

RiskMAP 2013-17

Oklahoma Business Plan

OWRB

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I. Acronyms and Abbreviations

AEC	Areas of Environmental Concern	MAS	Mapping Activity Statement
ASCE	American Society of Civil Engineers	Map Mod	Map Modernization Program
BFE	Base Flood Elevation	MCC	Map Coordination Contractor
CAC	Community Assistance Contact CAP Community Assistance Program	MENCA	Mapping and Engineering Needs Community Assessment
CAP/SSSE	Community Assistance Program/State Support Services Element	MICS	Monitoring Information for Contracted Studies
CAVs	Community Assistance Visits	MIP	Mapping Information Platform
CFM®	Certified Floodplain Manager	MMMS	Map Modernization Management Support
CFS	Certified Floodplain Surveyor	MNC	Middle North Canadian Watershed
CI/KRs	Critical Infrastructure and Key Resource sectors cm centimeter	MNUSS	Mapping Needs Update Support System
CNMS	Coordinated Needs Management Strategy	NASA	National Aeronautics and Space Administration
CRS	Community Rating System	NAVD 88	North American Vertical Data of 1988
CTP	Cooperating Technical Partners	NVUE	New, Validated or Updated Engineering
CTS	Cooperating Technical State	OFMA	Oklahoma Floodplain Managers Association
DEM	Digital Elevation Model	ODOT	Oklahoma Department of Transportation
DFIRM	Digital Flood Insurance Rate Map	OEM	Oklahoma Department of Emergency Management
DHS	Department of Homeland Security	NFIP	National Flood Insurance Program
DOQQ	Digital Orthophoto Quarter Quadrangle	NHMP	Natural Hazard Mitigation Plan
EDA	Economic Development Administration	NOAA	National Oceanic and Atmospheric Administration
EPA	Environmental Protection Agency	NPDES	National Pollutant Discharge Elimination System
ESRI	Environmental Systems Research Institute	NWS	National Weather Service
FEMA	Federal Emergency Management Agency	OWRB	Oklahoma Water Resources Board
FIRM	Flood Insurance Rate Map	PAL	Provisionally Accredited Levee
FIS	Flood Insurance Study FY Fiscal Year	PMR	Physical Map Revision
GIS	Geographic Information System	PS	Polecat-Snake Watershed
GLOC	Grand Lake O' The Cherokees Watershed	PTS	Production and Technical Services
HAG	Highest Adjacent Grade	QA/QC	Quality Assurance/Quality Control
HAZUS-MH	Hazards United States Multi-Hazard	RAMPP	Risk Assessment, Mapping, and Planning Partners
HMP	Hazard Mitigation Plan	RAT	Resource Allocation Tool
IT	Information Technology	RiskMAP	Risk (Mapping, Assessment, and Planning)
IHRM	Integrated Hazard Risk Management	RMC	Regional Management Center
IMS	Internet Mapping Service	RMSE	Root Mean Square Error
JES-PDM	Joint Explanatory Statement-Pre-disaster Mitigation	SFHA	Special Flood Hazard Area
KPI	Key Performance Indicator	SLOSH	Sea, Lake and Overland Surges from Hurricanes
LAG	Lowest Adjacent Grade	TIN	Triangulated Irregular Network
LCW	Lower Canadian Walnut Watershed	UDO	Unified Development Ordinance
LIDAR	Light Detection and Ranging	USACE	U.S. Army Corps of Engineers
LOMA	Letter of Map Amendment	USGS	U.S. Geological Survey
LNC	Lower North Canadian Watershed	WMS	Web Mapping Service
LCS	Lower Cimarron Skeleton		
LOMC	Letter of Map Change		
LOMR	Letter of Map Revision		
LOMR-F	Letter of Map Revision - based on Fill		

II. Executive Summary

This plan is submitted annually at the request of the Federal Emergency Management Agency (FEMA). The document details the State of Oklahoma's 5-YR strategy for deployment of FEMA's RiskMAP Program under the Cooperative Technical Partner (CTP) Agreement Number EMT-2011-CA-0007 between FEMA and the Oklahoma Water Resources Board (OWRB).

In October 2011, FEMA approved the first Risk MAP activity to be performed by the OWRB as a CTP. Tasks included performance of Discovery and Risk Mapping completion of approximately 30 stream miles of detailed study for the Middle North Canadian and Polecat-Snake Watersheds. Other activities have included Discovery support and efforts for Lower North Canadian, Grand Lake of 'The Cherokees, Lower Verdigris, Lower Canadian-Walnut and Lower Cimarron-Skeleton Watersheds. It is assumed that the OWRB will progressively grow its roles and responsibilities in the administration of RiskMAP; thus, it requires a multi-year approach to guide the successful continuation of the program.

The OWRB's vision for participation in RiskMAP as a FEMA CTP is to promote sound water policies for the protection of life and property from flooding and to encourage the preservation and restoration of the natural functions of the floodplains. In support of this vision, the State has defined the following RiskMAP program priorities as: (1) reduce the number of repetitive loss properties statewide, (2) assist property owners with flood related insurance issues, and (3) provide (depth grids) information for better risk mitigation and planning.

This document explains OWRB's capabilities for administration and deployment of Risk MAP in Oklahoma conforming to FEMA's Business Rules and Region VI's RiskMAP Prioritization & Multiyear Sequencing Decision Support System. It set forth 5-year strategy to mitigate flood risk by completing additional Discovery (for three new watersheds), Non-Regulatory products (for 115 steam miles) and Detailed Studies (of 440 stream miles) in Oklahoma. Total cost for implementation of the recommended plan is approximately \$10 million over the 5-yr period.

III. Background

The State of Oklahoma's participation in FEMA's National Flood Insurance Program (NFIP) is led by the OWRB through the agency's Floodplain Management Program. The OWRB has been authorized to perform such duties under the Floodplain Management Act, 82 O.S., Sections 1601-1618, as amended. The OWRB's primary goal is to serve as the administrative agency that works with FEMA Region VI overseeing the state's NFIP. The OWRB also serves as a coordinator and/or facilitator between FEMA, other State and Federal agencies, and local communities in the completion of mapping activities.

FEMA's Flood Map Modernization (Map Mod) Program, which began in 2003, culminated in 2012 with the adoption of Digital Flood Insurance Rate Maps (DFIRMs) by 41 of Oklahoma's 77 counties. In 2010, FEMA began transition from Map Mod to a new program termed Risk Mapping Assessment, and Planning (RiskMAP) to enable the continue update of the Flood Insurance Rate Maps. This new program was created to build on the progress made under Map Mod with the added goal of reducing risk by addressing other hazards across the nation.

This document, the 2013-2017 Oklahoma Business Plan, is an update of the previously submitted plan, and incorporates revisions based on the work completed in the first year of the State's RiskMAP program. This plan is submitted annually at the request of the Federal Emergency Management Agency (FEMA) and details the State of Oklahoma's strategy for deployment of the RiskMAP Program under a Cooperative Technical Partner (CTP) agreement between FEMA and the State of Oklahoma. Specifically, the State outlines a multi-year process that will allow for complete Statewide DFIRM coverage – including mapping, risk assessment, analysis and mitigation action planning for all HUC 8 river basins in Oklahoma as the State CTP.

A. Program Vision

The OWRB's vision for participation in the RiskMAP Program as a FEMA CTP is to promote sound water policies for the protection of life and property from flooding and to encourage the preservation and restoration of the natural functions of the floodplains. In support of the vision, the State has defined the following RiskMAP program strategies:

- Strategy 1 Deployment of a statewide program to acquire, process, and disseminate current, accurate, and detailed elevation data, flood hazard studies, reports and maps.
- Strategy 2 Implementation of a statewide program involving flood risk assessment, flood risk analysis and flood risk mitigation action plans, as part of the State's Hazard Mitigation Plan (HMP) and local HMPs. These are intended to be used to assist the State, the counties, cities and towns in the implementation of those plans through FEMA's Hazard Mitigation Grant Program, Pre-Disaster Mitigation Grant Program, Flood Mitigation Assistance Program, and other grant programs.

- Strategy 3 Establishment of a statewide program and capability to determine, display, and provide an alert regarding what land, roads and/or bridges are currently inundated by flood waters and which ones will be in the near future (forecast).

In 2012, in support of the strategies above, the OWRB deployed a statewide (webviewer) program to disseminate current flood related data, including FEMA flood maps and dam inundation modeling. The system has been well received by community FPAs, and its use continues to be taught at the nine annual State's Floodplain 101 Workshops.

As part of the Discovery, in 2012, the State began coordination with the State's Emergency Management Office to incorporate flood risk and flood risk mitigation plans as part of the State's Hazard Mitigation Plan. Similarly, it is anticipated that information provided by RiskMAP will enable both agencies to collaborate and assist counties, cities and towns benefit from available grant programs.

Lastly, the State has been involved in efforts by the Silver Jackets Program to deploy a flood alert system for Miami, Oklahoma. The pilot web application model enables input of stage conditions (for the Neosho River and Grand Lake O' The Cherokees) and outputs forecasted flood-inundation maps.

The RiskMAP Program supports this vision through a carefully planned process of mapping, assessment and planning to derive at most appropriate and cost-effective mitigation measures of risk. Specifically, the vision – protection of life and property and the management of floodplains – is attained through the implementation of strategies set forth via the RiskMAP process.

The OWRB wishes to progressively grow its roles and responsibilities in the administration of the RiskMAP Program via a Cooperative Technical Partner agreement with FEMA. This will enable FEMA – and the state – to leverage current synergies between the State's Floodplain Management Program and the Oklahoma Comprehensive Water Plan efforts. For this reason, the State has further defined its focus and set forth three priorities for 2013 as follows:

- Priority 1 Reduce the number of repetitive loss properties statewide.
- Priority 2 Assist property owners with flood related insurance issues.
- Priority 3 Provide (depth grids) information for better risk mitigation and planning.

B. Current Level of Participation

The OWRB has assisted FEMA under both Map Mod and RiskMAP programs as follows:

I. Map Modernization Program

Since 2007, 41 of Oklahoma's 77 counties have received and effected new maps under the Map Mod program. Map coverage is illustrated in Figures I, below.

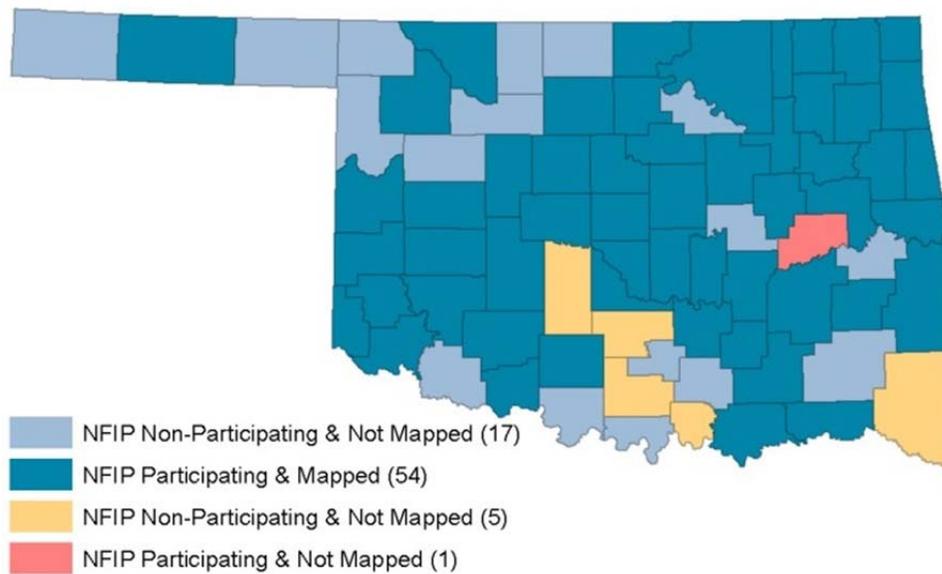


Figure 1: Status of Map Mod Studies per County¹

OWRB has assisted in the adoption of DFIRM maps and new ordinances for 41 counties. Additionally, our staff continues to support communities and promote NFIP program compliance by performing regular outreach activities, maintaining and disseminating flood maps, and hosting training in the use and understanding of updated data for better floodplain management.

To support communities, OWRB has deployed an interactive web-based mapping application which assists Oklahoma’s communities by providing enhanced access to floodplain management information, flood mitigation resources, and flood preparedness. The site may be accessed at

<http://www.arcgis.com/explorer/?open=fa01168b867e4e8e81fcdab2ec438544>.

2. RiskMAP

The OWRB supported FEMA in the completion of Discovery Efforts for the following watersheds:

- Lower North Canadian Watershed (Aug 2011)
- Grand Lake O’ The Cherokees Watershed (Sept 2011)
- Lower Verdigris Watershed (Jun 2012)²

¹ Status of MapMod Studies in 2011. Carter – noted as “NFIP Non-Participating & Non Mapped” above – is “NFIP Participating & Mapped.”

Discovery of the Lower Cimarron-Skeleton Watershed (previously scheduled for March 2013) has been postponed by FEMA and is scheduled to occur in May 2013. The OWRB plans on assisting FEMA in the completion of such efforts.

Additionally, under the CTP Program, the OWRB held Discovery Meetings for Middle North Canadian and Polecat-Snake Watersheds (Feb 2012) and for the Lower Canadian-Walnut Watershed (Feb 2013). Discovery Reports for Middle North Canadian and Polecat-Snake were published in October 2012. The Discovery Report for Lower Canadian-Walnut is underway and scheduled for completion in 2013.

The OWRB efforts under the CTP Agreement are include:

1. Mapping Activity Statements No. 1:
 - 2012 Business Plan (completed)
 - Discovery Support for Lower North Canadian and Grand Lake O' The Cherokees Watersheds (completed)
2. Mapping Activity Statements No. 2:
 - Discovery for Middle North Canadian and Polecat-Snake Watersheds (completed)
 - Broken Arrow Creek (underway)
 - Fourmile Creek (underway)
3. Mapping Activity Statements No. 3:
 - Business Plan Update (underway)
 - Discovery Support for Lower Cimarron-Skeleton (postponed)
4. Mapping Activity Statement No. 4:
 - Discovery for Lower Canadian-Walnut (underway)

The Scope of Work and/or tasks to be completed by OWRB are detailed under each Map Activity Statement. Refer to Figure 3 for an illustration of work completed under RiskMAP.

C. Benefits of Partnering Program

Partnering between FEMA and the State has enabled the leverage of synergies between the RiskMAP Program, the State's Floodplain Management Program, and the Oklahoma Comprehensive Water Plan efforts. RiskMAP outreach efforts have been integrated and work

² Completed by the City of Tulsa.

in concurrence with OWRB outreach initiatives for the National Flood Insurance Compliance, Dam Safety and Water Plan programs.

These efforts have increased local involvement in the mapping project at a level that has not been seen in the past. Through this process, the State and its partners plan will continue evaluation of sources of existing and new data to maximize leverage funding for more accurate flood maps – as local communities, private developers, and Federal agencies (like the Corps of Engineers) develop new data for private and Federal projects.

Lastly, the Oklahoma Department of Emergency Management (OEM) has supported Discovery efforts and become a partner in outreach efforts. It is anticipated that these efforts will result in increased leverage of grant funding and implementation of risk mitigation actions.

