Discovery Report

Lower Canadian-Walnut, HUC - 11090202

Blaine, Caddo, Canadian, Cleveland, Garvin, Grady, Hughes, McClain, Oklahoma, Pontotoc, Pottawatomie, and Seminole Counties of Oklahoma

April 10, 2014

FEMA

Table 1: Lower Canadian-Walnut Project Area Community List

Community Name	CID
Blaine County Communities	
Blaine County Unincorporated Areas	400011
Geary	400381
Caddo County Communities	
Caddo County Unincorporated Areas	400479
Bridgeport	400465
Hinton	400534
Canadian County Communities	
Canadian County Unincorporated Areas	400485
El Reno	405377
Mustang	400409
Union City	400334
Cleveland County Communities	
Cleveland County Unincorporated Areas	400475
Lexington	400043
Moore	400044
Noble	400045
Norman	400046
Slaughterville	400539
Garvin County Communities	
Garvin County Unincorporated Areas	400472
Stratford	400416
Grady County Communities	
Grady County Unincorporated Areas	400483
Blanchard	400101
Bridge Creek	NA
Minco	400406
Tuttle	400443
Hughes County Communities	
Hughes County Unincorporated Areas	400467
Atwood	NA
Calvin	400269
McClain County Communities	
McClain County Unincorporated Areas	400538
Byars	400267
Cole	400184
Dibble	400153
Goldsby	400102
Newcastle	400103
Purcell	400104

Community Name	CID
Rosedale	400160
Washington	400105
Wayne	400450
Oklahoma County Communities	
Oklahoma County	400466
Oklahoma City	405378
Pontotoc County Communities	
Pontotoc County Unincorporated Areas	400495
Ada	400173
Allen	400174
Byng	400175
Fitzhugh	400594 (N)
Francis	400593 (N)
Pottawatomie County Communities	
Pottawatomie County Unincorporated Areas	400496
Asher	400259
Tribbey	400421
Wanette	400180
Seminole County Communities	
Seminole County Unincorporated Areas	400497
Konawa	400190
Native American Tribes	
Absentee - Shawnee Tribe	NA
Cheyenne - Arapaho Tribe	NA
Chickasaw Nation	NA
Choctaw Nation	NA
Citizen Pottawatomi Nation	400553
Muscogee (Creek) Nation	NA
Seminole Nation	NA
Wichita and Affiliated Tribes	NA
Caddo Nation	NA
Delaware Tribe of Western Oklahoma	NA

Table of Contents

List of Tables

List of Figures

I. Acronyms and Abbreviations

BFE	Base (1-percent-annual-chance) Flood Elevation
CAV	Community Assistance Visit
CEO	Chief Elected Officer
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CFS	Cubic Feet per Second
CID	Community Identification Number
CLOMR	Conditional Letter of Map Revision
CNMS	Coordinated Needs Management Strategy[1]
CRS	Community Rating System
CTP	Cooperating Technical Partner
DEM	Digital Elevation Model
DFIRM	Digital Flood Insurance Rate Map
eLOMA	Electronic Letter of Map Amendment
EPA	Environmental Protection Agency
ESRI	Environmental Systems Research Institute
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
FPA	Floodplain Administrator
FY	Fiscal Year
G&S	Guidelines and Standards for Flood Hazard Mapping Partners
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
H&H	Hydrologic and Hydraulic
HMP	Hazard Mitigation Plan
HUC	Hydrologic Unit Code
HWM	High Water Mark
IDIQ	Indefinite Delivery Indefinite Quantity
LCW	Lower Canadian-Walnut
LiDAR	Light Detection and Ranging System
LOMA	Letter of Map Amendment
LOMC	Letter of Map Change
LOMR	Letter of Map Revision
LOMR-F	Letter of Map Revision based on Fill
MAT	Mitigation Assessment Team
MDP	Master Drainage Plan
MIP	Mapping Information Platform
MLP	Midterm Levee Inventory
MXD	ArcMap Document Extension
NAVD	North American Vertical Datum
NCDC	National Climatic Data Center
NRCS	National Resource Conservation Service
NFIP	National Flood Insurance Program
NHD	National Hydrologic Dataset
NVUE	New Validated or Updated Engineering
OEM	Oklahoma Department of Emergency Management
ODEQ	Oklahoma Department of Environmental Quality
ODOT	Oklahoma Department of Transportation
OKC	Oklahoma City
OWRB	Oklahoma Water Resources Board
PDF	Portable Document Format File
PMR	Physical Map Revision
RAMPP	Risk Assessment, Mapping and Planning Partners
RCRA	Resource Conservation and Recovery Act
Risk MAP	Risk Mapping, Assessment, and Planning
RL	Repetitive Loss
RSC	Regional Service Center
SFHA	Special Flood Hazard Area
SHMO	State Hazard Mitigation Officer
SHP	ESRI Shape File
SQ MI	Square Mile
SRL	Severe Repetitive Loss
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey

[1] CNMS files used for this report are dated June 30, 2013, unless noted otherwise.

II. 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, local, and Tribal entities with information needed to mitigate flood related risks.

The beginning step of the Risk MAP process is defined as Discovery and encompasses deployment of engagement activities in a watershed of interest. Watersheds are selected for Discovery based on risk, need, available topographic data, and other factors. The goal of the Discovery process is to gather local information and readily available data to determine project viability and the need for Risk MAP products to assist in the movement of communities towards resilience.

Through the Discovery process, FEMA can determine which areas of the HUC8 Discovery watersheds may/will be funded for further flood risk identification and assessment in a collaborative manner, taking into consideration the information collected from local communities during this process. Discovery initiates 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 included watershed 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.

In October 2012, FEMA approved a series of two Discovery Meetings in this watershed area. During Discovery, FEMA and the State reached out to local communities to:

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

The results of the Discovery process are presented in a Discovery Report, a watershed scale Discovery Map and the digital data that were gathered or developed during the process. This document contains the Discovery Report. The digital data submitted (on a DVD) with this report contain correspondence, exhibits used at the Discovery meetings, geographic information system (GIS) data, mapping documents (PDF, shapefiles, personal geodatabases and ESRI ArcGIS 9.3.1 Map Exchange Documents [MXDs]), or other supplemental digital information. Graphics in this Discovery Report are available as larger format graphic files for printing and as GIS data that may be printed and used at any map scale.

A. Watershed Selection

The Lower Canadian-Walnut (HUC 11090202) encompasses an area of approximately 1,833 square miles and extends across 12 counties in south central Oklahoma. Major communities include the Cities of Oklahoma City, Norman, Ada, Newcastle, Purcell, and Noble. Tribal Lands belonging to the Absentee-Shawnee Tribe, Cheyenne-Arapaho Tribes, Chickasaw Nation, Choctaw Nation, Muscogee (Creek) Nation, Citizen Potawatomi Nation, Seminole Nation, Wichita and Affiliated Tribes, Caddo Nation, and Delaware Tribe of Western Oklahoma are located in counties that intersect the watershed. There are no levees in the watershed that are shown to provide protection from the base flood on the DFIRMs.

Table 2 provides a status update for each community's NFIP participation, CRS rating, and current FIRMs in the watershed. Ten of the counties and 23 communities are participating in the NFIP. Two of the counties and 17 communities are not participating in the NFIP. Figure 1 shows the locations of all communities in the watershed.

Table 2: Lower Canadian-Walnut NFIP Status of Project Area Communities[2]

County	Community Name	CID	NFIP Participant	CRS Rating	FIRM Date	FIRM Status	Population (2010 Census)
Blaine	County Unincorporated Areas	400011	Y	NR	8/2/1995	Effective	11,972
Blaine	Geary	400381	Y	NR	10/29/1976	Effective	1,390
Caddo	County Unincorporated Areas	400479	Y	NR	4/18/2011	Effective	28,951
Caddo	Bridgeport	400465	N	NR	4/18/2011	Effective	142
Caddo	Hinton	400534	N	NR	4/18/2011	Effective	2,554
Canadian	County Unincorporated Areas	400485	Y	NR	9/26/2008	Effective	109,814
Canadian	El Reno	405377	Y	NR	9/26/2008	Effective	16,542
Canadian	Mustang	400409	Y	NR	9/26/2008	Effective	16,529
Canadian	Union City	400334	Y	NR	9/26/2008	Effective	2,063

[2] NR: Not rated; NA: Not Available

County	Community Name	CID	NFIP Participant	CRS Rating	FIRM Date	FIRM Status	Population (2010 Census)
Cleveland	County Unincorporated Areas	400475	Y	NR	9/26/2008	Effective	246,831
Cleveland	Lexington	400043	Y	NR	9/26/2008	Effective	2,272
Cleveland	Moore	400044	Y	NR	9/26/2008	Effective	52,506
Cleveland	Noble	400045	Y	NR	9/26/2008	Effective	6,249
Cleveland	Norman	400046	Y	5	9/26/2008	Effective	108,265
Cleveland	Slaughterville	400539	Y	NR	9/26/2008	Effective	4,036
Garvin	County Unincorporated Areas	400472	N	NR	4/3/2012	Effective	27,462
Garvin	Stratford	400416	Y	NR	4/3/2012	Effective	1,452
Grady	County Unincorporated Areas	400483	N	NR	4/3/2012	Effective	27,462
Grady	Blanchard	400101	Y	NR	4/3/2012	Effective	7,222
Grady	Bridge Creek	NA	NA	NR	4/3/2012	Effective	NA
Grady	Minco	400406	N	NR	4/3/2012	Effective	1,831
Grady	Tuttle	400443	Y	NR	4/3/2012	Effective	5,786
Hughes	County Unincorporated Areas	400467	Y	NR	12/1/1989	Effective	13,606
Hughes	Atwood	40x008	NA	NR	12/1/1989	Effective	111
Hughes	Calvin	400269	Y	NR	12/1/1989	Effective	162
McClain	County Unincorporated Areas	400538	Y	NR	11/16/2007	Effective	33,107
McClain	Byars	400267	Y	NR	11/16/2007	Effective	216
McClain	Cole	400184	N	NR	11/16/2007	Effective	619
McClain	Dibble	400153	N	NR	11/16/2007	Effective	1,793
McClain	Goldsby	400102	Y	NR	11/16/2007	Effective	2,191
McClain	Newcastle	400103	Y	NR	11/16/2007	Effective	7,225
McClain	Purcell	400104	Y	NR	11/16/2007	Effective	5,805
McClain	Rosedale	400160	NA	NR	11/16/2007	Effective	78
McClain	Washington	400105	NA	NR	11/16/2007	Effective	590
McClain	Wayne	400450	Y	NR	11/16/2007	Effective	554
Oklahoma	Oklahoma County	400466	Y	NR	12/18/2009	Effective	704,023
Oklahoma	Oklahoma City	405378	Y	NR	12/18/2009	Effective	563,571
Pontotoc	County Unincorporated Areas	400495	Y	NR	7/17/2012	Effective	36,644
Pontotoc	Ada	400173	Y	NR	7/17/2012	Effective	16,543
Pontotoc	Allen	400174	N	NR	7/17/2012	Effective	1,004
Pontotoc	Byng	400175	Y	NR	7/17/2012	Effective	1,259

County	Community Name	CID	NFIP Participant	CRS Rating	FIRM Date	FIRM Status	Population (2010 Census)
Pontotoc	Fitzhugh	40x034	N	NR	7/17/2012	Effective	170
Pontotoc	Francis	40x040	NA	NR	7/17/2012	Effective	179
Pottawatomie	County Unincorporated Areas	400496	Y	NR	9/3/2010	Effective	68,751
Pottawatomie	Asher	400259	N	NR	9/3/2010	Effective	338
Pottawatomie	Tribbey	400421	N	NR	9/3/2010	Effective	345
Pottawatomie	Wanette	400180	N	NR	9/3/2010	Effective	219
Seminole	County Unincorporated Areas	400497	Y	NR	7/18/2011	Effective	25,224
Seminole	Konawa	400190	Y	NR	7/18/2011	Effective	1,740
Tribal	Absentee- Shawnee Tribe	NA	N	NR	9/3/2010	Effective	NA
Tribal	Cheyenne - Arapaho Tribes	NA	N	NR	NA	NA	NA
Tribal	Chickasaw Nation	NA	N	NR	NA	NA	NA
Tribal	Choctaw Nation	NA	N	NR	NA	NA	NA
Tribal	Citizen Potawatomi Nation	400553	Y	NR	9/3/2010	Effective	NA
Tribal	Muscogee (Creek) Nation	NA	N	NR	NA	NA	NA
Tribal	Seminole Nation	NA	N	NR	NA	NA	NA
Tribal	Wichita and Affiliated Tribes	NA	N	NR	NA	NA	NA
Tribal	Caddo Nation	NA	N	NR	NA	NA	NA
Tribal	Delaware Tribe of Western Oklahoma	NA	N	NR	NA	NA	NA

The primary river in the watershed is the Canadian River which drains parts of Colorado, New Mexico, Texas, and Oklahoma. The Canadian River is the longest tributary of the Arkansas River at approximately 906 miles in length. The river originates in southwestern Colorado, just north of the New Mexico border. It then flows east-southeast across New Mexico and into the Texas Panhandle and through central Oklahoma. It joins the Arkansas River approximately 40 miles west of the Arkansas border. During its journey the Canadian River is dammed twice, once in Sanford, Texas (as Lake Meredith) and again in Eufaula, Oklahoma (as Lake Eufaula).

The watershed contains state and local parks scattered throughout the watershed. No national forests or parks, or military facilities, are located in the watershed. Areas that may be excluded from flood risk consideration, if they have significant acreages, include large cemeteries, U.S. Environmental Protection Agency (EPA) remediation sites (i.e., Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Resource Conservation and Recovery Act (RCRA) sites), prison areas, and water quality or flowage easement areas.

Figure 1: Watershed and Communities

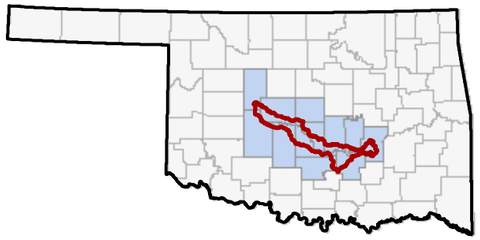
Lower Canadian-Walnut Watershed

Feb 19 2013

FEMA

OWRB Water Resources Board

WATERSHED LOCATOR - STATE OF OKLAHOMA



Congressional District Representatives

District 02: Rep. Markwayne Mullan (R)
District 03: Rep. Frank Lucas (R)
District 04: Rep. Tom Cole (R)
District 05: Rep. James Lankford (R)

Senators

Sen. Tom Coburn (R)
Sen. James M. Inhofe (R)

Map Symbology

- Cities
- County Seat
- Major Highways
- Canadian River
- Other Streams
- Congressional District Boundaries
- County Boundaries
- Watershed Boundary: HUC 8
- HUC 12 Basins

BLAINE County
CANADIAN County
OKLAHOMA County
CLEVELAND County
POTTAWATOMIE County
CADDO County
GRADY County
MCCLAIN County
GARVIN County
PONTOTOC County
SEMINOLE County
HUGHES County

DIST 5
DIST 3
DIST 4
DIST 2

Geary, Calumet, Piedmont, Edmond, Luther, Hydro, Bridgeport, El Reno, The Village, Jones, Yukon, Bethany, Warr Acres, Woodlawn Park, Spencer, Choctaw, Harrah, Forest Park, Nicoma Park, Smith Village, Del City, McLoud, Valley Brook, Johnson, Hinton, Union City, Mustang, Lookeba, Moore, Shawnee, Cromwell, Eakly, Binger, Minco, Tuttle, Bethel Acres, Earlsboro, Pink, Tecumseh, Newcastle, Hall Park, Norman, Seminole, Wetumka, Dustin, Gracemont, Pocasset, Amber, Lima, Wewoka, Yeager, Blanchard, Goldsby, Noble, Etowah, Macomb, Tribbey, Maud, Bowlegs, Carnegie, Fort Cobb, Anadarko, Verden, Chickasha, Cole, Slaughterville, Saint Louis, Holdenville, Horntown, Lamar, Dibble, Washington, Purcell, Lexington, Spaulding, Asher, Wanette, Konawa, Sasakwa, Atwood, Calvin, Norge, Ninnekah, Cement, Cyril, Alex, Bradley, Wayne, Rosedale, Byars, Byng, Francis, Allen, Stuart, Gerty, Lindsay, Erin Springs, Maysville, Paoli, Stratford, Ada, Rush Springs, Pauls Valley, Fitzhugh, Stonewall, Wynnewood, Roff, Elmore City

0 5 10 20 Miles

These areas contribute to the overall square mileage of the watershed, but are not places where communities plan for population growth and development.

The Midterm Levee Inventory (MLI), DFIRM database and Flood Map DesktopTM revealed no record of certified levees within this HUC-8. A listing of 172 was obtained from the USACE National Inventory of Dams. Dams under federal, state, local and utility jurisdiction are listed below:

Dam Name	Owner	River
1. Dahlgrin Lake	Department of Wildlife Conservation	Helsel Creek
2. Hinton Sewage Pond	Town of Hinton	Tributary of Canadian River
3. Konawa Lake	Oklahoma Gas & Electric	Jumper Creek
4. Purcell City Lake	City of Purcell	Tributary of Walnut Creek
5. SCS-Canyon View Site-1	Canadian County Conservation District	Tributary of Canyon View Creek
6. SCS-Canyon View Site-2	Canadian County Conservation District	Tributary of Canyon View Creek
7. SCS-Canyon View Site-3	Canadian County Conservation District	Tributary of Canyon View Creek
8. SCS-Canyon View Site-4	Canadian County Conservation District	Canyon View Creek
9. SCS-Sandy Creek Site-01	Pontotoc County Conservation District	Tributary of Canadian Sandy Creek
10. SCS-Sandy Creek Site-02	Pontotoc County Conservation District	Tributary of Canadian Sandy Creek
11. SCS-Sandy Creek Site-03	Pontotoc County Conservation District	Black Creek
12. SCS-Sandy Creek Site-04	Pontotoc County Conservation District	Rodtky Creek
13. SCS-Sandy Creek Site-06	Pontotoc County Conservation District	Tributary of East Days Creek
14. SCS-Sandy Creek Site-07	Pontotoc County Conservation District	East Days Creek
15. SCS-Sandy Creek Site-08	Pontotoc County Conservation District	West Days Creek
16. SCS-Sandy Creek Site-09	Pontotoc County Conservation District	Tributary of Canadian Sandy Creek
17. SCS-Sandy Creek Site-10	Pontotoc County Conservation District	Tributary of Canadian Sandy Creek
18. SCS-Sandy Creek Site-11	Pontotoc County Conservation District	Canadian Sandy Creek
19. SCS-Sandy Creek Site-12	Pontotoc County Conservation District	Tributary of Canadian Sandy Creek
20. SCS-Sandy Creek Site-13	Pontotoc County Conservation District	Tributary of Canadian Sandy Creek
21. SCS-Sandy Creek Site-14	Garvin County Conservation District	Little Canadian Sandy Creek
22. SCS-Sandy Creek Site-15	Garvin County Conservation District	Tributary of Little Canadian Sandy Creek
23. SCS-Sandy Creek Site-16	Pontotoc County Conservation District	Burkhart Creek
24. SCS-Sandy Creek Site-17	Pontotoc County Conservation District	Coon Creek
25. SCS-Sandy Creek Site-18	Pontotoc County Conservation District	Burris Creek
26. SCS-Sandy Creek Site-19	Pontotoc County Conservation District	Tributary of Coon Creek
27. SCS-Sandy Creek Site-20	Pontotoc County Conservation District	Coon Creek
28. SCS-Sandy Creek Site-21	Pontotoc County Conservation District	Tributary of Coon Creek
29. SCS-Sandy Creek Site-22	Pontotoc County Conservation District	Tributary of Spring Brook Creek
30. SCS-Sandy Creek Site-23	Pontotoc County Conservation District	Tributary of Spring Brook Creek
31. SCS-Sandy Creek Site-27	Garvin County Conservation District	Tributary of Spring Brook Creek
32. SCS-Sandy Creek Site-28	Garvin County Conservation District	Tributary of Spring Brook Creek
33. SCS-Sandy Creek Site-29	Pontotoc County Conservation District	Tributary of Spring Brook Creek
34. SCS-Sandy Creek Site-30	Pontotoc County Conservation District	Tributary of Spring Brook Creek
35. SCS-Sandy Creek Site-31	Pontotoc County Conservation District	Spring Brook Creek
36. SCS-Sandy Creek Site-32	Pontotoc County Conservation District	Tributary of Canadian Sandy Creek
37. SCS-Sandy Creek Site-33	Pontotoc County Conservation District	Tributary of Canadian Sandy Creek
38. University of Oklahoma	University of Oklahoma	Bishop Creek

For the Discovery process, watersheds are selected and analyzed at the HUC 8 level using three major factors (or "Trifecta" factors): population, topographic data availability and risk decile. The latter 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. Description and impact of these factors on the watershed are described below.

1. Population

The population in this watershed totals 234,141 people, based on the 2010 census. In total, there are 48 populated areas inside this watershed. Figure 2 shows the population densities within the Lower Canadian-Walnut Watershed based on U.S. Census Data 2010. Oklahoma City is one of the watershed's highest population centers (population: 563,571). Figure 3 identifies the relative percent urban cover for areas within the watershed.

2. Land Use

The primary land use in the watershed is cultivated crops and pasture hay, with a significant portion in grassland and forest for a total of 81 percent. Developed land accounts for 2 percent of the land cover in the watershed. Areas with the largest increase in urbanization include Cleveland and Pontotoc Counties around the urban areas of Norman and Ada, respectively. HUC 12 watersheds surrounding Norman are on average 28 percent urbanized with watersheds near the City of Ada at 26 percent urbanized. Both areas urbanization has increased by one percent over the last five years. Figure 4 shows the changes in the percent urban coverage that have occurred in the watershed in the last five years.

3. NFIP

Table 3lists the number of NFIP insurance claims for the portions of the communities within the Watershed. Of the insurance claims filed within the watershed, 82 percent have been filed in Oklahoma City, Norman, Tuttle, and Unincorporated areas of Cleveland County. Figure 5 depicts the distribution of NFIP insurance claims within the Lower Canadian-Walnut Watershed.

