FLOOD INSURANCE STUDY

CLAY COUNTY, MISSOURI
AND INCORPORATED AREAS
VOLUME 1 OF 2

COMMUNITY NAME	COMMUNITY NUMBER
AVONDALE, CITY OF	290087
BIRMINGHAM, VILLAGE OF	295272
CLAY COUNTY, UNINCORPORATED AREAS	290086
CLAYCOMO, VILLAGE OF	290089
EXCELSIOR SPRINGS, CITY OF	290090
GLADSTONE, CITY OF	290091
GLENAIRE, CITY OF	290092
HOLT, CITY OF	290093
KEARNEY, CITY OF	290095
LAWSON, CITY OF	290705
LIBERTY, CITY OF	290096
MISSOURI CITY, CITY OF	290097
MOSBY, CITY OF	290098
NORTH KANSAS CITY, CITY OF	290099
*OAKS, VILLAGE OF	290775
*OAKVIEW, VILLAGE OF	290695
*OAKWOOD PARK, VILLAGE OF	290819
*OAKWOOD, VILLAGE OF	290854
PLEASANT VALLEY, CITY OF	290100
PRATHERSVILLE, VILLAGE OF	290101
RANDOLPH, CITY OF	290102
SMITHVILLE, CITY OF	295271

* NO SPECIAL FLOOD HAZARD AREAS IDENTIFIED

EFFECTIVE: August 3, 2015

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER

29047CV001A

FLOOD INSURANCE 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.

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.

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:

Old Zone	New Zone
A1 through A30	AE
V1 through V30	VE
B	X
C	X

Initial Countywide FIS Date: August 3, 2015

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FLOOD INSURANCE STUDY
CLAY COUNTY, MISSOURI AND INCORPORATED AREAS

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study (FIS) report revises and updates information on the existence and severity of flood hazards in the geographic area of Clay County, Missouri, including: the Cities of Avondale, Excelsior Springs, Gladstone, Glenaire, Holt, Kearney, Lawson, Liberty, Missouri City, Mosby, North Kansas City, Pleasant Valley, Randolph, Smithville; the Villages of Birmingham, Claycomo, Oaks, Oakview, Oakwood, Oakwood Park, and Prathersville, and the unincorporated areas of 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

This FIS revises and supersedes previous FISs countywide. This information will be used by the communities to update existing floodplain regulations as part of the regular phase of the NFIP. The information will also be used by local and regional planners to further promote sound land use and floodplain development.

As part of this revision, the format of the map panels has changed. Previously, flood-hazard information was shown on both the Flood Insurance Rate Map (FIRM) and Flood Boundary and Floodway Map (FBFM). In the new format, all base flood elevations, cross sections, zone designations, and floodplain and floodway boundary delineations are shown on the FIRM and the FBFM has been eliminated. Some of the flood insurance zone designations were changed to reflect the new format. Areas previously shown as numbered Zone A were changed to Zone AE. Areas previously shown as Zone B were changed to Zone X (shaded). Areas previously shown as Zone C were changed to Zone X (unshaded). In addition, all Flood Insurance Zone Data Tables were removed from the FIS report and all zones designations and reach determinations were removed from the profile panels.

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 System (GIS) format requirements. The flood hazard information was created 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.

Please note that the Cities of Excelsior Springs, Excelsior Estates, Holt, Independence, Lawson and Smithville are geographically located in Clay County and Ray, Clinton, Jackson, and Platte Counties. The cities of Excelsior Springs, Holt, Lawson and Smithville are included in their entirety in this FIS report. Flood hazard information for the Cities of Kansas City and Independence can be found in the Jackson County, Missouri and Incorporated Areas FIS and DFIRM. Flood hazard information for the City of Excelsior Estates can be found the Ray County, Missouri and Incorporated Areas FIS and DFIRM.

Please note that the City of Oakwood Park and Villages of Oaks, Oakview, and Oakwood do not have special flood hazard areas identified.

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

1.2 Authority and Acknowledgments

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

For this countywide FIS report, AMEC Earth and Environmental, Inc., performed the hydrologic and hydraulic analyses for Clay County and Incorporated Areas as contracted by the State of Missouri Emergency Management Agency (SEMA), for FEMA under Cooperative Agreement No. EMK-2007-CA-7005. These analyses were completed on September 14, 2009 and October 5, 2010 respectively.

The hydrologic and hydraulic analyses for the Missouri River were performed by the U.S. Army Corps of Engineers (USACE) as part of the Upper Mississippi River System Flow Frequency Study (UMRSFFS). This study was a collaboration of effort between the Rock Island, St. Louis, Kansas City, Omaha, and St. Paul districts and was completed in 2003. The 1-percent-annual-chance flood water surface profile and floodway computations on the Missouri River were performed within HEC-RAS for FEMA under Interagency Agreement No. HSFE07-06-X-0012 by the Kansas City and Omaha districts and were completed in 2007.

The floodplain mapping for the Missouri River was performed by Watershed Concepts for FEMA under Contract No. HSFE07-07-C-0022.

Planimetric base map information shown on all FIRM panels was derived from the National Agriculture Imagery Program (NAIP) 2010, 2 meter orthoimagery. These base map files were provided in digital format by the United States Department of Agriculture, "Data Gateway". Users of this FIRM should be aware that minor adjustments may have been made to specific base map features (Reference 14).

The coordinate system used for the production of this FIRM is the North American Datum of 1983 (NAD 83), State Plane Missouri West, FIPS 2403, feet. Corner coordinates shown on the FIRM are in latitude and longitude referenced to the Universal Transverse Mercator (UTM) projection, NAD 83 Zone 15N.

Village of Claycomo:
The hydrologic and hydraulic analyses for the previous *Village of Claycomo, Missouri* study were performed by the USACE, Kansas City District, for the Federal Insurance Administration, under Interagency Agreement No. IAA-H-16-75, Project Order No. 11. This work, which was completed in May 1976, covered all flooding sources affecting the Village of Claycomo (Reference 1).

Clay County Unincorporated Areas:
The hydrologic and hydraulic analyses for the previous *Clay County, Missouri, and Unincorporated areas* effective study were performed by the U.S Natural Resources Conservation Service, (formerly known as the U.S. Soil Conservation Service), U.S. Department of Agriculture (USDA), for the Federal Insurance Administration, under Interagency Agreement No. IAA-H-16-72, Project Order No. 16. This work, which was completed in June 1973, covered all significant flooding sources affecting the unincorporated areas of Clay County, except the Little Platte River, First and Second Creeks, Owens Branch

and Wilkerson Creek. Water-surface elevations for these streams were computed in March of 1977 by Dames & Moore to reflect the effects of the Smithville Reservoir. Profiles for the Missouri, Fishing and East Fork Fishing Rivers, Williams, Crockett, Holmes, Clear and Holt Creeks, and Dry Fork were corrected according to data developed recently by the USACE (Reference 2).

City of Excelsior Springs:
The *City of Excelsior Springs, Missouri* Flood Insurance study was conducted by Black and Veatch at the request of the Federal Insurance Administration, U.S. Department of Housing and Urban Development. The source of authority for this study is the National Flood Insurance Act of 1968, as amended. Authority and financing are contained in Contract No.H-3709 between the contractor and the Federal Insurance Administration (Reference 3).

City of Gladstone:
The hydrologic and hydraulic analyses for the *City of Gladstone, Missouri* study were performed by USACE for FEMA, under Interagency Agreement No. IAA-H-18-78, Project Order No. 34. This study was completed in January 1982 (Reference 4).

City of Holt:
The hydrologic and hydraulic analyses for the *City of Holt, Missouri* study were performed by the USACE, Kansas City District, for the Federal Insurance Administration, under Interagency Agreement No. H-10-77, Project Order No. 8. This work, which was completed in December 1977, covered all significant flooding sources affecting Holt (Reference 5).

City of Kearney:
The hydrologic and hydraulic analyses for the *City of Kearney, Missouri* study were performed by USACE for the Federal Insurance Administration, under Interagency Agreement No. IAA-H-7-76, Project Order No. 13. This work, which was completed in March 1977, covered all significant flooding sources affecting Kearney (Reference 6).

City of Lawson:
The hydrologic and hydraulic analyses for the *City of Lawson, Missouri* study were performed by the NRCS, for FEMA, under Interagency Agreement No. IAA-H-16-72, Project Order No. 16. This study was completed in June 1973 for Clay County, Missouri (Reference 7).

City of Liberty:
The hydrologic and hydraulic analyses for the *City of Liberty, Missouri* study were performed by USACE, Kansas City District, for the Federal Insurance Administration, under Interagency Agreement No. IAA-H-16-75 Project Order No. 11. This work, which was completed in July 1976, covered all significant flooding sources affecting the City of Liberty (Reference 8).

City of Missouri City:
The hydrologic and hydraulic analyses for the *City of Missouri City* study were performed by USACE, Kansas City District, for the Federal Insurance Administration, under Interagency Agreement No. IAA-H-16-75, Project Order No. 21. This work, which was completed in June 1977, covered all significant flooding sources affecting Missouri City (Reference 9).

City of Mosby:
The hydrologic and hydraulic analyses for the *City of Mosby, Missouri* study were performed by USACE, Kansas City District, for the Federal Insurance Administration, under Interagency Agreement No. IAA-H-7-76, Project Order No. 13. This work, which was completed in March 1977, covered all significant flooding sources affecting Mosby (Reference 10).

City of North Kansas City:
This Type 15 Flood Insurance Study was prepared by the USACE, Kansas City District, for the FIA, Department of Housing and Urban Development. The study was authorized by a letter from the Office of the Chief of Engineers (DAEN-CWP-F), and was financed by the FIA, through reimbursement of funds to the Corps of Engineers under Interagency Agreement (IAA)-H-2-73, Project Order, No. 4 (Reference 28).

Village of Prathersville:
The hydrologic and hydraulic analyses for the *Village of Prathersville, Missouri* study were performed by the USACE, Kansas City District, for the Federal Insurance Administration, under Interagency Agreement No. IAA-H-7-74, Project No. 13. This work, which was completed in March 1977, covered all significant flooding sources affecting the Village of Prathersville (Reference 11).

Village of Randolph:
The hydrologic and hydraulic analyses for the *Village of Randolph, Missouri* study were performed by the USACE for the Federal Insurance Administration, under Interagency Agreement No. H-16-75, Project Order No. 13. This work, which was completed in July 1976, covered all flooding sources affecting the Village of Randolph (Reference 12).

City of Smithville:
The hydrologic and hydraulic analyses for the *City of Smithville, Missouri* study were performed by the USACE, Kansas City District, the Study Contractor, for FEMA, under Interagency Agreement Nos. 87-E-2549 and 87-E-2678, Project Order No. 6. FEMA reviewed and accepted these data for purposes of this revision (Reference 13).

1.3 Coordination

1.3.1 Pre-Countywide Study

Village of Claycomo:
Basic data research was coordinated through and centered with, officials of the Village of Claycomo. Residents of the area were contacted and supplied basic flood information. Meetings were held on September 19, 1975, for this purpose, and on December 8, 1975 to discuss floodway criteria. A final coordination meeting to review the draft of this report was held with village officials on April 14, 1976 (Reference 1).

Clay County Unincorporated Areas:
The Clay County Planning and Zoning Commission Office and the Clay County Soil and Water Conservation District office provided valuable assistance during the *Clay County, Missouri, and Unincorporated Areas* study. The USACE, NRCS, and the USGS provided useful information for the study, as did a private engineering firm, Evans Surveying and Engineering Co., Inc.

Maps used in the report were developed from county road maps and USGS 7.5-minute topographic quadrangle maps.

A final coordination meeting was held on January 13, 1976. Attending the meeting were, county officials interested citizens and representatives of the NRCS and the Federal Insurance Administration. All problems found at this time meeting have been resolved (Reference 2).

City of Excelsior Springs:
Coordination efforts for *City of Excelsior Springs* study include contact with the USGS Water Resources Division, for data input, and with the USACE for flood frequency data, water-surface profile data, and proposed reservoir information. Drawings for the new bridge under construction at Seabold Road were furnished by Associated Consultants, Inc. Information relative to past floods was obtained from the Daily standard newspaper and from interviews with local citizens. Street maps and information relative to past and future development of the community were provided by city officials. A meeting was held with members of the Excelsior Spring City Council on October 22, 1974, at which time the purpose and scope of this study were discussed (Reference 3).

A final coordination meeting with the community was held on March 28, 1975.

City of Gladstone:
Streams requiring detailed study were identified at a meeting in September 1980, attended by representatives of the Study Contractor, FEMA and the City of Gladstone.

On September 30, 1985, the results of the work by the Study Contractor were reviewed and accepted at a final coordination meeting attended by representatives of the Study Contractor, FEMA, and the community (Reference 4).

City of Holt:
Basic data research was coordinated through and centered with officials of the City of Holt. The Missouri Department of Natural Resources (DNR), the Water Resources Division of the USGS, the U.S. Department of Agriculture (USDA), Soil Conservation Services (SCS), and local residents of the area were contacted and supplied basic flood information. The updating of map features was coordinated with the Mid-America Regional Council. Coordination for this study included meetings with city officials on September 10, 1976, for the purpose of data collection and on November 17, 1977 to discuss floodway criteria (Reference 5).

On March 15, 1979, the results of the study were reviewed and accepted at a final coordination meeting attended by officials of the City of Holt, and representatives of the Federal Insurance Administration and the USACE, Kansas City District (the Study Contractor).

City of Kearney:
Basic data research was coordinated through and centered with Kearney officials. The Missouri DNR Water Resource Division of the USGS, the SCS, the USDA and residents were contacted to supply any available flood information. The Mid-America Regional Council was contacted to obtain aerial photography for updating of map features and descriptive historical information.

Coordination for this study included a meeting with city officials on March 16, 1976 for the purpose of data collection and a meeting on February 14, 1977 to discuss floodway criteria. A final meeting to review the draft of this report was held with city official on June 6, 1977; the study was accepted (Reference 6).

City of Lawson:
The results of the *Clay County, Missouri and Unincorporated Areas* were reviewed at the final CCO meeting held on January 13, 1976, and attended by representatives of the SCS and Federal Insurance Administration, Clay County officials and interested citizens. All problems raised at the meeting were addressed.

On November 20, 1995, a final CCO meeting was held for the portion of this study affecting the City of Lawson. That meeting was attended by representatives of the city of Lawson and FEMA and private land owners. All problems raised at that meeting have been addressed in the study (Reference 7).

City of Liberty:
Basic data research was coordinated through and centered with Liberty city officals. Residents of the area were contacted and supplied basic flood information. Coordination for this study included meetings with city officals on September 17, 1975, for the purpose of data collection and on November 17, 1975, to discuss floodway criteria. A final community coordination meeting to review the draft of this report was held on March 11, 1976, attended by representatives of the Federal Insurance Administration, the USACE, Kansas City District, the City of Liberty, and community residents. No problems were raised during the meeting (Reference 8).

The Mid-America Regional Council was contacted to obtain aerial photography for updating map features and descriptive historical information.

City of Missouri City:
Basic data research was coordinated through officals of the City of Missouri City. Coordination for this study included a meeting with the City Clerk on May 5, 1977, for the purpose of data collection, and on July 18, 1977 to discuss floodway criteria. On December 12, 1977, the results of the study by the USACE, Kansas City District, were reviewed and accepted at a final coordination meeting attended by personnel of the Federal Insurance Administration and the USACE, officals of Missouri City, and private citizens (Reference 9).

City of Mosby:
Basic data research was coordinated though and centered with city officals. The Missouri Department of Natural Resources, the Water Resources Divison of the USGS, NRCS, the Mid-America Regional Council, the USDA, and local residents were contacted and supplied information for the study.

Coordination meetings were held with city officals on March 16, 1976, for the purpose of data collection and on Februrary 14, 1977, to discuss floodway criteria. A final coordination meeting to review the draft of this report was held with city officals on July 28, 1977. Officals from the Federal Insurance Administration and the USACE, as well as local residents attended the meeting, and study results were found acceptable (Reference 10).

City of North Kansas City:
This *City of North Kansas City* study was coordinated with the City of North Kansas City. The City Engineer's office assisted by providing base maps of the corporate area to the USACE (Reference 28).

Village of Prathersville:
Basic data research was coordinated through the village officals. The Missouri Department of Natural Resources; the Water Resources Division of the USGS; NRCS; and area residents were contacted and supplied basic flood information. Coordination for this study included

meetings with city officals on March 16, 1976, for the purpose of data collection, and February 14, 1977, to discuss floodway criteria (Reference 11).

A CCO meeting to review the draft of this report was held on October 11, 1977 and was attended by representatives of the Federal Insurance Administration, the USACE, village

officals and concerned citizens. No objections were made concerning the results of the *Village of Prathersville* study.

The Mid-America Regional Council provided information used in the report.

Village of Randolph:
Basic data research was coordinated through, and centered with, the Randolph village officals. Residents of the area were contacted and supplied basic flood information. Coordination for this study included meetings with village officals on September 16, 1975, to discuss floodway criteria. A final coordination meeting to review the draft of this report was held with village officals on March 16, 1976 (Reference 12).

City of Smithville:
On Septmenber 9, 1987, a coordination meeting was held with representatives of FEMA, the City of Smithville, and the Study Contractor. The results of the Flood Insurance Study were reviewed and accepted at a final coordination meeting attended by representatives of the Study Contractor, FEMA, and the community (Reference 13).

1.3.2 Countywide Study

The initial Consultation Coordination Officer (CCO) meeting was held on January 17, 2007 and attended by representatives of SEMA, AMEC Earth and Environmental, Inc., City of Kearney, and the City of Smithville.

The results of the study were reviewed at the final CCO meeting held on February 15, 2011, and attended by representatives of Clay County, the Cities of Excelsior Springs, Gladstone, Glenaire, Independence, Kearney, Liberty, North Kansas City, Pleasant Valley, Smithville; the Village of Birmingham; the North Kansas City Levee District, FEMA, SEMA and AMEC. All related issues raised at that meeting have been addressed in this study.

2.0 AREA STUDIED

2.1 Scope of Study

2.1.1 Pre-Countywide Study

Village of Claycomo:
The *Village of Claycomo, Missouri Clay County FIS* covered the incorporated area of the Village of Claycomo, located in southwest Clay County, Missouri.

Detailed study was made of the entire length of Shoal Creek and its branches, Mill Creek, and Little Shoal Creek, as they relate to the incorporated area of Claycomo. Little Shoal Creek study limits extended from the extreme southeast tip of Claycomo, where Little Shoal Creek forms the eastern corporate boundary, and continue north about one mile. The study limit for Shoal Creek extends from its junction with Little Shoal Creek, upstream approximately six miles, where it leaves Claycomo, at the village's northern boundary. Mill Creek's study limit extends for 2.6 miles from its mouth. The areas studied in detail were chosen with consideration given to all forecasted development and proposed construction through November 1980. Although this report is limited to the incorporated area of Claycomo, it should be noted that both creeks extend much farther into developed areas of Gladstone and Kansas City. Also, after leaving Claycomo, Shoal Creek continues south into parts of Liberty and Kansas City, Missouri before entering the Missouri River (Reference 1).

Clay County Unincorporated Areas:
The *Clay County, Missouri and Unincorporated Areas FIS* covered the unincorporated areas of Clay County, Missouri. Not included in the study are the incorporated areas of Smithville, Kearney, Mosby, Prathersville, Excelsior Springs, Holt, Missouri City, Liberty, Kansas City, Glenaire, Pleasant Valley, Claycomo and Watkins Mill State Park.

The two major rivers in the county are the Missouri River, which forms the southern county limits, and the Fishing River, which flows in the center of the county. The East Fork Fishing River is located in the east-central portion of the county. Numerous creeks and rivers flow through the area. In the northwest are First Creek, Little Platte River, Owens Branch, Rocky Branch, Second Creek, and Wilkerson Creek. In the northeast are Brushy Creek, Brushy Creek Tributaries I and II, Clear Creek, Crockett Creek, Dry Fork, Muddy Fork, Holmes Creek, Williams Creek and its Tributary flow in the central part of the county. Cages Branch, Shoal Creek, and Town Branch are located in the southern part of the county. The streams studied in detail are in the areas where the most development is occurring. Other smaller tributaries in rural areas have been studied using approximate methods.

Those areas studied by detailed methods were chosen with consideration given to all proposed construction and forecasted development through 1978 (Reference 2).

City of Excelsior Springs:
The *City of Excelsior Springs, Missouri, Clay County FIS* covered the incorporated areas within the City of Excelsior Springs, Clay and Ray Counties, located in northwest Missouri.

Excelsior Springs sits astride the relatively deep and narrow valley of the East Fork Fishing River, which meanders through the city from the northeast to the southwest. Approximately 20 square miles of woodland and farmland contribute runoff this stream above the old stream gage at Golf Hill Drive. The width of the flood plain along the stream ranges from 400 feet to 800 feet. Near the center of the business district of the city, East Fork Fishing River is joined by Dry Fork Fishing River from the north. Dry Fork cuts through the city, forming a second major valley. The drainage area consists of about 3.9 square miles. The streambed is very steep and the floodplain is about 300 feet wide, spreading to about 800 feet near its mouth. At the southern end of town, near Seabold Road, the East Fork Fishing river is joined by a small tributary flowing from the north. This stream drains the geographic center of the community and ahs a contributing area of 1.7 square miles. The tributary's streambed is steep and the floodplain ranges from about 200 feet to 400 feet in width. There are several other small drainage courses within the corporate limits of the city. In general, these streams drain in a southwesterly to westerly direction, have small watershed areas, steep streambeds, narrow floodplains, and are located in areas of sparse development.

A detailed analysis was made of the East Fork Fishing River from river mile 3.41, at the southern city limits, through the city to river mile 8.13, at the northern city limits. Dry Fork Fishing River was analyzed from its confluence with East Fork to the northern city limits, stream mile 0.0 to 1.0. The small tributary which joins East Fork Fishing River near Seabold Road was analyzed in detail from its mouth to stream mile 0.89. The stream above this point becomes steeper and the floodplain narrows, confining the flood water of the base flood to the narrow flood plain so that it constitutes no serious hazard. The tow tributaries to Williams Creek that drain the northern part of the city and the two streams that drain the southwestern part of the city were studied by using approximate analyses. These four stream have steep slopes and narrow, undeveloped floodplains. The analyses indicate that there is no serious threat of flood damage by these streams (Reference 3).

City of Gladstone:
The *City of Liberty, Missouri, Clay County FIS* covered portions of the incorporated areas of the City of Gladstone, Clay County, Missouri. The limits of detailed study were determined by FEMA with city and Study Contractor consultation at the meeting held in September 1980.

The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development or proposed construction for the next five years, through January 1987.

Approximate methods of analysis were used to study those areas having a low development potential or minimal flood hazards as identified at the initiation of the study. The scope and methods of study were proposed to and agreed upon by FEMA and the City of Gladstone.