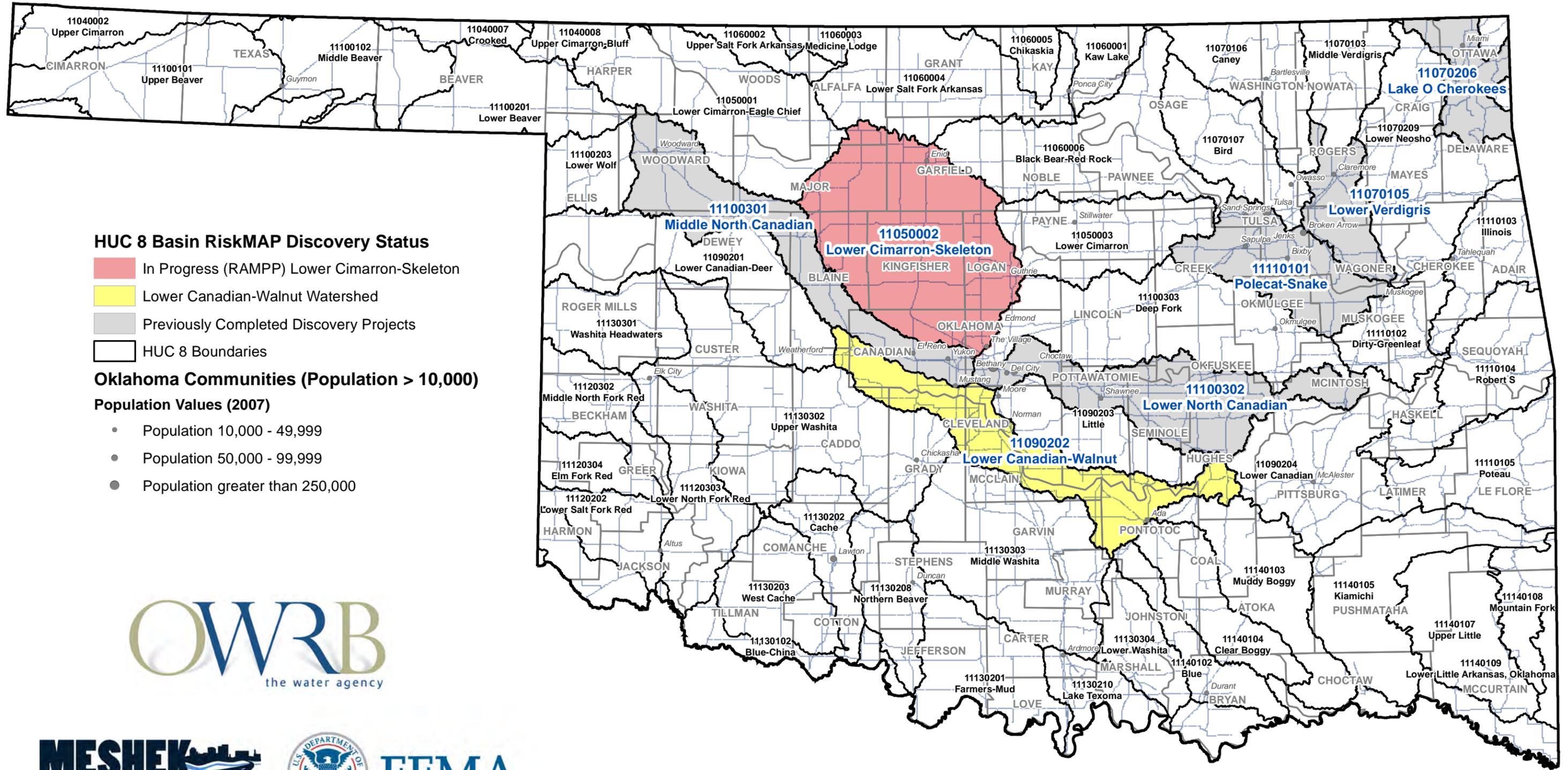


Figure 2: Risk MAP Program Status in Oklahoma (2013)

IV. Personnel Resources & Capabilities

A. OWRB

The Floodplain Management Program operates under the OWRB's Planning and Management Division – which employs a staff of approximately 20 professionals. Operations are centralized in the OWRB's main office in Oklahoma City with staff in field offices across the state.

The program is administered by Mr. Gavin Brady, CFM. With over 26 years of Floodplain Management experience, Mr. Brady is responsible for NFIP and floodplain mapping activities conducted under FEMA's Community Assistance Program. He currently serves on the Board of Directors for the Oklahoma Floodplain Managers Association. Mr. Matt Rollins, also a CFM, supports Mr. Brady in the performance of NFIP related services. He has worked with OWRB since 2002 and currently supports NFIP compliance efforts. Additional staff includes Mr. Kim Sullivan, CFM, Ms. Cathy Poage, CFM, and Ms. Theda Adkisson.

B. Contractors

The OWRB also employs contractors to assist with the CAP-SSSE, MMMS and RiskMAP programs. In 2011, OWRB contracted a consortium of local engineering consultants to assist in Program Management, and update the State Business Plan and RiskMAP activities through CTP and local-match funding.

C. FEMA

Additionally, OWRB will rely on FEMA's Region VI engineering staff for support. This staff offers significant experience in working with states, communities, and contractors to ensure that quality products are produced. The Region may also use assistance from the FEMA National Service Provider. The identification of detailed cost-sharing arrangements and partnerships between FEMA and Management, State agencies and/or local communities will occur during the scoping of individual studies. The State expects that FEMA will continue to assist with NFIP compliance efforts, assist in identifying study/restudy needs, technical standards agreements, scoping revision, and study coordination. FEMA will also continue to provide the engineering and floodplain delineation review, QA/QC of DFIRM production, and post-preliminary processing until the State of Oklahoma is prepared to assume those responsibilities. Close coordination between the FEMA's contractors, FEMA Region VI, contractors, the State, and communities will be an important aspect of this effort.

D. State's CTPs and Other Partners

Tulsa County, the City of Stillwater, the City of Tulsa, and the OWRB currently have Cooperating Technical Partner (CTP) agreements with FEMA. The City of Stillwater's CTP Agreement includes Assessment of Community Mapping Needs, hydrologic and hydraulic

analyses, floodplain mapping, and re-delineation of detailed Flood Hazard Information using updated topographic data.

The OWRB and the City of Tulsa activated their CTP Programs in 2011. The City of Tulsa and the OWRB are currently completing Mapping Activity Statements (MAS) approved by FEMA in 2011.

Although not related to the NFIP, the Oklahoma Department of Transportation (ODOT) and the Oklahoma Turnpike Authority (OTA) produce flood analyses (1% storm) for all new highway and bridge construction in the State. This information may be used for conducting flood studies or may be used as an indication of where future studies are needed in the State.

E. Oklahoma Floodplain Managers Association

The Oklahoma Floodplain Managers Association (OFMA) was formed in 1990 with the intent of bringing together those individuals who have a common interest in floodplain management. The purpose of the Association is to encourage and support flood safe development and flood mitigation; to promote sound floodplain management practices and the natural and cultural benefits of the floodplain; and support the floodplain management profession through education and certification. A majority of the members are local community officials, both elected officials and administrative staff. The membership also includes private citizens, consultants and staff members of State and Federal government agencies who work in floodplain management. Through OFMA, the Disaster Response Team (DRT) was formed in 2008 and currently assists communities with Substantial Damage/Improvement determinations after floods.

F. Oklahoma Geographic Information Council

The OWRB will coordinate the development of flood maps with the Oklahoma Geographic Information Council (OGIC). Authorized by SB 722, the Oklahoma Legislature established the OGIC as the authority to set base map standards and coordinate digital base mapping in Oklahoma. The OGIC is also designated to:

- Procure ortho-digitized base map coverage for the State of Oklahoma;
- Identify agencies responsible for data gathering, maintenance, and dissemination;
- Develop a comprehensive data catalog and clearinghouse;
- Identify a continuing statewide GIS coordinating entity;
- Provide education and public access; and
- Coordinate efforts with Federal, Regional, State, County, and Local agencies in GIS development.

The OGIC is currently working on a pilot study to determine the viability of deploying a web portal to facilitate the consolidations of information by the various Oklahoma State Agencies (see <http://ogi.state.ok.us/ogi/search.aspx>). Representatives from the Oklahoma Water

Resources Board, Oklahoma Department of Transportation, Oklahoma Department of Environmental Quality, and Oklahoma Conservation Commission are working together via the OGIC to assist in this endeavor. A portal currently serviced by the University of Oklahoma was intended to be used for this purpose; however, lack of funding has hindered system maintenance and compromised data reliability. Much of the State's data is currently decentralized and held by various agencies across the State. Refer to Section V.A., next page, for an inventory of data repositories for Oklahoma.

V. Data Availability and Assessment

A. Flood Hazard Data Inventory

The State has identified existing resources and data collection sources that may be useful in RiskMAP/CTP activities. Existing data and resources are as follows:

Table 1: Oklahoma Inventory of Flood Hazard Data

Type of Data	Location	Counties Affected
Hardcopy paper: FEMA FIRMs, Flood Insurance Studies, Surveys of existing structures, Soil maps for 4 counties, Hydrologic data, Hydraulic analyses Misc. archives (incl. HEC-2 model), Other related data on participating communities in NFIP Digital Terrain Data and other GIS compatible topographic data as available	OWRB	All counties in the NFIP
Digital (GIS compatible) soil maps for 12 counties in Oklahoma	Oklahoma Tax Commission	Canadian, Cleveland, Comanche, Creek, Garfield, Grady, Kay, Oklahoma, Osage, Ottawa, Payne, Tulsa
Digital (GIS compatible) USGS Orthophoto Quadrangle maps	Oklahoma Conservation Commission	All counties in the NFIP
Digital (GIS compatible) Atlas of Oklahoma and other spatial information	http://www.geo.ou.edu/	All
USGS hardcopy paper flood prone area maps	USGS	All
Preliminary Flood Hazard Boundary Maps (FHBMs) produced in 1970s	OWRB	Beckham, Murray, Tillman
Hydrologic and Hydraulic data	Oklahoma Turnpike Authority, Oklahoma Department of Transportation	All
Digital (GIS compatible) Rural Water Systems Maps	OWRB	All
Digital (GIS compatible) Lake, Stream, Aquifer, Water Rights, and Water Well location maps	OWRB	All
Digital (GIS compatible) wetlands maps	OWRB, Oklahoma Conservation Commission, Oklahoma State University	All

B. Topographic Data Availability

The USGS provides (10-meter) DEM data for the entire state of Oklahoma. Additionally, other “Non-DEM” topographic data (for the purpose of this report defined as topographic data with

equal or greater quality than that provided by USGS DEM) is available for approximately 54% of the state. Table 2, below, provides a listing of HUC 8s within additional “Non-DEM” topographic data, in descending order of area coverage currently available. Refer to Appendix A (Table A.1) for detailed HUC 8 information, including topographic coverage.

Table 2: Oklahoma Inventory of Non-DEM Topographic Data

HUC 08 Name	Total HUC 08 Area (SqMi)	Total HUC 08 Area inside Oklahoma (SqMi)	Non-DEM Topographic Data Coverage (SqMi)	Cumm. % Total Area Covered by Non-DEM.
Upper Washita	3,209.32	3,209.32	3,208.59	4.59%
Lower Cimarron-Skeleton	3,236.07	3,236.07	2,653.45	3.80%
Middle Washita	2,509.60	2,509.60	2,509.60	3.59%
Deep Fork	2,536.50	2,536.50	2,449.33	3.50%
Lower North Canadian	1,870.03	1,870.03	1,867.57	2.67%
Lower Canadian	1,981.69	1,981.69	1,838.05	2.63%
Lower Canadian-Walnut	1,833.37	1,833.37	1,833.37	2.62%
Black Bear-Red Rock	2,135.57	2,135.57	1,456.51	2.08%
Lower North Fork Red	1,384.86	1,384.86	1,384.86	1.98%
Lower Cimarron	1,384.48	1,384.48	1,384.48	1.98%
Polecat-Snake	1,322.22	1,322.22	1,229.42	1.76%
Kiamichi	1,823.63	1,823.50	1,013.06	1.45%
Little	977.35	977.35	977.35	1.40%
Clear Boggy	1,003.70	1,003.70	919.81	1.32%
Muddy Boggy	1,436.24	1,436.24	918.66	1.31%
Farmers-Mud	2,323.92	1,476.69	892.70	1.28%
West Cache	1,100.77	1,100.77	861.10	1.23%
Northern Beaver	864.66	864.66	785.92	1.12%
Poteau	1,905.81	1,348.71	736.30	1.05%
Robert S. Kerr Reservoir	1,762.63	1,432.38	734.16	1.05%
Lower Washita	731.90	731.90	731.90	1.05%
Washita Headwaters	1,472.62	1,025.69	713.47	1.02%
Lower Salt Fork Arkansas	2,335.30	1,923.21	709.24	1.01%
Cache	800.13	800.13	631.81	0.90%
Lake O' The Cherokees	909.37	725.40	580.92	0.83%
Lower Canadian-Deer	2,042.32	1,999.85	556.60	0.80%
Dirty-Greenleaf	796.69	796.69	532.08	0.76%
Lower Verdigris	714.06	714.06	511.17	0.73%
Middle North Canadian	1,858.30	1,858.30	459.40	0.66%
Blue	687.33	687.33	371.62	0.53%
Upper Little	1,406.11	1,406.11	369.64	0.53%
Lower Salt Fork Red	1,247.96	707.62	344.57	0.49%

HUC 08 Name	Total HUC 08 Area (SqMi)	Total HUC 08 Area inside Oklahoma (SqMi)	Non-DEM Topographic Data Coverage (SqMi)	Cumm. % Total Area Covered by Non-DEM.
Middle North Fork Red	1,654.63	865.73	241.00	0.34%
Bird	1,137.35	1,137.35	239.89	0.34%
Lake Texoma	993.57	568.61	238.04	0.34%
Blue-China	770.96	377.86	143.81	0.21%
Lower Cimarron-Eagle Chief	2,421.68	2,377.35	114.24	0.16%
Groesbeck-Sandy	1,314.65	506.95	110.79	0.16%
Mountain Fork	846.94	600.34	95.37	0.14%
Middle Verdigris	1,517.65	822.27	78.78	0.11%
Caney	2,094.54	1,176.62	73.26	0.10%
Elm Fork Red	928.68	563.46	65.77	0.09%
Lower Neosho	2,225.60	2,081.88	63.65	0.09%
Chikaskia	2,023.04	372.31	38.58	0.06%
Kaw Lake	953.04	453.93	36.92	0.05%
Medicine Lodge	1,279.57	197.12	18.83	0.03%
Upper Salt Fork Arkansas	1,079.29	349.91	17.53	0.03%
Spring	2,590.44	99.73	4.80	0.01%
Illinois	1,653.70	896.40	2.16	0.00%
Elk	1,025.49	52.01	1.88	0.00%
Bois D'arc-Island	1,983.34	546.38	1.64	0.00%
Middle Neosho	1,425.69	5.14	0.01	0.00%
Cimarron Headwaters	1,677.93	40.93	-	0.00%
Coldwater	1,961.91	336.69	-	0.00%
Crooked	1,445.55	11.25	-	0.00%
Lower Beaver	1,780.70	1,331.63	-	0.00%
Lower Little Arkansas, Oklahoma	1,991.76	196.20	-	0.00%
Lower Prairie Dog Town Fork Red	1,440.80	12.18	-	0.00%
Lower Wolf	1,089.91	653.83	-	0.00%
Middle Beaver	1,355.71	1,323.82	-	0.00%
Middle Canadian-Spring	2,752.95	0.41	-	0.00%
Palo Duro	1,936.90	144.94	-	0.00%
Pecan-Waterhole	1,449.47	416.10	-	0.00%
Rita Blanca	1,094.39	3.02	-	0.00%
Upper Beaver	2,731.89	1,818.41	-	0.00%
Upper Cimarron	1,650.00	657.03	-	0.00%
Upper Cimarron-Bluff	1,860.09	314.68	-	0.00%
Upper Cimarron-Liberal	1,732.69	359.58	-	0.00%
Totals	109,477.01	69,916.05	37,753.67	54.00%

C. Mapping Program Status

Since 2007, 41 of Oklahoma’s 77 counties have received and effected new maps under the Map Mod program. These maps account for approximately 80% of existing maps for Oklahoma. Preliminary assessment of map coverage reveals the following Oklahoma statistics:

- Population Mapped: 95.60%
- Square Miles Mapped: 75.62%

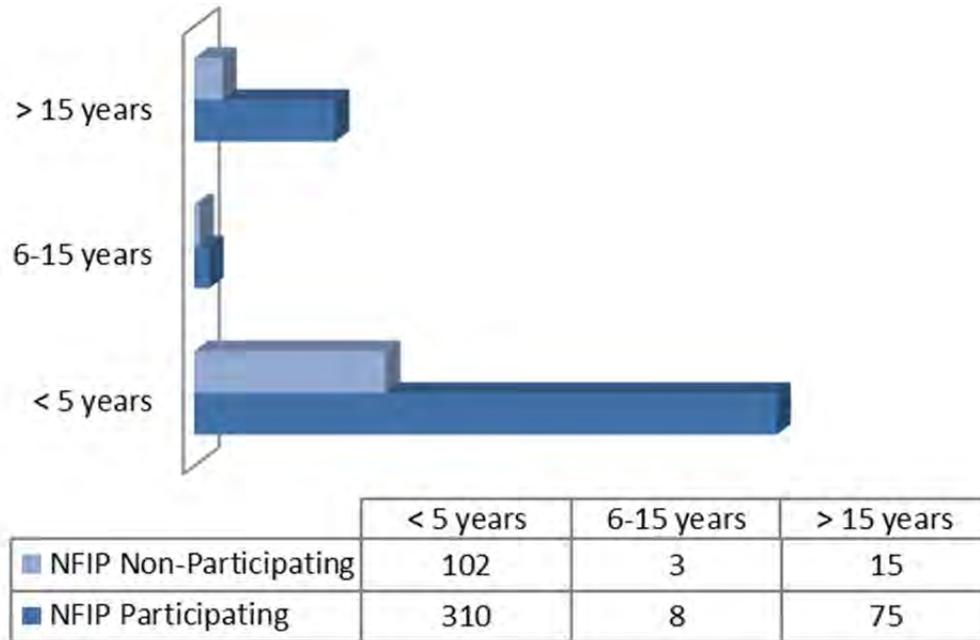


Figure 3: Age of Effective Map Panels for Oklahoma Communities³

Further studies are currently underway in the Lower North Canadian, Grand Lake O’ The Cherokees, Middle North Canadian, Polecat-Snake and Lower Verdigris Watersheds. These are expected to be completed by 2015. New mapping may result from this work.

D. CNMS Data Review

The OWRB received the Oklahoma’s Coordinated Needs Management Strategy (CNMS) database provided by FEMA in January 2012. No other dataset has been received.

The CNMS provides an inventory (or validation status) for stream miles in the state and the means to quantify progress via the New, Updated, Validated, Engineering (NVUE) metric. Three validation statuses have been defined: “Valid”, “Unverified”, and “Unknown”. The following provides a summary of the CNMS analysis performed in 2012.

