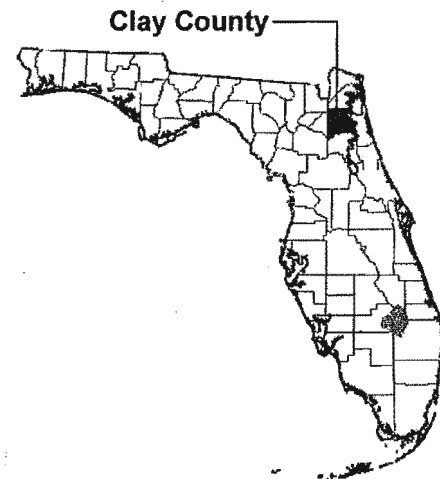


FLOOD INSURANCE STUDY



VOLUME 1 OF 2

CLAY COUNTY, FLORIDA AND INCORPORATED AREAS



Community Name	Community Number
CLAY COUNTY (UNINCORPORATED AREAS)	120064
GREEN COVE SPRINGS, CITY OF	120065
KEYSTONE HEIGHTS, CITY OF	120671
ORANGE PARK, TOWN OF	120066
PENNEY FARMS, TOWN OF	120059

EFFECTIVE:
March 17, 2014



Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
12019CV001A

**NOTICE TO
FLOOD INSURANCE STUDY USERS**

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

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

<u>Old Zone</u>	<u>New Zone</u>
A1 through A30	AE
B	X
C	X

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

Initial Countywide FIS Effective Date: March 17, 2014

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Exhibit 2 – Flood Insurance Rate Map Index (Published Separately)
Flood Insurance Rate Maps (Published Separately)

FLOOD INSURANCE STUDY
CLAY COUNTY, FLORIDA AND INCORPORATED AREAS

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study (FIS) revises and updates information on the existence and severity of flood hazards in the geographic area of Clay County, including the Cities of Green Cove Springs and Keystone Heights; the Towns of Orange Park and Penney Farms and the unincorporated areas of Clay County (referred to collectively herein as Clay County), and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood-risk data for various areas of the community that will be used to establish actuarial flood insurance rates and to assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

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

The Digital Flood Insurance Rate Map (DFIRM) and FIS Report for this countywide study have been produced in digital format. Flood hazard information was converted to meet the Federal Emergency Management Agency (FEMA) DFIRM database specifications and Geographic Information and is provided in a digital format so that it can be incorporated into a local GIS and be accessed more easily by the community.

1.2 Authority and Acknowledgments

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

This update includes an effort to combine all communities, as well as the unincorporated areas of Clay County, into a countywide FIS, as compiled from previously published FIS narratives. Table 1 provides a chronological summary of the most recent analyses of flooding sources studied within Clay County, the contract number under which they were performed (if known), and the communities affected by each.

Table 1: Summary of Flooding Sources Presented in Current Study

Flooding Source	Completion Date	Study Contractor(s)	Contractor/Ingr. Agency Agreement No.	Communities Affected
Big Branch	September 1992	Engineering Methods & Applications, Inc.	EMN-88-C-2611	Clay County, Uninc. Areas
Black Creek	September 1992	Engineering Methods & Applications, Inc.	EMN-88-C-2611	Clay County, Uninc. Areas
Black Creek Tributaries	March 2010	Watershed IV Alliance	EMA-2002-CO-0011A	Clay County and Inc.
Bradley Creek	September 1992	Engineering Methods & Applications, Inc.	EMN-88-C-2611	Clay County, Uninc. Areas
Bradley Creek Tributary 1	March 2010	U.S. Geological Survey	EMA-2002-CO-0011A	Clay County and Inc.
Buckeys Creek	January 1988	Braswell Engineering, Inc.	EMA-96-00-0021	Green Cove Springs
Bull Creek	September 1992	Engineering Methods & Applications, Inc.	EMN-88-C-2611	Clay County, Uninc. Areas
Bull Creek Tributary 1	June 1977	U.S. Geological Survey	IAA-H-9-77, Project Order No. 8	Clay County, Uninc. Areas
Bush Creek	March 2010	Watershed IV Alliance	EMA-2002-CO-0011A	Clay County and Inc.
Bush Creek Tributary 1	March 2010	Watershed IV Alliance	EMA-2002-CO-0011A	Clay County and Inc.
Clarkes Creek	June 1977	U.S. Geological Survey	IAA-H-9-77, Project Order No. 8	Clay County, Uninc. Areas

Table 1: Summary of Flooding Sources Presented in Current Study

Flooding Source	Publication Date	Study Contractor(s)	Contractor/Inter-Agency Agreement No.	Communities Affected
Clay Branch	September 1992	Engineering Methods & Applications, Inc.	EMN-88-C-2611	Clay County, Uninc. Areas
Doctors Lake Tributary 1	June 1977	U.S. Geological Survey	EMA-2002-CO-0011A	Clay County, Uninc. Areas
Doctors Lake Tributary 2	March 2010	Watershed IV Alliance	EMA-2002-CO-0011A	Clay County and Inc.
Double Branch	June 1977	U.S. Geological Survey	IAA-H-9-77, Project Order No. 8	Clay County, Uninc. Areas
Duckwater Branch	September 1992	Engineering Methods & Applications, Inc.	EMN-88-C-2611	Clay County, Uninc. Areas
Governors Creek	June 1977	U.S. Geological Survey	IAA-H-9-77, Project Order No. 8	Clay County, Uninc. Areas
Governors Creek Tributary 1	March 2010	Watershed IV Alliance	EMA-2002-CO-0011A	Clay County and Inc.
Greens Creek	March 2010	Watershed IV Alliance	EMA-2002-CO-0011A	Clay County, Uninc. Areas
Grog Creek ²	March 2010	Watershed IV Alliance	EMA-2002-CO-0011A	Clay County and Inc.
Grog Creek	September 1992	Engineering Methods & Applications, Inc.	EMN-88-C-2611	Clay County, Uninc. Areas
Little Black Creek ²	March 2010	Watershed IV Alliance	EMA-2002-CO-0011A	Clay County and Inc.

² Duplicate entries due to different contractors studying different stream sections that are included in this FIS report

Table 1: Summary of Flooding Sources Presented in Current Study

Flooding Source	Completion Date	Study Contractor	Contract or Agency Agreement No.	Communities Affected
Little Black Creek	September 1992	Engineering Methods & Applications, Inc.	EMN-88-C-2611	Clay County, Uninc. Areas
Little Black Creek Tributary 1 ²	March 2010	Watershed IV Alliance	EMA-2002-CO-0011A	Clay County and Inc.
Little Black Creek Tributary 1	September 1992	Engineering Methods & Applications, Inc.	EMN-88-C-2611	Clay County, Uninc. Areas
Little Black Creek Tributary 2 ²	March 2010	Watershed IV Alliance	EMA-2002-CO-0011A	Clay County and Inc.
Little Black Creek Tributary 2	June 1977	U.S. Geological Survey	IAA-H-9-77, Project Order No. 8	Clay County, Uninc. Areas
Little Black Creek Tributary 3	March 2010	Watershed IV Alliance	EMA-2002-CO-0011A	Clay County and Inc.
Little Black Creek and Tributary 1A	March 2010	Watershed IV Alliance	EMA-2002-CO-0011A	Clay County and Inc.
Long Branch	June 1977	U.S. Geological Survey	IAA-H-9-77, Project Order No. 8	Clay County, Uninc. Areas
Lucy Branch	March 2010	Watershed IV Alliance	EMA-2002-CO-0011A	Clay County and Inc.
Mill Creek	September 1992	Engineering Methods & Applications, Inc.	EMN-88-C-2611	Clay County, Uninc. Areas
North Fork Black Creek	September 1992	Engineering Methods & Applications, Inc.	EMN-88-C-2611	Clay County, Uninc. Areas

² Duplicate entries due to different contractors studying different stream sections that are included in this FIS report

Table 1: Summary of Flooding Sources Presented in Current Study

Flooding Source	Completion Date	Study Contractor(s)	Contract or Inter-Agency Agreement No.	Communities Affected
North Fork Black Creek Tributary 1 ²	March 2010	Watershed IV Alliance	EMA-2002-CO-0011A	Clay County and Inc.
North Fork Black Creek Tributary 1	June 1977	U.S. Geological Survey	IAA-H-9-77, Project Order No. 8	Clay County, Uninc. Areas
North Fork Black Creek Tributary 2 ²	March 2010	Watershed IV Alliance	EMA-2002-CO-0011A	Clay County and Inc.
North Fork Black Creek Tributary 2	September 1992	Engineering Methods & Applications, Inc.	EMN-88-C-2611	Clay County, Uninc. Areas
North Prong Double Branch ¹	March 2010	Watershed IV Alliance	EMA-2002-CO-0011A	Clay County and Inc.
North Prong Double Branch	June 1977	U.S. Geological Survey	IAA-H-9-77, Project Order No. 8	Clay County, Uninc. Areas
Ortega River	March 2010	Watershed IV Alliance	EMA-2002-CO-0011A	Clay County and Inc.
Ortega River Tributary	March 2010	Watershed IV Alliance	EMA-2002-CO-0011A	Clay County and Inc.
Ortega River Tributary 1	June 1977	U.S. Geological Survey	IAA-H-9-77, Project Order No. 8	Clay County, Uninc. Areas
Peters Branch ²	March 2010	Watershed IV Alliance	EMA-2002-CO-0011A	Clay County and Inc.
Peters Branch	September 1992	Engineering Methods & Applications, Inc.	EMN-88-C-2611	Clay County, Uninc. Areas
Peters Creek ²	March 2010	Watershed IV Alliance	EMA-2002-CO-0011A	Clay County and Inc.

¹ Flooding source with new or revised analyses incorporated as part of current study update

² Duplicate entries due to different contractors studying different stream sections that are included in this FIS report

Table 1: Summary of Flooding Sources Presented in Current Study

Flooding Source	Completion Date	Study Contractor	Contractor/Inter-Agency Agreement No.	Communities Affected
Peters Creek	June 1977	U.S. Geological Survey	IAA-H-9-77, Project Order No. 8	Clay County, Uninc. Areas
Peters Creek Tributaries	March 2010	Watershed IV Alliance	EMA-2002-CO-0011A	Clay County and Inc.
Polander Branch	September 1992	Engineering Methods & Applications, Inc.	EMN-88-C-2611	Clay County, Uninc. Areas
South Fork Black Creek ¹	March 2010	Watershed IV Alliance	EMA-2002-CO-0011A	Clay County and Inc.
South Fork Black Creek	March 2010	Watershed IV Alliance	EMA-2002-CO-0011A	Clay County and Inc.
South Fork Black Creek Tributaries	March 2010	Watershed IV Alliance	EMA-2002-CO-0011A	Clay County and Inc.
South Fork Black Creek Tributary 1	June 1977	U.S. Geological Survey	IAA-H-9-77, Project Order No. 8	Clay County, Uninc. Areas
South Prong Double Branch ²	March 2010	Watershed IV Alliance	EMA-2002-CO-0011A	Clay County and Inc.
South Prong Double Branch	September 1992	Engineering Methods & Applications, Inc.	EMN-88-C-2611	Clay County, Uninc. Areas
St. Johns River	June 1977	U.S. Geological Survey	IAA-H-9-77, Project Order No. 8	Clay County, Uninc. Areas
St. Johns River Tributaries	March 2010	Watershed IV Alliance	EMA-2002-CO-0011A	Clay County and Inc.

¹ Flooding source with new or revised analyses incorporated as part of current study update

² Duplicate entries due to different contractors studying different stream sections that are included in this FIS report

Table 1: Summary of Flooding Sources Presented in Current Study

Flooding Source	Completion Date	Study Conducted by	Contract or Inter-Agency Agreement No.	Communities Affected
St. Johns River Tributary 1, 2, and 3	June 1977	U.S. Geological Survey	IAA-H-9-77, Project Order No. 8	Clay County, Uninc. Areas
Swimming Pen Creek	June 1977	U.S. Geological Survey	IAA-H-9-77, Project Order No. 8	Clay County, Uninc. Areas
Unnamed Stream 1 and Tributaries	March 2010	Watershed IV Alliance	EMA-2002-CO-0011A	Clay County and Inc.
North Lake Ashbury	August 1980	U.S. Army Corps of Engineers ²	-	Clay County, Uninc. Areas
South Lake Ashbury	August 1980	U.S. Army Corps of Engineers	-	Clay County, Uninc. Areas
Brooklyn Lake	June 1977	U.S. Geological Survey	IAA-H-9-77, Project Order No. 8	Clay County, Uninc. Areas
Coopers Pond	June 1977	U.S. Geological Survey	IAA-H-9-77, Project Order No. 8	Clay County, Uninc. Areas
Flowers Prairie	June 1977	U.S. Geological Survey	IAA-H-9-77, Project Order No. 8	Clay County, Uninc. Areas
Gator Bone Lake	June 1977	U.S. Geological Survey	IAA-H-9-77, Project Order No. 8	Clay County, Uninc. Areas
Lake Geneva	June 1977	U.S. Geological Survey	IAA-H-9-77, Project Order No. 8	Clay County, Uninc. Areas
Hall Lake	June 1977	U.S. Geological Survey	IAA-H-9-77, Project Order No. 8	Clay County, Uninc. Areas
Lake Johnson	June 1977	U.S. Geological Survey	IAA-H-9-77, Project Order No. 8	Clay County, Uninc. Areas

Table 1: Summary of Flooding Sources Presented in Current Study

Flooding Source	Completion Date	Study Contractor	Contract (Int.) Agency Agreement No.	Communities Affected
Kingsley Lake	June 1977	U.S. Geological Survey	IAA-H-9-77, Project Order No. 8	Clay County, Uninc. Areas
Lake Lark	August 1980	U.S. Army Corps of Engineers	---	Clay County, Uninc. Areas
Long Lake	June 1977	U.S. Geological Survey	IAA-H-9-77, Project Order No. 8	Clay County, Uninc. Areas
M Lake	June 1977	U.S. Geological Survey	IAA-H-9-77, Project Order No. 8	Clay County, Uninc. Areas
Magnolia Lake	June 1977	U.S. Geological Survey	IAA-H-9-77, Project Order No. 8	Clay County, Uninc. Areas
Lake Ryan	August 1980	U.S. Army Corps of Engineers	---	Clay County, Uninc. Areas
Sand Hill Lake	June 1977	U.S. Geological Survey	IAA-H-9-77, Project Order No. 8	Clay County, Uninc. Areas
Smith Lake	June 1977	U.S. Geological Survey	IAA-H-9-77, Project Order No. 8	Clay County, Uninc. Areas
Spring Lake	June 1977	U.S. Geological Survey	IAA-H-9-77, Project Order No. 8	Clay County, Uninc. Areas
White Sand Lake (Swindle Lake)	June 1977	U.S. Geological Survey	IAA-H-9-77, Project Order No. 8	Clay County, Uninc. Areas

For this countywide FIS, the hydrologic and hydraulic analyses were revised for sections of the following flooding sources:

- Big Branch
- Black Creek
- Black Creek Tributary 1 and Tributary 2

- Bradley Creek
- Bradley Creek Tributary 1
- Buckeys Creek
- Bull Creek
- Bush Creek
- Bush Creek Tributary 1
- Clarkes Creek
- Clay Branch
- Dillaberry Branch
- Doctors Lake Tributary 1, Tributary 2 and Tributary 5
- Double Branch
- Duckwater Branch
- Dudley Branch
- Governors Creek
- Greens Creek
- Grog Creek
- Grog Creek Tributary 1
- Little Black Creek
- Little Black Creek Tributary 1, Tributary 1A, Tributary 2, Tributary 3 and Tributary 4
- Long Branch
- Lucy Branch
- Mill Creek
- Mill Log Creek
- Mill Log Creek Tributary 1
- North Fork Black Creek
- North Fork Black Creek Tributary 1, Tributary 1A, and Tributary 2
- North Prong Double Branch
- North Prong Double Branch Tributary 1
- Ortega River
- Ortega River Tributary
- Ortega River Tributary 1
- Peters Branch
- Peters Creek
- Peters Creek Tributary 1, Tributary 2
- Polander Branch
- Polander Branch Tributary 1
- South Fork Black Creek
- South Fork Black Creek Tributary 1, Tributary 2, Tributary 3, Tributary 4, and Tributary 7
- South Prong Double Branch
- St. Johns River
- St. Johns River Tributary 1, Tributary 2, Tributary 3, and Tributary 3A, Tributary 4A East, Tributary 5, Tributary 6, Tributary 7
- Swimming Pen Creek

Base map information for Clay County and all incorporated communities within Clay County was provided in digital format by the Clay County Property Appraiser's Office produced at a scale of 1:12,000 from. This information was photogrammetrically compiled from photography dated 2008.

The coordinate system used in the preparation of the DFIRM was HARN State Plane Florida East FIPS Zone 0901 Feet. The horizontal datum was North American Datum of 1983, Geodetic Reference System of 1980 spheroid. Differences in the datum and spheroid used in the production of FIRMs for adjacent counties may result in slight positional differences in map features at the county boundaries. These differences do not affect the accuracy of information shown on the FIRM.

1.3 Coordination

An initial Consultation Coordination Officer (CCO) meeting (also occasionally referred to as the Scoping meeting) is held with representatives of the communities, FEMA, and the study contractors to explain the nature and purpose of the FIS and to identify the streams to be studied. A final CCO meeting (often also referred to as the Preliminary DFIRM Community Coordination, or PDCC, meeting) is held with representatives of the communities, FEMA, and the study contractors to review the results of the study.

The dates of the historical initial and final CCO meetings held for the communities within Clay County are shown in Table 2 (References 1; 2; 3; 4).

Table 2: Historical CCO Meeting Dates

Community Name	Initial CCO Date	Final CCO Date
Clay County (Unincorporated Areas)	*	*
City of Green Cove Springs	December 5, 1997	*
City of Green Cove Springs	February 1976	September 16, 1977
City of Keystone Heights	March 2, 1995	*
Town of Orange Park	February 1976	February 8, 1979

*Date not available

For this countywide FIS, the initial CCO meeting was held on August 28, 2008, and attended by representatives of Clay County, local communities, FEMA Region IV, and Watershed IV Alliance.