Flooding caused by the overflow of Rock Creek Tributary, from the eastern corporate limits to about 1.21 miles upstream of Prospect Avenue North; Mill Creek, form the southern corporate limits to about 0.61 mile upstream of North Highland Street; and East Creek, from the western corporate limits to about 0.15 mile upstream of Apartment Driveway was studied in detail. Flooding caused by Shoal Creek within the corporate limits was studied in detail in the Type 15 Flood Insurance Study and has been included in this study (Reference 4).

City of Holt:
The *City of Holt, Missouri, Clay and Clinton Counties FIS* covered the incorporated areas of the City of Holt.

The areas studied by detailed methods were selected with priority given to all known flood hazard areas, and areas of projected development or proposed construction until September 1982. The scope and methods of study were proposed to and agreed upon by the Federal Insurance Administration and the community.

A detailed study was made for the entire length of Holt Creek (Reference 5).

City of Kearney:
The *City of Liberty, Missouri, Clay County FIS* covered the incorporated areas of the City of Kearney located in central Clay County, Missouri.

The areas studied by detailed methods were selected with priority given to all known flood hazard areas, areas of projected development and proposed construction until May 1981.

Approximate methods of analysis were used to study those areas having low development potential and/or minimal flood hazards as identified at the initiation of the study.

The areas to be studied were decided jointly with city officials and officials of the Federal Insurance Administration.

A detailed study was made for the entire length of Clear Creek along the corporate boundary of Kearney. A small tributary of Fishing River which flows through the southern portion of Kearney was not studied (Reference 6).

City of Lawson:
The *City of Lawson, Missouri, Clay and Ray Counties FIS* covered incorporated areas of the City of Lawson, Missouri.

Brushy Creek and Brushy Creek Tributary II flow through the city. Both streams were studied in detail through the current corporate limits as part of the Clay County study.

The areas studied by detailed methods were selected with priority given to all known flood hazards and areas of projected development or proposed construction through 1978.

Approximate floodplain areas were taken for the Flood Hazard Boundary Map previously published for the City of Lawson, dated June 4, 1976.

Approximate analysis was used to study those areas having a low development potential or minimal flood hazards (Reference 7).

City of Liberty:
The *City of Liberty, Missouri, Clay County FIS* covered the incorporated areas of the City of Liberty, Clay County, Missouri. The City of Glenaire, located entirely within the corporate limits of Liberty, was not included in this study.

Shoal Creek, Town Branch, Cates Branch, Little Shoal Creek, and Little Shoal Creek Tridents No. 3 and No. 4 were studied entirely in detail within the community. Little Shoal Creek Trident No. 2, Ruch Creek, Holmes Creek, and Fishing River were studied partially by detailed methods and partially by approximate methods. Approximate methods were used because of a lack of present development in the area, and the study contractor anticipated a floodplain width of less than 200 feet.

All areas studied in detail were chosen with consideration given all forecasted development and proposed construction through July 1981 (Reference 8).

City of Missouri City:
The *City of Missouri City, Missouri, Clay County FIS* covered the incorporated area of the City of Missouri City.

The areas studied by detailed methods were selected with priority given to all known flood hazard areas, areas of projected development and proposed construction until 1983.

Approximate methods of analysis were used to study those areas having low development potential and/or minimal flood hazard as identified at the initiation of the study. The scope and methods of study were proposed to and agreed upon by the Federal Insurance Administration and the community.

The Missouri River was studied in detail from river mile 343.75 to river mile 346.25. Rose Branch was studied by approximate methods (Reference 9).

City of Mosby:
The *City of Mosby, Missouri, Clay County FIS* covered the incoporated area of the City of Mosby, Clay County, Missouri.

Fishing River and Holmes Creek were studied in detail. Those areas studied by detailed methods were chosen with consideration given to all proposed construction and forecasted development through May 1981 (Reference 10).

City of North Kansas City:
The *City of North Kansas City, Missouri, Clay County FIS* covered the corporate area of North Kansas City, Clay County, Missouri, directly north of Kansas City, Missouri. The All

drainage from the city is carried to the Missouri River, which encompasses the city of the west, south and east and defines the south-east corporate limits. The river's principal tributaries in the city are Rock Creek and The North Hillside Drainage Ditch (Reference 28).

Village of Prathersville:
The *Village of Prathersville, Missouri, Clay County FIS* covered the incorporated area of the Village of Praterhsville, Clay County, Missouri.

A detailed study was made for the entire length of both the Fishing River and Williams Creek within the corporate limits.

Those areas studied by detailed methods were chosen with consideration given to all proposed construction and forecasted development through 1982 (Reference 11).

Village of Randolph:
This *Village of Randolph, Missouri, Clay County FIS* covered the incorporated are of the Village of Randolph, located in southwest Clay County, Missouri.

The limits of detailed and approximate study in Randolph were determined by the Federal Insurance Administration after consultation with the community and the study contractor. The entire length of the Unnamed Creek (North Branch) upstream from the western corporate limits, the Unnamed Creek (East Branch), for about 0.2 mile above its mouth, as well as 0.5 mile of the Missouri River, were studied in detail. The upper limits of the Unnamed Creek (East Branch) were studied by approximate methods. In general, those areas that were already or expected to be developed through 1981, were studied by detailed methods (Reference 12).

City of Smithville:
The *City of Smithville, Missouri, Clay County FIS* covered the incorporated area of the City of Smithville, Clay County, Missouri. The Little Platte River, Wilkerson Creek, Second Creek, and Owens Branch were restudied in detail.

Flooding along Rocky Branch and along portion of Wilkerson Creek was taken from the FIS for Unincorporated Areas of Clay County, Missouri (Reference 13).

2.1.2 Countywide Study

This FIS report covers the geographic area of Clay County, Missouri, including the incorporated communities listed in Section 1.1. The areas studied by detailed methods were selected with priority given to all known flood hazards and areas of projected development or proposed construction.

The following flooding sources were studied by new detailed hydrologic and hydraulic analyses.

1. Brushy Creek entire length within Clay County.

2. Buckeye Creek form the confluence with Missouri River to 3.2 miles upstream of the confluence with Missouri River.

3. Buckeye Creek Tributary 1 form the confluence with Buckeye Creek to 0.9 miles upstream of the confluence with Buckeye Creek.

4. Cates Branch from the confluence with Town Branch to 3.0 miles upstream of the confluence with Town Branch.

5. Clear Creek from the confluence with Fishing River to 10.8 miles upstream of the confluence with Fishing River

6. Clear Creek Tributary 15 from the confluence with Clear Creek to 1.0 mile upstream of the confluence with Clear Creek.

7. Clear Creek Tributary 15.1 from the confluence with Clear Creek Tributary 15 to 1.3 miles upstream of the confluence with Clear Creek Tributary 15.

8. Crockett Creek from the confluence with Holmes Creek to 2.5 miles upstream of the confluence with Holmes Creek

9. Crockett Creek Tributary 3 from the confluence with Crockett Creek to 0.7 miles upstream of the confluence with Crockett Creek.

10. Crockett Creek Tributary 4 from the confluence with Crockett Creek to 0.6 miles upstream of the confluence with Crockett Creek.

11. Dry Fork from the confluence with East Fork Fishing River to 3.0 miles upstream of the confluence with East Fork Fishing River.

12. East Creek from just below the confluence with East Creek Tributary 1 in Clay County to 2.6 mile upstream of the confluence with East Creek Tributary 1.

13. East Creek Tributary 1 from the confluence with East Creek To 0.5 miles upstream of the confluence with East Creek.

14. East Fork Fishing River from confluence with Fishing River to 8.7 miles upstream of the confluence with Fishing River.

15. East Fork Fishing River Tributary 2 from confluence with East Fork Fishing River to 0.9 miles upstream of the confluence with East Fork Fishing River.

16. East Fork Line Creek from just upstream of 68th Street to 3.2 miles upstream of 68th Street.

17. East Fork Line Creek Tributary 1 from the confluence with East Fork Line Creek to 0.6 miles upstream.

18. East Fork Line Creek Tributary 1.2 from the confluence with East Fork Line Creek to 0.3 miles upstream of the confluence with East Fork Line Creek.

19. East Fork Shoal Creek from the confluence with Shoal Creek to 7.6 miles upstream of the confluence with Shoal Creek

20. East Fork Shoal Creek Tributary 1 from the confluence with East Fork Shoal Creek to 3.0 miles upstream of the confluence with East Fork Shoal Creek.

21. East Fork Shoal Creek Tributary 2 from the confluence with East Fork Shoal Creek to 1.5 miles upstream of the confluence with East Fork Shoal Creek.

22. East Fork Shoal Creek Tributary 3 from the confluence with East Fork Shoal Creek to 3.0 miles upstream of the confluence with East Fork Shoal Creek.

23. First Creek from the confluence with Second Creek to 2.7 miles upstream of the confluence with Second Creek, and from the county boundary just upstream of Platte Purchase Road to 0.1 miles upstream.

24. First Creek Tributary 1 from the confluence with First Creek to 1.4 miles upstream of the confluence with First Creek.

25. Fishing River from the Clay/Ray County boundary to 28.3 miles upstream of the Clay/Ray County Boundary.

26. Fishing River Tributary 1 from the confluence with Fishing River to 3.2 miles upstream of the confluence with Fishing River.

27. Fishing River Tributary 1.1 from the confluence with Fishing River Tributary 1 to 1.6 miles upstream of the confluence with Fishing River Tributary 1.

28. Fishing River Tributary 1.2 from the confluence with Fishing River Tributary 1 to 0.9 miles upstream of the confluence with Fishing River Tributary 1.

29. Fishing River Tributary 16 from the confluence with Fishing River to downstream of West 6th Street.

30. Holmes Creek from the confluence with Fishing River to 6.5 miles upstream of the confluence with Holmes Creek.

31. Little Platte River from 415 feet upstream of the Clay County Boundary to 700 feet below Smithville Dam.

32. Little Shoal Creek from the confluence with Shoal Creek to 11.0 miles upstream of the confluence with Shoal Creek.

33. Little Shoal Creek Tributary 1 from the confluence with Little Shoal Creek to 3.4 miles upstream of the confluence with Little Shoal Creek.

34. Little Shoal Creek Tributary 5 from the confluence with Little Shoal Creek to 2.5 miles upstream of the confluence with Little Shoal Creek.

35. Little Shoal Creek Tributary 6 from the confluence with Little Shoal Creek to 1.5 miles upstream of the confluence with Little Shoal Creek.

36. Little Shoal Creek Tributary 7 from the confluence with Little Shoal Creek to 2.1 miles upstream of the confluence with Little Shoal Creek.

37. Mill Creek from the confluence with Shoal Creek to 8.1 miles upstream of the confluence with Shoal Creek.

38. Mill Creek Tributary 1 from the confluence with Mill Creek 0.3 miles upstream of the confluence with Mill Creek Tributary 1.

39. Missouri River at the western boundary between Clay County and Ray County, Missouri to the eastern boundary between Clay County and Platte County, Missouri.

40. Muddy Fork from the confluence with Clear Creek to 10.0 miles upstream of the confluence with Clear Creek.

41. Old Maids Creek from the Clay/Platte County boundary to 1.4 miles upstream of the Clay/Platte County boundary.

42. Owens Branch from the confluence with Little Platte River to 3.6 miles upstream of the confluence with Little Platte River.

43. Polecat Creek from the confluence with Wilkerson Creek to 2.7 miles upstream of the confluence with Wilkerson Creek.

44. Randolph Creek from the confluence with Missouri River to 2.3 miles upstream of the confluence with Missouri River.

45. Randolph Creek Tributary from the confluence with Randolph Creek to 0.3 miles upstream of the confluence with Randolph Creek.

46. Rock Creek from the confluence with Missouri River to 3.8 miles upstream of the confluence with Missouri River.

47. Rock Creek Gladstone from the confluence with Mill Creek to 4.1 miles upstream of the confluence with Mill Creek.

48. Rock Creek Tributary 11 from the confluence with Rock Creek Tributary 11.2 to just downstream of Interstate 29.

49. Rock Creek Tributary 11.2 from the confluence with Rock Creek to 2.7 miles upstream of the confluence with Rock Creek.

50. Rocky Branch from the confluence with Wilkerson Creek to 6.2 miles upstream of the confluence with Wilkerson Creek.

51. Rocky Branch Tributary 1 from the confluence with Rocky Branch to 0.9 miles upstream of the confluence with Rocky Branch.

52. Rush Creek from the confluence with Missouri River to 9.2 miles upstream of the confluence with Missouri River.

53. Searcy Branch from the confluence with Buckeye Creek to 2.4 miles upstream of the confluence with Buckeye Creek.

54. Searcy Branch Tributary 1 from the confluence with Searcy Branch to 1.1 miles upstream of the confluence with Searcy Branch.

55. Second Creek from the confluence with Little Platte River to 2.2 miles upstream of the confluence with Little Platte River at the Clay/Platte County boundary.

56. Shoal Creek from the confluence with Missouri River to 21.7 miles upstream of the confluence with Missouri River.

57. Shoal Creek Tributary 6 from the confluence with Shoal Creek to 2.7 miles upstream of the confluence with Shoal Creek.

58. Shoal Creek Tributary 8 from the confluence with Shoal Creek to 1.0 miles upstream of the confluence with Shoal Creek

59. Shoal Creek Tributary 9 from the confluence with Shoal Creek to 1.3 miles upstream of the confluence with Shoal Creek

60. Shoal Creek Tributary 20 from the confluence with Shoal Creek to 1.5 miles upstream of the confluence with Shoal Creek

61. Shoal Creek Tributary 20.1 from the confluence with Shoal Creek Tributary 20 to 0.7 miles upstream of the confluence with Shoal Creek Tributary 20.

62. Town Branch from the confluence with Shoal Creek to 2.6 miles upstream of the confluence with Shoal Creek.

63. Wilkerson Creek from the confluence with Little Platte River to 9.3 miles upstream of the confluence with Little Platte River.

64. Williams Creek from the confluence with Fishing River to 9.8 miles upstream of the confluence with Fishing River.

65. Williams Creek Tributary 14 from the confluence with Williams Creek to 0.8 miles upstream of the confluence with Williams Creek

For this study a redelineation was performed on Brushy Creek Tributary II from the confluence with Brushy Creek to 1.3 miles above the confluence with Brushy Creek. Brushy Creek Tributary II was originally selected with priority given to all known flood hazards and areas of projected development or proposed construction.

Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon, by FEMA representatives of Clay County and the State of Missouri.

2.2 Community Description

Clay County is located in west-central Missouri and includes a large portion of the incorporated areas of the Kansas City Metropolitan Area. Several major U.S and State Highways provide transportation in the county, including Interstates 35, 435 and 29, U.S Highways 169, 69 and State Highways 152, 92, 210 and 291. In 2009, the U.S Census Bureau estimated the population of Clay County to be 228,358 (Reference 19).

The topography of Clay County consists of plains, low open hills, farm ground and a relatively large area of urbanized land. Channel slopes range from approximately 2.5 feet per mile in the lower river reaches to over 29.0 feet per mile on the smaller tributaries. The county is under heavy development pressure from Kansas City (Reference 2).

The Clay County area has a modified continental climate. Moist air currents from the Gulf of Mexico, dry air currents from the semiarid Southwest, and cold polar continental

currents affect the weather in the area. The wide range of potential influences produces weather that is variable and subject to rapid change, particularly during the spring season (Reference 2). The summers are warm and moderately humid, while the winters are rather dry, but not severely cold. July is the warmest month with an average high of 88.5 Fahrenheit (°F), and an average low of 68.4 (°F). January is the coldest month with an average high of 35.7 (°F) and an average low of 17.9 (°F). Normal annual precipitation between 1971 and 2000 has been 37.74 inches with the most precipitation occurring during the month of May with 5.25 inches and the least during the month of January measuring 1.15 inches (Reference 20).

2.3 Principal Flood Problems

Clay County Unincorporated Areas:
Most major floods on the Missouri River occur in the spring. On the other watercourses, flooding is caused by the short, intense summer storms and the quick runoff from the steep topography of the area. The most severe floods events in Clay County in the past four decades occurred in July of 1993, April of 1994, October of 1998, May of 2003 and June of 2004 (Reference 21).

Village of Claycomo:
In 1957, the waste-water treatment plant near the Ford Motor Company property was severely damaged by flood waters from Shoal Creek. A levee was constructed to contain the creek during light rainfalls, but heavy rains continually cause the treatment plant to become inoperable.

From local resident reports, inadequate bridging along parts of the creeks, especially where Interstate 435 crosses Mill Creek, causes water to back up and flood upstream properties. Many storms culverts are filled with brush and debris, restricting water flow. Flooding in Claycomo has worsened as development upstream in Kansas City and Gladstone has increased. Property damage has occurred to homes and businesses along the creek side of Eugene Field, Riley, Poe, and Longfellow Streets, and to businesses on Whitney Avenue. The flood of May 1974 was the most severe flood the village has ever witnessed, according to long time residents. Numerous homes, apartments, business buildings, and roads were flooded. Damage was estimated at $366,000. About $140,000 worth of this damage was to residential property.

Development in the flood plain areas of Claycomo is not presently discouraged by village officials. Development upstream in Kansas City and Gladstone, within the Shoal and Mill Creek Basins, is expected to continue at its present momentum and may intensify future flood problems (Reference 1).

City of Excelsior Springs:
Floods in the study area usually occur in spring or early summer; however, because of the relatively small size of drainage basins of the streams studied herein, floods usually are the result of high intensity thunderstorms that can occur anytime. Because of its location in the middle of the continent, with few natural obstructions to prevent the free sweep of air currents from all directions, Excelsior Springs is subjected to frequent and rapid changes in weather. Violent storms often occur, producing great amounts of rainfall in a short time period.

Flooding of Excelsior Springs by East Fork and Dry Fork Fishing Rivers has occurred at frequent intervals in the past. Documentation of major flood events has been recorded for the floods of 1908, 1909, 1915, 1924, 1929, 1941, 1943, 1947, 1951, 1965, 1969, and 1974, with the largest flood in June 1947. Damage estimated at $7 million resulted from the flood of

July 1965, which inundated about 68 dwellings, 3 hotels, 25 business places, a school, church, and the Hall of Waters. Extensive damage was caused by the less severe flood that occurred in May 1974 (Reference 3).

City of Gladstone:
Flooding in the City of Gladstone results from high intensity rainfall due to thunderstorm activity with the heaviest flooding occurring along Shoal and Rock Creeks. Heavy rains in spring 1974 caused flooding at Shady Lane, west of North Bales Street, when waters from Rock Creek Tributary flooded backyards and basements, and reached heights exceeding the tops of curbs and resulted in the flooding of the entire cul-de-sac. Similar conditions occurred at 69th Street and Woodland Avenue, 72nd Street and Highland Avenue, and 64th and Bellfontaine Streets. In a new residential development east of North Bales Street, called Brooketree, homes were inundated at least 5 feet deep and damage to private property was $300,000. Flooding also occurred the same year to homes at 58th Terrace and Mill Creek (Reference 4).

City of Holt:
Holt Creek is the principal flood threat to the city as a whole. Complete records have not been kept on flooding but flooding of lower areas is frequent (Reference 5).

City of Kearney:
Clear Creek, a large left bank tributary of Fishing River, is the principal flood threat to the city. There are no official records kept on historic flooding in the City of Kearney, but local citizens indicated that Clear Creek floods frequently inundate farm lands. As the urban areas spread to the east and south in the floodplain, increased drainage is foreseen (Reference 6).

City of Lawson:
Flooding is caused by short, intense summer storms and quick runoff due to the steep topography of the area. Flooding along these creeks is aggravated by the presence of numerous highway and railroad bridges, creating a potential for debris blockage and floodwater backup. Historically, the tributary to East Form Fishing River has not been a flood problem within the City of Lawson. Therefore, this area has been designated as Zone X (shaded), an area of minimal flood risk (Reference 7).

City of Liberty:
The majority of the town is built on a series of substantially high hills, with the various streambeds radiating out from them. As a result, the city is presently relatively free of serious flood threats from streams. A potentially serious flood problem relates to the unnamed tributary of Little Shoal Creek that parallels Interstate 35 at the western edge of the city.

The most frequent and severe flooding in Liberty occurs in the extreme southern portions of the city, within the Shoal Creek and Missouri River flood plains, but this area is presently undeveloped. However, with the forecasted growth potential expected in Liberty, damage from flooding could become severe if development is not guided.

Liberty has numerous problems with storm water ponding throughout the city. These problems consist of partial flooding of streets and intersections, and minor erosion of storm water channels (Reference 8).

City of Mosby:
Fishing River is the principal flood threat to the city, with Holmes Creek affecting a small portion of Mosby in the southwest. Complete records have not been kept on flooding; however residents indicated that floods occur frequently. This is due to the large drainage

area above Mosby and a flat floodplain (Reference 10).

City of North Kansas City:
The North Hillside Drainage Ditch and Rock Creek run through the northern part of the city. These streams and the Missouri River periodically overflow and flood adjacent areas of North Kansas City (Reference 28).

Village of Prathersville:
The Fishing River is the principal flood threat to the village. Williams Creek adds to the problem at its confluence with Fishing Creek within Prathersville. Complete records have not been kept on flooding, but townspeople indicate that both the river and Williams Creek flood frequently, mostly affecting agricultural lands. Flooding is due to the large drainage area above Prathersville and a flat flood plain (Reference 11).

Village of Randolph:
Randolph's present flood problems result from flooding of residential property adjacent to the unnamed creek during high intensity rainfall. Large changes in runoff amounts have been noted from recently constructed developments north of Randolph. Long-time residents stated that the most severe flood they had ever witnessed occurred in May of 1974. Damage in town consisted of bridges being washed out, flooded basements and yards, and erosion of streets and ditches. Damage from this event was estimated to be about $10,000.

Presently, a large industrial park is under construction north of Randolph which may increase future flood problems. Local developers have shown increasing interest in this area and more commercial growth is expected in the foreseeable future, thus presenting a threat of more frequent and intensive flood problems (Reference 12).

2.4 Flood Protection Measures

Clay County Unincorporated Areas:
A U.S. Soil Conservation Service P.L. 556 Small Watershed Project on Williams Creek controls runoff from 11.43 square miles of drainage area in four structures. These structures provide 2100 acre-feet of surface storage.

The USACE began construction of the Smithville Reservoir on the Little Platte River, located approximately 2 miles east of Smithville, in the summer of 1975. Closure of the dam took place in 1977. After construction is completed, flood protection will be provided along the Little Platte River and to the City of Smithville. The effect of the dam was considered in the analysis of peak discharges on the Little Platte River in this study (Reference 2).

City of Excelsior Springs:
There are no significant flood protection projects existing in the study area. There is an existing levee along the north bank of East Fork Fishing River behind the Hall of Waters. This levee, however, provides little protection because seepage allows water to rise behind the levee and flood the Hall of Waters.