³ FY2009 and FY2011 State Business Plans

The CNMS contains data for 61 of Oklahoma’s 71 HUC 8s, providing attribute information for over 38,000 stream miles classified as Zones A, AE, AO, and AH as illustrated below:

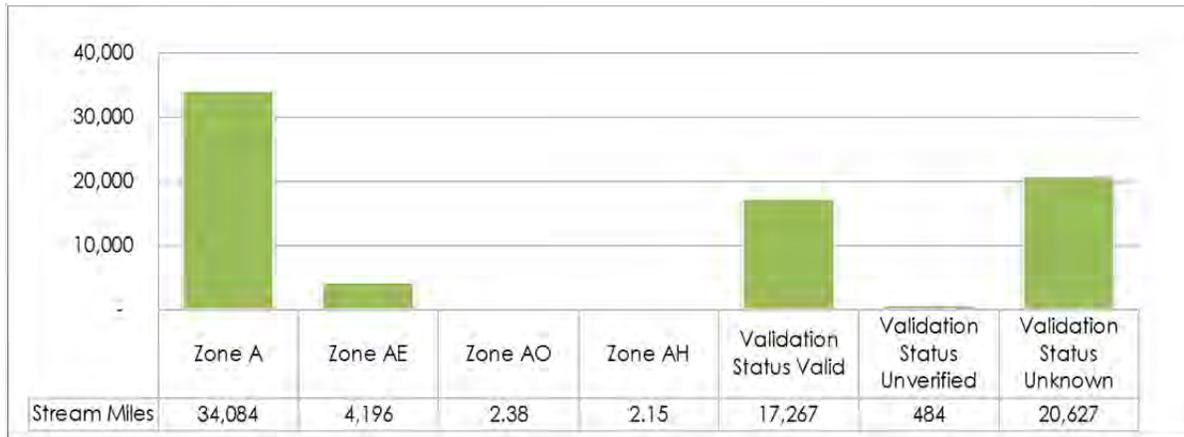


Figure 4: Oklahoma Stream Miles Classification (based on CNMS)

Currently, CNMS notes 17,267 stream miles (of Zone A, AE, AO and AH) as “Valid”, 484 stream miles as “Unverified”, and 20,627 stream miles as “Unknown” under the NVUE classification. The state’s NVUE is approximately 45%.

It should be noted that of the “Valid” classification, over 14,000 stream miles contain one or more “NULL” Critical Elements and approximately 1,000 stream miles contain four or more “Unknown” Secondary Elements. Thus, it is anticipated that the state’s NVUE will adjust following completion of the CNMS.

E. HAZUS Data Inventory

HAZUS (Hazards United States) was developed by FEMA as a nationally applicable standardized methodology for estimating potential losses from earthquakes, floods, and hurricanes. This methodology includes the use of a software HAZUS-MH that employs Geographic Information Systems (GIS) technology to estimate physical, economic, and social impacts of disasters.

The Average Annualized Loss (AAL) analysis performed by FEMA in 2011 for Oklahoma is summarized in Table 3 for Oklahoma’s Top 10 Counties. Results of the modeling for each Oklahoma County are included in Appendix B (Table A.1).

The AAL data can be used to guide the selection between detailed and approximate studies for a community. As the decile increases for a community from 1 to 10, the range of approximate study should be greater than detailed study due to less population at risk. The opposite is also true that as the decile decreases to 1, there should be more detailed study than approximate. Refer to Figure 5 for an illustration of Oklahoma Average Annualized Loss (AAL) By Risk Deciles.

Table 3: Oklahoma Top 10 Counties HAZUS AAL

County FIPs	County Name	Average Annualized Flood Losses (\$ million)		
		Total	Building	Content
40109	Oklahoma	\$ 77,547	\$ 28,961	\$ 44,917
40143	Tulsa	\$ 68,778	\$ 29,592	\$ 36,059
40031	Comanche	\$ 18,111	\$ 7,743	\$ 10,201
40147	Washington	\$ 15,411	\$ 7,956	\$ 7,174
40131	Rogers	\$ 13,709	\$ 6,505	\$ 6,618
40049	Garvin	\$ 11,078	\$ 4,681	\$ 6,039
40037	Creek	\$ 10,982	\$ 5,637	\$ 5,173
40119	Payne	\$ 10,937	\$ 5,088	\$ 5,520
40017	Canadian	\$ 10,914	\$ 5,260	\$ 5,203
40027	Cleveland	\$ 10,798	\$ 5,411	\$ 5,153
Total		\$ 664,748	\$ 297,542	\$ 344,024

F. Repetitive Loss Properties

Priorities for the State include Repetitive Loss Mitigation. The following table provides current Repetitive Loss information per HUC 8. This information will be used for prioritization purposes.

Table 4: Oklahoma’s Repetitive Loss Properties per HUC 8

HUC 8 Name	Number Of RLPs	Number of Claims	Total Paid
A. Lake O' The Cherokees	136	552	\$14,151,837
B. Polecats-Snake	211	582	\$ 8,598,431
C. Lower Cimarron-Skeleton	128	404	\$ 7,178,757
D. Bird	83	295	\$ 4,434,139
E. Lower Verdigris	37	140	\$ 3,889,070
F. Caney	31	132	\$ 3,547,601
G. Lower North Canadian	65	176	\$ 3,236,311
H. Upper Washita	27	70	\$ 2,213,823
I. Dirty-Greenleaf	22	78	\$ 2,077,554
J. Lower Canadian-Walnut	26	72	\$ 1,963,049
K. Deep Fork	34	120	\$ 1,737,436
L. Cache	32	125	\$ 1,674,504
M. Middle North Canadian	19	51	\$ 1,074,109
N. West Cache	10	28	\$ 885,690
O. Lower Neosho	7	22	\$ 481,379
P. Little	4	19	\$ 429,558
Q. Chikaskia	13	46	\$ 379,180

HUC 8 Name	Number Of RLPs	Number of Claims	Total Paid
R. Illinois	10	21	\$ 361,364
S. Kaw Lake	11	30	\$ 361,123
T. Lower Salt Fork Arkansas	11	27	\$ 322,472
U. Northern Beaver	8	32	\$ 283,501
V. Upper Little	5	13	\$ 231,202
W. Lower Cimarron	4	11	\$ 135,595
X. Lower North Fork Red	3	9	\$ 103,350
Y. Medicine Lodge	3	6	\$ 100,428
Z. Middle Washita	4	8	\$ 90,854
AA. Robert S. Kerr Reservoir	4	8	\$ 84,110
BB. Lake Texoma	2	5	\$ 67,892
CC. Black Bear-Red Rock	1	4	\$ 32,205
DD. Farmers-Mud	1	3	\$ 29,925
EE. Poteau	1	5	\$ 28,487
FF. Clear Boggy	1	3	\$ 20,967
GG. Blue	1	3	\$ 19,082
Totals	955	3100	\$60,224,986

Refer to Figure 6 for an illustration of Oklahoma’s Repetitive Loss distributions.

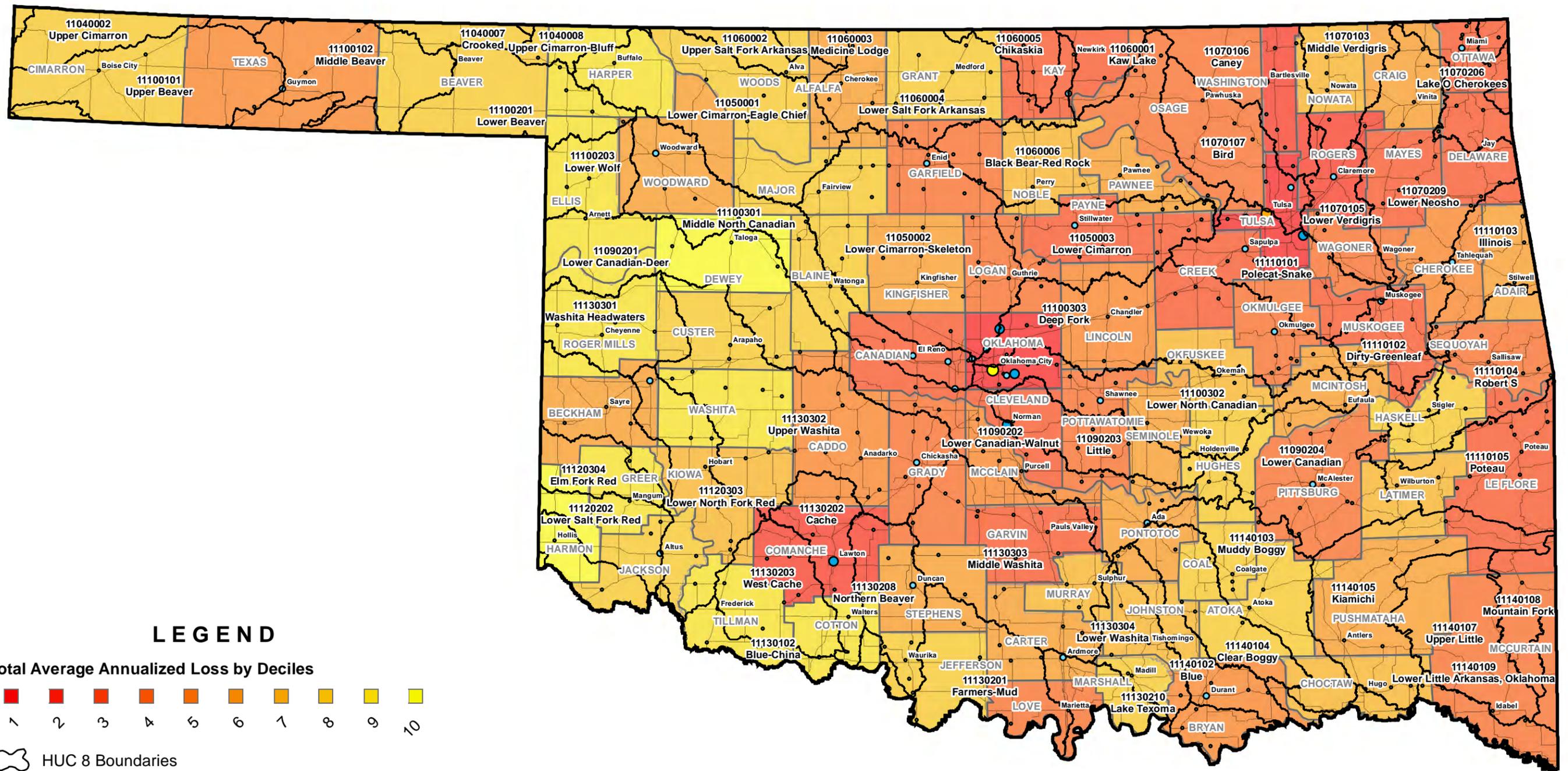
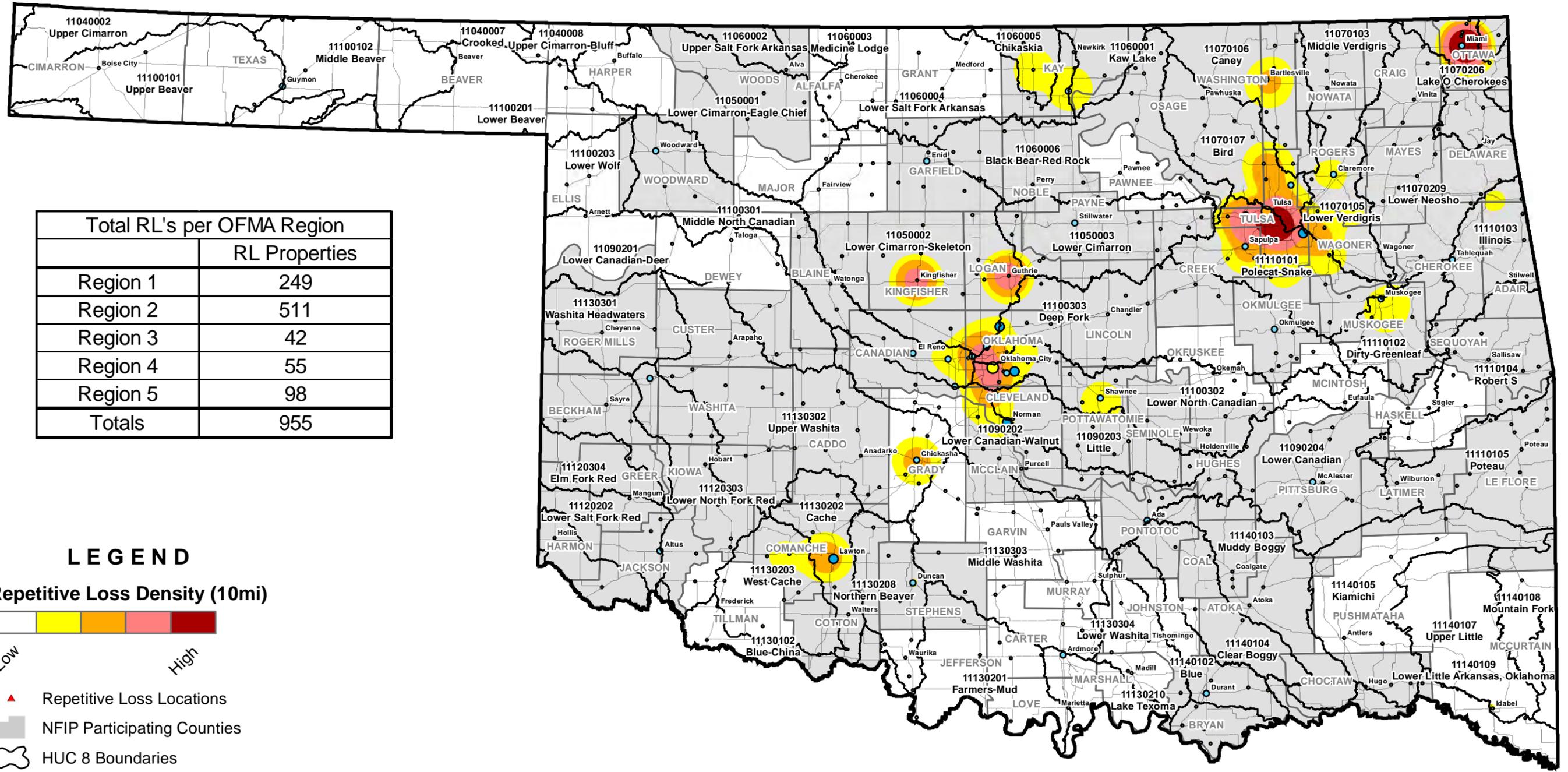


Figure 5: Oklahoma Average Annualized Loss (AAL) By Risk Deciles



Total RL's per OFMA Region	
Region	RL Properties
Region 1	249
Region 2	511
Region 3	42
Region 4	55
Region 5	98
Totals	955

LEGEND

Repetitive Loss Density (10mi)



Low High

- ▲ Repetitive Loss Locations
- NFIP Participating Counties
- HUC 8 Boundaries

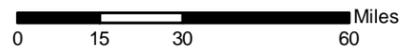


Figure 6: NFIP Participation and Repetitive Loss Location

VI. State Prioritization Criteria

The State of Oklahoma is fully committed in assisting FEMA in the delivery of “quality data that increases public awareness and leads to action that reduces risk to life and property” as intended by RiskMAP. In support of such efforts, the State of Oklahoma has identified *Deployment, NVUE, Risk Awareness* and *Action* as key criteria for watershed and/or project selection and prioritization. A summary of targets for these performance measures is presented below. A detailed description of each measurement as it relates to Oklahoma is presented in the subsequent sections of this report.

Table 5: RiskMAP Program Performance Measures⁴

Measure	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17
Deployment	44%	47%	50%	53%	TBD	TBD
NVUE	52%	58%	61%	64%	TBD	TBD
Risk Awareness	70%	TBD	TBD	TBD	TBD	TBD
Action #1	33%	38%	41%	43%	44%	TBD
Action #2	37%	40%	42%	43%	44%	TBD

In addition to the criteria described above, the State’s prioritization of Discovery for HUC 8 will be based on FEMA’s trifecta, modified to incorporate factors for Local Funding Availability and the Risk Assessment, Mapping, and Planning Partners (RAMPP) Regional Sequencing Tool:

- Risk (measured and prioritized by FEMA’s HAZUS database)
- Need (quantified using the sum of Non-NVUE compliant mileage within a HUC)
- Topographic Data (availability status)
- Local Funding (availability status and type)
- RAMPP Regional Sequencing Tool (prioritization scheme as defined by RAMPP’s tool)

A. Oklahoma’s Performance Indicators Computations

The following provides an assessment of the State of Oklahoma’s RiskMAP Program based on the RiskMAP Program Performance Measures described in the previous section:

I. Deployment:

Defined as the percentage of population where RiskMAP has been deployed. The (FY12) National and Region VI targets for deployment are 44% and 40%, respectively. The

⁴ FEMA publication “RiskMAP Performance Measures”, December 7, 2011

current status for Region VI is approximately 24.8%. Deployment also provides the baseline population for the Risk Awareness and Action Measures.