The final CCO meeting was held on February 9, 2012 to review and accept the results of this FIS. Those who attended this meeting included representatives of Clay County, Watershed IV Alliance, FEMA, and the communities. All problems raised at that meeting have been addressed in this study.

2.0 AREA STUDIED

2.1 Scope of Study

This FIS report covers the geographic area of Clay County, Florida, including the incorporated communities listed in Section 1.1. The scope and methods of this study were proposed to, and agreed upon, by FEMA, Clay County, and Watershed IV Alliance.

In this FIS, some streams have names other than those used in previously printed FISs. Details of these name changes are listed in Table 3.

Table 3: Stream Name Changes

<u>Community</u>	<u>Old Name</u>	<u>New Name</u>
Clay County	Tributary No. 1	Big Branch Tributary 4
	Unnamed Tributary	Bradley Creek Tributary 1
	Little Black Creek Tributary No. 1	Little Black Creek Tributary 1
	Little Black Creek Tributary No. 2	Little Black Creek Tributary 2
	North Fork Black Creek Tributary No. 1	North Fork Black Creek Tributary 1
	North Fork Black Creek Tributary No. 2	North Fork Black Creek Tributary 1A
	Ortega River Tributary No. 1	Ortega River Tributary 1
	Clay County	South Fork Black Creek Tributary No. 1
South Fork Black Creek Tributary No. 1		South Fork Black Creek Tributary II
St. Johns River Tributary No. 2		St. Johns River Tributary 2
St. Johns River Tributary No. 3		St. Johns River Tributary 3
Green Cove Springs, City of	St. Johns River Tributary No. 1	St. Johns River Tributary 1
Orange Park, Town of	Doctors Lake Tributary No. 1	Doctors Lake Tributary 1

The areas studied by detailed methods were selected with priority given to all known flood hazards and areas of projected development. The scope and methods of study were proposed to and agreed upon by FEMA and Clay County. The flooding sources studied by detailed methods are presented in Table 4.

Table 4: Flooding Sources Studied by Detailed Methods

Flooding Source	Reach Length (miles) or Area (sq. miles)	Study Limits
Big Branch	4.0	From County Road 218 to confluence with North Fork Black Creek
Black Creek	12.2	From confluence with North and South Fork Black Creek to a point approximately 4,199 feet upstream of confluence with St Johns River.
Bradley Creek	4.6	From approximately 168 feet upstream of County Road 218 to confluence with Black Creek
Bull Creek	3.9	From Juniper Avenue to confluence with Mill Creek
Clarkes Creek	5.7	From a point approximately 1.5 miles upstream of US Highway 17 to a point approximately 0.5 miles downstream of County Road 209
Dillaberry Branch	2.6	From County Road 218 to confluence with North Fork Black Creek
Double Branch	4.0	From a point approximately 0.4 miles upstream of Branan Field Road to confluence with Little Black Creek
Duckwater Branch	1.1	From a point approximately 205 feet upstream of County Road 218 to confluence with Big Branch
Governors Creek	3.9	From a point approximately 1 mile upstream of State Road 16 to confluence with St Johns River
Greens Creek	1.6	From a point approximately 1.8 miles upstream of State Road 16 to confluence with South Fork Black Creek.
Grog Creek	3.4	From a point approximately 0.6 mile upstream of Blanding Boulevard to confluence with Black Creek.
Little Black Creek	9.7	From a point approximately 2000 feet downstream of Cheswick Oak to confluence with Black Creek
Little Black Creek Tributary 1	1.1	From a point approximately 911 feet downstream of Trail Ridge to confluence with Little Black Creek
Little Black Creek Tributary 2	0.8	From Watson Ranch Road to confluence with Little Black Creek
Long Branch	4.0	From a point approximately 1.5 miles upstream of County Road 217 to confluence with North Fork Black Creek

Table 4: Flooding Sources Studied by Detailed Methods

Flooding Source	Reach Length (miles) or Area (sq. miles)	Study Limits
Mill Creek	2.2	From Calendula Avenue to confluence with Bull Creek
North Fork Black Creek	22.6	From a point approximately 100 feet upstream of North Road to the confluence with Black Creek
North Fork Black Creek Tributary 1	0.9	From Long Bay Road to confluence with North Fork Black Creek
North Fork Black Creek Tributary 1A	0.9	From Long Bay Road to confluence with North Fork Black Creek Tributary 1
North Prong Double Branch	1.7	From Banan Field Road to confluence with Double Branch
Ortega River	2.7	From Wells Road to a point approximately 1.5 miles downstream of Blanding Boulevard
Peters Branch	1.1	From US Highway 17 to confluence with St Johns River
Peters Creek	4.4	From a point approximately 0.4 mile upstream of Rosemary Hill Road to confluence with Black Creek
Polander Branch	1.4	From County Road 218 to confluence with South Black Creek
South Fork Black Creek	10.9	From confluence of Greens Creek to confluence of Bull Creek
South Fork Black Creek Tributary 1	0.9	From a point approximately 600 feet upstream of Country Road 218 to confluence with South Fork Black Creek
South Fork Black Creek Tributary 7	2.0	From a point approximately 1.5 miles upstream of State Road 16 to confluence with South Fork Black Creek
South Prong Double Branch	2.0	From a point approximately 0.5 mile downstream of Oakleaf Plantation to the confluence with Double Branch
St. Johns River	27.3	From southern county boundary to northern county boundary.
St. Johns River Tributary 1	1.5	From a point approximately 0.5 mile upstream of US Highway 17 to the confluence with St Johns River
Swimming Pen Creek	3.1	From Eagle Creek Drive to confluence with Doctors Lake

In addition to the riverine flooding sources listed in Table 4, the following lakes/ponding areas were studied by detailed methods: Blue Pond, Bundy Lake, Coopers Pond, Crystal Lake, Deer Springs Lake, Doctors Lake, Flowers Prairie, Gator Bone Lake, Hall Lake, Kingsley Lake, Lake Brooklyn, Lake Geneva, Lake Hutchinson, Lake Johnson (Big Lake), Lake Johnson (Little Lake), Lake Lark, Lake Lily, Lake Lure, Lake Margie, Lake Opal, Lake Ryan, Little Lake Geneva, Loch Lomond, Long Lake, M Lake, Magnolia Lake, North Lake Asbury, Oldfield Pond, Pebble Lake, Ponding Areas No. 1-25, Sand Hill Lake, Silver Sand Lake, Smith Lake, South Lake Asbury, Spring Lake, White Sand Lake (Swindle Lake).

The areas studied by limited detailed methods were selected for areas having low to moderate development potential or flood hazards. The scope and methods of study were proposed to and agreed upon by FEMA and Clay County. The flooding sources studied by limited detailed methods are presented in Table 5. All flooding sources studied by limited detailed methods were new analyses incorporated as part of the current study update.

Table 5: Flooding Sources Studied by Limited Detailed Methods

Flooding Source	Reach Length (miles) or Area (sq. miles)	Study Limits
Black Creek Tributary 1	1.1	From a point approximately 0.5 miles upstream of Russel Road to confluence with Black Creek
Black Creek Tributary 2	1.4	From a point approximately 350 feet downstream of Lake Asbury Drive to confluence with Black Creek
Bradley Creek Tributary 1	0.5	From a point approximately 0.5 downstream of Jubilee Lane to confluence with Bradley Creek
Bush Creek	0.8	From a point approximately 0.2 miles upstream of Railroad to a point approximately 0.5 miles downstream of County Road 209
Bush Creek Tributary 1	1.3	From a point approximately 0.9 miles upstream of County Road 209 to a point approximately 0.4 miles downstream of County Road 209
Clay Branch	1.1	From a point approximately 0.4 miles upstream of Rivers Road to a point approximately 360 feet upstream of US Highway 17
Doctors Lake Tributary 2	1.8	From Blanding Boulevard to a point approximately 0.2 miles downstream of Doctors Lake Drive
Doctors Lake Tributary 5	0.9	From Eagle Harbor Parkway to a point approximately 500 feet of Salt Marsh Lane
Grog Creek	0.5	From a point approximately 0.5 miles upstream of Blanding Boulevard to a point approximately 0.6 miles upstream Blanding Boulevard..

Table 5: Flooding Sources Studied by Limited Detailed Methods

Flooding Source	Reach Length (miles) or Area (sq miles)	Study Limits
Grog Creek Tributary 1	0.7	From a point approximately 180 feet downstream Blanding Boulevard to the confluence with Grog Creek
Little Black Creek	0.5	From a point approximately 330 feet upstream of Cheswick Oak Avenue to a point approximately 0.4 miles downstream of Cheswick Avenue.
Little Black Creek Tributary 1	1.4	From a point approximately 100 feet downstream Club Lake Drive to a point approximately 780 Feet downstream of Trail Ridge Road
Little Black Creek Tributary 1A	1.4	From a point approximately 0.4 miles upstream of Pine Ridge Parkway to confluence with Little Black Creek Tributary 1
Little Black Creek Tributary 2	1.7	From a point approximately 500 feet downstream of Village Oaks Lane to Watson Ranch
Little Black Creek Tributary 3	2.2	From a point approximately 0.5 miles upstream of Browns Road to a point approximately 0.9 miles downstream of Branan Field Road
Little Black Creek Tributary 4	1.7	From Jefferson Avenue to the confluence with Little Black Creek
Lucy Branch	2.1	From a point approximately 0.4 miles of Blanding Boulevard to the confluence with Doctors Lake
Mill Log Creek	3.6	From a point approximately 1.3 miles upstream of Sandridge Road Boulevard to the confluence with Black Creek
Mill Log Creek Tributary 1	1.1	From a point approximately 0.7 miles upstream of Russel Road to confluence with Mill Log Creek
North Fork Black Creek Tributary 1	0.7	From a point approximately 0.2 miles downstream of Appalosa Road to Long Bay road
North Fork Black Creek Tributary 1A	0.5	From a point approximately 0.5 miles upstream of Long Bay Road to Long Bay Road
North Fork Black Creek Tributary 2	0.7	From a point approximately 0.2 miles upstream of Crazy Horse Avenue to confluence with North Fork Black Creek
North Prong Double Branch Tributary 1	0.4	From a point approximately 0.3 miles upstream of Branan Field to a point approximately 0.1 miles downstream of Branan Field
Ortega River Tributary	0.8	From a point approximately 270 feet upstream of Beecher Lane to a point approximately 250 feet downstream of Wells Road

Table 5: Flooding Sources Studied by Limited Detailed Methods

Tributary Source	Reach Length (miles) (0.172 (30 miles)	Study Limits
Ortega River Tributary 1	0.8	From a point approximately 0.5 miles upstream of Country Club Boulevard to confluence with Ortega River ¹
Peters Branch	0.5	From a point approximately 100 feet upstream of County Road 220 to a point approximately 115 feet upstream of US Highway 17
Peters Creek	0.5	From a point approximately 1.4 miles upstream of State Road 16 to a point approximately 0.5 miles of confluence with Peters Creek Tributary 2
Peters Creek Tributary 1	2.6	From a point approximately 200 feet upstream of Mill Field Road to confluence with Peters Creek
Peters Creek Tributary 2	0.9	From a point approximately 0.5 miles upstream Intersection of County Road 215 and Rosemary Hill Road to confluence with Peters Creek
Polander Branch Tributary 1	0.3	From confluence with Polander Branch to a point approximately 0.4 miles upstream of confluence with Polander Branch
South Fork Black Creek Tributary 2	1.3	From a point approximately 500 feet downstream Maggie Lane to confluence with South Fork Black Creek
South Fork Black Creek Tributary 3	2.6	From a point approximately 0.8 miles upstream of Thunder road to confluence with South Fork Black Creek
South Fork Black Creek Tributary 4	0.6	From a point approximately 1.5 miles upstream of Thunder Road to a point approximately 0.8 miles upstream of Thunder Road
South Prong Double Branch	1.1	From a point approximately 0.5 miles upstream of Oakleaf Plantation Parkway to a point approximately 0.6 miles downstream of Oakleaf Plantation Parkway
St. Johns River Tributary 1	0.2	From a point approximately 0.5 miles upstream of CSX railroad to a point approximately 0.8 miles upstream of CSX railroad
St. Johns River Tributary 3	0.8	From a point approximately 1000 feet upstream of Railroad to confluence with St Johns Tributary 3A

¹ Ortega River Tributary 1 was studied by Limited Detailed Methods, however due to model limitations and inundation of backwater from Ortega River this entire reach is shown on the FIRM as an Approximate Zone A.

Table 5: Flooding Sources Studied by Limited Detailed Methods

Flooding Source	Reach Length (miles)/Area (sq. miles)	Study Limits
St. Johns River Tributary 3A	1.1	From appoint approximately 0.5 miles upstream of Railroad to confluence with St Johns River Tributary 3
St. Johns River Tributary 4 A East	0.5	From a point approximately 0.2 miles upstream of County Road 209 to a point approximately 320 feet downstream of Railroad
St. Johns River Tributary 5 DS	0.7	From a point approximately 700 feet upstream of Bayard Road to a point approximately 0.6 miles downstream of Bayard Road
St. Johns River Tributary 5 US	0.3	From a point approximately 500 feet upstream of Railroad to a point approximately 0.15 miles downstream of US Highway 17
St. Johns River Tributary 6	1.2	From a point approximately 0.5 miles upstream of Railroad to a point approximately 0.2 miles downstream of County road 209
St. Johns River Tributary 7	0.5	From a point approximately 280 ft downstream of Railroad to a point approximately 500 feet downstream of County Road 209

Numerous streams and basins were studied by approximate methods. The total number of stream miles and square miles of basins studied by approximate methods are shown in Table 6. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards.

Table 6: Flooding Sources Studied by Approximate Methods

Flooding Source	Reach Length (miles)/Area (sq. miles)	Study Limits
Zone A Streams	482.0 miles	All Zone A riverine flooding sources within Clay County

The following table, Table 7, lists the Letters of Map Revision within Clay County and Incorporated Areas which have been incorporated into the revised FIRMs.

Table 7: Letters of Map Revision (LOMRs) Incorporated into Current Study

Case Number	Flooding Source(s)	Communities Affected	Effective Date
00-04-331P	Doctors Lake	Clay County	3/27/01
02-04-1082P	Little Black Creek Tributary 1	Clay County	7/17/02
03-04-3244A	Ponding Areas No. 2-23	Clay County	6/5/03
03-04-3370A	Ponding Areas No. 2-23	Clay County	5/22/03
03-04-3372A	Ponding Areas No. 2-23	Clay County	5/22/03
03-04-3374A	Ponding Areas No. 2-23	Clay County	5/22/03
03-04-3376A	Ponding Areas No. 2-23	Clay County	5/22/03
03-04-3378A	Ponding Areas No. 2-23	Clay County	3/21/03
06-04-BQ02P	Little Black Creek	Clay County	10/16/06
10-04-6297P	Ponding Area No. 1	Clay County	12/9/10
94-04-229P		Clay County	7/11/95
95-04-111P		Clay County	9/29/95
96-04-922R		Clay County	7/2/97
97-04-011P		Clay County	9/29/95

Floodplain boundaries for all flooding sources within the study area have been mapped based upon the most up-to-date topographic data available.

2.2 Community Description

Clay County is located in northeastern Florida on the St. Johns River. Clay County is bordered by Duval County and the City of Jacksonville to the north; St. Johns County and the City of Jacksonville to the east; Putnam County to the south; and Bradford and Baker Counties to the west. The county encompasses an area of 644 square miles which includes 43 square miles of water.

Clay County has a mild, subtropical climate, with average temperatures in the City of Jacksonville ranging from 53.1 degrees Fahrenheit (°F) in January to 81.6 °F in July for the period 1971-2000 (Reference 5). Average annual rainfall is approximately 52 inches with September as the wettest month, averaging 7.90 inches of rainfall. In an average year, approximately 60 percent of the annual total can be expected to occur during the four month "rainy season," from June through September. During this period, thunderstorms occasionally release large amounts of rain over small areas. A 6-hour rainfall total exceeding 3 inches is common. Tropical storms or hurricanes, which usually occur during late summer or fall, occasionally affect this area. These storms can bring copious amounts of rain and strong winds to the entire area (Reference 6).

Terrain is nearly level to gently sloping in Clay County. Well-drained to poorly drained sandy soils are underlain by weakly cemented, poorly drained, sandy subsoils. Areas along streams and in marshes are poorly drained sandy soils subject to flooding. This rural county has vast areas of forest cover containing dense undergrowth of palmetto; hardwood trees, such as oak; and groves of slash pines (Reference 2).

Clay County was formed from Duval County on December 31, 1858 and named after Kentucky Senator and Secretary of State Henry Clay. Retail trade was the largest of 20 major economic sectors in the county in 2008. The population for 2008 for Clay County was estimated at 184,727 (Reference 7). The population for the county grew by 339.2% in the last three decades of the 1900s and by 31.2 % from April 2000 to July 2008.

The City of Green Cove Springs is the county seat of Clay County. Green Cove Springs lies on the St. Johns River on the eastern border of Clay County, approximately 25 miles south of the City of Jacksonville. The year 2000 population of Green Cove Springs was reported to be 5,378 (Reference 7). Clay County also includes the incorporated communities of the City of Keystone Heights (population 1,349) on the western border of the county and the Town of Orange Park (population 9,081) adjacent to Jacksonville in the northeast corner of Clay County. Clay County includes the unincorporated communities of Middleburg (population 10,338) and Doctors Inlet.

The eastern border of Clay County is the St. Johns River and most of the county drains eastward into this river. St. Johns River is the largest river in Florida, with a basin of approximately 9,430 square miles measured at its discharge into the Atlantic Ocean near the City of Jacksonville. St. Johns River flows over 300 miles from its source in the east-central part of the state to its discharge. Mostly single family residences are clustered on the banks of the St. Johns River in Green Cove Springs and in Orange Park.