A federally funded flood-control project consisting of two reservoirs, one on Dry Fork Fishing River and the other on East Fork Fishing River, has been authorized. This project would be located northeast of Excelsior Springs and would provide flood protection to the city. A recent study completed in January 1974 by the USACE, Kansas City district, recommends that this project be deleted from the list of authorized projects. City officials are opposed to this recommendation and have appealed to federal authorities on behalf of the city. At present, there appears to be little chance that this project will be built (Reference 3).

City of Missouri City:
Within the Kansas River basin, there are 18 Federal lakes and dams above Kansas City and on the Missouri River, there are five large lakes and dams. All of these contribute a certain amount of flood control; however, should the storm originate below the main stream dams and be of such magnitude, Missouri City could still experience flooding.

The railroad embankment, which lies between the city and the Missouri River, can offer some protection from wave action until it is overtopped. Culverts placed within the fill allow the floodwaters to enter the city (Reference 9).

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long time average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 100-year flood (1-percent-chance-annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, 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 Countywide Analyses

Hydrologic analyses were carried out to establish peak discharge-frequency relationships for each flooding source studied by detailed methods affecting the community. Peak discharges for the 10-, 2-, 1-, and 0.2-percent-annual-chance flood of each flooding source studied in detail in the county are shown in Table 1.

Peak discharges were calculated for the following streams using the USACE HEC-HMS modeling program Version 3.2 or 3.3: Brushy Creek, Buckeye Creek, Buckeye Creek Tributary 1, Cates Branch, Clear Creek, Clear Creek Tributary 15, Clear creek Tributary 15.1, Crockett Creek, Crockett Creek Tributary 3, Crockett Creek Tributary 4, Dry Fork, East Creek, East Creek Tributary 1, East Fork Fishing River, East Fork Fishing River Tributary 2, East Fork Line Creek, East Fork Line Creek Tributary 1, East Fork Line Creek Tributary 1.2, East Fork Shoal creek, East Fork Shoal Creek Tributary 1, East Fork Shoal Creek Tributary 2, East Fork Shoal Creek Tributary 3, Fishing River, Fishing River Tributary 1, Fishing River Tributary 1.1, Fishing River Tributary 1.2, Holmes Creek, Little Platte River, Little Shoal Creek, Little Shoal Creek Tributary 1, Little Shoal Creek Tributary 5, Little Shoal Creek Tributary 6, Little Shoal Creek Tributary 7, Mill Creek, Mill Creek Tributary 1, Muddy Fork, Old Maids Creek, Owens Branch, Polecat Creek, Randolph Creek, Randolph Creek Tributary, Rock Creek, Rock creek Gladstone, Rock Creek Tributary 11, Rock Creek Tributary 11.2, Rocky Branch, Rocky Branch Tributary 1, Rush Creek, Searcy Branch, Searcy Branch

Tributary 1, Shoal Creek, Shoal Creek Tributary 6, Shoal Creek Tributary 8, Shoal Creek Tributary 9, Shoal Creek Tributary 20, Shoal Creek Tributary 20.1, Town Branch, Wilkerson Creek, Williams Creek, and Williams Creek Tributary 14.

The First Creek and Second Creek Watershed was modeled using XP SWMM Version 10.6 (Reference 23).

Brushy Creek Tributary II redelineated and was studied previously using runoff data from U.S. Geological Survey stream gaging record and were statistically analyzed using the log-Pearson Type II method (Reference 24). Peak streamflow probability was determined by using procedures and data in the Missouri River Basin Comprehensive Framework Study Reports for Sub-basin 8 (Reference 25).

New hydrology was performed for previous approximate Zone A studies or those streams with a contributing drainage area of 1 square mile or greater. USGS Rural Regression analysis was derived from USGS Fact Sheet 015-01 dated March 2001 (Reference 26). Region 1 regression equation was selected for this study and the calculated variables were drainage area and stream channel slope. Some Zone A streams that fell within the watershed of a detailed Zone AE model utilized results from the detailed watershed hydrology models instead of regression equations.

3.1.2 Upper Mississippi River System Flow Frequency Study Methodology

Major Upper Mississippi River Basin flooding during the 1990s resulted in significant losses, as well as raised questions regarding the frequency of the associated flood events. Reevaluation of the Upper Mississippi River System became necessary to address the questions resulting from the Great Flood of 1993, and was facilitated based on the availability of new topographic data, new computational techniques, and about 20 more years of recorded hydrologic data since the previous study of the Mississippi River had been performed in 1979. This is generally true for the Missouri River as well. The last major effort to comprehensively determine Missouri River flow frequencies was in 1962. The additional record of more than 35 years included the major events of 1993 downstream of Nebraska City and the 1997 large volume flood in the upper reaches of the Missouri River.

The UMRSFFS was undertaken starting in 1998 with the purpose to update the discharge-frequency relationships and associated water-surface profiles for the Mississippi River from St. Paul, Minnesota to the confluence of the Ohio River; for the Illinois River from Lockport, Illinois to its mouth; and for the Missouri River from Gavins Point Dam to its mouth. Five USACE Districts participated in the study: Rock Island, St. Louis, St. Paul, Kansas City, and Omaha. The study was completed in 2003.

The hydrologic analysis for the UMRSFFS utilized a combination of the following methods and approaches to determine discharge-frequency relationships: 100 years of record from 1898 to 1998; the log-Pearson Type III distribution for unregulated flows at gages; main stem flows between gages determined by interpolation of the mean and standard deviation for the annual flow distribution based on drainage area in conjunction with a regional skew; flood control reservoir impacts defined by developing regulated versus non-regulated relationships for discharges; extreme events determined by factoring up major historic events; HEC-HMS and/or HEC-1 models for the main tributaries; and the UNET unsteady flow program to address hydraulic impacts. In situations where historic records were not adequate or appropriate to develop discharge-frequency relationships or to verify the results, hydrologic modeling was used to create synthetic flows based on rainfall. Gage records for all streams were carefully evaluated.

The computation of unregulated flow frequency relationships on the Missouri River upstream of the Kansas River required special consideration due to the combination of the two historic peak flow periods consisting of the plains snowmelt of the early spring and the mountain snowmelt and plains rainfall of the late spring/early summer. An additional concern related to the Missouri River was flow depletion due to irrigation and reservoir evaporation. Historic depletions were added to the observed flow record to help obtain unregulated flows, while historic depletions were adjusted to present level depletions for computation of the regulated flow record.

The result of the hydrologic aspects of the study was a discharge and related frequency of occurrence for stations or given cross section located along each of the principle main stem rivers. For more detailed information on each of the hydrologic methodologies used to determine discharges, the reader is encouraged to consult the report cited (Reference 15) in Section 9.0 of this FIS.

Table 1. Summary of Discharges

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (CFS) 10-Percent Annual Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent Annual Chance
BUCKEYE CREEK					
At approximately 600 feet upstream of the confluence with the Missouri River	4.8	2,832	3,989	4,622	5,606
150 feet downstream of Birmingham Road	3.0	1,661	2,268	2,755	3,541
1,300 feet upstream of 38th Street	2.2	1,901	2,317	2,541	2,888
590 feet upstream of Cleveland Avenue	0.8	912	1,336	1,598	2,739
BUCKEYE CREEK TRIBUTARY 1					
280 feet upstream of North Spruce Avenue	0.4	563	749	863	1,023
At approximately 0.6 miles upstream of North Spruce Avenue	0.2	332	451	541	691
BRUSHY CREEK					
Just downstream of Atchinson, Topeka and Santa Fe RR	3.9	3,430	5,220	6,080	8,180
At approximately 1200 feet upstream of Atchinson, Topeka and Santa Fe RR	2.0	2,030	3,030	3,500	4,660
At approximately 1865 feet downstream of US Highway 69	1.7	1,690	2,510	2,890	3,830
At approximately 0.9 miles upstream of US Highway 69	1.0	1,160	1,730	1,990	2,650
CATES BRANCH					
Just upstream of Ruth Ewing Road	2.3	2,545	3,615	4,410	5,740
At approximately 1,200 feet upstream of Ruth Ewing Road	2.2	2,385	3,420	4,175	5,455
At approximately 1,500 feet upstream of Marilynn Avenue	1.9	2,150	3,005	3,670	4,795

Table 1. Summary of Discharges (Continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (CFS) 10-Percent Annual Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent Annual Chance
CATES BRANCH (cont.)					
At approximately 0.6 feet upstream of Marilynn Avenue	1.7	1,920	2,710	3,330	4,390
1,200 feet downstream of State Highway 291	1.6	1,810	2,550	3,130	4,130
Just upstream of Murray Road	1.1	1,780	2,450	2,950	3,800
200 feet upstream of Mill Road	0.4	650	910	1,120	1,460
CLEAR CREEK					
At approximately 0.8 miles upstream of confluence with Fishing River	91.8	14,600	22,520	26,340	36,820
At approximately 1250 feet upstream of State Highway 92/E 6th Street	70.0	13,660	20,670	23,760	32,400
At approximately 615 feet downstream of State Highway CC	21.1	7,960	12,340	14,440	19,560
At approximately 0.8 miles upstream of State Highway CC	18.4	7,510	11,520	13,460	18,190
CLEAR CREEK TRIBUTARY 15					
At approximately 600 feet upstream of confluence with Clear Creek	1.1	740	1,170	1,370	1,900
At approximately 0.6 miles upstream of confluence with Clear Creek	0.4	520	800	940	1,270
CLEAR CREEK TRIBUTARY 15.1					
At approximately 180 feet upstream of Jesse James Farm Road	0.5	450	680	790	1,050

Table 1. Summary of Discharges (Continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (CFS) 10-Percent Annual Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent Annual Chance
CROCKETT CREEK					
At approximately 1700 feet upstream of confluence with Holmes Creek	6.4	3,730	6,060	7,210	10,070
At approximately 1.2 miles upstream of confluence with Holmes Creek	5.4	3,450	5,570	6,590	9,210
At approximately 1560 feet downstream of Longridge Road	4.2	2,960	4,710	5,550	7,710
CROCKETT CREEK TRIBUTARY 3					
At approximately 0.7 miles upstream of the confluence with Crockett Creek	0.8	730	1,150	1,350	1,840
CROCKETT CREEK TRIBUTARY 4					
0.6 miles upstream of confluence with Crockett Creek	2.3	1,570	2,490	2,930	4,030
DRY FORK					
At approximately 840 feet upstream of Marietta Street	3.8	2,230	3,520	4,150	5,790
At approximately 2210 feet upstream of 142nd Street	2.9	1,880	2,940	3,400	4,640
At approximately 1.2 miles upstream of 142nd Street	1.4	1,280	1,970	2,300	3,120
At approximately 183 feet upstream of Salem Road	0.5	550	840	990	1,340
EAST CREEK					
At the confluence with Line Creek	3.8	4,349	5,959	7,211	9,374

Table 1. Summary of Discharges (Continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (CFS) 10-Percent Annual Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent Annual Chance
EAST CREEK (cont.)					
At approximately 420 feet downstream of Northwest Vivion Road	3.5	4,156	5,654	6,915	8,919
EAST CREEK TRIBUTARY 1					
100 feet upstream of the confluence with East Creek	1.5	2,015	2,732	3,303	4,191
520 feet upstream of US Highway 69	1.4	1,883	2,527	3,042	3,876
EAST FORK FISHING RIVER					
At approximately 0.6 miles downstream of Regent Avenue	24.8	6,750	10,550	12,350	16,800
At approximately 290 feet downstream of Marietta Road	24.4	6,720	10,520	12,310	16,750
At approximately 820 feet upstream of Isley Avenue	20.2	6,070	9,500	11,130	15,180
EAST FORK FISHING RIVER TRIBUTARY 2					
At approximately 140 feet downstream of St. Louis Avenue	1.4	1,490	2,280	2,650	3,560
At approximately 1600 feet upstream of St. Louis Avenue	1.1	1,290	1,940	2,250	2,980
EAST FORK LINE CREEK					
Just upstream of the confluence with Line Creek	4.3	4,865	6,867	8,185	10,651
EAST FORK LINE CREEK TRIBUTARY 1					
1,250 feet upstream of Arrowhead Trafficway	0.9	1,528	2,073	2,513	3,247

Table 1. Summary of Discharges (Continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (CFS) 10-Percent Annual Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent Annual Chance
EAST FORK LINE CREEK TRIBUTARY 1.2					
Just upstream of the confluence with East Fork Line Creek Tributary 1	0.5	620	817	965	1,218
380 feet upstream of Northwest Arrowhead Trafficway	0.2	282	369	435	544
EAST FORK SHOAL CREEK					
1,100 feet downstream of lower most Interstate 435 crossing	12.7	7,904	11,113	13,736	18,173
At approximately 0.5 miles downstream of upper most Interstate 435 crossing	8.8	6,977	9,653	11,821	15,486
900 feet downstream of upper most Interstate 435 crossing	3.9	2,804	3,869	4,719	6,167
At approximately 0.5 miles upstream of Brighton Avenue	3.2	2,575	3,578	4,345	5,627
1,280 feet downstream of 100th Street	2.6	2,218	3,069	3,684	4,709
650 feet upstream of lower most Staley Road crossing	2.1	1,959	2,702	3,234	4,143
1,800 feet upstream of lower most Staley Road crossing	1.9	1,769	2,431	2,914	3,735
700 feet upstream of upper most Staley Road crossing	0.8	837	1,139	1,366	1,747
EAST FORK SHOAL CREEK TRIBUTARY 1					
500 feet upstream of 96th Street	4.4	4,053	5,703	6,970	9,079
2,000 feet upstream of 96th Street	3.3	3,165	4,444	5,421	7,048

Table 1. Summary of Discharges (Continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (CFS) 10-Percent Annual Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent Annual Chance
EAST FORK SHOAL CREEK TRIBUTARY 1 (cont.)					
At approximately 0.55 miles downstream of Interstate 435	2.8	2,733	3,834	4,675	6,081
1,500 feet upstream of Interstate 435	1.7	1,590	2,244	2,749	3,589
At approximately 0.6 miles upstream of Hardesty Avenue	1.4	1,380	1,932	2,359	3,053
EAST FORK SHOAL CREEK TRIBUTARY 2					
450 feet downstream of Interstate 435 on ramp	1.1	1,145	1,613	1,978	2,652
570 feet upstream of State Highway 152	1.0	1,047	1,464	1,808	2,413
140 feet upstream of Barry Road	0.9	938	1,319	1,632	2,155
EAST FORK SHOAL CREEK TRIBUTARY 3					
At approximately 1 mile upstream of confluence with East Fork Shoal Creek	1.2	1,003	1,461	1,715	2,330
120 feet upstream of Brighton Avenue	1.0	980	1,360	1,568	2,181
900 feet upstream of 80th Street	0.9	873	1,180	1,386	1,925
370 feet upstream of State Highway 152	0.6	691	955	1,155	1,492
FIRST CREEK					
Just upstream of the confluence with Second Creek (Clay County)	10.2	2,325	3,243	3,984	5,398
Just upstream of Martin Road (Clay County)	8.9	2,305	3,193	3,959	5,321
Just downstream of Highway 435	3.6	1,689	2,356	2,820	3,614

Table 1. Summary of Discharges (Continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (CFS) 10-Percent Annual Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent Annual Chance
FIRST CREEK TRIBUTARY 1					
Just upstream of the confluence with First Creek	1.8	1,419	1,983	2,481	3,068
FISHING RIVER					
Approximately 320 feet upstream of Greenwood Road W	223.8	27,450	46,510	5,630	80,360
just upstream of State Highway H	187.5	24,330	41,130	50,080	71,150
At approximately 1620 feet upstream of US Highway 69	138.2	22,500	36,210	42,820	61,710
At Approximately 1.2 miles upstream of Plattsburg Road	45.2	11,150	18,020	21,140	30,080
At approximately 0.95 miles upstream of State Highway A	9.6	5,850	9,450	11,190	15,560
At approximately 350 feet upstream of N Home Avenue	6.4	4,490	7,240	8,570	12,220
At approximately 380 feet downstream of N Stark Avenue	2.0	1,660	2,650	3,130	4,380
At approximately 0.9 miles downstream of NE 120th Street	1.6	1,430	2,260	2,660	3,650
Just upstream of NE 120th Street	0.3	280	450	530	720
FISHING RIVER TRIBUTARY 1					
Just upstream of NE 112th Street	3.7	2,610	4,380	5,250	7,380
At approximately 900 feet upstream of Cookingham Drive	0.4	430	640	750	990

Table 1. Summary of Discharges (Continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (CFS) 10-Percent Annual Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent Annual Chance
FISHING RIVER TRIBUTARY 1.1					
Just upstream of 112th Street	1.0	990	1,530	1,780	2,410
FISHING RIVER TRIBUTARY 1.2					
At approximately 840 feet upstream of NE 104th Street	0.4	360	560	660	890
FISHING RIVER TRIBUTARY 16					
Confluence with Fishing River	3.0	2,340	3,560	5,560	5,560
Just upstream of Meadowbrook Drive	2.5	2,060	3,120	3,320	4,860
Just upstream of East 19th Street	2.0	1,750	2,630	3,050	4,070
Approximately 400 feet downstream of Regency Drive	1.2	1,100	1,630	1,880	2,480
Just downstream of 6th Street	0.6	731	1,095	1,268	1,697
HOLMES CREEK					
At 0.8 miles upstream of confluence with Fishing River	17.0	6,520	10,780	12,940	18,350
At approximately 340 feet downstream of 122nd Avenue	14.5	5,670	9,440	1,430	16,320
At approximately 1 mile upstream of Summersette Road	7.4	2,880	4,840	5,820	8,260
At approximately 2050 feet upstream of Moffitt Road	5.0	2,270	3,900	4,710	6,720
At approximately 0.44 miles downstream of State Highway 33	4.4	2,070	3,410	4,100	5,840
At approximately 1270 feet upstream of State Highway 33	4.1	1,950	3,130	3,720	5,230
At approximately 0.45 miles upstream of NE 121st Street Terrace	2.8	1,590	2,490	2,920	3,990

Table 1. Summary of Discharges (Continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (CFS) 10-Percent Annual Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent Annual Chance
HOLMES CREEK (cont.)					
At approximately 0.5 miles upstream of NE 121st Street Terrace	1.1	870	1,370	1,600	2,180
LITTLE PLATTE RIVER					
1,500 feet downstream of US Highway 169	53.2	10,301	13,395	16,465	22,321
At approximately 0.5 miles upstream of Bridge Road	22.3	6,633	9,199	11,503	15,303
At approximately 2.2 miles upstream of Bridge Road	0.8	2,995	3,155	3,221	8,377
LITTLE SHOAL CREEK					
At approximately 0.3 miles downstream of Withers Road	12.0	7,665	10,955	13,422	17,561
1,000 feet upstream of Withers Road	10.4	6,518	9,113	11,100	15,028
700 feet upstream of Campbell Drive	7.7	4,967	7,033	8,692	11,853
780 feet downstream of 76th Street	5.1	4,150	5,974	7,441	10,115
At approximately 0.6 miles downstream of State Highway 152	2.3	1,875	2,791	3,493	4,704
380 feet upstream of Shoal Creek Valley Drive	1.8	1,760	2,554	3,167	4,220
At approximately 1.5 miles upstream of Shoal Creek Valley Drive	1.3	1,556	2,207	2,702	3,548
At approximately 2.3 miles upstream of Shoal Creek Valley Drive	1.0	1,271	1,795	2,194	2,872
LITTLE SHOAL CREEK TRIBUTARY 1					
At approximately 0.4 miles downstream of State Highway 152	1.9	2,595	3,630	4,441	5,809
1,100 feet upstream of State Highway 152	1.6	2,212	3,176	3,940	5,205
At approximately 0.4 miles downstream of State Highway 152	1.9	2,595	3,630	4,441	5,809

Table 1. Summary of Discharges (Continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (CFS) 10-Percent Annual Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent Annual Chance
LITTLE SHOAL CREEK TRIBUTARY 1					
1,100 feet upstream of State Highway 152	1.6	2,212	3,176	3,940	5,205
At approximately 0.4 miles downstream of Flintlock Road	1.4	1,661	2,384	3,618	4,734
At approximately 0.7 miles upstream of NE 88th Street	0.4	857	1,150	1,369	1,733
LITTLE SHOAL CREEK TRIBUTARY 5					
At approximately 0.3 miles upstream of South Wales Drive	2.2	2,650	3,619	4,340	5,563
At approximately 0.4 miles downstream of Liberty Drive	2.0	2,335	3,147	3,740	4,783
Just downstream of Liberty Drive	1.6	1,839	2,481	2,941	3,788
At approximately 0.3 miles upstream of Circle Drive	1.4	1,660	2,213	2,661	3,436
LITTLE SHOAL CREEK TRIBUTARY 6					
Approximately 1.47 miles upstream of the confluence with Little Shoal Creek	0.4	211	292	354	459
LITTLE SHOAL CREEK TRIBUTARY 7					
At approximately 0.35 miles upstream of Liberty Drive	1.2	1,297	1,734	2,060	2,606
1,000 feet downstream of Kings Highway	1.0	1,205	1,598	1,890	2,377
300 feet upstream of Kings Highway	0.5	852	1,122	1,322	1,654
MILL CREEK					
Just upstream of Brighton Avenue	5.4	5,586	7,637	9,400	12,406
240 feet upstream of Indiana Avenue	2.2	2,381	3,293	3,962	5,075

Table 1. Summary of Discharges (Continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (CFS) 10-Percent Annual Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent Annual Chance
OWENS BRANCH					
1,500 feet upstream of US Highway 169	4.0	2,853	3,854	4,614	5,896
1,500 feet upstream of Hillcrest Street	2.6	2,293	3,118	3,740	4,776
Just upstream of Northwest 180th Street	1.8	1,736	2,361	2,830	3,608
At approximately 0.8 miles upstream of Northwest 180th Street	0.6	876	1,200	1,438	1,826
At approximately 1.1 miles upstream of Northwest 180th Street	0.4	641	872	1,038	1,315
POLECAT CREEK					
440 feet upstream of Mount Olivet Road	1.3	1,169	1,609	1,941	2,500
700 feet upstream of Clementine Road	0.9	1,002	1,370	1,648	2,116
At approximately 0.6 miles upstream of Clementine Road	0.7	736	1,004	1,205	1,541
At approximately 1 mile upstream of Clementine Road	0.3	196	269	325	418
RANDOLPH CREEK					
480 feet upstream of lower most Interstate 435 crossing	1.7	3,247	4,335	5,143	6,520
350 feet downstream of upper most Interstate 435 crossing	1.0	1,703	2,374	2,871	3,712
750 feet upstream of upper most Interstate 435 crossing	0.8	1,427	1,993	2,418	3,132
1,250 feet downstream of Parvin Road	0.6	1,047	1,493	1,826	2,387
600 feet downstream of Parvin Road	0.5	912	1,295	1,585	2,089
1000 feet upstream of Parvin Road	0.4	606	871	1,074	1,420

