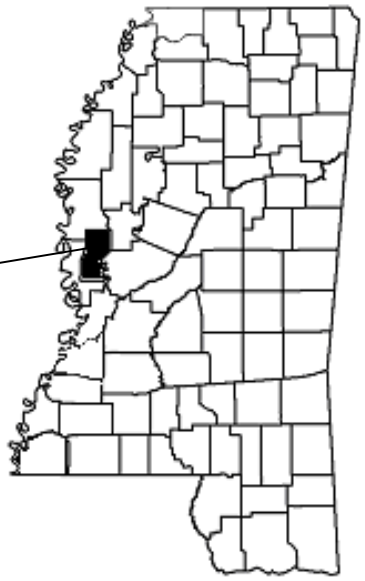
FLOOD INSURANCE STUDY

SHARKEY COUNTY, MISSISSIPPI
AND INCORPORATED AREAS



COMMUNITY NAME	COMMUNITY NUMBER
ANGUILLA, TOWN OF	280153
CARY, TOWN OF	280154
ROLLING FORK, CITY OF	280155
SHARKEY COUNTY (UNINCORPORATED AREAS)	280152

EFFECTIVE:

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
28125CV000A

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program (NFIP) have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

Part or all of this FIS may be revised and republished at any time. In addition, part of this FIS may be revised by the Letter of Map Revision process, which does not involve republication or redistribution of the FIS. It is, therefore, the responsibility of the user to consult with community officials and to check the community repository to obtain the most current FIS components.

Selected Flood Insurance Rate Map panels for this community contain information that was previously shown on the corresponding Flood Boundary and Floodway Map panels (e.g., floodways, cross sections). In addition, former flood hazard zone designations have been changed as follows:

Old Zone(s)	New Zone
C	X

Initial Countywide FIS Effective Date:

Revised Countywide FIS Dates:

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FLOOD INSURANCE STUDY
SHARKEY COUNTY, MISSISSIPPI AND INCORPORATED AREAS

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study (FIS) revises and supersedes the FIS reports and/or Flood Insurance Rate Maps (FIRMs) in the geographic area of Sharkey County, Mississippi, including the City of Rolling Fork, the Towns of Anguilla and Cary, and unincorporated areas of Sharkey County (hereinafter referred to collectively as Sharkey County).

This FIS aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates. This information will also be used by Sharkey County to update existing floodplain regulations as part of the Regular Phase of the National Flood Insurance Program (NFIP), and by local and regional planners to further promote sound land use and floodplain development. Minimum floodplain management requirements for participation in the NFIP are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some States or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the State (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this FIS report are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this countywide FIS were performed by the State of Mississippi for the Federal Emergency Management Agency (FEMA), under Contract No. EMA-2008-CA-5883. This study was completed in April 2010.

The digital base map information files were provided by the State of Mississippi. The digital orthophotography was acquired in March 2006, with the imagery processed to a 2-foot pixel resolution.

The digital FIRM was produced using the Mississippi State Plane Coordinate System, West Zone, FIPSZONE 2302. The horizontal datum was the North American Datum of 1983, GRS 80 spheroid. Distance units were measured in U.S. feet.

1.3 Coordination

An initial Consultation Coordination Officer's (CCO) meeting is held with representatives from FEMA, the community, and the study contractor to explain the nature and purpose of a FIS, and to identify the streams to be studied by detailed methods. A final CCO meeting

is held with representatives from FEMA, the community, and the study contractor to review the results of the study.

For this countywide FIS, the Project Scoping Meeting was held on August 19, 2008 in Rolling Fork, MS. Attendees for these meetings included representatives from the Mississippi Department of Environmental Quality, Mississippi Emergency Management Agency, FEMA National Service Provider, the City of Rolling Fork, the Town of Anguilla, Sharkey County, and the Study Contractor. Coordination with county officials and Federal, State, and regional agencies produced a variety of information pertaining to floodplain regulations, available community maps, flood history, and other hydrologic data.

2.0 AREA STUDIED

2.1 Scope of Study

This FIS covers the geographic area of Sharkey County, Mississippi, and its incorporated communities listed in Section 1.1.

