FLOOD INSURANCE STUDY

GEORGE COUNTY, MISSISSIPPI
AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
GEORGE COUNTY (UNINCORPORATED AREAS)	280223
LUCEDALE, CITY OF	280056

PRELIMINARY
AUG 15 2007

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
28039CV000A

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
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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 George County, Mississippi, including the City of Lucedale and unincorporated areas of George County (hereinafter referred to collectively as George 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 George 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, George County in a countywide format. Information on the authority and acknowledgements for each jurisdiction included in this countywide FIS, as compiled from their previous printed FIS reports, is shown below.

George County, Mississippi Unincorporated Areas	The hydrologic and hydraulic analyses for this study were performed by the U.S. Geological Survey (USGS), Mississippi District, (The study Contractor) for the Federal Emergency Management Agency (FEMA), under Inter-Agency Agreement No. EMW-85-E-1823. This study was completed in February 1986 (Reference 1).

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-2003-GR-5370. 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, FIPSZONE 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 the August 16, 1988, George County, Mississippi Unincorporated Areas FIS study, an initial coordination meeting was held on January 27, 1985 with representatives of FEMA, the community, and the Study Contractor. On September 22, 1987, the results of this FIS were reviewed and accepted at a final coordination meeting attended by representatives of the Study Contractor, FEMA, and the community.

For this countywide FIS, an initial Pre-Scoping Meeting was held on February 14, 2005. A Project Scoping Meeting was held on April 5, 2005. Attendees for these meetings included representatives from the Mississippi Department of Environmental Quality, Mississippi Emergency Management Agency, George 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 George County, Mississippi, including the incorporated communities listed in Section 1.1.

The August 16, 1988 study covered the unincorporated areas of George County, Mississippi.

Flooding caused by overflow of the Pascagoula River and the Escatawpa River was studied in detail.

Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The areas studied were selected with priority given to all known flood hazard areas and areas of projected development or proposed construction through February 1991. The scope and methods of study were proposed to and agreed upon by FEMA and George County.

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

For George 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 FIRMs for the Enhanced Approximate stream. Limited Detailed survey methods were implemented, and approximate floodway analyses were performed (not shown on the FIRMs), however, flood profiles have not been included in this FIS report, and Base Flood Elevations and Cross Sections are not shown on the FIRM since the zone designation for the Enhanced Approximate Study stream is Zone A.

Also, floodplain boundaries of streams that have been previously studied by detailed methods were redelineated based upon available topographic information (Reference 2).

Several flooding sources in the county were studied by Enhanced Approximate methods, and are the basis of the revised Zone A mappings included on the FIRMs. These streams include portions or all of the following: Black Creek, Chickasawhay River, Leaf River, Red Creek.

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 FIRMs.

This countywide FIS reflects a vertical datum conversion from the National Geodetic Vertical Datum of 1929 (NGVD29) to the North American Vertical Datum of 1988 (NAVD88).

2.2 Community Description

George County is located in southeastern Mississippi. The county is bordered by Greene County, Mississippi on the north; Perry County, Mississippi on the northwest; Stone County, Mississippi on the west; Jackson County, Mississippi on the south; and Mobile County, Alabama on the east. George County is served by U.S. Highway 98, State Highways 26, 57, 63, 612, and 613, the Illinois Central Gulf Railroad and the Mississippi Export Railroad. George County has an area of 478.29 square miles and as of 2000 the population was reported to be 19,144. (Reference 3).

The topography is low, undulating hills with several tributaries to the meandering Pascagoula and Escatawpa Rivers.

2.3 Principal Flood Problems

The principal source of flooding in George County is the Pascagoula River, which begins with the confluence of the Leaf and Chickasawhay Rivers near the northern county boundary, and flows southward. Localized flooding also exists, caused by stormwater runoff filling depressions, with an area of extent ranging from a few acres to a square mile.