Table 3: Lower Canadian-Walnut Total NFIP Insurance Claims

Total NFIP Insurance Claims by Community			
Community	**Claims**	**Community**	**Claims**
Blanchard	3	Moore	4
Cleveland County Unincorporated Areas	25	Mustang	2
		Newcastle	5
Goldsby	4	Noble	2
Grady County Unincorporated Areas	1	Norman	59
		Oklahoma City	54
Hinton	1	Purcell	4
Lexington	8	Slaughterville	1
McClain County Unincorporated Areas	1	Stratford	3
		Tuttle	24

Figure 2: Population Density in the Watershed

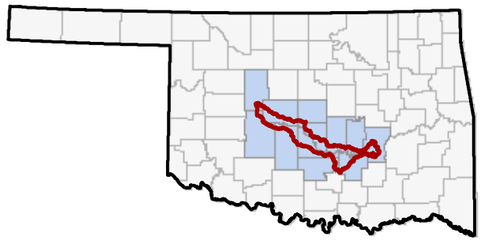
Lower Canadian-Walnut Watershed

Feb 19 2013

FEMA

OWRB Water Resources Board

WATERSHED LOCATOR - STATE OF OKLAHOMA



Map Symbology

- Cities
- County Seat
- Major Highways
- Canadian River
- Communities
- County Boundaries
- Watershed Boundary: HUC 8
- HUC 12 Basins

CNMS Validation Status

- Unknown
- Unverified
- Valid

Population Density

- Low
- High

BLAINE County
CANADIAN County
OKLAHOMA County
CLEVELAND County
POTTAWATOMIE County
HUGHES County
SEMINOLE County
GRADY County
MCCLAIN County
GARVIN County
PONTOTOC County

Geary, Hydro, Bridgeport, Calumet, El Reno, Piedmont, Edmond, Arcadia, Luther, The Village, Jones, Bethany, Warr Acres, Yukon, Woodlawn Park, Spencer, Choctaw, Harrah, Forest Park, Nicoma Park, Smith Village, Del City, Valley Brook, McLoud, Johnson, Cromwell, Hinton, Lookeba, Union City, Mustang, Moore, Minco, Tuttle, Newcastle, Norman, Hall Park, Shawnee, Bethel Acres, Pink, Tecumseh, Earlsboro, Seminole, Lima, Wewoka, Bowlegs, Macomb, Maud, Etowah, Tribbey, Saint Louis, Yeager, Holdenville, Horntown, Lamar, Wetumka, Dustin, Gracemont, Pocasset, Amber, Blanchard, Goldsby, Noble, Cole, Slaughterville, Washington, Dibble, Purcell, Lexington, Asher, Wanette, Konawa, Sasakwa, Spaulding, Calvin, Atwood, Stuart, Allen, Byng, Francis, Gerty, Anadarko, Verden, Chickasha, Norge, Ninnekah, Cement, Cyril, Alex, Bradley, Lindsay, Erin Springs, Maysville, Paoli, Rush Springs, Pauls Valley, Wynnewood, Elmore City, Rosedale, Wayne, Byars, Stratford, Ada, Fitzhugh, Roff, Stonewall

0 5 10 20 Miles

Figure 3: Percent Urban Coverage

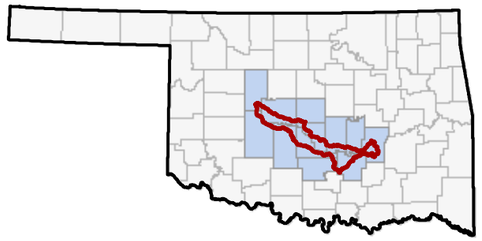
Lower Canadian-Walnut Watershed

Feb 19 2013

FEMA

OWRB Water Resources Board

WATERSHED LOCATOR - STATE OF OKLAHOMA



Map Symbology

- Cities
- County Seats
- Major Highways
- Canadian River
- Communities
- County Boundaries
- Watershed Boundary: HUC 8
- HUC 12 Basins

CNMS Validation Status

- Unknown
- Unverified
- Valid

Current Percent Urban Cover

- Low
- High

BLAINE County
CANADIAN County
OKLAHOMA County
CLEVELAND County
POTTAWATOMIE County
HUGHES County
SEMINOLE County
GRADY County
MCCLAIN County
GARVIN County
PONTOTOC County

Geary, Calumet, Piedmont, Edmond, Arcadia, Luther, Hydro, Bridgeport, El Reno, The Village, Jones, Bethany, Warr Acres, Yukon, Woodlawn Park, Spencer, Choctaw, Harrah, Forest Park, Nicoma Park, Smith Village, Del City, Valley Brook, McLoud, Johnson, Cromwell, Hinton, Union City, Mustang, Lookeba, Moore, Shawnee, Bethel Acres, Minco, Tuttle, Eakly, Binger, Pink, Tecumseh, Earlsboro, Wetumka, Dustin, Newcastle, Hall Park, Norman, Seminole, Lima, Wewoka, Yeager, Gracemont, Pocasset, Amber, Macomb, Bowlegs, Blanchard, Goldsby, Noble, Etowah, Tribbey, Maud, Lamar, Cole, Slaughterville, Saint Louis, Holdenville, Horntown, Anadarko, Verden, Chickasha, Washington, Dibble, Purcell, Lexington, Spaulding, Asher, Wanette, Konawa, Sasakwa, Calvin, Atwood, Norge, Ninnekah, Cement, Cyril, Wayne, Rosedale, Byars, Byng, Francis, Allen, Stuart, Gerty, Alex, Bradley, Lindsay, Erin Springs, Maysville, Paoli, Stratford, Ada, Rush Springs, Pauls Valley, Fitzhugh, Stonewall, Wynnewood, Roff, Elmore City

0 5 10 20 Miles

Figure 4: Urban Change Last 5 Years

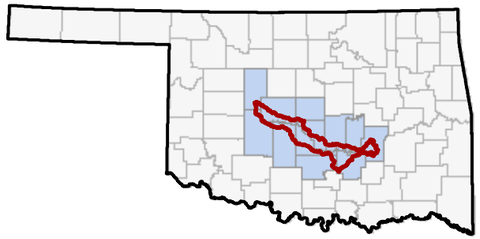
Lower Canadian-Walnut Watershed

Feb 19 2013

FEMA

OWRB Water Resources Board — the water agency

WATERSHED LOCATOR - STATE OF OKLAHOMA



Map Symbology

- Cities
- County Seats
- Major Highways
- Canadian River
- Communities
- County Boundaries
- Watershed Boundary: HUC 8
- HUC 12 Basins

CNMS Validation Status

- Unknown
- Unverified
- Valid

Relative Urbanization Last 5 Years

- Low
- High

BLAINE County
CANADIAN County
OKLAHOMA County
CLEVELAND County
POTTAWATOMIE County
HUGHES County
SEMINOLE County
GRADY County
MCCLAIN County
GARVIN County
PONTOTOC County

Geary, Calumet, Piedmont, Edmond, Arcadia, Luther, Hydro, Bridgeport, El Reno, The Village, Jones, Yukon, Bethany, Warr Acres, Woodlawn Park, Spencer, Choctaw, Harrah, Forest Park, Nicoma Park, Smith Village, Del City, Valley Brook, McLoud, Johnson, Hinton, Union City, Mustang, Lookeba, Moore, Shawnee, Cromwell, Eakly, Binger, Minco, Tuttle, Bethel Acres, Pink, Tecumseh, Earlsboro, Newcastle, Hall Park, Norman, Seminole, Wetumka, Dustin, Pocasset, Amber, Blanchard, Goldsby, Noble, Cole, Etowah, Tribbey, Macomb, Maud, Bowlegs, Lima, Wewoka, Yeager, Holdenville, Horntown, Lamar, Saint Louis, Slaughterville, Washington, Dibble, Purcell, Lexington, Spaulding, Asher, Wanette, Konawa, Sasakwa, Calvin, Atwood, Stuart, Wayne, Rosedale, Byars, Byng, Francis, Allen, Gerty, Verden, Chickasha, Norge, Ninnekah, Cement, Cyril, Alex, Bradley, Lindsay, Erin Springs, Maysville, Paoli, Stratford, Ada, Rush Springs, Pauls Valley, Fitzhugh, Stonewall, Roff, Wynnewood, Elmore City

0 5 10 20 Miles

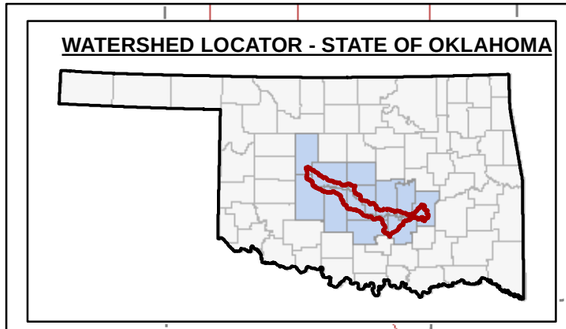
Figure 5: Single Claims In the Watershed

Lower Canadian-Walnut Watershed

Feb 19 2013

FEMA

OWRB Water Resources Board



Claim Totals by Community	
Community	Number
Blanchard	3
Goldsby	4
Hinton	1
Lexington	8
Moore	4
Mustang	2
Newcastle	5
Noble	2
Norman	59
Oklahoma City	54
Purcell	4
Slaughterville	1
Stratford	3
Tuttle	24
Claim Totals by County	
Cleveland County	25
Grady County	1
Mcclain County	1

Map Symbology

- Cities
- County Seats
- Major Highways
- Canadian River
- Communities
- County Boundaries
- Watershed Boundary: HUC 8
- HUC 12 Basins

CNMS Validation Status

- Unknown
- Unverified
- Valid

Single Claim Totals

- None
- Low
- High

BLAINE County
CANADIAN County
OKLAHOMA County
CLEVELAND County
POTTAWATOMIE County
HUGHES County
SEMINOLE County
GRADY County
MCCLAIN County
GARVIN County
PONTOTOC County

Geary, Hydro, Bridgeport, Calumet, El Reno, Piedmont, Edmond, The Village, Bethany, Warr Acres, Yukon, Woodlawn Park, Spencer, Forest Park, Smith Village, Del City, Valley Brook, Hinton, Union City, Mustang, Lookeba, Eakly, Binger, Minco, Tuttle, Moore, Newcastle, Hall Park, Norman, Gracemont, Pocasset, Amber, Blanchard, Goldsby, Noble, Cole, Slaughterville, Washington, Dibble, Purcell, Lexington, Anadarko, Verden, Chickasha, Norge, Ninnekah, Cement, Cyril, Alex, Bradley, Lindsay, Erin Springs, Maysville, Paoli, Rush Springs, Wayne, Rosedale, Wanette, Asher, Byars, Stratford, Pauls Valley, Wynnewood, Elmore City, Roff, Fitzhugh, Stonewall, Ada, Byng, Francis, Konawa, Sasakwa, Spaulding, Holdenville, Horntown, Lamar, Wewoka, Yeager, Seminole, Maud, Bowlegs, Lima, Tecumseh, Pink, Bethel Acres, Earlsboro, Cromwell, Wetumka, Dustin, Macomb, Tribbey, Etowah, Saint Louis, Atwood, Calvin, Stuart, Allen, Gerty, Johnson

0 5 10 20 Miles

In addition to NFIP claims, there are several locations of Repetitive Loss (RL) or Severe Repetitive Loss (SRL) properties within the Lower Canadian-Walnut Watershed. Table 4 summarizes RL and SRL claims by county and community within the Watershed. A concentration of these locations appears in the Oklahoma City area within HUC 12 areas that make up the HUC 8 watershed. Figure 6 shows the approximate location of these losses.

Table 4: Lower Canadian-Walnut Repetitive or Severe Repetitive Loss*

Non-Mitigated Losses by County**			
County	**Number of Properties**	**Total Claims**	**Average Number of Claims per Property**
Cleveland County	3	7	2.3
McClain County	1	2	2
Non-Mitigated Losses by Community			
Community	**Number of Properties**	**Total Claims**	**Average Number of Claims per Property**
Lexington	2	4	2
Norman	6	19	3.2
Oklahoma City	10	30	3
Purcell	1	2	2

* Communities and counties not shown do not have RL/SRL properties.
** Unincorporated areas.
***Data current as of January 2013

4. Declarations

The Lower Canadian-Walnut Watershed has a history of flooding as demonstrated by numerous major disaster declarations with 29 issued in the past 42 years. The state mitigation plan asserts that 2,150 floods have been recorded in Oklahoma. Of that number, 41 flood events since 1955 have been severe enough to be determined by the Federal Government as Major Disaster Declarations. Four such events occurred in 2008 alone. Table 5 lists recent disaster declarations for multiple hazards within the watershed.

Table 5: Lower Canadian-Walnut Disaster Declarations

Date of Declaration	Watershed Counties Declared	For Hazard
10/14/1970	Cleveland, Garvin, McClain, Pontotoc, Pottawatomie, Seminole	Heavy Rains, Tornadoes, Flooding
06/13/1973	Canadian, Cleveland, Garvin, McClain, Pontotoc,	Severe Storms, Flooding, Tornadoes
12/10/1973	Cleveland, Garvin, Hughes, McClain, Seminole	Severe Storms, Flooding
06/10/1974	Oklahoma, Pottawatomie, Seminole	Severe Storms, Flooding
11/26/1974	Canadian, Oklahoma	Severe Storms, Flooding
07/09/1975	Blaine, Cleveland, McClain	Severe Storms, Flooding, Tornadoes
06/18/1982	Blaine, Caddo	Severe Storms, Flooding

Date of Declaration	Watershed Counties Declared	For Hazard
06/10/1983	Hughes	Severe Storms, Flooding
10/26/1983	Caddo, Cleveland, Grady, McClain, Oklahoma, Pottawatomie	Severe Storms, Flooding
10/14/1986	Blaine, Caddo, Canadian, Cleveland, Grady, McClain, Pottawatomie	Severe Storms, Flooding
07/19/1987	Caddo, Canadian, Garvin, Grady, McClain	Severe Storms, Flooding
05/18/1990	Garvin, Hughes, McClain, Oklahoma, Pontotoc, Pottawatomie, Seminole	Flooding, Severe Storms, Tornadoes
05/12/1993	Blain, Caddo, Canadian, Grady, McClain, Oklahoma, Pottawatomie	Flooding, Severe Storms, Tornadoes
06/26/1995	Caddo, Canadian, Pottawatomie, Seminole	Flooding, Severe Storms, Tornadoes
09/01/1995	Blaine, Caddo, Canadian, Oklahoma	Flooding, Tornadoes
05/04/1999	Caddo, Canadian, Cleveland, Grady, McClain, Oklahoma, Pottawatomie	Severe Storms, Flooding, Tornadoes
11/27/2000	Caddo, Grady, McClain,	Severe Storms, Flooding
10/25/2001	Caddo	Severe Storms
01/14/2007	Blaine, Caddo, Canadian, Cleveland, Garvin, Grady, Hughes, McClain, Oklahoma, Pontotoc, Pottawatomie, Seminole	Severe Winter Storms, Flooding
06/07/2007	Blaine, Caddo, Canadian, Grady, Hughes, McClain, Pottawatomie, Seminole	Severe Storms, Flooding, Tornadoes
07/07/2007	Blaine, Caddo, Canadian, Garvin, Grady, Hughes, McClain, Oklahoma, Pontotoc, Pottawatomie, Seminole	Severe Storms, Flooding, Tornadoes
08/24/2007	Blaine, Caddo, Canadian, Garvin, Grady, McClain, Pottawatomie, Seminole	Severe Storms, Flooding, Tornadoes
08/31/2007	Garvin, Pontotoc, Seminole	Severe Storms, Flooding, Tornadoes
05/05/2008	Hughes	Severe Storms, Flooding, Tornadoes
05/09/2008	Caddo, Hughes, Seminole	Severe Storms, Flooding, Tornadoes
07/09/2008	Blaine	Severe Storms, Flooding
07/26/2010	Oklahoma	Severe Storms, Straight-line Winds, Flooding, Tornadoes
06/06/2011	Blaine, Caddo, Canadian, Grady, McClain,	Severe Storms, Straight-line Winds, Flooding, Tornadoes
05/29/2012	Blaine, Caddo, Canadian	Straight-line Winds, Hail, Flooding, Tornadoes

5. Topographic Data

Acquisitions of topographic data have been completed for Blaine, Caddo, Canadian, Cleveland, Garvin, Grady, Hughes, McClain, Oklahoma, Pottawatomie and Seminole Counties. Topographic coverage totals about 90 percent for the entire watershed. Areas that are noted to be lacking updated topographic information are the unincorporated areas of Pontotoc County. Only the USGS 10 meter DEM data is available for these missing areas, and it is not suitable for enhanced study modeling and floodplain mapping. Figure 7 provides a snapshot of the availability of topographic data.

6. Stream Data

Significant streams in this watershed include the Lower Canadian River, Canadian Sandy Creek, Pond Creek, Buggy Creek, Walnut Creek, and Spring Brook Creek. In addition to significant streams, Purcell Lake and Lake Konawa are significant water resources within the watershed. The USGS provides a National Hydrologic Dataset (NHD) that can be used to identify stream miles that reflect drainage areas of one square mile 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 1,999 miles of streams in the Lower Canadian-Walnut Watershed.

The Coordinated Needs Management Strategy (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 one-mile drainage area and that currently have effective Special Flood Hazard Areas (SFHA) 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 stream within a watershed, CNMS documents certain physiological, climatological, or engineering methodological factors 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 the only 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 which are 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' require further input to determine their validity – often because they represent paper inventory or non-modernized studies. 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 6 compares the NHD data to the CNMS data and summarizes the Validated NVUE stream mileage from CNMS for the watershed.

Figure 6: Repetitive Loss (RL) and Severe Repetitive Loss (SRL) Claims

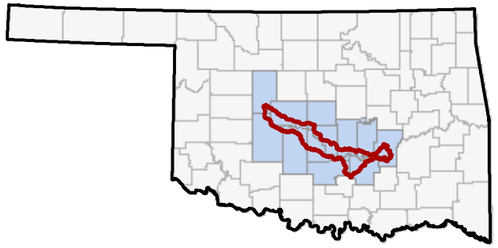
Lower Canadian-Watershed

Feb 19 2013

FEMA

OWRB Oklahoma Water Resources Board

WATERSHED LOCATOR - STATE OF OKLAHOMA



Repetitive Loss/ Severe Repetitive Loss by Community			
Community	Number of Properties	Total Claims	Average Claims Per Property
Cleveland County	3	7	2.33
City of Lexington	2	4	2.00
Mcclain County	1	2	2.00
City of Norman	6	19	3.17
City of Oklahoma City	10	30	3.00
City of Purcell	1	2	2.00
City of Tuttle	3	8	2.67

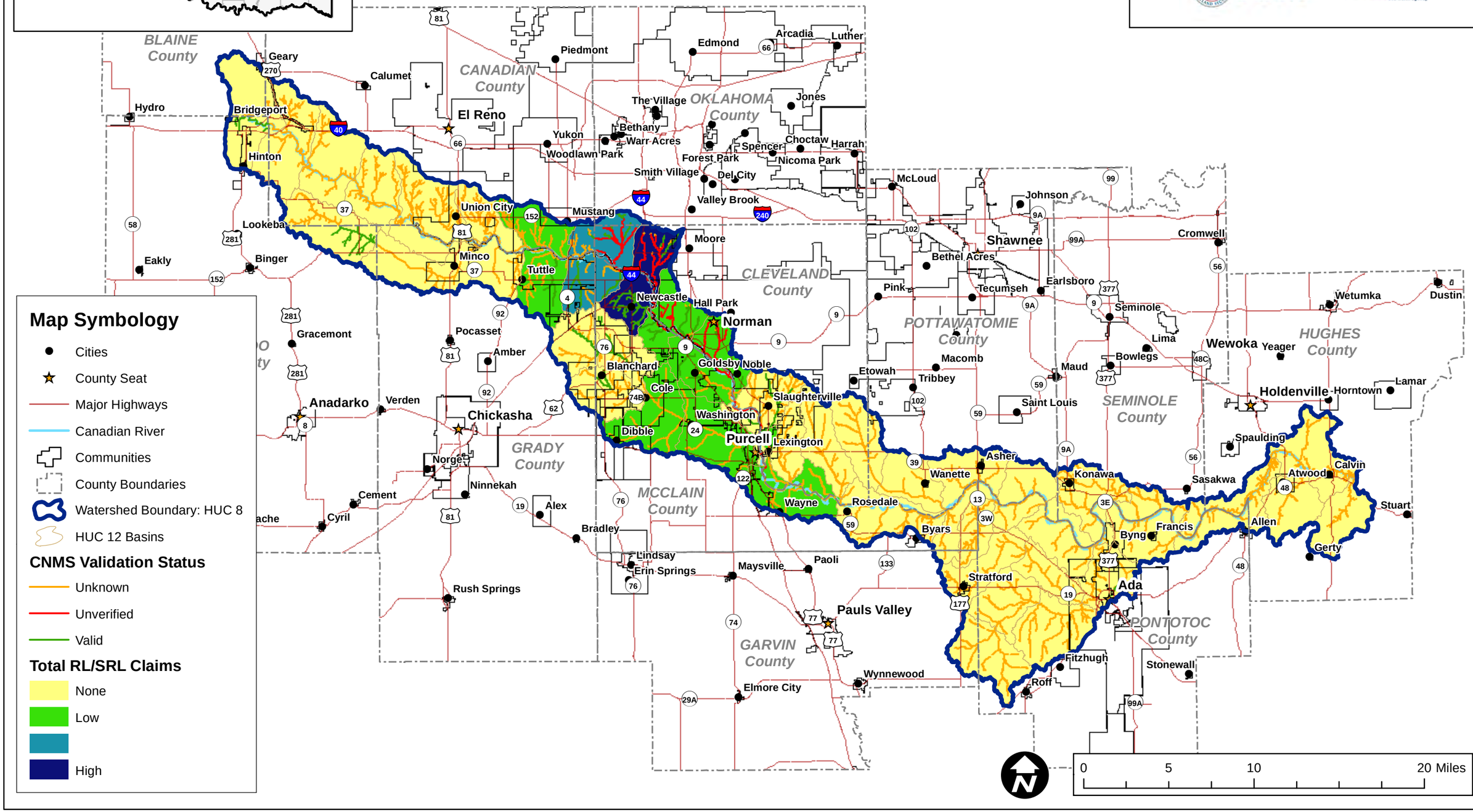


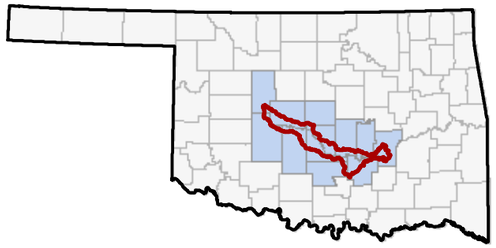
Figure 7: Risk Factors and Available Topographic Data