The most prominent tributary to St. Johns River in Clay County is Black Creek, which drains 489 square miles. Black Creek begins 13 miles upstream at Middleburg where North Fork Black Creek and South Fork Black Creek come together. North Fork and South Fork Black Creeks are major streams in Clay County and are studied in detail upstream from their mouths, 20 miles and 11 miles, respectively. Vacation homes are being built along these streams as the area increases in popularity. The North Fork Black Creek system includes Gum Branch, Mill Branch, Long Branch, Yellow Water Creek, and Big Branch. The South Fork Black Creek includes Ates Creek, Greens Creek, Bull Creek, and Dillaberry Branch. Grog Branch, Bradley Creek, Little Black Creek, and Peters Creek are smaller tributaries discharging directly into Black Creek.

North of the Black Creek system, Doctors Creek and its tributaries flow south and eastward to the St. Johns River. Dudley Branch arises in the northern part of the Town of Orange Park and flows north to south to discharge into Johnson Slough. This stream drains about 1.6 square miles. Doctors Lake Tributary No. 1 drains an area of about 1.5 square miles west of Orange Park and flows south to Doctors Lake. Doctors Lake lies along the southwest border of Orange Park and connects with Johnson Slough on the east side. Johnson Slough is about 0.9 miles long and flows from west to east across Orange Park to the St. Johns River. Doctors Lake also connects to the St. Johns River south of Johnson Slough through Doctors Inlet, which makes up the southeast border of Orange

Park. Development has occurred and continues on the banks of the streams in and near Orange Park (Reference 3).

Governors Creek is a small tributary in the southeastern portion of Clay County. This creek flows along the western and northern corporate limits of the City of Green Cove Springs and then into the St. Johns River. Its basin is approximately 14 square miles. Below State Route 16, Governors Creek has been dredged to alleviate flooding. The upper half of the basin is rural and undeveloped; the lower half of the basin near Green Cove Springs has very little development. Buckeys Creek is a tributary to Governors Creek in the western portion of the city. Developing areas, including newer residential housing, are located chiefly on sloping banks above the 1-percent-annual-chance flood elevation (Reference 1).

The southwestern portion of the county around Keystone Heights is characterized by numerous lakes. A chain of six lakes ending with Lake Geneva in the south is known as the Estonia chain of lakes. A natural channel connects Lake Brooklyn, Lake Keystone, and Lake Geneva near Keystone Heights and is known locally as Alligator Creek. Alligator Creek is primarily an intermittent watercourse that only has flows following rain or during periods of unusually high groundwater levels (Reference 6).

2.3 Principal Flood Problems

Low-lying areas of Clay County are subject to periodic flooding caused by stream and lake overflow. Since the soils in the area are primarily sands, large amounts of rainfall can infiltrate when the antecedent rainfall has been low, thereby causing lower peaks. During the principal rainy season, June to October, saturated soils can cause rapid runoff and higher peaks during intense storms. The most severe flooding occurs along major streams as a result of hurricanes.

The highest known historical peak flood on North Fork Black Creek occurred in June 1919. Those peaks were below the 1-percent-annual-chance flood elevation. Hurricane Dora in May 1964 caused flooding on St. Johns River that equaled the 1-percent-annual-chance flood elevations in Clay County. The greatest amount of flooding occurred on the Black Creek stream system at Middleburg where approximately 45 homes received some water damage. Unofficial damage was estimated to be \$150,000. Extensive building of waterfront homes, especially in the Middleburg area, increases the likelihood of severe property damage with any future major floods (Reference 2). Less extensive flooding in Middleburg occurred in February 1970, July 1995, and October 1996 (Reference 8). Orange Park experienced significant urban flooding problems in July 2005 due to heavy rains. In October 2007, several homes were flooded in sections of Fleming Island and Orange Park. Tropical Storm Fay caused storm surge flooding along Black Creek and the St. Johns River in August 2008. A complex of storms in August 2009 caused 5.74 inches of rainfall in two hours, leading to significant flooding from Orange Park toward Middleburg.

Low-lying areas of Green Cove Springs have also been subject to periodic flooding caused by overflow of the St. Johns River and Governors Creek. Low-lying areas of Orange Park are subject to periodic flooding caused by overflow of the St. Johns River, Dudley Branch, Johnson Slough, Doctors Lake, and Doctors Lake Tributary No. I.

Low-lying areas in Keystone Heights experience shallow flooding caused by inadequate drainage and overflow of minor streams. During significant rainfall (usually greater than 1 inch per hour), runoff from Grove Street, Garden Street, Peach Street, and Satsuma Street overtops State Route 21. This creates a major safety problem for motorists and threatens property downhill from State Route 21. Improper roadway and drainage features at the intersection are the major factors contributing to the overtopping. There are inadequate means of intercepting the runoff from the side streets and directing it into State Route 21 ditches. Ditches along State Route I need constant maintenance to remove the sediment and prepare for the next storm (Reference 6).

Lake overflow in Keystone Heights causes periodic flooding of adjacent low-lying areas. Two gaging stations are operated in the area: No. 02244750 on Lake Brooklyn at the City of Keystone Heights; and No. 02244800 on Lake Geneva at the City of Keystone Heights. An associated problem is street erosion resulting in sediment deposition in the lakes. Unprotected soils on steep slopes experience erosive velocities several times a year. All classical types of erosion have been observed, and sedimentation mounds or deltas have formed at each stormwater outlet examined in Lakes Keystone and Geneva. Sheet and rill erosion were documented throughout the city occurring at many different sites (Reference 6). A significant improvement to this channel was recently made with the construction of a concrete lined section near the creek terminus into Lake Keystone.

Low lying areas in the unincorporated areas of Clay County also experience shallow flooding caused by ponding and overflow of minor streams, such as during February 1998. Flooding in these areas primarily results in some roads being temporarily closed and a few rural homes being flooded.

2.4 Flood Protection Measures

Some homeowners on St. Johns River have reinforced the shoreline in front of their homes to prevent erosion from wind and wave action.

The lower reach of Governors Creek in Green Cove Springs was deepened to improve runoff.

Near Middleburg, a dike separates Black Creek and Lake Asbury (Lake Asbury Drive runs along the top of the dike). A pipe culvert, which extends through the dike above the elevation of the 0.2-percent-annual-chance flood on Black Creek, allows overflows from Lake Asbury to spill into Black Creek.

No other special flood protection structures have been built or planned for the area which would affect 1- or 0.2-percent-annual-chance flooding.

3.0 ENGINEERING METHODS

For the flooding sources studied by detailed methods in the county, standard hydrologic and hydraulic study methods were used to determine the flood-hazard data required for this study. Flood events of a magnitude that is expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events,

commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 1-percent-annual-chance flood in any 50-year period is approximately 40 percent (4 in 10); for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

3.1.1 Methods for Flooding Sources with New or Revised Analyses in Current Study

For this countywide study, hydrologic analyses were carried out to establish peak discharge frequency relationships for each flooding source studied by detailed, limited detailed, and approximate methods affecting the community. A summary of peak discharge-drainage area relationships for streams studied by detailed methods is shown in Table 8: Summary of Discharges for Detailed Studies. Streams studied by limited detailed methods are shown in Table 9: Summary of Discharges for Limited Detailed Studies. Stillwater elevations are shown in Table 10: Summary of Stillwater Elevations.

Peak discharges for all new detailed, limited detail, and approximate studied streams were determined using the Florida A Region United States Geological Survey (USGS) regression equation for Florida described in the USGS Water-Resources Investigations report (WRIR) 82-4012 (Reference 9).

3.1.2 Methods for Flooding Sources Incorporated from Previous Studies

This section describes the methodology used in previous studies of flooding sources incorporated into this FIS that were not revised for this countywide study. Hydrologic analyses were carried out to establish peak discharge-frequency relationships for each flooding source studied by detailed methods affecting the community.

Portions of Buckeys Creek were analyzed for the year 2000 revision of the FIS for the City of Green Cove Springs. Those hydrologic analyses were performed using *Magnitude and Frequency of Flood Discharges in Northeast Florida* (Technical Publication SJ-86-2) to establish a peak discharge-frequency relationship (Reference 10). The discharge equation for the selected recurrence intervals, in cubic feet per second, and the values for the constants in the discharge equation were derived from log-Pearson estimates found in *Water Resource Council (WRC) Bulletin 17A* (Reference 11).

The September 3, 1992, revision for Clay County included analysis of various streams in the Black Creek system, including Big Branch, Black Creek, Bradley Creek, Bull Creek, Dillaberry Branch, Duckwater Branch, Grog Creek, Little

Black Creek, Little Black Creek Tributary 1, Mill Creek, N. Fork Black Creek, N. Fork Black Creek Tributary 2, Peters Branch, Polander Branch, and South Prong Double Branch. The 10-, 2-, 1-, and 0.2-percent-annual-chance discharges for these streams were established by a detailed simulation of the basin using the HEC-1 computer program (Reference 12). The HEC-1 model used U.S. Soil Conservation Service (SCS) curve numbers to estimate rainfall losses. The curve numbers were developed using the Clay County Soil Maps and aerial photographs (Reference 13). Snyder's unit hydrograph was used to transform excess rainfall to basin outflow. The Modified Pulse method was used to simulate flood wave movement through river reaches and reservoirs. The HEC-1 model was calibrated using data from gages in the area. Two long term gages that were most useful were N. Fork Black Creek, close to the confluence with Big Branch, and South Fork Black Creek, at State Road 16. Other gages used included N. Fork Black Creek at the City of Middleburg, Black Creek at U.S. Route 17, Clarkes Creek near Green Cove Springs, Greens Creek near Penny Farms, and South Fork Black Creek near Camp Blanding.

Hydrologic analyses were carried out for Governors Creek for the original 1979 FIS for the City of Green Cove Springs (Reference 14). A stage-frequency relationship for the St. Johns River adjacent to Green Cove Springs was computed for the selected recurrence intervals. These stage-frequency profiles agree with those profiles published by the U.S. Army Corps of Engineers (USACE) (Reference 15).

Table 8: Summary of Discharges for Detailed Studies

Flooding Source and Location	Drainage Area (Square miles)	Peak Discharges (Cubic Feet per Second)			
		10-percent	2-percent	1-percent	0.2-percent
BIG BRANCH					
At mouth	10.1	1,820	2,920	3,330	4,620
At confluence of Duckwater Branch	4.6	1,070	1,660	1,860	2,510
At County Road 218	1.3	320	490	550	740
BLACK CREEK					
At confluence with St. Johns River	489	23,200	41,500	50,000	72,300
At CSX railroad	453.4	23,200	41,300	47,300	69,300
Downstream of confluence of Little Black Creek	445	22,500	40,200	48,400	70,000
Upstream of confluence of Little Black Creek	406	20,800	37,100	44,700	64,700
At confluence with North and South Forks of Black Creek	393	20,300	36,100	43,500	62,900
BRADLEY CREEK					
At mouth	6.4	640	1,100	1,320	1,910
BUCKEYS CREEK					
At confluence with Governors Creek	1.95	378	691	842	1,302
Downstream of Tributary 1	1.45	333	614	751	1,168
Upstream of Tributary 1	1.12	276	511	625	974
Downstream of Tributary 2	0.97	260	480	588	917
Upstream of Tributary 2	0.42	116	211	256	394
BULL CREEK					
At mouth	26.6	3,340	5,440	6,240	8,790
At County Highway 215	20.0	2,480	4,060	4,650	6,540
At Juniper Avenue	7.6	1,050	1,700	1,940	2,710
CLARKES CREEK					
At mouth	9.8	960	1,690	2,080	3,100
At U.S. Highway 17	8.7	867	1,560	1,900	2,850
DILLABERRY BRANCH					
At mouth	2.3	690	1,000	1,110	1,450

Table 8: Summary of Discharges for Detailed Studies

Flooding Source and Location	Drainage Area (Square miles)	Peak Discharges (Cubic Feet per Second)			
		10-percent	2-percent	1-percent	0.2-percent
At North Dolphin Avenue	1.6	520	750	840	1,090
At Cinnamon Street	0.7	240	340	370	480
DOCTORS LAKE TRIBUTARY 1					
---	1.5	385	540	610	780
DOUBLE BRANCH					
At mouth	8.6	821	1,410	1,700	2,450
DUCKWATER BRANCH					
At mouth	1.8	440	680	760	1,030
At County Road 218	0.8	240	360	410	560
DUDLEY BRANCH					
---	1.6	355	495	555	690
GREENS CREEK					
At mouth	47.9	3,011	5,133	6,166	8,867
GOVERNORS CREEK					
At confluence with St. Johns River	13.9	1,830	2,850	3,310	4,460
Downstream of Buckeys Creek	13.0	1,236	1,951	2,366	3,619
At State Highway 16 (Idlewild Avenue)	10.5	1,150	1,840	2,230	3,130
Idlewild Avenue	9.6	1,060	1,740	2,070	2,890
GROG CREEK					
At mouth	2.3	685 ²	1,100 ²	1,255 ²	1,760 ²
At State Road 21	1.4	475 ²	790 ²	915 ²	1,330 ²
LITTLE BLACK CREEK					
At confluence with Black Creek	38.5	2,870	5,000	6,030	8,720
Downstream of confluence of Little Black Creek Tributary 1	33.2	2,540	4,420	5,320	7,700
At confluence of Little Black Creek Tributary 1	31.9	5,220	8,150	9,280	12,720

Table 8: Summary of Discharges for Detailed Studies

Flooding Source and Location	Drainage Area (Square miles)	Peak Discharges (Cubic Feet per Second)			
		10-percent	2-percent	1-percent	0.2-percent
Just downstream of confluence of Double Branch	23.2	3,800	5,910	6,740	9,240
Downstream of confluence of Little Black Creek Tributary 2	7.1	694	1,190	1,430	2,070
At confluence of Little Black Creek Tributary 2	6.7	1,380	2,090	2,350	3,150
Just downstream of Spencer Lake	0.9	270	420	480	650
LITTLE BLACK CREEK TRIBUTARY 1					
At confluence with Little Black Creek	7.5	728	1,250	1,500	2,170
At Brandon Field Road	6.4	1,170	1,840	2,090	2,840
Opposite Trailridge Road	4.0	840	1,270	1,440	1,930
LITTLE BLACK CREEK TRIBUTARY 2					
At confluence with Little Black Creek	1.5	190	321	387	560
LONG BRANCH					
At mouth	24.4	1,960	3,390	4,090	5,910
MILL CREEK					
At mouth	3.0	770	1,140	1,270	1,680
At Masters Road	2.4	640	930	1,040	1,370
At Calendula Avenue	1.0	270	390	440	580
NORTH FORK BLACK CREEK					
At confluence with Black Creek	201	11,500	19,300	23,000	33,600
At confluence of Big Branch	184.4	9,290	16,200	18,680	27,270
Just upstream of Big Branch	174.3	9,000	15,640	18,030	26,320
At confluence of Yellow Water Creek	166.5	9,280	15,780	18,080	26,260
At confluence of Long Branch	98.8	5,680	9,640	11,070	15,930
Downstream of confluence of Long Branch	96	6,200	10,700	13,000	18,500
At County Road 218	50.6	3,120	5,400	6,250	9,110
At Camp Blanding north boundary	27.8	1,890	3,180	3,650	5,200

Table 8: Summary of Discharges for Detailed Studies

Flowing Source and Location	Drainage Area (Square miles)	Peak Discharge (Cubic Feet per Second)			
		10-Year	20-Year	50-Year	100-Year
NORTH FORK BLACK CREEK					
TRIBUTARY 2					
At confluence with N. Fork Black Creek	1.7	209	353	425	615
At County Highway 220-A	0.7	280	410	460	610
NORTH PRONG DOUBLE BRANCH					
At mouth	3.6	396	673	811	1,170
PETERS BRANCH					
At mouth	1.9	340	620	750	1,120
At U.S. Route 17	1.3	270	480	590	890
PETERS CREEK					
At mouth	24.0	1,940	3,360	4,040	5,850
At County Road 209	22.3	1,820	3,150	3,800	5,490
POLANDER BRANCH					
At mouth	1.7	380	610	690	940
At County Road 218	0.8	250	400	450	630
SOUTH FORK BLACK CREEK					
At confluence with Black Creek	192	11,800	21,100	26,000	38,000
Downstream of confluence of S. Fork Black Creek Tributary 1	140	9,400	17,200	21,300	32,000
Upstream of State Road 16	137	9,400	17,200	21,300	32,000
SOUTH FORK BLACK CREEK TRIBUTARY 1					
Downstream of County Road 18	3.6	1,010	1,740	2,100	3,030
SOUTH FORK BLACK CREEK TRIBUTARY 7					
At confluence with S. Fork Black Creek	2.8	544	960	1,160	1,691
SOUTH PRONG DOUBLE BRANCH					
At mouth	3.9	720	1,120	1,280	1,760

Table 8: Summary of Discharges for Detailed Studies

Flooding Source and Location	Drainage Area (Square miles)	Peak Discharge (Cubic Feet per Second)			
		1-percent	2-percent	3-percent	10-percent
At Private Road	2.2	540	810	910	1,200
ST. JOHNS RIVER TRIBUTARY 1					
At confluence with St. Johns River	1.4	179	301	363	525
At Seaboard Coast Line Railroad	1.0	134	225	271	392
ST. JOHNS RIVER TRIBUTARY 2					
At confluence with St. Johns River	1.9	230	388	468	676
Upstream of Seaboard Coast Line Railroad	1.2	154	259	312	451
ST. JOHNS RIVER TRIBUTARY 3					
At confluence with St. Johns River	2.3	271	458	552	800
SWIMMING PEN CREEK					
At mouth	2.3	269	455	548	793

¹ Discharges affected by overflow from Black Creek into Doctors Lake

² Discharges affected by flow between N. Fork Black Creek Tributary 2 and Grog Creek basins

