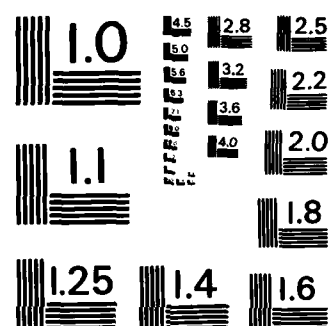


SOUTHWEST MISSISSIPPI TRIBUTARIES STUDY AREA
ENVIRONMENTAL INVENTORY; MIL. (U) ARMY ENGINEER
WATERWAYS EXPERIMENT STATION VICKSBURG MS ENVIR.
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SOUTHWEST MISSISSIPPI TRIBUTARIES STUDY AREA ENVIRONMENTAL INVENTORY; WILDLIFE RESOURCES

by

Wilma A. Mitchell, Chester O. Martin

Environmental Laboratory

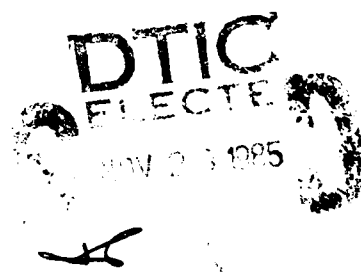
DEPARTMENT OF THE ARMY
Waterways Experiment Station, Corps of Engineers
PO Box 631, Vicksburg, Mississippi 39180-0631



September 1985

Final Report

Approved For Public Release, Distribution Unlimited



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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report synthesizes existing information on wildlife resources of the Southwest Mississippi Tributaries Basin, which lies mostly within the lower portion of the Loess Bluffs region and encompasses an area of 2,023,982 acres. The study provides information on physiographic features, soils, land uses and cover types, forest communities, wildlife management areas, game and fur har- vests, nongame species, and threatened and endangered species. (Continued)		

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20. ABSTRACT (Continued).

Forestry and agriculture are the primary land uses of the basin. Almost 73 percent of the area is forested, and 20 percent is in cropland and pasture. Forestlands consist of 33 percent loblolly pine (*Pinus taeda*) and shortleaf pine (*P. echinata*), 26 percent oak-hickory (*Quercus-Carya* spp.), and 41 percent mixed pine and hardwood. The Homochitto National Forest comprises 9 percent of the basin and is covered predominantly by loblolly pine.

Three wildlife management areas, totaling 57,700 acres, are open to public hunting, and approximately 500 hunting clubs operate within the basin. White-tailed deer (*Odocoileus virginianus*) and wild turkey (*Meleagris gallopavo*) are the major game species hunted on both public and private lands. The Southwest Basin produces about 20 percent of the annual statewide deer harvest and from 19 to 25 percent of the annual statewide turkey harvest. Squirrels (*Sciurus carolinensis* and *S. niger*) are the primary small game mammals, and the mourning dove (*Zenaida macroura*) is the most heavily harvested upland game bird. Mallards (*Anas platyrhynchos*) and wood ducks (*Aix sponsa*) are the chief waterfowl taken.

Twelve species of furbearers are harvested in Southwest Mississippi, with raccoon (*Procyon lotor*) and opossum (*Didelphis virginiana*) accounting for the largest harvests. Most species exhibit seasonal peaks in harvest, but a general decline in total harvest has occurred since the 1979-1980 trapping season. The data indicate that the furbearer resource is available but is not being fully utilized.

Approximately 330 species of mammals, birds, reptiles, and amphibians occur in Southwest Mississippi, but limited information is available on the non-game fauna of the study area. Federally endangered species known to occur in the basin are the American alligator (*Alligator mississippiensis*) and the red-cockaded woodpecker (*Picoides borealis*). The Homochitto National Forest has one of the few large populations of red-cockaded woodpeckers in Mississippi; more than 60 active colonies are located in the forest. The black bear (*Ursus americanus*), endangered in Mississippi, is found primarily in this region of the State.

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PREFACE

This report was prepared at the request of the US Army Engineer District (USAED), Vicksburg, Vicksburg, Mississippi. The survey was conducted as part of the reconnaissance phase of the Southwest Mississippi Tributaries Study for the USAED, Vicksburg, and was completed in September 1984.

Authors of this report were Dr. Wilma A. Mitchell and Mr. Chester O. Martin, Wildlife Biologists, Environmental Laboratory (EL), US Army Engineer Waterways Experiment Station (WES). Mr. Paul E. Davis, Geographic Information Systems Division, Mississippi Research and Development Center, Jackson, provided inventory and modeling of geographic data for the watershed. 1LT Albert R. Hamblin and Mr. Ellis J. Clairain, EL, provided assistance with computerized data and programs, and Ms. Felicia A. Chiplin, EL, assisted with compilation of tables. The manuscript was reviewed by Messrs. Charles E. Crowther and James E. Chandler of the USAED, Vicksburg. The report was edited by Ms. Jessica S. Ruff of the WES Publications and Graphic Arts Division.

Work was performed under the general supervision of Dr. Hanley K. Smith, Chief, Wetland and Terrestrial Habitat Group, EL; Dr. Conrad J. Kirby, Chief, Environmental Resources Division, EL; and Dr. John Harrison, Chief, EL. Commanders and Directors of WES during the study and preparation of this report were COL Tilford C. Creel, CE, and COL Robert C. Lee, CE; Technical Director was Mr. Fred R. Brown. Director of WES during publication of this report was COL Allen F. Grum, USA; Technical Director was Dr. Robert W. Whalin.

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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:

<u>Multiply</u>	<u>By</u>	<u>To Obtain</u>
acres	4046.873	square metres
Fahrenheit degrees	5/9	Celsius degrees or Kelvins*
feet	0.3048	metres
inches	25.4	millimetres
miles (US statute)	1.609347	kilometres
square miles	2.589998	square kilometres

* To obtain Celsius (C) temperature readings from Fahrenheit (F) readings, use the following formula: $C = (5/9)(F - 32)$. To obtain Kelvin (K) readings, use $K = (5/9)(F - 32) + 273.15$.

SOUTHWEST MISSISSIPPI TRIBUTARIES STUDY AREA
ENVIRONMENTAL INVENTORY--WILDLIFE RESOURCES

PART I: INTRODUCTION

This report is an inventory and assessment of wildlife resources of the Southwest Mississippi Tributaries Basin. The basin consists of 2,023,982 acres* or 3,162 square miles in the southwestern corner of Mississippi. The region is predominantly upland forested terrain drained by Bayou Pierre, Coles and St. Catherine Creeks, and the Homochitto, Buffalo, and Mississippi Rivers.

The study provides information on physiographic features, soils, land use and cover types, forest communities (including data and maps on forest cover), wildlife management areas, hunting and recreational uses of wildlife (including tabular summaries of harvest data), fur harvest and prices, nongame species, and threatened and endangered species. Due to a paucity of published literature on natural resources of the study area, the majority of information presented was obtained through contacts with State and Federal agencies. Data on soils and land capabilities were obtained from the US Department of Agriculture (USDA) Soil Conservation Service (SCS), and information on forest resources was provided by the US Forest Service. Game and furbearer harvest data were summarized from records provided by the Mississippi Department of Wildlife Conservation. Mapping and computerized land use data were developed by the Mississippi Automated Resource Information System (MARIS) of the Mississippi Research and Development Center in Jackson.

Information presented in this report includes a description of the environmental setting of the study area (Part I) and discussions of land use and cover types (Part II) and wildlife resources (Part III). Supplemental information includes descriptions of the soils of counties within the basin (Appendix A), habitat capability indices for the Homochitto National Forest (Appendix B), furbearer harvest data for counties in the basin for 1979-1983

* A table of factors for converting non-SI units of measurement to SI (metric) units is presented on page 7.

(Appendix C), breeding bird survey data obtained in Southwest Mississippi between 1966 and 1983 (Appendix D), and 1973-1982 Christmas bird counts taken at Natchez, Miss. (Appendix E). Scales were removed from the soils and land use maps because reduction was necessary to accommodate page size. The authors may be contacted for the original maps.

PART II: ENVIRONMENTAL SETTING

Location

The Southwest Mississippi Tributaries Basin lies in the southwestern corner of Mississippi and encompasses all of Adams, Franklin, and Jefferson Counties and portions of Claiborne, Hinds, Copiah, Lincoln, Amite, and Wilkinson Counties (Figure 1). Major drainages are the Bayou Pierre system in the north; the Homochitto and Buffalo Rivers in the south; and Coles Creek, St. Catherine Creek, and the Mississippi River in the west. The basin is bounded on the west by the Mississippi River; on the south by lower Wilkinson County; on the north by upper Claiborne County and northwestern Hinds County; on the east by eastern Hinds, Copiah, and Lincoln Counties; and on the southeast by almost all of Amite County. The basin covers an area of more than 2.1 million acres (Table 1).

Table 1
Land Area of Counties Within the Southwest
Mississippi Tributaries Basin

<u>County</u>	<u>Number of Acres in Basin</u>	<u>Percent of Basin Area</u>
Adams	255,577	12.63
Amite	64,311	3.18
Claiborne	228,642	11.30
Copiah	309,633	15.30
Franklin	350,530	17.32
Hinds	85,439	4.22
Jefferson	331,935	16.40
Lincoln	101,193	5.00
Wilkinson	<u>296,722</u>	14.66
Total	2,023,982	

SOURCE: MARIS.

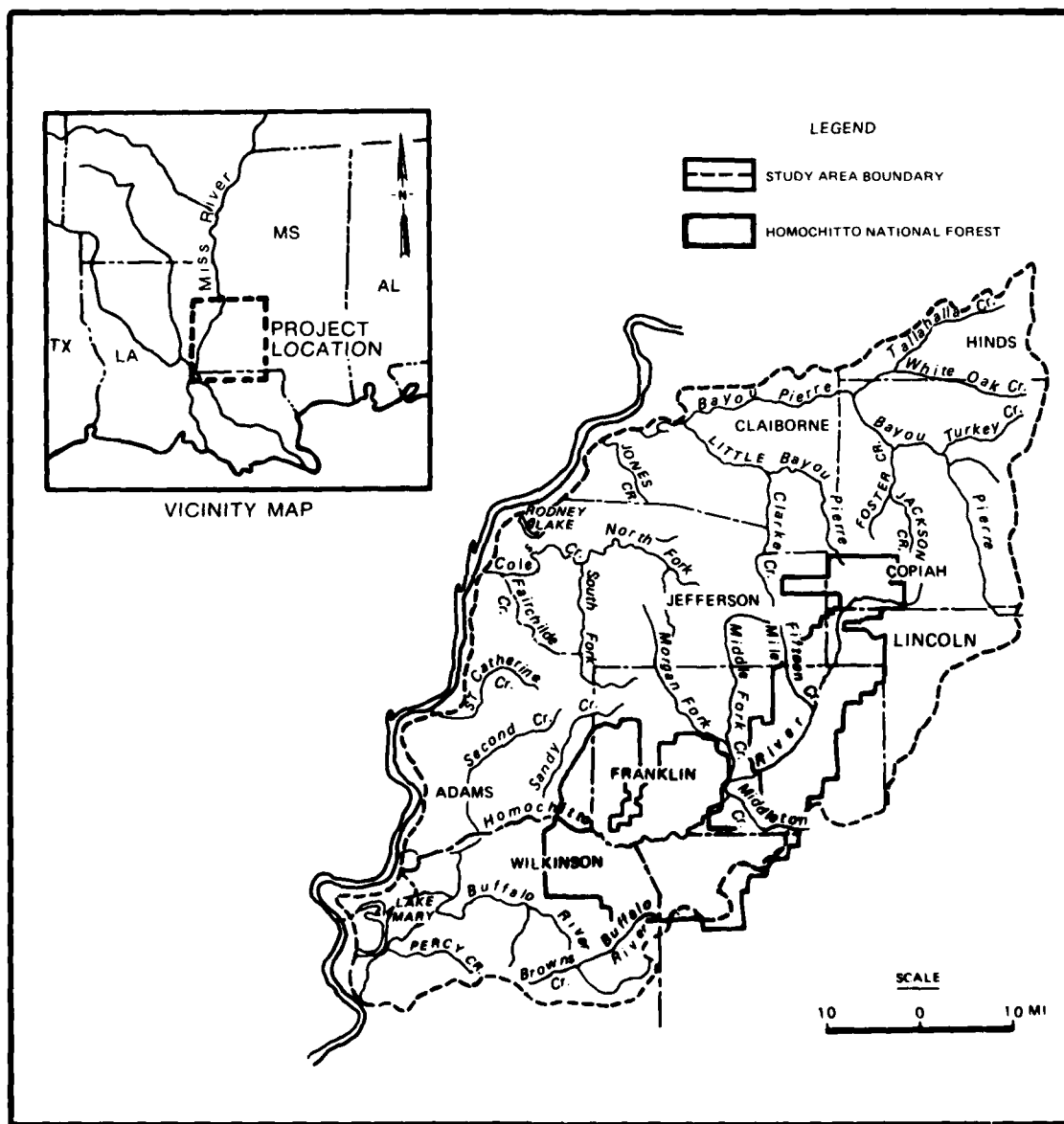


Figure 1. The Southwest Mississippi Tributaries Basin

Climate

Southwest Mississippi has long, hot summers and short, mild winters characteristic of subtropical regions. The climate is influenced by its latitude, proximity to the warm waters of the Gulf of Mexico, prevailing southerly winds, and the extensive land mass to the north. The following information on climatological characteristics for the basin is summarized from available soil surveys for counties in the study area (Lane and Cole 1963, Milbrandt et al. 1963, Morris et al. 1969, Milbrandt 1976, Cole et al. 1979, Morris 1980).

Winds from the Gulf prevail in summer and bring warm, moist air favorable to the sporadic development of thundershowers. Occasionally, a change in pressure distribution brings westerly to northerly winds. When this change is extended, dry hot weather results; if prolonged, drought may occur. In winter the alternation of periods of warm, tropical air with dry polar air produces abrupt weather changes. Extensive variations in temperature occur, but cold periods are usually of short duration.

Annual rainfall for the region averages 55 to 60 in. Winter and spring are wet seasons, and summer and fall are usually dry. Precipitation occurs as prolonged rains in winter and spring whereas, in summer and fall, rainfall is predominantly in the form of thundershowers. Severe droughts are rare; however, local droughts may occur because scattered thunderstorms bypass areas needing rain. Local flash floods are possible during any month if an area receives ≥ 3 in. of rainfall in a day. Snowfall occurs in about 1 in 4 years and averages < 1.5 in. per year.

The mean annual temperature is approximately 65° F throughout the basin. On the average, 38 days a year have temperatures of $\leq 32^{\circ}$ F, and 93 days have temperatures of $\geq 90^{\circ}$ F. The lowest average monthly temperatures of 47° – 51° F are in January, and the highest average monthly temperatures of 80° – 82° F are in July and August. The growing season lasts approximately 7 months, from April through October, with 230 to 240 frost-free days. In a typical year the basin receives 65 percent of the sunshine possible in summer and 50 percent of that possible in winter.

Relative humidity is always high; it is ≥ 60 percent for 70 to 75 percent of the time and ≤ 40 percent for only 8 percent of the time. When the temperature is $< 50^{\circ}$ F, relative humidity ranges from 50 to 79 percent for 46 percent of the time and from 80 to 100 percent for 44 percent of the time. When summer

temperatures are $\geq 90^{\circ}$ F, relative humidity ranges from 50 to 79 percent for 42 percent of the time but does not exceed 79 percent.

Thunderstorms are frequent and likely to occur during any season. Those associated with passing weather systems are common in late fall, winter, and early spring and may be accompanied by strong winds. A tropical depression or remnant of a hurricane that has moved inland may bring heavy rains for 1-3 days in summer or fall. Gale-force winds occur only once in 21 years, but flooding may result from the rains. Approximately six hurricanes per 100 years approach the area near enough to cause crop and property damage. The frequency of tornadoes varies within the basin. Claiborne County receives tornado damage about once every 4 years, whereas tornadoes strike other areas once every 15 to 20 years.

Physiography

The Southwest Mississippi Tributaries Basin lies within two of six general physiographic regions in Mississippi (Figure 2). The western edge of the basin is in the lower section of Delta, but the majority of the basin is in the lower portion of the Loess Bluffs region. Information on physiography was provided by the USDA SCS (Pettry 1977).

Delta

The Delta is bounded on the west by the Mississippi River and on the east by the loessal uplands. It is no more than 5 miles wide and is nearly absent at some points. The flat topography of the Delta is broken by depressional swamps and natural levees that form gentle ridges which may be 15-20 ft higher than the normal level of the river. This narrow alluvial plain is free of man-made levees along the Mississippi River. Basin counties that contain small portions of Delta are Claiborne, Jefferson, Adams, and Wilkinson.

Loess Bluffs

The lower section of the Loess Bluffs lies between the Coastal Plain on the east and the Delta on the west. This uplands area is 40-60 miles wide and extends 70-80 miles south and southwest of Raymond in Hinds County. The area is overlain with a layer of loess, which is windblown sediment deposited during the Pleistocene onto the hills and valleys of the eastern Mississippi River Valley. The uplands can be divided into two zones characterized by the depth of loess, which is thicker near the Mississippi River and becomes progressively

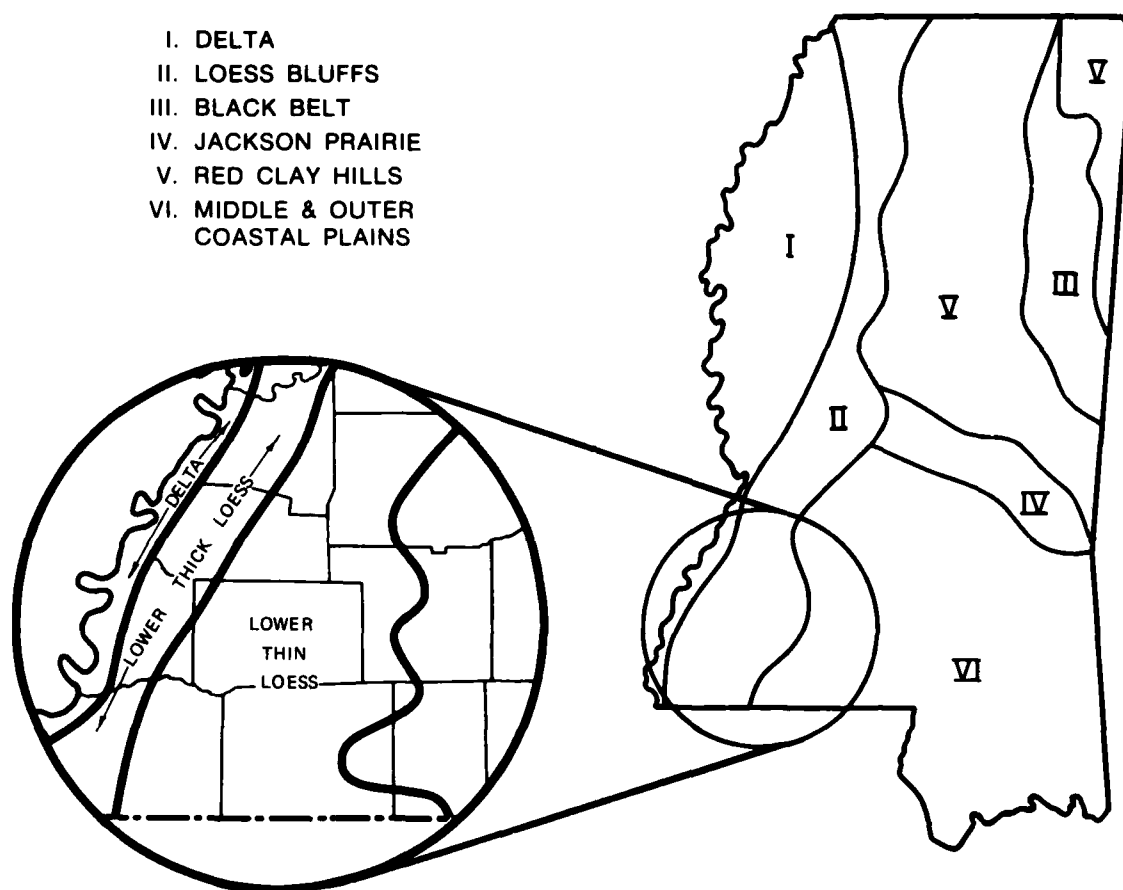


Figure 2. Physiographic regions of Mississippi and the Southwest Tributaries Basin (SCS)

thinner toward the east. The Lower Thick Loess, the more westerly zone, is 10-20 miles wide and covered by loess deposits of 4-60 ft; the Lower Thin Loess is 30-40 miles wide with deposits of < 4 ft.

Because of the escarpment formed where loess comes in contact with the alluvial plain, the Thick Loess is frequently called the bluff hills; in many places the buff-colored soil stands in vertical erosional remnant columns. This zone is also referred to as the brown loam area because of the color and character of the soils. The topography of the Thick Loess section is generally level terrain dissected by steep-walled gullies and stream channels that contain strips of level bottomland soils. Extensive stream branches form a broken pattern of narrow valleys and ridges, which may have a relief of 160 ft. Although similar, the general topography of the Thin Loess is less steep and more undulating than that of the Thick Loess. The major part of

Adams County is in the Lower Thick Loess; most of Franklin County and the portions of Hinds, Copiah, Lincoln, and Amite Counties in the study area basin are in the Lower Thin Loess; and Claiborne, Jefferson, and Wilkinson Counties have approximately equal portions of land area in each zone.

Soils

The majority of soils within the Southwest Mississippi Tributaries Basin are silty because the loess materials were first laid down by glaciers along the Mississippi River banks and later deposited by wind onto the uplands. The alluvial soils of the Delta and tributary floodplains contain clay and loam as well as silt, and some of the upland soils are clayey or loamy. A general description of the soils of each county within the basin and county maps showing the major soil associations are presented in Appendix A. Soils information was obtained from the SCS, and maps were supplied by the MARIS of the Mississippi Research and Development Center.

Slope

Soils within the Southwest Mississippi Tributaries Basin exhibit 0-40 percent slope (Figure 3). The four categories shown on the map are based on generalized slope characteristics assigned to soil land classification units rather than on actual measured values of topography. Approximately 46 percent (933,780 acres) of basin soils have slopes of 12-40 percent, and more than two-thirds of these are in Jefferson, Franklin, Adams, and Wilkinson Counties (Table 2). Soils in Jefferson County exhibit the greatest slope, with 59 percent in the 12-40 percent category.

Approximately 50 percent of basin soils have ≤ 8 percent slope, with 27.5 percent in the 0-2 percent category and 22 percent in the 3-8 percent category. Amite, Hinds, and Lincoln Counties contribute only 2-4 percent of soils with 0-2 percent slope, and the other counties contribute 14-19 percent. These soils lie primarily on floodplains; Wilkinson County has the largest percentage, approximately 106,000 acres. Soils in Copiah and Franklin Counties account for 23.5 and 18 percent, respectively, of those with 3-8 percent slope; the other counties contribute 4-11 percent of soils in this category. Only 4 percent of basin soils have 9-17 percent slope, and approximately one-half of these are equally distributed between Claiborne and Copiah Counties.

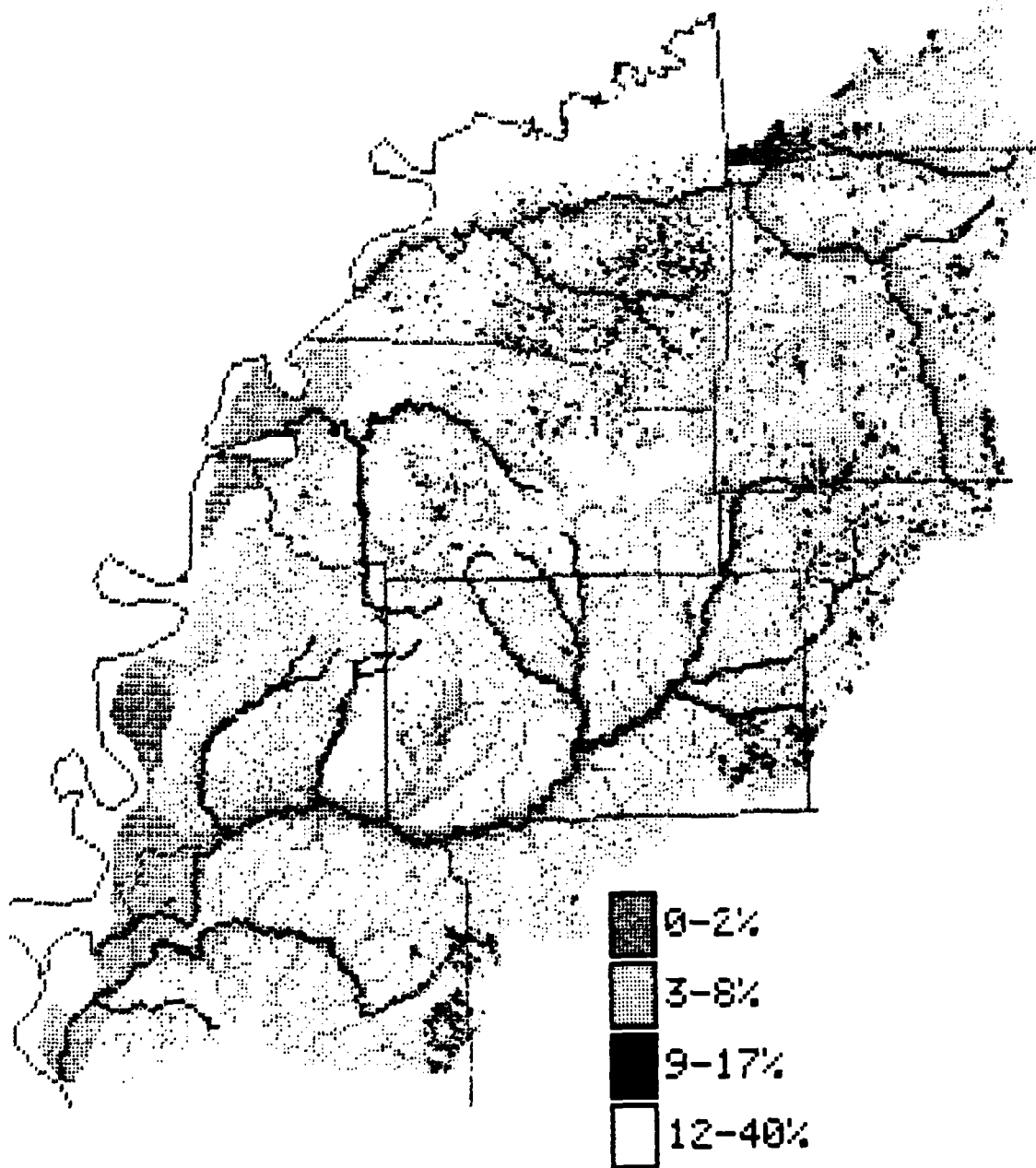


Figure 3. Slope of soils in the Southwest Mississippi Tributaries Basin (MARIS)

Table 2
Percentages of Sloping Land in Counties of the
Southwest Mississippi Tributaries Basin*

County	0-2 percent		3-8 percent		9-17 percent		12-40 percent	
	Basin	County	Basin	County	Basin	County	Basin	County
Adams	3.99	31.59	2.46	19.48	0.00	0.00	6.18	48.92
Amite	0.57	18.06	0.89	27.86	0.04	1.25	1.68	52.83
Claiborne	3.73	33.02	1.65	14.62	1.00	8.84	4.92	43.53
Copiah	4.13	27.00	5.26	34.36	0.98	6.40	4.93	32.24
Franklin	3.93	22.66	4.02	23.23	0.34	1.99	9.03	52.11
Hinds	1.05	24.87	1.90	45.05	0.45	10.56	0.82	19.52
Jefferson	3.85	23.47	2.47	15.04	0.36	2.20	9.72	59.30
Lincoln	0.99	19.78	1.81	36.26	0.54	10.81	1.66	33.15
Wilkinson	<u>5.25</u>	35.81	<u>1.81</u>	12.35	<u>0.40</u>	2.75	<u>7.20</u>	49.09
Total	27.49		22.27		4.11		46.14	

SOURCE: SCS.

* Given as percent of basin and percent of county within the basin.

Erosion potential

The SCS uses numeric K-factor ratings to express the erosion potential of soils. These factors have been combined to give a general overview of the soils in the Southwest Mississippi Tributaries Basin (Figure 4). Most soils are highly susceptible to erosion, as indicated by the 84 percent that have high and very high erosion potentials (Table 3). Approximately 12 percent of basin soils have moderate erosion potential; only about 4 percent have low and very low erosion potentials. The counties adjacent to the Mississippi River and large percentages of Franklin, Hinds, and Copiah Counties have highly erodible soils; whereas the soils of southeastern Jefferson County, eastern Franklin County, and the basin portion of Copiah and Lincoln Counties have moderate erodibility. Adams and Lincoln Counties contribute the largest percentages of soils with low erosion potentials; 25 percent of Lincoln County soils within the basin have low erosion potential and 8 percent of Adams County soils have very low erosion potential. Although Copiah County contributes the most very highly erodible soils to the basin, 8 percent of the soils within

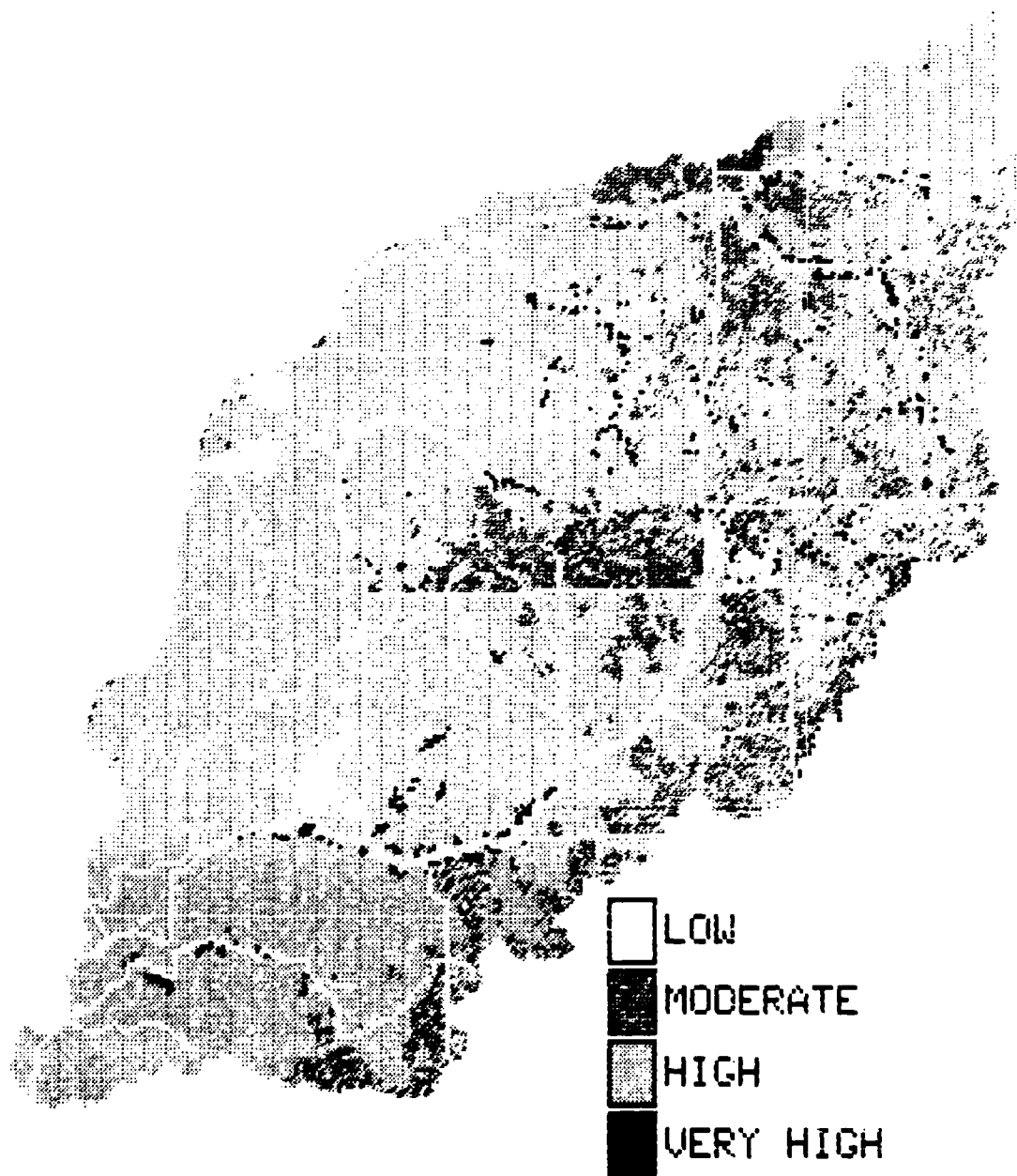


Figure 4. Erosion potential for soils of the Southwest Mississippi Tributaries Basin (MARIS)

Table 3
Erosion Potential of Soils in Counties of the
Southwest Mississippi Tributaries Basin*

County	Very High		High		Moderate		Low		Very Low	
	Basin	County	Basin	County	Basin	County	Basin	County	Basin	County
Adams	0.00	0.00	11.64	92.14	0.02	0.17	0.00	0.00	0.97	7.69
Amite	0.09	2.79	2.18	68.68	0.78	24.69	0.09	2.98	0.03	0.86
Claiborne	0.30	2.67	9.85	87.22	1.03	9.16	0.00	0.00	0.11	0.95
Copiah	0.66	4.31	11.05	72.21	3.19	20.85	0.32	2.08	0.09	0.56
Franklin	0.30	1.73	14.24	82.20	2.41	13.92	0.10	0.56	0.27	1.59
Hinds	0.03	0.72	3.94	93.42	0.22	5.21	0.00	0.00	0.03	0.65
Jefferson	0.35	2.12	13.35	81.39	2.55	15.58	0.00	0.00	0.15	0.91
Lincoln	0.38	7.69	2.43	48.53	0.89	17.83	1.24	24.79	0.06	1.16
Wilkinson	<u>0.25</u>	1.69	<u>13.39</u>	91.34	<u>0.88</u>	6.00	<u>0.00</u>	0.00	<u>0.14</u>	0.98
Total	2.36		82.07		11.97		1.75		1.85	

SOURCE: SCS.

* Percentages in each category are given as percent of basin and percent of county within the basin.

the Lincoln County portion of the basin have very high erosion potential.

