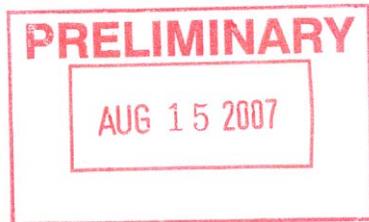


FLOOD INSURANCE STUDY



BENTON COUNTY, MISSISSIPPI AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
BENTON COUNTY (UNINCORPORATED AREAS)	280064
HICKORY FLAT, TOWN OF	280010
ASHLAND, TOWN OF	280083
SNOW LAKE SHORES, TOWN OF	280063



Federal Emergency Management Agency
FLOOD INSURANCE STUDY NUMBER
28009CV000A

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.

Initial Countywide FIS Effective Date:

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**FLOOD INSURANCE STUDY
BENTON 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 Benton County, Mississippi, including the Town of Hickory Flat, Town of Ashland, Town of Snow Lake Shores, and unincorporated areas of Benton County (hereinafter referred to collectively as Benton County), and 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 Benton 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.

This FIS was prepared to include the unincorporated area of, and incorporated communities within, Benton County in a countywide format.

The hydrologic and hydraulic analyses for this study were performed by the State of Mississippi for the Federal Emergency Management Agency (FEMA), under Contract No. EMA-2004-CA-5028. This study was completed in xxxxxx[t1].

The digital base map information files were provided by the State of Mississippi. The aerial photography was obtained from the National Agriculture Imagery Program (NAIP) and was photogrammetrically compiled at a scale of 1:12,000 from aerial photography dated September 2004.

The digital FIRM was produced using the State Plane Coordinate System, Mississippi East, FIPZONE 2301. 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, an initial Pre-Scoping Meeting was held on May 6, 2004. A Project Scoping Meeting was held on July 22, 2004, followed by a Post-Scoping Meeting on September 24, 2004. Attendees for these meetings included representatives from the Mississippi Department of Environmental Quality, Mississippi Emergency Management Agency, FEMA National Service Provider, Benton County, and the State 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 report covers the geographic area of Benton County, Mississippi, including the incorporated communities listed in Section 1.1.

For this countywide FIS, no new detailed studies were performed.

For Benton County, use of an Enhanced Approximate Analysis approach was used instead of Limited Detailed Studies for areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon, by FEMA and the State of Mississippi. The difference between an Enhanced Approximate Study and a Limited Detailed Study is in the flood zone designation applied to the mapping on the DFIRMs for the Enhanced Approximate stream. Limited Detailed survey methods were implemented, and approximate floodway analyses were performed (not shown on the DFIRMs), however, flood profiles have not been included in this FIS report, and Base Flood Elevations and Cross Sections are not shown on the DFIRM since the zone designation for the Enhanced Approximate Study stream is Zone A.

Wolf River was studied by Enhanced Approximate methods, and is the basis of the revised Zone A mappings included on the FIRM.

The remaining flooding sources in the county were studied by approximate methods, and are the basis of the revised Zone A mappings included on the FIRM.

This countywide FIS reflects vertical elevations referencing the North American Vertical Datum of 1988 (NAVD88).

2.2 Community Description

Benton County is located in north central Mississippi. The county is bordered by Hardeman County, Tennessee, to the northeast; Fayette County, Tennessee, to the Northwest; Marshall County, Mississippi, to the West; Union County, Mississippi, to the South; and Tippah County, Mississippi, to the East. Benton County is served by U.S. Highway 72 and 78, and State Highways 2, 4, 5, 7. Benton County has an area of 409 square miles and as of 2000 the population was reported to be 8,026. (Reference 1).

2.3 Principal Flood Problems

There is an issue with flooding at several road crossings along the Wolf River in the northern area of the county. Michigan City also experiences problems with flooding along the Wolf River near Highway 7. Other areas of flooding along the Wolf River include the crossings with Old Highway 17 and Tubby Bottom Road. Flooding has been experienced at the confluence of the Wolf River and Grogg Creek, as well as the confluence with Goose Creek.

2.4 Flood Protection Measures

No flood protection measures exist in the county.

3.0 **ENGINEERING METHODS**

For the flooding sources studied by detailed methods in the community, 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.

This Countywide Study

Peak discharges for the streams studied by Enhanced Approximate methods were calculated based on USGS regional regression equations (Reference 2).

For the discharges calculated based on regional regression equations, the rural regression values were updated to reflect urbanization as necessary.

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

Enhanced Approximate Study Streams					
<u>FLOODING SOURCE AND LOCATION</u>	<u>DRAINAGE AREA (sq. mi.)</u>	<u>PEAK DISCHARGES (cfs)</u>			
		<u>10-percent</u>	<u>2-percent</u>	<u>1-percent</u>	<u>0.2-percent</u>
WOLF RIVER					
At State Highway 7	121.7	*	*	19,786	*
At Old US Highway 72	95.5	*	*	19,369	*
At Blackjack Road	20.8	*	*	7,238	*

* Data not available

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. Users should be aware that flood elevations shown on the Flood Insurance Rate Map (FIRM) represent rounded whole-foot elevations and may not exactly reflect the elevations shown on the Flood Profiles or in the Floodway Data table in the FIS report. Flood elevations shown on the FIRM are primarily intended for flood insurance rating purposes. For construction and/or floodplain management purposes, users are cautioned to use the flood elevation data presented in this FIS report in conjunction with the data shown on the FIRM.

