Illinois Watershed Engagement Plan / Pre-Discovery Report

Illinois Watershed, HUC - 11110103

Portions of Incorporated and Unincorporated areas of Benton, Washington, and Crawford Counties, Arkansas; Adair, Cherokee, Delaware, and Sequoyah Counties, Oklahoma; and the Cherokee Nation and United Keetoowah Band of Cherokee

05/20/2015

Project Area Community List

Community Name (AR)	CID	Population in the Watershed
Benton County Communities		
Benton County Unincorporated Areas [3]	050419	12,009
Bentonville, City of [3]	050012	16,259
Bethel Heights, Town of	050386	2,343
Cave Springs, City of	050398	1,750
Centerton, City of [3]	050399	4.423
Gentry, City of	050324	3,147
Highfill, Town of [3]	050581	562
Little Flock, City of [3]	050479	78
Lowell, City of [3]	050342	6,264
Rogers, City of [3]	050013	49,951
Siloam Springs, City of	050014	14,952
Springdale, City of [2, 3]	050219	69,080
Springtown, Town of	050004	87
Crawford County Communities		
Crawford County Unincorporated Areas [3]	050428	10
Washington County Communities		
Washington County Unincorporated Areas [3]	050212	21,796
Elm Springs, City of	050213	1,531
Farmington, City of	050215	4,225
Fayetteville, City of [3]	050216	51,024
Greenland, City of [3]	050217	16
Johnson, City of	050218	3,354
Lincoln, City of	050338	1,949
Prairie Grove, City of	050587	4,351
Springdale, City of [2, 3]	050219	above
Tontitown, Town of	050293	2,457
Total Population in the Watershed (AR)		**271,618**

Community Name (OK)	CID	Population in the Watershed
Adair County Communities [1]		
Adair County Unincorporated Areas [3]	400501	12,542
Stilwell, City of [3]	400001	3,949
Watts, City of	400002	533
Westville, Town of	400003	2,169
Cherokee County Communities [1]		
Cherokee County Unincorporated Areas [3]	400488	16,240
Tahlequah, City of [3]	400037	15,739
Oaks, Town of [3]	400314	288
Delaware County Communities [1]		
Delaware County Unincorporated Areas [3]	400502	2,713
Colcord, Town of [3]	400281	453
Kansas, Town of [3]	400290	401
West Siloam Springs, Town of	400339	1,380
Sequoyah County Communities [1]		
Sequoyah County Unincorporated Areas [3]	400503	3,336
Gore, Town of [3]	400195	977
Paradise Hill, Town of	400569	249
Tribal Nations [1]		
Cherokee Nation [4]	400605	N/A
United Keetoowah Band of Cherokee Indians [4]	405450	N/A
Total Population in the Watershed (OK)		**60,782**
Total Population in the Illinois Watershed		**332,400**

[1] Only the areas within Arkansas have had First Order Approximation modeling performed.

[2] Community in multiple counties.

[3] Community extends beyond watershed boundary. Only those portions within the watershed are included.

[4] The Tribal Nations in this watershed do not have defined geographic area. Information for these tribes is noted in the incorporated communities or in the unincorporated area summaries where their interests have been identified.

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Acronyms and Abbreviations

AAL	Average Annualized Loss
ADEM	Arkansas Department of Emergency Management
AGIO	Arkansas Geographic Information Office
AHTD	Arkansas Highway and Transportation Department
ANRC	Arkansas Natural Resources Commission
BFE	base (1-percent-annual-chance) flood elevation
cfs	cubic feet per second
CID	Community Identification number
CNMS	Coordinated Needs Management Strategy
CRS	Community Rating System
CTP	Cooperating Technical Partners
DEM	Digital Elevation Model
DFIRM	Digital Flood Insurance Rate Map
EAP	Emergency Action Plan
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
FTN	FTN Associates, Ltd. (Arkansas State Contractor)
GIS	geographic information system
HEC-1	Hydrologic Engineering Center – Hydrologic Model Program
HEC-2	Hydrologic Engineering Center – Hydraulic Model Program
HEC-HMS	Hydrologic Engineering Center – Hydrologic Modeling System
HEC-RAS	Hydrologic Engineering Center – River Analysis System
H&H	hydrologic and hydraulic
HMP	Hazard Mitigation Plan
HUC	Hydrologic Unit Code
HUC- 8	HUC for watershed unit with average size of 700 square miles
HUC-12	HUC for watershed unit with average size of 40 square miles
HWM	high water mark
LIDAR	Light Detection and Ranging System
LOMA	Letter of Map Amendment

Acronyms and Abbreviations (Cont'd)

LOMC	Letter of Map Change
LOMR	Letter of Map Revision
Map Mod	Map Modernization
MAS	Mapping Activity Statement
MXD	Map Exchange Document
NAIP	National Agriculture Imagery Program
NFIP	National Flood Insurance Program
NHD	National Hydrologic Dataset
NRCS	Natural Resources Conservation Service
NVUE	New, Validated, or Updated Engineering
NWARPC	Northwest Arkansas Regional Planning Commission
OEM	Oklahoma Emergency Management
OWRB	Oklahoma Water Resources Board
Risk MAP	Risk Mapping, Assessment, and Planning
RL	Repetitive Loss
PMR	Physical Map Revision
SFHA	Special Flood Hazard Area
SHMO	State Hazard Mitigation Officer
SHP	ESRI Shape File
SRL	Severe Repetitive Loss
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey

I. Discovery Overview

The Federal Emergency Management Agency (FEMA) is currently implementing the Risk Mapping, Assessment, and Planning (Risk MAP) Program across the Nation. The purpose of Risk MAP is continued improvement of flood hazard information for the National Flood Insurance Program (NFIP), the promotion of increased national awareness and understanding of flood risk and the support of Federal, State, and local mitigation actions to reduce risk.

The vision and intent of the Risk MAP program is to, through collaboration with State, Local, and Tribal entities, deliver quality data that increases public awareness and leads to mitigation actions that reduce risk to life and property. To achieve this vision, FEMA has transformed its traditional flood identification and mapping efforts into a more integrated process of more accurately identifying, assessing, communicating, planning and mitigating flood risks. Risk MAP attempts to address gaps in flood hazard data and form a solid foundation for risk assessment, floodplain management, and provide State and Local entities with information needed to mitigate flood related risks.

The FEMA Region 6 office and the Arkansas Natural Resources Commission (ANRC) entered into a Cooperating Technical Partners (CTP) partnership agreement for implementation of Risk MAP in the State of Arkansas. As part of this partnership, the ANRC and its contractor, FTN Associates, Ltd. (FTN), began the Discovery process in the Illinois Watershed in October 2014. As this watershed extends into the State of Oklahoma, the Oklahoma CTP was contacted to participate in a joint Discovery project. Based on the OK CTP priorities the Illinois Watershed was not considered a candidate for Discovery. Therefore, FEMA elected to use its technical contractor (RAMPP) to perform the Illinois Watershed Discovery in Oklahoma. Because the Discovery project is a priority for the State of Arkansas, the AR CTP Team will take the lead on the project.

The Discovery process includes gathering local information and readily available data for the area to determine project viability and the need for Risk MAP products to assist in the movement of communities towards resilience. Figure 1, Watersheds and Communities Map, identifies the watershed boundaries and all of the communities that are included, all or in part, of the Illinois Watershed and the estimated population within the watershed, which is over 330,000. The Upper Illinois Watershed in Arkansas includes a population of approximately 270,000 while in the Lower Illinois Watershed in Oklahoma the population is approximately 60,000.

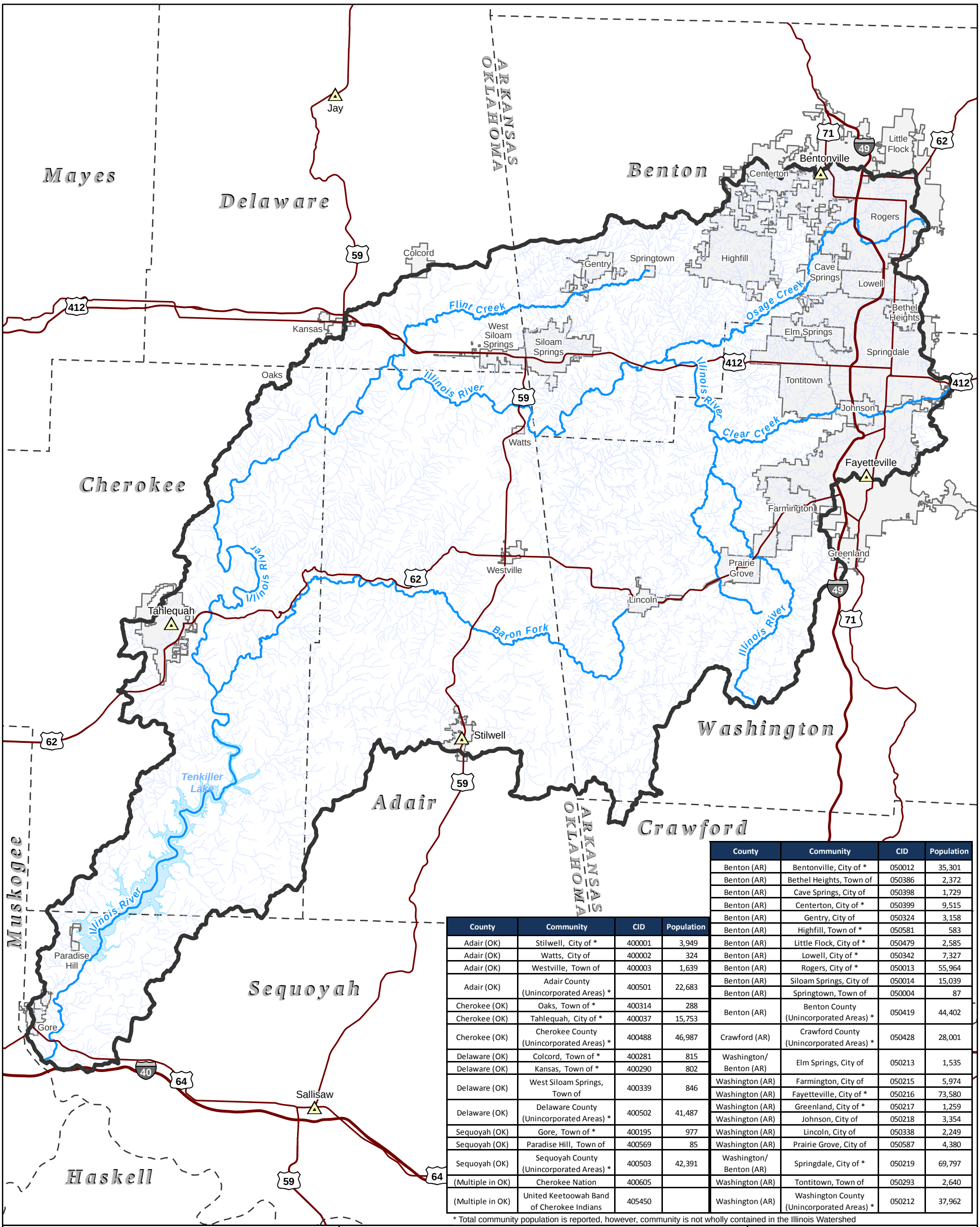
Through the Discovery process, FEMA, RAMPP, and the State of Arkansas CTP can determine which areas of the Hydrologic Unit Code (HUC) 8 watershed may be examined for further flood risk identification and assessment in a collaborative manner, taking into consideration the information collected from local communities during this process. Discovery open lines of communication and relies on local involvement for productive discussions about flood risk. The process provides a forum for a watershed-wide effort to understand how the community's flood risks are related to flood risk throughout the watershed. In Risk MAP, projects are analyzed on a watershed basis, so Discovery Meetings target numerous stakeholders from throughout the watershed on local, regional, State, and Federal levels.

The AR CTP Team will lead Discovery Meetings in June 2015 in Arkansas, while FEMA and RAMPP will lead Discovery Meetings in Oklahoma during July 2015.

During Discovery both teams will reach out to the respective local communities to:

- Gather information about local flood risk and flood hazards;
- Obtain and ultimately review current and historic mitigation plans to understand local mitigation capabilities, hazard risk assessments, and current or future mitigation activities; and
- Include multi-disciplinary staff from within each community to participate and assist in the development of a watershed vision.

The results of the Discovery process are presented in a final Discovery Report, a watershed scale Discovery Map and the digital data that were gathered or developed during the process. This document contains the initial Engagement Plan / Draft Discovery Report. The digital data included with this report includes the preliminary data development and exhibits used in preparation for the Discovery meetings. This includes the geographic information system (GIS) data, mapping documents (PDF, shapefiles, personal geodatabases and ESRI ArcGIS 10 Map Exchange Documents [MXDs]), or other supplemental digital information. All of this information will be updated following the Discovery Meetings with the information collected and presented in the final Discovery Report along with FEMA's Flood Risk Products at the Discovery Close-out Meeting.



County	Community	CID	Population
Adair (OK)	Stilwell, City of *	400001	3,949
Adair (OK)	Watts, City of	400002	324
Adair (OK)	Westville, Town of	400003	1,639
Adair (OK)	Adair County (Unincorporated Areas) *	400501	22,683
Cherokee (OK)	Oaks, Town of *	400314	288
Cherokee (OK)	Tahlequah, City of *	400037	15,753
Cherokee (OK)	Cherokee County (Unincorporated Areas) *	400488	46,987
Delaware (OK)	Colcord, Town of *	400281	815
Delaware (OK)	Kansas, Town of *	400290	802
Delaware (OK)	West Siloam Springs, Town of	400339	846
Delaware (OK)	Delaware County (Unincorporated Areas) *	400502	41,487
Sequoyah (OK)	Gore, Town of *	400195	977
Sequoyah (OK)	Paradise Hill, Town of	400569	85
Sequoyah (OK)	Sequoyah County (Unincorporated Areas) *	400503	42,391
(Multiple in OK)	Cherokee Nation	400605	
(Multiple in OK)	United Keetoowah Band of Cherokee Indians	405450	

County	Community	CID	Population
Benton (AR)	Bentonville, City of *	050012	35,301
Benton (AR)	Bethel Heights, Town of	050386	2,372
Benton (AR)	Cave Springs, City of	050398	1,729
Benton (AR)	Centerton, City of *	050399	9,515
Benton (AR)	Gentry, City of	050324	3,158
Benton (AR)	Highfill, Town of *	050581	583
Benton (AR)	Little Flock, City of *	050479	2,585
Benton (AR)	Lowell, City of *	050342	7,327
Benton (AR)	Rogers, City of *	050013	55,964
Benton (AR)	Siloam Springs, City of	050014	15,039
Benton (AR)	Springtown, Town of	050004	87
Benton (AR)	Benton County (Unincorporated Areas) *	050419	44,402
Crawford (AR)	Crawford County (Unincorporated Areas) *	050428	28,001
Washington/ Benton (AR)	Elm Springs, City of	050213	1,535
Washington (AR)	Farmington, City of	050215	5,974
Washington (AR)	Fayetteville, City of *	050216	73,580
Washington (AR)	Greenland, City of *	050217	1,259
Washington (AR)	Johnson, City of	050218	3,354
Washington (AR)	Lincoln, City of	050338	2,249
Washington (AR)	Prairie Grove, City of	050587	4,380
Washington/ Benton (AR)	Springdale, City of *	050219	69,797
Washington (AR)	Tontitown, Town of	050293	2,640
Washington (AR)	Washington County (Unincorporated Areas) *	050212	37,962

* Total community population is reported, however, community is not wholly contained in the Illinois Watershed

WATERSHED AND COMMUNITIES MAP

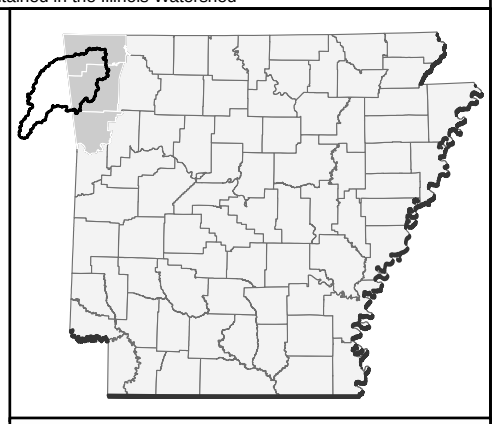
ILLINOIS WATERSHED (HUC 11110103)

FEMA

0 6 12 Miles

N W E S

County Seat
Interstate
U.S. Highway
County Boundary
City Limits
Major Reaches of Illinois Watershed
Other Waters
Large Waterbody
Illinois Watershed



Project Location

FIGURE 1

DATE: 4/30/2015

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The results of the Discovery process will be presented in the final Discovery Report, a watershed scale Discovery Map and corresponding digital data. In Oklahoma, the Discovery products will be developed under FEMA Indefinite Delivery Indefinite Quantity Contract HSFEHQ-09-D-0369, Task Order HSFE06-14-J-0001 and provided to the Arkansas Team for final compilation. The AR CTP Team will prepare the Arkansas Illinois Watershed Discovery products and then compile the data collected for a watershed-wide data set that will be developed under the fiscal year 2014 CTP Agreement, EMW-2014-CA-00163, Mapping Activity Statement (MAS) 7, between FEMA and ANRC.

This document contains the Engagement Plan / Pre-Discovery Report for the entire Illinois Watershed. The digital data submitted with this report contains correspondence, exhibits to be used at the Discovery meetings, GIS data, mapping documents (PDF, shapefiles, personal geodatabases and ESRI ArcGIS 10.x Map Exchange Documents [MXDs]), or other supplemental information. Graphics in this Pre-Discovery Report are available as larger format graphics files for printing and as GIS data that may be printed and used at any map scale.

i. Watershed Selection

For the Discovery process, watersheds are selected and analyzed at the HUC-8 level and evaluated using three major factors (or trifecta factors): population, topographic data availability, and risk decile. Risk decile is calculated from nine parameters including total population density, historical population growth, predicted population growth, housing units, flood policies, single claims, repetitive losses, repetitive loss properties, and declared disasters.

The Illinois Watershed (HUC 11110103) encompasses an area of approximately 1,650 square miles, in two states (735 square miles in Arkansas and 915 square miles in Oklahoma), touches seven counties (Benton, Crawford and Washington in Arkansas, and Adair, Cherokee, Delaware, and Sequoyah in Oklahoma) and two Tribal Nations (Cherokee Nation and the United Keetoowah Band of Cherokee Indians). Major communities include portions of the cities of Bentonville, Fayetteville, Rogers, and Springdale in Arkansas and Tahlequah in Oklahoma. Smaller communities include all or portions of Bethel Heights, Cave Springs, Centerton, Elm Springs, Farmington, Gentry, Greenland, Highfill, Johnson, Lincoln, Little Flock, Lowell, Prairie Grove, Siloam Springs, Springtown, and Tontitown in Arkansas and Colcord, Kansas, Oaks, Stillwell, Watts, West Siloam Springs, and Westville in Oklahoma.

The Illinois Watershed was selected by the ANRC, the State of Arkansas CTP with FEMA Region 6, for the reasons summarized below.

- Topographic data (LiDAR) is available throughout the Upper Illinois Watershed aiding in providing quality data. Additionally, updated topographic data is being collected for Washington County as part of a FY14 (2014-2015) FEMA / USGS LIDAR project. Benton County is also pursuing updated topographic data through a USGS grant.
- The watershed is located in the region of Arkansas referred to as Northwest Arkansas, which has been growing rapidly over the last 15 years.
- Many Arkansas communities have been active partners with FEMA and ANRC in flood risk identification.
- All of the Arkansas communities participate in the NFIP.
- Recent disaster declarations for flooding occurred in 2011 and 2013, and localized flash flooding occurs frequently.

- Claims in Benton, Washington, and Crawford counties have exceeded $8 million from 1978 through March 2015, and there are over 1,700 policies. These reported values include entire cities / counties which may or may not be wholly located in the watershed.
- The Upper Illinois Watershed communities in AR have over 350 NFIP claims since 1978, which does not include flood losses on uninsured properties. There are also over 20 Repetitive Loss properties located in the watershed.
- During FEMA's past Map Modernization (Map Mod) activities, from approximately 2004 – 2005, for Washington and Benton Counties, the following items were noted:
    - The scoping process revealed community study requests for numerous streams that were not studied as part of the Map Mod projects.

FEMA looks to promote mitigation action within the watershed. After internal and partner review of the communities within the watershed, the following are overarching opportunities identified to promote community action within the watershed:

- The Illinois Watershed, within the State of Arkansas, has elevation data, which could be used by communities to pursue updated hydrologic and hydraulic studies and result in new and/or improved mapping of the Special Flood Hazard Areas (SFHAs), and
- Mitigation activities to reduce risk to life and property are being evaluated and may be underway in the watershed.

Table 1, NFIP Status of Project Area Communities, provides the current status for each community's NFIP participation, Community Rating System (CRS) rating, and Flood Insurance Rate Maps (FIRMs).

In Arkansas all of the counties and communities participate in the NFIP. To date, Benton County, the City of Bentonville and the City of Centerton are participating in the CRS program. Several other communities in the watershed have expressed an interest in joining the CRS program and are working with ANRC to consider the application process and implement the program locally.

In Oklahoma, the four counties and six of the ten communities are participating in the NFIP. The two Tribal Nations are in good standing with the NFIP but are self-insured, so they do not officially participate in the NFIP. Additionally, no communities are participating in CRS.