Flooding potential

One-fifth of basin soils are subject to flooding (Figure 5, Table 4). Approximately 24 percent of those soils are in Wilkinson County, and 15-17 percent are in Claiborne, Adams, and Jefferson Counties. These counties contain floodplains of the Mississippi River and numerous tributaries of river systems within the basin. Franklin County has the largest percentage of soils that are not subject to flooding; these amount to approximately 90 percent of the county and 16 percent of the total basin. Copiah and Jefferson Counties also contribute large percentages of soils that are not subject to flooding, and only 16 and 17 percent, respectively, of soils in the Amite and Lincoln County portions of the basin are subject to flooding.

Agricultural soils

Prime agricultural soils are those most suited for agriculture and have been determined by the application of SCS land capability units. There are 561,565 acres of prime agricultural soils within the basin, and these occur on approximately 28 percent of the land (Figure 6, Table 5). Copiah County has

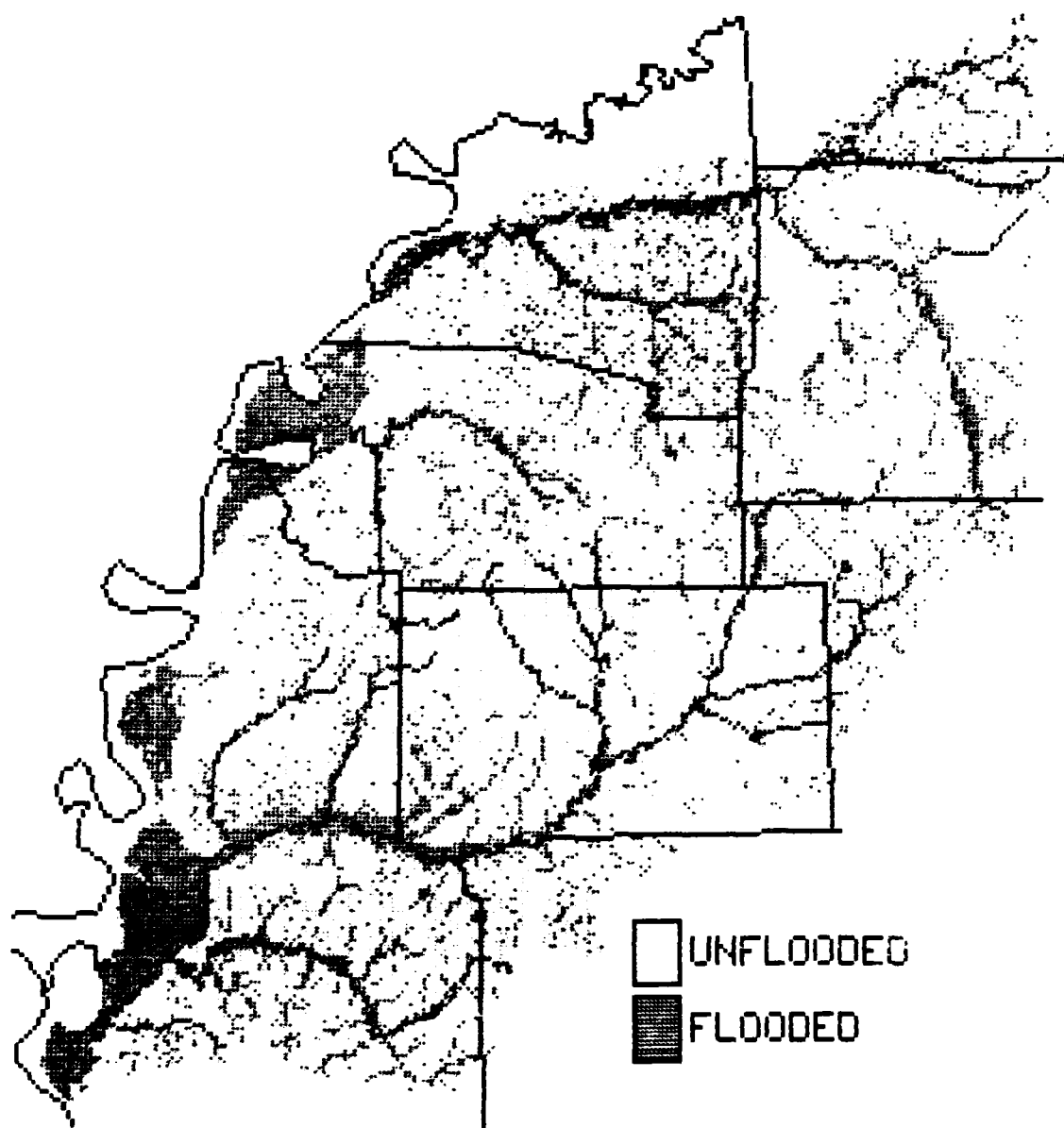


Figure 5. Location of soils subject to flooding in the Southwest Mississippi Tributaries Basin (MARIS)

approximately one-fourth of these soils; Franklin, Claiborne, and Wilkinson Counties account for 41 percent of the total acreage. Although Jefferson County lies entirely within the basin, it contributes a small percentage, as only 13 percent of its soils are classified as prime agricultural soils.

Table 4
Percentages of Soils Subject to Flooding in Counties
of the Southwest Mississippi Tributaries Basin

County	Flooded			Not Flooded		
	Acres	Percent of Basin	Percent of County*	Acres	Percent of Basin	Percent of County*
Adams	67,091	3.31	26.25	188,486	9.31	73.75
Amite	10,317	0.51	16.04	53,994	2.67	83.96
Claiborne	62,087	3.07	27.15	166,554	8.23	72.85
Copiah	34,287	1.69	11.07	275,346	13.60	88.93
Franklin	35,770	1.77	10.20	314,761	15.55	89.80
Hinds	19,584	0.97	22.92	65,856	3.25	77.08
Jefferson	69,748	3.45	21.01	262,187	12.95	78.99
Lincoln	17,669	0.87	17.46	83,524	4.13	82.54
Wilkinson	<u>101,193</u>	<u>5.00</u>	34.10	<u>195,529</u>	<u>9.66</u>	65.90
Total**	417,745	20.64		1,606,237	79.36	

SOURCE: SCS.

* Percent of county within basin.

** Totals may not be exact due to rounding.

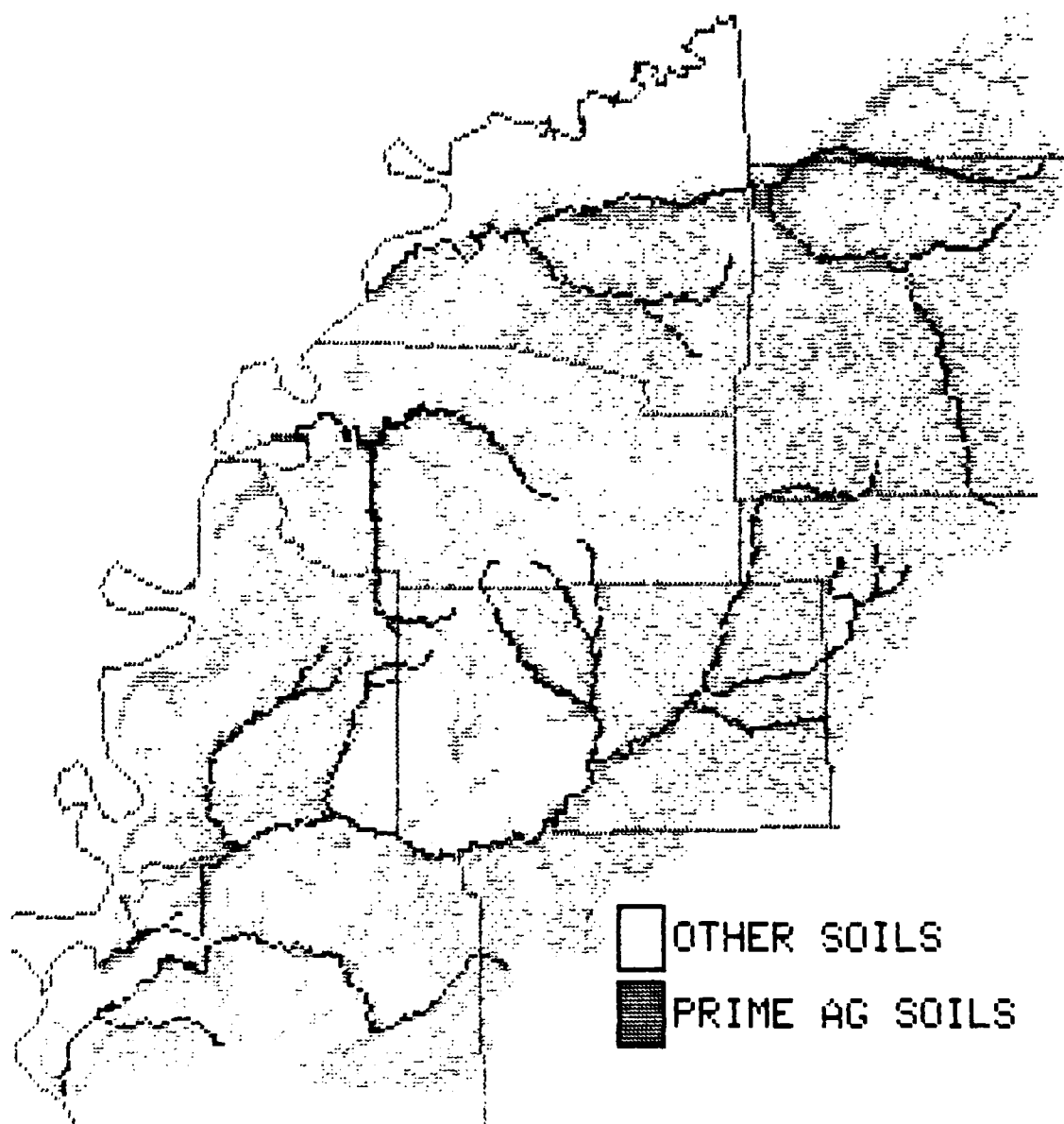


Figure 6. Location of prime agricultural soils in the Southwest Mississippi Tributaries Basin (MARIS)

Table 5
Acreage and Percentage of Prime Agricultural Soils in Counties
of the Southwest Mississippi Tributaries Basin

<u>County</u>	<u>Acres</u>	<u>Basin</u>	<u>Percent*</u>	<u>County</u>
Adams	57,083	2.82		22.34
Amite	24,588	1.21		38.23
Claiborne	67,524	3.34		29.53
Copiah	145,179	7.17		46.89
Franklin	97,610	4.82		27.85
Hinds	26,750	1.32		31.31
Jefferson	44,357	2.19		13.36
Lincoln	33,360	1.65		32.97
Wilkinson	<u>65,114</u>	<u>3.22</u>		21.94
Total	561,565	27.74		

SOURCE: SCS.

* Given as percent of basin and percent of county within the basin.

PART III: LAND USE AND COVER TYPES

Forestry and agriculture are the primary land uses in the Southwest Mississippi Tributaries Basin (Figure 7). Almost 73 percent of the basin is forested, and almost 20 percent is in cropland and pasture (Table 6). Water covers approximately 3 percent of the study area, and only 4 percent of the basin is in other land uses such as urban and industrial development, gravel and borrow pits, farmsteads, and roads. Most of the information on cover types and land use was provided by the US Forest Service and the MARIS.

Public Lands

State and Federal lands cover 198,722 acres of the Southwest Mississippi Tributaries Basin and include the Copiah County Wildlife Management Area (WMA), Natchez State Park, and Homochitto National Forest (Figure 8). There are two WMAs on the forest, but these and the Copiah County WMA will be discussed in a later section. The Natchez State Park (not shown on map) contains 3,441 acres of primarily forested land in northeast Adams County. Although open to the public, the park still is in developmental stages. Presently it has campsites and several miles of walking trails; upon completion, it will have a 250-acre lake. The park is under the administration of the Recreation and Parks Bureau, Mississippi Department of Natural Resources.

The Homochitto National Forest extends on a diagonal from northeast Wilkinson County to southwest Copiah County. It consists of 188,781 acres, which represents 17 percent of the national forestland in Mississippi. The map shows the forest covering 19 percent of the total basin area when it actually covers only 9 percent. This discrepancy results because the map includes all the land within the proclamation boundary, an assumed regular boundary around the entire forest and the many interspersed private landholdings.

The largest percentage of the Homochitto National Forest lies in centrally located Franklin County, which contributes almost 50 percent of its total land area to the forest. The remainder is formed by the northwest corner of Amite County and smaller portions of Adams, Wilkinson, Jefferson, Copiah, and Lincoln Counties. The Homochitto River courses from northeast to southwest through the length of the forest; it is fed by numerous streams that also pass through and dissect the forest terrain.

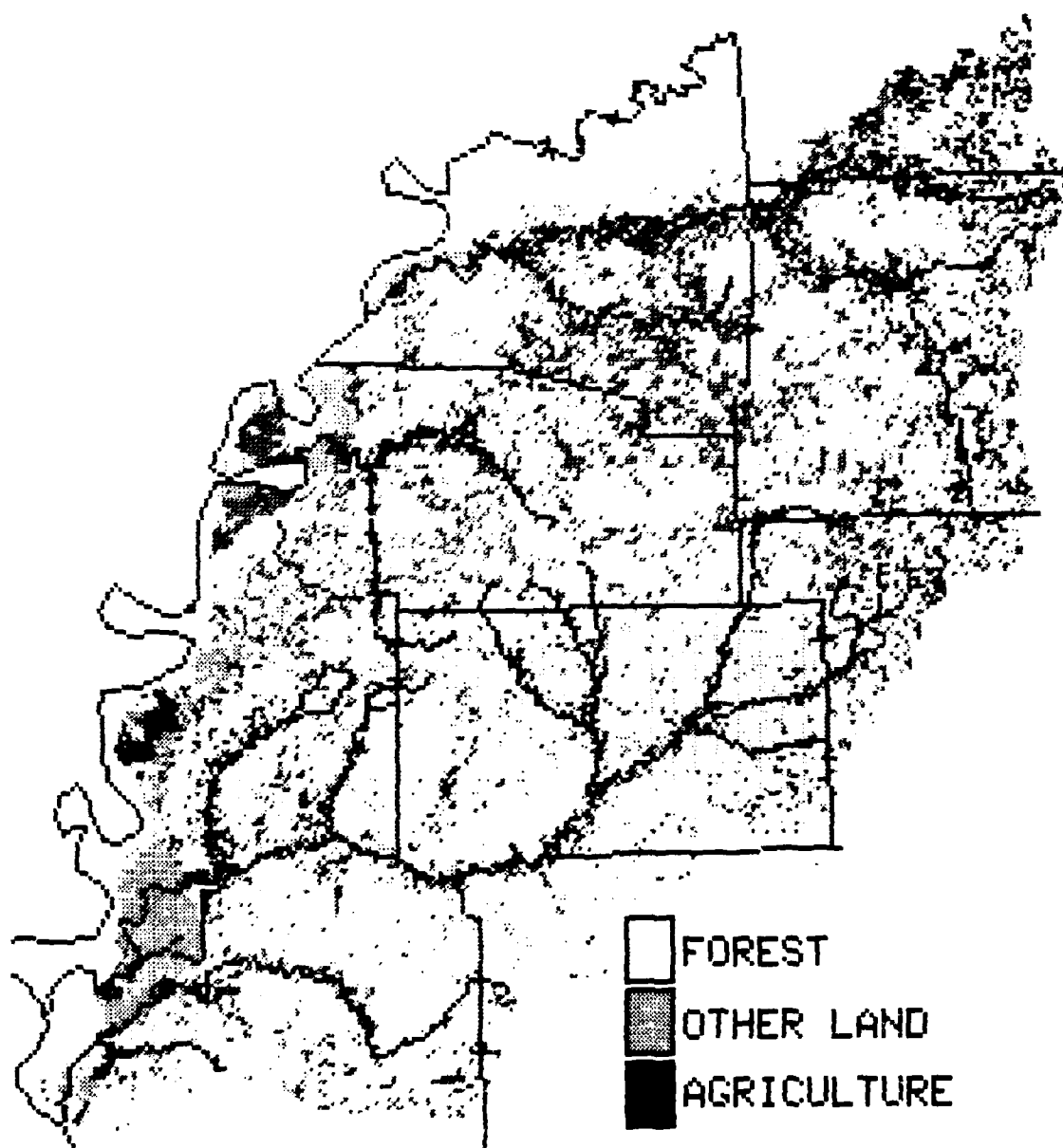


Figure 7. Major land uses in the Southwest Mississippi Tributaries Basin (MARIS)

Table 6
Vegetative Cover and Land Uses in the Southwest
Mississippi Tributaries Basin

<u>Cover and Land Use</u>	<u>Number of Acres</u>	<u>Percent of Basin</u>
<u>Forestland</u>		
Pine	473,964	23.42
Hardwood	374,748	18.52
Mixed	603,080	29.80
Other	24,279	1.20
Total	1,476,071	72.94
<u>Agricultural land</u>		
Cropland/pasture	401,065	19.82
Orchards	432	0.02
Other	247	0.01
Total	401,744	19.85
<u>Water areas</u>		
Lakes/ponds	4,077	0.20
Swamps	46,519	2.30
Freshwater marsh	1,483	0.07
Reservoirs	5,560	0.27
Total	57,639	2.84
Other land use	88,448	4.37

SOURCE: MARIS.

Approximately 61,900 visitor days were recorded for the Homochitto National Forest in 1975 (Porterfield et al. 1978). The major activity was hunting (26,200 visitor days), which was followed by camping (17,200 visitor days). Visitors also engaged in fishing and nonconsumptive activities such as picnicking, swimming, nature walks, photography, and scenic drives. Specific information on hunting activity and harvest records in the Homochitto Forest and on other public lands of the basin are covered in Part IV, Wildlife Resources.

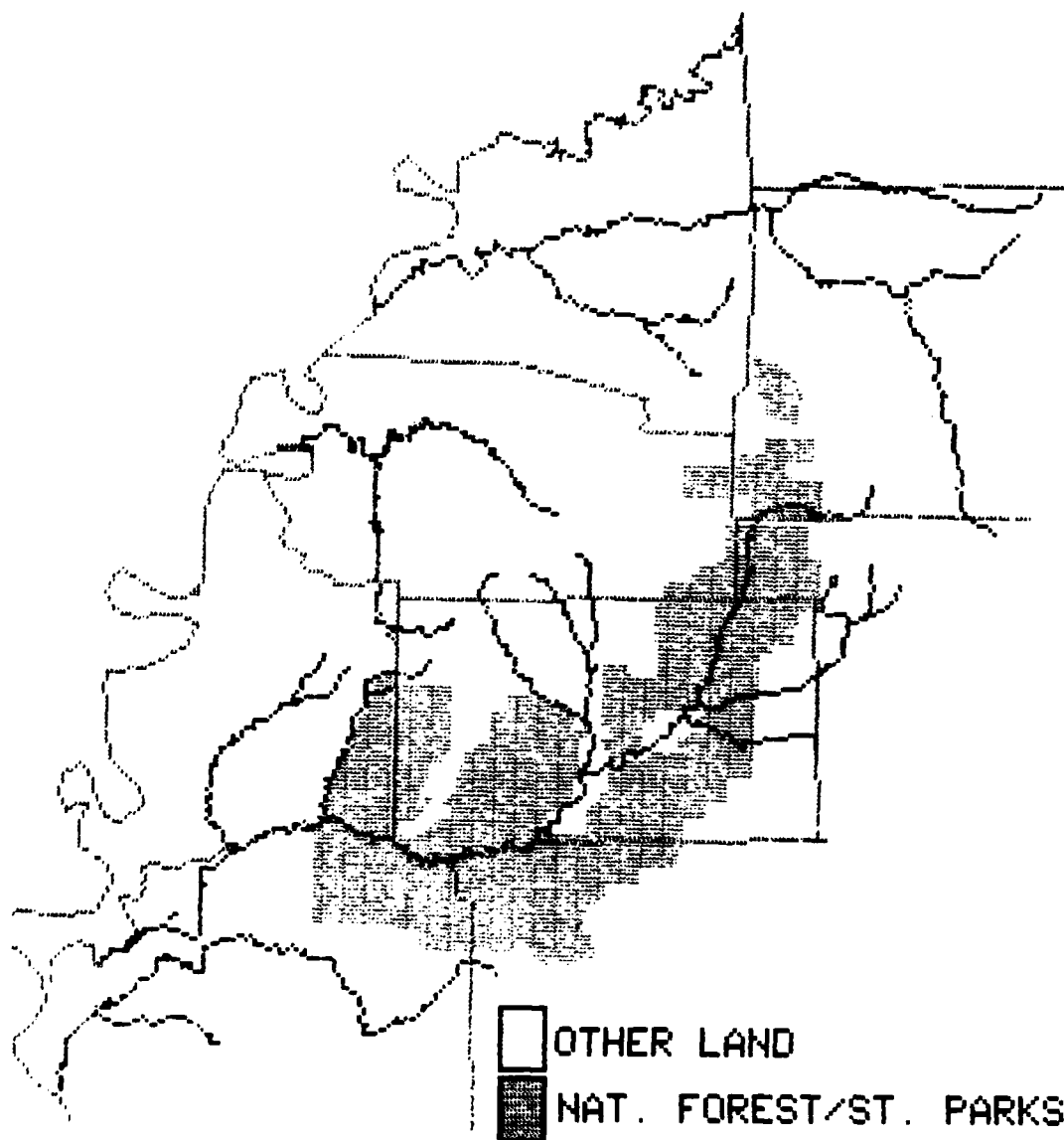


Figure 8. Public lands in the Southwest Mississippi Tributaries Basin (MARIS)

Forestlands

Forest types

Forest covers approximately 1.5 million acres of the Southwest Mississippi Tributaries Basin (Figure 9), and about 50 percent of this acreage is in Franklin, Jefferson, and Wilkinson Counties (Table 7). Franklin and Jefferson Counties lie entirely within the basin and are, respectively, 85 and 73 percent forested; 77 percent of Wilkinson County within the basin is forested (Table 8). The basin is covered by 23 percent pine, 18.5 percent hardwood, and 29.8 percent mixed pine and hardwood (Table 6).

Early accounts indicated that original loessal forests were composed entirely of hardwoods (Dunston 1910, Holmes 1913), and Lowe (1921) stated that pine was present almost solely as second growth in old fields or other openings. Pine is currently growing on 30 percent of the basin area. Pine communities consist chiefly of loblolly (*Pinus taeda*) and shortleaf (*P. echinata*) pines with a much larger percentage of loblolly in the southern part of the basin. A small amount of longleaf pine (*P. palustris*) is also found in the southern part of the study area.

Pine forests presently occur on 474,000 acres of basin land. One-third of the pine is in Franklin County, and another third is about equally distributed in Copiah and Wilkinson Counties. These counties lie on a diagonal from southwest to northeast through the basin and contain more than 90 percent of the Homochitto National Forest. The remaining counties each provide 3-10 percent of the basin's pine forests.

Hardwood forests in the basin amount to approximately 375,000 acres, and most are found on thick loess soils concentrated along bluffs bordering the Delta region. One-third of the hardwood is in Jefferson County, and another third is in Wilkinson (18 percent) and Adams (15 percent) Counties. The hardwood component contributed by other counties ranges from 5 percent for Amite County to 10 percent for Franklin County.

Hardwood communities in the basin are characterized as oak-hickory. Those on thick loess soils are dominated by water oak (*Quercus nigra*), cherry-bark oak (*Q. falcata pagodaefolia*), bitternut hickory (*Carya cordiformis*), sweetgum (*Liquidambar styraciflua*), basswood (*Tilia americana*), tulip poplar (*Liriodendron tulipifera*), American elm (*Ulmus americana*), and slippery elm (*U. rubra*). Dominant hardwood species on thin loess soils are black oak

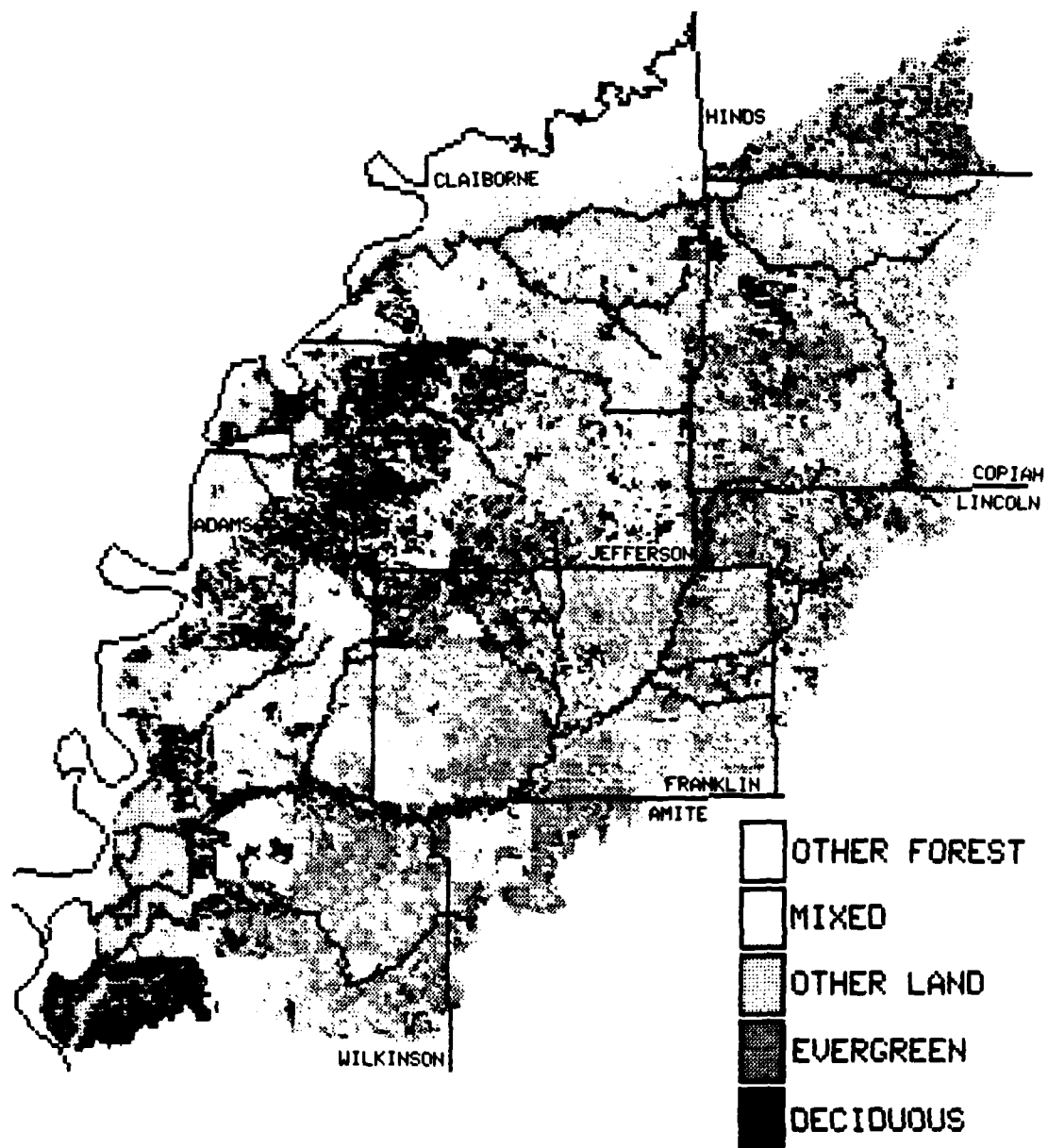


Figure 9. Forest cover of the Southwest Mississippi Tributaries Basin

Table 7

Acreage and Percent of Forest Types Contributed by Each
County to the Southwest Mississippi Tributaries Basin

County	Pine		Hardwood		Mixed		Other*		Total	
	Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent
Adams	20,078	0.99	54,921	2.71	87,787	4.34	1,421	0.07	114,207	8.11
Amite	30,086	1.49	5,931	0.29	20,881	1.03	927	0.05	57,825	2.86
Claiborne	13,962	0.69	20,634	1.02	110,151	5.44	371	0.02	145,117	7.17
Copiah	69,871	3.45	32,681	1.61	109,904	5.43	7,043	0.35	219,499	10.84
Franklin	156,176	7.72	36,079	1.78	102,737	5.08	3,460	0.17	298,452	14.75
Hinds	19,460	0.96	19,769	0.98	9,390	0.46	618	0.03	49,237	2.43
Jefferson	47,508	2.35	123,433	6.10	68,883	3.40	2,039	0.10	241,863	11.95
Lincoln	35,955	1.78	14,209	0.70	17,051	0.84	3,089	0.15	70,304	3.47
Wilkinson	80,867	4.00	67,091	3.31	76,296	3.77	5,313	0.26	229,567	11.34

SOURCE: MARIS.

* Acres that have been burned or cleared.

Table 8
Forest Types in Counties of the Southwest
Mississippi Tributaries Basin*

<u>County</u>	<u>Total Forest</u>	<u>Pine</u>	<u>Hardwood</u>	<u>Mixed</u>	<u>Other</u>
Adams	64.26	7.86	21.49	34.35	0.56
Amite	89.91	46.78	9.22	32.47	1.44
Claiborne	63.47	6.11	9.02	48.18	0.16
Copiah	70.88	22.57	10.55	35.49	2.27
Franklin	85.14	44.55	10.29	29.31	0.99
Hinds	57.63	22.78	23.14	10.99	0.72
Jefferson	72.86	14.31	37.19	20.75	0.61
Lincoln	69.47	35.53	14.04	16.85	3.05
Wilkinson	77.36	27.25	22.61	25.71	1.79

SOURCE: MARIS.

* Given as percentages of forestland in the portions of counties within the basin.

(*Q. velutina*), mockernut hickory (*C. tomentosa*), American beech (*Fagus grandifolia*), and tupelo gum (*Nyssa sylvatica*) (Caplenor 1968). Oak-gum-cypress (*Taxodium distichum*) communities are found on the floodplains of major streams, and the elm-ash (*Fraxinus* spp.) - cottonwood (*Populus deltoides*) association is found along the more well-drained terraces of those floodplains (LMRCS Committee 1974).

The 603,000 acres of mixed forest are more uniformly distributed than either pine or hardwood. Franklin, Claiborne, and Copiah Counties provide the largest percentages (17-18 percent), followed by Jefferson, Wilkinson, and Adams Counties (11-15 percent). Hinds, Lincoln, and Amite Counties contribute less than 4 percent each.

National forest

The Homochitto National Forest contains 183,905 acres of forestland under an even-aged management system (Table 9). Pine constitutes 82 percent of the total acreage; hardwood and pine-hardwood comprise 7 and 11 percent, respectively, of the remaining timberland. The amount of acreage of each timber type in each age class is shown in Table 10. Almost 69 percent of all timber

Table 9
Summary of Cover and Land Use on the Homochitto National Forest

<u>Land Use</u>	<u>Acres Managed for Timber</u>	<u>Acres Not Managed for Timber</u>	<u>Acres in Nontimber</u>	<u>Total Acres</u>
Pine	151,076	1,277		152,353
Hardwood	13,021	31		13,052
Pine-hardwood	19,808			19,808
Water			500	500
Permanent openings			<u>3,068</u>	<u>3,068</u>
Total	183,905	1,308	3,568	188,781

SOURCE: US Forest Service.

in the forest is distributed in the age classes from 40 to 79 years. Approximately 70 percent of the pine, 66 percent of the hardwood, and 61 percent of the pine/hardwood fall within these age classes. From 21 to 23 percent of the timber in each category is under 10 years of age, and only 385 acres of the forest is in stands of 100-119 years.

Forest industry

The US Forest Service divides Mississippi into five survey regions based on dominant forest species and physiography (Figure 10). The study area falls within the Southwest Region, which also includes Madison and Pike Counties and the remainder of the counties that lie partially within the basin. Although this region encompasses more area than the basin, forest industry is concentrated south of the upper basin boundary. Table 11 shows the relationships of the Southwest timber harvest to that of the other regions. The Southwest Region produces 25 percent of the softwood sawtimber and approximately 25 percent of the hardwood pulpwood. The value of the 1975 harvest delivered (f.o.b.) to the first processing plant was \$46,632,022. The value of the harvested wood as uncut raw material still standing in the woods was almost \$23 million (Porterfield et al. 1978).

The South and Southwest Regions employ the largest numbers of people in forest industry. Southwest Region statistics for 1975 showed 8,592 employees; 37 percent worked in sawmills, and 26 percent were employed in paper and allied products. The Southwest Region accounts for 35 percent of the total state employment in the paper and allied products sector (Porterfield et al.

Table 10

Description of Timber Acreage on the Homochitto National Forest

<u>Age Class years</u>	<u>Acres Managed for Timber</u>	<u>Acres Not Managed for Timber</u>	<u>Total Acres</u>
<u>Pine</u>			
0-9	33,297		33,297
10-19	4,702		4,702
20-29	810		810
30-39	2,197	14	2,211
40-49	20,586	55	20,641
50-59	39,985	310	40,295
60-69	32,930	478	33,408
70-79	11,906	300	12,206
80-89	3,473	50	3,523
90-99	1,053	70	1,123
100-109	<u>137</u>		<u>137</u>
	151,076	1,277	152,353
<u>Hardwood</u>			
0-9	2,752		2,752
10-19	650		650
20-29	98		98
30-39	301		301
40-49	3,108		3,108
50-59	2,155		2,155
60-69	2,201		2,201
70-79	1,074	31	1,105
80-89	568		568
90-99			
100-109	76		76
110-119	<u>38</u>		<u>38</u>
	13,021	31	13,052

(Continued)

Table 10 (Concluded)

<u>Age Class years</u>	<u>Acres Managed for Timber</u>	<u>Acres Not Managed for Timber</u>	<u>Total Acres</u>
	<u>Pine/hardwood</u>		
0-9	4,482		4,482
10-19	869		869
20-29	185		185
30-39	271		271
40-49	1,527		1,527
50-59	5,507		5,507
60-69	3,375		3,375
70-79	1,693		1,693
80-89	1,422		1,422
90-99	343		343
100-109	84		84
110-119	<u>50</u>	<u>0</u>	<u>50</u>
	19,808	0	19,808

SOURCE: US Forest Service.

1978). According to 1972 data, the study area was the site of 13 large sawmills, 3 small sawmills, 1 pulpmill, and 2 veneer plants (Bertelson 1973). Two processing plants for posts and poles were located in Lincoln County just east of the basin boundary.

Agricultural Lands

Approximately 400,000 acres of the Southwest Mississippi Tributaries Basin are in cropland and pasture. Claiborne, Jefferson, and Copiah Counties each contribute 17-19 percent, which is more than half of these agricultural lands (Figure 11, Table 12). Amite County furnishes only 0.9 percent, and each of the other counties provides 7-13 percent of the acreage. Twenty-one percent of Jefferson County is in agriculture, and 30 and 38 percent of the basin portions of Claiborne and Hinds Counties, respectively, are agricultural.