Table 9: Summary of Discharges for Limited Detailed Studies

Flooding Source and Location	Drainage Area (Square miles)	Peak Discharge (Cubic Feet per Second)			
		1-percent	2-percent	3-percent	10-percent
BLACK CREEK TRIBUTARY 1					
Upstream of Russel Road	1.0			577	
At confluence with Black Creek	1.2			637	
BLACK CREEK TRIBUTARY 2					
At Callie Lane	0.8			528	
At confluence with Black Creek	1.1			575	

Table 9: Summary of Discharges for Limited Detailed Studies

Flooding Source and Location	Drainage Area (Square miles)	Peak Discharges (Cubic Feet per Second)			
		10-percent	2-percent	1-percent	0.2-percent
BRADLEY CREEK TRIBUTARY 1					
At confluence with Bradley Creek	0.3			583	
BUSH CREEK					
At confluence with Bush Creek Tributary 1	11.1			2,823	
At County Road 209	5.5			1,740	
BUSH CREEK TRIBUTARY 1					
At confluence with St Johns River	2.7			995	
Upstream of County Road 209	0.1			108	
CLAY BRANCH					
Upstream of US Highway 17	0.6			444	
Upstream of Railroad	0.4			365	
DOCTORS LAKE TRIBUTARY 2					
At mouth	1.7			912	
Upstream of Doctors Lake Drive	0.5			435	
At Moody Avenue	0.3			312	
DOCTORS LAKE TRIBUTARY 5					
At mouth	0.3			239	
Upstream of Sandy Springs	0.1			162	
GROG CREEK					
At approximately 0.5 miles upstream of Blanding Boulevard	0.8			437	
GROG CREEK TRIBUTARY 1					
At confluence with Grog Creek	0.07			87	
LITTLE BLACK CREEK					
Just downstream of Spencer Lake	0.9			480	

Table 9: Summary of Discharges for Limited Detailed Studies

Flooding Source and Location	Drainage Area (Square miles)	Peak Discharge (Cubic Feet per Second)
LITTLE BLACK CREEK TRIBUTARY 1		
At confluence with Little Black Creek Tributary 1A	5.3	1,440
Upstream of Trail Ridge Road	2.6	1,221
Upstream of Tynes Boulevard	2.3	1,210
LITTLE BLACK CREEK TRIBUTARY 1A		
At confluence with Little Black Creek Tributary 1	0.7	518
At Pine Ridge Parkway	0.5	404
LITTLE BLACK CREEK TRIBUTARY 2		
At Watson Ranch Road	1.6	387
At approximately 1.0 miles upstream of Watson Ranch Road	0.3	236
LUCY BRANCH		
At mouth	1.9	764
At Doctors Lake Drive	1.4	721
At Moody Avenue	1.1	609
At Blanding Boulevard	0.3	230
MILL LOG CREEK		
At mouth	3.8	1,163
At Railroad	2.8	927
At Russel Road	1.4	767
Downstream of Sandridge Road at approximately 1,200 feet	0.7	503
Upstream of Sandridge road at approximately 0.5 miles	0.3	271
MILL LOG CREEK TRIBUTARY 1		
At mouth	0.8	455

Table 9: Summary of Discharges for Limited Detailed Studies

Flooding Source and Location	Drainage Area (Square miles)	Peak Discharges (Cubic Feet per Second)			
		10-percent	2-percent	1-percent	0.2-percent
At Russel Road	0.6			407	
Upstream of Russel road at approximately 0.6 miles	0.4			254	
NORTH FORK BLACK CREEK					
TRIBUTARY 1					
At Long Bay Road	0.4			213	
Downstream of Appaloosa Road	0.2			81	
NORTH FORK BLACK CREEK TRIBUTARY					
1A					
At Long Bay road	0.5			393	
NORTH FORK BLACK CREEK TRIBUTARY					
2					
At confluence with North Fork Black Creek	2.6			1,142	
At approximately 0.4 miles upstream of confluence with North Fork Black Creek	2.3			1,042	
At approximately 640 feet downstream of Crazy Horse Avenue	2.2			995	
NORTH PRONG DOUBLE BRANCH					
TRIBUTARY 1					
At approximately 0.7 miles upstream of Plantation Oaks Boulevard	1.2			597	
At Branan Field Road	1.1			557	
ORTEGA RIVER TRIBUTARY					
At mouth	0.8			99	
ORTEGA RIVER TRIBUTARY 1					
At confluence with Ortega River	4.0			370	
PETERS BRANCH					
At US Highway 17	0.9			590	

Table 9: Summary of Discharges for Limited Detailed Studies

Flooding Source and Location	Drainage Area (Square miles)	Peak Discharges (Cubic Feet per Second)			
		10-percent	2-percent	1-percent	0.2-percent
PETERS CREEK					
At confluence with Peters Creek Tributary 2	13.4			3,107	
PETERS CREEK TRIBUTARY 1					
At confluence with Peters Creek	2.4			1,101	
At approximately 0.8 miles upstream of confluence with Peters Creek	1.8			814	
At approximately 1.4 miles upstream of confluence with Peters Creek	1.1			618	
At approximately 2.2 miles upstream of confluence with Peters Creek	0.5			339	
PETERS CREEK TRIBUTARY 2					
At confluence with Peters Creek	0.4			422	
POLANDER BRANCH TRIBUTARY 1					
At confluence with Polander Branch	0.2			208	
At approximately 500 feet of confluence with Polander Branch	0.03			99	
SOUTH FORK BLACK CREEK TRIBUTARY 2					
At confluence with S. Fork Black Creek	0.3			314	
At approximately 0.6 miles upstream of confluence with S. Fork Black Creek	0.2			295	
SOUTH FORK BLACK CREEK TRIBUTARY 3					
At confluence with S. Fork Black Creek	2.1			1,001	
At approximately 0.7 miles upstream of confluence with S. Fork Black Creek	1.4			822	
At Thunder Road	0.5			406	
At approximately 0.5 miles upstream of Thunder Road	0.1			138	

Table 9: Summary of Discharges for Limited Detailed Studies

Flooding Source and Location	Drainage Area (Square miles)	Peak Discharges (Cubic Feet per Second)			
		10-percent	2-percent	1-percent	0.2-percent
SOUTH FORK BLACK CREEK TRIBUTARY 5					
At approximately 0.7 miles upstream of Thunder road	0.8			388	
SOUTH DOUBLE PRONG BRANCH					
At approximately 0.8 miles upstream of Branan Field Road	3.0			1,048	
At Oakleaf Plantation Parkway	2.6			879	
ST. JOHNS RIVER TRIBUTARY 1					
At approximately 0.5 miles upstream of US Highway 17	0.4			350	
ST. JOHNS RIVER TRIBUTARY 3					
At confluence with St. Johns River Tributary 3A	7.7			552	
ST. JOHNS RIVER TRIBUTARY 3A					
At confluence with St. Johns River Tributary 3	0.5			708	
ST. JOHNS RIVER TRIBUTARY 4A East					
At confluence with St Johns River	1.5			841	
ST. JOHNS RIVER TRIBUTARY 5 US					
At approximately 0.9 miles downstream of US Highway 17	2.4			841	
ST. JOHNS RIVER TRIBUTARY DS					
At approximately 0.7 miles downstream of Bayard Road	4.6			1,250	
ST. JOHNS RIVER TRIBUTARY 6					
At approximately 0.3 miles downstream of County Road 209	2.2			244	

Table 9: Summary of Discharges for Limited Detailed Studies

Flooding Source and Location	Drainage Area (Square miles)	Peak Discharges (Cubic Feet per Second)			
		10-percent	2-percent	1-percent	0.2-percent
ST. JOHNS RIVER TRIBUTARY 6 (continued) At RailRoad	2.0			194	
ST. JOHNS RIVER TRIBUTARY 7 At approximately 1,000 feet downstream of County road 209	0.02			35	

For other streams in previous FIS reports, eight nearby stream low gaging stations were used to define discharge-frequency relationships at each site. Two of the gaging stations have long term records: North Fork Black Creek since 1931 and South Fork Black Creek since 1939 (Reference 2). The gages were as follows:

<u>Gage Number</u>	<u>Flooding Source and Location</u>	<u>No. of Years of Record</u>
02245500	South Fork Black Creek, near Penny Farms	36
02246000	North Fork Black Creek, near Middleburg	44
02245300	Clarkes Creek, near Green Cove Springs	10
02245400	South Fork Black Creek, near Camp Blanding	18
02245470	Greens Creek, near Penny Farms	18
02245900	Yellow Water Creek, near Maxville	18
02246300	Ortega River, at Jacksonville	11
02231280	Thomas Creek, Near Crawford	11

Values of the 10-, 2-, 1-, and 0.2-percent-annual-chance peak discharges and corresponding water-surface elevations were obtained for the eight sites from a log-Pearson Type III distribution of annual peak flow data, as outlined in *Water Resources Council Bulletin 17A* (Reference 11). The frequency data from the eight gaging stations were used in a regression analysis to develop equations for determining flood peaks at ungaged sites in Clay County for the 10-, 2-, 1-, and 0.2-percent-annual-chance peak discharges. The standard error for the equations is 25 percent or less.

In urban areas, peak discharges can be increased by more rapid runoff due to drainage improvements, such as ditches and storm sewers, and by reducing the amount of water infiltrating into the ground because of pavement, houses, and other impervious surfaces. Peak discharges from the regression equations were increased in urban areas of Green Cove Springs and Orange Park based on ratios of the percentage of the drainage area improved and ratios of rainfall-intensity for the area. Peak discharges in Orange Park were reduced for the effect of ponding above certain culverts by using a USGS computer program for reservoir routing (References 16; 17).

For the September 1992 revision to the Clay County FIS report, flood hazards in areas of tidal influence along the St. Johns River and in lower reaches of streams discharging to the St. Johns River were taken from the coastal analysis performed as part of the City of Jacksonville, Florida FIS (Reference 18).

For the previous analyses of the St. Johns River, stage-frequency relationships for the selected recurrence intervals were developed from six USGS stream gages

along the river. Although there are no gages on the river within Clay County, stage records have been collected downstream at Jacksonville since 1954 (Gage No. 02246500), and upstream at Palatka since 1968 (Gage No. 02244450). These stage-frequency profiles were blended with profiles for the FIS for the City of Jacksonville (Reference 19), and were in agreement with profiles published by the USACE (Reference 15). These profiles accounted for the effect of freshwater runoff from upstream versus the effect of storm-tide surge from the Atlantic Ocean. The stage-frequency relationships for the selected recurrence intervals on the St. Johns River are presented in Table 10.

Dudleys Branch and Doctors Lake Tributary 1 were analyzed for the preparation of the Orange Park FIS report in 1979. Johnson Slough acts like an equalizing canal between Doctors Lake and the St. Johns River. Profiles for other streams show that Johnson Slough would also be inundated by backwater from the St. Johns River. Therefore the flood profiles for Johnson Slough are the same as those for the St. Johns River. The east side of Doctors Lake is the St. Johns River and lake elevations closely correspond with those for the river. Lake levels and Johnson Slough elevations are sustained by backwater effect from the St. Johns River.

For the revision of the Clay County FIS report in September 1992, flood elevations for four lakes near the City of Middleburg were adopted from a dam safety study (Reference 20). These lakes are Lake Lure, North Lake Ashbury, Lake Ryan, and South Lake Ashbury. Fourteen other lakes, primarily in the southwest portion of the county, were newly studied using water budget techniques. These were Blue Pond, Bundy Lake, Crystal Lake, Deer Springs Lake, Lake Geneva, Lake Hutchinson, Lake Lily, Lake Lure, Lake Margie, Lake Opal, Loch Lomond, Oldfield Pond, Pebble Lake, and Silver Sand Lake. Water budget analyses were performed for fourteen lakes. The 1-percent-annual-chance flood elevations for these lakes are shown in Table 10.

Previous hydrologic analyses for the unincorporated areas of Clay County studied 15 lakes in detail which are listed in Table 10 (Reference 2). Lake-level records for seven sites (two sections of Lake Johnson) in Clay County and five lakes in nearby Alachua and Marion Counties were used to define maximum lake volume-frequency relationships. The USGS gages were as follows:

<u>Gage Number</u>	<u>Flooding Source and Location</u>	<u>No. of Years of Record</u>
02244600	Sand Hill Lake, near Gold Head Branch State Park	18
02244650	Magnolia Lake, at Magnolia Lake State Park	17
02244750	Lake Brooklyn, at Keystone Heights	18
02244800	Lake Geneva, at Keystone Heights	18

<u>Gage Number</u>	<u>Flooding Source and Location</u>	<u>No. of Years of Record</u>
02244850	Pebble Lake, near Keystone Heights	30
02245700	Kingsley Lake, near Camp Blanding	
02294900	Lake Johnson (Little Lake), at Gold Head Branch State Park*	30
02294905	Lake Johnson (Big Lake), at Gold Head Branch State Park*	16
02236200	Lake Kerr, near Eureka	40
02240900	Newnans Lake, near Gainesville	40
02242450	Orange Lake, at Orange Lake	34
02238800	Lake Weir, at Oklawaha	34
02242400	Lochloosa Lake, near Lochloosa	40

*Lake Johnson (Little Lake) and Lake Johnson (Big Lake) were once contiguous but were separated below an elevation of 95 feet by a shallow channel and earthen dam in June 1957. A new dam was constructed in April 1969 with a maximum elevation of 96 feet. Since this is exceeded by the 10-percent-annual-chance flood (see Table 10), the two lakes are considered here as one.

The drainage area for these lakes ranges from 0.19 square mile to 319 square miles and the surface area of these lakes ranges from 0.015 square mile (9.6 acres) to 20.6 square miles (more than 13,000 acres). Changes in lake level range from less than 2 feet to more than 30 feet. These lakes are also vastly different in outflow characteristics. They range from completely closed with no outflow at any flood frequency to outflow which occurs at all flood frequencies.

Values of the 10-, 2-, 1-, and 0.2-percent-annual-chance peak volumes and corresponding water-surface elevations were obtained for the 12 gaged sites from a log-Pearson Type III distribution of annual lake volume, as outlined in *Water Resources Council Bulletin 17A* (Reference 11). The frequency data from the 12 gaging stations were used in a regression analysis to develop equations for determining the 10-, 2-, 1-, and 0.2-percent-annual-chance peak volumes and corresponding water-surface elevations for ungaged lakes in Clay County. Table 10 shows the values obtained from the log-Pearson Type III distribution for the six gaged lakes in Clay County and from the regression equations for the nine ungaged lakes in Clay County.

Table 10: Summary of Stillwater Elevations

Flooding Source and Location	Stillwater Elevation (Feet NAVD)			
	10-percent	2-percent	1-percent	0.2-percent
BLUE POND ²				
--	--	--	175.1	--
BUNDY LAKE ²				
--	--	--	82.1	--
COOPERS POND				
Near Gold Head Branch State Park	84.8	85.9	86.3	86.9
CRYSTAL LAKE ²				
--	--	--	113.1	--
DEER SPRINGS LAKE ²				
--	--	--	110.1	--
DOCTORS LAKE ²				
--	--	--	4.1	--
FLOWERS PRAIRIE				
Near Gold Head Branch State Park	87.2	88.2	88.5	89.2
GATOR BONE LAKE				
Near Gold Head Branch State Park	93.0	93.9	94.3	94.7
HALL LAKE				
Near Gold Head Branch State Park	85.0	85.7	86.0	87.5
KINGSLEY LAKE ¹				
Near Camp Blanding	176.7	176.9	177.0	177.2
LAKE BROOKLYN ¹				
At Keystone Heights	116.8	116.9	117.3	117.7

Table 10: Summary of Stillwater Elevations

Flowing Surface and Location	Stillwater Elevation (feet MVD)			
	Upstream	Downstream	Flowline	Downstream
LAKE GENEVA ¹ At Keystone Heights	106.4	106.9	107.0	107.3
LAKE HUTCHINSON ² --	--	--	108.1	--
LAKE JOHNSON (BIG LAKE) ¹ At Gold Head Branch State Park	100.2	103.5	104.9	107.8
LAKE JOHNSON (LITTLE LAKE) ¹ At Gold Head Branch State Park	100.2	103.5	104.9	107.8
LAKE LARK ² --	--	--	40.1	--
LAKE LILY ² --	--	--	112.1	--
LAKE LURE ² --	--	--	99.1	--
LAKE MARGIE ² --	--	--	94.1	--
LAKE OPAL ² --	--	--	123.1	--
LAKE RYAN ² --	--	--	51.1	--
LITTLE LAKE GENEVA ² --	--	--	99.1	--

Table 10: Summary of Stillwater Elevations

Flooding Source and Location	Stillwater Elevation (Feet NAVD)			
	10-percent	2-percent	1-percent	0.2-percent
LOCH LOMOND ²				
--	--	--	107.1	--
LONG LAKE				
Near Gold Head Branch State Park	86.4	87.3	87.5	88.0
M LAKE				
Near Gold Head Branch State Park	98.5	100.0	100.5	101.4
MAGNOLIA LAKE ¹				
At Magnolia Lake State Park	124.9	125.1	125.4	125.6
NORTH LAKE ASBURY ²				
--	--	--	27.1	--
OLDFIELD POND ²				
--	--	--	102.1	--
PEBBLE LAKE ²				
--	--	--	108.1	--
PONDING AREA NO. 1 ²				
--	--	--	86.9	--
PONDING AREA NO. 24 ²				
--	--	--	86.3	--
PONDING AREA NO. 25 ²				
--	--	--	94.1	--
SAND HILL LAKE ¹				
Near Gold Head Branch State Park	131.7	132.0	132.2	132.5

Table 10: Summary of Stillwater Elevations

Flooding Source and Location	Stillwater Elevation (feet A.D.)			
	10-percent	1-percent	1-percent	10-percent
SILVER SAND LAKE ²				
--	--	--	95.1	--
SMITH LAKE				
Near Gold Head Branch State Park	93.5	93.9	94.1	94.4
SOUTH LAKE ASBURY ²				
--	--	--	47.1	--
SPRING LAKE				
Near Gold Head Branch State Park	105.3	107.1	107.7	108.9
ST. JOHNS RIVER				
At Orange Park	2.1	3.1	4.1	6.1
At State Highway 16 (Shands Bridge)	1.6	3.4	4.1	5.5
WHITE SAND LAKE (SWINDLE LAKE)				
Gold Head Branch State Park	96.3	97.9	98.5	98.9

¹Gaged Lake

²Only 1-percent flood elevation available

3.2 Hydraulic Analyses

Hydraulic analyses were performed to estimate the elevation of flooding during the base flood event. Users should be aware that flood elevations shown on the FIRM represent rounded whole-foot elevations and may not exactly reflect the elevations shown on the Flood Profiles or in the Floodway Data tables in the FIS report. Flood elevations shown on the FIRM are primarily intended for flood insurance rating purposes. For construction and/or floodplain management purposes, users are cautioned to use the flood elevation data presented in this FIS in conjunction with the data shown on the FIRM.