Lower Canadian-Walnut Watershed

Feb 19 2013

FEMA OWRB

WATERSHED LOCATOR - STATE OF OKLAHOMA



Map Symbology

- Cities
- County Seats
- Major Highways
- Canadian River
- Communities
- County Boundaries
- Watershed Boundary: HUC 8
- HUC 12 Basins
- Existing Topographic Data

CNMS Validation Status

- Unknown
- Unverified
- Valid

Risk

- Low
- High

BLAINE County
CANADIAN County
OKLAHOMA County
CLEVELAND County
POTTAWATOMIE County
HUGHES County
SEMINOLE County
GRADY County
MCCLAIN County
GARVIN County
PONTOTOC County

Geary, Hydro, Bridgeport, Hinton, Calumet, El Reno, Piedmont, Edmond, Arcadia, Luther, The Village, Jones, Bethany, Warr Acres, Yukon, Woodlawn Park, Spencer, Choctaw, Harrah, Forest Park, Nicoma Park, Smith Village, Del City, Valley Brook, McLoud, Johnson, Shawnee, Cromwell, Bethel Acres, Pink, Tecumseh, Earlsboro, Seminole, Lima, Macomb, Tribbey, Etowah, Maud, Bowlegs, Wewoka, Yeager, Wetumka, Dustin, Holdenville, Horntown, Lamar, Saint Louis, Spaulding, Asher, Wanette, Konawa, Sasakwa, Atwood, Calvin, Stuart, Allen, Gerty, Byng, Francis, Byars, Rosedale, Wayne, Purcell, Lexington, Slaughterville, Washington, Dibble, Blanchard, Cole, Goldsby, Noble, Newcastle, Hall Park, Norman, Moore, Mustang, Union City, Minco, Tuttle, Lookeba, Anadarko, Verden, Chickasha, Norge, Ninnekah, Cement, Cyril, Alex, Bradley, Lindsay, Erin Springs, Rush Springs, Maysville, Paoli, Pauls Valley, Stratford, Ada, Fitzhugh, Roff, Stonewall, Wynnewood, Elmore City, Pocasset, Amber, Gracemont

0 5 10 20 Miles

Table 6: Lower Canadian-Walnut NVUE Approximate Stream Mileage

NVUE Validation	Stream Miles
NHD Streams (streams with a drainage area of greater than one square mile)	1,999.1
CNMS Streams (streams with effective SFHA)	1,579.5
Stream Miles not included in CNMS	419.6
CNMS Valid Zone AE / AH	125.4
CNMS Valid Zone A	28.1
CNMS Unverified Zone AE / AH	106.5
CNMS Unverified Zone A	0
CNMS Zone AE / AH Requiring Further Assessment or in the process of being studied	0
CNMS Zone A Requiring Further Assessment	1,319.5
All Stream Miles not included in CNMS as there are no effective SFHAs (sum of the below)	431.9
Stream Miles not included in CNMS that would fall in land that *could be* developed	431.9
Stream Miles not included in CNMS that would fall in land that *could not be* developed	0

Within the Lower Canadian-Walnut Watershed and using these criteria from CNMS, none of Zone A and 106.5 miles of Zone AE areas were identified as being unverified. Streams included in the unverified grouping include portions of: the Canadian River, including tributaries 1, 2, 3 and 4, Cow Creek, including portions of tributaries 1, 2, and the north branch of 2, Bishop Creek, including tributary A, Imhoff Creek, and Ten Mile Flat Creek with approximately 1,319.5 miles of Zone AE flagged as requiring further assessment or are being studied with on-going projects. Additionally, 125.4 miles of Zone AE/AH in the watershed were characterized as being Valid under the NVUE metrics. Figure 7 also provides a snapshot of CNMS validation status for each stream segment, level of risk at HUC 12 level, and topographic data availability for the watershed.

The Risk Decile is computed at the HUC 8 watershed level based on 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 is 1-10, 1 being the highest and 10 being the lowest.

This HUC's National and Regional risk deciles are both 2. Considering the historical flooding events that have occurred in the last decade in Louisiana and Texas (also within Region 6), a Risk Decile of 2 is rather significant. The combination of these factors resulted in the selection of Lower Canadian-Walnut Watershed for Discovery.

Table 7 lists the overall rankings of the Lower Canadian-Walnut Watershed when compared nationally and regionally to other HUC 8 watersheds.

Table 7: Lower Canadian-Walnut Watershed Risk Factor Rankings

Lower Canadian-Walnut Watershed Selection Rankings			
National Risk Factor Rank:	332	Region 6 Risk Factor Rank:	51
National Risk Decile:	2	Region 6 Risk Decile:	2
Average Annualized Loss:	$14,500,000	Average Annualized Loss:	$14,500,000
National Average Annualized Loss Rank:	513	Region 6 Average Annualized Loss Rank:	73
National Overall Rank:	109	Region 6 Overall Rank:	29

III. Discovery Efforts

A. Engagement Plan

1. Pre-Discovery Community Engagement

Table 8 provides a listing of the staff members comprising the Regional Project Team.

Table 8: Lower Canadian-Walnut Regional Project Team

Organization	Name/E-Mail	Responsibility
FEMA Region 6	Ron Wanhanen ronald.wanhanen@fema.dhs.gov	Project Monitor
FEMA Region 6	Shanene Thomas shanene.thomas@dhs.gov	Mitigation Planning and Tribal Liaison
FEMA Region 6	Diane Howe, CFM diane.howe@dhs.gov	Risk Communications
FEMA Region 6	Danielle Brown danielle.brown2@fema.dhs.gov	Hazard Mitigation Grants
FEMA Region 6	Roberto Ramirez roberto.ramirez@fema.dhs.gov	Compliance and Insurance Specialist
Oklahoma Water Resources Board	Gavin Brady, CFM jgbrady@owrb.ok.gov	State NFIP Coordinator OWRB Program Manager
Oklahoma Water Resources Board	Yohanes Sugeng, P.E, CFM. ypsugeng@owrb.ok.gov	State Dam Safety Engineer
Oklahoma Water Resources Board	Matthew Rollins, CFM mjrollins@owrb.ok.gov	GIS Specialist
Oklahoma Department of Emergency Management	Bill Penka bill.penka@oem.ok.gov	State Hazard Mitigation Officer
Meshek & Associates	Chris Duncan, P.E., CFM cduncan@meshekengr.com	Meshek Program Manager
Meshek & Associates	Ana Stagg, P.E., CFM astagg@meshekengr.com	Discovery Manager
Meshek & Associates	Will Gustafson, GISP wgustafson@meshekengr.com	GIS Specialist
Meshek & Associates	Bethany Scott, CFM bscott@meshekengr.com	Discovery Coordinator

FEMA and the Regional Project Team were in contact with all Watershed stakeholders via letters, email, and phone calls before this Discovery meeting to request local participation. In addition to assistance in scheduling the meeting, locals were asked to help identify stakeholders to be included in the Discovery process and to acquire any data that would assist in the risk identification and assessment for the Lower Canadian-Walnut 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. In preparation for the Discovery meeting, the Regional Project Team:

- Gathered information about local flood risk and flood hazards.
- Reviewed mitigation plans to understand local mitigation capabilities, hazard risk assessments, current or future mitigation activities, and areas of mitigation interest.
- Encouraged communities within the watershed to develop a vision for the watershed's future.
- Used all information gathered to determine which areas of the watershed may require further study through a Risk MAP project.

The Regional Project Team began outreach efforts to local governments within the Watershed, and to Congressional and public officials, to inform them of the Discovery process and to invite them to participate and contribute information about the Watershed and about water resource concerns. The following are key steps that were taken before the Discovery workshops:

- Initial Coordination meeting with FEMA, the Oklahoma Water Resources Board and Meshek to set the stage for co-participation and sharing of the meeting. Establish potential meeting times and locations.
- Information and invitation letters mailed to the CEOs, email invitation to other key personnel communities and other local stakeholders.
- Initial calls to watershed stakeholders to request information that may be pertinent to the watershed.
- Follow up with email with meeting information.
- Follow up with phone calls to personally invite communities and remind them of the meeting details and logistics to ensure the major watershed players will be there.
- Coordination internally for meeting attendees to support the project.
- Invitation of USACE to actively participate as an active member of the project team.
- Briefing of Congressional and Media representatives before the meeting.

Discussions are being held with these agencies about potential partnership opportunities, as well as their help in identifying flood risk throughout the watershed. A history of Community Engagement by OWRB has been listed in Table 9, and Table 10 details the status of Hazard Mitigation Planning for each of the participating communities.

Contact information for the community and additional stakeholders can be found with the supplemental digital data.

Table 9: Lower Canadian-Walnut FEMA History of Engagement

Community Name	Type of Engagement	Date
Blaine County Unincorportated Areas	CAC	5/31/2012
Geary	CAC	8/07/2012
Caddo County Unincorportated Areas	CAC	8/07/2012
Canadian County Unincorporated Areas	Funding Visit	8/08/2012
Canadian County Unincorporated Areas	CAC	8/07/2012
El Reno	CAV	7/30/2012
Union City	Funding Visit	1/22/2013
Union City	Funding Visit	8/08/2012
Cleveland County Unincorporated Areas	Funding Visit	1/22/2013
Cleveland County Unincorporated Areas	CAC	8/07/2012
Moore	CAV	7/12/2011
Moore	CAC	11/01/2012
Norman	Funding Visit	8/08/2012
Norman	CAC	10/22/2012
Slaughterville	Funding Visit	1/22/2013
Slaughterville	CAC	8/07/2012
Stratford	CAC	12/12/2011
Grady County Unincorporated Areas	Funding Visit	1/22/2013
Blanchard	Funding Visit	1/22/2013
Blanchard	CAV	6/02/2010
Blanchard	CAC	2/03/2012
Tuttle	Funding Visit	1/22/2013
Tuttle	Funding Visit	8/08/2012
Tuttle	CAC	5/16/2012
Hughes County Unincorporated Areas	Funding Visit	1/22/2013
Calvin	CAC	8/10/2012
McClain County Unincorporated Areas	Funding Visit	1/22/2012
McClain County Unincorporated Areas	CAC	10/02/2012
Byars	CAC	6/01/2012
Dibble	CAC	4/13/2010
Goldsby	CAV	6/22/2010
Goldsby	CAC	6/9/2010
Newcastle	Funding Visit	8/08/2012

Table 10: Lower Canadian-Walnut Mitigation Plan Status[3]

Community Plan	Plan Status	Plan Approved	Plan Expires
Blaine County Unincorporated Areas	Approved	3/15/2010	3/21/2016
Geary	In County Plan	3/15/2010	3/21/2016
Caddo County Unincorporated Areas	Approved	8/23/2011	8/22/2016
Bridgeport	In County Plan	8/23/2011	8/22/2016
Hinton	In County Plan	8/23/2011	8/22/2016
Canadian County Unincorporated Areas	Expired	4/23/2004	4/22/2009
El Reno	Expired	3/31/2004	3/30/2009
Mustang	Expired	7/26/2004	7/25/2009
Union City	Expired	7/7/2004	7/06/2009
Cleveland County Unincorporated Areas	Expired	10/12/2006	10/11/2011
Lexington	In County Plan, Expired	10/12/2006	10/11/2011
Moore	In County Plan, Expired	10/12/2006	10/11/2011
Noble	In County Plan, Expired	10/12/2006	10/11/2011
Norman	In County Plan, Expired	10/12/2006	10/11/2011
Slaughterville	In County Plan, Expired	10/12/2006	10/11/2011
Garvin County Unincorporated Areas	Preliminary	NA	NA
Stratford	Approved	11/23/2009	11/22/2014
Grady County Unincorporated Areas	Approved	9/04/2008	9/03/2013
Blanchard	In McClain County Plan	12/30/2009	12/29/2014
Bridge Creek	Approved	9/04/2008	9/03/2013
Minco	Approved	9/04/2008	9/03/2013
Tuttle	Approved	9/04/2008	9/03/2013
Hughes County Unincorporated Areas	Approved, Pending Adoption	NA	NA
Atwood	In County Plan	NA	NA
Calvin	In County Plan	NA	NA
McClain County Unincorporated Areas	Approved	12/30/2009	12/29/2014
Byars	No Plan	NA	NA
Cole	No Plan	NA	NA
Dibble	In County Plan	12/30/2009	12/29/2014
Goldsby	In County Plan	12/30/2009	12/29/2014
Newcastle	Approved	11/20/2008	11/19/2013
Purcell	In County Plan	12/30/2009	12/29/2014
Rosedale	No Plan	NA	NA
Washington	No Plan	NA	NA
Wayne	In County	12/30/2009	12/29/2014
Oklahoma County	Expired	9/10/2007	9/09/2012
Oklahoma City	Approved	7/11/2012	7/10/2017
Pontotoc County Unincorporated Areas	Approved	12/26/2010	12/25/2015
Ada	Approved	8/19/2008	8/18/2013
Allen	In County Plan	12/26/2010	12/25/2015
Byng	In County Plan	12/26/2010	12/25/2015
Fitzhugh	In County Plan	12/26/2010	12/25/2015
Francis	In County Plan	12/26/2010	12/25/2015
Pottawatomie County Unincorporated Areas	Expired	NA	NA

[3] Survey completed in March 2013.

Community Plan	Plan Status	Plan Approved	Plan Expires
Asher	In County Plan, Expired	NA	NA
Tribbey	In County Plan, Expired	NA	NA
Wanette	In County Plan, Expired	NA	NA
Seminole County Unincorporated Areas	Expired	1/03/2007	1/02/2012
Konawa	In County Plan, Expired	1/03/2007	1/02/2012
Absentee-Shawnee Tribe	Approved	6/30/2011	6/29/2016
Cheyenne - Arapaho Tribe	Approved	7/16/2010	7/15/2015
Chickasaw Nation	No Plan	NA	NA
Choctaw Nation	Approved	3/24/2010	3/23/2015
Citizen Pottawatomi Nation	Approved	1/25/2011	1/24/2016
Muscogee (Creek) Nation	Approved	6/10/2008	6/09/2013
Seminole Nation	Approved	11/01/2012	10/31/2017
Wichita and Affiliated Tribes	No Plan	NA	NA
Caddo Nation	Approved	5/25/2011	5/24/2016
Delaware Tribe of Western Oklahoma	Expired	NA	NA

Figure 8 displays the locations and types of mitigation grant activity in the Lower Canadian-Walnut Watershed which have been approved by FEMA. This map only shows approved grant activity. There may be additional grants being pursued at both the state and local level within the watershed. Pre-Discovery Congressional and Media Engagement

In order to achieve success with any Region 6 Risk MAP project, members of Congress, their staff members, and the media must be made aware and understand the study process. Working with FEMA External Affairs to inform both legislators and the media will improve credibility and open the door to understanding risk in a more holistic, comprehensive manner. An initial contact briefing of the legislators occurred on February 14, 2013.

Table 11, page 26, provides information obtained from research performed in preparation for the Discovery Meeting.

2. Tribal Engagement

Tribal awareness is a very sensitive subject for the Region, and the following guidance was followed:

- All contact with any tribal entity requires FEMA tribal liaison/ FEMA R6 Planning approval prior to occurrence.
- Any and all information (letters, newsletters, reports, studies, etc.) provided to tribal entities should be done in a collaborative effort between FEMA and its contractors.

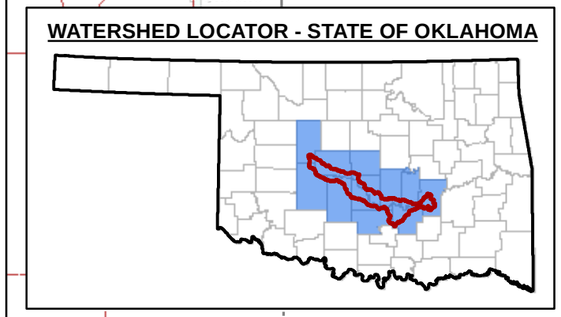
Figure 8: Grant Map
Lower Canadian-Walnut Watershed

Feb 19 2013

FEMA

OWRB Oklahoma Water Resources Board

Map Location	City	Grant Title	Grant Type	Amount	Total
1	Ada	Ada, City of, Generator	601.1: Generators	$41,989.00	
		ODOT Field Division #3, Generator	601.1: Generators	$40,000.00	
		East Central University Community Safe Room	206.2: Safe Room (Tornado and Severe Wind Shelter) - Public Structures	$1,950,777.00	**$2,032,766.00**
2	Byng	Town of Byng Warning Siren	600.1: Warning Systems (as a Component of a Planned, Adopted, and Exercised Risk Reduction Plan)	$13,555.00	
		Byng (Francis Elementary) Public School Safe Room Project	206.2: Safe Room (Tornado and Severe Wind Shelter) - Public Structures	$252,202.00	**$265,757.00**
3	El Reno	City of El Reno GIS/GPS Multi-Hazard Mitigation Project	800.1: Miscellaneous	$95,300.00	
		El Reno, City of, Warning Siren System	600.1: Warning Systems (as a Component of a Planned, Adopted, and Exercised Risk Reduction Plan)	$73,154.00	
		Riverside Public School Storm Shelter	206.1: Safe Room (Tornado and Severe Wind Shelter) - Private Structures	$191,057.00	**$359,511.00**
4	Francis	Francis Multi Hazard Plan	91.1: Local Multihazard Mitigation Plan	$3,700.00	**$3,700.00**
5	Hinton	Cedar Lake Fire Dept. Early Warning System	600.1: Warning Systems (as a Component of a Planned, Adopted, and Exercised Risk Reduction Plan)	$38,953.00	**$38,953.00**
6	Lexington	Lexington, Storm Sirens	600.1: Warning Systems (as a Component of a Planned, Adopted, and Exercised Risk Reduction Plan)	$58,653.00	**$58,653.00**
7	Moore	Moore, City of Sirens	600.1: Warning Systems (as a Component of a Planned, Adopted, and Exercised Risk Reduction Plan)	$73,036.00	
		St. John's Lutheran School Safe Room/Shelter Project	206.1: Safe Room (Tornado and Severe Wind Shelter) - Private Structures	$25,200.00	**$98,236.00**
8	Mustang	Mustang, City Advanced Warning System Project	600.1: Warning Systems (as a Component of a Planned, Adopted, and Exercised Risk Reduction Plan)	$51,960.00	**$51,960.00**
9	New Castle	City of Newcastle Warning System Software	600.1: Warning Systems (as a Component of a Planned, Adopted, and Exercised Risk Reduction Plan)	$33,533.00	
		Newcastle, City of, Warning Sirens	600.1: Warning Systems (as a Component of a Planned, Adopted, and Exercised Risk Reduction Plan)	$55,619.00	
		Newcastle, City of, Multi-Jurisdictional Multi-Hazard Mitigation Plan Update	91.1: Local Multihazard Mitigation Plan	$45,684.00	
		Newcastle School Storm Shelter	206.1: Safe Room (Tornado and Severe Wind Shelter) - Private Structures	$680,520.00	**$815,356.00**
10	Noble	Noble, City of - Warning Siren System	600.1: Warning Systems (as a Component of a Planned, Adopted, and Exercised Risk Reduction Plan)	$53,300.00	**$53,300.00**
11	Oklahoma City	Oklahoma OSF Facility Safe Room	206.2: Safe Room (Tornado and Severe Wind Shelter) - Public Structures	$910,460.00	
		Oklahoma City Fire Department Generator Project	601.1: Generators	$24,730.00	
		Heartline 2-1-1 Generator	601.1: Generators	$12,110.00	
		Oklahoma City Plan Update	91.1: Local Multihazard Mitigation Plan	$97,991.00	
		Oklahoma City Fire Station #4, Generator Project	601.1: Generators	$27,440.00	
		OKC MAPS (John Marshall High School) Safe Room Project	206.2: Safe Room (Tornado and Severe Wind Shelter) - Public Structures	$520,747.00	
		Oklahoma City, City of Generator	601.1: Generators	$42,887.00	
		OKC MAPS (Grant High School) Safe Room Project	206.2: Safe Room (Tornado and Severe Wind Shelter) - Public Structures	$753,931.00	
		OKC MAPS (Longfellow Elementary School) Safe Room Project	206.2: Safe Room (Tornado and Severe Wind Shelter) - Public Structures	$552,277.00	
		OKC MAPS (Douglas High School) Safe Room Project	206.2: Safe Room (Tornado and Severe Wind Shelter) - Public Structures	$970,776.00	
		OKC MAPS (Wheeler Elementary School) Safe Room Project	206.2: Safe Room (Tornado and Severe Wind Shelter) - Public Structures	$719,000.00	**$4,632,349.00**
12	Tuttle	Tuttle, City of, Saferoom	206.2: Safe Room (Tornado and Severe Wind Shelter) - Public Structures	$1,639,039.00	**$1,639,039.00**
Map Location	**County**	**Grant Title**	**Grant Type**	**Amount**	**Total**
13	Blaine County	Blaine County All Hazard Plan	91.1: Local Multihazard Mitigation Plan	$26,667.00	
		Blaine County Multi-Jurisdictional Multi-hazard Mitigation Plan Update	91.1: Local Multihazard Mitigation Plan	$58,000.00	
		Blaine County Sheriffs Office Generator	601.1: Generators	$40,323.00	**$124,990.00**
14	Caddo County	Caddo County Acquisiton of Substantially Damaged Property (Joseyville)	200.3: Acquisition of Public Real Property (Structures and Land) - Riverine	$646,291.00	
		CADDO COUNTY, HMPG PLANNING APPLICATION	91.1: Local Multihazard Mitigation Plan	$26,667.00	
		Caddo County Acquisition/Demolition of Substantially Damaged Property	200.1: Acquisition of Private Real Property (Structures and Land) - Riverine	$383,155.00	
		Caddo County Weather Radios	600.1: Warning Systems (as a Component of a Planned, Adopted, and Exercised Risk Reduction Plan)	$2,043.00	
		Caddo County Hazard Mitigation Plan Update	91.1: Local Multihazard Mitigation Plan	$66,667.00	**$1,124,823.00**
15	Canadian County	Canadian County All Hazard Plan	91.1: Local Multihazard Mitigation Plan	$175,000.00	
		Canadian County Public Awareness Brochures	100.1: Public Awareness and Education (Brochures, Workshops, Videos, etc.)	$3,907.00	
		Canadian County GIS Project	602.1: Other Equipment Purchase and Installation	$84,833.00	
		Cedar Lake Advanced Warning System	600.1: Warning Systems (as a Component of a Planned, Adopted, and Exercised Risk Reduction Plan)	$39,289.00	
		Cedar Lake EOC Retrofit and upgrade	106.1: Other Non Construction (Regular Project Only); 602.1: Other Equipment Purchase and Installation	$24,000.00	
		Canadian County Multi-Jurisdictional Multi-Hazard Mitigation Plan Update	91.1: Local Multihazard Mitigation Plan	$255,461.00	**$582,490.00**
16	Cleveland County	Cleveland County Multi Hazard Mitigation Plan	91.1: Local Multihazard Mitigation Plan	$192,000.00	
		Cleveland County Multi-Jurisdictional Multi-Hazard Mitigation Plan Update	91.1: Local Multihazard Mitigation Plan	$248,677.00	
		Cleveland Public Middle School Storm Shelter	206.2: Safe Room (Tornado and Severe Wind Shelter) - Public Structures	$285,600.00	
		Cleveland Public Primary School Storm Shelter	206.2: Safe Room (Tornado and Severe Wind Shelter) - Public Structures	$228,600.00	**$954,877.00**
17	Garvin County	Garvin County Multi - Jurisdictional Hazard Mitigation Plan	91.1: Local Multihazard Mitigation Plan	$78,370.00	**$78,370.00**
18	Grady County	GRADY COUNTY, HMGP PLANNING APPLICATION	91.1: Local Multihazard Mitigation Plan	$37,551.00	
		Grady County Multi Hazard Mitigation Plan	91.1: Local Multihazard Mitigation Plan	$38,862.00	
		Grady County Emergency Management, Generator	601.1: Generators	$35,656.00	**$112,069.00**
19	Hughes County	HUGHES COUNTY, HMGP PLANNING APPLICATION	91.1: Local Multihazard Mitigation Plan	$26,667.00	
		Hughes County Storm Sirens	600.1: Warning Systems (as a Component of a Planned, Adopted, and Exercised Risk Reduction Plan)	$45,698.00	
		Hughes County Generator Project	601.1: Generators	$40,050.00	
		Hughes County Multi-Jurisdictional Multi-Hazard Mitigation Plan Update	91.1: Local Multihazard Mitigation Plan	$91,802.00	
		Hughes County Weather Radios	800.1: Miscellaneous	$20,000.00	**$224,217.00**
20	McClain County	McClain County All Hazard Plan	91.1: Local Multihazard Mitigation Plan	$27,406.00	
		McClain County Generator	601.1: Generators	$49,500.00	
		McClain County RWD 8 Treatment Plant Generator	601.1: Generators	$36,895.00	
		McMlain County RWD #8 Generator for Well	601.1: Generators	$23,895.00	**$137,696.00**
21	Oklahoma County	Oklahoma County Multi Hazard Mitigation Plan	91.1: Local Multihazard Mitigation Plan	$209,742.00	
		Oklahoma County Crutcho Park Acquisition Project Phase 1	200.1: Acquisition of Private Real Property (Structures and Land) - Riverine	$1,751,755.00	
		Oklahoma County Crutcho Creek Acquisition Project Phase III	200.1: Acquisition of Private Real Property (Structures and Land) - Riverine	$1,478,297.00	
		Oklahoma County Plan Update	91.1: Local Multihazard Mitigation Plan	$120,125.00	
		Oklahoma County Crutcho Park Acquisition Phase V	200.1: Acquisition of Private Real Property (Structures and Land) - Riverine	$2,151,399.00	
		Oklahoma County Crutcho Park Acquisition Phase IV	200.1: Acquisition of Private Real Property (Structures and Land) - Riverine	$840,805.00	
		Regional Food Bank of Oklahoma Generator	601.1: Generators	$125,000.00	
		Regional Food Bank of Oklahoma City Backup Generator	601.1: Generators	$113,655.00	**$6,790,778.00**
22	Pontotoc County	Pontotoc County Multihazard Mitigation Plan	91.1: Local Multihazard Mitigation Plan	$56,138.00	**$56,138.00**
23	Pottawatomie County	Pottawatomie County Multi-Jurisdictional Multi-Hazard Mitigation Plan	91.1: Local Multihazard Mitigation Plan	$151,892.00	**$151,892.00**
24	Seminole County	SEMINOLE COUNTY, HMGP PLANNING APPLICATION	91.1: Local Multihazard Mitigation Plan	$26,667.00	**$26,667.00**
Map Location	**Tribe**	**Grant Title**	**Grant Type**	**Amount**	**Total**
25	Delaware Nation of Oklahoma	Delaware Nation HM Plan with GIS/GPS	93.1: Tribal (Local) Multihazard Mitigation Plan	$86,667.00	**$86,667.00**
26	Cheyenne-Arapaho Tribe	Cheyenne and Arapaho Tribe Hazard Mitigation Plan	94.1: Tribal Multihazard Mitigation Plan	$83,230.00	**$83,230.00**
27	Seminole Nation of Oklahoma	Seminole Nation Hazard Mitigation Plan	93.1: Tribal (Local) Multihazard Mitigation Plan	$30,000.00	**$30,001.00**