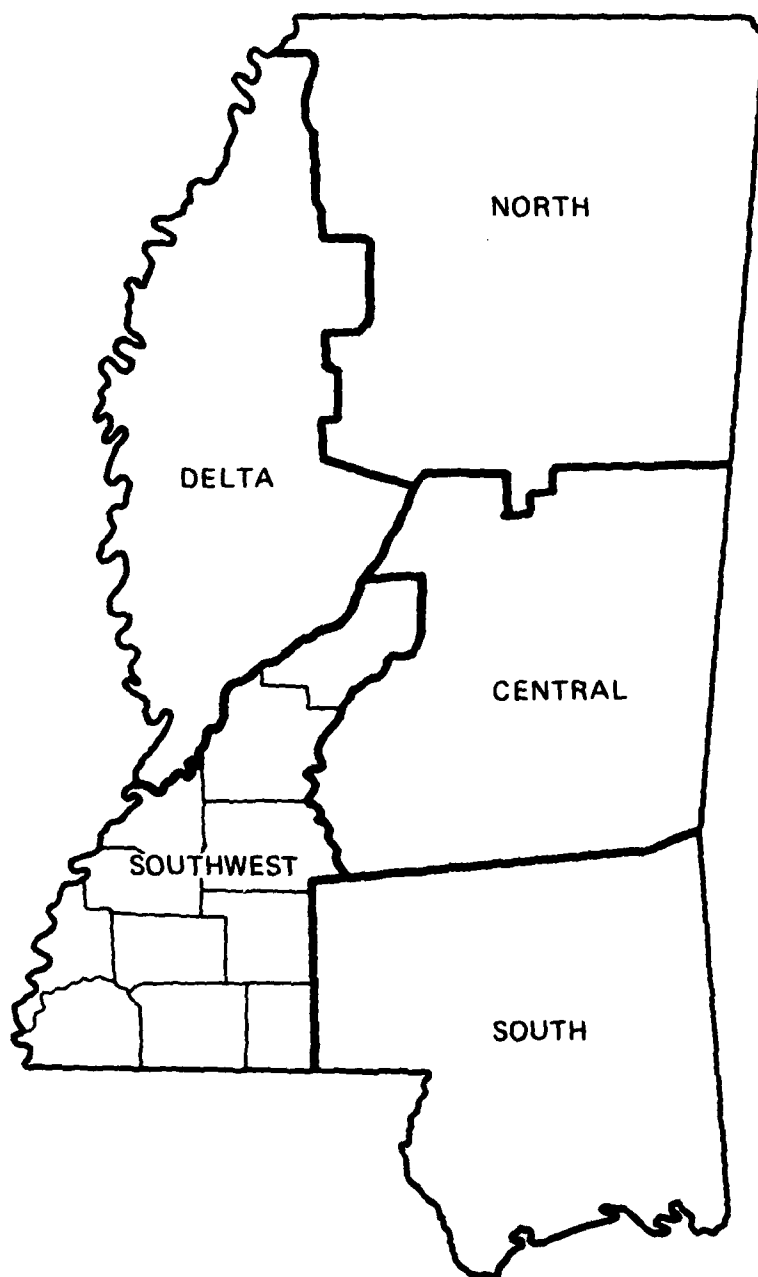


Figure 10. US Forest Service survey regions in Mississippi

Table 11
Mississippi's Timber Harvest by Product,
Species Group, and Survey Region, 1975

<u>Region</u>	<u>Sawtimber, thousand bd ft</u>		<u>Pulpwood, cords</u>	
	<u>Softwood</u>	<u>Hardwood</u>	<u>Softwood</u>	<u>Hardwood</u>
Delta	6,331	68,957	41,985	101,769
North	76,527	82,078	441,180	139,502
Central	262,591	59,406	837,790	427,617
South	166,973	20,982	799,270	219,869
Southwest	<u>167,767</u>	<u>51,182</u>	<u>458,037</u>	<u>284,068</u>
Total	680,189	282,605	2,578,262	1,172,825

SOURCE: Porterfield et al. 1978.

Cotton was formerly the leading cash crop in Southwest Mississippi; however, in the past 30 years it has decreased in importance and the emphasis has shifted to sod crops and livestock, chiefly beef cattle. Claiborne County is a leading area in the state for raising beef cattle, and Lincoln County supports large dairy and beef industries. Major crops grown in the basin are soybeans, corn, sorghum, and small grains for hay. Quality of pasturage varies (Figures 12 and 13), but many pastures are improved with legumes or winter perennial grasses such as wheat or ryegrass.

Surface Water

More than 57,000 acres of the Southwest Mississippi Tributaries Basin is covered by water other than rivers and streams, and 81 percent of this acreage is in swamps. Most of the swamplands lie along the Mississippi River in Claiborne, Jefferson, Adams, and Wilkinson Counties; 78 percent of these lands are in Adams and Wilkinson Counties around Lake Mary and the mouth of the Homochitto River.

Lakes account for only a small percentage of the water area. Two oxbow lakes, Lake Rodney and Lake Mary, are the largest lakes in the basin. Lake Mary in western Wilkinson County is approximately 9.5 miles long; during winter and spring flooding its backwaters and those of the nearby Buffalo River may extend into the surrounding area. Lake Rodney is approximately 6.5 miles

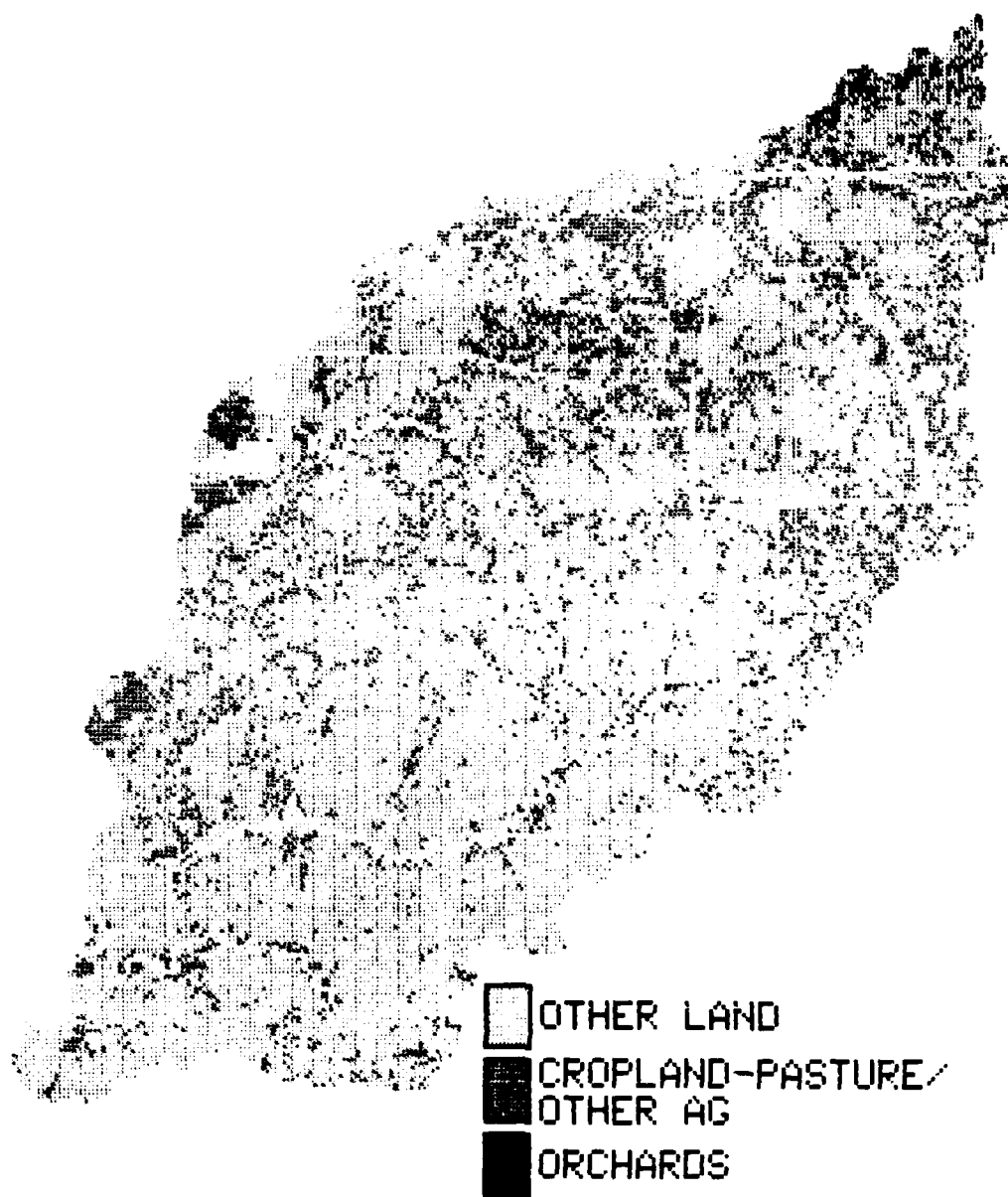


Figure 11. Agricultural land use in the Southwest Mississippi Tributaries Basin (MARIS)

Table 12
Acreage and Percentage of Cropland and Pasture
in the Southwest Mississippi Tributaries Basin

<u>County</u>	<u>Acres</u>	<u>Percent of Basin</u>	<u>Percent of County*</u>
Adams	53,685	2.65	21.01
Amite	3,583	0.18	5.57
Claiborne	70,489	3.48	30.83
Copiah	76,976	3.80	24.86
Franklin	35,893	1.77	10.24
Hinds	32,495	1.61	38.03
Jefferson	71,169	3.52	21.44
Lincoln	26,935	1.33	26.62
Wilkinson	29,840	1.47	10.06

Source: MARIS.

* Within the basin.

long and is located on the Mississippi-Louisiana boundary where part of Tensas Parish lies beside Jefferson County. There are several small lakes and swamps in the Homochitto National Forest, but the total surface area is less than 200 acres. Figure 14 shows the location of bodies of surface water in the Southwest Mississippi Tributaries Basin; reservoirs refer to small man-made impoundments.



Figure 12. Poor quality pasture in Wilkinson County



Figure 13. Good pasturage in Wilkinson County

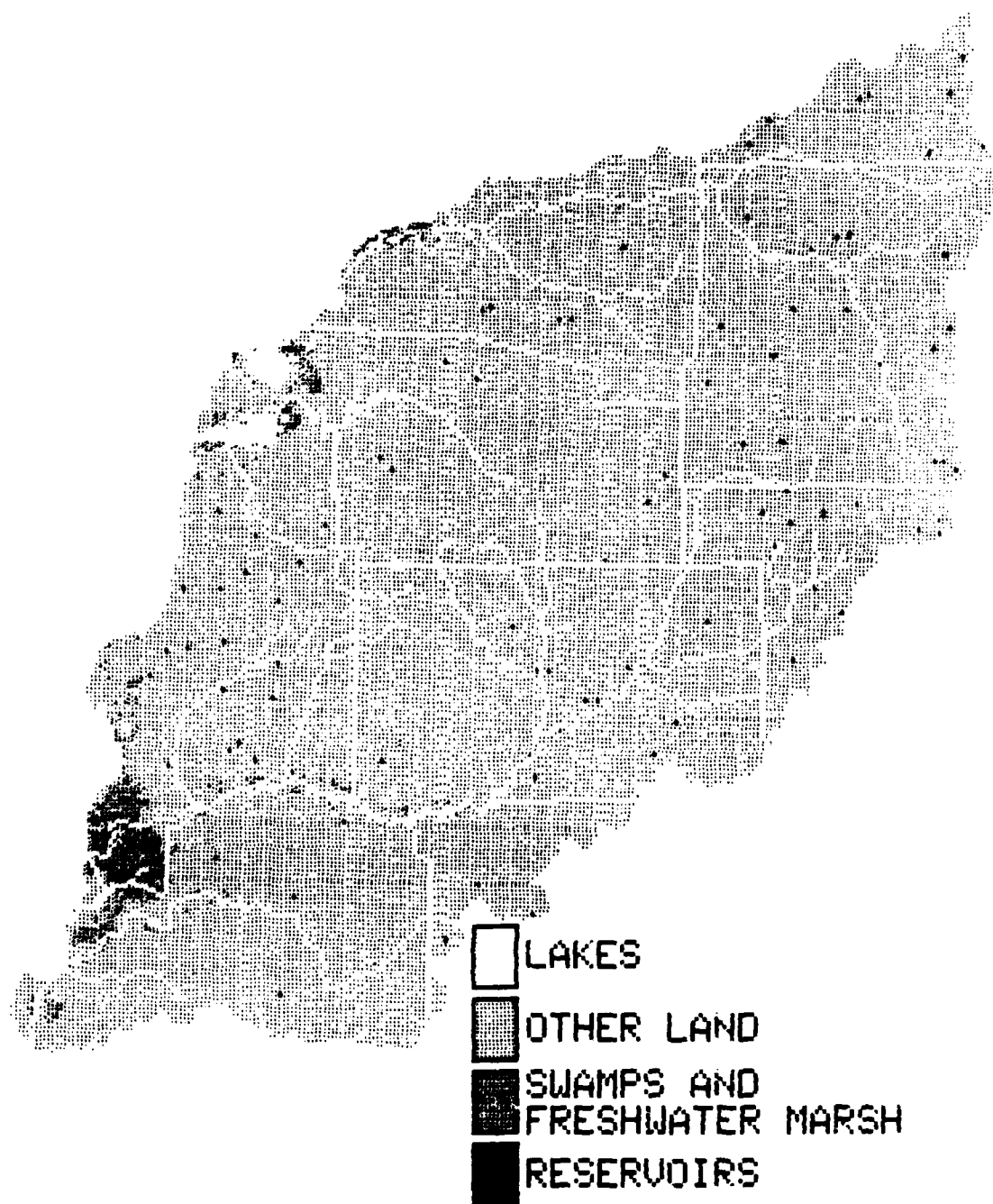


Figure 14. Location of surface water bodies in the Southwest Mississippi Tributaries Basin (MARIS)

PART IV: WILDLIFE RESOURCES

Wildlife Management Areas

Three State WMAs have been established within the Southwest Tributaries Basin: (a) Copiah County WMA; (b) Homochitto WMA; and (c) Sandy Creek WMA (Figure 15). The Copiah County WMA is located on State-owned land, whereas the Homochitto and Sandy Creek WMAs are on US Forest Service land within the Homochitto National Forest. Homochitto WMA covers 34,570 acres in southeast Franklin and northwest Amite Counties; Sandy Creek WMA, containing 16,407 acres, lies in southeast Adams County with a minor portion extending into southwest Franklin County; and Copiah County WMA contains 6,500 acres in the southwest corner of Copiah County. Wildlife management on all areas is administered by the Mississippi Department of Wildlife Conservation (MDWC).

White-tailed deer (*Odocoileus virginianus*) and wild turkey (*Meleagris gallopavo*) are major game species on the three WMAs. Although no population data are available, the US Forest Service has assigned a habitat capability index (HCI) to each timber stand on the Homochitto National Forest (Appendix B, Table B1). The HCI indicates the number of deer or turkey that a given timber stand is capable of supporting within its carrying capacity. The indices were determined on the basis of the treatments performed in stand management. The HCIs calculated for deer and turkey indicate that the forest could support approximately 6,000 deer and 5,000 turkey, or one deer per 30 acres and one turkey per 38 acres (Table 13). However, it is likely that actual deer density is greater and turkey density is less than the potential expressed by these indices.

Food plots are a common management practice on all the areas. On Copiah County WMA, 80 acres of wheat (*Triticum aestivum*) are planted each year in dove fields, and approximately 4 acres of bicolor lespedeza (*Lespedeza bicolor*) are maintained in 1/8-acre plots for quail. On all three areas winter food plots are sowed with ryegrass (*Lolium* spp.) and winter wheat: 90 acres on Copiah County WMA, 24 acres on Sandy Creek WMA, and 18 acres on Homochitto WMA. Although planted for deer, the plots are readily used by turkeys as summer brood habitat.

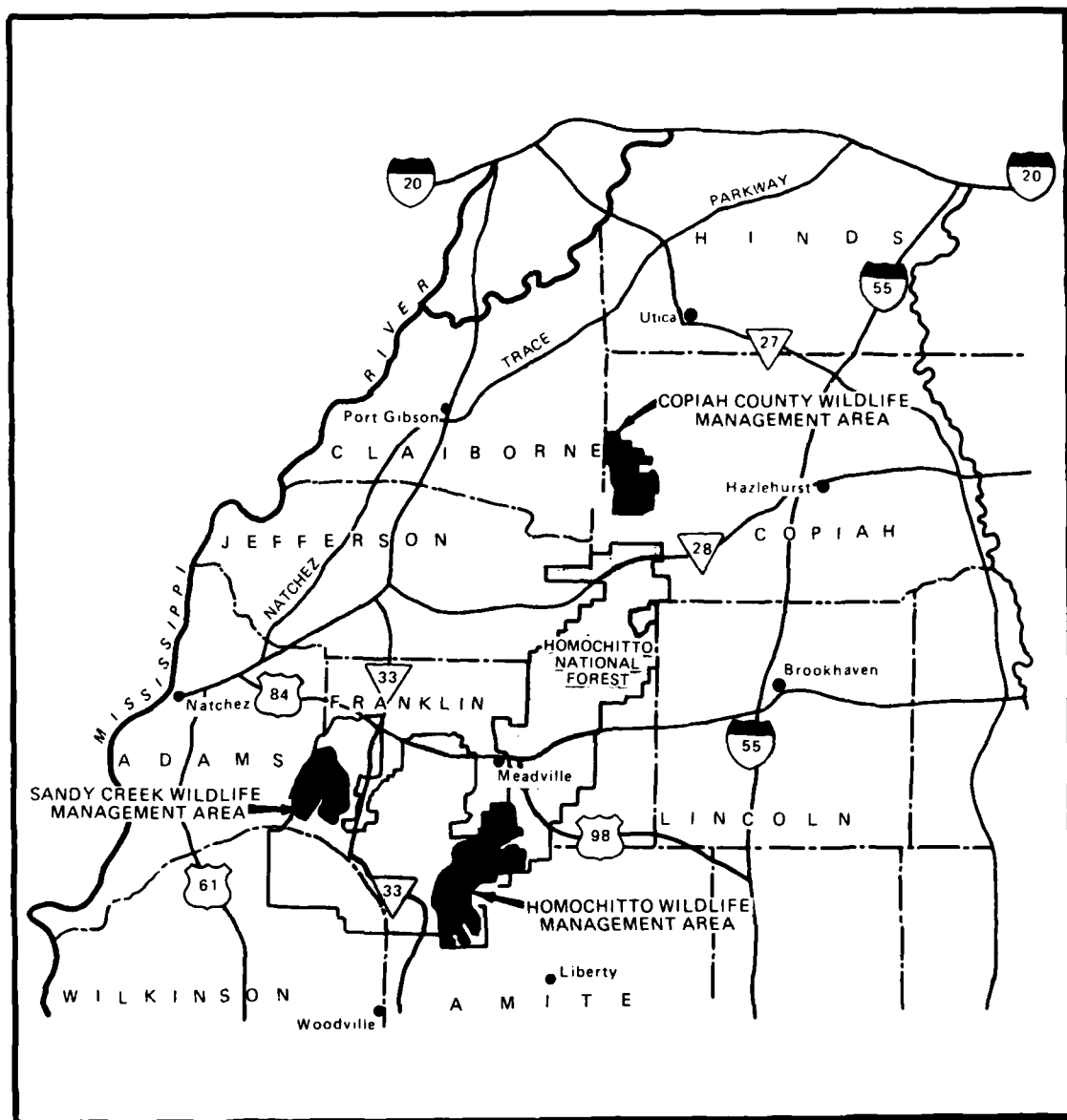


Figure 15. Location of wildlife management areas in the Southwest Mississippi Tributaries Basin

Table 13
Summary of Habitat Capability for Deer and
Turkey on the Homochitto National Forest

<u>Habitat</u>	<u>Acres</u>	<u>Deer Habitat Capability</u>	<u>Acres Per Deer</u>	<u>Turkey Habitat Capability</u>	<u>Acres Per Turkey</u>
Pine	152,353	4,564.60	33.38	3,517.77	43.31
Hardwood	13,052	686.63	19.00	599.92	21.76
Pine-hardwood	19,808	1,001.06	19.79	801.38	24.72
Water	500				
Permanent openings	<u>3,068</u>				
Total	188,781	6,252.29		4,919.07	

SOURCE: US Forest Service.

Prescribed burning is another management tool used on the three areas. Approximately 3,500 acres of the Covich County WMA are subject to burning, and one-third of that acreage is burned annually. On the other areas burning is conducted in conjunction with US Forest Service timber management practices. Burning benefits most wildlife species by allowing for growth of legumes and other understory plants that provide desirable wildlife foods.

Self-service permit stations are located at main access points for hunters to record harvest and use of management areas (Figure 16). Presently, there is only one station on Homochitto WMA, but others are soon to be installed. Several stations have been used at Sandy Creek WMA since the inception of this practice in 1976. On Covich County WMA hunters record harvest and area use in a logbook at the main entrance.

Game and Furbearing Species

The Southwest Mississippi Tributaries Basin falls into the state Game Region 3, which is bounded by Interstate Highways 20 and 55. This region is slightly larger than the study area because it includes all of Amite, Claiborne, and Wilkinson Counties, part of Warren County, and additional areas in Hinds and Lincoln Counties. Region 3 represents approximately one-eighth of the Mississippi land area. Population density data are not available for game

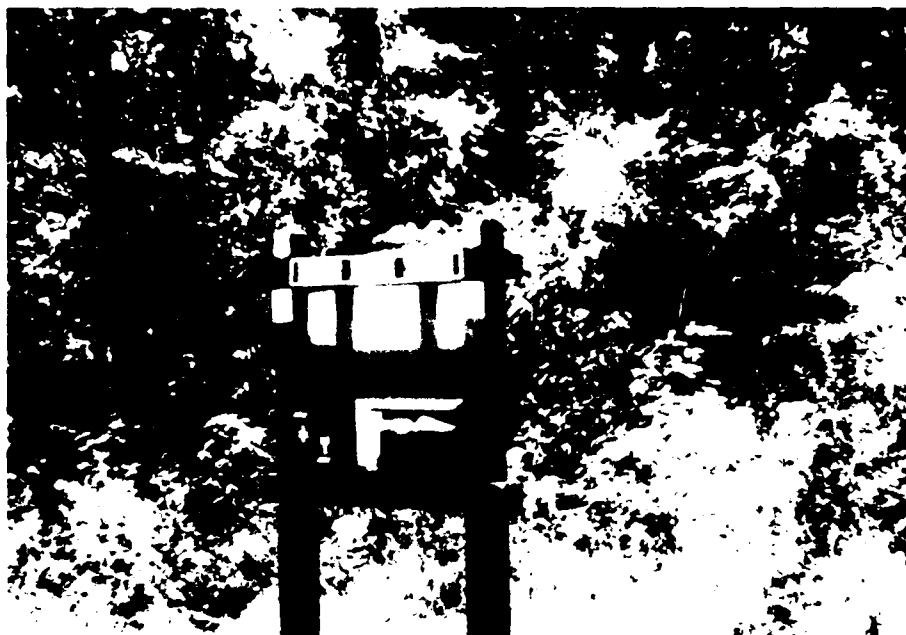


Figure 16. Self-service permit station used by hunters on the Homochitto Wildlife Management Area

species in the basin; therefore, harvest estimates for the 1980-1981, 1981-1982, and 1982-1983 seasons are used here to describe the game resources in Southwest Mississippi. These estimates are based on statewide mail surveys of game harvest and hunter effort conducted annually by the MDWC (Steffen 1981, 1982, 1983a). The data obtained from the mail surveys have been expanded to estimate the regional harvests of each game species.

Upland Game Birds

Wild turkey

The wild turkey is the major game bird of the Southwest Mississippi Tributaries Basin. Estimates of total spring harvest for the above seasons ranged from 7,252 to 10,724 birds and represented 19-25 percent of the total harvest estimates for the state (Tables 14-16). From 20 to 21 percent of spring turkey hunters in the state hunted in Region 3 from 1980-1981 through 1982-1983. Southwest Mississippi, except for Homochitto National Forest, is one of the two regions (the Delta being the other) that harvest turkey during

Table 14

Expanded Summary of Upland Game Bird and Waterfowl Hunting in
Southwest Mississippi During the 1980-1981 Hunting Season

<u>Game Species</u>	<u>Statistic*</u>	<u>Total Harvest</u>	<u>Average Daily Kill</u>	<u>Average Seasonal Harvest</u>	<u>Total Hunters</u>
<u>Upland game birds</u>					
Dove	Estimate (SE)	214,189 (21,874)	4.76 (0.34)	21.61 (1.70)	9,918 (645)
Quail	Estimate (SE)	35,713 (8,115)	2.45 (0.41)	11.40 (2.24)	3,128 (366)
Woodcock	Estimate (SE)	4,527 (2,014)	1.41 (0.52)	8.08 (2.93)	560 (155)
Wild turkey					
Spring	Estimate (SE)	8,425 (976)	0.116 (0.010)	0.97 (0.09)	8,680
Fall	Estimate (SE)	608 (184)	0.077 (0.023)	0.36 (0.09)	1,692 (270)
<u>Waterfowl</u>					
All ducks	Estimate (SE)	51,216 (8,743)	1.76 (0.15)	10.69 (1.53)	4,825 (454)
Mallard	Estimate (SE)	18,413 (3,868)	0.69 (0.11)	3.85 (0.72)	
Wood duck	Estimate (SE)	25,935 (4,556)	0.90 (0.08)	5.63 (0.79)	
Other ducks	Estimate (SE)	5,829 (2,461)	0.18 (0.07)	1.22 (0.50)	
Goose	Estimate (SE)	258 (258)	2.00 (1.33)	3.00 (3.00)	86 (61)

SOURCE: MDWC.

* SE = standard error.

Table 15
Expanded Summary of Upland Game Bird and Waterfowl Hunting in
Southwest Mississippi During the 1981-1982 Hunting Season

<u>Game Species</u>	<u>Statistic*</u>	<u>Total Harvest</u>	<u>Average Daily Kill</u>	<u>Average Seasonal Harvest</u>	<u>Total Hunters</u>
<u>Upland game birds</u>					
Dove	Estimate (SE)	233,522 (48,195)	5.99 (0.50)	25.88 (4.34)	9,249 (1,109)
Quail	Estimate (SE)	19,327 (7,324)	2.46 (0.57)	10.77 (2.90)	1,788 (494)
Woodcock	Estimate (SE)	3,139 (1,329)	1.53 (0.24)	3.29 (0.68)	956 (361)
Wild turkey					
Spring	Estimate (SE)	7,252 (1,517)	0.103 (0.016)	0.91 (0.15)	8,217 (1,049)
Fall	Estimate (SE)	690 (365)	0.333 (0.150)	0.83 (0.31)	828 (338)
<u>Waterfowl</u>					
All ducks	Estimate (SE)	78,553 (22,102)	2.18 (0.26)	13.90 (3.31)	5,903 (889)
Mallard	Estimate (SE)	40,999 (13,878)	1.11 (0.22)	7.10 (2.17)	
Wood duck	Estimate (SE)	22,576 (5,042)	0.62 (0.07)	3.90 (0.64)	
Other ducks	Estimate (SE)	15,271 (4,920)	0.41 (0.08)	2.58 (0.74)	
Goose	Estimate (SE)	136 (136)	0.07 (0.02)	0.50 (0.50)	272 (193)

SOURCE: MDWC.

* SE = standard error.

Table 16
Expanded Summary of Upland Game Bird and Waterfowl Hunting in
Southwest Mississippi During the 1982-1983 Hunting Season

<u>Game Species</u>	<u>Statistic*</u>	<u>Total Harvest</u>	<u>Average Daily Kill</u>	<u>Average Seasonal Harvest</u>	<u>Total Hunters</u>
<u>Upland game birds</u>					
Dove	Estimate (SE)	218,172 (36,075)	4.94 (0.63)	19.87 (2.55)	11,193 (1,161)
Quail	Estimate (SE)	51,712 (24,069)	2.91 (0.58)	21.63 (9.01)	2,512 (559)
Woodcock	Estimate (SE)	1,252 (849)	1.33 (0.88)	2.50 (1.32)	626 (279)
Wild turkey					
Spring	Estimate (SE)	10,724 (1,877)	0.143 (0.016)	1.18 (0.16)	9,054 (1,053)
Fall	Estimate (SE)	1,395 (633)	0.115 (0.041)	0.73 (0.28)	1,902 (489)
<u>Waterfowl</u>					
All ducks	Estimate (SE)	34,903 (11,048)	1.56 (0.33)	9.23 (2.44)	3,776 (685)
Mallard	Estimate (SE)	13,104 (5,410)	0.59 (0.18)	3.47 (1.31)	
Wood duck	Estimate (SE)	12,972 (3,821)	0.58 (0.14)	3.43 (0.81)	
Other ducks	Estimate (SE)	8,820 (3,961)	0.40 (0.14)	2.33 (0.97)	
Goose	Estimate (SE)	250 (177)	0.17 (0.14)	1.00 (0.00)	250 (177)

SOURCE: MDWC.

* SE = standard error.

the fall season. Harvest estimates increased from 608 birds in the fall of 1980 to 1,395 birds in the fall of 1982. The latter figure represented 42 percent of the fall state harvest and involved 37.5 percent of the statewide fall turkey hunters for the 1982-1983 season. For the three seasons, Southwest Mississippi produced 18-27 percent of the state harvests and 20-24 percent of the state turkey hunters. Statewide trends indicate that turkey harvest and hunter effort are on the increase.

Mourning dove

The mourning dove (*Zenaida macroura*) is the most heavily harvested game bird in Southwest Mississippi, as it is in the other regions of the state. However, harvest estimates of approximately 214,000 to 234,000 birds represented only 6-7 percent of the state harvest for the three seasons and required the effort of only 7-8 percent of state hunters.

Quail

Bobwhite quail (*Colinus virginianus*) harvest estimates ranged from approximately 19,000 to 52,000 birds during the three seasons. Although quail is the second most heavily harvested game bird, the estimates from Region 3 were only 2-4 percent of those for the state, and only 3-5 percent of Mississippi quail hunters were in this region. Homochitto WMA produces a good quail harvest; estimates for 1982-1983 were 840 quail, or 1 bird harvested per 41 acres (Mississippi Game Division 1983a). Copiah County WMA was formerly managed chiefly for quail, but production has declined in recent years. However, the 291 quail reported for the 1982-1983 season represented a harvest of approximately 1 bird per 22 acres.

Woodcock

The small numbers of American woodcock (*Scolopax minor*) represented 3-8 percent of the estimates for state harvests and 5-9 percent of state woodcock hunters. Total harvest figures for Southwest Mississippi showed a steady decline from 4,537 to 1,252 birds over the three seasons. The decreased harvest of both quail and woodcock during the 1981-1982 season corresponded to a statewide decline in harvest of these species.

Waterfowl

Estimates showed that the Southwest Mississippi waterfowl harvest made up 7-11 percent of the state harvest from the 1980-1981 through the 1982-1983

seasons. The harvest estimate increased from approximately 51,000 ducks in 1980-1981 to approximately 78,500 ducks in 1981-1982 and then dropped to about 35,000 birds in 1982-1983. The data for the second year showed a real increase in percentage of statewide harvest; the decrease in 1982-1983 followed the general trend for state harvest that season. Mallards (*Anas platyrhynchos*) and wood ducks (*Aix sponsa*) are the most heavily harvested species and, during those three seasons, accounted for 75-87 percent of the total waterfowl harvest. Although all species numbers declined in 1982-1983, the percentage of other ducks increased from 19 to 25 percent. Only a few geese were killed each year.

Small Game Mammals

Squirrels

Fox squirrels (*Sciurus niger*) and gray squirrels (*S. carolinensis*) are the most heavily harvested game species in Southwest Mississippi, as they are statewide. Harvest estimates (combined for both species) were between 400,000 and 500,000 animals and represented 15-19 percent of the state harvests for the three seasons (Tables 17-19). Squirrels are hunted heavily on Homochitto and Sandy Creek WMAs. The 3,900 squirrels harvested on Homochitto WMA and the 2,900 taken from Sandy Creek WMA in the 1982-1983 season resulted from 41 and 32 percent, respectively, of total hunter effort expended on these areas (Mississippi Game Division 1983a).

Rabbit

The eastern cottontail (*Sylvilagus floridanus*) is the second most heavily harvested game mammal in the state and in Southwest Mississippi. Total harvest estimates for Region 3 ranged between 93,000 and 125,000 animals and represented 7-10 percent of the total state harvests during the three seasons. Homochitto WMA was the only one of the three management areas to report a substantial rabbit harvest during the 1982-1983 season; 580 animals was the estimated harvest (Mississippi Game Division 1983a). Fluctuations in harvest from year to year were shown by both squirrels and rabbit.

Predators

The long-haired furbearing mammals are considered predators and are

Table 17

Expanded Summary of Game Mammal Harvest in Southwest Mississippi
During the 1980-1981 Hunting Season

<u>Game Species</u>	<u>Statistic*</u>	<u>Total Harvest</u>	<u>Average Daily Kill</u>	<u>Average Seasonal Harvest</u>	<u>Total Hunters</u>
<u>Small mammals</u>					
Rabbit	Estimate (SE)	113,310 (18,036)	1.55 (0.20)	11.14 (1.62)	10,187 (658)
Squirrel	Estimate (SE)	435,366 (29,001)	2.69 (0.12)	21.07 (1.04)	20,633 (921)
<u>Predators</u>					
Raccoon	Estimate (SE)	33,258 (7,776)	0.08 (0.13)	9.82 (2.03)	3,427 (383)
Red fox	Estimate (SE)	605 (220)	0.02 (0.02)	0.93 (0.25)	648 (167)
Gray fox	Estimate (SE)	604 (259)	0.08 (0.05)	1.40 (0.43)	432 (136)
Bobcat	Estimate (SE)	344 (161)	0.67 (0.28)	1.14 (0.34)	301 (114)
Coyote	Estimate (SE)	819 (454)	0.01 (0.01)	1.36 (0.68)	603 (161)
<u>White-tailed deer</u>					
Archery	Estimate (SE)	2,830 (561)	0.053 (0.009)	0.49 (0.09)	5,788 (495)
Buck	Estimate (SE)	1,350 (345)	0.025 (0.006)	0.23 (0.06)	
Doe	Estimate (SE)	1,481 (331)	0.028 (0.005)	0.26 (0.05)	
Primitive weapon	Estimate (SE)	2,171 (397)	0.104 (0.015)	0.49 (0.08)	4,472 (436)
Buck	Estimate (SE)	1,086 (249)	0.052 (0.011)	0.24 (0.05)	
Doe	Estimate (SE)	1,086 (233)	0.052 (0.009)	0.24 (0.05)	
Regular gun	Estimate (SE)	28,951 (2,094)	0.094 (0.005)	1.23 (0.07)	23,437 (966)
Buck	Estimate (SE)	24,321 (1,854)	0.080 (0.005)	1.04 (0.07)	
Doe	Estimate (SE)	4,624 (529)	0.014 (0.002)	0.20 (0.02)	

SOURCE: MDWC.

