae	Alligator silty clay loam, 1/2 to 2 percent slopes	3W	Rare	0.50-2.00	2365	0.5
Do	Dowling silty clay and clay (Alligator)	4W	Occas	0.50-2.00	2020	0.5
Fw	Falaya and Waverly silt loams	4W	Freq	1.00-2.00	4670	1.1
Wa	Waverly silt loam	5W	Freq	0.50-1.00	5153	1.2
	Total				31,288	7.1%

Quitman County:

	Swamps	5W	Freq		5120	1.9
Aa	Alligator clay, level phase	3W	Rare	0.50-2.00	16,252	6.2
Ab	Alligator clay, gently sloping phase	3E	Rare	0.50-2.00	1625	0.6
Ac	Alligator silty clay, nearly level phase	3W	Rare	0.50-2.00	21,940	8.3
Ad	Alligator silty clay, gently sloping phase	3E	Rare	0.50-2.00	813	0.3
Ae	Alligator and Dowling clays (Sharkey)	5W	Freq	0.50-2.00	23,378	8.9
Ag	Alligator and Sharkey clays, nearly level phases	3W	Rare	0.50-2.00	14,632	5.5
Ah	Alligator and Sharkey clays, gently sloping phases	3E	Rare	0.50-2.00	1620	0.6
Be	Brittain silt loam, nearly level phase (Amagon)	3W	Rare	1.00-2.00	4575	1.7
Bh	Brittain silty clay loam, nearly level phase (Amagon)	3W	Rare	1.00-2.00	5630	2.1
Bm	Brittain soils-waverly soils, local alluvium phases (Amagon, Rosebloom)	3W	Rare	1.00-2.00	7604	2.9
Da	Dowling clay and silty clay (Sharkey)	4W	Occas	0.00-2.00	36,860	14.0
Fe	Forestdale silty clay loam, nearly level phase	3W	Rare	0.50-2.00	25,743	9.8
Sc	Sharkey silt loam, nearly level overwash phase	3E	Rare	0.00-2.00	190	0.1
Sd	Sharkey silty clay, nearly level phase	3E	Rare	0.00-2.00	13,720	5.2
Se	Sharkey silty clay, gently sloping phase	3E	Rare	0.00-2.00	430	0.2
Sg	Souva silt loam, nearly level phase (Sharkey)	3E	Rare	0.00-2.00	768	0.3
Sh	Souva silt loam, gently sloping phase (Sharkey)	3E	Rare	0.00-2.00	192	0.1
Ta	Tunica silty clay, nearly level phase	3W	Rare	1.50-3.00	2957	1.1
Wa	Waverly soils, depressional phases (Rosebloom)	3W	Occas	0.00-1.00	2160	0.8
	Total				186,209	70.6%

Sharkey County:

Aa	Alligator clay, 0 to 1/2 percent slopes	3W	Rare	0.50-2.00	6325	2.3
Ab	Alligator clay, 1/2 to 2 percent slopes	3W	Rare	0.50-2.00	25,100	9.0
Ac	Alligator clay, overflow, 0 to 2 percent slopes	5W	Freq	0.50-2.00	560	0.2
Ae	Alligator silty clay loam, 0 to 2 percent slopes	3W	Rare	0.50-2.00	1395	0.5
Da	Dowling Clay (Sharkey)	4W	Occas	0.00-2.00	11,765	4.2
Db	Dowling Soils, (Sharkey)	4W	Occas	0.00-2.00	4700	1.7
Fd	Forestdale silty clay loam, 0 to 2 percent slopes	3W	Rare	0.50-2.00	9800	3.5
Sa	Sharkey clay, 0 to 1/2 percent slopes	3W	Rare	0.00-2.00	20,385	7.3
Sb	Sharkey clay, 1/2 to 2 percent slopes	3E	Rare	0.00-2.00	38,205	13.7
Sd	Sharkey clay, overflow, 0 to 2 percent slopes	5W	Freq	0.00-2.00	1410	0.5
Se	Sharkey silt loam, overwash, 0 to 2 percent slopes	3E	Rare	0.00-2.00	300	0.1
Sk	Sharkey silty clay loam, 0 to 2 percent slopes	3E	Rare	0.00-2.00	770	0.3
Sr	Sharkey, Alligator, and Dowling soils (Sharkey, Alligator, Sharkey)	5W	Freq	0.00-2.00	95,000	34.0
Ta	Tunica clay, 0 to 2 percent slopes	3W	Rare	1.50-3.00	5415	1.9
	Total				221,130	79.2%

Sunflower County:

Aa	Alligator clay, level phase	3W	Rare	0.50-2.00	20,651	4.7
Ab	Alligator clay, nearly level phase	3W	Rare	0.50-2.00	51,175	11.5
Ac	Alligator clay, gently sloping phase	3E	Rare	0.50-2.00	2351	0.5
Ad	Alligator clay, sloping phase	3E	Rare	0.50-2.00	120	<0.1
Ae	Alligator silty clay, level phase	3W	Rare	0.50-2.00	2216	0.5
Ag	Alligator silty clay, nearly level phase	3W	Rare	0.50-2.00	31,885	7.2
Ah	Alligator silty clay, gently sloping phase	3E	Rare	0.50-2.00	1550	0.3
Ak	Alligator silty clay loam, level phase	3W	Rare	0.50-2.00	210	0.1
Am	Alligator silty clay loam, nearly level phase	3W	Rare	0.50-2.00	3978	0.9
Be	Brittain silt loam, nearly level phase (Amagon)	3W	Rare	1.00-2.00	922	0.2
Db	Dowling clay (Sharkey)	4W	Occas	0.00-2.00	49,117	11.1
Dc	Dowling soils, overwash phases (Sharkey)	4W	Occas	0.00-2.00	40,101	9.0
Fe	Forestdale silty clay, level phase	3W	Rare	0.50-2.00	92	<0.1
Fg	Forestdale silty clay, nearly level phase	3W	Rare	0.50-2.00	8078	1.8
Fk	Forestdale silty clay loam, level phase	3W	Rare	0.50-2.00	630	0.1
Fm	Forestdale silty clay loam, nearly level phase	3W	Rare	0.50-2.00	40,467	9.1
Ia	Iberia clay (Sharkey)	3W	Rare	0.00-2.00	432	0.1
Sa	Sharkey clay, level phase	3W	Rare	0.00-2.00	4487	1.0
Sb	Sharkey clay, nearly level phase	3E	Rare	0.00-2.00	11,517	2.6
Sc	Sharkey clay, gently sloping phase	3E	Rare	0.00-2.00	638	0.1
Sd	Sharkey clay, sloping phase	3E	Rare	0.00-2.00	34	<0.1
Se	Sharkey silty clay loam, level phase	3W	Rare	0.00-2.00	97	<0.1
Sg	Sharkey silty clay loam, nearly level phase	3E	Rare	0.00-2.00	195	<0.1
Sh	Sharkey-Clack soils, nearly level phases (Sharkey, Bruno)	3E	Rare	0.00-2.00	284	0.1
Sh	Sharkey-Clack soils, nearly level phases (Sharkey, Bruno)	3S	Rare	4.00-2.00	*	*
Sk	Sharkey-Clack soils, gently sloping phases (Sharkey, Bruno)	3E	Rare	0.00-2.00	878	0.2
Sk	Sharkey-Clack soils, gently sloping phases (Sharkey, Bruno)	3S	Rare	4.00-6.00	*	*
Sm	Souva soils (Amagon)	3W	Occas	1.00-2.00	320	0.1
Ta	Tunica silty clay, nearly level phase	3W	Rare	1.50-3.00	270	0.1
Wa	Waverly silt loam, local alluvium phase (Rosebloom)	3W	Occas	0.00-1.00	80	<0.1
	Total				272,775	61.5%

Tallahatchie County:

AcA	Alligator clay, 0 to 2 percent slopes	3W	Rare	0.50-2.00	68,375	16.6
Ad	Alligator clay, depressional	4W	Occas	0.50-2.00	38,060	9.2
AsA	Alligator silty clay loam, 0 to 2 percent slopes	3W	Rare	0.50-2.00	6100	1.5
Cb	Calhoun-Bonn complex	3W	None	0.00-2.00	3000	0.7

Fe	Falaya-Waverly association	4W	Freq	1.00-2.00	5720	1.4
Fo	Forestdale silt loam, depressional	4W	Occas	0.50-2.00	700	0.2
Fr	Forestdale silty clay loam, 0 to 3 percent slopes	3W	Rare	0.50-2.00	17,580	4.3
Ro	Rosebloom silt loam	3W	Occas	0.00-1.00	2300	0.6
Sh	Sharkey Clay	3E	Rare	0.00-2.00	1000	0.2
Wv	Waverly silt loam	3W	Occas	0.50-1.00	4190	1.0
	Total				147,025	35.7%

Tate County:

AS	Alligator-Dowling association (Alligator, Alligator)	5W	Freq	0.50-2.00	3251	1.3
Ao	Alligator clay	3W	Rare	0.50-2.00	1289	0.5
Ar	Alligator silty clay loam	3W	Rare	0.50-2.00	781	0.3
Au	Arkabutla silty clay loam	4W	Freq	1.00-1.50	2150	0.9
Dc	Dowling clay (Alligator)	4W	Occas	0.50-2.00	598	0.2
Wv	Waverly silt loam	5W	Freq	0.50-1.00	1042	0.4
	Total				9111	3.7%

Tunica County:

Aa	Alligator clay, level phase	3W	Rare	0.50-2.00	3200	1.1
Ab	Alligator clay, undulating phase	3E	Rare	0.50-2.00	640	0.2
Da	Dowling silt loam, and clay loam (Sharkey)	4W	Occas	0.00-2.00	1280	0.4
Db	Dowling soils (Sharkey)	4W	Occas	0.00-2.00	2560	0.9
Fc	Forestdale silty clay loam-clay, level phases	3W	Rare	0.50-2.00	5280	1.8
Fd	Forestdale silty clay loam-clay undulating phases	3W	Rare	0.50-2.00	4160	1.4
Sb	Sharkey-Alligator clays, level phases	3E	Rare	0.00-2.00	47,434	16.2
Sc	Sharkey and Dowling clays (Sharkey)	4W	Occas	0.00-2.00	45,153	15.4
Sd	Sharkey clay, undulating phase	3E	Rare	0.00-2.00	5120	1.8
Sf	Sharkey silty clay loam, level overwash phase	3E	Rare	0.00-2.00	400	0.1
Sg	Sharkey silty clay loam, undulating overwash phase	3E	Rare	0.00-2.00	300	0.1
Sh	Souva silt loam, gently sloping phase (Sharkey)	4W	Occas	0.00-2.00	1600	0.6
Sk	Souva silt loam, level phase (Sharkey)	4W	Occas	0.00-2.00	9280	3.2
Tc	Tunica clay and silty clay, level phases	3W	Rare	1.50-3.00	8960	3.1
Td	Tunica clay and silty clay, undulating phases	3E	Rare	1.50-3.00	7520	2.6
Te	Tunica, Commerce, and Sharkey soils	5W	Freq	1.50-3.00	1800	0.6
	Total				144,687	49.4%

Warren County:

Ar	Alligator clay	3W	Rare	0.50-2.00	2410	0.7
CrC	Commerce, Robinsonville, and Crevasse soils (Commerce, Robinsonville, Bruno)	5W	Freq	1.50-4.00	43,080	11.9
Do	Dowling clay (Sharkey)	5W	Freq	0.00-2.00	7345	2.0
Sc	Sharkey clay	3E	Rare	0.00-2.00	12,810	3.5
Sw	Swamp	5W	Freq		880	0.2
Tu	Tunica silty clay	3W	Rare	1.50-3.00	4610	1.3
Ur	Sharkey, Tunica, and Dowling clays (Sharkey, Tunica, Sharkey)	5W	Freq	0.00-2.00	41,075	11.3
Wf	Waverly and Falaya silt loams (Rosebloom and Collins)	5W	Freq	0.00-1.00	9150	2.5
	Total				121,360	33.5%

Washington County:

Aa	Alligator clay, level phase	3W	Rare	0.50-2.00	7000	1.5
Ab	Alligator clay, nearly level phase	3W	Rare	0.50-2.00	29,270	6.3
Ac	Alligator clay, gently sloping phase	3E	Rare	0.50-2.00	470	0.1
Ad	Alligator silty clay loam, level phase	3W	Rare	0.50-2.00	720	0.1
Ae	Alligator silty clay loam, nearly level phase	3W	Rare	0.50-2.00	4430	0.9
Da	Dowling clay (Sharkey)	4W	Occas	0.00-2.00	51,330	11.0
Db	Dowling soils (Sharkey)	4W	Occas	0.00-2.00	9000	1.9

Fb	Forestdale silty clay, nearly level phase	3W	Rare	0.50-2.00	15,940	3.4
Fd	Forestdale silty clay loam, nearly level phase	3W	Rare	0.50-2.00	19,990	4.3
Sa	Sharkey clay, level phase	3W	Rare	0.00-2.00	36,630	7.9
Sb	Sharkey clay, nearly level phase	3E	Rare	0.00-2.00	100,460	21.6
Sc	Sharkey clay, gently sloping phase	3E	Rare	0.00-2.00	2010	0.4
Sd	Sharkey silty clay loam, nearly level phase	3E	Rare	0.00-2.00	4060	0.9
Se	Sharkey very fine sandy loam, nearly level overwash phase	3E	Rare	0.00-2.00	2000	0.4
So	Souva silt loam (Commerce)	3W	Occas	1.50-4.00	940	0.2
Sw	Swamp	5W	Freq		5550	1.2
Ta	Tunica clay, nearly level phase	3W	Rare	1.50-3.00	10,360	2.2
	Total				300,160	64.5%

Yalobusha County:

Au	Arkabutla silt loam, frequently flooded	4W	Freq	1.00-1.50	4972	1.6
Bu	Bruno sandy loam, frequently flooded	5W	Freq	4.00-6.00	130	<0.1
Cd	Cascilla silt loam, frequently flooded	4W	Freq	6.00-6.00	345	0.1
Co	Collins silt loam, frequently flooded	4W	Freq	2.00-5.00	3800	1.2
Gb	Gillsburg silt loam, frequently flooded	4W	Freq	1.00-1.50	500	0.2
Ok	Oaklimeter silt loam, frequently flooded	4W	Freq	1.50-2.50	3658	1.2
	Total				13,405	4.2%

Yazoo County:

Bm	Bruno-Morganfield complex	5W	Freq	4.00-6.00	875	0.1
FC	Falaya-Vicksburg-Leverett Association	4W	Freq	1.00-2.00	24,275	4.0
Fr	Forestdale silty clay loam	3W	Rare	0.50-2.00	21,435	3.6
Sa	Sharkey silty clay loam	3E	Rare	0.00-2.00	7925	1.3
Sc	Sharkey clay	3E	Rare	0.00-2.00	60,790	10.1
Sd	Sharkey clay, depressional	4W	Occas	0.00-2.00	11,500	1.9
Sf	Sharkey and Forestdale soils	5W	Freq	0.00-2.00	33,100	5.5
	Total				159,900	26.6%

Source: USDA, Soil Conservation Service, State Conservationist, Jackson, MS. Figures were compiled in 1989, but based on soil surveys done in each county during the 1950's, 1960's and 1970's.

* Denotes soils complexes that occur in such an intricate pattern that it was not practical to map them separately. Acreage and proportional extent figures for these soils are listed as a lump sum at the first listing of the complex.

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APPENDIX A: GLOSSARY

Capability class - a grouping of soils that generally shows how suitable they are for most kinds of farming. It is a practical grouping based on the limitations of the soil (risk of erosion, water in or on the soil, droughty or stony, or climate), the risk of damage when they are used, and the way they respond to treatment. In the capability system, soils are grouped at three levels: the capability class, the subclass, and the unit. Capability classes, the broadest groups, are designated by Roman numerals I through VII. The numerals indicate progressively greater limitations and narrower choices for practical uses.

Capability subclass - soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is too cold or too dry.

Channel scars - lengthy segments of a river abandoned when its associated stream diverted to a new course across the floodplain.

Drainage class - refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to the altered drainage which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. The seven classes of recognized natural soil drainage are: excessively drained, somewhat excessively drained, well drained moderately well drained, somewhat poorly drained, poorly drained and very poorly drained.

Facultative species (FAC) - plants that are equally likely to occur in wetlands or nonwetlands (estimated probability 34-66%).

Facultative upland species (FACU) - plants that usually occur in nonwetlands (estimated probability 67-99%), but occasionally are found in wetlands (estimated probability 1-33%).

Facultative wetland species (FACW) - plants that usually occur in wetlands (estimated probability 67-99%), but occasionally are found in nonwetlands (estimated probability 1-33%).

Growing season - the portion of the year when soil temperatures are above biological zero (41°F) as defined by "Soil Taxonomy" (USDA Soil Survey Staff 1975); the following growing season months are assumed for each of the soil temperature regimes: (1) thermic (February-October); (2) mesic (March-October); (3) frigid (May-September; (4) cryic (June-August); (5) pergelic (July-August); (6) isohyperthermic (January-December); hyperthermic (February-December); (8) isothermic (January-December); and (9) isomesic (January-December).

Meander scar - a collective term that reflects several different methods of deposition effected by the meandering of rivers and streams.

Natural levees - broad, low ridges which flank both sides of streams that periodically overflow their banks. Since the coarsest textured material and greatest quantity of material are deposited closest to the stream channel, the natural levee is the highest and deepest in this area and gradually gets thinner as one moves away from the channel.

Obligate species (OBL) - plants that nearly always are found in wetlands; their frequency of occurrence in wetlands is 99% or more.

Oxbow remnants - abandoned channels composed of partially filled segments of meandering streams which formed when the stream shortened its course. They are characterized by open water or "oxbow lakes."

Point bar - deposits consisting of sediments laid on the inside of a stream or river bend as a result of meandering. Point bar deposits characteristically form ridge and swale topography, the configuration of which conforms to the curvature of the migrating channel and indicates the direction and extent of meandering.

Upland - any area that does not qualify as a wetland because the associated hydrologic regime is not sufficiently wet to elicit development of vegetation, soils, and/or hydrologic characteristics associated with wetlands. Such areas occurring in floodplains are more appropriately termed nonwetlands.

APPENDIX B: LIST OF PARTICIPANTS

Team 1 Washington and Bolivar Counties

David Lofton	Environmental Specialist	CE, Vicksburg
William Kirchner	Life Scientist	EPA, Region 6
Robert Wimbish	Soil Scientist	SCS

Team 2 Sharkey and Quitman Counties

Larry Marcy	Environmental Specialist	CE, Vicksburg
James Teáford	Wildlife Biologist	CE, WES
Robert Wimbish	Soil Scientist	SCS

Team 3 Humphreys and Coahoma Counties

Edward Claypool	Environmental Specialist	CE, Vicksburg
Thomas Roberts	Wildlife Biologist	CE, WES
Jerry Huddleston	Soil Scientist	SCS

Team 4 Leflore and Tallahatchie Counties

Larry Harper	Environmental Specialist	CE, Vicksburg
Barbara Kleiss	Ecologist	CE, WES
Jerry Huddleston	Soil Scientist	SCS

Quality Control Team

Russell Theriot	Wetland Ecologist	CE, WES
Blake Parker	Soil Scientist	Hydricsoils, Inc.
Charles Newling	Wetland Ecologist	Wetlands Science Applications, Inc.

US Soil Conservation Service Representatives

David Jones	State Soil Scientist
Robert Henton	State Soils Coordinator
Floyd Brent	Soil Scientist
Robert Wimbish	Soil Scientist
Jerry Huddleston	Soil Scientist

US Environmental Protection Agency Representatives

Thomas Welborn	Life Scientist	EPA, Region 4
Steve Chapin	Environmental Prot. Spec.	EPA, Region 4
William Kirchner	Life Scientist	EPA, Region 6

US Fish and Wildlife Service Representatives

Lee Barkley	Field Supervisor
James Nipper	Wildlife Biologist
Russell Watson	Wildlife Biologist
Robert Barkley	Wildlife Biologist

APPENDIX C: COUNTY SOILS INFORMATION

<u>USDA, Soil Conservation Service</u>
<u>Soil Series Map Unit Information</u>

<u>Bolivar County, Mississippi</u>

Map Symbol	Soil Series Map Unit Name	Capability Class	Annual Flood	Range of Depth to Seasonal High Water Table (feet)	Acres	Percent
	Other areas, not mapped in detail				14,720	2.5
Aa	Alligator clay, level phase	3W	Rare	0.50 - 2.00	810	0.1
Ab	Alligator clay, nearly level phase	3W	Rare	0.50 - 2.00	28,593	4.9
Ac	Alligator clay, gently sloping phase	3E	Rare	0.50 - 2.00	1042	0.2
Ad	Alligator silty clay, level phase	3W	Rare	0.50 - 2.00	227	<0.1
Ae	Alligator silty clay, nearly level phase	3W	Rare	0.50 - 2.00	7104	1.2
Ag	Alligator silty clay, gently sloping phase	3E	Rare	0.50 - 2.00	337	0.1
Ah	Alligator silty clay loam, nearly level phase	3W	Rare	0.50 - 2.00	1311	0.2
Ak	Alluvial soils		Freq		56,033	9.6
Ba	Beulah very fine sandy loam, nearly level phase	2S	Rare	6.00 - 6.00	1527	0.3
Bb	Bosket very fine sandy loam, nearly level phase (Dubbs)	1	None	6.00 - 6.00	4456	0.8
Bc	Bosket very fine sandy loam, gently sloping phase (Dubbs)	3E	None	6.00 - 6.00	124	<0.1
Bd	Brittain silty loam, nearly level phase (Forestdale)	3W	Rare	0.50 - 2.00	14,840	2.5
Ca	Clack loamy sand, nearly level phase (Crevasse)	4S	Rare	3.50 - 6.00	788	0.1
Cb	Clack sandy loam, nearly level phase (Crevasse)	4S	Rare	3.50 - 6.00	394	0.1
Cc	Commerce silt loam	2E	Rare	1.50 - 4.00	8290	1.4
Cd	Commerce silty clay	2E	Rare	1.50 - 4.00	1451	0.3
Ce	Commerce silty clay loam	2E	Rare	1.50 - 4.00	5126	0.9
Cg	Commerce-Robinsonville-Crevasse soils	2E	Rare	1.50 - 4.00	1053	0.2
Cg	Commerce-Robinsonville-Crevasse soils	1	Rare	4.00 - 6.00	*	*
Cg	Commerce-Robinsonville-Crevasse soils	4S	Rare	3.50 - 6.00	*	*
Ch	Crevasse loamy sand	4S	Rare	3.50 - 6.00	3224	0.6
Ck	Crevasse loamy sand, shallow variant	4S	Rare	3.50 - 6.00	893	0.1
Da	Dexter silt loam, nearly level phase (Dubbs)	1	None	6.00 - 6.00	1307	0.2
Db	Dexter silt loam, gently sloping phase (Dubbs)	3E	None	6.00 - 6.00	413	0.1
Dc	Dowling clay (Sharkey)	5W	Freq	0.00 - 2.00	80,563	13.7
Dd	Dowling soils, overwash phases (Sharkey)	5W	Freq	0.00 - 2.00	23,698	4.0
De	Dubbs very fine sandy loam, nearly level phase	1	None	6.00 - 6.00	5087	0.9
Dg	Dubbs very fine sandy loam, gently sloping phase	3E	None	6.00 - 6.00	492	0.1
Dh	Dundee silt loam, nearly level phase	2W	Rare	1.50 - 3.50	11,487	2.0
Dk	Dundee silt loam, gently sloping phase	3E	Rare	1.50 - 3.50	2337	0.4
Dm	Dundee silty clay, nearly level phase	2W	Rare	1.50 - 3.50	7854	1.3
Dn	Dundee silty clay loam, nearly level phase	2W	Rare	1.50 - 3.50	29,769	5.1
Do	Dundee silty clay loam, gently sloping phase	3E	Rare	1.50 - 3.50	1527	0.3
Dp	Dundee silty clay loam, sloping phase	3E	Rare	1.50 - 3.50	55	<0.1
Dr	Dundee very fine sandy loam, nearly level phase	2W	Rare	1.50 - 3.50	11,487	2.0
Ds	Dundee very fine sandy loam, gently sloping phase	3E	Rare	1.50 - 3.50	1189	0.2
Dt	Dundee-Clack soils, nearly level phase (Dundee, Crevasse)	2W	Rare	1.50 - 3.50	2251	0.4
Dt	Dundee-Clack soils, nearly level phase (Dundee, Crevasse)	4S	Rare	3.50 - 6.00	*	*
Du	Dundee-Clack soils, gently sloping phase (Dundee, Crevasse)	3E	Rare	1.50 - 3.50	1665	0.3
Du	Dundee-Clack soils, gently sloping phase (Dundee, Crevasse)	4S	Rare	3.50 - 6.00	*	*
Fa	Forestdale silty loam, nearly level phase	3W	Rare	0.50 - 2.00	21,052	3.6
Fb	Forestdale silt loam, gently sloping phase	3W	Rare	0.50 - 2.00	90	<0.1
Fc	Forestdale silty clay, nearly level phase	3W	Rare	0.50 - 2.00	3198	0.5
Fd	Forestdale silty clay, gently sloping phase	3W	Rare	0.50 - 2.00	445	0.1
Fe	Forestdale silty clay loam, nearly level phase	3W	Rare	0.50 - 2.00	27,136	4.6
Fg	Forestdale silty clay loam, gently sloping phase	3W	Rare	0.50 - 2.00	555	0.1

Fh	Forestdale soils, nearly level phase	3W	Rare	0.50 - 2.00	1244	0.2
Ma	Mhoon silt loam	2W	Rare	0.00 - 3.00	223	<0.1
Pa	Pearson silt loam, nearly level phase (Dundee)	2W	Rare	1.50 - 3.50	3985	0.7
Pb	Pearson silt loam, gently sloping phase (Dundee)	3E	Rare	1.50 - 3.50	1121	0.2
Ra	Robinsonville fine sandy loam	1	Rare	4.00 - 6.00	1194	0.2
Sa	Sharkey clay, level phase	3W	Rare	0.00 - 2.00	10,619	1.8
Sb	Sharkey clay, nearly level phase	3E	Rare	0.00 - 2.00	106,490	18.1
Sc	Sharkey clay gently sloping phase	3E	Rare	0.00 - 2.00	604	0.1
Sd	Sharkey silty clay, level phase	3W	Rare	0.00 - 2.00	484	0.1
Se	Sharkey silty clay, nearly level phase	3E	Rare	0.00 - 2.00	47,893	8.2
Sg	Sharkey silty clay, gently sloping phase	3E	Rare	0.00 - 2.00	490	0.1
Sh	Sharkey silty clay loam, nearly level overwash phase	3E	Rare	0.00 - 2.00	1545	0.3
Sk	Sharkey very fine sandy loam, nearly level, overwash phase	3E	Rare	0.00 - 2.00	824	0.1
Sm	Sharkey-Clack soils, nearly level phases (Sharkey, Crevasse)	3E	Rare	0.00 - 2.00	3242	0.6
Sm	Sharkey-Clack soils, nearly level phases (Sharkey, Crevasse)	4S	Rare	3.50 - 6.00	*	*
Sn	Sharkey-Clack soils, gently sloping phase (Sharkey, Crevasse)	3E	Rare	0.00 - 2.00	847	0.1
Sn	Sharkey-Clack soils, gently sloping phase (Sharkey, Crevasse)	4S	Rare	3.50 - 6.00	*	*
So	Souva Soils (Sharkey)	5W	Freq	0.00 - 2.00	1163	0.2
Ta	Tunica silty clay, nearly level phase	3W	Rare	1.50 - 3.00	16,086	2.7
Tb	Tunica silty clay, gently sloping phase	3E	Rare	1.50 - 3.00	1127	0.2
Wa	Waverly silt loam, local alluvium phase (Sharkey)	5W	Freq	0.00 - 2.00	1699	0.3
	Total				586,880	100.0

Source: USDA, Soil Conservation Service, State Conservationist, Jackson, MS. Figures were compiled in 1989, but based on the Bolivar County Soil Survey, 1958, USDA Soil Conservation Service.