This Countywide Study

For this countywide FIS, detailed streams were studied by limited detail methods. This study type entails collecting basic field measurements of hydraulic structures and channel geometry. Vertical control for the measurements is established from survey data. Generalized roughness values are estimated form aerial photography, and photographs taken during the survey.

The Steele Bayou Control Structure 1.0-percent annual-chance stillwater elevation was calculated. Much of the county north of the structure is below the calculated flood elevation. A limited-detail study was performed on Deer Creek from a point 53,930 feet upstream of the U.S. Highway 61 bridge to a point 62,135 feet upstream of the U.S. Highway 61 bridge.

Peak flood discharges and water surface elevations for the Yazoo River were not computed because the Mississippi River overbank flow or backwater encompasses nearly 80 miles of the Yazoo River. Thus, the Yazoo River reach that flows through Sharkey County was determined to be completely contained by the Mississippi River 1-percent-annual-chance flood plain. Also, peak discharges for tributaries to the Yazoo River and Steele Bayou were not computed because of the ponding characteristics caused by the presence of floodgates that regulate the outflow rate from these tributaries (FEMA, 2008).

Several flooding sources within the county were studied by approximate methods. Approximate analyses are used to study those areas having a low developmental potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon, by FEMA and the State of Mississippi.

2.2 Community Description

Formed in 1876 and named after W. L. Sharkey, Sharkey County is in southwestern Mississippi and is bordered on the north by Washington County, Mississippi; on the east by Yazoo and Humphreys County, Mississippi; and on the south and west by Issaquena County, Mississippi; (MS Blue Book, 2009). Sharkey County is served by U.S. Highway 61, State Highways 14, 16, and 434, and by the Canadian National Railroad. The 2009 population of Sharkey County was reported to be 5,420 (U.S. Census Bureau, 2010).

The climate in Sharkey County is influenced mainly by its subtropical latitude, the huge landmass to the north, its proximity to the warm waters of the Gulf of Mexico, and the prevailing southerly winds. Temperatures vary from a mean low of 43.0 ^{o}F in January to a mean high of 81.5 ^{o}F in July. The yearly average precipitation is 56 inches (National Oceanic and Atmospheric Administration, 2010).

2.3 Principal Flood Problems

Flood problems in Sharkey County are primarily due to the overflow of the Mississippi River. "The 1973 flood in the Mississippi Valley must be considered as one of the greatest in the history of the lower valley. The flood inundated 17 million acres throughout the valley. In the Mississippi Levee District, the flooding was disastrous to both the region's residents and to wildlife populations. In the Delta, this flood caused almost $170 million in damages in 1973 dollars. The 1973 flood was the first test of completed works in 23 years. This test proved that the Mississippi River improvements (particularly the cut-offs) were not functioning as efficiently as predicted. The result was that the Project Design Flood on the river would result in higher stages particularly from Greenville south. Sixty-nine miles of Mainline Levee in the district were required to be raised to safely pass this flood. The levee near Mayersville was found to require a maximum raise of 8 feet. (MS Levee Board, 2010)."

2.4 Flood Protection Measures

The main stem of the Mississippi River below Cape Girardeau, Missouri, has been confined by levees on one or both banks. These provide protection from flooding to approximately 24,000 square miles of alluvial valley land. Cutoff channels and other realignments have shortened the river by approximately 170 miles and have reduced the flood stages by as much as 3 to 4 feet at the City of Natchez, MS.

Completed in 1969, the Steele Bayou gravity control structure protects 750,000 acres of alluvial lands from flooding by the backwater of the Mississippi River. The structure can pass 51,000 cubic feet per second of water by the natural gravity flow when water levels in the Delta are higher than the Mississippi River (USACE, 2010).

The proposed Yazoo Backwater Pump Project is a USACE project to reduce flooding in the Mississippi Delta. The proposal includes: installation of a 14,000 cfs pump station, the reforestation of 55,600 acres of existing agricultural land, and maintain a conservation pool three feet higher at the Steel Bayou Structure during summer low water conditions. The plan states that the 1-percent annual chance flood would be reduced by up to 4.5 feet (USACE, 2010).