* SE = standard error.

Table 18
Expanded Summary of Game Mammal Harvest in Southwest Mississippi
During the 1981-1982 Hunting Season

<u>Game Species</u>	<u>Statistic*</u>	<u>Total Harvest</u>	<u>Average Daily Kill</u>	<u>Average Seasonal Harvest</u>	<u>Total Hunters</u>
<u>Small mammals</u>					
Rabbit	Estimate (SE)	93,183 (18,905)	1.99 (0.29)	9.66 (1.60)	9,600 (1,141)
Squirrel	Estimate (SE)	473,723 (63,712)	3.09 (0.20)	22.95 (2.49)	20,531 (1,638)
<u>Predators</u>					
Raccoon	Estimate (SE)	18,848 (6,873)	1.21 (0.24)	6.23 (1.89)	3,025 (641)
Red fox	Estimate (SE)	409 (305)	0.02 (0.03)	0.75 (0.48)	545 (272)
Gray fox	Estimate (SE)	546 (334)	0.01 (0.01)	1.00 (0.41)	546 (273)
Bobcat	Estimate (SE)	1,227 (873)	0.30 (0.03)	1.80 (1.11)	682 (305)
Coyote	Estimate (SE)	1,639 (610)	0.05 (0.03)	1.33 (0.24)	1,229 (409)
<u>White-tailed deer</u>					
Archery	Estimate (SE)	3,601 (1,156)	0.068 (0.019)	0.63 (0.18)	5,676 (874)
Buck	Estimate (SE)	1,385 (678)	0.027 (0.012)	0.24 (0.11)	
Doe	Estimate (SE)	2,216 (647)	0.041 (0.010)	0.39 (0.10)	
Primitive weapon	Estimate (SE)	6,372 (1,509)	0.155 (0.029)	0.94 (0.18)	6,783 (953)
Buck	Estimate (SE)	3,047 (780)	0.072 (0.015)	0.45 (0.10)	
Doe	Estimate (SE)	3,324 (956)	0.082 (0.020)	0.49 (0.12)	
Regular gun	Estimate (SE)	35,431 (4,263)	0.103 (0.009)	1.53 (0.15)	23,395 (1,720)
Buck	Estimate (SE)	29,959 (3,768)	0.087 (0.008)	1.29 (0.13)	
Doe	Estimate (SE)	6,307 (1,117)	0.018 (0.003)	0.27 (0.04)	

SOURCE: MDWC.

* SE = standard error.

Table 19
Expanded Summary of Game Mammal Harvest in Southwest Mississippi
During the 1982-1983 Hunting Season

<u>Game Species</u>	<u>Statistic*</u>	<u>Total Harvest</u>	<u>Average Daily Kill</u>	<u>Average Seasonal Harvest</u>	<u>Total Hunters</u>
<u>Small mammals</u>					
Rabbit	Estimate (SE)	125,033 (21,118)	1.56 (0.21)	10.08 (1.38)	12,584 (1,241)
Squirrel	Estimate (SE)	397,668 (43,437)	2.48 (0.22)	18.30 (1.47)	21,85 (1,610)
<u>Predators</u>					
Raccoon	Estimate (SE)	46,783 (17,897)	1.16 (0.39)	12.83 (4.37)	3,766 (683)
Red fox	Estimate (SE)	375 (280)	0.16 (0.19)	1.00 (0.58)	375 (217)
Gray fox	Estimate (SE)	125 (125)	0.06 (0.12)	0.50 (0.50)	250 (177)
Bobcat	Estimate (SE)	375 (280)	0.09 (0.12)	1.00 (0.58)	375 (217)
Coyote	Estimate (SE)	1,004 (434)	0.20 (0.21)	1.14 (0.26)	879 (332)
<u>White-tailed deer</u>					
Archery	Estimate (SE)	3,821 (966)	0.052 (0.013)	0.59 (0.13)	6,496 (897)
Buck	Estimate (SE)	2,038 (622)	0.028 (0.008)	0.31 (0.09)	
Doe	Estimate (SE)	1,783 (508)	0.024 (0.007)	0.27 (0.07)	
Primitive weapon	Estimate (SE)	3,949 (1,185)	0.081 (0.023)	0.58 (0.16)	6,751 (914)
Buck	Estimate (SE)	2,293 (843)	0.047 (0.018)	0.34 (0.12)	
Doe	Estimate (SE)	1,656 (492)	0.034 (0.010)	0.25 (0.07)	
Regular gun	Estimate (SE)	38,530 (4,393)	0.107 (0.010)	1.48 (0.14)	26,182 (1,745)
Buck	Estimate (SE)	31,537 (3,642)	0.087 (0.008)	1.21 (0.11)	
Doe	Estimate (SE)	6,994 (1,302)	0.020 (0.003)	0.27 (0.05)	

SOURCE: MDWC.

* SE = standard error.

harvested by hunting as well as by trapping; these include raccoon (*Procyon lotor*), red fox (*Vulpes vulpes*), gray fox (*Urocyon cinereoargenteus*), bobcat (*Felis rufus*), and coyote (*Canis latrans*). All of these species except gray fox are taken in larger numbers through hunting than by trapping. Raccoon is the most heavily harvested species, with estimates ranging from approximately 19,000 to 47,000 animals over the three seasons. The low numbers in 1981-1982 most likely resulted from a distemper epidemic found during that season. The high estimate in 1982-1983 represented 21 percent of the statewide harvest and may have been a response to the peak in raccoon fur prices of the 1981-1982 season. Although there is open season on predatory mammals, harvest estimates were low for Region 3: ≤ 605 gray or red foxes; 344-1,227 bobcats; and 819-1,639 coyotes. The increased bobcat and coyote harvests during the 1981-1982 season each represented 19 percent of the total state harvest and were probably responses to relatively high fur prices. In all three seasons less than 100 coyotes and 400 bobcats were trapped in the Southwest Mississippi Basin.

White-Tailed Deer

Harvest

The white-tailed deer is the most sought-after game species in Mississippi and the Southwest Basin, and both harvest and hunter effort have steadily increased since the 1973-1974 season (Steffen 1983b). It was estimated that 462,339 man-days were spent hunting deer in Region 3 during the 1982-1983 season. On the Copiah County and Sandy Creek WMAs over 70 percent of hunter effort was directed toward deer, and on Homochitto WMA approximately 50 percent of hunter effort was expended on deer (Mississippi Game Division 1983a).

Although Region 3 encompasses only one-eighth of the land area in the state, it produced 17-21.5 percent of the state deer harvests and 19.5-21.5 percent of the state hunters from the 1980-1981 through the 1982-1983 seasons. The harvest estimate increased from 33,952 deer in 1980-1981 to 46,404 deer in 1982-1983, and the number of hunters increased from 33,697 to 39,429. Deer harvest, therefore, increased by 36 percent, and the number of hunters increased by 17 percent over the three seasons. The regular gun harvest increased by 33 percent and the number of gun hunters increased by only 12 percent, but average daily kill showed an increase of 9.5 percent. This apparent increase in harvest may partially reflect the growing populations of deer;

however, hunting effort is a major factor as total man-days increased by 29 percent from 1980-1981 to 1982-1983.

Deer are hunted on both public and private lands. Copiah County WMA furnishes 6,500 acres of public land, and the Homochitto National Forest provides 189,000 acres; however, the major portion of deer hunting on the forest occurs on the management areas. There are at least 470 private hunting clubs in the Southwest Basin, with club lands ranging in size from < 100 to \geq 10,000 acres. The largest numbers of clubs are found in Jefferson, Copiah, Claiborne, and Wilkinson Counties. Jefferson County has approximately 100 clubs, and the other three counties each have 75-80 clubs within the basin. In Wilkinson County these clubs are concentrated in the northwest corner around Lake Mary and along the Buffalo River.

Management

Because of the irruptive nature of deer populations, the entire state is experiencing a rapid increase in deer numbers. This exploding population is the major management problem of not only Region 3 but also the entire State of Mississippi. Therefore, statewide policies and management practices set forth by the MDWC apply to the Southwest region.

Hunting regulations and seasons for all game species are set by the Mississippi Legislature upon recommendations of the MDWC. All game seasons have been stabilized for 5 years, and the deer season has been lengthened to include 105 days for hunting with several types of weapons. The regular gun season, in which the largest percentage of deer are taken, is 49 days. The management areas in Southwest Mississippi are closed to Sunday hunting and therefore receive approximately 15 days less hunting pressure than the general region.

Lengthening the hunting season does not alone effectively curtail expanding deer populations. Therefore, herd reduction through controlled antlerless harvest is becoming an accepted management practice throughout the state. Although all deer are legal during archery and primitive weapon seasons, the hunting segment for these seasons is not large enough to remove the number of antlerless deer required to reduce herds to levels compatible with habitat capabilities. Therefore, postseason hunts are conducted on some management areas throughout the state, and private clubs may be issued permits to harvest antlerless deer during regular gun seasons. In the 1984-1985 season any deer

will be legal on the opening day of regular gun season; this new regulation will be effective throughout the state.

No special hunts are needed on Covich County WMA because sufficient numbers of antlerless deer are removed during archery and primitive weapon seasons. Postseason hunts have become established on Homochitto and Sandy Creek WMAs and are held each year after the last regular gun season. During a 2-day period in January 1980, approximately 100 deer were removed from Sandy Creek WMA, and 75 deer were harvested on a 1-day hunt in January 1983. As these two areas have a large percentage of nonresident hunters, the current state regulations prohibiting nonresident hunting of antlerless deer have considerably reduced the antlerless harvest. Therefore, neither area receives sufficient either-sex hunting to maintain deer populations at the most desirable levels.

Many clubs are managing deer through the Mississippi Cooperative Deer Management Assistance Program (DMAP). This is a cooperative effort between the MDWC and private hunting clubs to manage the resource within the carrying capacity of club lands. Each participating club keeps harvest records to ascertain the age structure and physiological conditions of the deer herd on its lands. The MDWC personnel use these data to recommend hunting policy and issue antlerless permits, which allows the club to control harvest and thereby adjust herd structure and population levels. During the 1982-1983 season, 58 hunting clubs in the Southwest Basin participated in DMAP, and their privately owned club lands totaled 151,302 acres (Mississippi Game Division 1983b). Wilkinson County had the largest number of participating clubs (21) with 51,542 acres of land; Jefferson County had only 12 clubs with 30,000 acres.

Furbearers

Harvest

The harvest of furbearing mammals was estimated from an annual statewide survey of trapping information taken for each season from 1976-1977 through 1982-1983 (MDWC, unpublished data). Data were extracted for the nine counties of the Southwest Mississippi Tributaries Basin, and estimated harvests for the seven trapping seasons are presented in Table 20.

Harvest figures were higher for nine species in the 1976-1977 season than in any of the other seasons. Of the more heavily harvested species, beaver (*Castor canadensis*) showed a 12-percent increase in 1977-1978, and gray fox

Table 20
Estimated Harvests of Furbearer Species in Southwest Mississippi

Species	Statistic*	1976-1977	1977-1978	1978-1979	1979-1980	1980-1981	1981-1982	1982-1983
Beaver	Estimate (SE)	1,148 (9)	1,285 (10)	844 (9)	1,135 (9)	783 (7)	717 (6)	604 (6)
Bobcat	Estimate (SE)	553 (4)	260 (2)	351 (4)	359 (3)	401 (4)	291 (3)	157 (2)
Raccoon	Estimate (SE)	5,994 (46)	3,975 (30)	4,283 (45)	4,353 (33)	3,924 (35)	3,959 (35)	2,984 (30)
Coyote	Estimate (SE)	23 (0)	52 (0)	23 (0)	62 (0)	58 (1)	67 (1)	76 (1)
Gray fox	Estimate (SE)	1,529 (12)	1,363 (10)	1,166 (12)	1,680 (13)	986 (9)	816 (7)	525 (5)
Red fox	Estimate (SE)	1,069 (8)	291 (2)	335 (3)	359 (3)	222 (2)	205 (2)	152 (2)
Mink	Estimate (SE)	920 (7)	427 (3)	524 (5)	863 (7)	578 (5)	651 (6)	285 (3)
Opossum	Estimate (SE)	5,232 (40)	2,466 (19)	4,060 (42)	5,074 (39)	2,375 (21)	2,051 (18)	1,869 (19)
Otter	Estimate (SE)	98 (1)	47 (0)	58 (1)	111 (1)	75 (1)	67 (1)	52 (1)
Spotted skunk	Estimate (SE)	181 (1)	172 (1)	94 (1)	71 (1)	151 (1)	57 (1)	61 (1)
Striped skunk	Estimate (SE)	218 (2)	130 (1)	335 (3)	241 (2)	324 (3)	224 (2)	253 (3)
Muskrat	Estimate (SE)	511 (4)	120 (1)	139 (1)	96 (1)	84 (1)	17 (0)	42 (0)
Weasel	Estimate (SE)	9 (0)	0 (0)	4 (0)	0 (0)	0 (0)	5 (0)	0 (0)
Nutria	Estimate (SE)	260 (2)	31 (0)	85 (1)	96 (1)	78 (1)	106 (1)	59 (1)

SOURCE: MDMC.
* SE = standard error.

showed a 10-percent increase in 1979-1980. However, furbearer harvest has shown a general downward trend since 1976-1977. Although secondary peaks are evident for eight species, the total estimated harvest for 1982-1983 was well below that of the 1976-1977 season for 10 of the furbearers. Raccoon, beaver, and river otter (*Lutra canadensis*) harvests were approximately 50 percent lower for 1982-1983; opossum (*Didelphis virginiana*), gray fox, mink (*Mustela vison*), and spotted skunk (*Spilogale putorius*) harvests were about one-third of the 1976-1977 estimates; bobcat and nutria (*Myocaster coypus*) estimates were approximately one-fourth those of 1976-1977; and red fox and muskrat (*Ondatra zibethicus*) estimates were only 14 and 8 percent, respectively, of the earlier figures. Opossum, gray fox, beaver, and mink harvests showed peaks in the 1979-1980 season, and raccoon and bobcat harvests showed increases in the 1979-1980 and 1980-1981 seasons, respectively. However, the overall trend in furbearer harvest over the seven seasons has been downward for the more heavily trapped species.

Raccoon and opossum are the more heavily harvested furbearers. Total harvest over the seven seasons was estimated at 29,472 for raccoon and 23,127 for opossum. In descending order of harvest estimates are gray fox - 8,065; beaver - 6,516; mink - 4,248; red fox - 2,633; bobcat - 2,372; striped skunk (*Mephitis mephitis*) - 1,725; and muskrat - 1,009. Estimates for other species are below 800 for the 7-year period. Weasels (*Mustela frenata*) are seldom trapped, and fewer than 100 coyotes are trapped each year in the Southwest Basin.

Estimated harvests for the five seasons from 1978-1979 through 1982-1983 are presented for each species taken from each county (Appendix C, Tables C1-C5). A summary of the total estimated harvests for those years is shown in Table 21. Data for the first two seasons are not included because of a problem with retrieval from the computer tape.

For the five seasons, Hinds County showed the largest total harvest estimate and Jefferson County showed the least, with 11,216 and 1,973 animals, respectively. There was variation among counties with respect to the harvest of individual species. Although Hinds County showed the highest estimates for most species, Wilkinson County showed the largest raccoon harvest. Trappers in Wilkinson County harvested more than 4,000 raccoons, whereas those in Adams and Jefferson Counties harvested fewer than 1,000. Approximately 2,500 opossums were trapped in Hinds and Franklin Counties, but only about 600 were

Table 21

Estimated Total Harvests of Furbearer Species for Nine Counties in Southwest
Mississippi for All Seasons from 1978-1979 Through 1982-1983

Species	Hinds	Wilkinson	Copiah	Amite	Franklin	Lincoln	Claiborne	Adams	Jefferson
Beaver	1,320	238	1,221	416	62	473	151	75	125
Bobcat	205	326	54	221	349	58	206	69	68
Raccoon	3,523	4,062	2,740	2,651	2,536	1,285	1,028	846	732
Coyote	162	34	37	5	10	2	19	2	12
Gray fox	899	784	432	854	855	730	175	292	153
Red fox	288	154	81	229	140	255	42	66	16
Mink	1,556	170	536	173	171	238	10	6	38
Opossum	2,540	1,981	1,851	2,086	2,401	1,771	1,113	1,075	608
Otter	41	113	63	45	16	36	17	2	15
Spotted skunk	63	65	37	43	60	30	84	29	72
Striped skunk	281	83	74	140	152	390	128	38	117
Muskrat	262	15	8	0	0	9	0	0	0
Weasel	0	0	0	4	0	0	0	5	0
Nutria	76	173	38	52	38	5	8	2	17
Total	11,216	8,198	7,172	6,919	6,790	5,282	2,981	2,507	1,973

SOURCE: MDWC.

trapped in Jefferson County. Fewer than 1,000 gray foxes were taken in any county; however, trappers in Hinds, Franklin, and Amite Counties harvested between 850 and 900 animals per county. Only in Hinds and Copiah Counties were more than 1,000 beavers harvested, whereas fewer than 100 were trapped in Adams and Franklin Counties. The Hinds County estimate showed 1,556 mink; all other counties showed less than 550.

Fur prices

Average prices for the pelts of each species are shown for all fur sales held in Mississippi from 1976-1977 through 1982-1983 (Table 22). Pelts of long-haired furbearers commanded the higher prices over the seven seasons. Bobcat fur brought the highest prices, ranging from \$36 to \$110; prices for red and gray fox pelts ranged from \$30 to \$59 and from \$24 to \$57, respectively. Among the short-haired species, river otter pelts sold for the highest prices, \$12 to \$65.

Of the more heavily harvested species, opossum and beaver furs brought the lower prices. The top price for opossum was \$6 and, except for one season, beaver prices ranged between \$3 and \$11. Raccoon pelts sold for \$10 to \$18, and muskrat and nutria brought no more than \$7.

There has been a general decline in fur prices since 1979. Prices for bobcat, red fox, gray fox, coyote, and opossum peaked during the 1978-1979 season; those for beaver, mink, otter, and muskrat peaked during the 1979-1980 season. Since these peak seasons, fur prices have dropped for all species and, in the 1982-1983 season, pelts of eight furbearers brought the lowest prices of the seven seasons.

Harvest trends

The trends shown in regional harvest figures reflect statewide trends. Although state harvest statistics had not been completely processed at the writing of this report, trapper license sales were known. Statewide license sales peaked in the 1979-1980 season but had declined sharply by the 1982-1983 season. The large increases in total harvest of opossum, gray fox, beaver, and mink during 1979-1980 were probably in response to increased trapping. Fur prices of the long-haired species peaked in 1978-1979, and those for mink and beaver peaked in 1979-1980; therefore, harvest response may have also reflected fur price fluctuations. These data indicate that the furbearer resource is available in Southwest Mississippi but is not being utilized to the extent it was several years ago.

Table 22

Average Price per Pelt by Species for Each Mississippi Trappers
Association Sale from the 1976-1977 Through 1982-1983 Seasons

Species	1976-1977*			1977-1978**			
	December	January	February	December	January	January	February
Mink	7.00	18.73	11.89	10.67	11.58	15.03	9.77
Raccoon	14.36	16.73	14.09	13.15	11.61	12.93	9.99
Muskrat	3.88	5.14	5.15	4.94	4.72	4.83	4.68
Red fox	49.33	39.31	36.56	35.54	--	50.00	39.10
Gray fox	31.81	34.57	33.46	31.02	29.51	34.67	23.35
Bobcat	51.09	59.71	63.49	37.27	--	36.78	39.30
Opossum	1.52	2.90	2.98	3.05	2.65	4.02	2.85
Otter	43.08	48.54	43.91	--	22.77	30.18	29.15
Spotted skunk	--	--	--	--	--	--	--
Striped skunk	2.50	--	4.63	--	4.10	--	--
Coyote	30.00	24.00	28.00	--	--	--	17.52
Weasel	--	--	--	--	--	--	--
Nutria	--	--	--	--	--	3.87	6.19
Beaver	5.28	8.25	10.53	7.48	8.56	6.44	5.16

Species	1978-1979			1979-1980		
	December	January	February	December	January	February
Mink	--	24.43	22.22	21.55	27.27	26.09
Raccoon	16.19	18.30	17.82	11.20	13.34	12.53
Muskrat	--	5.16	4.71	5.82	6.94	6.14
Red fox	53.74	59.18	50.56	42.06	36.84	38.80
Gray fox	45.10	56.89	52.53	47.44	45.18	46.97
Bobcat	60.25	96.24	110.36	56.91	55.76	74.86
Opossum	3.84	6.12	5.10	4.68	4.35	3.85
Otter	46.00	49.13	47.81	60.00	65.32	49.93
Spotted skunk	--	--	12.50	--	--	--
Striped skunk	--	--	3.53	--	--	5.62
Coyote	--	36.62	47.50	--	10.71	12.83
Weasel	--	--	--	--	--	--
Nutria	3.75	3.00	3.00	4.00	--	6.86
Beaver	--	9.00	7.47	12.90	14.96	19.44

(Continued)

* One March beaver only sale, average price = \$12.10.

** Sales were held on 13 and 27 January 1978.

Table 22 (Concluded)

Species	1980-1981			1981-1982		1982-1983		
	December	January	February	January	February	December	January	February
Mink	20.98	18.58	16.87	19.13	18.99	12.01	15.70	11.87
Raccoon	9.64	11.98	14.95	18.53	21.06	10.13	15.13	10.65
Muskrat	5.57	5.95	6.35	4.03	4.38	2.68	2.98	2.16
Red fox	38.44	45.03	48.83	41.23	46.52	35.25	34.00	30.34
Gray fox	37.43	35.11	42.91	28.90	30.69	23.62	30.07	30.96
Bobcat	46.35	70.56	75.56	46.31	50.29	36.07	36.57	40.51
Opossum	1.73	1.74	1.99	2.19	1.87	.49	1.42	1.06
Otter	27.83	32.04	31.59	26.00	24.07	12.41	12.90	12.59
Spotted skunk	--	--	7.05	--	--	--	--	--
Striped skunk	--	--	2.95	--	1.29	--	--	3.50
Coyote	10.50	15.60	14.49	27.60	28.99	15.08	10.77	10.26
Weasel	--	--	--	--	--	--	--	--
Nutria	4.82	6.99	6.66	2.44	3.57	1.98	1.32	1.50
Beaver	7.14	8.71	9.05	9.62	9.27	3.91	4.80	5.14

SOURCE: Mississippi Trappers Association.

Nongame Species

Mammals

Approximately 50 species of mammals have been reported from counties located within the boundaries of the Southwest Tributaries study area (Table 23). Common species occurring in forested areas include the opossum, eastern mole, eastern chipmunk, fox squirrel, gray squirrel, white-footed mouse, cotton mouse, raccoon, bobcat, and white-tailed deer. Species found in bottomlands and marshy areas include the swamp rabbit, beaver, marsh rice rat, muskrat, nutria, raccoon, and mink. The eastern cottontail rabbit, short-tailed shrew, least shrew, fulvous harvest mouse, hispid cotton rat, coyote, striped skunk, opossum, and armadillo are common in sparse woodlands and open terrain.

Although several statewide and regional studies have been published on Mississippi mammals (e.g., Crain and Cliburn 1965, Ward 1965, Wolfe 1971, Hayden and MacCallum 1976), the mammal fauna of the southwestern part of the state is not well documented. To our knowledge, no detailed ecological studies on mammals have been conducted in the study area. Information on distribution, abundance, and habitat characteristics of nongame species is especially lacking.

Table 23

Mammals of Actual or Probable Occurrence in the Southwest Mississippi Tributaries Basin

Opossums

Virginia opossum (*Didelphis virginiana*)

Shrews and moles

Southeastern shrew (*Sorex longirostris*)

Short-tailed shrew (*Blarina brevicauda*)

Least shrew (*Cryptotis parva*)

Eastern mole (*Scalopus aquaticus*)

Bats

Eastern pipistrelle (*Pipistrellus subflavus*)

Big brown bat (*Eptesicus fuscus*)

Red bat (*Lasiurus borealis*)

Seminole bat (*Lasiurus seminolus*)

Evening bat (*Nycticeius humeralis*)

(Continued)

Table 23 (Concluded)

Bats (Continued)

- Rafinesque's big-eared bat (*Plecotus rafinesqueii*)
- Brazilian free-tailed bat (*Tadarida brasiliensis*)

Armadillos

- Nine-banded armadillo (*Dasypus novemcinctus*)

Rabbits

- Eastern cottontail (*Sylvilagus floridanus*)
- Swamp rabbit (*Sylvilagus aquaticus*)

Rodents

- Eastern chipmunk (*Tamias striatus*)
- Gray squirrel (*Sciurus carolinensis*)
- Fox squirrel (*Sciurus niger*)
- Southern flying squirrel (*Glaucomys volans*)
- Beaver (*Castor canadensis*)
- Marsh rice rat (*Oryzomys palustris*)
- Eastern harvest mouse (*Reithrodontomys humilus*)
- Fulvous harvest mouse (*Reithrodontomys fulvescens*)
- White-footed mouse (*Peromyscus leucopus*)
- Cotton mouse (*Peromyscus gossypinus*)
- Golden mouse (*Ochrotomys nuttalli*)
- Hispid cotton rat (*Sigmodon hispidus*)
- Eastern woodrat (*Neotoma floridana*)
- Woodland vole (*Microtus pinetorum*)
- Muskrat (*Ondatra zibethicus*)
- Black rat (*Rattus rattus*)
- Norway rat (*Rattus norvegicus*)
- House mouse (*Mus musculus*)
- Nutria (*Myocastor coypus*)

Carnivores

- Coyote (*Canis latrans*)
- Red wolf (*Canis rufus*) - probably extinct in the area; old records from Claiborne, Jefferson, and Franklin Counties
- Red fox (*Vulpes vulpes*)
- Gray fox (*Urocyon cinereoargenteus*)
- Black bear (*Ursus americanus*)
- Raccoon (*Procyon lotor*)
- Long-tailed weasel (*Mustela frenata*)
- Mink (*Mustela vison*)
- Eastern spotted skunk (*Spilogale putorius*)
- Striped skunk (*Mephitis mephitis*)
- River otter (*Lutra canadensis*)
- Bobcat (*Felis rufus*)

Hoofed mammals

- White-tailed deer (*Odocoileus virginianus*)
-

Birds*

Breeding bird surveys sponsored by the US Fish and Wildlife Service (FWS) have been conducted in five counties in Southwest Mississippi. The 24.5-mile routes are shown in Figure 17, and results of the surveys are given in Appendix D, Tables D1-D5. Route 9 in Lincoln County lay just outside the study area and was included in this report because the habitat is typical of that within the Lincoln County portion of the basin.

In Southwest Mississippi, 106 species of breeding birds were recorded in the surveys. The total number of species observed on each survey route were as follows: Route 1 in Wilkinson County - 76; Route 8 in Hinds County - 82; Route 9 in Lincoln County - 84; Route 10 in Jefferson County - 86; and Route 2 in Adams County - 97. It is probable that fewer species were recorded for Wilkinson County because Route 1 was surveyed for only 6 years, whereas surveys were conducted on the other routes for 12-17 years. However, Wilkinson County showed large numbers of at least 10 species of birds: cattle egret, white-eyed vireo, Carolina wren, American crow, yellow-breasted chat, orchard oriole, cardinal, indigo bunting, red-winged blackbird, and parula warbler. The cardinal was the most abundant species found breeding in the basin, and the largest numbers were recorded from Wilkinson County. Birds of open fields were most abundant in Hinds and Lincoln Counties and included the mockingbird, meadowlark, grackle, and bobwhite.

The cattle egret is the most frequent and abundant of the wading birds and is not numerous in Adams and Wilkinson Counties. Cattle egrets appeared in the Adams County survey in 1968 but did not occur in the Jefferson County survey until 1974; they have been recorded only once in the Hinds and Lincoln County surveys. Other wading birds that breed in the basin are the great blue heron, little blue heron, green-backed heron, yellow-crowned night heron, great egret, snowy egret, and white ibis. Anhingas have also been found in Adams County surveys. The relative abundance and frequency of the water birds in Adams and Wilkinson Counties can probably be attributed to extensive tracts of swamp that provide excellent breeding habitat in the Homochitto and Buffalo River bottomlands. Route 1 traversed part of the area surrounding Lake Mary, where a large heronry has been known to exist. A colony of anhingas formerly

* Scientific names of birds found in the study area are given in Table 24.

Table 24
Birds Recorded from the Southwest Mississippi Tributaries
Basin on Summer Surveys and Christmas Bird Counts

<u>Species</u>	<u>Summer</u>	<u>Winter</u>
<u>Loons</u>		
Common loon (<i>Gavia immer</i>)		X
<u>Grebes</u>		
Pied-billed grebe (<i>Podilymbus podiceps</i>)		X
Horned grebe (<i>Podiceps auritus</i>)		X
Eared grebe (<i>P. nigricollis</i>)		X
<u>Pelicans and allies</u>		
American white pelican (<i>Pelecanus erythrorhynchos</i>)		X
Double-crested cormorant (<i>Phalacrocorax auritus</i>)		X
Anhinga (<i>Anhinga anhinga</i>)	X	X
<u>Wading birds</u>		
Great blue heron (<i>Ardea herodias</i>)	X	X
Great egret (<i>Casmerodius albus</i>)	X	X
Snowy egret (<i>Egretta thula</i>)	X	X
Little blue heron (<i>E. caerulea</i>)	X	X
Cattle egret (<i>Bubulcus ibis</i>)	X	X
Green-backed heron (<i>Butorides striatus</i>)	X	X
Yellow-crowned night-heron (<i>Nycticorax violaceus</i>)	X	
White ibis (<i>Eudocimus albus</i>)	X	X
<u>Waterfowl</u>		
Snow goose (<i>Chen caerulescens</i>)		X
Canada goose (<i>Branta canadensis</i>)		X
Wood duck (<i>Aix sponsa</i>)	X	X
Green-winged teal (<i>Anas crecca</i>)		X
Mallard (<i>A. platyrhynchos</i>)		X
Northern pintail (<i>A. acuta</i>)		X
Blue-winged teal (<i>A. discors</i>)		X
Northern shoveler (<i>A. clypeata</i>)		X
Gadwall (<i>A. strepera</i>)		X
American wigeon (<i>A. americana</i>)		X
Canvasback (<i>Athya valisineria</i>)		X
Redhead (<i>A. americana</i>)		X
Ring-necked duck (<i>A. collaris</i>)		X
Lesser scaup (<i>A. affinis</i>)		X
Common goldeneye (<i>Bucephala clangula</i>)		X
Bufflehead (<i>B. albeola</i>)		X
Hooded merganser (<i>Lophodytes cucullatus</i>)		X
Ruddy duck (<i>Oxyura jamaicensis</i>)		X

(Continued)

(Sheet 1 of 6)

Table 24 (Continued)

Species	Summer	Winter
<u>Raptors</u>		
Black vulture (<i>Coragyps atratus</i>)	X	X
Turkey vulture (<i>Cathartes aura</i>)	X	X
Osprey (<i>Pandion haliaetus</i>)		X
Mississippi kite (<i>Ictinia mississippiensis</i>)	X	
Northern harrier (<i>Circus cyaneus</i>)		X
Sharp-shinned hawk (<i>Accipiter striatus</i>)	X	X
Cooper's hawk (<i>A. cooperii</i>)	X	
Red-shouldered hawk (<i>Buteo lineatus</i>)	X	X
Broad-winged hawk (<i>B. platypterus</i>)	X	
Red-tailed hawk (<i>B. jamaicensis</i>)	X	X
American kestrel (<i>Falco sparverius</i>)	X	X
<u>Gallinaceous birds</u>		
Wild turkey (<i>Meleagris gallopavo</i>)	X	X
Northern bobwhite (<i>Colinus virginianus</i>)	X	X
<u>Rails and coots</u>		
Sora (<i>Porzana carolina</i>)		X
American coot (<i>Fulica americana</i>)		X
<u>Shorebirds</u>		
Black-bellied plover (<i>Pluvialis squatarola</i>)		X
Killdeer (<i>Charadrius vociferus</i>)	X	X
Greater yellowlegs (<i>Tringa melanoleuca</i>)		X
Spotted sandpiper (<i>Actitis macularia</i>)		X
Semipalmated sandpiper (<i>Calidris pusilla</i>)		X
Western sandpiper (<i>C. mauri</i>)		X
Least sandpiper (<i>C. minutilla</i>)		X
Common snipe (<i>Gallinago gallinago</i>)		X
American woodcock (<i>Scolopax minor</i>)		X
<u>Gulls and terns</u>		
Bonaparte's gull (<i>Larus philadelphia</i>)		X
Ring-billed gull (<i>L. delawarensis</i>)		X
Herring gull (<i>L. argentatus</i>)		X
Forster's tern (<i>Sterna forsteri</i>)		X
<u>Doves</u>		
Rock dove (<i>Columba livis</i>)	X	X
Mourning dove (<i>Zenaida macroura</i>)	X	X
Common ground-dove (<i>Columbina passerina</i>)		X
<u>Cuckoos</u>		
Yellow-billed cuckoo (<i>Coccyzus americanus</i>)	X	

(Continued)

(Sheet 2 of 6)

Table 24 (Continued)