Per 2010 Census data, Oklahoma’s population is 3,751,351. The State is contained within 71 HUC 8s, and since 2011, Discovery has been deployed for seven Oklahoma HUC 8s as follows: Lake O’Cherokees, Lower North Canadian, Middle North Canadian, Polecat-Snake, Lower Verdigris, Lower Canadian-Walnut and Lower Cimarron-Skeleton. Based on the population, deployment for the State computes as 46.1% (see Table 6 below).

Table 6: FY 2012 Oklahoma Deployment Measures

HUC 8	Population (2010 Census)	% of Oklahoma Population
Lake O' The Cherokees	52,595	1.4%
Lower North Canadian	413,359	11.0%
Middle North Canadian	152,114	4.1%
Polecat-Snake	432,528	11.5%
Lower Verdigris	120,401	3.2%
Lower Canadian-Walnut	239,544	6.4%
Lower Cimarron-Skeleton	318,460	8.5%
Total	1,729,000	46.1%

A summary of Oklahoma’s Top 10 HUC 8s – ranked solely on population – are shown below:

Table 7: Oklahoma’s Population – Top 10 HUC 8s

HUC 08 Name	Estimated Population	Population %	Cumulative Population %
1) Polecat-Snake	432,528	11.5%	11.5%
2) Lower North Canadian	413,359	11.0%	22.5%
3) Lower Cimarron-Skeleton	318,460	8.5%	31.0%
4) Bird	259,052	6.9%	37.9%
5) Deep Fork	253,771	6.8%	44.7%
6) Lower Canadian-Walnut	239,544	6.4%	51.1%
7) Middle North Canadian	152,114	4.1%	55.1%
8) Little	133,325	3.6%	58.7%
9) Lower Verdigris	120,401	3.2%	61.9%
10) Cache	106,406	2.8%	64.7%
Subtotal	2,526,772	64.7%	

It is worth noting that Discovery efforts have been completed (or scheduled) on six of the “Top 10 HUC 8s” watersheds. Those remaining include Bird, Deep Fork, Little and Cache Watersheds.

2. New, Validated or Updated Engineering (NVUE):

This is defined as the percentage of flood hazard data available or in-work that meets new, valid or updated engineering standards reflecting current conditions. The (FY12) National and Region VI Targets for NVUE are 52% and 40%, respectively. The status for Region VI was reported as 33.1% for 2011.

Overall, the State currently stands at 45% using the as-is data. However, if adjustments are made to CNMS “Validation Status” to account for Critical and/or Secondary factors noted as “Unknown” or “NULL”, Oklahoma’s adjusted NVUE decreases significantly. Further assessment on this metric will be performed following released of revised data.

3. Risk Awareness:

This is measured as the percentage of local officials with flood risk awareness in RiskMAP communities. Indicators of Risk Awareness are the number of communities in Oklahoma with signed Cooperation Statements or Charters and/or the percentage of population covered by an active local Hazard Mitigation Plan (HMP).

Oklahoma currently has no signed Cooperation Statements or Charters, thus, Risk Awareness represented by such measure is 0%. Information has been collected from the Oklahoma Emergency Management office to assess the percent of Oklahoma population covered by an active local HMP. Risk Awareness coverage, computed as percent of population covered by a local HMP, is 65%.

Table 8, below, provides a listing of Top 10 HUC 8s with (percentage of) population not covered by a local HMP.

Table 8: Oklahoma’s Risk Awareness – Top 10 HUC 8s

HUC 8 Name	Adjusted Population	HUC 8 Population Covered by a HMP	% OK Population Not Covered by a HMP
1) Polecat-Snake	432,528	231,848	5.40%
2) Lower Cimarron-Skeleton	318,460	159,980	4.27%
3) Middle North Canadian	152,114	60,571	2.46%
4) Lower Canadian-Walnut	239,544	152,373	2.35%
5) Lower North Canadian	413,359	340,425	1.96%
6) Lower Verdigris	120,401	59,693	1.63%

HUC 8 Name	Adjusted Population	HUC 8 Population Covered by a HMP	% OK Population Not Covered by a HMP
7) Lower Cimarron	97,812	1,054	1.53%
8) Middle Washita	72,149	3,078	1.32%
9) Little	133,325	7,581	0.96%
10) Caney	71,794	9,840	0.86%
Subtotal	2,051,486	1,206,443	22.75%

4. Action:

This is measured as actions taken by a community to reduce risk. Two measures have been assigned for Action. Measure 1 is defined as the percentage of population where RiskMAP helped identify new strategies or improve current planned mitigation actions, in direct collaboration with communities. Measure 2 is defined as percentage of population that has advanced identified mitigation actions following deployment of RiskMAP.

No indicators are available at this time for this measure.

B. Jurisdictional Classification

For the purpose of HUC consideration under the Oklahoma State Business Plan, it is required that 55% of the HUC 8's be located inside the State of Oklahoma – at a minimum. This criterion reduces the number of HUC 8s to be evaluated herein from 68 to 43 as shown in Table 9:

Table 9: Oklahoma’s Jurisdictional HUC 8 Listing

HUC 08 Name	Total HUC 08 Area (SqMi)	Total HUC 08 Area inside Oklahoma (SqMi)	% Total HUC 08 Area inside Oklahoma (SqMi)	% Total Area Covered by Non-DEM.
Bird	1,137.35	1,137.35	100.00%	0.35%
Black Bear-Red Rock	2,135.57	2,135.57	100.00%	2.10%
Blue	687.33	687.33	100.00%	0.54%
Cache	800.13	800.13	100.00%	0.91%
Caney	2,094.54	1,176.62	56.18%	0.19%
Clear Boggy	1,003.70	1,003.70	100.00%	1.33%
Deep Fork	2,536.50	2,536.50	100.00%	3.54%
Dirty-Greenleaf	796.69	796.69	100.00%	0.77%
Elm Fork Red	928.68	563.46	60.67%	0.16%
Farmers-Mud	2,323.92	1,476.69	63.54%	2.03%
Kiamichi	1,823.63	1,823.50	99.99%	1.46%
Lake O' The Cherokees	909.37	725.40	79.77%	1.05%
Lake Texoma	993.57	568.61	57.23%	0.60%

HUC 08 Name	Total HUC 08 Area (SqMi)	Total HUC 08 Area inside Oklahoma (SqMi)	% Total HUC 08 Area inside Oklahoma (SqMi)	% Total Area Covered by Non-DEM.
Little	977.35	977.35	100.00%	1.41%
Lower Beaver	1,780.70	1,331.63	74.78%	0.00%
Lower Canadian	1,981.69	1,981.69	100.00%	2.66%
Lower Canadian-Deer	2,042.32	1,999.85	97.92%	0.82%
Lower Canadian-Walnut	1,833.37	1,833.37	100.00%	2.65%
Lower Cimarron	1,384.48	1,384.48	100.00%	2.00%
Lower Cimarron-Eagle Chief	2,421.68	2,377.35	98.17%	0.17%
Lower Cimarron-Skeleton	3,236.07	3,236.07	100.00%	3.83%
Lower Neosho	2,225.60	2,081.88	93.54%	0.10%
Lower North Canadian	1,870.03	1,870.03	100.00%	2.70%
Lower North Fork Red	1,384.86	1,384.86	100.00%	2.00%
Lower Salt Fork Arkansas	2,335.30	1,923.21	82.35%	1.24%
Lower Salt Fork Red	1,247.96	707.62	56.70%	0.88%
Lower Verdigris	714.06	714.06	100.00%	0.74%
Lower Washita	731.90	731.90	100.00%	1.06%
Lower Wolf	1,089.91	653.83	59.99%	0.00%
Middle Beaver	1,355.71	1,323.82	97.65%	0.00%
Middle North Canadian	1,858.30	1,858.30	100.00%	0.66%
Middle Washita	2,509.60	2,509.60	100.00%	3.63%
Mountain Fork	846.94	600.34	70.88%	0.19%
Muddy Boggy	1,436.24	1,436.24	100.00%	1.33%
Northern Beaver	864.66	864.66	100.00%	1.14%
Polecat-Snake	1,322.22	1,322.22	100.00%	1.78%
Poteau	1,905.81	1,348.71	70.77%	1.50%
Robert S. Kerr Reservoir	1,762.63	1,432.38	81.26%	1.31%
Upper Beaver	2,731.89	1,818.41	66.56%	0.00%
Upper Little	1,406.11	1,406.11	100.00%	0.53%
Upper Washita	3,209.32	3,209.32	100.00%	4.64%
Washita Headwaters	1,472.62	1,025.69	69.65%	1.48%
West Cache	1,100.77	1,100.77	100.00%	1.24%
Totals	69,211.08			56.71%

C. Watershed (HUC 8) Prioritization Criteria

I. RiskMAP Prioritization & Multiyear Sequencing Decision Support System

The “RiskMAP Prioritization and Multiyear Sequencing Decision Support System” is the ranking device deployed by FEMA’s Region VI to enable the comparison of watersheds based on normalized factors. The process of normalization was employed to enable the fair comparison when population and areas are varying among watersheds. The following provides a summary of the criteria employed by this ranking system:

Table 10: Region VI RiskMAP Prioritization & Multiyear Sequencing Decision Support System Incorporated Decision Factors

Factor	Sub-Factor Weight	Sub-Factor Name	Factor Weight
RISK	40%	Average Annualized Loss (AAL)	30%
	25%	Population	
	10%	High Hazard Dams (HHDS) Presence	
	25%	Percent Impervious	
NEEDS	53%	Non-NVUE Miles	50%
	5%	Percentage Urban Change	
	11%	Topo Coverage	
	5%	Unknown TBA Topo Coverage	
	5%	LOMC Rank	
	21%	Project Footprint	
ACTION	19%	Mitigation Plan	20%
	10%	Participation	
	0%	Violations	
	24%	Community Ranking System (CRS)	
	5%	Disaster Declarations	
	10%	FIA	
	0%	Grants	
	19%	Stormwater Utilities	
	0%	CTP's	
	10%	Congressional Hot Spots	
	5%	HHD w/ EAP RANK	
Subtotal			100%

Prioritization for Oklahoma Top 20 HUC 8s based on the “RiskMAP Prioritization and Multiyear Sequencing Decision Support System” is shown in Table 11.

Table II: Oklahoma Top 20 HUC 8s (based on FEMA’s Region VI RiskMAP Prioritization and Multiyear Sequencing Decision Support System)

Rank	HUC 8	Watershed Name	Rank	HUC 8	Watershed Name
1	11130302	Upper Washita	11	11090204	Lower Canadian
2	11050002	Lower Cimarron-Skeleton	12	11130201	Farmers-Mud
3	11090203	Little	13	11140104	Clear Boggy
4	11090202	Lower Canadian-Walnut	14	11050003	Lower Cimarron
5	11070209	Lower Neosho	15	11100302	Lower North Canadian
6	11060006	Black Bear-Red Rock	16	11130210	Lake Texoma
7	11070107	Bird	17	11100303	Deep Fork
8	11130208	Northern Beaver	18	11140102	Blue
9	11130303	Middle Washita	19	11090201	Lower Canadian-Deer
10	11060004	Lower Salt Fork Arkansas	20	11130202	Cache

2. Oklahoma’s HUC 8 Sequencing Tool

The Oklahoma sequencing schematics for watershed ranking is based on five parameters (each weighed equally): (1) population, (2) jurisdictional authority, (3) topographic data availability, (4) population covered by Hazard Mitigation Plan, and (5) Repetitive Loss data. Table 12 below provides a HUC 8 listing prioritized in descending order. Refer to Appendix C (Table C.1) for complete listing.

Table 12: Oklahoma Top 20 HUC 8s (based on State’s Five Parameters)

Rank	HUC 8	Watershed Name	Rank	HUC 8	Watershed Name
1	11130302	Upper Washita	11	11120303	Lower North Fork Red
2	11100302	Lower North Canadian	12	11110101	Polecat-Snake
3	11090202	Lower Canadian-Walnut	13	11070206	Lake O’ The Cherokees
4	11050002	Lower Cimarron-Skeleton	14	11110102	Dirty-Greenleaf
5	11070107	Bird	15	11070209	Lower Neosho
6	11130203	West Cache	16	11090204	Lower Canadian
7	11090203	Little	17	11130304	Lower Washita
8	11130303	Middle Washita	18	11050003	Lower Cimarron
9	11130202	Cache	19	11060006	Black Bear-Red Rock
10	11100303	Deep Fork	20	11070105	Lower Verdigris

Table 13, below, compares the Top 20 HUC 8s derived using the various prioritization criteria used to establish at the HUC 8 level. Refer to Table C.2 for a comparison of the complete listing of Oklahoma HUC 8s.

Table 13: Comparison of Ranking for Oklahoma Top 20 HUC 8s

HUC 08 Name	HUC 8	Ranking Criteria			
		Trifecta (Top 10)	20 Factors (Top 10)	Region VI Tool	OK Tool
Bird	11070107	10	7	7	5
Black Bear-Red Rock	11060006	0	8	6	19
Blue	11140102	0	0	18	23
Cache	11130202	0	0	20	9
Caney	11070106	7	6	23	24
Clear Boggy	11140104	0	0	13	26
Deep Fork	11100303	0	0	17	10
Dirty-Greenleaf	11110102	0	0	30	14
Farmers-Mud	11130201	0	0	12	36
Lake O' The Cherokees	11070206	0	0	37	13
Lake Texoma	11130210	0	0	16	41
Little	11090203	0	0	3	7
Lower Beaver	11100201	0	0	N/A	40
Lower Canadian	11090204	0	9	11	16
Lower Canadian-Deer	11090201	0	0	19	35
Lower Canadian-Walnut	11090202	3	5	4	3
Lower Cimarron	11050003	0	0	14	18
Lower Cimarron-Eagle Chief	11050001	0	0	40	38
Lower Cimarron-Skeleton	11050002	2	1	2	4
Lower Neosho	11070209	5	2	5	15
Lower North Canadian	11100302	1	3	15	2
Lower North Fork Red	11120303	0	0	28	11
Lower Salt Fork Arkansas	11060004	0	10	10	28
Lower Verdigris	11070105	0	0	24	20
Lower Washita	11130304	0	0	33	17
Lower Wolf	11100203	0	0	39	43
Middle Beaver	11100102	0	0	42	39
Middle Washita	11130303	4	4	9	8
Mountain Fork	11140108	0	0	N/A	37
Northern Beaver	11130208	0	0	8	21
Polecat-Snake	11110101	0	0	22	12
Poteau	11110105	9	0	27	22
Upper Beaver	11100101	0	0	41	42
Upper Washita	11130302	6	0	1	1
West Cache	11130203	0	0	21	6

Differences in the prioritization methodology yield dissimilar result for Top 10 watersheds selection – specifically related to Lower Neosho, Black Bear-Red Rock, Northern Beaver and Lower Salt Fork Arkansas. Significant discrepancies may also be found in the ranking of Lake Texoma, Lake O' The Cherokees, Farmers-Mud, Lower North Fork Red, Dirty-Greenleaf, Lower Washita, Lower Canadian-Deer, West Cache, Lower North Canadian, Clear Boggy, Cache, and Polecat-Snake. These discrepancies are attributed to the State's higher priority for repetitive loss mitigation.

3. Oklahoma Watershed Prioritization Recommendation

The State recommends the study of the following HUC 8s (listed in alphabetical order):

- Bird
- Black Bear-Red Rock
- Cache
- Deep Fork
- Dirty-Greenleaf
- Lake O' The Cherokees
- Little
- Lower Canadian
- Lower Canadian-Walnut
- Lower Cimarron
- Lower Cimarron-Skeleton
- Lower Neosho
- Lower North Canadian
- Lower North Fork Red
- Lower Verdigris
- Lower Washita
- Middle Washita
- Polecat-Snake
- Upper Washita
- West Cache

The listing above is based on both FEMA's Region VI RiskMAP Prioritization & Multiyear Sequencing Decision Support System and the State's priorities. Refer to Appendix C for detailed computations.

D. Project (HUC 12) Prioritization Criteria

During Discovery, the sequencing tool used by the State for ranking of Phase 2 Projects was based on a composite of HUC 12 factors as follows:

- 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

Based on the above criteria, priority should be given to projects located in the following HUC 12s, listed in descending order of priority. Refer to Appendix D, Table D.1, for a complete listing.

- | | |
|---|-------------------------------------|
| 1. Mooser Creek-Arkansas River | 11. Harlow Creek-Arkansas River |
| 2. Adams Creek | 12. Euchee Creek-Arkansas River |
| 3. Cat Creek-Dog Creek | 13. Mustang Creek |
| 4. Broken Arrow Creek-Arkansas River | 14. Commodore Creek-Verdigris River |
| 5. Haikey Creek | 15. Port of Dunkin-Verdigris River |
| 6. Inola Creek | 16. Spunky Creek |
| 7. Lake Overholser-North Canadian River | 17. Posey Creek-Arkansas River |
| 8. Nickel Creek | 18. Big Flag Lake-Verdigris River |
| 9. North Canadian River | 19. Coal Creek-Arkansas River |
| 10. Campbell Creek-North Canadian River | 20. Moss Creek-Verdigris River |

In 2013, the State further defined priorities to emphasize “Repetitive Loss Mitigation, Flood Insurance Outreach and Assistance to Floodplain Managers and Developing Depth Grids for Outreach Tools.” To support this mission, the State wishes to place priority on projects that enable development of depth grids for use in mitigation of repetitive losses.