The USGS has operated a river gage on the Pascagoula River at Merrill, Mississippi, about 23 river miles upstream from the study reach, from April 1900, February 1905 to the current year. Note that the 1905 to 1929 period of record is based on information from the National Weather Service. For the period of record from 1930 to the present, the maximum flood at this site occurred in February 1961. At the dismantled railroad crossing, this flood crested at elevation 56.95 feet NAVD with an estimated discharge of 178,000 cubic feet per second (cfs). The crest elevation was determined from levels and the peak discharge was transferred from Merrill on the basis of drainage area. This flood had a recurrence interval of about 50 years, or a 1 in 50 chance, on the average, of occurring in any given year. The Pascagoula River has a wide, densely vegetated floodplain, much of which is inundated during large floods. However, the lack of development limits the potential for widespread flood damage.

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.

Pre-Countywide FIS Analyses

The 100-year flood for the Pascagoula River at Merrill was determined in the USGS report “Flood Frequency of Mississippi Streams” (Reference 4). This discharge was transferred downstream using techniques described in the report on the basis of drainage area ratios.

This Countywide Study

Peak discharges for the streams studied by enhanced approximate methods were calculated based on USGS regional regression equations (Reference 5).

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

Detail Study Streams

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mi.)	PEAK DISCHARGES (cfs) 10-percent	2-percent	1-percent	0.2-percent
Pascagoula River					
At Davis Fish Camp	6,772	*	*	225,000	*

Enhanced Approximate Study Streams

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mi.)	PEAK DISCHARGES (cfs) 10-percent	2-percent	1-percent	0.2-percent
Black Creek					
At State HWY 57	7,54.3	*	*	53,589	*
Chickasawhay River					
At confluence with Leaf River	3,017	*	*	92,174	*
Leaf River					
At confluence with Chickasawhay River	3,576	*	*	132,990	*
Red Creek					
1900 feet US from confluence with Flurry Mill Pond Branch	440	*	*	36,234	*

* 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.

Pre-Countywide FIS 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.

An estimated stage-discharge relation was developed for the Pascagoula River at Davis Fish Camp. This relation was developed using the stage and estimate discharge of the February 1961 flood and discharge conveyance ratios. Conveyance was computed using a channel section taken at this site in June 1959, an overbank section taken from topographic maps, and roughness coefficients selected by personnel of the USGS. Computed conveyance for the 1961 flood in the cross section compared favorably with that for a surveyed cross section taken at Merrill. From the estimated stage-discharge relation, the 1% annual chance flood crest is 38.0 feet NGVD for the Pascagoula River at Davis Fish Camp. The slope of the 1% annual chance elevation profile data from the USGS report was determined using February 1961 flood profile data from the USGS report "Floods of 1961 in Mississippi" (Reference 6).

Tide effects at this site occur during combined high tides and low flows. It is assumed that large floods will not be tidally affected.

Flood profiles were drawn showing the computed water-surface elevations for floods of the selected recurrence intervals. In cases where the 2% and 1% annual chance flood elevations are close together, due to limitations of the profile scale, only the 1% annual chance profile has been shown.

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

This Countywide Study

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 hydraulics 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 5). 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

FLOODING SOURCE	CHANNEL "N"	OVERBANK "N"
Black Creek	0.03 – 0.05	0.03 – 0.15
Chickasawhay River	0.03 – 0.05	0.15
Leaf River	0.03 – 0.05	0.15
Red Creek	0.03	0.15

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the Flood Profiles (Exhibit 1) 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 George 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 -0.04 foot to the NAVD88 elevation. The -0.04 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, including Flood Profiles. 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 0.2-percent-annual-chance flood is employed to indicate additional areas of flood risk in the community. For each stream studied by detailed methods, the 1- and 0.2-percent-annual-chance floodplain boundaries have been delineated using the flood elevations determined at each cross section.

For this study, 10 meter Digital Elevation Model (DEM) data from the United States Geological Survey were used to delineate the floodplain boundaries (Reference 2).