Flood profiles were drawn showing the computed water-surface elevations for floods of the selected recurrence intervals. Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 4.2), selected cross section locations are also shown on the FIRM (Exhibit 2).

Roughness coefficients (Manning's "n") were chosen by engineering judgment and based on field observation of the channel and floodplain areas (References 1; 2; 3). Table 11 contains the channel and overbank "n" values for the streams studied by detailed and limited detailed methods.

Table 11: Summary of Roughness Coefficients

Flooding Source	Channel	Overbanks
Black Creek	0.03-0.07	0.05-0.20
Black Creek Tributary 1	0.05	0.10-0.15
Black Creek Tributary 2	0.04-0.05	0.12-0.15
Bradley Creek	0.03-0.07	0.05-0.20
Bradley Creek Tributary 1	0.05	0.15
Bradley Creek Tributary 2	0.05	0.15
Buckeys Creek	0.035	0.120
Bull Creek	0.03-0.07	0.05-0.20
Bush Creek	0.04-0.05	0.12-0.15
Bush Creek Tributary 1	0.05	0.10-0.15
Clarkes Creek	0.03-0.7	0.05-0.20
Clay Branch	0.05	0.15
Double Branch	0.03-0.7	0.05-0.20
Dillaberry Branch	0.03-0.07	0.05-0.20
Doctors Lake Tributary 2	0.03-0.05	0.12-0.15
Doctors Lake Tributary 5	0.04	0.12

Table 11: Summary of Roughness Coefficients

Flooding Source	Channel	Overbanks
Duckwater Branch	0.03-0.07	0.05-0.20
Dudley Branch	0.035	0.120
Governors Creek	0.035	0.120
Greens Creek	0.05-0.055	0.08-0.14
Grog Creek	0.03-0.07	0.05-0.20
Grog Creek Tributary 1	0.04	0.08
Little Black Creek	0.03-0.07	0.05-0.20
Little Black Creek Tributary 1	0.03-0.07	0.05-0.20
Little Black Creek Tributary 1A	0.05	0.15
Little Black Creek Tributary 2	0.05	0.15
Little Black Creek Tributary 3	0.05	0.12-0.15
Little Black Creek Tributary 4	0.05	0.15
Long Branch	0.03-0.07	0.05-0.20
Lucy Branch	0.04	0.12
Mill Creek	0.03-0.07	0.05-0.20
Mill Log Creek	0.04-0.05	0.11-0.15
Mill Log Creek Tributary 1	0.05	0.15
North Fork Black Creek	0.03-0.07	0.05-0.20
North Fork Black Creek Tributary 1	0.04	0.12
North Fork Black Creek Tributary 1A	0.04	0.12
North Fork Black Creek Tributary 2	0.025-0.055	0.070 - 0.250
North Prong Double Branch Tributary 1	0.05	0.15
Ortega River	0.03-0.07	0.05-0.20
Ortega River Tributary	0.05	0.12-0.15
Ortega River Tributary 1	0.05	0.15
Peters Branch	0.03-0.07	0.05-0.20
Peters Creek	0.05	0.15
Peters Creek Tributary 1	0.03-0.05	0.10-0.15
Peters Creek Tributary 2	0.05	0.15

Table 11: Summary of Roughness Coefficients

Flooding Source	Channel	Overbanks
Polander Branch	0.03-0.07	0.05-0.20
Polander Branch Tributary 1	0.03-0.05	0.15
South Fork Black Creek (upper reaches)	0.025-0.055	0.070 - 0.250
South Fork Black Creek	0.045-0.05	0.09-0.14
South Fork Black Creek Tributary 1	0.06	0.07-0.14
South Fork Black Creek Tributary 2	0.05	0.10-0.15
South Fork Black Creek Tributary 3	0.05	0.10-0.15
South Fork Black Creek Tributary 5	0.04-0.05	0.12-0.15
South Fork Black Creek Tributary 7	0.06	0.07-0.14
South Prong Double Branch	0.03-0.07	0.05-0.20
St. Johns River	0.03-0.07	0.05-0.20
St. Johns River Tributary 1	0.04-0.05	0.12-0.15
St. Johns River Tributary 3	0.05	0.15
St. Johns River Tributary 3A	0.04-0.05	0.12-0.15
St. Johns River Tributary 4A East	0.05	0.10-0.15
St. Johns River Tributary 5	0.05	0.08-0.15
St. Johns River Tributary 6	0.05	0.15
St. Johns River Tributary 7	0.05	0.15
Swimming Pen Creek	0.03-0.07	0.05-0.20

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the Flood Profiles (Exhibit 1) are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

3.2.1 Methods for Flooding Sources with New or Revised Analyses in Current Study

Cross sections for the backwater analyses were obtained from field surveys, USGS topographic maps, and 2009 Lidar data (Reference 21; 22). All bridges and culverts were field checked to obtain elevation data and structural geometry of waterway crossings.

For the streams studied in detail, limited detail, and approximate methods, the water surface elevation for floods of the selected recurrence intervals were developed using the HEC-RAS computer program (Reference 23). Water surface profiles were produced for the 1 percent annual chance storm for the limited

detailed and approximated studies. Water surface profiles were produced for the 10-, 2-, 1-, and 0.2-percent-annual-chance storms for the detailed studies.

The detailed, limited detailed, and approximate methodology used Watershed Information System (WISE) (Reference 24) as a preprocessor to HEC RAS. Tools within WISE allowed the engineer to verify that the cross section data are acceptable. Then the HEC RAS was used to determine flood elevation at each cross section of the modeled stream. No floodway was calculated for streams studied by limited detailed and approximated methods.

3.2.2 Methods for Flooding Sources Incorporated from Previous Studies

For the year 2000 revisions for Buckeys Creek and Governors Creek in Green Cove Springs, a field reconnaissance of the study streams and contributing drainage basins was performed to verify cross-section and structure locations, basin development, and floodplain/channel characteristics. Water-surface elevations of floods of the selected recurrence intervals were computed using the USACE HEC-2 step-backwater computer program (Reference 23). Starting water-surface elevations were calculated using the slope-area method. Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals. The backwater effects of the St. Johns River on Governor Creek and Buckeys Creek were taken from the November 4, 1992, Clay County FIS.

For the 1992 revision to the Clay County FIS report, the 10-, 2-, 1-, and 0.2-percent-annual-chance flood discharges for Peters Branch were determined using standard USGS regional regression equations (Reference 9). Flooding data for the portion of the Ortega River at the northern county boundary were taken from the USACE floodplain management study of the City of Jacksonville, Florida (Reference 25).

For all other streams included in the 1992 revisions for the unincorporated areas of Clay County, including Big Branch, Black Creek, Bradley Creek, Bull Creek, Dillaberry Branch, Duckwater Branch, Grog Creek, Little Black Creek, Little Black Creek Tributary 1, Mill Creek, North Fork Black Creek, North Fork Black Creek Tributary 2, Polander Branch, and South Prong Double Branch, water-surface elevations of floods of the selected recurrence intervals were computed using the HEC-2 water-surface profile computer program (Reference 23). Starting water-surface elevation for each of the streams and tributaries was normal depth or mean high tide, whichever was greater. Many of the cross sections for the revisions were obtained from the prior study performed by the USGS. Those cross sections were reviewed for applicability; all structures were inspected and new cross sections obtained by field survey, where necessary. For areas not included in the prior study, new cross sections were obtained from both land and aerial surveys undertaken as part of this study, including survey of bridges, dams, and culverts. Additional areas of aerial topography were obtained from the St. Johns River Water Management District. Structure sections for two new bridges were obtained from the Florida Department of Transportation. Roughness coefficients

(Manning's "n") used in the hydraulic computations were selected on the basis of field observations, aerial photos, and photographs of the streams and floodplain areas. Roughness values ranged from 0.03 to 0.07 for the channel areas, and from 0.05 to 0.20 for the overbank areas, for all flood frequencies.

For streams studied by detailed methods that were not included in the September 3, 1992 revisions, water-surface elevations were developed using the USGS E-431 step-backwater computer model (Reference 26). Profiles were determined for the 10-, 2-, 1-, and 0.2-percent-annual-chance floods. Cross section data for streams in the area were obtained by surveying all bridges, culverts, and below-water sections to obtain elevation data and structural geometry. To obtain better definition of water-surface profiles along the streams, some cross sections were interpolated on the basis of field-surveyed cross sections and topographic maps at a scale of 1:24,000, with a contour interval of 5 or 10 feet (Reference 27). Roughness coefficients (Manning's "n") were estimated by field inspection at each cross section and ranged from 0.025 to 0.055 for the main channel and from 0.070 to 0.180 for the flood plain for all floods. Roughness values for the flood plain on the upper reaches of South Fork Black Creek ranged up to 0.250 in order to match the gaging station record. This higher value is assumed to compensate for storage. Starting water-surface elevations were determined by normal depth calculations for the 1-percent-annual-chance and from confluence elevations for the 10-, 2-, and 0.2-percent-annual-chance except for Governors Creek and North Prong Double Branch. For these two streams, normal depth calculations were used for all recurrence intervals.

Flood profiles for the 0.2-percent-annual-chance were calculated for the following streams only:

- Governors Creek
- North Prong Double Branch
- Ortega River
- St. Johns River
- St. Johns River Tributary 1
- St. Johns River Tributary 3
- Swimming Pen Creek

For the September 1992 revision to the Clay County FIS report, flood elevations along the St. Johns River and adjacent tidal zones, including Doctors Lake, were taken from a detailed storm surge analysis performed as part of the FIS for the City of Jacksonville (Reference 18). Elevations in zones between the low tidal areas and the higher areas of exclusive-runoff flooding were determined by statistical combination of the tidal and runoff levels, considered as independent events.

Water-surface profiles for Dudley Branch and Doctors Lake Tributary 1 in Orange Park were developed using the USGS step-backwater computer model. Starting water-surface elevations were taken from Doctors Lake for Doctors Lake Tributary No.1 and from Johnson Slough for Dudley Branch. Profiles for the St.

Johns River were computed using annual peak elevations in a log-Pearson Type III distribution for the 10-, 2-, 1-, and 0.2-percent-annual-chance floods. Profiles for Doctors Lake and Johnson Slough were considered the same as the St. Johns River.

Flood elevations for four lakes near the City of Middleburg were adopted from a dam safety study (Reference 20). These lakes are Lake Lore, Lake Ryan, North Lake Ashbury, and South Lake Ashbury. Fourteen other lakes, primarily in the southwest portion of the county, were newly studied using water budget techniques. These were Blue Pond, Bundy Lake, Crystal Lake, Deer Springs Lake, Lake Geneva, Lake Hutchinson, Lake Lily, Lake Lure, Lake Margie, Lake Opal, Loch Lomond, Oldfield Pond, Pebble Lake, and Silver Sand Lake.

3.3 Vertical Datum

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

Flood elevations shown in this FIS report and on the FIRM are referenced to the NAVD. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. It is important to note that adjacent counties may be referenced to NGVD, which may result in differences in base flood elevations across county lines.

Some of the data used in this revision were taken from the prior effective FIS reports and FIRMs and adjusted to NAVD. The datum conversion factor from NGVD to NAVD in Clay County is -0.95 feet.

For more information regarding conversion between the NGVD and NAVD, see the FEMA publication entitled *Converting the National Flood Insurance Program to the North American Vertical Datum of 1988* (Reference 28), 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

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

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

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. To assist in this endeavor, each FIS report provides 1-percent-annual-chance floodplain data, which may include a combination of the following: 10-, 2-, 1-, and 0.2-percent-annual-chance flood elevations; delineations of the 1- and 0.2-percent-annual-chance floodplains; and a 1-percent-annual-chance floodway. This information is presented on the FIRM and in many components of the FIS report, including Flood Profiles, Floodway Data tables, and Summary of Stillwater Elevation tables. Users should reference the data presented in the FIS report as well as additional information that may be available at the local community map repository before making flood elevation and/or floodplain boundary determinations.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent-annual-chance flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent-annual-chance flood is employed to indicate additional areas of flood risk in the community. For each stream studied by detailed or limited detailed methods, the 1- and 0.2-percent-annual-chance floodplain boundaries have been delineated using the flood elevations determined at each cross section.

The St. Johns River, adjacent to Green Cove Springs and Orange Park, is like a large lake with tidal effects. Flow data are not available due to the complexities of tide, wind and storage. Flood elevations on the St. Johns River are the same for the entire length of these communities. Doctors Lake and Johnson Slough have the same profiles as the St. Johns River. Flood boundaries along the shore of Johnson Slough were interpolated, as explained for Dudley Branch.

The 1- and 0.2-percent-annual-chance floodplain boundaries for streams studied by detailed methods are shown on the FIRM. On this map, the 1-percent-annual-chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A and AE), and the 0.2-percent-annual-chance floodplain boundary corresponds to the boundary of areas of moderate flood hazards (Zone X). In cases where the 1- and 0.2-percent-annual-chance floodplain boundaries are close together, only the 1-percent-annual-chance floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations, but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

Some low-lying areas within the county are subject to periodic, temporary flooding due to inadequate drainage. These areas are not included in the detailed study.

For streams studied by approximate methods, only the 1-percent-annual-chance floodplain boundary is shown on the FIRM (Exhibit 2). Approximate flood boundaries in some portions of the study area were taken from the Federal Insurance Administration's Flood Hazard Boundary Map and from USGS Flood-Prone Area Maps.

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the NFIP, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 1-percent-annual-chance floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the base flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways presented in this study 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. The results of the floodway computations are tabulated for selected cross sections and provided in Table 12. The computed floodway is shown on the FIRM (Exhibit 2). In cases where the floodway and 1-percent-annual-chance floodplain boundaries are either close together or collinear, only the floodway boundary is shown on the FIRM.

Near the confluence of streams studied in detail, floodway computations were made without regard to flood elevations on the receiving water body. Therefore, "Without Floodway" elevations presented in **Error! Reference source not found.** for certain downstream cross sections of Governors Creek and for Dudley Branch and Doctors Lake Tributary 1 are lower than the regulatory flood elevations in that area, which must take into account the 1-percent-annual-chance flooding due to backwater from other sources.

Floodway computations on Dudley Branch and Doctors Lake Tributary 1 were based on equal conveyance without consideration of backwater flooding from the St. Johns River (Table 12). Therefore, floodway surcharge elevations along the lower reaches are below rather than above the 1-percent-annual-chance flood elevations as determined by St. Johns River backwater. A floodway for Johnson Slough was considered unnecessary and therefore not computed.

A floodway was not computed for the St. Johns River as it was considered unnecessary. The river is two miles wide and resembles a lake more than a river.

Encroachment into the river could probably occur for a quarter to a half a mile or more. Encroachment of this magnitude is impracticable and prohibited by the State of Florida regulations.

The floodway concept is inapplicable in areas of lacustrine flooding; therefore, no floodways were computed for lakes and basins.

Encroachment into areas subject to inundation by floodwaters having hazardous velocities aggravates the risk of flood damage and heightens potential flood hazards by further increasing velocities. A listing of stream velocities at selected cross sections is provided in Table 12: Floodway Data. To reduce the risk of property damage in areas where the stream velocities are high, the community may wish to restrict development in areas outside the floodway.

The area between the floodway and 1-percent-annual-chance floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation (WSEL) of the base 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 1, "Floodway Schematic."