Table 1. Summary of Discharges (Continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (CFS) 10-Percent Annual Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent Annual Chance
RANDOLPH CREEK (cont.)					
At approximately 0.5 miles upstream of Parvin Road	0.2	485	686	841	1,105
At approximately 0.6 miles upstream of Parvin Road	0.2	397	564	692	910
At approximately 0.8 miles upstream of Parvin Road	0.2	331	466	569	744
RANDOLPH CREEK TRIBUTARY					
1,200 feet upstream of Randolph Road	0.5	900	900	900	900
ROCK CREEK					
400 feet upstream of Rock Creek Parkway North	5.8	5,409	7,621	9,202	11,843
280 feet upstream of Parvin Road	2.7	2,857	3,969	4,811	6,233
700 feet downstream of NE Davidson Road	2.0	2,148	2,940	3,547	4,577
560 feet upstream of NE Davidson Road	1.9	1,948	2,680	3,239	4,188
170 feet upstream of Vivion Road	1.6	1,396	1,925	2,332	3,024
ROCK CREEK GLADSTONE					
Just downstream of North Jackson Drive	2.8	2,544	3,258	4,083	5,457
Just upstream of the North Brooktree Lane Detention	2.4	2,396	3,156	3,994	5,315
At the 64th Street Basin	2.0	2,083	2,887	3,606	4,742
Approximately 200 feet downstream of Prospect Avenue	1.8	2,457	3,141	3,626	4,618
Just downstream of the Prospect Avenue Detention Facility	1.4	1,939	2,465	2,831	3,665
Approximately 700 feet downstream of Woodland Avenue	1.2	2,271	3,116	3,733	4,775
Just downstream of Woodland Avenue	0.9	1,719	2,347	2,809	3,588
Just upstream of 72nd Street	0.6	1,225	1,669	2,002	2,552

Table 1. Summary of Discharges (Continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (CFS) 10-Percent Annual Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent Annual Chance
ROCK CREEK TRIBUTARY 11					
500 feet downstream of the intersection of Holmes Street and 32nd Street	1.2	1,300	1,797	2,183	2,835
Just upstream of the intersection of Holmes Street and 32nd Street	1.1	1,253	1,722	2,085	2,694
ROCK CREEK TRIBUTARY 11.2					
1,200 feet upstream of the confluence with Rock Creek	2.5	2,268	3,171	3,809	4,870
1,000 feet downstream of Interstate 35	2.2	2,003	2,799	3,383	4,326
At approximately 0.5 miles upstream of Interstate 35	0.7	672	956	1,175	1,517
At approximately 1.4 miles upstream of Interstate 35	0.4	455	627	757	976
At approximately 1.9 miles upstream of Interstate 35	0.3	405	551	660	844
ROCKY BRANCH					
580 feet upstream of the confluence with Wilkerson Creek	7.5	2,366	3,443	4,396	6,075
160 feet downstream of Interstate 435	1.7	2,367	3,127	3,529	4,157
1,500 feet upstream of Interstate 435	0.4	768	1,056	1,284	1,660
360 feet upstream of 115th Terrace	0.2	503	670	794	1,000
ROCKY BRANCH TRIBUTARY 1					
280 feet downstream of 114th Terrace	0.5	1,108	1,464	1,663	2,003

Table 1. Summary of Discharges (Continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (CFS) 10-Percent Annual Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent Annual Chance
ROCKY BRANCH TRIBUTARY 1 (cont.)					
Just upstream of 114th Terrace	0.4	728	944	1,078	1,322
RUSH CREEK					
Just upstream of 74th Street	12.9	5,865	8,266	10,126	13,237
1,200 feet downstream of Richfield Drive	10.3	5,474	7,616	9,210	11,812
At approximately 0.6 miles downstream of State Highway 4	9.0	5,080	6,956	8,372	10,670
At approximately 0.5 miles downstream of State Highway 4	7.6	4,371	5,975	7,192	9,165
1,280 feet upstream of State Highway 4	5.9	3,592	4,915	5,926	7,617
At approximately 0.6 miles upstream of State Highway 4	3.2	1,731	2,360	2,840	3,650
At approximately 1.4 miles upstream of State Highway 4	2.5	1,425	1,949	2,344	3,008
SEARCY BRANCH					
850 feet upstream of Northeast Parvin Road	1.2	940	1,421	1,746	2,373
950 feet downstream of Northeast 44th Terrace	0.5	617	956	1,139	1,421
715 feet upstream of Drury Avenue	0.2	290	373	422	495
SEARCY BRANCH TRIBUTARY 1					
Approximately 1.1 miles upstream of the confluence with Searcy Branch	0.0	40	54	64	82
Approximately 0.73 miles upstream of the confluence with Searcy Branch	0.1	258	421	596	844

Table 1. Summary of Discharges (Continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (CFS) 10-Percent Annual Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent Annual Chance
SECOND CREEK					
Just upstream of the confluence with Little Platte River (Clay County)	30.9	5,088	7,256	8,671	12,069
Just downstream of the confluence with First Creek (Clay County)	30.1	5,131	7,255	8,644	12,085
At Cookingham Drive/ Highway 291	12.0	3,961	5,434	6,772	9,012
At Northwest 108th Drive	4.2	1,817	2,573	3,353	4,170
SHOAL CREEK					
2,500 feet downstream of State Highway 291	69.5	15,971	16,006	31,562	44,396
Just downstream of confluence of East Fork Shoal Creek	25.4	14,644	20,740	25,505	33,799
1,000 feet upstream of North Agnes Avenue	8.7	7,836	10,995	13,469	17,604
At approximately 0.7 miles downstream of NE Barry Road	7.5	7,232	9,999	12,157	15,949
At approximately 0.7 miles downstream of North Oak Trafficway	3.4	5,090	6,918	8,299	10,657
1,015 feet downstream of North Oak Trafficway	1.7	2,384	3,272	3,944	5,084
Just upstream of North Oak Trafficway	1.5	2,093	2,874	3,464	4,447
Just upstream of State Highway 152	1.2	1,733	2,388	2,882	3,709
1,400 feet upstream of State Highway 152	0.9	1,302	1,803	2,185	2,819
SHOAL CREEK TRIBUTARY 6					
At approximately 0.4 miles upstream of confluence with Shoal Creek	1.6	1,630	2,298	2,816	3,725

Table 1. Summary of Discharges (Continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (CFS) 10-Percent Annual Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent Annual Chance
SHOAL CREEK TRIBUTARY 6 (cont.)					
At approximately 2.1 miles upstream of confluence with Shoal Creek	0.7	948	1,245	1,467	1,868
At approximately 2.7 miles upstream of confluence with Shoal Creek	0.5	817	1,050	1,221	1,504
SHOAL CREEK TRIBUTARY 8					
1,400 feet downstream of 96th Street	1.3	2,575	3,451	4,087	5,111
Just upstream of 96th Street	1.1	2,148	2,887	3,428	4,287
700 feet upstream of 96th Street	0.9	1,864	2,480	2,928	3,668
SHOAL CREEK TRIBUTARY 9					
At approximately 0.4 miles upstream of State Highway 152 off ramp	1.5	2,098	2,856	3,428	4,410
At approximately 1 mile upstream of State Highway 152 off ramp	0.9	1,462	1,991	2,391	3,094
SHOAL CREEK TRIBUTARY 20					
390 feet downstream of Pleasant Valley Road	1.1	1,650	2,260	2,710	3,455
600 feet upstream of Boucher Circle	1.0	1,435	1,980	2,375	3,040
SHOAL CREEK TRIBUTARY 20.1					
At approximately 0.3 miles upstream of Kaill Road	0.5	780	1,050	1,250	1,570

Table 1. Summary of Discharges (Continued)

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (CFS) 10-Percent Annual Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent Annual Chance
TOWN BRANCH					
At approximately 1 mile upstream of confluence with Shoal Creek	5.4	5,810	8,034	9,896	13,153
At approximately 0.6 miles downstream of Ruth Ewing Street	4.4	4,659	6,493	7,975	10,481
1,100 feet downstream of Ruth Ewing Street	3.8	4,203	5,967	7,269	9,444
160 feet downstream of Ruth Ewing Street	3.2	3,510	4,947	6,005	7,795
At approximately 0.8 miles upstream of Ruth Ewing Road	0.7	935	1,284	1,548	1,992
WILKERSON CREEK					
At approximately 0.8 miles upstream of State Highway 92	17.3	7,342	10,180	12,527	16,634
At approximately 1.1 miles upstream of 132nd Street	3.6	4,967	6,768	8,135	10,426
At approximately 1.7 miles upstream of 132nd Street	2.5	3,513	4,852	5,881	7,537
At approximately 2.2 miles upstream of 132nd Street	1.1	1,856	2,544	3,063	3,943
WILLIAMS CREEK					
At approximately 0.37 miles downstream of NE 144th Street	18.9	4,940	8,310	9,970	14,280
At approximately 1700 feet upstream of Stahe Highway 92	11.8	4,460	7,370	8,830	12,750
At approximately 0.5 miles upstream of County Road RA	5.1	3,220	5,340	6,390	8,960
WILLIAMS CREEK TRIBUTARY 14					
At approximately 180 feet upstream of NE 161st Street	4.7	1,130	1,890	2,400	3,790

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevation of floods of the selected recurrence intervals. 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, users are cautioned to use the flood elevation data presented in this FIS in conjunction with the data shown on the FIRM.

3.2.1 Countywide Analyses

The following streams were previously modeled by detailed methods as part of watershed studies conducted by the City of Kansas City: East Creek, East Fork Line Creek, East Fork Line Creek Tributary 1, East Fork Line Creek Tributary 1.2, East Fork Shoal Creek, East Fork Shoal Creek Tributary 1, East Fork Shoal Creek Tributary 2, East Fork Shoal Creek Tributary 3, First Creek, First Creek Tributary 1, Fishing River, Fishing River Tributary 1, Fishing River Tributary 1.1, Fishing River Tributary 1.2, Little Shoal Creek, Little Shoal Creek Tributary 1, Mill Creek, Old Maids Creek, Rock Creek Gladstone, Rocky Branch, Rocky Branch Tributary 1, Second Creek, Shoal Creek, Shoal Creek Tributary 6, Shoal Creek Tributary 20, Shoal Creek Tributary 20.1, Wilkerson Creek. These "Leverage" models previously conducted were used to extract structure and channel data, which were then combined by AMEC with updated overbank data from the 2 foot LIDAR data. All structure data available from the leverage models was utilized. In some cases structure data was not available in the leverage data; these structures were supplemented with survey data collected by AMEC in 2009. Channel data obtained from the leverage models was considered to be more accurate especially in the vicinity of structures or where water is visible in the aerial photographs. In the case that channel data obtained from the leverage model was not in agreement with what was visible on the aerials or what was indicated by the LIDAR data, LIDAR data was instead used to define the channel geometry.

All new hydraulic modeling was performed using HEC-RAS, version 4.0, from the USACE, Hydrologic Engineering Center (HEC) (Reference 27), with the exception of Fishing River Tributary 16. It was performed using HEC-RAS, version 4.1 (Reference 29).

Topographic data in the form of 2-foot LIDAR was used for elevation data. Minor adjustments were made to structures, ineffective areas and the floodway in order to account for inconsistencies created in the update of leverage data. Detailed cross section data for over bank areas was compiled from 2 foot LIDAR data and field survey points collected by AMEC in 2009. Channel data was based on field survey points. Aerial photography (2007 and 2008) was also used to help determine roughness coefficients, structure locations and other stream features.

Stream crossing information for all the study areas was taken from field survey points. Field notes consisting of structure dimensions and channel geometry, as well as structure material (i.e. corrugated metal pipe), were used in conjunction with survey data to most accurately represent the structures. Roughness coefficients were assigned based on aerial photography and field reconnaissance (Table 2). Peak flow values were obtained from corresponding HEC-HMS and SWMM models. Starting water surface elevations were computed using a normal depth boundary condition.

3.2.2 Upper Mississippi River System Flow Frequency Study Methodology

The main hydraulic tool used to determine flood elevations along the Missouri River was the UNET unsteady flow computer modeling program (Reference 16). Included in the UNET model were the main stem of the Mississippi River, several of its main tributaries, navigation dams, and the levees and levee systems. Hydrographic surveys were assembled from navigation channel maintenance surveys, dam periodic inspection surveys, and environment management project surveys. These surveys date from 1997 or later. For areas where no digital hydrographic surveys were available, such as in some side channels and chutes, depths were estimated from the most current printed surveys available. Bluff-to-bluff digital terrain data collected in 1995 and 1998 were used to supplement the channel survey data (Reference 18). Model development consisted of constructing HEC-RAS models from the original cross-sections, adding in ineffective flow areas or obstructions as necessary, and then converting the models to UNET.

The cross section stationing used in the Missouri River model was based on existing USACE River Mile markers of 1960 (Reference 22). The reach length between cross sections is based on a model centerline developed for the HEC-RAS converted model of the UMRSFFS (Reference 15). The distances between cross sections shown in the floodway data table and flood profile were created using the cross section stations based on the 1960 River Miles. While the calculated distance between cross sections using the 1960 River Miles are similar to the measured distance along the model centerline, some differences may occur. This difference in distance does not affect the calculated water surface elevation at each cross section shown on the floodway data table and flood profile, nor does it affect the placement of the BFEs on the map.

The UNET model was calibrated to reproduce recorded flood hydrographs for a selected period of record. The UNET model was calibrated to both stage and discharge at gaging locations primarily by adjusting roughness coefficients and estimated lateral inflows. Annual peak flows and peak stages from the period of record run of the calibrated UNET model were used to develop rating curves for each cross section location. Using these station rating curves and the station frequency flows developed during the hydrology phase, frequency elevation points were obtained for each cross section location. Connecting the corresponding points resulted in flood frequency profiles. These profiles were coordinated among the computational teams and appropriate adjustments were made to assure consistency.

Some special considerations and techniques were required to address especially complex flow reaches. The confluences of the Missouri and Illinois Rivers with the Mississippi relied primarily on development of graphical stage-probability relationships for backwater-impacted cross sections. These were created using a graphical Weibull approach. The graphical period-of-record stage-probability curves were combined to blend a consistent and reasonable profile for each probability flood. Confluences of many other smaller streams with the main stem also exhibited backwater effects resulting in discontinuities in the profiles. A computer routine was developed to smooth the profile in these reaches so as to form a consistent, reasonable transition through the zone of backwater.

The 1-percent-annual-chance water surface elevation profile was calculated using the HEC-RAS 3.1.3 computer program (Reference 17). Upon completion of the Upper Mississippi River System Flow Frequency Study (UMRSFFS), FEMA funded the Corps of Engineers to compute a floodway for the studied reach of the Missouri River. This floodway determination consisted of converting the hydraulic data from UNET to HEC-RAS, calibrating the HEC-RAS steady-state models to the UMRSFFS results for the 1-percent-annual-chance profile,

and performing the floodway computations. The 1-percent-annual-chance elevations from this calibrated HEC-RAS model were used as the basis to delineate the associated 1-percent-annual-chance floodplain and correspond to the base flood elevation shown on the maps. The 10-, 2-, and 0.2-percent-annual-chance elevations shown on the flood profiles were plotted using the original UNET elevations.

For more detailed information on each of the hydraulic methodologies used to calculate flood elevation profiles, the reader is encouraged to consult the report cited (Reference 15) in Section 9.0 of this FIS.

Table 2. Manning's "n" Values

Flooding Source	Channel "n"	Overbank "n"
BUCKEYE CREEK	0.01-0.045	0.03-0.1
BUCKEYE CREEK TRIBUTARY 1	0.015-0.045	0.035-0.1
BRUSHY CREEK	0.035	0.025-0.1
CATES BRANCH	0.04-0.065	0.02-0.1
CLEAR CREEK	0.05	0.012-0.1
CLEAR CREEK TRIBUTARY 15	0.05	0.05-0.1
CLEAR CREEK TRIBUTARY 15.1	0.045-0.1	0.012-0.1
CROCKETT CREEK	0.035	0.04-0.1
CROCKETT CREEK TRIBUTARY 3	0.035	0.04-0.1
CROCKETT CREEK TRIBUTARY 4	0.035-0.04	0.035-0.045
DRY FORK	0.05-0.08	0.02-0.1
EAST CREEK	0.04-0.045	0.016-0.12
EAST CREEK TRIBUTARY 1	0.035-0.045	0.016-0.06
EAST FORK FISHING RIVER	0.05	0.012-0.08
EAST FORK FISHING RIVER TRIBUTARY 2	0.05	0.012-0.085
EAST FORK LINE CREEK	0.04-0.05	0.016-0.1
EAST FORK LINE CREEK TRIBUTARY 1	0.045	0.05-0.1
EAST FORK LINE CREEK TRIBUTARY 1.2	0.045	0.05-0.08
EAST FORK SHOAL CREEK	0.035-0.05	0.035-0.09
EAST FORK SHOAL CREEK TRIBUTARY 1	0.03-0.053	0.04-0.1
EAST FORK SHOAL CREEK TRIBUTARY 2	0.04-0.05	0.03-0.1
EAST FORK SHOAL CREEK TRIBUTARY 3	0.03-0.055	0.035-0.2
FIRST CREEK	0.045	0.08-0.12
FIRST CREEK TRIBUTARY 1	0.035-0.05	0.06-0.08
FISHING RIVER	0.032	0.032-0.1
FISHING RIVER TRIBUTARY 1	0.032	0.02-0.1
FISHING RIVER TRIBUTARY 1.1	0.032-0.045	0.04-0.1
FISHING RIVER TRIBUTARY 1.2	0.032	0.04-0.1
FISHING RIVER TRIBUTARY 16	0.045-0.055	0.05-0.12
HOLMES CREEK	0.035	0.04-0.1
LITTLE PLATTE RIVER	0.035-0.045	0.08-0.12
LITTLE SHOAL CREEK	0.035-0.055	0.025-0.1
LITTLE SHOAL CREEK TRIBUTARY 1	0.04-0.05	0.05-0.09
LITTLE SHOAL CREEK TRIBUTARY 5	0.045-0.075	0.05-0.1
LITTLE SHOAL CREEK TRIBUTARY 6	0.013-0.075	0.02-0.15
LITTLE SHOAL CREEK TRIBUTARY 7	0.04-0.1	0.03-0.1
MILL CREEK	0.035-0.06	0.04-0.12

Table 2. Manning's "n" Values (Continued)

Flooding Source	Channel "n"	Overbank "n"
MILL CREEK TRIBUTARY 1	0.045	0.09
MISSOURI RIVER	0.014-0.0375	0.03-0.2
MUDDY FORK	0.035-0.1	0.012-0.1
OLD MAIDS CREEK	0.045-0.055	0.065-0.12
OWENS BRANCH	0.05	0.07-0.1
POLECAT CREEK	0.045-0.05	0.07-0.12
RANDOLPH CREEK	0.035-0.1	0.013-0.1
RANDOLPH CREEK TRIBUTARY	0.045	0.085
ROCK CREEK	0.035-0.055	0.02-0.1
ROCK CREEK GLADSTONE	0.025-0.06	0.04-0.1
ROCK CREEK TRIBUTARY 11	0.04-0.05	0.02-0.07
ROCK CREEK TRIBUTARY 11.2	0.035-0.055	0.02-0.075
ROCKY BRANCH	0.045-0.05	0.06-0.12
ROCKY BRANCH TRIBUTARY 1	0.04-0.05	0.05-0.12
RUSH CREEK	0.045	0.04-0.1
SEARCY BRANCH	0.045-0.05	0.04-0.1
SEARCY BRANCH TRIBUARTY 1	0.045	0.1
SECOND CREEK	0.045-0.055	0.07-0.1
SHOAL CREEK	0.045-0.057	0.045-0.11
SHOAL CREEK TRIBUTARY 6	0.045-0.1	0.035-0.1
SHOAL CREEK TRIBUTARY 8	0.04-0.045	0.07-0.09
SHOAL CREEK TRIBUTARY 9	0.045	0.08-0.09
SHOAL CREEK TRIBUTARY 20	0.044-0.06	0.03-0.08
SHOAL CREEK TRIBUTARY 20.1	0.045-0.06	0.05-0.08
TOWN BRANCH	0.035-0.06	0.04-0.1
WILKERSON CREEK	0.045	0.05-0.1
WILLIAMS CREEK	0.05	0.012-0.08
WILLIAMS CREEK TRIBUTARY 14	0.05	0.012-0.1

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.

To accurately convert flood elevation for Clay County from the current NGVD29 datum to the newer NAVD88 datum, the following procedure was implemented. The vertical datum shift was calculated for each corner of the USGS 7.5-munute topographic quadrangle maps located inside or within 2.5 miles of the county boundary using the USACE conversion program, Corpscon 6.0.1. A resulting conversion factor of .311 feet was applied to all components of the FIS that display redelineated elevations.

Flood elevations shown in this FIS report and on the FIRM are referenced to the NAVD88. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the NGVD and NAVD,

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
(301) 713-4172 (fax)

Methods for the Missouri River

The studied reach of Missouri River spans multiple counties in multiple states, and the river forms the actual border between adjacent counties. The UMRSFFS was originally performed using the NGVD29 vertical datum. Applying an average countywide datum shift to convert to NAVD88 would have resulted in a mismatch of elevations between counties. Therefore, in order to perform the most accurate vertical datum conversion possible, and to maintain consistency in approach across county lines, the datum conversion for the Missouri River was performed on a cross-section by cross-section basis, rather than by applying an average county-wide or stream-wide value.

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 the FIRM for this jurisdiction, please contact the Information Services Branch of the NGS at (301) 713-3242, or visit their Web site 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 and Floodway Data 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 methods, the 1- and 0.2-percent-annual-chance floodplain boundaries have been delineated using the flood

elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:300, with a contour interval of 2 feet.

Methods for the Missouri River

Between cross sections along the Missouri River, the boundaries were interpolated using a digital terrain model (DTM) created from photogrammetric-derived mass points and break lines, with a post spacing of 15 feet an vertically accurate enough to support the creation of 4 foot contours (Reference 18).

The 1- and 0.2-percent-annual-chance floodplain boundaries 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. In cases where the 1- and 0.2-percent-annual-chance floodplain boundaries are close together, only the 1-percent-annual-chance floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations, but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the streams studied by approximate methods, only the 1-percent-annual-chance floodplain boundary is shown on the FIRM.

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 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 (see Table 4, Floodway Data). In cases where the floodway and 1-percent-annual-chance floodplain boundaries are either close together or collinear, only the floodway boundary is shown.

Methods for the Missouri River

Upon completion of the UMRSFFS, FEMA funded the USACE to compute a floodway for the studied reach of the Missouri River. This floodway determination consisted of converting the hydraulic data from UNET to HEC-RAS, calibrating the HEC-RAS steady-state models to the UMRSFFS results, and performing the floodway computations.