Table 1a: NFIP Status of Project Area Communities (Arkansas)

County	Community Name	Community Identification Number (CID)	Participating Community?	CRS Rating
Benton	Benton County Unincorporated Areas [1]	050419	Yes	8
Benton	Bentonville, City of [1]	050012	Yes	8
Benton	Bethel Heights, Town of	050386	Yes	N/A
Benton	Cave Springs, City of	050398	Yes	N/A
Benton	Centerton, City of [1]	050399	Yes	9
Benton	Gentry, City of	050324	Yes	N/A
Benton	Highfill, Town of [1]	050581	Yes	N/A
Benton	Little Flock, City of [1]	050479	Yes	N/A
Benton	Lowell, City of [1]	050342	Yes	N/A
Benton	Rogers, City of [1]	050013	Yes	N/A
Benton	Siloam Springs, City of	050014	Yes	N/A
Benton	Springdale, City of [1, 2]	050219	Yes	N/A
Benton	Springtown, Town of	050004	Yes	N/A
Crawford	Crawford County Unincorporated Areas [1]	050428	Yes	N/A
Washington	Washington County Unincorporated Areas [1]	050212	Yes	N/A
Washington	Elm Springs, City of [2]	050213	Yes	N/A
Washington	Farmington, City of	050215	Yes	N/A
Washington	Fayetteville, City of [1]	050216	Yes	N/A
Washington	Greenland, City of [1]	050217	Yes	N/A
Washington	Johnson, City of	050218	Yes	N/A
Washington	Lincoln, City of	050338	Yes	N/A
Washington	Prairie Grove, City of	050587	Yes	N/A
Washington	Springdale, City of [1, 2]	050219	Yes	N/A
Washington	Tontitown, Town of	050293	Yes	N/A

[1] Community is located within one or more HUC8 watersheds.

[2] Community in multiple counties.

Table 1b: NFIP Status of Project Area Communities (Oklahoma)

County	Community Name	Community Identification Number (CID)	Participating Community?	CRS Rating
Adair	Adair County Unincorporated Areas [1]	400501	Yes	N/A
Adair	Stillwell, City of [1]	400001	Yes	N/A
Adair	Watts, City of	400002	Yes	N/A
Adair	Westville, Town of	400003	Yes	N/A
Cherokee	Cherokee County Unincorporated Areas [1]	400488	Yes	N/A
Cherokee	Tahlequah, City of [1]	400037	Yes	N/A
Cherokee	Oaks, Town of [1]	400314	No	N/A
Delaware	Delaware County Unincorporated Areas [1]	400502	Yes	N/A
Delaware	Colcord, Town of [1]	400281	No	N/A
Delaware	Kansas, Town of [1]	400290	No	N/A
Delaware	West Siloam Springs, Town of	400339	Yes	N/A
Sequoyah	Sequoyah County Unincorporated Areas [1]	400503	Yes	N/A
Sequoyah	Gore, Town of [1]	400195	Yes	N/A
Sequoyah	Paradise Hill, Town of	400569	No	N/A
	Cherokee Nation[3]	400605	N/A	N/A
	United Keetoowah Band of Cherokee Indians[3]	405450	N/A	N/A

[1] Community is located within one or more HUC8 watersheds.

[2] Community is located in one or more counties.

[3] No geographically defined border.

Drainage and Flooding

The Illinois Watershed lies within the Arkansas River Basin. The watershed is a multi-state watershed, starting in the Ozark Mountains of Arkansas and flowing west into the hills of eastern Oklahoma. The Illinois River in Oklahoma flows into Tenkiller Ferry Lake and outlets to the Arkansas River just north of Interstate 40. The majority of the population in the Illinois Watershed is concentrated in the upper watershed in Arkansas.

Flood problems in the Illinois Watershed in Arkansas are generally the result of flash flooding on any (or all) of the Illinois River tributaries, which is consistent with the terrain. The flooding problems have persisted for some time due to the ongoing development and growth in northwest Arkansas which results in more population and development being located in areas with a greater flood risk.

The Illinois River in Oklahoma also has a history of flooding. The two highest river crests were recorded near Watts, OK in 2011. Additional reports of river crests nearing flood stage have occurred in 2013 and 2014.

The most significant flooding event in recent history was in April 2011 when over 7 days rainfall totals of 6" to 17" fell across northwest Arkansas and east central Oklahoma resulting in 5 fatalities. The Illinois River at Watts, OK reached a record crest of 28.51' on April 25, 2011 breaking the previous record from June 21, 2000. The Illinois River crest in Tahlequah on April 26, 2011 was 25.97' which was near the record crest of 27.94' on May 10, 1950. The effective SFHA mapping for all of the counties included in the Illinois Watershed were prepared prior to the historic rainfall and flooding recorded during the 2011 flood event. It is not known if high water marks were captured from the flood event and compared to the effective SFHAs in this watershed.

The primary river in the watershed is the Illinois River with its headwaters in Hogeye, Arkansas. The major tributaries to the Illinois River start in Arkansas and include Osage Creek, Flint Creek, Clear Creek, Muddy Fork, and Baron Fork. In Oklahoma, Tenkiller Ferry Lake is formed just downstream of the confluence of Baron Fork with the Illinois River and then outfalls to the Arkansas River.

Three Arkansas counties and four Oklahoma counties are part of the Illinois Watershed. As part of FEMA's Map Modernization program, Benton, Washington, and Crawford Counties in Arkansas received countywide digital Flood Insurance Rate Maps (DFIRMs) on September 28, 2007, May 16, 2008, and March 16, 2009 respectively. In Crawford County, the City of Van Buren completed a levee certification on the Arkansas River resulting in several updated FIRM panels dated 12/03/2010. Adair, Cherokee, Delaware, and Sequoyah Counties received their countywide DFIRMs on November 26, 2010, December 3, 2009, August 5, 2010, and September 29, 2010 respective.

From 2008 – 2010 the City of Rogers, AR funded a local master drainage plan that included acquisition of new topographic data used in updating hydrology, hydraulics, and floodplain mapping for 29 miles of streams in the City. During the same period of time the City of Bentonville, AR funding engineering analyses for approximately 8 miles of streams to update Zone A special flood hazard areas (SFHAs) to a detailed Zone AE SFHA with floodways. These community funded flood risk updates were then incorporated into an updated Benton County DFIRM dated June 5, 2012 by FEMA.

A summary of the community FIRM dates is included in Table 2, Community FIRM Status.

Table 2a: Arkansas Community FIRM Status

County	Community Name	Community Identification Number (CID)	FIRM Date	FIRM Status
Benton County	Unincorporated Benton County	050419	9/28/2007 & 6/05/2012	REVISED; Modernized Countywide; without Model Back Zone A SFHAs
Benton County	Bentonville, City of	050012	9/28/2007 & 6/05/2012	REVISED; Modernized Countywide; without Model Back Zone A SFHAs
Benton County	Bethel Heights, Town of	050386	9/28/2007 & 6/05/2012	REVISED; Modernized Countywide; without Model Back Zone A SFHAs
Benton County	Cave Springs, City of	050398	9/28/2007 & 6/05/2012	REVISED; Modernized Countywide; without Model Back Zone A SFHAs
Benton County	Centerton, City of	050399	9/28/2007 & 6/05/2012	REVISED; Modernized Countywide; without Model Back Zone A SFHAs
Benton / Washington County	Elm Springs, City of *	050213	9/28/2007, & 6/05/2012 / 5/16/2008	REVISED; Modernized Countywide; without Model Back Zone A SFHAs
Benton County	Gentry, City of	050324	9/28/2007 & 6/05/2012	REVISED; Modernized Countywide; without Model Back Zone A SFHAs
Benton County	Highfill, Town of	050581	9/28/2007 & 6/05/2012	REVISED; Modernized Countywide; without Model Back Zone A SFHAs
Benton County	Little Flock, City of	050479	6/05/2012	REVISED; Modernized Countywide; without Model Back Zone A SFHAs
Benton County	Lowell, City of	050342	9/28/2007 & 6/05/2012	REVISED; Modernized Countywide; without Model Back Zone A SFHAs
Benton County	Rogers, City of	050013	6/05/2012	REVISED; Modernized Countywide; without Model Back Zone A SFHAs
Benton County	Siloam Springs, City of	050014	9/28/2007 & 6/05/2012	REVISED; Modernized Countywide; without Model Back Zone A SFHAs
Benton / Washington County	Springdale, City of *	050219	9/28/2007, & 6/05/2012 / 5/16/2008	REVISED; Modernized Countywide; without Model Back Zone A SFHAs
Benton County	Springtown, Town of	050004	6/05/2012	REVISED; Modernized Countywide; without Model Back Zone A SFHAs
Crawford County	Unincorporated Crawford County	050428	3/16/2009 & 12/3/2010	REVISED; Modernized Countywide; without Model Back Zone A SFHAs
Washington County	Unincorporated Washington County	050212	5/16/2008	REVISED; Modernized Countywide; without Model Back Zone A SFHAs
Washington / Benton County	Elm Springs, City of *	050213	5/16/2008 / 9/28/2007 & 6/05/2012	REVISED; Modernized Countywide; without Model Back Zone A SFHAs

Table 2a: Arkansas Community FIRM Status (continued)

County	Community Name	Community Identification Number (CID)	FIRM Date	FIRM Status
Washington County	Farmington, City of	050215	5/16/2008	REVISED; Modernized Countywide; without Model Back Zone A SFHAs
Washington County	Fayetteville, City of	050216	5/16/2008	REVISED; Modernized Countywide; without Model Back Zone A SFHAs
Washington County	Greenland, City of	050217	5/16/2008	REVISED; Modernized Countywide; without Model Back Zone A SFHAs
Washington County	Johnson, City of	050218	5/16/2008	REVISED; Modernized Countywide; without Model Back Zone A SFHAs
Washington County	Lincoln, City of	050338	5/16/2008	REVISED; Modernized Countywide; without Model Back Zone A SFHAs
Washington County	Prairie Grove, City of	050587	5/16/2008	REVISED; Modernized Countywide; without Model Back Zone A SFHAs
Washington County	Springdale, City of *	050219	5/16/2008 / 9/28/2007 & 6/05/2012	REVISED; Modernized Countywide; without Model Back Zone A SFHAs
Washington County	Tontitown, Town of	050293	5/16/2008	REVISED; Modernized Countywide; without Model Back Zone A SFHAs

*Located in more than one county

Table 2b: Oklahoma Community FIRM Status

County	Community Name	Community Identification Number (CID)	FIRM Date	FIRM Status
Adair County	Unincorporated Adair County	400501	11/26/2010	REVISED; Modernized Countywide
Adair County	City of Stillwell	400001	11/26/2010	REVISED; Modernized Countywide
Adair County	Town of Westville	400002	11/26/2010	REVISED; Modernized Countywide
Adair County	City of Watts	400003	11/26/2010	REVISED; Modernized Countywide
Cherokee County	Unincorporated Cherokee County	400488	12/03/2009	REVISED; Modernized Countywide
Cherokee County	Town of Oaks	400314	12/03/2009	REVISED; Modernized Countywide
Cherokee County	City of Tahlequah	400037	12/03/2009	REVISED; Modernized Countywide
Delaware County	Unincorporated Delaware County	400502	08/05/2010	REVISED; Modernized Countywide
Delaware County	Town of Colcord	400281	08/05/2010	REVISED; Modernized Countywide
Delaware County	Town of Kansas	400290	08/05/2010	REVISED; Modernized Countywide
Delaware County	Town of West Siloam Springs	400339	08/05/2010	REVISED; Modernized Countywide
Sequoyah County	Unincorporated Sequoyah County	400503	09/30/2010	REVISED; Modernized Countywide
Sequoyah County	Town of Gore	400195	09/30/2010	REVISED; Modernized Countywide
Sequoyah County	Town of Paradise Hill	400569	09/30/2010	REVISED; Modernized Countywide
	Cherokee Nation	400605	N/A[1]	N/A
	United Keetoowah Band of Cherokee Indians	405450	N/A[1]	N/A

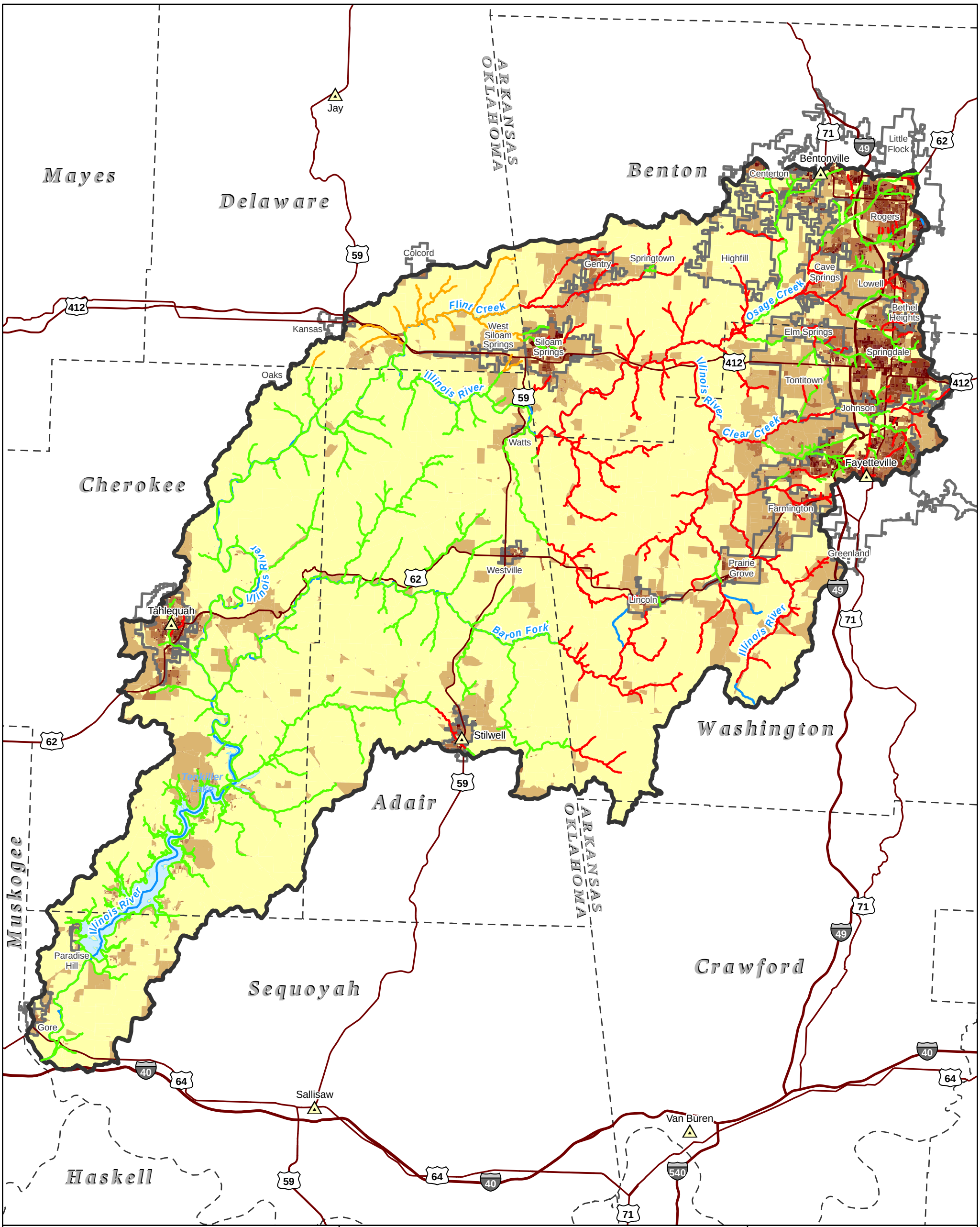
[1] *The Tribal Nations are not shown as having their CID on an effective FIRM and FIS for any countywide products in this watershed, as they have no geographically defined boundaries.*

Population

The population in this watershed totals approximately 330,000 people, based on the 2010 US Census. The cities in Arkansas make up the bulk of the population in the watershed accounting for a population over 270,000. The Fayetteville-Springdale-Rogers Metropolitan Statistical Area (MSA) referred to at Northwest Arkansas (NWA) has an estimated total population of nearly 500,000 and continues to be one of the faster growing areas in the U.S. While not all of the NWA communities are in the Illinois Watershed a large part of them are and the area continues to grow and develop. The Arkansas cities of Bentonville, Fayetteville, Springdale and Rogers have an estimated population in the watershed of approximately 186,000, accounting for nearly 70% Arkansas population in the watershed. In Oklahoma, the City of Tahlequah has the largest population in the watershed with over 15,000. The remaining population areas within Oklahoma are spread out over a fairly large area owing to the more rural nature of the watershed. Population estimates were computed using means such as GIS queries intersecting the 2010 Census Block data, political boundaries of the communities, percent of area included in the watershed, and the watershed boundary. This process allowed us to estimate the population within the watershed rather than the total community populations. A summary of the watershed populations are included in the Project Area Summary at the start of this report and a summary of the total community populations are included with Figure 1, Watershed and Communities Map, presented previously. Figure 2 shows the population densities (number of persons per square mile) within the Illinois Watershed based on 2010 US Census' Census Block Data and provides a clear understanding of where the population is concentrated in the Illinois Watershed.

Coordinated Needs Management Strategy

Included on Figure 2, and subsequent figures, is the Coordinated Needs Management Strategy (CNMS) Inventory. CNMS provides a snapshot of the status and attributes of currently studied streams existing within FEMA's floodplain study inventory. In general, the stream mileage shown in CNMS reflects streams with an approximately 1-square mile drainage area and that currently have effective SFHAs designated for them. CNMS does not reflect the total potential of stream miles to be studied within a watershed.



POPULATION DENSITY (2010)

ILLINOIS WATERSHED (HUC 11110103)

FEMA

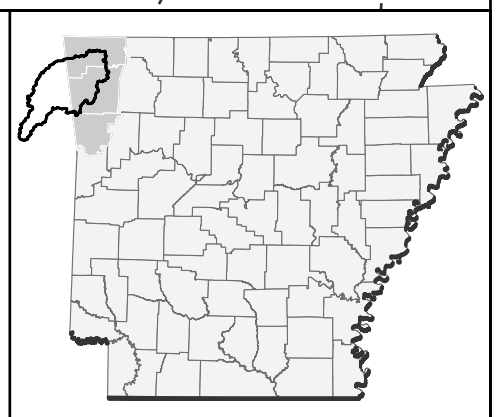
0 6 12 Miles

N W E S

County Seat
Interstate
U.S. Highway
County Boundary
City Limits
Major Reaches of Watershed
Large Waterbody
Illinois Watershed

CNMS Validation Status
Unverified
Assessed
Valid

Population per Sq. Mi. - 2010 Census
0 - 78
79 - 465
466 - 2,092
2,093 - 4,733
4,734 - 817,500,000



Project Location

FIGURE 2

DATE: 4/24/2015

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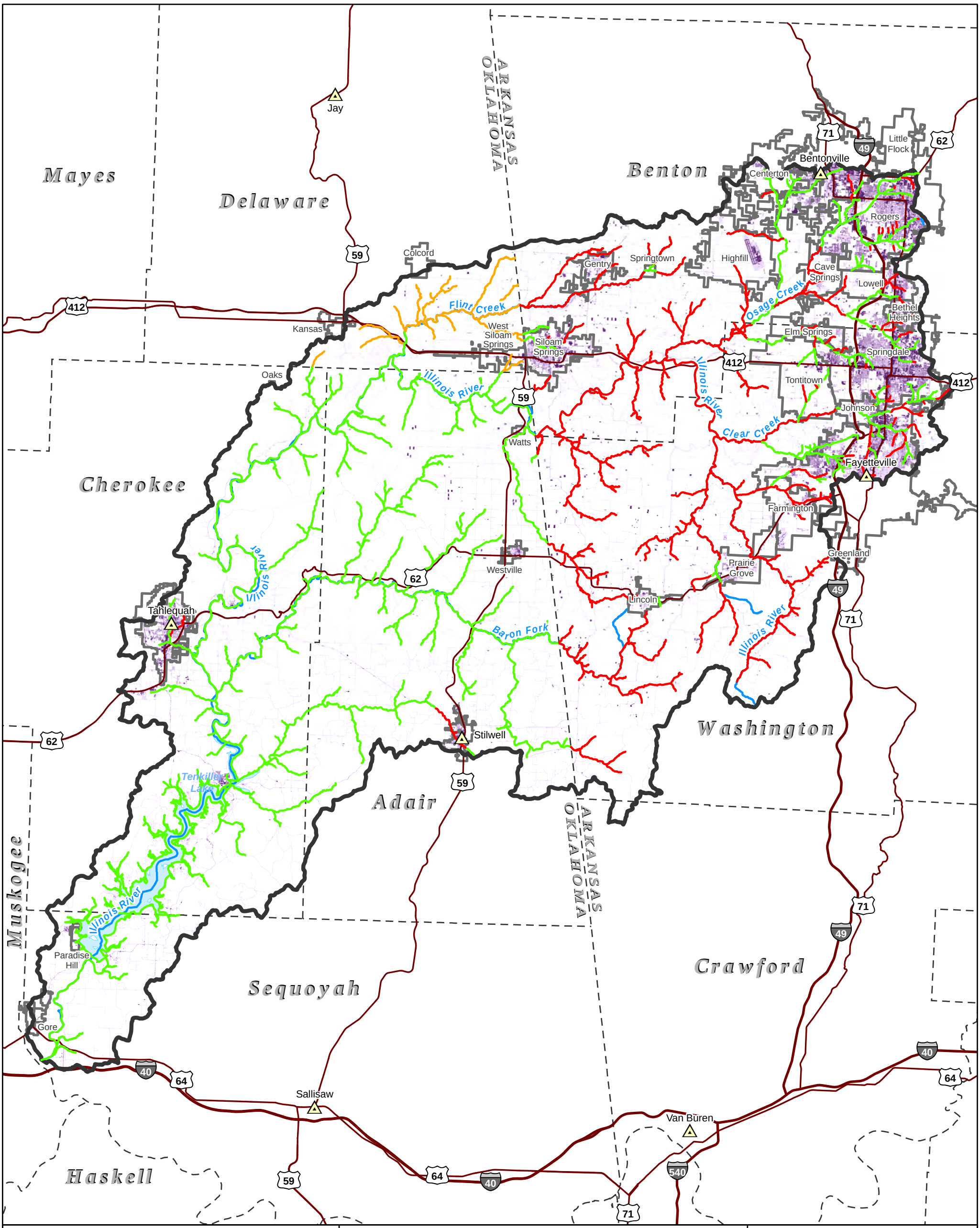
Landuse

The landuse of the Upper Illinois Watershed in Arkansas includes nearly equal parts of pasture and forest (46% and 41% respectively) and 13% urbanized areas. The forested areas are primarily deciduous hardwoods and are generally owned by private landowners. Lake Wedington which is located wholly within the watershed is part of a 24 square mile Ozark National Forest area. The majority of the landuse in the Upper Illinois Watershed is pasture and grassland/forage which is the dominant form of agriculture in the area, supporting both cattle and poultry. The urbanized areas are largely concentrated around the population centers of Fayetteville-Springdale-Rogers, and they continue to grow. As the NWA Region develops, the pastures are giving way to urban and forested areas. The land clearing and leveling has altered the hydrology in the Upper Illinois Watershed through various means, such as drainage structures, ditches and stream realignments. Changes in the flow regime in the watershed can be found in the long-term flow record for Osage Creek and the Illinois River near Savoy, Arkansas. These records indicate minimum flows have increased over the past two decades. (Watershed Based Management Plan for the Upper Illinois River Watershed, Northwest Arkansas, FTN 2012.)