The 1- and 0.2-percent-annual-chance floodplain boundaries are 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 (Zones A and AE), and 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 2).

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.

Floodways are 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. The results of the floodway computations are tabulated for selected cross sections of detailed study streams and limited detailed study streams. 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 the "Data Table" 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. For detailed study streams, a listing of stream velocities at selected cross sections is provided in the "Data Table". 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.

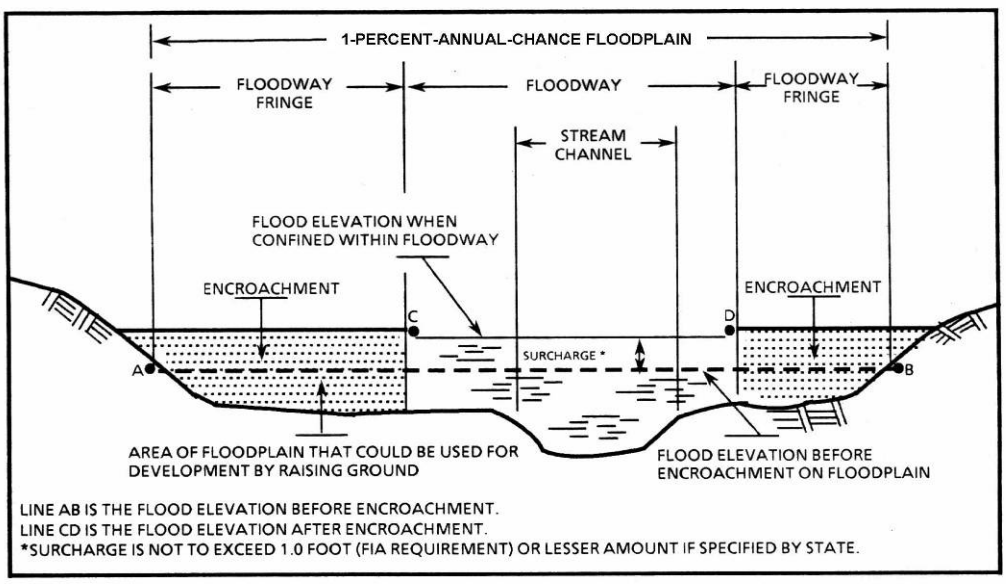

FIGURE 1. FLOODWAY SCHEMATIC

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 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 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 George 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.”

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
George County (Unincorporated Areas)	September 16, 1977	None	August 16, 1988	--
Lucedale, City of	--	None	--	--

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

GEORGE COUNTY, MS
AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

7.0 OTHER STUDIES

An FIS has been prepared for the Unincorporated Areas of George County, Mississippi, (Reference 1).

This FIS report either supersedes or is compatible with all previous studies published on streams studied in this report and should be considered authoritative for the purposes of the NFIP.