Map Symbology

- Grants
- Cities
- County Seat
- Major Highways
- Canadian River
- Other Streams
- County Boundaries
- Watershed Boundary: HUC 8
- HUC 12 Basins

0 5 10 20 Miles

Table 11: Lower Canadian-Walnut Congressional Information

U.S. Senator	Term Expiration	FEMA History of Engagement	Source
James Inhofe	2015	5/10/2012: 2 Representatives from Mr. Inhofe's office attended the congressional meeting on Mapping in Edmond, OK.	http://inhofe.senate.gov/public/
		9/21/2011: Statement of Senator Inhofe on the floor of the Senate on the introduction of S. 1583, the Storm Shelter Tax Relief Act of 2011	http://inhofe.senate.gov/public/
		5/25/2011: Inhofe Offers Condolences; Pledges Help to Oklahoma Storm Victims	http://inhofe.senate.gov/public/
		4/15/2011: Inhofe, Boren To Work For Tornado Damaged Area	http://inhofe.senate.gov/public/
		3/29/2011: Inhofe Defends Oklahoma Homeowners Against FEMA Floodplain Changes	http://inhofe.senate.gov/public/
		2/11/2009: Inhofe Looks to Work With Obama on FEMA Legislation	http://inhofe.senate.gov/public/
Thomas Coburn	2017	5/10/2012: Four Representatives from Dr. Coburn's office attended the congressional meeting on Mapping in Edmond, OK.	http://www.coburn.senate.gov/public
		1/2012: History of Grants and Federal Domestic Assistance	http://www.coburn.senate.gov/public
		9/15/2011: Dr. Coburn Files Amendment #610 to Offset $7 Billion FEMA Funding Bill	http://www.coburn.senate.gov/public
Thomas Coburn	2017	3/28/2011: Area school districts, governments consider FEMA disaster shelter grants	http://www.coburn.senate.gov/public
Tom Cole District 4	2019	5/28/2008: Cole Introduces Legislation to Establish FEMA as an Independent Agency	https://cole.house.gov/press-release
		3/29/2007: Cole Releases Statement on FEMA Denial	https://cole.house.gov/press-release
		3/13/2007: Cole Advises Counties on New FEMA Contact Information	https://cole.house.gov/press-release
		3/09/2006: Borne, Cole Call on FEMA to Make Trailers Available to Oklahomans	https://cole.house.gov/press-release
Frank Lucas District 3	2017	2/4/2013: House Panel Approves Changes to New Consumer Financial Protection Bureau, Extends Flood Insurance Program	http://www.cutimes.com/2011/05/13/house-panel-approves-changes-to-new-consumer-finan
		6/15/2011: Oklahoma Congressman Frank Lucas Defends Funding for Flood Control Dam Rehab During House Ag Appropriations Debate	http://oklahomafarmreport.com/wire/news/2011/06/00076_LucasDefendsDamRehabMoney06152011b_161217.php
		4/06/2009: Lucas Announces Federal Funds for Rehabilitating Oklahoma Flood Control Structures	http://agriculture.house.gov/press-release/lucas-announces-federal-funds-rehabilitating-oklahoma-flood-control-structures
James Lankford District 5	2017	5/24/2012: Congressman Lankford Visits Shawnee to Discuss FEMA Regulations Stifling Business Development	http://lankford.house.gov/press-release
		4/20/2012: Sen. Tom Coburn and Rep. James Lankford Take Aim at Overlapping Programs	http://article.wn.com/view/2012/04/20/Sen_Tom_Coburn_and_Rep_James_Lankford_take_aim_at_overlappin/
Markwayne Mullin District 2	2019	12/05/2012: Congressman-Elect Markwayne Mullin Appointed to 2 House Committees, Including House Committee on Natural Resources	http://www.newson6.com/story/20268040/congressman-elect-markwayne-mullin-appointed-to-two-house-committees

B. Pre-Discovery Data Collection

The following provides a listing of the data collected prior to the Discovery Meeting.

Table 12: Lower Canadian-Walnut Data Collection

Data Types	Deliverable/Product	Source
Average Annualized Loss Data	Discovery Map Geodatabase	Brian Shumon, FEMA Region II
Boundaries: Community	Discovery Map Geodatabase	University of Oklahoma Center for Spatial Analysis
Boundaries: County and State	Discovery Map Geodatabase	University of Oklahoma Center for Spatial Analysis
Boundaries: Watersheds	Discovery Map Geodatabase	USGS NHD
Census Blocks	Discovery Map Geodatabase	U.S. Census Bureau
Contacts	Table	Local Web Sites, State/FEMA Updates
Community Assistance Visits	Discovery Report	Community Information System (CIS)
Community Rating System (CRS)	Discovery Report	FEMA's "Community Rating System Communities and Their Classes"
Dams and Levees	Discovery Map Geodatabase	FEMA DFIRM Data (MLI)/USACE Levee Inventory NRCS

C. Discovery Meeting

Two Discovery meetings were held on February 28, 2013, as noted in Table 13. Each Workshop site hosted a series of stations and provided an interactive setting for the Regional Project Team and Discovery Workshop attendees to listen, discuss and document any issues for the Watershed.

Table 13: Lower Canadian-Walnut Project Discovery Workshop Times and Locations

Workshop	Date and Time	Location
1	Thursday February 28, 2013 9:30 am – 11:30 am	City of Norman Multipurpose Room 201 West Gray Street Norman, OK 73069
2	Thursday February 28, 2013 2:30 pm – 4:30 am	City of Ada Engineering Depot 300 West Main Ada, OK 74820

Discovery Team representatives greeted each attendee as they arrived. Attendees rotated around the following four Discovery stations:

- Community Benefits and Grant Opportunities (Grants station) – Maps of current 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. The station also had handouts on various FEMA grant programs.

- Mitigation Planning and Mitigation Activities (Planning station) – Handouts on mitigation plans, understanding Risk MAP and determining risk.

- NFIP Community Actions (Compliance and Mitigation station) – Effective FIRMs, FIS and LOMCs; maps of RL/SRL properties; single claims; and urban changes over the last 5 years.

- Risk Identification and Communication (Mapping station) – 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.

At each station, attendees were asked to actively contribute information about concerns in the Watershed by identifying a relevant location on the large watershed map and then providing a short explanation on the comment form. The activity at the stations was intended to be interactive where attendees and staff at the stations worked together to listen, discuss and document any topical item(s) for the watershed. Members of the Regional Project Team (FEMA, Oklahoma Water Resources Board and Meshek) were at the stations to answer questions and engage the attendees. During each workshop, Regional Project Team members requested that attendees provide any additional information within 2 weeks of the workshop.

Each station was equipped with a series of large-format watershed maps with an aerial photo of the Watershed displayed, along with community boundaries and road names to assist in identifying areas of concern. Additionally, the stations had several 11-inch by 17-inch laminated maps of the watershed with information related to that station's content.

Information sheets were collected at each station for locations that were identified and labeled on the Discovery watershed maps. These information sheets are included in the external files included with this report.

D. Discovery Implementation

All Discovery Workshops were attended by local stakeholders. A full list of attendees is provided by the sign-in sheets included with the supplemental digital data accompanying this report. Forty-three attendees signed in and were greeted by Discovery Team representatives from FEMA, OEM, OWRB and Meshek & Associates. Communities represented during the meeting were as follows:

- Blaine County
- Caddo County
- Canadian County
- Citizen Pottawatomi Nation
- City of Ada
- City of Moore
- City of Mustang
- City of Newcastle
- City of Noble
- City of Norman
- City of Oklahoma City
- McClain County
- Muscogee Creek Nation
- Oklahoma City
- Oklahoma County
- Pontotoc County

- City of Blanchard
- City of Byng
- City of El Reno
- City of Lexington
- City of Purcell
- City of Tuttle
- Cleveland County
- Cleveland County
- Pottawatomie County
- Town of Goldsby
- Town of Slaughterville

Additional attendees included congressional representatives and personnel from ACOG, USGS and USACE.

It should be noted that no community officials from Garvin, Grady, Hughes, and Seminole Counties as well as the communities of Geary, Bridgeport, Hinton, Union City, Stratford, Bridge Creek, Minco, Atwood, Calvin, Byars, Cole, Dibble, Rosedale, Washington, Wayne, Allen, Fitzhugh, Francis, Asher, Tribbey, Wanette, Konawa, and the Absentee-Shawnee Tribe, Cheyenne-Arapaho Tribe, Chickasaw Nation, Choctaw Nation, Seminole Nation, Wichita and Affiliated Tribes, and Caddo Nation attended the Discovery Workshops.

The Workshops afforded personal, interactive communication with attendees at each station. The Project Team interviewed attendees and discussed areas of positive mitigation and areas of continuing concern for the Watershed as a whole. As attendees visited each station, they not only discussed their own local concerns but also listened to the concerns of others in the Watershed.

Attendees were polled by the FEMA Project Monitor as they exited the Workshop. Verbal feedback from the attendees indicated they felt the Workshop was an opportunity to express their issues and concerns for the Watershed. Many attendees were appreciative of the chance to speak with the various Regional Project Team members from FEMA and the State of Oklahoma. The community perception conveyed to FEMA was that attendees felt more engaged in the process to determine where needs and projects may be identified.

E. Data Gathering Overview

Information about the Lower Canadian-Walnut Watershed was gathered both prior to the Discovery Workshops and interactively during the Workshops. Much of the data collected in pre-discovery was obtained from FEMA or other national datasets. Additional data was collected from OWRB, ODOT, NRCS, USACE and local communities via their public web sites. Table 14 summarizes the data collected prior to the Discovery Workshop and the primary sources of the data.

During the pre-discovery process phone calls were made to local FPAs, Emergency Managers, and Mitigation planners to collect current and proposed mitigation actions. This data was collected in spreadsheets, and it will be used by FEMA to track mitigation actions within the region. The final spreadsheets are included in the supplemental digital data.

Table 14: Lower Canadian-Walnut Pre-Discovery Workshop Data Collection Summary

Data Location	Data Custodian	Data Set Description
Watershed-wide	FEMA	Effective FIRM and FIS and backup information available from FEMA's Map Service Center and FEMA Library
Watershed-wide	FEMA	LOMC locations from FEMA's Map Service Center and FEMA Library
Watershed-wide	FEMA, OWRB	Locations of RL/SRL properties and Claims
Watershed-wide	FEMA, OWRB	Location of Grants being funded
Watershed-wide	FEMA	Participation in the NFIP, Community Rating System (CRS) ratings
Watershed-wide	FEMA	Disaster Declarations
Watershed-wide	FEMA	CNMS information
Watershed-wide	FEMA	AAL data
Watershed-wide	FEMA, Community Officials	High water marks (HWMs) and associated reports
Watershed-wide	FEMA	Approved HMPs
Watershed-wide	FEMA, USGS, OU	Location of available or planned areas of updated LiDAR or other topographic data
Watershed-wide	FEMA, U.S. Census, ODOT	Transportation features
Watershed-wide	FEMA, U.S. Census, USGS	Populated places and population characteristics
Watershed-wide	USGS	Watershed HUC (8 & 12) boundaries, NHD streams, stream gage information, land use and land cover
Watershed-wide	USDA	NAIP Imagery
Watershed-wide	Local FPAs, Mitigation Planners and Emergency Managers, FEMA	Mitigation Actions identified by local stakeholders and collected by phone call

At the Discovery Workshop stations, attendees completed data information sheets and placed stickers on the hard copy maps to identify the approximate locations of their concern(s) within the Watershed. This information was later captured in GIS format (ESRI Personal Geodatabase, point features named "Other_Community_Concerns") and the data from the forms were matched with each point location on the watershed maps. Data from all of the stations were compiled into a single data set. The watershed collection maps with the sticker locations as well as the individual comment forms are included in the supplemental digital data accompanying this report.

Table 15 summarizes the comments that were made at each of the stations. If the same comment was made at different stations by the same attendee, it is only listed once. If multiple attendees made the same comment, the "Information Provided By" column lists more than one attendee.

Item numbers tie directly back to the GIS data and the data collection sheets. In addition, data collected in pre-Discovery from Newton County and from calls with local community officials have also been placed in GIS format and are shown on the watershed collection. Discovery data collection continued after the Discovery Workshop as additional datasets were provided and have also been included in Table 15.

Some comments collected at the Discovery Workshop reflect on areas outside of the Lower Canadian-Walnut Watershed. This information was collected for future use in future Discovery efforts and is noted below.

Table 15: Lower Canadian-Walnut Data Collection Summary

Item	Flooding Source	Information Provided By	Discovery Workshop Comment Summary
C1	Canadian County	Canadian County	Reviewed Status of Hazard Mitigation Plan (HMP).
C2	Canadian County	Canadian County	Good mapping would facilitate guiding of oil and gas development. Foresees most of the new development to occur within the Cimarron Skeleton watershed.
C3	City of Ada	City of Ada	Reviewed Status of HMP. Plan update is in progress. Current plan will expire 2013.
C4	City of Ada	City of Ada	Completed long-range plan. Requested assistance for completion of Master Drainage Plan to abate nuisance flooding.
C5	City of Blanchard	City of Blanchard	Reviewed Status of HMP. Plan is Approved and Current. Community included in McClain County HMP.
C6	City of Mustang	City of Mustang	Reviewed Status of HMP. Plan Expired.
C7	City of Mustang	City of Mustang	Completed Comprehensive Plan in 2003. Document available for review. Enforces Stormwater Management permitting. Number of recent LOMAs and LOMRs increasing.
C8	City of Newcastle	City of Newcastle	Reviewed Status of HMP. Expires 11/20/2013, Update in Progress.
C9	City of Norman	City of Norman	Stormwater Master Plan available. Concerned over expired status of county HMP – of which Community is a member.
C10	City of Oklahoma City	City of Oklahoma City	Currently updating Comprehensive Plan. Requested that such planning be considered during Discovery and subsequent studies.
C11	Cleveland County	Cleveland County	Discussed status of HMP update. Plan is currently expired.
C12	Pontotoc County	Pontotoc County	Reviewed Status of HMP. Plan Approved, Expires 12/25/2015.
C13	Pottawatomie County	Pottawatomie County	Inquired about what is covered in HMP and requirements for completing. Explained that a hazard has to be identified in a current HMP in order to be eligible for Federal Mitigation Grant funds.

Item	Flooding Source	Information Provided By	Discovery Workshop Comment Summary
C13	Pottawatomie County	Pottawatomie County	Advised that Pottawatomie County plan is currently being revised. Floodplain Administrator will follow up with County Engineers on the status of the plan update.
M1	Canadian River	Canadian County	Good mapping would facilitate guiding of oil and gas development.
M2	Sixmile Creek	Canadian County	Great volume of oil and gas development in the Calumet area.
M3	Purcell Creek	Canadian County	Problems with the Purcell creek delineation. Complaint relates to a property that was added to floodplain.
M4	Lake Creek	City of Ada	Lake floodplain mapped incorrectly. Appears that USGS Quad maps were used for mapping. LIDAR data available from City. Useful to determine new elevations for the lake.
M5	East Branch Mustang Creek Tributary 1	City of Mustang	Requested enhanced study of stream segments south of SW 59th Street and between Sara and Morgan Road.
M6	South Branch Tributary 2	City of Mustang	Requested enhanced study of Lakehoma Acres and Cedar Ridge subdivisions area. Stream located north of SW 89th Street between Spring Creek and Clear Springs Road.
M7	Mustang Creek Tributary 2	City of Mustang	Requested enhanced study of stream segment extending south of SW 59th Street, between Clear Springs and Czech Road.
M8	Campbell Creek	City of Mustang	Requested enhanced study of stream segment extending north of SH152.
M9	Mustang Creek Tributary South Branch	City of Mustang	Requested enhanced study of stream segment extending south of SH152, east of Sara Road.
M10	West Branch Mustang Creek Tributary 1	City of Mustang	Requested enhanced study of stream segments south of SW 59th Street and between Sara and Morgan Road.
M11	Canadian River	City of Newcastle	Streams are in very deep channels with low flow. Some shallow flooding occurs around Oklahoma River where floodplain widens.
M12	Bell Creek	City of Noble	Lack of floodplain information on north end of Bell Creek where a 200 home development is being proposed. Lack of floodplain information in this area concerns city. Requested enhanced study to better guide development.
M13	Ten Mile Flat Creek	City of Norman	Completed a 2 mile long highway project that changed the drainage. Map for the area was done in 2008. Another study was conducted later with a Conditional Letter of Map Revision (CLOMR). Requested map update to incorporate all changes done in that basin. Change affects City of Moore and Oklahoma City.