Species	Summer	Winter
<u>Owls</u>		
Eastern screech-owl (<i>Otus asio</i>)	X	
Great horned owl (<i>Bubo virginianus</i>)		X
Barred owl (<i>Strix varia</i>)	X	X
<u>Goatsuckers</u>		
Common nighthawk (<i>Chordeiles minor</i>)	X	
Chuck-will's-widow (<i>Caprimulgus carolinensis</i>)	X	
<u>Swifts</u>		
Chimney swift (<i>Chaetura pelagica</i>)	X	
<u>Hummingbirds</u>		
Ruby-throated hummingbird (<i>Archilochus colubris</i>)	X	
<u>Kingfishers</u>		
Belted kingfisher (<i>Ceryle alcyon</i>)	X	X
<u>Woodpeckers</u>		
Red-headed woodpecker (<i>Melanerpes erythrocephalus</i>)	X	X
Red-bellied woodpecker (<i>M. carolinus</i>)	X	X
Yellow-bellied sapsucker (<i>Sphyrapicus varius</i>)	X	X
Downy woodpecker (<i>Picoides pubescens</i>)	X	X
Hairy woodpecker (<i>P. villosus</i>)	X	X
Northern flicker (<i>Colaptes auratus</i>)	X	X
Pileated woodpecker (<i>Dryocopus pileatus</i>)	X	X
<u>Flycatchers</u>		
Eastern wood-pewee (<i>Contopus virens</i>)	X	
Acadian flycatcher (<i>Empidonax virescens</i>)	X	
Eastern phoebe (<i>Sayornis phoebe</i>)	X	X
Vermillion flycatcher (<i>Pyrocephalus rubinus</i>)		X
Great crested flycatcher (<i>Myiarchus crinitus</i>)	X	
Eastern kingbird (<i>Tyrannus tyrannus</i>)	X	X
<u>Larks</u>		
Horned lark (<i>Eremophila alpestris</i>)		X
<u>Swallows</u>		
Purple martin (<i>Progne subis</i>)	X	
Tree swallow (<i>Tachycineta bicolor</i>)	X	
Northern rough-winged swallow (<i>Stelgidopteryx serripennis</i>)	X	
Bank swallow (<i>Riparia riparia</i>)	X	
Barn swallow (<i>Hirundo rustica</i>)	X	

(Continued)

(Sheet 3 of 6)

Table 24 (Continued)

Species	Summer	Winter
<u>Jays and crows</u>		
Blue jay (<i>Cyanocitta cristata</i>)	X	X
American crow (<i>Corvus brachyrhynchos</i>)	X	X
Fish crow (<i>C. ossifragus</i>)	X	
<u>Chickadees and titmice</u>		
Carolina chickadee (<i>Parus carolinensis</i>)	X	X
Tufted titmouse (<i>P. bicolor</i>)	X	X
<u>Nuthatches</u>		
White-breasted nuthatch (<i>Sitta carolinensis</i>)	X	
Brown-headed nuthatch (<i>S. pusilla</i>)	X	
<u>Creepers</u>		
Brown creeper (<i>Certhia americana</i>)		X
<u>Wrens</u>		
Carolina wren (<i>Thryothorus ludovicianus</i>)	X	X
House wren (<i>Troglodytes aedon</i>)	X	X
Winter wren (<i>T. troglodytes</i>)		X
Marsh wren (<i>Cistothorus palustris</i>)		X
<u>Kinglets and gnatcatchers</u>		
Golden-crowned kinglet (<i>Regulus satrapa</i>)		X
Ruby-crowned kinglet (<i>R. calendula</i>)		X
Blue-gray gnatcatcher (<i>Poliophtila caerulea</i>)	X	X
<u>Bluebirds and thrushes</u>		
Eastern bluebird (<i>Sialia sialis</i>)	X	X
Swainson's thrush (<i>Catharus ustulatus</i>)		X
Hermit thrush (<i>C. guttatus</i>)		X
Wood thrush (<i>Hylocichla mustelina</i>)	X	
American robin (<i>Turdus migratorius</i>)	X	X
<u>Mockingbirds and thrashers</u>		
Gray catbird (<i>Dumetella carolinensis</i>)	X	X
Northern mockingbird (<i>Mimus polyglottos</i>)	X	X
Brown thrasher (<i>Toxostoma rufum</i>)	X	X
<u>Pipits</u>		
Water pipit (<i>Anthus spinoletta</i>)		X
Sprague's pipit (<i>A. spragueii</i>)		X
<u>Waxwings</u>		
Cedar waxwing (<i>Bombycilla cedrorum</i>)		X

(Continued)

(Sheet 4 of 6)

Table 24 (Continued)

Species	Summer	Winter
<u>Shrikes</u>		
Loggerhead shrike (<i>Lanius ludovicianus</i>)	X	X
<u>Starlings</u>		
European starling (<i>Sturnus vulgaris</i>)	X	X
<u>Vireos</u>		
White-eyed vireo (<i>Vireo griseus</i>)	X	
Solitary vireo (<i>V. solitarius</i>)		X
Yellow-throated vireo (<i>V. flavifrons</i>)	X	X
Warbling vireo (<i>V. gilvus</i>)	X	
Red-eyed vireo (<i>V. olivaceus</i>)	X	
<u>Warblers</u>		
Orange-crowned warbler (<i>Vermivora celata</i>)		X
Northern parula (<i>Parula americana</i>)	X	
Yellow warbler (<i>Dendroica petechia</i>)	X	
Yellow-rumped warbler (<i>D. coronata</i>)		X
Yellow-throated warbler (<i>D. dominica</i>)	X	
Pine warbler (<i>D. pinus</i>)	X	X
Prairie warbler (<i>D. discolor</i>)	X	
Black-and-white warbler (<i>Mniotilta varia</i>)	X	
American redstart (<i>Setophaga ruticilla</i>)	X	
Prothonotary warbler (<i>Protonotaria citrea</i>)	X	
Worm-eating warbler (<i>Helminthophila vermivorus</i>)	X	
Swainson's warbler (<i>Limothlypis swainsonii</i>)	X	
Louisiana waterthrush (<i>Seiurus motacilla</i>)	X	
Kentucky warbler (<i>Oporornis formosus</i>)	X	
Common yellowthroat (<i>Geothlypis trichas</i>)	X	X
Hooded warbler (<i>Wilsonia citrina</i>)	X	
Yellow-breasted chat (<i>Icteria virens</i>)	X	
<u>Tanagers</u>		
Summer tanager (<i>Piranga rubra</i>)	X	
Scarlet tanager (<i>P. olivacea</i>)	X	
<u>Grosbeaks, cardinals, buntings</u>		
Northern cardinal (<i>Cardinalis cardinalis</i>)	X	X
Blue grosbeak (<i>Guiraca caerulea</i>)	X	
Indigo bunting (<i>Passerina cyanea</i>)	X	
Painted bunting (<i>P. ciris</i>)	X	X
Dickcissel (<i>Spiza americana</i>)	X	
<u>Towhees and sparrows</u>		
Rufous-sided towhee (<i>Pipilo erythrophthalmus</i>)	X	X
Bachman's sparrow (<i>Aimophila aestivalis</i>)	X	

(Continued)

(Sheet 5 of 6)

Table 24 (Concluded)

Species	Summer	Winter
<u>Towhees and sparrows (Continued)</u>		
American tree sparrow (<i>Spizella arborea</i>)		X
Chipping sparrow (<i>S. passerina</i>)	X	X
Field sparrow (<i>S. pusilla</i>)	X	X
Vesper sparrow (<i>Pooecetes gramineus</i>)		X
Lark sparrow (<i>Chondestes grammacus</i>)	X	X
Savannah sparrow (<i>Passerculus sandwichensis</i>)		X
Grasshopper sparrow (<i>Ammodramus savannarum</i>)		X
Henslow's sparrow (<i>A. henslowii</i>)		X
Fox sparrow (<i>Passerella iliaca</i>)		X
Song sparrow (<i>Melospiza melodia</i>)		X
Lincoln's sparrow (<i>M. lincolnii</i>)		X
Swamp sparrow (<i>M. georgiana</i>)		X
White-throated sparrow (<i>Zonotrichia albicollis</i>)		X
White-crowned sparrow (<i>Z. leucophrys</i>)		X
Dark-eyed junco (<i>Junco hyemalis</i>)		X
<u>Blackbirds</u>		
Red-winged blackbird (<i>Agelaius phoeniceus</i>)	X	X
Eastern meadowlark (<i>Sturnella magna</i>)	X	X
Yellow-headed blackbird (<i>Xanthocephalus xanthocephalus</i>)	X	
Rusty blackbird (<i>Euphagus carolinus</i>)		X
Brewer's blackbird (<i>E. cyanocephalus</i>)		X
Common grackle (<i>Quiscalus quiscula</i>)	X	X
Brown-headed cowbird (<i>Molothrus ater</i>)	X	X
<u>Orioles</u>		
Orchard oriole (<i>Icterus spurius</i>)	X	
Northern oriole (<i>I. galbula</i>)	X	X
<u>Finches</u>		
Purple finch (<i>Carpodacus purpureus</i>)		X
House finch (<i>C. mexicanus</i>)		X
Pine siskin (<i>Carduelis pinus</i>)		X
American goldfinch (<i>C. tristis</i>)		X
Evening grosbeak (<i>Coccothraustes vespertinus</i>)		X
<u>Weaver finches</u>		
House sparrow (<i>Passer domesticus</i>)	X	X
TOTAL	106	135

SOURCES: FWS and National Audubon Society.

(Sheet 6 of 6)

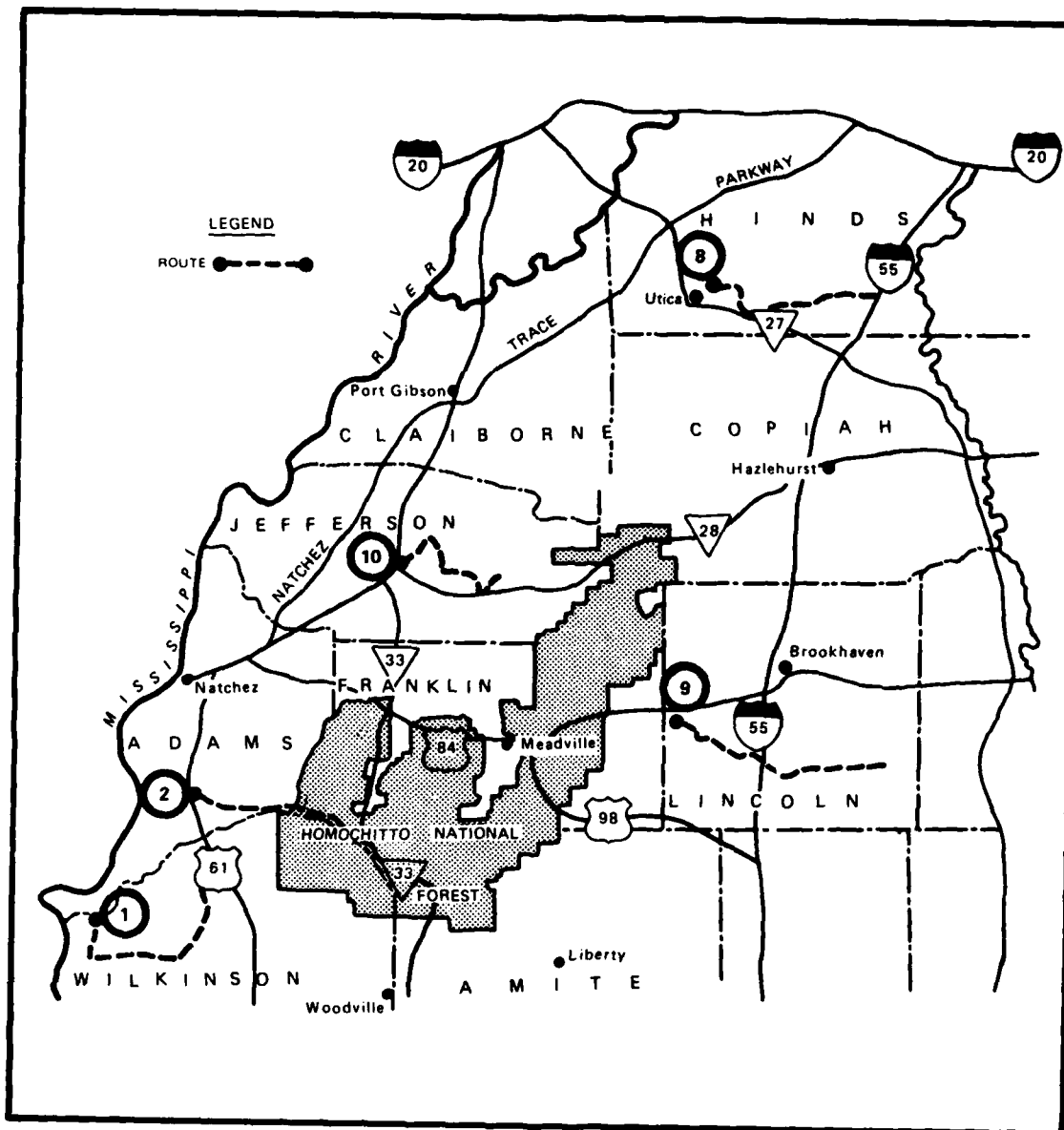


Figure 17. Breeding bird survey routes in Southwest Mississippi

nested in a cypress swamp near Lake Rodney (Jefferson County), but the present status of that rookery is unknown.

Of the upland game birds, the bobwhite, mourning dove, and wild turkey breed within the basin. The bobwhite was the most abundant of these in the surveys, and the greatest numbers were found in Hinds and Lincoln Counties where routes ran primarily through agricultural lands. The dove was more abundant in the Hinds County survey than in the other surveys. Although the basin has relatively high populations of wild turkey, as shown by harvest data, turkeys are difficult to observe on survey routes that follow road systems.

At least seven species of woodpeckers breed in Southwest Mississippi; of the six species regularly observed in these surveys, the red-bellied woodpecker is most abundant. Because the red-cockaded woodpecker is on the Federal list of endangered species, it will be discussed in the section Endangered and Sensitive Species. This woodpecker has probably not been detected on breeding bird surveys because of the specialized habitat it requires; most of the known colonies are in the Homochitto National Forest outside the reach of the five routes.

Chipping and field sparrows are the only species of sparrows that consistently breed within the basin. The chipping sparrow was recorded from the five counties surveyed, whereas the field sparrow was found only in Jefferson and Lincoln Counties. Though uncommon, Bachman's sparrow has occurred in Lincoln County, and the lark sparrow has been found in Hinds County.

Raptors that breed in the study area are the Mississippi kite and the following hawks: Cooper's, red-shouldered, broad-winged, red-tailed, and sharp-shinned. The eastern bluebird now breeds regularly in Southwest Mississippi and was most abundant on the relatively open routes in Lincoln, Jefferson, and Hinds Counties. Robins breed regularly in Hinds and Jefferson Counties and were found in several surveys in Lincoln County. Of 17 species of warblers in the area, the common yellowthroat and yellow-breasted chat were most abundant; the prothonotary, hooded, and parula warblers were also common in Wilkinson County. The killdeer was the only shorebird found breeding in the basin, and the wood duck was the only waterfowl species recorded for the area.

Little information is available on winter birds in the Southwest Mississippi Tributaries Basin. However, a Christmas Bird Count sponsored by the National Audubon Society has been conducted annually in the Natchez area for

more than 15 years (National Audubon Society 1974-1983). The count is held 15-31 December and includes one 24-hr period of observation and enumeration of bird species within a 7.5-mile radius of a central point in Natchez. Data for the counts conducted from 1973 through 1982 are presented in Appendix E, Table E1. During these 10 counts, 135 species of birds were recorded with an average of 77 species per year; numbers of species ranged from 64 in 1974 to 92 in 1976. A list of breeding and winter birds is presented in Table 24.

Amphibians and reptiles

Little ecological research has been conducted on the amphibians and reptiles of Southwest Mississippi. Most species reported in the literature were collected in more extensive studies within the state, and 75 percent of the southwestern specimens came from Copiah and Lincoln Counties on the eastern edge of the basin. Table 25 provides a list of the herpetofauna of known or probable occurrence within the Southwest Mississippi Tributaries Basin.

Amphibian species that have been reported in the literature include the mole salamander (Cook 1959), pickerel frog, and two-toed amphiuma (Brode 1958, 1960). Species of lizards collected from counties within the basin are the broadhead skink (Boyd and Vickers 1963); green anole, five-lined, and ground skinks and southern fence lizard (Cliburn 1959a); and southeastern five-lined skink (Cliburn 1959a, Boyd and Vickers 1963).

Species of snakes are the most frequently reported herpetofauna from Southwest Mississippi. Specimens of the following have been collected: corn snake (Cook 1943); brown water snake (Cliburn 1956); midland water snake (Cliburn 1957); western mud snake, eastern hognose snake, speckled kingsnake, rough earth snake, southern copperhead, and western cottonmouth (Cliburn 1958); southern black racer, western pigmy rattlesnake, and timber rattlesnake (Cliburn 1959b); southern ringneck snake (Brode 1960); and eastern ribbon snake (Cook 1943, Cliburn 1961).

The basin lies just outside the range of the eastern diamondback rattlesnake (*Crotalus adamanteus*) and the gopher tortoise (*Gopherus polyphemus*). The alligator is present at various locations within the basin but is discussed in the following section, as it is on the Federal list of endangered species.

Table 25

Amphibians and Reptiles of Actual or Probable Occurrence
in the Southwest Mississippi Tributaries Basin

Salamanders

Spotted salamander (*Ambystoma maculatum*)
 Marbled salamander (*A. opacum*)
 Mole salamander (*A. talpoidum*)
 Smallmouth salamander (*A. texanum*)
 Eastern tiger salamander (*A. t. tigrinum*)
 Two-toed amphiuma (*Amphiuma means*)
 Three-toed amphiuma (*A. tridactylum*)
 Southern dusky salamander (*Desmognathus auriculatus*)
 Spotted dusky salamander (*D. fuscus conanti*)
 Southern two-lined salamander (*Eurycea bislineata cirrigera*)
 Three-lined salamander (*E. longicauda guttolineata*)
 Dwarf salamander (*E. quadridigitata*)
 Four-toed salamander (*Hemidactylium scutatum*)
 Gulf Coast waterdog (*Necturus beyeri*)
 Central newt (*Notophthalmus viridescens louisianensis*)
 Slimy salamander (*Plethodon g. glutinosus*)
 Southern red salamander (*Pseudotriton ruber vioscai*)
 Western lesser siren (*Siren intermedia nettingi*)

Frogs and toads

Northern cricket frog (*Acris c. crepitans*)
 Southern cricket frog (*A. g. gryllus*)
 American toad (*Bufo a. americanus*)
 Oak toad (*B. quercicus*)
 Southern toad (*B. terrestris*)
 Fowler's toad (*B. woodhousei fowleri*)
 Eastern narrowmouth toad (*Gastrophryne carolinensis*)
 Bird-voiced treefrog (*Hyla avivoca*)
 Gray treefrog (*H. chrysoscelis/versicolor*)
 Green treefrog (*H. cinerea*)
 Northern spring peeper (*H. c. crucifer*)
 Pine woods treefrog (*H. femoralis*)
 Barking treefrog (*H. gratiosa*)
 Squirrel treefrog (*H. squirella*)
 Upland chorus frog (*Pseudacris triseriata feriarum*)
 Northern crawfish frog (*Rana areolata circulosa*)
 Bullfrog (*R. catesbeiana*)
 Bronze frog (*R. c. clamitans*)
 Pickerel frog (*R. palustris*)
 Southern leopard frog (*R. sphenocephala*)
 Eastern spadefoot (*Scaphiopus h. holbrookii*)

Crocodylians

American alligator (*Alligator mississippiensis*)

(Continued)

(Sheet 1 of 3)

Table 25 (Continued)

Turtles

Common snapping turtle (*Chelydra s. serpentina*)
 Southern painted turtle (*Chrysemys picta dorsalis*)
 Eastern chicken turtle (*Deirochelys r. reticularia*)
 Mississippi map turtle (*Graptemys kohnii*)
 Eastern mud turtle (*Kinosternon s. subrubrum*)
 Mississippi mud turtle (*K. s. hippocrepis*)
 Alligator snapping turtle (*Macrochelys temminckii*)
 River cooter (*Pseudemys concinna*)
 Missouri cooter (*P. floridana hoyi*)
 Red-eared slider (*P. scripta elegans*)
 Razorback musk turtle (*Sternotherus carinatus*)
 Stinkpot (*S. odoratus*)
 Three-toed box turtle (*Terrapene carolina triunguis*)
 Midland smooth softshell (*Trionyx m. muticus*)
 Gulf Coast smooth softshell (*T. m. calvatus*)
 Gulf Coast spiny softshell (*T. spiniferus asperus*)

Lizards

Green anole (*Anolis c. carolinensis*)
 Six-lined racerunner (*Cnemidophorus s. sexlineatus*)
 Southern coal skink (*Eumeces anthracinus pluvialis*)
 Five-lined skink (*E. fasciatus*)
 Southeastern five-lined skink (*E. inexpectatus*)
 Broadhead skink (*E. laticeps*)
 Eastern slender glass lizard (*Ophisaurus attenuatus longicaudus*)
 Eastern glass lizard (*O. ventralis*)
 Southern fence lizard (*Sceloporus u. undulatus*)
 Ground skink (*Scincella lateralis*)

Snakes

Southern copperhead (*Agkistrodon c. contortrix*)
 Western cottonmouth (*A. piscivorus leucostoma*)
 Midwest worm snake (*Carphophis amoenus helenae*)
 Northern scarlet snake (*Cemophora coccinea copei*)
 Black-masked racer (*Coluber c. latrunculus*)
 Southern black racer (*C. c. priapus*)
 Timber rattlesnake (*Crotalus horridus*)
 Southern ringneck snake (*Diadophis p. punctatus*)
 Mississippi ringneck snake (*D. p. stictogenys*)
 Corn snake (*Elaphe g. guttata*)
 Gray rat snake (*E. obsoleta spiloides*)
 Western mud snake (*Farancia abacura reinwardti*)
 Rainbow snake (*F. e. erythrogramma*)
 Eastern hognose snake (*Heterodon platyrhinos*)
 Mole kingsnake (*Lampropeltis calligaster rhombomaculata*)
 Speckled kingsnake (*L. getulus holbrooki*)

(Continued)

(Sheet 2 of 3)

Table 25 (Concluded)

Snakes (Continued)

Scarlet kingsnake (*L. triangulum elapsoides*)
 Eastern coachwhip (*Masticophis f. flagellum*)
 Eastern coral snake (*Micrurus f. fulvius*)
 Green water snake (*Nerodia c. cyclopion*)
 Yellowbelly water snake (*N. erythrogaster flavigaster*)
 Broad-banded water snake (*N. fasciata confluens*)
 Diamondback water snake (*N. r. rhombifera*)
 Midland water snake (*N. sipedon pleuralis*)
 Brown water snake (*N. t. taxispilota*)
 Rough green snake (*Opheodrys aestivus*)
 Graham's crayfish snake (*Regina grahami*)
 Gulf crayfish snake (*R. rigida sinicola*)
 Western pigmy rattlesnake (*Sistrurus miliarius streckeri*)
 Midland brown snake (*Storeria dekayi wrightorum*)
 Northern redbelly snake (*S. o. occipitomaculata*)
 Southeastern crowned snake (*Tantilla coronata*)
 Western ribbon snake (*Thamnophis p. proximus*)
 Eastern ribbon snake (*T. s. sauritus*)
 Eastern garter snake (*T. s. sirtalis*)
 Rough earth snake (*Virginia striatula*)
 Western earth snake (*V. valeriae elegans*)

SOURCES: Lohoefer and Altig 1983; Personal Communications, 1984, Edmund D. Keiser, University of Mississippi; William Cliburn, University of Southern Mississippi; and Terry Vandeventer, The Living Reptile Museum, Clinton, Miss.

(Sheet 3 of 3)

Endangered and Sensitive Species

In Southwest Mississippi, four terrestrial species are on the Federal list of threatened and endangered species, and two others are on the State list (USFWS 1984, MDWC 1984). Brief descriptions of known locations of these species in the Southwest Mississippi Tributaries Basin are presented below. The endangered species of Mississippi are listed in Table 26.

American alligator

Although the American alligator has been delisted in Louisiana and Texas, it remains on the Federal list of endangered species in Mississippi (MDWC 1984). Alligators are present in at least 55 counties throughout the state (Woodard 1980). The largest natural populations are in drainages along the Mississippi Gulf Coast; most inland populations have been derived from animals released into river systems, lakes, and private ponds.

Alligators were released on private property in southwest Copiah County in 1970 and at the following sites just outside the Southwest Mississippi Tributaries Basin: Lake Tangipahoa, Pike County, 1972; Georgetown, Copiah County, 1975; and Grand Gulf, Claiborne County, 1975. The alligator has since been reliably reported from at least five counties within the basin (Figure 18). Alligators or sign have been observed on Sandy Creek at Pipes Lake recreational area in Adams County, at Lake Rodney in Jefferson County, west of Utica in Claiborne County, and in the Homochitto bottoms of northwest Wilkinson County. Nests have also been found around the ponds where they were released in Copiah County.

Red-cockaded woodpecker

The range of the red-cockaded woodpecker formerly extended throughout the southern pine forests. Today, however, its distribution is patchy, and the birds are common only in large tracts of mature timber. The Homochitto National Forest contains one of the few large populations in Mississippi (Figure 18). There are 61 active colonies with at least 127 active cavity trees; the largest colony has 8 active trees. In loblolly pine the red-cockaded woodpecker usually nests in trees that are from 70 to 90 years old (Hooper et al. 1980); however, many of the cavity trees in the forest are younger, and a few are only 40 years old. The forest provides good habitat for the woodpecker, as it contains over 15,000 acres of 70- to 90-year-old loblolly stands and 33,000 acres of 60- to 70-year-old trees. An example of a typical nest

Table 26
Endangered Vertebrates of Mississippi

Fish

Southern redbelly dace (*Phoxinus erythrogaster*)
Bayou darter (*Etheostoma rubrum*)*
Crystal darter (*Ammocrypta asprella*)*
Frecklebelly madtom (*Noturus munitus*)
Atlantic sturgeon (*Acipenser oxyrhynchus*)
Undescribed Tombigbee River sturgeon (*Scaphirhynchus* sp.)

Amphibians

Cave salamander (*Eurycea lucifuga*)
Green salamander (*Aneides aeneus*)
Northern spring salamander (*Gyrinophilus porphyriticus*)

Reptiles

American alligator (*Alligator mississippiensis*)**
Black pine snake (*Pituophis melanoleucus lodingi*)
Eastern indigo snake (*Drymarchon corais couperi*)
Rainbow snake (*Farancia erytrogramma*)*
Southern hognose snake (*Heterodon simus*)
Gopher tortoise (*Gopherus polyphemus*)
Atlantic green turtle (*Chelonia mydas*)
Atlantic loggerhead turtle (*Caretta caretta*)
Atlantic ridley turtle (*Lepidochelys kempi*)
Black-knobbed sawback turtle (*Graptemys nigrinoda*)
Hawksbill turtle (*Eretmochelys imbricata*)
Leatherback turtle (*Dermochelys coriacea*)
Ringed sawback turtle (*Graptemys oculifera*)
Yellow-blotched sawback turtle (*Graptemys flavimaculata*)

Birds

Mississippi sandhill crane (*Grus canadensis pulla*)
Bald eagle (*Haliaeetus leucocephalus*)**
Peregrine falcon (*Falco peregrinus*)
Brown pelican (*Pelecanus occidentalis*)
Snowy plover (*Charadrius alexandrinus*)
Wood stork (*Mycteria americana*)
Bachman's warbler (*Vermivora bachmani*)
Ivory-billed woodpecker (*Campephilus principalis*)
Red-cockaded woodpecker (*Picoides borealis*)**
Bewick's wren (*Thryomanes bewickii*)

Mammals

Gray bat (*Myotis grisescens*)
Indiana bat (*Myotis sodalis*)
Black bear (*Ursus americanus*)*
West Indian (Florida) manatee (*Trichechus manatus*)
Florida panther (*Felis concolor coryi*)**
Whales, all species (order Cetacea, excluding Family Delphinidae)

SOURCE: MDWC 1984.

* Species on the State List occurring in the Basin.

** Species on the Federal List occurring in the Southwest Mississippi
Tributaries Basin.

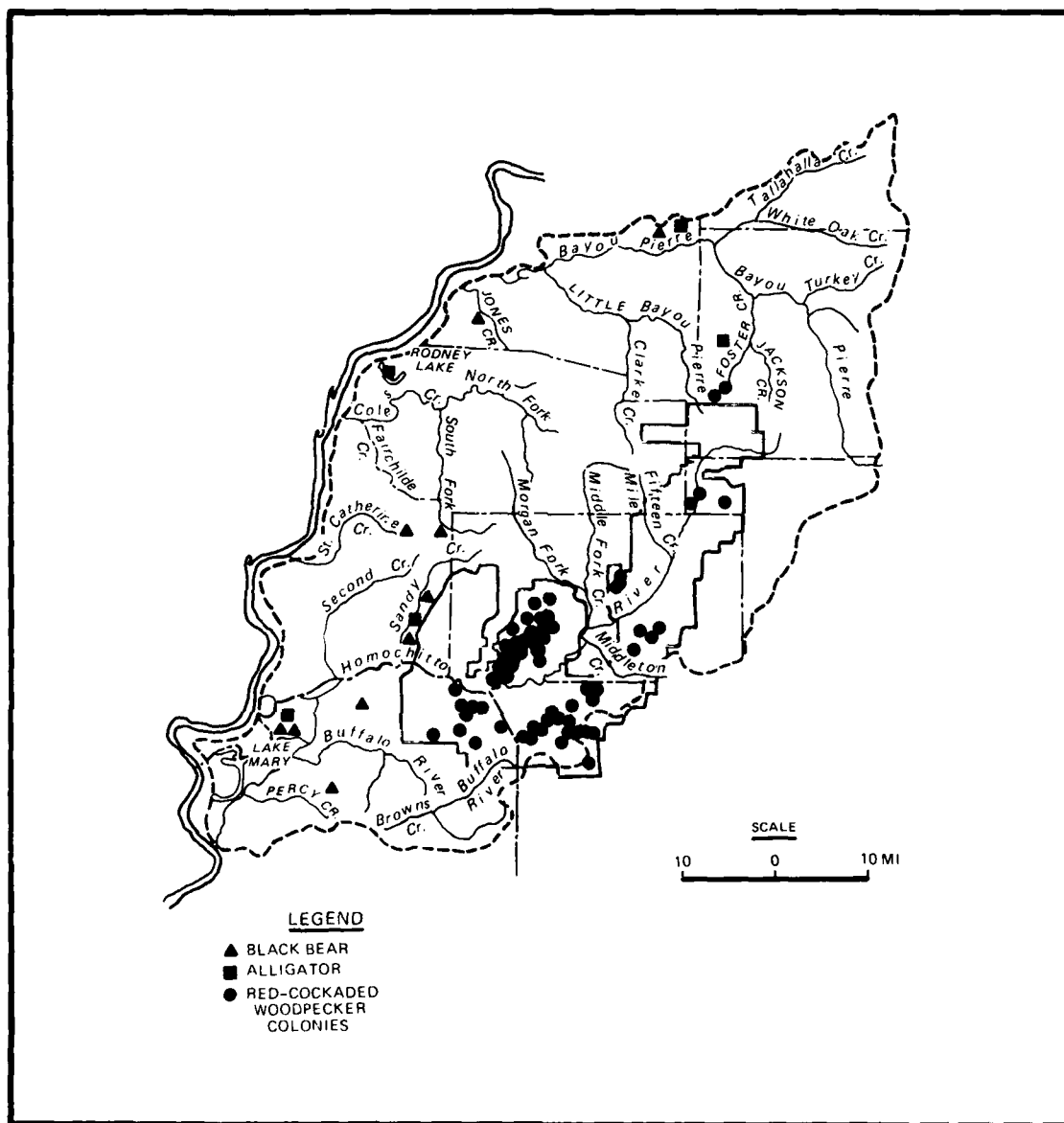


Figure 18. Recorded locations of endangered species in the Southwest Mississippi Tributaries Basin

cavity found within the Homochitto National Forest is shown in Figure 19.

The US Forest Service has intensively managed for the red-cockaded woodpecker since it was placed on the Federal list of endangered species. Management includes two major practices: (a) protection of colony sites, and (b) maintenance of flight paths around these sites. Each cavity tree has a buffer zone of 200-ft radius, and all mechanized activities, such as road construction, timber sales, and oil well operations, are restricted within that zone. Understory and midstory growth must be periodically removed to maintain open flight paths in younger stands. The methods employed include prescribed burning, thinning, and chemical injection; these procedures must be performed at times other than the nesting season.

Several known active colonies are located outside the Homochitto National Forest. Two are on Copiah County WMA, and one is on private land west of Crosby in Wilkinson County. Other colonies could probably be found on land owned by private industry; however, company lands tend to have younger timber than that required by the red-cockaded woodpecker.

Black bear

The legal status of black bear in Mississippi has recently been changed from threatened to endangered (MDWC 1984). Bears have been absent from most of the state since the early 1900s and today are found primarily in the southern Delta and the bluff hills of Southwest Mississippi (Anonymous 1983).

Bear sightings reported by hunters and bear damage to hives reported by beekeepers are fairly common in the Southwest Mississippi Tributaries Basin. Since 1977 at least 11 sightings and signs of bear have been verified by knowledgeable wildlife personnel; locations of the sites where these occurred are shown in Figure 18. The sites on Sandy Creek represent five verifications, and the site in northeast Wilkinson County represents an illegal kill in October 1982. There were also verifications in 1973 of bear damage in Claiborne County and a sighting in 1977 at Grand Gulf, which is in the same county but just outside the study area.

Other species

The bald eagle was reported from the Kingston area in January 1984. Bald eagles have overwintered at some Mississippi lakes in recent years; therefore, it is likely that they could appear on Lake Mary or Lake Rodney during winter months. Currier (Russell 1978) indicates that reliable sightings of the Florida panther have been made in Southwest Mississippi since 1951. There are



Figure 19. Red-cockaded woodpecker nest cavity in loblolly pine on the Homochitto WMA

occasional reports of panthers from local people; however, the only documented sighting within counties of the basin in recent years occurred at Grand Gulf in June 1973. There is no current information available on the rainbow snake in this area.

Penalties

Under the Endangered Species Act, the maximum penalties for taking an endangered animal are a fine of \$20,000 and 1-year imprisonment (Committee on Environment and Public Works 1983). Violations involving importation and exportation of endangered animals or animal products carry a maximum penalty of \$10,000 per violation. As black bear is not on the Federal list, penalties for criminal violation are less severe; the maximum is a fine of \$1,000 and 1-year imprisonment.

PART V: SUMMARY

The Southwest Mississippi Tributaries Basin lies within the southwestern corner of Mississippi and encompasses all of Adams, Franklin, and Jefferson Counties and portions of Claiborne, Hinds, Copiah, Lincoln, Amite, and Wilkinson Counties. Major drainages in the region are the Bayou Pierre system, the Homochitto and Buffalo Rivers, and Coles and St. Catherine Creeks. The basin covers an area of 2,023,982 acres or 3,162 square miles.