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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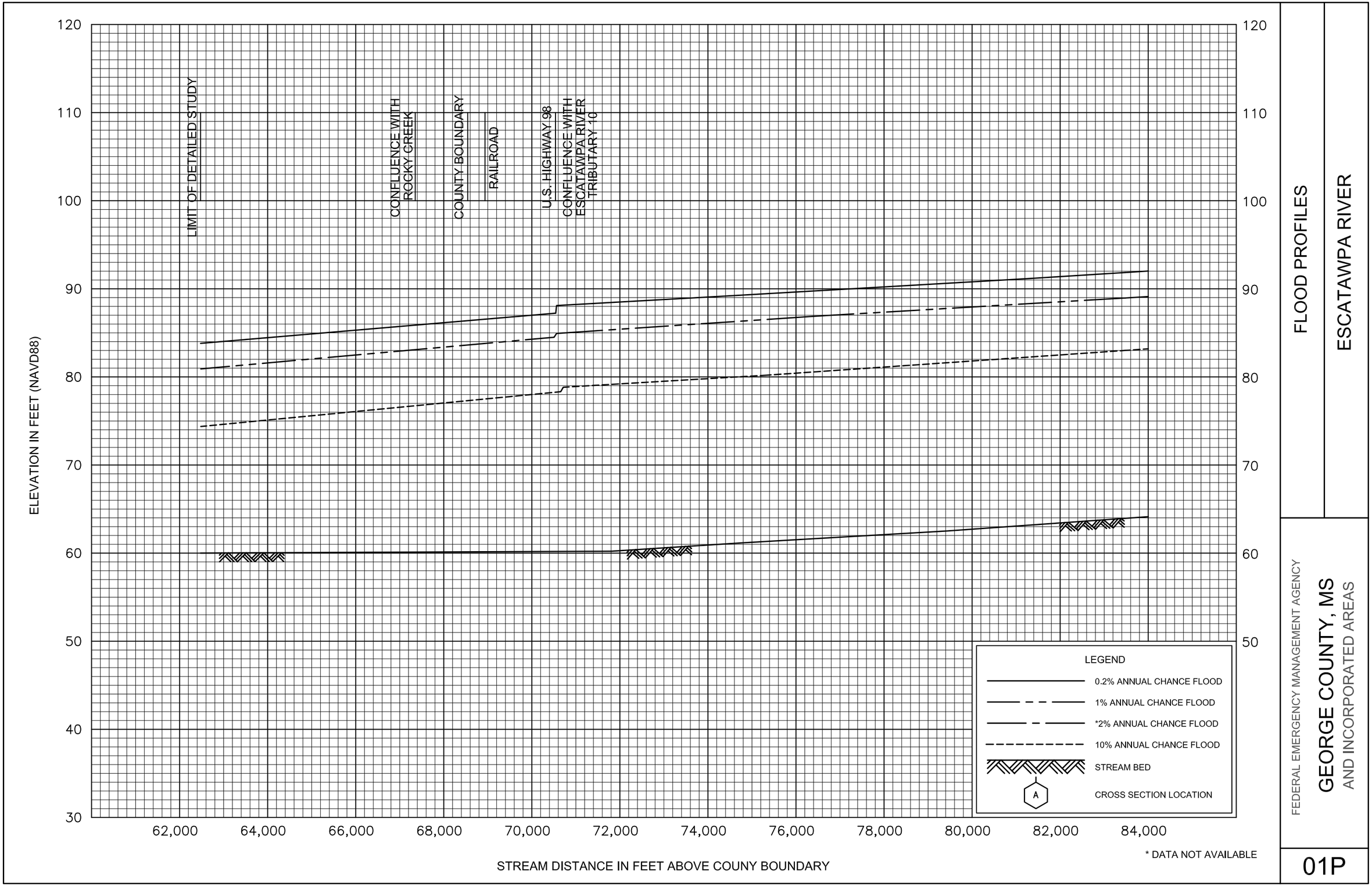
2. Mississippi Automated Resource Information System (MARIS), Countywide Elevation Grid for Mississippi, 10 Meter, 2004.

3. U.S. Census Bureau, website – Annual Estimates of the Population for Counties: April 1, 2000 to July 1, 2005, U.S. Census Bureau, Population Division, http://www.census.gov/popest/counties/CO-EST2005-01.html.

4. U.S. Geological Survey, Flood Frequency of Mississippi Streams, B.E. Colson and J.W. Hudson, 1976.

5. U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-RAS River Analysis System, User's Manual, version 3.1, Davis, California, November 2002.

