# FLOOD INSURANCE STUDY

## FEDERAL EMERGENCY MANAGEMENT AGENCY

**VOLUME 1 OF 1**

# LONG COUNTY, GEORGIA

## AND INCORPORATED AREAS

| COMMUNITY NAME | COMMUNITY NUMBER |
|---|---|
| **LONG COUNTY, UNINCORPORATED AREAS** | **130127** |
| **LUDOWICI, CITY OF** | **130128** |

**PRELIMINARY**
**10/30/2015**

FEMA

## EFFECTIVE:

FLOOD INSURANCE STUDY NUMBER
**13183CV000C**

Version Number 2.3.2.1

# TABLE OF CONTENTS
**Volume 1**


| | | Page |
|---|---|---|
| **SECTION 1.0 – INTRODUCTION** | | **1** |
| 1.1 | The National Flood Insurance Program | 1 |
| 1.2 | Purpose of this Flood Insurance Study Report | 2 |
| 1.3 | Jurisdictions Included in the Flood Insurance Study Project | 2 |
| 1.4 | Considerations for using this Flood Insurance Study Report | 3 |
| **SECTION 2.0 – FLOODPLAIN MANAGEMENT APPLICATIONS** | | **13** |
| 2.1 | Floodplain Boundaries | 13 |
| 2.2 | Floodways | 14 |
| 2.3 | Base Flood Elevations | 18 |
| 2.4 | Non-Encroachment Zones | 18 |
| 2.5 | Coastal Flood Hazard Areas | 18 |
| 2.5.1 | Water Elevations and the Effects of Waves | 18 |
| 2.5.2 | Floodplain Boundaries and BFEs for Coastal Areas | 18 |
| 2.5.3 | Coastal High Hazard Areas | 18 |
| 2.5.4 | Limit of Moderate Wave Action | 18 |
| **SECTION 3.0 – INSURANCE APPLICATIONS** | | **19** |
| 3.1 | National Flood Insurance Program Insurance Zones | 19 |
| 3.2 | Coastal Barrier Resources System | 19 |
| **SECTION 4.0 – AREA STUDIED** | | **19** |
| 4.1 | Basin Description | 19 |
| 4.2 | Principal Flood Problems | 20 |
| 4.3 | Non-Levee Flood Protection Measures | 21 |
| 4.4 | Levees | 21 |
| **SECTION 5.0 – ENGINEERING METHODS** | | **23** |
| 5.1 | Hydrologic Analyses | 23 |
| 5.2 | Hydraulic Analyses | 25 |
| 5.3 | Coastal Analyses | 34 |
| 5.3.1 | Total Stillwater Elevations | 34 |
| 5.3.2 | Waves | 34 |
| 5.3.3 | Coastal Erosion | 34 |
| 5.3.4 | Wave Hazard Analyses | 34 |
| 5.4 | Alluvial Fan Analyses | 36 |
| **SECTION 6.0 – MAPPING METHODS** | | **37** |
| 6.1 | Vertical and Horizontal Control | 37 |
| 6.2 | Base Map | 38 |
| 6.3 | Floodplain and Floodway Delineation | 39 |
| 6.4 | Coastal Flood Hazard Mapping | 42 |
| 6.5 | FIRM Revisions | 42 |

6.5.1 Letters of Map Amendment 42
6.5.2 Letters of Map Revision Based on Fill 43
6.5.4 Letters of Map Revision 43
6.5.3 Physical Map Revisions 43
6.5.4 Contracted Restudies 44
6.5.5 Community Map History 44

**SECTION 7.0 – CONTRACTED STUDIES AND COMMUNITY COORDINATION 45**
7.1 Contracted Studies 45
7.2 Community Meetings 47

**SECTION 8.0 – ADDITIONAL INFORMATION 49**

**SECTION 9.0 – BIBLIOGRAPHY AND REFERENCES 50**

Figures

Page

Figure 1: FIRM Panel Index 5
Figure 2: FIRM Notes to Users 6
Figure 3: Map Legend for FIRM 9
Figure 4: Floodway Schematic 17
Figure 5: Wave Runup Transect Schematic 18
Figure 6: Coastal Transect Schematic 18
Figure 7: Frequency Discharge-Drainage Area Curves 24
Figure 8: 1% Annual Chance Total Stillwater Elevations for Coastal Areas 34
Figure 9: Transect Location Map 35

Tables

Page

Table 1: Listing of NFIP Jurisdictions 2
Table 2: Flooding Sources Included in this FIS Report 14
Table 3: Flood Zone Designations by Community 19
Table 4: Coastal Barrier Resources System Information 19
Table 5: Basin Characteristics 20
Table 6: Principal Flood Problems 21
Table 7: Historic Flooding Elevations 21
Table 8: Non-Levee Flood Protection Measures 21
Table 9: Levees 22
Table 10: Summary of Discharges 24
Table 11: Summary of Non-Coastal Stillwater Elevations 24
Table 12: Stream Gage Information used to Determine Discharges 25
Table 13: Summary of Hydrologic and Hydraulic Analyses 27
Table 14: Roughness Coefficients 34
Table 15: Summary of Coastal Analyses 34

Table 16: Tide Gage Analysis Specifics 34
Table 17: Coastal Transect Parameters 35
Table 18: Summary of Alluvial Fan Analyses 36
Table 19: Results of Alluvial Fan Analyses 36
Table 20: Countywide Vertical Datum Conversion 37
Table 21: Stream-Based Vertical Datum Conversion 38
Table 22: Base Map Sources 39
Table 23: Summary of Topographic Elevation Data used in Mapping 40
Table 24: Floodway Data 41
Table 25: Flood Hazard and Non-Encroachment Data for Selected Streams 42
Table 26: Summary of Coastal Transect Mapping Considerations 42
Table 27: Incorporated Letters of Map Change 43
Table 28: Community Map History 45
Table 29: Summary of Contracted Studies Included in this FIS Report 45
Table 30: Community Meetings 48
Table 31: Map Repositories 49
Table 32: Additional Information 49
Table 33: Bibliography and References 51

**Published Separately**

Flood Insurance Rate Map (FIRM)

**FLOOD INSURANCE STUDY REPORT**
**LONG COUNTY, GEORGIA**

# SECTION 1.0 – INTRODUCTION

## 1.1 The National Flood Insurance Program

The National Flood Insurance Program (NFIP) is a voluntary Federal program that enables property owners in participating communities to purchase insurance protection against losses from flooding. This insurance is designed to provide an alternative to disaster assistance to meet the escalating costs of repairing damage to buildings and their contents caused by floods.

For decades, the national response to flood disasters was generally limited to constructing flood-control works such as dams, levees, sea-walls, and the like, and providing disaster relief to flood victims. This approach did not reduce losses nor did it discourage unwise development. In some instances, it may have actually encouraged additional development. To compound the problem, the public generally could not buy flood coverage from insurance companies, and building techniques to reduce flood damage were often overlooked.

In the face of mounting flood losses and escalating costs of disaster relief to the general taxpayers, the U.S. Congress created the NFIP. The intent was to reduce future flood damage through community floodplain management ordinances, and provide protection for property owners against potential losses through an insurance mechanism that requires a premium to be paid for the protection.

The U.S. Congress established the NFIP on August 1, 1968, with the passage of the National Flood Insurance Act of 1968. The NFIP was broadened and modified with the passage of the Flood Disaster Protection Act of 1973 and other legislative measures. It was further modified by the National Flood Insurance Reform Act of 1994 and the Flood Insurance Reform Act of 2004. The NFIP is administered by the Federal Emergency Management Agency (FEMA), which is a component of the Department of Homeland Security (DHS).

Participation in the NFIP is based on an agreement between local communities and the Federal Government. If a community adopts and enforces floodplain management regulations to reduce future flood risks to new construction and substantially improved structures in Special Flood Hazard Areas (SFHAs), the Federal Government will make flood insurance available within the community as a financial protection against flood losses. The community's floodplain management regulations must meet or exceed criteria established in accordance with Title 44 Code of Federal Regulations (CFR) Part 60.3, *Criteria for Land Management and Use*.

SFHAs are delineated on the community's Flood Insurance Rate Maps (FIRMs). Under the NFIP, buildings that were built before the flood hazard was identified on the community's FIRMs are generally referred to as "Pre-FIRM" buildings. When the NFIP was created, the U.S. Congress recognized that insurance for Pre-FIRM buildings would be prohibitively expensive if the premiums were not subsidized by the Federal Government. Congress also recognized that most of these floodprone buildings were built by individuals who did not have sufficient knowledge of the flood hazard to make informed decisions. The NFIP requires that full actuarial rates reflecting the complete flood risk be charged on all buildings constructed or substantially improved on or after

the effective date of the initial FIRM for the community or after December 31, 1974, whichever is later. These buildings are generally referred to as "Post-FIRM" buildings.

## 1.2 Purpose of this Flood Insurance Study Report

This Flood Insurance Study (FIS) Report revises and updates information on the existence and severity of flood hazards for the study area. The studies described in this report developed flood hazard data that will be used to establish actuarial flood insurance rates and to assist communities in efforts to implement sound floodplain management.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive than the minimum Federal requirements. Contact your State NFIP Coordinator to ensure that any higher State standards are included in the community's regulations.

## 1.3 Jurisdictions Included in the Flood Insurance Study Project

This FIS Report covers the entire geographic area of Long County, Georgia.

The jurisdictions that are included in this project area, along with the Community Identification Number (CID) for each community and the 8-digit Hydrologic Unit Codes (HUC-8) sub-basins affecting each, are shown in Table 1. The Flood Insurance Rate Map (FIRM) panel numbers that affect each community are listed. If the flood hazard data for the community is not included in this FIS Report, the location of that data is identified.

The location of flood hazard data for participating communities in multiple jurisdictions is also indicated in the table.

**Table 1: Listing of NFIP Jurisdictions**

| Community | CID | HUC-8 Sub-Basin(s) | Located on FIRM Panel(s) | If Not Included, Location of Flood Hazard Data |
|---|---|---|---|---|
| Long County, Unincorporated Areas | 130127 | 03060203<br>03060204<br>03070106 | 13183C0050C<br>13183C0075C<br>13183C0125C<br>13183C0150C<br>13183C0175C<br>13183C0190E<br>13183C0210C<br>13183C0250C<br>13183C0275C<br>13183C0300E<br>13183C0325E<br>13183C0350C<br>13183C0375C<br>13183C0400E | |
| Ludowici, City of | 130128 | 03070106 | 13183C0250C<br>13183C0275C | |

## 1.4 Considerations for using this Flood Insurance Study Report

The NFIP encourages State and local governments to implement sound floodplain management programs. To assist in this endeavor, each FIS Report provides floodplain data, which may include a combination of the following: 10-, 4-, 2-, 1-, and 0.2-percent annual chance flood elevations (the 1% annual chance flood elevation is also referred to as the Base Flood Elevation (BFE)); delineations of the 1% annual chance and 0.2% annual chance floodplains; and 1% annual chance floodway. This information is presented on the FIRM and/or in many components of the FIS Report, including Flood Profiles, Floodway Data tables, Summary of Non-Coastal Stillwater Elevations tables, and Coastal Transect Parameters tables (not all components may be provided for a specific FIS).

This section presents important considerations for using the information contained in this FIS Report and the FIRM, including changes in format and content. Figures 1, 2, and 3 present information that applies to using the FIRM with the FIS Report.

- Part or all of this FIS Report may be revised and republished at any time. In addition, part of this FIS Report may be revised by a Letter of Map Revision (LOMR), which does not involve republication or redistribution of the FIS Report. Refer to Section 6.5 of this FIS Report for information about the process to revise the FIS Report and/or FIRM.