3.0 ENGINEERING METHODS

For the flooding sources studied by detailed methods in the communities, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 1-percent-annual-chance flood in any 50-year period is approximately 40 percent (4 in 10); for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish peak discharge-frequency relationships for each flooding source studied by detailed methods affecting the community. Peak discharges were calculated based on USGS regional regression equations (U.S. Department of the Interior, 1991). For the discharges calculated based on regional regression equations, the rural regression values were modified to reflect stream gage weighting and/or urbanization as necessary. The 1-percent annual chance flood elevation was calculated for Steele Bayou using gage data provided by the USACE (USACE, 2009).

For the Mississippi River, discharge values for the 10-, 2-, 1-, and 0.2-percent-annual-chance floods were developed based on statistical analysis of discharge records covering a 76-year period at Vicksburg gaging station No. GS07289000. This analysis followed the standard log-Pearson Type III method as outlined in the Bulletin No. 17B (FEMA, 1987).

A summary of the drainage area-peak discharge relationships for all the streams is shown in Table 1, “Summary of Discharges.”

TABLE 1. SUMMARY OF DISCHARGES*

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mi.)	PEAK DISCHARGES (cfs) 10-percent	2-percent	1-percent	0.2-percent
MISSISSIPPI RIVER					
At Interstate 20 Bridge (Warren County)	1,144,400	1,600,000	2,050,000	2,250,000	2,720,000#
YAZOO RIVER					
At Redwood, Mississippi, at U.S. Route 61	12,603	Peak discharges influenced by Mississippi River backwater			

Mississippi River Project Flood
* Source: Warren County 11/5/08 FIS

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Cross section geometries were obtained from a combination of terrain data and field surveys. Bridges and culverts located within the limited detailed study limits were field surveyed to obtain elevation data and structural geometry.

Downstream boundary conditions for the hydraulic models were set to normal depth using a starting slope calculated from values taken from topographic data, or where applicable, derived from the water-surface elevations. Water-surface profiles were computed through the use of the USACE HEC-RAS version 4.0.0 computer program (USACE, 2008). The model was run for the 1-percent annual chance storm for the limited detail and approximate studies.

Water-surface elevations of the floods of selected recurrence intervals for the Mississippi River were estimated from the MRC frequencies of EN flows, the 1975 average rating curves, and the stage frequency curve dated April 1976 for Vicksburg, MS (USACE, 1976).

The 1.0-percent annual-chance flood elevation for the Steele Bayou Control Structure was determined by analysis of historical gage records. Much of the county north of the Control Structure is below the computed flood elevation. This elevation is presented in Table 2 – Summary of Stillwater Elevations.

TABLE 2. SUMMARY OF STILLWATER ELEVATIONS

FLOODING SOURCE AND LOCATION	ELEVATION (Feet) 10-percent	2-percent	1-percent	0.2-percent
Steele Bayou				
At Control Structure	*	*	100.1	*

* Data Not Available

Channel roughness factors (Manning's "n" values) used in the hydraulic computations for both channel and overbank areas were based on recent digital orthophotography and field investigations. For Deer Creek, the channel "n" value used was 0.035 and the overbank "n" value was 0.09.

The hydraulic analyses for this countywide FIS were based on unobstructed flow. The flood elevations are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

Qualifying bench marks within a given jurisdiction that are cataloged by the National Geodetic Survey (NGS) and entered into the National Spatial Reference System (NSRS) as First or Second Order Vertical and have a vertical stability classification of A, B, or C are shown and labeled on the FIRM with their 6-character NSRS Permanent Identifier.

Benchmarks cataloged by the NGS and entered into the NSRS vary widely in vertical stability classification. NSRS vertical stability classifications are as follows:

> Stability A: Monuments of the most reliable nature, expected to hold position/elevation well (e.g., mounted in bedrock)
>
> Stability B: Monuments which generally hold their position/elevation well (e.g., concrete bridge abutment)
>
> Stability C: Monuments which may be affected by surface ground movements (e.g., concrete monuments below frost line)
>
> Stability D: Mark of questionable or unknown vertical stability (e.g., concrete monument above frost line, or steel witness post)

In addition to NSRS benchmarks, the FIRM may also show vertical control monument established by a local jurisdiction; these monuments will be shown on the FIRM with the appropriate designations. Local monuments will only be placed on the FIRM if the community has requested that they be included, and if the monuments meet the aforementioned NSRS inclusion criteria.