In the Lower Illinois Watershed in Oklahoma, the landscape is more significantly rural. Tenkiller Ferry Lake is the primary water feature other than the Illinois River and Lake Francis in this watershed. Lake Francis is the water supply for Siloam Springs, AR. Tenkiller Lake supports significant economic stimulus by providing recreation, river floating, hunting, fishing, and water supply for Eastern Oklahoma. Agricultural and confined animal feeding operations (primarily poultry) with deciduous and pine forest land predominant in the area but being cleared for cattle grazing pasture, hay production, in-stream aggregate mining, contribute to most of the landuse activities outside of the incorporated communities (Comprehensive Basin Management Plan for the Illinois River Basin, Oklahoma Conservation Commission 1999). The National Landuse and Urban Change institute (NUCI) tracks landuse and urban change from 1983 to 2013 based on comparison of aerial and satellite imagery that has been categorized into several macros landuse categories. Imagery can be compared from year to year and a cumulative landuse and urban area change date set was developed. In this approximately 10-year window, three areas of Adair County Unincorporated Areas showed greater than 10% landuse change mostly likely documenting the change from forest to agricultural production or the development of updated transportation corridors. Only the City of Tahlequah showed notable urban change with an approximate 3% urban growth in this 10-year window. No other areas in the lower Illinois Watershed showed noticeable landuse or urban change. The U.S. Geological Survey (USGS) and National Oceanographic Atmospheric Administration (NOAA) have both characterized flood and storm events in this watershed.

Figure 3, Percent Impervious Cover, identifies where impervious cover, or percent impervious, is distributed throughout the watershed. As is apparent, the urban centers create the most impervious cover and may result in more “flashy” and more frequent flooding. Figure 4, Land Use Changes (2006 – 2011) shows where changes to landuse have occurred in the watershed from 2006 - 2011. These changes can be from pasture to urban, but they can also indicate forestry operations and land clearing for pasture.



PERCENT IMPERVIOUS COVER (2011)

ILLINOIS WATERSHED (HUC 11110103)

FEMA

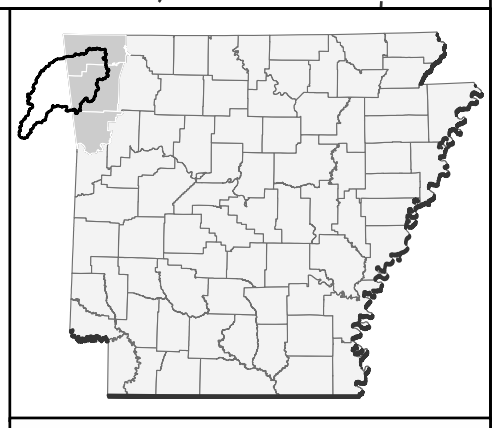
0 6 12 Miles

N W E S

County Seat
Interstate
U.S. Highway
County Boundary
City Limits
Major Reaches of Watershed
Large Waterbody
Illinois Watershed

CNMS Validation Status
Unverified
Assessed
Valid

Impervious Cover
1 - 25%
25 - 50%
50 - 75%
75 - 100%



Project Location

FIGURE 3

DATE: 4/24/2015

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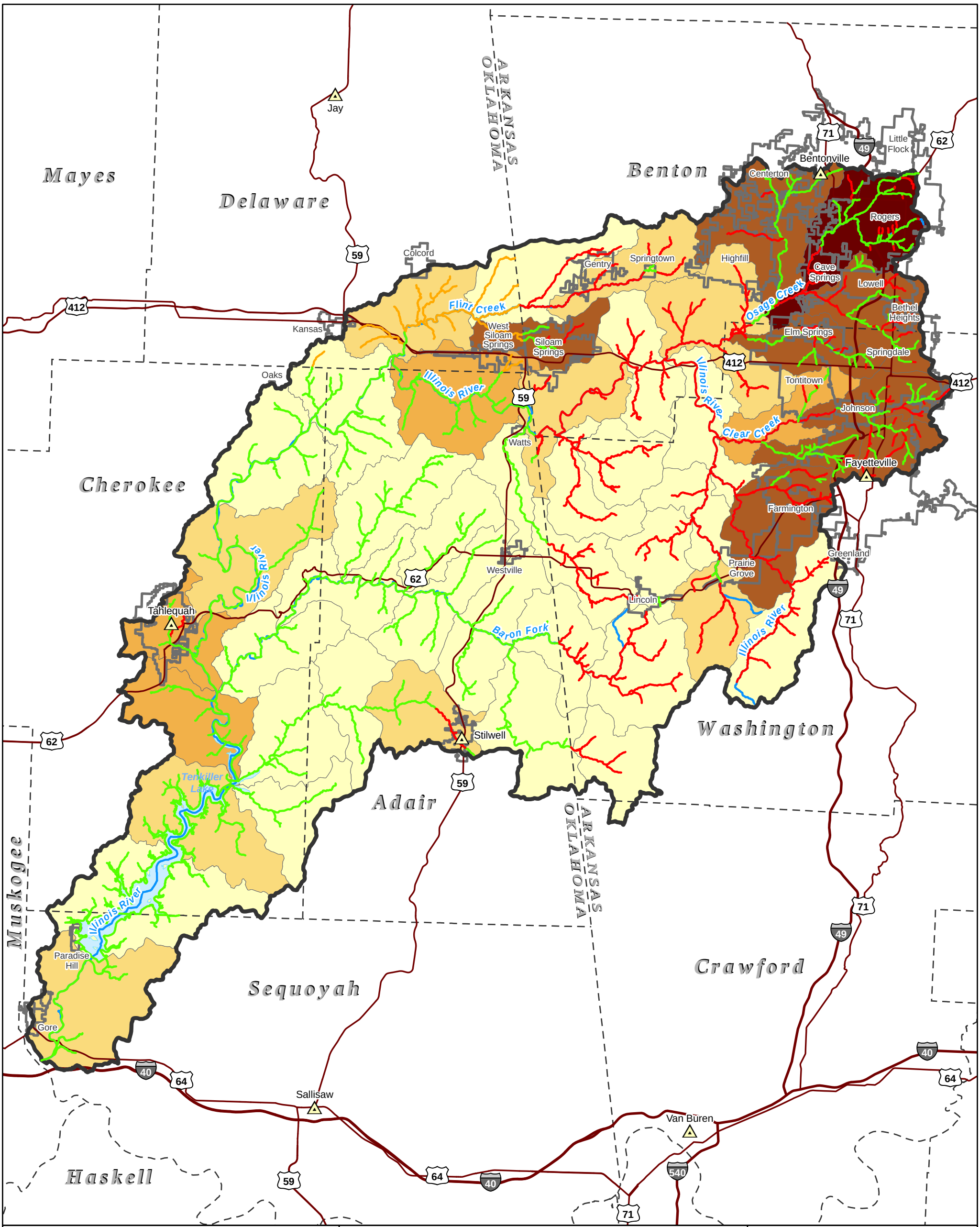

LAND USE CHANGES (2006 - 2011)

ILLINOIS WATERSHED (HUC 11110103)

FEMA

0 6 12 Miles

N W E S

County Seat
Interstate
U.S. Highway
County Boundary
City Limits
Major Reaches of Watershed
Large Waterbody
Illinois Watershed

CNMS Validation Status
Unverified
Assessed
Valid

Land Use Change (2006 - 2011)
Least
Most

Project Location

FIGURE 4

DATE: 4/24/2015

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Insurance Claims

Table 3, Total NFIP Insurance Claims, lists the number of NFIP insurance claims for the communities that touch the Watershed. Due to limitations on the physical locations of the claims data, the graphical locations were developed using street addresses, where available, but modified to comply with privacy requirements. All locations reported are approximate and are near and/or within the boundary of the Illinois Watershed. Flood losses for uninsured properties are not captured in this data.

In Arkansas, the majority of the claims have occurred in the cities of Fayetteville, Rogers, and Springdale, and the Unincorporated Areas of Benton County. The NFIP claims reported are identified either as those within the SFHA or those outside of the SFHA. Claims outside of the SFHA are identified specifically as BCX Claims, which refers to an older Zone naming convention that included Zones B, C, or X, all of which are considered outside of the SFHA. Of note is Siloam Springs and Johnson, where more than two-thirds of the claims occurred are outside of the SFHA.

In Oklahoma, NFIP claims activity is relatively small compared to the Arkansas side, however approximately 53 percent have been filed in the Unincorporated Areas of Cherokee County following by Unincorporated Areas of Adair County and the City of Tahlequah.

Figure 5, Claims Activity, provides a graphical representation of the NFIP insurance claims activity within the Illinois Watershed.

In addition to NFIP claims activity, there are several Repetitive Loss (RL) or Severe Repetitive Loss (SRL) properties within the Illinois Watershed shown on Figure 6, Repetitive and Severe Repetitive Loss Claims. Table 4, Repetitive or Severe Repetitive Loss within the Watershed, also summarizes RL and SRL claims by county and community. A RL property can be either residential or commercial, although a severe repetitive loss property is only a residential property. A Repetitive Loss (RL) property is any insurable building for which two or more claims of more than $1,000 were paid by the NFIP within any rolling ten-year period, since 1978. A RL property may or may not be currently insured by the NFIP. FEMA's Repetitive Loss (RL) properties strategy is to eliminate or reduce the damage to property and the disruption to life caused by repeated flooding of the same properties. The main concentration of these properties in the Illinois Watershed is in the Cities of Farmington and Fayetteville in AR, and in Adair and Cherokee Counties in Oklahoma. No SRL properties have been identified in the Illinois Watershed. Repetitive or Severe Repetitive Loss within the Watershed are also displayed on the Discovery Map, which will be made available at the Discovery meetings and is included in the supplemental digital data to be provided at the conclusion of the Discovery process.

Table 3a: Total NFIP Insurance Claims (Arkansas)

Total NFIP Insurance Claims by Community in Arkansas*		
County	**Community**	**Claims**
Benton (AR)	Bentonville, City Of	11
Benton (AR)	Bethel Heights, Town Of	0
Benton (AR)	Cave Springs, City Of	1
Benton (AR)	Centerton, City Of	0
Benton (AR)	Gentry, City Of	0
Benton (AR)	Highfill, Town Of	0
Benton (AR)	Little Flock, City Of	0
Benton (AR)	Lowell, City Of	2
Benton (AR)	Rogers, City Of	43
Benton (AR)	Siloam Springs, City Of	15
Benton (AR)	Springtown, Town Of	0
Benton (AR)	Benton County (Unincorporated Areas)	32
Crawford (AR)	Crawford County (Unincorporated Areas)	0
Washington / Benton (AR)	Elm Springs, City Of	3
Washington (AR)	Farmington, City Of	21
Washington (AR)	Fayetteville, City Of	84
Washington (AR)	Greenland, City Of	0
Washington (AR)	Johnson, City Of	19
Washington (AR)	Lincoln, City Of	0
Washington (AR)	Prairie Grove, City Of	0
Washington / Benton (AR)	Springdale, City Of	26
Washington (AR)	Tontitown, Town Of	1
Washington (AR)	Washington County (Unincorporated Areas)	10

*Claims reported are approximate based on limited location information and watershed extents.

Table 3b: Total NFIP Insurance Claims (Oklahoma)

Total NFIP Insurance Claims by Community *		
County	**Community**	**Claims**
Adair (OK)	Stilwell, City of	1
Adair (OK)	Watts, City of	1
Adair (OK)	Westville, Town of	1
Adair (OK)	Adair County (Unincorporated Areas)	13
Cherokee (OK)	Tahlequah, City of	11
Cherokee (OK)	Oaks, Town of	0
Cherokee (OK)	Cherokee County (Unincorporated Areas)	39
Delaware (OK)	Colcord, Town of	0
Delaware (OK)	Kansas, Town of	0
Delaware (OK)	West Siloam Springs, Town of	0
Delaware (OK)	Delaware County (Unincorporated Areas)	4
Sequoyah (OK)	Gore, Town of	0
Sequoyah (OK)	Paradise Hill, Town of	0
Sequoyah (OK)	Sequoyah County (Unincorporated Areas)	4
(Multiple in OK)	Cherokee Nation	N/A
(Multiple in OK)	United Keetoowah Band of Cherokee Indians	N/A

*Claims information for Oklahoma provided by RAMPP.

Table 4a: Repetitive or Severe Repetitive Loss within the Watershed (Arkansas)

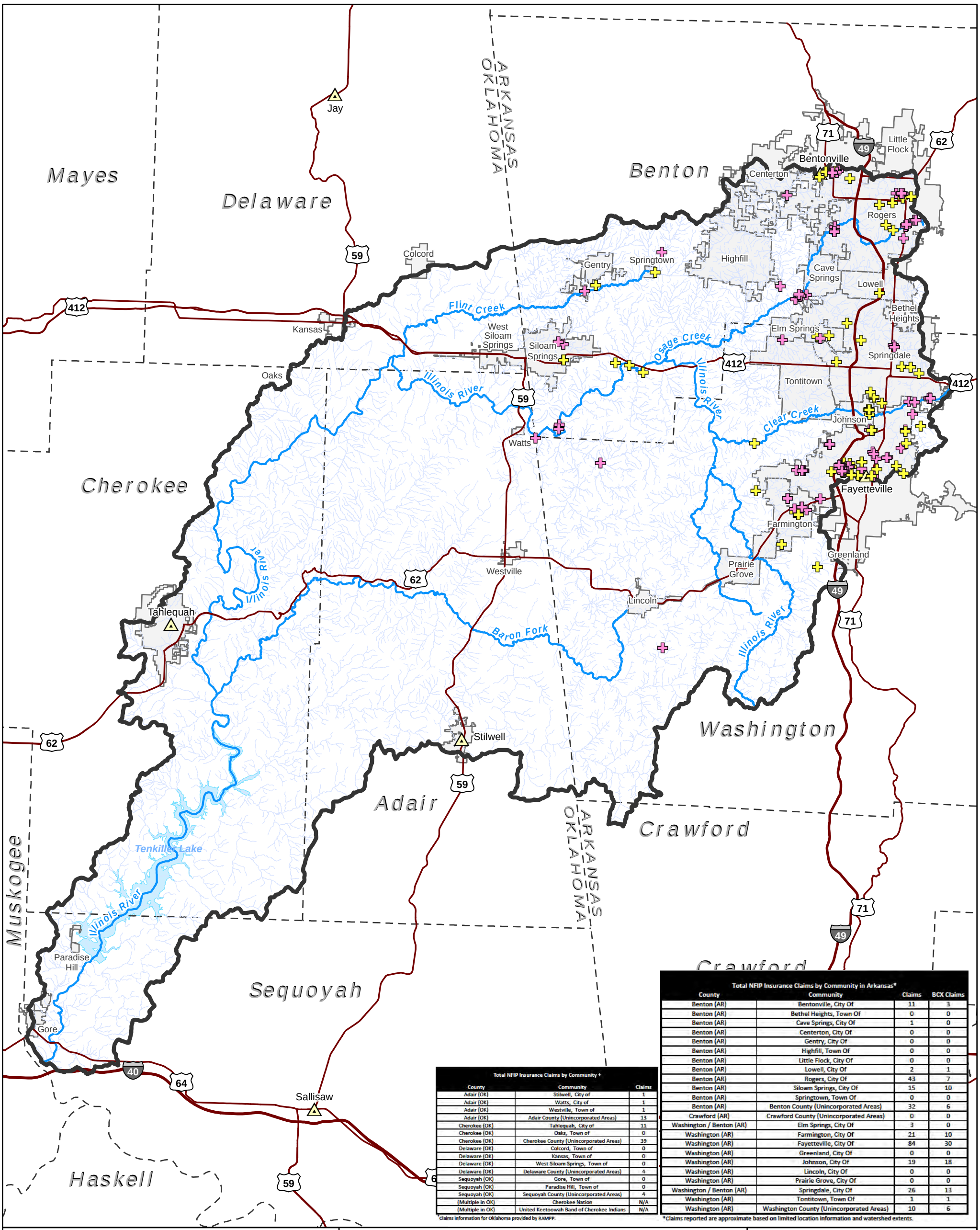
Repetitive Losses/Severe Repetitive Losses By Community *			
Community	Number of Properties	Total Claims	Average Number of Claims Per Property
Bentonville, City Of	0	0	0
Bethel Heights, Town Of	0	0	0
Cave Springs, City Of	0	0	0
Centerton, City Of	0	0	0
Gentry, City Of	0	0	0
Highfill, Town Of	0	0	0
Little Flock, City Of	0	0	0
Lowell, City Of	0	0	0
Rogers, City Of	2	4	2.00
Siloam Springs, City Of	2	6	3.00
Springtown, Town Of	0	0	0
Benton County (Unincorporated Areas)	3	7	2.33
Crawford County (Unincorporated Areas)	0	0	0
Elm Springs, City Of	0	0	0
Farmington, City Of	5	11	2.20
Fayetteville, City Of	5	12	2.40
Greenland, City Of	0	0	0
Johnson, City Of	2	4	2.00
Lincoln, City Of	0	0	0
Prairie Grove, City Of	0	0	0
Springdale, City Of	2	5	2.50
Tontitown, Town Of	0	0	0
Washington County (Unincorporated Areas)	1	2	2.00

* Numbers reported are approximate based on limited location information and watershed extents.

Table 4b: Repetitive or Severe Repetitive Loss within the Watershed (Oklahoma)

Repetitive Losses/Severe Repetitive Losses By Community *	
Community	**Total Claims**
Stilwell, City of	0
Watts, City of	0
Westville, Town of	0
Adair County (Unincorporated Areas)[1]	6
Tahlequah, City of	2
Oaks, Town of	0
Cherokee County (Unincorporated Areas)	0
Colcord, Town of	0
Kansas, Town of	6
West Siloam Springs, Town of	0
Delaware County (Unincorporated Areas)	0
Gore, Town of	0
Paradise Hill, Town of	0
Sequoyah County (Unincorporated Areas)	0
Cherokee Nation	N/A
United Keetoowah Band of Cherokee Indians	N/A

[1] RL for HUC-12 sub-basins in Adair County Unincorporated Areas are mostly likely on the Arkansas side of the watershed. Only counts are provided for the HUC-12. No individual claim information is available for this location from the records for the State of Oklahoma.



Total NFIP Insurance Claims by Community †		
County	Community	Claims
Adair (OK)	Stilwell, City of	1
Adair (OK)	Watts, City of	1
Adair (OK)	Westville, Town of	1
Adair (OK)	Adair County (Unincorporated Areas)	13
Cherokee (OK)	Tahlequah, City of	11
Cherokee (OK)	Oaks, Town of	0
Cherokee (OK)	Cherokee County (Unincorporated Areas)	39
Delaware (OK)	Colcord, Town of	0
Delaware (OK)	Kansas, Town of	0
Delaware (OK)	West Siloam Springs, Town of	0
Delaware (OK)	Delaware County (Unincorporated Areas)	4
Sequoyah (OK)	Gore, Town of	0
Sequoyah (OK)	Paradise Hill, Town of	0
Sequoyah (OK)	Sequoyah County (Unincorporated Areas)	4
(Multiple in OK)	Cherokee Nation	N/A
(Multiple in OK)	United Keetoowah Band of Cherokee Indians	N/A

†Claims information for Oklahoma provided by RAMPP.