  It is, therefore, the responsibility of the user to consult with community officials by contacting the community repository to obtain the most current FIS Report components. Communities participating in the NFIP have established repositories of flood hazard data for floodplain management and flood insurance purposes. Community map repository addresses are provided in Table 31, "Map Repositories," within this FIS Report.

- New FIS Reports are frequently developed for multiple communities, such as entire counties. A countywide FIS Report incorporates previous FIS Reports for individual communities and the unincorporated area of the county (if not jurisdictional) into a single document and supersedes those documents for the purposes of the NFIP.

  The initial Countywide FIS Report for Long County became effective on September 26, 2008. Refer to Table 28 for information about subsequent revisions to the FIRMs.

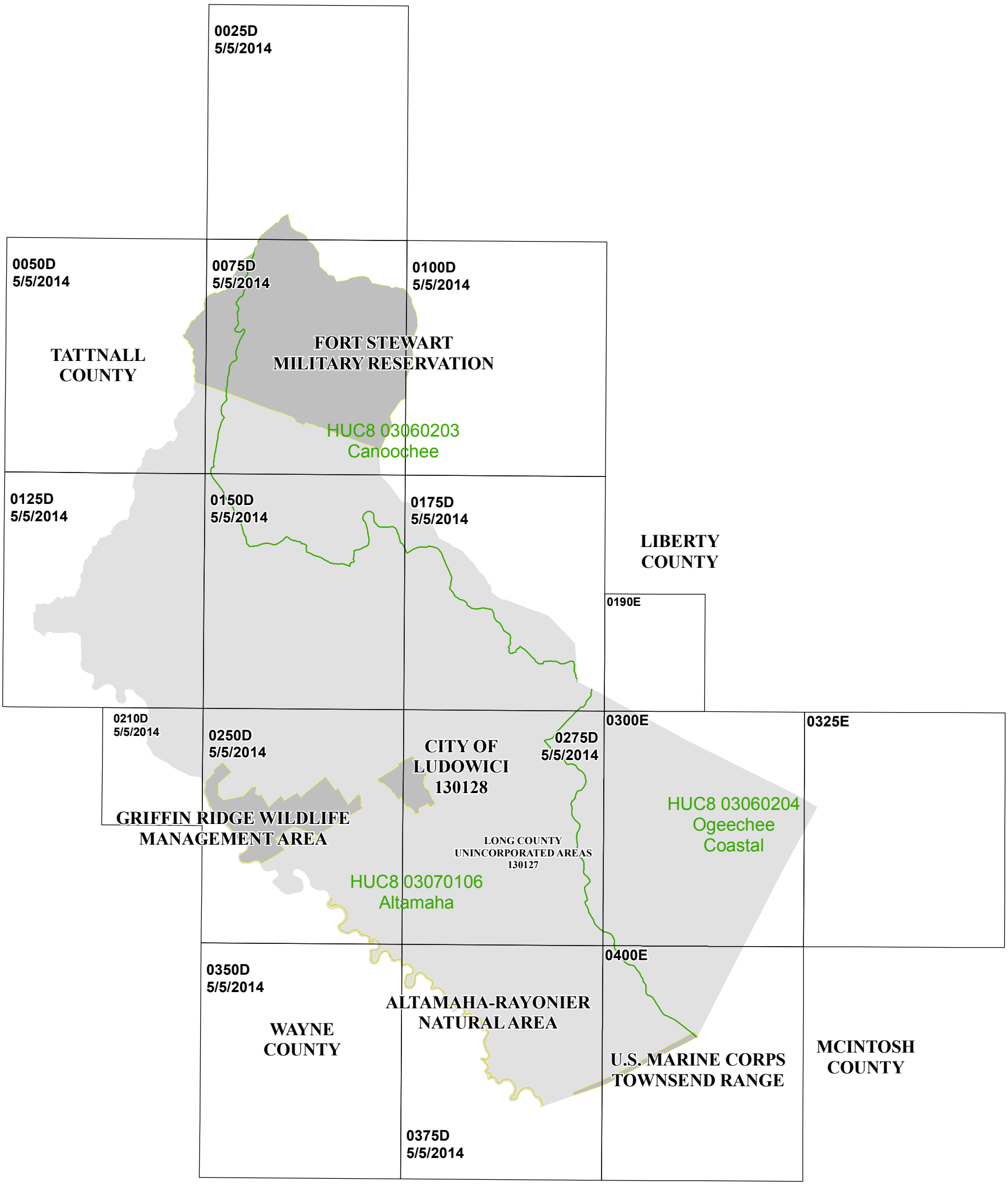
- Selected FIRM panels for the community may contain information (such as floodways and cross sections) that was previously shown separately on the corresponding Flood Boundary and Floodway Map panels. In addition, former flood hazard zone designations have been changed as follows:

| Old Zone | New Zone |
|---|---|
| A1 through A30 | AE |
| B | X (shaded) |
| C | X (unshaded) |

  The CRS is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. Visit the FEMA Web site at www.fema.gov/national-flood-insurance-program-community-rating-system or contact your appropriate FEMA Regional Office for more information about this program.

- FEMA has developed a *Guide to Flood Maps* (FEMA 258) and online tutorials to assist users in accessing the information contained on the FIRM. These include how to read panels and step-by-step instructions to obtain specific information. To obtain this guide and other assistance in using the FIRM, visit the FEMA Web site at www.fema.gov/online-tutorials.

The FIRM Index in Figure 1 shows the overall FIRM panel layout within Long County, and also displays the panel number and effective date for each FIRM panel in the county.




N

1 inch = 4 miles

Miles

0 1.75 3.5 7 10.5

Map Projection:
Universal Transverse Mercator Zone 17 North
North American Datum 1983

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTP://MSC.FEMA.GOV

SEE FLOOD INSURANCE STUDY FOR ADDITIONAL INFORMATION

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP INDEX

LONG COUNTY, GEORGIA and Incorporated Areas

PANELS PRINTED:

0025D, 0050D, 0075D, 0100D, 0125D, 0150D, 0175D, 0190E, 0210D, 0250D, 0275D, 0300E, 0325E, 0350D, 0375D, 0400E

FEMA

PRELIMINARY
10/30/2015

MAP NUMBER
13183CIND0C

MAP REVISED

Each FIRM panel may contain specific notes to the user that provide additional information regarding the flood hazard data shown on that map. However, the FIRM panel does not contain enough space to show all the notes that may be relevant in helping to better understand the information on the panel. Figure 2 contains the full list of these notes.

**Figure 2: FIRM Notes to Users**

# NOTES TO USERS

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products, or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Flood Map Service Center website or by calling the FEMA Map Information eXchange.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates, refer to Table 28 in this FIS Report.

To determine if flood insurance is available in the community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

PRELIMINARY FIS REPORT: FEMA maintains information about map features, such as street locations and names, in or near designated flood hazard areas. Requests to revise information in or near designated flood hazard areas may be provided to FEMA during the community review period, at the final Consultation Coordination Officer's meeting, or during the statutory 90-day appeal period. Approved requests for changes will be shown on the final printed FIRM.

The map is for use in administering the NFIP. It may not identify all areas subject to flooding, particularly from local drainage sources of small size. Consult the community map repository to find updated or additional flood hazard information.

BASE FLOOD ELEVATIONS: For more detailed information in areas where Base Flood Elevations (BFEs) and/or floodways have been determined, consult the Flood Profiles and Floodway Data and/or Summary of Non-Coastal Stillwater Elevations tables within this FIS Report. Use the flood elevation data within the FIS Report in conjunction with the FIRM for construction and/or floodplain management.

FLOODWAY INFORMATION: Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the FIS Report for this jurisdiction.

FLOOD CONTROL STRUCTURE INFORMATION: Certain areas not in Special Flood Hazard Areas may be protected by flood control structures. Refer to Section 4.3 "Non-Levee Flood Protection Measures" of this FIS Report for information on flood control structures for this jurisdiction.

**Figure 2. FIRM Notes to Users - continued**

PROJECTION INFORMATION: The projection used in the preparation of the map was State Plane Georgia East (FIPS 1001 Feet). The horizontal datum was NAD83. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

ELEVATION DATUM: Flood elevations on the FIRM are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

*NGS Information Services*
*NOAA, N/NGS12*
*National Geodetic Survey*
*SSMC-3, #9202*
*1315 East-West Highway*
*Silver Spring, Maryland 20910-3282*
*(301) 713-3242*

Local vertical monuments may have been used to create the map. To obtain current monument information, please contact the appropriate local community listed in Table 31 of this FIS Report.

BASE MAP INFORMATION: Base map information shown on the FIRM was provided by U.S. Geological Survey (USGS) Digital Orthophoto Quadrangles produced at a scale of 1:24,000 from National Areal Photography Program. Black and while photography data 1999 or later. For information about base maps, refer to Section 6.2 “Base Map” in this FIS Report.

Corporate limits shown on the map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after the map was published, map users should contact appropriate community officials to verify current corporate limit locations.

## NOTES FOR FIRM INDEX

REVISIONS TO INDEX: As new studies are performed and FIRM panels are updated within Long County, Georgia, corresponding revisions to the FIRM Index will be incorporated within the FIS Report to reflect the effective dates of those panels. Please refer to Table 28 of this FIS Report to determine the most recent FIRM revision date for each community. The most recent FIRM panel effective date will correspond to the most recent index date.

## SPECIAL NOTES FOR SPECIFIC FIRM PANELS

This Notes to Users section was created specifically for Long County, Georgia**,** effective October 30, 2015**.**

**Figure 2. FIRM Notes to Users - continued**

FLOOD RISK REPORT: A Flood Risk Report (FRR) may be available for many of the flooding sources and communities referenced in this FIS Report. The FRR is provided to increase public awareness of flood risk by helping communities identify the areas within their jurisdictions that have the greatest risks. Although non-regulatory, the information provided within the FRR can assist communities in assessing and evaluating mitigation opportunities to reduce these risks. It can also be used by communities developing or updating flood risk mitigation plans. These plans allow communities to identify and evaluate opportunities to reduce potential loss of life and property. However, the FRR is not intended to be the final authoritative source of all flood risk data for a project area; rather, it should be used with other data sources to paint a comprehensive picture of flood risk.

Each FIRM panel contains an abbreviated legend for the features shown on the maps. However, the FIRm panel does not contain enough space to show the legend for all map features. Figure 3 shows the full legend of all map features. Note that not all of these features may appear on the FIRM panels in Long County.