Item	Flooding Source	Information Provided By	Discovery Workshop Comment Summary
M14	Brookhaven Creek	City of Norman	Two LOMRs completed to remove floodplain north of Rock Creek Road. Mapping should be modified to reflect change.
M15	Brookhaven Creek Tributary	City of Norman	Floodplain map changed due to new roadway project on I-35 overpass. New wetland project was completed with a grant w/ Conservation Commission. Requested enhanced study for the stream segment north of Rock Creek Road.
M16	Brookhaven Creek	City of Norman	Requested remapping of Brookhaven Creek from Rock Creek Road to confluence with Canadian River. New development has occurred in the area.
M17	Bishop Creek	City of Norman	Requested study of this tributary. HWY 9 south to River is first priority. Stream segment noted as "Unverified" in CNMS.
M18	Canadian River	City of Norman	Requested study of Canadian River. Stream segment noted as "Unverified" in CNMS.
M19	Little River	City of Norman	Requested study of unmapped stream from 12th Avenue NE to Lake Thunderbird. The other section completed in 2010 by Dewberry. Maps adopted in February 2013.
M20	City of Oklahoma	City of Oklahoma	Agreed to provide comments on the web viewer.
M21	Beaver creek/walnut creek	City of Purcell	Railroad trestle gets clogged easily. Refer to Item M38 below.
M22	Unnamed Stream Canadian River Tributary	City of Slaughterville	Stream segment located east of US 77 and south of Slaughterville Road. CNMS Validation "Unknown". Aerials used for the effective maps are out of date.
M23	Unnamed Stream Canadian River Tributary	City of Slaughterville	Stream segment between 60th and US 77. CNMS Validation "Unknown". Zone A's that were developed in Map Mod are much different and much higher in this watershed. Slaughterville completed internal work on the previous mapping and were comfortable with those. New maps do not seem accurate.
M24	West Willow Creek	City of Slaughterville	This area was on the old maps and now is removed.
M25	Chouteau Creek (North of Lexington)	City of Slaughterville	Bridge was replaced in late 1990's. When the new maps were prepared in 1999, the Base Flood Elevation (BFE) went up several feet. This appears inaccurate. Questioned whether new model reflects current condition. Validation status noted as "Valid" in CNMS.
M26	FIRM Panel 40027C0315H	City of Slaughterville	SFHA boundaries have been changed.
M27	FIRM Panel 40027C0320H	City of Slaughterville	Large portions of Special Flood Hazard Area (SFHA) have been removed. Portions of SFHA extended or added.

Item	Flooding Source	Information Provided By	Discovery Workshop Comment Summary
M27	FIRM Panel 40027C0320H	City of Slaughterville	Some street names need to be aligned with their corresponding streets. Section 27: Add Songbird Lane (new street).
M28	FIRM Panel 40027C0340H	City of Slaughterville	Portions of SFHA changed having impact on existing structures Section 31: Boundary of town limits correction.
M29	FIRM Panel 40027C0380H	City of Slaughterville	Section 4: Stream moved to incorrect location. Section 5: SFHA extended across 84th Street impacting existing structures. Section 7: Boundary correction (indicated on map; move north). Added SFHA to Section 7 impacting newly zoned Planned Unit Development. Section 8: Add Wynne Lane (new street). Bulge in floodway added. Portions of SFHA increased and extended. Portions of SFHA reduced. Section 17-K.O. Rayburn Drive changed to Roberts Road; Roberts Court added.
M30	FIRM Panel 40027C0385H	City of Slaughterville	Section 1: Boundary of town limits correction. Section 4: Street name correction to Cedar Trace. Portions of SFHA increased and extended. Section 10: SFHA added and portions of SFHA reduced. Section 14: Boundary of town limits correction. Section 16: Move Douglas Lane and Smith Lane to unincorporated county area. Section 23: Remove 113th Street Label from private driveway.
M31	FIRM Panel 40027C0390H	City of Slaughterville	Section 30: Boundary of town limits correction. US 77 south of Chouteau Creek flooded in 1980's. Area should be identified as SFHA instead of Zone X.
M32	FIRM Panel 40027C0395H	City of Slaughterville	Section 33: Boundary of town limits correction. Section 34: Boundary of town limits correction. Portions of SFHA deleted and portions added.
M33	FIRM Panel 40027C0425H	City of Slaughterville	Portions of SFHA reduced.
M34	Buggy Creek	Caddo County	New Bridge on 152 over Buggy Creek.
M35	Oklahoma County	Oklahoma County	No unincorporated area in this watershed. No comment.
M36	Walnut Creek	McClain County	Large Zone A that should be taken out of floodplain. Walnut Creek floodplains seem to be offset from channel. SH 76 south of Blanchard curves back south s5-7n-4w county barn is not in FP, but shows as in 100yr at least 2' above BFE. District storage facility is in the floodplain should be an island.
M37	Walnut Creek Unnamed Tributary	McClain County	Floodplain overstated north of City of Washington on HWY 24. Area has multiple LOMAs. Maple Circle (Maple/250th & Main/Hwy24) is improperly shown in the floodplain.

Item	Flooding Source	Information Provided By	Discovery Workshop Comment Summary
M38	Walnut Creek	McClain County	Problems causing flooding –SE Purcell I-35 Walnut Creek crosses under I-35 and 77. Railroad trestle causes backup with little debris. Community wishes to straighten channel and increase flow at trellis. In the 2007 flood, the railroad company reinforced the trellis and banks to prevent washout.
M39	Walnut Creek	McClain County	At 35.028906 -97.392273, from 1995-2012, the stream is encroaching on 220th threatening to wash it out. Streams shown are not positionally correct (shown outside of actual channel. Walnut Creek overall is inaccurately mapped.
M40	Deer Creek Tributary	Oklahoma City	This area is now within the City Limits.
M41	Little Sandy Creek	Pontotoc County/City of Byng	Accurate mapping would facilitate better guidance of development in the area.
M42	Canadian River	Pottawatomie County	Indicated that most of the Lower Canadian is located in farm land. North Canadian goes thru Shawnee and therefore is more important. No reported problems in the Lower Canadian River.
P1	Caddo County	Caddo County	Caddo County noted no real repetitive loss problem. A link to HMA was provided to community.
P2	Canadian County	Canadian County	Floodplain Management staffing changes have occurred. Services will be moved to Emergency Management. New Floodplain Administrator requested information on Risk MAP program.
P3	Pond Creek	City of Newcastle	Communicated drainage problem at I-35.
P4	East Creek	City of Tuttle	Discussed information on grants. City currently has three RL properties. Requested enhanced study of East Creek to facilitate grant application.
P5	Walnut Creek	McClain County	Discussed flooding problems at 220th. Provided mapping comment.
P6	Oklahoma County	Oklahoma County	Oklahoma County provided update on Crutcho Creek Acquisition Project. No unincorporated areas in this watershed. No comments related to Discovery.
P7	City of Noble	City of Noble	Requested enhanced study to facility guiding of development.
N1	City of Blanchard	City of Blanchard	Community is interested in joining the CRS. Requested a Community Assistance Visit (CAV) in 2014.
N2	Muscogee Creek Nation	Muscogee Creek Nation	Tribe is joining NFIP. Oklahoma Floodplain Management Association (OFMA) contacted Tribe to join NFIP. Communicated information for Polecat-Snake and Lower North Canadian Discovery.
N3	Blaine County	Blaine County	Discussed the revised Flood Insurance Rate Map (FIRM) maps. No additional comment provided.

Item	Flooding Source	Information Provided By	Discovery Workshop Comment Summary
N4	Caddo County	Caddo County	Discussed community Information including Repetitive Losses (RL), National Flood Insurance Program (NFIP) Policies and participation in the Community Rating System (CRS) program.
N5	City of Moore	City of Moore	Discussed RL property information with City.
N6	City of Noble	City of Noble	Community is upgrading ordinance for areas adjacent to floodplains. Discussed community information for RL.
N7	City of Mustang	City of Mustang	Discussed community Information including RL, NFIP Policies and participation in the CRS program.
N8	McLain County	McClain County	In process of requesting a Section 1316 from FEMA. Explained that Houston Texas and Harris County are familiar with process and may provide guidance.
N9	Walnut Creek	City of Purcell	Drainage issues south of the city limits located in McClain County. OWRB agreed to assist McClain County Floodplain Administrator resolve issue. OWRB agreed to send "Community Information" packet.
N10	Pottawatomie County	Pottawatomie County	Communicated no major issues. Only small portion of southern Pottawatomie County is located inside watershed. OWRB agreed to send "Community Information" packet.
N11	City of Tuttle	City of Tuttle	Community noted that the quality of aerials used for maps is poor quality for aerials. Difficult to interpret maps and determine whether a structure is in the floodplain. Paper maps are being used at this location. Discussed erosion setbacks, community information, CAV notification guidelines and CRS participation.

All supporting information, data and files for this report are included in the supplemental digital data submitted with this report. The directory structure is as shown in the following list of files, folders and associated data.

- HUC-11090202\Discovery
  - Transmittal letter
- \Project_Discovery_Initiation
  - Community Contact List
  - Project Team Information
  - \GIS
    - Political Areas SHP file
    - Transportation SHP file
    - HUC boundary SHP file
- \Discovery_Meeting
  - Meeting agenda / summary
  - Meeting attendance record
  - Discovery Meeting Information Collection Sheets

    - Discovery Meeting Data Collection Maps
    - Discovery Meeting Exhibits
    - \Correspondence
        - Invitation letters, notification letters, thank-you letters, etc.
- \Post_Discovery
    - Discovery Map(s) (final)
    - Discovery Map (Flood Risk) – Watershed information with AAL
    - Discovery Map (Flood Hazard) – Watershed information with effective SFHAs
    - Discovery Report (final)
- \Supplemental_Data
    - Engagement Plan
    - \GIS
    - \Mitigation Action Tracker
- \Other Data - collected during Discovery (community supplied exhibits, reports, etc.).

Once the data was collected from the Discovery Meeting, an analysis was performed to identify critical areas highlighted as concerns for future projects in the watershed. The analysis focused on areas within the watershed that had been identified as having mitigation action plans for the future. The details in this section supplement the documentation supporting the need for further mitigation actions or studies in particular streams, reaches, or communities in the watershed.

This section describes the riverine floodplain analysis as either basic or enhanced. The basic analysis will produce a model-backed Zone A floodplain delineation. The enhanced analysis will produce a model-backed Zone AE floodplain delineation. These analysis types are discussed in more detail below as part of the evaluation of needs.

F. Engineering Review of Community Comments

Engineering-related comments provided by communities during the Discovery Meeting were identified for further hydrologic and hydraulics review. All comments were investigated to determine whether or not they would have any effect on the hydrology of the watershed. Communities and counties communicating issues include: Cities of Ada, Mustang, Norman, Newcastle, and Slaughterville and Counties of Canadian, Caddo and McClain.

The City of Mustang discussed several areas of detailed mapping needs. Streams mentioned included the West Branch of Mustang Creek Tributary 1, Cambell Creek, Mustang Creek Tributary 2, and the South Branch Tributary 2. Updated mapping data was requested on each stream.

The City of Norman noted several areas of development that have changed the floodplain. Development included highway projects along Ten Mile Flat Creek as well as Brookhaven Creek Tributary. Also, a request for several stream segments to be mapped were made including Brookhaven Creek Tributary, the Little River, and portions of the Canadian River that go through Norman.

Additional comments related to modeling issues with effective FIRMs and infrastructure projects not properly reflected on current maps. Particular attention should be given to I-35

improvements – as the City of Newcastle and McClain County communicated flooding issues and the City of Norman communicated map changes. Other recent improvements included a new bridge over SH 152 communicated by Caddo County.

Discussions included difficulties encountered by communities when regulating development in Zone As without Base Flood Elevations. Some communities mentioned the availability of detailed topographic data (not reflected in current FIRMs) which can be provided to FEMA to lessen the cost of future enhanced studies of Zone As. Other communities discussed concerns over FIRMs Zone A and Zone AEs that do not tie together, channels that are located outside the floodway and flooding issues that extend beyond the floodplain areas shown in the effective FIRMs.

One recurring issue identified by many communities was detailed mapping requests due to increased development in the drainage basin or existing mapping errors. Examples of errors discussed were areas shown in the floodplain but now raised above the BFE and streams mapped outside of channel boundaries.

Many comments also addressed the locations and types of flooding within communities, including repetitive loss structures and structures that have been replaced after being washed out during storm events. These structures were identified during the Discovery Meeting.

G. Post-Discovery Hydrology

Two limited reviews of hydrologic information were performed for Discovery analysis within the Lower Canadian-Walnut watershed. The reviews were kept at a high level of informational research and were performed by senior engineering staff that relied on engineering judgment, some limited analysis, and regional experience. These reviews were focused on:

- Review of Peak Discharges in the watershed.
- Limited Gage analysis for the watershed.

For the watershed as a whole, the one-percent annual chance peak discharges were reviewed for all streams within a community and across community boundaries looking for discharge anomalies (places where LOMRs demonstrate that the effective discharges may be suspect on a more global basis). Any notes were added if these changes can be eliminated as a concern due to hydrologic factors including local flood control structures, detention, flow breakouts, sinks or other natural or manmade factors that may significantly alter hydrology flows. Finally, a watershed wide high-level gage analysis was reviewed comparing the information on any available gages within the watershed that had appropriate historical information to the effective FIS, discharges for streams with gages. This analysis could potentially flag any anomalies that would indicate that the hydrology may be out of date, too high, or too low for sub-basin areas within the watershed.

1. Review of Peak Discharges

Peak discharges were reviewed based on available FIS reports, hydraulic models, flow gages and available LOMRs within the watershed at the crossing of SHFA areas at corporate limits (county, city and town). A limited number of FIS reports have been completed in this watershed, with the majority completed in Cleveland County. A comparison of discharges was made for the same studied streams across county boundaries as shown in Table 16,

Table 16: Lower Canadian-Walnut Discharge at County Limits

Stream Name	County	Effective 1% Annual Chance Discharge (cfs)	Effective Discharge Source	Notes
Canadian River At Purcell	Cleveland	162,000	2013 FIS	Floodway Data, Cross Section V-AE, vertical and horizontal misalignment
Canadian River At US 77	McClain	162,000	2007 FIS	
Bridge Creek upstream State 76	Grady	14,950	2012 FIS	Vertical misalignment
Bridge Creek At County Line Road	McClain	14,950	2007 FIS	
West Branch Walnut Creek upstream confluence	Grady	N/A	2012 FIS	Study ends at county line
West Branch Walnut Creek upstream confluence	McClain	9,530	2007 FIS	

2. Frequency Analysis

Frequency analyses were performed – for all gages located within the Lower Canadian-Walnut Watershed – using Peak Q computer software. A comparison between FIS flow rates and gage analysis discharges is shown in Table 17. In most cases, discharge flow rates differ significantly between the two sources – with those computed using Peak Q being the lesser of the values. The number of peaks in record at gages ranges from 11 to 45.

Table 17: Lower Canadian-Walnut Summary of Hydrologic Analysis

Stream Name	Drainage Area from USGS Gage (square mile)	Effective discharges Source	Effective 1% annual chance discharge (cfs)	95% confidence limits lower (cfs) (Gage)	1% annual chance discharge from PeakQ (Gage)	95% confidence limits upper (cfs) (Gage)	Number of peaks in record
Arbeca Creek near Allen, OK	2.26	*NA	*NA	2,089	4,069	14,590	11
Canadian River at Bridgeport, OK	20,061	*NA	*NA	95,070	64,530	159,900	40
Canadian River at Calvin, OK	22,780	*NA	*NA	197,100	145,300	295,900	45
Canadian River at Purcell, OK	25,394	2007 FIS	161,598	118,200	46,820	2,358,000	28
Canadian River near Noble, OK	21,110	2013 FIS	160,922	47,020	34,590	81,210	13
Canadian River Tributary near Newcastle, OK	3.3	2007 FIS	6,416	2,559	1,675	5,804	11
Julian Creek Tributary near Asher, OK	2.3	*NA	*NA	2,316	1,528	4,488	21
Leader Creek Tributary near Atwood, OK	0.7	*NA	*NA	1,943	1,251	3,907	21
Worley Creek near Tuttle, OK	11.2	2012 FIS	12,090	4,245	2,943	7,921	15

*NA – Zone A with no published peak flow discharges

H. Post-Discovery Hydraulics and Floodplain Analysis

Table 18 provides hydraulic information, including hydraulic model type and effective age, for Zone AE streams in the Lower Canadian-Walnut Watershed as inventoried in the CNMS Database dated June 2013. It should be noted that of the total 229 miles of Zone AE, 203.45 miles – or over 88% of streams – have an Effective Date of 10 years or older. Hydraulic Models used include HEC-2, HEC-RAS, HEC-RAS 4.0.

Letters of Map Amendment and Revision are distributed throughout the watershed, but appear to be concentrated in the Cities of Oklahoma City and Norman, around Tributary 1 of the Canadian River in Oklahoma City, and around Bishop, Brookhaven, Merkle and Imhoff Creeks in Norman. Refer to Figure 9 for the location of these Letters of Map Change (LOMC).

Table 18: Lower Canadian-Walnut Summary of Hydraulic Analysis

Stream Name	County/Parish	Validation Status	Date of Effective Analysis	Hydraulic Model
Cow Creek Tributary 2	Canadian	Valid	6/1/2006	HEC-2
Belle Creek	Cleveland	Valid	11/1/1979	HEC-2
Bishop Creek	Cleveland	Unverified	2/13/1998	HEC-RAS
Bishop Creek Tributary A	Cleveland	Unverified	6/1/1977	HEC-2
Bishop Creek Tributary B	Cleveland	Valid	6/1/1977	HEC-2
Bishop Creek Tributary C	Cleveland	Valid	6/1/1977	HEC-2
Brookhaven Creek	Cleveland	Valid	6/1/1977	HEC-2
Brookhaven Creek Tributary A	Cleveland	Valid	6/1/1977	HEC-2
Brookhaven Creek Tributary B	Cleveland	Valid	6/1/1977	HEC-2
Canadian River	Cleveland	Unverified	6/1/1977	HEC-2
Canadian River Tributary 1	Cleveland	Unverified	5/1/1980	HEC-2
Canadian River Tributary 2	Cleveland	Unverified	5/1/1980	HEC-2
Chouteau Creek (North of Lexington)	Cleveland	Valid	9/1/1997	HEC-2
Cow Creek	Cleveland	Unverified	5/1/1980	HEC-2
Cow Creek Tributary 1	Cleveland	Unverified	5/1/1980	HEC-2
Cow Creek Tributary 2	Cleveland	Unverified	5/1/1980	HEC-2
Cow Creek Tributary 2 North Branch	Cleveland	Unverified	5/1/1980	HEC-2
Cow Creek Tributary 2 West Branch	Cleveland	Valid	5/1/1980	HEC-2
Cow Creek Tributary 3	Cleveland	Valid	5/1/1980	HEC-2
Dave Blue Creek	Cleveland	Valid	4/30/2010	HEC-RAS 4.0
Dave Blue Creek	Cleveland	Valid	11/1/1979	WSP-2

Stream Name	County/Parish	Validation Status	Date of Effective Analysis	Hydraulic Model
Dripping Springs Creek	Cleveland	Valid	9/1/1997	HEC-2
Imhoff Creek	Cleveland	Unverified	8/20/1996	HEC-2
Merkle Creek	Cleveland	Valid	6/1/1977	HEC-2
Merkle Creek Overflow	Cleveland	Valid	6/1/1977	HEC-2
Ten Mile Flat Creek	Cleveland	Unverified	6/1/1977	HEC-2
Tributary 0 of Canadian River Tributary 1	Cleveland	Valid	9/26/2008	HEC-RAS
Tributary 1 of Canadian River Tributary 1	Cleveland	Unverified	5/1/1980	HEC-2
Tributary 2 of Canadian River Tributary 1	Cleveland	Unverified	5/1/1980	HEC-2
Tributary 3 of Canadian River Tributary 1	Cleveland	Unverified	5/1/1980	HEC-2
Tributary 3 of Canadian River Tributary 1	Cleveland	Valid	4/30/2010	HEC-RAS 4.0
Tributary 4 of Canadian River Tributary 1	Cleveland	Unverified	5/1/1980	HEC-2
Unnamed Tributary to Cow Creek Tributary 2 North Branch	Cleveland	Valid	4/30/2010	HEC-RAS 4.0
Unnamed Tributary to Tributary 3 of Canadian River Tributary 1	Cleveland	Valid	12/29/2005	HEC-RAS
Bridge Creek	Grady	Valid	8/1/1989	HEC-2
Coal Creek	Grady	Valid	8/1/1989	HEC-2
Coal Creek Lower Reach	Grady	Valid	3/1/2001	HEC-RAS
Coal Creek Tributary	Grady	Valid	8/1/1989	HEC-2
Coal Creek Tributary Lower Reach	Grady	Valid	3/1/2001	HEC-RAS
Worley Creek	Grady	Valid	8/1/1989	HEC-2
Worley Creek Lower Reach	Grady	Valid	3/1/2001	HEC-RAS
Worley Creek Tributary	Grady	Valid	8/1/1989	HEC-2
Beaver Creek	McClain	Valid	10/1/1979	HEC-2
Bridge Creek	McClain	Valid	7/1/2003	HEC-RAS
Canadian River Divided Flow	McClain	Valid	10/1/1979	HEC-2
Crooked Bridge Creek	McClain	Valid	9/1/1987	HEC-2
East Branch Walnut Creek Tributary	McClain	Valid	7/1/2003	HEC-RAS
Goldsby Creek	McClain	Valid	9/1/1987	HEC-2
North Fork Walnut Creek	McClain	Valid	7/1/2003	HEC-RAS
Pond Creek	McClain	Valid	9/1/1996	HEC-2