* Denotes soils complexes that occur in such an intricate pattern that it was not practical to map them separately. Acreage and proportional extent figures for these soils are listed as a lump sum at the first listing of the complex.

USDA, Soil Conservation Service
Soil Series Map Unit Information

Carroll County, Mississippi

Map Symbol	Soil Series Map Unit Name	Capability Class	Annual Flood	Range of Depth to Seasonal High Water Table (feet)	Acres	Percent
13	Bruno sandy loam, occasionally flooded	3S	Occas	4.00 - 6.00	9780	2.4
17	Chenneby-Arkabutla Association, frequently flooded	4W	Freq	1.00 - 2.50	5300	1.3
17	Chenneby-Arkabutla Association, frequently flooded	4W	Freq	1.00 - 1.50	*	*
19	Bruno-Tutwiler complex	3S	Rare	4.00 - 6.00	2410	0.6
19	Bruno-Tutwiler complex	2E	None	6.00 - 6.00	*	*
20	Alligator silty clay	3W	Rare	0.50 - 2.00	770	0.2
21	Adler silt loam, occasionally flooded	2W	Occas	2.00 - 3.00	8560	2.1
22	Arkabutla silt loam, frequently flooded	4W	Freq	1.00 - 1.50	1960	0.5
23	Chenneby silt loam, frequently flooded	4W	Freq	1.00 - 2.50	2150	0.5
24	Forestdale silt loam	3W	Rare	0.50 - 2.00	1520	0.4
25	Morganfield silt loam, occasionally flooded	2W	Occas	3.00 - 4.00	2080	0.5
26	Oaklimeter silt loam, occasionally flooded	2W	Occas	1.50 - 2.50	21,980	5.4
27	Sharkey clay, frequently flooded	5W	Freq	0.00 - 2.00	2340	0.6
28	Ariel silt loam, occasionally flooded	2W	Occas	2.50 - 4.00	6770	1.7
43	Falaya silt loam, occasionally flooded	2W	Occas	1.00 - 2.00	7950	1.9
47	Gullied land-Loring complex	7E	None	6.00 - 6.00	24,200	5.9
47	Gullied land-Loring complex	7E	None	2.00 - 3.00	*	*
48	Gullied land-Smithdale complex	7E	None	6.00 - 6.00	5850	1.5
48	Gullied land-Smithdale complex	6E	None	6.00 - 6.00	*	*
50	Udorthents, gravelly		None		3240	0.8
72	Crevasse sand, occasionally flooded	4S	Occas	3.50 - 6.00	1920	0.5
80	Bonn silt loam, occasionally flooded	4S	Occas	0.00 - 2.00	1890	0.5
10E2	Smithdale sandy loam, 12 to 30 percent slopes, eroded	7E	None	6.00 - 6.00	15,050	3.7
14E	Maben-Memphis complex, 8 to 20 percent slopes	6E	None	6.00 - 6.00	2000	0.5
14E	Maben-Memphis complex, 8 to 20 percent slopes	6E	None	6.00 - 6.00	*	*
1A	Calloway silt loam, 0 to 1 percent slopes	2W	None	1.00 - 2.00	2560	0.6
210	Adler silt loam	1	Rare	2.00 - 3.00	10,220	2.5
250	Morganfield silt loam	1	Rare	3.00 - 4.00	1190	0.3
2A	Dubbs silt loam, 0 to 2 percent slopes	1	None	6.00 - 6.00	2710	0.7
300	Sharkey clay, ponded	5W	Freq	0.00 - 2.00	6000	1.5
34E	Loring-Memphis Association, rolling		None	2.00 - 3.00	10,230	2.5
34E	Loring-Memphis Association, rolling	6E	None	6.00 - 6.00	*	*
3A	Dundee silt loam, 0 to 2 percent slopes	2W	None	1.50 - 3.50	2790	0.7
3C3	Dulac silt loam, 5 to 8 percent slopes, severely eroded4E	None		1.00 - 2.00	760	0.2
3D3	Dulac silt loam, 8 to 12 percent slopes, severely eroded	4E	None	1.00 - 2.00	1830	0.5
4A	Grenada silt loam, 0 to 1 percent slopes	2W	None	1.50 - 2.50	1720	0.4
4B	Grenada silt loam, 1 to 3 percent slopes	2E	None	1.50 - 2.50	3750	0.9
5B2	Loring silt loam, 2 to 5 percent slopes, eroded	2E	None	2.00 - 3.00	5960	1.5
5C2	Loring silt loam, 5 to 8 percent slopes, eroded	3E	None	2.00 - 3.00	12,100	3.0
5C3	Loring silt loam, 5 to 8 percent slopes, severely eroded	4E	None	2.00 - 3.00	8810	2.2
5D3	Loring silt loam, 8 to 12 percent slopes, severely eroded	6E	None	2.00 - 3.00	9040	2.2
60F1	Natchez-Saffell Association, hilly	7E	None	6.00 - 6.00	3410	0.8
60F1	Natchez-Saffell Association, hilly	7E	None	6.00 - 6.00	*	*
6A	Memphis silt loam, 0 to 2 percent slopes	1	None	6.00 - 6.00	3010	0.7
6B2	Memphis silt loam, 2 to 5 percent slopes, eroded	2E	None	6.00 - 6.00	2720	0.7
6C2	Memphis silt loam, 5 to 8 percent slopes, eroded	3E	None	6.00 - 6.00	5290	1.3
6C3	Memphis silt loam, 5 to 8 percent slopes, severely eroded	4E	None	6.00 - 6.00	5270	1.3
6D3	Memphis silt loam, 8 to 12 percent slopes, severely eroded	6E	None	6.00 - 6.00	7610	1.9
6E3	Memphis silt loam, 12 to 40 percent slopes, severely eroded	7E	None	6.00 - 6.00	26,050	6.4

6F2	Memphis silt loam, 15 to 40 percent slopes, eroded	7E	None	6.00 - 6.00	5080	1.2
7F	Memphis-Natchez Association, hilly	7E	None	6.00 - 6.00	27,900	6.8
7F	Memphis-Natchez Association, hilly	7E	None	6.00 - 6.00	*	*
8C3	Providence silt loam, 5 to 8 percent slopes, severely eroded	4E	None	1.50 - 3.00	8310	2.0
8D3	Providence silt loam, 8 to 12 percent slopes, severely eroded	6E	None	1.50 - 3.00	18,450	4.5
9F	Smithdale-Providence-Lexington Association, hilly	7E	None	6.00 - 6.00	81,900	20.1
9F	Smithdale-Providence-Lexington Association, hilly		None	1.50 - 3.00	*	*
9F	Smithdale-Providence-Lexington Association, hilly	6E	None	6.00 - 6.00	*	*
W	Water (less than 40 acres)				2630	0.6
W	Water (more than 40 acres)				3300	0.8
	Total				408,320	100.0

Source: USDA, Soil Conservation Service, State Conservationist, Jackson, MS. Figures were compiled in 1989, but based on the Carroll County Soil Survey, 1990, USDA Soil Conservation Service.

* Denotes soils complexes that occur in such an intricate pattern that it was not practical to map them separately. Acreage and proportional extent figures for these soils are listed as a lump sum at the first listing of the complex.

USDA, Soil Conservation Service
Soil Series Map Unit Information

Coahoma County, Mississippi

Map Symbol	Soil Series Map Unit Name	Capability Class	Annual Flood	Range of Depth to Seasonal High Water Table (feet)	Acres	Percent
	Swamps, Lakes, Towns, and other areas not covered by soil survey				21,684	5.9
Aa	Alligator clay, level phase	3W	Rare	0.50 - 2.00	7070	1.9
Ab	Alligator clay, nearly level phase	3W	Rare	0.50 - 2.00	30,432	8.3
Ac	Alligator clay, gently sloping phase	3E	Rare	0.50 - 2.00	362	0.1
Ad	Alligator silty clay, level phase	3W	Rare	0.50 - 2.00	379	0.1
Ae	Alligator silty clay, nearly level phase	3W	Rare	0.50 - 2.00	2163	0.6
Ag	Alluvial soils		Freq		48,213	13.2
Ba	Beulah silty clay loam, nearly level, overwash phase	2S	Rare	6.00 - 6.00	244	0.1
Bb	Beulah very fine sandy loam, nearly level phase	2S	Rare	6.00 - 6.00	912	0.3
Bc	Beulah very fine sandy loam, gently sloping phase	2S	Rare	6.00 - 6.00	272	0.1
Bd	Bosket very fine sandy loam, nearly level phase (Dubbs)	1	None	6.00 - 6.00	9395	2.6
Be	Bosket very fine sandy loam, gently sloping phase (Dubbs)	3E	None	6.00 - 6.00	1138	0.3
Ca	Clack-Bosket soils, nearly level phases (Bruno, Dubbs)	3S	Rare	4.00 - 6.00	410	0.1
Cb	Commerce silt loam, nearly level phase	2E	Rare	1.50 - 4.00	7774	2.1
Cc	Commerce silt loam, gently sloping phase	2E	Rare	1.50 - 4.00	211	0.1
Cd	Commerce silty clay, level phase	2W	Rare	1.50 - 4.00	274	0.1
Ce	Commerce silty clay, nearly level phase	2E	Rare	1.50 - 4.00	2473	0.7
Cg	Commerce silty clay loam, nearly level phase	2E	Rare	1.50 - 4.00	4789	1.3
Ch	Commerce silty clay loam, gently sloping phase	2E	Rare	1.50 - 4.00	355	0.1
Ck	Crevasse soils, nearly level phases (Bruno)	5W	Freq	4.00 - 6.00	525	0.1
Da	Dowling clay (Sharkey)	4W	Occas	0.00 - 2.00	34,689	9.5
Db	Dowling soils (Sharkey)	4W	Occas	0.00 - 2.00	18,475	5.1
Dc	Dubbs silt loam, nearly level phase	1	None	6.00 - 6.00	820	0.2
Dd	Dubbs very fine sandy loam, nearly level phase	1	None	6.00 - 6.00	19,769	5.4
De	Dubbs very fine sandy loam, gently sloping phase	3E	None	6.00 - 6.00	1277	0.3
Dg	Dundee silty loam, nearly level phase	2W	Rare	1.50 - 3.50	17,808	4.9
Dh	Dundee silt loam, gently sloping phase	3E	Rare	1.50 - 3.50	726	0.2
Dk	Dundee silty clay loam, level phase	2W	Rare	1.50 - 3.50	204	0.1
Dm	Dundee silty clay loam, nearly level phase	2W	Rare	1.50 - 3.50	19,345	5.3
Dn	Dundee silty clay loam, gently sloping phase	3E	Rare	1.50 - 3.50	1443	0.4
Do	Dundee very fine sandy loam, nearly level phase	2W	Rare	1.50 - 3.50	21,839	6.0
Dp	Dundee very fine sandy loam, gently sloping phase	3E	Rare	1.50 - 3.50	1127	0.3
Dr	Dundee-Clack soils, nearly level phases (Dundee, Bruno)	2W	Rare	1.50 - 3.50	975	0.3
Ds	Dundee-Clack soils, gently sloping phases (Dundee, Bruno)	3E	Rare	1.50 - 3.50	1085	0.3
Dt	Dundee-Clack soils, sloping phases (Dundee, Bruno)	3E	Rare	1.50 - 3.50	817	0.2
Fa	Forestdale silt loam, level phase	3W	Rare	0.50 - 2.00	318	0.1
Fb	Forestdale silt loam, nearly level phase	3W	Rare	0.50 - 2.00	4099	1.1
Fc	Forestdale silty clay, level phase	3W	Rare	0.50 - 2.00	1349	0.4
Fd	Forestdale silty clay, nearly level phase	3W	Rare	0.50 - 2.00	13,539	3.7
Fe	Forestdale silty clay, gently sloping phase	3W	Rare	0.50 - 2.00	482	0.1
Fg	Forestdale silty clay loam, level phase	3W	Rare	0.50 - 2.00	540	0.1
Fh	Forestdale silty clay loam, nearly level phase	3W	Rare	0.50 - 2.00	17,325	4.8
Fk	Forestdale silty clay loam, gently sloping phase	3W	Rare	0.50 - 2.00	109	<0.1
Ma	Mhoon silty clay, nearly level phase	2W	Rare	0.00 - 3.00	110	<0.1
Ra	Robinsonville very fine sandy loam, nearly level phase	1	Rare	4.00 - 6.00	2301	0.6
Rb	Robinsonville very fine sandy loam, gently sloping phase	2E	Rare	4.00 - 6.00	187	0.1
Rc	Robinsonville-Crevasse soils, nearly level phases (Robinsonville, Bruno)	1	Rare	4.00 - 6.00	1821	0.5

Rd	Robinsonville-Crevasse soils, gently sloping phases (Robinsonville, Bruno)	2E	Rare	4.00 - 6.00	402	0.1
Sa	Sharkey clay, level phase	3W	Rare	0.00 - 2.00	7613	2.1
Sb	Sharkey silty clay, nearly level phase	3E	Rare	0.00 - 2.00	21,658	5.9
Sb	Sharkey clay, nearly level phase	3E	Rare	0.00 - 2.00	1792	0.5
Sb	Sharkey silty clay, nearly level phases	3E	Rare	0.00 - 2.00	*	*
Sb	Sharkey clay, nearly level phase	3E	Rare	0.00 - 2.00	*	*
Sc	Sharkey clay, nearly level phase, shallow over sand	3E	Rare	0.00 - 2.00	120	<0.1
Sd	Sharkey silty clay, gently sloping phase	3E	Rare	0.00 - 2.00	679	0.2
Sd	Sharkey clay, gently sloping phase	3E	Rare	0.00 - 2.00	147	<0.1
Sd	Sharkey silty clay, gently sloping phase	3E	Rare	0.00 - 2.00	*	*
Sd	Sharkey clay, gently sloping phase	3E	Rare	0.00 - 2.00	*	*
Se	Sharkey silt loam, nearly level overwash phase	3E	Rare	0.00 - 2.00	267	0.1
Sg	Sharkey silty clay, level phase	3W	Rare	0.00 - 2.00	196	0.1
Sm	Sharkey-Clack soils, nearly level phase (Sharkey, Bruno)	4W	Occas	0.00 - 2.00	679	0.2
Sm	Sharkey-Clack soils, nearly level phase (Sharkey, Bruno)	3S	Occas	4.00 - 6.00	*	*
Sn	Sharkey-Clack soils, gently sloping phase (Sharkey, Bruno)	4W	Occas	0.00 - 2.00	366	0.1
Sn	Sharkey-Clack soils, gently sloping phases (Sharkey, Bruno)	3S	Occas	4.00 - 6.00	*	*
So	Souva silt loam (Forestdale)	3W	Rare	0.50 - 2.00	1645	0.5
Ta	Tunica silty clay, nearly level phase	3W	Rare	1.50 - 3.00	6387	1.8
Tb	Tunica silty clay, gently sloping phase	3E	Rare	1.50 - 3.00	1195	0.3
	Total				364,800	100.0

Source: USDA, Soil Conservation Service, State Conservationist, Jackson, MS. Figures were compiled in 1989, but based on the Coahoma County Soil Survey, 1959, USDA Soil Conservation Service.

* Denotes soils complexes that occur in such an intricate pattern that it was not practical to map them separately. Acreage and proportional extent figures for these soils are listed as a lump sum at the first listing of the complex.

USDA, Soil Conservation Service
Soil Series Map Unit Information

DeSoto County, Mississippi

Map Symbol	Soil Series Map Unit Name	Capability Class	Annual Flood	Range of Depth to Seasonal High Water Table (feet)	Acres	Percent
Aa	Alligator clay, nearly level phase	3W	Rare	0.50 - 2.00	466	0.2
Ab	Alluvial soils				4565	1.6
Ba	Beulah and Dundee soils, gently sloping phases	2S	Rare	6.00 - 6.00	405	0.1
Ba	Beulah and Dundee soils, gently sloping phases	3E	Rare	1.50 - 3.50	*	*
Bb	Bosket very fine sandy loam, nearly level phases (Dubbs)	1	None	6.00 - 6.00	538	0.2
Bc	Bosket very fine sandy loam, very gently sloping phase (Dubbs)	2E	None	6.00 - 6.00	1140	0.4
Bd	Brandon-Loring silt loams, strongly sloping phases	6E	None	6.00 - 6.00	796	0.3
Bd	Brandon-Loring silt loams, strongly sloping phases		None	2.00 - 3.00	*	*
Ca	Calhoun silt loam, nearly level phase	3W	None	0.00 - 2.00	226	0.1
Cb	Calhoun silt loam, very gently sloping phase	3W	None	0.00 - 2.00	250	0.1
Cc	Calloway silt loam, very gently sloping phase	3E	None	1.00 - 2.00	750	0.3
Cd	Calloway silt loam, eroded, very gently sloping phase	3E	None	1.00 - 2.00	83	<0.1
Ce	Calloway silt loam, severely eroded gently sloping phase	3E	None	1.00 - 2.00	102	<0.1
Cf	Collins loamy sand, overwash phase (Nugent)	3S	Occas	3.50 - 6.00	939	0.3
Cg	Collins silt loam (Adler)	2W	Occas	2.00 - 3.00	32,710	11.5
Ch	Collins silty clay loam (Adler)	2W	Occas	2.00 - 3.00	1369	0.5
Ck	Collins silty clay loam, shallow phase (Adler)	2W	Occas	2.00 - 3.00	509	0.2
Cl	Collins and Falaya silt loams, local alluvium phases	2W	Occas	2.00 - 5.00	26,422	9.3
Cl	Collins and Falaya silt loams, local alluvium phases	2W	Occas	1.00 - 2.00	*	*
Cm	Commerce silt loam, very gently sloping phase (Bruin)	2E	Rare	6.00 - 6.00	383	0.1
Cn	Commerce silty clay loam, nearly level phase (Bruin)	2E	Rare	6.00 - 6.00	1279	0.5
Co	Commerce very fine sandy loam, nearly level phase (Bruin)	2E	Rare	6.00 - 6.00	1398	0.5
Da	Dowling clay (Sharkey)	4W	Occas	0.00 - 2.00	1930	0.7
Db	Dowling soils (Sharkey)	4W	Occas	0.00 - 2.00	2171	0.8
Dc	Dubbs silt loam, very gently sloping phase	2E	None	6.00 - 6.00	623	0.2
Dc	Dundee silt loam, very gently sloping phase	2E	None	6.00 - 6.00	291	0.1
Dc	Dundee silty loam, very gently sloping phase	2E	Rare	1.50 - 3.50	*	*
Dd	Dubbs very fine sandy loam, very gently sloping phase	2E	None	6.00 - 6.00	1681	0.6
De	Dubbs very fine sandy loam, gently sloping phase	3E	None	6.00 - 6.00	211	0.1
Df	Dundee silt loam, nearly level phase	2W	Rare	1.50 - 3.50	968	0.3
Dh	Dundee silty clay loam, nearly level phase	2W	Rare	1.50 - 3.50	1423	0.5
Dk	Dundee silty clay loam, very gently sloping phase	2E	Rare	1.50 - 3.50	1186	0.4
Dl	Dundee silty clay loam, gently sloping phase	3E	Rare	1.50 - 3.50	148	0.1
Dm	Dundee very fine sandy loam, nearly level phase	2W	Rare	1.50 - 3.50	3917	1.4
Dn	Dundee very fine sandy loam, very gently sloping phase	2E	Rare	1.50 - 3.50	491	0.2
Fa	Falaya silt loam (Arkabutla)	2W	Occas	1.00 - 1.50	9648	3.4
Fb	Falaya silty clay loam (Arkabutla)	2W	Occas	1.00 - 1.50	8433	3.0
Fc	Falaya and Waverly silt loams, local alluvium phases (Arkabutla and Rosebloom)	4W	Freq	1.00 - 1.50	358	0.1
Fc	Falaya and Waverly silt loams, local alluvium phases (Arkabutla and Rosebloom)	5W	Freq	0.00 - 1.00	*	*
Fd	Forestdale silty clay loam, nearly level phase	3W	Rare	0.50 - 2.00	1476	0.5
Ga	Grenada silt loam, eroded, very gently sloping phase	2E	None	1.50 - 2.50	4225	1.5
Gb	Grenada silt loam, severely eroded very gently sloping phase	3E	None	1.50 - 2.50	1916	0.7
Gd	Grenada silt loam, severely eroded, gently sloping phase	4E	None	1.50 - 2.50	10,991	3.9
Ge	Grenada silt loam, sloping phase (Loring)	4E	None	2.00 - 3.00	636	0.2

Gf	Grenada silt loam, severely eroded sloping phase (Loring)	6E	None	2.00 - 3.00	3367	1.2
Gg	Guin gravelly sandy loam, moderately steep phase (Saffell)	7E	None	6.00 - 6.00	309	0.1
Gh	Gullied land, Grenada soil material	7E	None	6.00 - 6.00	7670	2.7
Gk	Gullied land, Loring soil material	7E	None	6.00 - 6.00	44,744	15.8
Ha	Henry silt loam	3W	None	0.50 - 1.50	16	0.0
Ka	Kershaw sand, moderately steep phase (Lakeland)	7S	None	6.00 - 6.00	25	0.0
La	Lexington-Loring-Providence silt loams, eroded moderately steep phases	6E	None	6.00 - 6.00	475	0.2
La	Lexington-Loring-Providence silt loams, eroded moderately steep phases		None	2.00 - 3.00	*	*
La	Lexington-Loring-Providence silt loams, eroded moderately steep phases		None	1.50 - 3.00	*	*
Lb	Lintonia silt loam, eroded very gently sloping phase (Memphis)	2E	None	6.00 - 6.00	441	0.2
Lc	Loring silt loam, eroded very gently sloping phase	2E	None	2.00 - 3.00	10,065	3.5
Ld	Loring silt loam, gently sloping phase	3E	None	2.00 - 3.00	1111	0.4
Le	Loring silt loam, sloping phase	4E	None	2.00 - 3.00	1838	0.7
Lf	Loring silt loam, strongly sloping phase		None	2.00 - 3.00	1427	0.5
Lg	Loring silt loam, eroded strongly sloping phase		None	2.00 - 3.00	1401	0.5
Lh	Loring silt loam, moderately steep phase		None	2.00 - 3.00	553	0.2
Lk	Loring silty clay loam, severely eroded very gently sloping phase	3E	None	2.00 - 3.00	4207	1.5
Ll	Loring silty clay loam, severely eroded gently sloping phase	4E	None	2.00 - 3.00	14,243	5.0
Lm	Loring silty clay loam, severely eroded sloping phase	6E	None	2.00 - 3.00	13,745	4.8
Ln	Loring silty clay loam, severely eroded strongly sloping phase	7E	None	2.00 - 3.00	4214	1.5
Ma	Memphis silt loam, eroded very gently sloping phase	2E	None	6.00 - 6.00	7666	2.7
Mb	Memphis silt loam, eroded gently sloping phase	3E	None	6.00 - 6.00	450	0.2
Mc	Memphis silt loam, eroded sloping phase	4E	None	6.00 - 6.00	118	0.0
Md	Memphis silt loam, eroded strongly sloping phase	6E	None	6.00 - 6.00	1492	0.5
Me	Memphis silt loam, eroded moderately steep phase	6E	None	6.00 - 6.00	1994	0.7
Mf	Memphis silty clay loam, severely eroded very gently sloping phase	3E	None	6.00 - 6.00	660	0.2
Mg	Memphis silty clay loam, severely eroded gently sloping phase	4E	None	6.00 - 6.00	3473	1.2
Mh	Memphis silty clay loam, severely eroded sloping phase	6E	None	6.00 - 6.00	776	0.3
Mk	Memphis silty clay loam, severely eroded strongly sloping phase	6E	None	6.00 - 6.00	1967	0.7
Ml	Memphis silty clay loam, severely eroded moderately steep phase	6E	None	6.00 - 6.00	813	0.3
Mm	Mhoon silty clay, nearly level phase	2W	Rare	0.00 - 3.00	1166	0.4
Na	Natchez silt loam, steep phase	6E	None	6.00 - 6.00	1989	0.7
Oa	Oliver silt loam, nearly level phase (Loring)	2W	None	2.00 - 3.00	176	0.1
Ob	Oliver silt loam, eroded very gently sloping phase (Loring)	2E	None	2.00 - 3.00	2758	1.0
Oc	Oliver silt loam, severely eroded gently sloping phase (Loring)	4E	None	2.00 - 3.00	239	0.1
Ra	Richland silt loam, very gently sloping phase (Loring)	2E	None	2.00 - 3.00	482	0.2
Rb	Richland silt loam, eroded very gently sloping phase (Loring)	2E	None	2.00 - 3.00	2678	0.9
Rc	Richland silt loam, severely eroded very gently sloping phase (Loring)	3E	None	2.00 - 3.00	1062	0.4
Rd	Richland silt loam, severely eroded gently sloping phase (Loring)	4E	None	2.00 - 3.00	1949	0.7
Re	Richland silt loam, severely eroded sloping phase (Loring)	6E	None	2.00 - 3.00	457	0.2
Rf	Robinsonville very fine sandy loam, nearly level phase	1	Rare	4.00 - 6.00	190	0.1
Sa	Sharkey clay, nearly level phase	3E	Rare	0.00 - 2.00	3066	1.1
Sb	Sharkey clay, level phase	3W	Rare	0.00 - 2.00	1697	0.6

Sc	Sharkey very fine sandy loam, very gently sloping overwash	3E	Rare	0.00 - 2.00	234	0.1
Va	Vicksburg silt loam	2W	Occas	2.50 - 4.00	3301	1.2
Vb	Vicksburg and Collins silt loams, local alluvium phases	2W	Occas	2.50 - 4.00	5171	1.8
Vb	Vicksburg and Collins silt loams, local alluvium phases	2W	Occas	2.00 - 5.00	*	*
Wa	Waverly silty clay loam (Rosebloom)	5W	Freq	0.00 - 1.00	592	0.2
	Total				283,520	100.0

Source: USDA, Soil Conservation Service, State Conservationist, Jackson, MS. Figures were compiled in 1989, but based on the DeSoto County Soil Survey, 1959, USDA Soil Conservation Service.
* Denotes soils complexes that occur in such an intricate pattern that it was not practical to map them separately. Acreage and proportional extent figures for these soils are listed as a lump sum at the first listing of the complex.