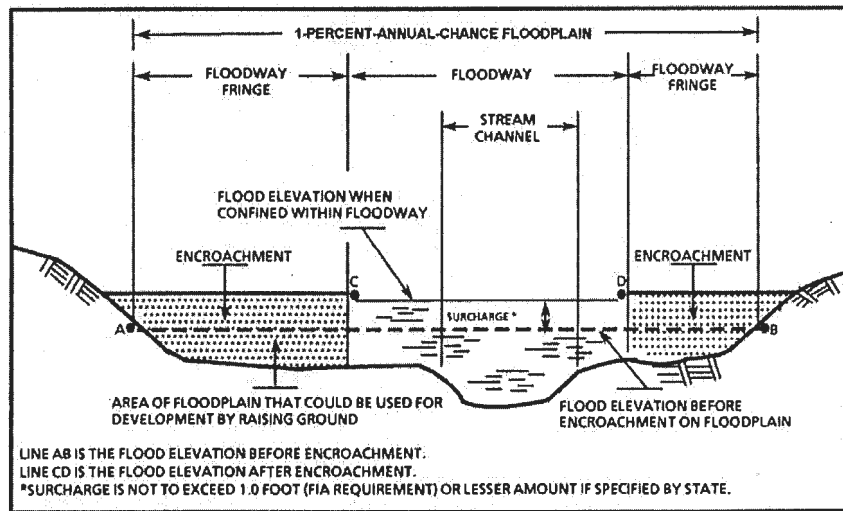


Figure 1: Floodway Schematic

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
BIG BRANCH								
A	1,309 ¹	114	706	4.7	23.2	12.9 ³	13.9	1.0
B	4,479 ¹	208	998	3.2	23.2	23.0 ³	24.0	1.0
C	11,509 ¹	144	718	2.6	41.9	41.9	42.9	1.0
D	15,189 ¹	105	742	1.5	53.7	53.7	54.5	0.8
E	17,469 ¹	54	206	2.7	60.0	60.0	60.8	0.8
F	20,721 ¹	15	205	2.7	83.6	83.6	84.6	1.0
BLACK CREEK								
A	121 ²	1,338	17,577	2.6	4.2	1.3 ⁴	2.3	1.0
B	2,456 ²	653	11,518	3.9	4.2	1.5 ⁴	2.4	0.9
C	7,751 ²	394	12,116	3.7	4.3	2.2 ⁴	3.0	0.8
D	13,151 ²	681	13,201	3.4	4.5	2.8 ⁴	3.5	0.7
E	17,101 ²	550	7,878	5.5	4.6	3.2 ⁴	3.9	0.7
F	22,391 ²	620	7,700	6.1	5.3	4.8 ⁴	5.4	0.6
G	25,501 ²	431	8,628	5.5	6.2	6.0 ⁴	6.8	0.8
H	28,031 ²	1,317	15,426	3.1	6.7	6.6 ⁴	7.2	0.6
I	31,711 ²	1,386	16,918	2.8	7.2	7.2	8.0	0.8
J	35,871 ²	1,403	16,186	2.7	7.8	7.8	8.7	0.9
K	38,991 ²	1,406	13,941	3.1	8.5	8.5	9.4	0.9

¹ Stream distance in feet above confluence with North Fork Black Creek

² Stream distance in feet above confluence with St. Johns River

³ Elevation computed without consideration of backwater effects from North Fork Black Creek

⁴ Elevation computed without consideration of storm surge from St. Johns River

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

**CLAY COUNTY, FL
AND INCORPORATED AREAS**

FLOODWAY DATA

BIG BRANCH-BLACK CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
BLACK CREEK (continued)								
L	45,711	1,112	9,631	4.5	9.9	9.9	10.9	1.0
M	49,665	514	9,966	4.3	10.5	10.5	11.5	1.0
N	53,485	428	7,805	5.5	11.1	11.1	12.0	0.9
O	56,215	395	8,437	5.1	11.9	11.9	12.8	0.9
P	59,035	435	8,574	5.0	12.6	12.6	13.3	0.7
Q	62,670	583	10,888	3.9	13.3	13.3	14.0	0.7
R	65,290	833	12,071	3.5	13.8	13.8	14.5	0.7
S	67,810	762	12,493	3.4	14.1	14.1	15.0	0.9
NORTH FORK BLACK CREEK								
T	70,650	428	8,028	2.4	14.6	14.6	15.6	1.0
U	72,990	834	12,672	1.5	14.9	14.9	15.9	1.0
V	77,344	374	6,364	3.0	15.5	15.5	16.5	1.0
W	80,429	1,215	16,363	1.2	16.0	16.0	16.9	0.9
X	85,299	1,242	11,679	1.6	16.7	16.7	17.7	1.0
Y	87,474	692	9,373	2.0	17.1	17.1	18.1	1.0
Z	90,824	734	9,169	2.0	18.0	18.0	18.9	0.9
AA	95,974	886	12,644	1.5	19.3	19.3	20.3	1.0

¹ Stream distance in feet above confluence with St. Johns River

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY
CLAY COUNTY, FL
 AND INCORPORATED AREAS

FLOODWAY DATA

BLACK CREEK-NORTH FORK BLACK CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
NORTH FORK BLACK CREEK (continued)								
AB	98,404	962	13,017	1.4	19.9	19.9	20.9	1.0
AC	104,104	1222	13,720	1.4	21.9	21.9	22.8	0.9
AD	105,554	1,223	12,318	1.5	22.6	22.6	23.4	0.8
AE	107,984	1,225	13,011	1.4	23.5	23.5	24.5	1.0
AF	110,434	723	10,052	1.8	24.7	24.7	25.6	0.9
AG	112,854	1,492	20,507	0.9	26.0	26.0	26.9	0.9
AH	117,424	2,265	27,329	0.7	26.9	26.9	27.9	1.0
AI	121,574	2,133	24,377	0.7	27.5	27.5	28.5	1.0
AJ	124,114	1,926	20,182	0.9	28.1	28.1	29.0	0.9
AK	127,344	942	7,858	1.4	29.1	29.1	30.0	0.9
AL	132,144	932	8,635	1.3	31.7	31.7	32.6	0.9
AM	135,119	915	7,533	1.5	33.4	33.5	34.2	0.7
AN	137,969	997	6,551	1.7	35.6	35.6	36.2	0.6
AO	142,369	1,007	8,888	1.2	39.3	39.3	40.3	1.0
AP	145,219	932	8,903	1.2	40.9	40.9	41.9	1.0
AQ	150,069	939	6,605	0.9	43.6	43.6	44.6	1.0
AR	153,819	866	5,650	1.1	45.5	45.5	46.3	0.8
AS	157,669	977	6,506	1.0	48.4	48.3	49.3	1.0
AT	161,569	961	5,387	1.2	51.1	51.1	52.1	1.0
AU	163,969	906	4,349	1.4	54.2	54.2	55.1	0.9
AV	168,119	958	6,277	1.0	60.4	60.4	61.3	0.9

¹Stream distance in feet above confluence with St. Johns River

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY
CLAY COUNTY, FL
 AND INCORPORATED AREAS

FLOODWAY DATA

NORTH FORK BLACK CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
NORTH FORK BLACK CREEK (continued)								
AW	172,298 ¹	198	1,620	3.9	66.7	66.7	67.7	1.0
AX	175,628 ¹	966	7,858	0.8	69.1	69.1	70.1	1.0
AY	178,948 ¹	816	5,554	1.1	72.6	72.6	73.4	0.8
AZ	180,678 ¹	802	5,414	1.1	74.9	74.9	75.7	0.8
BA	186,053 ¹	812	4,871	1.1	82.5	82.5	83.4	0.9
BB	190,249 ¹	900	6,662	0.8	87.6	87.6	88.6	1.0
BC	194,319 ¹	65	599	6.1	90.2	90.2	91.2	1.0
BRADLEY CREEK								
A	2,491 ²	72	398	4.5	7.0	3.4 ³	4.1	0.7
B	4,948 ²	239	1,706	1.0	7.0	5.8 ³	6.7	0.9
C	11,226 ²	157	815	1.8	15.6	15.6	16.6	1.0
D	15,106 ²	56	399	3.1	28.2	28.2	28.2	0.0
E	22,590 ²	31	79	8.5	49.6	49.6	49.6	0.0
F	24,830 ²	61	218	2.8	61.4	61.4	62.1	0.7
G	26,342 ²	12	87	3.3	78.6	78.6	78.9	0.3

¹ Stream distance in feet above confluence with St. Johns River

² Stream distance in feet above confluence with Black Creek

³ Elevation computed without consideration of backwater effects from Black Creek

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY
CLAY COUNTY, FL
 AND INCORPORATED AREAS

FLOODWAY DATA

NORTH FORK BLACK CREEK-BRADLEY CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
BUCKEYS CREEK								
A	1,895 ¹	76	230	3.7	5.4	5.4	6.4	1.0
B	3,285 ¹	115	464	1.8	10.1	10.1	10.9	0.8
C	4,230 ¹	135	536	1.4	14.6	14.6	15.5	0.9
D	5,880 ¹	114	334	1.9	17.4	17.4	18.1	0.7
BULL CREEK								
A	1,000 ²	431	2,890	2.2	21.1	14.4 ³	15.4	1.0
B	8,200 ²	400	1,789	2.6	21.7	21.7	22.4	0.7
C	10,685 ²	271	1,728	2.7	25.0	25.0	25.7	0.7
D	13,185 ²	351	2,424	1.9	29.3	29.3	30.3	1.0
E	20,525 ²	183	1,053	2.3	40.4	40.4	41.1	0.7
F	24,700 ²	222	1,295	1.5	48.7	48.7	49.7	1.0

¹ Stream distance in feet above confluence with Governors Creek

² Stream distance in feet above confluence with South Fork Black Creek

³ Elevation computed without consideration of backwater effects from South Fork Black Creek

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY
CLAY COUNTY, FL
 AND INCORPORATED AREAS

FLOODWAY DATA

BUCKEYS CREEK-BULL CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
CLARKES CREEK								
A	5,600 ¹	125	790	2.6	6.9	6.9	7.5	0.6
B	5,740 ¹	125	730	2.8	6.9	6.9	7.5	0.6
C	7,240 ¹	221	1,100	1.9	8.2	8.2	9.0	0.8
D	7,360 ¹	309	1,950	1.1	8.3	8.3	9.0	0.7
E	10,160 ¹	277	864	2.4	10.7	10.7	11.5	0.8
F	12,960 ¹	70	437	4.8	18.4	18.4	19.3	0.9
G	15,760 ¹	70	475	4.0	24.8	24.8	24.9	0.1
H	15,880 ¹	85	682	2.8	25.7	25.7	26.7	1.0
I	17,380 ¹	199	1,190	1.6	26.4	26.4	27.4	1.0
J	21,480 ¹	230	661	2.4	34.9	34.9	35.9	1.0
K	23,930 ¹	92	316	3.0	40.7	40.7	41.7	1.0
DILLABERRY BRANCH								
A	543 ²	55	279	4.0	16.2	5.5 ³	5.9	0.4
B	1,543 ²	98	459	2.4	16.2	12.3 ³	13.3	1.0
C	3,226 ²	109	713	1.6	21.0	21.0	21.8	0.8
D	7,094 ²	25	126	6.7	36.8	36.8	37.4	0.6
E	9,694 ²	60	245	3.4	47.9	47.9	48.9	1.0

¹ Stream distance in feet above confluence with St. Johns River

² Stream distance in feet above confluence with North Fork Black Creek

³ Elevation computed without consideration of backwater effects from North Fork Black Creek

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY
CLAY COUNTY, FL
 AND INCORPORATED AREAS

FLOODWAY DATA

CLARKES CREEK-DILLABERRY BRANCH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
DILLABERRY BRANCH (continued)								
F	11,585 ¹	23	114	3.2	61.4	61.4	61.4	0.0
G	13,795 ¹	17	56	6.6	77.8	77.8	78.4	0.6
DOCTORS LAKE TRIBUTARY 1								
A	855 ²	50	119	5.1	5.1	-0.4 ⁴	-0.4	0.0
B	915 ²	50	268	2.3	5.3	2.5 ⁴	2.5	0.0
C	1,995 ²	50	123	5.0	5.6	4.8 ⁴	4.8	0.0
D	2,095 ²	50	122	5.0	7.7	7.7	7.7	0.0
E	2,145 ²	50	256	2.4	9.2	9.2	9.2	0.0
F	3,045 ²	50	152	4.0	10.2	10.2	10.2	0.0
DOUBLE BRANCH								
A	3,325 ³	312	1,380	1.2	13.1	11.5 ⁵	12.5	1.0
B	6,250 ³	260	1,000	1.7	17.2	17.2	18.0	0.8
C	9,300 ³	380	1,110	1.4	23.4	23.4	24.4	1.0
D	11,525 ³	300	916	1.6	28.6	28.6	29.3	0.7

¹ Stream distance in feet above confluence with North Fork Black Creek

² Stream distance in feet above confluence with Johnson Slough

³ Stream distance in feet above confluence with Little Black Creek

⁴ Elevation computed without consideration of backwater effects from St. Johns River

⁵ Elevation computed without consideration of backwater effects from Little Black Creek

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

**CLAY COUNTY, FL
AND INCORPORATED AREAS**

FLOODWAY DATA

DILLABERRY BRANCH-DOCTORS LAKE TRIBUTARY 1-DOUBLE BRANCH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
DUCKWATER BRANCH								
A	450 ¹	92	330	2.3	47.4	46.3 ³	47.3	1.0
B	6,342 ¹	13	87	4.7	79.7	79.7	80.5	0.8
DUDLEY BRANCH								
A	120 ²	35	130	4.3	5.1	1.8 ⁴	2.7	0.9
B	160 ²	80	268	2.1	5.1	2.7 ⁴	2.8	0.1
C	1,345 ²	80	240	2.3	5.2	4.0 ⁴	4.7	0.7
D	1,360 ²	140	485	1.1	5.8	4.7 ⁴	5.3	0.6
E	2,470 ²	45	197	2.8	5.9	5.3 ⁴	5.8	0.5
F	2,520 ²	50	166	3.4	5.9	5.8 ⁴	6.4	0.6
G	4,120 ²	50	191	2.9	7.7	7.7	7.9	0.2
H	4,190 ²	50	155	3.6	7.8	7.8	8.0	0.2
I	5,395 ²	50	521	1.1	8.4	8.4	9.2	0.8
J	5,460 ²	100	397	1.4	8.4	8.4	9.2	0.8
K	5,965 ²	100	521	1.1	8.5	8.5	9.3	0.8
L	6,020 ²	100	486	1.1	8.5	8.5	9.3	0.8
M	6,365 ²	100	428	1.3	8.5	8.5	9.3	0.8
N	6,420 ²	100	499	1.1	8.5	8.5	9.3	0.8
O	6,565 ²	100	523	1.1	8.5	8.5	9.3	0.8
P	6,620 ²	100	589	0.9	8.5	8.5	9.3	0.8
Q	7,935 ²	100	655	0.8	8.5	8.5	9.3	0.8

¹Stream distance in feet above confluence with Big Branch

²Stream distance in feet above confluence with Johnson Slough

³Elevation computed without consideration of backwater effects from Big Branch

⁴Elevation computed without consideration of backwater effects from St. Johns River

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

**CLAY COUNTY, FL
AND INCORPORATED AREAS**

FLOODWAY DATA

DUCKWATER BRANCH-DUDLEY BRANCH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
GOVERNORS CREEK								
A	800 ¹	268	1,039	2.7	4.1	-0.3 ³	-0.2	0.1
B	1,100 ¹	414	1,622	1.7	4.1	0.1 ³	0.2	0.1
C	3,850 ¹	163	1,708	1.6	4.1	1.7 ³	1.7	0.0
D	5,650 ¹	108	1,251	2.2	4.1	1.8 ³	1.8	0.0
E	7,150 ¹	143	595	4.0	4.1	1.9 ³	1.9	0.0
F	8,950 ¹	308	1,783	1.3	4.7	4.7	5.5	0.8
G	10,750 ¹	56	404	5.9	7.1	7.1	7.7	0.6
H	10,850 ¹	240	655	3.6	8.1	8.1	8.4	0.3
I	13,250 ¹	184	946	2.5	12.5	12.5	13.4	0.9
J	16,450 ¹	146	478	2.6	17.3	17.3	18.2	0.9
GREENS CREEK								
A	1,256 ²	406	4,495	1.4	40.2	35.9 ⁴	36.9	1.0
B	2,268 ²	265	3,086	2.0	40.2	36.5 ⁴	37.4	0.9
C	2,952 ²	295	4,059	1.5	40.2	37.0 ⁴	37.9	0.9
D	4,153 ²	290	3,692	1.7	40.2	37.4 ⁴	38.4	1.0
E	4,912 ²	150	1,558	4.0	40.2	37.8 ⁴	38.8	1.0
F	5,456 ²	120	1,291	4.8	40.2	39.1 ⁴	39.7	0.6
G	6,007 ²	130	1,752	3.5	40.2	40.2	40.8	0.6

¹ Stream distance in feet above confluence with St. Johns River

² Stream distance in feet above confluence with South Fork Black Creek

³ Elevation computed without consideration of backwater effects from St. Johns River

⁴ Elevation computed without consideration of backwater effects from South Fork Black Creek

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY
CLAY COUNTY, FL
 AND INCORPORATED AREAS

FLOODWAY DATA

GOVERNORS CREEK-GREENS CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
GREENS CREEK (continued)								
H	7,079 ¹	150	2,165	2.8	41.4	41.4	42.1	0.7
I	7,957 ¹	275	3,902	1.6	42.2	42.2	43.1	0.9
J	9,003 ¹	200	2,479	2.5	42.6	42.6	43.6	1.0
GROG CREEK								
A	3,985 ²	127	860	1.5	13.3	9.3 ³	10.3	1.0
B	7,559 ²	21	205	5.0	13.4	13.4	14.4	1.0
C	9,578 ²	95	717	1.3	20.1	20.1	20.6	0.5
D	12,128 ²	20	115	5.4	21.7	21.7	22.7	1.0
LITTLE BLACK CREEK								
A	3,250 ²	854	6,661	1.5	7.9	6.6 ³	7.4	0.8
B	5,437 ²	837	7,220	1.4	7.9	7.9 ³	8.6	0.7
C	8,868 ²	1,477	12,644	0.8	9.4	9.4	10.1	0.7
D	11,359 ²	137	1,820	5.5	11.1	11.1	11.9	0.8
E	13,509 ²	1,370	13,067	0.8	11.9	11.9	12.8	0.9
F	15,261 ²	1,329	12,562	0.8	12.2	12.2	13.2	1.0
G	16,332 ²	350	4,496	2.2	12.7	12.7	13.7	1.0

¹ Stream distance in feet above confluence with South Fork Black Creek

² Stream distance in feet above confluence with Black Creek

³ Elevation computed without consideration of backwater effects from Black Creek

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY
CLAY COUNTY, FL
 AND INCORPORATED AREAS