6. United States Department of the Interior, Geological Survey, Floods of 1961 in Mississippi, K. V. Wilson, 1964.



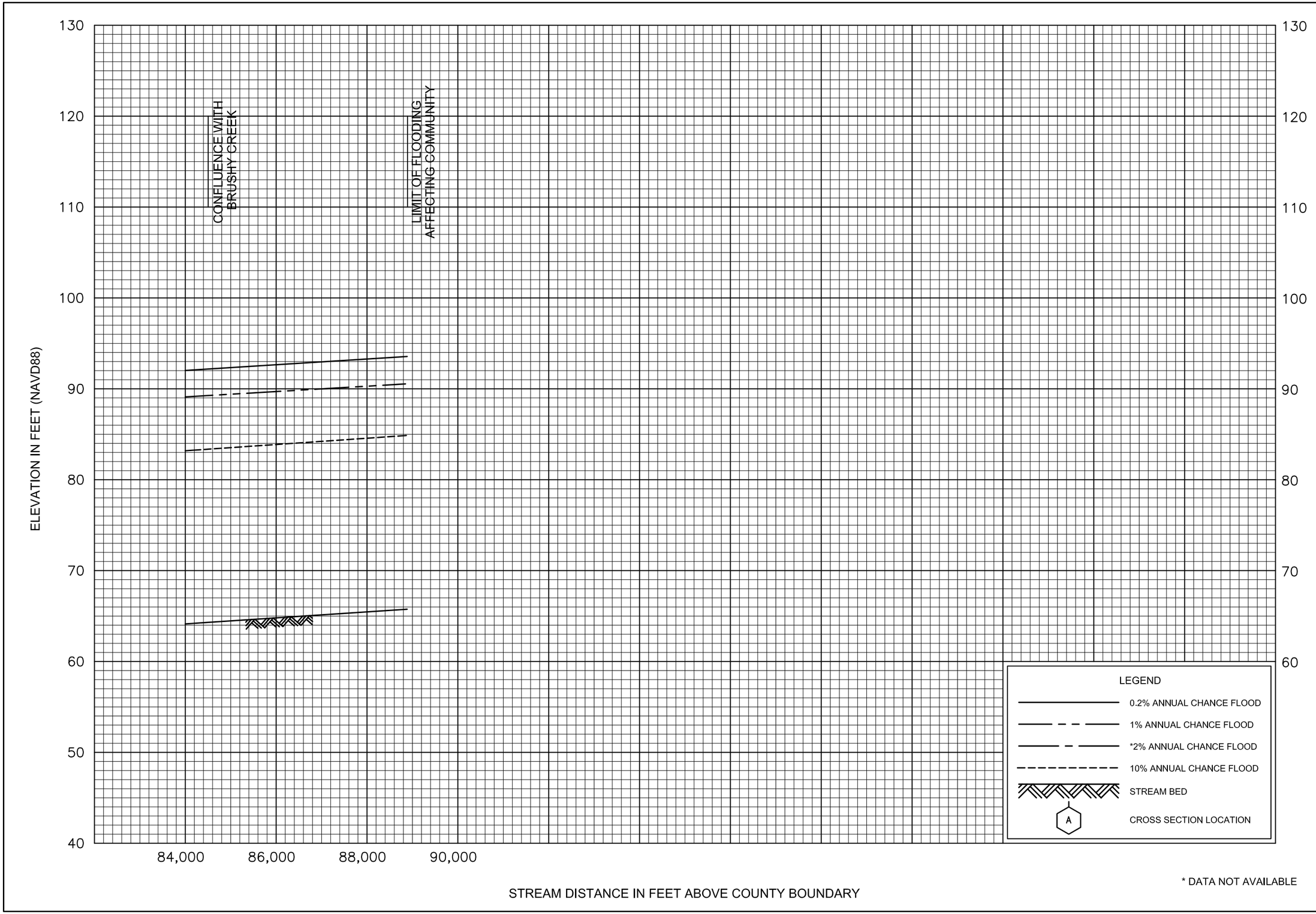
FLOOD PROFILES

ESCATAWPA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

GEORGE COUNTY, MS
AND INCORPORATED AREAS

01P



* DATA NOT AVAILABLE