Most of the basin is in the lower portion of the Loess Bluffs physiographic region, but the western edge is in the Delta. The terrain varies from level to undulating and is dissected by many stream channels that contain strips of bottomland soils. Upland soils are generally well drained, acid, silty, and highly erodible; floodplain soils are poorly drained, subject to flooding, and composed of fairly large percentages of clay and loam.

Forestry and agriculture are the primary land uses in the basin. Almost 75 percent of the area is in forestland, and 20 percent is in cropland and pasture. The Southwest Forest Survey Region, which includes most of the study area plus Madison and Pike Counties, produces 25 percent of the softwood sawtimber and approximately 25 percent of the hardwood pulpwood in Mississippi. Approximately 562,000 acres within the basin are designated by the Soil Conservation Service as prime agricultural lands. Beef cattle and sod crops, such as soybeans, corn, and sorghum, are the leading agricultural products. Only 4 percent of the basin is in other land uses such as urban and industrial development, gravel and borrow pits, farmsteads, and roads. Water other than rivers and streams covers 3 percent of the study area.

State and Federal lands occupy 198,772 acres of the Southwest Mississippi Tributaries Basin and include the Natchez State Park, Homochitto National Forest, and the Copiah County, Homochitto, and Sandy Creek WMAs; the Homochitto and Sandy Creek WMAs are located within the national forest. The Homochitto National Forest consists of 188,781 acres, which represents 17 percent of the national forestland in Mississippi.

Approximately 474,000 acres of the basin is covered by pine forests, which are composed chiefly of loblolly and shortleaf pines. The majority of pine stands occur in the counties contributing to the Homochitto National Forest, which comprises 9 percent of the study area; pine constitutes 82 percent of the national forest's total acreage. Oak-hickory forests cover

approximately 375,000 acres of basin land and are concentrated in Adams, Jefferson, and Wilkinson Counties. Mixed forests occur on 603,000 acres but are more uniformly distributed throughout the basin than are pine or hardwood forests. Oak-gum-cypress communities are found on the floodplains of major streams, and the elm-ash-cottonwood association is found along the more well-drained terraces of floodplains.

The three WMAs located within the basin represent approximately 57,700 acres of land open to public hunting. In addition to these areas, approximately 500 private hunting clubs have been established in the region; the largest numbers of clubs are found in Jefferson, Copiah, Claiborne, and Wilkinson Counties. White-tailed deer and wild turkey are the major game species on both public and private hunting lands in Southwest Mississippi.

More hunter effort is directed toward the pursuit of white-tailed deer than any other species in the Southwest Basin. This region produces approximately one-fifth of the annual statewide deer harvest, and the total regional harvest has been increasing over the past 10 years. Statewide management is directed toward controlling the rapidly expanding deer populations; the hunting season has been lengthened in Mississippi, and regulations have been adjusted to encourage the harvest of antlerless deer.

The wild turkey is the most popular game bird of the Southwest Mississippi Basin. Estimates of spring harvest for 1980-1983 seasons ranged from 7,252 to 10,724 birds and represented 19-25 percent of the total harvest estimates for the state. Statewide trends indicate that turkey harvest and hunter effort are on the increase.

Squirrels are the most heavily harvested small game mammals, and the mourning dove is the most heavily harvested upland game bird in the southwest region. Mallards and wood ducks are the major waterfowl taken. Bobwhite quail, woodcock, rabbits, and predatory mammals are other game species of the basin.

Twelve species of furbearers are harvested in Southwest Mississippi. The raccoon and opossum have been the most heavily trapped, but pelts of bobcat, gray fox, and red fox have brought the higher prices since the 1976-1977 season. During this period Hinds County showed the largest total harvest, and Jefferson County had the least. Although individual species have shown seasonal harvest peaks, there has been a general downward trend in furbearer harvest. Fur prices have also fluctuated but have declined since 1979. The

trends in Southwest Mississippi reflect statewide trends in furbearer harvest. License sales have declined sharply since the 1979-1980 season, and statewide harvest has dropped accordingly.

Little information is available on nongame species in the Southwest Mississippi Tributaries Basin. Approximately 50 species of mammals have been reported from counties within the basin; 106 species of birds have been recorded from five breeding bird survey routes; and 135 species of wintering birds have been documented over the past 10 years of Christmas Bird Counts in the Natchez area. A list was compiled of 103 amphibian and reptile species of actual or probable occurrence in the study area.

The American alligator and red-cockaded woodpecker are Federally listed endangered species known to occur in the basin. The Homochitto National Forest has one of the few large populations of red-cockaded woodpeckers in Mississippi, and more than 60 active colonies are located in the forest. Bald eagles have overwintered at some Mississippi lakes in recent years, and it is likely they could appear on Lake Mary or Lake Rodney during winter months. The Florida panther has been reported from Southwest Mississippi, but there are few documented sightings. The black bear, recently designated as endangered on the Mississippi list of threatened and endangered species, is found primarily in the southwest region of the State.

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Sources of Information

Danny Bystrak
US Department of the Interior
Fish and Wildlife Service
Patuxent Wildlife Research Center
Laurel, MD 20708
(301)776-4880

William J. Hamrick
Mississippi Department of
Wildlife Conservation
Route 3, Box 547
Newton, MS 39345
(601)683-3905

Dr. William Cliburn
Department of Biological Sciences
University of Southern Mississippi
Southern Station, Box 5018
Hattiesburg, MS 39406
(601)266-4923

Dr. Edmund D. Keiser
Department of Biology
University of Mississippi
University, MS 38677
(601)232-7203

Paul E. Davis
Geographic Information Systems Division
Mississippi Research and Development Center
3825 Ridgewood Road
Jackson, MS 39211
(601)982-6354

Brian Knowles
USDA Forest Service
Black Creek Ranger District
Box 248
Wiggins, MS 39577
(601)928-4422

B. F. Finison
USDA Forest Service
Suite 1141, Federal Building
100 West Capitol Street
Jackson, MS 39269
(601)960-5484

William M. Koos
USDA Soil Conservation Service
Suite 1321, Federal Building
100 West Capitol Street
Jackson, MS 39269
(601)960-5207

Ken Gordon
Mississippi Natural Heritage Program
Mississippi Museum of Natural Science
111 North Jefferson Street
Jackson, MS 39202
(601)354-7303

Dinnie Lambert
USDA Forest Service
Homochitto Ranger District
PO Box 398
Gloster, MS 39638
(601)225-4281

Don Lewis
Mississippi Department of
Wildlife Conservation
743 Brookwood Circle
Brookhaven, MS 39601
(601)833-3095

Zelbert Palmer
USDA Forest Service
Suite 1141, Federal Building
100 West Capitol Street
Jackson, MS 39269
(601)960-5506

James W. Lipe
Mississippi Department of
Wildlife Conservation
PO Box 451
Jackson, MS 39205
(601)961-5317

William I. Smith
USDA Soil Conservation Service
Suite 1321, Federal Building
100 West Capitol Street
Jackson, MS 39269
(601)960-5209

Bruce Macko
USDA Forest Service
Suite 1141, Federal Building
100 West Capitol Street
Jackson, MS 39269
(601)960-5495

David E. Steffen
Mississippi Department of
Wildlife Conservation
PO Box 451
Jackson, MS 39205
(601)961-5308

Carl E. Mason
Mississippi Trappers Association
212 East Broadway
Yazoo City, MS 39194
(601)746-6736

James Stewart
US Department of the Interior
Fish and Wildlife Service
Jackson Mall
Suite 316
300 Woodrow Wilson Avenue
Jackson, MS 39213
(601)960-4900

Sidney Moss
Mississippi Forestry Commission
908 Robert E. Lee Building
Jackson, MS 39201
(601)359-1386

Terry L. Vandeventer
The Living Reptile Museum
303½ East Main Street
Clinton, MS 39056
(601)924-1409

Wendell Neal
US Department of the Interior
Fish and Wildlife Service
Jackson Mall
Suite 316
300 Woodrow Wilson Avenue
Jackson, MS 39213
(601)960-4900

Dr. James L. Wolfe
Mississippi State University
Research Center
National Space Technology
Laboratories
NSTL Station, MS 39529
(601)688-3227

APPENDIX A: SOILS OF COUNTIES IN THE SOUTHWEST MISSISSIPPI
TRIBUTARIES BASIN

A brief description of major soils is given for each of the counties contributing to the Southwest Mississippi Tributaries Basin. The accompanying maps of soil associations have been provided by the Mississippi Automated Resource Information System. To ensure contrast and clarity, similar associations were combined into a few major groups.

Adams County

Upland soils comprise 61 percent of the soils in Adams County and belong to three associations: (a) Memphis, (b) Memphis-Lucy, and (c) gullied land--Natchez-Memphis (Figure A1). These associations are characterized by deep, well-drained, nearly level to steep, acid, silty soils that have a high available water capacity. There are two major associations of nearly level floodplain soils. The Falaya-Collins association consists of poorly and moderately well-drained, acid, silty soils along upland streams. The Sharkey-Tunica-Newellton association on the Mississippi River floodplain is made up of poorly drained, nonacid, clayey soils that have a seasonally high water table but shrink and crack when dry. These two associations account for 24 percent of the soils in Adams County.

Amite County

Soils in the basin portion of Amite County are chiefly in the Smithdale-Susquehanna association (Figure A2), which accounts for 11 percent of soils in the county. These acid soils are rolling to hilly and vary from well-drained, loamy soils with a medium to high available water capacity to somewhat poorly drained, clayey soils that shrink and crack when dry. Floodplain soils along the Homochitto River system are in the Collins-Bude association and are poorly to moderately well drained with a loamy subsoil high in silt.

Claiborne County

Approximately 54 percent of the soils in Claiborne County are in the Memphis-Natchez-Adler association (Figure A3). These upland soils are undulating to steep, well drained, mostly acid, and silty with a high available water capacity. Approximately one-fourth of the soils are on the alluvial plains of the Mississippi River and along tributary streams. Those adjacent to the river in the Bowdre-Adler-Commerce association are somewhat poorly drained, slightly acid to moderately alkaline, and primarily silty loam; whereas those on stream floodplains in the Collins-Falaya-Calloway association are poorly to moderately well drained, acid, and silty. Alluvial soils have a high seasonal water table, and those on tributary streams usually overflow. Rough broken land with

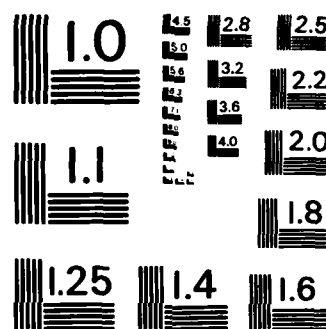
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**SOUTHWEST MISSISSIPPI TRIBUTARIES STUDY AREA
ENVIRONMENTAL INVENTORY; WIL. (U) ARMY ENGINEER
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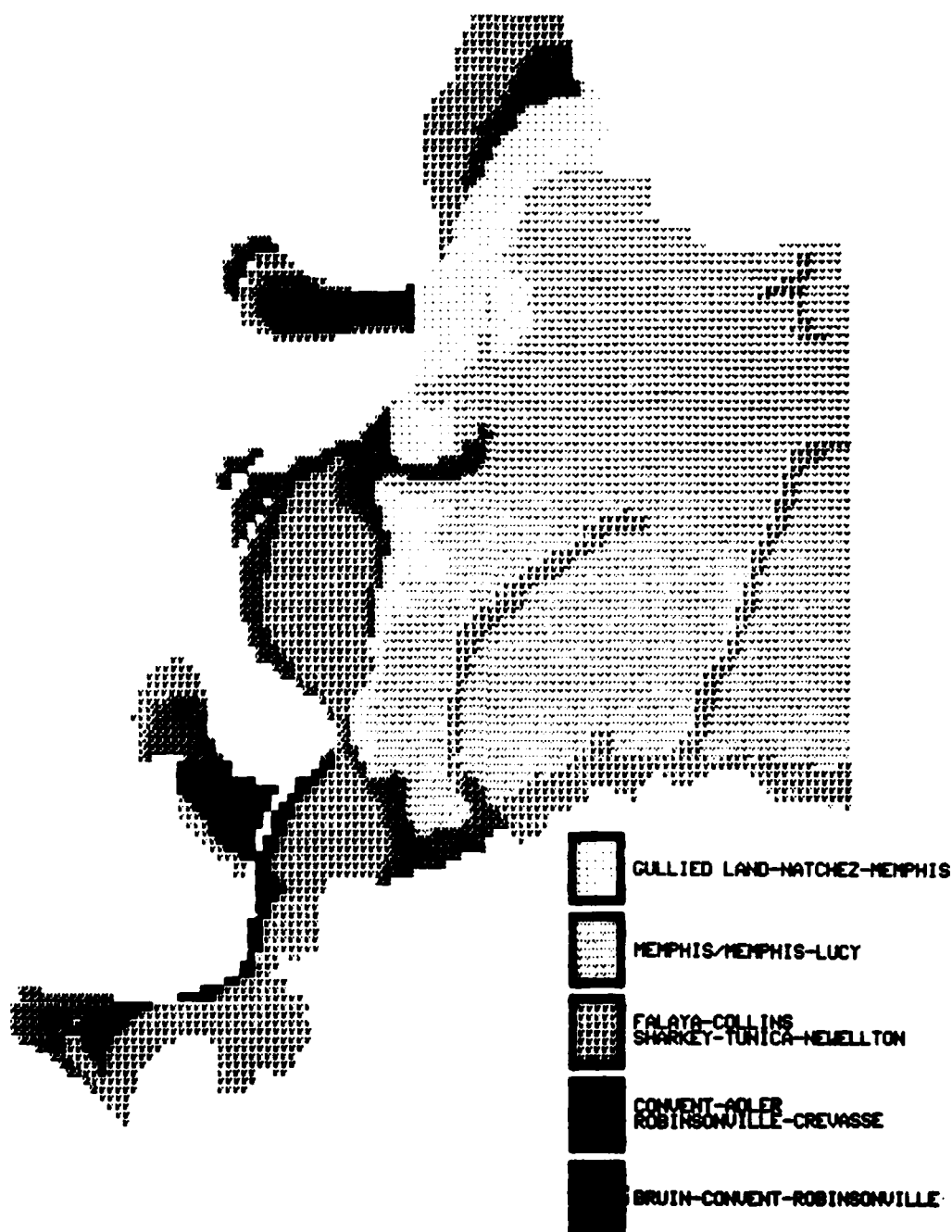


Figure A1. Soil associations in Adams County, Miss.

A brief description of major soils is given for each of the counties contributing to the Southwest Mississippi Tributaries Basin. The accompanying maps of soil associations have been provided by the Mississippi Automated Resource Information System. To ensure contrast and clarity, similar associations were combined into a few major groups.

Adams County

Upland soils comprise 61 percent of the soils in Adams County and belong to three associations: (a) Memphis, (b) Memphis-Lucy, and (c) gullied land--Natchez-Memphis (Figure A1). These associations are characterized by deep, well-drained, nearly level to steep, acid, silty soils that have a high available water capacity. There are two major associations of nearly level floodplain soils. The Falaya-Collins association consists of poorly and moderately well-drained, acid, silty soils along upland streams. The Sharkey-Tunica-Newellton association on the Mississippi River floodplain is made up of poorly drained, nonacid, clayey soils that have a seasonally high water table but shrink and crack when dry. These two associations account for 24 percent of the soils in Adams County.

Amite County

Soils in the basin portion of Amite County are chiefly in the Smithdale-Susquehanna association (Figure A2), which accounts for 11 percent of soils in the county. These acid soils are rolling to hilly and vary from well-drained, loamy soils with a medium to high available water capacity to somewhat poorly drained, clayey soils that shrink and crack when dry. Floodplain soils along the Homochitto River system are in the Collins-Bude association and are poorly to moderately well drained with a loamy subsoil high in silt.

Claiborne County

Approximately 54 percent of the soils in Claiborne County are in the Memphis-Natchez-Adler association (Figure A3). These upland soils are undulating to steep, well drained, mostly acid, and silty with a high available water capacity. Approximately one-fourth of the soils are on the alluvial plains of the Mississippi River and along tributary streams. Those adjacent to the river in the Bowdre-Adler-Commerce association are somewhat poorly drained, slightly acid to moderately alkaline, and primarily silty loam; whereas those on stream floodplains in the Collins-Falaya-Calloway association are poorly to moderately well drained, acid, and silty. Alluvial soils have a high seasonal water table, and those on tributary streams usually overflow. Rough broken land with

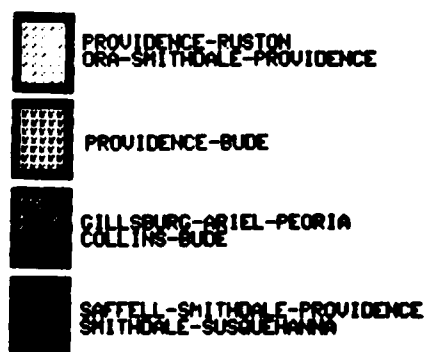


Figure A2. Soil associations in Amite County, Miss.

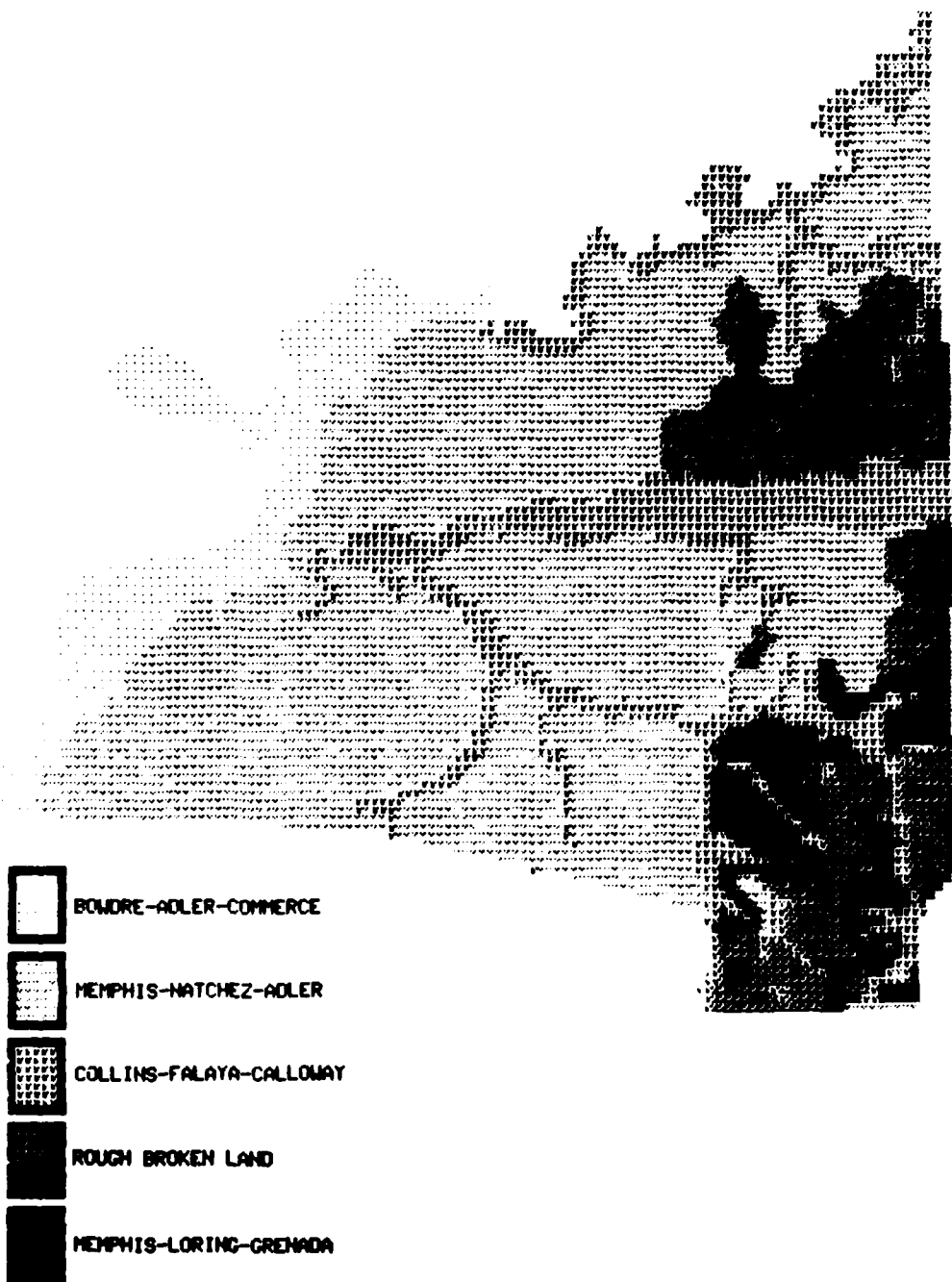


Figure A3. Soil associations in Claiborne County, Miss.

long, narrow ridges and steep, broken side slopes make up 14 percent of the soils in Claiborne County.

Copiah County

The 15 soil associations of Copiah County have been combined into four major groups (Figure A4). The soils that lie in the basin portion of the county fall chiefly into the first and third groups, which make up 35 and 29 percent, respectively, of soils in the county. The Smithdale/Lorman-Smithdale/Saffell associations consist of upland soils that are strongly sloping to steep, moderately well drained to well drained, acid, and loamy with a medium available water capacity. The other major group of soil associations is found on floodplains and stream terraces; soils are primarily level to gently sloping, poorly drained, acid, and silty. The Providence/Kolin associations are found on nearly level to strongly sloping uplands and are composed of moderately well-drained, acid, silty soils that have a fragipan,* or clayey subsoil layer.

Franklin County

The 13 soil associations of Franklin County have been combined into four groups (Figure A5). The first group consists of upland soils and makes up 50 percent of soils in the county. These are nearly level to steep, acid, silty, clayey, and loamy soils with medium to high available water capacity.

One-half the soils in Franklin County are associated with the Homochitto River and its tributaries. About 9 percent of these soils are in the last group and lie along the Homochitto River and its major tributary streams; these are poorly drained, acid, and mostly silty soils with a very high available water capacity. Approximately 13 percent of soils are in the Iuka-Ariel/Ariel-Gillsburg associations that are found along the Homochitto River but also on the floodplains of smaller creeks and streams; these are moderately well-drained to well-drained, acid, loamy soils that have medium available water capacity and are subject to flooding. The remainder of Franklin County soils (27 percent) are on stream terraces and gently to strongly sloping uplands in the Homochitto drainage system; these are poorly drained, acid, silty soils with fragipans and high erodibility.

* An impervious subsoil layer that restricts water and limits its availability.

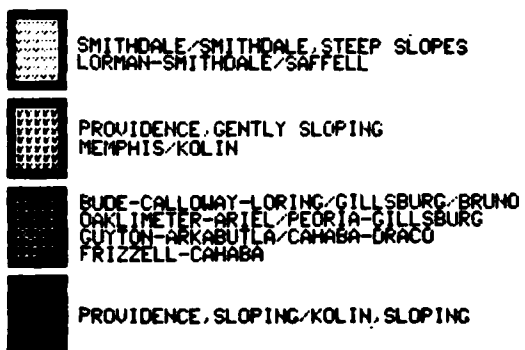
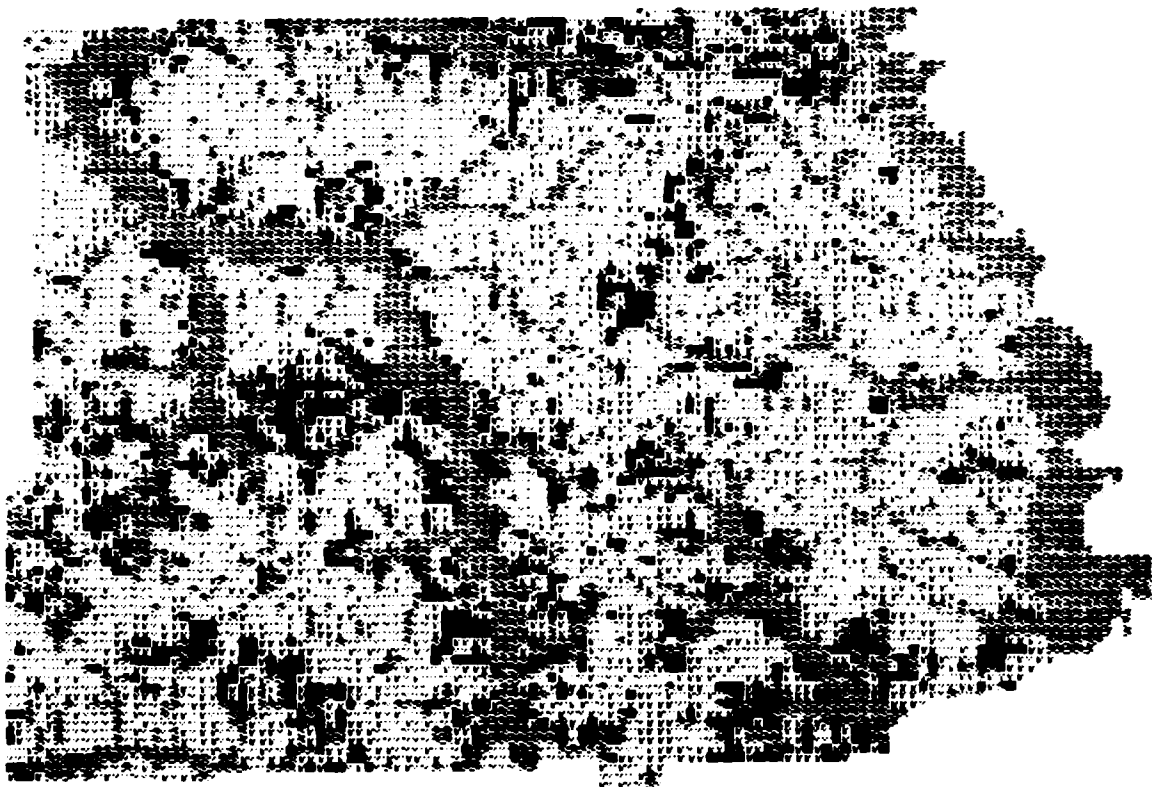


Figure A4. Soil associations in Copiah County, Miss.

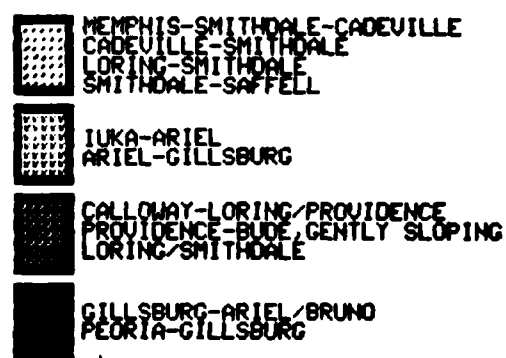
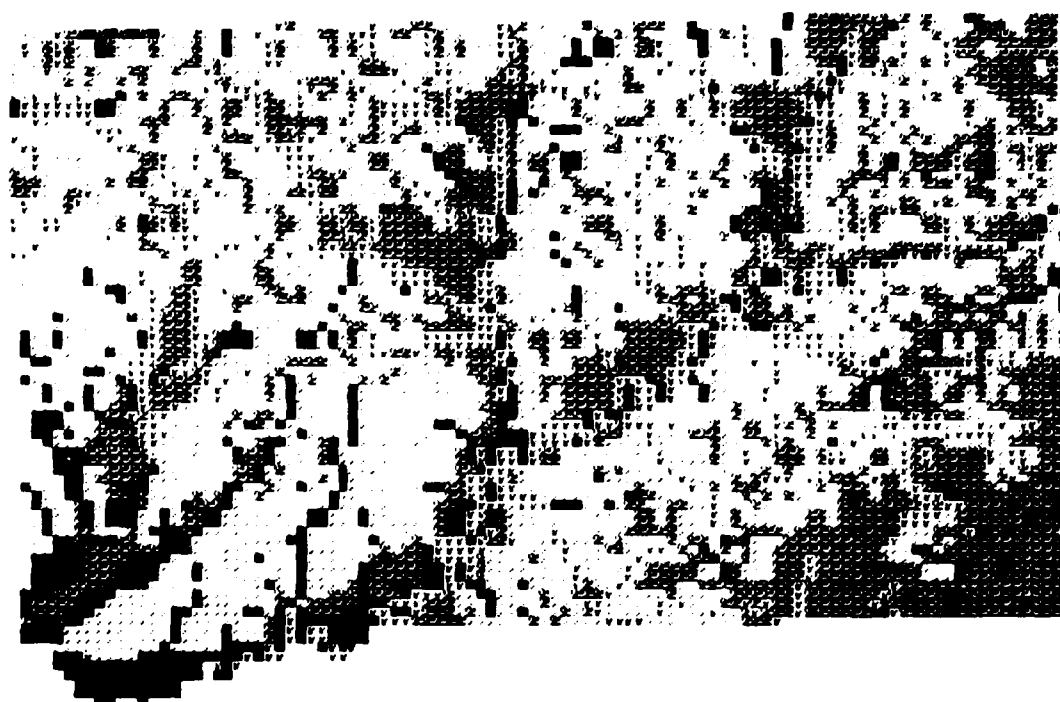


Figure A5. Soil associations in Franklin County, Miss.

Hinds County

Two major groups of associations account for 65 percent of the soils in Hinds County (Figure A6), and 45 percent of soils are in the Memphis-Loring and Loring-Providence-Grenada associations. Upland soils in the basin belong to these and the Providence-Smithdale associations. Soils of the Loring-Providence-Grenada association are nearly level to rolling, but some of the Memphis-Loring soils are moderately steep. Most soils in these associations are acid, silty, and moderately well drained with a fragipan that limits available water. Soils of the Providence-Smithdale association are located only in the basin portion of the county. They are undulating to hilly, acid, silty, and well drained to moderately well drained with a fragipan. Floodplain soils of tributary streams are in the Riedtown-Oaklimer-McRaven association; these soils are nearly level, silty, and moderately well drained to poorly drained with a fragipan and have a tendency to overflow.

Jefferson County

Eighteen percent of Jefferson County soils occur on floodplains, and 82 percent occur on uplands. Three soil associations (in the first and fourth groups) are found on floodplains along the Mississippi River, and Falaya-Collins-Deerford soils are found on tributary streams (Figure A7). These associations consist of nearly level, silty, clayey, and loamy soils that are poorly to moderately well drained.

Upland soils are sloping to steep and occur in five associations. The well-drained, acid, silty soils of the Memphis-Natchez association are found in the western half of Jefferson County and account for 26 percent of its soils. The other associations occur chiefly in the eastern part of the county and vary from well-drained, silty and loamy soils to moderately well-drained, clayey and silty soils with fragipans.

Lincoln County

The soils of Lincoln County fall into five major associations, but only two of these contribute significantly to the basin area (Figure A8). The Providence-Guin-Boswell-Ruston association is located primarily in the northwest part of the county and makes up 21 percent of county soils; it consists of moderately well-drained soils on narrow ridgetops and well-drained to excessively drained soils on strongly sloping to very steep side slopes. The gently sloping soils of the Providence-Bude association, distributed

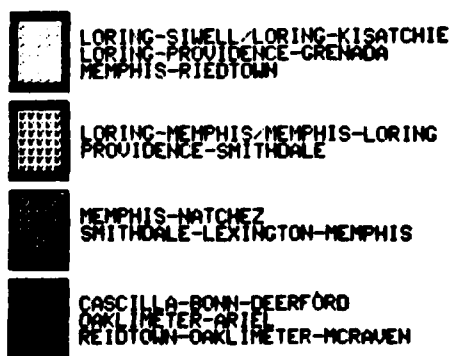


Figure A6. Soil associations in Hinds County, Miss.

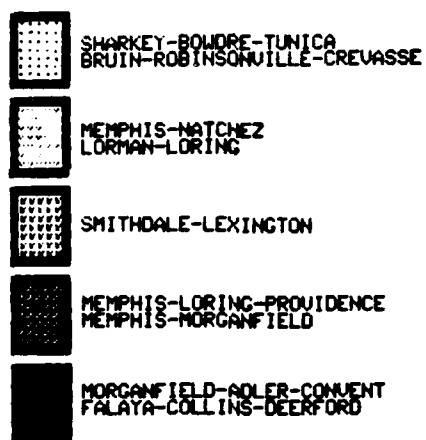
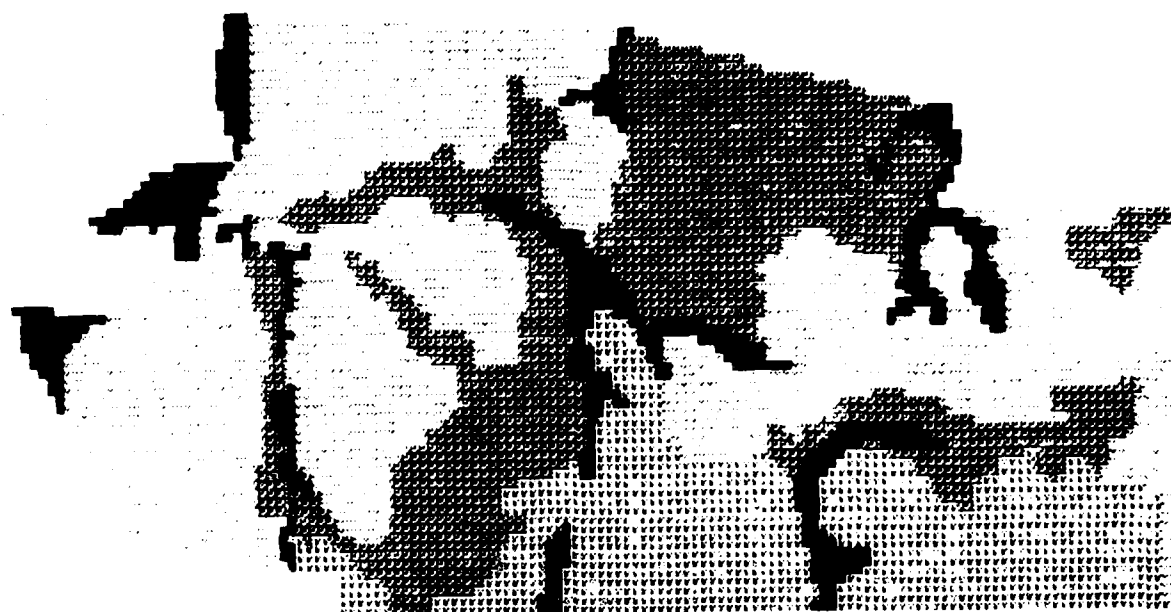


Figure A7. Soil associations in Jefferson County, Miss.