Stream Name	County/Parish	Validation Status	Date of Effective Analysis	Hydraulic Model
Stinson Creek	McClain	Valid	7/1/2003	HEC-RAS
Stinson Creek	McClain	Valid	2/1/1985	HEC-2
Tributary A of Canadian River	McClain	Valid	2/1/1985	HEC-2
Tributary A.1 of Canadian River	McClain	Valid	2/1/1985	HEC-2
Tributary A.1.1 of Canadian River	McClain	Valid	2/1/1985	HEC-2
Tributary A2	McClain	Valid	7/1/2003	HEC-RAS
Tributary B of Canadian River	McClain	Valid	2/1/1985	HEC-2
Tributary D of Canadian River	McClain	Valid	9/1/1996	HEC-2
Tributary D.1 of Canadian River	McClain	Valid	9/1/1996	HEC-2
Tributary No. 1 of Pond Creek	McClain	Valid	2/1/1985	HEC-2
Tributary No. 1 of Stinson Creek	McClain	Valid	2/1/1985	HEC-2
Tributary No. 1.1 of Pond Creek	McClain	Valid	2/1/1985	HEC-2
Tributary No. 1.2 of Pond Creek	McClain	Valid	2/1/1985	HEC-2
Tributary No. 10 of Pond Creek	McClain	Valid	2/1/1985	HEC-2
Tributary No. 2 of Pond Creek	McClain	Valid	2/1/1985	HEC-2
Tributary No. 2 of Stinson Creek	McClain	Valid	2/1/1985	HEC-2
Tributary No. 3 of Pond Creek	McClain	Valid	2/1/1985	HEC-2
Tributary No. 3 of Stinson Creek	McClain	Valid	2/1/1985	HEC-2
Tributary No. 4 of Pond Creek	McClain	Valid	9/1/1996	HEC-2
Tributary No. 5 of Pond Creek	McClain	Valid	9/1/1996	HEC-2
Tributary No. 5.1 of Pond Creek	McClain	Valid	9/1/1996	HEC-2
Tributary No. 5.1.1 of Pond Creek	McClain	Valid	9/1/1996	HEC-2
Tributary No. 5.2 of Pond Creek	McClain	Valid	9/1/1996	HEC-2
Tributary No. 5.3 of Pond Creek	McClain	Valid	9/1/1996	HEC-2
Tributary No. 6 of Pond Creek	McClain	Valid	9/1/1996	HEC-2
Tributary No. 7 of Pond Creek	McClain	Valid	2/1/1985	HEC-2
Tributary No. 8 of Pond Creek	McClain	Valid	9/1/1996	HEC-2
Cow Creek	Oklahoma	Unverified	5/1/1980	Other
Little Sandy Creek	Pontotoc	Valid	1/11/1978	HEC-2

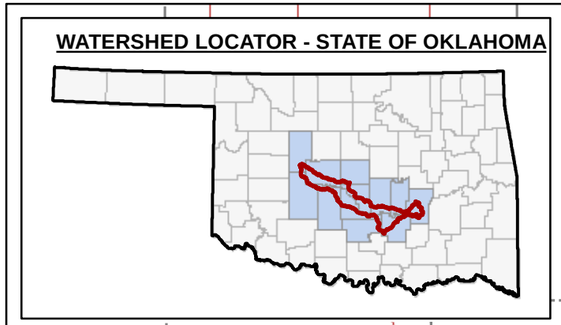
Figure 9: Letters of Map Change

Lower Canadian-Walnut Watershed

Feb 19 2013

FEMA

OWRB Water Resources Board



BLAINE County
CANADIAN County
OKLAHOMA County
CLEVELAND County
POTTAWATOMIE County
CADDO County
GRADY County
MCCLAIN County
GARVIN County
SEMINOLE County
HUGHES County
PONTOTOC County

Geary
Calumet
Piedmont
Edmond
Arcadia
Luther
Hydro
Bridgeport
El Reno
The Village
Jones
Yukon
Bethany
Warr Acres
Woodlawn Park
Spencer
Choctaw
Harrah
Forest Park
Nicoma Park
Hinton
Smith Village
Del City
McLoud
Valley Brook
Union City
Mustang
Johnson
Lookeba
Moore
Shawnee
Cromwell
Bethel Acres
Eakly
Binger
Minco
Tuttle
Pink
Tecumseh
Earlsboro
Newcastle
Hall Park
Seminole
Wetumka
Dustin
Norman
Gracemont
Pocasset
Amber
Lima
Wewoka
Yeager
Macomb
Bowlegs
Carnegie
Fort Cobb
Blanchard
Goldsby
Noble
Etowah
Tribbey
Maud
Holdenville
Horntown
Lamar
Cole
Slaughterville
Saint Louis
Verden
Chickasha
Washington
Dibble
Purcell
Lexington
Spaulding
Asher
Norge
Wanette
Konawa
Sasakwa
Atwood
Calvin
Cement
Ninnekah
Wayne
Rosedale
Byars
Byng
Francis
Allen
Stuart
Gerty
Alex
Bradley
Lindsay
Erin Springs
Maysville
Paoli
Stratford
Ada
Rush Springs
Pauls Valley
Fitzhugh
Stonewall
Wynnewood
Roff
Elmore City

Map Symbology

- Cities
- County Seats
- Major Highways
- Canadian River
- County Boundaries
- Watershed Boundary: HUC 8
- HUC 12 Basins
- Letters of Map Revision (LOMR)
- Letters of Map Ammendment (LOMA)

CNMS Validation Status

- Unknown
- Unverified
- Valid

0 5 10 20 Miles

I. Post-Discovery CNMS Analysis

Table 19 shows the enhanced study streams in the Lower Canadian-Walnut Watershed that have failed one or more validation element(s) 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 elements fails, or if four or more of the 10 secondary elements fail during stream reach level validation. Table 20 provides a description of the validation elements that failed as identified in the CNMS database.

The CNMS contains data for 1,579 stream miles in this Watershed – subdivided in 1,347 miles of Zone A, 229 miles of Zone AE, 1.6 miles of Zone AH and 1.1 miles of Zone AO streams. Of this total, over 90 percent of stream miles are classified as either Unknown (84%) or Unverified (7%).

Again, of the total Zone A streams, the majority (98%) are classified as Unknown – with only 28 miles noted as Valid and none as Unverified. Conversely, of the total Zone AE streams, 55 percent are considered Valid and 45 percent are noted as Unverified. No AE stream was classified as Unknown.

The following is a detail of the CNMS review findings, including any Zone A's, per County:

1. Blaine County

Blain County has 5.7 stream miles, all noted as Zone A, Unknown, To Be Assessed. All floodplain is non-digital approximation and not model-backed. This includes 2.8 miles of (Lower) Canadian River.

The following creeks had null values for all Critical and Secondary Elements:

- Canadian River, 2.8 miles
- Lumpmouth Creek, 1.3 miles

The CNMS data should be completed and validation status confirmed (Valid or Unverified). Particular attention should be given to the Canadian River. No change to validation status is recommended.

2. Caddo County

Caddo County has 26 miles of streams, all noted as Zone A, model-backed and Valid. Study type is Updated Approximate, dated October 2010. The following Valid streams had null values for all Critical and Secondary Elements.

- Canadian River, 3.5 miles
- Buggy Creek, 4.6 miles
- Bullet Creek, 1.6 miles
- Fisher Creek, 2.0 miles

Table 19: Lower Canadian-Walnut CNMS Review for Zone AE Streams

					Discovery Level CNMS review			
Stream Name	County/Parish	Validation Status	Failed CNMS Elements	Null Elements	Date of Effective Study	Age of Effective Study	Failed CNMS Elements	Recommended Validation Status Change
Cow Creek Tributary 2	Canadian	Valid		All	6/1/2006	7		Unknown
Belle Creek	Cleveland	Valid	S3		11/1/1979	34	C3	Unverified
Bishop Creek	Cleveland	Unverified	C6, S3, S6		2/13/1998	16		
Bishop Creek Tributary A	Cleveland	Unverified	C6, S3, s6		6/1/1977	36		
Bishop Creek Tributary B	Cleveland	Valid	S3, S4, S6		6/1/1977	36	C3, C5	Unverified
Bishop Creek Tributary C	Cleveland	Valid	S3, S4, S6		6/1/1977	36	C3	Unverified
Brookhaven Creek	Cleveland	Valid	S3, S4, S6		6/1/1977	36	C3, C5	Unverified
Brookhaven Creek Tributary A	Cleveland	Valid	S3, S6		6/1/1977	36	C3, C5	Unverified
Brookhaven Creek Tributary B	Cleveland	Valid	S3, S6		6/1/1977	36	C3	Unverified
Canadian River	Cleveland	Unverified	C1, S3, S6		6/1/1977	36		
Canadian River Tributary 1	Cleveland	Unverified	C6, S3, S5, S6, S10		5/1/1980	33	S2	
Canadian River Tributary 2	Cleveland	Unverified	C6, S3, S6		5/1/1980	33		
Chouteau Creek (North of Lexington)	Cleveland	Valid			9/1/1997	16	C3	Unverified
Cow Creek	Cleveland	Unverified	S1, S4, S6, S10		5/1/1980	33		
Cow Creek Tributary 1	Cleveland	Unverified	S1, S4, S6, S10		5/1/1980	33		
Cow Creek Tributary 2	Cleveland	Unverified	S1, S4, S6, S10		5/1/1980	33		
Cow Creek Tributary 2 North Branch	Cleveland	Unverified	S1, S4, S6, S10		5/1/1980	33		
Cow Creek Tributary 2 West Branch	Cleveland	Valid	S1, S6, S10		5/1/1980	33	C3	Unverified
Cow Creek Tributary 3	Cleveland	Valid	S1, S6, S10		5/1/1980	33	C3	Unverified
Dave Blue Creek	Cleveland	Valid		All	4/30/2010	3	C3, C5	Unverified
Dave Blue Creek	Cleveland	Valid	S3		11/1/1979	34		
Dripping Springs Creek	Cleveland	Valid	S3, S4		9/1/1997	16	C3, C5	Unverified
Imhoff Creek	Cleveland	Unverified	C6, S6		8/20/1996	17	S2	
Merkle Creek	Cleveland	Valid	S3, S4, S6		6/1/1977	36	C3	Unverified
Merkle Creek Overflow	Cleveland	Valid	S3, S6		6/1/1977	36	C3	Unverified
Ten Mile Flat Creek	Cleveland	Unverified	C6, S2, S3, S6		6/1/1977	36	S2	
Tributary 0 of Canadian River Tributary 1	Cleveland	Valid		All	9/26/2008	5	S2	Unknown
Tributary 1 of Canadian River Tributary 1	Cleveland	Unverified	C6, S3, S5, S6, S10		5/1/1980	33		
Tributary 2 of Canadian River Tributary 1	Cleveland	Unverified	C6, S3, S6, S10		5/1/1980	33		
Tributary 3 of Canadian River Tributary 1	Cleveland	Unverified	S3, S5, S6, S10		5/1/1980	33		
Tributary 3 of Canadian River Tributary 1	Cleveland	Valid			4/30/2010	3	C5	Unverified
Tributary 4 of Canadian River Tributary 1	Cleveland	Unverified	S3, S4, S6, S10		5/1/1980	33		
Unnamed Tributary to Cow Creek Tributary 2 North Branch	Cleveland	Valid		All	4/30/2010	3		Unknown
Unnamed Tributary to Tributary 3 of Canadian River Tributary 1	Cleveland	Valid	S6		12/29/2005	8	C3	Unverified
Bridge Creek	Grady	Valid			8/1/1989	24	C3	Unverified
Coal Creek	Grady	Valid	S3		8/1/1989	24	C3, S2	Unverified
Coal Creek Lower Reach	Grady	Valid			3/1/2001	13	C3, C5	Unverified
Coal Creek Tributary	Grady	Valid	S4		8/1/1989	24	C3, C5	Unverified
Coal Creek Tributary Lower Reach	Grady	Valid			3/1/2001	13	C3	Unverified
Worley Creek	Grady	Valid	S4		8/1/1989	24	C3, C5	Unverified
Worley Creek Lower Reach	Grady	Valid			3/1/2001	13	C3	Unverified
Worley Creek Tributary	Grady	Valid			8/1/1989	24	C3, C5	Unverified

					Discovery Level CNMS review			
Stream Name	County/Parish	Validation Status	Failed CNMS Elements	Null Elements	Date of Effective Study	Age of Effective Study	Failed CNMS Elements	Recommended Validation Status Change
Beaver Creek	McClain	Valid	S10		10/1/1979	34	C3	Unverified
Bridge Creek	McClain	Valid		All	7/1/2003	10	C3	Unverified
Canadian River Divided Flow	McClain	Valid	S10		10/1/1979	34	C3	Unverified
Crooked Bridge Creek	McClain	Valid	S4, S10		9/1/1987	26	C3	Unverified
East Branch Walnut Creek Tributary	McClain	Valid		All	7/1/2003	10	C5	Unverified
Goldsby Creek	McClain	Valid	S10		9/1/1987	26	C3	Unverified
North Fork Walnut Creek	McClain	Valid		All	7/1/2003	10		Unknown
Pond Creek	McClain	Valid	S10		9/1/1996	17	C3	Unverified
Stinson Creek	McClain	Valid		All	7/1/2003	10		Unknown
Stinson Creek	McClain	Valid	S10		2/1/1985	29	C3, C5	Unknown
Tributary A of Canadian River	McClain	Valid	S10		2/1/1985	29	C3	Unknown
Tributary A.1 of Canadian River	McClain	Valid	S10		2/1/1985	29	C3	Unknown
Tributary A.1.1 of Canadian River	McClain	Valid			2/1/1985	29	C3	Unknown
Tributary A2	McClain	Valid		All	7/1/2003	10	C3	Unknown
Tributary B of Canadian River	McClain	Valid	S10		2/1/1985	29	C3	Unknown
Tributary D of Canadian River	McClain	Valid	S10		9/1/1996	17	C3	Unknown
Tributary D.1 of Canadian River	McClain	Valid			9/1/1996	17	C3	Unknown
Tributary No. 1 of Pond Creek	McClain	Valid	S10		2/1/1985	29	C3	Unknown
Tributary No. 1 of Stinson Creek	McClain	Valid	S10		2/1/1985	29	C3	Unknown
Tributary No. 1.1 of Pond Creek	McClain	Valid	S10		2/1/1985	29	C3	Unknown
Tributary No. 1.2 of Pond Creek	McClain	Valid	S10		2/1/1985	29	C3	Unknown
Tributary No. 10 of Pond Creek	McClain	Valid			2/1/1985	29	C3	Unknown
Tributary No. 2 of Pond Creek	McClain	Valid	S10		2/1/1985	29	C3	Unknown
Tributary No. 2 of Stinson Creek	McClain	Valid	S10		2/1/1985	29	C3	Unknown
Tributary No. 3 of Pond Creek	McClain	Valid	S10		2/1/1985	29	C3	Unknown
Tributary No. 3 of Stinson Creek	McClain	Valid	S10		2/1/1985	29	C3	Unknown
Tributary No. 4 of Pond Creek	McClain	Valid	S10		9/1/1996	17	C3	Unknown
Tributary No. 5 of Pond Creek	McClain	Valid	S10		9/1/1996	17	C3	Unknown
Tributary No. 5.1 of Pond Creek	McClain	Valid	S10		9/1/1996	17	C3	Unknown
Tributary No. 5.1.1 of Pond Creek	McClain	Valid	S10		9/1/1996	17	C3	Unknown
Tributary No. 5.2 of Pond Creek	McClain	Valid	S10		9/1/1996	17	C3	Unknown
Tributary No. 5.3 of Pond Creek	McClain	Valid	S10		9/1/1996	17	C3	Unknown
Tributary No. 6 of Pond Creek	McClain	Valid	S10		9/1/1996	17	C3	Unknown
Tributary No. 7 of Pond Creek	McClain	Valid	S10		2/1/1985	29	C3	Unknown
Tributary No. 8 of Pond Creek	McClain	Valid	S10		9/1/1996	17	C3	Unknown
Tributary No. 9 of Pond Creek	McClain	Valid			2/1/1985	29	C3	Unknown
Walnut Creek	McClain	Valid		All	12/1/2005	8		Unknown
West Branch Walnut Creek Tributary	McClain	Valid		All	7/1/2003	10	C5	Unknown
Cow Creek	Oklahoma	Unverified	S3, S4, S6, S10		5/1/1980	33	C5	
Little Sandy Creek	Pontotoc	Valid	S4, S10		11/1/1978	35	C3	Unknown

Table 20: CNMS Category Descriptions

Element Name	Issue being identified by the Element	Element Description
C1	*Major change in gage record since effective analysis that includes major flood events*	Failure of this element happens when a major change in the gage record occurs after the date of the Effective Study.
C2	*Updated and effective peak discharges differ significantly based on confidence limits criteria*	Failure of this element indicates that the updated and effective peak discharges differ significantly from the current confidence limits criteria since the date of the Effective Study.
C3	*Model methodology no longer appropriate*	This element fails when the model methodology used no longer meets current guidelines and specifications.
C4	*Major flood control structure added or removed*	Failure of this element indicates the addition or removal of a major flood control structure (i.e., certified levee or seawall, reservoir with more than 50 acre-ft storage per square mile).
C5	*Current channel reconfiguration outside effective SFHA*	Failure of this element indicates the streamline is seen on imagery as outside the SFHA and cannot be explained by a minor mapping error, which could be corrected through base fitting.
C6	*More than five new or removed hydraulic structures*	This element fails when more than five new or removed hydraulic structures that impact the BFEs have not been identified.
C7	*Significant channel fill or scour*	Failure of this element indicates a significant channel or scour has been identified.
S1	*Use of rural regression equations in urbanized areas*	This element attempts to flag studies in current urban areas where rural regression equations were used for the effective study hydrology.
S2	*Repetitive losses outside the SFHA*	This element fails when repetitive losses have been noted outside of the SFHA. Repetitive losses determined to be from an unmapped source, or due to local drainage issues are not considered.
S3	*Increase in impervious area in subbasin of more than 50 percent*	Failure of this element identifies a significant increase in impervious area (due to urban development since the study date) based on best available land use/land cover data sources.
S4	*More than one and less than five new or removed hydraulic structures (bridge/culvert) impacting BFEs*	This element identifies addition or removal of more than one, but less than five hydraulic structures along the studied streams since the date of the Effective Study.
S5	*Channel improvements / shoreline changes*	Failure of this element indicates the FIRM, Imagery, or other data input sources show channel improvements since the study date.
S6	*Better topographic or bathymetric data available*	Failure of this element indicates better topographic or bathymetric data has been made available since the Effective Study date.
S7	*Changes to vegetation or land use*	Failure of this element indicates there have been significant changes in land use or vegetative cover since the date of the Effective Study.
S8	*Failure to identify primary frontal dune in coastal areas*	Failure of this element indicates that the primary frontal dune was not properly identified in coastal areas.
S9	*Significant storms with high water marks*	Failure of this element indicates that recent storm surge high waters marks were not identified.
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.

Hydrologic and hydraulic information is missing from the dataset along with effective date. The CNMS data should be completed and validation status confirmed.

Caddo County noted the construction of a new SH 52 bridge over Buggy Creek. This project should be investigated further as a potential source of new hydrology and hydraulic analysis that may facilitate completion of enhanced analysis in the area.

3. Canadian County

Canadian County has a total of 313 miles of streams, of which 312 miles are Zone A. All Zone A streams are listed as Unknown, Digital Conversion Approximate, dated January 2000. Of these 313 miles, only 1.4 miles of Zone AE (Cow Creek Tributary 2) is shown as Valid. The study type is Updated Detailed, HEC-2 model with an effective date of June 2006. This segment was validated as part of "Bulk Validation" during Map Mod.

The following streams – includes Zone A and AE – had null values for all Critical and Secondary Elements.

- Arapaho Creek, 7.5 miles
- Beaver Creek, 7.9 miles
- Bennett Creek, 2.7 miles
- Buggy Creek, 7.1 miles
- Canadian River, 68.2 miles
- Canyon View Creek, 6.0 miles
- Cedar Lake, 1.1 miles
- Cow Creek Tributary 2, 1.1 miles
- Dry Creek, 7.7 miles
- Foreman Creek, 3.5 miles
- Powder Face Creek, 6.3 miles
- South Branch Tributary 2, 1.9 miles

The CNMS data should be completed and validation status confirmed (Valid or Unverified). Particular attention should be given to the Canadian River, as segments failed Critical Element C5 indicating that the streamline is shown outside the SFHA. Additionally, validation status for Crow Creek Tributary 2 should be changed to Unknown as the stream contains null data for all Critical and Secondary Elements.

4. Cleveland County

Cleveland County has a total of 289 miles of streams in the Lower Canadian-Walnut Watershed. Of these, 150 miles are Zone A and classified as Unknown, Digital Conversion Approximate, date January 2000. The watershed also contains 1.1 miles of Zone AO and 1.6 miles of Zone AH, all classified as Unverified Canadian River.

The county's remaining 137 miles are Zone AE streams. Of these 33 miles are Valid, with 2.8 miles of New Detailed, 26.7 miles of Redelineated and 4.4 miles of Updated Detailed study types. Of these Valid streams, the CNMS notes that none failed any Critical Elements and 12.2 miles failed three or more Secondary Elements.

The following Valid Zone AE streams have null values for Critical and Secondary Elements:

- Dave Blue Creek, 1.1 miles
- Tributaries 0 and 3 of Canadian River Tributary 1, 4.4 miles and 0.9 miles, respectively
- Unnamed Tributary to Cow Creek Tributary 2 North Branch, 0.8 miles

The following Valid Zone AE streams failed three or more Secondary Elements:

- Bishop Creek Tributaries B and C, 0.8 miles each
- Brookhaven Creek, 4.4 miles,
- Cow Creek Tributary 2 West Branch, 1.0 miles
- Cow Creek Tributary 3, 2.8 miles
- Merkle Creek, 2.3 miles

Further review during Discovery revealed that the following Valid streams failed Critical Element C3 indicating that Model methodology is no longer appropriate:

- Belle Creek, 1.5 miles
- Bishop Creek Tributary B and C
- Brookhaven Creek and Tributaries A and B, 4.4 miles, 0.4 miles and 0.2 miles, respectively
- Chouteau Creek (North of Lexington), 6.6 miles
- Cow Creek Tributary 2 West Branch
- Cow Creek Tributary 3, 2.8 miles
- Dave Blue Creek, 0.8 miles
- Dripping Springs Creek, 4.3 miles
- Merkle Creek and Overflow, 2.3 miles and 0.4 miles, respectively
- Unnamed Tributary to Tributary 3 of Canadian River Tributary 1, 0.3 miles

Additionally, the following Valid streams failed Critical Element C5 indicating that the streamline is shown outside the SFHA:

- Bishop Creek Tributary B
- Brookhaven Creek and Tributary A
- Dave Blue Creek
- Dripping Springs Creek
- East Branch Boone Creek, 1.7 miles
- Little Buckhead Creek, 4.3 miles
- Merkle Creek
- Tributaries 1 and 3 of Canadian River Tributary 1, 2.1 miles and 0.9 miles, respectively
- West Branch Boone Creek, 2.1 miles
- Willow Creek, 7.0 miles

The following Valid streams also failed Secondary Element S2 indicating Repetitive losses outside the SFHA:

- Canadian River Tributary 1, 7.3 miles
- Imhoff Creek, 4.1 miles
- Ten Mile Flat Creek, 2.5 miles
- Tributary 0 of Canadian River Tributary 1, 2.5 miles

The CNMS data should be completed and validation status confirmed for all above listed streams. For those Valid AE streams that failed C3, C5, and/or three or more Secondary Elements status should be revised from Valid to Unverified or Unknown.