To obtain current elevation, description, and/or location information for benchmarks shown on the FIRM for this jurisdiction, please contact the Information Services Branch of the NGS at (301) 713-3242, or visit its website at http://www.ngs.noaa.gov.

Temporary vertical monuments are often established during the preparation of a flood hazard analysis for the purpose of establishing local vertical control. Although these monuments are not shown on the FIRM, they may be found in the Technical Support Data Notebook associated with the FIS report and FIRM. Interested individuals may contact FEMA to access this data.

3.3 Vertical Datum

All FIS reports and FIRMs are referenced to a specific vertical datum. The vertical datum provides a starting point against which flood, ground, and structure elevations can be referenced and compared. Until recently, the standard vertical datum in use for newly created or revised FIS reports and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD29). With the finalization of the North American Vertical Datum of 1988 (NAVD88), many FIS reports and FIRMs are being prepared using NAVD88 as the referenced vertical datum.

All flood elevations shown in this FIS report and on the FIRM are referenced to NAVD88. Structure and ground elevations in the community must, therefore, be referenced to NAVD88. It is important to note that adjacent communities may be referenced to NGVD29. This may result in differences in Base Flood Elevations (BFEs) across the corporate limits between the communities. The elevations shown in the FIS report and on the FIRM for Sharkey County are referenced to NAVD88.

Ground, structure, and flood elevations may be compared and/or referenced to NGVD29 by applying a conversion factor. To convert elevations from NAVD88 to NGVD29, add 0.24 feet to the NAVD88 elevation. The 0.24 feet value is an average for the entire county. The adjustment value was determined using the USACE Corpscon 6.0.1 computer program (USACE, 2004) and topographic maps (U.S. Department of the Interior, 1965). The BFE's shown on the FIRM represent whole-foot rounded values. For example, a BFE of 12.4 feet will appear as 12 feet on the FIRM, and 12.6 feet as 13 feet. Users who wish to convert the elevations in this FIS report to NGVD29 should apply the stated conversion factor to elevations shown on the Flood Profiles and supporting data tables in the FIS report, which are shown at a minimum to the nearest 0.1-foot.

For more information regarding conversion between the NGVD and the NAVD, see the FEMA publication entitled *Converting the National Flood Insurance Program to the North American Vertical Datum of 1988* or contact the Vertical Network Branch, National Geodetic Survey, Coast and Geodetic Survey, National Oceanic and Atmospheric Administration, Rockville, Maryland 20910 (Internet address http://www.ngs.noaa.gov).

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. Therefore, each FIS provides 1-percent-annual-chance flood elevations and delineations of the 1- and 0.2-percent-annual-chance floodplain boundaries and 1-percent-annual-chance floodway to assist communities in developing floodplain management measures. This information is presented on the FIRM and in many components of the FIS report, including Flood Profiles, Floodway Data Table and Summary of Stillwater Elevations Table. Users should

reference the data presented in the FIS report as well as additional information that may be available at the local map repository before making flood elevation and/or floodplain boundary determinations.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent-annual-chance flood has been adopted by FEMA as the base flood for floodplain management purposes.

The 1-percent-annual-chance floodplain boundary is shown on the FIRM (Exhibit 2). On this map, the 1-percent-annual-chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zone A). Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For this revision, for the streams studied by limited detailed and approximate methods, only the 1-percent-annual-chance floodplain boundary is shown on the FIRM (Exhibit 2). Floodplain boundaries for these streams were generated using 5-foot contours based on the March 2006 2-foot resolution digital orthophotography.

4.2 Floodways

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1-percent annual chance flood can be carried without substantial increases in flood heights.

Floodways have not been shown or computed for this community. Along streams where floodways have not been computed, the community must ensure that the cumulative effect of development in the floodplain will not cause more than a 1.0-foot increase in the base flood elevations at any point within the community.