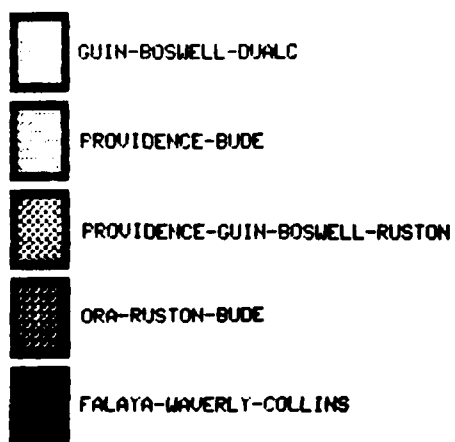
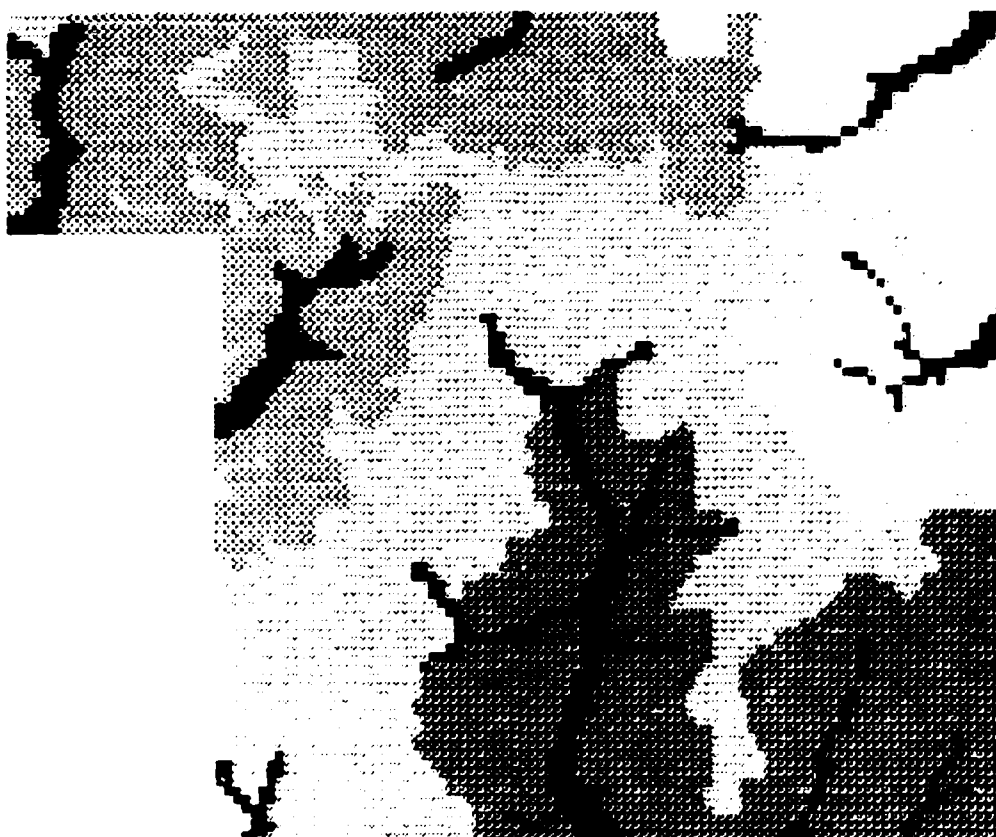


Figure A8. Soil associations in Lincoln County, Miss.

throughout the central part of the county, are poorly to moderately well drained and usually contain a fragipan. The Falaya-Waverly-Collins soils are found on stream floodplains; these are poorly to moderately well drained and usually overflow. The soils in these three associations are primarily acid and silty.

Wilkinson County

Wilkinson County soil associations have been combined into five major groups (Figure A9). Soils in the basin portion of the county are almost entirely in the second and fourth groups, which account for 37 and 23 percent, respectively, of Wilkinson County soils. The Cadeville-Smithdale/Smithdale/Memphis associations are composed of hilly to steep upland soils that are moderately well drained to well drained, acid, and clayey, loamy, or silty. Soils of the fourth group of associations are nearly level floodplain soils subject to flooding. These soils have varying degrees of acidity, may be silty, clayey, or loamy, and usually have a high available water capacity.

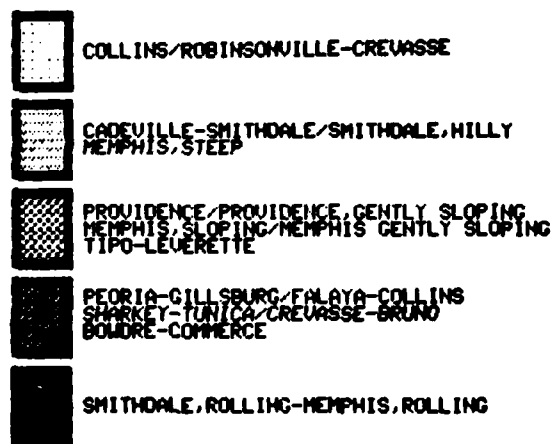
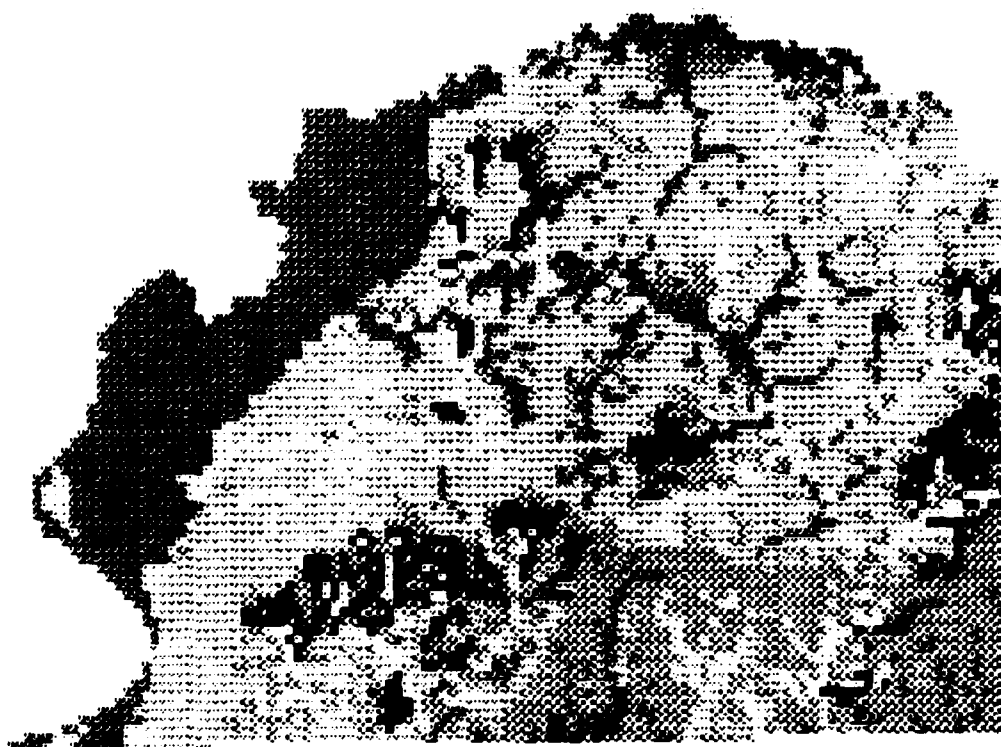


Figure A9. Soil associations in Wilkinson County, Mississippi

APPENDIX B: HABITAT CAPABILITY INDICES FOR HOMOCHITTO NATIONAL FOREST

Table B1
Habitat Capability for Deer and Turkey on Homochitto National Forest

<u>Age Class, years</u>	<u>Acres</u>	<u>Deer Habitat Capability</u>	<u>Acres Per Deer</u>	<u>Turkey Habitat Capability</u>	<u>Acres Per Turkey</u>
<u>Pine</u>					
0-9	33,297	998.91	33.33	566.05	58.82
10-19	4,702	136.36	34.48	98.74	47.62
20-29	810	24.30	33.33	19.44	33.33
30-39	2,211	66.32	33.34	55.21	40.05
40-49	20,641	622.31	33.17	518.08	39.84
50-59	40,295	1208.54	33.34	1006.14	40.05
60-69	33,408	1001.76	33.34	833.30	40.09
70-79	12,206	365.88	33.36	303.96	40.16
80-89	3,523	104.34	33.76	86.94	40.52
90-99	1,123	31.59	35.55	26.33	42.65
100-109	137	3.06	44.77	2.55	53.73
110-119		1.23	1.23	1.03	1.03
Total	152,353	4564.60	33.38	3517.77	43.31
<u>Hardwood</u>					
0-9	2,752	264.19	10.42	52.29	52.63
10-19	650	28.60	22.73	11.05	58.82
20-29	98	5.29	18.53	3.72	26.34
30-39	301	9.93	30.31	12.64	23.81
40-49	3,108	136.75	22.73	198.92	15.62
50-59	2,155	75.43	28.57	94.81	22.73
60-69	2,201	101.25	21.74	145.27	15.15
70-79	1,105	40.75	27.12	50.76	21.77
80-89	568	20.45	27.78	25.56	22.22
100-109	76	2.66	28.57	3.27	23.24
110-119	38	1.33	28.57	1.63	23.31
Total	13,052	686.63	19.00	599.92	21.76

(Continued)

Table B1 (Concluded)

<u>Age Class, years</u>	<u>Acres</u>	<u>Deer Habitat Capability</u>	<u>Acres Per Deer</u>	<u>Turkey Habitat Capability</u>	<u>Acres Per Turkey</u>
<u>Pine-Hardwood</u>					
0-9	4,482	430.27	10.42	85.16	52.63
10-19	869	38.24	22.72	14.77	58.84
20-29	185	9.99	18.52	7.03	26.32
30-39	271	8.93	30.35	11.11	24.39
40-49	1,527	61.08	25.00	85.51	17.86
50-59	5,507	187.24	29.41	242.31	22.73
60-69	3,375	138.38	24.39	195.75	17.24
70-79	1,693	60.95	27.78	76.19	22.22
80-89	1,422	49.77	28.57	62.57	22.73
90-99	343	11.66	29.42	15.09	22.73
100-109	84	2.85	29.47	3.69	22.76
110-119	50	1.70	29.41	2.20	22.73
Total	19,808	1001.06	19.79	801.38	24.72

SOURCE: US Forest Service.

APPENDIX C: FURBEARER HARVEST DATA FOR COUNTIES IN THE SOUTHWEST
MISSISSIPPI TRIBUTARIES BASIN

Table C1
Estimated Harvests of Furbearer Species for Counties in Southwest Mississippi in 1978-1979

Species	Statistic*	Adams	Anite	Claiborne	Copiah	Franklin	Hinds	Jefferson	Lincoln	Wilkinson
Beaver	Estimate (SE)	8 (0)	87 (1)	0 (0)	403 (4)	19 (0)	247 (3)	33 (0)	4 (0)	42 (0)
Bobcat	Estimate (SE)	0 (0)	94 (1)	50 (1)	35 (0)	35 (0)	19 (0)	2 (0)	6 (0)	110 (0)
Raccoon	Estimate (SE)	60 (1)	875 (9)	102 (1)	827 (9)	386 (4)	337 (4)	162 (2)	314 (3)	1120 (13)
Coyote	Estimate (SE)	0 (0)	0 (0)	6 (0)	6 (0)	0 (0)	8 (0)	0 (0)	0 (0)	2 (0)
Gray fox	Estimate (SE)	29 (0)	187 (2)	58 (1)	164 (2)	52 (1)	137 (1)	31 (0)	276 (3)	231 (2)
Red fox	Estimate (SE)	2 (0)	71 (1)	6 (0)	35 (0)	44 (0)	31 (0)	0 (0)	106 (1)	39 (0)
Mink	Estimate (SE)	0 (0)	50 (1)	0 (0)	216 (2)	31 (0)	127 (1)	8 (0)	62 (1)	29 (0)
Opossum	Estimate (SE)	116 (1)	721 (8)	195 (2)	756 (8)	251 (3)	364 (4)	56 (1)	642 (7)	958 (10)
Otter	Estimate (SE)	0 (0)	12 (0)	0 (0)	12 (0)	0 (0)	10 (0)	0 (0)	6 (0)	17 (0)
Spotted skunk	Estimate (SE)	2 (0)	21 (0)	12 (0)	23 (0)	6 (0)	2 (0)	0 (0)	12 (0)	15 (0)
Striped skunk	Estimate (SE)	8 (0)	44 (0)	25 (0)	39 (0)	23 (0)	23 (0)	4 (0)	150 (2)	19 (0)
Muskrat	Estimate (SE)	0 (0)	0 (0)	0 (0)	8 (0)	0 (0)	116 (0)	0 (0)	0 (0)	15 (0)
Weasel	Estimate (SE)	0 (0)	4 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Mutria	Estimate (SE)	0 (0)	25 (0)	2 (0)	17 (0)	2 (0)	21 (0)	8 (0)	0 (0)	10 (0)

* SE = standard error.

Table C2

Estimated Harvests of Furbearer Species for Counties in Southwest Mississippi in 1979-1980

Species	Statistic*	Adams	Amite	Claiborne	Copiah	Franklin	Hinds	Jefferson	Lincoln	Wilkinson
Beaver	Estimate (SE)	65 (1)	0 (0)	28 (0)	377 (3)	0 (0)	226 (2)	0 (0)	334 (3)	105 (1)
Bobcat	Estimate (SE)	22 (0)	34 (0)	34 (0)	6 (0)	105 (1)	31 (0)	6 (0)	25 (0)	96 (1)
Raccoon	Estimate (SE)	291 (2)	381 (3)	238 (2)	656 (5)	609 (5)	928 (7)	59 (0)	325 (3)	866 (7)
Coyote	Estimate (SE)	0 (0)	0 (0)	0 (0)	31 (0)	6 (0)	15 (0)	0 (0)	0 (0)	9 (0)
Gray fox	Estimate (SE)	59 (0)	254 (2)	34 (0)	164 (1)	427 (3)	226 (2)	53 (0)	278 (2)	186 (1)
Red fox	Estimate (SE)	22 (0)	68 (1)	9 (0)	12 (0)	50 (0)	56 (0)	9 (0)	105 (1)	28 (0)
Mink	Estimate (SE)	6 (0)	6 (0)	3 (0)	127 (1)	43 (0)	575 (4)	9 (0)	90 (1)	3 (0)
Opossum	Estimate (SE)	393 (3)	597 (5)	396 (0)	702 (5)	1333 (10)	755 (6)	56 (0)	507 (4)	334 (3)
Otter	Estimate (SE)	0 (0)	0 (0)	6 (0)	15 (0)	9 (0)	19 (0)	0 (0)	19 (0)	43 (0)
Spotted skunk	Estimate (SE)	0 (0)	6 (0)	15 (0)	6 (0)	25 (0)	0 (0)	0 (0)	9 (0)	9 (0)
Striped skunk	Estimate (SE)	6 (0)	9 (0)	46 (0)	3 (0)	31 (0)	22 (0)	3 (0)	105 (1)	15 (0)
Muskrat	Estimate (SE)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	87 (1)	0 (0)	9 (0)	0 (0)
Weasel	Estimate (SE)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Nutria	Estimate (SE)	0 (0)	3 (0)	0 (0)	3 (0)	0 (0)	31 (0)	0 (0)	3 (0)	50 (0)

* SE = standard error.

Table C3
Estimated Harvests of Furbearer Species for Counties in Southwest Mississippi in 1980-1981

Species	Statistic*	Adams	Amite	Claborn	Copiah	Franklin	Hinds	Jefferson	Lincoln	Wilkinson
Beaver	Estimate (SE)	0 (0)	95 (1)	69 (1)	222 (2)	4 (0)	207 (2)	63 (1)	91 (1)	32 (0)
Bobcat	Estimate (SE)	0 (0)	56 (1)	93 (1)	4 (0)	69 (1)	47 (0)	43 (0)	2 (0)	86 (1)
Raccoon	Estimate (SE)	52 (0)	492 (4)	304 (3)	511 (5)	684 (6)	738 (7)	285 (3)	188 (2)	671 (6)
Coyote	Estimate (SE)	0 (0)	0 (0)	11 (0)	0 (0)	4 (0)	28 (0)	2 (0)	0 (0)	13 (0)
Gray fox	Estimate (SE)	2 (0)	216 (2)	56 (1)	60 (1)	203 (2)	211 (2)	52 (0)	60 (1)	125 (1)
Red fox	Estimate (SE)	0 (0)	45 (0)	17 (0)	19 (0)	19 (0)	91 (1)	2 (0)	15 (0)	13 (0)
Mink	Estimate (SE)	0 (0)	28 (0)	2 (0)	99 (1)	43 (0)	308 (3)	11 (0)	17 (0)	69 (1)
Opossum	Estimate (SE)	54 (0)	317 (3)	332 (3)	123 (1)	315 (3)	479 (4)	214 (2)	209 (2)	332 (3)
Otter	Estimate (SE)	0 (0)	9 (0)	4 (0)	24 (0)	0 (0)	2 (0)	13 (0)	4 (0)	19 (0)
Spotted skunk	Estimate (SE)	0 (0)	2 (0)	35 (0)	4 (0)	17 (0)	2 (0)	45 (0)	9 (0)	37 (0)
Striped skunk	Estimate (SE)	0 (0)	65 (1)	13 (0)	22 (0)	84 (1)	56 (1)	39 (0)	24 (0)	22 (0)
Muskrat	Estimate (SE)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	84 (1)	0 (0)	0 (0)	0 (0)
Weasel	Estimate (SE)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Nutria	Estimate (SE)	0 (0)	2 (0)	6 (0)	11 (0)	9 (0)	0 (0)	9 (0)	0 (0)	41 (0)

* SE = standard error.

Table C4
Estimated Harvests of Furbearer Species for Counties in Southwest Mississippi in 1981-1982

Species	Statistic ⁺	Adams	Amite	Claiborne	Copiah	Franklin	Hinds	Jefferson	Lincoln	Wilkinson
Beaver	Estimate (SE)	0 (0)	170 (2)	39 (0)	96 (1)	39 (0)	308 (3)	2 (0)	42 (0)	20 (0)
Bobcat	Estimate (SE)	42 (0)	32 (0)	27 (0)	4 (0)	108 (1)	59 (1)	0 (0)	5 (0)	12 (0)
Raccoon	Estimate (SE)	288 (3)	535 (5)	259 (2)	439 (4)	599 (5)	616 (5)	44 (0)	217 (2)	961 (9)
Coyote	Estimate (SE)	0 (0)	5 (0)	2 (0)	0 (0)	0 (0)	52 (0)	0 (0)	2 (0)	5 (0)
Gray fox	Estimate (SE)	148 (1)	141 (1)	15 (0)	32 (0)	121 (1)	158 (1)	5 (0)	57 (1)	141 (1)
Red fox	Estimate (SE)	30 (0)	25 (0)	10 (0)	5 (0)	25 (0)	39 (0)	0 (0)	12 (0)	59 (1)
Mink	Estimate (SE)	0 (0)	67 (1)	5 (0)	89 (1)	44 (0)	330 (3)	0 (0)	54 (0)	62 (1)
Opossum	Estimate (SE)	328 (3)	313 (3)	153 (1)	128 (1)	365 (3)	414 (4)	2 (0)	175 (2)	173 (2)
Otter	Estimate (SE)	2 (0)	17 (0)	5 (0)	12 (0)	5 (0)	10 (0)	0 (0)	2 (0)	12 (0)
Spotted skunk	Estimate (SE)	20 (0)	12 (0)	10 (0)	2 (0)	10 (0)	0 (0)	0 (0)	0 (0)	2 (0)
Striped skunk	Estimate (SE)	22 (0)	20 (0)	42 (0)	10 (0)	2 (0)	59 (0)	0 (0)	67 (1)	2 (0)
Muskrat	Estimate (SE)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	17 (0)	0 (0)	0 (0)	0 (0)
Weasel	Estimate (SE)	5 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Nutria	Estimate (SE)	2 (0)	22 (0)	0 (0)	2 (0)	27 (0)	19 (0)	0 (0)	2 (0)	30 (0)

* SE = standard error.

Table C5
Estimated Harvests of Furbearer Species for Counties in Southwest Mississippi in 1982-1983

Species	Statistic*	Adams	Amite	Claiborne	Copiah	Franklin	Hinds	Jefferson	Lincoln	Wilkinson
Beaver	Estimate (SE)	2 (0)	64 (1)	15 (0)	123 (1)	0 (0)	332 (3)	27 (0)	2 (0)	39 (0)
Bobcat	Estimate (SE)	5 (0)	5 (0)	2 (0)	5 (0)	32 (0)	49 (0)	17 (0)	20 (0)	22 (0)
Raccoon	Estimate (SE)	155 (2)	368 (4)	125 (1)	307 (3)	258 (3)	904 (9)	182 (2)	241 (2)	444 (4)
Coyote	Estimate (SE)	2 (0)	0 (0)	0 (0)	0 (0)	0 (0)	59 (1)	10 (0)	0 (0)	5 (0)
Gray fox	Estimate (SE)	54 (1)	56 (1)	12 (0)	12 (0)	52 (1)	167 (2)	12 (0)	59 (1)	101 (1)
Red fox	Estimate (SE)	12 (0)	20 (0)	0 (0)	10 (0)	2 (0)	71 (1)	5 (0)	17 (0)	15 (0)
Mink	Estimate (SE)	0 (0)	22 (0)	0 (0)	5 (0)	10 (0)	216 (2)	10 (0)	15 (0)	7 (0)
Opossum	Estimate (SE)	184 (2)	138 (1)	37 (0)	142 (1)	137 (1)	528 (5)	280 (3)	238 (2)	184 (2)
Otter	Estimate (SE)	0 (0)	1/ (0)	2 (0)	0 (0)	2 (0)	0 (0)	2 (0)	5 (0)	22 (0)
Spotted skunk	Estimate (SE)	7 (0)	2 (0)	12 (0)	2 (0)	2 (0)	5 (0)	27 (0)	0 (0)	2 (0)
Striped skunk	Estimate (SE)	2 (0)	2 (0)	2 (0)	0 (0)	12 (0)	93 (0)	71 (1)	44 (0)	25 (0)
Muskrat	Estimate (SE)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	42 (0)	0 (0)	0 (0)	0 (0)
Weasel	Estimate (SE)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Nutria	Estimate (SE)	0 (0)	0 (0)	0 (0)	5 (0)	0 (0)	5 (0)	0 (0)	0 (0)	42 (0)

* SE = standard error.

APPENDIX D: BREEDING BIRD SURVEYS IN SOUTHWEST MISSISSIPPI

Table D1
Results of Breeding Bird Surveys for Route 1 in
Wilkinson County, Mississippi

Species	1974	1975	1976	1977	1978	1979	Means
Great blue heron	9	0	0	0	0	0	1.50
Green-backed heron	7	2	4	4	7	1	4.17
Little blue heron	28	2	14	0	1	4	8.17
Cattle egret	23	46	35	176	40	30	58.33
Great egret	24	5	0	0	0	0	4.83
Yellow-crowned night-heron	6	0	1	0	2	0	1.50
White ibis	18	0	0	1	0	0	3.17
Wood duck	0	0	0	0	1	0	.17
Turkey vulture	1	1	0	4	2	0	1.33
Black vulture	16	8	0	22	3	0	8.17
Mississippi kite	0	2	0	2	0	1	0.83
Red-tailed hawk	0	2	0	0	1	0	0.50
Red-shouldered hawk	2	0	2	2	2	3	1.83
Broad-winged hawk	1	2	0	0	2	0	0.83
Northern bobwhite	7	5	4	5	9	5	5.83
Killdeer	0	1	3	1	1	0	1.00
Mourning dove	11	13	6	19	12	16	12.83
Yellow-billed cuckoo	17	19	15	11	22	21	17.50
Barred owl	0	2	1	0	0	0	0.50
Chimney swift	13	14	4	17	13	6	11.17
Ruby-throated hummingbird	0	2	0	1	1	1	0.83
Belted kingfisher	0	1	0	0	0	0	0.17
Northern flicker	0	0	1	0	0	1	0.33
Pileated woodpecker	1	2	0	0	2	1	1.00
Red-bellied woodpecker	12	21	23	7	16	15	15.67
Downy woodpecker	1	1	3	0	0	3	1.33
Eastern kingbird	2	4	3	4	2	3	3.00
Great crested flycatcher	9	10	7	9	2	19	9.33
Acadian flycatcher	4	4	8	13	17	18	10.67

(Continued)

(Sheet 1 of 3)

Table D1 (Continued)

Species	1974	1975	1976	1977	1978	1979	Means
Eastern wood-pewee	2	1	2	3	4	4	2.67
Northern rough-winged swallow	3	9	0	0	5	0	2.83
Barn swallow	10	26	20	10	28	24	19.67
Purple martin	7	3	23	11	15	7	11.00
Blue jay	21	13	16	14	12	6	13.67
American crow	26	26	68	52	37	43	42.00
Fish crow	5	0	4	3	2	0	2.33
Carolina chickadee	2	12	14	5	9	11	8.83
Tufted titmouse	11	19	21	13	17	13	15.67
Carolina wren	48	48	49	35	42	33	42.50
Northern mockingbird	10	22	28	14	26	7	17.83
Brown thrasher	4	9	0	6	12	3	5.67
Wood thrush	7	10	7	9	9	13	9.17
Eastern bluebird	0	0	1	3	2	0	1.00
Blue-gray gnatcatcher	5	9	7	4	9	7	6.83
Loggerhead shrike	1	0	0	0	0	0	0.17
European starling	7	0	1	0	0	0	1.33
White-eyed vireo	41	44	57	45	51	48	47.67
Yellow-throated vireo	10	10	8	9	3	14	9.00
Red-eyed vireo	18	25	18	8	27	29	20.83
Warbling vireo	0	0	0	0	0	1	0.17
Black-and-white warbler	0	1	2	0	0	1	0.67
Prothonotary warbler	13	16	9	10	12	11	11.83
Swainson's warbler	0	3	1	2	0	0	1.00
Worm-eating warbler	0	0	3	0	0	0	0.50
Northern parula	27	22	34	27	20	29	26.50
Yellow-throated warbler	2	1	1	2	1	0	1.17
Kentucky warbler	5	6	6	5	11	8	6.83
Common yellowthroat	14	17	18	14	18	28	18.17
Yellow-breasted chat	35	47	36	31	31	41	36.83
Hooded warbler	12	8	8	8	11	16	10.50

(Continued)

(Sheet 2 of 3)

Table D1 (Concluded)

Species		1974	1975	1976	1977	1978	1979	Means
American redstart		4	4	2	3	6	3	3.67
House sparrow		2	6	2	5	8	2	4.17
Eastern meadowlark		5	13	9	8	12	6	8.83
Red-winged blackbird		25	46	25	20	29	21	27.67
Orchard oriole		21	37	28	28	38	24	29.33
Northern oriole		4	3	0	0	0	2	1.50
Common grackle		21	10	23	4	1	14	12.17
Brown-headed cowbird		18	5	22	30	7	13	15.83
Summer tanager		17	15	16	4	19	14	14.17
Northern cardinal		81	74	107	71	72	1	81.00
Blue grosbeak		2	3	0	3	0	1	1.50
Indigo bunting		29	21	25	31	29	33	28.00
Painted bunting		5	5	13	10	5	9	7.83
Rufous-sided towhee		13	11	9	7	10	12	10.33
Chipping sparrow		0	0	0	0	1	2	0.50
Total birds	4,969	805	829	879	865	809	782	3.00
Total species	76	61	62	57	55	59	55	58

SOURCE: US Fish and Wildlife Service.

(Sheet 3 of 3)

Table D2
Results of Breeding Bird Surveys for Route 2 in Adams County, Miss.

Species	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	Means
Anhinga	0	0	0	1	0	1	0	1	0	0	1	1	0	0	0	0	0	0.36
Great blue heron	0	0	0	0	0	0	0	1	0	0	0	3	0	1	3	1	4	0.76
Green-backed heron	0	0	0	0	0	0	0	3	3	1	0	1	0	0	0	1	1	0.59
Little blue heron	7	11	2	3	4	5	3	2	0	5	5	4	2	1	0	3	1	3.53
Cattle egret	0	0	3	14	1	22	28	11	6	9	39	19	12	40	99	15	9	19.24
Great egret	3	0	15	0	0	0	0	0	4	2	9	0	2	3	4	0	0	2.47
Snowy egret	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0.21
Yellow-crowned night-heron	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0.14
Wood duck	0	0	0	0	0	0	0	1	0	5	0	0	0	1	0	0	0	0.50
Turkey vulture	6	3	1	1	2	3	6	0	1	0	3	3	5	1	3	1	0	2.29
Black vulture	3	2	12	4	4	26	1	9	4	0	6	5	5	2	5	4	1	5.47
Mississippi kite	1	0	0	0	0	0	2	0	0	0	1	1	0	0	0	2	1	0.47
Sharp-shinned hawk	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.14
Cooper's hawk	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.07
Red-tailed hawk	0	0	0	0	0	0	0	0	0	1	0	1	0	1	2	1	1	0.41
Red-shouldered hawk	0	1	0	0	0	3	1	1	0	0	1	0	3	1	1	1	1	0.88
Broad-winged hawk	0	0	0	2	0	0	0	0	1	0	2	0	0	0	0	2	1	0.47
Northern bobwhite	12	4	9	6	4	6	9	7	6	13	6	5	5	12	1	3	1	6.41
Wild turkey	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.07
Killdeer	0	1	0	0	0	0	0	0	1	0	1	0	1	2	0	1	4	0.65
Rock dove	0	0	0	0	0	0	0	0	2	0	0	2	2	6	0	0	0	0.86
Mourning dove	2	5	13	14	6	4	9	15	3	8	9	5	15	4	11	8	12	8.41
Yellow-billed cuckoo	9	3	2	5	6	6	1	7	2	6	3	5	7	9	10	8	8	5.71
Barred owl	0	1	0	0	1	0	0	2	0	0	0	0	0	1	0	0	0	0.36
Chuck-will's-widow	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.07
Common nighthawk	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.21
Chimney swift	5	8	16	4	15	9	11	6	11	2	4	5	1	4	4	17	8	7.65
Ruby-throated hummingbird	2	0	3	0	0	1	1	1	7	1	3	2	2	2	3	1	5	2.00
Belted kingfisher	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0.14
Northern flicker	0	0	0	0	1	0	0	0	2	0	1	0	0	0	0	0	3	0.41
Pileated woodpecker	0	1	0	3	1	1	1	2	0	3	0	2	1	1	0	2	0	1.06
Red-bellied woodpecker	19	9	8	2	1	6	2	2	2	6	3	5	5	6	7	8	9	5.41

(Continued)

(Sheet 1 of 3)

Table D2 (Continued)

Species	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	Means
Red-headed woodpecker	0	1	1	2	3	0	0	4	3	2	0	2	0	1	3	1	2	1.47
Hairy woodpecker	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0	0	0	0.21
Downy woodpecker	2	0	2	1	3	1	1	1	2	1	1	3	3	4	0	0	3	1.65
Eastern kingbird	7	5	10	4	5	3	6	2	5	4	3	1	2	2	0	0	3	3.65
Great crested flycatcher	1	1	0	0	0	2	1	2	0	2	1	1	1	4	1	0	1	1.06
Acadian flycatcher	1	0	0	0	0	1	0	1	1	1	0	0	0	1	2	6	7	1.24
Eastern wood-pewee	1	1	4	6	6	2	1	1	1	2	3	1	2	2	1	5	5	2.59
Tree swallow	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0.29
Bank swallow	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0.14
Northern rough-winged swallow	1	0	0	0	0	0	5	0	0	0	15	0	0	0	0	0	12	1.94
Barn swallow	0	0	0	0	0	0	0	0	10	4	23	16	66	19	31	31	41	14.18
Purple martin	2	5	7	4	2	14	7	0	16	1	13	15	10	13	28	6	3	8.58
Blue jay	19	6	8	3	6	11	6	6	3	3	11	5	9	12	3	3	11	7.35
American crow	48	37	53	22	31	36	27	47	42	32	37	12	29	44	21	22	26	33.29
Fish crow	0	0	2	0	3	0	0	1	2	0	0	1	1	0	1	1	0	0.71
Carolina chickadee	6	1	7	12	13	14	4	3	2	3	4	21	1	13	28	5	24	9.47
Tufted titmouse	17	19	6	3	5	18	0	2	0	2	1	7	6	13	24	23	13	9.47
White-breasted nuthatch	0	0	2	3	0	0	0	0	0	1	1	0	0	0	0	0	0	0.50
Brown-headed nuthatch	0	0	1	0	0	4	0	4	0	0	0	0	0	0	0	0	0	0.64
House wren	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.07
Carolina wren	11	4	22	3	3	6	2	5	2	3	4	2	3	9	6	23	6	6.35
Northern mockingbird	13	13	8	12	4	12	6	6	10	7	7	7	9	13	10	10	8	9.07
Gray catbird	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0.18
Brown thrasher	4	1	2	1	0	5	4	0	0	2	3	2	3	2	1	1	2	1.94
Wood thrush	16	4	26	4	3	3	3	5	3	2	3	8	4	5	5	2	3	5.82
Eastern bluebird	6	0	1	1	1	1	0	1	5	0	2	0	2	0	2	0	3	1.47
Blue-gray gnatcatcher	3	0	3	1	1	0	0	2	2	3	1	5	3	4	6	6	4	2.59
Loggerhead shrike	2	0	2	0	2	0	2	2	1	3	1	3	2	1	0	1	4	1.53
European starling	3	1	1	2	6	2	0	3	0	4	9	3	1	1	1	0	0	2.18
White-eyed vireo	47	14	33	15	20	19	15	16	20	36	26	26	22	22	33	47	32	26.06
Yellow-throated vireo	0	0	7	0	0	0	0	0	1	1	0	2	0	2	0	1	2	0.94
Red-eyed vireo	3	2	6	3	1	3	0	4	3	7	5	5	9	6	14	9	11	5.00
Warbling vireo	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.21
Black-and-white warbler	8	1	0	2	0	0	0	0	1	1	0	1	1	2	0	0	0	1.21

(Continued)

(Sheet 2 of 3)

Table D2 (Concluded)

Species	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	Means
Prothonotary warbler	1	2	2	6	9	8	2	3	1	6	3	4	10	8	6	8	3	4.82
Swinson's warbler	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.14
Worm-eating warbler	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.14
Northern parula	19	2	12	4	2	7	7	3	5	5	8	9	6	7	20	17	13	7.47
Yellow warbler	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	3	0	0.29
Yellow-throated warbler	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.07
Pine warbler	2	0	1	0	0	2	2	0	2	0	2	11	1	1	5	4	1	2.00
Prairie warbler	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.07
Louisiana waterthrush	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0.14
Kentucky warbler	1	0	2	0	0	0	0	0	1	0	0	1	0	1	0	2	0	0.47
Common yellowthroat	13	12	17	9	10	5	6	6	4	9	12	10	10	8	13	14	18	10.35
Yellow-breasted chat	40	7	44	5	3	9	12	10	14	12	9	8	28	19	14	14	18	15.65
Hooded warbler	0	1	11	0	0	0	0	0	0	0	0	0	0	0	1	9	4	1.53
American redstart	0	1	1	1	0	0	1	2	1	0	4	6	0	0	1	2	1	1.24
House sparrow	12	25	4	25	2	13	1	12	18	7	5	2	2	1	9	1	1	8.24
Eastern meadowlark	6	4	4	1	2	1	1	0	0	1	2	1	1	1	1	2	9	2.18
Yellow-headed blackbird	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.07
Red-winged blackbird	12	12	6	4	17	2	10	3	15	2	4	14	4	8	6	1	3	7.24
Orchard oriole	20	7	3	2	1	4	6	2	2	4	9	2	5	3	5	6	3	4.94
Northern oriole	7	3	3	0	0	1	2	2	0	1	0	0	0	1	1	0	1	1.29
Common grackle	18	14	4	0	14	22	12	11	33	9	4	3	4	4	6	1	15	10.24
Brown-headed cowbird	1	17	10	3	1	5	7	4	2	0	5	5	9	30	3	24	3	7.59
Summer tanager	12	4	8	4	5	2	6	2	1	6	5	5	1	3	5	10	7	5.06
Northern cardinal	51	15	61	18	35	28	36	24	10	27	14	22	21	36	24	22	27	27.71
Blue grosbeak	5	0	1	1	2	2	0	0	2	0	0	0	0	0	1	2	1	1.00
Indigo bunting	14	5	16	8	5	10	5	20	9	13	17	14	14	15	10	20	11	12.11
Painted bunting	2	5	2	2	2	5	2	1	0	0	1	4	4	0	0	6	6	2.47
Dickcissel	0	0	0	1	2	1	0	0	0	0	0	0	0	0	1	1	1	0.41
Rufous-sided towhee	19	2	16	4	4	3	4	5	8	9	6	9	9	7	6	14	9	7.88
Chipping sparrow	5	0	0	1	0	0	0	0	0	0	0	0	1	0	3	0	2	0.71
Total birds	555	308	528	264	280	381	291	308	321	305	384	352	389	449	515	465	453	7.00
Total species	97	56	51	56	51	48	49	59	56	55	59	61	55	61	53	37	60	54

SOURCE: US Fish and Wildlife Service.