**Figure 3: Map Legend for FIRM**

**SPECIAL FLOOD HAZARD AREAS:** *The 1% annual chance flood, also known as the base flood or 100-year flood, has a 1% chance of happening or being exceeded each year. Special Flood Hazard Areas are subject to flooding by the 1% annual chance flood. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood. The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights. See note for specific types. If the floodway is too narrow to be shown, a note is shown.*

| | |
|---|---|
| | Special Flood Hazard Areas subject to inundation by the 1% annual chance flood (Zones A, AE, AH, AO, AR, A99, V and VE) |
| Zone A | The flood insurance rate zone that corresponds to the 1% annual chance floodplains. No base (1% annual chance) flood elevations (BFEs) or depths are shown within this zone. |
| Zone AE | The flood insurance rate zone that corresponds to the 1% annual chance floodplains. Base flood elevations derived from the hydraulic analyses are shown within this zone. |
| Zone AH | The flood insurance rate zone that corresponds to the areas of 1% annual chance shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot BFEs derived from the hydraulic analyses are shown at selected intervals within this zone. |
| Zone AO | The flood insurance rate zone that corresponds to the areas of 1% annual chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the hydraulic analyses are shown within this zone. |
| Zone AR | The flood insurance rate zone that corresponds to areas that were formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood. |
| Zone A99 | The flood insurance rate zone that corresponds to areas of the 1% annual chance floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or flood depths are shown within this zone. |
| Zone V | The flood insurance rate zone that corresponds to the 1% annual chance coastal floodplains that have additional hazards associated with storm waves. Base flood elevations are not shown within this zone. |
| Zone VE | Zone VE is the flood insurance rate zone that corresponds to the 1% annual chance coastal floodplains that have additional hazards associated with storm waves. Base flood elevations derived from the coastal analyses are shown within this zone as static whole-foot elevations that apply throughout the zone. |

**Figure 3: Map Legend for FIRM - continued**

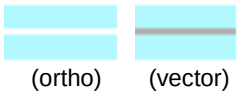
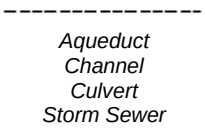
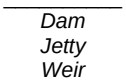
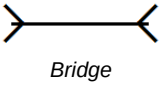
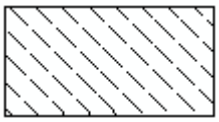
| | |
|---|---|
|  | Regulatory Floodway determined in Zone AE. |
| **OTHER AREAS OF FLOOD HAZARD** | |
|  | Shaded Zone X: Areas of 0.2% annual chance flood hazards and areas of 1% annual chance flood hazards with average depths of less than 1 foot or with drainage areas less than 1 square mile. |
|  | Future Conditions 1% Annual Chance Flood Hazard – Zone X: The flood insurance rate zone that corresponds to the 1% annual chance floodplains that are determined based on future-conditions hydrology. No base flood elevations or flood depths are shown within this zone. |
|  | Area with Reduced Flood Risk due to Levee: Areas where an accredited levee, dike, or other flood control structure has reduced the flood risk from the 1% annual chance flood. |
| **OTHER AREAS** | |
|  | Zone D (Areas of Undetermined Flood Hazard): The flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible. |
|   | Unshaded Zone X: Areas of minimal flood hazard. |
| **FLOOD HAZARD AND OTHER BOUNDARY LINES** | |
|   | Flood Zone Boundary (white line on ortho-photography-based mapping; gray line on vector-based mapping) |
|  | Limit of Study |
|  | Jurisdiction Boundary |
|  | Limit of Moderate Wave Action (LiMWA): Indicates the inland limit of the area affected by waves greater than 1.5 feet |
| **GENERAL STRUCTURES** | |
|   | Channel, Culvert, Aqueduct, or Storm Sewer |
|   | Dam, Jetty, Weir |
|  | Levee, Dike, or Floodwall |
|   | Bridge |

**Figure 3: Map Legend for FIRM - continued**

**COASTAL BARRIER RESOURCES SYSTEM (CBRS) AND OTHERWISE PROTECTED AREAS (OPA):** *CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.*

**CBRS AREA 09/30/2009**

Coastal Barrier Resources System Area: Labels are shown to clarify where this area shares a boundary with an incorporated area or overlaps with the floodway.



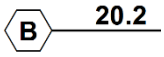
**OTHERWISE PROTECTED AREA 09/30/2009**

Otherwise Protected Area

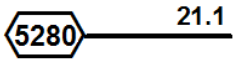
**REFERENCE MARKERS**


River mile Markers

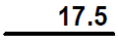
**CROSS SECTION & TRANSECT INFORMATION**



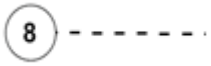

Lettered Cross Section with Regulatory Water Surface Elevation (BFE)




Numbered Cross Section with Regulatory Water Surface Elevation (BFE)




Unlettered Cross Section with Regulatory Water Surface Elevation (BFE)



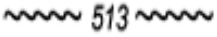

Coastal Transect



Profile Baseline: Indicates the modeled flow path of a stream and is shown on FIRM panels for all valid studies with profiles or otherwise established base flood elevation.



Coastal Transect Baseline: Used in the coastal flood hazard model to represent the 0.0-foot elevation contour and the starting point for the transect and the measuring point for the coastal mapping.




Base Flood Elevation Line

**ZONE AE (EL 16)**

Static Base Flood Elevation value (shown under zone label)

**ZONE AO (DEPTH 2)**

Zone designation with Depth

**ZONE AO (DEPTH 2) (VEL 15 FPS)**

Zone designation with Depth and Velocity

**Figure 3: Map Legend for FIRM - continued**

| BASE MAP FEATURES | |
|---|---|
| *Missouri Creek* | River, Stream or Other Hydrographic Feature |
| 234 | Interstate Highway |
| 234 | U.S. Highway |
| 234 | State Highway |
| 234 | County Highway |
| MAPLE LANE | Street, Road, Avenue Name, or Private Drive if shown on Flood Profile |
| *RAILROAD* | Railroad |
| | Horizontal Reference Grid Line |
| | Horizontal Reference Grid Ticks |
| + | Secondary Grid Crosshairs |
| Land Grant | Name of Land Grant |
| 7 | Section Number |
| R. 43 W. T. 22 N. | Range, Township Number |
| **$^{42}76^{000m}$E** | Horizontal Reference Grid Coordinates (UTM) |
| **365000 FT** | Horizontal Reference Grid Coordinates (State Plane) |
| **80° 16’ 52.5”** | Corner Coordinates (Latitude, Longitude) |

# SECTION 2.0 – FLOODPLAIN MANAGEMENT APPLICATIONS

## 2.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1% annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2% annual chance (500-year) flood is employed to indicate additional areas of flood hazard in the community.

Each flooding source included in the project scope has been studied and mapped using professional engineering and mapping methodologies that were agreed upon by FEMA and Long County as appropriate to the risk level. Flood risk is evaluated based on factors such as known flood hazards and projected impact on the built environment. Engineering analyses were performed for each studied flooding source to calculate its 1% annual chance flood elevations; elevations corresponding to other floods (e.g. 10-, 4-, 2-, 0.2-percent annual chance, etc.) may have also been computed for certain flooding sources. Engineering models and methods are described in detail in Section 5.0 of this FIS Report. The modeled elevations at cross sections were used to delineate the floodplain boundaries on the FIRM; between cross sections, the boundaries were interpolated using elevation data from various sources. More information on specific mapping methods is provided in Section 6.0 of this FIS Report.

Depending on the accuracy of available topographic data (Table 23), study methodologies employed (Section 5.0), and flood risk, certain flooding sources may be mapped to show both the 1% and 0.2% annual chance floodplain boundaries, regulatory water surface elevations (BFEs), and/or a regulatory floodway. Similarly, other flooding sources may be mapped to show only the 1% annual chance floodplain boundary on the FIRM, without published water surface elevations. In cases where the 1% and 0.2% annual chance floodplain boundaries are close together, only the 1% annual chance floodplain boundary is shown on the FIRM. Figure 3, "Map Legend for FIRM", describes the flood zones that are used on the FIRMs to account for the varying levels of flood risk that exist along flooding sources within the project area.Table 2 and Table 3 indicate the flood zone designations for each flooding source and each community within Long County, Georgia, respectively.

Table 2, "Flooding Sources Included in this FIS Report," lists each flooding source, including its study limits, affected communities, mapped zone on the FIRM, and the completion date of its engineering analysis from which the flood elevations on the FIRM and in the FIS Report were derived. Descriptions and dates for the latest hydrologic and hydraulic analyses of the flooding sources are shown in Table 13. Floodplain boundaries for these flooding sources are shown on the FIRM (published separately) using the symbology described in Figure 3. On the map, the 1% annual chance floodplain corresponds to the SFHAs. The 0.2% annual chance floodplain shows areas that, although out of the regulatory floodplain, are still subject to flood hazards.

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. The procedures to remove these areas from the SFHA are described in Section 6.5 of this FIS Report.

**Table 2: Flooding Sources Included in this FIS Report**

| Flooding Source | Community | Downstream Limit | Upstream Limit | HUC-8 Sub-Basin(s) | Length (mi) (streams or coastlines) | Area ($mi^2$) (estuaries or ponding) | Floodway (Y/N) | Zone shown on FIRM | Date of Analysis |
|---|---|---|---|---|---|---|---|---|---|
| Altamaha River | Long County, Unincorporated Areas | Southern county boundary | Confluence of Beards Creek | 03070106 | N/A | | N | A | 2014 |
| Beards Creek | Long County, Unincorporated Areas | Approximately at Altamaha River | County Boundary | 03070106 | N/A | | N | A | 2014 |
| Doctors Creek | Long County, Unincorporated Areas | Confluence of Altamaha River | Approximately 5,820 feet upstream of Rye Patch Road | 03070106 | N/A | | N | A | 2007 |
| Horse Creek | Long County, Unincorporated Areas | County boundary | Approximately 2,190 feet upstream of Horsecreek Road | 03060203 | N/A | | N | A | 2007 |
| Jones Creek | Long County, Unincorporated Areas; Ludowici, City of | Confluence of Still Branch | Approximately 2,010 feet upstream of the confluence of Jones Creek Tributary 2.10 | 03070106 | N/A | | N | A | 2007 |
| Kirkland Creek | Long County, Unincorporated Areas | Confluence of Taylors Creek | Approximately 9,800 feet upstream of the confluence of Kirkland Creek Tributary 3 | 03060203 | N/A | | N | A | 2007 |
| Kirkland Creek Tributary 3 | Long County, Unincorporated Areas | Confluence of Kirkland Creek | Approximately 10,380 feet upstream of the confluence of Kirkland Creek | 03060203 | N/A | | N | A | 2007 |

**Table 2: Flooding Sources Included in this FIS Report - continued**

| Flooding Source | Community | Downstream Limit | Upstream Limit | HUC-8 Sub-Basin(s) | Length (mi) (streams or coastlines) | Area ($mi^2$) (estuaries or ponding) | Floodway (Y/N) | Zone shown on FIRM | Date of Analysis |
|---|---|---|---|---|---|---|---|---|---|
| Little Doctor Creek | Long County, Unincorporated Areas | Confluence of Doctors Creek | Approximately 3,730 feet upstream of Rye Patch Road | 03070106 | N/A | | N | A | 2007 |
| Little Doctor Creek Tributary 1 | Long County, Unincorporated Areas | Confluence of Little Doctor Creek | Approximately 560 feet upstream of Long County Road | 03070106 | N/A | | N | A | 2007 |
| Old Millhead Branch | Long County, Unincorporated Areas | Confluence of Taylors Creek | Approximately 1,050 feet upstream of Old Millhead Branch Tributary 5 | 03060203 | N/A | | N | A | 2007 |
| Old Millhead Branch Tributary 4 | Long County, Unincorporated Areas | Confluence of Old Millhead Branch | Approximately 7,200 feet upstream of confluence of Old Millhead Branch | 03060203 | N/A | | N | A | 2007 |
| Old Millhead Branch Tributary 5 | Long County, Unincorporated Areas | Confluence of Old Millhead Branch | Approximately 4,250 feet upstream of the confluence of Old Millhead Branch | 03060203 | N/A | | N | A | 2007 |
| Payne Creek | Long County, Unincorporated Areas | County boundary | Approximately 4,000 feet upstream of the county boundary | 03060204 | N/A | | N | A | 2007 |
| Slades Branch | Long County, Unincorporated Areas | County boundary | County boundary | 03070106 | N/A | | N | A | 2014 |
| Taylors Creek | Long County, Unincorporated Areas | County boundary | Confluence of Taylors Creek Tributary 13 | 03060203 | N/A | | N | A | 2007 |