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.

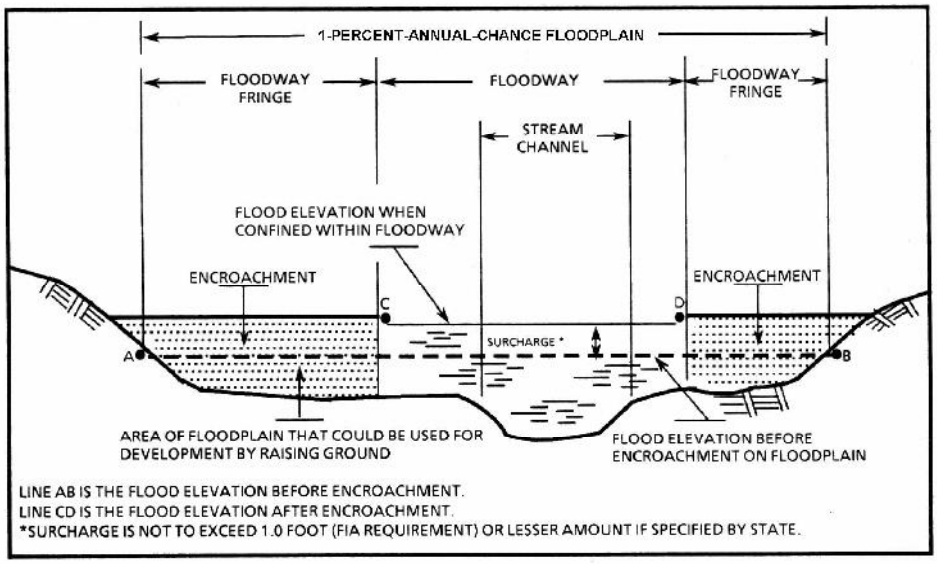

Figure 1. Floodway Schematic

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Brushy Creek								
A	417	146	1,261	4.8	987.3	987.3	987.8	0.5
B	2,601	295	1,483	4.1	995.5	995.5	996.3	0.8
C	5,528	85	869	7.0	1,006.5	1,006.5	1,006.5	0.0
D	7,773	193	1,172	3.0	1,010.9	1,010.9	1,011.0	0.1
E	10,028	118	466	6.2	1,014.2	1,014.2	1,014.8	0.6
F	12,534	105	376	5.8	1,021.5	1,021.5	1,021.9	0.4
G	14,716	87	437	5.0	1,029.5	1,029.5	1,030.1	0.6
H	16,046	38	186	11.7	1,035.0	1,035.0	1,035.0	0.0
I	18,077	94	455	4.8	1,045.1	1,045.1	1,045.4	0.3

[1]Feet above Clay County boundary

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

BRUSHY CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Buckeye Creek								
A	2,276	48	238	11.6	743.6	738.8[2]	738.8	0.0
B	2,485	51	496	5.4	745.6	745.6	745.6	0.0
C	2,832	52	428	6.3	747.8	747.8	747.8	0.0
D	4,051	44	269	10.0	751.6	751.6	751.7	0.1
E	5,746	153	440	6.1	762.6	762.6	762.6	0.0
F	6,938	133	519	5.2	770.8	770.8	770.8	0.0
G	7,801	75	415	6.5	774.7	774.7	774.7	0.0
H	8,562	52	649	3.9	787.9	787.9	787.9	0.0
I	9,747	47	227	11.2	790.7	790.7	790.8	0.1
J	11,927	39	188	8.5	801.6	801.6	801.7	0.1
K	12,470	27	193	8.3	807.3	807.3	807.4	0.1
L	13,202	48	336	4.8	815.3	815.3	815.6	0.3
M	13,855	283	2701	0.4	826.3	826.3	827.2	0.9
N	14,648	201	1470	0.7	829.0	829.0	829.1	0.1
O	15,677	138	1834	0.6	846.2	846.2	846.2	0.0
P	17,071	67	350	3.0	846.1	846.1	846.2	0.1
Q	17,406	42	175	6.0	850.6	850.6	851.0	0.4

[1]Feet above confluence with Missouri River
[2]Elevation computed without considering backwater effects from the Missouri River

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

BUCKEYE CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Buckeye Creek Tributary 1								
A	388	27	167	5.2	794.6	793.0[2]	794.0	1.0
B	949	85	208	4.2	799.5	799.5	800.2	0.7
C	1,474	18	95	9.1	805.4	805.4	806.2	0.8
D	1,878	17	128	6.8	809.8	809.8	810.2	0.4
E	2,577	17	79	6.9	814.3	814.3	814.4	0.1
F	3,541	26	76	7.1	841.7	841.7	841.7	0.0
G	4,180	27	70	7.7	844.9	844.9	844.9	0.0
H	4,693	29	76	7.2	847.9	847.9	848.0	0.1

[1]Feet above confluence with Buckeye Creek
[2]Elevation computed without considering backwater effects from Buckeye Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

BUCKEYE CREEK TRIBUTARY 1

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Cates Branch								
A	439	99	1,037	4.3	757.6	757.6	757.9	0.3
B	1,538	278	2,778	1.6	764.9	764.9	765.1	0.2
C	2,357	133	1,485	2.8	765.4	765.4	765.7	0.3
D	4,102	63	642	6.3	767.9	767.9	768.0	0.1
E	5,019	54	487	8.3	774.3	774.3	774.6	0.3
F	6,117	61	660	5.6	777.2	777.2	777.6	0.4
G	6,843	139	1,155	2.9	780.6	780.6	780.8	0.2
H	8,145	71	501	6.6	787.5	787.5	787.5	0.0
I	9,861	164	3,380	0.9	814.0	814.0	814.0	0.0
J	11,326	70	1,266	2.4	814.0	814.0	814.0	0.0
K	12,624	132	1,496	2.0	826.0	826.0	826.2	0.2
L	14,042	147	2,273	0.5	842.2	842.2	842.2	0.0
M	14,800	96	1,106	1.0	842.8	842.8	843.7	0.9
N	15,249	126	783	1.4	842.8	842.8	843.7	0.9
O	16,229	39	247	4.5	851.0	851.0	851.7	0.7

[1]Feet above confluence with Town Branch

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

CATES BRANCH

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Clear Creek								
A	4,455	1285	9,799	2.7	775.3	770.5[2]	771.4	0.9
B	6,276	594	7,262	3.6	775.3	772.9[2]	773.8	0.9
C	7,989	1808	14,884	1.8	775.3	773.3[2]	774.3	1.0
D	10,181	1152	7,410	3.2	775.3	774.3[2]	775.2	0.9
E	14,000	934	10,826	2.2	777.0	777.0	778.0	1.0
F	19,712	775	8,323	2.9	780.8	780.8	781.7	0.9
G	24,031	831	9,513	2.5	785.2	785.2	786.2	1.0
H	26,852	540	5,706	4.2	787.0	787.0	787.6	0.6
I	32,441	409	4,989	2.9	790.7	790.7	791.7	1.0
J	36,848	391	3,113	4.6	795.0	795.0	795.9	0.9
K	40,319	1767	10,811	1.3	802.0	802.0	802.7	0.7
L	44,176	484	4,482	3.2	806.5	806.6	806.6	0.0
M	48,000	579	3,882	3.7	809.6	809.6	809.9	0.3
N	52,432	319	3,194	4.5	815.6	815.6	816.0	0.4
O	56,000	522	5,947	2.4	822.0	822.0	822.9	0.9

[1]Feet above confluence with Fishing River
[2]Elevations computed without consideration of backwater effects from Fishing River

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

CLEAR CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Clear Creek Tributary 15								
A	608	418	1238	1.1	778.7	769.6[2]	770.6	1.0
B	1,591	286	2818	0.3	778.7	776.5[2]	776.9	0.4
C	3,158	73	558	1.7	778.7	777.0[2]	777.3	0.3
D	5,103	22	120	7.8	788.3	788.3	788.7	0.4

[1]Feet above confluence with Clear Creek
[2]Elevations computed without consideration of backwater effects from Clear Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

CLEAR CREEK TRIBUTARY 15

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Clear Creek Tributary 15.1								
A	1,000	69	358	2.2	779.9	768.4[2]	768.7	0.3
B	2,906	53	262	3.0	781.0	769.7[2]	770.2	0.5
C	4,067	75	406	2.0	781.5	773.1[2]	773.3	0.2
D	6,682	114	276	2.9	786.0	784.3[2]	785.2	0.9

[1]Feet above confluence with Clear Creek Tributary 15
[2]Elevations computed without consideration of overflow from Clear Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

CLEAR CREEK TRIBUTARY 15.1

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Crockett Creek								
A	2,557	165	1,645	4.2	766.2	762.7[2]	762.8	0.1
B	3,375	164	1,316	5.2	766.2	764.1[2]	764.2	0.1
C	5,905	181	1,352	4.9	767.1	767.1	767.2	0.1
D	8,493	67	671	8.3	770.8	770.8	771.2	0.4
E	10,204	75	633	8.8	779.4	779.4	779.4	0.0
F	11,697	121	584	5.0	782.6	782.6	782.6	0.0
G	12,581	215	1,788	1.6	789.2	789.2	789.7	0.5
H	13,522	101	335	8.7	789.5	789.5	789.5	0.0

[1]Feet above confluence with Holmes Creek
[2]Elevation computed without considering overflow effects from Fishing River

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

CROCKETT CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Crockett Creek Tributary 3								
A	945	41	236	5.7	770.7	769.3[2]	769.3	0.0
B	1,831	50	166	8.2	774.1	774.1	774.1	0.0
C	2,125	31	127	10.6	780.3	780.3	780.4	0.1
D	3,493	38	188	7.2	790.6	790.6	791.2	0.6

[1]Feet above confluence with Crockett Creek
[2]Elevation computed without considering backwater effects from Crockett Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

CROCKETT CREEK TRIBUTARY 3

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Crockett Creek Tributary 4								
A	654	62	308	9.5	793.8	793.8	793.8	0.0
B	1,608	107	426	6.9	800.3	800.3	800.3	0.0
C	2,288	123	419	7.0	806.7	806.7	807.3	0.6
D	2,957	121	649	4.5	813.8	813.8	814.4	0.6

[1]Feet above confluence with Crockett Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

CROCKETT CREEK TRIBUTARY 4

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Dry Fork								
A	1,013	275	3,310	1.3	778.6	778.6	779.2	0.6
B	3,600	184	1,288	3.2	784.7	784.7	785.6	0.9
C	6,000	104	500	7.4	798.3	798.3	799.0	0.7
D	8,000	60	354	9.6	814.0	814.0	814.2	0.2
E	9,600	76	335	6.9	830.3	830.3	830.4	0.1
F	12,800	50	249	9.2	864.8	864.8	865.1	0.3
G	14,400	63	144	6.9	884.5	884.5	884.5	0.0
H	16,291	75	307	3.2	905.1	905.1	905.1	0.0

[1]Feet above confluence with East Fork Fishing River

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

DRY FORK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
East Creek								
D	2,830	103 / 43[3]	754	9.2	768.0	766.4[2]	767.2	0.8
E	3,283	94 / 41[3]	789	4.6	768.7	768.7	769.2	0.5
F	4,239	54	388	9.4	772.5	772.5	773.4	0.9
G	6,044	212	1,841	1.7	794.0	794.0	794.0	0.0
H	7,065	91	310	10.1	804.7	804.7	804.7	0.0
I	8,465	76	351	8.9	812.8	812.8	812.8	0.0
J	10,037	172	605	4.8	826.6	826.6	826.9	0.3
K	11,122	156	1,042	2.8	839.3	839.3	839.9	0.6
L	12,912	85	1,183	1.0	866.3	866.3	866.9	0.6
M	13,944	45	280	4.1	866.8	866.8	867.4	0.6
N	14,501	64	168	6.8	871.3	871.3	871.3	0.0
O	15,626	20	83	9.3	880.6	880.6	880.6	0.0
P	16,190	28	79	9.8	890.2	890.2	890.2	0.0
Q	16,691	108	256	3.0	899.2	899.2	899.2	0.0

[1]Stream distance in feet above confluence with Line Creek
[2]Elevation computed without consideration of backwater effects from Line Creek
[3]Total width / Width within Clay County

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

EAST CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
East Creek Tributary 1								
A	317	49	236	12.9	768.4	767.4[2]	767.4	0.0
B	489	48	265	11.5	769.5	769.5	769.5	0.0
C	1,071	55	309	9.9	775.1	775.1	775.1	0.0
D	1,552	104	1,178	2.6	792.1	792.1	793.0	0.9
E	1,920	90	1,253	2.4	801.1	801.1	802.1	1.0
F	2,003	102	1,221	2.5	801.1	801.1	802.1	1.0

[1]Stream distance in feet above confluence with East Creek
[2]Elevation computed without consideration of backwater effects from East Creek in Platte County

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

EAST CREEK TRIBUTARY 1

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
East Fork Fishing River								
A	15,751	245	2,740	4.5	750.6	750.6	751.5	0.9
B	18,551	223	2,786	4.4	753.4	753.4	754.3	0.9
C	20,951	457	5,027	2.5	754.9	754.9	755.9	1.0
D	24,151	209	2,876	4.3	757.5	757.5	758.5	1.0
E	25,577	285	3,917	3.2	759.0	759.0	760.0	1.0
F	27,751	155	2,220	5.6	760.0	760.0	760.9	0.9
G	30,870	200	2,740	4.5	762.0	762.0	763.0	1.0
H	33,751	435	4,502	2.7	763.4	763.4	764.4	1.0
I	36,551	116	1,588	7.8	766.5	766.5	767.1	0.6
J	39,701	196	2,686	4.2	773.1	773.1	773.7	0.6
K	41,351	229	2,566	4.4	775.4	775.4	776.1	0.7
L	42,515	279	2,566	4.4	776.7	776.7	777.4	0.7
M	43,088	349	4,696	2.4	782.2	782.2	783.2	1.0
N	45,351	217	2,337	4.8	785.8	785.8	786.3	0.5

[1]Feet above confluence with Fishing River

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

EAST FORK FISHING RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
East Fork Fishing River Tributary 2								
A	2,000	197	2,273	1.2	759.0	757.9[2]	757.9	0.0
B	4,036	129	1,971	1.1	768.2	768.2	768.3	0.1
C	4,893	62	660	3.4	768.2	768.2	768.3	0.1

[1]Feet above confluence with East Fork Fishing River
[2]Elevation computed without considering backwater effects from East Fork Fishing River

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

EAST FORK FISHING RIVER TRIBUTARY 2

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
East Fork Line Creek								
F	8,389	355	2668	2.9	845.7	845.7	845.7	0.0
G	9,960	111	952	7.0	847.2	847.2	847.2	0.0
H	11,468	149	770	8.7	852.6	852.6	852.7	0.1
I	13,983	70	551	12.1	859.4	859.4	859.5	0.1
J	15,538	259	913	7.3	870.9	870.9	871.0	0.1
K	17,158	182	751	5.2	877.0	877.0	877.9	0.9
L	18,516	282	597	6.5	883.9	883.9	883.9	0.0
M	20,246	61	285	9.4	895.4	895.4	895.5	0.1
N	21,306	193	692	3.9	904.8	904.8	904.8	0.0
O	22,658	43	227	6.2	916.0	916.0	916.0	0.0
P	23,394	70	333	4.2	930.2	930.2	930.6	0.4
Q	24,252	56	167	8.3	946.8	946.8	946.8	0.0

[1]Stream distance in feet above confluence with Line Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

EAST FORK LINE CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
East Fork Line Creek Tributary 1								
A	162	119	419	6.2	875.6	874.2[2]	874.2	0.0
B	1,249	121	427	5.9	880.6	880.6	881.2	0.6
C	2,020	396	7798	0.3	909.3	909.3	910.3	1.0
D	2,611	220	3673	0.7	909.3	909.3	910.3	1.0
E	3,120	170	1970	1.3	909.3	909.3	910.3	1.0

[1]Stream distance in feet above confluence with East Fork Line Creek
[2]Elevation computed without consideration of backwater effects from East Fork Line Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

EAST FORK LINE CREEK TRIBUTARY 1

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
East Fork Line Creek Tributary 1.2								
A	252	23	91	4.8	905.9	902.6[2]	903.1	0.5
B	491	19	48	9.1	905.9	905.4[2]	905.4	0.0
C	795	30	87	5.0	909.7	909.7	909.9	0.2
D	1,267	32	161	2.7	917.3	917.3	917.3	0.0

[1]Stream distance in feet above confluence with East Fork Line Creek
[2]Elevation computed without consideration of overflow effects from East Fork Line Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

EAST FORK LINE CREEK TRIBUTARY 1.2

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
East Fork Shoal Creek								
A	7,495	254	1,638	7.9	806.1	806.1	806.1	0.0
B	8,573	337	2,471	5.3	811.6	811.6	812.0	0.4
C	10,117	155	1,028	12.6	816.5	816.5	817.4	0.9
D	10,933	154	1,769	7.3	821.5	821.5	821.8	0.3
E	12,031	196	2,529	5.1	824.4	824.4	824.5	0.1
F	13,949	225	1,588	8.2	826.9	826.9	826.9	0.0
G	15,255	182	1,377	9.3	836.0	836.0	836.5	0.5
H	17,205	299	1,695	7.5	841.3	841.3	842.3	1.0
I	19,268	273	1,219	9.8	848.3	848.3	848.6	0.3
J	20,720	371	2,364	5.0	856.1	856.1	857.0	0.9
K	22,395	126	721	6.4	862.0	862.0	862.0	0.0
L	23,696	128	882	5.2	870.1	870.1	870.5	0.4
M	24,794	103	791	5.8	874.9	874.9	875.0	0.1
N	26,573	229	1,082	4.2	884.1	884.1	884.3	0.2
O	28,192	255	739	5.9	891.6	891.6	891.8	0.2
P	29,558	164	778	4.9	897.0	897.0	897.4	0.4
Q	30,532	159	514	7.2	901.5	901.5	901.5	0.0
R	31,634	312	1,230	2.9	908.1	908.1	908.1	0.0
S	32,633	182	959	3.7	913.4	913.4	914.1	0.7
T	33,371	159	631	5.1	914.6	914.6	915.2	0.6
U	34,596	134	488	6.6	922.4	922.4	922.5	0.1
V	36,682	160	395	3.5	935.1	935.1	935.3	0.2

[1]Feet above confluence with Shoal Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO
AND INCORPORATED AREAS

FLOODWAY DATA

EAST FORK SHOAL CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
East Fork Shoal Creek (cont.)								
W	37,348	336	562	2.4	938.8	938.8	939.5	0.6
X	37,752	35	169	8.1	944.1	944.1	944.9	0.8
Y	38,639	59	188	7.3	950.0	950.0	950.1	0.1
Z	40,156	76	218	6.3	958.5	958.5	958.6	0.1

[1]Feet above confluence with Shoal Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO
AND INCORPORATED AREAS

FLOODWAY DATA

EAST FORK SHOAL CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
East Fork Shoal Creek Tributary 1								
A	1,006	168	726	9.7	853.8	853.8	853.8	0.0
B	2,445	304	1,525	4.6	860.1	860.1	860.3	0.2
C	3,493	260	1,381	5.1	865.9	865.9	866.0	0.1
D	5,406	113	538	8.7	869.2	869.2	869.7	0.5
E	6,853	58	366	12.8	878.2	878.2	878.5	0.3
F	7,606	120	881	5.3	888.4	888.4	888.5	0.1
G	9,206	67	400	6.9	890.6	890.6	890.9	0.3
H	11,206	78	395	7.0	903.9	903.9	903.9	0.0
I	12,464	58	351	6.7	912.6	912.6	912.7	0.1
J	13,336	165	876	2.7	919.1	919.1	919.3	0.2
K	14,299	58	247	9.5	923.9	923.9	923.9	0.0
L	16,006	123	424	5.6	941.6	941.6	941.7	0.1

[1]Feet above confluence with East Fork Shoal Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

EAST FORK SHOAL CREEK TRIBUTARY 1

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
East Fork Shoal Creek Tributary 2								
A	2,022	41	184	11.1	800.9	800.9	801.6	0.7
B	2,577	81	927	2.2	814.7	814.7	815.4	0.7
C	4,077	58	373	5.3	815.4	815.4	816.1	0.7
D	5,077	60	362	5.5	821.0	821.0	821.3	0.3
E	5,769	33	170	10.6	829.1	829.1	829.3	0.2
F	6,293	51	370	4.9	837.9	837.9	837.9	0.0
G	7,177	119	785	2.3	850.2	850.2	850.2	0.0
H	7,654	72	290	5.6	851.3	851.3	851.7	0.4
I	8,077	149	721	2.3	858.3	858.3	858.9	0.6

[1]Feet above confluence with East Fork Shoal Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

EAST FORK SHOAL CREEK TRIBUTARY 2

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
East Fork Shoal Creek Tributary 3								
A	1,669	43	174	10.2	797.7	797.7	797.7	0.0
B	3,278	77	220	7.8	815.6	815.6	815.6	0.0
C	4,980	50	190	9.0	835.3	835.3	835.3	0.0
D	8,480	88	296	5.3	848.4	848.4	848.7	0.3
E	9,523	161	584	2.4	854.4	854.4	854.4	0.0
F	10,528	110	282	4.9	857.4	857.4	857.7	0.3
G	11,176	112	277	5.0	862.8	862.8	862.8	0.0
H	11,980	52	324	4.3	872.0	872.0	872.8	0.8
I	12,910	51	199	5.8	875.7	875.7	876.0	0.3
J	14,427	44	208	5.6	881.8	881.8	882.1	0.3
K	15,441	93	794	1.5	895.4	895.4	895.4	0.0

[1]Feet above confluence with East Fork Shoal Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

EAST FORK SHOAL CREEK TRIBUTARY 3

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
First Creek								
A	421	53	387	10.5	819.3	815.1[3]	815.5	0.4
B	1,476	111	1154	3.5	821.8	821.8	821.9	0.1
C	3,377	74	663	6.2	823.4	823.4	823.7	0.3
D	4,733	56	325	12.5	829.0	829.0	829.0	0.0
E	6,807	70	703	5.8	840.8	840.8	840.9	0.1
F	8,136	142	961	4.2	842.9	842.9	843.1	0.2
G	9,758	370	479	8.4	846.4	846.4	846.6	0.2
H	11,061	403	1207	3.3	852.8	852.8	852.9	0.1
I	12,233	354	959	4.1	855.5	855.5	855.6	0.1
L	18,854	104	1005	4.3	875.4	875.4	876.2	0.8
AB	49,804	63 / 56[2]	261	3.7	990.0	990.0	990.0	0.0
AC	50,260	53	211	4.6	991.6	991.6	991.6	0.0

[1]Stream distance in feet above confluence with Second Creek
[2]Total Width / Width within Clay County
[3]Elevation computed without consideration of backwater effects from Second Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCOPORATED AREAS