Total NFIP Insurance Claims by Community in Arkansas*			
County	Community	Claims	BCX Claims
Benton (AR)	Bentonville, City Of	11	3
Benton (AR)	Bethel Heights, Town Of	0	0
Benton (AR)	Cave Springs, City Of	1	0
Benton (AR)	Centerton, City Of	0	0
Benton (AR)	Gentry, City Of	0	0
Benton (AR)	Highfill, Town Of	0	0
Benton (AR)	Little Flock, City Of	0	0
Benton (AR)	Lowell, City Of	2	1
Benton (AR)	Rogers, City Of	43	7
Benton (AR)	Siloam Springs, City Of	15	10
Benton (AR)	Springtown, Town Of	0	0
Benton (AR)	Benton County (Unincorporated Areas)	32	6
Crawford (AR)	Crawford County (Unincorporated Areas)	0	0
Washington / Benton (AR)	Elm Springs, City Of	3	0
Washington (AR)	Farmington, City Of	21	10
Washington (AR)	Fayetteville, City Of	84	30
Washington (AR)	Greenland, City Of	0	0
Washington (AR)	Johnson, City Of	19	18
Washington (AR)	Lincoln, City Of	0	0
Washington (AR)	Prairie Grove, City Of	0	0
Washington / Benton (AR)	Springdale, City Of	26	13
Washington (AR)	Tontitown, Town Of	1	1
Washington (AR)	Washington County (Unincorporated Areas)	10	6

*Claims reported are approximate based on limited location information and watershed extents.

CLAIMS ACTIVITY

ILLINOIS WATERSHED (HUC 11110103)

FEMA

0 6 12 Miles

N W E S

County Seat
Interstate
U.S. Highway
County Boundary
City Limits
Major Reaches of Watershed
Other Waters
Large Waterbody
Illinois Watershed

NFIP Insurance Claims

BCX Claims (Outside SFHA)
Claims (Inside SFHA)

Project Location

FIGURE 5

DATE: 5/20/2015

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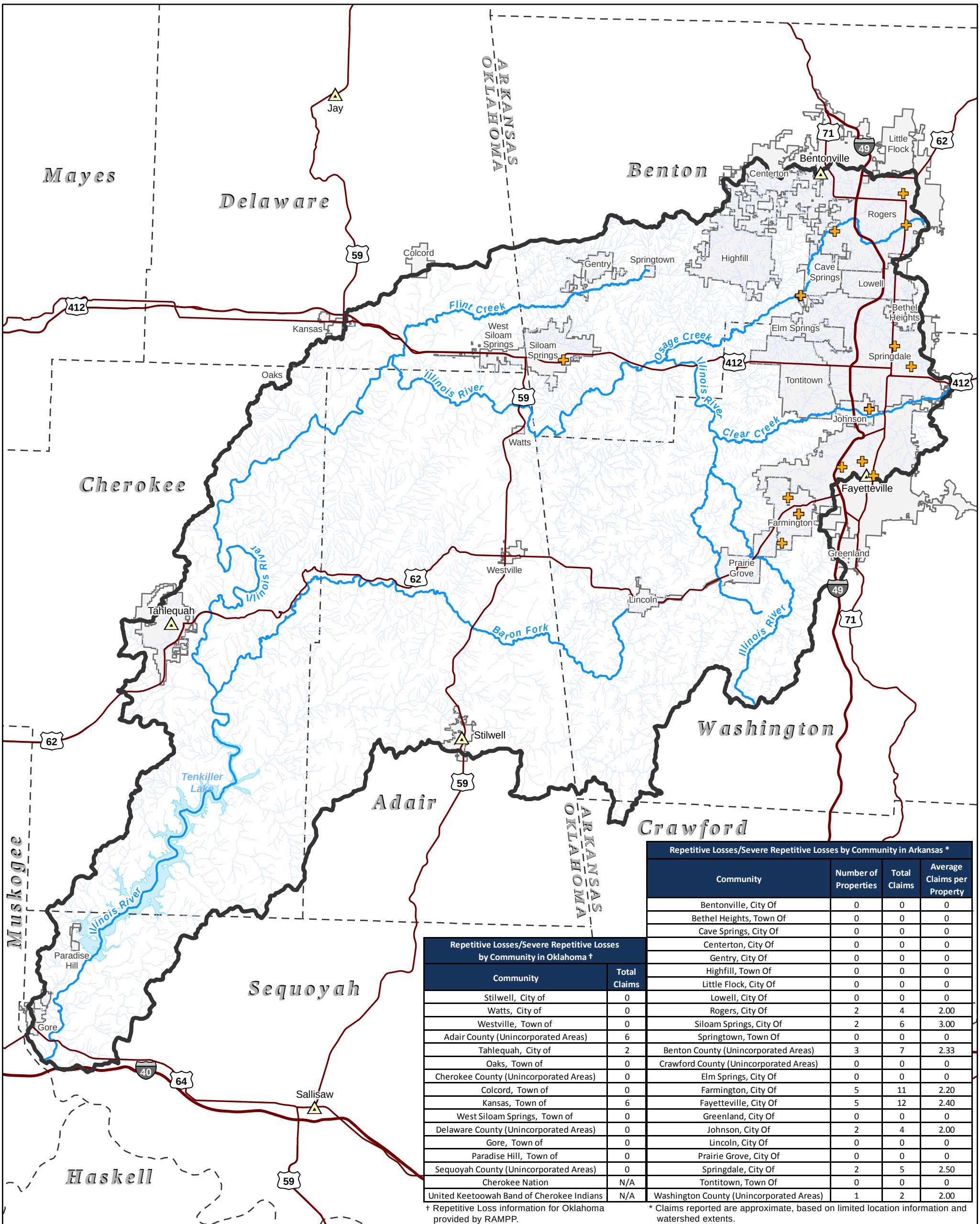


Repetitive Losses/Severe Repetitive Losses by Community in Oklahoma †	
Community	Total Claims
Stilwell, City of	0
Watts, City of	0
Westville, Town of	0
Adair County (Unincorporated Areas)	6
Tahlequah, City of	2
Oaks, Town of	0
Cherokee County (Unincorporated Areas)	0
Colcord, Town of	0
Kansas, Town of	6
West Siloam Springs, Town of	0
Delaware County (Unincorporated Areas)	0
Gore, Town of	0
Paradise Hill, Town of	0
Sequoyah County (Unincorporated Areas)	0
Cherokee Nation	N/A
United Keetoowah Band of Cherokee Indians	N/A

† Repetitive Loss information for Oklahoma provided by RAMPP.

Repetitive Losses/Severe Repetitive Losses by Community in Arkansas *			
Community	Number of Properties	Total Claims	Average Claims per Property
Bentonville, City Of	0	0	0
Bethel Heights, Town Of	0	0	0
Cave Springs, City Of	0	0	0
Centerton, City Of	0	0	0
Gentry, City Of	0	0	0
Highfill, Town Of	0	0	0
Little Flock, City Of	0	0	0
Lowell, City Of	0	0	0
Rogers, City Of	2	4	2.00
Siloam Springs, City Of	2	6	3.00
Springtown, Town Of	0	0	0
Benton County (Unincorporated Areas)	3	7	2.33
Crawford County (Unincorporated Areas)	0	0	0
Elm Springs, City Of	0	0	0
Farmington, City Of	5	11	2.20
Fayetteville, City Of	5	12	2.40
Greenland, City Of	0	0	0
Johnson, City Of	2	4	2.00
Lincoln, City Of	0	0	0
Prairie Grove, City Of	0	0	0
Springdale, City Of	2	5	2.50
Tontitown, Town Of	0	0	0
Washington County (Unincorporated Areas)	1	2	2.00

* Claims reported are approximate, based on limited location information and watershed extents.

REPETITIVE AND SEVERE REPETITIVE LOSS CLAIMS

ILLINOIS WATERSHED (HUC 11110103)

FEMA

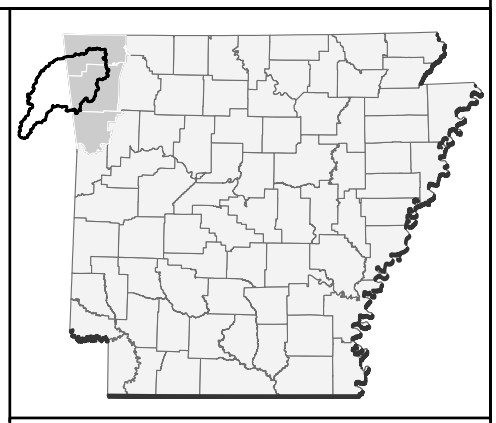
N W E S

0 6 12 Miles

County Seat
Interstate
U.S. Highway
County Boundary
City Limits
Major Reaches of Watershed
Other Waters
Large Waterbody
Illinois Watershed

Repetitive Losses

Severe Repetitive Loss
Repetitive Loss



Project Location

FIGURE 6

DATE: 4/24/2015

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Disaster Declarations

The Illinois Watershed has had a history of flooding as demonstrated by numerous presidential disaster declarations issued in the past. Table , Disaster Declarations in the Watershed, lists disaster declarations for multiple hazards within the watershed. Please note that "Severe Storm" typically includes flooding and in some cases tornadoes.

Table 5: Disaster Declarations in the Watershed

Watershed Counties Declared	Number of Disaster Declarations per Hazard *							
	Drought	Flood	Hurri-cane	Winter Storm (Ice/ Snow)	Severe Storm	Tornado	Fire	TOTAL
Benton County, AR	1	5	1	3	7	0	0	17
Crawford County, AR	1	3	1	4	7	2	0	18
Washington County, AR	0	3	1	3	5	0	0	12
Adair County, OK	0	4	1	4	9	0	1	19
Cherokee County, OK	0	3	1	5	8	0	0	17
Delaware County, OK	0	3	1	5	12	0	0	21
Sequoyah County, OK	0	4	1	5	11	0	0	21

* Time period of 1967 - January 2015

Risk Decile

The Risk Decile is calculated from nine parameters: total population density, historical population growth, predicted population growth, housing units, flood policies, single claims, repetitive losses, repetitive loss properties, and declared disasters. The scale of Risk Decile ranking is 1-10 with 1 being the highest and 10 being the lowest ranking for a portion of the watershed.

Watershed Rankings

For the Discovery process, watersheds are selected and analyzed at the HUC-8 level and evaluated using three major factors (or trifecta factors): population, topographic data availability, and risk decile. Table 6 lists the overall rankings of the Illinois Watershed when compared nationally and regionally to other HUC-8 watersheds. Nationally, this HUC's risk decile rating ranks between 0% and 25% of HUC-8s in the United States. This information, along with rankings of smaller HUC-12 subbasins, helps identify stream segments or locations where risk evaluation can be targeted. The combination of factors is important in the selection of a watershed for a Discovery Project.

Table 6a: Watershed Risk Factor Rankings (Arkansas)

Illinois Watershed Selection Rankings			
National Risk Factor Rank:	237	Region 6 Risk Factor Rank:	154
National Risk Decile:	2	Region 6 Risk Decile:	2
Average Annualized Loss (AR):	$5,809,000	Average Annualized Loss (AR):	$5,809,000
National Average Annualized Loss Rank:	0 - 25	Region 6 Average Annualized Loss Rank:	0 - 25
National Overall Rank:	237	Region 6 Overall Rank:	154

Table 6b: Watershed Risk Factor Rankings (Oklahoma)

Illinois Watershed Selection Rankings*			
National Risk Factor Rank:	21,490	Region 6 Risk Factor Rank:	237
National Risk Decile:	3	Region 6 Risk Decile:	2
Average Annualized Loss:	$5,100,000	Average Annualized Loss:	$5,100,000
National Average Annualized Loss Rank:	0 - 25	Region 6 Average Annualized Loss Rank:	0 - 25
National Overall Rank:	20,984	Region 6 Overall Rank:	237

* National Risk Factors averaged for the HUC 12 sub-basin level for just the Oklahoma side of the watershed. Region 6 Risk Factors are summarized only at the HUC 8 level for both the AR and OK sides combined (except for the AAL dollars)

Topographic Data

Several topographic acquisitions have been sponsored by the communities within northwest Arkansas in recent history and updates continue to be pursued. In 2004 Benton and Washington Counties worked together and through the Northwest Arkansas Regional Planning Commission (NWARPC) to have LIDAR data collected across the two county area. The resulting dataset included topographic data with an accuracy of approximately 2- to 4-ft for the area. For the initial Map Modernization Countywide DFIRM production in both Benton and Washington Counties that occurred between 2005 and 2008 the seamless countywide topographic dataset supporting 2- to 4-ft contours was used in lieu of integrating both the countywide dataset and the smaller pieces of topography in/around the communities that may have been at a higher accuracy but not as recent.

Additionally in 2008 – 2009, investments in the local topographic data were done by Incorporated and Unincorporated Areas of Benton and Washington Counties; however, only the portions of the Unincorporated Areas of Washington County near the population centers were included in this update. The latest topographic acquisition in 2008 - 2009 was again financed through the local consortium of communities in the two county area to collect and process topographic data with an accuracy of 2-ft or

better. The updated topographic data was then utilized by the Cities of Rogers and Bentonville in performing updated flood mapping. The investments of these communities in updated topographic data and in updated flood studies resulted in a Physical Map Revision for portions of Benton County, including the Cities of Rogers, Bentonville, and Centerton. The current FIRMs for Incorporated and Unincorporated Benton County includes both the 2004 and the 2009 topographic data. Those portions of Benton County that were not included in the PMR of 2010-2012 would see the quality of SFHA mapping improve with the use of the 2009 topographic data acquisition funding locally.

A 2014-2015 LIDAR acquisition project initiated through FEMA and USGS is currently collecting and processing LIDAR topographic data for Washington County, AR, which will be available in late 2015. The Washington County, AR LIDAR acquisition currently underway would improve the quality of the SFHA mapping throughout Unincorporated Washington County, but it would also improve the quality of the mapping done in the Cities within Washington County as well, including Fayetteville, Springdale, Farmington, and Prairie Grove.

Several of the Oklahoma communities in the Illinois Watershed have quality elevation data, albeit somewhat dated. Unincorporated Cherokee County has 2-ft contours collected in 1987, the City of Stilwell and Unincorporated Sequoyah County have 2-ft contours they collected locally in 1989, and Unincorporated Delaware County has 4-ft contours they collected in 1999. For the remainder of the lower Illinois Watershed (OK) the topographic data source is USGS 10m DEM's. There is no known plan for LIDAR acquisition in the Oklahoma portion of the watershed.

Coordinated Needs Management Strategy

The primary stream in the Illinois Watershed is the Illinois River, which has its headwaters in Hogeye, Arkansas. The Illinois River is joined by the Clear Creek, Muddy Fork, Osage Creek Flint Creek and Baron Creek before it forms Tenkiller Ferry Lake and outfalls into the Arkansas River. Within Arkansas and Oklahoma there are many smaller tributaries throughout the watershed that make up the SFHA's across the region. The USGS provides a National Hydrologic Dataset (NHD) that can be used to identify stream miles that reflect drainage areas of 1 square mile or greater from available topographic data. The NHD stream mileage may be used to gain a sense of the total potential stream miles for a watershed. Using the NHD, there are approximately 5,023 miles of streams in the Illinois Watershed, 2,735 stream miles in Arkansas and 2,288 stream miles in Oklahoma.

The CNMS Inventory provides a snapshot of the status and attributes of currently studied streams existing within FEMA's floodplain study inventory. In general, the stream mileage shown in CNMS reflects streams with an approximately 1 square mile drainage area or that currently have effective SFHAs designated for them. CNMS does not reflect the total potential of stream miles to be studied within a watershed.

In addition to listing the miles of studied streams within a watershed, CNMS documents certain other factors, such as physiological, climate, or engineering methods that may have changed since the date of the effective study. The stream miles shown in CNMS are attributed with an evaluation of a Validation Status and Status Type that allows an examination of the condition of a given study or group of studies. Studies which are considered Valid in CNMS are studies which contribute to the New, Validated, or Updated Engineering (NVUE) metric.

The NVUE metric is used as an indicator of the status of studies for FEMA's mapped SFHA Inventory. Those studies categorized as "Unverified" typically indicate that there are some factor(s) of change since the SFHA became effective or may have a deficiency warranting restudy. CNMS stream mileage categorized as "Requires Assessment" indicates further input is needed to determine their validity – often

because they represent paper inventory or non-modernized studies. During pre-Discovery of the Illinois Watershed no streams were found to be categorized as "Requires Assessment" although that may change once Discovery is completed. CNMS aids in identifying areas to consider for study during the Discovery process by highlighting needs on a map, quantifying them (mileage), and providing further categorization of these needs in order to differentiate factors that identify the needs.

Table , NVUE Approximate Stream Mileage in the Watershed, compares the NHD data to the CNMS data and summarizes the Validated NVUE stream mileage from CNMS for the watershed.

Table 7a: NVUE Approximate Stream Mileage in the Watershed (Arkansas)

NVUE Validation	Stream Miles
NHD Streams (Arkansas) (streams with a drainage area of greater than 1 square mile)	2,735
CNMS Streams	513
Stream Miles not accounted for in CNMS	2,227
CNMS Valid Zone AE / AH Stream Miles	110
CNMS Valid Zone A Stream Miles	38
CNMS Unverified Zone AE / AH Stream Miles	17
CNMS Unverified Zone A Stream Miles	343
CNMS Zone AE / AH Stream Miles Requiring Further Assessment or in the process of being studied	0
CNMS Zone A Stream Miles Requiring Further Assessment	0
Stream Miles not accounted for in CNMS as there are no effective SFHAs (sum of the below)	5
Stream Miles not accounted for in CNMS that would fall in land that *could be* developed	5
Stream Miles not accounted for in CNMS that would fall in land that *could not be* developed	0

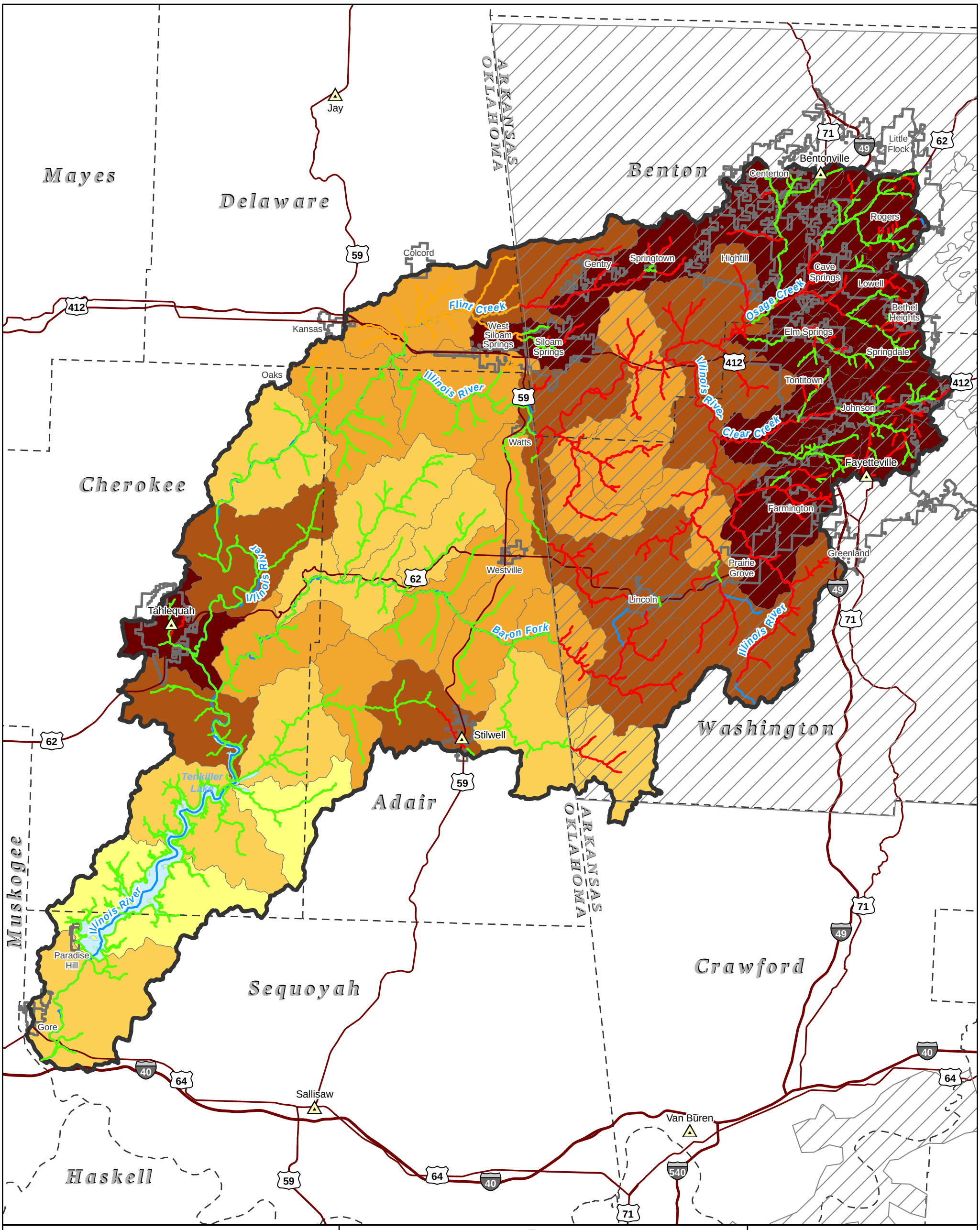
Within the Illinois Watershed in Arkansas, and using these criteria from CNMS, approximately 343 miles of Zone A streams and *17* miles of Zone AE streams were identified as being "Unverified" and as such are candidates for updated analysis. Streams included in the unverified grouping include portions of Christie Creek, Futrall Branch, Mud Creek Tributary, Osage Tributary 1, Owl Creek, Scull creek, Scull Creek Tributary 2, Tributary 3 to Spring Creek, and Turtle Creek Tributary 1A. Additionally, 38 miles of Zone A stream miles and 110 miles of Zone AE stream miles within the watershed were characterized as being Valid and included in the NVUE metrics. The unverified Zone A stream miles are characterized as unverified due to the absence of hydraulic model data or other analysis known to support the mapping.