**Table 2: Flooding Sources Included in this FIS Report - continued**

| Flooding Source | Community | Downstream Limit | Upstream Limit | HUC-8 Sub-Basin(s) | Length (mi) (streams or coastlines) | Area ($mi^2$) (estuaries or ponding) | Floodway (Y/N) | Zone shown on FIRM | Date of Analysis |
|---|---|---|---|---|---|---|---|---|---|
| Taylors Creek Tributary 2 | Long County, Unincorporated Areas | Confluence of Taylors Creek | Approximately 21,650 feet upstream of the confluence of Taylors Creek | 03060203 | N/A | | N | A | 2007 |
| Taylors Creek Tributary 6 | Long County, Unincorporated Areas | Confluence of Taylors Creek | Approximately 12,460 feet upstream of the confluence with Taylors Creek | 03060203 | N/A | | N | A | 2007 |
| Taylors Creek Tributary 7 | Long County, Unincorporated Areas | Confluence of Taylors Creek | Approximately 9,580 feet upstream of the confluence with Taylors Creek | 03060203 | N/A | | N | A | 2007 |
| Taylors Creek Tributary 12 | Long County, Unincorporated Areas | Confluence of Taylors Creek | Approximately 3,760 feet upstream of the confluence of Taylors Creek | 03060203 | N/A | | N | A | 2007 |
| Taylors Creek Tributary 13 | Long County, Unincorporated Areas | Confluence of Taylors Creek | Approximately 2,400 feet upstream of the confluence with Taylors Creek | 03060203 | N/A | | N | A | 2007 |
| Unnamed Tributary to Beards Creek | Long County, Unincorporated Areas | Confluence of Beards Creek | Not Available | 03070106 | N/A | | N | A | 2014 |

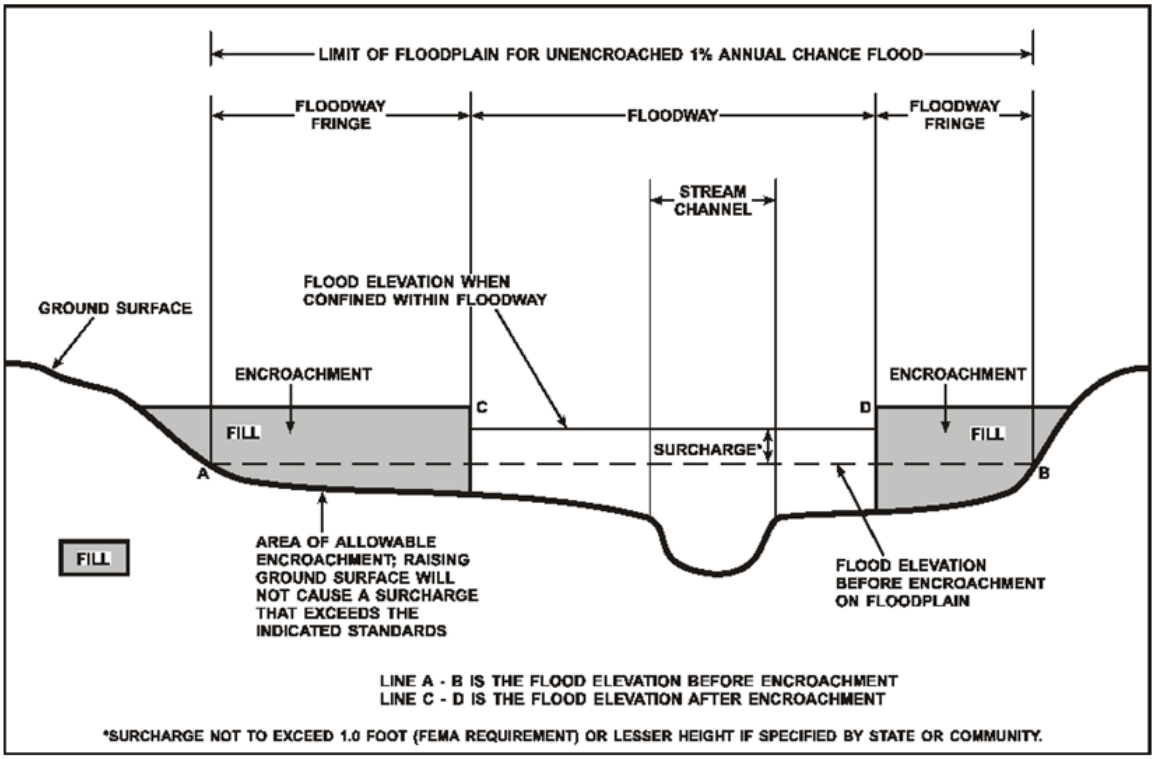
## 2.2 Floodways

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 balancing floodplain development against increasing flood hazard. With this approach, the area of the 1% annual chance floodplain on a river is divided into a floodway and a floodway fringe based on hydraulic modeling. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment in order to carry the 1% annual chance flood. The floodway fringe is the area between the floodway and the 1% annual chance floodplain boundaries where encroachment is permitted. The floodway must be wide enough so that the floodway fringe could be completely obstructed without increasing the water surface elevation of the 1% annual chance flood more than 1 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 4.

To participate in the NFIP, Federal regulations require communities to limit increases caused by encroachment to 1.0 foot, provided that hazardous velocities are not produced. No floodways have been mapped for Long County. The floodways in this project are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway projects.

**Figure 4: Floodway Schematic**



## 2.3 Base Flood Elevations

The hydraulic characteristics of flooding sources were analyzed to provide estimates of the elevations of floods of the selected recurrence intervals. The Base Flood Elevation (BFE) is the elevation of the 1% annual chance flood. These BFEs are most commonly rounded to the whole foot, as shown on the FIRM, but in certain circumstances or locations they may be rounded to 0.1 foot. Cross section lines shown on the FIRM may also be labeled with the BFE rounded to 0.1 foot. Whole-foot BFEs derived from engineering analyses that apply to coastal areas, areas of ponding, or other static areas with little elevation change may also be shown at selected intervals on the FIRM.

Cross sections with BFEs shown on the FIRM correspond to the cross sections shown in the Floodway Data table and Flood Profiles in this FIS Report. BFEs 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.

## 2.4 Non-Encroachment Zones

This section is not applicable to this Flood Risk Project.

## 2.5 Coastal Flood Hazard Areas

This section is not applicable to this Flood Risk Project.

### 2.5.1 Water Elevations and the Effects of Waves

This section is not applicable to this Flood Risk Project.

**Figure 5: Wave Runup Transect Schematic**

[Not Applicable to this Flood Risk Project]

### 2.5.2 Floodplain Boundaries and BFEs for Coastal Areas

This section is not applicable to this Flood Risk Project.

### 2.5.3 Coastal High Hazard Areas

This section is not applicable to this Flood Risk Project.

**Figure 6: Coastal Transect Schematic**

[Not Applicable to this Flood Risk Project]

### 2.5.4 Limit of Moderate Wave Action

This section is not applicable to this Flood Risk Project.

## SECTION 3.0 – INSURANCE APPLICATIONS

### 3.1 National Flood Insurance Program Insurance Zones

For flood insurance applications, the FIRM designates flood insurance rate zones as described in Figure 3Each FIRM panel contains an abbreviated legend for the features shown on the maps. However, the FIRm panel does not contain enough space to show the legend for all map features. Figure 3 shows the full legend of all map features. Note that not all of these features may appear on the FIRM panels in Long County.
Figure 3, "Map Legend for FIRM." Flood insurance zone designations are assigned to flooding sources based on the results of the hydraulic or coastal analyses. Insurance agents use the zones shown on the FIRM and depths and base flood elevations in this FIS Report in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

The 1% annual chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (e.g. Zones A, AE, V, VE, etc.), and the 0.2% annual chance floodplain boundary corresponds to the boundary of areas of additional flood hazards.

Table 3 lists the flood insurance zones in Long County.

**Table 3: Flood Zone Designations by Community**

| Community | Flood Zone(s) |
|---|---|
| Long County, Unincorporated Areas | A, X |
| Ludowici, City of | A, X |

### 3.2 Coastal Barrier Resources System

This section is not applicable to this Flood Risk Project.

**Table 4: Coastal Barrier Resources System Information**

[Not Applicable to this Flood Risk Project]

## SECTION 4.0 – AREA STUDIED

### 4.1 Basin Description

Table 5 contains a description of the characteristics of the HUC-8 sub-basins within which each community falls. The table includes the main flooding sources within each basin, a brief description of the basin, and its drainage area.

**Table 5: Basin Characteristics**

| HUC-8 Sub-Basin Name | HUC-8 Sub-Basin Number | Primary Flooding Source | Description of Affected Area | Drainage Area (square miles) |
|---|---|---|---|---|
| Canoochee | 03060203 | Horse Creek, Kirkland Creek, Kirkland Creek Tributary 3, Old Millhead Branch, Old Millhead Branch Tributary 4, Old Millhead Branch Tributary 5, Taylors Creek, Taylors Creek Tributary 2, Taylors Creek Tributary 6, Taylors Creek Tributary 7, Taylors Creek Tributary 12, Taylors Creek Tributary 13 | Drainage watershed area for Horse Creek, Kirkland Creek, Old Millhead Branch, and Taylors Creek and tributaries located in eastern portion of Long County | Not Available |
| Ogeechee Coastal | 03060204 | Payne Creek | Drainage watershed for Payne Creek located in the southeastern portion of Long County | Not Available |
| Altamaha | 03070106 | Altamaha River, Beards Creek, Doctors Creek, Jones Creek, Little Doctor Creek, Little Doctor Creek Tributary 1, Slades Branch, Unnamed Tributary to Beards Creek | Drainage watershed for Altamaha River, Doctors Creek, Little Doctor Creek, and Slades Branch and tributaries located in the southeastern portion of Long County | Not Available |

## 4.2 Principal Flood Problems

Table 6 contains a description of the principal flood problems that have been noted for Long County by flooding source.

**Table 6: Principal Flood Problems**

| Flooding Source | Description of Flood Problems |
|---|---|
| Miscellaneous within Long County, Georgia | Historically, precipitation which can result in flooding occurs as a result of prolonged, slow-moving low-pressure systems particularly in the cooler months; tropical hurricanes; frontal storm activity, or concentrated thunderstorms, as is particularly the case during the summer months. |

**Table 7: Historic Flooding Elevations**

[Not Applicable to this Flood Risk Project]

## 4.3 Non-Levee Flood Protection Measures

This section is not applicable to this Flood Risk Project.

**Table 8: Non-Levee Flood Protection Measures**

[Not Applicable to this Flood Risk Project]

## 4.4 Levees

This section is not applicable to this Flood Risk Project.

**Table 9: Levees**

[Not Applicable to this Flood Risk Project]

## SECTION 5.0 – ENGINEERING METHODS

For the flooding sources 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 at least once on the average during any 10-, 25-, 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-, 25-, 50-, 100-, and 500-year floods, have a 10-, 4-, 2-, 1-, and 0.2% annual 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 100-year flood (1-percent chance of annual exceedance) during the term of a 30-year mortgage is approximately 26 percent (about 3 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.

### 5.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak elevation-frequency relationships for floods of the selected recurrence intervals for each flooding source studied. Hydrologic analyses are typically performed at the watershed level. Depending on factors such as watershed size and shape, land use and urbanization, and natural or man-made storage, various models or methodologies may be applied. A summary of the hydrologic methods applied to develop the discharges used in the hydraulic analyses for each stream is provided in Table 13. Greater detail (including assumptions, analysis, and results) is available in the archived project documentation.

October 30, 2015 Partial Map Revision

No new Hydrologic analyses were carried out for this revision.

May 5, 2014 Partial Map Revision

Approximately 240 square miles of Automated Approximate Method Zone A and Limited Detailed Analysis floodplain was studied as part of this revised analysis. The two-dimensional XPSWMM-2D software package (version 2011) was utilized for both the hydrologic and hydraulic modeling tasks.

To obtain the 1% annual chance flow rate on the Altamaha River, a gage analysis of annual peak flow records at stream gage 02226000- Altamaha River at Doctortown, GA was performed. PEAKFQ-Win is a program produced by the USGS to evaluate the flood frequency of annual peak flow records according to the USGS's Bulletin 17-B, "Guidelines for Determining Flood Flow Frequency." The Altamaha River gage at Doctortown, GA has an excellent historic record, with 86 years of peak flow data. The 1% annual chance flood (100-year) event at this gage site was calculated to be 211,200 cfs.