Additionally, the county's Zone AE also contains 103 miles of Unverified streams. These include:

- Bishop Creek, 7.9 miles
- Bishop Creek Tributary A, 2.1 miles
- Canadian River, 41.0 miles
- Canadian River Tributary 1, 8.3 miles
- Canadian River Tributary 2, 7.2 miles
- Cow Creek, 7.6 miles
- Cow Creek Tributaries 1, 2 and Tributary 2 North Branch, 4.2 miles, 4.3 miles and 3.3 miles, respectively
- Imhoff Creek, 4.1 miles
- Ten Mile Flat Creek, 5.4 miles
- Tributaries 1, 2, 3 and 4 of Canadian River Tributary 1, 2.0 miles, 2.7 miles, 1.5 miles and 1.0 miles, respectively

Recommendations for Cleveland County also include the enhanced analysis of approximately 100 miles of Unverified Zone AE streams and (the basic or enhanced analysis of) approximately 150 miles of Unknown Zone A streams.

- Beaver Creek
- Belle Creek
- Bishop Creek and Tributaries A, B, C
- Brookhaven Creek and Tributaries A and B
- Canadian River and Tributaries 1 and 2
- Chouteau Creek (North of Lexington)
- Cow Creek and Tributaries 1, 2, 2 North Branch, 2 West Branch and 3
- Dripping Springs Creek
- Ten Mile Flat Creek
- Tributaries 0, 1, 2 3 and 4 of Canadian River Tributary 1 and Unnamed Tributary to Tributary 3 of Canadian River Tributary 1
- Walnut Creek

5. Garvin County

Garvin County has a total of 27 miles of streams in the Lower Canadian-Walnut Watershed. Of these, all are Zone A and classified as Unknown, Digital Conversion Approximate, dated January 2010. All streams have null values for Critical and Secondary Elements. The CNMS data should be completed and validation status confirmed.

6. Grady County

Grady County has a total of 147.5 miles of streams in the Lower Canadian-Walnut Watershed. Of these, 125 miles are Zone A and 22.5 miles as Zone AE.

All Zone A streams are classified as Unknown, To Be Assessed, with null for all Critical or Secondary Elements. In contrast, all Zone AE streams are noted as Valid, Redelineated Studies. Effective Dates for these Zone AE streams range from August 1989 to March 2001, and HEC-1 and HEC-2 or HEC-RAS were the models used for hydrology and hydraulics.

The following Zone AE Valid streams failed S3, indicating an increase in impervious area in subbasin of more than 50 percent:

- Coal Creek, 3.7 miles
- Coal Creek Tributary, 3.2 miles

Further review under Discovery revealed that the portion of Coal Creek Tributary located in City of Bridge Creek also failed Secondary Element S2, indicating that Repetitive losses have occurred outside the SFHA.

Grady County has one of the highest Repetitive loss density in the State. The County, however, does not participate in the NFIP.

7. Hughes County

Digitizing of Hughes County was not completed as part of Map Modernization. The CNMS includes data for 105.5 miles of stream, all validation Unknown, To Be Assessed. Study type is Non-Digital Approximate.

8. McClain County

McClain County has a total of 261 miles of streams in the Lower Canadian-Walnut Watershed. Of these, 196 miles are Zone A, all classified as Unknown, To Be Assessed. Null values are recorded for all Critical and Secondary Elements.

The County's 65 miles of Zone AE are all classified as Valid. Updated Detailed studies were completed in October 2010 (as part of Map Mod) for 17 miles – streams listed below. Null values are recorded for all Critical and Secondary Elements.

- Bridge Creek, 0.5 miles
- East Branch Walnut Creek Tributary, 1.9 miles
- North Fork Walnut Creek, 4.8 miles
- Stinson Creek, 2.7 miles
- Tributary A2, 0.7 miles
- Walnut Creek, 3.7 miles
- West Branch Walnut Creek Tributary, 2.8 miles

The remaining Valid streams (48 miles) were Redelineated in October 2010. The Effective Date for these streams ranges from 1979 to 1996. All streams in this grouping failed Secondary Element S10, indicating that new regression equations are available. In addition, the following streams also failed S4, indicating the possible existence of more than one and less than five new or removed hydraulic structures (bridge/culvert) impacting BFEs.

- Canadian River Divided Flow, 2.6 miles
- Crooked Bridge Creek, 3.9 miles
- Goldsby Creek, 2.0 miles

Further review during Discovery revealed that the following Valid streams failed Critical Element C3 indicating that Model methodology is no longer appropriate:

- Beaver Creek
- Bridge Creek
- Canadian River Divided Flow
- Crooked Bridge Creek
- Goldsby Creek
- Pond Creek
- Tributary A of Canadian River
- Tributary A.1 of Canadian River
- Tributary A.1.1 of Canadian River
- Tributary A2
- Tributary B of Canadian River
- Tributary D of Canadian River
- Tributary D.1 of Canadian River
- Tributary No. 1 of Pond Creek
- Tributary No. 1 of Stinson Creek
- Tributary No. 1.1 of Pond Creek
- Tributary No. 1.2 of Pond Creek
- Tributary No. 2 of Pond Creek
- Tributary No. 2 of Stinson Creek
- Tributary No. 3 of Pond Creek
- Tributary No. 3 of Stinson Creek
- Tributary No. 4 of Pond Creek
- Tributary No. 5 of Pond Creek
- Tributary No. 5.1 of Pond Creek
- Tributary No. 5.1.1 of Pond Creek
- Tributary No. 5.2 of Pond Creek
- Tributary No. 5.3 of Pond Creek
- Tributary No. 6 of Pond Creek
- Tributary No. 7 of Pond Creek
- Tributary No. 8 of Pond Creek
- Tributary No. 9 of Pond Creek
- Tributary No. 10 of Pond Creek

Additionally, East Branch Walnut Creek Tributary also failed Critical Element C5 indicating that the streamline is shown outside the SFHA. Stinson Creek failed Critical Elements C3 and C5.

The CNMS data should be completed and validation status confirmed. The status of Valid AE streams with null values for Critical and Secondary Elements should be revised to Unknown. Status for streams that failed C3 and/or C5 should be revised from Valid to Unverified. Priority should be given to Walnut Creek and Tributaries, as the County communicated several issues with these streams.

9. Oklahoma County

Oklahoma County has a total of 3.2 miles of streams in the Lower Canadian-Walnut Watershed. The majority, 2.3 miles, are Zone A, Valid streams. The remainder, 1.1 miles (Cow Creek) are Zone AE, classified as Unverified.

Null values are recorded for all Zone A streams. The CNMS data should be completed and validation status confirmed for these streams.

Cow Creek failed Secondary Elements S3, S4, S6 and S10, indicating that an increase in impervious area in subbasin of more than 50 percent, more than one and less than five new or removed hydraulic structures (bridge/culvert) impacting BFEs, better topographic or bathymetric data

available, and new regression equations are available. Additionally, review under Discovery revealed that Cow Creek also failed C5, indicating that the current channel reconfiguration is outside effective SFHA. Thus, it is recommended that enhanced analysis be completed for the 3.23 miles of Cow Creek and Unnamed Tributaries (existing Zone A and AE).

10. Pontotoc County

Pontotoc County has a total of 271 miles of streams in the Lower Canadian-Walnut Watershed. Of these, 268 miles are Zone A, Unknown, To Be Assessed, Not Model-Backed streams. Null values are recorded for all Zone A streams. The CNMS data should be completed and validation status confirmed for these Zone A streams.

The remaining 2.9 miles (Little Sandy Creek) are Zone AE, Valid streams. According to the CNMS, Little Sandy Creek failed Secondary Elements S4 and S10, indicating that an increase in impervious area in subbasin of more than 50 percent and new regression equations are available. Review under Discovery also revealed that Little Sandy Creek also failed C3, indicating that Model methodology is no longer appropriate. The status of Little Sandy Creek should be revised from Valid to Unverified.

Lastly, because Pontotoc County and City of Bing requested additional Zone AE mapping for Little Sandy Creek (to aid guide development in the area), it is recommended that enhanced analysis be completed for 5.7 miles Zone A and 2.90 Zone AE of Little Sandy Creek.

11. Pottawatomie County

Pottawatomie County has a total of 71.5 miles of streams in the Lower Canadian-Walnut Watershed. All of these are Zone A, Unknown, To Be Assessed, Not Model-Backed streams. Null values are recorded for all Zone A streams. The CNMS data should be completed and validation status confirmed for these Zone A streams.

12. Seminole County

Pottawatomie County has a total of 71.5 miles of streams in the Lower Canadian-Walnut Watershed. All of these are Zone A, Unknown, To Be Assessed, Not Model-Backed streams. Null values are recorded for all Zone A streams. The CNMS data should be completed and validation status confirmed for these Zone A streams.

J. Summary of CNMS Concerns

The CNMS (dated June 2013) contains validation status for a total of 1,579 stream miles. Of such, 1,319 miles are Unknown, 153 miles are Valid, and 106 are Unverified. All Unknown streams are Zone A, and Valid streams include 125 miles of Zone AE and 28 miles of Zone A.

Of the 153 miles classified as Valid (28 miles of Zone A and 25.4 miles of Zone AE) 53.5 miles have null values for all Critical and Secondary Elements. All Valid Zone A stream miles are not Model Backed, Updated Approximate, dated May 2007.

Discovery revealed that approximately 100 miles of streams currently classified as Valid Zone AE have failed Critical Element C3. Similarly, 70 miles of Valid AE also failed C5, indicating that the streamlines are shown outside the SFHA. Of this grouping, however, only 10 miles are additional to the 100 miles mentioned above – as 60 miles failed both C3 and C5. Thus, the status for approximately 110 miles of Valid Zone AE should be revised to Unverified.

Lastly, Discovery also revealed that 5.2 miles of Valid Zone AE failed Secondary Element, indicating that a number of repetitive losses have been recorded outside of the SFHA. These appear along Coal Creek Tributary, Grady County, and Tributary 0 of Canadian River Tributary 1, Cleveland County.

IV. Watershed Options

FEMA looks to promote mitigation action within the watershed; thus, as a result of Discovery, opportunities must be identified to promote and support community action. Table 21 provides a listing of potential Watershed activities that could be taken under each of the four areas discussed during the Discovery meetings to promote action. Those areas are:

- 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 – outreach and disaster activities as well as non-flooding hazards like safe room information

Table 21: Lower Canadian-Walnut Potential Activities

Risk Identification and Communication
• Update FISs and FIRMs for flooding sources identified by the communities as needing updates due to updated topographic information, infrastructure improvement projects not incorporated into the effective FIS and FIRMs, and inaccuracies in effective information. • Update FISs and FIRMs for Unverified or Unknown Lower North Canadian City. Complete enhanced hydrologic and hydraulic studies and Zone AE floodplain mapping for Lower North Canadian in urban areas. • Update FISs and FIRMs for Unverified and Unknown Zone As. Specifically, Canadian County requested assistance in the development of BFEs to guide safe oil and gas development. City of Mustang requested assistance in development of BFEs for already developed areas. • Update FISs and FIRMs for Brookhaven Creek Tributary identified by City of Norman as needing updates due to I-35 infrastructure improvement and new wetland project by NRCS. • Update FISs and FIRMs for Ten Mile Flat Creek identified by City of Norman as needing updates due to updated LiDAR information, infrastructure improvement projects and multiple Letter of Map Revisions not incorporated into the effective FIS and FIRMs. • Update FISs and FIRMs for Unnamed Canadian River Tributary, West Willow Creek and Choteau Creek identified by City of Slaughterville as needing update to correct inaccuracies in effective maps.

Risk Identification and Communication
• Update FISs and FIRMs for Walnut Creek identified by McClain County as needing update to address various inaccuracies in effective map. • Assist communities in the completion of master drainage plans and enhanced studies. City of Ada requested assistance in completion of Community Master Drainage Plan and communicated the availability of updated topographic information. • Deliver presentations on the benefits of Risk MAP to interested communities. Include insurance issues in discussions.
NFIP Community Action
• Deliver presentations on the benefits of joining the NFIP to non-participating, interested communities. • Deliver presentations on the CRS program to interested communities. • Train communities on the electronic Letter of Map Amendment (eLOMA) process to facilitate LOMC submissions. • Work with Tribes to increase communication.
Mitigation Planning and Mitigation Actions
• Assist Byars, Cole, Rosedale, Washington, Chickasaw Nation and Wichita and Affiliated Tribes in completion of HMP. • Facilitate prompt adoption of HMP updates. Mitigation Plans for Counties of Canadian, Cleveland, Oklahoma, Pottawatomie and Seminole; Cities of El Reno, Mustang, Union City; and Delaware Tribe of Western Oklahoma have expired. • Assist communities with preparation of Emergency Action Plan for small communities and private dam owners. • Review availability of grants for small communities and private dam owners for repair and breach inundation mapping. • Foster and support continued communication with communities. Osage county requested to communicate with FEMA regarding bridges in the county. • Train communities on grants for repetitive loss properties. • Support and leverage communities master drainage planning efforts.

Community Benefits and Grant Opportunities
• Additional communities in NFIP. • Community outreach improved. • Increased facilitation for HMP Grants applications. • Expedite the Grant approval process. • Local drainage and flooding issue addressed. • Updated and current flood hazard information for communities. • Increased credibility of NFIP information. • Identification of local drainage issues and possible solutions.

BFE = Base Flood Elevation
CAV = Community Assistance Visit
CLOMR = Conditional Letter of Map Revision
CRS = Community Rating System
FIRM = Flood Rate Insurance Map
Hazus = Hazards U.S.
HMP = Hazard Mitigation Plan
LiDAR = Light Detection and Ranging System
LOMR = Letter of Map Revision
LSU = Louisiana State University
NFIP = National Flood Insurance Program
NVUE = New, Validated, or Updated Engineering
PMRS = Physical Map Revision
Risk MAP = Risk Mapping, Assessment, and Planning
RL/SRL = Repetitive Loss/Severe Repetitive Loss
SFHA = Special Flood Hazard Area
SRA = Sabine River Authority
ODOT = Oklahoma Department of Transportation
USGS = U.S. Geological Survey

Risk, need, available data, and desired output products are assessed for the entire HUC 8 during the Discovery process. The data collected is reviewed in an effort to identify, for FEMA Region 6, the State, and Communities, watershed needs and associated potential projects to be considered for future program phases. The selection of the project tasks necessary to respond to the identified levels of risk and need are made after the entire HUC 8 has been evaluated. The objective is to select projects that maximize the amount and usefulness of work – not to tackle every identified project or need in the watershed.

Following the assessment of risk, need, availability of topographic data, and community input during Discovery, a list of potential of projects is developed for consideration as future risk mitigation actions. Refer to Table 22 for a listing of such projects.

FEMA-based metrics that would be met if a project is undertaken are noted, 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 a project are also noted.

Table 22: Lower Canadian-Walnut Watershed Needs and Metrics

Item	Description of Need		Impacts from Any Current Map Actions	FEMA Metric or Community Benefit	Evaluation	Relates to Community Comment Number
	Evaluation Guide **Community Action – Activity would be more appropriate as a community-led action** **Low – Local community activities can continue without this revision, and FEMA"s metrics are not impacted** **Medium – Local community would benefit over the longer term from the action, and a portion of FEMA"s metrics may be met** **High – Local community would immediately benefit from the action, and FEMA's metrics would also be met**					
	Location of Need/Project	**Details**				
A	Mitigation / HMP Updates	• The following communities have an expired HMP: o Canadian County o El Reno o Mustang o Union City o Cleveland County Unincorporated Areas o Oklahoma County o Pottawatomie County o Seminole County o Delaware Tribe of Western Oklahoma o The following communities are included in the expired Cleveland County HMP: o Lexington o Moore o Noble o Norman o Slaughterville • The following communities are included in the expired Pottawatomie County HMP: o Asher o Tribbey o Wanette o Konawa is included in the expired Seminole County HMP.	None	• Impacts all communities • Facilitate the application for HMP Grants • Expedite the Grant approval process	Community Action	C1, C3, C5, C6, C11, C13
B	Mitigation / Prepare New HMP	• Completion of HMP document recommended. • The following communities lack a HMP: o Byars o Cole o Rosedale o Washington o Chickasaw Nation o Wichita and Affiliated Tribes o Garvin County has a preliminary HMP.	None	• Facilitate the application for HMP Grants • Expedite the Grant approval process	Community Action	C13
C	Mitigation / HMP Approval	• Communities should update their HMP any time flood risks change. • Communities should develop mitigation strategies in an on-going fashion. • Update with mitigation successes to show work completed.	None	• Impacts community • Facilitate the application for HMP Grants • Expedite the Grant approval process	Community Action	C12, P1

Item	Description of Need **Evaluation Guide** **Community Action – Activity would be more appropriate as a community-led action** **Low – Local community activities can continue without this revision, and FEMA"s metrics are not impacted** **Medium – Local community would benefit over the longer term from the action, and a portion of FEMA"s metrics may be met** **High – Local community would immediately benefit from the action, and FEMA's metrics would also be met**		Impacts from Any Current Map Actions	FEMA Metric or Community Benefit	Evaluation	Relates to Community Comment Number
	Location of Need/Project	Details				
D	Outreach / Coordination for Dam Emergency Action Plan	• OWRB has begun to request Emergency Action Plans for dams. • OWRB to coordinate and assists communities with compliance.	None	• Community outreach improved	Community Action	No specific comment
E	Outreach / Coordination for Discovery	• OWRB to provide Discovery Reports.	None	• Community outreach improved	Community Action	C4, C7, C9, C10
F	Outreach / Coordination for FPM	• OWRB to extend outreach to support protection and beneficial use of floodplain areas.	None	• Community outreach improved	Community Action	C6, C10, N8
G	Outreach / Coordination for Grant Opportunities	• OWRB to provide information on grants for small communities / private owners for dam repair and breach inundation mapping.	None	• Community outreach improved	Community Action	P4
H	Outreach / Coordination for Repetitive Loss Grant Opportunities	• City of Tuttle is interested in mitigation of repetitive loss properties. Requested enhanced Study of East Creek to facilitate grant application.	None	• Community outreach improved	High	P4
I	Outreach / Coordination to enter CRS program	• Caddo County, City of Blanchard and City of Mustang show interest in joining the CRS program.	None	• Potential decrease in flood insurance premiums • Community outreach improved	Community Action	N1, N8
J	Outreach / Coordination to join NFIP program	• OWRB to extend outreach for NFIP program.	None	• Additional communities in NFIP • Community outreach improved	Community Action	No specific comment
K	Outreach / Master Drainage Planning	• City of Ada Arrow requested assistance from FEMA for the completion of a Master Drainage Plan (MDP).	None	• Identification of local drainage issues and possible solutions • Grant application for assistance in mitigation • Community outreach improved	High	C4
L	HAZUS Outreach / Coordination	• Provide information from the Average Annualized Loss Study. • Introduction to HAZUS.	None	• Communities become more familiar with the HAZUS program and are prepared to use Risk MAP products when they are issued. • HAZUS can be used for HMP updates.	Medium	No specific comment
M	Updating the FIRM and FIS for Canadian River, Cleveland County. • Request for study due to significant, recent urbanization changes and replacement of structures. • Effective model dated 1977. • New studies necessary to assess changes in flood risk due to urbanization.	• 58.4 miles of enhanced riverine floodplain analysis. • 58.4 miles of floodplain mapping.	None	• 58.4 miles of new NVUE. • Community outreach improved. • FIRMs updated to reflect existing conditions.	High	M18

Item	Description of Need **Evaluation Guide** **Community Action – Activity would be more appropriate as a community-led action** **Low – Local community activities can continue without this revision, and FEMA"s metrics are not impacted** **Medium – Local community would benefit over the longer term from the action, and a portion of FEMA"s metrics may be met** **High – Local community would immediately benefit from the action, and FEMA's metrics would also be met**		Impacts from Any Current Map Actions	FEMA Metric or Community Benefit	Evaluation	Relates to Community Comment Number
	Location of Need/Project	Details				
N	Updating the FIRM and FIS for the Canadian River Tributaries, Oklahoma City. • Significant urbanization changes and new structures impacting BFEs. • Effective model dated 1980. • Repetitive losses outside the SFHA.	• 31 miles of enhanced riverine floodplain analysis. • 31 miles of floodplain mapping.	None	• 25.4 miles of new NVUE. • No NVUE for 5.6 miles (study already valid in CNMS). • FIRMs updated to reflect existing conditions.	High	No specific comment
O	Updating the FIRM and FIS for the Canadian River, Blaine, Canadian, Caddo and Grady Counties. • Digital Conversion Approximate. • Validation Status Unknown. • Repetitive losses outside the SFHA.	• 109 miles of enhanced riverine floodplain analysis. • 109 miles of floodplain mapping.	None	• 105.5 miles of new NVUE. • No NVUE for 3.5 miles (study already valid in CNMS). • FIRMs updated to reflect existing conditions.	High	No specific comment
P	Updating the FIRM and FIS for the Canadian River, McClain, Pottawatomie and Pontotoc Counties. • Digital Conversion Approximate. • Validation Status Unknown.	• 108 miles of enhanced riverine floodplain analysis. • 108 miles of floodplain mapping.	None	• 105 miles of new NVUE. • No NVUE for 2.6 miles (study already valid in CNMS). • FIRMs updated to reflect existing conditions.	Medium	No specific comment
Q	Updating the FIRM and FIS for Cow Creek, Oklahoma City. • Significant urbanization changes and new structures impacting BFEs. • Better topographic data available. • Repetitive losses outside the SFHA. • Use of rural regression equations in urbanized areas. • Model methodology no longer appropriate. • New regression equations available. • Effective model dated 1980.	• 30 miles of enhanced riverine floodplain analysis. • 30 miles of floodplain mapping.	None	• 21.7 miles of new NVUE. • No NVUE for 7.9 miles (study already valid in CNMS). • FIRMs updated to reflect existing conditions.	High	No specific comment
R	Updating the FIRM and FIS for Buggy Creek, Caddo Counties. • New bridge along Highway 152. • Effective model dated 2000. • Digital Conversion Approximate. • New studies requested to assess changes in flood risk due to bridge.	• 18 miles of enhanced riverine floodplain analysis. • Some enhanced study already completed by ODOT. • 18 miles of floodplain mapping.	None	• No NVUE (study already valid in CNMS). • Community outreach improved. • FIRMs updated to reflect existing conditions.	Low	M34