Similarly, discovery revealed that some of the recommended projects may have been initiated – at least in part – by jurisdictional community. The State also gives these projects priority because work completed may be potentially used to significantly reduce project costs.

Lastly, the City of Tulsa requested that Age of Study be added to the criteria as “Developing Current Hydrologic and Hydraulic Models” is of high priority to the community⁵. Such has been added to the State’s Project Prioritization Matrix.

The following table provides a summary of RL data per HUC 12 for Lower Verdigris, Middle North Canadian and Polecat-Snake Watersheds. The States’ priority projects for Grand Lake O’ The Cherokees and Lower North Canadian Watersheds are currently underway by FEMA. Refer to Table D.2, Appendix D, for complete RL information.

⁵ City of Tulsa employs hydrologic and hydraulic models to guide safe development within its borders.

Table 14: Repetitive Loss data per (discovered) HUC 12

HUC 8	HUC 12 Name	Repetitive Losses	Number of Claims	Total Paid
LVR	Adams Creek	17	55	\$ 1,666,740
LVR	Inola Creek	7	33	\$ 1,228,117
LVR	Cat Creek-Dog Creek	7	40	\$ 797,730
LVR	Spunky Creek	3	6	\$ 86,697
LVR	Fourmile Creek	1	2	\$ 58,983
LVR	Coal Creek	1	2	\$ 36,110
LVR	Lake Claremore Dam	1	2	\$ 14,693
MNC	Purcell Creek	3	13	\$ 580,003
MNC	111003010705-North Canadian River	1	3	\$ 160,262
MNC	111003010706-North Canadian River	3	9	\$ 151,193
MNC	Lake Overholser-North Canadian River	6	12	\$ 58,453
MNC	Campbell Creek-North Canadian River	3	7	\$ 56,993
MNC	Target Creek-North Canadian River	1	3	\$ 43,333
MNC	Spring Creek-North Canadian River	2	4	\$ 23,872
PS	Euchee Creek-Arkansas River	45	129	\$ 2,338,763
PS	Mooser Creek-Arkansas River	78	191	\$ 1,684,926
PS	Broken Arrow Creek-Arkansas River	8	29	\$ 905,214
PS	Euchee Creek	19	58	\$ 753,748
PS	Duck Creek	5	26	\$ 656,021
PS	Nickel Creek	8	18	\$ 508,035
PS	Coal Creek-Arkansas River	10	35	\$ 493,552
PS	City of Sapulpa-Polecat Creek	3	9	\$ 299,040
PS	Lower Snake Creek	4	15	\$ 206,671
PS	Harlow Creek-Arkansas River	7	15	\$ 200,318
PS	Posey Creek-Arkansas River	11	29	\$ 166,468
PS	Haikey Creek	7	16	\$ 140,937
PS	Concharty Creek	1	2	\$ 85,715
PS	Skull Creek-Polecat Creek	3	6	\$ 76,522
PS	Cedar Creek-Arkansas River	1	2	\$ 65,803
PS	Rock Creek	1	2	\$ 16,699
Total		267	773	\$ 13,561,611

The above claims represent approximately 23% of the State’s total numbers. PS contains the most losses totaling over \$8.5M in claims.

Ranking of HUC 12s – based on RL, population density, effective age of study and validation status – is shown in Table 15.

Table 15: 2013 Oklahoma Project Prioritization Matrix

Ranking Weight ==>											
Maximum Values ==>		\$2,338,763		3196		356		305			
HUC 8	Project	RL	RLs Ranks	Pop. Den. Per Sq Mile	PD/SM Rank	Eff. Study Age	Age Rank	Val. Stat.	VS Ranks	2012-2013 Proj.	Sum
LVR	Adams Creek	\$ 1,666,740	71	445	14	296	83	305	100	X	268
PS	Mooser Creek-Arkansas River	\$ 1,684,926	72	2679	84	210	59	63	21	X	236
LVR	Inola Creek	\$ 1,228,117	53	136	4	356	100	187	61		218
LVR	Cat Creek-Dog Creek	\$ 797,730	34	884	28	234	66	272	89	X	217
PS	Broken Arrow Creek-Arkansas River	\$ 905,214	39	642	20	273	77	238	78	*	214
PS	Coal Creek-Arkansas River	\$ 493,552	21	231	7	188	53	292	96	X	177
PS	Euchee Creek-Arkansas River	\$ 2,338,763	100	487	15	80	22	95	31		168
PS	Haickey Creek	\$ 140,937	6	2286	72	169	47	26	8		133
MNC	Lake Overholser-North Canadian River	\$ 58,453	2	3196	100	36	10	57	19	X	131
PS	Nickel Creek	\$ 508,035	22	776	24	181	51	88	29		126
MNC	North Canadian River	\$ 151,193	6	1009	32	120	34	163	53	X	125
MNC	Purcell Creek	\$ 580,003	25	741	23	62	17	155	51		116
MNC	Campbell Creek-North Canadian River	\$ 56,993	2	1240	39	100	28	140	46		115
PS	Duck Creek	\$ 656,021	28	105	3	167	47	105	34		112
LVR	Spunky Creek	\$ 86,697	4	605	19	136	38	137	45		106
PS	Harlow Creek-Arkansas River	\$ 200,318	9	660	21	119	33	77	25		88
PS	Posey Creek-Arkansas River	\$ 166,468	7	973	30	123	35	16	5		77
MNC	Spring Creek-North Canadian River	\$ 23,872	1	266	8	181	51	24	8		68
PS	Euchee Creek	\$ 753,748	32	414	13	45	13	7	2		60
LVR	Lake Claremore Dam	\$ 14,693	1	143	4	125	35	58	19		59
LVR	Coal Creek	\$ 36,110	2	165	5	84	24	82	27		58
PS	City of Sapulpa-Polecat Creek	\$ 299,040	13	442	14	58	16	0	0		43
PS	Skull Creek-Polecat Creek	\$ 76,522	3	206	6	90	25	24	8		42
PS	Concharty Creek	\$ 85,715	4	30	1	50	14	69	23		42
PS	Lower Snake Creek	\$ 206,671	9	111	3	22	6	73	24		42
MNC	Fourmile Creek-North Canadian River	\$ 58,983	3	82	3	93	26	14	5		37

Projects recommended during Discovery were prioritized per HUC 12 ranking – using both composite and 2013 methodologies – to generate the State’s project prioritization list. Table 16, below, shows the Top 10 Projects – for projects located in Lower Verdigris, Lower North Canadian, and Polecat-Snake.

Table 16: Oklahoma Project Prioritization

Project Name	Project Length	Project Cost	Comp.	2013
Updating the FIRM and FIS for Adams Creek, Tulsa and Wagoner Counties	57.23	\$ 1,413,000	5	1
Updating the FIRM and FIS for Joe Creek, Tulsa County	12.87	\$ 322,000	1	2
Updating the FIRM and FIS for Crow Creek, Tulsa County	1.84	\$ 35,000	2	3
Updating the FIRM and FIS for Red Fork Creek, Tulsa County	0.66	\$ 17,000	3	4
Updating the FIRM and FIS for Mooser Creek, Tulsa County	4.74	\$ 119,000	4	5
Updating the FIRM and FIS for Inola Creek, Rogers County	27.87	\$ 697,000	12	6
Updating the FIRM and FIS for Cat Creek and Dog Creek in Rogers County	14.00	\$ 351,000	6	7
Updating the FIRM and FIS for Elm Creek, Tulsa County	4.00	\$ 41,000	7	8
Updating the FIRM and FIS for Aspen Creek, Tulsa County	7.14	\$ 72,000	8	9
Updating the FIRM and FIS for Broken Arrow Creek, Tulsa and Wagoner County	24.94	\$ 603,000	9	10
Subtotal		\$ 3,930,000		

Refer to Table D.3, Appendix D, for a detailed listing of projects recommended during Discovery – including those in Lower North Canadian and Grand Lake O’ The Cherokee. Priority for all Lower Verdigris, Lower North Canadian, and Polecat-Snake projects is shown in Table D.4.

VII. Five Year Strategy and Work Plan

The State of Oklahoma envisions upgrading its role in RiskMAP for 2013 and beyond through the Cooperating Technical Partner (CTP) Program. It is understood that specific activities completed will depend upon the funding available from FEMA and local communities – and programmed based on the guidelines and priorities established herein. The specific scope of activities will continue to be detailed in annual partnership agreements.

A. Plan Objectives

The objective of this plan is to facilitate a State-administered Floodplain Management Program that will:

- Conduct aggressive outreach to achieve community buy-in of DFIRMs to reduce the number of appeals and protests.
- Define Base Flood Elevations (BFEs) for all Special Flood Hazard Areas in Oklahoma using current, accurate digital elevation data and engineering models, and produce statewide, seamless mapping on a watershed basis.
- Replace all unnumbered A Zones in watersheds of 1.0 square mile or more with BFEs through detailed studies.
- Identify shaded Zone X fully urbanized floodplains in watersheds of 40 acres or more in urban areas (to be defined in Business Plan).
- Provide and manage production and maintenance of DFIRMs in a timely and cost-efficient manner.
- Provide 24-hour free, online access to state-wide Geographic Information System (GIS) data, flood maps, and reports through a web portal, to enable more precise flood risk determinations through access to accurate, detailed, digital data.
- Enable communities to obtain basin-wide flood-risk identification and mitigation plans in addition to floodplain mapping using CTP grants, and assist in obtaining hazard mitigation grants for identified projects.
- Meet all FEMA requirements at a minimum (i.e., DFIRM panel, database, scoping).
- Prioritize and provide/manage dam breach inundation mapping statewide.

B. Business Rules

The OWRB Business Rules as approved by FEMA are as follows:

- Leverage efficient and effective technology and procedures for more efficient digital for new maps/future updates (GIS, Light Detection and Ranging (LiDAR), etc.).

- Engage in communication and promote digital data sharing with counties and municipalities as means to improve flood mapping data accuracy and reliability.
- Leverage existing data and analysis prepared by local and State governments to reduce costs and further implement other programs such as:
 - Dam Safety Emergency Action Plans
 - Dam Breach Inundation Mapping
 - Multi-Hazard Mitigation Planning Statewide
 - Low-water Crossing GIS mapping (Turn Around Don't Drown initiative) Statewide
- Maximize State's return on investment by promoting and advancing programs with greatest risk reduction effect.
- Employ FEMA Business Rules for the deployment of RiskMAP (See Appendix B).

Activities, Performance Measures and Timelines relative to Oklahoma's potential future performance of RiskMAP are shown in Appendix E. Depending on funding, resources and priorities, the State of Oklahoma would assume that State participation would be consistent with the mapping sequences adopted for the State and subsequent number of annual mapping initiatives.

The proposal detailed below is based on preliminary findings from assessments performed to-date. It is anticipated that as additional work is completed, prioritization criteria will be adjusted. It is recommended that this listing be reviewed annually to ensure the program meets its intended outcome.

C. Discovery

To-date, FEMA and CTP partners have completed Discovery on seven of the state's highest ranking watersheds (noted in underline above). Oklahoma's Top 10 list adds Deep Fork, Bird and Little to the list of seven discovered watersheds. It is recommended that Discovery be prioritized as follows:

2. Bird
3. Deep Fork
4. Little

Prioritization rational and computations may be found in Appendix C.

Table 17 below notes Deployment numbers for the recommended watersheds. Local match funding is available immediately for the performance of Discovery for Bird Watershed by the City of Tulsa. It is also anticipated that deployment of these watersheds will increase action measures, as the areas encompass metropolitan areas with high population and repetitive loss numbers.

Table 17: Oklahoma Deployment Goal (FY2013-14)

HUC 8	Population (2010 Census)	% of Oklahoma Population
Lake O' The Cherokees	56,432	1.5%
Lower North Canadian	443,518	11.8%
Middle North Canadian	160,655	4.3%
Polecat-Snake	464,086	12.4%
Lower Verdigris	129,186	3.4%
Lower Canadian-Walnut	257,021	6.9%
Lower Cimarron-Skeleton	341,695	9.1%
Bird	277,953	7.4%
Deep Fork	272,287	7.3%
Little	143,053	3.8%
Total	2,545,886	67.9%

Cost per Discovery has been estimated using FEMA’s Blue Book Pricing Unit Cost (September 2011) as follows:

Table 18: Discovery Estimate of Cost

Project Ranking	HUC 8 Name	Estimated No. of Communities	\$/Community ⁶	Estimated Cost
1	Bird	22	\$ 6,500.00	\$ 143,000.00
2	Deep Fork	60	\$ 6,500.00	\$ 390,000.00
3	Little	30	\$ 6,500.00	\$ 195,000.00

D. Detailed and Approximate Studies

Generating accurate depth grids – needed for repetitive loss mitigation and outreach purposes – may require the development of current hydraulic models. Five of the Top 10 HUC 8s (prioritized per RL) have undergone Discovery; and many of the Phase 2 studies recommended during Discovery for the Lake O' The Cherokees and Lower North Canadian are currently

⁶ Cost per community includes \$4,000 for Discovery and \$2,500 for Risk Communication and Outreach.

underway. Furthermore, one study each has been funded in the Lower Verdigris, Middle North Canadian and Polecat-Snake watersheds. These Phase 2 efforts are expected to yield depth grids for the segment of stream studied. However, these studies are not enough. Additional Phase 2 efforts are necessary to enable the development of depth grids impacting RL properties Polecat-Snake and Lower Verdigris.

List of recommended projects is presented in Section V. Further review of Discovery-level project costs was performed for Top 20 projects in an effort to generate a more accurate forecast of funding needed in the near future.

Table 19, below, provides a detailed listing of recommended FY 2013 projects as well as a forecasted listing for FY 2014-2017 projects for planning purposes.

Table 19: State of Oklahoma Project Schedule

Project Name	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017
Updating the FIRM and FIS for Adams Creek, Tulsa and Wagoner Counties	\$ 685,960				
Updating the FIRM and FIS for Mooser Creek, Tulsa County.	\$ 178,115				
Updating the FIRM and FIS for Red Fork Creek, Tulsa County.	\$ 94,426				
Updating the FIRM and FIS for Crow Creek, Tulsa County.	\$ 138,501				
Updating the FIRM and FIS for Joe Creek, Tulsa County.	\$ 520,587				
Updating the FIRM and FIS for Inola Creek, Rogers County		\$ 710,685			
Updating the FIRM and FIS for Cat Creek and Dog Creek in Rogers County		\$ 235,200			
Updating the FIRM and FIS for Aspen Creek, Tulsa County.		\$ 182,070			
Updating the FIRM and FIS for Elm Creek, Tulsa County.		\$ 102,000			
Updating the FIRM and FIS for Coweta Creek, Wagoner County.		\$ 403,155			
Updating the FIRM and FIS for Arkansas River, Muskogee County.			\$ 117,810		
Updating the FIRM and FIS for Haskell Creek, Muskogee County.			\$ 190,230		
Updating the FIRM and FIS for Haikey Creek, Tulsa County (Little Haikey Creek only)			\$ 209,100		
Updating the FIRM and FIS for White Church Creek, Tulsa County.			\$ 104,295		
Updating the FIRM and FIS for Coal Creek, Tulsa County.			\$ 518,160		

Project Name	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017
Updating the FIRM and FIS for Hager Creek, Tulsa County.			\$ 140,278		
Updating the FIRM and FIS for Nickel Creek, Creek County (unverified Section only).			\$ 169,575		
Updating the FIRM and FIS for Wilmott Creek, Tulsa County.			\$ 32,385		
Updating the FIRM and FIS for Turtle Creek, Canadian County.			\$ 139,440		
Updating the FIRM and FIS for Purcell Creek, Canadian County.			\$ 792,285		
Updating the FIRM and FIS for North Canadian River, Canadian, Oklahoma and Woodward County.				\$3,064,845	
Updating the FIRM and FIS for Campbell Creek, Canadian and Oklahoma Counties.					\$ 331,500
Updating the FIRM and FIS for North Canadian River Tributary 14, Oklahoma County.					\$ 85,425
Updating the FIRM and FIS for Spunky Creek, Rogers, Tulsa and Wagoner Counties					\$ 288,023
Updating the FIRM and FIS for Harlow Creek, Bigheart Creek and West Bigheart Creek, Osage and Tulsa County.					\$ 693,922
Updating the FIRM and FIS for Vensel Creek, Tulsa County.					\$ 223,682
Updating the FIRM and FIS for Bixby Creek, Tulsa County.					\$ 25,500
Updating the FIRM and FIS for Fry Creek, Tulsa County.					\$ 141,270
Updating the FIRM and FIS for City of Woodward, Woodward County.					\$ 569,925
Total	\$1,617,589	\$1,633,110	\$2,413,558	\$3,064,845	\$2,359,247

Refer to Appendix E (Table E.3) for a detailed cost estimate per project, including proposed miles of none regulatory products and detailed studies.

VIII. 5-YR Plan Funding Requirements

Table 20, below, provides a summary of funding needs for the proposed 5-YR program.