Beards Creek is a tributary of the Altamaha River that flows in a southern direction along the border of Long and Tattnall Counties. The Beards Creek watershed lies partially outside of Long County in adjacent Tattnall County. High resolution LiDAR topography data was not available for all portions of the Beards Creek watershed, so it was impossible to include this creek and its tributaries in the larger Zone 1 XP-SWMM 2D modeling domain. Instead, it was decided to model Beards Creek, Slades Branch, and tributary to Beards Creek using the more conventional HEC-RAS hydraulic program. The hydrology for Beards Creek was obtained through gage analysis of USGS Gage # 22258850, Beards Creek near Glennville,GA. On the other hand, the hydrology for the tributaries to Beards Creek was determined using Georgia rural Regression Equations.

September 26, 2008 Countywide Analysis

Hydrologic analyses were carried out to establish peak discharge-frequency relationships for each flooding source studied.

For the approximate analyses listed in Table 1, peak discharges were estimated by published USGS regional regression equations (Stamey and Hess, 1993). Regression equations estimate peak discharges for ungaged streams based on characteristics of nearby gaged streams.

The USGS has developed regression equations for both rural and urban areas within Georgia. Based on a review of available aerial photos, all of approximate streams studied are in rural watersheds. Therefore the only physiographic parameter utilized for the regression equations is drainage area (square miles).

Stream gage information is provided in Table 12.

**Table 10: Summary of Discharges**

[Not Applicable to this Flood Risk Project]

**Figure 7: Frequency Discharge-Drainage Area Curves**

[Not Applicable to this Flood Risk Project]

**Table 11: Summary of Non-Coastal Stillwater Elevations**

[Not Applicable to this Flood Risk Project]

**Table 12: Stream Gage Information used to Determine Discharges**

| Flooding Source | Gage Identifier | Agency that Maintains Gage | Site Name | Drainage Area (Square Miles) | Period of Record | |
|---|---|---|---|---|---|---|
| | | | | | From | To |
| Altamaha River | 02226000 | USGS | Altamaha River at Doctortown, GA | 13,600 | | |
| Beards Creek | 22258850 | USGS | Beards Creek near Glennville, GA | 74.4 | | |

## 5.2 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. Base flood elevations on the FIRM represent the elevations shown on the Flood Profiles and in the Floodway Data tables in the FIS Report. Rounded whole-foot elevations may be shown on the FIRM in coastal areas, areas of ponding, and other areas with static base flood elevations. These whole-foot elevations may not exactly reflect the elevations derived from the hydraulic analyses. 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. The hydraulic analyses for this FIS were based on 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.

October 30, 2015 Partial Map Revision

No new Hydraulic analyses were carried out for this revision.

May 5, 2014 Partial Map Revision

Approximately 240 square miles of Automated Approximate Method Zone A and Limited Detailed Analysis floodplain was studied as part of this revise analysis. The two- dimensional XPSWMM-2D software package (version 2011) was utilized for both the hydrologic and hydraulic modeling tasks.

Initial modeling simulations of the Altamaha River showed that there were two bridges crossing the river that were not appropriately represented within the 2D model. Both the Highway 84/25 bridge and a smaller unnamed bridge located approximately 1000 feet of the Highway 84/25 bridge were only partially represented in the 2D grid. Because the Highway 84/25 bridge and the unnamed downstream bridge have total widths that are less than the grid spacing (180 feet and 120 feet, respectively), when 2D grid elevations were calculated the full elevation of the bridge deck was underrepresented because adjacent ground elevations within the grid square were being picked up

and used to derive an average elevation. Manning's n values for both the channel and overbanks were entered into the hydraulic model to represent the values that were estimated from aerial photography from ESRI Servers. Manning's n roughness parameters were set to 0.05 for channels and 0.12 for overbank areas for all 1D streams.

Hydraulic analysis for Beards Creek, Slades Branch, and Unnamed Tributary to Beards Creek was carried out using HEC-RAS version 4.1.0. Cross sections were cut from the available topographic data using HEC-GeoRAS toolset in Environmental Systems Research Institute (ESRI) ArcMap Geographical Information System (GIS) platform.

Manning's n values for both the channel and overbanks were entered into the hydraulic model to represent the values that were estimated from aerial photography from ESRI Servers. Manning's n roughness parameters were set to 0.05 for channels and 0.12 for overbank areas for all three streams.

Since a subcritical flow regime is assumed, downstream boundary conditions are required. In accordance with FEMA guidelines Appendix C, the starting water surface elevation chosen for profile computations were based on normal depth method.

September 26, 2008 Countywide Analysis

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.

The 1-percent-annual-chance WSELs for the approximate studies listed in Table 1 were computed using the USACE's HEC-RAS hydraulic model, version 3.1.3 (HEC, 2004b). HEC-GeoRAS was used to generate preprocessing data (HEC, 2004a). The hydraulic models were prepared without surveying bathymetric data.

A summary of the methods used in hydraulic analyses performed for this project is provided in Table 13. Roughness coefficients are provided in Table 14. Roughness coefficients are values representing the frictional resistance water experiences when passing overland or through a channel. They are used in the calculations to determine water surface elevations. Greater detail (including assumptions, analysis, and results) is available in the archived project documentation.

**Table 13: Summary of Hydrologic and Hydraulic Analyses**

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Altamaha River | Southern county boundary | Confluence of Breards Creek | XPSWMM-2D (version 2011) | XPSWMM-2D (version 2011) | 2014 | A | Gage No. 02226000 was used in hydrologic analysis. PEAKFQ-Win used to evaluate flood frequency of annual peak flow records. The 1% annual chance flood (100-year) event at this gage site was calculated to be 211,200 cfs. USGS's Bulletin 17-B, "Guidelines for Determining Flood Flow Frequency." |
| Beards Creek | Approximately at Altamaha River | County boundary | HEC-RAS 4.1 | HEC-RAS 4.1.0 | 2014 | A | Hydrology for Beards Creek was obtained through gage analysis of USGS Gage # 22258850, Beards Creek near Glennville,GA. Cross sections were cut from available topographic data using HEC-GeoRAS in Environmental Systems Research Institute (ESRI) ArcMap platform. |
| Doctors Creek | Confluence of Altamaha River | Approximately 5,820 feet upstream of Rye Patch Road | USGS regional regression equations | HEC-RAS 3.1.3 | 2007 | A | Peak discharges were estimated by published USGS regional regression equations (Stamey and Hess, 1993. Only physiographic parameter utilized for the regression equations is drainage area (square miles). HEC-GeoRAS was used to generate preprocessing data (HEC, 2004a). The hydraulic models were prepared without surveying bathymetric data. |

**Table 13: Summary of Hydrologic and Hydraulic Analyses - continued**

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Horse Creek | County boundary | Approximately 2,190 feet upstream of Horsecreek Road | USGS regional regression equations | HEC-RAS 3.1.3 | 2007 | A | Peak discharges were estimated by published USGS regional regression equations (Stamey and Hess, 1993. Only physiographic parameter utilized for the regression equations is drainage area (square miles). HEC-GeoRAS was used to generate preprocessing data (HEC, 2004a). The hydraulic models were prepared without surveying bathymetric data. |
| Jones Creek | Confluence of Still Branch | Approximately 2,010 feet upstream of the confluence of Jones Creek Tributary 2.10 | USGS regional regression equations | HEC-RAS 3.1.3 | 2007 | A | Peak discharges were estimated by published USGS regional regression equations (Stamey and Hess, 1993. Only physiographic parameter utilized for the regression equations is drainage area (square miles). HEC-GeoRAS was used to generate preprocessing data (HEC, 2004a). The hydraulic models were prepared without surveying bathymetric data. |
| Kirkland Creek | Confluence of Taylors Creek | Approximately 9,800 feet upstream of the confluence of Kirkland Creek Tributary 3 | USGS regional regression equations | HEC-RAS 3.1.3 | 2007 | A | Peak discharges were estimated by published USGS regional regression equations (Stamey and Hess, 1993. Only physiographic parameter utilized for the regression equations is drainage area (square miles). HEC-GeoRAS was used to generate preprocessing data (HEC, 2004a). The hydraulic models were prepared without surveying bathymetric data. |

**Table 13: Summary of Hydrologic and Hydraulic Analyses - continued**

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Kirkland Creek Tributary 3 | Confluence of Kirkland Creek | Approximately 10,380 feet upstream of the confluence of Kirkland Creek | USGS regional regression equations | HEC-RAS 3.1.3 | 2007 | A | Peak discharges were estimated by published USGS regional regression equations (Stamey and Hess, 1993. Only physiographic parameter utilized for the regression equations is drainage area (square miles). HEC-GeoRAS was used to generate preprocessing data (HEC, 2004a). The hydraulic models were prepared without surveying bathymetric data. |
| Little Doctor Creek | Confluence of Doctors Creek | Approximately 3,730 feet upstream of Rye Patch Road | USGS regional regression equations | HEC-RAS 3.1.3 | 2007 | A | Peak discharges were estimated by published USGS regional regression equations (Stamey and Hess, 1993. Only physiographic parameter utilized for the regression equations is drainage area (square miles). HEC-GeoRAS was used to generate preprocessing data (HEC, 2004a). The hydraulic models were prepared without surveying bathymetric data. |
| Little Doctor Creek Tributary 1 | Confluence of Little Doctor Creek | Approximately 560 feet upstream of Long County Road | USGS regional regression equations | HEC-RAS 3.1.3 | 2007 | A | Peak discharges were estimated by published USGS regional regression equations (Stamey and Hess, 1993. Only physiographic parameter utilized for the regression equations is drainage area (square miles). HEC-GeoRAS was used to generate preprocessing data (HEC, 2004a). The hydraulic models were prepared without surveying bathymetric data. |

**Table 13: Summary of Hydrologic and Hydraulic Analyses - continued**

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Old Millhead Branch | Confluence of Taylors Creek | Approximately 1,050 feet upstream of Old Millhead Branch Tributary 5 | USGS regional regression equations | HEC-RAS 3.1.3 | 2007 | A | Peak discharges were estimated by published USGS regional regression equations (Stamey and Hess, 1993. Only physiographic parameter utilized for the regression equations is drainage area (square miles). HEC-GeoRAS was used to generate preprocessing data (HEC, 2004a). The hydraulic models were prepared without surveying bathymetric data. |
| Old Millhead Branch Tributary 4 | Confluence of Old Millhead Branch | Approximately 7,200 feet upstream of confluence of Old Millhead Branch | USGS regional regression equations | HEC-RAS 3.1.3 | 2007 | A | Peak discharges were estimated by published USGS regional regression equations (Stamey and Hess, 1993. Only physiographic parameter utilized for the regression equations is drainage area (square miles). HEC-GeoRAS was used to generate preprocessing data (HEC, 2004a). The hydraulic models were prepared without surveying bathymetric data. |
| Old Millhead Branch Tributary 5 | Confluence of Old Millhead Branch | Approximately 4,250 feet upstream of the confluence of Old Millhead Branch | USGS regional regression equations | HEC-RAS 3.1.3 | 2007 | A | Peak discharges were estimated by published USGS regional regression equations (Stamey and Hess, 1993. Only physiographic parameter utilized for the regression equations is drainage area (square miles). HEC-GeoRAS was used to generate preprocessing data (HEC, 2004a). The hydraulic models were prepared without surveying bathymetric data. |