(Sheet 3 of 3)

Table D3

Results of Breeding Bird Surveys for Route 8 in Hinds County, Miss.

Species	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	Means
Great blue heron	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.07
Green-backed heron	3	1	2	1	3	4	2	1	8	1	6	4	2	1	1	2.67
Little blue heron	0	0	0	2	0	2	0	1	0	2	0	0	0	0	0	0.50
Cattle egret	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0.50
Great egret	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0.14
Yellow-crowned night-heron	0	0	0	0	2	3	0	0	1	0	1	0	0	0	0	0.50
Wood duck	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0.21
Turkey vulture	0	0	0	2	0	0	0	0	0	4	0	0	8	0	0	1.00
Black vulture	0	0	9	2	0	0	0	0	3	12	10	5	1	7	0	3.50
Cooper's hawk	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.07
Red-shouldered hawk	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.07
Broad-winged hawk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.06
Northern bobwhite	41	50	55	36	41	39	35	39	35	23	40	27	30	38	19	36.53
Killdeer	4	0	1	3	4	4	1	1	4	6	1	2	2	2	6	2.73
Rock dove	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0.29
Mourning dove	10	13	9	25	10	13	10	27	19	12	22	16	28	15	13	16.13
Yellow-billed cuckoo	4	3	7	7	1	7	10	16	8	5	13	9	4	7	9	7.33
Barred owl	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0.14
Chuck-will's-widow	3	7	7	8	0	2	5	3	4	2	0	0	0	0	0	2.93
Common nighthawk	1	4	1	1	3	0	1	0	0	0	1	0	0	0	0	0.86
Chimney swift	5	14	1	5	13	5	13	10	10	18	11	13	15	10	11	10.27
Ruby-throated hummingbird	1	0	0	0	1	2	0	0	0	0	0	0	1	1	0	0.43
Belted kingfisher	1	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0.29
Northern flicker	4	5	1	1	4	3	2	0	2	1	1	4	1	2	0	2.21
Pileated woodpecker	0	1	0	0	0	0	0	0	1	0	4	0	0	1	0	0.50
Red-bellied woodpecker	9	8	8	3	13	6	5	9	11	12	10	8	10	5	13	8.67
Red-headed woodpecker	1	1	3	2	1	1	0	1	0	0	0	0	0	0	0	0.71
Hairy woodpecker	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.21
Downy woodpecker	0	0	1	1	0	0	0	0	3	0	0	1	0	0	1	0.46
Eastern kingbird	23	24	24	14	11	24	14	8	9	6	8	4	6	2	6	12.20
Great crested flycatcher	4	2	10	6	0	5	4	2	2	2	5	7	8	2	0	4.21

(Continued)

(Sheet 1 of 3)

Table D3 (Continued)

Species	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	Means
Acadian flycatcher	1	1	2	0	0	2	0	0	0	1	0	2	0	0	0	0.64
Eastern wood-pewee	4	3	0	3	5	1	1	0	1	1	0	1	0	0	1	1.40
Northern rough-winged swallow	0	0	0	0	0	0	1	0	0	2	1	1	0	0	0	0.36
Barn swallow	0	0	4	7	13	12	19	3	12	14	22	14	34	18	25	13.13
Purple martin	9	17	10	15	23	34	15	3	13	19	6	8	41	8	51	18.13
Blue jay	24	35	26	40	14	25	17	17	22	26	27	43	28	22	11	25.13
American crow	27	18	22	15	8	20	22	21	20	26	2	30	23	16	18	20.93
Fish crow	3	2	1	2	0	3	3	1	3	1	3	9	1	14	6	3.47
Carolina chickadee	1	2	2	3	6	4	2	1	4	0	6	3	2	0	0	2.57
Tufted titmouse	5	8	11	9	6	4	2	8	1	7	4	8	14	9	10	7.20
Brown-headed nuthatch	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.07
Carolina wren	14	13	13	6	7	15	14	15	14	17	10	8	6	9	16	11.80
Northern mockingbird	41	44	52	57	48	59	49	42	48	46	63	52	50	52	52	50.33
Gray catbird	0	0	0	1	0	2	0	0	0	0	4	0	1	0	1	0.60
Brown thrasher	9	12	9	10	16	7	5	7	9	4	3	9	14	6	8	8.53
American robin	1	0	0	3	9	2	6	3	1	6	8	3	7	6	4	3.93
Wood thrush	8	5	15	19	12	18	7	8	5	7	13	7	5	6	9	9.60
Eastern bluebird	1	4	3	8	0	1	3	5	10	5	2	1	4	3	6	3.73
Blue-gray gnatcatcher	0	0	2	1	0	1	1	0	0	0	0	0	0	0	0	0.36
Loggerhead shrike	8	7	11	2	4	9	11	9	7	7	7	8	2	3	3	6.33
European starling	22	18	11	16	7	23	6	21	18	9	11	16	9	13	6	13.73
White-eyed vireo	10	3	9	6	4	11	4	8	7	7	4	13	9	9	10	7.60
Yellow-throated vireo	0	1	0	0	1	0	0	2	1	1	0	0	0	0	1	0.46
Red-eyed vireo	2	1	1	1	1	3	1	1	4	1	0	1	0	1	2	1.33
Prothonotary warbler	1	2	2	1	0	0	2	0	0	0	1	1	0	1	2	0.86
Swinson's warbler	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.07
Northern parula	1	3	2	2	6	1	1	4	3	3	4	2	4	1	2	2.60
Pine warbler	1	0	3	1	0	1	0	0	0	0	0	2	0	0	2	0.67
Louisiana waterthrush	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.14
Kentucky warbler	1	2	1	2	1	2	1	0	2	1	3	3	2	2	3	1.73
Common yellowthroat	10	17	11	6	9	10	9	6	4	10	8	3	5	2	7	7.80
Yellow-breasted chat	15	11	12	10	10	12	11	0	9	8	9	7	10	8	8	9.33

(Continued)

(Sheet 2 of 3)

Table D3 (Concluded)

Species	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	Means
Hooded warbler	0	0	0	0	0	1	0	0	1	1	1	0	1	0	1	0.40
American redstart	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0.13
House sparrow	18	21	26	7	13	9	27	12	9	9	8	15	12	4	3	12.87
Eastern meadowlark	63	76	77	49	33	50	35	35	33	36	39	21	36	23	22	41.87
Red-winged blackbird	78	46	42	46	34	61	59	37	40	55	48	48	61	39	23	47.80
Orchard oriole	37	53	37	30	43	28	33	22	20	25	15	16	22	13	17	27.40
Northern oriole	1	1	8	2	4	2	3	3	1	0	2	1	2	2	0	2.29
Common grackle	97	88	94	96	65	115	100	74	103	78	56	60	37	57	24	76.27
Brown-headed cowbird	12	7	29	7	3	2	14	8	3	5	6	7	6	5	1	7.67
Summer tanager	13	3	9	9	7	8	7	4	7	5	8	4	6	3	3	6.40
Northern cardinal	49	41	34	51	56	39	37	22	27	27	39	33	34	36	34	37.26
Blue grosbeak	4	4	10	7	9	11	7	3	4	2	6	5	3	6	7	6.13
Indigo bunting	7	14	13	11	9	10	7	7	9	3	11	2	4	3	9	7.93
Painted bunting	1	3	0	1	2	2	1	0	0	0	0	0	1	0	2	0.86
Dickcissel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.13
Rufous-sided towhee	22	17	28	22	23	15	19	18	10	9	15	13	10	13	20	16.93
Lark sparrow	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0.21
Chipping sparrow	5	2	2	1	0	1	0	0	2	0	0	0	0	0	0	0.93
Field sparrow	10	15	4	10	5	2	8	4	2	0	0	2	3	0	6	4.73
Total birds	9,196	753	790	716	625	762	673	553	609	598	639	583	630	507	519	65.00
Total species	82	57	54	59	50	59	52	46	53	52	53	52	51	47	51	52

SOURCE: US Fish and Wildlife Service.

(Sheet 3 of 3)

Table D4

Results of Breeding Bird Surveys for Route 9 in Lincoln County, Miss.

Species	1966	1967	1968	1969	1970	1972	1974	1975	1976	1977	1978	1979	Means
Great blue heron	0	0	0	0	0	0	0	0	1	0	0	0	0.08
Green-backed heron	0	0	0	0	0	0	2	0	3	0	1	1	0.58
Little blue heron	0	3	0	0	0	0	0	1	0	0	0	0	0.33
Little egret	0	0	0	0	0	0	0	0	0	0	0	1	0.08
Yellow-crowned night-heron	0	0	0	0	0	0	0	0	0	1	0	0	0.08
Turkey vulture	0	0	0	0	0	0	2	0	0	1	0	0	0.25
Black vulture	0	0	0	0	0	0	5	0	4	1	4	2	1.33
Cooper's hawk	0	0	0	0	0	0	0	0	0	1	0	0	0.08
Red-shouldered hawk	0	0	0	0	0	0	0	0	0	0	1	0	0.08
Broad-winged hawk	0	0	0	0	0	0	0	1	1	2	1	1	0.50
American kestrel	0	1	2	0	0	0	0	0	0	0	0	0	0.25
Northern bobwhite	14	52	32	41	44	28	35	19	25	39	31	33	32.75
Killdeer	0	0	0	0	0	0	0	0	0	0	0	1	0.08
Mourning dove	7	2	1	9	4	12	10	10	11	15	13	21	9.58
Yellow-billed cuckoo	3	5	2	0	1	2	18	22	9	9	20	20	9.25
Eastern screech-owl	0	1	0	0	0	0	0	0	0	0	0	0	0.08
Barred owl	0	0	0	0	0	0	1	0	0	0	1	0	0.17
Chuck-will's-widow	1	3	6	3	0	3	3	0	1	2	4	0	2.17
Common nighthawk	0	2	1	3	0	0	1	0	0	2	1	1	0.92
Chimney swift	2	18	14	12	6	24	12	14	3	9	12	8	11.17
Ruby-throated hummingbird	0	0	0	0	1	1	0	0	1	0	0	1	0.33
Belted kingfisher	0	0	0	0	0	0	2	1	0	1	0	0	0.33
Northern flicker	2	6	3	0	1	0	0	0	0	0	0	1	1.08
Pileated woodpecker	0	2	0	0	0	0	1	0	2	1	4	3	1.08
Red-bellied woodpecker	1	7	5	9	6	7	14	15	13	21	15	14	10.58
Red-headed woodpecker	0	0	3	2	2	1	0	0	1	0	0	0	0.75
Downy woodpecker	0	0	0	0	0	0	2	2	2	2	1	0	0.75
Eastern kingbird	4	21	18	20	12	22	11	7	12	5	14	8	12.83
Great crested flycatcher	0	4	0	0	0	0	12	3	2	4	7	4	3.00
Eastern phoebe	0	7	0	0	0	0	0	0	0	0	0	0	0.58
Acadian flycatcher	0	2	0	0	0	0	7	3	3	4	6	4	2.42

(Continued)

(Sheet 1 of 3)

Table D4 (Continued)

Species	1966	1967	1968	1969	1970	1972	1974	1975	1976	1977	1978	1979	Means
Eastern wood-pewee	0	9	7	3	11	7	3	7	5	1	0	1	4.50
Northern rough-winged swallow	0	0	0	0	0	0	1	4	1	6	0	0	1.00
Barn swallow	0	0	0	0	0	0	4	0	10	10	3	9	3.00
Purple martin	3	9	5	0	26	13	4	4	29	8	21	20	11.83
Blue jay	14	49	26	43	52	37	30	28	60	31	32	38	36.67
American crow	14	21	21	30	32	27	37	34	30	27	47	44	30.33
Fish crow	0	0	0	0	0	0	0	1	0	2	3	7	1.08
Carolina chickadee	0	10	16	17	18	8	10	8	18	1	2	9	9.75
Tufted titmouse	0	17	8	11	5	7	14	16	9	25	31	28	14.25
Brown-headed nuthatch	0	3	0	0	0	0	4	2	0	2	2	0	1.08
Carolina wren	9	8	0	0	0	5	26	46	52	10	14	11	15.08
Northern mockingbird	13	35	40	34	34	34	40	41	39	31	40	34	34.58
Gray catbird	0	0	0	0	1	0	1	0	1	1	0	0	0.33
Brown thrasher	8	22	4	11	15	11	3	10	5	16	10	11	10.50
American robin	0	0	0	0	1	0	0	0	0	2	0	1	0.33
Wood thrush	0	0	3	5	4	1	22	21	22	23	15	16	11.00
Eastern bluebird	1	10	2	5	20	11	0	4	6	2	1	8	5.83
Blue-gray gnatcatcher	0	5	0	3	2	2	7	6	9	4	3	6	3.92
Loggerhead shrike	5	7	3	1	1	13	4	4	3	3	6	0	4.17
European starling	5	12	2	1	7	6	11	2	2	0	7	3	4.83
White-eyed vireo	0	13	2	4	3	3	30	28	36	25	22	29	16.25
Yellow-throated vireo	0	2	0	0	0	0	2	7	2	7	6	6	2.67
Red-eyed vireo	0	0	0	0	0	0	4	4	8	5	9	5	2.92
Black-and-white warbler	0	0	0	0	0	2	0	1	0	0	2	1	0.50
Prothonotary warbler	1	2	0	4	0	2	9	8	10	3	4	5	4.00
Swainson's warbler	0	0	0	0	0	0	1	2	4	3	1	1	1.00
Worm-eating warbler	0	0	0	0	0	0	2	0	1	0	1	1	0.42
Northern parula	0	0	0	0	0	0	4	1	2	3	6	1	1.42
Pine warbler	0	14	8	0	6	0	6	14	11	2	9	7	6.42
Prairie warbler	0	0	0	0	0	0	0	0	0	1	2	0	0.25
Louisiana waterthrush	0	0	0	0	0	0	0	1	0	0	1	0	0.17
Kentucky warbler	1	0	0	0	0	0	7	8	5	7	6	12	3.83

(Continued)

(Sheet 2 of 3)

Table D4 (Concluded)

Species	1966	1967	1968	1969	1970	1972	1974	1975	1976	1977	1978	1979	Means
Common Yellowthroat	15	0	0	0	0	0	10	17	13	11	5	14	7.08
Yellow-breasted chat	0	15	0	4	13	7	21	16	26	22	18	19	13.42
Hooded warbler	0	0	3	0	0	0	8	5	8	7	9	6	3.83
American redstart	0	0	0	0	0	0	3	0	2	0	0	1	0.50
House sparrow	0	0	0	0	0	0	2	1	3	7	4	3	1.67
Eastern meadowlark	21	20	24	19	19	13	30	25	21	15	23	26	21.33
Red-winged blackbird	5	9	2	9	7	5	13	22	23	11	14	8	10.67
Orchard oriole	2	7	3	3	6	5	32	26	23	19	22	22	14.17
Northern oriole	0	0	0	3	1	0	1	1	0	0	0	1	0.58
Common grackle	76	16	15	18	43	56	23	13	23	18	11	15	27.25
Brown-headed cowbird	0	0	0	0	0	0	5	8	3	5	7	1	2.42
Summer tanager	4	8	0	0	2	2	11	11	8	14	9	20	7.42
Northern cardinal	29	51	43	59	62	88	75	75	66	61	71	68	62.33
Blue grosbeak	0	3	1	2	0	0	11	5	17	7	6	3	4.58
Indigo bunting	3	7	17	35	4	11	16	20	21	12	13	14	14.42
Painted bunting	0	1	0	0	0	0	0	0	0	0	0	0	0.08
Dickcissel	0	0	0	0	0	1	0	0	0	0	0	0	0.08
Rufous-sided towhee	17	21	6	6	10	30	18	29	29	23	29	50	22.33
Bechman's sparrow	0	0	0	0	0	0	2	0	1	0	0	0	0.25
Chipping sparrow	1	0	0	0	0	0	1	2	2	1	1	0	0.67
Field sparrow	2	0	0	0	0	0	3	2	2	2	4	2	1.42
Total birds	6,768	283	348	429	482	507	709	688	765	616	688	711	17.00
Total species	84	30	34	32	36	36	62	56	61	62	61	60	48

SOURCE: US Fish and Wildlife Service.

(Sheet 3 of 3)

Table D5
Results of Breeding Bird Surveys for Route 10 in Jefferson County, Miss.

Species	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1980	1983	Means
Great blue heron	0	0	0	0	0	0	0	0	0	0	0	0	0	1		0.06
Green-backed heron	0	0	1	0	0	0	0	2	1	1	0	2	0	2	0	0.56
Little blue heron	1	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0.31
Cattle egret	0	0	0	0	0	0	0	0	3	4	0	16	15	22	7	4.19
Great egret	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.15
Yellow-crowned night-heron	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.15
Turkey vulture	4	2	3	10	5	1	2	3	9	1	0	0	1	9	0	3.13
Black vulture	3	2	4	5	3	0	0	5	17	9	0	0	3	15	10	4.75
Mississippi kite	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.08
Cooper's hawk	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.08
Red-shouldered hawk	1	0	1	0	0	0	2	0	0	2	1	0	0	0	0	0.54
Broad-winged hawk	0	0	1	1	0	0	0	0	1	1	0	1	1	0	0	0.46
Northern bobwhite	26	33	16	28	19	21	18	14	13	13	11	13	10	12	29	17.25
Wild turkey	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.06
Killdeer	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.15
Mourning dove	18	31	4	10	6	13	10	7	9	3	7	7	10	5	31	10.69
Yellow-billed cuckoo	8	1	2	14	12	13	14	11	5	6	6	9	11	1	20	8.31
Chuck-will's-widow	3	1	1	0	0	1	0	0	0	0	0	0	1	0	0	0.54
Common nighthawk	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0.19
Chimney swift	13	11	10	15	13	10	15	10	8	1	2	8	5	6	10	8.56
Ruby-throated hummingbird	0	3	1	5	0	1	1	0	0	0	0	1	5	1	3	1.31
Belted kingfisher	1	0	0	1	0	0	0	0	0	1	2	0	2	0	0	0.54
Northern flicker	0	1	0	2	0	0	2	1	1	0	0	0	0	1	2	0.63
Pileated woodpecker	2	0	2	2	0	0	2	2	1	2	2	2	1	0	1	1.19
Red-bellied woodpecker	2	2	2	6	6	6	11	8	5	3	7	5	6	5	5	4.94
Red-headed woodpecker	0	0	1	1	0	1	0	1	0	0	0	1	1	0	0	0.46
Hairy woodpecker	0	0	1	0	1	0	0	0	0	0	0	1	0	0	1	0.25
Downy woodpecker	1	1	4	2	1	1	5	0	1	0	1	1	0	2	0	1.25
Eastern kingbird	13	16	24	8	4	15	24	8	3	10	11	5	5	5	4	9.69
Great crested flycatcher	5	1	0	0	7	0	7	6	2	2	6	2	8	1	11	3.63
Eastern phoebe	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.15

(Continued)

(Sheet 1 of 3)

Table D5 (Continued)

Species	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1980	1983	Means
Acadian flycatcher	0	0	0	0	0	0	5	2	1	3	2	1	1	5	7	1.69
Eastern wood-pewee	0	0	7	1	2	3	7	3	4	4	0	2	1	2	21	3.56
Northern rough-winged swallow	0	0	0	0	0	0	8	0	0	1	4	1	0	0	0	1.08
Barn swallow	0	0	2	1	0	0	9	5	18	11	6	14	13	9	12	6.25
Purple martin	37	25	3	25	18	6	34	24	43	41	25	46	42	13	19	25.06
Blue jay	24	33	15	12	21	19	12	15	15	10	13	6	15	13	23	15.38
American crow	21	91	63	57	48	45	42	22	36	25	35	42	26	25	23	37.56
Fish crow	0	0	0	0	1	0	0	10	8	7	4	6	5	0	0	3.15
Carolina chickadee	0	1	6	10	7	22	14	2	4	1	8	1	4	8	2	5.63
Tufted titmouse	0	1	6	10	5	4	13	15	9	11	10	8	18	9	22	8.81
White-breasted nuthatch	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.08
Brown-headed nuthatch	0	0	0	0	0	6	6	0	0	0	0	0	3	0	0	1.15
Carolina wren	0	0	9	2	5	7	40	25	24	15	16	15	13	16	39	14.13
Northern mockingbird	26	52	26	26	21	33	32	17	22	20	21	27	23	18	49	25.81
Gray catbird	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0.23
Brown thrasher	3	8	11	8	2	1	8	2	4	3	1	9	6	4	4	4.13
American robin	0	0	0	0	0	0	5	2	1	1	2	1	1	0	0	1.00
Wood thrush	0	0	24	10	11	10	30	10	7	11	11	16	16	9	19	11.25
Eastern bluebird	6	1	6	2	1	13	7	3	3	5	2	5	4	9	5	4.50
Blue-gray gnatcatcher	0	0	0	2	1	0	8	0	0	0	2	0	0	0	0	1.00
Loggerhead shrike	4	5	1	0	6	3	5	2	4	4	0	3	1	1	0	2.92
European starling	7	5	4	3	2	6	2	3	2	1	1	1	1	0	0	2.92
White-eyed vireo	3	7	21	28	26	14	38	15	26	18	17	37	24	33	24	20.69
Yellow-throated vireo	1	3	2	2	6	2	5	0	0	3	5	1	1	4	6	2.56
Red-eyed vireo	0	1	3	4	0	0	11	3	6	3	7	5	7	6	16	4.50
Warbling vireo	0	0	0	3	0	0	0	1	0	0	0	0	0	0	0	0.31
Black-and-white warbler	0	0	0	0	0	2	2	0	2	1	0	0	1	0	0	0.62
Prothonotary warbler	1	0	3	2	1	0	2	1	3	1	0	2	1	1	0	1.31
Swinson's warbler	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.13
Worm-eating warbler	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0.15
Northern parula	0	0	7	15	19	2	9	3	2	0	0	2	1	4	0	4.00
Pine warbler	0	0	1	1	0	0	7	2	2	5	3	1	5	0	5	2.00

(Continued)

(Sheet 2 of 3)

Table D5 (Concluded)

Species	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1980	1983	Means
Prairie warbler	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0.15
Louisiana waterthrush	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.08
Kentucky warbler	0	0	0	0	2	0	14	5	2	7	6	9	3	3	17	4.25
Common yellowthroat	0	0	15	19	17	12	10	14	9	9	11	8	4	9	36	10.81
Yellow-breasted chat	15	22	27	34	20	30	40	18	23	21	16	19	17	11	48	22.56
Hooded warbler	0	0	3	0	7	6	8	6	3	1	2	4	4	12	6	3.88
House sparrow	4	3	5	8	3	17	0	0	3	2	6	2	4	0	5	3.88
Eastern meadowlark	14	23	17	8	7	12	21	14	10	4	5	8	17	12	26	12.38
Red-winged blackbird	12	19	8	8	2	3	10	17	10	3	5	17	13	4	5	8.50
Orchard oriole	14	22	14	20	4	3	37	32	24	15	25	33	25	22	7	18.56
Northern oriole	0	0	2	7	6	1	0	1	0	0	0	1	1	0	0	1.46
Common grackle	54	29	29	15	10	20	17	5	5	3	3	16	3	2	2	13.31
Brown-headed cowbird	6	1	1	1	6	4	4	7	2	5	7	1	4	5	12	4.13
Scarlet tanager	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.08
Summer tanager	2	1	11	4	2	4	13	12	6	2	5	8	3	7	12	5.75
Northern cardinal	20	33	49	40	33	36	67	30	18	19	15	28	22	20	53	30.19
Blue grosbeak	3	4	0	3	3	2	9	11	4	6	6	9	4	2	8	4.63
Indigo bunting	1	8	14	15	22	12	19	12	14	14	8	8	2	9	18	11.00
Painted bunting	0	0	0	0	0	0	0	1	6	0	2	2	8	4	1	1.50
Dickcissel	0	0	0	5	2	0	0	0	0	0	0	0	0	0	0	0.54
Rufous-sided towhee	6	0	17	12	14	15	23	10	15	11	11	11	9	15	19	11.75
Chipping sparrow	1	0	0	0	0	0	12	2	1	4	2	1	4	7	0	2.13
Field sparrow	0	0	0	0	2	4	7	2	1	0	1	1	0	0	0	1.38
Total birds	6,345	390	508	533	442	466	786	465	484	390	389	515	467	410	709	18.00
Total species	86	42	40	51	48	48	56	55	58	55	52	60	61	49	48	52

SOURCE: US Fish and Wildlife Service.

(Sheet 3 of 3)

APPENDIX E: CHRISTMAS BIRD COUNTS AT NATCHEZ, MISS.

Table E1

Species Recorded on Christmas Bird Counts at Natchez, Miss., for 1973-1982

Bird Species	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Common loon					X	X	X	X	X	
Horned grebe					X					
Eared grebe				X			X	X		
Pied-billed grebe	X		X	X	X	X	X	X	X	X
American white pelican									X	X
Double-crested cormorant					X		X	X	X	X
Anhinga				X					X	
Great blue heron			X	X	X	X	X	X	X	X
Green-backed heron		X								
Little blue heron				X		X				
Cattle egret	X	X	X	X		X				X
Great egret	X	X	X		X	X	X	X	X	X
Snowy egret				X						
White ibis			X							
Canada goose				X						
Snow goose			X	X	X			X		
Mallard	X	X	X	X	X	X	X	X	X	X
Gadwall					X	X			X	
Northern pintail			X							
Green-winged teal									X	
Blue-winged teal				X		X			X	

(Continued)

(Sheet 1 of 7)

Table E1 (Continued)

Bird Species	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
American wigeon				X	X	X				
Northern shoveler										X
Wood duck	X		X	X	X		X	X	X	
Redhead				X	X	X			X	
Ring-necked duck					X	X		X		
Canvasback			X	X	X					
Lesser scaup	X	X	X	X	X	X	X	X	X	
Scaup sp.						X				
Common goldeneye				X	X	X				
Bufflehead						X				
Ruddy duck				X	X				X	X
Hooded merganser				X	X			X	X	
Turkey vulture	X	X	X	X	X	X	X	X	X	X
Black vulture	X	X	X	X	X	X	X	X	X	X
Sharp-shinned hawk				X						
Red-tailed hawk	X	X	X	X	X	X	X	X	X	X
Red-shouldered hawk			X	X	X	X	X	X	X	X
Buteo sp.		X			X					
Northern harrier	X			X	X	X	X	X	X	X
Osprey						X				X
American kestrel	X	X	X	X	X	X	X	X	X	X
Falcon sp.		X								

(Continued)

(Sheet 2 of 7)

Table E1 (Continued)

Bird Species	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Northern bobwhite	X	X		X	X	X		X	X	
Wild turkey			X							X
Sora										X
American coot	X	X	X	X	X	X	X	X	X	X
Killdeer	X	X	X	X	X	X	X	X	X	X
Black-bellied plover						X				
American woodcock				X						
Common snipe	X			X		X		X	X	
Spotted sandpiper								X	X	
Greater yellowlegs									X	
Least sandpiper	X			X					X	
Semipalmated sandpiper								X		
Western sandpiper				X					X	
Herring gull	X		X	X	X		X	X	X	
Ring-billed gull					X			X	X	
Bonaparte's gull								X	X	
Forster's tern								X		X
Rock dove	X	X	X	X	X		X	X	X	
Mourning dove	X	X	X	X	X	X	X	X	X	X
Common ground-dove									X	
Great horned owl		X	X		X	X	X		X	
Barred owl	X		X	X	X			X	X	X

(Continued)

(Sheet 3 of 7)

Table E1 (Continued)

Bird Species	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Belted kingfisher		X	X	X	X	X	X	X	X	X
Northern flicker	X	X	X	X	X	X	X	X	X	X
Pileated woodpecker	X	X	X	X		X	X	X	X	X
Red-bellied woodpecker	X	X	X	X	X	X	X	X	X	X
Red-headed woodpecker	X	X	X	X	X	X	X	X	X	X
Yellow-bellied sapsucker	X	X	X	X	X	X	X	X	X	X
Hairy woodpecker	X	X	X	X	X	X	X	X	X	X
Downy woodpecker	X	X	X	X	X	X	X	X	X	
Eastern kingbird										X
Eastern phoebe	X	X	X	X	X	X	X	X	X	X
Vermillion flycatcher			X	X						
Horned lark										X
Blue jay	X	X	X	X	X	X	X	X	X	X
American crow	X	X	X	X	X	X	X	X	X	X
Carolina chickadee	X	X	X	X	X	X	X	X	X	X
Tufted titmouse	X	X	X	X	X	X	X	X	X	X
Brown creeper	X	X		X			X	X		X
House wren			X	X		X		X	X	X
Winter wren	X			X				X		
Carolina wren	X	X	X	X	X	X	X	X	X	X
Marsh wren								X		
Northern mockingbird	X	X	X	X	X	X	X	X	X	X

(Continued)

(Sheet 4 of 7)

Table E1 (Continued)

Bird Species	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Gray catbird				X						
Brown thrasher	X	X	X	X	X	X	X	X	X	X
American robin	X	X	X	X	X	X	X	X	X	X
Hermit thrush	X	X	X	X	X	X	X	X		X
Swainson's thrush										X
Eastern bluebird	X	X	X	X	X	X	X	X	X	X
Blue-gray gnatcatcher							X			
Golden-crowned kinglet		X		X			X	X		
Ruby-crowned kinglet	X	X	X	X	X	X	X	X	X	X
Water pipit	X	X	X	X	X	X	X		X	X
Sprague's pipit								X		
Cedar waxwing	X	X	X	X	X	X	X	X	X	X
Loggerhead shrike	X	X	X	X	X	X	X	X	X	X
European starling	X	X	X	X	X	X	X	X	X	X
White-eyed vireo							X			
Solitary vireo			X							
Orange-crowned warbler	X	X	X	X						
Yellow-rumped warbler	X	X	X	X	X	X	X	X		X
Pine warbler	X	X	X	X	X	X	X	X	X	X
Common yellowthroat									X	
House sparrow	X	X	X	X	X	X	X	X	X	X
Eastern meadowlark	X	X	X	X	X	X	X	X	X	X

(Continued)

(Sheet 5 of 7)

Table E1 (Continued)

Bird Species	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Red-winged blackbird	X	X	X	X	X	X	X	X	X	X
Northern oriole	X		X	X	X		X	X	X	X
Rusty blackbird								X		
Brewer's blackbird		X	X				X			
Common grackle	X	X	X	X	X	X	X	X	X	X
Brown-headed cowbird	X	X	X	X	X	X	X	X	X	X
Northern cardinal	X	X	X	X	X	X	X	X	X	X
Painted bunting				X						
Evening grosbeak								X		
Purple finch	X	X	X	X	X		X	X		X
House finch								X		
Pine siskin	X							X		X
American goldfinch	X	X	X	X	X	X	X	X	X	X
Rufous-sided towhee	X	X	X	X	X	X	X	X	X	X
Savannah sparrow	X	X	X	X	X	X	X	X	X	X
Grasshopper sparrow										X
Henslow's sparrow				X				X		X
Vesper sparrow	X	X	X	X			X	X		
Lark sparrow									X	
Dark-eyed junco	X	X	X	X	X	X	X	X	X	X
American tree sparrow			X					X		
Chipping sparrow	X	X	X	X	X	X	X	X	X	

(Continued)

Table E1 (Concluded)

Bird Species	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Field sparrow	X	X		X		X	X	X	X	X
White-crowned sparrow	X	X	X	X	X	X	X	X	X	
White-throated sparrow	X	X	X	X	X	X	X	X	X	X
Fox sparrow	X	X	X	X	X		X	X	X	X
Lincoln's sparrow			X				X	X		X
Swamp sparrow	X	X	X	X	X		X	X	X	X
Song sparrow	X	X	X	X	X	X	X	X	X	X
Sparrow sp.		X								
Total species	69	67	76	92	77	72	72	89	83	73

SOURCE: National Audubon Society.

(Sheet 7 of 7)

END

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