<u>USDA, Soil Conservation Service</u>
<u>Soil Series Map Unit Information</u>

<u>Grenada County, Mississippi</u>

Map Symbol	Soil Series Map Unit Name	Capability Class	Annual Flood	Range of Depth to Seasonal High Water Table (feet)	Acres	Percent
AT	Alligator association	5W	Freq	0.50 - 2.00	2790	1.0
Ac	Alligator clay	3W	Rare	0.50 - 2.00	416	0.1
Ad	Alligator clay, depressional	5W	Freq	0.50 - 2.00	381	0.1
As	Alligator silty clay loam	3W	Rare	0.50 - 2.00	1389	0.5
Ba	Borrow area	8S	Freq		92	<0.1
BtF	Boswell-Tippah complex, 17 to 40 percent slopes (Sweatman, Tippah)	7E	None	6.00 - 6.00	7264	2.6
BtF	Boswell-Tippah complex, 17 to 40 percent slopes (Sweatman, Tippah)	4E	None	2.00 - 2.50	*	*
CRF	Cuthbert-Ruston Association, hilly (Sweatman, Smithdale)	7E	None	6.00 - 6.00	22,520	8.1
CRF	Cuthbert-Ruston Association, hilly (Sweatman, Smithdale)	7E	None	6.00 - 6.00	*	*
CaA	Calloway silt loam, 0 to 2 percent slopes	2E	None	1.00 - 2.00	6375	2.3
CaB	Calloway silt loam, 2 to 5 percent slopes	3E	None	1.00 - 2.00	1846	0.7
Cc	Cascilla silt loam	1	Rare	6.00 - 6.00	325	0.1
Cm	Collins silt loam	2W	Occas	2.00 - 5.00	16,945	6.1
Cn	Collins silt loam, local alluvium	2W	Occas	2.00 - 5.00	2760	1.0
CxE	Cuthbert-Ruston complex, 12 to 17 percent slopes (Sweatman, Smithdale)	7E	None	6.00 - 6.00	1140	0.4
CxE	Cuthbert-Ruston complex, 12 to 17 percent slopes (Sweatman, Smithdale)	6E	None	6.00 - 6.00	*	*
CxE2	Cuthbert-Ruston complex, 12 to 17 percent slopes, eroded (Sweatman, Smithdale)	7E	None	6.00 - 6.00	2160	0.8
CxE2	Cuthbert-Ruston complex, 12 to 17 percent slopes, eroded (Sweatman, Smithdale)	6E	None	6.00 - 6.00	*	*
Db	Dubbs silty clay loam	1	None	6.00 - 6.00	151	0.1
DuB2	Dulac silt loam, 2 to 5 percent slopes, eroded	2E	None	1.00 - 2.00	140	0.1
DuC2	Dulac silt loam, 5 to 8 percent slopes, eroded	3E	None	1.00 - 2.00	1110	0.4
DuC3	Dulac silt loam, 5 to 8 percent slopes, severely eroded	4E	None	1.00 - 2.00	3880	1.4
FC	Falaya-Collins Association	4W	Freq	1.00 - 2.00	6220	2.2
FC	Falaya-Collins Association	4W	Freq	2.00 - 5.00	*	*
Ff	Falaya silt loam	2W	Occas	1.00 - 2.00	29,160	10.5
Fl	Falaya silt loam, local alluvium	2W	Occas	1.00 - 2.00	2680	1.0
Fo	Forestdale silty clay loam	3W	Rare	0.50 - 2.00	337	0.1
Gp	Gravel pits	8S	None		500	0.2
GrA	Grenada silt loam, 0 to 2 percent slopes	2E	None	1.50 - 2.50	1960	0.7
GrB2	Grenada silt loam, 2 to 5 percent slopes, eroded	2E	None	1.50 - 2.50	5130	1.9
GrB3	Grenada silt loam, 2 to 5 percent slopes, severely eroded	3E	None	1.50 - 2.50	554	0.2
GrC2	Grenada silt loam, 5 to 8 percent slopes, eroded	3E	None	1.50 - 2.50	222	0.1
GrC3	Grenada silt loam, 5 to 8 percent slopes, severely eroded	4E	None	1.50 - 2.50	3603	1.3
Gs	Gullied land, clayey	7E	None	6.00 - 6.00	2875	1.0
Gt	Gullied land, sandy	7E	None	6.00 - 6.00	11,620	4.2
Gu	Gullied land, silty	7E	None	6.00 - 6.00	28,180	10.2
He	Henry silt loam	3W	None	0.50 - 1.50	1650	0.6
LoA	Loring silt loam, 0 to 2 percent slopes	2W	None	2.00 - 3.00	260	0.1
LoB2	Loring silt loam, 2 to 5 percent slopes, eroded	2E	None	2.00 - 3.00	554	0.2
LoB3	Loring silt loam, 2 to 5 percent slopes, severely eroded	3E	None	2.00 - 3.00	166	0.1
LoC2	Loring silt loam, 5 to 8 percent slopes, eroded	3E	None	2.00 - 3.00	915	0.3
LoC3	Loring silt loam, 5 to 8 percent slopes, severely eroded	4E	None	2.00 - 3.00	4082	1.5
LoD2	Loring silt loam, 8 to 12 percent slopes, eroded	4E	None	2.00 - 3.00	277	0.1
LoD3	Loring silt loam, 8 to 12 percent slopes, severely eroded	6E	None	2.00 - 3.00	3860	1.4

MeA	Memphis silt loam, 0 to 2 percent slopes	1	None	6.00 - 6.00	1386	0.5
MeB2	Memphis silt loam, 2 to 5 percent slopes, eroded	2E	None	6.00 - 6.00	277	0.1
MeC3	Memphis silt loam, 5 to 8 percent slopes, severely eroded	4E	None	6.00 - 6.00	2840	1.0
MeD3	Memphis silt loam, 8 to 12 percent slopes, severely eroded	6E	None	6.00 - 6.00	1960	0.7
MeE	Memphis silt loam, 12 to 17 percent slopes	6E	None	6.00 - 6.00	1940	0.7
MeE2	Memphis silt loam, 12 to 17 percent slopes, eroded	6E	None	6.00 - 6.00	4711	1.7
MeF	Memphis silt loam, 17 to 40 percent slopes	7E	None	6.00 - 6.00	7760	2.8
MeF3	Memphis silt loam, 17 to 50 percent slopes, severely eroded	7E	None	6.00 - 6.00	850	0.3
MgF	Memphis-Guin complex, 17 to 50 percent slopes (Memphis, Saffell)	7E	None	6.00 - 6.00	4078	1.5
MgF	Memphis-Guin complex, 17 to 50 percent slopes (Memphis, Saffell)	7E	None	6.00 - 6.00	*	*
Mx	Mixed alluvial land				1940	0.7
PAF	Providence-Loring Association, hilly (Providence-Memphis)		None	1.50 - 3.00	7105	2.6
PAF	Providence-Loring Association, hilly (Providence-Memphis)	6E	None	6.00 - 6.00	*	*
PcD2	Providence-Loring complex, 8 to 12 percent slopes, eroded	4E	None	1.50 - 3.00	830	0.3
PcD2	Providence-Loring complex, 8 to 12 percent slopes, eroded	4E	None	2.00 - 3.00	*	*
PcE	Providence-Loring complex, 12 to 17 percent slopes		None	1.50 - 3.00	760	0.3
PcE	Providence-Loring complex, 12 to 17 percent slopes		None	2.00 - 3.00	*	*
PcE2	Providence-Loring complex, 12 to 17 percent slopes, eroded		None	1.50 - 3.00	1140	0.4
PcE2	Providence-Loring complex, 12 to 17 percent slopes, eroded		None	2.00 - 3.00	*	*
PrC2	Providence silt loam, 5 to 8 percent slopes, eroded	3E	None	1.50 - 3.00	275	0.1
PrC3	Providence silt loam, 5 to 8 percent slopes, severely eroded	4E	None	1.50 - 3.00	1690	0.6
RCF	Ruston-Cuthbert Association, hilly (Smithdale, Sweatman)	7E	None	6.00 - 6.00	21,660	7.8
RCF	Ruston-Cuthbert Association, hilly (Smithdale, Sweatman)	7E	None	6.00 - 6.00	*	*
RPF	Ruston-Providence Association, hilly (Smithdale, Providence)	7E	None	6.00 - 6.00	7260	2.6
RPF	Ruston-Providence Association, hilly (Smithdale, Providence)		None	1.50 - 3.00	*	*
RxE	Ruston-Providence complex, 12 to 17 percent slopes (Smithdale, Providence)	6E	None	6.00 - 6.00	420	0.1
RxE	Ruston-Providence complex, 12 to 17 percent slopes (Smithdale, Providence)		None	1.50 - 3.00	*	*
RxE2	Ruston-Providence complex, 12 to 17 percent slopes, eroded (Smithdale, Providence)	6E	None	6.00 - 6.00	580	0.2
RxE2	Ruston-Providence complex, 12 to 17 percent slopes, eroded (Smithdale, Providence)		None	1.50 - 3.00	*	*
Sa	Sandy alluvial land				720	0.3
Sp	Sand pits	8S	None		490	0.2
TbD	Tippah-Boswell complex, 8 to 12 percent slopes (Tippah, Sweatman)	4E	None	2.00 - 2.50	554	0.2
TbD	Tippah-Boswell complex, 8 to 12 percent slopes (Tippah, Sweatman)	6E	None	6.00 - 6.00	*	*
TbD2	Tippah-Boswell complex, 8 to 12 percent slopes, eroded (Tippah, Sweatman)	4E	None	2.00 - 2.50	2220	0.8
TbD2	Tippah-Boswell complex, 8 to 12 percent slopes, eroded (Tippah, Sweatman)	6E	None	6.00 - 6.00	*	*
TbE	Tippah-Boswell complex, 12 to 17 percent slopes (Tippah, Sweatman)	4E	None	2.00 - 2.50	2030	0.7
TbE	Tippah-Boswell complex, 12 to 17 percent slopes (Tippah, Sweatman)	7E	None	6.00 - 6.00	*	*
TbE2	Tippah-Boswell complex, 12 to 17 percent slopes, eroded (Tippah, Sweatman)	4E	None	2.00 - 2.50	1920	0.7
TbE2	Tippah-Boswell complex, 12 to 17 percent slopes, eroded (Tippah, Sweatman)	7E	None	6.00 - 6.00	*	*
Vb	Vicksburg silt loam	2W	Occas	2.50 - 4.00	415	0.1
Vc	Vicksburg silt loam, local alluvium	2W	Occas	2.50 - 4.00	220	0.1

WF	Waverly-Falaya Association	5W	Freq	0.50 - 1.00	12,900	4.7
WF	Waverly-Falaya Association	4W	Freq	1.00 - 2.00	*	*
Ws	Waverely silt loam	3W	Occas	0.50 - 1.00	9700	3.5
Total					277,120	100.0

Source: USDA, Soil Conservation Service, State Conservationist, Jackson, MS. Figures were compiled in 1989, but based on the Grenada County Soil Survey, 1967, USDA Soil Conservation Service.

* Denotes soils complexes that occur in such an intricate pattern that it was not practical to map them separately. Acreage and proportional extent figures for these soils are listed as a lump sum at the first listing of the complex.

USDA, Soil Conservation Service
Soil Series Map Unit Information

Holmes County, Mississippi

Map Symbol	Soil Series Map Unit Name	Capability Class	Annual Flood	Range of Depth to Seasonal High Water Table (feet)	Acres	Percent
1	Adler silt loam, occasionally flooded	2W	Occas	2.00 - 3.00	8775	6.8
3	Morganfield silt loam, occasionally flooded	2W	Occas	3.00 - 4.00	4721	3.6
4	Bruno sandy loam, occasionally flooded	3S	Occas	4.00 - 6.00	2503	1.9
6	Providence silt loam, 5 to 8 percent slopes, eroded	3E	None	1.50 - 3.00	*	*
7	Providence silt loam, 8 to 12 percent slopes, eroded	4E	None	1.50 - 3.00	*	*
8	Providence silt loam, 8 to 12 percent slopes, severely eroded	6E	None	1.50 - 3.00	*	*
9	Smithdale sandy loam, 12 to 30 percent slopes, eroded	7E	None	6.00 - 6.00	*	*
10	Smithdale-Providence Association, hilly	7E	None	6.00 - 6.00	*	*
10	Smithdale-Providence Association, hilly		None	1.50 - 3.00	*	*
11	Smithdale-Udorthents complex, gullied	7E	None	6.00 - 6.00	*	*
12	Oaklimeter silt loam, occasionally flooded	2W	Occas	1.50 - 2.50	17	<0.1
14	Sharkey clay, occasionally flooded	4W	Occas	0.00 - 2.00	14,484	11.0
15	Crevasse sand, occasionally flooded	4S	Occas	3.50 - 6.00	*	*
16	Sharkey clay, depressional	4W	Occas	0.00 - 2.00	7635	5.8
17	Sharkey silty clay loam, occasionally flooded	4W	Occas	0.00 - 2.00	5147	3.9
20	Grenada silt loam, 0 to 2 percent slopes	2E	None	1.50 - 2.50	*	*
21	Sharkey clay, frequently flooded	5W	Freq	0.00 - 2.00	25,748	19.6
22	Dubbs silt loam, 0 to 2 percent slopes	1	None	6.00 - 6.00	16,862	12.8
23	Dubbs silt loam, 2 to 5 percent slopes	2E	None	6.00 - 6.00	3763	2.9
24	Dundee silt loam, 0 to 2 percent slopes	3W	Occas	1.50 - 3.50	14,546	11.1
25	Dundee silt loam, 2 to 5 percent slopes	2E	None	1.50 - 3.50	1948	1.6
26	Calloway silt loam, 0 to 2 percent slopes	2E	None	1.00 - 2.00	*	*
27	Dundee silty clay loam, 0 to 2 percent slopes	3W	Occas	1.50 - 3.50	6381	4.9
28	Forestdale silty clay loam, 0 to 2 percent slopes	3W	Rare	0.50 - 2.00	10,279	7.8
29	Dundee silty clay loam, 2 to 5 percent slopes	3W	Occas	1.50 - 3.50	*	*
30	Memphis silt loam, 0 to 2 percent slopes	1	None	6.00 - 6.00	3818	2.9
31	Memphis silt loam, 2 to 5 percent slopes, eroded		None	6.00 - 6.00	*	*
33	Memphis silt loam, 5 to 8 percent slopes, eroded		None	6.00 - 6.00	*	*
34	Memphis-Natchez Association, hilly	6E	None	6.00 - 6.00	*	*
34	Memphis-Natchez Association, hilly	7E	None	6.00 - 6.00	*	*
35	Memphis silt loam, 8 to 12 percent slopes, eroded		None	6.00 - 6.00	*	*
36	Memphis silt loam, 8 to 12 percent slopes, severely eroded	6E	None	6.00 - 6.00	*	*
37	Memphis silt loam, 12 to 40 percent slopes, eroded		None	6.00 - 6.00	*	*
38	Providence silt loam, 5 to 8 percent slopes, severely eroded	4E	None	1.50 - 3.00	*	*
39	Pits-Udorthents complex	8S	None	* - *	584	<0.1
39	Pits-Udorthents complex	3E	None	5.00 - 5.00	*	*
40	Loring silt loam, 2 to 5 percent slopes, eroded	3E	None	2.00 - 3.00	*	*
41	Loring silt loam, 5 to 8 percent slopes, eroded	4E	None	2.00 - 3.00	*	*
42	Loring silt loam 8 to 12 percent slopes, severely eroded	6E	None	2.00 - 3.00	*	*
43	Loring silt loam, 8 to 12 percent slopes, eroded	6E	None	2.00 - 3.00	*	*
44	Memphis-Udorthents complex, gullied	7E	None	6.00 - 6.00	*	*
45	Adler and Bruno soils, frequently flooded	4W	Freq	2.00 - 3.00	4234	3.2
45	Adler and Bruno soils, frequently flooded	5W	Freq	4.00 - 6.00	*	*
	Total				**131,445	100.0

Source: USDA, Soil Conservation Service, State Conservationist, Jackson, MS. Figures were compiled in 1989, but based on the Holmes County Soil Survey, preliminary map sheets, USDA Soil Conservation Service.

* Denotes soils complexes that occur in such an intricate pattern that it was not practical to map them separately. Acreage and proportional extent figures for these soils are listed as a lump sum at the first listing of the complex.

** Total acres reflects only the area within the study area and not the entire county.

USDA, Soil Conservation Service
Soil Series Map Unit Information

Humphreys County, Mississippi

Map Symbol	Soil Series Map Unit Name	Capability Class	Annual Flood	Range of Depth to Seasonal High Water Table (feet)	Acres	Percent
	Swamp	5W	Freq		2871	1.1
Aa	Alligator clay, level phase	3W	Rare	0.50 - 2.00	16,016	6.1
Ab	Alligator clay, level overflow phase	5W	Freq	0.50 - 2.00	1586	0.6
Ac	Alligator clay, nearly level phase	3W	Rare	0.50 - 2.00	68,045	25.9
Ad	Alligator clay, nearly level overflow phase	5W	Freq	0.50 - 2.00	5247	2.0
Ae	Alligator clay, gently sloping phase	3E	Rare	0.50 - 2.00	1546	0.6
Ag	Alligator silty clay loam, nearly level phase	3W	Rare	0.50 - 2.00	9594	3.7
Ah	Alligator silty clay loam, nearly level overflow phase	5W	Freq	0.50 - 2.00	1495	0.6
Ak	Alligator silty clay loam, gently sloping phase	3E	Rare	0.50 - 2.00	224	0.1
Am	Alligator-Dowling clays, overflow phase (Alligator, Alligator)	5W	Freq	0.50 - 2.00	11,056	4.2
Am	Alligator-Dowling clays, overflow phase (Alligator, Alligator)	5W	Freq	0.50 - 2.00	*	*
An	Alligator, Dowling, and Forestdale soils, overflow phases (Alligator, Alligator, Forestdale)	5W	Freq	0.50 - 2.00	20,398	7.8
An	Alligator, Dowling, and Forestdale soils, overflow phases (Alligator, Alligator, Forestdale)	5W	Freq	0.50 - 2.00	*	*
An	Alligator, Dowling, and Forestdale soils, overflow phases (Alligator, Alligator, Forestdale)	5W	Freq	0.50 - 2.00	*	*
Da	Dowling clay (Alligator)	4W	Occas	0.50 - 2.00	21,914	8.3
Db	Dowling clay, overflow phase (Alligator)	5W	Freq	0.50 - 2.00	6317	2.4
Dc	Dowling soils (Alligator)	4W	Occas	0.50 - 2.00	8378	3.2
Dd	Dowling soils, overflow phases (Alligator)	5W	Freq	0.50 - 2.00	1420	0.5
De	Dubbs silt loam	1	None	6.00 - 6.00	394	0.1
Dg	Dubbs very fine sandy loam, nearly level phase	1	None	6.00 - 6.00	1480	0.6
Dh	Dubbs very fine sandy loam, gently sloping phase	2E	None	6.00 - 6.00	572	0.2
Dk	Dundee silty clay loam, nearly level phase	2W	Rare	1.50 - 3.50	692	0.3
Dm	Dundee silty clay loam, gently sloping phase	2E	Rare	1.50 - 3.50	389	0.1
Dn	Dundee silty loam, nearly level phase	2W	Rare	1.50 - 3.50	5087	1.9
Do	Dundee silty loam, gently sloping phase	2E	Rare	1.50 - 3.50	3220	1.2
Dp	Dundee very fine sandy loam	2W	Rare	1.50 - 3.50	4943	1.9
Dr	Dundee-Pearson silt loams (Dundee, Askew)	2W	Rare	1.50 - 3.50	2268	0.9
Dr	Dundee-Pearson silt loams (Dundee, Askew)	1	None	1.00 - 2.00	*	*
Fa	Forestdale silty clay, nearly level phase	3W	Rare	0.50 - 2.00	5275	2.0
Fb	Forestdale silty clay, gently sloping phase	3W	Rare	0.50 - 2.00	530	0.2
Fc	Forestdale silty clay loam, level phase	3W	Rare	0.50 - 2.00	1017	0.4
Fd	Forestdale silty clay loam, nearly level phase	3W	Rare	0.50 - 2.00	24,008	9.2
Fe	Forestdale silty clay loam, nearly level overflow phase	5W	Freq	0.50 - 2.00	2679	1.0
Fg	Forestdale silty clay loam, nearly level shallow phase	3W	Rare	0.50 - 2.00	893	0.3
Fh	Forestdale silty clay loam, gently sloping phase	3W	Rare	0.50 - 2.00	1943	0.7
Fk	Forestdale silty clay loam, gently sloping overflow phase	5W	Freq	0.50 - 2.00	1291	0.5
Fm	Forestdale silt loam, nearly level phase	3W	Rare	0.50 - 2.00	12,857	4.9
Fn	Forestdale silt loam, nearly level overflow phase	5W	Freq	0.50 - 2.00	747	0.3
Fo	Forestdale silt loam, nearly level moderately shallow phase	3W	Rare	0.50 - 2.00	1353	0.5
Fp	Forestdale silt loam, gently sloping phase	3W	Rare	0.50 - 2.00	2116	0.8
Fr	Forestdale silt loam, moderately eroded sloping phase	3W	Rare	0.50 - 2.00	235	0.1
Fs	Forestdale very fine sandy loam, nearly level phase	3W	Rare	0.50 - 2.00	5539	2.1

Ft	Forestdale very fine sandy loam, gently sloping phase	3W	Rare	0.50 - 2.00	490	0.2
Fu	Forestdale-Brittain silt loams (Forestdale, Amagon)	3W	Rare	0.50 - 2.00	6005	2.3
Fu	Forestdale-Brittain silt loams (Forestdale, Amagon)	3W	Rare	1.00 - 2.00	*	*
Is	Iberia clay (Sharkey)	3E	Rare	0.00 - 2.00	270	0.1
	Total				262,400	100.0

Source: USDA, Soil Conservation Service, State Conservationist, Jackson, MS. Figures were compiled in 1989, but based on the Humphreys County Soil Survey, 1959, USDA Soil Conservation Service.

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USDA, Soil Conservation Service
Soil Series Map Unit Information

Issaquena County, Mississippi

Map Symbol	Soil Series Map Unit Name	Capability Class	Annual Flood	Range of Depth to Seasonal High Water Table (feet)	Acres	Percent
Af	Alluvial land				26,530	10.0
Ba	Beulah very fine sandy loam, 0 to 3 percent slopes	2S	Rare	6.00 - 6.00	870	0.3
Bk	Bowdre clay, 0 to 2 percent slopes	2W	Rare	1.50 - 2.00	6480	2.4
Bm	Bowdre clay, 2 to 5 percent slopes	2W	Rare	1.50 - 2.00	580	0.2
Bp	Borrow pits	8S	None		5100	1.9
Cb	Commerce silt loam, 0 to 2 percent slopes	2E	Rare	1.50 - 4.00	6670	2.5
Cd	Commerce silt loam, moderately shallow, 0 to 2 percent slopes	2E	Rare	1.50 - 4.00	1120	0.4
Ch	Commerce silty clay loam, 0 to 2 percent slopes	2W	Rare	0.00 - 3.00	16,200	6.1
Ck	Commerce silty clay loam, 2 to 5 percent slopes	2E	Rare	1.50 - 4.00	2290	0.9
Cm	Commerce silty clay loam, moderately shallow, 0 to 2 percent slopes	2E	Rare	1.50 - 4.00	2230	0.8
Cn	Commerce very fine sandy loam, 0 to 2 percent slopes	2E	Rare	1.50 - 4.00	3260	1.2
Cr	Commerce very fine sandy loam, 2 to 5 percent slopes	2E	Rare	1.50 - 4.00	645	0.2
Cv	Crevasse sandy loams and loamy sands, 0 to 3 percent slopes (Bruno)	3S	Occas	4.00 - 6.00	1900	0.7
Da	Dowling clay (Sharkey)	4W	Occas	0.00 - 2.00	31,813	12.0
Db	Dowling soils (Sharkey)	4W	Occas	0.00 - 2.00	1485	0.6
Df	Dundee silt loam, 0 to 2 percent slopes	2W	Rare	1.50 - 3.50	390	0.1
Dk	Dundee silty clay loam, 0 to 2 percent slopes	2W	Rare	1.50 - 3.50	360	0.1
Fd	Forestdale silty clay loam, 0 to 2 percent slopes	3W	Rare	0.50 - 2.00	380	0.1
Le	Levee berms	7E	None	6.00 - 6.00	2720	1.0
Mh	Mhoon silty clay, 0 to 2 percent slopes	2W	Rare	0.00 - 3.00	440	0.2
Ro	Robinsonville very fine sandy loam, 0 to 2 percent slopes	1	Rare	4.00 - 6.00	1555	0.6
Rs	Robinsonville very fine sandy loam, 2 to 5 percent slopes	2E	Rare	4.00 - 6.00	385	0.1
Sa	Sharkey clay, 0 to 1 percent slopes	3W	Rare	0.00 - 2.00	740	0.3
Sb	Sharkey clay, 0 to 2 percent slopes	3E	Rare	0.00 - 2.00	23,375	8.8
Sc	Sharkey clay, 2 to 5 percent slopes	3E	Rare	0.00 - 2.00	910	0.3
Se	Sharkey silty clay loam, 0 to 2 percent slopes	3E	Rare	0.00 - 2.00	9025	3.4
Sf	Sharkey fine sandy loam, overwash, 0 to 2 percent slopes	3E	Rare	0.00 - 2.00	865	0.3
Sk	Sharkey silt loam, overwash, 0 to 2 percent slopes	3E	Rare	0.00 - 2.00	2380	0.9
Sr	Sharkey and Dowling clays (Sharkey, Sharkey)	5W	Freq	0.00 - 2.00	95,177	35.8
Sr	Sharkey and Dowling clays (Sharkey, Sharkey)	5W	Freq	0.00 - 2.00	*	*
Ta	Tunica clay, 0 to 2 percent slopes	3W	Rare	1.50 - 3.00	15,920	6.0
Tb	Tunica clay, 2 to 5 percent slopes	3E	Rare	1.50 - 3.00	785	0.3
Tc	Tunica silty clay loam, 0 to 2 percent slopes	3W	Rare	1.50 - 3.00	2660	1.0
	Total				265,420	100.0

Source: USDA, Soil Conservation Service, State Conservationist, Jackson, MS. Figures were compiled in 1989, but based on the Issaquena County Soil Survey, 1961, USDA Soil Conservation Service.