Table 20: 5-YR Program Funding Requirements

Program Year	Discovery	Recommended Studies		Total
		Miles	Cost	
FY 2013	\$143,000	77	\$1,618,000	\$1,761,000
FY 2014	\$390,000	69	\$1,634,000	\$2,024,000
FY 2015	\$195,000	96	\$2,414,000	\$2,609,000
FY 2016		120	\$3,065,000	\$3,065,000
FY 2017		90	\$2,360,000	\$2,360,000
Subtotal	\$728,000	452	\$8,731,000	\$9,459,000

A. State and Local Funding

The State proposes to continue participation in RiskMAP as a CTP partner. Although activities currently do not require a match for funding, FEMA has a nationwide goal for 25% leverage. Leverage is a significant part of the goals for RiskMAP, and therefore, is a factor in determining priorities for the State. It is anticipated that the 25% leverage will be provided through various combinations of in-kind and cash contributions, including community participation.

The State has continued to commit to hiring a contractor each year to assist in increasing its involvement in floodplain mapping activities—this, in essence, will provide an approximate 25% cost share in the form of a soft match. The match would be in the manner of administrative time spent to hire or contract for an individual to fill the position, providing State benefits or contracting costs, and covering overhead costs (i.e., office space, office equipment, etc.) and travel expenses, where appropriate.

While no firm dollar commitment can be made for the purpose of this planning document, it is anticipated that this existing cost share program will be continued with the 25% leverage to be obtained from the State/local contributions.

It is likely that the package of cash and in-kind services provided will vary somewhat from study to study, depending on the local community’s ability to provide cost share, the amount of in-kind services the State is able to provide, the amount of cost share available through the State’s cost share program, and the expense associated with developing the required data.

B. Resources/Staffing

The OWRB anticipates that same level of staff/contractor involvement, along with other State and institutional involvement, will continue. The State will provide dollar leveraging by

contributing a cost share match in the form of contractors' salaries and participation in activities beyond the State's requirements. Additional contractor RiskMAP support will be provided as scoped under the CTP Program.

C. Reporting

The State Floodplain Administrator and/or contractor will submit reports to FEMA Region VI using the FEMA Quarterly Report template.

D. Quality Assurance

The State will prepare all materials and conduct all activities in conformance with FEMA's applicable guidelines.

Appendix A

Oklahoma State Data Summary

Table A.1: Oklahoma HUC-8 General Data

HUC 08 Name	HUC-8	of Census Blocks Touched	2010 Census Pop	2010 Census Pop (Adjusted *.932)	Pop % by HUC 08	Total HUC 08 Area (SqMi)	Total HUC 08 Area inside OK (SqMi)	% Total HUC 08 Area inside OK (SqMi)	Total Area Covered by non-DEM Topo	% Total Area Covered by non-DEM Topo	Area Covered by a HMP	% HUC 08 Area Covered by a HMP	% pop Covered by a HMP	Trifecta Ranking (Top 10)	20 Factors Ranking (Top 10)	Region VI Tool	OK Factor
Bird	11070107	8,983	277,953	259,052	1829.0%	1,137.35	1,137.35	100.0%	239.89	21.09%	1,107.58	97.4%	1781.13%	10	7	7	5
Black Bear-Red Rock	11060006	6,831	35,661	33,236	234.7%	2,135.57	2,135.57	100.0%	1456.51	68.20%	1,288.52	60.3%	141.58%	0	8	6	19
Blue	11140102	2,759	31,858	29,692	209.6%	687.33	687.33	100.0%	371.62	54.07%	529.41	77.0%	161.47%	0	0	18	23
Blue-China	11130102	1,215	4,024	3,750	26.5%	770.96	377.86	49.0%	143.81	38.06%	385.88	50.1%	13.25%	0	0	N/A	N/A
Bois D'arc-Island	11140101	2,057	17,679	16,477	116.3%	1,983.34	546.38	27.5%	1.64	0.30%	537.29	27.1%	31.51%	0	0	N/A	N/A
Cache	11130202	5,967	114,169	106,406	751.3%	800.13	800.13	100.0%	631.81	78.96%	692.61	86.6%	650.31%	0	0	20	9
Caney	11070106	5,428	77,032	71,794	506.9%	2,094.54	1,176.62	56.2%	73.26	6.23%	1,162.30	55.5%	281.28%	7	6	23	24
Chikaskia	11060005	1,613	9,394	8,755	61.8%	2,023.04	372.31	18.4%	38.58	10.36%	366.64	18.1%	11.20%	0	0	N/A	N/A
Cimarron Headwaters	11040001	51	41	38	0.3%	1,677.93	40.93	2.4%				0.0%	0.00%	0	0	N/A	N/A
Clear Boggy	11140104	2,551	24,877	23,185	163.7%	1,003.70	1,003.70	100.0%	919.81	91.64%	470.93	46.9%	76.81%	0	0	13	26
Coldwater	11100103	619	600	559	3.9%	1,961.91	336.69	17.2%				0.0%	0.00%	0	0	N/A	N/A
Crooked	11040007	18	5	5	0.0%	1,445.55	11.25	0.8%				0.0%	0.00%	0	0	N/A	N/A
Deep Fork	11100303	15,047	272,287	253,771	1791.7%	2,536.50	2,536.50	100.0%	2449.33	96.56%	2,223.05	87.6%	1570.30%	0	0	17	10
Dirty-Greenleaf	11110102	5,513	71,465	66,605	470.3%	796.69	796.69	100.0%	532.08	66.79%	625.54	78.5%	369.23%	0	0	30	14
Elk	11070208	214	2,865	2,670	18.9%	1,025.49	52.01	5.1%	1.88	3.61%	52.04	5.1%	0.96%	0	0	N/A	N/A
Elm Fork Red	11120304	1,030	3,165	2,950	20.8%	928.68	563.46	60.7%	65.77	11.67%	561.65	60.5%	12.60%	0	0	35	32
Farmers-Mud	11130201	2,555	23,399	21,808	154.0%	2,323.92	1,476.69	63.5%	892.70	60.45%	461.62	19.9%	30.58%	0	0	12	36
Groesbeck-Sandy	11130101	1,371	3,578	3,335	23.5%	1,314.65	506.95	38.6%	110.79	21.85%	504.10	38.3%	9.03%	0	0	N/A	N/A
Illinois	11110103	5,577	60,756	56,625	399.8%	1,653.70	896.40	54.2%	2.16	0.24%	874.67	52.9%	211.46%	0	0	N/A	N/A
Kaw Lake	11060001	1,544	23,105	21,534	152.0%	953.04	453.93	47.6%	36.92	8.13%	447.83	47.0%	71.44%	0	0	N/A	N/A
Kiamichi	11140105	4,122	24,214	22,567	159.3%	1,823.63	1,823.50	100.0%	1013.06	55.56%	784.79	43.0%	68.57%	0	0	38	30
Lake O' The Cherokees	11070206	5,236	56,432	52,595	371.3%	909.37	725.40	79.8%	580.92	80.08%	713.15	78.4%	291.21%	0	0	37	13
Lake Texoma	11130210	2,373	37,821	35,249	248.9%	993.57	568.61	57.2%	238.04	41.86%	369.18	37.2%	92.47%	0	0	16	41
Little	11090203	4,717	143,053	133,325	941.3%	977.35	977.35	100.0%	977.35	100.00%	715.32	73.2%	688.95%	0	0	3	7
Lower Beaver	11100201	1,892	5,526	5,150	36.4%	1,780.70	1,331.63	74.8%				0.0%	0.00%	0	0	N/A	40
Lower Canadian	11090204	7,542	60,621	56,499	398.9%	1,981.69	1,981.69	100.0%	1838.05	92.75%	1,948.68	98.3%	392.26%	0	9	11	16
Lower Canadian-Deer	11090201	4,349	20,564	19,166	135.3%	2,042.32	1,999.85	97.9%	556.60	27.83%	777.11	38.1%	51.49%	0	0	19	35
Lower Canadian-Walnut	11090202	10,201	257,021	239,544	1691.3%	1,833.37	1,833.37	100.0%	1833.37	100.00%	1,166.20	63.6%	1075.81%	3	5	4	3
Lower Cimarron	11050003	7,643	104,949	97,812	690.6%	1,384.48	1,384.48	100.0%	1384.48	100.00%	581.10	42.0%	289.86%	0	0	14	18
Lower Cimarron-Eagle Chief	11050001	3,163	7,007	6,531	46.1%	2,421.68	2,377.35	98.2%	114.24	4.81%	386.15	15.9%	7.35%	0	0	40	38
Lower Cimarron-Skeleton	11050002	16,273	341,695	318,460	2248.4%	3,236.07	3,236.07	100.0%	2653.45	82.00%	1,625.66	50.2%	1129.52%	2	1	2	4
Lower Little Arkansas, Oklahoma	11140109	459	998	930	6.6%	1,991.76	196.20	9.9%				0.0%	0.00%	0	0	N/A	N/A
Lower Neosho	11070209	8,499	98,480	91,783	648.0%	2,225.60	2,081.88	93.5%	63.65	3.06%	2,015.89	90.6%	586.96%	5	2	5	15
Lower North Canadian	11100302	17,111	443,518	413,359	2918.5%	1,870.03	1,870.03	100.0%	1867.57	99.87%	1,540.08	82.4%	2403.52%	1	3	15	2
Lower North Fork Red	11120303	6,493	41,679	38,845	274.3%	1,384.86	1,384.86	100.0%	1384.86	100.00%	1,350.81	97.5%	267.51%	0	0	28	11
Lower Prairie Dog Town Fork Red	11120105	26	2	2	0.0%	1,440.80	12.18	0.8%			12.18	0.8%	0.00%	0	0	N/A	N/A
Lower Salt Fork Arkansas	11060004	5,474	29,760	27,736	195.8%	2,335.30	1,923.21	82.4%	709.24	36.88%	1,368.25	58.6%	114.74%	0	10	10	28
Lower Salt Fork Red	11120202	3,006	14,436	13,454	95.0%	1,247.96	707.62	56.7%	344.57	48.70%	700.23	56.1%	53.30%	0	0	32	34
Lower Verdigris	11070105	5,774	129,186	120,401	850.1%	714.06	714.06	100.0%	511.17	71.59%	354.02	49.6%	421.45%	0	0	24	20
Lower Washita	11130304	2,877	24,160	22,517	159.0%	731.90	731.90	100.0%	731.90	100.00%	274.65	37.5%	59.66%	0	0	33	17
Lower Wolf	11100203	1,410	3,467	3,231	22.8%	1,089.91	653.83	60.0%				0.0%	0.00%	0	0	39	43
Medicine Lodge	11060003	360	482	449	3.2%	1,279.57	197.12	15.4%	18.83	9.55%		0.0%	0.00%	0	0	N/A	N/A
Middle Beaver	11100102	3,432	14,548	13,559	95.7%	1,355.71	1,323.82	97.6%				0.0%	0.00%	0	0	42	39
Middle Canadian-Spring	11090106	2	5	5	0.0%	2,752.95	0.41	0.0%			0.28	0.0%	0.00%	0	0	N/A	N/A
Middle Neosho	11070205	13	141	131	0.9%	1,425.69	5.14	0.4%	0.01	0.14%	5.11	0.4%	0.00%	0	0	N/A	N/A
Middle North Canadian	11100301	8,553	163,212	152,114	1074.0%	1,858.30	1,858.30	100.0%	459.40	24.72%	739.97	39.8%	427.65%	0	0	25	31
Middle North Fork Red	11120302	2,464	10,130	9,441	66.7%	1,654.63	865.73	52.3%	241.00	27.84%	843.20	51.0%	33.97%	0	0	31	N/A
Middle Verdigris	11070103	1,839	15,284	14,245	100.6%	1,517.65	822.27	54.2%	78.78	9.58%	817.49	53.9%	54.17%	8	0	34	N/A
Middle Washita	11130303	9,130	77,413	72,149	509.4%	2,509.60	2,509.60	100.0%	2509.60	100.00%	802.73	32.0%	162.94%	4	4	9	8
Mountain Fork	11140108	1,440	3,377	3,147	22.2%	846.94	600.34	70.9%	95.37	15.89%	151.84	17.9%	3.98%	0	0	N/A	37
Muddy Boggy	11140103	3,361	23,957	22,328	157.6%	1,436.24	1,436.24	100.0%	918.66	63.96%	775.34	54.0%	85.10%	0	0	26	27
Northern Beaver	11130208	4,814	49,939	46,543	328.6%	864.66	864.66	100.0%	785.92	90.89%	548.70	63.5%	208.53%	0	0	8	21

Table A.1: Oklahoma HUC-8 General Data

HUC 08 Name	HUC-8	of Census Blocks Touched	2010 Census Pop	2010 Census Pop (Adjusted *.932)	Pop % by HUC 08	Total HUC 08 Area (SqMi)	Total HUC 08 Area inside OK (SqMi)	% Total HUC 08 Area inside OK (SqMi)	Total Area Covered by non-DEM Topo	% Total Area Covered by non-DEM Topo	Area Covered by a HMP	% HUC 08 Area Covered by a HMP	% pop Covered by a HMP	Trifecta Ranking (Top 10)	20 Factors Ranking (Top 10)	Region VI Tool	OK Factor
Palo Duro	11100104	169	116	108	0.8%	1,936.90	144.94	7.5%	0.00	0.00%		0.0%	0.00%	0	0	N/A	N/A
Pecan-Waterhole	11140106	1,187	7,659	7,138	50.4%	1,449.47	416.10	28.7%				0.0%	0.00%	0	0	N/A	N/A
Polecat-Snake	11110101	14,684	464,086	432,528	3053.8%	1,322.22	1,322.22	100.0%	1229.42	92.98%	708.75	53.6%	1636.93%	0	0	22	12
Poteau	11110105	5,015	50,939	47,475	335.2%	1,905.81	1,348.71	70.8%	736.30	54.59%	1,222.20	64.1%	214.96%	9	0	27	22
Rita Blanca	11090103	15	0	0	0.0%	1,094.39	3.02	0.3%				0.0%	0.00%	0	0	N/A	N/A
Robert S. Kerr Reservoir	11110104	5,458	58,220	54,261	383.1%	1,762.63	1,432.38	81.3%	734.16	51.25%	1,387.30	78.7%	301.53%	0	0	N/A	29
Spring	11070207	378	4,759	4,435	31.3%	2,590.44	99.73	3.8%	4.80	4.81%	98.83	3.8%	1.19%	0	0	N/A	N/A
Upper Beaver	11100101	3,665	11,807	11,004	77.7%	2,731.89	1,818.41	66.6%	0.00	0.00%		0.0%	0.00%	0	0	41	42
Upper Cimarron	11040002	514	235	219	1.5%	1,650.00	657.03	39.8%				0.0%	0.00%	0	0	43	N/A
Upper Cimarron-Bluff	11040008	372	380	354	2.5%	1,860.09	314.68	16.9%				0.0%	0.00%	0	0	N/A	N/A
Upper Cimarron-Liberal	11040006	584	1,519	1,416	10.0%	1,732.69	359.58	20.8%				0.0%	0.00%	0	0	N/A	N/A
Upper Little	11140107	4,943	27,527	25,655	181.1%	1,406.11	1,406.11	100.0%	369.64	26.29%	78.86	5.6%	10.16%	0	0	36	33
Upper Salt Fork Arkansas	11060002	848	6,556	6,110	43.1%	1,079.29	349.91	32.4%	17.53	5.01%		0.0%	0.00%	0	0	N/A	N/A
Upper Washita	11130302	12,094	75,628	70,485	497.7%	3,209.32	3,209.32	100.0%	3208.59	99.98%	2,842.11	88.6%	440.71%	6	0	1	1
Washita Headwaters	11130301	1,847	4,665	4,348	30.7%	1,472.62	1,025.69	69.7%	713.47	69.56%	1,008.11	68.5%	21.01%	0	0	29	25
West Cache	11130203	2,899	15,197	14,164	100.0%	1,100.77	1,100.77	100.0%	861.10	78.23%	1,086.64	98.7%	98.72%	0	0	21	6
Totals		251,897	3,842,769	3,581,461		109,477.01	69,916.05		37753.67	54.00%			14101.49%				

Note: 2010 Census Population adjustment factor of 0.932 accounts for overlapping census blocks per HUC 8

0.64

Comparables (QA/QC)
 State of Oklahoma Census Blocks
 2010 Population of Oklahoma
 Area of Oklahoma (SqMi)

269,118
 3,751,351
 69,916

Table A.2: Oklahoma HAZUS AAL Data Per County (\$ million)