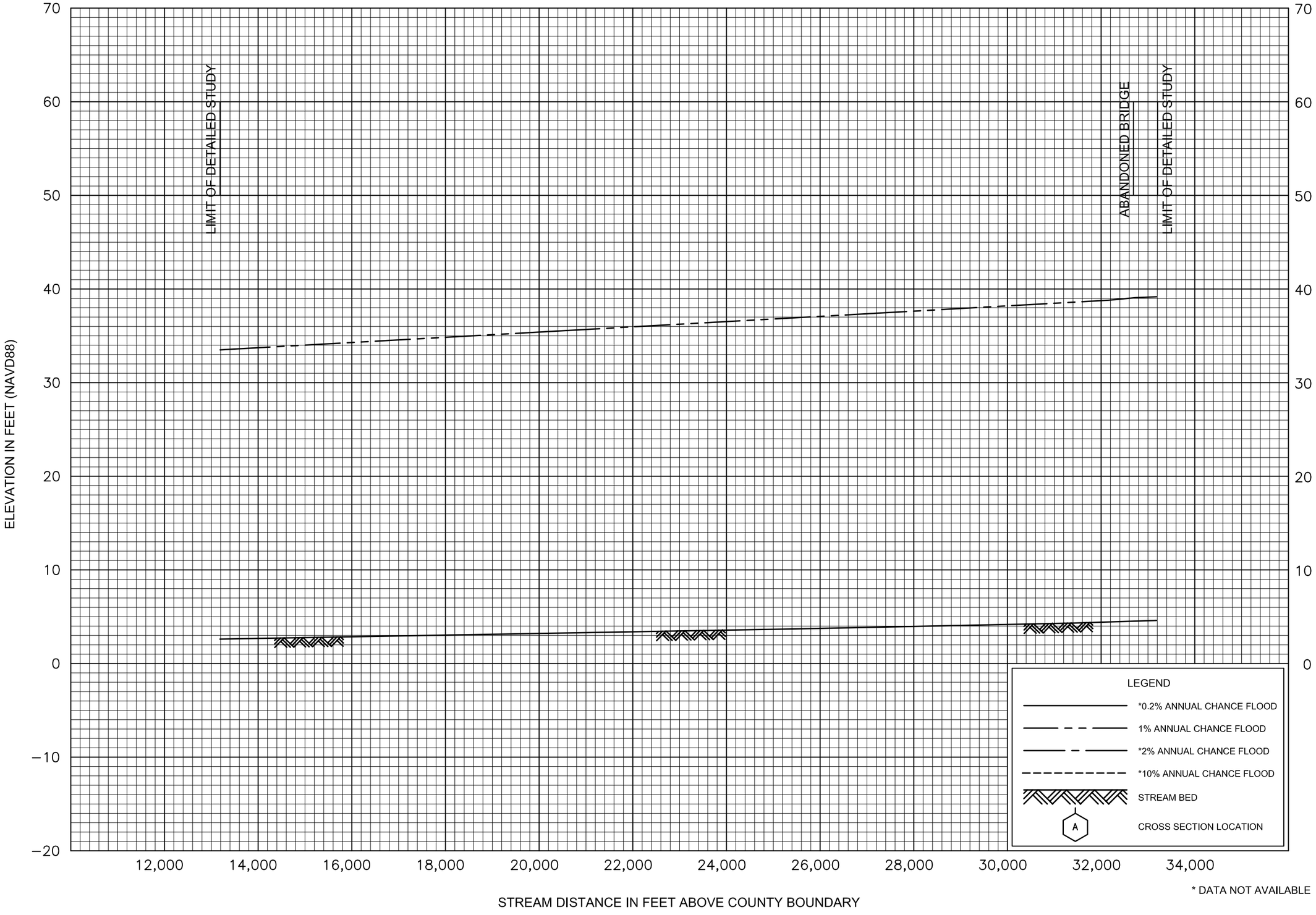
FLOOD PROFILES

ESCATAWPA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

GEORGE COUNTY, MS
AND INCORPORATED AREAS

02P



* DATA NOT AVAILABLE

FLOOD PROFILES

PASCAGOULA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

GEORGE COUNTY, MS
AND INCORPORATED AREAS

03P