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USDA, Soil Conservation Service
Soil Series Map Unit Information

Leflore County, Mississippi

Map Symbol	Soil Series Map Unit Name	Capability Class	Annual Flood	Range of Depth to Seasonal High Water Table (feet)	Acres	Percent
	Bayous				2509	0.7
	Home sites				4875	1.3
	Pits				199	0.1
	Water				6434	1.7
Aa	Alligator clay, level phase	3W	Rare	0.50 - 2.00	7983	2.1
Ab	Alligator clay, level overflow phase	5W	Freq	0.50 - 2.00	66	<0.1
Ac	Alligator clay, nearly level phase	3W	Rare	0.50 - 2.00	61,955	16.5
Ad	Alligator clay, nearly level overflow phase	5W	Freq	0.50 - 2.00	8772	2.3
Ae	Alligator clay, gently sloping phase	3E	Rare	0.50 - 2.00	3536	0.9
Af	Alligator silt loam, overwash phase	5W	Freq	0.50 - 2.00	694	0.2
Ag	Alligator silty clay loam, nearly level phase	3W	Rare	0.50 - 2.00	17,545	4.7
Ah	Alligator silty clay loam, gently sloping phase	3E	Rare	0.50 - 2.00	836	0.2
Ak	Alligator and Dowling clays, overflow phases (Alligator, Alligator)	5W	Freq	0.50 - 2.00	21,611	5.7
Ak	Alligator and Dowling clays, overflow phases (Alligator, Alligator)	5W	Freq	0.50 - 2.00	*	*
Am	Alligator, Dowling, and Forestdale soils (Alligator, Alligator, Forestdale)	3E	Rare	0.50 - 2.00	5094	1.4
Am	Alligator, Dowling, and Forestdale soils (Alligator, Alligator, Forestdale)	5W	Freq	0.50 - 2.00	*	*
Am	Alligator, Dowling, and Forestdale soils (Alligator, Alligator, Forestdale)	3W	Rare	0.50 - 2.00	*	*
An	Alligator, Dowling, and Forestdale soils, overflow phases (Alligator, Alligator, Forestdale)	5W	Freq	0.50 - 2.00	2338	0.6
An	Alligator, Dowling, and Forestdale soils, overflow phases (Alligator, Alligator, Forestdale)	5W	Freq	0.50 - 2.00	*	*
An	Alligator, Dowling, and Forestdale soils, overflow phases (Alligator, Alligator, Forestdale)	5W	Freq	0.50 - 2.00	*	*
Ao	Alligator-Forestdale soils, gently sloping phase	3E	Rare	0.50 - 2.00	1103	0.3
Ao	Alligator-Forestdale soils, gently sloping phases	3W	Rare	0.50 - 2.00	*	*
Ap	Alligator-Forestdale soils, sloping phases	3E	Rare	0.50 - 2.00	228	0.1
Ap	Alligator-Forestdale soils, sloping phases	3W	Rare	0.50 - 2.00	*	*
Ar	Alligator-Forestdale soils, strongly sloping phases	3E	Rare	0.50 - 2.00	95	<0.1
Ar	Alligator-Forestdale soils, strongly sloping phases	3W	Rare	0.50 - 2.00	*	*
Ba	Beulah very fine sandy loam, gently sloping phase	2S	None	6.00 - 6.00	161	<0.1
Bb	Bosket very fine sandy loam, nearly level phase (Dubbs)	1	None	6.00 - 6.00	1359	0.4
Bc	Bosket very fine sandy loam, gently sloping phase (Dubbs)	2E	None	6.00 - 6.00	360	0.1
Ca	Collins silt loam (Alder)	1	Rare	2.00 - 3.00	2622	0.7
Da	Dowling clay (Alligator)	4W	Occas	0.50 - 2.00	37,793	10.0
Db	Dowling soils (Alligator)	3W	Rare	0.50 - 2.00	19,604	5.2
Dc	Dubbs silt loam, nearly level phase	1	None	6.00 - 6.00	1254	0.3
Dd	Dubbs silt loam, gently sloping phase	3E	None	6.00 - 6.00	703	0.2
De	Dubbs silt loam, sloping phase	3E	None	6.00 - 6.00	48	<0.1
Df	Dubbs very fine sandy loams, nearly level phase	1	None	6.00 - 6.00	12,526	3.3
Dg	Dubbs very fine sandy loam, gently sloping phase	2E	None	6.00 - 6.00	6509	1.7
Dh	Dubbs very fine sandy loam, sloping phase	3E	None	6.00 - 6.00	896	0.2
Dk	Dundee silt loam, nearly level phase	2W	Rare	1.50 - 3.50	11,452	3.0
Dm	Dundee silt loam, gently sloping phase	2E	Rare	1.50 - 3.50	4143	1.1
Dn	Dundee silt loam, sloping phase	3E	Rare	1.50 - 3.50	294	0.1
Do	Dundee silty clay loam, nearly level phase	2W	Rare	1.50 - 3.50	8230	2.2

Dp	Dundee silty clay loam, gently sloping phase	2E	Rare	1.50 - 3.50	3487	0.9
Dr	Dundee very fine sandy loam, nearly level phase	2W	Rare	1.50 - 3.50	22,485	6.0
Ds	Dundee very fine sandy loam, gently sloping phase	2E	Rare	1.50 - 3.50	6158	1.6
Dt	Dundee very fine sandy loam, sloping phase	3E	Rare	1.50 - 3.50	1123	0.3
Du	Dundee-Bosket soils, sloping phases (Dubbs)	3E	Rare	1.50 - 3.50	1539	0.4
Du	Dundee-Bosket soils, sloping phases (Dubbs)	3E	None	6.00 - 6.00	*	*
Fa	Falaya silt loam	2W	Occas	1.00 - 2.00	5294	1.4
Fb	Falaya silty clay loam (Arkabutla)	2W	Occas	1.00 - 1.50	1587	0.4
Fc	Falaya silty clay loam, moderately shallow phase (Arkabutla)	2W	Occas	1.00 - 1.50	1368	0.4
Fd	Falaya-Ina-Collins soils (Falaya, Adler, Adler)	4W	Freq	1.00 - 2.00	5217	1.4
Fd	Falaya-Ina-Collins soils (Falaya, Adler, Adler)	4W	Freq	2.00 - 3.00	*	*
Fd	Falaya-Ina-Collins soils (Falaya, Adler, Adler)	4W	Freq	2.00 - 3.00	*	*
Fe	Forestdale silt loam, nearly level phase	3W	Rare	0.50 - 2.00	14,152	3.8
Ff	Forestdale silt loam, gently sloping phase	3W	Rare	0.50 - 2.00	3111	0.8
Fg	Forestdale silty clay, nearly level phase	3W	Rare	0.50 - 2.00	76	<0.1
Fh	Forestdale silty clay loam, nearly level phase	3W	Rare	0.50 - 2.00	28,967	7.7
Fk	Forestdale silty clay loam, nearly level moderately shallow phase	3W	Rare	0.50 - 2.00	817	0.2
Fm	Forestdale silty clay loam, nearly level overflow phase	5W	Freq	0.50 - 2.00	1178	0.3
Fn	Forestdale silty clay loam, gently sloping phase	3W	Rare	0.50 - 2.00	5009	1.3
Fo	Forestdale very fine sandy loam, nearly level phase	3W	Rare	0.50 - 2.00	5360	1.4
Ha	Hymon very fine sandy loam (Adler)	1	Rare	2.00 - 3.00	275	0.1
Ia	Ina silt loam (Adler)	1	Rare	2.00 - 3.00	998	0.3
Ib	Ina very fine sandy loam (Adler)	1	Rare	2.00 - 3.00	1340	0.4
Pa	Pearson silt loam, nearly level phase (Dubbs)	1	None	6.00 - 6.00	1321	0.3
Sa	Sandy alluvial land (Crevasse)	5W	Freq	3.50 - 6.00	1358	0.4
Sb	Swamp	5W	Freq		10,178	2.7
Wa	Waverly soils, local alluvium phases	3W	Occas	0.50 - 1.00	95	<0.1
	Total				376,320	100.0

Source: USDA, Soil Conservation Service, State Conservationist, Jackson, MS. Figures were compiled in 1989, but based on the Leflore County Soil Survey, 1959, USDA Soil Conservation Service.

* Denotes soils complexes that occur in such an intricate pattern that it was not practical to map them separately. Acreage and proportional extent figures for these soils are listed as a lump sum at the first listing of the complex.

USDA, Soil Conservation Service
Soil Series Map Unit Information

Panola County, Mississippi

Map Symbol	Soil Series Map Unit Name	Capability Class	Annual Flood	Range of Depth to Seasonal High Water Table (feet)	Acres	Percent
Aa	Alligator clay, 0 to 1/2 percent slopes	3W	Rare	0.50 - 2.00	7470	1.7
Ab	Alligator clay, 1/2 to 2 percent slopes	3W	Rare	0.50 - 2.00	1145	0.3
Ac	Alligator silt loam, overwash, 1/2 to 2 percent slopes	3W	Rare	0.50 - 2.00	530	0.1
Ad	Alligator silty clay loam, 0 to 1/2 percent slopes	3W	Rare	0.50 - 2.00	7935	1.8
Ae	Alligator silty clay loam, 1/2 to 2 percent slopes	3W	Rare	0.50 - 2.00	2365	0.5
CaA	Calloway silt loam, 0 to 2 percent slopes	2E	None	1.00 - 2.00	1375	0.3
CaB	Calloway silt loam, 2 to 5 percent slopes	3E	None	1.00 - 2.00	4002	0.9
Cm	Collins silt loam	2W	Occas	2.00 - 5.00	61,457	14.0
Co	Collins silt loam, local alluvium	2W	Occas	2.00 - 5.00	11,625	2.6
CpF2	Cuthbert and Providence soils, 12 to 35 percent slopes, eroded (Sweatman and Providence)	7E	None	6.00 - 6.00	900	0.2
CpF2	Cuthbert and Providence soils, 12 to 35 percent slopes, eroded (Sweatman and Providence)		None	1.50 - 3.00	•	•
Do	Dowling silty clay and clay (Alligator)	4W	Occas	0.50 - 2.00	2020	0.5
Fa	Falaya silt loam	2W	Occas	1.00 - 2.00	56,198	12.8
Fi	Falaya silt loam, local alluvium	2W	Occas	1.00 - 2.00	2438	0.6
Fs	Falaya silty clay loam (Arkabutla)	2W	Occas	1.00 - 1.50	4319	1.0
Fw	Falaya and Waverly silt loams	4W	Freq	1.00 - 2.00	4670	1.1
Fw	Falaya and Waverly silt loams	5W	Freq	0.50 - 1.00	•	•
GrA	Grenada silt loam, 0 to 2 percent slopes	2E	None	1.50 - 2.50	254	0.1
GrB	Grenada silt loam, 2 to 5 percent slopes	2E	None	1.50 - 2.50	486	0.1
GrB2	Grenada silt loam, 2 to 5 percent slopes, eroded	2E	None	1.50 - 2.50	8291	1.9
GrB3	Grenada silt loam, 2 to 5 percent slopes, severely eroded	2E	None	1.50 - 2.50	1817	0.4
GrC2	Grenada silt loam, 5 to 8 percent slopes, eroded	3E	None	1.50 - 2.50	881	0.2
GrC3	Grenada silt loam, 5 to 8 percent slopes, severely eroded	4E	None	1.50 - 2.50	11,496	2.6
GrD2	Grenada silt loam, 8 to 12 percent slopes, eroded (Loring)	4E	None	2.00 - 3.00	523	0.1
GrD3	Grenada silt loam, 8 to 12 percent slopes, severely eroded (Loring)	6E	None	2.00 - 3.00	1475	0.3
Gs	Gullied land, sandy	7E	None	6.00 - 6.00	43,048	9.8
Gu	Gullied land, silty	7E	None	6.00 - 6.00	67,889	15.5
He	Henry silt loam	3W	None	0.50 - 1.50	1722	0.4
LoB2	Loring silt loam, 2 to 5 percent slopes, eroded	2E	None	2.00 - 3.00	10,070	2.3
LoB3	Loring silt loam, 2 to 5 percent slopes, severely eroded	3E	None	2.00 - 3.00	10,217	2.3
LoC	Loring silt loam, 5 to 8 percent slopes	3E	None	2.00 - 3.00	315	0.1
LoC2	Loring silt loam, 5 to 8 percent slopes, eroded	3E	None	2.00 - 3.00	2611	0.6
LoC3	Loring silt loam, 5 to 8 percent slopes, severely eroded	4E	None	2.00 - 3.00	24,563	5.6
LoD	Loring silt loam, 8 to 12 percent slopes	4E	None	2.00 - 3.00	886	0.2
LoD2	Loring silt loam, 8 to 12 percent slopes, eroded	4E	None	2.00 - 3.00	721	0.2
LoD3	Loring silt loam, 8 to 12 percent slopes, severely eroded	6E	None	2.00 - 3.00	5575	1.3
LoE2	Loring silt loam, 12 to 17 percent slopes, eroded		None	2.00 - 3.00	6957	1.6
LoE3	Loring silt loam, 12 to 17 percent slopes, severely eroded	7E	None	2.00 - 3.00	5746	1.3
MeB2	Memphis silt loam, 2 to 5 percent slopes, eroded	2E	None	6.00 - 6.00	868	0.2
MeB3	Memphis silt loam, 2 to 5 percent slopes, severely eroded	3E	None	6.00 - 6.00	1251	0.3
MeC3	Memphis silt loam, 5 to 8 percent slopes, severely eroded	4E	None	6.00 - 6.00	2178	0.5
MiF2	Memphis and Loring silt loams, 17 to 35 percent slopes, eroded		None	6.00 - 6.00	9554	2.2
MiF2	Memphis and Loring silt loams, 17 to 35 percent slopes, eroded		None	2.00 - 3.00	•	•
MiF3	Memphis and Loring silt loams, 17 to 35 percent slopes, severely eroded	7E	None	6.00 - 6.00	1068	0.2

MiF3	Memphis and Loring silt loams, 17 to 35 percent slopes, severely eroded	7E	None	2.00 - 3.00	*	*
MnF2	Memphis, Natchez, and Guin soils, 17 to 40 percent slopes, eroded (Memphis, Natchez, Saffell)	7E	None	6.00 - 6.00	8514	1.9
MnF2	Memphis, Natchez, and Guin soils, 17 to 40 percent slopes, eroded (Memphis, Natchez, Saffell)	7E	None	6.00 - 6.00	*	*
MnF2	Memphis, Natchez, and Guin soils, 17 to 40 percent slopes, eroded (Memphis, Natchez, Saffell)	7E	None	6.00 - 6.00	*	*
Mx	Mixed alluvial land				11,567	2.6
RpE2	Ruston, Providence, and Eustis soils, 12 to 17 percent slopes, eroded (Smithdale, Providence and Eustis)	6E	None	6.00 - 6.00	5563	1.3
RpE2	Ruston, Providence, and Eustis soils, 12 to 17 percent slopes, eroded (Smithdale, Providence and Eustis)		None	1.50 - 3.00	*	*
RpE2	Ruston, Providence, and Eustis soils, 12 to 17 percent slopes, eroded (Smithdale, Providence and Eustis)	7S	None	6.00 - 6.00	*	*
RpF2	Ruston, Providence, and Eustis soils, 17 to 35 percent slopes, eroded (Smithdale, Providence and Eustis)	7E	None	6.00 - 6.00	18,692	4.3
RpF2	Ruston, Providence, and Eustis soils, 17 to 35 percent slopes, eroded (Smithdale, Providence and Eustis)		None	1.50 - 3.00	*	*
RpF2	Ruston, Providence, and Eustis soils, 17 to 35 percent slopes, eroded (Smithdale, Providence and Eustis)	7S	None	6.00 - 6.00	*	*
Wa	Waverly silt loam	5W	Freq	0.50 - 1.00	5153	1.2
	Total				438,400	100.0

Source: USDA, Soil Conservation Service, State Conservationist, Jackson, MS. Figures were compiled in 1989, but based on the Panola County Soil Survey, 1963, USDA Soil Conservation Service.

* Denotes soils complexes that occur in such an intricate pattern that it was not practical to map them separately. Acreage and proportional extent figures for these soils are listed as a lump sum at the first listing of the complex.

USDA, Soil Conservation Service
Soil Series Map Unit Information

Quitman County, Mississippi

Map Symbol	Soil Series Map Unit Name	Capability Class	Annual Flood	Range of Depth to Seasonal High Water Table (feet)	Acres	Percent
	Pits, made land, intermittent streams and lakes, ditches, water, etc.				3650	1.4
	Swamps	5W	Freq		5120	1.9
Aa	Alligator clay, level phase	3W	Rare	0.50 - 2.00	16,252	6.2
Ab	Alligator clay, gently sloping phase	3E	Rare	0.50 - 2.00	1625	0.6
Ac	Alligator silty clay, nearly level phase	3W	Rare	0.50 - 2.00	21,940	8.3
Ad	Alligator silty clay, gently sloping phase	3E	Rare	0.50 - 2.00	813	0.3
Ae	Alligator and Dowling clays (Sharkey)	5W	Freq	0.50 - 2.00	23,378	8.9
Ae	Alligator and Dowling clays (Sharkey)	5W	Freq	0.00 - 2.00	*	*
Ag	Alligator and Sharkey clays, nearly level phases	3W	Rare	0.50 - 2.00	14,632	5.5
Ag	Alligator and Sharkey clays, nearly level phases	3E	Rare	0.00 - 2.00	*	*
Ah	Alligator and Sharkey clays, gently sloping phases	3E	Rare	0.50 - 2.00	1620	0.6
Ah	Alligator and Sharkey clays, gently sloping phases	3E	Rare	0.00 - 2.00	*	*
Ak	Ark silt loam (Commerce)	2E	None	1.50 - 4.00	320	0.1
Ba	Beulah sandy loam, nearly level phases	2S	None	6.00 - 6.00	128	0.1
Bb	Beulah sandy loam, gently sloping phases	2S	None	6.00 - 6.00	382	0.1
Bc	Bosket sandy loam, nearly level phase (Dubbs)	1	None	6.00 - 6.00	1224	0.5
Bd	Bosket sandy loam, gently sloping phase (Dubbs)	2E	None	6.00 - 6.00	816	0.3
Be	Brittain silt loam, nearly level phase (Amagon)	3W	Rare	1.00 - 2.00	4575	1.7
Bg	Brittain silt loam, gently sloping phase (Amagon)	3W	Rare	1.00 - 2.00	220	0.1
Bh	Brittain silty clay loam, nearly level phase (Amagon)	3W	Rare	1.00 - 2.00	5630	2.1
Bk	Brittain silty clay loam, gently sloping phase (Amagon)	3W	Rare	1.00 - 2.00	231	0.1
Bm	Brittain soils-waverly soils, local alluvium phases (Amagon, Rosebloom)	3W	Rare	1.00 - 2.00	7604	2.9
Bm	Brittain soils-waverly soils, local alluvium phases (Amagon, Rosebloom)	3W	Occas	0.00 - 1.00	*	*
Ca	Clack loamy sand, nearly level phase (Bruno)	3S	Occas	4.00 - 6.00	30	<0.1
Cc	Clack sandy loam, nearly level phase (Bruno)	3S	Occas	4.00 - 6.00	60	<0.1
Ce	Clay and sand banks, sloping				192	0.1
Cg	Clay and sand banks, strongly sloping				128	0.1
Ch	Collins silt loam	1	Rare	2.00 - 5.00	2822	1.1
Ck	Collins silty clay loam (Arkabutla)	2W	Occas	1.00 - 1.50	58	<0.1
Cm	Collins-Falaya silt loams, nearly level phases (Collins, Waverly)	2W	Occas	2.00 - 5.00	4325	1.6
Cm	Collins-Falaya silt loams, nearly level phases (Collins, Waverly)	3W	Occas	0.50 - 1.00	*	*
Cn	Collins-Falaya silt loams, gently sloping phase (Collins, Waverly)	2W	Occas	2.00 - 5.00	125	0.1
Cn	Collins-Falaya silt loams, gently sloping phase (Collins, Waverly)	3W	Occas	0.50 - 1.00	*	*
Co	Collins soils and waverly soils, local alluvium phases	2W	Occas	2.00 - 5.00	550	0.2
Cp	Crowder sandy clay (Sharkey)	3E	Rare	0.00 - 2.00	2560	1.0
Da	Dowling clay and silty clay (Sharkey)	4W	Occas	0.00 - 2.00	36,860	14.0
Db	Dubbs fine sandy loam, nearly level phase	1	None	6.00 - 6.00	1955	0.7
Dc	Dubbs fine sandy loam, gently sloping phase	2E	None	6.00 - 6.00	105	<0.1
Dd	Dundee silty clay loam, gently sloping phase	1	None	6.00 - 6.00	978	0.4
Dd	Dubbs silty loam, nearly level phase	1	None	6.00 - 6.00	951	0.4
Dd	Dundee silty clay loam, gently sloping phase	2E	Rare	1.50 - 3.50	*	*
Dd	Dubbs silty loam, nearly level phase	2E	Rare	1.50 - 3.50	*	*
De	Dubbs silt loam, gently sloping phase	2E	None	6.00 - 6.00	52	<0.1

Dg	Dundee fine sandy loam, nearly level phase	2W	Rare	1.50 - 3.50	11,095	4.2
Dh	Dundee fine sandy loam, gently sloping phase	2E	Rare	1.50 - 3.50	634	0.2
Dk	Dundee silt loam, nearly level phase	2W	Rare	1.50 - 3.50	8576	3.3
Dm	Dundee silt loam, gently sloping phase	2E	Rare	1.50 - 3.50	317	0.1
Dn	Dundee silty clay loam, nearly level phase	2W	Rare	1.50 - 3.50	9827	3.7
Fa	Falaya silt loam (Waverly)	3W	Occas	0.50 - 1.00	1016	0.4
Fb	Falaya silty clay loam (Arkabutla)	2W	Occas	1.00 - 1.50	904	0.3
Fc	Forestdale silt loam, nearly level phase	3W	Rare	0.50 - 2.00	17,495	6.6
Fd	Forestdale silt loam, gently sloping phase	3W	Rare	0.50 - 2.00	921	0.3
Fe	Forestdale silty clay loam, nearly level phase	3W	Rare	0.50 - 2.00	25,743	9.8
Fg	Forestdale silty clay loam, gently sloping phase	3W	Rare	0.50 - 2.00	1881	0.7
Pa	Pearson silt loam, nearly level phase (Dubbs)	1	None	6.00 - 6.00	689	0.3
Pb	Pearson silt loam, gently sloping phase (Dubbs)	2E	None	6.00 - 6.00	31	<0.1
Pc	Pearson silty clay loam, nearly level phase (Dubbs)	1	None	6.00 - 6.00	547	0.2
Pd	Pearson silty clay loam, gently sloping phase (Dubbs)	2E	None	6.00 - 6.00	29	0.0
Pe	Pearsons very fine sandy loam, nearly level phase (Dubbs)	1	None	6.00 - 6.00	130	0.1
Pg	Pearsons very fine sandy loam, gently sloping phase (Dubbs)	2E	None	6.00 - 6.00	14	<0.1
Sb	Sand banks, strongly sloping				640	0.2
Sc	Sharkey silt loam, nearly level overwash phase	3E	Rare	0.00 - 2.00	190	0.1
Sd	Sharkey silty clay, nearly level phase	3E	Rare	0.00 - 2.00	13,720	5.2
Se	Sharkey silty clay, gently sloping phase	3E	Rare	0.00 - 2.00	430	0.2
Sg	Souva silt loam, nearly level phase (Sharkey)	3E	Rare	0.00 - 2.00	768	0.3
Sh	Souva silt loam, gently sloping phase (Sharkey)	3E	Rare	0.00 - 2.00	192	0.1
Ta	Tunica silty clay, nearly level phase	3W	Rare	1.50 - 3.00	2957	1.1
Tb	Tunica silty clay, gently sloping phase	3E	Rare	1.50 - 3.00	563	0.2
Tc	Tunica and Dundee soils, nearly level phase	3W	Rare	1.50 - 3.00	225	0.1
Tc	Tunica and Dundee soils, nearly level phase	2W	Rare	1.50 - 3.50	*	*
Td	Tunica and Dundee soils, gently sloping phases	3E	Rare	1.50 - 3.00	75	<0.1
Td	Tunica and Dundee soils, gently sloping phases	2E	Rare	1.50 - 3.50	*	*
Wa	Waverly soils, depressional phases (Rosebloom)	3W	Occas	0.00 - 1.00	2160	0.8
	Total				263,680	100.0

Source: USDA, Soil Conservation Service, State Conservationist, Jackson, MS. Figures were compiled in 1989, but based on the Quitman County Soil Survey, 1958, USDA Soil Conservation Service.