**Table 13: Summary of Hydrologic and Hydraulic Analyses - continued**

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Payne Creek | County boundary | Approximately 4,000 feet upstream of the county boundary | USGS regional regression equations | HEC-RAS 3.1.3 | 2007 | A | Peak discharges were estimated by published USGS regional regression equations (Stamey and Hess, 1993. Only physiographic parameter utilized for the regression equations is drainage area (square miles). HEC-GeoRAS was used to generate preprocessing data (HEC, 2004a). The hydraulic models were prepared without surveying bathymetric data. |
| Slades Branch | County boundary | County boundary | HEC-RAS 4.1 | HEC-RAS 4.1.0 | 2014 | A | Hydrology determined using Georgia rural Regression Equations. Cross sections were cut from available topographic data using HEC-GeoRAS in ESRI ArcMap platform. |
| Taylors Creek | County boundary | Confluence of Taylors Creek Tributary 13 | USGS regional regression equations | HEC-RAS 3.1.3 | 2007 | A | Peak discharges were estimated by published USGS regional regression equations (Stamey and Hess, 1993. Only physiographic parameter utilized for the regression equations is drainage area (square miles). HEC-GeoRAS was used to generate preprocessing data (HEC, 2004a). The hydraulic models were prepared without surveying bathymetric data. |

**Table 13: Summary of Hydrologic and Hydraulic Analyses - continued**

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Taylors Creek Tributary 2 | Confluence of Taylors Creek | Approximately 21,650 feet upstream of the confluence of Taylors Creek | USGS regional regression equations | HEC-RAS 3.1.3 | 2007 | A | Peak discharges were estimated by published USGS regional regression equations (Stamey and Hess, 1993. Only physiographic parameter utilized for the regression equations is drainage area (square miles). HEC-GeoRAS was used to generate preprocessing data (HEC, 2004a). The hydraulic models were prepared without surveying bathymetric data. |
| Taylors Creek Tributary 6 | Confluence of Taylors Creek | Approximately 12,460 feet upstream of the confluence with Taylors Creek | USGS regional regression equations | HEC-RAS 3.1.3 | 2007 | A | Peak discharges were estimated by published USGS regional regression equations (Stamey and Hess, 1993. Only physiographic parameter utilized for the regression equations is drainage area (square miles). HEC-GeoRAS was used to generate preprocessing data (HEC, 2004a). The hydraulic models were prepared without surveying bathymetric data. |
| Taylors Creek Tributary 7 | Confluence of Taylors Creek | Approximately 9,580 feet upstream of the confluence with Taylors Creek | USGS regional regression equations | HEC-RAS 3.1.3 | 2007 | A | Peak discharges were estimated by published USGS regional regression equations (Stamey and Hess, 1993. Only physiographic parameter utilized for the regression equations is drainage area (square miles). HEC-GeoRAS was used to generate preprocessing data (HEC, 2004a). The hydraulic models were prepared without surveying bathymetric data. |

**Table 13: Summary of Hydrologic and Hydraulic Analyses - continued**

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Taylors Creek Tributary 12 | Confluence of Taylors Creek | Approximately 3,760 feet upstream of the confluence of Taylors Creek | USGS regional regression equations | HEC-RAS 3.1.3 | 2007 | A | Peak discharges were estimated by published USGS regional regression equations (Stamey and Hess, 1993. Only physiographic parameter utilized for the regression equations is drainage area (square miles). HEC-GeoRAS was used to generate preprocessing data (HEC, 2004a). The hydraulic models were prepared without surveying bathymetric data. |
| Taylors Creek Tributary 13 | Confluence of Taylors Creek | Approximately 2,400 feet upstream of the confluence with Taylors Creek | USGS regional regression equations | HEC-RAS 3.1.3 | 2007 | A | Peak discharges were estimated by published USGS regional regression equations (Stamey and Hess, 1993. Only physiographic parameter utilized for the regression equations is drainage area (square miles). HEC-GeoRAS was used to generate preprocessing data (HEC, 2004a). The hydraulic models were prepared without surveying bathymetric data. |
| Unnamed Tributary to Beards Creek | Confluence of Beards Creek | County boundary | HEC-RAS 4.1 | HEC-RAS 4.1.0 | 2014 | A | Hydrology determined using Georgia rural Regression Equations. Cross sections were cut from available topographic data using HEC-GeoRAS in ESRI ArcMap platform. |

**Table 14: Roughness Coefficients**

| Flooding Source | Channel “n” | Overbank “n” |
|---|---|---|
| Altamaha River | 0.05 | 0.12 |
| Beards Creek | 0.05 | 0.12 |
| Slades Branch | 0.05 | 0.12 |
| Unnamed Tributary to Beards Creek | 0.05 | 0.12 |

## 5.3 Coastal Analyses

This section is not applicable to this Flood Risk Project.

**Table 15: Summary of Coastal Analyses**

[Not Applicable to this Flood Risk Project]

### 5.3.1 Total Stillwater Elevations

This section is not applicable to this Flood Risk Project.

**Figure 8: 1% Annual Chance Total Stillwater Elevations for Coastal Areas**

[Not Applicable to this Flood Risk Project]

**Table 16: Tide Gage Analysis Specifics**

[Not Applicable to this Flood Risk Project]

### 5.3.2 Waves

This section is not applicable to this Flood Risk Project.

### 5.3.3 Coastal Erosion

This section is not applicable to this Flood Risk Project.

### 5.3.4 Wave Hazard Analyses

This section is not applicable to this Flood Risk Project.

**Table 17: Coastal Transect Parameters**

[Not Applicable to this Flood Risk Project]

**Figure** 9**: Transect Location Map**

[Not applicable to this Flood Risk Project]

## 5.4 Alluvial Fan Analyses

This section is not applicable to this Flood Risk Project.

**Table 18: Summary of Alluvial Fan Analyses**

[Not applicable to this Flood Risk Project]

**Table 19: Results of Alluvial Fan Analyses**

[Not applicable to this Flood Risk Project]

## SECTION 6.0 – MAPPING METHODS

### 6.1 Vertical and Horizontal Control

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 used for newly created or revised FIS Reports and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD29). With the completion of the North American Vertical Datum of 1988 (NAVD88), many FIS Reports and FIRMs are now prepared using NAVD88 as the referenced vertical datum.

Flood elevations shown in this FIS Report and on the FIRMs are referenced to NAVD88. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between NGVD29 and NAVD88 or other datum conversion, visit the National Geodetic Survey website at www.ngs.noaa.gov, or contact the National Geodetic Survey (NGS) at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

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 archived project documentation associated with the FIS Report and the FIRMs for this community. Interested individuals may contact FEMA to access these data.

To obtain current elevation, description, and/or location information for benchmarks in the area, please contact information services Branch of the NGS at (301) 713-3242, or visit their website at www.ngs.noaa.gov.

The datum conversion locations and values that were calculated for Long County are provided in Table 20.

**Table 20: Countywide Vertical Datum Conversion**

| Quadrangle Name | Quadrangle Corner | Latitude | Longitude | Conversion from NGVD29 to NAVD88 (feet) |
|---|---|---|---|---|
| Glissons Millpond | SW | -81.875 | 32.000 | -0.781 |
| Willie | SW | -81.750 | 32.000 | -0.84 |
| Glennville NE | SW | -81.875 | 31.875 | -0.833 |

**Table 20: Countywide Vertical Datum Conversion - continued**

| Quadrangle Name | Quadrangle Corner | Latitude | Longitude | Conversion from NGVD29 to NAVD88 (feet) |
|---|---|---|---|---|
| Taylors Creek | SW | -81.750 | 31.875 | -0.886 |
| Glennville SE | SW | -81.875 | 31.750 | -0.873 |
| Walthourville | SW | -81.750 | 31.750 | -0.896 |
| Hinesville | SW | -81.625 | 31.750 | -0.945 |
| Ludowici | SW | -81.750 | 31.625 | -0.919 |
| East of Ludowici | SW | -81.625 | 31.625 | -0.938 |
| Riceboro | SW | -81.500 | 31.625 | -0.958 |
| Average Conversion from NGVD29 to NAVD88 = -0.887 feet | | | | |

**Table 21: Stream-Based Vertical Datum Conversion**

[Not applicable to this Flood Risk Project]

## 6.2 Base Map

The FIRMs and FIS Report for this project have been produced in a digital format. The flood hazard information was converted to a Geographic Information System (GIS) format that meets FEMA's FIRM database specifications and geographic information standards. This information is provided in a digital format so that it can be incorporated into a local GIS and be accessed more easily by the community. The FIRM Database includes most of the tabular information contained in the FIS Report in such a way that the data can be associated with pertinent spatial features. For example, the information contained in the Floodway Data table and Flood Profiles can be linked to the cross sections that are shown on the FIRMs. Additional information about the FIRM Database and its contents can be found in FEMA's *Guidelines and Standards for Flood Risk Analysis and Mapping*, www.fema.gov/guidelines-and-standards-flood-risk-analysis-and-mapping.

Base map information shown on the FIRM was derived from the sources described in Table 22.

**Table 22: Base Map Sources**

| Data Type | Data Provider | Data Date | Data Scale | Data Description |
|---|---|---|---|---|
| Digital Orthophotography | USGS | 1999 or later | 1:24,000 | Black and White Digital Orthophotography from National Agriculture Imagery Program |
| Long County Aerials | USDA | 10/26/2010 | 1:12,000 | Black and White Digital Orthophoto Quadrangles from National Aerial Photography Program |
| County Boundaries | Georgia Department of Transportation | 12/09/2009 | 1:100,000 | |
| Road Centerlines and Road Names | Long County GIS | 10/08/2009 | 1:6,000 | |

## 6.3 Floodplain and Floodway Delineation

The FIRM shows tints, screens, and symbols to indicate floodplains and floodways as well as the locations of selected cross sections used in the hydraulic analyses and floodway computations.

For riverine flooding sources, the mapped floodplain boundaries shown on the FIRM have been delineated using the flood elevations determined at each cross section; between cross sections, the boundaries were interpolated using the topographic elevation data described in Table 23.

In cases where the 1% and 0.2% annual chance floodplain boundaries are close together, only the 1% 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.

The floodway widths presented in this FIS Report and on the FIRM were computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. Table 2 indicates the flooding sources for which floodways have been determined. The results of the floodway computations for those flooding sources have been tabulated for selected cross sections and are shown in Table 24, "Floodway Data."

Certain flooding sources may have been studied that do not have published BFEs on the FIRMs, or for which there is a need to report the 1% annual chance flood elevations at selected cross sections because a published Flood Profile does not exist in this FIS Report. These streams may have also been studied using methods to determine non-encroachment zones rather than floodways. For these flooding sources, the 1% annual chance floodplain boundaries have been delineated using the flood elevations determined at each cross section; between cross sections, the boundaries were interpolated using the topographic elevation data described in Table 23. All topographic data used for modeling or mapping has been converted as necessary to NAVD88.

**Table 23: Summary of Topographic Elevation Data used in Mapping**

| Community | Flooding Source | Source for Topographic Elevation Data | | | | | |
|---|---|---|---|---|---|---|---|
| | | Description | Scale | Contour Interval | $RMSE_z$ | $Accuracy_z$ | Citation |
| Long County | Miscellaneous within Long County | Topographic maps digitized by Geotechnologies, Inc. | 1:24,000 | 5 feet<br>10 feet | N/A | N/A | USGS 2008 |

BFEs shown at cross sections on the FIRM represent the 1% annual chance water surface elevations shown on the Flood Profiles and in the Floodway Data tables in the FIS Report. Rounded whole-foot elevations may be shown on the FIRM in coastal areas, areas of ponding, and other areas with static base flood elevations.

**Table 24: Floodway Data**

[Not applicable to this Flood Risk Project]

**Table 25: Flood Hazard and Non-Encroachment Data for Selected Streams**

[Not applicable to this Flood Risk Project]

## 6.4 Coastal Flood Hazard Mapping

This section is not applicable to this Flood Risk Project.