County FIPs	County Name	Total	Building	Content
40001	Adair	\$ 1,738	\$ 906	\$ 783
40003	Alfalfa	\$ 1,648	\$ 761	\$ 816
40005	Atoka	\$ 772	\$ 412	\$ 339
40007	Beaver	\$ 949	\$ 448	\$ 470
40009	Beckham	\$ 2,118	\$ 815	\$ 1,215
40011	Blaine	\$ 774	\$ 406	\$ 347
40013	Bryan	\$ 2,443	\$ 1,309	\$ 1,081
40015	Caddo	\$ 2,737	\$ 1,321	\$ 1,337
40017	Canadian	\$ 10,914	\$ 5,260	\$ 5,203
40019	Carter	\$ 1,664	\$ 921	\$ 714
40021	Cherokee	\$ 3,789	\$ 1,928	\$ 1,774
40023	Choctaw	\$ 1,017	\$ 598	\$ 410
40025	Cimarron	\$ 862	\$ 444	\$ 404
40027	Cleveland	\$ 10,798	\$ 5,411	\$ 5,153
40029	Coal	\$ 634	\$ 374	\$ 254
40031	Comanche	\$ 18,111	\$ 7,743	\$ 10,201
40033	Cotton	\$ 541	\$ 330	\$ 209
40035	Craig	\$ 1,759	\$ 940	\$ 805
40037	Creek	\$ 10,982	\$ 5,637	\$ 5,173
40039	Custer	\$ 785	\$ 457	\$ 319
40041	Delaware	\$ 8,811	\$ 5,093	\$ 3,678
40043	Dewey	\$ 149	\$ 96	\$ 53
40045	Ellis	\$ 340	\$ 186	\$ 148
40047	Garfield	\$ 6,172	\$ 2,160	\$ 3,779
40049	Garvin	\$ 11,078	\$ 4,681	\$ 6,039
40051	Grady	\$ 4,525	\$ 1,927	\$ 2,304
40053	Grant	\$ 754	\$ 411	\$ 322
40055	Greer	\$ 233	\$ 147	\$ 86
40057	Harmon	\$ 191	\$ 110	\$ 78
40059	Harper	\$ 295	\$ 175	\$ 119
40061	Haskell	\$ 937	\$ 576	\$ 358
40063	Hughes	\$ 950	\$ 543	\$ 401
40065	Jackson	\$ 767	\$ 414	\$ 340
40067	Jefferson	\$ 720	\$ 394	\$ 310
40069	Johnston	\$ 1,496	\$ 662	\$ 820
40071	Kay	\$ 8,294	\$ 4,156	\$ 3,973
40073	Kingfisher	\$ 1,889	\$ 1,003	\$ 841
40075	Kiowa	\$ 922	\$ 515	\$ 393
40077	Latimer	\$ 1,119	\$ 645	\$ 468
40079	Le Flore	\$ 6,774	\$ 3,588	\$ 3,068
40081	Lincoln	\$ 3,484	\$ 1,596	\$ 1,786
40083	Logan	\$ 5,312	\$ 2,048	\$ 2,912
40085	Love	\$ 3,448	\$ 1,496	\$ 1,819
40093	Major	\$ 915	\$ 460	\$ 435
40095	Marshall	\$ 723	\$ 378	\$ 333
40097	Mayes	\$ 6,532	\$ 3,641	\$ 2,763
40087	McClain	\$ 3,751	\$ 1,570	\$ 2,026
40089	McCurtain	\$ 3,787	\$ 2,019	\$ 1,684
40091	McIntosh	\$ 1,944	\$ 1,189	\$ 751
40099	Murray	\$ 1,566	\$ 817	\$ 716
40101	Muskogee	\$ 6,825	\$ 3,623	\$ 3,018
40103	Noble	\$ 1,156	\$ 552	\$ 550
40105	Nowata	\$ 1,102	\$ 644	\$ 444
40107	Okfuskee	\$ 1,132	\$ 657	\$ 465
40109	Oklahoma	\$ 77,547	\$ 28,961	\$ 44,917
40111	Okmulgee	\$ 6,024	\$ 2,756	\$ 3,093
40113	Osage	\$ 5,556	\$ 2,996	\$ 2,457

Table A.2: Oklahoma HAZUS AAL Data Per County (\$ million)

County FIPs	County Name	Total	Building	Content
40115	Ottawa	\$ 8,204	\$ 3,962	\$ 4,094
40117	Pawnee	\$ 1,929	\$ 973	\$ 911
40119	Payne	\$ 10,937	\$ 5,088	\$ 5,520
40121	Pittsburg	\$ 5,128	\$ 2,246	\$ 2,639
40123	Pontotoc	\$ 1,630	\$ 894	\$ 708
40125	Pottawatomie	\$ 5,355	\$ 2,340	\$ 2,838
40127	Pushmataha	\$ 2,286	\$ 1,403	\$ 879
40129	Roger Mills	\$ 427	\$ 235	\$ 187
40131	Rogers	\$ 13,709	\$ 6,505	\$ 6,618
40133	Seminole	\$ 1,943	\$ 1,057	\$ 819
40135	Sequoyah	\$ 5,184	\$ 2,675	\$ 2,368
40137	Stephens	\$ 2,016	\$ 913	\$ 1,034
40139	Texas	\$ 3,077	\$ 1,147	\$ 1,715
40141	Tillman	\$ 253	\$ 140	\$ 109
40143	Tulsa	\$ 68,778	\$ 29,592	\$ 36,059
40145	Wagoner	\$ 4,692	\$ 2,699	\$ 1,938
40147	Washington	\$ 15,411	\$ 7,956	\$ 7,174
40149	Washita	\$ 441	\$ 233	\$ 203
40151	Woods	\$ 871	\$ 452	\$ 401
40153	Woodward	\$ 1,957	\$ 892	\$ 999
	Total	\$ 416,483	\$ 190,708	\$ 211,967

Appendix B

FEMA's Business Rules for Project Selection

The business rules for determining the location of study within a HUC-8 and the type of study within that same area are defined below:

A. Location of Study

- 1) Stream segments with engineering data validated through the NVUE process in CNMS are not required to be restudied, unless they do not tie-in or have inconsistent hydrology. Reaching compliance with the NVUE metrics for all mapped flood studies is to be a driving factor in this consideration as well.
- 2) Stream segments with invalid engineering data, and high risk levels are required to be restudied. Segments with invalid engineering data and low risk levels may be addressed in later studies, and should be listed in CNMS for future study.
- 3) Existing procedural guidance will be used to determine which segments containing levees will require study. Segments affected by Provisionally Accredited Levee (PAL) agreements are one example of this. Furthermore, PAL remapping should not be delayed during implementation of the watershed study process.
- 4) While the level of need in a stream segment will be defined by CNMS data, Regions will have discretion in prioritizing those needs within a specific project area based on things learned during discovery.
- 5) Areas with low risk, no needs defined, and minimal potential for future development should not be studied unless necessary to address gaps or to correct inconsistent hydrology.
- 6) Areas with low risk, less than four secondary needs in CNMS, and minimal potential for future development do not need to be studied, unless necessary to address gaps or to correct inconsistent hydrology.
- 7) Where hydrology between adjacent stream segments does not agree within the 95% confidence limits of the applicable USGS regression equations, one or both stream segments will be revised to correct the mismatch.
- 8) Where Water Surface Elevations (WSEL) between contiguous stream segments do not agree within 0.5 foot, one or both stream segments will be revised to correct the mismatch.
- 9) Where floodplain or floodway widths between adjacent stream segments do not agree within 5% of the total width, one or both stream segments will be revised to correct the mismatch. Special considerations related to this rule may be required where the stream is a boundary between two jurisdictions with different floodway surcharges.
- 10) It may be necessary to review adjacent HUC-8s for tributary inflows, bordering floodplains from other sources, and other considerations that would affect flow in the subject HUC-8.
- 11) As noted above, any new study to connect between study areas or to address

hydrologic discrepancies shall be accomplished using the most basic study method that is appropriate based on the risk and need of those connecting areas.

B. Type of Study

- 1) As defined in the guiding principles, the existing effective study will be the baseline for future study. For example, if an area has published Base Flood Elevations (BFEs), it will continue to do so. Likewise, once a floodway has been defined, a floodway shall be maintained on future flood maps. An effective floodway cannot be eliminated or downgraded.
- 2) Along a stream segment, varying hydraulic methods (within the Acceptable Models list) will be used; however, the continuity of the computation of WSELs will be maintained within the required tie-in of 0.5 feet for all recurrence intervals in the models.
- 3) As noted above, any new study to connect between study areas or to address hydrologic discrepancies shall be accomplished using the most basic study method that is appropriate based on the risk and need of those connecting areas.

C. Regulatory and Non-Regulatory Flood Mapping

- 1) Regulatory flood map updates (DFIRM updates) are required wherever Base Flood Elevations (BFEs) change by more than one foot in either direction.
- 2) Regulatory flood map updates (DFIRM updates) are required wherever floodplain widths increase or decrease by more than 10% on average across the stream segment.
- 3) All other studies not requiring regulatory flood map updates may have as their final product, workmaps distributed to the affected communities through Risk MAP outreach and product production processes. Disclaimers on these non-regulatory maps should indicate they are Best Available Data and may only be used for selected purposes under the community's floodplain ordinance.
- 4) When a watershed project requires modeling or Flood Insurance Rate Map (FIRM) revisions within an unmodernized county, a countywide digital conversion will be performed for the unmodernized county to bring all data into the modern platform. If cost or other factors prohibit this, then a partial countywide digital conversion or physical map revision (PMR) on the unmodernized panel may be performed.
- 5) Risk MAP products will be produced based on "Procedure Memorandum No. 58-Guidance for Acquisition of Risk MAP Products in FY10" and additional guidance and Guidelines and Standards updates, as they become available.
- 6) Upon a justifiable request of the community, FEMA will update regulatory products, even if not otherwise required. Justifiable requests include those which permit the community to enforce existing floodplain management ordinances in high-risk areas, or to undertake activities that will reduce or eliminate future flood losses.

Appendix C

HUC 8 Ranking Computations

Table C.1: Oklahoma HUC-8 Ranking Computations

Rank	HUC 8	Watershed Name	HUC 8	Pop.	Jurisd.	Topo	HMP	Claims	Points
1	11130302	Upper Washita	11130302	4	12	7	6	8	37
2	11100302	Lower North Canadian	11100302	9	13	8	9	7	46
3	11090202	Lower Canadian-Walnut	11090202	7	9	3	17	10	46
4	11050002	Lower Cimarron-Skeleton	11050002	8	11	14	26	3	62
5	11070107	Bird	11070107	1	22	34	4	4	65
6	11130203	West Cache	11130203	19	14	17	1	14	65
7	11090203	Little	11090203	40	3	2	14	16	75
8	11130303	Middle Washita	11130303	6	7	1	35	26	75
9	11130202	Cache	11130202	38	2	16	8	12	76
10	11100303	Deep Fork	11100303	42	8	9	7	11	77
11	11120303	Lower North Fork Red	11120303	31	21	4	3	24	83
12	11110101	Polecat-Snake	11110101	43	5	10	25	2	85
13	11070206	Lake O' The Cherokees	11070206	33	32	15	12	1	93
14	11110102	Dirty-Greenleaf	11110102	36	16	21	11	9	93
15	11070209	Lower Neosho	11070209	5	29	39	5	15	93
16	11090204	Lower Canadian	11090204	35	15	11	2	33	96
17	11130304	Lower Washita	11130304	23	1	6	33	33	96
18	11050003	Lower Cimarron	11050003	37	4	5	30	23	99
19	11060006	Black Bear-Red Rock	11060006	29	6	20	20	29	104
20	11070105	Lower Verdigris	11070105	39	19	18	27	5	108
21	11130208	Northern Beaver	11130208	32	24	13	18	21	108
22	11110105	Poteau	11110105	2	35	25	16	31	109
23	11140102	Blue	11140102	28	10	26	13	33	110
24	11070106	Caney	11070106	3	43	37	23	6	112
25	11130301	Washita Headwaters	11130301	13	36	19	15	33	116
26	11140104	Clear Boggy	11140104	25	23	12	28	32	120
27	11140103	Muddy Boggy	11140103	22	20	22	24	33	121
28	11060004	Lower Salt Fork Arkansas	11060004	27	30	30	21	20	128
29	11110104	Robert S. Kerr Reservoir	11110104	34	31	27	10	27	129
30	11140105	Kiamichi	11140105	24	25	24	29	33	135
31	11100301	Middle North Canadian	11100301	41	17	33	31	13	135
32	11120304	Elm Fork Red	11120304	10	39	36	19	33	137
33	11140107	Upper Little	11140107	26	18	32	39	22	137
34	11120202	Lower Salt Fork Red	11120202	17	42	28	22	33	142
35	11090201	Lower Canadian-Deer	11090201	20	27	31	32	33	143
36	11130201	Farmers-Mud	11130201	21	38	23	36	30	148
37	11140108	Mountain Fork	11140108	11	34	35	37	33	150
38	11050001	Lower Cimarron-Eagle Chief	11050001	15	26	38	38	33	150
39	11100102	Middle Beaver	11100102	18	28	40	40	33	159
40	11100201	Lower Beaver	11100201	14	33	41	41	33	162
41	11130210	Lake Texoma	11130210	30	41	29	34	28	162
42	11100101	Upper Beaver	11100101	16	37	42	42	33	170
43	11100203	Lower Wolf	11100203	12	40	43	43	33	171

Table C.2: Oklahoma HUC-8 Ranking Computations

HUC 08 Name	HUC-8	Trifecta Ranking (Top 10)	20 Factors Ranking (Top 10)	Region VI Tool	OK Factor
Upper Washita	11130302	6	0	1	1
Lower North Canadian	11100302	1	3	15	2
Lower Canadian-Walnut	11090202	3	5	4	3
Lower Cimarron-Skeleton	11050002	2	1	2	4
Bird	11070107	10	7	7	5
West Cache	11130203	0	0	21	6
Little	11090203	0	0	3	7
Middle Washita	11130303	4	4	9	8
Cache	11130202	0	0	20	9
Deep Fork	11100303	0	0	17	10
Lower North Fork Red	11120303	0	0	28	11
Polecat-Snake	11110101	0	0	22	12
Lake O' The Cherokees	11070206	0	0	37	13
Dirty-Greenleaf	11110102	0	0	30	14
Lower Neosho	11070209	5	2	5	15
Lower Canadian	11090204	0	9	11	16
Lower Washita	11130304	0	0	33	17
Lower Cimarron	11050003	0	0	14	18
Black Bear-Red Rock	11060006	0	8	6	19
Lower Verdigris	11070105	0	0	24	20
Northern Beaver	11130208	0	0	8	21
Poteau	11110105	9	0	27	22
Blue	11140102	0	0	18	23
Caney	11070106	7	6	23	24
Washita Headwaters	11130301	0	0	29	25
Clear Boggy	11140104	0	0	13	26
Muddy Boggy	11140103	0	0	26	27
Lower Salt Fork Arkansas	11060004	0	10	10	28
Robert S. Kerr Reservoir	11110104	0	0	N/A	29
Kiamichi	11140105	0	0	38	30
Middle North Canadian	11100301	0	0	25	31
Elm Fork Red	11120304	0	0	35	32
Upper Little	11140107	0	0	36	33
Lower Salt Fork Red	11120202	0	0	32	34
Lower Canadian-Deer	11090201	0	0	19	35
Farmers-Mud	11130201	0	0	12	36
Mountain Fork	11140108	0	0	N/A	37
Lower Cimarron-Eagle Chief	11050001	0	0	40	38
Middle Beaver	11100102	0	0	42	39
Lower Beaver	11100201	0	0	N/A	40
Lake Texoma	11130210	0	0	16	41
Upper Beaver	11100101	0	0	41	42
Lower Wolf	11100203	0	0	39	43
Middle North Fork Red	11120302	0	0	31	N/A
Middle Verdigris	11070103	8	0	34	N/A
Upper Cimarron	11040002	0	0	43	N/A
Blue-China	11130102	0	0	N/A	N/A
Bois D'arc-Island	11140101	0	0	N/A	N/A
Chikaskia	11060005	0	0	N/A	N/A
Cimarron Headwaters	11040001	0	0	N/A	N/A
Coldwater	11100103	0	0	N/A	N/A
Crooked	11040007	0	0	N/A	N/A

Table C.2: Oklahoma HUC-8 Ranking Computations

HUC 08 Name	HUC-8	Trifecta Ranking (Top 10)	20 Factors Ranking (Top 10)	Region VI Tool	OK Factor
Elk	11070208	0	0	N/A	N/A
Groesbeck-Sandy	11130101	0	0	N/A	N/A
Illinois	11110103	0	0	N/A	N/A
Kaw Lake	11060001	0	0	N/A	N/A
Lower Little Arkansas, Oklahoma	11140109	0	0	N/A	N/A
Lower Prairie Dog Town Fork Red	11120105	0	0	N/A	N/A
Medicine Lodge	11060003	0	0	N/A	N/A
Middle Canadian-Spring	11090106	0	0	N/A	N/A
Middle Neosho	11070205	0	0	N/A	N/A
Palo Duro	11100104	0	0	N/A	N/A
Pecan-Waterhole	11140106	0	0	N/A	N/A
Rita Blanca	11090103	0	0	N/A	N/A
Spring	11070207	0	0	N/A	N/A
Upper Cimarron-Bluff	11040008	0	0	N/A	N/A
Upper Cimarron-Liberal	11040006	0	0	N/A	N/A
Upper Salt Fork Arkansas	11060002	0	0	N/A	N/A
Totals					