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USDA, Soil Conservation Service
Soil Series Map Unit Information

Sharkey County, Mississippi

Map Symbol	Soil Series Map Unit Name	Capability Class	Annual Flood	Range of Depth to Seasonal High Water Table (feet)	Acres	Percent
Aa	Alligator clay, 0 to 1/2 percent slopes	3W	Rare	0.50 - 2.00	6325	2.3
Ab	Alligator clay, 1/2 to 2 percent slopes	3W	Rare	0.50 - 2.00	25,100	9.0
Ac	Alligator clay, overflow, 0 to 2 percent slopes	5W	Freq	0.50 - 2.00	560	0.2
Ae	Alligator silty clay loam, 0 to 2 percent slopes	3W	Rare	0.50 - 2.00	1395	0.5
Bk	Bowdre silty clay, 0 to 2 percent slopes	2W	Rare	1.50 - 2.00	4330	1.6
Bp	Borrow Pits	8S	None		200	0.1
Ch	Commerce silt loam, 0 to 2 percent slopes	2E	Rare	1.50 - 4.00	6265	2.3
Cm	Commerce silt loam, moderately shallow, 0 to 2 percent slopes	2E	Rare	1.50 - 4.00	570	0.2
Cn	Commerce very fine sandy loam, 0 to 2 percent slopes	2E	Rare	1.50 - 4.00	*	*
Cn	Commerce silty clay loam, 0 to 2 percent slopes	2E	Rare	1.50 - 4.00	11,785	4.2
Cn	Commerce very fine sandy loam, 0 to 2 percent slopes	2E	Rare	1.50 - 4.00	19,050	6.8
Cn	Commerce silty clay loam, 0 to 2 percent slopes	2E	Rare	1.50 - 4.00	*	*
Cr	Commerce very fine sandy loam, 2 to 5 percent slopes	2E	Rare	1.50 - 4.00	*	*
Cr	Commerce silty clay loam, 2 to 5 percent slopes	2E	Rare	1.50 - 4.00	*	*
Cr	Commerce very fine sandy loam, 2 to 5 percent slopes	2E	Rare	1.50 - 4.00	450	0.2
Cr	Commerce silty clay loam, 2 to 5 percent slopes	2E	Rare	1.50 - 4.00	440	0.2
Cs	Commerce silty clay loam, moderately shallow, 0 to 2 percent slopes	2E	Rare	1.50 - 4.00	1115	0.4
Cs	Commerce very fine sandy loam, moderately shallow, 0 to 2 percent slopes	2E	Rare	1.50 - 4.00	985	0.3
Cs	Commerce silty clay loam, moderately shallow, 0 to 2 percent slopes	2E	Rare	1.50 - 4.00	*	*
Cs	Commerce very fine sandy loam, moderately shallow, 0 to 2 percent slopes	2E	Rare	1.50 - 4.00	*	*
Da	Dowling Clay (Sharkey)	4W	Occas	0.00 - 2.00	11,765	4.2
Db	Dowling Soils, (Sharkey)	4W	Occas	0.00 - 2.00	4700	1.7
De	Dundee Silt loam, 0 to 2 percent slopes	2W	Rare	1.50 - 3.50	2690	1.0
Df	Dundee Silt loam, 2 to 5 percent slopes	2E	Rare	1.50 - 3.50	655	0.2
Dk	Dundee silty clay Loam, 0 to 2 percent slopes	2W	Rare	1.50 - 3.50	515	0.2
Fa	Forestdale silt Loam, 0 to 2 percent slopes	3W	Rare	0.50 - 2.00	4635	1.7
Fc	Forestdale silt loam, 2 to 5 percent slopes	3W	Rare	0.50 - 2.00	395	0.1
Fd	Forestdale silty clay loam, 0 to 2 percent slopes	3W	Rare	0.50 - 2.00	9800	3.5
Fe	Forestdale silty clay loam, 2 to 5 percent slopes	3W	Rare	0.50 - 2.00	605	0.2
Mh	Mhoon silty clay, 0 to 2 percent slopes	2W	Rare	0.00 - 3.00	750	0.3
Ro	Robinsonville very fine sandy loam, 0 to 2 percent slopes	1	Rare	4.00 - 6.00	630	0.2
Sa	Sharkey clay, 0 to 1/2 percent slopes	3W	Rare	0.00 - 2.00	20,385	7.3
Sb	Sharkey clay, 1/2 to 2 percent slopes	3E	Rare	0.00 - 2.00	38,205	13.7
Sd	Sharkey clay, overflow, 0 to 2 percent slopes	5W	Freq	0.00 - 2.00	1410	0.5
Se	Sharkey silt loam, overwash, 0 to 2 percent slopes	3E	Rare	0.00 - 2.00	300	0.1
Sk	Sharkey silty clay loam, 0 to 2 percent slopes	3E	Rare	0.00 - 2.00	770	0.3
Sr	Sharkey, Alligator, and Dowling soils (Sharkey, Alligator, Sharkey)	5W	Freq	0.00 - 2.00	95,000	34.0
Sr	Sharkey, Alligator, and Dowling soils (Sharkey, Alligator, Sharkey)	5W	Freq	0.50 - 2.00	*	*

Sr	Sharkey, Alligator, and Dowling Soils (Sharkey, Alligator, Sharkey)	5W	Freq	0.00 - 2.00	*	*
Ta	Tunica clay, 0 to 2 percent slopes	3W	Rare	1.50 - 3.00	5415	1.9
Tc	Tunica silty clay loam, 0 to 2 percent slopes	3W	Rare	1.50 - 3.00	520	0.2
	Large bodies of water (more than 40 acres)				900	0.3
	Small bodies of water (less than 40 acres)				425	0.1
	Total				279,040	100.0

Source: USDA, Soil Conservation Service, State Conservationist, Jackson, MS. Figures were compiled in 1989, but based on the Sharkey County Soil Survey, 1962, USDA Soil Conservation Service.*

* Denotes soils complexes that occur in such an intricate pattern that it was not practical to map them separately. Acreage and proportional extent figures for these soils are listed as a lump sum at the first listing of the complex.

USDA, Soil Conservation Service
Soil Series Map Unit Information

Sunflower County, Mississippi

Map Symbol	Soil Series Map Unit Name	Capability Class	Annual Flood	Range of Depth to Seasonal High Water Table (feet)	Acres	Percent
	Other areas, not mapped in detail				12,965	2.9
Aa	Alligator clay, level phase	3W	Rare	0.50 - 2.00	20,651	4.7
Ab	Alligator clay, nearly level phase	3W	Rare	0.50 - 2.00	51,175	11.5
Ac	Alligator clay, gently sloping phase	3E	Rare	0.50 - 2.00	2351	0.5
Ad	Alligator clay, sloping phase	3E	Rare	0.50 - 2.00	120	<0.1
Ae	Alligator silty clay, level phase	3W	Rare	0.50 - 2.00	2216	0.5
Ag	Alligator silty clay, nearly level phase	3W	Rare	0.50 - 2.00	31,885	7.2
Ah	Alligator silty clay, gently sloping phase	3E	Rare	0.50 - 2.00	1550	0.3
Ak	Alligator silty clay loam, level phase	3W	Rare	0.50 - 2.00	210	0.1
Am	Alligator silty clay loam, nearly level phase	3W	Rare	0.50 - 2.00	3978	0.9
Ba	Beulah fine sandy loam, nearly level phase	2S	None	6.00 - 6.00	266	0.1
Bb	Beulah fine sandy loam, gently sloping phase	2S	None	6.00 - 6.00	112	<0.1
Bc	Bosket very fine sandy loam, nearly level phase (Dubbs)	1	None	6.00 - 6.00	897	0.2
Bd	Bosket very fine sandy loam, gently sloping phase (Dubbs)	3E	None	6.00 - 6.00	216	0.1
Be	Brittain silt loam, nearly level phase (Amagon)	3W	Rare	1.00 - 2.00	922	0.2
Da	Dexter silt loam, nearly level phase (Dubbs)	1	None	6.00 - 6.00	429	0.1
Db	Dowling clay (Sharkey)	4W	Occas	0.00 - 2.00	49,117	11.1
Dc	Dowling soils, overwash phases (Sharkey)	4W	Occas	0.00 - 2.00	40,101	9.0
Dd	Dubbs silt loam, nearly level phase	1	None	6.00 - 6.00	2899	0.7
De	Dubbs silt loam, gently sloping phase	3E	None	6.00 - 6.00	174	<0.1
Dg	Dubbs very fine sandy loam, nearly level phase	1	None	6.00 - 6.00	9502	2.1
Dh	Dubbs very fine sandy loam, gently sloping phase	3E	None	6.00 - 6.00	613	0.1
Dk	Dundee silt loam, nearly level phase	2W	Rare	1.50 - 3.50	42,885	9.7
Dm	Dundee silt loam, gently sloping phase	3E	Rare	1.50 - 3.50	2662	0.6
Dn	Dundee silt loam, sloping phase	3E	Rare	1.50 - 3.50	133	<0.1
Do	Dundee silty clay loam, nearly level phase	2W	Rare	1.50 - 3.50	5143	1.2
Dp	Dundee silty clay loam, gently sloping phase	3E	Rare	1.50 - 3.50	1650	0.4
Dr	Dundee silty clay loam, sloping phase	3E	Rare	1.50 - 3.50	245	0.1
Ds	Dundee very fine sandy loam, nearly level phase	2W	Rare	1.50 - 3.50	20,573	4.6
Dt	Dundee very fine sandy loam, gently sloping phase	3E	Rare	1.50 - 3.50	1815	0.4
Du	Dundee very fine sandy loam, sloping phase	3E	Rare	1.50 - 3.50	240	0.1
Dv	Dundee-Clack soils, nearly level phases (Dundee, Bruno)	2W	Rare	1.50 - 3.50	522	0.1
Dv	Dundee-Clack soils, nearly level phases (Dundee, Bruno)	3S	Rare	4.00 - 6.00	*	*
Dw	Dundee-Clack soils, gently sloping phases (Dundee, Bruno)	3E	Rare	1.50 - 3.50	938	0.2
Dw	Dundee-Clack soils, gently sloping phases (Dundee, Bruno)	3S	Rare	4.00 - 6.00	*	*
Fa	Forestdale silt loam, level phase	3W	Rare	0.50 - 2.00	1251	0.3
Fb	Forestdale silt loam, nearly level phase	3W	Rare	0.50 - 2.00	55,942	12.6
Fc	Forestdale silt loam, gently sloping phase	3W	Rare	0.50 - 2.00	1685	0.4
Fd	Forestdale silt loam, sloping phase	3W	Rare	0.50 - 2.00	138	<0.1
Fe	Forestdale silty clay, level phase	3W	Rare	0.50 - 2.00	92	<0.1
Fg	Forestdale silty clay, nearly level phase	3W	Rare	0.50 - 2.00	8078	1.8
Fh	Forestdale silty clay, gently sloping phase	3W	Rare	0.50 - 2.00	1133	0.3
Fk	Forestdale silty clay loam, level phase	3W	Rare	0.50 - 2.00	630	0.1
Fm	Forestdale silty clay loam, nearly level phase	3W	Rare	0.50 - 2.00	40,467	9.1
Fn	Forestdale silty clay loam, gently sloping phase	3W	Rare	0.50 - 2.00	2057	0.5
Fo	Forestdale silty clay loam, sloping phase	3W	Rare	0.50 - 2.00	249	0.1
Fp	Forestdale very fine sandy loam, level phase	3W	Rare	0.50 - 2.00	6	<0.1
Fr	Forestdale very fine sandy loam, nearly level phase	3W	Rare	0.50 - 2.00	2055	0.5
Fs	Forestdale very fine sandy loam, gently sloping phase	3W	Rare	0.50 - 2.00	209	0.1

Ia	Iberia clay (Sharkey)	3W	Rare	0.00 - 2.00	432	0.1
Pa	Pearson silt loam, nearly level phase (Dundee)	2W	Rare	1.50 - 3.50	1099	0.3
Pb	Pearson silt loam, gently sloping phase (Dundee)	3E	Rare	1.50 - 3.50	42	<0.1
Sa	Sharkey clay, level phase	3W	Rare	0.00 - 2.00	4487	1.0
Sb	Sharkey clay, nearly level phase	3E	Rare	0.00 - 2.00	11,517	2.6
Sc	Sharkey clay, gently sloping phase	3E	Rare	0.00 - 2.00	638	0.1
Sd	Sharkey clay, sloping phase	3E	Rare	0.00 - 2.00	34	<0.1
Se	Sharkey silty clay loam, level phase	3W	Rare	0.00 - 2.00	97	<0.1
Sg	Sharkey silty clay loam, nearly level phase	3E	Rare	0.00 - 2.00	195	<0.1
Sh	Sharkey-Clack soils, nearly level phases (Sharkey, Bruno)	3E	Rare	0.00 - 2.00	284	0.1
Sh	Sharkey-Clack soils, nearly level phases (Sharkey, Bruno)	3S	Rare	4.00 - 2.00	*	*
Sk	Sharkey-Clack soils, gently sloping phases (Sharkey, Bruno)	3E	Rare	0.00 - 2.00	878	0.2
Sk	Sharkey-Clack soils, gently sloping phases (Sharkey, Bruno)	3S	Rare	4.00 - 6.00	*	*
Sm	Souva soils (Amagon)	3W	Occas	1.00 - 2.00	320	0.1
Ta	Tunica silty clay, nearly level phase	3W	Rare	1.50 - 3.00	270	0.1
Wa	Waverly silt loam, local alluvium phase (Rosebloom)	3W	Occas	0.00 - 1.00	80	<0.1
	Total				443,520	100.0

Source: USDA, Soil Conservation Service, State Conservationist, Jackson, MS. Figures were compiled in 1989, but based on the Sunflower County Soil Survey, 1959, USDA Soil Conservation Service.

* Denotes soils complexes that occur in such an intricate pattern that it was not practical to map them separately. Acreage and proportional extent figures for these soils are listed as a lump sum at the first listing of the complex.

USDA, Soil Conservation Service
Soil Series Map Unit Information

Tallahatchie County, Mississippi

Map Symbol	Soil Series Map Unit Name	Capability Class	Annual Flood	Range of Depth to Seasonal High Water Table (feet)	Acres	Percent
	Miscellaneous				12,420	3.0
AcA	Alligator clay, 0 to 2 percent slopes	3W	Rare	0.50 - 2.00	68,375	16.6
Ad	Alligator clay, depressional	4W	Occas	0.50 - 2.00	38,060	9.2
AsA	Alligator silty clay loam, 0 to 2 percent slopes	3W	Rare	0.50 - 2.00	6100	1.5
Ca	Calhoun silt loam	3W	None	0.00 - 2.00	300	0.1
Cb	Calhoun-Bonn complex	3W	None	0.00 - 2.00	3000	0.7
Cb	Calhoun-Bonn complex	4S	None	0.00 - 2.00	•	•
ClA	Calloway silt loam, 0 to 3 percent slopes	2E	None	1.00 - 2.00	895	0.2
CmA	Cascilla silt loam, 0 to 3 percent slopes	1	Rare	6.00 - 6.00	550	0.1
Cn	Collins silt loam	2W	Occas	2.00 - 5.00	19,895	4.8
Co	Collins silt loam, clayey subsoil variant	2W	Occas	2.00 - 5.00	380	0.1
Cs	Crevasse and Bruno soils	4S	Rare	3.50 - 6.00	410	0.1
Cs	Crevasse and Bruno soils	3S	Rare	4.00 - 6.00	•	•
DbA	Dubbs very fine sandy loam, 0 to 2 percent slopes	1	None	6.00 - 6.00	25,960	6.3
DbB	Dundee silt loam, 2 to 5 percent slopes	2E	None	6.00 - 6.00	17,000	4.1
DbB	Dubbs very fine sandy loam, 2 to 5 percent slopes	2E	None	6.00 - 6.00	•	•
DbB	Dundee silt loam, 2 to 5 percent slopes	2E	Rare	1.50 - 3.50	3990	1.0
DbB	Dubbs very fine sandy loam, 2 to 5 percent slopes	2E	Rare	1.50 - 3.50	•	•
DdA	Dundee silt loam, 0 to 2 percent slopes	2W	Rare	1.50 - 3.50	37,075	9.0
DeA	Dundee silty clay loam, 0 to 2 percent slopes	2W	Rare	1.50 - 3.50	5900	1.4
DeB	Dundee silty clay loam, 2 to 5 percent slopes	2E	Rare	1.50 - 3.50	2000	0.5
DnC	Dundee soils, 5 to 8 percent slopes	3E	Rare	1.50 - 3.50	1260	0.3
DtA	Dundee and Tensas silt loams, 0 to 3 percent slopes	2W	Rare	1.50 - 3.50	18,515	4.5
DtA	Dundee and Tensas silt loams, 0 to 3 percent slopes	3E	Rare	1.00 - 3.00	•	•
FE	Falaya-Waverly association	4W	Freq	1.00 - 2.00	5720	1.4
FE	Falaya-Waverly association	5W	Freq	0.50 - 1.00	•	•
Fa	Falaya silt loam	2W	Occas	1.00 - 2.00	10,125	2.5
Fo	Forestdale silt loam, depressional	4w	Occas	0.50 - 2.00	700	0.2
Fr	Forestdale silty clay loam, 0 to 3 percent slopes	3W	Rare	0.50 - 2.00	17,580	4.3
GrA	Grenada silt loam, 0 to 2 percent slopes	2E	None	1.50 - 2.50	985	0.2
GrB2	Grenada silt loam, 2 to 5 percent slopes, eroded	2E	None	1.50 - 2.50	1520	0.4
GrC3	Grenada silt loam, 2 to 8 percent slopes, severely eroded	4E	None	1.50 - 2.50	400	0.1
GuF	Gullied land-Memphis complex, 8 to 40 percent slopes	7E	None	6.00 - 6.00	19,285	4.7
GuF	Gullied land-Memphis complex, 8 to 40 percent slopes	6E	None	6.00 - 6.00	•	•
LeA	Leverett silt loam, 0 to 2 percent slopes	1	None	2.50 - 3.00	890	0.2
LeB	Leverett silt loam, 2 to 5 percent slopes	2E	None	2.50 - 3.00	480	0.1
LoA	Loring silt loam, 0 to 2 percent slopes	2W	None	2.00 - 3.00	550	0.1
LoB2	Loring silt loam, 2 to 5 percent slopes, eroded	2E	None	2.00 - 3.00	2240	0.5
LoC2	Loring silt loam, 5 to 8 percent slopes, eroded	3E	None	2.00 - 3.00	3725	0.9
LoD2	Loring silt loam, 8 to 12 percent slopes, eroded	4E	None	2.00 - 3.00	2160	0.5
MeA	Memphis silt loam, 0 to 2 percent slopes	1	None	6.00 - 6.00	280	0.1
MeB2	Memphis silt loam, 2 to 5 percent slopes, eroded	2E	None	6.00 - 6.00	1230	0.3
MeC2	Memphis silt loam, 5 to 8 percent slopes, eroded	3E	None	6.00 - 6.00	4820	1.2
MeD2	Memphis silt loam, 8 to 12 percent slopes, eroded	4E	None	6.00 - 6.00	1380	0.3
MeD3	Memphis silt loam, 5 to 12 percent slopes, severely eroded	4E	None	6.00 - 6.00	9485	2.3
MeE	Memphis silt loam, 12 to 17 percent slopes	6E	None	6.00 - 6.00	4375	1.1
MeE3	Memphis silt loam, 12 to 17 percent slopes, severely eroded	6E	None	6.00 - 6.00	7230	1.8
MeF	Memphis silt loam, 17 to 40 percent slopes	7E	None	6.00 - 6.00	24,085	5.8
MeF3	Memphis silt loam, 17 to 40 percent slopes, severely eroded	7E	None	6.00 - 6.00	7425	1.8
MnF	Memphis-Natchez complex, 17 to 40 percent slopes	7E	None	6.00 - 6.00	3540	0.9

MnF	Memphis-Natchez complex, 17 to 40 percent slopes	7E	None	6.00 - 6.00	*	*
Ro	Rosebloom silt loam	3W	Occas	0.00 - 1.00	2300	0.6
Sh	Sharkey Clay	3E	Rare	0.00 - 2.00	1000	0.2
TpA	Tippo silt loam, 0 to 2 percent slopes	2W	None	1.50 - 2.50	1240	0.3
TuA	Tutwiler very fine sandy loam, 0 to 3 percent slopes	1	None	6.00 - 6.00	3295	0.8
TwB	Tutwiler-Bruno complex, 0 to 5 percent slopes	2E	None	6.00 - 6.00	1690	0.4
TwB	Tutwiler-Bruno complex, 0 to 5 percent slopes	3S	Occas	4.00 - 6.00	*	*
Vc	Vicksburg silt loam	2W	Occas	2.50 - 4.00	3430	0.8
Vk	Vicksburg and Bruno soils	2W	Occas	2.50 - 4.00	2720	0.7
Vk	Vicksburg and Bruno soils	3S	Occas	4.00 - 6.00	*	*
Wv	Waverly silt loam	3W	Occas	0.50 - 1.00	4190	1.0
	Total				412,160	100.0

Source: USDA, Soil Conservation Service, State Conservationist, Jackson, MS. Figures were compiled in 1989, but based on the Tallahatchie County Soil Survey, 1970, USDA Soil Conservation Service.

* Denotes soils complexes that occur in such an intricate pattern that it was not practical to map them separately. Acreage and proportional extent figures for these soils are listed as a lump sum at the first listing of the complex.

USDA, Soil Conservation Service
Soil Series Map Unit Information

Tate County, Mississippi

Map Symbol	Soil Series Map Unit Name	Capability Class	Annual Flood	Range of Depth to Seasonal High Water Table (feet)	Acres	Percent
AS	Alligator-Dowling association (Alligator, Alligator)	5W	Freq	0.50 - 2.00	3251	1.3
AS	Alligator-Dowling association (Alligator, Alligator)	5W	Freq	0.50 - 2.00	*	*
Aa	Adler silt loam, local alluvium	2W	Occas	2.00 - 3.00	375	0.1
Ag	Adler and Morganfield silt loams	2W	Occas	2.00 - 3.00	740	0.3
Ag	Adler and Morganfield silt loams	2W	Occas	3.00 - 4.00	*	*
Am	Adler and Morganfield silt loams, local alluvium	2W	Occas	2.00 - 3.00	980	0.4
Am	Adler and Morganfield silt loams, local alluvium	2W	Occas	3.00 - 4.00	*	*
Ao	Alligator clay	3W	Rare	0.50 - 2.00	1289	0.5
Ar	Alligator silty clay loam	3W	Rare	0.50 - 2.00	781	0.3
At	Alluvial land				2822	1.1
Au	Arkabutla silty clay loam	4W	Freq	1.00 - 1.50	2150	0.9
CaA	Calloway silt loam, 0 to 2 percent slopes	2E	None	1.00 - 2.00	1052	0.4
CaB	Calloway silt loam, 2 to 5 percent slopes	3E	None	1.00 - 2.00	1202	0.5
CaB2	Calloway silt loam, 2 to 5 percent slopes, eroded	3E	None	1.00 - 2.00	1787	0.7
Cm	Collins silt loam	2W	Occas	2.00 - 5.00	29,905	12.2
Co	Collins silt loam, local alluvium	2W	Occas	2.00 - 5.00	8099	3.3
Dc	Dowling clay (Alligator)	4W	Occas	0.50 - 2.00	598	0.2
DnA	Dundee loam, 0 to 2 percent slopes	2W	Rare	1.50 - 3.50	359	0.1
DsA	Dundee silty clay loam, 0 to 2 percent slopes	2W	Rare	1.50 - 3.50	129	0.1
Fa	Falaya silt loam	2W	Occas	1.00 - 2.00	27,320	11.2
GrC	Grenada silt loam, 5 to 8 percent slopes	3E	None	1.50 - 2.50	427	0.2
GrC2	Grenada silt loam, 5 to 8 percent slopes, eroded	3E	None	1.50 - 2.50	3015	1.2
GrC3	Grenada silt loam, 5 to 8 percent slopes, severely eroded	4E	None	1.50 - 2.50	15,702	6.4
GrD	Grenada silt loam, 8 to 12 percent slopes (Loring)	4E	None	2.00 - 3.00	880	0.4
GrD2	Grenada silt loam, 8 to 12 percent slopes, eroded (Loring)	4E	None	2.00 - 3.00	675	0.3
GrD3	Grenada silt loam, 8 to 12 percent slopes, severely eroded (Loring)	6E	None	2.00 - 3.00	8616	3.5
Gs	Grenada-gullied land complex (Loring)	4E	None	2.00 - 3.00	20,942	8.5
Gs	Grenada-gullied land complex (Loring)	7E	None	6.00 - 6.00	*	*
Gt	Gullied land, sandy	7E	None	6.00 - 6.00	10,050	4.1
Gu	Gullied land, silty	7E	None	6.00 - 6.00	21,370	8.7
He	Henry silt loam	3W	None	0.50 - 1.50	646	0.3
LgA	Loring-Grenada silt loams, 0 to 2 percent slopes	2W	None	2.00 - 3.00	265	0.1
LgA	Loring-Grenada silt loams, 0 to 2 percent slopes	2E	None	1.50 - 2.50	*	*
LgB	Loring-Grenada silt loams, 2 to 5 percent slopes	2E	None	2.00 - 3.00	740	0.3
LgB	Loring-Grenada silt loams, 2 to 5 percent slopes	2E	None	1.50 - 2.50	*	*
LgB2	Loring-Grenada silt loams, 2 to 5 percent slopes, eroded	2E	None	2.00 - 3.00	14,022	5.7
LgB2	Loring-Grenada silt loams, 2 to 5 percent slopes, eroded	2E	None	1.50 - 2.50	*	*
LgB3	Loring-Grenada silt loams, 2 to 5 percent slopes, severely eroded	3E	None	2.00 - 3.00	4139	1.7
LgB3	Loring-Grenada silt loams, 2 to 5 percent slopes, severely eroded	3E	None	1.50 - 2.50	*	*
Ma	Made land				337	0.1
MeB2	Memphis silt loam, 2 to 5 percent slopes, eroded	2E	None	6.00 - 6.00	5321	2.2
MeB3	Memphis silt loam, 2 to 5 percent slopes, severely eroded	3E	None	6.00 - 6.00	1362	0.6
MeC2	Memphis silt loam, 5 to 8 percent slopes, eroded	3E	None	6.00 - 6.00	963	0.4
MeC3	Memphis silt loam, 5 to 8 percent slopes, severely eroded	4E	None	6.00 - 6.00	8374	3.4
MeD2	Memphis silt loam, 8 to 12 percent slopes, eroded	4E	None	6.00 - 6.00	222	0.1
MeD3	Memphis silt loam, 8 to 12 percent slopes, severely eroded	6E	None	6.00 - 6.00	3770	1.5
MeE2	Memphis silt loam, 12 to 17 percent slopes, eroded	6E	None	6.00 - 6.00	2240	0.9

MeE3	Memphis silt loam, 12 to 17 percent slopes, severely eroded	6E	None	6.00 - 6.00	4010	1.6
MeF	Memphis silt loam, 17 to 45 percent slopes	7E	None	6.00 - 6.00	5052	2.1
MeF3	Memphis silt loam, 17 to 45 percent slopes, severely eroded	7E	None	6.00 - 6.00	1198	0.5
Mg	Memphis-gullied land complex	4E	None	6.00 - 6.00	11,322	4.6
Mg	Memphis-gullied land complex	7E	None	6.00 - 6.00	*	*
NmE	Natchez-Memphis silt loams, 12 to 17 percent slopes	6E	None	6.00 - 6.00	335	0.1
NmE	Natchez-Memphis silt loams, 12 to 17 percent slopes	6E	None	6.00 - 6.00	*	*
NmF	Natchez-Memphis silt loams, 17 to 50 percent slopes	7E	None	6.00 - 6.00	2110	0.9
NmF	Natchez-Memphis silt loams, 17 to 50 percent slopes	7E	None	6.00 - 6.00	*	*
PoD3	Providence silt loams, 8 to 12 percent slopes, severely eroded	6E	None	1.50 - 3.00	537	0.2
PrE	Providence-Ruston complex, 12 to 17 percent slopes (Providence, Smithdale)		None	1.50 - 3.00	3230	1.3
PrE	Providence-Ruston complex, 12 to 17 percent slopes (Providence, Smithdale)	6E	None	6.00 - 6.00	*	*
PrE3	Providence-Ruston complex, 12 to 17 percent slopes, severely eroded (Providence, Smithdale)	7E	None	1.50 - 3.00	2860	1.2
PrE3	Providence-Ruston complex, 12 to 17 percent slopes, severely eroded (Providence, Smithdale)	7E	None	6.00 - 6.00	*	*
RpF	Ruston-Providence complex, 17 to 50 percent slopes (Smithdale, Providence)	7E	None	6.00 - 6.00	4487	1.8
RpF	Ruston-Providence complex, 17 to 50 percent slopes (Smithdale, Providence)		None	1.50 - 3.00	*	*
Sm	Smoothed silt land				1700	0.7
Wk	Wakeland silt loam (Convent)	3W	Occas	1.50 - 4.00	320	0.1
Wv	Waverly silt loam	5W	Freq	0.50 - 1.00	1042	0.4
	Total				245,120	100.0

Source: USDA, Soil Conservation Service, State Conservationist, Jackson, MS. Figures were compiled in 1989, but based on the Tate County Soil Survey, 1967, USDA Soil Conservation Service.