Table 4b: NVUE Approximate Stream Mileage in the Watershed (Oklahoma)

NVUE Validation	Stream Miles
NHD Streams (streams with a drainage area of greater than 1 square mile)	2,288
NFHL Total Miles	1,846
CNMS Streams	567
Stream Miles not accounted for in CNMS	770
CNMS Valid Zone AE / AH Stream Miles	26
CNMS Valid Zone A Stream Miles	443
CNMS Unverified Zone AE / AH Stream Miles	6
CNMS Unverified Zone A Stream Miles	48
CNMS Zone AE / AH Stream Miles Requiring Further Assessment or in the process of being studied	0
Potentially Unmapped or Unverified Total Miles	770
Difference between NHD and NFHL	442
Difference between NFHL SFHA and CNMS SHFA	274
CNMS Unverified	54

Within the Illinois Watershed in Oklahoma, most of the populated areas have effective SFHAs recently updated within the last five-years. The effective FIRMs show 1,846 stream miles out of the 2,288 NHD stream miles that have been calculated using USGS information. Of these stream miles in the watershed, 567 are cataloged under FEMA's CNMS database as having a drainage area of one square mile. Approximately 469 stream miles of the CNMS data are considered to have new, validated, or updated engineering information. This leaves approximately 54 miles of stream with an unknown or unverified status for the effective SFHAs as a sub-part of the total of 770 stream miles that potentially could have some kind of modernized flood hazard area established.

Figure 7, Risk, Needs, and Topographic Data in the Watershed, provides a snapshot of CNMS factors or needs for each stream segment, the HUC-12 risk decile, and the availability of topographic data. The combination of these three factors contributed to the selection of Illinois Watershed for a Discovery Project.



RISK, NEEDS, AND TOPOGRAPHIC DATA

ILLINOIS WATERSHED (HUC 11110103)

FEMA

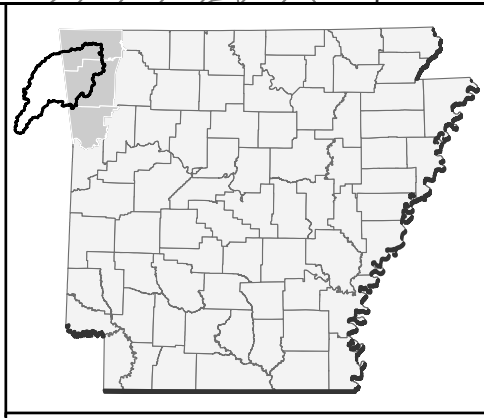
0 6 12 Miles

N W E S

County Seat
Interstate
U.S. Highway
County Boundary
City Limits
Major Reaches of Watershed
Large Waterbody
Illinois Watershed
LiDAR available

CNMS Validation Status
Unverified
Assessed
Valid

Density Risk Decile
High
Low



Project Location

FIGURE 7

DATE: 4/24/2015

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Congressional Representation

In order to achieve success with any Region 6 Risk MAP project, members of Congress and their staff, and the local media, must be give the opportunity to become aware of and understand the study process. Not only will their understanding enable them to communicate effectively about the study details and process, it allows for greater collaboration and coordination.

Representing the Upper Illinois Watershed in Arkansas are two U.S Senators, one member of the U.S. House of Representatives, six Arkansas State Senators, and sixteen (16) members of the Arkansas House of Representatives. Representing the lower Illinois Watershed in Oklahoma are 2 U.S. Senators, one member from the U.S. House of Representatives, four Oklahoma State Senators, and four members of the Oklahoma House of Representatives.

Table 8 and Table 9 provide a tabular summary of the U.S. and State Congressionals for the Illinois Watershed as of February 2015, while Figures 8 - 10 provide a graphical summary of the U.S. and State Congressional district boundaries across the watershed.

Currently, U.S Senator Boozman from Arkansas serves on the Committee on Appropriations and the Committee on Environment and Public and Representative Womack serves on the Committee on Appropriations in the House of Representatives. These committees influence funding and project priorities within FEMA.

The U.S. Congressionals from Arkansas were provided the opportunity to participate in a Pre-Discovery Webinar that was a high level briefing on the Discovery process and activities in Arkansas. This briefing occurred on March 11, 2015 at 2:00 pm and was attended by representatives from Senator Tom Cotton's Office and Congressman Womack and Hill's Offices.

The U.S. Congressionals from Oklahoma were provided the opportunity to participate in a Pre-Discovery Webinar that was a high level briefing on the Discovery process and activities in the Lower Illinois Watershed. This briefing occurred on _____ and was attended by representatives from _____.

The two Tribal Nations within the Lower Illinois Watershed were invited to participate in the Discovery process with the other incorporated communities and counties. In conjunction with the Tribal liaisons at FEMA Region 6, separate events and meetings were determined to not be necessary, instead the Tribal Nations will be engaged along with the State of Oklahoma and as participates in the complete process.

Table 5: U.S. Congressionals

U.S. Senators (AR)			
Name	**Address**	**Phone**	**Email**
John Boozman (R)	1401 W. Capitol Ave., Plaza F Little Rock, AR 72201	(501) 372-7153	www.boozman.senate.gov/public/index.cfm/e-mail-me
Tom Cotton (R)	11809 Hinson Road Suite 100 Little Rock, AR 72212	(870) 864-8582	www.cotton.senate.gov/content/contact-tom
U.S. Senators (OK)			
James "Jim" Inhofe (R)	205 Russell Senate Office Building Washington DC 20510	(202) 224-4721	www.inhofe.senate.gov/public/index.cfm?FuseAction=Contact...
James Lankford (R)	316 Hart Senate Office Building Washington DC 20510	(202) 224-5754	www.lankford.senate.gov/content/contact-james

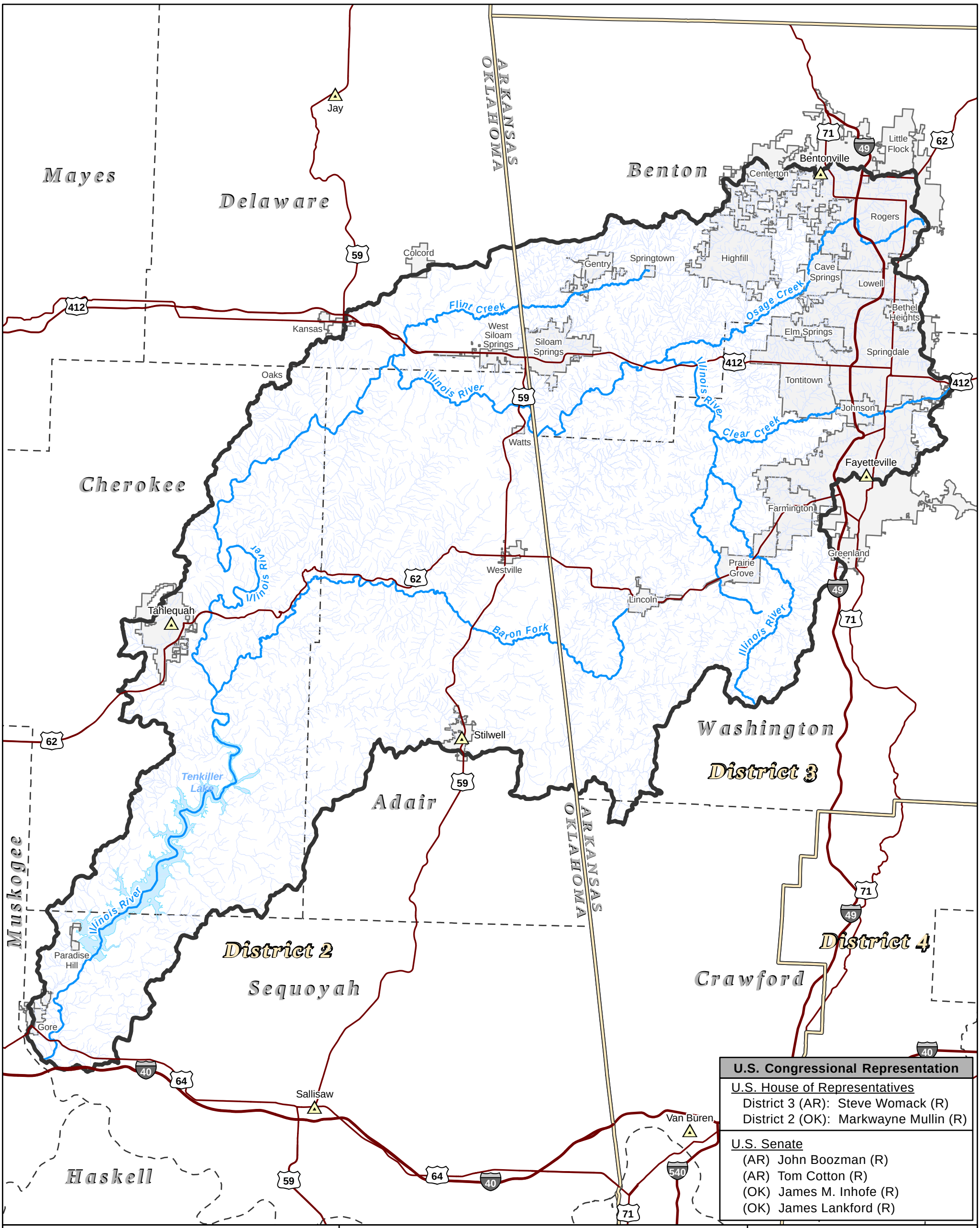
U.S. Representatives (AR)			
Name	**Address**	**Phone**	**Email**
Steve Womack (R) District 3	3333 Pinnacle Hills, Suite 120 Rogers, Arkansas 72758	(479) 464-0446	http://womack.house.gov/contact/
U.S. Representatives (OK)			
Markwayne Mullin (R) District 2	1 E. Choctaw, Suite 175 McAlester, OK 74501	(918) 423-5951	

Table 6: State Congressionals

State Senators (AR) [1]			
District	Name	Phone	Email
1	Bart Hester (R)	479-531-4176	bart.hester@senate.ar.gov
2	Jim Hendren (R)	479-787-6222	jim.hendren@senate.ar.gov
3	Cecile Bledsoe (R)	479-636-2115	Cecile.Bledsoe@senate.ar.gov
4	Uvalde Lindsey (R)	479-444-6752	uvalde.lindsey@senate.ar.gov
5	Bryan King (R)	870-438-4565	bryan.king@senate.ar.gov
7	Jon Woods (R)	479-200-3100	jon.woods@senate.ar.gov
State Senators (OK) [1]			
3	Wayne Shaw (R)	405-521-5574	shaw@oksenate.gov
4	Mark Allen (R)	405-521-5576	allen@oksenate.gov
9	Earl Garrison (D)	405-521-5533	whitep@oksenate.gov
18	Kim David (R)	405-521-5590	david@oksenate.gov

State Representatives (AR) [1]			
District	Name	Phone	Email
80	Charlene Fite (R)	479-414-1818	charlenefiteforstaterep@yahoo.com
81	Justin T. Harris (R)	479-871-8542	Justin.Harris@arkansashouse.org
84	Charlie Collins (R)	479-283-9303	clcollins6@cox.net
85	David Whitaker (D)		david.whitaker@arkansashouse.org
86	Greg Leding (D)	479-966-9201	greg.leding@arkansashouse.org
87	Robin Lundstrum (R)	479-957-1959	robin.lundstrum@arkansashouse.org
88	Lance Eads (R)		lance.eads@gmail.com
89	Micah S. Neal (R)	479-935-5550	micah.neal@arkansashouse.org
90	Jana Della Rosa (R)	479-236-3060	dellarosa4arkansas@gmail.com
91	Dan M. Douglas (R)	479-619-9231	dan-douglas@sbcglobal.net
92	Kim Hendren (R)	479-787-6500	kim.hendren@arkansashouse.org
93	Jim Dotson (R)	479-644-0740	jim.dotson@arkansashouse.org
94	Rebecca Petty (R)	479-621-3464	pettyforar@yahoo.com
95	Sue Scott (R)	479-621-1265	grandmotherscott@yahoo.com
96	Grant Hodges (R)	479-381-9513	grant.hodges@arkansashouse.org
97	Bob Ballinger (R)	870-423-1035	bob@bobballinger.com
State Representatives (AR) [1]			
2	John Bennett (R)	405-557-7315	john.bennett@okhouse.gov
4	Mike Brown (D)	405-557-7408	mikebrown@okhouse.gov
15	Ed Cannaday (D)	405-557-7375	ed.cannaday@okhouse.gov
86	William Fourkiller (D)	405-557-7394	will.fourkiller@okhouse.gov

[1] State Congressionals listed in numerical order by District Served.



U.S. CONGRESSIONAL DISTRICTS

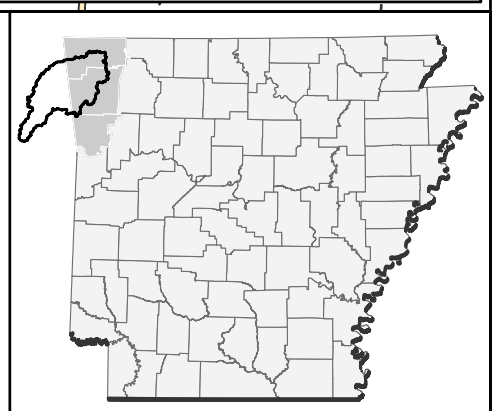
ILLINOIS WATERSHED (HUC 11110103)

FEMA

0 6 12 Miles

N W E S

County Seat
Interstate
U.S. Highway
County Boundary
City Limits
Major Reaches of Illinois Watershed
Other Waters
Large Waterbody
Illinois Watershed
Congressional District Boundaries



Project Location

FIGURE 8

DATE: 4/10/2015

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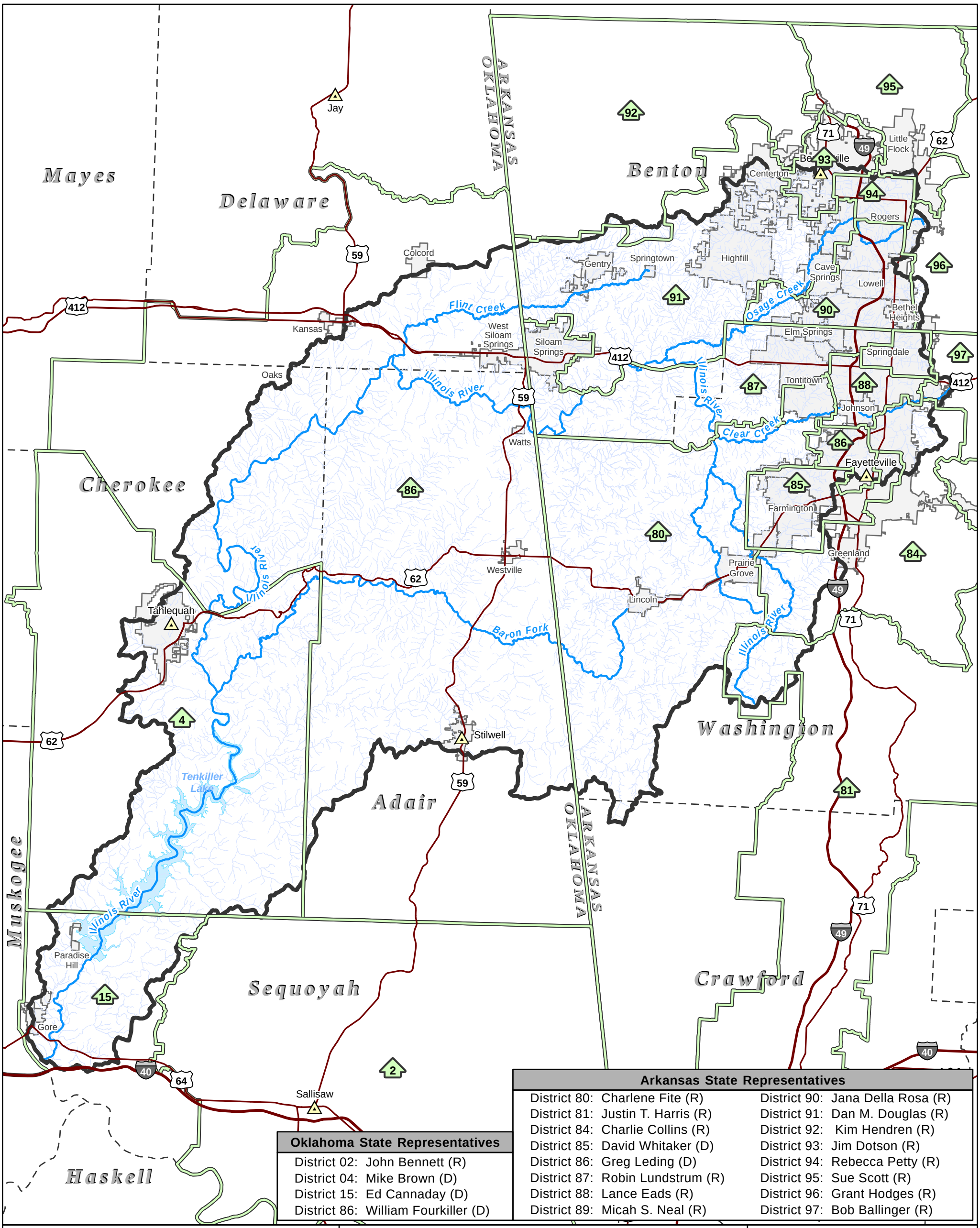


Oklahoma State Representatives	
District 02:	John Bennett (R)
District 04:	Mike Brown (D)
District 15:	Ed Cannaday (D)
District 86:	William Fourkiller (D)

Arkansas State Representatives			
District 80:	Charlene Fite (R)	District 90:	Jana Della Rosa (R)
District 81:	Justin T. Harris (R)	District 91:	Dan M. Douglas (R)
District 84:	Charlie Collins (R)	District 92:	Kim Hendren (R)
District 85:	David Whitaker (D)	District 93:	Jim Dotson (R)
District 86:	Greg Leding (D)	District 94:	Rebecca Petty (R)
District 87:	Robin Lundstrum (R)	District 95:	Sue Scott (R)
District 88:	Lance Eads (R)	District 96:	Grant Hodges (R)
District 89:	Micah S. Neal (R)	District 97:	Bob Ballinger (R)

STATE HOUSES OF REPS. DISTRICTS

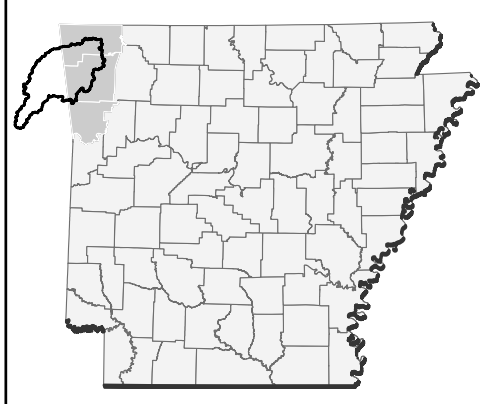
ILLINOIS WATERSHED (HUC 11110103)

FEMA

N W E S

0 6 12 Miles

- County Seat
- Interstate
- U.S. Highway
- County Boundary
- City Limits
- Major Reaches of Illinois Watershed
- Other Waters
- Large Waterbody
- Illinois Watershed
- State House District Boundaries