Item	Description of Need **Evaluation Guide** **Community Action – Activity would be more appropriate as a community-led action** **Low – Local community activities can continue without this revision, and FEMA"s metrics are not impacted** **Medium – Local community would benefit over the longer term from the action, and a portion of FEMA"s metrics may be met** **High – Local community would immediately benefit from the action, and FEMA's metrics would also be met**		Impacts from Any Current Map Actions	FEMA Metric or Community Benefit	Evaluation	Relates to Community Comment Number
	Location of Need/Project	Details				
S	Updating the FIRM and FIS for Buggy Creek, Grady County. • Changes in SFHAs mapping due to urbanization. • New studies requested to assess changes in flood risk. • Effective model dated 2000. • Digital Conversion Approximate.	• 22.5 miles of enhanced riverine floodplain analysis. • 22.5 miles of floodplain mapping.	None	• 22.5 miles of new NVUE. • Community outreach improved. • FIRMs updated to reflect existing conditions.	Low	M34
T	Updating the FIRM and FIS for the Snake Creek, Grady County. • Current channel reconfiguration outside effective SFHA.	• 5.1 miles of enhanced riverine floodplain analysis. • 5.1 miles of floodplain mapping.	None	• 5.1 miles of new NVUE. • FIRMs updated to reflect existing conditions.	Medium	No specific comment
U	Updating the FIRM and FIS for East Creek, City of Tuttle, Grady County. • Community requested enhanced study of East Creek to facilitate grant application.	• 17.8 miles of enhanced riverine floodplain analysis. • 17.8 miles of floodplain mapping.	None	• 17.8 miles of new NVUE. • FIRMs updated to reflect existing conditions.	High	P4
V	Updating the FIRM and FIS for Coal Creek, City of Tuttle, Grady County. • Model methodology no longer appropriate. • Current channel reconfiguration outside effective SFHA.	• 14.1 miles of enhanced riverine floodplain analysis. • 14.1 miles of floodplain mapping.	None	• 4 miles of new NVUE. • No NVUE for 10.1 miles (study already valid in CNMS). • FIRMs updated to reflect existing conditions.	Medium	No specific comment
W	Updating the FIRM and FIS for West Creek, City of Tuttle, Grady County. • Current channel reconfiguration outside effective SFHA.	• 8.9 miles of enhanced riverine floodplain analysis. • 8.9 miles of floodplain mapping.	None	• 8.9 miles of new NVUE. • FIRMs updated to reflect existing conditions.	Medium	No specific comment
X	Updating the FIRM and FIS for Worley Creek, City of Tuttle, Grady County. • Model methodology no longer appropriate. • Current channel reconfiguration outside effective SFHA.	• 12.1 miles of enhanced riverine floodplain analysis. • 12.1 miles of floodplain mapping.	None	• No NVUE (study already valid in CNMS). • FIRMs updated to reflect existing conditions.	Medium	No specific comment
Y	Updating the FIRM and FIS for Pond Creek, City of Newcastle. • Significant urbanization changes and new structures. • Effective model dated 1996. • New regression equation available.	• 10 miles of enhanced riverine floodplain analysis. • 10 miles of floodplain mapping.	None	• No NVUE (study already valid in CNMS). • FIRMs updated to reflect existing conditions.	Medium	No specific comment

Item	Description of Need **Evaluation Guide** **Community Action – Activity would be more appropriate as a community-led action** **Low – Local community activities can continue without this revision, and FEMA"s metrics are not impacted** **Medium – Local community would benefit over the longer term from the action, and a portion of FEMA"s metrics may be met** **High – Local community would immediately benefit from the action, and FEMA's metrics would also be met**		Impacts from Any Current Map Actions	FEMA Metric or Community Benefit	Evaluation	Relates to Community Comment Number
	Location of Need/Project	Details				
Z	Updating the FIRM and FIS for Ten Mile Flat Creek, City of Norman. • Changes in mapping due to I35 improvements. • Significant, recent urbanization changes and replacement of structures. • More than five new or removed hydraulic structures. • Repetitive losses outside the SFHA. • Increase in impervious area in subbasin of more than 50 percent. • Better topographic data available. • New studies requested to incorporate all changes in flood risk. • Study will benefit City of Norman, Moore and Oklahoma City. • Effective model dated 1977.	• 5.4 miles of enhanced riverine floodplain analysis. • 5.4 miles of floodplain mapping.	None	• 5.4 miles of new NVUE. • FIRMs updated to reflect existing conditions.	High	M13
AA	Updating the FIRM and FIS for Brookhaven Creek and Tributaries, City of Norman. • Requested enhanced study from Rock Creek to Confluence with Canadian River. • Changes in mapping due to I35 overpass improvements. Significant, recent urbanization changes and new structures. Increase in impervious area in subbasin of more than 50 percent. • Current channel reconfiguration outside effective SFHA. Better topographic data available. • Model methodology no longer appropriate. Effective model dated 1977.	• 5.7 miles of enhanced riverine floodplain analysis. • 5.7 miles of floodplain mapping.	None	• 0.80 miles of new NVUE. • No NVUE for 5.6 miles (study already valid in CNMS). • FIRMs updated to reflect existing conditions.	High	M14, M15, M16
AB	Updating the FIRM and FIS for Merkle Creek, City of Norman. • Model methodology no longer appropriate. • Increase in impervious area in subbasin of more than 50 percent. • New and/or removed structures impacting BFEs. • Better topographic data available. • Effective model dated 1977.	• 3.9 miles of enhanced riverine floodplain analysis. • 3.9 miles of floodplain mapping.	None	• 1.15 miles of new NVUE. • No NVUE for 2.7 miles (study already valid in CNMS). • FIRMs updated to reflect existing conditions.	Medium	No specific comment

Item	Description of Need **Evaluation Guide** **Community Action – Activity would be more appropriate as a community-led action** **Low – Local community activities can continue without this revision, and FEMA"s metrics are not impacted** **Medium – Local community would benefit over the longer term from the action, and a portion of FEMA"s metrics may be met** **High – Local community would immediately benefit from the action, and FEMA's metrics would also be met**		Impacts from Any Current Map Actions	FEMA Metric or Community Benefit	Evaluation	Relates to Community Comment Number
	Location of Need/Project	Details				
AC	Updating the FIRM and FIS for Imhoff Creek, City of Norman. • Repetitive losses outside the SFHA. • Better topographic data available. • Model methodology no longer appropriate.	• 4.1 miles of enhanced riverine floodplain analysis. • 4.1 miles of floodplain mapping.	None	• 4.1 miles of new NVUE. • FIRMs updated to reflect existing conditions.	Medium	No specific comment
AD	Updating the FIRM and FIS for Bishop Creek and Tributaries, City of Norman, Noble and Cleveland County. • Requested priority for enhanced study from Highway 9 to Canadian River. • Significant urbanization changes and new structures impacting BFEs. • Increase in impervious area in subbasin of more than 50 percent. • Better topographic data available. • Current channel reconfiguration outside effective SFHA. • Model methodology no longer appropriate. • Effective model dated 1998.	• 18.3 miles of enhanced riverine floodplain analysis. • 18.3 miles of floodplain mapping.	None	• 15.9 miles of new NVUE. • No NVUE for 2.44 miles (study already valid in CNMS). • FIRMs updated to reflect existing conditions.	High	M17
AF	Updating the FIRM and FIS for Belle Creek, City of Noble. • Model methodology no longer appropriate • Increase in impervious area in subbasin of more than 50 percent.	• 4.5 miles of enhanced riverine floodplain analysis. • 4.5 miles of floodplain mapping.	None	• 3 miles of new NVUE. • No NVUE for 1.5 miles (study already valid in CNMS). • FIRMs updated to reflect existing conditions.	Medium	M1
AG	Updating the FIRM and FIS for Unnamed Stream, City of Slaughterville. Project A • Null values provided for all Critical and Secondary elements. • Validation Unknown. • Not model backed.	• 1.5 miles of enhanced riverine floodplain analysis. • 1.5 miles of floodplain mapping.	None	• 1.5 miles of new NVUE. • FIRMs updated to reflect existing conditions.	Medium	M23
AH	Updating the FIRM and FIS for Unnamed Stream, City of Slaughterville. Project B • Map changes impacted existing structures. • Validation Unknown. • Not model backed.	• 3 miles of enhanced riverine floodplain analysis. • 3 miles of floodplain mapping.	None	• 3 miles of new NVUE. • FIRMs updated to reflect existing conditions.	Medium	M22, M29

Item	Description of Need **Evaluation Guide** **Community Action – Activity would be more appropriate as a community-led action** **Low – Local community activities can continue without this revision, and FEMA"s metrics are not impacted** **Medium – Local community would benefit over the longer term from the action, and a portion of FEMA"s metrics may be met** **High – Local community would immediately benefit from the action, and FEMA's metrics would also be met**		Impacts from Any Current Map Actions	FEMA Metric or Community Benefit	Evaluation	Relates to Community Comment Number
	Location of Need/Project	Details				
AI	Updating the FIRM and FIS for Dripping Springs Creek, City of Slaughterville. • Community noted SFHAs mapping changes. • New studies requested to assess changes in flood risk since 2009 DFIRM. • Model methodology no longer appropriate. • Current channel reconfiguration outside effective SFHA. • Effective model dated 1981.	• 40.7 miles of enhanced riverine floodplain analysis. • 40.7 miles of floodplain mapping.	None	• 25.4 miles of new NVUE. • No NVUE for 13.2 miles (study already valid in CNMS). • FIRMs updated to reflect existing conditions.	Medium	M26, M27
AJ	Updating the FIRM and FIS for Chouteau Creek (North of Lexington), City of Slaughterville. • Model methodology no longer appropriate.	• 22.25 miles of enhanced riverine floodplain analysis. • 22.25 miles of floodplain mapping.	None	• 15.6 miles of new NVUE. • No NVUE for 6.6miles (study already valid in CNMS). • FIRMs updated to reflect existing conditions.	Medium	M25, M30, M31
AK	Updating the FIRM and FIS for West Willow Creek, City of Slaughterville. • Current channel reconfiguration outside effective SFHA. • New mapping removes areas from floodplain. • Community is concerned over accuracy.	• 15.8 miles of enhanced riverine floodplain analysis. • 15.8 miles of floodplain mapping.	None	• 15.8 miles of new NVUE. • FIRMs updated to reflect existing conditions.	Medium	M24, M32
AL	Updating the FIRM and FIS for Walnut Creek, City of Purcell. Significant flooding at railroad junction (southeast Purcell) Improvements constructed following 2007 flood. • Request study to assess flood risk. • Noted errors in existing floodplain. • Effective model dated 1979 for Tributaries. • Digital Conversion Approximate.	• 4.6 miles of enhanced riverine floodplain analysis. • 4.6 miles of floodplain mapping.	None	• No NVUE (study already valid in CNMS)	Low	M21

Item	Description of Need **Evaluation Guide** **Community Action – Activity would be more appropriate as a community-led action** **Low – Local community activities can continue without this revision, and FEMA"s metrics are not impacted** **Medium – Local community would benefit over the longer term from the action, and a portion of FEMA"s metrics may be met** **High – Local community would immediately benefit from the action, and FEMA's metrics would also be met**		Impacts from Any Current Map Actions	FEMA Metric or Community Benefit	Evaluation	Relates to Community Comment Number
	Location of Need/Project	Details				
AM	Updating the FIRM and FIS for Walnut Creek, McClain and Grady Counties. • Request study to assess flood risk. • Walnut Creek mapping inaccurate and delineation offset from channel. • Current channel reconfiguration outside effective SFHA. • Floodplain along Highway 24, City of Washington, inaccurately mapped. • McClain County Barn (s5-7n-4w) erroneously shown in floodplain. • Flooding along 220th Street (35.028906 -97.392273) threatening infrastructure. • Effective model dated 2003 and 2005.	• 40.3 miles of enhanced riverine floodplain analysis. • 13.2 miles of basic riverine floodplain analysis. • 53.5 miles of floodplain mapping.	None	• 40.3 miles of new NVUE. • No NVUE for 13.2 miles (study already valid in CNMS). • FIRMs updated to reflect existing conditions.	High	M36, M37, M38, M39
AN	Updating the FIRM and FIS for Little Sandy Creek, City of Ada, Pontotoc County. • Model methodology no longer appropriate. • Current channel reconfiguration outside effective SFHA. • Effective model dated 1978. • Request study to facilitate guidance of development in the area.	• 4.5 miles of enhanced riverine floodplain analysis. • 8.7 miles of basic riverine floodplain analysis. • 13.2 miles of floodplain mapping.	None	• 10.3 miles of new NVUE. • No NVUE for 2.9 mile (study already valid in CNMS). • FIRMs updated to reflect existing conditions.	High	M41
AO	Modernization of Hughes County FIRMs.	• 105.5 miles of basic riverine floodplain analysis. • 105.5 miles of floodplain mapping.	None	• 105.5 miles of new NVUE. • FIRMs updated to reflect existing conditions.	High	No specific comment
AP	Updating the FIRM and FIS for Buggy Creek, Canadian County. • Effective model dated 2000. • Digital Conversion Approximate.	• 10.80 miles of basic riverine floodplain analysis. • 10.80 miles of floodplain mapping.	None	• 22.5 miles of new NVUE. • Community outreach improved. • FIRMs updated to reflect existing conditions.	Low	M34

Some projects are listed that were not raised by any specific community, but they were identified as improvements that could be made to meet program goals. In general terms, projects are classified as high, medium, or low priority based on the following:

- 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.

A. Project Prioritization

Watershed projects are initiated and catalogued at a HUC 8 unit by FEMA. When a project is initiated, all flood hazards within the HUC-8 must be evaluated to determine the appropriate project scope within that HUC-8 boundary. Because it is desired that all future projects within a HUC-8 boundary be task-ordered at one time, all identified HUC 8 projects must be properly prioritized and evaluated prior to selection. This prioritization work is completed as part of Discovery.

In compliance with FEMA and State guidelines, prioritization is computed based on the following factors:

- Population Density
- Percent Urban
- Number of Repetitive Loss Properties
- Total Value of Repetitive Loss Claims
- Percent available Topographic Data
- Population Density in the Floodplain
- Effective Study Age
- Validation Status
- Available Local Funding

Project rankings are derived from computations made at the HUC12 level. Those projects extending over more than one HUC12 are assigned a weighted value computed based on percentage of stream length located in each HUC 12 watershed. Table 23, below, shows the priority of projects for the Lower Canadian-Walnut Watershed.

Table 23: Lower Canadian-Walnut Watershed Project Prioritization

Project Name	Project Length (miles)
Updating the FIRM and FIS for the Canadian River, Cleveland County.	58.37
Updating the FIRM and FIS for Ten Mile Flat Creek, City of Norman.	5.40
Updating the FIRM and FIS for Buggy Creek, Caddo Counties.	18.09
Updating the FIRM and FIS for Brookhaven Creek and Tributaries, City of Norman.	5.73
Updating the FIRM and FIS for Unnamed Stream, City of Slaughterville. Project A	1.48
Updating the FIRM and FIS for Pond Creek, City of Newcastle.	9.96
Updating the FIRM and FIS for Bishop Creek and Tributaries, City of Norman.	18.33
Updating the FIRM and FIS for Merkle Creek, City of Norman.	3.85
Updating the FIRM and FIS for Cow Creek, Oklahoma City.	29.58
Updating the FIRM and FIS for the Canadian River Tributaries, Oklahoma City.	30.98
Updating the FIRM and FIS for the Canadian River, Blaine, Canadian, Caddo and Grady Counties.	108.98
Updating the FIRM and FIS for East Creek, City of Tuttle, Grady County.	17.81
Updating the FIRM and FIS for Imhoff Creek, City of Norman.	4.07
Updating the FIRM and FIS for Coal Creek, City of Tuttle, Grady County.	14.13
Updating the FIRM and FIS for Walnut Creek, McClain and Grady Counties.	53.51
Updating the FIRM and FIS for Buggy Creek, Canadian County.	10.80
Updating the FIRM and FIS for Buggy Creek, Grady County.	22.52
Updating the FIRM and FIS for the Snake Creek, Grady County.	5.06
Updating the FIRM and FIS for Walnut Creek, City of Purcell.	4.62
Updating the FIRM and FIS for Worley Creek, City of Tuttle, Grady County.	12.10
Updating the FIRM and FIS for the Canadian River, McClain, Pottawatomie and Pontotoc Counties.	107.52
Updating the FIRM and FIS for Dripping Springs Creek, City of Slaughterville.	9.75
Updating the FIRM and FIS for Unnamed Stream, City of Slaughterville. Project B	3.03
Modernize Hughes County.	105.49
Updating the FIRM and FIS for Belle Creek, City of Noble.	4.52
Updating the FIRM and FIS for West Creek, City of Tuttle, Grady County.	8.91
Updating the FIRM and FIS for Little Sandy Creek, City of Ada, Pontotoc County.	13.21
Updating the FIRM and FIS for Chouteau Creek (North of Lexington), City of Slaughterville.	22.25
Updating the FIRM and FIS for West Willow Creek, City of Slaughterville.	15.75

The above are estimates only. Detailed scope/length of project are derived in following phases of Risk MAP contingent of FEMA funding availability and community support and engagement.

Project	Mitigation / HMP Updates
L	Updating the FIRM and FIS for Canadian River, Cleveland County.
M	Updating the FIRM and FIS for the Canadian River Tributaries, Oklahoma City.
N	Updating the FIRM and FIS for the Canadian River, Blaine, Canadian, Caddo and Grady Counties.
O	Updating the FIRM and FIS for the Canadian River, McClain, Pottawatomie and Pontotoc Counties.
P	Updating the FIRM and FIS for Cow Creek, Oklahoma City.
Q	Updating the FIRM and FIS for Buggy Creek, Caddo Counties.
R	Updating the FIRM and FIS for Buggy Creek, Grady County.
S	Updating the FIRM and FIS for the Snake Creek, Grady County.
T	Updating the FIRM and FIS for East Creek, City of Tuttle, Grady County.
U	Updating the FIRM and FIS for Coal Creek, City of Tuttle, Grady County.
V	Updating the FIRM and FIS for West Creek, City of Tuttle, Grady County.
W	Updating the FIRM and FIS for Worley Creek, City of Tuttle, Grady County.
X	Updating the FIRM and FIS for Pond Creek, City of Newcastle.
Y	Updating the FIRM and FIS for Ten Mile Flat Creek, City of Norman.
Z	Updating the FIRM and FIS for Brookhaven Creek and Tributaries, City of Norman.
AA	Updating the FIRM and FIS for Merkle Creek, City of Norman.
AB	Updating the FIRM and FIS for Imhoff Creek, City of Norman.
AC	Updating the FIRM and FIS for Bishop Creek and Tributaries, City of Norman, Noble and Cleveland County.
AD	Updating the FIRM and FIS for Belle Creek, City of Noble.
AF	Updating the FIRM and FIS for Unnamed Stream, City of Slaughterville. Project A
AG	Updating the FIRM and FIS for Unnamed Stream, City of Slaughterville. Project B
AH	Updating the FIRM and FIS for Dripping Springs Creek, City of Slaughterville.
AI	Updating the FIRM and FIS for Chouteau Creek (North of Lexington), City of Slaughterville.
AJ	Updating the FIRM and FIS for West Willow Creek, City of Slaughterville.
AK	Updating the FIRM and FIS for Walnut Creek, City of Purcell
AL	Updating the FIRM and FIS for Walnut Creek, McClain and Grady Counties.
AM	Updating the FIRM and FIS for Little Sandy Creek, City of Ada, Pontotoc County.
AN	Modernization of Hughes County FIRMs.

Non-Mitigated Losses by County**			
County	Number of Properties	Total Claims	Average Number of Claims per Property
Cleveland County	3	7	2.3
McClain County	1	2	2
Non-Mitigated Losses by Community			
Community	Number of Properties	Total Claims	Average Number of Claims per Property
Lexington	2	4	2
Norman	6	19	3.2
Oklahoma City	10	30	3
Purcell	1	2	2

* Communities and counties not shown do not have RL/SRL properties.
** Unincorporated areas.
***Data current as of January 2013

Map Symbology

- HUC 8 Watershed Boundary
- Dams
- Grants
- Point of Concern
- LOMC Locations
- Claims
- Repetetive Losses

NFIP Participation

- No
- Yes

CNMS DATA

- Valid
- Unknown
- Unverified

Effective Flooding

Flood Zone

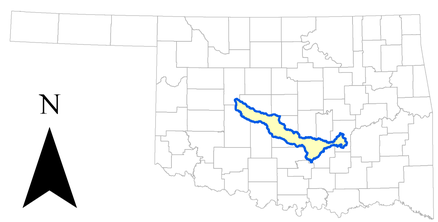
- AE; AO; AH
- 1% - A
- X Protected By Levee
- 0.2% Chance Flood

Average Annualized losses

Total Loss

- Very Low
- Low
- Medium
- High
- Very High

WATERSHED LOCATOR



NATIONAL FLOOD INSURANCE PROGRAM

Discovery Map

LOWER CANADIAN - WALNUT WATERSHED

HUC-8 Code : 11090202

Release Date: 12/18/2013

OWRB the water agency

FEMA

0 5 10 20 Miles

Prepared by:

Meshek & Associates, PLC
1437 South Boulder Avenue, Suite 1550
Tulsa, Oklahoma 74119
918.392.5620

Prepared for:

Oklahoma Water Resources Board
3800 North Classen Boulevard
Oklahoma City, Oklahoma 73118
405.530.8800