FLOODWAY DATA

GREENS CREEK-GROG CREEK-LITTLE BLACK CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
LITTLE BLACK CREEK (continued)								
H	18,892 ¹	2,363	27,194	0.4	13.0	13.0	14.0	1.0
I	23,092 ¹	3,056	26,895	0.3	13.1	13.1	14.1	1.0
J	28,248 ¹	1,180	11,304	0.3	13.2	13.2	14.2	1.0
K	31,762 ¹	927	10,166	0.3	13.2	13.2	14.2	1.0
L	34,112 ¹	925	10,581	0.2	13.2	13.2	14.2	1.0
M	36,803 ¹	801	6,856	0.3	13.2	13.2	14.2	1.0
N	39,641 ¹	700	5,581	0.3	13.3	13.3	14.3	1.0
O	42,891 ¹	800	6,894	0.1	13.3	13.3	14.3	1.0
P	46,362 ¹	475	2,913	0.2	13.3	13.3	14.3	1.0
Q	49,164 ¹	200	860	0.7	13.3	13.3	14.3	1.0
R	51,864 ¹	89	178	2.7	32.8	32.8	32.8	0.0
LITTLE BLACK CREEK TRIBUTARY 1								
A	3,235 ²	200	753	3.2	13.3	7.4 ³	8.2	0.8
B	5,915 ²	200	901	2.7	15.4	15.4	15.8	0.4
C	9,245 ²	307	1,694	1.2	24.4	24.4	24.9	0.5
D	15,879 ²	185	1,024	1.4	40.1	40.1	41.1	1.0

¹ Stream distance in feet above confluence with Black Creek

² Stream distance in feet above confluence with Little Black Creek

³ Elevation computed without consideration of backwater effects from Little Black Creek

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

**CLAY COUNTY, FL
AND INCORPORATED AREAS**

FLOODWAY DATA

LITTLE BLACK CREEK-LITTLE BLACK CREEK TRIBUTARY 1

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
LITTLE BLACK CREEK TRIBUTARY 2								
A	2,085 ¹	144	393	1.0	13.2	11.2 ⁴	12.1	0.9
B	4,800 ¹	110	257	1.3	17.4	17.4	17.9	0.5
LONG BRANCH								
A	2,675 ²	444	2,290	1.8	40.9	40.9	41.8	0.9
B	5,910 ²	308	2,540	1.4	47.8	47.8	48.7	0.9
C	8,080 ²	418	3,280	1.1	52.2	52.2	53.2	1.0
D	10,790 ²	265	1,570	2.3	55.6	55.6	56.5	0.9
E	14,305 ²	100	1,160	2.7	63.8	63.8	64.7	0.9
F	14,470 ²	112	1,400	2.2	63.8	63.8	64.7	0.9
G	17,150 ²	378	2,000	1.4	67.4	67.4	68.3	0.9
H	18,840 ²	239	1,120	2.4	70.8	70.8	71.7	0.9
I	18,900 ²	293	1,350	2.0	71.2	71.2	72.1	0.9
J	21,560 ²	299	1,420	1.5	77.5	77.5	78.4	0.9
MILL CREEK								
A	3,738 ³	48	224	5.7	27.3	27.3	28.2	0.9
B	5,333 ³	41	266	3.9	33.7	33.7	34.5	0.8
C	7,973 ³	20	78	5.6	47.0	47.0	47.4	0.4

¹ Stream distance in feet above confluence with Little Black Creek

² Stream distance in feet above confluence with North Fork Black Creek

³ Stream distance in feet above confluence with Bull Creek

⁴ Elevation computed without consideration of backwater effects from Little Black Creek

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

**CLAY COUNTY, FL
AND INCORPORATED AREAS**

FLOODWAY DATA

LITTLE BLACK CREEK TRIBUTARY 2-LONG BRANCH-MILL CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
NORTH FORK BLACK CREEK TRIBUTARY 1								
A	1,675 ¹	262	948	0.9	15.0	2.4 ³	3.4	1.0
B	4,300 ¹	268	1,070	0.8	15.0	3.5 ³	4.5	1.0
C	6,025 ¹	38	179	4.2	15.0	4.5 ³	5.3	0.8
D	6,260 ¹	449	2,243	0.3	15.0	13.6 ³	13.6	0.0
E	9,210 ¹	56	264	1.2	20.6	20.6	21.6	1.0
NORTH FORK BLACK CREEK TRIBUTARY 1A								
A	1,100 ²	103	282	1.5	15.6	14.0 ⁴	15.0	1.0
B	1,700 ²	147	104	4.0	18.7	18.7	19.3	0.6
C	2,600 ²	259	694	0.6	19.8	19.8	20.5	0.7
D	7,750 ²	48	131	4.2	36.3	36.3	37.3	1.0
E	11,060 ²	36	100	4.6	56.7	56.7	57.3	0.6

¹ Stream distance in feet above confluence with North Fork Black Creek

² Stream distance in feet above confluence with North Fork Black Creek Tributary 1

³ Elevation computed without consideration of backwater effects from North Fork Black Creek

⁴ Elevation computed without consideration of backwater effects from North Fork Black Creek Tributary 1

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY
CLAY COUNTY, FL
 AND INCORPORATED AREAS

FLOODWAY DATA

NORTH FORK BLACK CREEK TRIBUTARY 1-NORTH FORK BLACK CREEK TRIBUTARY 1A

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
NORTH PRONG DOUBLE BRANCH								
A	2,600 ¹	80	343	2.2	38.1	38.1	38.6	0.5
B	4,625 ¹	200	555	1.3	44.7	44.7	45.2	0.5
C	7,925 ¹	200	531	1.1	50.6	50.6	51.0	0.4
D	10,475 ¹	200	393	0.8	60.1	60.1	60.7	0.6
PETERS BRANCH								
A	1,400 ²	31	206	3.6	4.1	0.2 ⁴	1.2	1.0
B	3,270 ²	49	476	1.4	8.5	8.5	9.4	0.9
PETERS CREEK								
A	3,825 ³	450	6,040	0.7	4.1	-1.0 ⁴	0.1	1.1
B	5,725 ³	126	1,220	3.3	4.1	-0.9 ⁴	0.1	1.0
C	6,975 ³	152	1,160	3.4	4.1	-0.3 ⁴	0.6	0.9
D	7,150 ³	126	800	5.0	4.1	-0.2 ⁴	0.6	0.8
E	7,240 ³	139	1,150	3.3	4.1	0.1 ⁴	0.9	0.8
F	7,300 ³	129	1,340	2.8	4.1	0.3 ⁴	1.0	0.7

¹ Stream distance in feet above confluence with Double Branch and South Prong Double Branch

² Stream distance in feet above confluence with St. Johns River

³ Stream distance in feet above confluence with Black Creek

⁴ Elevation computed without consideration of backwater effects from St. Johns River

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

**CLAY COUNTY, FL
AND INCORPORATED AREAS**

FLOODWAY DATA

NORTH PRONG DOUBLE BRANCH-PETERS BRANCH-PETERS CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
PETERS CREEK (continued)								
G	10,500 ¹	130	849	4.5	4.1	1.5 ³	2.1	0.6
H	14,500 ¹	208	1,265	3.0	6.6	6.6	7.6	1.0
I	14,560 ¹	204	1,370	2.8	6.9	6.9	7.9	1.0
J	18,360 ¹	246	1,550	2.0	8.4	8.4	9.4	1.0
K	21,410 ¹	125	750	4.0	11.3	11.3	12.3	1.0
L	21,500 ¹	222	1,230	2.4	11.6	11.6	12.5	0.9
M	23,710 ¹	247	1,420	2.1	14.6	14.6	15.6	1.0
POLANDER BRANCH								
A	2,390 ²	102	802	0.9	16.6	15.5 ⁴	15.5	0.0
B	3,255 ²	159	977	0.7	16.6	15.5 ⁴	15.7	0.2
C	8,423 ²	43	148	3.0	30.8	30.8	31.7	0.9

¹ Stream distance in feet above confluence with Black Creek

² Stream distance in feet above confluence with South Fork Black Creek

³ Elevation computed without consideration of backwater effects from St. Johns River

⁴ Elevation computed without consideration of backwater effects from South Fork Black Creek

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY
CLAY COUNTY, FL
 AND INCORPORATED AREAS

FLOODWAY DATA

PETERS CREEK-POLANDER BRANCH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
SOUTH FORK BLACK CREEK								
A	2,050	500	3,790	6.9	14.6 ²	6.8	7.7	0.9
B	5,500	499	4,840	5.4	14.8 ²	8.9	9.7	0.8
C	9,200	500	5,800	4.6	14.8 ²	10.4	11.1	0.7
D	14,025	796	6,710	3.9	14.8 ²	12.7	13.5	0.8
E	14,265	916	10,000	2.6	14.8 ²	13.3	13.9	0.6
F	17,765	561	5,730	4.5	14.9	14.9	15.7	0.8
G	20,715	793	9,720	2.7	16.9	16.9	17.6	0.7
H	23,840	799	12,400	2.1	19.2	19.2	20.0	0.8
I	28,665	594	10,400	2.2	22.3	22.3	23.2	0.9
J	32,765	524	5,460	4.2	24.4	24.4	25.4	1.0
K	35,690	500	6,260	3.6	28.0	28.0	28.7	0.7
L	38,690	500	7,460	3.1	30.9	30.9	31.6	0.7
M	42,040	500	7,110	3.2	33.6	33.6	34.3	0.7
N	44,815	1,000	16,100	1.4	35.5	35.5	36.4	0.9
O	48,415	1,000	22,800	1.0	36.9	36.9	37.7	0.8
P	50,515	1,000	24,100	0.9	37.4	37.4	38.2	0.8
Q	54,315	1,000	20,500	1.1	38.1	38.1	39.0	0.9
R	57,365	1,000	23,800	0.9	38.7	38.7	39.7	1.0
S	59,190	1,000	18,200	1.1	39.2	39.2	40.2	1.0
T	59,600	1,000	17,200	1.2	39.3	39.3	40.3	1.0
U	62,314	895	11,152	1.5	39.5	39.5	40.5	1.0
V	63,660	980	15,587	1.1	39.9	39.9	40.9	1.0

¹ Stream distance in feet above confluence with Black Creek and North Fork Black Creek

² Flooding controlled by North Fork Black Creek

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY
CLAY COUNTY, FL
 AND INCORPORATED AREAS

FLOODWAY DATA

SOUTH FORK BLACK CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
SOUTH FORK BLACK CREEK (continued)								
W	64,678 ¹	1170	15,569	1.1	40.2	40.2	41.1	0.9
X	65,609 ¹	1100	13,279	0.7	40.3	40.3	41.3	1.0
SOUTH FORK BLACK CREEK TRIBUTARY 1								
A	1,600 ²	105	515	4.1	37.3	17.5 ³	18.5	1.0
B	2,725 ²	100	427	4.9	37.3	23.3 ³	24.1	0.8
C	2,800 ²	200	923	2.3	37.3	24.3 ³	25.2	0.9
D	5,400 ²	268	889	2.1	37.3	31.4 ³	32.2	0.8
E	8,200 ²	200	586	2.8	38.5	38.5	39.0	0.5
F	10,250 ²	200	680	1.7	42.0	42.0	42.8	0.8
G	13,800 ²	200	717	1.6	48.1	48.1	49.0	0.9
H	15,700 ²	203	693	1.6	54.4	54.4	55.4	1.0
I	17,370 ²	170	867	1.4	55.2	55.2	56.2	1.0
J	18,506 ²	80	374	3.3	60.7	60.7	61.1	0.4
K	19,309 ²	80	537	2.3	63.6	63.6	64.2	0.6
L	20,193 ²	128	665	1.5	66.0	66.0	66.7	0.7

¹ Stream distance in feet above confluence with Black Creek and North Fork Black Creek

² Stream distance in feet above confluence with South Fork Black Creek

³ Elevation computed without consideration of backwater effects from South Fork Black Creek

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY
CLAY COUNTY, FL
 AND INCORPORATED AREAS

FLOODWAY DATA

SOUTH FORK BLACK CREEK-SOUTH FORK BLACK CREEK TRIBUTARY 1

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
SOUTH FORK BLACK CREEK TRIBUTARY 1 (continued)								
M	21,001	152	702	1.5	68.0	68.0	68.8	0.8
N	21,714	112	452	2.3	70.9	70.9	71.7	0.8
O	22,625	92	268	3.8	75.1	75.1	75.9	0.8
P	23,560	84	415	1.8	78.6	78.6	79.3	0.7
Q	24,299	138	697	1.1	82.1	82.1	82.8	0.7
R	25,481	182	1,238	0.6	85.5	85.5	86.2	0.7
S	26,682	100	620	1.2	85.8	85.8	86.6	0.8
SOUTH FORK BLACK CREEK TRIBUTARY 7								
A	1,956	63	604	1.9	38.7	35.1 ²	35.9	0.8
B	2,704	80	595	1.9	38.7	36.0 ²	36.7	0.7
C	3,630	112	688	1.7	38.7	38.4 ²	39.3	0.9
D	4,370	82	385	3.0	40.0	40.0	41.0	1.0
E	4,975	98	561	2.0	42.3	42.3	43.2	0.9
F	5,545	74	338	3.4	45.0	45.0	45.8	0.8
G	6,195	76	357	2.4	48.8	48.8	49.3	0.5

¹ Stream distance in feet above confluence with South Fork Black Creek

² Elevation computed without consideration of backwater effects from South Fork Black Creek

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY
CLAY COUNTY, FL
 AND INCORPORATED AREAS

FLOODWAY DATA

SOUTH FORK BLACK CREEK TRIBUTARY 1-SOUTH FORK BLACK CREEK TRIBUTARY 7

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
SOUTH FORK BLACK CREEK TRIBUTARY 7 (continued)								
H	7,260 ¹	118	598	1.5	51.7	51.7	52.7	1.0
I	8,147 ¹	113	526	1.6	53.8	53.8	54.8	1.0
J	8,883 ¹	66	284	3.1	57.4	57.4	58.1	0.7
K	9,662 ¹	134	577	1.5	60.6	60.6	61.6	1.0
L	9,991 ¹	152	626	1.4	61.4	61.4	62.3	0.9
M	10,654 ¹	141	1,039	0.6	65.2	65.2	66.1	0.9
N	11,280 ¹	94	417	1.5	65.3	65.3	66.3	1.0
SOUTH PRONG DOUBLE BRANCH								
A	1,485 ²	97	464	2.8	36.4	36.4	37.4	1.0
B	3,019 ²	130	557	2.3	40.7	40.7	41.5	0.8
C	4,254 ²	108	630	2.0	46.4	46.4	46.8	0.4
D	7,430 ²	105	537	2.0	53.4	53.4	54.3	0.9
E	9,150 ²	82	457	2.3	58.7	58.7	59.7	1.0

¹ Stream distance in feet above confluence with South Fork Black Creek

² Stream distance in feet above confluence with Double Branch and North Prong Double Branch

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY
CLAY COUNTY, FL
 AND INCORPORATED AREAS

FLOODWAY DATA

SOUTH FORK BLACK CREEK TRIBUTARY 7-SOUTH PRONG DOUBLE BRANCH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	INCREASE
ST. JOHNS RIVER TRIBUTARY 1								
A	0	87	272	1.3	4.1	2.2 ²	3.2	1.0
B	80	384	1,304	0.3	4.1	3.2 ²	4.2	1.0
C	1,300	41	207	1.7	4.6	4.6	5.1	0.5
D	1,560	171	753	0.5	5.7	5.7	6.0	0.3
E	1,740	287	1,475	0.2	5.7	5.7	6.0	0.3
F	1,810	541	4,190	0.1	8.5	8.5	8.6	0.1
G	4,000	26	111	2.4	10.8	10.8	11.6	0.8
ST. JOHNS RIVER TRIBUTARY 2								
A	4,325	60	155	2.8	5.6	5.6	5.9	0.3
B	4,450	54	96	4.5	5.8	5.8	6.1	0.3
C	7,150	71	236	1.6	13.4	13.4	14.1	0.7
D	7,275	60	238	1.5	13.4	13.4	14.3	0.9
E	9,750	100	172	1.8	21.5	21.5	22.1	0.6
F	12,800	100	213	0.8	27.4	27.4	27.8	0.4

¹ Stream distance in feet above confluence with St. Johns River

² Elevation computed without consideration of backwater effects from St. Johns River

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY
CLAY COUNTY, FL
 AND INCORPORATED AREAS

FLOODWAY DATA

ST. JOHNS RIVER TRIBUTARY 1-ST. JOHNS RIVER TRIBUTARY 2

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD) ³	WITH FLOODWAY (NAVD)	INCREASE
ST. JOHNS RIVER TRIBUTARY 3								
A	3,700 ¹	120	448	0.9	4.1	4.7	5.7	1.0
SWIMMING PEN CREEK								
A	2,175 ²	579	3,260	0.2	4.1	-1.0	0.1	1.1
B	2,515 ²	606	2,990	0.2	4.1	-1.0	0.1	1.1
C	3,680 ²	545	2,760	0.2	4.1	-1.0	0.1	1.1
D	7,830 ²	50	200	2.7	4.1	1.0	1.3	0.3

¹ Stream distance in feet above confluence with St. Johns River

² Stream distance in feet above confluence with Doctors Lake

³ Elevation computed without consideration of backwater effects from St. Johns River

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

**CLAY COUNTY, FL
AND INCORPORATED AREAS**

FLOODWAY DATA

ST. JOHNS RIVER TRIBUTARY 3-SWIMMING PEN CREEK

No floodways were computed for streams studied by limited detailed methods. Computed base flood elevations for streams studied by limited detailed methods are presented in Table 13.