Project Location

FIGURE 9

DATE: 4/10/2015

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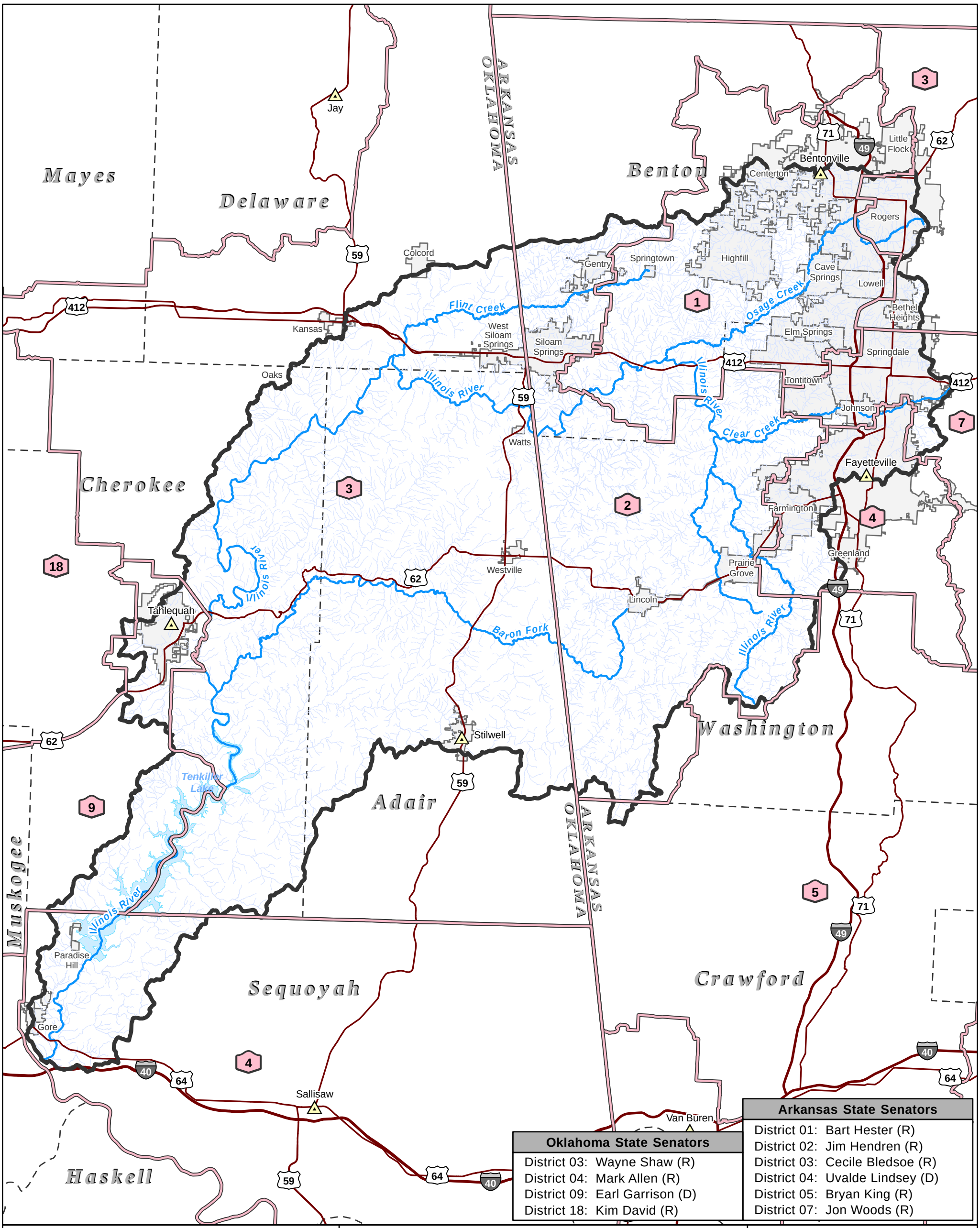


Oklahoma State Senators

District 03:	Wayne Shaw (R)
District 04:	Mark Allen (R)
District 09:	Earl Garrison (D)
District 18:	Kim David (R)

Arkansas State Senators

District 01:	Bart Hester (R)
District 02:	Jim Hendren (R)
District 03:	Cecile Bledsoe (R)
District 04:	Uvalde Lindsey (D)
District 05:	Bryan King (R)
District 07:	Jon Woods (R)

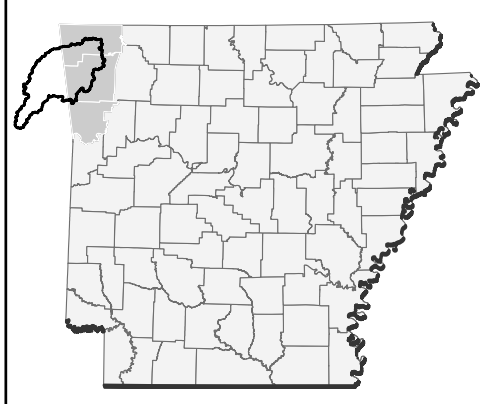
STATE SENATE DISTRICTS

ILLINOIS WATERSHED (HUC 11110103)

0 6 12 Miles

N W E S

- County Seat
- Interstate
- U.S. Highway
- County Boundary
- City Limits
- Major Reaches of Illinois Watershed
- Other Waters
- Large Waterbody
- Illinois Watershed
- State Senate District Boundaries



Project Location

FIGURE 10

DATE: 4/10/2015

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II. Discovery Efforts

i. Engagement / Pre-Discovery Report

Pre-Discovery Community Engagement

The Illinois Watershed Project Teams identified in Table 10 below, will or have been in contact with watershed stakeholders via letters, email, and phone calls before the Discovery meetings to request local participation. In addition to assisting in scheduling the meetings, locals were asked to help identify additional key people who should be included in the Discovery process and acquire any data that will assist in the risk identification and assessment for the Illinois Watershed. A detailed list of Communities, local officials, federal, state and regional agencies that were invited to participate in the Discovery Process is included with the supplemental digital data accompanying this report.

Table 7a: Illinois Watershed Project Team (Arkansas)

Name	Organization	Project Role
Michael Borengasser	State of Arkansas / ANRC	CTP Coordinator / Project Manager / State NFIP Coordinator
John Bourdeau	FEMA Region 6	Project Monitor – FEMA Region 6
Lacye Blake	State of Arkansas / ADEM	State Hazard Mitigation Officer
Linda Johnson	FTN	CTP Contractor / Program Manager
MaryBeth Breed	FTN	CTP Contractor / Project Manager
Lee Beshoner	FTN	CTP Contractor / Technical Manager

Table 8: Illinois Watershed Project Team (Oklahoma)

Name	Organization	Project Role
John Bourdeau	FEMA R6	Project Monitor
Jerry Clark	FEMA R6	PM POC for Oklahoma (for awareness)
David Reiff	FEMA R6	Planning
Shanene Thomas	FEMA R6	Tribal Liaison
Norma Reyes	FEMA R6	EA Tribal Liaison
Danielle Brown	FEMA R6	Disaster Grants- OK
John Washington	FEMA R6	Disaster Grants- AR
Trey Rozelle	FEMA R6	Non-Disaster Grants- OK
Marty Chester	FEMA R6	Non-Disaster Grants- AR
Roberto Ramirez	FEMA R6	FMI – OK

Table 10b: Illinois Watershed Project Team (Oklahoma) (Cont'd)

Name	Organization	Project Role
John Bowman	FEMA R6	FMI – AR
Diane Howe	FEMA R6	Risk MAP Communications
Nitja McGrane	FEMA R6	Community Education & Outreach – OK
Cindy Wirz	FEMA R6	Community Education & Outreach – AR
Earl Armstrong	FEMA R6	External Affairs
Barbara Shipp	FEMA R6	Congressional Liaison
Matt Rollins	State of Oklahoma (OWRB)	Oklahoma NFIP Coordinator
Annie Vest	State of Oklahoma (OEM)	Oklahoma SHMO
Mike Borengasser	State of Arkansas (ANRC)	Arkansas NFIP Coordinator
Stephanie Routh	RAMPP	Study Manager - Oklahoma
Jessica Baker	COMPASS	RTC Support

In preparation for the Discovery meeting, the Project Teams:

- Gathered information about local flood risk and flood hazards
- Reviewed local hazard mitigation plans,
- Mapped the Population Density (2010) in the Watershed,
- Mapped the Percent Impervious Cover (2011) in the Watershed,
- Mapped LandUse Change from 2006 – 2011,
- Mapped known and available Grant Activity in the Watershed,
- Mapped known and available Claims Activity in the Watershed,
- Mapped known and available RL and SRL Properties in the Watershed,
- Mapped Areas Potentially at Risk in the Watershed, and
- Mapped LOMCs.

The information gathered before, during and after the Discovery meeting will be used to aid the project teams and the local stakeholders to determine which areas of the watershed may require further study through a Risk MAP project. Discovery will also include discussions with other state and federal agencies about potential partnership opportunities, as well as enlisting their help in identifying flood risk throughout the watershed.

The State CTP's and FEMA's activity with the communities in the Illinois Watershed is summarized in Table 11, History of Engagement and Table 12, Hazard Mitigation Plan Status.

Table 9: History of Engagement (Arkansas)

Community Name	Type of Engagement	Date	Agency	Comments
Benton & Washington Counties, AR	Topographic Acquisition / LIDAR	2004	Local Partnerships	Coordinated through NWARPC
Benton County, AR	Map Modernization	2005 - 2007	FEMA	
City of Rogers, Bentonville, Centerton, & Benton County, AR	FIRM Map Updates – Roger, AR CTP and FEMA R6		City of Rogers / FTN & FEMA	Incorporate Rogers Citywide Mapping, Bentonville LOMR's, and additional study funded through FEMA Region 6
Crawford County, AR	Map Modernization	2005 - 2007	FEMA	
Washington County, AR	Map Modernization	2006 - 2008	FEMA	FIRMs utilized Washington Countywide 4-ft terrain data source
Incorporated and Unincorporated Benton County and Incorporated areas of Washington County, AR	Topographic Acquisition / LIDAR	2008	Local Partnerships	Coordinated through NWARPC
Washington County, AR	Topographic Acquisition / LIDAR	In Progress	FEMA / USGS	LIDAR acquisition and processing for Washington, Jefferson, and Randolph Counties in Arkansas
City of Elm Springs	CAC / CAV	2011 / 2009	FEMA / ANRC	No Issues
City of Farmington	CAC / CAV	2008 / 2009	FEMA / ANRC	Eng: Serious
City of Fayetteville	CAC / CAV	2011 / 2014	FEMA / ANRC	Eng: Minor / Other: Minor
City of Greenland	CAC / CAV	2011 / 2009	FEMA / ANRC	Eng: Minor
City of Johnson	CAC / CAV	2008 / 2009	FEMA / ANRC	Enf: Serious
City of Lincoln	CAC / CAV	2008 / 2009	FEMA / ANRC	None
City of Prairie Grove	CAC / CAV	2011 / 2009	FEMA / ANRC	None
City of Springdale	CAC / CAV	2008 / 2011	FEMA / ANRC	Enf: Minor
Town of Tontitown	CAC / CAV	2008 / 2009	FEMA / ANRC	None
Washington County	CAC / CAV	2011 / 2014	FEMA / ANRC	Eng: Minor
Benton County	CAC / CAV	2004 / 2010	FEMA / FEMA	Enf: Minor
City of Bentonville	CAC / CAV	2008 / 2011	FEMA / ANRC	None
Town of Bethel Heights	CAC / CAV	2008 / 2011	FEMA / FEMA	Enf: Minor
City of Cave Springs	CAC	2011	FEMA	None
City of Centerton	CAC / CAV	2008 / 2012	FEMA / ANRC	None
City of Gentry	CAC / CAV	2011 / 2005	FEMA / ANRC	None
Town of Highfill	CAC / CAV	2011 / 2005	FEMA / ANRC	Enf: Minor
Town of Little Flock	CAC	2011	FEMA	None
City of Lowell	CAC / CAV	2011 / 2005	FEMA / ANRC	Enf: Minor
City of Rogers	CAC / CAV	2008 / 2010	FEMA / ANRC	Enf: Minor
City of Siloam Springs	CAC / CAV	2011 / 2005	FEMA / ANRC	Enf: Minor
Town of Springtown	CAC / CAV	2010 / 2005	FEMA / ANRC	None

Table 11b: History of Engagement (Oklahoma)

Community Name	Type of Engagement	Date	Agency	Comments
Cherokee County Unincorporated Areas	CAC	04/10/2013 07/31/2014	State of Oklahoma	CAV is Requested – Serious violation
Cherokee County Unincorporated Areas	CAV	03/31/2014	State of Oklahoma	Remediated
Delaware County Unincorporated Areas	CAC	08/07/2013	State of Oklahoma	N/A

FEMA Region 6 and the AR CTP Project Team encourage the counties and communities to be diligent in the process of updating their Hazard Mitigation Plans (HMPs) and incorporating mitigation projects that might be considered for future Risk MAP project. Table 12 Hazard Mitigation Plan Status, provides a summary of the local Hazard Mitigation Plan Status in Arkansas, followed by Oklahoma.

During the Discovery activities in Arkansas representative(s) from ADEM will be available to discuss grant opportunities and/or general assistance that may be available for their HMPs in Arkansas.

Table 12a: Hazard Mitigation Plan Status (Arkansas)

Community Name	Hazard Mitigation Plan Name	Flood Hazard Related Community Mitigation Action	Plan Status	Plan Expires
Benton County, AR	Benton County Comprehensive Natural Hazards Mitigation Plan	TBD	Update In Progress	(expired November, 2014)
Crawford County, AR	Hazard Mitigation Plan Update / Crawford County, AR	TBD	Current	August, 2016
Washington County, AR	Washington County, Arkansas Pre-Hazard Mitigation Plan	TBD	Update In Progress	(expired January, 2014)
State of Arkansas	State of Arkansas All-Hazards Mitigation Plan	TBD	Current	September, 2016

In Oklahoma, no Hazard Mitigation Plan is available for review for communities in Sequoyah County, the incorporated areas of Adair County, or for the United Keetoowah Band of Cherokee Indians. A plan may exist or be in process, but that content cannot be reviewed for these summaries until the plan is approved. The OEM SHMO has been identified as part of the Oklahoma Project Team and will likely participate in the Oklahoma Discovery activities to provide general assistance with regard to the HMPs in Oklahoma.

Table 10b: Hazard Mitigation Plan Status (Oklahoma)

Community Name	Hazard Mitigation Plan Name	Flood Hazard Related Community Mitigation Action	Plan Status	Plan Expires
Adair County Unincorporated Areas	Adair County Oklahoma Hazard Mitigation Plan (Single Jursidiction)	Increase countywide ability to communicate and respond quickly and efficiently to disasters with telecom towers and flood warning system. Enhance public awareness and understanding of hazard mitigation and review tie-down process for mobile homes. Reduce the impact of repetitive flooding in flood-prone areas through elevation and survey properties to see if they are being reported correctly. Enhance pre-disaster and prevention activities. Lessen the effects of natural hazards by elevating low road crossings with rip/rap, debris removal, raising bridges, implement code enforcement. Protect natural resources.	Expired	06/09/2014
City of Stilwell, Adair County	None, not included in County's Plan	N/A	N/A	N/A
City of Watts, Adair County	None, not included in County's Plan	N/A	N/A	N/A
Town of Westville, Adair County	None, not included in County's Plan	N/A	N/A	N/A

Table 11b: Hazard Mitigation Plan Status (OK) (Cont'd)

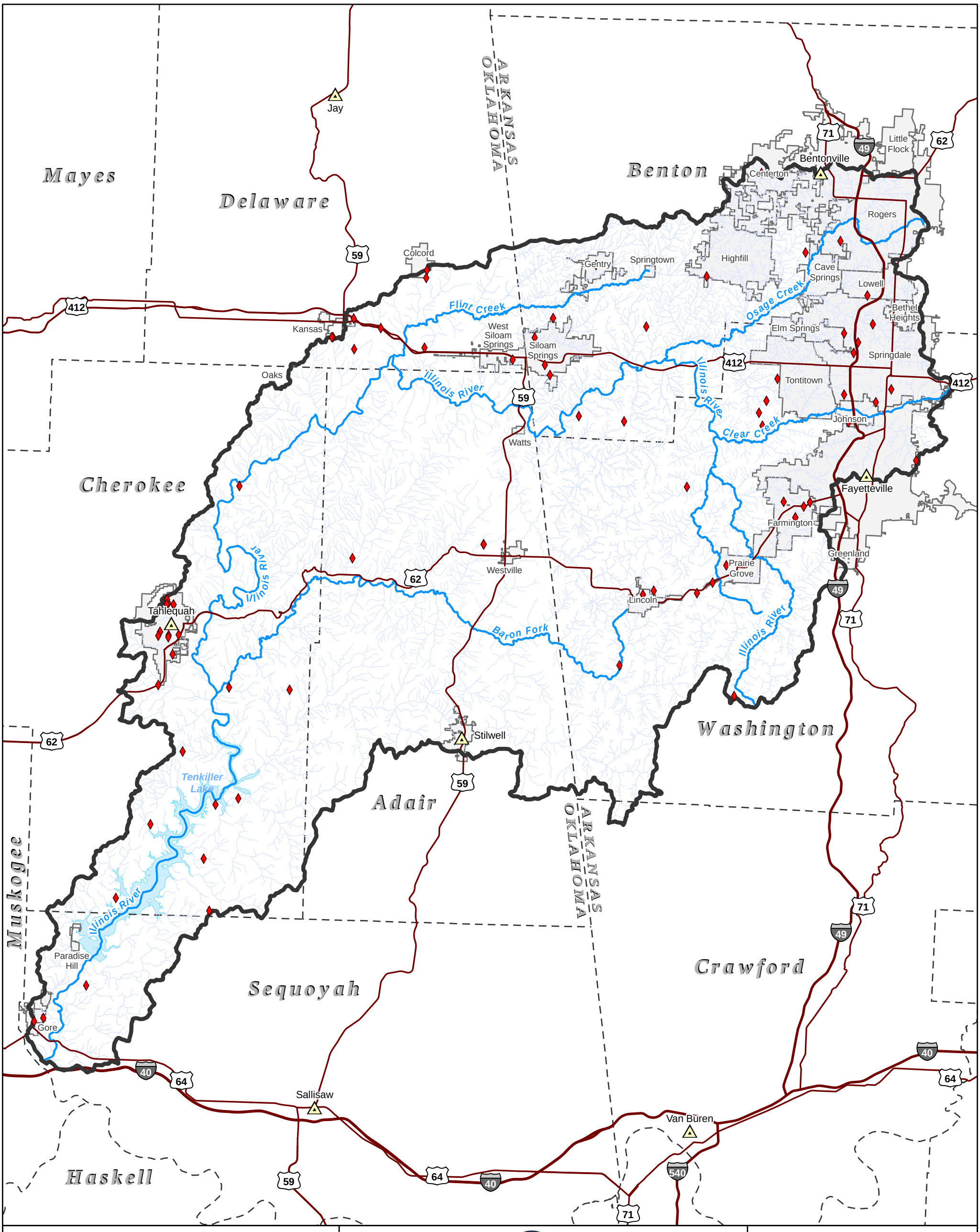
Cherokee County Unincorporated Areas, Town of Oaks	Cherokee County Oklahoma Hazard Mitigation Plan	Increase countywide ability to communicate and respond quickly and efficiently to disasters with telecom towers and flood warning system. Enhance public awareness and understanding of hazard mitigation and review tie-down process for mobile homes. Reduce the impact of repetitive flooding in flood-prone areas through elevation and buy out. Enhance pre-disaster and prevention activities. Lessen the effects of natural hazards by elevating low road crossings with rip/rap, debris removal, raising bridges, implement code enforcement. Protect natural resources.	Expired	12/09/2014
City of Tahlequah, Cherokee County	City of Tahlequah Multi-Jurisdictional Multi-Hazard Mitigation Plan Update	Develop an All-Hazard Public Information, Education, and Awareness Program. Educate the public on the importance of Family Disaster Plan and supply kits, guides, public information locations. Develop a GIS inventory, registry and database of Special Needs Populations. Update warning and Alert systems, NOAA radios, message boards and sites for tourists. Join CRS and continue with NFIP compliance. Look at watershed wide flood hazards, not stopping at community boundaries. Resolve repetitive loss locations. Develop non-structural solutions to flood problems (e.g. wetlands, culvert and debris management, ecosystem BMP).	Approved	09/20/2019

Table 12b: Hazard Mitigation Plan Status (OK) (Cont'd)

Delaware County, Incorporated and Unincorporated Areas	Delaware County Oklahoma Hazard Mitigation Plan	Develop Alert, warning systems, and communication towers and mutual aid agreements. Develop countywide preparedness plan and agency response plan for disaster recovery. Flood protection projects such as adding rip/rap to failing embankments, road crossings, and fixing undersized culverts and bridges. Repair and expand existing retention/detention and reservoirs. Increase education of the need for Flood Insurance. Encourage non-NFIP communities to join NFIP. Colcord, Kansas, West Siloam Springs: Join NFIP and participate in all county identified actions.	Expired	11/20/2012
Sequoyah County Incorporated and Unincorporated Areas	Sequoyah County Oklahoma Hazard Mitigation Plan	N/A	In Progress	N/A
Cherokee Nation	Cherokee Nation Tribal Hazard Mitigation Plan	Create hazard awareness and information platform. Participate in alert and warning systems and add more stream gauges. Identify special needs populations. Develop debris and brush maintenance and management system for culverts, creeks waters ways that could cause flooding and backup of water. Plan for upgrading undersized culverts or bridges and increase size of detention/retention/reservoirs. Implement an elevation, acquisition or relocation fund for repetitive flooding structures or for homes that are going to be financially negatively impacted by true risk flood insurance rates. Incorporate a geographic boundary for the Cherokee National Tribal Jurisdiction Service Area onto the FIRM maps so they are able to get notifications for map actions and can incorporate GIS data for their areas. Incorporate non-structure mitigation measures for flooding like improving riparian habitat and adding wetlands.	Expired	11/14/2014
United Keetoowah Band of Cherokee Indians	N/A	N/A	N/A	N/A

Figure 11 displays the locations and types of mitigation grant activity in the Illinois Watershed. Additional mitigation activities will be identified during Discovery that may or may not have been completed through a grant process. There may be additional grants being pursued at both the state and local level within the watershed that have not been identified.

In Arkansas and Oklahoma, information available to date indicates grants for Safe Rooms are the only FEMA sponsored grant activities within the watershed.