* Denotes soils complexes that occur in such an intricate pattern that it was not practical to map them separately. Acreage and proportional extent figures for these soils are listed as a lump sum at the first listing of the complex.

USDA, Soil Conservation Service
Soil Series Map Unit Information

Tunica County, Mississippi

Map Symbol	Soil Series Map Unit Name	Capability Class	Annual Flood	Range of Depth to Seasonal High Water Table (feet)	Acres	Percent
	Levee and river not mapped				33,280	11.3
Aa	Alligator clay, level phase	3W	Rare	0.50 - 2.00	3200	1.1
Ab	Alligator clay, undulating phase	3E	Rare	0.50 - 2.00	640	0.2
Ac	Alluvial soils		Freq		1080	0.4
Ad	Alva and Eupora soils, (Tutwiler)	1	None	6.00 - 6.00	320	0.1
Ad	Alva and Eupora soils, (Tutwiler)	1	None	6.00 - 6.00	*	*
Ae	Ark soils, (Commerce)	2E	Rare	1.50 - 4.00	1920	0.7
Ba	Bosket sandy loam, level phase (Dubbs)	1	None	6.00 - 6.00	3200	1.1
Bb	Bosket sandy loam, undulating phase (Dubbs)	2E	None	6.00 - 6.00	2560	0.9
Bc	Bosket very fine sandy loam, level phase (Dubbs)	1	None	6.00 - 6.00	10,880	3.7
Bd	Bosket very fine sandy loam, undulating phase (Dubbs)	3E	None	6.00 - 6.00	1920	0.7
Be	Bowdre soils	2W	Rare	1.50 - 2.00	960	0.3
Ca	Clack loamy sand, level phase (Bruno)	3S	Occas	4.00 - 6.00	400	0.1
Cb	Clack loamy sand, undulating phase (Bruno)	3S	Occas	4.00 - 6.00	1840	0.6
Cc	Clay and sand banks, gently sloping				2240	0.8
Cd	Clay and sand banks, sloping				960	0.3
Ce	Clay soils (unclassified)				39,253	13.4
Cf	Collins silt loam (Adler)	1	Rare	2.00 - 3.00	960	0.3
Cg	Commerce silt loam and very fine sandy loam (Morganfield)	1	Rare	3.00 - 4.00	4480	1.5
Ch	Commerce silt loam, shallow phase (Adler)	1	Rare	2.00 - 3.00	320	0.1
Ck	Crevasse sandy loam, level phase (Bruno)	3S	Occas	4.00 - 6.00	100	<0.1
Cl	Crevasse sandy loam, undulating (Bruno)	3S	Occas	4.00 - 6.00	220	0.1
Da	Dowling silt loam, and clay loam (Sharkey)	4W	Occas	0.00 - 2.00	1280	0.4
Db	Dowling soils (Sharkey)	4W	Occas	0.00 - 2.00	2560	0.9
Dc	Dubbs silt loam and very fine sandy loam, level phases	1	None	6.00 - 6.00	1920	0.7
Dd	Dubbs silt loam and very fine sandy loam, undulating phases	2E	None	6.00 - 6.00	640	0.2
De	Dubbs very fine sandy loam, level phase	1	None	6.00 - 6.00	2880	1.0
Df	Dubbs very fine sandy loam, undulating phase	2E	None	6.00 - 6.00	960	0.3
Dg	Dundee silt loam and very fine sandy loam, level phase	2W	Rare	1.50 - 3.50	10,240	3.5
Dh	Dundee silt loam, very fine sandy loam, undulating phases	2E	Rare	1.50 - 3.50	2560	0.9
Di	Dundee silt loam, undulating phase	2E	Rare	1.50 - 3.50	1600	0.6
Dk	Dundee silt loam, level phase	2W	Rare	1.50 - 3.50	5280	1.8
Dm	Dundee silty clay loam, level phase (Forestdale)	3W	Rare	0.50 - 2.00	2560	0.9
Dn	Dundee silty clay loam, undulating phase (Forestdale)	3W	Rare	0.50 - 2.00	2880	1.0
Do	Dundee very fine sandy loam, level phase	2W	Rare	1.50 - 3.50	480	0.2
Fa	Forestdale silt loam, level phase	3W	Rare	0.50 - 2.00	3840	1.3
Fb	Forestdale silt loam, undulating phase	3W	Rare	0.50 - 2.00	160	0.1
Fc	Forestdale silty clay loam-clay, level phases	3W	Rare	0.50 - 2.00	5280	1.8
Fd	Forestdale silty clay loam-clay undulating phases	3W	Rare	0.50 - 2.00	4160	1.4
Ma	Mhoon and Sharkey soils, (Commerce, Sharkey)	2E	Rare	1.50 - 4.00	700	0.2
Ma	Mhoon and Sharkey soils, (Commerce, Sharkey)	3E	Rare	0.00 - 2.00	*	*
Mb	Mhoon silt loam (Commerce)	2E	Rare	1.50 - 4.00	640	0.2
Ra	Riverwash (Crevasse)	5W	Freq	3.50 - 6.00	200	0.1
Rb	Robinsonville silt loam and very fine sandy loam	1	Rare	4.00 - 6.00	1920	0.7
Sa	Sand banks, sloping				320	0.1
Sb	Sharkey-Alligator clays, level phases	3E	Rare	0.00 - 2.00	47,434	16.2
Sb	Sharkey-Alligator clays, level phases	3W	Rare	0.50 - 2.00	*	*
Sc	Sharkey and Dowling clays (Sharkey)	4W	Occas	0.00 - 2.00	45,153	15.4
Sc	Sharkey and Dowling clays (Sharkey)	4W	Occas	0.00 - 2.00	*	*
Sd	Sharkey clay, undulating phase	3E	Rare	0.00 - 2.00	5120	1.8

Sf	Sharkey silty clay loam, level overwash phase	3E	Rare	0.00 - 2.00	400	0.1
Sg	Sharkey silty clay loam, undulating overwash phase	3E	Rare	0.00 - 2.00	300	0.1
Sh	Souva silt loam, gently sloping phase (Sharkey)	4W	Occas	0.00 - 2.00	1600	0.6
Sk	Souva silt loam, level phase (Sharkey)	4W	Occas	0.00 - 2.00	9280	3.2
Ta	Tunica and Dundee soils, level phases	3W	Rare	1.50 - 3.00	1600	0.6
Ta	Tunica and Dundee soils, level phases	2W	Rare	1.50 - 3.50	*	*
Tb	Tunica and Dundee soils, undulating phases	3E	Rare	1.50 - 3.00	160	0.1
Tb	Tunica and Dundee soils, undulating phases	2E	Rare	1.50 - 3.50	*	*
Tc	Tunica clay and silty clay, level phases	3W	Rare	1.50 - 3.00	8960	3.1
Td	Tunica clay and silty clay, undulating phases	3E	Rare	1.50 - 3.00	7520	2.6
Te	Tunica, Commerce, and Sharkey soils	5W	Freq	1.50 - 3.00	1800	0.6
Te	Tunica, Commerce, and Sharkey soils	5W	Freq	1.50 - 4.00	*	*
Te	Tunica, Commerce, and Sharkey soils	5W	Freq	0.00 - 2.00	*	*
	Total				293,120	100.0

Source: USDA, Soil Conservation Service, State Conservationist, Jackson, MS. Figures were compiled in 1989, but based on the Tunica County Soil Survey, 1956, USDA Soil Conservation Service.

* Denotes soils complexes that occur in such an intricate pattern that it was not practical to map them separately. Acreage and proportional extent figures for these soils are listed as a lump sum at the first listing of the complex.

USDA, Soil Conservation Service
Soil Series Map Unit Information

Warren County, Mississippi

Map Symbol	Soil Series Map Unit Name	Capability Class	Annual Flood	Range of Depth to Seasonal High Water Table (feet)	Acres	Percent
Ad	Adler silt loam	2W	Occas	2.00 - 3.00	22,030	6.1
Am	Adler and Morganfield silt loams, local alluvium	2W	Occas	2.00 - 3.00	2480	0.7
Am	Adler and Morganfield silt loams, local alluvium	2W	Occas	3.00 - 4.00	*	*
Ar	Alligator clay	3W	Rare	0.50 - 2.00	2410	0.7
Bo	Bowdre silty clay	2W	Rare	1.50 - 2.00	775	0.2
Ca	Calloway silt loam	2E	None	1.00 - 2.00	950	0.3
Ci	Collins silt loam	2W	Occas	2.00 - 5.00	830	0.2
Cm	Collins silt loam, local alluvium	2W	Occas	2.00 - 5.00	700	0.2
Cn	Commerce silt loam	2E	Rare	1.50 - 4.00	3135	0.9
Co	Commerce silty clay loam	2E	Rare	1.50 - 4.00	8480	2.3
Cp	Commercé very fine sandy loam	2E	Rare	1.50 - 4.00	11,925	3.3
CrC	Commerce, Robinsonville, and Crevasse soils (Commerce, Robinsonville, Bruno)	5W	Freq	1.50 - 4.00	43,080	11.9
CrC	Commerce, Robinsonville, and Crevasse soils (Commerce, Robinsonville, Bruno)	4W	Freq	4.00 - 6.00	*	*
CrC	Commerce, Robinsonville, and Crevasse soils (Commerce, Robinsonville, Bruno)	5W	Freq	4.00 - 6.00	*	*
Cy	Crevasse fine sandy loam (Bruno)	3S	Occas	4.00 - 6.00	1315	0.4
Do	Dowling clay (Sharkey)	5W	Freq	0.00 - 2.00	7345	2.0
Fa	Falaya silt loam (Collins)	2W	Occas	2.00 - 5.00	11,340	3.1
Fi	Falaya silt loam, local alluvium (Collins)	2W	Occas	2.00 - 5.00	2970	0.8
GrA	Grenada silt loam, 0 to 2 percent slopes	2E	None	1.50 - 2.50	615	0.2
GrB	Grenada silt loam, 2 to 5 percent slopes	2E	None	1.50 - 2.50	395	0.1
GrB2	Grenada silt loam, 2 to 5 percent slopes, eroded	2E	None	1.50 - 2.50	425	0.1
GrC3	Grenada silt loam, 5 to 8 percent slopes, severely eroded	4E	None	1.50 - 2.50	215	0.1
Gu	Gullied land	7E	None	6.00 - 6.00	24,095	6.7
Hn	Henry silt loam	3W	None	0.50 - 1.50	400	0.1
MeA	Memphis silt loam, 0 to 2 percent slopes	1	None	6.00 - 6.00	2790	0.8
MeB	Memphis silt loam, 2 to 5 percent slopes	2E	None	6.00 - 6.00	1115	0.3
MeB2	Memphis silt loam, 2 to 5 percent slopes, eroded	2E	None	6.00 - 6.00	2260	0.6
MeB3	Memphis silt loam, 2 to 5 percent slopes, severely eroded	2E	None	6.00 - 6.00	930	0.3
MeC2	Memphis silt loam, 5 to 8 percent slopes, eroded	3E	None	6.00 - 6.00	700	0.2
MeC3	Memphis silt loam, 5 to 8 percent slopes, severely eroded	4E	None	6.00 - 6.00	7915	2.2
MiA	Memphis and loring silt loams, 0 to 2 percent slopes	1	None	6.00 - 6.00	320	0.1
MiA	Memphis and loring silt loams, 0 to 2 percent slopes	2W	None	2.00 - 3.00	*	*
MiB	Memphis and loring silt loams, 2 to 5 percent slopes	2E	None	6.00 - 6.00	505	0.1
MiB	Memphis and loring silt loams, 2 to 5 percent slopes	2E	None	2.00 - 3.00	*	*
MiB2	Memphis and loring silt loams, 2 to 5 percent slopes, eroded	2E	None	6.00 - 6.00	3690	1.0
MiB2	Memphis and loring silt loams, 2 to 5 percent slopes, eroded	2E	None	2.00 - 3.00	*	*
MiB3	Memphis and loring silt loams, 2 to 5 percent slopes, severe eroded	3E	None	6.00 - 6.00	2605	0.7
MiB3	Memphis and loring silt loams, 2 to 5 percent slopes, severe eroded	3E	None	2.00 - 3.00	*	*
MiC2	Memphis and loring silt loams, 5 to 8 percent slopes, eroded	3E	None	6.00 - 6.00	1170	0.3
MiC2	Memphis and loring silt loams, 5 to 8 percent slopes, eroded	3E	None	2.00 - 3.00	*	*
MiC3	Memphis and loring silt loams, 5 to 8 percent slopes, severe eroded	4E	None	6.00 - 6.00	8140	2.3
MiC3	Memphis and loring silt loams, 5 to 8 percent slopes, severe eroded	4E	None	2.00 - 3.00	*	*

MnD3	Memphis and Natchez silt loams, 8 to 12 percent slopes, severely eroded	6E	None	6.00 - 6.00	4155	1.1
MnD3	Memphis and Natchez silt loams, 8 to 12 percent slopes, severely eroded	6E	None	2.00 - 3.00	*	*
MnE3	Memphis and Natchez silt loam, 12 to 17 percent slopes, severely eroded	6E	None	6.00 - 6.00	3475	1.0
MnE3	Memphis and Natchez silt loam, 12 to 17 percent slopes, severely eroded	7E	None	6.00 - 6.00	*	*
MnF2	Memphis and Natchez silt loams, 17 to 40 percent slopes, eroded	7E	None	6.00 - 6.00	95,260	26.3
MnF2	Memphis and Natchez silt loams, 17 to 40 percent slopes, eroded	7E	None	6.00 - 6.00	*	*
Mr	Morganfield silt loam	2W	Occas	3.00 - 4.00	180	0.1
Ro	Robinsonville loam	1	Rare	4.00 - 6.00	400	0.1
Sc	Sharkey clay	3E	Rare	0.00 - 2.00	12,810	3.5
SsC	Silty land, rolling				1500	0.4
SsF	Silty land, steep				2310	0.6
Sw	Swamp	5W	Freq		880	0.2
Tu	Tunica silty clay	3W	Rare	1.50 - 3.00	4610	1.3
Ur	Sharkey, Tunica, Dowling clays (Sharkey, Tunica, Sharkey)	5W	Freq	0.00 - 2.00	41,075	11.3
Ur	Sharkey, Tunica, Dowling clays (Sharkey, Tunica, Sharkey)	5W	Freq	1.50 - 3.00	*	*
Ur	Sharkey, Tunica, Dowling clays (Sharkey, Tunica, Sharkey)	5W	Freq	0.00 - 2.00	*	*
Wa	Wakeland silt loam (Adler)	2W	Occas	2.00 - 3.00	6705	1.9
Wd	Wakeland silt loam, local alluvium (Adler)	2W	Occas	2.00 - 3.00	1680	0.5
Wf	Waverly and Falaya silt loams (Rosebloom and Collins)	5W	Freq	0.00 - 1.00	9150	2.5
Wf	Waverly and Falaya silt loams (Rosebloom and Collins)	4W	Freq	2.00 - 5.00	*	*
	Total				362,240	100.0

Source: USDA, Soil Conservation Service, State Conservationist, Jackson, MS. Figures were compiled in 1989, but based on the Warren County Soil Survey, 1964, USDA Soil Conservation Service.

* Denotes soils complexes that occur in such an intricate pattern that it was not practical to map them separately. Acreage and proportional extent figures for these soils are listed as a lump sum at the first listing of the complex.

USDA, Soil Conservation Service
Soil Series Map Unit Information

Washington County, Mississippi

Map Symbol	Soil Series Map Unit Name	Capability Class	Annual Flood	Range of Depth to Seasonal High Water Table (feet)	Acres	Percent
	Cities, levees, lakes, other waters, U.S. Air Force Base				20,100	4.3
Aa	Alligator clay, level phase	3W	Rare	0.50 - 2.00	7000	1.5
Ab	Alligator clay, nearly level phase	3W	Rare	0.50 - 2.00	29,270	6.3
Ac	Alligator clay, gently sloping phase	3E	Rare	0.50 - 2.00	470	0.1
Ad	Alligator silty clay loam, level phase	3W	Rare	0.50 - 2.00	720	0.1
Ae	Alligator silty clay loam, nearly level phase	3W	Rare	0.50 - 2.00	4430	0.9
Af	Alluvial land				27,850	6.0
Ba	Beulah very fine sandy loam, nearly level phase	2S	None	6.00 - 6.00	2740	0.6
Bb	Beulah very fine sandy loam, gently sloping phase	2S	None	6.00 - 6.00	940	0.2
Bc	Beulah very fine sandy loam, nearly level, moderately shallow phase	2S	None	6.00 - 6.00	600	0.1
Bd	Bosket silty clay loam, nearly level phase (Askew)	2W	None	1.00 - 2.00	620	0.1
Be	Bosket very fine sandy loam, nearly level phase (Askew)	2W	None	1.00 - 2.00	24,100	5.2
Bf	Bosket very fine sandy loam, gently sloping phase (Askew)	2W	None	1.00 - 2.00	910	0.2
Bg	Bosket very fine sandy loam, nearly level moderately shallow phase (Askew)	2W	None	1.00 - 2.00	680	0.1
Bh	Bowdre silty clay, nearly level phase	2W	Rare	1.50 - 2.00	3170	0.7
Bk	Bowdre silty clay loam, nearly level phase	2W	Rare	1.50 - 2.00	940	0.2
Bp	Borrow pits	8S	None		7500	1.6
Ca	Commerce silty clay loam, nearly level phase	2E	Rare	1.50 - 4.00	10,140	2.2
Cb	Commerce silt loam, nearly level phase	2E	Rare	1.50 - 4.00	1220	0.3
Cd	Commerce silt loam, nearly level shallow phase	2E	Rare	1.50 - 4.00	480	0.1
Ce	Commerce very fine sandy loam	2E	Rare	1.50 - 4.00	1040	0.2
Cf	Commerce very fine sandy loam, moderately shallow phase	2E	Rare	1.50 - 4.00	780	0.2
Cg	Crevasse sandy loams and loamy sands (Bruno)	3S	Occas	4.00 - 6.00	950	0.2
Da	Dowling clay (Sharkey)	4W	Occas	0.00 - 2.00	51,330	11.0
Db	Dowling soils (Sharkey)	4W	Occas	0.00 - 2.00	9000	1.9
Dc	Dubbs silt loam, nearly level phase	1	None	6.00 - 6.00	600	0.1
Dd	Dubbs very fine sandy loam, nearly level phase	1	None	6.00 - 6.00	760	0.2
De	Dundee silt loam, nearly level phase	2W	Rare	1.50 - 3.50	3640	0.8
Df	Dundee silt loam, gently sloping phase	2E	Rare	1.50 - 3.50	220	0.1
Df	Dundee silty clay, nearly level phase	2W	Rare	1.50 - 3.50	2280	0.5
Dh	Dundee silty clay, gently sloping phase	2E	Rare	1.50 - 3.50	270	0.1
Dk	Dundee silty clay loam, nearly level phase	2W	Rare	1.50 - 3.50	15,110	3.3
Dm	Dundee silty clay loam, gently sloping phase	2E	Rare	1.50 - 3.50	2100	0.5
Dn	Dundee silty clay loam, sloping phase	3E	Rare	1.50 - 3.50	450	0.1
Do	Dundee silty clay loam, nearly level shallow phase	2W	Rare	1.50 - 3.50	255	0.1
Dp	Dundee very fine sandy loam, nearly level phase	2W	Rare	1.50 - 3.50	19,670	4.2
Dr	Dundee very fine sandy loam, gently sloping phase	2E	Rare	1.50 - 3.50	830	0.2
Ds	Dundee very fine sandy loam, nearly level shallow phase	2W	Rare	1.50 - 3.50	1130	0.2
Dt	Dundee very fine sandy loam, nearly level moderately shallow phase	2W	Rare	1.50 - 3.50	1140	0.2
Fa	Forestdale silt loam, nearly level phase	3W	Rare	0.50 - 2.00	6000	1.3
Fb	Forestdale silty clay, nearly level phase	3W	Rare	0.50 - 2.00	15,940	3.4
Fc	Forestdale silty clay, gently sloping phase	3W	Rare	0.50 - 2.00	740	0.2
Fd	Forestdale silty clay loam, nearly level phase	3W	Rare	0.50 - 2.00	19,990	4.3
Fe	Forestdale silty clay loam, gently sloping phase	3W	Rare	0.50 - 2.00	760	0.2
Mh	Mhoon silty clay loam	2W	Rare	0.00 - 3.00	200	0.0
Pa	Pearson silt loam, nearly level phase (Dundee)	2W	Rare	1.50 - 3.50	1280	0.3
Ro	Robinsonville very fine sandy loam	1	Rare	4.00 - 6.00	1430	0.3

Sa	Sharkey clay, level phase	3W	Rare	0.00 - 2.00	36,630	7.9
Sb	Sharkey clay, nearly level phase	3E	Rare	0.00 - 2.00	100,460	21.6
Sc	Sharkey clay, gently sloping phase	3E	Rare	0.00 - 2.00	2010	0.4
Sd	Sharkey silty clay loam, nearly level phase	3E	Rare	0.00 - 2.00	4060	0.9
Se	Sharkey very fine sandy loam, nearly level overwash phase	3E	Rare	0.00 - 2.00	2000	0.4
So	Souva silt loam (Commerce)	3W	Occas	1.50 - 4.00	940	0.2
Sw	Swamp	5W	Freq		5550	1.2
Ta	Tunica clay, nearly level phase	3W	Rare	1.50 - 3.00	10,360	2.2
Tb	Tunica clay, gently sloping phase	3E	Rare	1.50 - 3.00	1280	0.3
Tc	Tunica silty clay loam, nearly level phase	3W	Rare	1.50 - 3.00	450	0.1
	Total				465,520	100.0

Source: USDA, Soil Conservation Service, State Conservationist, Jackson, MS. Figures were compiled in 1989, but based on the Washington County Soil Survey, 1961, USDA Soil Conservation Service.