FLOODWAY DATA

FIRST CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
First Creek Tributary 1								
E	2,523	133	1405	1.7	977.6	977.6	977.6	0.0
F	3,493	198	1657	1.5	977.8	977.8	977.9	0.1
G	4,351	69	628	3.8	978.1	978.1	978.2	0.1
H	5,140	65	519	4.6	978.8	978.8	979.1	0.3
I	6,078	62	486	4.9	980.3	980.3	980.9	0.6
J	7,070	74	478	5.0	983.9	983.9	984.8	0.9
K	7,824	43	327	7.3	985.8	985.8	986.6	0.8
L	8,147	69	685	3.5	992.0	992.0	992.2	0.2
M	8,710	77	596	4.0	992.5	992.5	992.9	0.4
N	9,350	38	317	7.5	992.6	992.6	993.2	0.6

[1]Stream distance in feet above confluence with First Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

FIRST CREEK TRIBUTARY 1

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Fishing River								
A	5,366	3,367	24,761	2.3	736.9	736.9	737.6	0.7
B	8,161	2,249	17,928	3.2	741.5	741.5	741.8	0.3
C	13,082	3,101	21,877	2.6	742.2	742.2	743.1	0.9
D	15,769	3,474	21,064	2.7	743.2	743.2	744.0	0.8
E	22,609	3,494	22,290	2.3	745.3	745.3	746.1	0.8
F	24,536	3,841	17,506	2.9	746.0	746.0	746.8	0.8
G	27,554	2,885	11,190	4.5	748.0	748.0	748.4	0.4
H	30,976	3,954	26,693	1.9	750.8	750.8	751.5	0.7
I	36,196	4,818	30,437	1.7	752.5	752.5	753.0	0.5
J	39,523	2,600	31,037	1.4	761.3	761.3	761.4	0.1
K	43,039	2,500	25,733	1.7	761.5	761.5	761.8	0.3
L	45,570	2,423	17,270	2.5	761.7	761.7	762.2	0.4
M	48,359	2,544	16,077	2.7	764.8	764.8	765.1	0.3
N	53,466	3,129	29,359	1.5	766.2	766.2	767.1	0.9
O	56,072	1,500	21,243	2.0	775.2	775.2	775.5	0.3
P	59,613	1,172	14,137	1.5	775.3	775.3	775.8	0.5
Q	63,791	1,410	14,385	1.5	775.5	775.5	776.3	0.8
R	65,132	1,354	14,015	1.5	775.6	775.6	776.5	0.9
S	67,029	985	5,872	3.6	775.7	775.7	776.7	1.0
T	68,534	248	4,030	5.3	778.7	778.7	779.1	0.4
U	71,265	441	5,019	4.2	779.9	779.9	780.7	0.8
V	73,309	640	7,252	2.9	781.0	781.0	781.9	0.9

[1]Feet above Clay County boundary

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

FISHING RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Fishing River								
W	75,220	352	5,457	3.9	781.8	781.8	782.7	0.9
X	77,256	219	3,425	6.2	782.3	782.3	783.2	0.9
Y	79,562	229	3,649	5.8	784.3	784.3	785.1	0.8
Z	82,070	342	5,262	4.0	786.2	786.2	786.9	0.7
AA	83,567	289	4,951	4.3	788.2	788.2	789.1	0.9
AB	85,008	545	8,199	2.6	790.0	790.0	790.8	0.8
AC	88,064	298	4,194	5.0	791.2	791.2	792.0	0.8
AD	89,545	193	3,052	6.9	792.5	792.5	793.3	0.8
AE	91,547	345	4,347	4.9	794.3	794.3	794.8	0.5
AF	93,565	384	2,129	9.9	796.1	796.1	796.6	0.5
AG	94,854	555	4,655	4.5	799.6	799.6	800.0	0.4
AH	98,006	662	6,358	3.3	804.8	804.8	805.8	1.0
AI	100,143	254	2,110	10.0	807.8	807.8	808.8	1.0
AJ	102,080	225	2,230	9.5	815.7	815.7	815.8	0.1
AK	104,592	810	7,201	2.9	820.8	820.8	820.9	0.1
AL	105,930	275	3,819	5.5	825.5	825.5	825.6	0.1
AM	107,749	911	10,485	2.0	827.0	827.0	827.2	0.2
AN	109,792	641	7,397	2.9	827.3	827.3	827.6	0.3
AO	113,078	126	1,495	8.2	831.9	831.9	831.9	0.0
AP	115,509	337	3,749	3.3	835.4	835.4	835.6	0.2
AQ	117,187	350	2,756	4.2	837.5	837.5	837.7	0.2
AR	119,541	198	1,343	8.6	843.5	843.5	843.5	0.0

[1]Feet above Clay County boundary

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

FISHING RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Fishing River								
AS	121,594	279	1862	6.1	849.4	849.4	849.6	0.2
AT	123,772	419	3019	3.7	855.2	855.2	855.4	0.2
AU	125,461	102	982	8.7	858.5	858.5	859.4	0.9
AV	128,016	313	1659	5.2	865.0	865.0	865.0	0.0
AW	130,202	81	477	6.6	876.8	876.8	876.9	0.1
AX	131,783	105	468	6.7	880.7	880.7	880.7	0.0
AY	133,601	178	575	5.4	889.9	889.9	889.9	0.0
AZ	135,701	143	435	7.2	899.4	899.4	899.5	0.1
BA	137,197	75	255	10.4	907.4	907.4	907.4	0.0
BB	138,443	124	568	4.7	914.3	914.3	914.3	0.0
BC	140,068	190	691	3.9	919.0	919.0	919.0	0.0
BD	142,621	154	532	5.0	924.4	924.4	924.4	0.0
BE	145,164	29	112	4.7	931.5	931.5	931.6	0.1
BF	147,112	59	85	6.2	954.0	954.0	954.1	0.1
BG	148,165	77	87	6.1	974.1	974.1	974.1	0.0

[1]Feet above Clay County boundary

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

FISHING RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Fishing River Tributary 1								
A	1,961	110	526	5.9	882.0	882.0	882.1	0.1
B	4,500	70	387	8.0	891.6	891.6	891.6	0.0
C	7,168	139	540	4.5	902.6	902.6	902.8	0.2
D	9,408	46	293	8.3	910.5	910.5	911.5	1.0
E	10,912	95	478	4.5	917.8	917.8	918.4	0.6
F	14,651	33	272	7.9	937.2	937.2	937.4	0.2
G	16,702	87	693	3.1	956.3	956.3	957.2	0.9

[1]Feet above confluence with Fishing River

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

FISHING RIVER TRIBUTARY 1

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Fishing River Tributary 1.1								
A	2,037	99	246	7.3	885.1	885.1	885.4	0.3
B	3,002	49	233	7.7	888.7	888.7	888.9	0.2
C	5,529	101	243	7.3	906.9	906.9	906.9	0.0
D	7,211	128	348	5.1	919.9	919.9	920.6	0.7
E	8,575	81	221	8.1	928.0	928.0	928.0	0.0

[1]Feet above confluence with Fishing River Tributary 1

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

FISHING RIVER TRIBUTARY 1.1

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Fishing River Tributary 1.2								
A	435	31	121	5.4	918.1	917.9[2]	918.5	0.6
B	961	29	100	6.6	923.8	923.8	923.8	0.0
C	2,752	62	144	4.6	940.5	940.5	941.1	0.6
D	4,065	29	73	9.0	954.9	954.9	955.4	0.5
E	5,115	38	81	8.1	964.7	964.7	964.7	0.0

[1]Feet above confluence with Fishing River Tributary 1

[2]Elevation computed without consideration of backwater effects from Fishing River Tributary 1

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

FISHING RIVER TRIBUTARY 1.2

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Fishing River Tributary 16								
A	516	74	965	4.3	781.4	771.4[2]	772.3	0.9
B	2,165	86	925	4.5	781.4	772.9[2]	773.8	0.9
C	4,336	148	1,300	2.8	781.4	775.3[2]	776.3	1.0
D	6,163	100	993	3.1	782.9	782.9	783.9	1.0
E	7,422	60	696	4.4	784.3	784.3	785.1	0.8
F	8,214	71	696	4.4	785.2	785.2	786.2	1.0
G	8,672	95	986	3.1	787.0	787.0	788.0	1.0
H	9,666	101	977	1.9	787.7	787.7	788.6	0.9
I	10,872	86	639	2.9	788.5	788.5	789.4	0.9
J	11,704	57	715	2.6	791.5	791.5	792.3	0.8
K	12,387	45	372	5.1	791.8	791.8	792.5	0.7
L	13,029	60	722	2.6	798.3	798.3	798.9	0.6
M	13,797	87	826	2.3	798.6	798.6	799.2	0.6
N	14,168	55	1,042	1.8	805.3	805.3	805.8	0.5
O	15,527	60	726	2.6	805.3	805.3	806.1	0.8
P	16,068	45	545	3.5	805.7	805.7	806.4	0.7
Q	16,435	69	707	2.7	810.5	810.5	811.4	0.9
R	17,242	49	504	3.7	818.4	818.4	819.4	1.0

[1]Feet above confluence with Fishing River

[2]Elevations computed without consideration of backwater effects from Fishing River

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

FISHING RIVER TRIBUTARY 16

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Holmes Creek								
A	12,060	138	1,430	3.9	775.2	767.1[2]	767.5	0.4
B	14,037	179	1,723	3.2	775.3	769.2[2]	769.6	0.4
C	14,919	84	922	6.1	775.3	769.7[2]	770.2	0.5
D	15,966	116	1,110	5.0	775.3	770.8[2]	771.3	0.5
E	16,941	127	1,215	4.6	775.3	772.2[2]	772.9	0.7
F	17,891	97	994	5.6	775.3	773.0[2]	773.6	0.6
G	18,800	248	2,034	2.8	775.3	774.7[2]	775.4	0.7
H	19,499	173	1,250	3.8	775.3	775.0[2]	775.7	0.7
I	21,424	66	772	6.1	785.1	785.1	785.6	0.5
J	22,485	55	451	10.5	785.8	785.8	786.0	0.2
K	23,470	65	455	9.0	788.5	788.5	789.3	0.8
L	24,558	145	1,044	3.9	795.3	795.3	795.8	0.5
M	25,516	43	344	11.9	800.6	800.6	800.8	0.2
N	26,536	231	2,192	1.7	805.9	805.9	806.5	0.6
O	27,480	351	725	5.1	805.9	805.9	806.5	0.6
P	29,009	104	822	4.5	814.4	814.4	814.7	0.3
Q	30,274	66	479	6.1	818.0	818.0	818.4	0.4
R	30,979	92	619	4.7	819.2	819.2	819.8	0.6
S	31,801	46	305	9.6	820.2	820.2	820.7	0.5
T	32,833	42	286	10.2	822.9	822.9	823.4	0.5
U	33,567	114	560	5.2	827.7	827.7	828.2	0.5
V	34,051	106	390	4.1	828.6	828.6	829.1	0.5

[1]Feet above confluence with Fishing River
[2]Elevation computed without considering overflow effects from Fishing River

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

HOLMES CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Little Platte River								
A	50,612	968	9,047	4.9	810.1	810.1	811.0	0.9
B	53,030	939	5,498	6.9	810.9	810.9	811.8	0.9
C	55,356	624	6,816	5.2	812.2	812.2	813.0	0.8
D	57,587	393	3,810	5.1	813.3	813.3	814.0	0.7
E	58,489	207	2,831	5.5	813.8	813.8	814.6	0.8
F	59,473	659	5,105	4.5	814.5	814.5	815.3	0.8
G	64,022	499	3,422	1.4	815.3	815.3	816.2	0.9
H	67,264	477	4,015	1.4	815.5	815.5	816.3	0.8
I	69,841	148	2,006	1.6	815.6	815.6	816.5	0.9

[1]Stream distance in feet above confluence with Platte River

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

LITTLE PLATTE RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Little Shoal Creek								
A	5,522	1,019	10,337	0.5	745.0	745.0	745.0	0.0
B	7,713	464	3,377	3.3	746.2	746.2	746.5	0.3
C	9,650	321	2,471	4.5	748.6	748.6	749.1	0.5
D	11,845	372	3,256	3.5	752.3	752.3	752.8	0.5
E	14,387	573	3,585	3.0	754.3	754.3	754.5	0.2
F	16,090	165	1,356	6.8	756.1	756.1	756.1	0.0
G	16,770	550	5,185	2.1	760.2	760.2	761.0	0.8
H	18,359	339	3,667	3.0	762.8	762.8	763.1	0.3
I	19,525	409	3,168	2.7	762.9	762.9	763.5	0.6
J	20,633	288	2,233	3.5	763.8	763.8	764.3	0.5
K	22,635	329	2,390	3.2	765.7	765.7	766.0	0.3
L	23,977	215	1,959	3.9	768.1	768.1	768.6	0.5
M	25,635	183	1,283	6.0	769.5	769.5	770.3	0.8
N	26,903	500	3,837	2.0	773.3	773.3	773.8	0.5
O	28,419	217	1,163	6.6	776.3	776.3	776.3	0.0
P	28,635	288	3,116	2.5	784.2	784.2	784.8	0.6
Q	30,635	124	1,080	6.9	784.7	784.7	785.5	0.8
R	31,974	345	1,223	6.1	787.9	787.9	788.1	0.2
S	32,135	150	1,422	5.2	792.6	792.6	792.9	0.3
T	32,594	290	3,287	2.3	800.8	800.8	801.0	0.2
U	34,049	397	2,046	3.6	800.9	800.9	801.1	0.2
V	35,783	168	933	3.7	804.9	802.5[2]	802.7	0.2

[1]Feet above confluence with Shoal Creek

[2]Elevation computed without considering overflow effects from Little Shoal Creek Tributary 1

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

LITTLE SHOAL CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Little Shoal Creek								
W	38,570	127	611	5.7	808.4	808.4	808.5	0.1
X	41,244	166	1,073	3.3	815.8	815.8	816.1	0.3
Y	44,005	67	448	7.1	829.4	829.4	829.6	0.2
Z	44,959	40	256	12.4	836.3	836.3	836.3	0.0
AA	46,021	328	3,621	0.9	846.2	846.2	846.9	0.7
AB	47,985	78	500	5.9	846.8	846.8	847.3	0.5
AC	49,197	103	386	7.6	851.2	851.2	851.2	0.0
AD	51,400	136	452	6.0	862.5	862.5	862.5	0.0
AE	52,246	100	558	4.8	867.7	867.7	867.8	0.0
AF	54,140	45	271	8.1	876.9	876.9	876.9	0.0
AG	55,634	52	215	10.2	885.8	885.8	885.8	0.0
AH	57,740	140	438	5.0	905.3	905.3	905.8	0.5

[1]Feet above confluence with Shoal Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

LITTLE SHOAL CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Little Shoal Creek Tributary 1								
A	1,044	237	1,785	2.5	804.6	804.6	804.7	0.1
B	2,619	208	818	5.4	805.5	805.5	805.6	0.1
C	4,444	191	961	4.6	810.3	810.3	810.4	0.1
D	5,024	170	909	4.9	814.3	814.3	814.3	0.0
E	6,635	135	876	5.1	820.4	820.4	821.3	0.9
F	8,398	229	1,570	2.5	828.9	828.9	828.9	0.0
G	9,897	197	1,542	2.6	832.7	832.7	833.1	0.4
H	11,189	140	438	3.1	833.8	833.8	834.5	0.7
I	12,438	61	174	7.9	843.6	843.6	843.7	0.1
J	13,808	93	249	5.5	856.5	856.5	856.7	0.2
K	14,820	147	1,666	0.8	874.9	874.9	875.2	0.3
L	16,195	115	974	1.4	896.3	896.3	896.7	0.4
M	17,546	96	270	5.1	901.3	901.3	901.5	0.2

[1]Feet above confluence with Little Shoal Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

LITTLE SHOAL CREEK TRIBUTARY 1

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Little Shoal Creek Tributary 5								
A	2,751	112	820	5.3	764.7	764.7	765.2	0.5
B	4,856	70	529	8.2	770.0	770.0	771.0	1.0
C	6,535	89	881	4.9	780.5	780.5	781.0	0.5
D	8,408	90	799	3.7	792.2	792.2	792.5	0.3
E	10,698	135	1,479	1.8	815.6	815.6	816.3	0.7
F	12,038	76	735	3.6	832.5	832.5	833.0	0.5
G	13,284	488	3,303	0.8	843.2	843.2	844.1	0.9

[1]Feet above confluence with Little Shoal Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

LITTLE SHOAL CREEK TRIBUTARY 5

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Little Shoal Creek Tributary 6								
A	2,982	76	455	0.8	772.8	772.8	772.9	0.1
B	4,185	39	188	1.9	777.7	777.7	777.8	0.1
C	5,192	43	443	0.8	789.3	789.3	789.3	0.0
D	6,519	48	831	0.4	811.9	811.9	812.3	0.4
E	7,416	26	48	7.4	822.4	822.4	822.4	0.0
F	7,812	22	44	8.0	830.3	830.3	830.3	0.0

[1]Feet above confluence with Little Shoal Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

LITTLE SHOAL CREEK TRIBUTARY 6

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Little Shoal Creek Tributary 7								
A	3,228	50	366	5.6	764.2	764.2	764.8	0.6
B	3,999	76	797	2.6	773.1	773.1	773.1	0.0
C	5,999	80	584	3.5	779.2	779.2	780.2	1.0
D	7,620	53	312	6.1	782.4	782.4	782.8	0.4
E	10,499	53	367	3.6	790.8	790.8	791.1	0.3
F	11,283	45	410	3.2	797.5	797.5	797.5	0.0

[1]Feet above confluence with Little Shoal Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

LITTLE SHOAL CREEK TRIBUTARY 7

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Mill Creek								
A	2,026	115	665	12.8	761.8	761.8	761.8	0.0
B	3,516	68	854	9.9	775.9	775.9	776.0	0.1
C	7,279	732	5,211	1.6	782.5	782.5	783.2	0.7
D	10,492	159	2,317	3.7	790.5	790.5	791.2	0.7
E	14,069	236	2,122	4.0	795.1	795.1	795.6	0.5
F	15,891	439	5,438	1.7	806.6	806.6	807.2	0.6
G	18,050	315	1,284	7.3	808.4	808.4	808.4	0.0
H	18,519	183	1,475	6.4	811.4	811.4	811.4	0.0
I	19,800	250	1,683	5.6	814.1	814.1	815.1	1.0
J	20,527	148	1,068	8.8	816.8	816.8	816.8	0.0
K	21,375	96	830	11.3	819.8	819.8	819.9	0.1
L	22,330	222	2,159	4.4	827.6	827.6	827.6	0.0
M	22,531	212	1,582	5.9	827.6	827.6	828.4	0.8
N	23,722	224	1,992	2.0	828.8	828.8	829.8	1.0
O	25,661	23	230	17.2	832.7	832.7	832.7	0.0
P	26,938	75	769	5.2	841.4	841.4	841.7	0.3
Q	29,118	67	370	10.7	848.6	848.6	848.7	0.1
R	31,197	62	467	8.5	864.4	864.4	864.8	0.4
S	33,346	70	479	7.3	872.6	872.6	872.6	0.0
T	35,194	86	408	7.0	884.5	884.5	885.2	0.7
U	35,480	41	292	10.5	886.7	886.7	887.7	1.0
V	35,842	79	557	5.5	891.5	891.5	891.9	0.4

[1]Feet above confluence with Shoal Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

MILL CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Mill Creek (cont.)								
W	37,029	83	514	6.0	894.3	894.3	894.6	0.3
X	37,782	98	365	8.4	898.6	898.6	898.6	0.0
Y	38,089	195	520	5.9	904.9	904.9	905.4	0.5
Z	38,890	82	596	4.2	911.8	911.8	912.5	0.7
AA	40,290	159	749	1.2	917.7	917.7	918.6	0.9
AB	41,397	34	101	9.0	926.1	926.1	926.2	0.1
AC	42,092	46	182	5.0	937.0	937.0	937.0	0.0
AD	42,754	43	146	6.2	947.4	947.4	947.4	0.0

[1]Feet above confluence with Shoal Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

MILL CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Mill Creek Tributary 1 A	1,651	27	84	7.9	817.3	817.3	817.3	0.0

[1]Feet above confluence with Mill Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

MILL CREEK TRIBUTARY 1

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH[4] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY[2]	WITHOUT FLOODWAY[3]	WITH FLOODWAY	INCREASE
Missouri River								
UL	339.66	7,081/4,832	78,360	5.2	717.3	716.9	717.8	0.9
UM	340.32	7,168/5,778	67,210	6.0	718.1	717.7	718.5	0.8
UN	341.06	4,746/2,735	63,021	6.4	719.0	719.3	719.9	0.6
UO	341.88	3,722/662	46,856	8.6	720.3	720.1	720.5	0.4
UP	342.49	4,089/898	65,126	6.2	721.0	721.6	722.1	0.5
UQ	343.09	3,755/1,048	52,925	7.7	721.7	721.6	722.2	0.6
UR	343.57	3,734/690	55,470	7.3	722.3	722.6	723.0	0.4
US	344.13	4,196/715	54,934	7.4	723.0	722.9	723.6	0.7
UT	344.74	3,935/636	55,403	7.3	723.7	724.0	724.5	0.5
UU	345.68	3,119/527	50,349	8.0	725.1	725.3	725.6	0.3
UV	346.54	3,420/908	58,653	6.9	726.0	726.6	726.8	0.2
UW	347.39	4,958/3,174	58,555	6.9	726.9	727.1	727.4	0.3
UX	348.25	6,561/5,126	83,149	4.9	727.8	728.1	728.8	0.7
UY	349.20	8,499/7,036	103,939	3.9	729.1	728.9	729.8	0.9
UZ	349.90	8,549/7,235	92,411	4.4	729.9	729.4	730.2	0.8
VA	350.50	6,223/5,807	71,879	5.6	730.6	730.1	730.8	0.7
VB	351.15	4,358/4,356	65,127	6.2	731.2	731.2	731.6	0.4
VC	351.93	1591/0[5]	42,710	9.5	732.0	731.8	732.3	0.5
VD	352.57	1776/0[5]	42,644	9.5	732.5	732.2	732.9	0.7
VE	352.64	1396/0[5]	40,103	10.1	732.5	732.4	732.9	0.5
VF	352.66	1403/0[5]	39,478	10.3	732.5	732.5	733.0	0.5
VG	352.74	1755/0[5]	36,658	11.1	732.6	732.5	732.9	0.4
VH	352.80	1870/0[5]	39,116	10.4	732.6	732.5	733.0	0.5