GRANT ACTIVITY

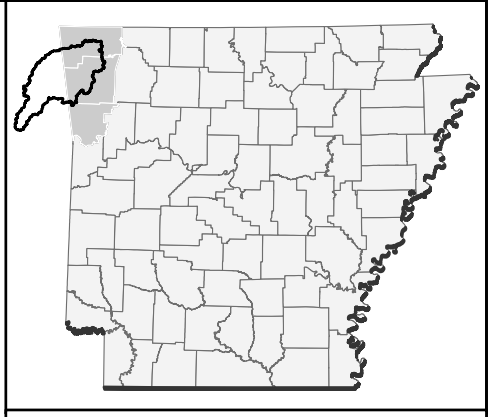
ILLINOIS WATERSHED
(HUC 11110103)

FEMA

0 6 12 Miles

N W E S

- County Seat
- Interstate
- U.S. Highway
- County Boundary
- City Limits
- Major Reaches of Watershed
- Other Waters
- Large Waterbody
- Illinois Watershed
- HMGP Grants (Safe Rooms)
- Mitigation Grants
- Property Acquisition
- Public Assistance Grants



Project Location

FIGURE 11

DATE: 5/8/2015

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ii. Pre-Discovery Data Collection

For the Illinois Watershed's Engagement / Pre-Discovery Report and Map, multiple datasets were used. The following tabular summary of the data collected is presented in Table 13 in order to document the data used and its sources. All data collected and used during the Discovery activities will be provided to the communities at the Discovery project close-out.

Table 13: Data Collection for the Watershed

Data Types / Description	Deliverable/Product	Source
Average Annualized Loss (AAL) Data	Discovery Map Geodatabase	FEMA
Boundaries: State, County, and Community	Discovery Map Geodatabase	AHTD / AGIO / OWRB / US Census
Boundaries : US and State Congressional Staff and	Discovery Map Geodatabase and Supporting Documents	State of Arkansas / personal communications / AGIO / State of Oklahoma
Census Blocks	Discovery Map Geodatabase	US Census Bureau / FEMA Hazus
Claims / Loss Data	Discovery Map Geodatabase	FEMA
Contacts	Spreadsheet / Supporting Documents	Local Web Sites / State of Arkansas & Oklahoma / OWRB / ANRC / FEMA / personal communications
Community Action Visits	Discovery Report	Community Information System (CIS) / OWRB
CRS	Discovery Report	FEMA's CRS Communities and Their Classes
CNMS Data	Discovery Map Geodatabase	FEMA / AR CTP
Dams (EAP status requested)	Discovery Map Geodatabase	USACE / ANRC / OWRB / USGS
Disaster Declarations	Discovery Report	FEMA
Effective Flooding (National Flood Hazard Layer, effective geo-referenced non-modernized panels)	Discovery Map Geodatabase and supporting digital dataset	FEMA / ANRC / OWRB
Elevation Hillshade	Discovery Map Geodatabase	USGS NED, FEMA Region 6
Grant Locations	Discovery Map Geodatabase, Supporting Documents	FEMA /ADEM / ANRC
Hazard Mitigation Plans and Mitigation Activities	Supporting Documents (copies of HMPs not included)	FEMA / ADEM / AR CTP
Imagery	Supporting Documents	AGIO / NAIP

Table 13: Data Collection for the Watershed (Cont'd)

Data Types / Description	Deliverable/Product	Source
Landuse and Urban Change	Discovery Map Geodatabase	NUCI
Letters of Map Change (LOMC)	Discovery Map Geodatabase	FEMA
Levees	Discovery Map Geodatabase	USACE / FEMA
Stream Gages	Discovery Map Geodatabase	USGS
Structures / Bridges	Discovery Map Geodatabase	FEMA / US Census Bureau / AHTD / AGIO / USDA / National Aerial Imagery Program (NAIP)
Transportation Lines	Discovery Map Geodatabase	AHTD
Topographic Data boundaries (available and in progress)	Discovery Map Geodatabase and supporting digital dataset	FEMA / NRCS / Local Communities
Stream Gages	Discovery Map Geodatabase	USGS
Structures / Bridges	Discovery Map Geodatabase	FEMA / US Census Bureau / AHTD / AGIO / USDA / National Aerial Imagery Program (NAIP)
Water Features	Discovery Map Geodatabase	USGS NDH / FEMA NFHL / CNMS
Watersheds (HUC 8 & 12)	Discovery Map Geodatabase	USGS NHD

iii. Discovery Meeting

As part of the Discovery process for the upper Illinois Watershed in Arkansas, three Discovery meetings will be held at the Northwest Arkansas Regional Planning Commission (NWARPC) Office on June 15 and June 16, 2015. Meeting times and address of location are shown in Table a. Each meeting will be customized to suit the stakeholders present and to allow interaction of the CTP and Project Team with the Discovery meeting attendees. The Discovery meetings are intended to provide the opportunity to learn about the Risk MAP Program, and discuss and document any concerns and mitigation interests for the Illinois Watershed.

Table 14a: Discovery Meeting Times and Location (Arkansas)

Meeting	Date and Time	Location
1	Monday June 15, 2015 1:30 – 3:30 PM	Northwest Arkansas Regional Planning Commission 1311 Clayton Springdale, AR
2	Tuesday June 16, 2015 9:00 – 11:00 AM	
3	Tuesday June 16, 2015 1:30 – 3:30 PM	

The Discovery Meetings in Arkansas will be led by Mike Borengasser, ANRC CTP Coordinator, as well as various other Discovery Meeting personnel from ADEM and FTN. The Discovery Meetings will include a brief introduction to the Risk MAP program and the initial results of the Discovery Activities. Community representatives and stakeholders will have the opportunity to collectively talk with the Hazard Mitigation Team (ADEM) and the Risk Identification Team (ANRC / FTN) to review past projects, discuss current projects, and evaluate project opportunities that are specific to mitigation actions. Important items for discussion may include some or all of the following:

- Community Benefits and Grant Opportunities – Floodplain-related grants; risk, needs, and topographic availability; RL/SRL properties; letters of map change (LOMCs); urban changes over the last 5 years; and single claims.
- Mitigation Planning and Mitigation Activities – Mitigation plans, understanding Risk MAP and determining risk.
- NFIP Information – Effective FIRMs, FIS and LOMCs.
- Risk Identification and Communication – Maps of risk/need/topographic availability, LOMCs, population density in the watershed, urban change in the watershed, estimated dollar exposure of parcels near SFHA areas, high-water marks, and low water crossings.

During Discovery (Arkansas and Oklahoma), community representatives and stakeholders will be encouraged to actively contribute information about concerns in the Watershed by identifying relevant locations on the large watershed map and then providing a short explanation on the comment form. Discovery will allow attendees and the project team to work together to listen, discuss, and document any notable items for the watershed. Members of the Project Teams (ANRC, ADEM, OWRB, OEM, FEMA, RAMPP, and FTN) will note their availability to answer questions and engage the attendees after the Discovery meeting. During each Discovery Meeting, the Project Team members will request that attendees provide any additional information within a specified period of days following the meeting.

Prior to the Discovery Meetings the Illinois Watershed Engagement Plan / Pre-Discovery Report will be distributed in hard copy to the community CEO's and will be available to download at http://www.riskmap6.com/ and http://www.floodplain.ar.gov.

Additional copies will be made available at the Discovery meeting along with several large-format watershed maps to be used for discussion and identifying areas of concern in the Watershed.

Information collected from the communities will be compiled into a final Discovery Report.

As part of the Discovery process for the Lower Illinois Watershed in Oklahoma, two Discovery meetings will be held. Meeting dates, times, and locations are shown in Table b.

Table 14b: Discovery Meeting Times and Locations (Oklahoma)

Meeting	Date and Time	Location
1	Tuesday July 16, 2015 9:00 – 11:00 AM	Indian Capital Technology Center 240 Vo-Tech Road Tahlequah, Oklahoma 74464
2	Tuesday July 16, 2015 2:00 – 4:00 PM	Indian Capital Technology Center Route 6 Box 3320 Highway 59 and Maryetta Road Stilwell, Oklahoma 74960

iv. Discovery Implementation (TO BE COMPLETED POST-DISCOVERY)

The communities / organizations represented at the Discovery Meetings are included in Table 15.

Table 15: Communities and Organizations Represented at the Discovery Meetings

Community/Organization Represented	Community/Organization Represented

The communities NOT represented at the Discovery Meetings are included in Table 16.

Table 16: Communities Not Represented at the Discovery Meetings

Community Not Represented	Community Not Represented

v. Data Gathering Overview

Information about the Illinois Watershed was gathered prior to the Discovery Meetings and is documented in the preceding Table 13 Data Collection for the Watershed. The data collected in pre-discovery was obtained from FEMA or other public and/or national datasets.

Table will be completed following the Discovery Meeting as part of the final Illinois Watershed Discovery Report and will summarize the comments collected at the Discovery Meeting specific to a flooding source and/or community area.

Table 17: Data Collection Summary - During and After Discovery Meeting

Information Provided By	Flooding Source	Discovery Workshop Comment Summary

At the conclusion of the Discovery process all supporting information, data and files for the final Discovery Report will be provided digitally in a directory structure comparable to the example provided below.

11110103\Illinois Watershed Discovery
\General

- Discovery Metadata – XML
- Project Narrative - PDF

\Correspondence
\Project_Discovery_Initiation

- Pre-Discovery Newsletter
- Engagement / Pre-Discovery Report – Word/PDF

\Discovery_Meeting (to be completed after the Discovery Meeting)

- Meeting Invitations – Word/PDF
- Meeting Attendance Records – PDF
- Risk MAP Action Survey
- Other

\Post_Discovery (to be completed after the Discovery Meeting)

- Discovery Map(s) Final - PDF
- Discovery Report - Final
- Discovery Newsletter

\Spatial_Files

- LCPR_Discovery.gdb
  - Community Contact List (L_Mtg_POC)
  - Source Citations (L_Sources)
  - Political Areas (DCS_S_Pol_AR)
  - Transportation (DCS_Trnsport_Ln)
  - HUC-8 (DCS_S_HUC)
  - Discovery Map (DCS_Discovery_Map)

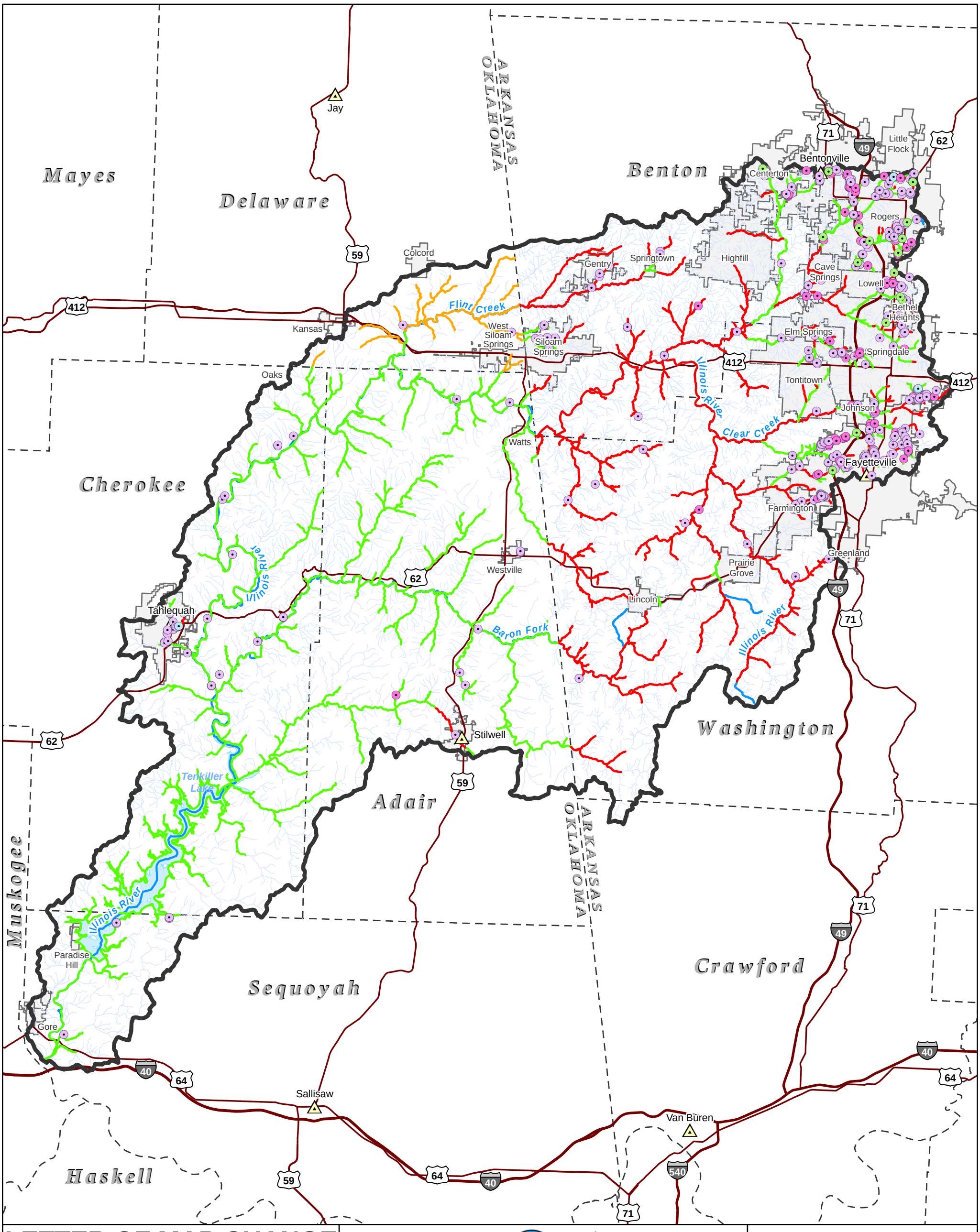
\Supplemental_Data

- All other data collected during Discovery
  - Congressional Briefing

III. Watershed Findings

The NFIP claims reported have been identified as either within the SFHA or those outside of the SFHA, which are identified specifically as BCX Claims, claims that occur outside of the SFHA in Zones B, C, or X. In addition, there are also several locations of RL/SRL within the Illinois Watershed. Claims activity is generally concentrated in the population centers of Farmington, Fayetteville, Johnson, and Rogers. Figures 5 and 6 show the claims activity and the RL/SRL claims respectively.

Letters of Map Amendment and Revisions are scattered throughout the watershed, but there are large concentrated areas in the population centers in Arkansas and in Tahlequah, OK. There are 480 LOMC's identified in the Illinois Watershed, 49 are located in Oklahoma and the remaining 431 are located in the Upper Illinois Watershed in Arkansas. The highest concentration is in the Fayetteville, AR where there are over 140 LOMCs identified. The community with this next highest number is the Rogers area with 82 followed by Springdale with 45. Please refer to Figure 12 for the location of these Letters of Map Change (LOMC).



LETTER OF MAP CHANGE (LOMC) ACTIVITY

ILLINOIS WATERSHED (HUC 11110103)

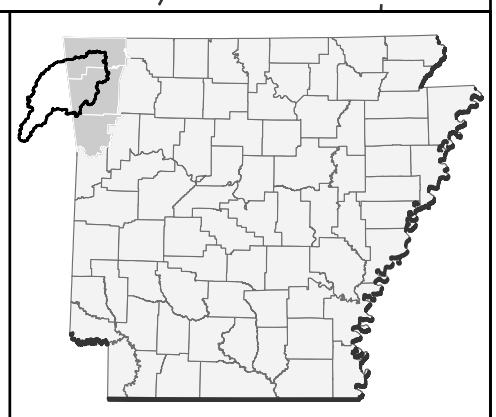
FEMA

0 6 12 Miles

N W E S

County Seat
Interstate
U.S. Highway
County Boundary
City Limits
Major Reaches of Watershed
Other Waters
Large Waterbody
Illinois Watershed
Letter of Map Amendment (LOMA)
Letter of Map Revision (LOMR)
LOMR - Fill (LOMR-F)
LOMR - Floodway (LOMR-FW)

CNMS Validation Status
Unverified
Assessed
Valid



Project Location

FIGURE 12

DATE: 5/8/2015

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i. CNMS Analysis (Arkansas)

A CNMS analysis was performed in preparation for the Discovery Meeting. Table shows the detailed study streams in the Illinois Watershed that have failed one or more validation elements during the CNMS stream reach level validation process. The CNMS validation elements attempt to identify changes to the Physical Environment, Climate and Engineering Methodologies since the date of the Effective Analysis (different from the Effective issuance date). Per the CNMS validation process, the study is considered as having a need or assigned an "Unverified" status, if one of seven critical (C) elements fail, or if four or more of the ten (10) secondary (S) elements fail during stream reach level validation. The "unverified" status may also have been identified as a community identified need during the Scoping Process that was not able to be addressed during Map Modernization or that was identified during the Map Modernization Project.

Table 18: "Unverified" Detailed Streams per CNMS Analysis (Arkansas)

Stream Name	City and/or County	Validation Status	Failed CNMS Elements
Christie Creek	City of Lowell / Town of Bethel Heights	Unverified	C5, S6
Futrall Branch	City of Fayetteville	Unverified	C6, S6
Mud Creek Tributary	City of Fayetteville	Unverified	C6, S6
Osage Tributary 1	City of Bentonville	Unverified	C5, S6
Owl Creek	City of Fayetteville	Unverified	C6, S6, S7
Scull Creek	City of Fayetteville	Unverified	C6, S2, S6
Scull Creek Tributary 2	City of Fayetteville	Unverified	C6, S6
Tributary 3 to Spring Creek	City of Springdale	Unverified	C5, S6, S7
Turtle Creek Tributary 1A	City of Rogers	Unverified	C5, S6

*Community request during Map Modernization

Table provides a description of the validation elements that failed as identified in the CNMS database.

Table 19: CNMS Category Descriptions (Arkansas)

Element Name	Element Description	Issue being identified by the Element
C5	Channel Reconfiguration	Current channel reconfiguration outside of effective SFHA
C6	Hydraulic structures added or removed (1 to 5)	Structures present and do not appear to be reflected in the FIS / FIRMs / hydraulic model
S6	Topographic data	New topographic data is available throughout the Illinois Watershed. Some of the effective FIRMs may not reflect this newer topographic data.
S7	Vegetation or Land Use	Changes to vegetation or land use

ii. CNMS Analysis (Oklahoma)

All streams within the CNMS inventory were further reviewed for each county. Streams given a "VALID" validation status are NVUE compliant, backed by engineering models, and require no further study. Streams given an "UNKNOWN" validation status need to be assessed and are not backed by engineering models. Streams given an "UNVERIFIED" status need to be studied and are planned for a future fiscal year. Table provides a summary of CNMS values by stream.

Adair County, OK:
The Adair County streams located within the Illinois Watershed are considered:
- VALID approximate study streams (212.3 miles)
- VALID detail study stream (0.05 miles)
- UNVERIFIED detail study streams (3.9 miles)

Cherokee County, OK:
The Cherokee County streams located within the Illinois Watershed are considered:
- VALID approximate study streams (198.8 miles)
- VALID detail study streams (8.9 miles)
- UNVERIFIED detail study streams (2.3 miles)

Delaware County, OK:
The Delaware County streams located within the Illinois Watershed are considered:
- VALID detail study streams (4.9 miles)
- UNKNOWN approximate study streams (48.0 miles)

Sequoyah County, OK:
The Sequoyah County streams located within the Illinois Watershed are considered:
- VALID approximate study streams (31.6 miles)
- VALID detail study streams (12.1 miles)

Refer back to **Error! Reference source not found.**7b that provides both a summary of NVUE and CNMS mileage.

Table 20: CNMS Analysis (Oklahoma)

County	Community	Stream Name	Flood Zone	Validation Status	Stream Miles
Adair	City of Stilwell	Eight Street Tributary	AE	UNVERIFIED	0.24
Adair	City of Stilwell	Caney Creek	AE	UNVERIFIED	3.65
Cherokee	City of Tahlequah	East Branch	AE	UNVERIFIED	2.31
Delaware	Town of West Siloam Springs	Beaver Creek	A	UNKNOWN	1.69
Delaware	Town of West Siloam Springs	Unknown	A	UNKNOWN	1.32

County	Community	Stream Name	Flood Zone	Validation Status	Stream Miles
Delaware	Delaware County	Blue Spring Branch	A	UNKNOWN	1.22
Delaware	Delaware County	Crazy Creek	A	UNKNOWN	5.67
Delaware	Delaware County	Fagan Creek	A	UNKNOWN	2.86
Delaware	Delaware County	Flint Creek	A	UNKNOWN	10.46
Delaware	Delaware County	Unknown	A	UNKNOWN	1.52
Delaware	Delaware County	Unknown	A	UNKNOWN	0.37
Delaware	Delaware County	Unknown	A	UNKNOWN	0.40
Delaware	Delaware County	Unknown	A	UNKNOWN	1.26
Delaware	Delaware County	Unknown	A	UNKNOWN	1.27
Delaware	Delaware County	Unknown	A	UNKNOWN	0.89
Delaware	Delaware County	Unknown	A	UNKNOWN	0.40
Delaware	Delaware County	Unknown	A	UNKNOWN	0.49
Delaware	Delaware County	Unknown	A	UNKNOWN	3.42
Delaware	Delaware County	Unknown	A	UNKNOWN	0.48
Delaware	Delaware County	Unknown	A	UNKNOWN	1.30
Delaware	Delaware County	Unknown	A	UNKNOWN	0.42
Delaware	Delaware County	Unknown	A	UNKNOWN	2.28
Delaware	Delaware County	Unknown	A	UNKNOWN	1.82
Delaware	Delaware County	Unknown	A	UNKNOWN	0.23
Delaware	Delaware County	Unknown	A	UNKNOWN	0.99
Delaware	Delaware County	Unknown	A	UNKNOWN	1.20
Delaware	Delaware County	Unknown	A	UNKNOWN	0.32
Delaware	Delaware County	Unknown	A	UNKNOWN	0.25
Delaware	Delaware County	Unknown	A	UNKNOWN	1.41
Delaware	Delaware County	Sager Creek	A	UNKNOWN	4.03

Table provides a description of the validation elements that failed as identified in the CNMS database for a variety of streams in the watershed.