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USDA, Soil Conservation Service
Soil Series Map Unit Information

Yalobusha County, Mississippi

Map Symbol	Soil Series Map Unit Name	Capability Class	Annual Flood	Range of Depth to Seasonal High Water Table (feet)	Acres	Percent
	Water				400	0.1
Ae	Ariel silt loam, occasionally flooded	2W	Occas	2.50 - 4.00	1820	0.6
Ar	Arkabutla silt loam, occasionally flooded	2W	Occas	1.00 - 1.50	1220	0.4
Au	Arkabutla silt loam, frequently flooded	4W	Freq	1.00 - 1.50	4972	1.6
Bo	Bonn silt loam	4S	None	0.00 - 2.00	965	0.3
Br	Bruno sandy loam, occasionally flooded	3S	Occas	4.00 - 6.00	1250	0.4
Bu	Bruno sandy loam, frequently flooded	5W	Freq	4.00 - 6.00	130	0.0
CaA	Calloway silt loam, 0 to 2 percent slopes	2E	None	1.00 - 2.00	3325	1.1
Cc	Cascilla silt loam, occasionally flooded	2W	Occas	6.00 - 6.00	2215	0.7
Cd	Cascilla silt loam, frequently flooded	4W	Freq	6.00 - 6.00	345	0.1
Cn	Collins silt loam, occasionally flooded	2W	Occas	2.00 - 5.00	17,730	5.6
Co	Collins silt loam, frequently flooded	4W	Freq	2.00 - 5.00	3800	1.2
De	Deerford complex	3W	None	0.50 - 1.50	665	0.2
Ga	Gillsburg silt loam, occasionally flooded	2W	Occas	1.00 - 1.50	8310	2.6
Gb	Gillsburg silt loam, frequently flooded	4W	Freq	1.00 - 1.50	500	0.2
GrA	Grenada silt loam, 0 to 2 percent slopes	2E	None	1.50 - 2.50	2215	0.7
GrB	Grenada silt loam, 2 to 5 percent slopes	2E	None	1.50 - 2.50	5540	1.8
LoB2	Loring silt loam, 2 to 5 percent slopes, eroded	2E	None	2.00 - 3.00	2690	0.8
LoC2	Loring silt loam, 5 to 8 percent slopes, eroded	3E	None	2.00 - 3.00	4430	1.4
LoC3	Loring silt loam, 5 to 8 percent slopes, severely eroded	4E	None	2.00 - 3.00	5210	1.6
LoD2	Loring silt loam, 8 to 12 percent slopes, eroded	4E	None	2.00 - 3.00	1330	0.4
LoD3	Loring silt loam, 8 to 12 percent slopes, severely eroded	6E	None	2.00 - 3.00	6735	2.1
LrE	Loring-udorthents complex, gullied		None	2.00 - 3.00	3280	1.0
LrE	Loring-udorthents complex, gullied	3E	None	5.00 - 5.00	*	*
MAE	Maben-Smithdale association, hilly	7E	None	6.00 - 6.00	15,880	5.0
MAE	Maben-Smithdale association, hilly	7E	None	6.00 - 6.00	*	*
MeB2	Memphis silt loam, 2 to 5 percent slopes, eroded	2E	None	6.00 - 6.00	400	0.1
MeC2	Memphis silt loam, 5 to 8 percent slopes, eroded	3E	None	6.00 - 6.00	1840	0.6
MeD3	Memphis silt loam, 8 to 12 percent slopes, severely eroded	6E	None	6.00 - 6.00	1075	0.3
MeE2	Memphis silt loam, 12 to 20 percent slopes, eroded	6E	None	6.00 - 6.00	4430	1.4
Oa	Oaklimeter silt loam, occasionally flooded	2W	Occas	1.50 - 2.50	24,680	7.8
Ok	Oaklimeter silt loam, frequently flooded	4W	Freq	1.50 - 2.50	3658	1.2
Pg	Pits	8S	None		775	0.3
PrB2	Providence silt loam, 2 to 5 percent slopes, eroded	2E	None	1.50 - 3.00	1595	0.5
PrC2	Providence silt loam, 5 to 8 percent slopes, eroded	3E	None	1.50 - 3.00	6735	2.1
PrE2	Providence silt loam, 8 to 15 percent slopes, eroded	4E	None	1.50 - 3.00	2050	0.7
PrE3	Providence silt loam, 8 to 15 percent slopes, severely eroded	6E	None	1.50 - 3.00	15,420	4.9
PvD3	Providence-Smithdale complex, 8 to 12 percent slopes, severely eroded	6E	None	1.50 - 3.00	2425	0.8
PvD3	Providence-Smithdale complex, 8 to 12 percent slopes, severely eroded	6E	None	6.00 - 6.00	*	*
STF	Smithdale-Providence association, hilly	7E	None	6.00 - 6.00	132,210	41.9
STF	Smithdale-Providence association, hilly		None	1.50 - 3.00	*	*
SdE2	Smithdale-Providence complex, 12 to 25 percent slopes, eroded	7E	None	6.00 - 6.00	9990	3.2
SdE2	Smithdale-Providence complex, 12 to 25 percent slopes, eroded		None	1.50 - 3.00	*	*
SmE	Smithdale-udorthents complex, gullied	6E	None	6.00 - 6.00	10,800	3.4
SmE	Smithdale-udorthents complex, gullied	3E	None	5.00 - 5.00	*	*

TaC2	Tippah silt loam, 5 to 8 percent slopes, eroded	3E	None	2.00 - 2.50	575	0.2
TpD2	Tippah-Maben complex, 8 to 12 percent slopes, eroded	4E	None	2.00 - 2.50	1905	0.6
TpD2	Tippah-Maben complex, 8 to 12 percent slopes, eroded	4E	None	6.00 - 6.00	*	*
	Total				315,520	100.0

Source: USDA, Soil Conservation Service, State Conservationist, Jackson, MS. Figures were compiled in 1989, but based on the Yalobusha County Soil Survey, 1978, USDA Soil Conservation Service.

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USDA, Soil Conservation Service
Soil Series Map Unit Information

Yazoo County, Mississippi

Map Symbol	Soil Series Map Unit Name	Capability Class	Annual Flood	Range of Depth to Seasonal High Water Table (feet)	Acres	Percent
	Adler silt loam	2W	Occas	2.00 - 3.00	17,130	2.9
Ae	Adler silt loam, clayey subsoil variant	2W	Occas	2.00 - 3.00	985	0.2
Bm	Bruno-Morganfield complex	5W	Freq	4.00 - 6.00	875	0.1
Bm	Bruno-Morganfield complex	4W	Freq	3.00 - 4.00	*	*
Ca	Calhoun silt loam	3W	None	0.00 - 2.00	5775	1.0
CIA	Calloway silt loam, 0 to 2 percent slopes	2E	None	1.00 - 2.00	7500	1.3
CIB	Calloway silt loam, 2 to 5 percent slopes	3E	None	1.00 - 2.00	6850	1.1
Co	Commerce silt loam	2E	Rare	1.50 - 4.00	1125	0.2
DbA	Dubbs silt loam, 0 to 2 percent slopes	1	None	6.00 - 6.00	12,475	2.1
DbB	Dubbs silt loam, 2 to 5 percent slopes	2E	None	6.00 - 6.00	1630	0.3
DnA	Dundee silt loam, 0 to 2 percent slopes	2W	Rare	1.50 - 3.50	43,340	7.2
DnB	Dundee silt loam, 2 to 5 percent slopes	2E	Rare	1.50 - 3.50	7090	1.2
DuA	Dundee silty clay loam, 0 to 2 percent slopes	2W	Rare	1.50 - 3.50	2035	0.3
DuB	Dundee silty clay loam, 2 to 5 percent slopes	2E	Rare	1.50 - 3.50	1490	0.3
FC	Falaya-Vicksburg-Leverett Association	4W	Freq	1.00 - 2.00	24,275	4.0
FC	Falaya-Vicksburg-Leverett Association	4W	Freq	2.50 - 4.00	*	*
FC	Falaya-Vicksburg-Leverett Association	4W	Freq	2.50 - 3.00	*	*
Fa	Falaya silt loam	2W	Occas	1.00 - 2.00	2795	0.5
Fo	Forestdale silt loam	3W	Rare	0.50 - 2.00	800	0.1
Fr	Forestdale silty clay loam	3W	Rare	0.50 - 2.00	21,435	3.6
GrA	Grenada silt loam, 0 to 2 percent slopes	2E	None	1.50 - 2.50	4080	0.7
GrB2	Grenada silt loam, 2 to 5 percent slopes, eroded	2E	None	1.50 - 2.50	5790	1.0
GuE	Gullied land-Memphis complex, 5 to 30 percent slopes	7E	None	6.00 - 6.00	20,805	3.5
GuE	Gullied land-Memphis complex, 5 to 30 percent slopes	6E	None	6.00 - 6.00	*	*
Le	Leverett silt loam	2W	Occas	2.50 - 3.00	6655	1.1
LoA	Loring silt loam, 0 to 2 percent slopes	2W	None	2.00 - 3.00	1720	0.3
LoB2	Loring silt loam, 2 to 5 percent slopes, eroded	2E	None	2.00 - 3.00	53,990	9.0
LoC2	Loring silt loam, 5 to 8 percent slopes, eroded	3E	None	2.00 - 3.00	23,530	3.9
LoD2	Loring silt loam, 8 to 12 percent slopes, eroded	4E	None	2.00 - 3.00	23,070	3.8
MNE	Memphis-Natchez association, hilly	7E	None	6.00 - 6.00	112,520	18.7
MNE	Memphis-Natchez association, hilly	7E	None	6.00 - 6.00	*	*
MeA	Memphis silt loam, 0 to 2 percent slopes	1	None	6.00 - 6.00	860	0.1
MeB2	Memphis silt loam, 2 to 5 percent slopes, eroded	2E	None	6.00 - 6.00	5345	0.9
MeC2	Memphis silt loam, 5 to 8 percent slopes, eroded	3E	None	6.00 - 6.00	18,010	3.0
Mo	Morganfield silt loam	1	Rare	3.00 - 4.00	48,990	8.2
Sa	Sharkey silty clay loam	3E	Rare	0.00 - 2.00	7925	1.3
Sc	Sharkey clay	3E	Rare	0.00 - 2.00	60,790	10.1
Sd	Sharkey clay, depressional	4W	Occas	0.00 - 2.00	11,500	1.9
Sf	Sharkey and Forestdale soils	5W	Freq	0.00 - 2.00	33,100	5.5
Sf	Sharkey and Forestdale soils	5W	Freq	0.50 - 2.00	*	*

Tu	Tunica silt loam	3W	Rare	1.50 - 3.00	565	0.1
VaE3	Vaiden soils, calcareous variant, 5 to 25 percent slopes, severely eroded	6E	None	1.00 - 2.00	1680	0.3
Vc	Vicksburg silt loam	1	Rare	2.50 - 4.00	1790	0.3
	Total				600,302	100.0

Source: USDA, Soil Conservation Service, State Conservationist, Jackson, MS. Figures were compiled in 1989, but based on the Yazoo County Soil Survey, 1975, USDA Soil Conservation Service.

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YAZOO RIVER BASIN SOILS DATABASE DEVELOPMENT

April 1990

Prepared for: Mr. Kent Parrish, U.S. Army Engineer, Vicksburg District

Prepared by: U.S. Army Engineer, Waterways Experiment Station,
Environmental Systems Division

Attachment 2

INTRODUCTION

Satellite digital images and geographic data base technology are well suited for mapping and analysis of the vast complex wetland environments of the lower Mississippi River valley. Spatial data base technology and satellite images are being used to develop a digital data base to satisfy requirements for wetlands regulation and impact analysis within the upper Yazoo River Basin project. The result of this initial effort is a digital map data base and acreage statistics for hydric soils (wetlands), nonhydric soils, and permanent water bodies derived from the Soil Conservation Service (SCS) soil survey photo map sheets. Recent satellite scenes are being used to develop current land use maps and update the SCS information on permanent water bodies. Two-year frequency flood maps are being developed for the Yazoo Basin from historical floods captured and preserved on archival satellite images. This report is restricted to the data developed from the SCS photo map sources.

The work was performed by a technical team in the Environmental Laboratory (EL) comprised of Ms. Jacqueline S. Hutto, Mr. Richard H. Sinclair, Mr. John L. Tingle, Mr. Mark R. Graves, and Mr. Jack K. Stoll. Mr. Michael R. Waring of the EL and Mr. Albert N. Williamson of the Geotechnical Laboratory assisted in the digitizing stage. Dr. Ellis J. Clairain, EL, was responsible for the hydric/non-hydric delineations on all SCS maps prior to digitizing. Mr. Stoll was the technical team leader. All work was conducted during the period September 1989 to April 1990 under the guidance of Mr. Kenneth D. Parrish, Project Manager, Upper Yazoo Basin Project, Vicksburg District.

OBJECTIVE AND SCOPE

The objective of this project task was to create a geo-referenced digital map database for the Upper Yazoo River Basin consisting of hydric and non-hydric soil types and of permanent water bodies. The project area covers all or portions of 20 counties within the Yazoo River Basin paralleling the lower Mississippi River floodplain in west central and northwest Mississippi. The total area is approximately 4.5 million acres comprised predominantly of agricultural land. The soil types were grouped into hydric (wetlands) and non-hydric (non-wetland) classes prior to digitizing, by delineating all non-hydric soils on soil survey photo map sheets. The following is a review of the source data, computer assets, database development methodology and deliverable products for the accomplished task.

SOURCE DATA

The photo map mosaics were composed of four SCS soil survey photo map sheets at a scale of 1:15,840 or 1:20,000 developed from photograph(s) produced from 1942 through 1989 (see county outline map of Mississippi for dates of photographs for each county). A total of 151 mosaics were compiled from individual map sheets included in the 20 county soil survey reports. Geo-referencing of the source data was done after digitizing and gridding using U.S. Geological Survey 1:62,500 scale quadrangle maps. All digital map data are referenced to the UTM projection zone with a grid resolution of 20 x 20 meters (0.0988454 acres).

COMPUTER HARDWARE AND SOFTWARE ASSETS

The PC workstations used for the Upper Yazoo River Basin Wetlands Mapping Project each consist of an IBM compatible 386 computer with hard disk capacity ranging from 380 to 760 megabytes. Up to four digitizing workstations were operated concurrently to digitize the soil boundaries on the 151 photo map mosaics. The digitizing software used is the commercial software package from Earth Resources Data Analysis System (ERDAS). Color plotting was done on a Versatec model 3436 electrostatic plotter using software designed by EL to execute with the ELAS file format.

DATA BASE DEVELOPMENT METHODOLOGY

The following is a generalized outline describing the procedures followed from photo map mosaic preparation through acreage calculations:

1. Digitize all county boundaries (20 total) and all Basin reach boundaries (23 total).

2. Aggregate basic soil types into hydric and non-hydric classes on individual SCS soil survey photo map sheets and assemble four photo map sheets to comprise a mosaic for use in digitizing.

3. Select two matching control points on mosaics and 1:62,500 scale USGS maps and assign UTM coordinates to the two mosaic control point locations.

4. Select additional matching control points, analyze differences in X and Y coordinates, and make adjustments in coordinates for two primary points on the mosaic. This is the first stage in geometric rectification.

5. Digitize all boundaries separating hydric and non-hydric soils.

    a. Mosaics were digitized at any one of the four PC workstations. Digitizer files were delivered to the database project administrator on 5.25 inch floppy disks.

    b. The digitizer data file for each individual mosaic was gridded (rasterized) into a county database file containing a UTM coordinate space covering the entire county. Some internal editing along mosaic edges was necessary to match polygon boundaries across the joining edges.

6. Once all mosaics for a single county were assembled into a gridded file and edited, this county file was placed into the GIS file containing UTM coordinate space for the entire project area (20 counties).

7. A second geometric rectification was performed by selecting matching control points along the joining county boundaries. This was to fit the county boundaries together in the final GIS map database. Some editing was necessary to match polygon boundaries across county boundaries.

8. Acreages were calculated for hydric, non-hydric and permanent water bodies for each county and reach.

Exercising extreme care in selecting control points and assigning UTM coordinates to the correct location for those points on the mosaics is essential to achieving acceptable geometric registration. The process for selecting control points was accomplished using road intersections or other permanent land marks that are readily identifiable on the photo map sheet mosaic and the corresponding 1:62,500 scale USGS quadrangle(s).

DELIVERABLE PRODUCTS

In addition to this document, other deliverable products are identified below:

a. Composite GIS database consisting of the entire project area at 20 x 20 meters grid cell resolution. This data base contains three classes of data: hydric and non-hydric soils and permanent water bodies geometrically rectified to UTM coordinates on 1:62,500 scale USGS map sheets. The size of this database is approximately 65 megabytes in 4-bit raster format.

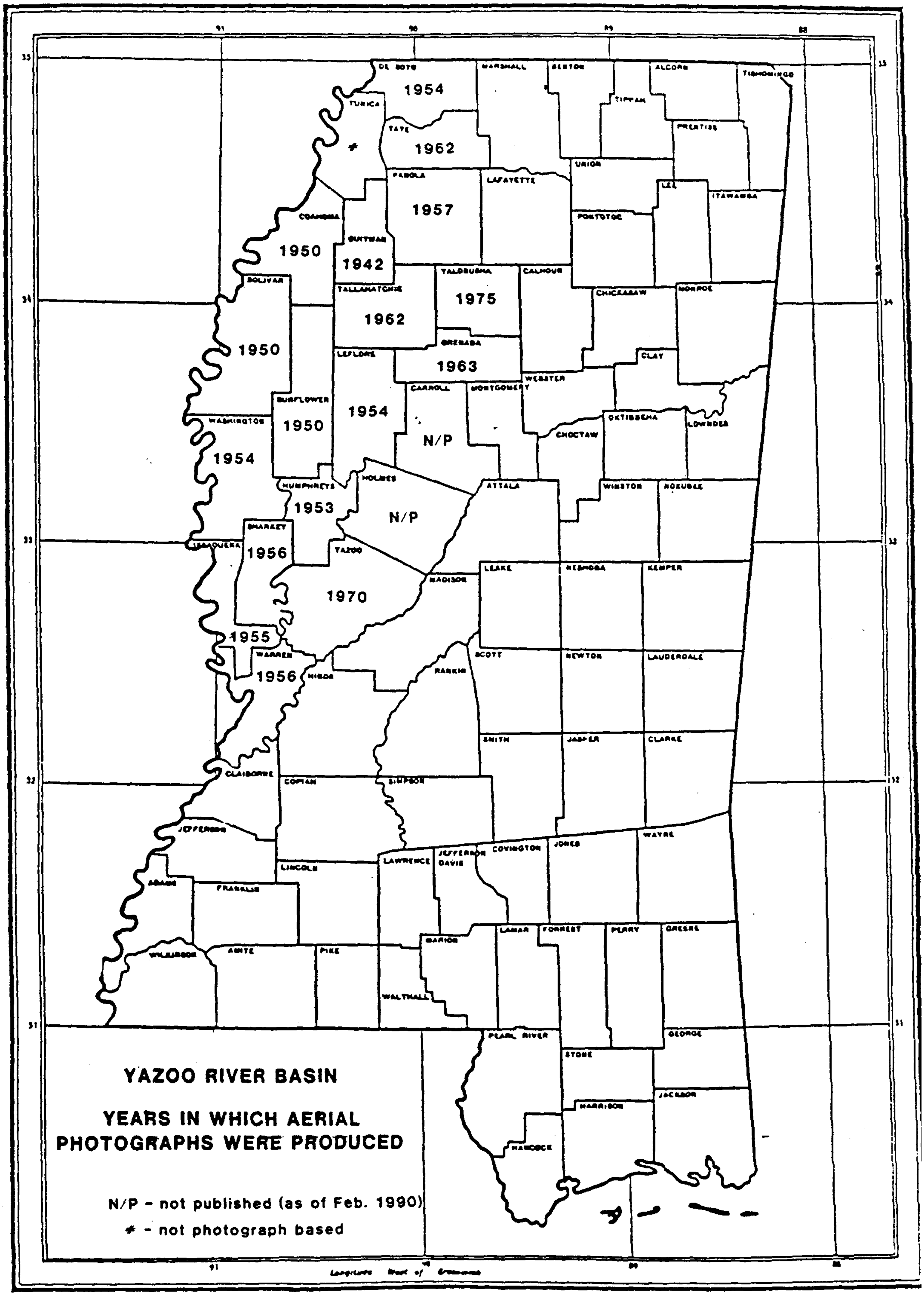
b. Individual data files for each of the 20 counties and 23 reaches. Each file contains the three classes of data within the boundary of a county or reach.

c. County boundaries file containing boundaries for all 20 counties as digitized from the USGS 1:62,500 scale map sheets.

d. Reach boundaries file containing boundaries for 23 reaches. Reaches 1-17 comprise the Upper Yazoo Basin project area and reaches 18-23 comprise the Steele Bayou project area.

e. SCS soil survey photo map mosaics for each of the 20 counties used in delineating the three classes of data and for creating the digital map data files.

f. Calculated statistics consisting of area values for each of the three data classes by county, by reach, and for the total project area. Total area is given for each county and reach and the percent of area occupied by each of the data classes. Area values are given in English units of square feet (sq.ft.), square miles (sq.mi.), and acres, and metric units of square meters (sq.m.), square kilometers (sq.km.), and hectares.



YAZOO RIVER BASIN
YEARS IN WHICH AERIAL PHOTOGRAPHS WERE PRODUCED
N/P - not published (as of Feb. 1990)
* - not photograph based
DE SOTO
1954
TUNICA
*
TATE
1962
PANOLA
1957
COAHOMA
1950
QUITMAN
1942
TALLAHATCHIE
1962
TALLAHATCHIE
1975
GRENADA
1963
BOLIVAR
1950
SUNFLOWER
1950
LEFLORE
1954
CARROLL
N/P
WASHINGTON
1954
HUMPHREYS
1953
HOLMES
N/P
SHARKEY
1956
YAZOO
1970
1955
WARREN
1956
MARSHALL
BENTON
ALCORN
TISHOMINGO
TIPPAH
PRENTISS
UNION
LAFAYETTE
LEE
ITAWAMBA
PONTOTOC
CALHOUN
CHICKASAW
MONROE
CLAY
WEBSTER
MONTGOMERY
OKTIBBEHA
LOWNDES
CHOCTAW
ATTALA
WINSTON
NOXUBEE
MADISON
LEAKE
NESHOBA
KEMPER
SCOTT
NEWTON
LAUDERDALE
RANKIN
HINDS
SMITH
JASPER
CLARKE
CLAIBORNE
COPIAH
SIMPSON
JEFFERSON
WAYNE
LINCOLN
LAWRENCE
JEFFERSON DAVIS
COVINGTON
JONES
ADAMS
FRANKLIN
MARION
LAMAR
FORREST
PERRY
GREENE
WILKINSON
AMITE
PIKE
WALTHALL
PEARL RIVER
STONE
GEORGE
HARRISON
JACKSON
HANCOCK

Header listing for GIS file: YAZOO.GIS
Date statistics printed: 26-APR-1990
Date statistics created: 25-APR-1990

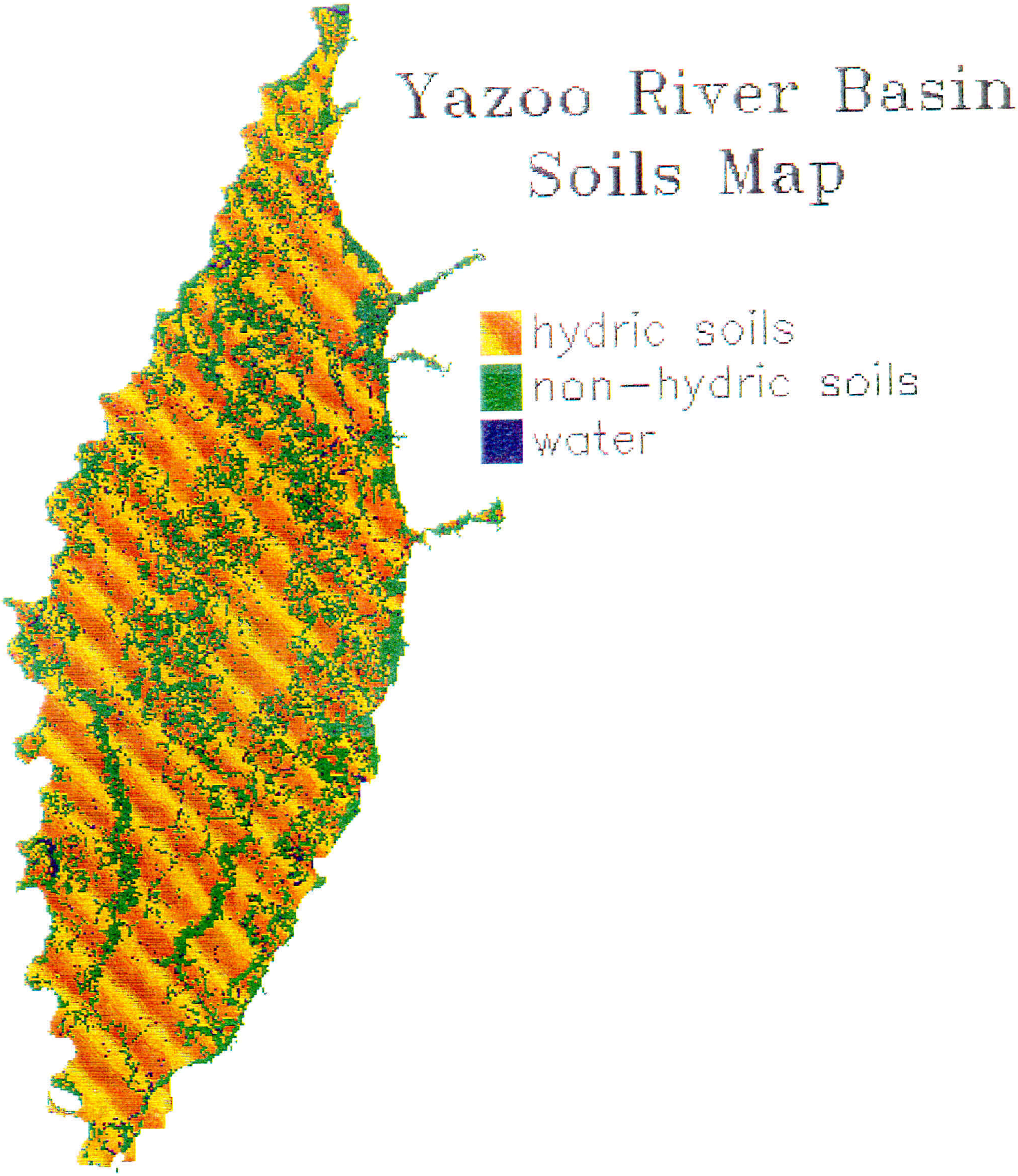
This file has 16324 rows, and 7959 columns

This image is geo-referenced to a UTM coordinate system
The upper left corner has coordinate: 663980, 3877200

The cell size is (X, Y): 20, 20
The number of acres per cell is: 0.0988454
Upper left corner data file coordinate (X,Y) is: 1, 1

Number of class in this variable is: 4
This file contains 4-bit data
The VARIABLE name is Yazoo River Basin Study

VALUE	POINTS	ACRES	%	DESCRIPTION
1	28452723.	2812420.786	64.74 %	hydric soils
2	14630981.	1446205.169	33.29 %	non-hydric soils
3	868544.	85851.579	1.98 %	water
Totals:	43952248.	4344477.534		


Yazoo River Basin
Soils Map
hydric soils
non-hydric soils
water

Header listing for GIS file: HUMP.GIS
Date statistics printed: 20-APR-1990
Date statistics created: 20-APR-1990

This file has 2277 rows, and 1895 columns

This image is geo-referenced to a UTM coordinate system
The upper left corner has coordinate: 711200, 3690500