**Table 26: Summary of Coastal Transect Mapping Considerations**

[Not applicable to this Flood Risk Project]

## 6.5 FIRM Revisions

This FIS Report and the FIRM are based on the most up-to-date information available to FEMA at the time of its publication; however, flood hazard conditions change over time. Communities or private parties may request flood map revisions at any time. Certain types of requests require submission of supporting data. FEMA may also initiate a revision. Revisions may take several forms, including Letters of Map Amendment (LOMAs), Letters of Map Revision Based on Fill (LOMR-Fs), Letters of Map Revision (LOMRs) (referred to collectively as Letters of Map Change (LOMCs)), Physical Map Revisions (PMRs), and FEMA-contracted restudies. These types of revisions are further described below. Some of these types of revisions do not result in the republishing of the FIS Report. To assure that any user is aware of all revisions, it is advisable to contact the community repository of flood-hazard data (shown in Table 31, "Map Repositories").

### 6.5.1 Letters of Map Amendment

A LOMA is an official revision by letter to an effective NFIP map. A LOMA results from an administrative process that involves the review of scientific or technical data submitted by the owner or lessee of property who believes the property has incorrectly been included in a designated SFHA. A LOMA amends the currently effective FEMA map and establishes that a specific property is not located in a SFHA.

To obtain an application for a LOMA, visit www.fema.gov/floodplain-management/letter-map-amendment-loma and download the form "MT-1 Application Forms and Instructions for Conditional and Final Letters of Map Amendment and Letters of Map Revision Based on Fill". Visit the "Flood Map-Related Fees" section to determine the cost, if any, of applying for a LOMA.

FEMA offers a tutorial on how to apply for a LOMA. The LOMA Tutorial Series can be accessed at www.fema.gov/online-tutorials.

For more information about how to apply for a LOMA, call the FEMA Map Information eXchange; toll free, at 1-877-FEMA MAP (1-877-336-2627).

### 6.5.2 Letters of Map Revision Based on Fill

A LOMR-F is an official revision by letter to an effective NFIP map. A LOMR-F states FEMA's determination concerning whether a structure or parcel has been elevated on fill above the base flood elevation and is, therefore, excluded from the SFHA.

Information about obtaining an application for a LOMR-F can be obtained in the same manner as that for a LOMA, by visiting www.fema.gov/floodplain-management/letter-map-amendment-loma for the "MT-1 Application Forms and Instructions for Conditional and Final Letters of Map Amendment and Letters of Map Revision Based on Fill" or by calling the FEMA Map Information eXchange, toll free, at 1-877-FEMA MAP (1-877-336-2627). Fees for applying for a LOMR-F, if any, are listed in the "Flood Map-Related Fees" section.

A tutorial for LOMR-F is available at www.fema.gov/online-tutorials.

### 6.5.3 Letters of Map Revision

A LOMR is an official revision to the currently effective FEMA map. It is used to change flood zones, floodplain and floodway delineations, flood elevations and planimetric features. All requests for LOMRs should be made to FEMA through the chief executive officer of the community, since it is the community that must adopt any changes and revisions to the map. If the request for a LOMR is not submitted through the chief executive officer of the community, evidence must be submitted that the community has been notified of the request.

To obtain an application for a LOMR, visit www.fema.gov/national-flood-insurance-program-flood-hazard-mapping/mt-2-application-forms-and-instructions and download the form "MT-2 Application Forms and Instructions for Conditional Letters of Map Revision and Letters of Map Revision". Visit the "Flood Map-Related Fees" section to determine the cost of applying for a LOMR. For more information about how to apply for a LOMR, call the FEMA Map Information eXchange; toll free, at 1-877-FEMA MAP (1-877-336-2627) to speak to a Map Specialist.

Previously issued mappable LOMCs (including LOMRs) that have been incorporated into the Long County FIRM are listed in Table 27.

**Table 27: Incorporated Letters of Map Change**

[Not applicable to this Flood Risk Project]

### 6.5.4 Physical Map Revisions

Physical Map Revisions (PMRs) are an official republication of a community's NFIP map to effect changes to base flood elevations, floodplain boundary delineations, regulatory floodways and planimetric features. These changes typically occur as a result of structural works or improvements, annexations resulting in additional flood hazard areas or correction to base flood elevations or SFHAs.

The community's chief executive officer must submit scientific and technical data to FEMA to support the request for a PMR. The data will be analyzed and the map will be revised if warranted. The community is provided with copies of the revised information and is afforded a review period. When the base flood elevations are changed, a 90-day appeal period is provided. A 6-month adoption period for formal approval of the revised map(s) is also provided.

For more information about the PMR process, please visit www.fema.gov and visit the "Flood Map Revision Processes" section.

### 6.5.5 Contracted Restudies

The NFIP provides for a periodic review and restudy of flood hazards within a given community. FEMA accomplishes this through a national watershed-based mapping needs assessment strategy, known as the Coordinated Needs Management Strategy (CNMS). The CNMS is used by FEMA to assign priorities and allocate funding for new flood hazard analyses used to update the FIS Report and FIRM. The goal of CNMS is to define the validity of the engineering study data within a mapped inventory. The CNMS is used to track the assessment process, document engineering gaps and their resolution, and aid in prioritization for using flood risk as a key factor for areas identified for flood map updates. Visit www.fema.gov to learn more about the CNMS or contact the FEMA Regional Office listed in Section 8 of this FIS Report.

### 6.5.6 Community Map History

The current FIRM presents flooding information for the entire geographic area of Long County. Previously, separate FIRMs, Flood Hazard Boundary Maps (FHBMs) and/or Flood Boundary and Floodway Maps (FBFMs) may have been prepared for the incorporated communities and the unincorporated areas in the county that had identified SFHAs. Current and historical data relating to the maps prepared for the project area are presented in Table 28, "Community Map History." A description of each of the column headings and the source of the date is also listed below.

- *Community Name* includes communities falling within the geographic area shown on the FIRM, including those that fall on the boundary line, nonparticipating communities, and communities with maps that have been rescinded. Communities with No Special Flood Hazards are indicated by a footnote. If all maps (FHBM, FBFM, and FIRM) were rescinded for a community, it is not listed in this table unless SFHAs have been identified in this community.

- *Initial Identification Date (First NFIP Map Published)* is the date of the first NFIP map that identified flood hazards in the community. If the FHBM has been converted to a FIRM, the initial FHBM date is shown. If the community has never been mapped, the upcoming effective date or "pending" (for Preliminary FIS Reports) is shown. If the community is listed in Table 28 but not identified on the map, the community is treated as if it were unmapped.

- *Initial FHBM Effective Date* is the effective date of the first Flood Hazard Boundary Map (FHBM). This date may be the same date as the Initial NFIP Map Date.

- *FHBM Revision Date(s)* is the date(s) that the FHBM was revised, if applicable.

- *Initial FIRM Effective Date* is the date of the first effective FIRM for the community.

- *FIRM Revision Date(s)* is the date(s) the FIRM was revised, if applicable. This is the revised date that is shown on the FIRM panel, if applicable. As countywide studies are completed or revised, each community listed should have its FIRM dates updated

accordingly to reflect the date of the countywide study. Once the FIRMs exist in countywide format, as Physical Map Revisions (PMR) of FIRM panels within the county are completed, the FIRM Revision Dates in the table for each community affected by the PMR are updated with the date of the PMR, even if the PMR did not revise all the panels within that community.

The initial effective date for the Long County FIRMs in countywide format was 09/26/2008.

**Table 28: Community Map History**

| Community Name | Initial Identification Date | Initial FHBM Effective Date | FHBM Revision Date(s) | Initial FIRM Effective Date | FIRM Revision Date(s) |
|---|---|---|---|---|---|
| Long County, Unincorporated Areas | 03/17/1978 | Not Available | None | 09/27/1985 | |
| Ludowici, City of | 09/26/2008 | Not Available | None | 09/26/2008 | |

## SECTION 7.0 – CONTRACTED STUDIES AND COMMUNITY COORDINATION

### 7.1 Contracted Studies

Table 29 provides a summary of the contracted studies, by flooding source, that are included in this FIS Report.

**Table 29: Summary of Contracted Studies Included in this FIS Report**

| Flooding Source | FIS Report Dated | Contractor | Number | Work Completed Date | Affected Communities |
|---|---|---|---|---|---|
| Altamaha River | 5/5/2014 | Dewberry and Davis, LLC. | Not Available | 2014 | Long County, Unincorporated Areas |
| Beards Creek | 5/5/2014 | Dewberry and Davis, LLC. | Not Available | 2014 | Long County, Unincorporated Areas |
| Doctors Creek | 9/26/2008 | PBS&J | EMA-2006-CA-5615 | 2007 | Long County, Unincorporated Areas |
| Horse Creek | 9/26/2008 | PBS&J | EMA-2006-CA-5615 | 2007 | Long County, Unincorporated Areas |

**Table 29: Summary of Contracted Studies Included in this FIS Report - continued**

| Flooding Source | FIS Report Dated | Contractor | Number | Work Completed Date | Affected Communities |
|---|---|---|---|---|---|
| Jones Creek | 9/26/2008 | PBS&J | EMA-2006-CA-5615 | 2007 | Long County, Unincorporated Areas; Ludowici, City of |
| Kirkland Creek | 9/26/2008 | PBS&J | EMA-2006-CA-5615 | 2007 | Long County, Unincorporated Areas |
| Kirkland Creek Tributary 3 | 9/26/2008 | PBS&J | EMA-2006-CA-5615 | 2007 | Long County, Unincorporated Areas |
| Little Doctor Creek | 9/26/2008 | PBS&J | EMA-2006-CA-5615 | 2007 | Long County, Unincorporated Areas |
| Little Doctor Creek Tributary 1 | 9/26/2008 | PBS&J | EMA-2006-CA-5615 | 2007 | Long County, Unincorporated Areas |
| Old Millhead Branch | 9/26/2008 | PBS&J | EMA-2006-CA-5615 | 2007 | Long County, Unincorporated Areas |
| Old Millhead Branch Tributary 4 | 9/26/2008 | PBS&J | EMA-2006-CA-5615 | 2007 | Long County, Unincorporated Areas |
| Old Millhead Branch Tributary 5 | 9/26/2008 | PBS&J | EMA-2006-CA-5615 | 2007 | Long County, Unincorporated Areas |
| Payne Creek | 9/26/2008 | PBS&J | EMA-2006-CA-5615 | 2007 | Long County, Unincorporated Areas |
| Slades Branch | 5/5/2014 | Dewberry and Davis, LLC. | Not Available | 2014 | Long County, Unincorporated Areas |
| Taylors Creek | 9/26/2008 | PBS&J | EMA-2006-CA-5615 | 2007 | Long County, Unincorporated Areas |
| Taylors Creek Tributary 2 | 9/26/2008 | PBS&J | EMA-2006-CA-5615 | 2007 | Long County, Unincorporated Areas |
| Taylors Creek Tributary 6 | 9/26/2008 | PBS&J | EMA-2006-CA-5615 | 2007 | Long County, Unincorporated Areas |

**Table 29: Summary of Contracted Studies Included in this FIS Report - continued**

| Flooding Source | FIS Report Dated | Contractor | Number | Work Completed Date | Affected Communities |
|---|---|---|---|---|---|
| Taylors Creek Tributary 7 | 9/26/2008 | PBS&J | EMA-2006-CA-5615 | 2007 | Long County, Unincorporated Areas |
| Taylors Creek Tributary 12 | 9/26/2008 | PBS&J | EMA-2006-CA-5615 | 2007 | Long County, Unincorporated Areas |
| Taylors Creek Tributary 13 | 9/26/2008 | PBS&J | EMA-2006-CA-5615 | 2007 | Long County, Unincorporated Areas |
| Unnamed Tributary to Beards Creek | 5/5/2014 | Dewberry and Davis, LLC. | Not Available | 2014 | Long County, Unincorporated Areas |

## 7.2 Community Meetings

The dates of the community meetings held for this Flood Risk Project and previous Flood Risk Projects are shown in Table 30. These meetings may have previously been referred to by a variety of names (Community Coordination Officer (CCO), Scoping, Discovery, etc.), but all meetings represent opportunities for FEMA, community officials, study contractors, and other invited guests to discuss the planning for and results of the project.