Table 21: CNMS Category Descriptions

Element Name	Issue being identified by the Element	Element Description
C5	*Current channel reconfiguration outside effective SFHA*	Failure of this element indicates that channel reconfiguration has occurred since the date of study and the channel is now located outside of the effective SFHA.
S4	*More than 1 and less than 5 new or removed hydraulic structures (bridge/culvert) impacting Base Flood Elevations (BFEs)*	This element identifies addition or removal of more than 1, but less than 5 hydraulic structures along the studied streams since the date of the effective Study. Please note, pursuant to guidance from FEMA, all structures identified using aerial imagery were to be counted for this element, including footbridges.
S5	*Channel improvements have occurred since the effective analysis*	Failure of this element indicates that channel improvements such as straightening, rerouting, concrete lining, or rip-rap placement have occurred since the effective analysis.
S10	*New regression equations available*	Failure of this element indicates updates to regression equations since the date of study for studies that used a regression analysis for hydrology.

Summary of CNMS Concerns (Oklahoma)

The main CNMS concerns for the Illinois Watershed are that the stream channel location may have changed and are no longer contained within the effective SFHA, and that BFEs are impacted along some streams where there are 5 or more new/removed structures. In addition, the 2011 flood and high water marks have not been incorporated into the detailed engineering analysis or assessed to see if this updated information is significant and could provide adjustments to estimated discharges in the watershed. A calibration and hydrologic analysis for the Illinois River using the most recent gage data would be beneficial.

Some minor concerns that affect many of the 'Unverified' streams is that better topography is not available but if new topographic data could be collected using LiDAR or updated ortho-aerial imagery instead of USGS 10m DEM data, the SFHA boundaries for many of these streams may be further refined. No floodplain boundary analysis statistics (FBS) were calculated for these communities and calculating FBS may give an indication of which streams may benefit from updated topographic analysis in conjunction with revised engineering analysis. For several streams, there have also been changes to land use, vegetation, and urbanization since the effective study was conducted.

Though it is only a secondary element, each 'Unverified' stream had the element for new regression equations fail and is located in urban areas. The effective analysis for these streams was from the original, effective data, but updated regression equations for the Illinois Watershed can be found.

Additional Findings will be Reported after the Discovery Meeting Process and included here for the Final Discovery Report.

The remaining portion of Section III is the Preliminary Oklahoma Pre-Discovery Findings:

Engineering Review of Community Comments (Oklahoma)

Any engineering related comments provided by the communities during the Discovery were initially validated. Comments were reviewed both in terms of hydrologic or hydraulic issues within the watershed and with any general floodplain or BFE related comments. Any supporting appeal or protest information, correspondence from communities, or anecdotal information was researched and expanded on as a concern if impacts to hydrologic analysis were substantiated.
A listing of community engineering questions and concerns will be incorporated after the Discovery meeting.

Pre-Discovery Hydrology (Oklahoma)

A limited review of hydrologic information was performed for analysis within the Oklahoma portion of the Illinois Watershed. No hydrologic models were available for Adair, Cherokee, Delaware, and Sequoyah Counties. At the time of this review the only topographic data available watershed-wide is a 10 meter Digital Elevation Model available through the USGS National Elevation Dataset which lacks the accuracy suitable for detailed study modeling. This data was derived from USGS paper maps dating from 1963-1974.

Summary of Hydrologic Methodologies by County:

Adair County:
Discharges for the 1-percent-annual-chance recurrence interval were calculated for approximate study streams using regression equations for rural areas in Oklahoma (USGS Fact Sheet 008-01). Discharges for the 10-, 2-, 1-, and 0.2-percent-annual-chance recurrence intervals were based on rainfall-frequency data using Technical Paper No. 40, “Rainfall Frequency Atlas of the United States.” Peak discharges were determined using NRCS technical Release No. 20, “Computer Program for Project Formulation-Hydrology.”

Cherokee County:
Approximate study discharges were determined using regional regression analysis. Town Branch and East Branch in the City of Tahlequah were analyzed using hydrologic and meteorological data from the US Weather Bureau. Mean annual precipitation published by the USGS was used in conjunction with regression formulas to establish peak discharges for the 10-, 2-, 1-, and 0.2-percent-annual-chance recurrence intervals. The discharges for the detailed study portion of the Illinois River were determined using log-Pearson Type III frequency analysis of data collected at the Tahlequah, OK gage. Since the gage is approximately 17 miles downstream of the detail study area the drainage area ratio was adjusted to reflect the smaller drainage area of the upstream study area.

Delaware County:
Approximate study discharges were determined by enhanced approximate analyses. The FIS for Delaware County does not reference hydrologic methodology for approximate study streams. Peak discharges for the detail study portions of Flint Creek and the Illinois River were determined using gage analysis. Three gages were utilized: Flint Creek near Kansas, OK (1956-1997), Illinois River near Watts, OK (1956-1997), and Illinois River near Tahlequah, OK (1916-1997). The 10-, 2-, 1-, and 0.2-percent chance discharges for these streams were calculated using an annual peak flood statistical analysis of the three gages.

Sequoyah County:
Approximate study discharges were determined using the USGS regression equations for rural areas in Oklahoma and mean annual precipitation values, both found in USGS WRI Report 97-4202. Hydrologic data for the detailed study of the Illinois River were obtained from the Tulsa District of the USACE 1982 report, "Special Flood Hazard Information Report, Illinois River, Mouth to Tenkiller Ferry Dam."

Stream Gage Data
The USGS has peak flow data for 12 stream gages located within the Illinois Watershed in Oklahoma. Peak flows record at three of the gages have been utilized for detailed studies in two counties: Illinois River near Tahlequah, OK (Cherokee and Delaware Counties), Illinois River near Watts (Delaware County), and Flint Creek near Kansas, OK (Delaware County). The 100-yr peak discharge for the detail study reach of the Illinois River in Cherokee County is 131,000 cfs. This reach is located approximately 17 miles upstream of the Tahlequah gage. The 100-yr peak discharges for the detail study reach of the Illinois River in Delaware County are 93,000 cfs upstream of the confluence with Flint Creek and 106,000 cfs downstream of Flint Creek. This reach is located downstream from the Watts, OK, gage.

East-central Oklahoma experienced record rainfall in April 2011, setting peak flow records at 6 gages in the watershed. Two notable records are the gages located on the Illinois River near Watts, OK, and on Baron Fork at Eldon, OK, both setting new crest height records. The Watts, OK, gage reached the 500-year flood stage. The Tahlequah gage on the Illinois River saw record peak discharge in 2011 since the impoundment of Lake Tenkiller in 1953 and the gage is noted as "discharge affected to unknown degree by regulation or diversion" for peaks flows from 1986-present. Lake Tenkiller dam is the only regulatory structure on the river in Oklahoma, with the exception of the remnants of the Lake Frances Dam just upstream of the Watts gage. It should be noted that the peak discharge recorded at the Tahlequah gage is 12,000 cfs less than the discharge recorded upstream at the Watts gage. At the time of this report, the only known regulatory structure on the Illinois River is the Lake Tenkiller dam which is operated by the USACE Tulsa District. If the flows of the Illinois River upstream of the Tahlequah gage are regulated by some means as suggested by the USGS gage data then a PeakFQ analysis of the regulated flows is needed to determine potential peak discharge reductions.

Record flood events during the April 2011 flood

County	Site Name	Record Flood Event		Previous Record	
		Crest Height (ft)	Crest Date	Crest Height (ft)	Crest Date
Adair	Illinois River near Watts, OK	28.6	4/26/2011	25.96	7/25/1960
Cherokee	Baron Fork at Eldon, OK	28.51	4/25/2011	26.77	6/21/2000
Cherokee	Illinois River near Tahlequah, OK	25.97	4/26/2011	27.94	5/10/1950

USGS stream gages and record peaks on the Illinois River

County	Site Name	Start Date	End Date	# of Peaks	Record Peak (CFS)	Date
Adair	Illinois River near Watts, OK	5/15/1956	5/10/2013	58	97400	4/26/2011
Adair	Illinois River at Chewey, OK	4/26/2011	5/11/2013	3	92200	4/26/2011
Adair	Peacheater Creek at Christie, OK	11/14/1993	5/18/2003	10	2750	6/21/2000
Cherokee	Steely Hollow near Tahlequah, OK	4/3/1965	11/3/1974	11	5000	6/8/1974
Cherokee	*Illinois River near Tahlequah, OK	1/1/1916	5/11/2013	81	85400	4/26/2011
Cherokee	Baron Fork at Eldon, OK	4/15/1945	5/22/2013	67	63400	4/25/2011
Cherokee	Caney Creek near Barber, OK	1/4/1998	7/24/2013	16	13100	4/25/2011
Delaware	Flint Creek near West Siloam Springs, OK	12/21/1984	5/10/2013	25	15900	4/25/2011
Delaware	Sager Creek near West Siloam Springs, OK	2/20/1997	8/8/2013	17	4130	6/21/2000
Delaware	Flint Creek near Kansas, OK	5/15/1956	6/23/2014	55	44400	6/8/1974
Delaware	Flint Creek Trib near Flint, OK	7/20/1966	6/8/1974	7	410	6/8/1974
Sequoyah	Illinois River near Gore, OK	12/21/1924	4/20/2013	75	15900	5/24/2011

*Note: This is not the historic peak for the Tahlequah, OK, gage. This peak flow has been exceeded three times: 150,000 cfs in May 1950, 112,000 cfs in January 1916, and 93,200 cfs in 1943. However, the USGS has noted that the peak flows recorded from 1986-present are "affected to an unknown degree by regulation or diversion."

Pre-Discovery Hydraulics and Floodplain Analysis

Hydraulics, hydrology, floodplains, and floodways were reviewed based on the FIS reports, available hydraulic models, available hydrologic models, and FIRMs. No hydraulic or hydrologic models were available through the FEMA Engineering Library for Adair, Cherokee, Delaware, or Sequoyah Counties. Since no detailed studies cross county or state lines and the FIS reports do not contain peak discharges for approximate study streams no discharge mismatches were identified.

Utilizing the limited hydraulic and hydrologic data available two floodplain disconnects were identified at the Arkansas-Oklahoma state line. No floodway or BFE disconnects were identified. No LOMRs are located in the Oklahoma portion of the Illinois Watershed.

1. The floodplain for Sager Creek does not match at the Oklahoma-Arkansas border. The Zone AE study is within the city limits of Siloam Springs, Arkansas, in Benton County. Immediately downstream of the Zone AE study at the state border is the Zone A study in Delaware County, Oklahoma. The Zone A floodplain width does not match the Zone AE floodplain width.

2. The floodplain for Tributary 3 of Sager Creek does not match at the Oklahoma-Arkansas border. The Zone AE study is within the city limits of Siloam Springs, Arkansas, in Benton County. Immediately downstream of the Zone AE study at the state border is the Zone A study in Delaware County, Oklahoma. The Zone A floodplain width does not match the Zone AE floodplain width.

Summary of Hydraulic Analysis

County	Stream Name	Date of Effective Analysis	Hydraulic Model
Adair	Caney Creek	9/1/1995	WSP-2
Adair	Caney Creek	9/1/1995	WSP-2
Adair	Eighth Street Tributary	9/1/1995	WSP-2
Adair	Master Drain Tributary	9/1/1995	WSP-2
Cherokee	Baron Fork	12/1/2007	HEC-RAS
Cherokee	Baron Fork Tributary 1	12/1/2007	HEC-RAS
Cherokee	Big Hollow Creek	12/1/2007	HEC-RAS
Cherokee	Black Fox Hollow Creek	12/1/2007	HEC-RAS
Cherokee	Black Fox Hollow Creek Tributary 2	12/1/2007	HEC-RAS
Cherokee	Black Fox Hollow Creek Tributary 3	12/1/2007	HEC-RAS
Cherokee	Burnt Cabin Creek	12/1/2007	HEC-RAS
Cherokee	Burnt Cabin Creek Tributary 1	12/1/2007	HEC-RAS
Cherokee	Burnt Cabin Creek Tributary 2	12/1/2007	HEC-RAS
Cherokee	Burnt Cabin Creek Tributary 2A	12/1/2007	HEC-RAS

County	Stream Name	Date of Effective Analysis	Hydraulic Model
Cherokee	Caney Creek	12/1/2007	HEC-RAS
Cherokee	Caney Creek Tributary 1	12/1/2007	HEC-RAS
Cherokee	Caney Creek Tributary 2	12/1/2007	HEC-RAS
Cherokee	Caney Creek Tributary 3	12/1/2007	HEC-RAS
Cherokee	Caney Creek Tributary 4	12/1/2007	HEC-RAS
Cherokee	Caney Creek Tributary 5	12/1/2007	HEC-RAS
Cherokee	Cedar Hollow Creek	12/1/2007	HEC-RAS
Cherokee	Dog Hollow Creek	12/1/2007	HEC-RAS
Cherokee	Dripping Spring Hollow Creek	12/1/2007	HEC-RAS
Cherokee	Dry Creek	12/1/2007	HEC-RAS
Cherokee	East Branch	5/1/1979	HEC-2
Cherokee	Elk Creek	12/1/2007	HEC-RAS
Cherokee	Elk Creek Tributary 1	12/1/2007	HEC-RAS
Cherokee	Elk Creek Tributary 2	12/1/2007	HEC-RAS
Cherokee	Falls Branch Creek	12/1/2007	HEC-RAS
Cherokee	Falls Branch Creek Tributary 1	12/1/2007	HEC-RAS
Cherokee	Field Hollow Creek	12/1/2007	HEC-RAS
Cherokee	Flint Creek	11/1/2000	HEC-RAS
Cherokee	Gum Creek	12/1/2007	HEC-RAS
Cherokee	Illinois River	3/1/1991	HEC-2
Cherokee	Illinois River	12/1/2007	HEC-RAS
Cherokee	Illinois River	11/1/2000	HEC-RAS
Cherokee	Illinois River Tributary 1	12/1/2007	HEC-RAS
Cherokee	Illinois River Tributary 10	12/1/2007	HEC-RAS
Cherokee	Illinois River Tributary 1A	12/1/2007	HEC-RAS
Cherokee	Illinois River Tributary 2	12/1/2007	HEC-RAS

County	Stream Name	Date of Effective Analysis	Hydraulic Model
Cherokee	Illinois River Tributary 4	12/1/2007	HEC-RAS
Cherokee	Illinois River Tributary 6	12/1/2007	HEC-RAS
Cherokee	Illinois River Tributary 7	12/1/2007	HEC-RAS
Cherokee	Illinois River Tributary 8	12/1/2007	HEC-RAS
Cherokee	Illinois River Tributary 9	12/1/2007	HEC-RAS
Cherokee	Kirk Spring Hollow Creek	12/1/2007	HEC-RAS
Cherokee	Mining Camp Hollow Creek	12/1/2007	HEC-RAS
Cherokee	Molly Field Hollow Creek	12/1/2007	HEC-RAS
Cherokee	Negro Jake Hollow Creek	12/1/2007	HEC-RAS
Cherokee	Park Hill Branch Creek	12/1/2007	HEC-RAS
Cherokee	Peavine Hollow Creek	12/1/2007	HEC-RAS
Cherokee	Pettit Creek	12/1/2007	HEC-RAS
Cherokee	Pettit Creek Tributary 1	12/1/2007	HEC-RAS
Cherokee	Pettit Creek Tributary 2	12/1/2007	HEC-RAS
Cherokee	Pipe Springs Hollow Creek	12/1/2007	HEC-RAS
Cherokee	Pumpkin Hollow Creek	12/1/2007	HEC-RAS
Cherokee	Pumpkin Hollow Creek Tributary 1	12/1/2007	HEC-RAS
Cherokee	Pumpkin Hollow Creek Tributary 2	12/1/2007	HEC-RAS
Cherokee	Ross Branch Creek	12/1/2007	HEC-RAS
Cherokee	Sawmill Hollow Creek	12/1/2007	HEC-RAS
Cherokee	Sixshooter Branch Creek	12/1/2007	HEC-RAS
Cherokee	Sixshooter Branch Creek Tributary 1	12/1/2007	HEC-RAS
Cherokee	Steely Hollow Creek	12/1/2007	HEC-RAS
Cherokee	Tahlequah Creek	12/1/2007	HEC-RAS
Cherokee	Tenkiller Ferry Reservoir	12/1/2007	HEC-RAS
Cherokee	Terrapin Creek	12/1/2007	HEC-RAS

County	Stream Name	Date of Effective Analysis	Hydraulic Model
Cherokee	Town Branch	5/1/1979	HEC-2
Cherokee	Tully Hollow Creek	12/1/2007	HEC-RAS
Cherokee	Unnamed Stream	12/1/2007	HEC-RAS
Cherokee	Wall Trip Branch Creek	12/1/2007	HEC-RAS
Cherokee	Winset Hollow Creek	12/1/2007	HEC-RAS
Sequoyah	Illinois River	4/1/1988	OTHER

IV. Watershed Options (TO BE COMPLETED POST-DISCOVERY)

In conjunction with the assessment of risk, need, and the availability of topographic data, as well as the input of stakeholders within in this Watershed, future projects within the Illinois Watershed are recommended. Both FEMA and their CTP Partner, ANRC, look to promote mitigation action within the watershed. After internal and partner review of the communities within the watershed, the following are overarching opportunities have been identified to promote community action within the watershed.

Table lists some potential needs in the Watershed and actions that could be taken under each of the areas discussed during the Discovery meetings, including:

- Risk Identification and Communication – traditional flood studies and data updates
- NFIP Community Actions – insurance-related mitigation or information
- Mitigation Planning and Mitigation Actions – items related to planning updates
- Community Benefits and Grant Opportunities – discuss potential opportunities specific to property acquisition

Table 22: Potential Watershed Activities (TO BE COMPLETED POST-DISCOVERY)

Risk Identification and Communication
•
NFIP Community Actions
•
Mitigation Planning and Mitigation Actions
•
Community Benefits and Grant Opportunities
•

Table provides specific evaluation guidelines for streams or areas that could benefit from additional study that have been identified during Discovery. Any FEMA-based metrics that would be met if the need or issue was addressed will be identified, as well as any current FEMA map actions that would affect the activity. Any comments or concerns raised by a stakeholder during the Discovery process that could be tied to one of the needs or actions for the Watershed will be included. Some needs/actions may be listed that were not raised by any specific community but were identified as general improvements that could be made in the Illinois Watershed to meet general FEMA regional goals based on the information gathered during Pre-Discovery and Discovery.

Needs will be identified as being on the critical path as high, medium, or low priority or as a task that could be assigned to a State or local community to complete. These definitions are also included in Table .

- **High** – The local community would immediately benefit from the action and FEMA's metrics would also be met.
- **Medium** – The local community would benefit over the longer term from the action and a portion of FEMA's metrics may be met.
- **Low** – The local community activities can continue without this revision and FEMA's metrics are not affected.
- **Community Action** – The activity would be more appropriate as a community-led action rather than a FEMA-led action.

Table 23: Metrics and Rankings of Needs (TO BE COMPLETED POST-DISCOVERY)

Priority	Description of Need Evaluation Guide **High** – Local community would immediately benefit from the action, and FEMA's metrics would also be met **Medium** – Local community would benefit over the longer term from the action, and a portion of FEMA's metrics may be met **Low** – Local community activities can continue without this revision, and FEMA's metrics are not impacted **Community Action** – Activity would be more appropriate as a community-led action rather than a FEMA-led action				
	Location of Need / Project	**Details**	**Impacts From Any Current Map Actions**	**FEMA Metric or Community Benefit**	**Evaluation**
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					

i. Project Prioritization (TO BE COMPLETED POST-DISCOVERY)

During the Discovery process, flood risk projects are intended to be initiated and cataloged at a HUC-8 level. This means that when a project is initiated, all flood hazards within the HUC-8 will be evaluated to determine the project scope within that HUC-8 boundary. Evaluation means that risk, need, available data, and desired output products are assessed for the entire HUC-8. Evaluation does not mean the actual development of new or updated flood risk products, only the assessment of what products would be required to fulfill the identified needs in light of the level of risk. Unmet needs will be cataloged in the CNMS Database.

Once the entire HUC-8 has been evaluated, FEMA Region 6, using input and recommendation from the Illinois Watershed Project Team and specifically the ANRC, who is the CTP of FEMA, will select the project tasks necessary to respond to the identified levels of risk and need. The CTP and the Region are expected to maximize the amount and usefulness of project work to be performed in any HUC-8, but is not expected to perform every project task and meet all needs in every watershed.

As a result of the Discovery process projects will be identified as being high priority projects for consideration in the FY15 (2015-2016) FEMA grant cycle based on current / planned community projects and cost-sharing capabilities.