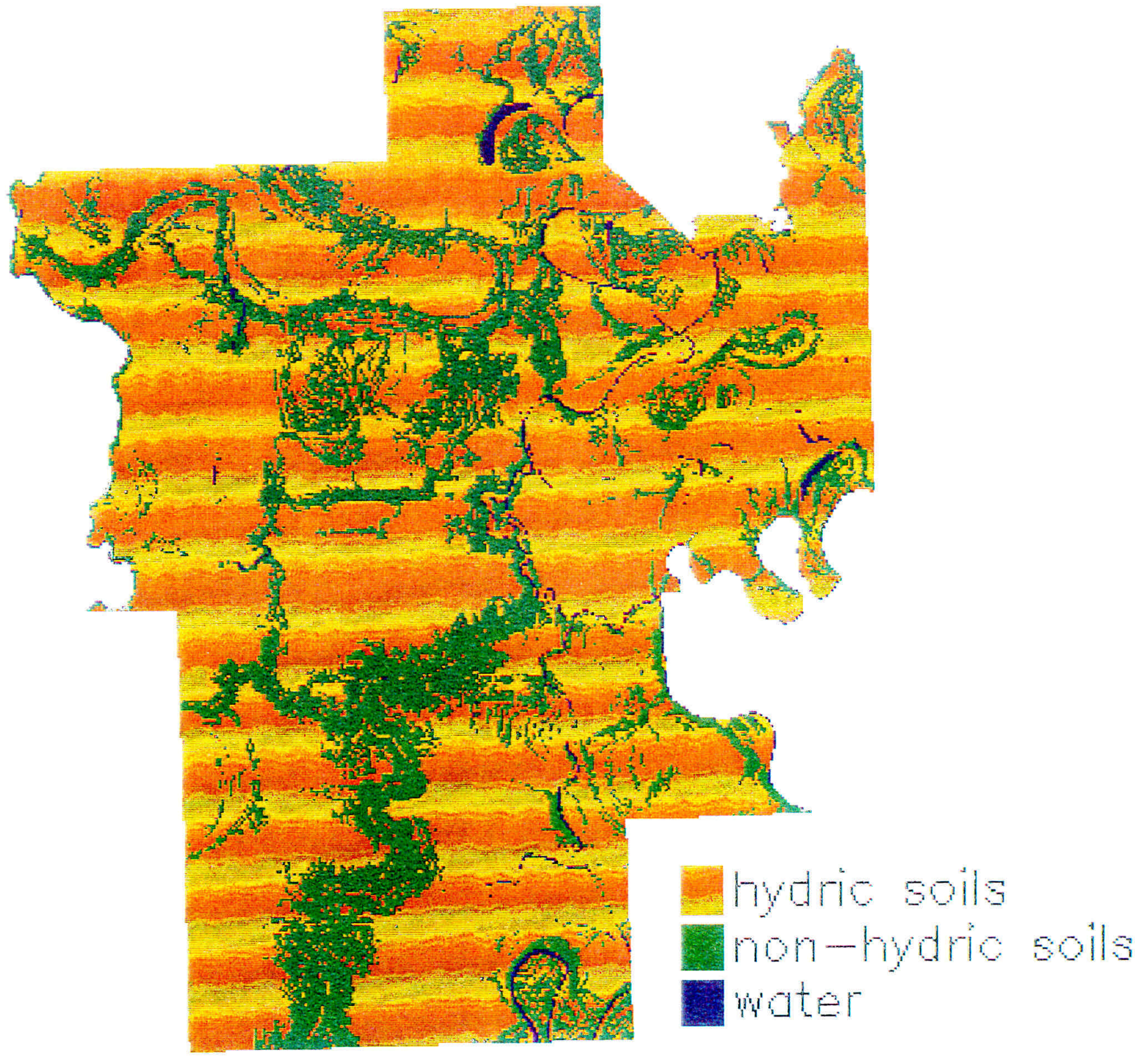
The cell size is (X, Y): 20, 20
The number of acres per cell is: 0.0988454
Upper left corner data file coordinate (X,Y) is: 2362, 9336

Number of classes in this variable is: 4
This file contains 4-bit data
The VARIABLE name is Humphreys County Soils Data

VALUE	POINTS	Acres	%	DESCRIPTION
0	1522625.	150504.484	0.00 %	area of non-interest
1	2053538.	202982.781	73.54 %	hydric soils
2	699875.	69179.422	25.06 %	non-hydric soils
3	38877.	3842.812	1.39 %	water
Totals:	2792290.	276005.031		

Totals and Percentages are Based on Non-zero points

Humphreys County Soils Map



Header listing for GIS file: ISSA.GIS
Date statistics printed: 20-APR-1990
Date statistics created: 20-APR-1990

This file has 3322 rows, and 2481 columns

This image is geo-referenced to a UTM coordinate system
The upper left corner has coordinate: 667000, 3654100

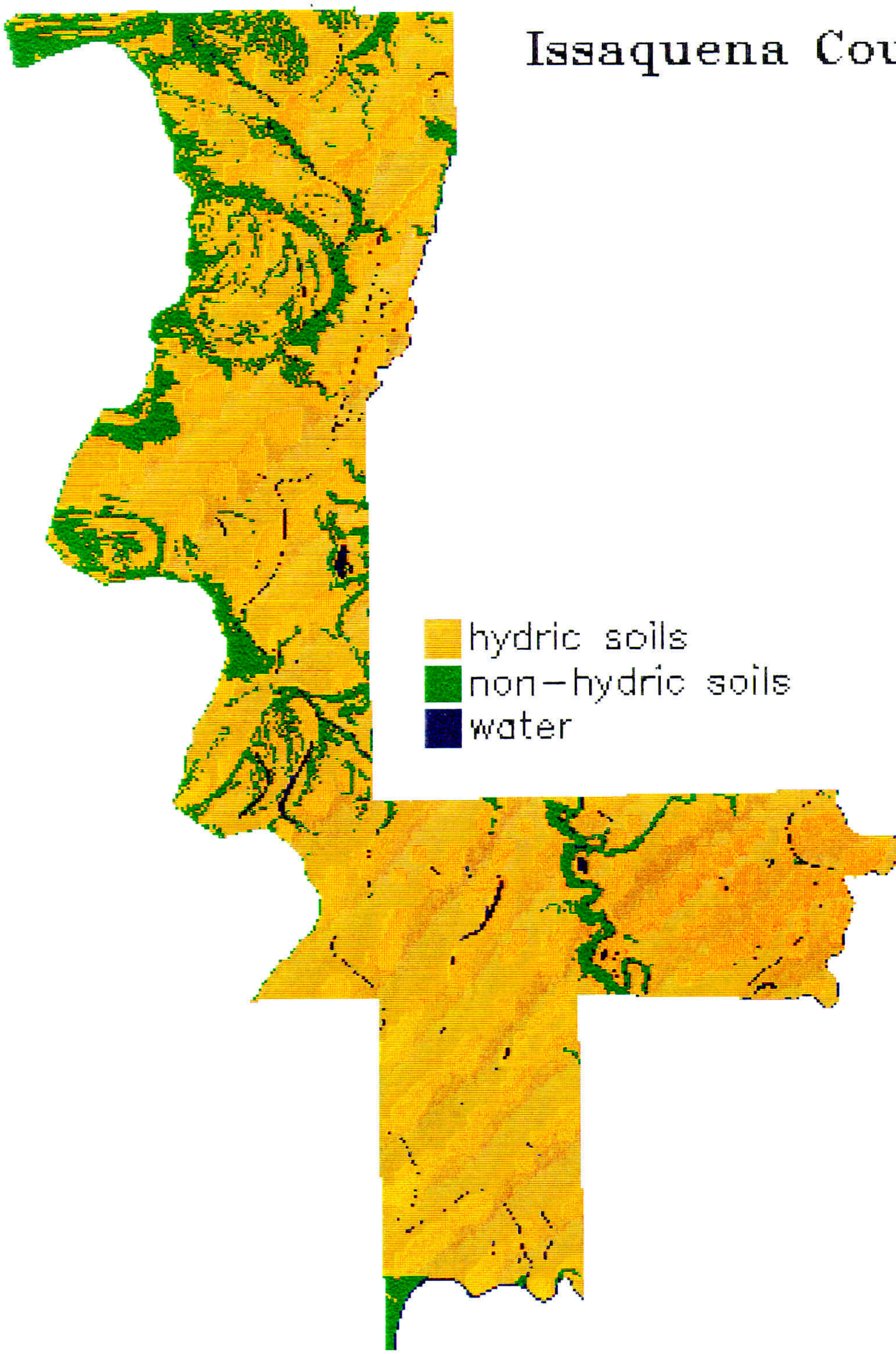
The cell size is (X, Y): 20, 20
The number of acres per cell is: 0.0988454
Upper left corner data file coordinate (X,Y) is: 152, 11156

Number of classes in this variable is: 4
This file contains 4-bit data
The VARIABLE name is Issaquena County Soils Data

VALUE	POINTS	Acres	%	DESCRIPTION
0	6010746.	594134.562	0.00 %	area of non-interest
1	1841873.	182060.672	82.55 %	hydric soils
2	351163.	34710.848	15.74 %	non-hydric soils
3	38100.	3766.010	1.71 %	water
Totals:	2231136.	220537.531		

Totals and Percentages are Based on Non-zero points

Issaquena County Soils Map



Header listing for GIS file: SHARKEY.GIS
Date statistics printed: 23-APR-1990
Date statistics created: 23-APR-1990

This file has 2437 rows, and 1430 columns

This image is geo-referenced to a UTM coordinate system
The upper left corner has coordinate: 690600, 3664220

The cell size is (X, Y): 20, 20
The number of acres per cell is: 0.0988454
Upper left corner data file coordinate (X,Y) is: 1332, 10650

Number of classes in this variable is: 4
This file contains 4-bit data
The VARIABLE name is Sharkey County Soils Data

VALUE	POINTS	Acres	%	DESCRIPTION
0	668788.	66106.617	0.00 %	area of non-interest
1	2206747.	218126.797	78.36 %	hydric soils
2	572089.	56548.367	20.31 %	non-hydric soils
3	37286.	3685.550	1.32 %	water
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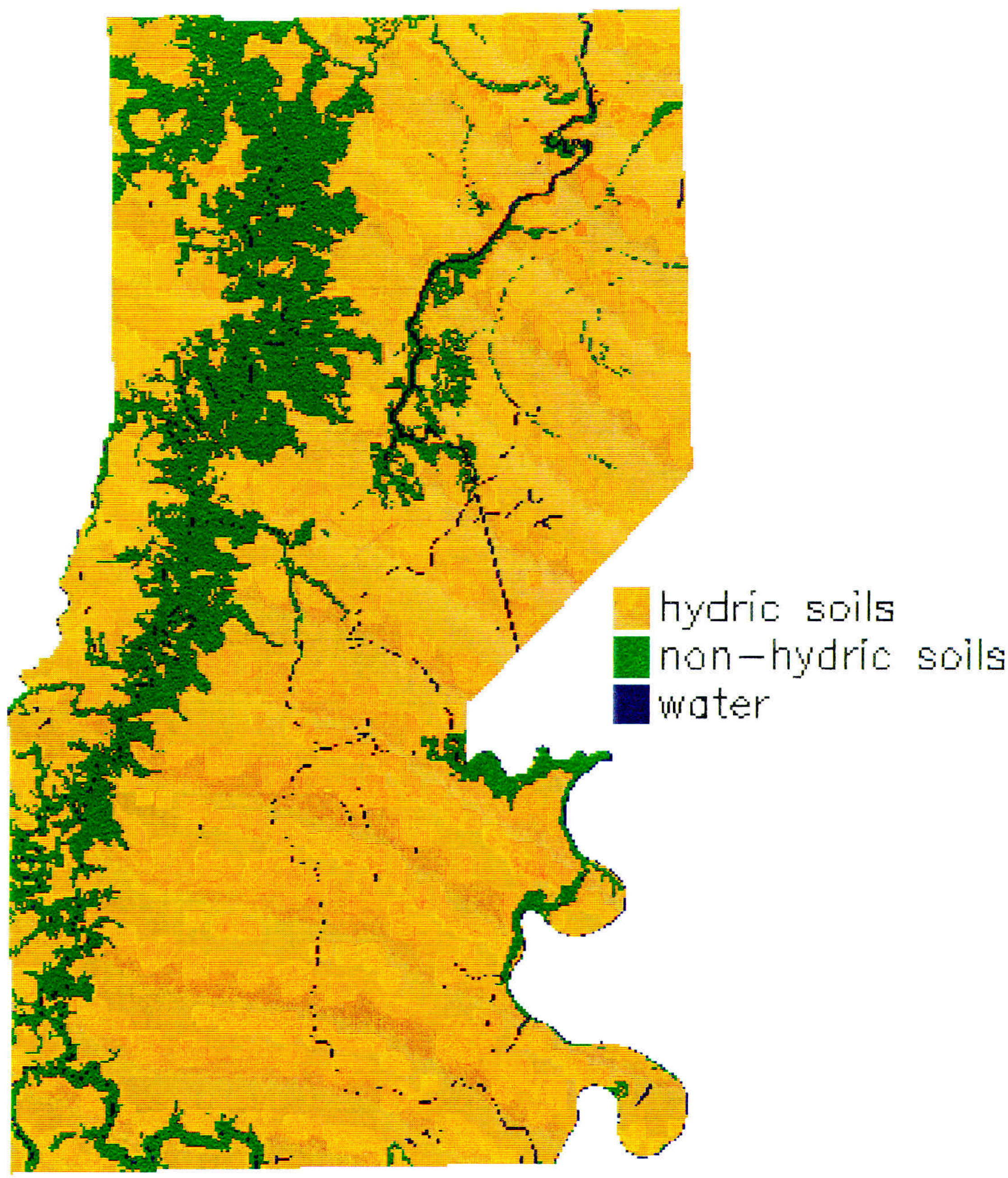
Totals:	2816122.	278360.719		

Totals and Percentages are Based on Non-zero points

Sharkey County Soils Map



Header listing for GIS file: SUN.GIS
Date statistics printed: 20-APR-1990
Date statistics created: 20-APR-1990

This file has 4002 rows, and 1479 columns

This image is geo-referenced to a UTM coordinate system
The upper left corner has coordinate: 707500, 3763300

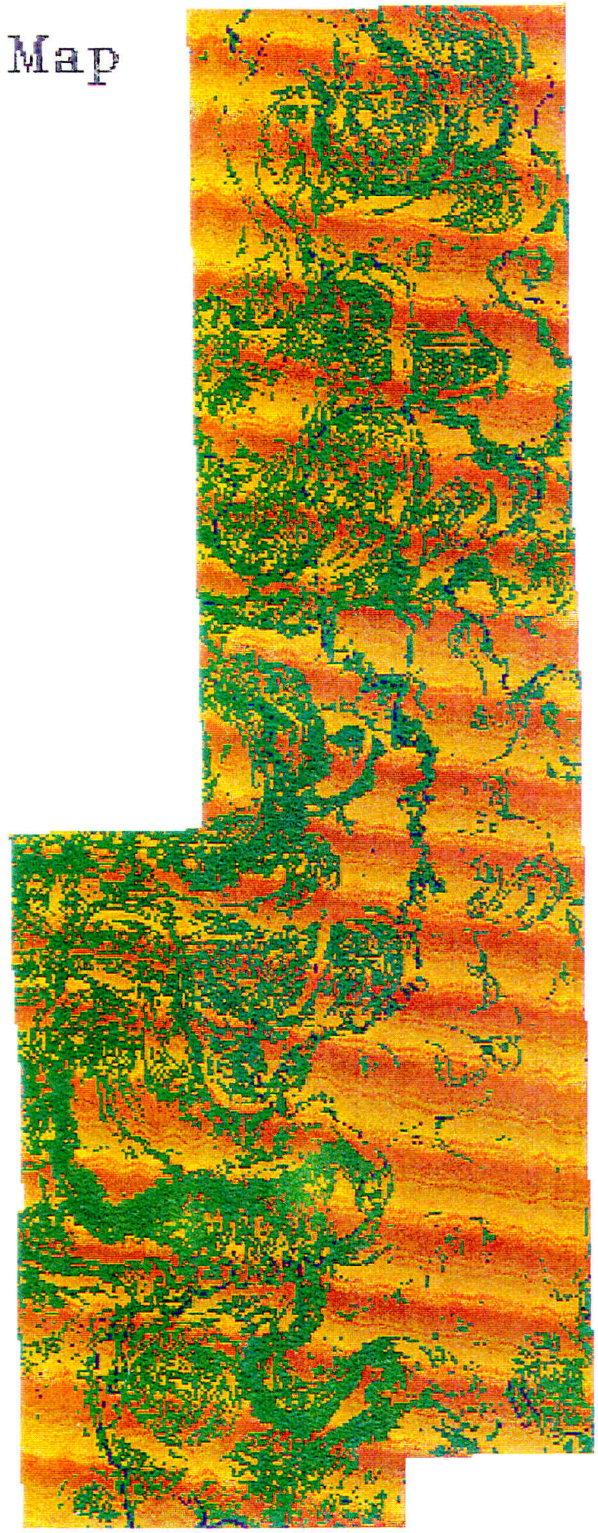
The cell size is (X, Y): 20, 20
The number of acres per cell is: 0.0988454
Upper left corner data file coordinate (X,Y) is: 2177, 5696

Number of classes in this variable is: 4
This file contains 4-bit data
The VARIABLE name is Sunflower County Soils Data

VALUE	POINTS	Acres	%	DESCRIPTION
0	1339616.	132414.875	0.00 %	area of non-interest
1	2836514.	280376.375	61.94 %	hydric soils
2	1699066.	167944.859	37.10 %	non-hydric soils
3	43762.	4325.672	0.96 %	water
Totals:	4579342.	452646.906		

Totals and Percentages are Based on Non-zero points

Sunflower County Soils Map



hydric soils
non-hydric soils
water

Header listing for GIS file: WARREN.GIS
Date statistics printed: 23-APR-1990
Date statistics created: 23-APR-1990

This file has 1688 rows, and 2033 columns

This image is geo-referenced to a UTM coordinate system
The upper left corner has coordinate: 679720, 3611120

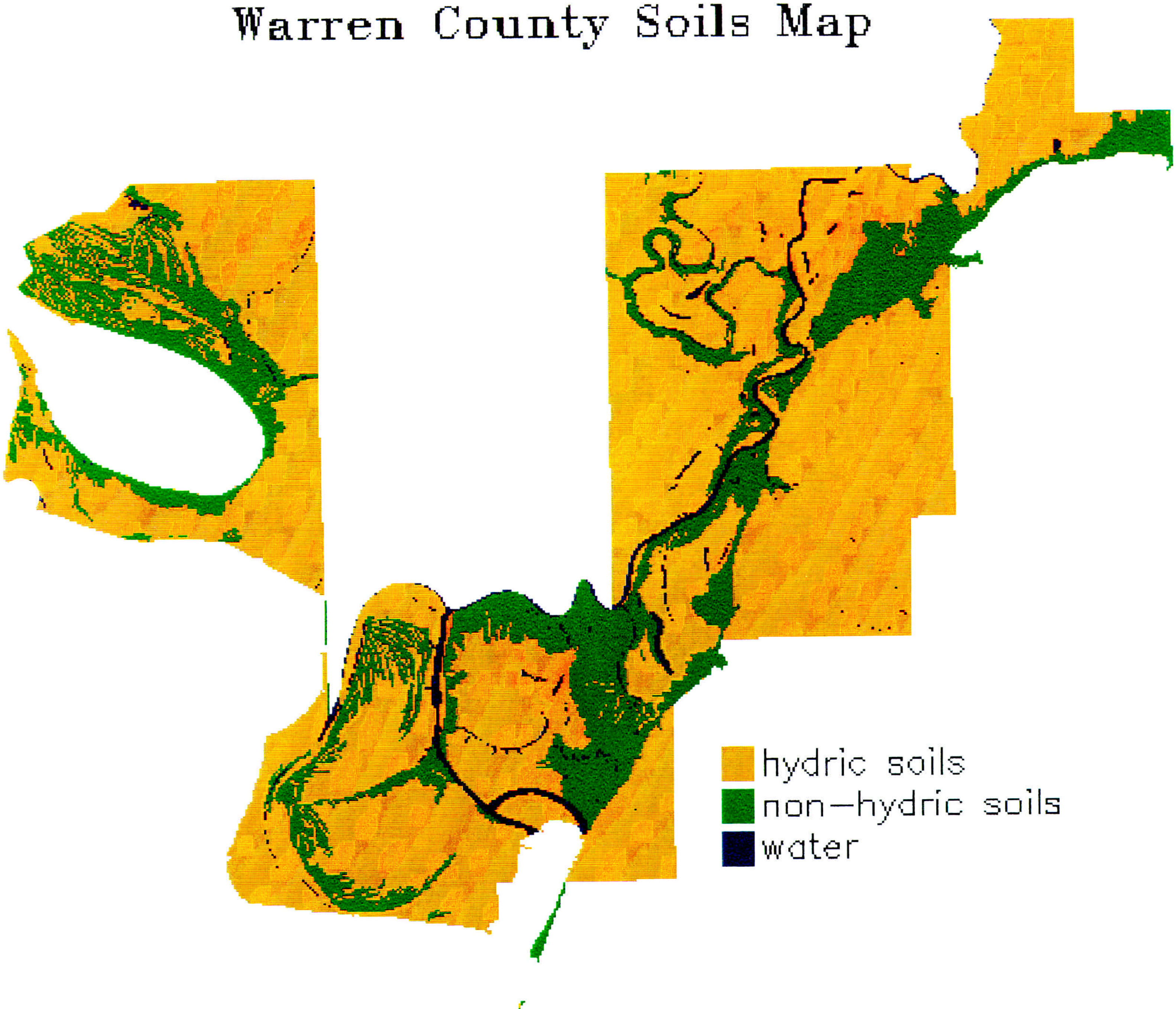
The cell size is (X, Y): 20, 20
The number of acres per cell is: 0.0988454
Upper left corner data file coordinate (X,Y) is: 788, 13305

Number of classes in this variable is: 4
This file contains 4-bit data
The VARIABLE name is Warren County Soils Data

VALUE	POINTS	Acres	%	DESCRIPTION
0	2371064.	234368.766	0.00 %	area of non-interest
1	781212.	77219.211	73.65 %	hydric soils
2	249986.	24709.967	23.57 %	non-hydric soils
3	29442.	2910.206	2.78 %	water
Totals:	1060640.	104839.383		

Totals and Percentages are Based on Non-zero points

Warren County Soils Map



Header listing for GIS file: WASH.GIS
Date statistics printed: 20-APR-1990
Date statistics created: 20-APR-1990

This file has 2911 rows, and 2633 columns

This image is geo-referenced to a UTM coordinate system
The upper left corner has coordinate: 664000, 3712020

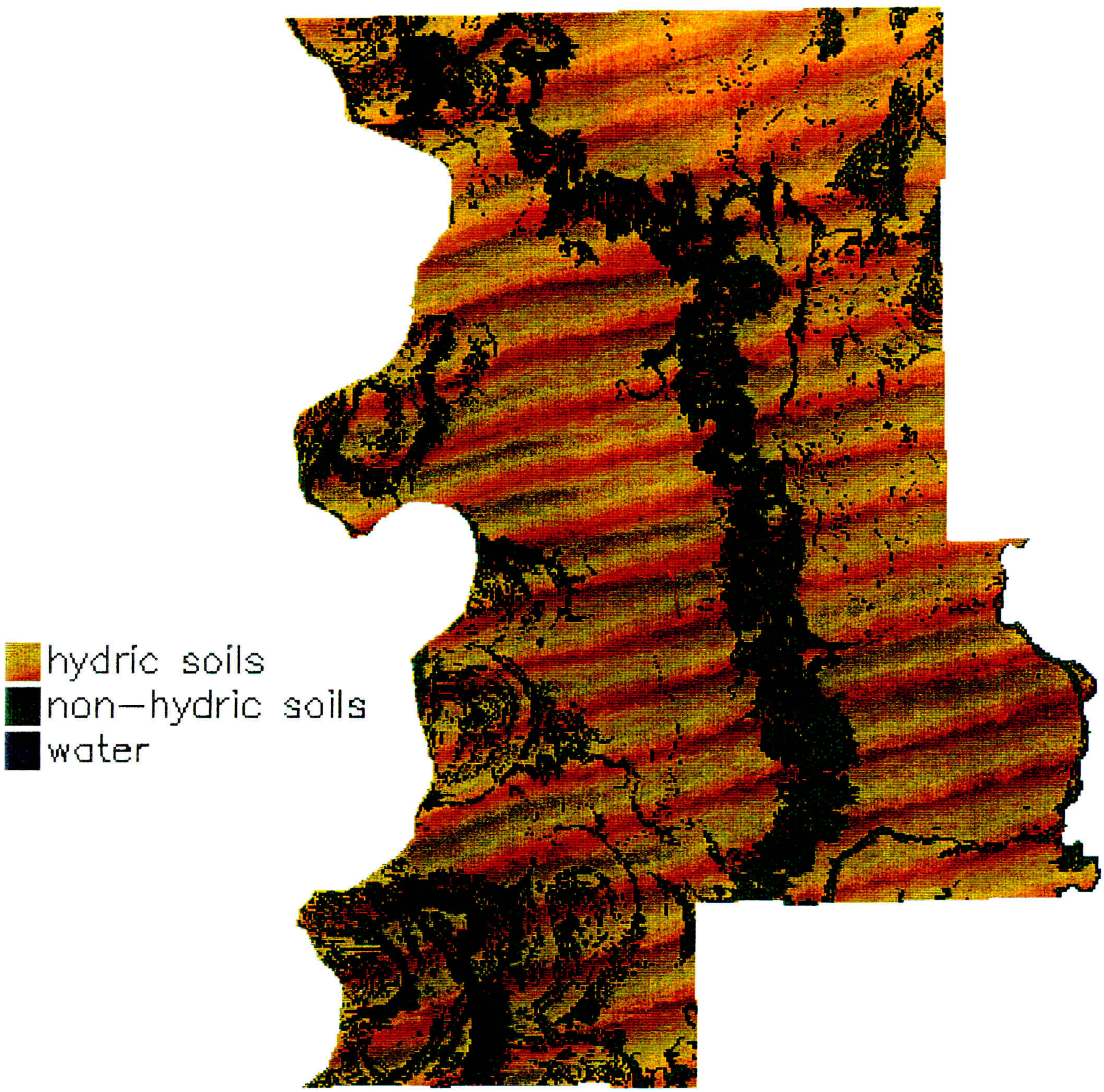
The cell size is (X, Y): 20, 20
The number of acres per cell is: 0.0988454
Upper left corner data file coordinate (X,Y) is: 2, 8260

Number of classes in this variable is: 4
This file contains 4-bit data
The VARIABLE name is Washington County Soils Data

VALUE	POINTS	Acres	%	DESCRIPTION
0	3286284.	324834.062	0.00 %	area of non-interest
1	3142973.	310668.437	71.78 %	hydric soils
2	1157902.	114453.289	26.45 %	non-hydric soils
3	77504.	7660.914	1.77 %	water
Totals:	4378379.	432782.625		

Totals and Percentages are Based on Non-zero points

Washington County Soils Map



Header listing for GIS file: YAZ.GIS
Date statistics printed: 23-APR-1990
Date statistics created: 23-APR-1990

This file has 5011 rows, and 2972 columns

This image is geo-referenced to a UTM coordinate system
The upper left corner has coordinate: 709720, 3656700

The cell size is (X, Y): 20, 20
The number of acres per cell is: 0.0988454
Upper left corner data file coordinate (X,Y) is: 2288, 11026

Number of classes in this variable is: 4
This file contains 4-bit data
The VARIABLE name is Yazoo County Soils Data

VALUE	POINTS	Acres	%	DESCRIPTION
0	12645375.	1249937.120	0.00 %	area of non-interest
1	1353394.	133776.766	60.22 %	hydric soils
2	816246.	80682.164	36.32 %	non-hydric soils
3	77677.	7678.014	3.46 %	water
Totals:	2247317.	222136.953		

Totals and Percentages are Based on Non-zero points

Yazoo County Soils Map