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Cross section geometries were obtained from a combination of terrain data and field surveys. Bridges and culverts located within the enhanced approximate 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 of existing effective flood elevations or recalculated flood elevations. Water surface profiles were computed through the use of USACE HEC-RAS version 3.1.2 computer program (Reference 3). The model was run for the 1-percent-annual-chance storm for the enhanced approximate and approximate studies.

Manning’s “n” values used in the hydraulic computations for both channel and overbank areas were based on recent digital orthophotography and field investigations.

Table 2, “Summary of Roughness Coefficients,” shows the ranges of the channel and overbank roughness factors used in the computations for all of the streams studied by enhanced approximate methods.

TABLE 2. SUMMARY OF ROUGHNESS COEFFICIENTS

Enhanced Approximate Study Streams		
<u>FLOODING SOURCE</u>	<u>CHANNEL “N”</u>	<u>OVERBANK “N”</u>
Wolf River	0.05	0.22

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

All elevations are referenced to NAVD88.

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.

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.

Bench marks 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)

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 Benton 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 -0.13 foot to the NAVD88 elevation. The -0.13 foot value is an average for the entire County. The BFEs 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.

To obtain current elevation, description, and/or location information for bench marks shown on the FIRM for this jurisdiction, or for information regarding conversion between the NGVD29 and NAVD88, see the FEMA publication entitled *Converting the National Flood Insurance Program to the North American Vertical Datum of 1988* (FEMA, June 1992), 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>).

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 for this community. Interested individuals may contact FEMA to access these data.

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. 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.

For this study, 10 meter Digital Elevation Model (DEM) data from the United States Geological Survey were used to delineate the floodplain boundaries (Reference 4).

The 1- and 0.2-percent-annual-chance floodplain boundaries are shown on the FIRM (Exhibit 1). On this map, the 1-percent-annual-chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A). If applicable, the 0.2-percent-annual-chance floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 1- and 0.2-percent-annual-chance floodplain boundaries are close together, only the 1-percent-annual-chance floodplain boundary has been shown. 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 the streams studied by Enhanced Approximate and approximate methods, only the 1-percent-annual-chance floodplain boundary is shown on the FIRM (Exhibit 1).

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the NFIP, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 1-percent-annual-chance floodplain is divided into a floodway and a floodway fringe. 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. Minimum Federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. Floodways are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodway is computed for certain stream segments on the basis of equal-conveyance reduction from each side of the floodplain. Floodway widths are computed at cross sections. Between cross sections, the floodway boundaries are interpolated. In cases where the floodway and 1-percent-annual-chance floodplain boundaries are either close together or collinear, only the floodway boundary is shown.

Near the mouths of streams studied in detail, floodway computations are made without regard to flood elevations on the receiving water body. Therefore, "Without Floodway" elevations presented in "Floodway Data" Tables, for certain downstream cross sections are lower than the regulatory flood elevations in that area, which must take into account the 1-percent-annual-chance flooding due to backwater from other sources.

Encroachment into areas subject to inundation by floodwaters having hazardous velocities aggravates the risk of flood damage, and heightens potential flood hazards by further increasing velocities. In order to reduce the risk of property damage in areas where the stream velocities are high, the county may wish to restrict development in areas outside the floodway.

The area between the floodway and 1-percent-annual-chance floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 1-percent-annual-chance flood more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 1.

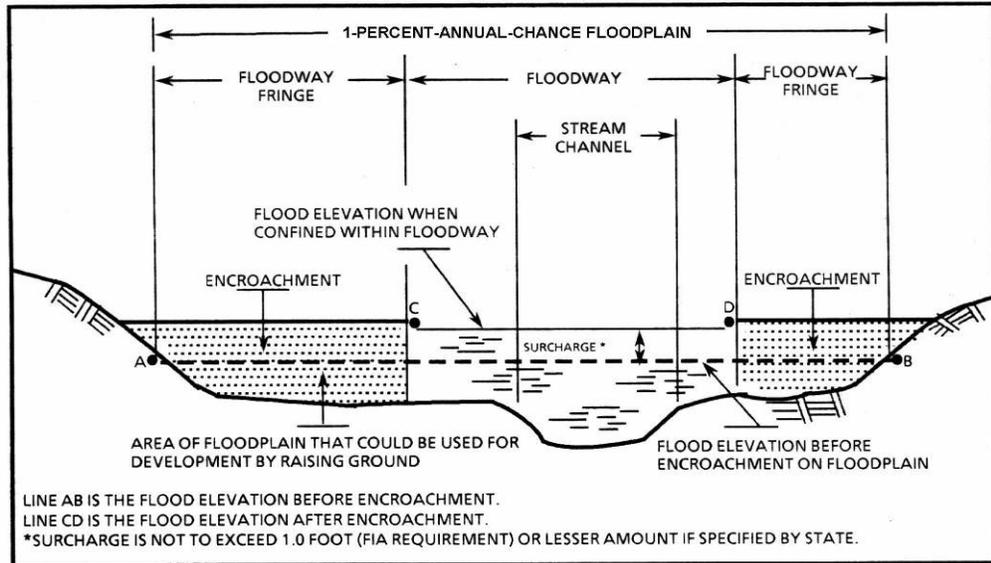


FIGURE 1. FLOODWAY SCHEMATIC

5.0 INSURANCE APPLICATION

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 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.

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 Benton County. Previously, FIRMs were prepared for each incorporated community and the unincorporated areas of the County identified as floodprone. 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 are presented in Table 3, "Community Map History."

7.0 OTHER STUDIES

No other studies are known to exist.

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.

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Benton County (Unincorporated Areas)	--	None	--	--
Hickory Flat, Town of	October 25, 1974	None	August 5, 1985	--

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY
BENTON COUNTY, MS
 AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

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