[1]Miles above confluence with Mississippi River

[2]Elevation produced by the original UNET model

[3]Elevation produced by the calibrated HEC-RAS model used for the floodway run

[4]Width/Width within Clay County

[5]Floodway not within Clay County

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

MISSOURI RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH[4] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY[2]	WITHOUT FLOODWAY[3]	WITH FLOODWAY	INCREASE
Missouri River (Cont.)								
VI	353.16	2,712/1,915	50,356	8.0	732.9	733.5	734.0	0.5
VJ	353.45	2,772/2,095	46,362	8.7	733.3	733.6	734.1	0.5
VK	353.82	1,967/1,117	43,750	9.3	733.8	733.8	734.3	0.5
VL	354.20	2,923/2,459	49,215	8.2	734.2	734.4	734.9	0.5
VM	354.62	4,048/3,345	68,024	6.0	734.7	735.1	735.6	0.5
VN	355.01	4,372/3,630	57,722	7.0	735.1	735.1	735.3	0.2
VO	355.39	5,954/5,297	56,289	7.2	735.6	735.4	735.8	0.4
VP	355.76	6,444/5,647	60,331	6.7	736.1	736.1	736.6	0.5
VQ	356.10	7,163/6,305	62,854	6.4	736.5	736.4	736.8	0.4
VR	356.43	6,991/6,290	55,747	7.3	736.9	736.5	736.9	0.4
VS	356.76	6,830/6,166	56,955	7.1	737.2	737.1	737.5	0.4
VT	357.06	6,126/6,011	56,563	7.2	737.5	737.4	737.6	0.2
VU	357.30	5,488/4,206	57,878	7.0	737.8	737.8	738.0	0.2
VV	357.63	6,495/3,357	78,285	5.2	738.2	738.4	738.9	0.5
VW	357.94	4,921/3,350	62,719	6.5	738.6	738.8	739.3	0.5
VX	358.26	3,464/1,782	48,764	8.2	739.0	738.8	739.3	0.5
VY	358.57	2,632/934	55,760	7.2	739.4	739.7	740.1	0.4
VZ	358.91	2,506/601	52,378	7.7	739.8	739.9	740.3	0.4
WA	359.26	2,700/695	49,138	8.2	740.3	740.1	740.5	0.4
WB	359.32	2,785/686	52,690	7.6	740.4	740.6	740.9	0.3
WC	359.33	2,724/702	50,381	8.0	740.4	740.7	741.0	0.3
WD	359.39	2,686/651	47,606	8.4	740.5	740.7	741.1	0.4
WE	359.55	2,712/793	43,761	9.2	740.8	740.7	741.1	0.4
WF	359.84	2,685/808	46,324	8.7	741.2	741.4	741.8	0.4

[1]Miles above confluence with Mississippi River

[2]Elevation produced by the original UNET model

[3]Elevation produced by the calibrated HEC-RAS model used for the floodway run

[4]Width/Width within Clay County

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

MISSOURI RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH[4] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY[2]	WITHOUT FLOODWAY[3]	WITH FLOODWAY	INCREASE
Missouri River (Cont.)								
WG	360.15	2,696/866	51,076	7.9	741.7	742.1	742.4	0.3
WH	360.22	2,712/972	54,543	7.4	741.8	742.3	742.6	0.3
WI	360.25	2,712/1,008	52,807	7.6	741.9	742.4	742.7	0.3
WJ	360.29	2,699/1,008	50,364	8.0	741.9	742.4	742.6	0.2
WK	360.60	2,283/710	45,143	8.9	742.4	742.6	742.8	0.2
WL	360.91	2,315/675	44,705	9.0	742.9	742.9	743.2	0.3
WM	361.23	2,379/699	48,469	8.3	743.4	743.5	743.8	0.3
WN	361.54	2,395/639	48,955	8.2	743.8	743.8	744.1	0.3
WO	361.84	2,393/704	48,454	8.3	744.2	744.1	744.4	0.3
WP	362.17	2,416/648	62,038	6.5	744.7	744.9	745.1	0.2
WQ	362.25	2,472/527	53,374	7.5	744.8	744.9	745.0	0.1
WR	362.27	2,507/538	53,435	7.5	744.8	744.9	745.0	0.1
WS	362.33	2,507/483	53,732	7.5	744.9	744.9	745.1	0.2
WT	362.54	2,615/526	57,560	7.0	745.1	745.5	745.7	0.2
WU	362.85	2,867/782	62,000	6.5	745.5	745.9	746.1	0.2
WV	363.14	2,489/835	59,654	6.7	745.9	746.0	746.2	0.2
WW	363.43	2,192/734	44,449	9.0	746.2	746.0	746.1	0.1
WX	363.73	1,786/652	47,918	8.4	746.6	746.7	746.9	0.2
WY	364.05	1,648/729	47,118	8.5	747.0	747.1	747.3	0.2
WZ	364.34	1,484/714	47,569	8.4	747.5	747.5	747.6	0.1
XA	364.65	1,512/711	46,563	8.6	748.0	747.7	747.9	0.2
XB	364.73	1,501/710	48,869	8.2	748.1	748.0	748.2	0.2
XC	364.75	1,537/732	45,715	8.8	748.1	748.0	748.2	0.2
XD	364.78	1,513/721	43,919	9.1	748.2	748.0	748.2	0.2

[1]Miles above confluence with Mississippi River

[2]Elevation produced by the original UNET model

[3]Elevation produced by the calibrated HEC-RAS model used for the floodway run

[4]Width/Width within Clay County

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

MISSOURI RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH[4] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY[2]	WITHOUT FLOODWAY[3]	WITH FLOODWAY	INCREASE
Missouri River (Cont.)								
XE	365.10	1,522/737	46,464	8.6	748.7	748.6	748.7	0.1
XF	365.43	1,516/750	45,521	8.8	749.1	748.9	749.1	0.2
XG	365.52	1,588/770	48,886	8.2	749.2	749.2	749.4	0.2
XH	365.56	1,605/813	50,641	7.9	749.2	749.4	749.6	0.2
XI	365.60	1,517/806	52,806	7.6	749.3	749.6	749.8	0.2
XJ	365.84	1,587/812	49,207	8.2	749.6	749.7	749.9	0.2
XK	366.06	1,461/819	44,876	8.9	749.9	749.7	749.9	0.2
XL	366.12	1,470/804	44,708	9.0	750.0	749.8	749.9	0.1
XM	366.15	1,480/814	43,786	9.2	750.0	749.9	750.1	0.2
XN	366.18	1,467/803	41,842	9.6	750.0	750.0	750.1	0.1
XO	366.20	1,469/810	45,451	8.8	750.1	750.0	750.3	0.3
XP	366.23	1,469/790	47,090	8.5	750.1	750.2	750.5	0.3
XQ	366.48	1,708/900	53,523	7.5	750.4	750.6	750.9	0.3
XR	366.75	2,014/1,532	61,106	4.7	750.8	751.4	751.6	0.2
XS	367.03	2,481/1,978	59,017	4.9	751.2	751.4	751.7	0.3
XT	367.57	2,836/1,727	59,206	4.9	751.6	751.7	752.0	0.3
XU	367.89	2,037/1,496	45,763	6.3	751.8	751.8	752.0	0.2
XV	368.19	1,835/1,357	42,792	6.8	752.1	752.1	752.3	0.2
XW	368.48	1,752/1,142	47,413	6.1	752.5	752.6	752.8	0.2
XX	368.73	1,739/1,052	49,965	5.8	752.8	752.9	753.1	0.2

[1]Miles above confluence with Mississippi River

[2]Elevation produced by the original UNET model

[3]Elevation produced by the calibrated HEC-RAS model used for the floodway run

[4]Width/Width within Clay County

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

MISSOURI RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH[4] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY[2]	WITHOUT FLOODWAY[3]	WITH FLOODWAY	INCREASE
Missouri River (Cont.)								
XY	369.05	1,714/942	45,013	6.4	753.1	753.1	753.3	0.2
XZ	369.38	1,875/797	46,320	6.2	753.5	753.4	753.6	0.2
YA	369.66	1,922/716	48,821	5.9	753.8	753.7	753.9	0.2
YB	369.96	1,796/568	44,886	6.4	754.2	753.9	754.1	0.2
YC	370.26	1,789/535	46,715	6.2	754.5	754.3	754.5	0.2
YD	370.54	2,048/838	49,511	5.8	754.8	754.6	754.8	0.2
YE	370.83	1,766/508	49,256	5.9	755.1	754.9	755.1	0.2
YF	371.14	1,926/474	50,284	5.8	755.4	755.1	755.3	0.2

[1]Miles above confluence with Mississippi River

[2]Elevation produced by the original UNET model

[3]Elevation produced by the calibrated HEC-RAS model used for the floodway run

[4]Width/Width within Clay County

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

MISSOURI RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Muddy Fork								
A	9,153	373	5,447	2.5	795.0	795.0	795.7	0.7
B	11,718	646	6,341	2.1	796.0	796.0	796.8	0.8
C	18,000	312	3,379	4.0	802.0	802.0	802.9	0.9
D	20,000	437	5,126	2.7	805.2	805.2	806.1	0.9
E	22,000	335	3,166	2.6	805.8	805.8	806.7	0.9
F	27,000	173	1,666	4.6	813.3	813.3	814.1	0.8
G	30,000	302	2,050	3.6	817.0	817.0	817.9	0.9
H	34,046	482	2,779	2.6	824.1	824.1	824.6	0.5
I	39,615	277	2,228	3.3	838.2	838.2	838.9	0.7
J	42,458	125	1,575	4.6	842.6	842.6	843.3	0.7
K	45,944	355	2,202	3.2	847.3	847.3	848.1	0.8
L	48,599	275	2,093	3.3	852.3	852.3	853.3	1.0
M	50,724	223	2,034	3.4	857.6	857.6	858.4	0.8

[1]Feet above confluence with Clear Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

MUDDY FORK

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Old Maids Creek								
E	6,249	70	337	7.8	827.2	827.2	827.4	0.2
F	6,889	94	551	4.8	832.3	832.3	832.4	0.1
G	8,342	77	351	7.5	842.3	842.3	842.3	0.0
H	9,994	74	437	5.5	857.9	857.9	858.2	0.3
I	11,459	109	609	4.0	870.3	870.3	870.4	0.1
J	12,795	32	45	6.8	887.5	887.5	887.5	0.0
K	13,124	42	117	2.6	893.4	893.4	893.8	0.4

[1]Stream distance in feet above confluence with Line Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

OLD MAIDS CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Owens Branch								
A	934	305	1681	2.8	812.2	807.9[2]	807.9	0.0
B	1,884	378	2129	2.2	812.2	808.5[2]	808.9	0.4
C	2,601	247	1837	2.6	812.2	811.7[2]	812.3	0.6
D	4,238	283	1641	2.9	814.0	814.0	814.8	0.8
E	5,981	111	954	4.8	821.2	821.2	822.0	0.8
F	7,789	90	579	6.5	824.3	824.3	825.1	0.8
G	8,875	63	554	6.8	830.3	830.3	830.4	0.1
H	9,552	195	2620	1.4	840.8	840.8	841.4	0.6
I	10,905	62	534	7.0	846.2	846.2	847.0	0.8
J	12,416	107	479	5.9	851.2	851.2	852.1	0.9
K	13,267	115	656	3.7	860.6	860.6	861.3	0.7
L	14,802	65	321	7.6	867.8	867.8	868.4	0.6
M	16,656	117	266	5.4	892.2	892.2	892.2	0.0
N	18,094	75	237	4.4	908.6	908.6	908.6	0.0

[1]Stream distance in feet above confluence with Little Platte River
[2]Elevation computed without consideration of backwater effects from Little Platte River

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

OWENS BRANCH

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Polecat Creek								
A	355	33	307	6.3	883.8	880.8[2]	880.9	0.2
B	1,117	58	440	4.4	883.8	882.6[2]	882.9	0.3
C	2,469	37	291	6.7	885.5	885.5	886.0	0.5
D	3,739	48	288	6.7	892.1	892.1	892.3	0.2
E	5,527	43	244	8.0	897.8	897.8	898.0	0.2
F	6,829	157	495	3.9	905.9	905.9	905.9	0.0
G	7,211	69	288	6.8	908.7	908.7	908.7	0.0
H	7,921	46	402	4.8	913.7	913.7	914.3	0.5
I	8,443	47	351	4.7	915.2	915.2	916.0	0.8
J	8,959	34	165	10.0	917.1	917.1	917.4	0.3
K	9,550	195	989	1.7	927.5	927.5	928.4	0.9
L	10,279	108	339	3.6	931.9	931.9	932.3	0.4
M	10,749	82	255	4.7	936.6	936.6	937.0	0.4
N	11,428	22	121	9.9	945.4	945.4	945.7	0.3
O	12,418	177	615	2.0	956.9	956.9	957.8	0.9
P	13,239	26	57	5.7	965.8	965.8	965.9	0.1
Q	14,135	20	40	8.1	976.9	976.9	976.9	0.0

[1]Stream distance in feet above confluence with Wilkerson Creek
[2]Elevation computed without consideration of backwater effects from Wilkerson Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

POLECAT CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
RANDOLPH CREEK								
A	2543	275	1390	3.7	751.4	751.4	751.9	0.5
B	2949	45	415	7.2	752.5	752.5	753.0	0.5
C	3441	89	630	4.7	758.4	758.4	758.6	0.2
D	5135	198	6213	0.4	798.1	798.1	798.7	0.6
E	5931	214	4964	0.4	798.1	798.1	798.7	0.6
F	6727	103	2578	0.7	798.1	798.1	798.7	0.6
G	7676	74	1521	1.0	798.2	798.2	798.8	0.6
H	8934	60	1161	0.9	812.8	812.8	813.7	0.9
I	9500	40	501	1.7	812.8	812.8	813.8	1.0
J	10187	15	76	11.1	814.9	814.9	815.3	0.4
K	10892	21	114	6.1	826.8	826.8	827.5	0.7
L	11687	16	55	10.4	842.3	842.3	842.3	0.0
M	11941	13	51	11.3	849.4	849.4	849.4	0.0
N	12267	18	57	10.0	867.6	867.6	868.0	0.4
O	12538	71	389	1.5	882.6	882.6	883.6	1.0

[1]Feet above confluence with Missouri River

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO
AND INCORPORATED AREAS

FLOODWAY DATA

RANDOLPH CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
RANDOLPH CREEK TRIBUTARY								
A	317	19	105	8.6	751.0	745.9[2]	745.9	0.0
B	698	36	177	5.1	751.1	751.1	751.1	0.0
C	1,132	24	87	10.4	753.2	753.2	753.2	0.0
D	1,717	46	231	3.9	763.2	763.2	763.3	0.1

[1]Feet above confluence with Randolph Creek

[2] Elevation computed without consideration of backwater effects from Randolph Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO
AND INCORPORATED AREAS

FLOODWAY DATA

RANDOLPH CREEK TRIBUTARY

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Rock Creek								
A	2,858	82	1255	7.3	748.6	748.6	748.6	0.0
B	3,520	107	1937	4.8	759.2	759.2	760.0	0.8
C	4,162	110	1760	5.2	759.8	759.8	760.8	1.0
D	5,230	106	1218	7.6	761.5	761.5	762.1	0.6
E	6,916	114	821	6.2	773.4	773.4	774.2	0.8
F	7,377	65	749	6.8	780.5	780.5	781.0	0.5
G	8,415	386	3686	1.4	786.0	786.0	786.4	0.4
H	10,222	118	828	5.8	789.7	789.7	790.3	0.6
I	11,772	37	324	14.9	797.9	797.9	797.9	0.0
J	13,032	80	632	6.0	809.3	809.3	809.8	0.5
K	14,217	66	630	6.0	815.1	815.1	815.9	0.8
L	15,782	190	1372	2.6	831.3	831.3	832.2	0.9
M	18,289	69	747	3.1	847.0	847.0	848.0	1.0
N	19,466	48	335	7.0	859.4	859.4	859.6	0.2
O	20,014	43	350	6.7	864.8	864.8	865.2	0.4

[1]Feet above confluence with Missouri River

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

ROCK CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Rock Creek Gladstone								
A	991	55	459	8.9	828.8	825.1[2]	825.3	0.2
B	1,669	65	511	8.0	828.8	828.0[2]	828.2	0.2
C	3,417	117	716	5.7	843.0	843.0	843.5	0.5
D	5,317	76	825	5.0	852.3	852.3	852.6	0.3
E	6,499	121	810	5.1	855.3	855.3	855.7	0.4
F	7,845	43	379	10.8	859.1	859.1	860.0	0.9
G	8,480	60	454	8.8	864.5	864.5	864.7	0.2
H	9,287	231	1,572	2.4	869.5	869.5	869.7	0.2
I	10,357	88	373	10.3	872.4	872.4	872.4	0.0
J	11,479	71	697	5.2	883.2	883.2	883.9	0.7
K	12,280	178	1,137	3.2	885.3	885.3	885.8	0.5
L	13,832	127	917	3.1	893.2	893.2	893.5	0.3
M	14,508	125	1,008	2.8	901.0	901.0	901.0	0.0
N	15,027	296	2,793	1.3	906.4	906.4	906.4	0.0
O	16,529	127	1,021	3.7	907.0	907.0	907.1	0.1
P	17,549	53	405	9.2	911.2	911.2	911.2	0.0
Q	18,559	48	239	12.6	917.4	917.4	917.4	0.1
R	19,790	104	718	3.9	923.0	923.0	923.9	0.9
S	20,304	111	911	3.1	926.7	926.7	926.7	0.0
T	20,935	222	1,321	1.5	930.1	930.1	930.5	0.4
U	21,200	128	333	6.0	932.5	932.5	932.7	0.2

[1]Feet above confluence with Mill Creek
[2]Elevation computed without consideration of overflow effects from Mill Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

ROCK CREEK GLADSTONE

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Rock Creek Tributary 11								
A	247	58	395	5.5	761.0	755.1[2]	755.1	0.0

[1]Feet above confluence with Rock Creek Tributary 11.2
[2]Elevation computed without considering backwater effects from Rock Creek Tributary 11.2

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

ROCK CREEK TRIBUTARY 11

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Rock Creek Tributary 11.2								
A	726	100	611	6.2	757.6	757.6	757.6	0.0
B	1700	71	763	4.4	758.9	758.9	758.9	0.0
C	2339	51	588	5.8	759.2	759.2	759.2	0.0
D	2563	60	752	4.5	760.6	760.6	761.1	0.5
E	3477	65	509	2.3	761.4	761.4	762.3	0.9
F	4731	86	783	1.5	783.6	783.6	783.9	0.3
G	5341	73	530	2.2	783.7	783.7	784.1	0.4
H	5875	42	131	9.0	784.8	784.8	784.9	0.1
I	7718	46	110	6.9	798.1	798.1	798.1	0.0
J	9363	25	120	6.3	813.0	813.0	813.1	0.1
K	10832	37	125	6.0	827.4	827.4	827.4	0.0
L	12347	18	98	6.8	836.5	836.5	836.9	0.4
M	13202	36	145	4.6	841.8	841.8	841.9	0.1
N	13983	25	74	8.9	849.9	849.9	849.9	0.0

[1]Feet above confluence with Rock Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

ROCK CREEK TRIBUTARY 11.2

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Rocky Branch								
A	62	817	1,146	3.8	847.9	844.0[2]	844.1	0.1
B	4,124	206	771	5.6	850.0	850.0	850.9	0.9
C	5,454	320	1,085	4.1	853.7	853.7	854.1	0.4
D	8,470	212	1,055	4.2	860.4	860.4	861.4	1.0
E	11,258	164	1,092	4.1	870.7	870.7	870.9	0.2
F	12,683	60	579	7.8	872.6	872.6	872.9	0.3
G	15,694	55	566	8.5	882.1	882.1	882.4	0.3
H	17,106	155	881	5.5	888.4	888.4	888.4	0.0
I	17,644	245	1,126	4.3	891.0	891.0	891.8	0.8
J	18,843	73	594	8.1	894.6	894.6	894.9	0.3
K	20,944	126	837	5.7	902.1	902.1	902.9	0.8
L	23,247	165	837	5.7	910.4	910.4	910.9	0.5
M	25,903	176	556	6.4	932.8	932.8	932.9	0.1
N	28,360	78	633	2.0	961.2	961.2	961.7	0.5
O	30,252	66	140	5.7	975.9	975.9	976.1	0.2
P	31,661	63	162	4.9	991.3	991.3	991.4	0.1
Q	32,796	43	209	3.8	1,003.1	1,003.1	1,003.8	0.7

[1]Stream distance in feet above confluence with Wilkerson Creek
[2] Elevation computed without consideration of backwater effects from Wilkerson Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

ROCKY BRANCH

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Rocky Branch Tributary 1								
A	97	65	224	7.4	961.1	956.7[2]	956.7	0.0
B	681	153	399	4.2	961.8	961.8	962.4	0.6
C	1,379	72	342	4.9	967.0	967.0	967.8	0.8
D	2,330	53	274	6.1	974.9	974.9	975.0	0.1
E	2,766	89	265	6.3	976.8	976.8	976.9	0.1
F	3,243	251	982	1.7	985.7	985.7	985.8	0.1
G	3,771	76	454	3.7	988.0	988.0	988.7	0.7
H	4,227	59	332	5.0	989.0	989.0	989.7	0.7
I	4,512	54	323	5.2	990.1	990.1	990.6	0.5

[1]Stream distance in feet above confluence with Rocky Branch
[2]Elevation computed without consideration of backwater effects from Rocky Branch

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

ROCKY BRANCH TRIBUTARY 1

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Rush Creek								
A	4,892	1,507	6,977	1.5	727.3	722.8[2]	723.7	0.9
B	6,176	1,982	8,619	1.2	727.3	722.9[2]	723.7	0.8
C	6,902	1,137	5,450	1.9	727.4	723.0[2]	723.9	0.9
D	8,979	860	4,465	2.3	728.1	723.9[2]	724.7	0.8
E	10,631	859	3,361	3.0	728.9	724.3[2]	725.3	1.0
F	11,522	380	1,499	6.8	732.9	732.9	733.2	0.3
G	11,862	800	6,376	1.6	735.4	735.4	735.9	0.5
H	13,479	1,405	11,649	0.9	735.5	735.5	736.1	0.6
I	14,335	1,590	15,266	0.7	735.5	735.5	736.1	0.6
J	15,045	1,031	10,857	0.9	740.5	740.5	741.3	0.8
K	16,479	1,245	12,031	0.8	740.5	740.5	741.4	0.9
L	19,405	212	1,324	7.7	742.0	742.0	742.1	0.1
M	20,988	361	2,630	3.9	745.8	745.8	746.5	0.7
N	22,755	210	1,568	6.5	748.0	748.0	748.4	0.4
O	23,979	305	2,419	4.2	750.5	750.5	750.8	0.3
P	24,323	514	5,498	1.8	752.3	752.3	752.8	0.5
Q	26,186	320	2,464	3.7	753.4	753.4	753.9	0.5
R	27,979	372	3,096	3.0	755.5	755.5	756.4	0.9
S	29,703	216	2,129	4.3	757.9	757.9	758.3	0.4
T	31,479	270	1,867	4.9	760.7	760.7	761.3	0.6
U	32,898	191	1,355	6.8	762.9	762.9	763.3	0.4
V	33,942	357	2,426	3.6	766.7	766.7	766.9	0.2
W	34,148	358	2,715	3.3	768.4	768.4	769.0	0.6
X	34,979	134	1,013	8.3	769.3	769.3	769.8	0.5