Table 13: Limited Detailed Base Flood Elevation Data

Cross Section ¹	Stream Station ²	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)
BLACK CREEK TRIBUTARY 1			
005	500	637	8.8 ³
010	1000	637	8.8 ³
015	1500	637	8.8 ³
020	2000	637	8.8 ³
025	2500	637	8.8 ³
030	3000	637	8.8 ³
035	3500	637	8.8 ³
040	4000	577	14.8
045	4500	577	15.1
050	5000	577	16.6
055	5500	577	20.1
060	6000	577	23.1
065	6500	577	24.1
BLACK CREEK TRIBUTARY 2			
003	298	575	9.9 ³
015	1500	575	9.9 ³
020	2000	575	9.9 ³
025	2500	575	9.9 ³
030	3000	575	9.9 ³
035	3500	575	9.9 ³
040	4000	575	9.9 ³
045	4500	528	12.9
050	5000	528	13.0
055	5500	528	13.4
060	6000	528	14.8
065	6500	528	18.9

Table 13: Limited Detailed Base Flood Elevation Data

Cross Section ¹	Stream Station ²	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)
BLACK CREEK TRIBUTARY 2 (continued)			
070	7000	528	22.0
074	7366	528	23.7
081	8084	528	32.9
BRADLEY CREEK TRIBUTARY 1			
002	213	583	19.5 ³
005	500	583	21.8
010	1000	583	29.3
014	1427	583	38.1
015	1500	583	38.1
020	2000	583	39.5
026	2599	466	46.8
BUSH CREEK			
073	7285	2823	4.1 ³
077	7694	2823	4.1 ³
082	8219	2823	4.1 ³
090	9000	2823	8.2
095	9500	2823	8.7
100	10000	2823	9.2
110	11000	1740	15.8
115	11500	1740	15.9
120	11952	1740	16.2
BUSH CREEK TRIBUTARY 1			
058	5815	995	4.1 ³
064	6429	995	4.1 ³
071	7054	995	4.9
080	8028	108	7.7
083	8295	108	8.9
085	8522	108	10.2

Table 13: Limited Detailed Base Flood Elevation Data

Cross Section ¹	Stream Station ²	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)
BUSH CREEK TRIBUTARY 1 (continued)			
090	8991	108	11.4
101	10081	108	14.0
112	11168	108	14.8
117	11693	108	16.8
127	12697	108	17.5
CLAY BRANCH			
045	4518	444	4.1 ³
048	4765	444	4.1 ³
050	5032	444	4.1 ³
053	5336	444	4.1 ³
056	5634	444	4.1 ³
064	6366	365	16.0
067	6750	365	16.0
070	7040	365	16.0
076	7552	365	16.0
079	7950	365	16.5
082	8210	365	19.1
084	8379	365	20.9
085	8546	365	22.3
093	9285	365	25.9
097	9687	365	26.8
101	10095	365	27.5
106	10628	365	28.1
DOCTOR LAKE TRIBUTARY 2			
055	5500	912	21.1
060	6000	435	21.4
065	6500	435	21.9
070	7000	435	23.2

Table 13: Limited Detailed Base Flood Elevation Data

Cross Section ¹	Stream Station ²	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)
DOCTORS LAKE TRIBUTARY 2 (continued)			
080	8000	435	31.8
085	8500	312	46.2
090	9000	312	51.3
094	9447	312	55.7
DOCTORS LAKE TRIBUTARY 5			
087	8720	239	4.1 ³
091	9050	239	4.1 ³
095	9500	239	5.7
107	10748	239	10.6
120	11973	162	12.6
125	12500	162	13.9
131	13141	162	16.3
GROG CREEK			
123	12283	437	21.7
125	12500	437	21.8
128	12848	437	23.0
GROG CREEK TRIBUTARY 1			
002	182	87	14.2 ³
007	654	87	14.2 ³
012	1155	87	14.9
LITTLE BLACK CREEK			
148	14809	480	32.8
152	15170	480	36.1
160	16000	480	44.2
165	16500	480	44.3
173	17292	480	51.0
LITTLE BLACK CREEK TRIBUTARY 1			
164	16366	1440	40.0

Table 13: Limited Detailed Base Flood Elevation Data

Cross Section ¹	Stream Station ²	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)
LITTLE BLACK CREEK TRIBUTARY 1 (continued)			
170	17000	1440	41.3
175	17500	1221	44.8
180	18000	1221	45.9
185	18500	1221	50.8
190	18974	1221	54.7
195	19500	1221	58.0
200	20000	1221	58.9
205	20500	1221	60.9
215	21500	1221	65.3
220	22000	1210	66.9
230	23000	1210	70.1
236	23565	1210	76.3
241	24129	1210	78.9
LITTLE BLACK CREEK TRIBUTARY 1A			
003	319	518	36.2
008	815	518	37.9
015	1500	518	52.8
020	2000	518	52.8
025	2500	518	52.9
030	3000	518	54.3
035	3500	518	60.0
040	4000	404	63.4
050	5000	404	71.4
055	5500	404	74.0
060	6000	404	75.9
065	6500	404	77.6
LITTLE BLACK CREEK TRIBUTARY 2			
046	4642	387	17.4

Table 13: Limited Detailed Base Flood Elevation Data

Cross Section ¹	Stream Station ²	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)
LITTLE BLACK CREEK TRIBUTARY 2 (continued)			
050	5000	387	18.9
055	5500	387	19.2
060	6000	387	19.6
065	6500	387	20.1
070	7000	387	21.3
075	7500	387	22.2
080	8000	387	23.7
085	8500	387	26.8
095	9500	387	37.8
100	10000	387	41.9
105	10500	236	45.6
110	11000	236	49.1
115	11500	236	53.2
120	12000	236	57.0
LITTLE BLACK CREEK TRIBUTARY 3			
053	5265	773	13.0 ³
059	5942	773	13.0 ³
070	7000	773	16.4
075	7500	773	18.5
080	8000	773	21.1
085	8500	773	23.8
090	9000	773	27.8
095	9500	773	31.7
100	10000	773	37.0
110	11000	541	46.2
115	11500	541	46.3
120	12000	541	50.5
130	13000	541	53.7

Table 13: Limited Detailed Base Flood Elevation Data

Cross Section ¹	Stream Station ²	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)
LITTLE BLACK CREEK TRIBUTARY 3 (continued)			
135	13500	541	55.1
140	14000	541	55.9
145	14500	541	56.3
150	15000	541	56.8
155	15500	541	58.6
160	16000	264	59.2
163	16330	264	62.5
170	17000	264	62.8
177	17651	264	62.9
183	18271	264	69.1
187	18693	264	72.4
193	19319	264	73.2
LITTLE BLACK CREEK TRIBUTARY 4			
005	500	507	13.1 ³
010	1000	507	13.1 ³
015	1500	507	13.1 ³
020	2000	507	20.4
030	3000	507	31.9
035	3500	507	37.3
040	4000	507	41.9
050	5000	507	52.2
057	5748	339	56.6
064	6430	151	60.4
068	6823	151	62.9
072	7204	151	62.9
090	9000	142	66.5
095	9500	142	66.5

Table 13: Limited Detailed Base Flood Elevation Data

Cross Section ¹	Stream Station ²	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)
LITTLE BLACK CREEK TRIBUTARY 4 (continued)			
101	10146	142	66.5
LUCY BRANCH			
038	3766	764	4.1 ³
043	4314	764	4.1 ³
050	5000	721	9.8
055	5500	721	9.9
060	6000	721	10.4
065	6500	721	11.1
070	7000	721	13.3
075	7500	609	15.3
080	8000	609	15.9
089	8916	609	19.2
090	8966	609	20.2
095	9500	230	20.2
100	10000	230	21.6
105	10500	230	24.3
MILL LOG CREEK			
016	1597	1163	6.0 ³
021	2092	1163	6.0 ³
026	2591	1163	6.0 ³
031	3090	927	6.0 ³
038	3777	927	6.4
041	4086	927	6.4
046	4585	927	6.4
052	5190	927	6.4
056	5565	927	6.5
059	5896	927	6.5
063	6271	927	6.5

Table 13: Limited Detailed Base Flood Elevation Data

Cross Section ¹	Stream Station ²	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)
MILL LOG CREEK (continued)			
068	6766	927	6.6
071	7122	927	6.6
082	8194	927	10.2
097	9737	767	16.9
102	10237	767	19.8
112	11233	767	23.4
117	11733	767	24.2
127	12728	767	28.8
137	13724	503	32.6
146	14606	503	39.6
151	15083	503	42.3
156	15569	503	45.0
161	16069	503	47.9
166	16553	503	50.3
170	17044	503	52.0
175	17469	271	53.8
180	17963	271	56.5
185	18452	271	59.3
189	18927	271	61.4
194	19382	271	64.9
202	20193	271	67.6
206	20561	271	67.8
211	21128	271	70.8
MILL LOG CREEK TRIBUTARY I			
005	522	455	6.0 ³
010	958	455	6.0 ³
014	1365	455	6.0 ³
018	1818	455	6.0 ³

Table 13: Limited Detailed Base Flood Elevation Data

Cross Section ¹	Stream Station ²	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)
MILL LOG CREEK TRIBUTARY 1 (continued)			
023	2274	455	8.4
028	2766	407	13.6
032	3153	407	13.7
036	3623	407	14.3
041	4087	407	17.8
044	4383	407	20.1
046	4552	407	21.8
050	4954	407	22.5
053	5322	407	23.3
058	5811	407	24.7
065	6530	254	25.7
072	7226	254	27.0
NORTH FORK BLACK CREEK TRIBUTARY 1			
095	9500	213	20.9
100	10000	213	21.1
105	10500	213	22.7
110	11000	213	25.3
115	11500	213	29.9
120	12000	213	39.4
128	12850	81	58.1
NORTH FORK BLACK CREEK TRIBUTARY 1A			
130	13000	393	59.4
135	13500	393	59.5
140	14000	393	60.3
145	14500	393	65.9
150	15000	393	70.2
155	15500	393	76.0

Table 13: Limited Detailed Base Flood Elevation Data

Cross Section ¹	Stream Station ²	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)
NORTH PRONG BLACK CREEK TRIBUTARY 2			
004	353	1142	21.8 ³
009	890	1142	21.8 ³
015	1495	1142	21.8 ³
020	1953	1042	21.8 ³
024	2444	1042	21.8 ³
028	2794	1042	22.7
032	3208	1042	24.9
035	3500	1042	26.1
040	4000	995	28.9
045	4500	995	31.9
050	5000	995	32.7
055	5500	995	35.7
NORTH PRONG DOUBLE BRANCH TRIBUTARY 1			
105	10504	597	55.6 ³
108	10768	597	55.6 ³
120	12000	557	57.8
125	12500	557	62.2
132	13239	557	65.6
ORTEGA RIVER TRIBUTARY			
055	5531	99	9.6
070	7031	99	12.0
075	7531	99	12.0
080	8031	99	12.0
088	8849	99	12.0
ORTEGA RIVER TRIBUTARY 1			
002	219	370	1.8
005	500	370	1.9
010	1000	370	2.2

Table 13: Limited Detailed Base Flood Elevation Data

Cross Section ¹	Stream Station ²	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)
ORTEGA RIVER TRIBUTARY 1¹ (continued)			
015	1500	370	2.4
020	2000	370	2.5
025	2500	370	2.6
030	3000	370	2.6
035	3500	370	2.7
040	4000	370	2.7
045	4500	370	2.7
050	5000	370	2.7
055	5500	370	2.8
PETERS BRANCH			
140	14048	590	13.1
145	14500	590	13.2
150	15000	590	13.4
158	15798	590	16.5
165	16505	590	17.0
168	16843	590	17.5
PETERS CREEK			
030	3000	3107	14.8
035	3500	3107	15.4
040	4000	3107	15.9
045	4500	3107	16.3
050	5000	3107	17.0
055	5500	3107	17.7
065	6500	2502	18.7
PETERS CREEK TRIBUTARY 1			
001	64	1101	7.8 ³
005	500	1101	7.8 ³
010	1000	1101	7.9

Table 13: Limited Detailed Base Flood Elevation Data

Cross Section ¹	Stream Station ²	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)
PETERS CREEK TRIBUTARY 1 (continued)			
015	1500	1101	9.1
020	2000	1101	10.8
025	2500	1101	12.4
030	3000	1101	14.9
035	3500	1101	15.7
040	4000	1101	16.3
045	4500	814	18.2
048	4820	814	22.9
055	5500	814	50.9
060	6000	814	50.9
065	6500	814	50.9
070	7000	814	50.9
075	7500	814	50.9
080	8000	618	50.9
085	8500	618	50.9
090	9000	618	50.9
095	9500	618	50.9
100	10000	618	50.9
105	10500	618	55.2
110	11000	618	64.1
115	11500	618	68.5
120	12000	618	71.6
125	12500	339	79.7
130	13000	339	83.5
135	13500	339	83.6
PETERS CREEK TRIBUTARY 2			
001	147	422	11.0 ³
005	500	422	12.7

Table 13: Limited Detailed Base Flood Elevation Data

Cross Section ¹	Stream Station ²	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)
PETERS CREEK TRIBUTARY 2 (continued)			
010	1000	422	16.8
015	1500	422	19.8
020	2000	422	21.4
025	2500	422	23.7
030	3000	422	28.9
035	3500	422	35.0
040	4000	422	50.4
045	4500	422	62.0
050	4982	422	70.1
POLANDER BRANCH TRIBUTARY 1			
090	9000	99	26.2
095	9500	99	38.8
099	9866	99	48.9
100	10000	99	54.7
102	10194	99	65.0
103	10303	99	68.8
SOUTH FORK BLACK CREEK TRIBUTARY 2			
005	500	320	17.4 ³
015	1500	314	17.5
020	2000	314	17.5
025	2500	314	17.5
030	3000	314	17.5
035	3500	314	17.5
040	4000	295	17.6
045	4500	295	24.0
050	5000	295	34.5
055	5500	295	45.2
060	6000	295	53.2

Table 13: Limited Detailed Base Flood Elevation Data

Cross Section ¹	Stream Station ²	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)
SOUTH FORK BLACK CREEK TRIBUTARY 2 (continued)			
065	6472	295	57.5
071	7118	295	67.5
SOUTH FORK BLACK CREEK TRIBUTARY 3			
008	778	1001	17.9 ³
015	1500	1001	17.9 ³
020	2000	1001	17.9 ³
025	2500	1001	17.9 ³
030	3000	1001	17.9 ³
035	3500	1001	17.9 ³
040	4000	1001	17.9 ³
045	4500	822	18.9
050	5000	822	24.0
055	5500	822	25.1
060	6000	822	28.5
065	6500	822	31.1
070	7000	822	34.3
075	7500	822	37.1
080	8000	822	40.0
085	8500	822	43.0
090	9000	822	45.3
095	9500	822	48.1
100	10000	822	52.0
110	11000	406	58.0
115	11500	406	58.5
120	12000	406	62.1
125	12500	138	65.4
130	13000	138	74.8
135	13500	138	81.6

Table 13: Limited Detailed Base Flood Elevation Data

Cross Section ¹	Stream Station ²	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)
SOUTH FORK BLACK CREEK TRIBUTARY 3 (continued)			
140	14000	138	83.6
151	15140	138	84.3
SOUTH FORK BLACK CREEK TRIBUTARY 4			
110	11000	388	68.9
115	11500	388	71.5
120	12000	388	74.7
125	12500	388	77.2
130	13000	232	78.9
135	13500	232	80.5
140	14000	232	80.6
145	14470	232	81.1
SOUTH PRONG DOUBLE BRANCH			
115	11489	1048	58.7
120	12000	1048	59.5
125	12500	1048	60.9
130	13000	1048	62.6
135	13500	1048	64.6
140	14000	1048	66.6
145	14500	1048	68.4
160	16000	879	70.2
170	17000	879	74.1
175	17500	879	74.7
180	18000	879	75.1
184	18407	879	77.3
ST. JOHNS RIVER TRIBUTARY 1			
049	4868	511	10.8
055	5500	350	10.9
060	6000	350	18.7

Table 13: Limited Detailed Base Flood Elevation Data

Cross Section ¹	Stream Station ²	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)
ST. JOHNS RIVER TRIBUTARY 1 (continued)			
065	6500	350	22.9
070	7000	350	25.9
075	7500	350	27.7
ST. JOHNS RIVER TRIBUTARY 3			
120	12000	552	7.0
124	12410	552	7.1
ST. JOHNS RIVER TRIBUTARY 3A			
009	903	708	4.1 ³
012	1220	708	4.1 ³
017	1731	708	5.2
019	1922	708	5.3
025	2500	708	7.9
030	3000	708	8.4
040	4000	708	15.6
045	4500	708	15.6
050	5000	708	15.9
055	5500	708	17.0
ST. JOHNS RIVER TRIBUTARY 4A EAST			
002	159	841	4.3
007	659	841	6.6
012	1159	841	9.2
014	1393	841	11.2
017	1676	841	12.1
020	2012	841	13.3
024	2429	841	16.4
029	2853	841	17.4
ST. JOHNS RIVER TRIBUTARY 5 DS			
206	20624	1250	4.1 ³

Table 13: Limited Detailed Base Flood Elevation Data

Cross Section ¹	Stream Station ²	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)
ST. JOHNS RIVER TRIBUTARY 5 DS (continued)			
222	22209	1250	4.1 ³
234	23444	1250	6.6
244	24417	1250	7.9
266	26569	1250	10.8
ST. JOHNS RIVER TRIBUTARY 5 US			
375	37456	841	15.4
378	37782	841	16.0
384	38441	841	21.1
385	38532	841	21.1
390	38973	841	23.7
ST. JOHNS RIVER TRIBUTARY 6			
081	8136	244.05	4.1 ³
088	8838	244.05	4.1 ³
092	9235	244.05	4.1 ³
097	9671	244.05	5.5
100	10000	244.05	7.9
105	10500	244.05	9.3
110	11000	244.05	11.8
114	11353	244.05	12.8
125	12500	194.05	15.8
130	13000	194.05	16.9
134	13433	194.05	17.9
140	14017	194.05	18.8
145	14508	194.05	19.0
148	14850	400.06	19.1
151	15149	738.49	20.4
155	15452	842	21.0

Table 13: Limited Detailed Base Flood Elevation Data

Cross Section ¹	Stream Station ²	Flood Discharge (cfs)	1% Annual Chance Water-Surface Elevation (feet NAVD 88)
ST. JOHNS RIVER TRIBUTARY 7			
086	8593	35	4.1 ³
096	9619	30	11.2

¹ This table reflects all modeled cross sections. Some cross sections shown in this table may not appear on the map.

² Feet above mouth

³ Elevation includes backwater effects.

⁴ Limited detailed model results shown without the effects of backwater from Ortega River. Mapping for this entire reach is shown on the FIRM as an Approximate Zone A due to model limitations.

5.0 INSURANCE APPLICATIONS

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

Zone A

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

Zone AE

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

Zone X

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