5.0 INSURANCE APPLICATIONS

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone A

Zone A is the flood insurance risk zone that corresponds to the 1-percent annual chance floodplains that are determined in the FIS by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base (1-percent annual chance) flood elevations (BFEs), or base flood depths are shown within this zone.

Zone AE

Zone AE is the flood insurance risk zone that corresponds to the 1-percent annual chance floodplains that are determined in the FIS by detailed methods. In most instances, whole-foot BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 1-percent annual chance shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within the zone.

Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 1-percent annual chance shallow flooding (usually sheet flow on sloping terrain) where the average depths are between 1 and 3 feet. Average whole-foot depths derived from the detailed hydraulic analyses are shown within the zone.

Zone A99

Zone A99 is the flood insurance rate zone that corresponds to areas of the 1-percent floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or depths are shown within this zone.

Zone V

Zone V is the flood insurance rate zone that corresponds to the 1-percent coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no base flood elevations are shown within this zone.

Zone VE

Zone VE is the flood insurance rate zone that corresponds to the 1-percent coastal floodplains that have additional hazards associated with storm waves. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance risk zone that corresponds to areas outside the 0.2-percent annual chance floodplain, areas within the 0.2-percent annual chance floodplain, areas of 1-percent annual chance flooding where average depths are less than 1 foot, areas of 1-percent annual chance flooding where the contributing drainage area is less than 1 square mile, and areas protected from the base flood by levees. No BFEs or depths are shown within this zone.

Zone D

Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

6.0 FLOOD INSURANCE RATE MAP

The FIRM is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance risk zones as described in Section 5.0 and, in the 1-percent-annual-chance floodplains that were studied by detailed methods, shows selected whole-foot BFEs or average depths. Insurance agents use the zones and BFEs in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 1- and 0.2-percent-annual-chance floodplains, floodways, and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

The countywide FIRM presents flooding information for the entire geographic area of Sharkey County. Previously, FIRMs were prepared for each incorporated community and the unincorporated areas of the County identified as flood-prone. This countywide FIRM also includes flood-hazard information that was presented separately on Flood Boundary and Floodway Maps (FBFMs), where applicable. Historical data relating to the maps prepared for each community, up to and including this countywide FIS are presented in Table 3, "Community Map History."

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Town of Anguilla	June 7, 1974	July 16, 1976	July 3, 1986	--
Town of Cary	June 14, 1974	June 25, 1976 February 8, 1980	April 15, 1986	--
City of Rolling Fork	May 24, 1974	July 23, 1976	September 26, 1986	--
Sharkey County (Unincorporated Areas)	December 9, 1977	--	July 17, 1986	--

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

SHARKEY COUNTY, MS
AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

7.0 OTHER STUDIES

Information pertaining to revised and unrevised flood hazards for each jurisdiction within Sharkey County has been compiled into this FIS. Therefore, this FIS supersedes all previously printed FIS reports, FIRMs, and/or FBFMs for all of the incorporated and unincorporated jurisdictions within Sharkey County.

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting Federal Insurance and Mitigation Division, FEMA Region IV, Koger-Center — Rutgers Building, 3003 Chamblee Tucker Road, Atlanta, GA 30341.

9.0 BIBLIOGRAPHY AND REFERENCES

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DOWNSTREAM FLOODING CONTROLLED BY BACKWATER EFFECTS FROM STEELE BAYOU CONTROL STRUCTURE

LIMIT OF DETAILED STUDY

DRIVEWAY

DIRT ROAD

LIMIT OF DETAILED STUDY

ELEVATION IN FEET (NAVD 88)

125
120
115
110
105
100
95
90
85
80

50000 51000 52000 53000 54000 55000 56000 57000 58000 59000 60000 61000 62000 63000

STREAM DISTANCE IN FEET ABOVE U.S. HIGHWAY 61 BRIDGE

A B C D

LEGEND

- 0.2% ANNUAL CHANCE FLOOD
- 1% ANNUAL CHANCE FLOOD
- 2% ANNUAL CHANCE FLOOD
- 10% ANNUAL CHANCE FLOOD
- STREAM BED
- A — CROSS SECTION LOCATION

FLOOD PROFILES

DEER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SHARKEY, MS
AND INCORPORATED AREAS

01P