[1]Feet above confluence with Missouri River

[2]Elevation computed without consideration of overflow effects from Missouri River

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

RUSH CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Rush Creek								
Y	36,479	169	1,536	5.5	777.3	777.3	777.7	0.4
Z	37,216	79	1,067	7.8	778.8	778.8	779.0	0.2
AA	37,702	203	3,054	2.7	782.8	782.8	783.3	0.5
AB	38,246	329	2,880	2.5	783.0	783.0	783.7	0.7
AC	38,526	290	2,160	2.9	783.0	783.0	783.8	0.8
AD	39,665	140	680	9.2	786.6	786.6	786.8	0.2
AE	40,403	49	420	14.8	789.8	789.8	789.8	0.0
AF	40,783	171	1,986	3.1	798.1	798.1	799.1	1.0
AG	41,161	65	833	7.5	800.1	800.1	800.9	0.8
AH	41,979	254	2,682	2.2	801.8	801.8	802.5	0.7
AI	42,512	226	1,687	1.7	802.0	802.0	802.9	0.9
AJ	43,402	75	619	4.6	802.1	802.1	803.1	1.0
AK	44,479	191	601	3.9	806.6	806.6	806.8	0.2
AL	45,479	185	632	3.7	810.3	810.3	810.4	0.1
AM	46,479	52	332	7.1	814.2	814.2	814.4	0.2
AN	47,479	207	896	2.6	819.8	819.8	820.4	0.6
AO	48,078	34	242	9.7	823.8	823.8	823.9	0.1

[1]Feet above confluence with Missouri River

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

RUSH CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Searcy Branch								
A	1,956	36	330	5.3	745.6	745.6	745.6	0.0
B	3,758	32	257	6.8	753.7	753.7	754.3	0.6
C	5,116	29	257	6.8	760.5	760.5	760.8	0.3
D	6,002	29	237	7.4	766.0	766.0	766.4	0.4
E	6,420	57	403	4.3	781.3	781.3	782.0	0.7
F	7,131	173	1,471	1.2	787.2	787.2	788.2	1.0
G	8,725	35	229	5.0	788.3	788.3	789.1	0.8
H	9,367	28	156	2.7	792.7	792.7	792.8	0.1
I	9,999	27	75	5.6	800.4	800.4	800.8	0.4
J	10,181	36	310	1.4	809.6	809.6	809.7	0.1
K	11,307	17	61	6.9	811.1	811.1	811.4	0.3
L	11,778	12	41	10.3	816.5	816.5	816.6	0.1
M	11,958	34	266	1.6	826.5	826.5	826.7	0.2
N	12,602	12	42	10.0	831.6	831.6	831.8	0.2

[1]Feet above confluence with Buckeye Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

SEARCY BRANCH

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Searcy Branch Tributary 1								
A	361	15	83	7.2	787.5	786.0[2]	786.0	0.0
B	1269	22	83	7.2	791.3	791.3	791.3	0.0
C	2860	15	85	7.0	800.7	800.7	801.3	0.6
D	3854	18	86	7.0	809.9	809.9	810.8	0.9
E	4201	6	12	5.5	816.3	816.3	816.8	0.5
F	4516	5	12	5.4	825.7	825.7	826.6	0.9
G	4699	6	9	7.1	836.0	836.0	836.1	0.1
H	4916	3	9	7.1	844.9	844.9	845.7	0.8
I	5143	6	15	4.3	852.4	852.4	853.0	0.6
J	5336	3	7	8.8	865.7	865.7	866.0	0.3
K	5568	4	8	7.9	871.4	871.4	871.9	0.5
L	5861	5	9	7.3	890.2	890.2	890.6	0.4

[1]Feet above confluence with Searcy Branch

[2] Elevation computed without consideration of backwater effects from Searcy Branch

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

SEARCY BRANCH TRIBUTARY 1

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Second Creek								
A	189	189	1454	6.0	812.7	809.7[2]	809.7	0.0
B	1,863	340	2031	4.3	812.7	812.2[2]	812.3	0.1
C	2,566	132	1327	6.5	813.0	813.0	813.2	0.2
D	3,834	190	1671	5.2	814.9	814.9	815.2	0.3
E	5,056	111	1584	5.5	816.4	816.4	816.8	0.4
F	6,169	198	1884	4.6	817.8	817.8	818.2	0.4
G	7,690	132	1634	5.3	819.1	819.1	820.1	1.0
H	11,339	91	1009	6.0	821.7	821.7	822.5	0.8

[1]Feet above confluence with Little Platte River
[2]Elevation computed without consideration of backwater effects from Little Platte River

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

SECOND CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH[4] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY[2]	WITH FLOODWAY	INCREASE
Shoal Creek								
A	7,655.6	2,288 / 930[5]	16,487	2.7	725.1 / 725.3 / 722.4[3]	723.8	724.6	0.8
B	8,773.2	2,804 / 1,004[5]	42,306	1.6	726.6 / 726.7 / 724.6[3]	726.3	727.2	0.9
C	10,153.9	2,046 / 1,128[5]	16,761	1.6	727.1 / 727.5 / 725.6[3]	726.9	727.7	0.8
D	12,665.2	3,042 / 321[5]	12,777	2.7	728.2 / 728.6 / 727.1[3]	728.2	728.9	0.7
E	13,901.2	3,072 / 482[5]	20,464	2.0	730.8 / 731.0 / 729.8[3]	731.1	731.8	0.7
F	16,586.7	4,124	42,335	0.6	731.2 / 731.3 / 730.1[3]	731.5	732.2	0.7
G	20,261.7	1,360	10,247	1.5	734.5 / 734.5 / 730.3[3]	731.7	732.5	0.8
H	21,520.2	1,021	10,452	2.3	736.5 / 736.5 / 733.1[3]	735.1	735.5	0.4
I	24,097.6	1,107	8,408	2.7	738.5 / 733.5[6]	737.9	738.2	0.3
J	26,685.7	2,008	19,960	0.9	739.0 / 733.5[6]	738.6	738.8	0.2
K	29,094.2	7,24	7,497	2.6	739.6 / 733.5[6]	739.3	739.5	0.2
L	32,889.9	1,046	10,508	1.2	743.5 / 735.7[6]	743.5	743.8	0.3
M	33,517.8	1,522	18,041	1.5	744.4	744.2	744.4	0.2
N	37,408.2	308	2,932	6.2	744.9	744.8	745.0	0.2
O	38,335.7	262	3,054	6.2	746.7	746.6	746.9	0.3
P	39,446.1	268	3,545	5.4	749.0	749.0	749.3	0.3
Q	41,880.4	383	5,200	3.7	752.2	752.1	752.4	0.3
R	43,062.2	592	5,654	3.4	753.3	753.3	753.6	0.3

[1]Feet above confluence with the Missouri River
[2]Elevation computed without consideration of Backwater effects from Missouri River
[3]Regulatory elevations computed without Backwater effects from Missouri River noted as Left Overbank/Riverward/Right Overbank
[4]Total width measured between left encroachment and right encroachment not including small areas above the flood elevation
[5]Total Width / Width within Clay County
[6]Regulatory elevations computed without Backwater effects from Missouri River noted as Riverward/Right Overbank
Note: Reference to left and right are based on looking in the downstream direction

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

SHOAL CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH[3] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY[2]	WITH FLOODWAY	INCREASE
Shoal Creek								
S	44,560.9	281	4,095	4.6	754.2	754.1	754.4	0.3
T	46,293.1	254	3,902	4.8	756.0	756.0	756.3	0.3
U	48,089.1	294	4,190	3.9	757.3	757.3	757.6	0.3
V	50,951.8	532	6,811	2.4	759.0	759.0	759.3	0.3
W	53,224.5	272	3,244	5.2	760.6	760.5	760.8	0.3
X	54,632	361	6,251	6.7	766.9	766.9	767.6	0.7
Y	57,020	356	6,311	6.4	769.9	769.9	770.0	0.1
Z	57,845	409	8,329	4.8	774.0	774.0	774.0	0.0
AA	60,899	273	5,241	7.7	774.7	774.7	775.0	0.3
AB	64,057	411	5,660	8.2	775.7	775.7	776.6	0.9
AC	66,823	198	3,031	11.2	783.0	783.0	783.0	0.0
AD	67,633	353	5,505	7.5	784.9	784.9	785.1	0.2
AE	69,504	494	6,156	8.9	786.5	786.5	787.1	0.6
AF	71,962	177	2,249	15.9	791.1	791.1	791.8	0.7
AG	73,654	710	8,816	3.0	797.2	797.2	798.2	1.0
AH	75,531	314	3,410	7.3	799.7	799.7	800.2	0.5
AI	77,138	161	2,227	8.7	804.6	804.6	805.3	0.7
AJ	78,013	388	3,638	8.7	806.5	806.5	807.3	0.8

[1]Feet above confluence with the Missouri River
[2]Elevation computed without consideration of levees and Missouri River backwater
[3]Total width measured between left encroachment and right encroachment not including small areas above the flood elevation

Note: Reference to left and right are based on looking in the downstream direction

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

SHOAL CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH[3] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY[2]	WITH FLOODWAY	INCREASE
Shoal Creek								
AK	79,131	163	1,934	10.4	809.6	809.6	810.1	0.5
AL	81,785	497	2,103	14.4	815.0	815.0	815.1	0.1
AM	84,359	396	3,058	6.7	834.6	834.6	835.0	0.4
AN	86,156	493	3,694	6.6	838.7	838.7	838.8	0.1
AO	88,373	305	3,166	7.9	844.1	844.1	845.0	0.9
AP	89,209	130	1,588	11.2	846.1	846.1	846.6	0.5
AQ	90,835	259	2,843	7.2	848.8	848.8	849.5	0.7
AR	94,039	322	2,092	11.1	856.7	856.7	857.7	1.0
AS	98,109	345	3,319	6.3	869.3	869.3	869.9	0.6
AT	100,685	401	2,703	10.4	874.6	874.6	875.4	0.8
AU	103,325	185	1,453	9.4	891.6	891.6	892.5	0.9
AV	105,325	174	701	9.2	909.8	909.8	910.4	0.6
AW	107,533	174	494	10.9	930.7	930.7	930.7	0.0
AX	108,346	161	940	5.1	936.1	936.1	936.3	0.2
AY	109,885	109	515	8.9	946.1	946.1	946.8	0.7
AZ	110,914	141	579	5.1	956.3	956.3	957.2	0.9
BA	111,826	68	384	7.7	962.4	962.4	962.5	0.1

[1]Feet above confluence with the Missouri River
[2]Elevation computed without consideration of levees and Missouri River backwater
[3]Total width measured between left encroachment and right encroachment not including small areas above the flood elevation

Note: Reference to left and right are based on looking in the downstream direction

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

SHOAL CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Shoal Creek Tributary 6								
A	2,367	29	603	4.7	757.0	757.0	757.8	0.8
B	4,689	65	356	4.1	758.4	758.4	759.3	0.9
C	6,236	38	207	7.1	767.2	767.2	767.4	0.2
D	7,249	45	209	7.0	773.5	773.5	774.0	0.5
E	8,265	92	287	5.1	786.7	786.7	786.8	0.1
F	9,692	92	357	4.1	798.2	798.2	798.8	0.6
G	11,001	65	325	4.5	812.6	812.6	813.1	0.5
H	13,531	30	209	5.9	824.8	824.8	824.9	0.1

[1]Feet above confluence with Shoal Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

SHOAL CREEK TRIBUTARY 6

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Shoal Creek Tributary 8								
A	1,385	221	1,896	2.2	912.5	912.5	912.5	0.0
B	2,665	85	419	9.8	914.3	914.3	914.8	0.6
C	3,740	142	690	5.0	924.6	924.6	925.4	0.8
D	4,305	104	423	8.1	930.8	930.8	930.8	0.0
E	5,128	69	610	4.8	940.4	940.4	941.1	0.7

[1]Feet above confluence with Shoal Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

SHOAL CREEK TRIBUTARY 8

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Shoal Creek Tributary 9								
A	1,463	61	580	6.3	890.7	890.7	890.9	0.2
B	3,085	95	442	7.8	904.8	904.8	905.0	0.2
C	4,821	106	389	6.1	917.5	917.5	918.2	0.7
D	6,506	120	524	4.6	936.0	936.0	936.7	0.7

[1]Feet above confluence with Shoal Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

SHOAL CREEK TRIBUTARY 9

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Shoal Creek Tributary 20								
A	2,399	76	601	4.5	771.0	771.0	771.6	0.6
B	3,009	55	283	9.6	772.2	772.2	772.5	0.3
C	4,068	72	464	5.1	782.6	782.6	783.6	1.0
D	6,093	150	355	6.7	798.8	798.8	798.8	0.0
E	6,766	77	694	3.4	808.3	808.3	808.9	0.6
F	7,931	58	686	3.5	824.5	824.5	825.3	0.8

[1]Feet above confluence with Shoal Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

SHOAL CREEK TRIBUTARY 20

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Shoal Creek Tributary 20.1								
A	485	43	322	4.3	778.5	778.5	779.5	1.0
B	1,236	31	199	6.9	781.1	781.1	781.6	0.5
C	1,802	31	151	9.1	784.2	784.2	784.6	0.4
D	2,250	55	475	2.6	796.0	796.0	796.8	0.8
E	2,934	27	112	11.2	798.2	798.2	798.3	0.1
F	3,629	72	332	3.8	805.4	805.4	806.2	0.8

[1]Feet above confluence with Shoal Creek Tributary 20

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

SHOAL CREEK TRIBUTARY 20.1

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Town Branch								
A	2,026	1,564	7,977	1.2	737.0	737.0	738.0	1.0
B	4,065	100	1,105	9.0	738.2	738.2	739.0	0.8
C	5,056	110	1,332	7.4	743.1	743.1	744.0	0.9
D	6,503	167	1,147	6.3	747.0	747.0	747.4	0.4
E	7,779	144	1,204	6.0	751.3	751.3	751.6	0.3
F	9,854	38	257	6.0	755.2	755.2	755.5	0.3
G	12,079	30	202	7.7	762.3	762.3	762.7	0.4
H	13,230	28	167	9.3	768.4	768.4	769.0	0.6

[1]Feet above confluence with Shoal Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

TOWN BRANCH

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Wilkerson Creek								
A	193	97	1,308	8.9	814.9	813.1[2]	813.8	0.7
B	684	242	2,567	4.6	815.4	815.4	816.0	0.6
C	1,851	634	5,212	2.2	816.8	816.8	817.4	0.6
D	3,464	309	2,618	4.4	817.7	817.7	818.3	0.6
E	5,115	264	3,372	3.4	819.9	819.9	820.7	0.8
F	6,394	635	3,184	3.6	820.5	820.5	821.2	0.7
G	7,710	165	1,775	6.5	827.0	827.0	827.9	0.9
H	8,932	375	2,059	5.6	829.0	829.0	829.8	0.8
I	10,787	355	3,311	3.7	837.7	837.7	837.9	0.2
J	11,801	409	4,045	3.0	838.9	838.9	839.5	0.6
K	13,635	490	3,654	3.4	841.2	841.2	841.8	0.6
L	15,085	434	4,624	2.7	845.8	845.8	845.9	0.1
M	16,582	417	4,506	2.8	846.0	846.0	846.3	0.3
N	17,352	383	2,400	5.2	846.1	846.1	846.3	0.2
O	19,208	79	1,063	7.7	850.2	850.2	850.8	0.6
P	20,968	185	1,759	4.7	854.6	854.6	855.3	0.7
Q	22,415	115	1,464	5.6	859.4	859.4	860.1	0.7
R	23,289	351	2,520	3.2	860.9	860.9	861.6	0.7
S	23,934	261	1,765	4.6	862.4	862.4	863.3	0.9
T	24,746	131	1,552	5.3	864.3	864.3	865.1	0.8
U	25,945	213	1,738	4.7	868.8	868.8	869.8	1.0

[1]Feet above confluence with Little Platte River

[2]Elevation computed without consideration of backwater effects from Little Platte River

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

WILKERSON CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Wilkerson creek								
V	27,361	207	1,757	4.6	871.5	871.5	872.3	0.8
W	29,484	162	1,613	4.9	878.0	878.0	878.7	0.7
X	30,154	161	1,702	4.6	879.3	879.3	880.0	0.7
Y	30,848	254	2,501	3.1	881.9	881.9	882.5	0.6
Z	32,633	382	3,090	2.5	883.6	883.6	884.3	0.7
AA	35,511	171	1,036	6.8	887.2	887.2	888.1	0.9
AB	37,025	274	1,753	4.0	892.8	892.8	893.0	0.2
AC	37,981	238	2,341	3.0	897.2	897.2	897.8	0.6
AD	39,318	260	1,823	3.9	898.9	898.9	899.6	0.7
AE	43,200	239	1,857	4.4	908.8	908.8	909.8	1.0
AF	44,948	197	1,492	3.9	912.1	912.1	913.0	0.9
AG	45,933	179	1,141	5.2	914.5	914.5	915.3	0.8
AH	47,404	63	422	7.3	922.9	922.9	923.0	0.1
AI	48,256	92	422	7.3	929.1	929.1	929.3	0.2
AJ	49,126	225	1,208	2.5	938.8	938.8	939.7	0.9

[1]Feet above confluence with Little Platte River

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

WILKERSON CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Williams Creek								
A	4,800	170	1,841	5.4	761.5	755.5[2]	756.5	1.0
B	7,200	260	2,689	3.7	761.7	758.9[2]	759.5	0.6
C	9,600	558	5,389	1.9	761.7	759.9[2]	760.6	0.7
D	10,801	250	2,660	3.8	761.7	761.4[2]	762.0	0.6
E	12,400	337	3,708	2.7	763.1	763.1	763.8	0.7
F	14,800	349	3,761	2.7	764.4	764.4	765.2	0.8
G	17,601	164	1,944	5.1	765.7	765.7	766.5	0.8
H	19,600	478	4,793	2.1	767.2	767.2	768.0	0.8
I	22,400	206	2,285	4.4	770.2	770.2	771.1	0.9
J	26,400	316	3,256	2.9	773.5	773.5	774.4	0.9
K	30,000	501	3,766	2.4	775.9	775.9	776.9	1.0
L	35,200	152	1,665	5.4	783.2	783.2	783.7	0.5
M	37,600	193	1,684	5.3	786.2	786.2	787.1	0.9
N	41,199	71	725	12.2	793.0	793.0	793.9	0.9
O	44,000	214	2,180	4.1	816.2	816.2	816.6	0.4
P	47,200	336	1,651	3.9	822.0	822.0	822.6	0.6
Q	50,000	250	1,299	4.9	844.2	844.2	845.0	0.8

[1]Feet above confluence with Fishing River
[2]Elevation computed without considering overflow effects from Fishing River

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

WILLIAMS CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Williams Creek Tributary 14								
A	2,000	78	401	6.0	820.9	820.9	821.4	0.5
B	3,801	138	473	5.1	825.5	825.5	826.4	0.9

[1]Feet above confluence with Williams Creek
[2]Elevation computed without considering backwater effects from Williams Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

FLOODWAY DATA

WILLIAMS CREEK TRIBUTARY 14

5.0 INSURANCE APPLICATION

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

Zone A

Zone A is the flood insurance 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 analysis are shown at selected intervals within this zone.

Zone AH

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

Zone AO

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

6.0 FLOOD INSURANCE RATE MAP

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

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

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

The countywide FIRM presents flooding information for the entire geographic area of Clay County. Previously, FIRMs were prepared for each incorporated community and the unincorporated areas of the county identified as having special flood hazard areas. This countywide FIRM also includes flood-hazard information that was presented separately on Flood Boundary and Floodway Maps (FBFMs), where applicable. Historical data relating to the maps prepared for each community are presented in Table 4, "Community Map History."

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Avondale, City of	January 9, 1974	None	October 26, 1976	None
** Birmingham, Village of	April 25, 1978	None	N/A	None
Clay County, Unincorporated Areas	September 6, 1974	None	March 18, 1980	February 17, 1989 April 16, 2003
Claycomo, Village of	January 23, 1974	February 20, 1976	August 1, 1977	December 2, 1980
Excelsior Springs, City of	April 5, 1974	May 28, 1976	March 15, 1977	April 16, 2003
Gladstone, City of	May 17, 1974	April 30, 1976	January 5, 1978	August 5, 1986
Glenaire, City of	June 4, 1974	January 23, 1976	September 15, 1977	None

* No Special Flood Hazard Areas Identified

** This community did not have a FIRM prior to the first countywide FIRM for Clay County

*** This community does not have map history prior to the first countywide mapping

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Holt, City of	July 2, 1976	None	March 4, 1980	None
Kearney, City of	March 22, 1974	November 14, 1975	July 17, 1978	April 16, 2003
Lawson, City of	June 4, 1976	None	December 5, 1996	None
Liberty, City of	March 15, 1978	None	March 15, 1978	February 1, 1985
Missouri City, City of	August 16, 1974	April 30, 1976	August 15, 1979	None
Mosby, City of	October 18, 1974	None	September 1, 1978	April 16, 2003
North Kansas City, City of	March 15, 1974	November 28, 1975	March 5, 1976	April 30, 1976

* No Special Flood Hazard Areas Identified

** This community did not have a FIRM prior to the first countywide FIRM for Clay County

*** This community does not have map history prior to the first countywide mapping

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
*,*** Oaks, Village of	N/A	None	N/A	None
*Oakview, Village of	July 16, 1976	None	November 6, 1979	None
*,*** Oakwood Park, Village of	N/A	None	N/A	None
*,*** Oakwood , Village of	N/A	None	N/A	None
Pleasant Valley, City of	March 15, 1974	None	July 18, 1977	None
Prathersville, Village of	February 18, 1977	None	November 15, 1978	April 16, 2003
Randolph, City of	July 18, 1977	None	July 18, 1977	None
Smithville, City of	June 5, 1970	None	May 21, 1971	July 1, 1974 April 23, 1976, August 12, 1977 November 4, 1992 April 16, 2003

* No Special Flood Hazard Areas Identified

** This community did not have a FIRM prior to the first countywide FIRM for Clay County

*** This community does not have map history prior to the first countywide mapping

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

CLAY COUNTY, MO AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

7.0 OTHER STUDIES

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

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting Federal Insurance and Mitigation, Division, FEMA Region VII, 9221 Ward Parkway, Suite 300, Kansas City, Missouri 64114-3372.

9.0 BIBLIOGRAPHY AND REFERENCES

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