**Table 30: Community Meetings**

| Community | FIS Report Dated | Date of Meeting | Meeting Type | Attended By |
|---|---|---|---|---|
| Long County | 10/30/2015 | 08/19/2015 | Work Map | FEMA, Georgia DNR, CDM Smith, and community officials |
| Long County | 5/5/2014 | 11/9/2010 | CCO Meeting | FEMA Region IV, community officials, Georgia Coastal Regoinal Commission, and various other agencies and affected groups |
| | | 11/16/2010 | Scoping | FEMA Region IV, community officials, and various other agencies and affected groups |
| Long County | 9/26/2008 | 12/7/2005 | CCO Meeting | FEMA, Georgia DNR, PBS&J, Long County, and the City of Ludowici |
| | | 2/7/2008 | CCO Meeting | FEMA, Georgia DNR, PBS&J, and Long County |

## SECTION 8.0 – ADDITIONAL INFORMATION

Information concerning the pertinent data used in the preparation of this FIS Report can be obtained by submitting an order with any required payment to the FEMA Engineering Library. For more information on this process, see www.fema.gov.

The additional data that was used for this project includes the FIS Report and FIRM that were previously prepared for Long County (FEMA 2014).

Table 31 is a list of the locations where FIRMs for Long County can be viewed. Please note that the maps at these locations are for reference only and are not for distribution. Also, please note that only the maps for the community listed in the table are available at that particular repository. A user may need to visit another repository to view maps from an adjacent community.

**Table 31: Map Repositories**

| Community | Address | City | State | Zip Code |
|---|---|---|---|---|
| Long County, Unincorporated Areas | Code Enforcement Office<br>459 South McDonald Street | Ludowici | GA | 31316 |
| Ludowici, City of | Ludowici City Hall<br>469 North Main Street | Ludowici | GA | 31316 |

The National Flood Hazard Layer (NFHL) dataset is a compilation of effective FIRM databases and LOMCs. Together they create a GIS data layer for a State or Territory. The NFHL is updated as studies become effective and extracts are made available to the public monthly. NFHL data can be viewed or ordered from the website shown in Table 32.

Table 32 contains useful contact information regarding the FIS Report, the FIRM, and other relevant flood hazard and GIS data. In addition, information about the State NFIP Coordinator and GIS Coordinator is shown in this table. At the request of FEMA, each Governor has designated an agency of State or territorial government to coordinate that State's or territory's NFIP activities. These agencies often assist communities in developing and adopting necessary floodplain management measures. State GIS Coordinators are knowledgeable about the availability and location of State and local GIS data in their state.Table 32: Additional Information

| FEMA and the NFIP | |
|---|---|
| FEMA and FEMA Engineering Library website | www.fema.gov/national-flood-insurance-program-flood-hazard-mapping/engineering-library |
| NFIP website | www.fema.gov/national-flood-insurance-program |
| NFHL Dataset | msc.fema.gov |
| FEMA Region IV | Federal Emergency Management Agency, 3003 Chamblee Tucker Road, Atlanta, Georgia 30341 |
| Other Federal Agencies | |
| USGS website | www.usgs.gov |

**Table 32: Additional Information - continued**

| | |
|---|---|
| Hydraulic Engineering Center website | www.hec.usace.army.mil |
| State Agencies and Organizations | |
| State NFIP Coordinator | Tom Shillock, CFM<br>Dept. of Natural Resources<br>Environmental Protection Division<br>2 Martin Luther King Jr. Drive<br>Atlanta, Georgia 30334 |
| State GIS Coordinator | Not Applicable |

## SECTION 9.0 – BIBLIOGRAPHY AND REFERENCES

Table 33 includes sources used in the preparation of and cited in this FIS Report as well as additional studies that have been conducted in the study area.

**Table 33: Bibliography and References**

| Citation in this FIS | Publisher/ Issuer | *Publication Title,* "Article," Volume, Number, etc. | Author/Editor | Place of Publication | Publication Date/ Date of Issuance | Link |
|---|---|---|---|---|---|---|
| USDA 2010 | U.S. Department of Agriculture | *Long County Aerials* | National Agriculture Imagery Program | Washington, D.C. | 10/26/2010 | |
| FEMA 2008 | Federal Emergency Management Agency | *Long County Flood Insurance Rate Maps* | Federal Emergency Management Agency | Washington, D.C. | 09/26/2008 | |
| FEMA 2012 | Federal Emergency Management Agency | *Study Contractor Data* | Dewberry and Davis, LLC | Washington, D.C. | 10/26/2012 | |
| Georgia DOT 2008 | Georgia Department of Transportation | *County Boundaries* | Georgia Department of Transportation | Atlanta, GA | 12/09/2008 | |
| Long County GIS 2009 | Long County GIS | *Road Centerlines and Road Names* | Long County GIS | Long County, GA | 10/08/2009 | |
| Dewberry and Davis 2012 | Dewberry and Davis, LLC | *Submittal Area* | Dewberry and Davis, LLC | Atlanta, GA | 07/01/2012 | |
| FEMA 1983a | Federal Emergency Management Agency | *Flood Insurance Study, Liberty County, Georgia (Unincorporated Areas)* | Federal Emergency Management Agency | Washington, D.C. | 06/01/1983 | |

**Table 33: Bibliography and References - continued**

| Citation in this FIS | Publisher/ Issuer | *Publication Title,* "Article," Volume, Number, etc. | Author/Editor | Place of Publication | Publication Date/ Date of Issuance | Link |
|---|---|---|---|---|---|---|
| FEMA 1983 | Federal Emergency Management Agency | *Flood Insurance Rate Map, Liberty County, Georgia* | Federal Emergency Management Agency | Washington, D.C. | 12/01/1983 | |
| FEMA 1988 | Federal Emergency Management Agency | *Flood Insurance Study, Wayne County, Georgia (Unicorporated Areas)* | Federal Emergency Management Agency | Washington, D.C. | 09/30/1988 | |
| FEMA 1983b | Federal Emergency Management Agency | *Flood Insurance Study. Mcintosh County, Georgia (Unicorporated Areas)* | Federal Emergency Management Agency | Washington, D.C. | 11/15/1983 | |
| FEMA 1992 | Federal Emergency Management Agency | *Flood Insurance Rate Map Mcintosh County, Georgia (Unicorporated Areas)* | Federal Emergency Management Agency | Washington, D.C. | 10/16/1992 | |
| USACE 2004a | U.S. Army Corps of Engineers | *HEC-GeoRAS River Analysis System, Version BETA 6.0* | Hydrologic Engineering Center | Davis, CA | 04/2004 | |
| USACE 2004b | U.S. Army Corps of Engineers | *HEC-RAS River Analysis System, Version 3.1.3* | Hydrologic Engineering Center | Davis, CA | 04/2004 | |
| NARSAL 2007 | NARSAL (Natural Resources Spatial Analysis Laboratory) | *Georgia Land Use Trends; Long County: 1998 Land Cover* | NARSAL (Natural Resources Spatial Analysis Laboratory) | | 01/23/2007 | http://narsal.ecology.uga.edu |

**Table 33: Bibliography and References - continued**

| Citation in this FIS | Publisher/ Issuer | *Publication Title,* "Article," Volume, Number, etc. | Author/Editor | Place of Publication | Publication Date/ Date of Issuance | Link |
|---|---|---|---|---|---|---|
| National Geodetic Survey 2007 | National Geodetic Survey | *VERTCON-North American Vertical Datum Conversion Utility* | National Geodetic Survey | | 01/23/2007 | http://www.ngs.noaa.gov |
| NOAA 2007 | National Oceanic and Atmospheric Administration | *NOAA's National Weather Service* | National Oceanic and Atmospheric Administration | | 01/27/2007 | http://www.nws.noaa.gov/ |
| USGS 1993 | U.S. Geological Survey | *USGS Water Resources Investigations Report 93-4016. Techniques for Estimating Magnitude and Frequency of Floods in Rural Basins of Georgia* | Stamey, T.C. and C.W. Hess | | 1993 | |
| U.S. Census Bureau 2012 | U.S. Census Bureau | *American FactFinder, Long County, Georgia, 2010* | U.S. Census Bureau | | 06/05/2012 | http://factfinder.census.gov/qfd/states/13/13183.html |
| U.S. Cities Online 2007 | U.S. Cities Online | *Key to the City: Ludowici. Long County, Georgia* | U.S. Cities Online | | 01/23/2007 | http://www.usacitiesonline.com |

**Table 33: Bibliography and References - continued**

| Citation in this FIS | Publisher/ Issuer | *Publication Title,* "Article," Volume, Number, etc. | Author/Editor | Place of Publication | Publication Date/ Date of Issuance | Link |
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| USGS 1993 | U.S. Department of the Interior | *7.5-Minute Series Topographic Maps, Scale 1:24,000, Contour Interval 5 and 10 feet, digitized by Geotechnologies, Inc.; Glissons Millpond, 1993; Glennville, 1993; Glennville NE, 1993; Taylors Creek, 1993; Glennville SW, 1993; Glennville SE, 1993; Walthourville, 1993; Hinesville, 1993; Jesup NW, 1993; Doctortown, 1993; Ludowici, 1993; East of Ludowici, 1993; Riceboro, 1993; Jesup East,1993; Bug Island, 1993; Townsend, 1993* | U.S. Geological Survey | | 1993 | |
| The Weather Channel 2007 | The Weather Channel | *Monthly Averages for Ludowici. GA* | The Weather Channel | | 1/23/2007 | http://www.weather.com |
| Chow 1998 | McGraw-Hill International Editions | *Applied Hydrology* | Chow, V.T. et a | | 1998 | |

**Table 33: Bibliography and References - continued**

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| Downer 2008 | Engineer Research and Development Center | *GSSHAWIKI User's Manual, Gridded Surface Subsurface Hydrologic Analysis Version 4.0 for WMS 8.1, ERDC Technical Report* | Downer, C.W., Ogden, F.L., and Byrd, A.R | Vicksburg, Mississippi | 2008 | |
| FEMA 2003 | Federal Emergency Management Agency | *Guidelines and Specifications for Flood Hazard Mapping Partners, Appendix C: Guidance for Riverine Flooding Analysis and Mapping* | Federal Emergency Management Agency | Washington, D.C. | 2003 | |
| NOAA | NOAA | *Technical Report NWS 24, A Methodology for Point-to-Area Rainfall Frequency Ratios* | NOAA | Washington, D.C. | 02/1980 | |
| USDA 2009 | United States Department of Agriculture | *WinTR-55 Small Watershed Hydrology Program, Version 1.00.09* | United States Department of Agriculture | | 08/05/2009 | |
| Hershfield 1961 | United States Department of Commerce | *Technical Paper No.40, Rainfall Frequency Atlas of the United States for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years* | David M. Hershfield | Washington, D.C. | 05/1961 | |

**Table 33: Bibliography and References - continued**

| Citation in this FIS | Publisher/ Issuer | *Publication Title,* "Article," Volume, Number, etc. | Author/Editor | Place of Publication | Publication Date/ Date of Issuance | Link |
|---|---|---|---|---|---|---|
| USGS 2009 | United States Geological Survey | *Magnitude and Frequency of Rural Floods in the Southeastern United States, 2006: Volume 1* | United States Geological Survey | Georgia | 2009 | |
| | XP-SWMM, XPSWMM | *2011 Getting Started Manual, US (NA)* | XP-SWMM, XPSWMM | Portland, Oregon | 2011 | |