Appendix D

HUC 12 and Project Ranking

Table D.1: HUC 12 Ranking Computations

HUC12	HUC12 Name	Population Density Per Square Mile	Normalized by Max	Percent Urban	Normalized by Max	Number of Repetitive Loss Properties	Normalized by Max	Total Value of Repetitive Loss Claims	Normalized by Max	Percent available Topographic Data	Normalized by Max	Population Density in the Floodplain	Normalized by Max	Effective Study Age	Normalized by Max	Validation Status	Normalized by Max	Available Local Funding	Sum	Ranking (0-100)
111003010209	Town of Curtis-North Canadian River	5	0	5	6	-	-	-	-	-	-	2	0	104	29	-	-	-	35.3	3.9
111101010405	Lower Cloud Creek	16	1	6	6	-	-	-	-	-	-	14	1	42	12	54	17	-	36.0	4.0
111003010102	South Persimmon Creek	23	1	5	6	-	-	-	-	-	-	5	0	100	28	-	-	-	34.9	3.9
111101010402	Little Cane Creek	14	0	5	6	-	-	-	-	-	-	17	1	91	26	6	2	-	34.6	3.8
111003010104	Hackberry Creek	38	1	6	7	-	-	-	-	-	-	5	0	97	27	-	-	-	35.5	3.9
111101010401	Upper Cane Creek	13	0	5	5	-	-	-	-	-	-	11	1	86	24	6	2	7	32.3	3.6
111101010406	Cane Creek-Cloud Creek	18	1	6	6	-	-	-	-	-	-	13	1	55	15	34	10	-	33.4	3.7
111101010404	Upper Cloud Creek	9	0	6	6	-	-	-	-	-	-	14	1	34	10	53	16	7	33.1	3.7
111003010205	Upper Indian Creek	3	0	5	6	-	-	-	-	-	-	4	0	95	27	-	-	-	33.1	3.7
111003010402	North Canadian River	5	0	5	5	-	-	-	-	-	-	1	0	90	25	-	-	-	30.8	3.4
111003010201	North Canadian River	2	0	3	3	-	-	-	-	-	-	2	0	90	25	-	-	-	28.7	3.2
111003010301	Cottonwood Creek	11	0	5	6	-	-	-	-	-	-	3	0	64	18	13	4	-	28.6	3.2
111101010103	Brown's Creek	18	1	6	7	-	-	-	-	-	-	15	1	69	19	4	1	7	28.4	3.2
111101010202	Eagle Creek	49	2	6	6	-	-	-	-	-	-	47	2	57	16	8	3	-	28.6	3.2
110701050404	Billy Creek	15	0	4	4	-	-	-	-	-	-	9	0	67	19	4	1	3	25.3	2.8
111101010104	Rowland Creek	30	1	6	7	-	-	-	-	-	-	25	1	67	19	-	-	-	27.8	3.1
111003010208	Sand Creek	59	2	5	6	-	-	-	-	-	-	3	0	69	19	-	-	-	27.5	3.1
111003010101	Upper North Persimmon Creek	2	0	4	4	-	-	-	-	-	-	2	0	70	20	-	-	-	24.2	2.7
111101010101	Figure Eight Creek	22	1	7	7	-	-	-	-	-	-	22	1	59	17	-	-	7	25.7	2.9
111101010102	Dog Creek	21	1	5	6	-	-	-	-	-	-	18	1	50	14	5	1	7	22.8	2.5
111003010204	Boiling Springs Creek-North Canadian River	23	1	5	5	-	-	-	-	-	-	19	1	54	15	-	-	-	22.0	2.4
111003010404	North Canadian River	3	0	5	6	-	-	-	-	-	-	2	0	46	13	-	-	-	18.9	2.1
111003010403	Deep Creek	8	0	5	6	-	-	-	-	-	-	3	0	43	12	-	-	-	18.8	2.1
111003010303	Camp Creek	11	0	4	5	-	-	-	-	-	-	2	0	38	11	-	-	-	16.2	1.8
111003010506	Weaver Creek	10	0	4	4	-	-	-	-	-	-	-	-	13	4	6	2	-	10.3	1.1
111003010302	Kizer Creek	10	0	4	5	-	-	-	-	-	-	1	0	8	2	-	-	-	7.8	0.9
111003010501	Minnehaha Creek	22	1	5	6	-	-	-	-	-	-	-	-	5	1	3	1	-	9.1	1.0
111003010503	North Canadian River	30	1	7	8	-	-	-	-	-	-	-	-	1	0	1	0	-	8.9	1.0
111003010405	Seiling Creek-North Canadian River	27	1	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	10.1	1.1
111003010502	Ninemile Creek	42	1	4	5	-	-	-	-	-	-	-	-	-	-	-	-	-	6.3	0.7
111003010407	Upper Canton Lake	3	0	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	5.4	0.6
111003010408	Lower Canton Lake	7	0	4	5	-	-	-	-	-	-	-	-	-	-	-	-	-	5.1	0.6
111003010406	North Canadian River	3	0	4	5	-	-	-	-	-	-	-	-	-	-	-	-	-	5.0	0.6
111003010504	North Canadian River	3	0	4	5	-	-	-	-	-	-	-	-	-	-	-	-	-	4.8	0.5

Table D.2: Repetitive Loss Information

HUC 8	HUC 8 Name	HUC 12	HUC 12 Name	Repetitive Losses	Number of Claims	Total Paid
11070206	Lake O Cherokees	110702060106	Tar Creek	67	300	\$ 8,586,141
11070206	Lake O Cherokees	110702060108	Hudson Creek-Neosho River	40	161	\$ 4,105,161
11050002	Lower Cimarron-Skeleton	110500020810	Outlet Cottonwood Creek	51	187	\$ 2,500,846
11110101	Polecat-Snake	111101010302	Euchee Creek-Arkansas River	45	129	\$ 2,338,763
11050002	Lower Cimarron-Skeleton	110500020711	Lower Kingfisher Creek	44	126	\$ 2,309,264
11070106	Caney	110701060702	Rich Creek-Caney River	9	50	\$ 1,749,439
11110101	Polecat-Snake	111101010304	Mooser Creek-Arkansas River	78	191	\$ 1,684,926
11070105	Lower Verdigris	110701050303	Adams Creek	17	55	\$ 1,666,740
11110102	Dirty-Greenleaf	111101020304	Lower Cody Creek	14	55	\$ 1,666,145
11070107	Bird	110701070403	Mingo Creek	31	87	\$ 1,585,417
11070206	Lake O Cherokees	110702060107	Coal Creek-Neosho River	23	75	\$ 1,371,933
11070107	Bird	110701070307	Charlie Creek-Bird Creek	25	111	\$ 1,306,848
11090202	Lower Canadian-Walnut	110902020303	Pond Creek-Canadian River	10	28	\$ 1,277,378
11050002	Lower Cimarron-Skeleton	110500020807	Chisholm Creek	6	24	\$ 1,240,580
11070105	Lower Verdigris	110701050304	Inola Creek	7	33	\$ 1,228,117
11130302	Upper Washita	111303020912	Otter Creek-Washita River	11	29	\$ 1,119,530
11130302	Upper Washita	111303020909	Rock Hollow Creek	15	39	\$ 1,089,356
11100302	Lower North Canadian	111003020102	Lightning Creek-North Canadian River	19	45	\$ 1,064,306
11130202	Cache	111302020302	Wolf Creek	15	74	\$ 912,252
11110101	Polecat-Snake	111101010502	Broken Arrow Creek-Arkansas River	8	29	\$ 905,214
11100303	Deep Fork	111003030101	111003030101-Deep Fork of Canadian River	24	83	\$ 903,080
11070106	Caney	110701060507	Post Oak Creek-Caney River	8	40	\$ 881,546
11070105	Lower Verdigris	110701050104	Cat Creek-Dog Creek	7	40	\$ 797,730
11070107	Bird	110701070402	Flat Rock Creek-Bird Creek	11	41	\$ 759,255
11110101	Polecat-Snake	111101010108	Euchee Creek	19	58	\$ 753,748
11110101	Polecat-Snake	111101010206	Duck Creek	5	26	\$ 656,021
11050002	Lower Cimarron-Skeleton	110500020801	Bluff Creek	16	44	\$ 630,397
11070107	Bird	110701070401	Delaware Creek	7	35	\$ 598,575
11130203	West Cache	111302030506	Rock Creek-West Cache Creek	6	19	\$ 593,539
11100301	Middle North Canadian	111003010703	Purcell Creek	3	13	\$ 580,003
11130202	Cache	111302020303	Lake George-East Cache Creek	16	47	\$ 568,982
11070106	Caney	110701060506	Lower Coon Creek	4	16	\$ 522,343
11100302	Lower North Canadian	111003020206	Lost Creek-North Canadian River	10	39	\$ 517,615
11110101	Polecat-Snake	111101010111	Nickel Creek	8	18	\$ 508,035
11110101	Polecat-Snake	111101010506	Coal Creek-Arkansas River	10	35	\$ 493,552
11100302	Lower North Canadian	111003020103	Brock Creek-North Canadian River	13	29	\$ 454,616
11100302	Lower North Canadian	111003020107	Silver Creek-North Canadian River	5	15	\$ 431,822
11090203	Little	110902030102	Mussel School Lake	3	17	\$ 410,213
11100302	Lower North Canadian	111003020105	Crooked Oak Creek-North Canadian River	5	14	\$ 386,164
11060001	Kaw Lake	110600010504	City of Ponca City-Arkansas River	9	25	\$ 345,596
11060005	Chikaskia	110600050708	City of Blackwell-Chikaskia River	12	35	\$ 334,566
11110101	Polecat-Snake	111101010110	City of Sapulpa-Polecat Creek	3	9	\$ 299,040
11090202	Lower Canadian-Walnut	110902020302	Coal Creek-Canadian River	4	12	\$ 289,027
11110102	Dirty-Greenleaf	111101020302	Lower Manard Bayou	3	12	\$ 265,004
11100303	Deep Fork	111003030104	Coffee Creek	1	9	\$ 261,646
11070209	Lower Neosho	110702090405	Mud Creek-Pryor Creek	2	6	\$ 250,600
11140107	Upper Little	111401070406	Mud Creek-Rock Creek	5	13	\$ 231,202
11100303	Deep Fork	111003030103	Arcadia Lake-Deep Fork of Canadian River	3	8	\$ 227,273
11100303	Deep Fork	111003030907	Long Branch	1	2	\$ 224,445
11050002	Lower Cimarron-Skeleton	110500020710	Middle Kingfisher Creek	3	6	\$ 209,531
11130208	Northern Beaver	111302080302	Willow creek	5	23	\$ 207,944
11110103	Illinois	111101030801	Black Fox Springs-Illinois River	6	13	\$ 206,779
11110101	Polecat-Snake	111101010207	Lower Snake Creek	4	15	\$ 206,671
11110101	Polecat-Snake	111101010303	Harlow Creek-Arkansas River	7	15	\$ 200,318
11130202	Cache	111302020104	Elmer Thomas Lake-Medicine Creek	1	4	\$ 193,269
11070106	Caney	110701060607	Outlet Sand Creek	5	15	\$ 188,644
11070209	Lower Neosho	110702090507	Hudson Lake Dam-Neosho River	3	11	\$ 183,236
11110101	Polecat-Snake	111101010305	Posey Creek-Arkansas River	11	29	\$ 166,468
11060004	Lower Salt Fork Arkansas	110600040903	Lower Bois d' Arc Creek	7	16	\$ 166,249
11050002	Lower Cimarron-Skeleton	110500021107	110500021107-Cimarron River	1	2	\$ 161,010
11100301	Middle North Canadian	111003010705	111003010705-North Canadian River	1	3	\$ 160,262
11100302	Lower North Canadian	111003020104	Crutcho Creek	6	17	\$ 156,238
11100301	Middle North Canadian	111003010706	111003010706-North Canadian River	3	9	\$ 151,193
11070106	Caney	110701060710	Sanders Creek Caney River	3	7	\$ 148,410
11100302	Lower North Canadian	111003020205	Squirrel Creek	3	6	\$ 147,032
11090202	Lower Canadian-Walnut	110902020305	Bishop Creek-Canadian River	5	17	\$ 146,236
11090202	Lower Canadian-Walnut	110902020304	Boggy Creek-Canadian River	2	5	\$ 146,010
11110101	Polecat-Snake	111101010501	Haikey Creek	7	16	\$ 140,937
11050003	Lower Cimarron	110500030106	Boomer Lake-Stillwater Creek	4	11	\$ 135,595
11130203	West Cache	111302030502	Upper Post Oak Creek	2	5	\$ 126,322
11070107	Bird	110701070404	Ranch Creek-Bird Creek	5	11	\$ 120,406
11130203	West Cache	111302030601	Husher Field	1	2	\$ 116,920
11060004	Lower Salt Fork Arkansas	110600040807	Town of Eddy-Salt Fork Arkansas River	1	4	\$ 112,502
11060003	Medicine Lodge	110600030306	Lower Driftwood Creek	3	6	\$ 100,428
11100303	Deep Fork	111003030308	Lower Bellcow Creek	3	12	\$ 88,898
11070105	Lower Verdigris	110701050204	Spunky Creek	3	6	\$ 86,697
11110101	Polecat-Snake	111101010504	Concharty Creek	1	2	\$ 85,715
11110102	Dirty-Greenleaf	111101020301	Upper Manard Bayou	1	2	\$ 79,814
11110101	Polecat-Snake	111101010109	Skull Creek-Polecat Creek	3	6	\$ 76,522
11110103	Illinois	111101030803	Dumpling Hollow-Illinois River	2	4	\$ 76,405
11110101	Polecat-Snake	111101010503	Cedar Creek-Arkansas River	1	2	\$ 65,803
11130210	Lake Texoma	111302100101	Headwaters Hickory Creek	1	3	\$ 63,682
11070105	Lower Verdigris	110701050201	Fourmile Creek	1	2	\$ 58,983
11100301	Middle North Canadian	111003010708	Lake Overholser-North Canadian River	6	12	\$ 58,453
11130303	Middle Washita	111303030205	Outlet Rush Creek	2	4	\$ 57,376
11100301	Middle North Canadian	111003010709	Campbell Creek-North Canadian River	3	7	\$ 56,993
11120303	Lower North Fork Red	111203030508	White Lake	1	4	\$ 54,742
11130203	West Cache	111302030102	Lake Frederick-Deep Red Creek	1	2	\$ 48,908
11100302	Lower North Canadian	111003020101	111003020101-North Canadian River	1	2	\$ 47,396
11060005	Chikaskia	110600050606	Rock Falls-Chikaskia River	1	11	\$ 44,615

Table D.2: Repetitive Loss Information

HUC 8	HUC 8 Name	HUC 12	HUC 12 Name	Repetitive Losses	Number of Claims	Total Paid
11120303	Lower North Fork Red	111203030203	City of Hobart Creek-Elk Creek	1	3	\$ 43,444
11100301	Middle North Canadian	111003010606	Target Creek-North Canadian River	1	3	\$ 43,333
11110103	Illinois	111101030802	Scraper Hollow-Baron Fork	1	2	\$ 42,264
11130208	Northern Beaver	111302080210	Goode Creek	1	5	\$ 42,151
11090202	Lower Canadian-Walnut	110902020301	Dry Creek-Canadian River	1	2	\$ 41,590
11050002	Lower Cimarron-Skeleton	110500020605	Lower Uncle Johns Creek	1	2	\$ 38,126
11110104	Robert S	111101040610	Garrison Creek	2	4	\$ 37,630
11050002	Lower Cimarron-Skeleton	110500020903	Hackberry Creek	1	2	\$ 37,006
11070106	Caney	110701060706	Timberlake Creek-Caney River	1	2	\$ 36,127
11070105	Lower Verdigris	110701050406	Coal Creek	1	2	\$ 36,110
11110103	Illinois	111101030907	Tenkiller Ferry Lake Dam	1	2	\$ 35,916
11130303	Middle Washita	111303030109	Rounds Creek-Washita River	2	4	\$ 33,477
11130208	Northern Beaver	111302080303	111302080303-Cow Creek	2	4	\$ 33,405
11060006	Black Bear-Red Rock	110600060606	Doga Creek	1	4	\$ 32,205
11070209	Lower Neosho	110702090508	Crutchfield Branch-Neosho River	1	2	\$ 31,771
11110102	Dirty-Greenleaf	111101020307	Horseshoe Lake-Arkansas River	2	4	\$ 30,053
11130201	Farmers-Mud	111302010601	Headwaters Walnut Bayou Creek	1	3	\$ 29,925
11070206	Lake O Cherokees	110702060406	Pensacola Dam-Lake O' The Cherokees	3	8	\$ 29,296
11110102	Dirty-Greenleaf	111101020312	Sand Creek-Arkansas River	1	2	\$ 28,807
11110104	Robert S	111101040108	Little Sallisaw Creek	1	2	\$ 28,637
11100303	Deep Fork	111003030102	111003030102-Deep Fork of Canadian River	1	4	\$ 28,500
11110105	Poteau	111101050608	Double Branch Creek-Poteau River	1	5	\$ 28,487
11090202	Lower Canadian-Walnut	110902020204	Middle Walnut Creek	1	2	\$ 27,098
11070107	Bird	110701070306	Skalall Creek-Bird Creek	1	2	\$ 26,415
11070107	Bird	110701070405	Elm Creek-Bird Creek	2	6	\$ 25,966
11090202	Lower Canadian-Walnut	110902020503	Rose Lake-Canadian River	2	4	\$ 24,917
11070206	Lake O Cherokees	110702060203	Sycamore Creek	1	4	\$ 24,521
11100301	Middle North Canadian	111003010203	Spring Creek-North Canadian River	2	4	\$ 23,872
11070106	Caney	110701060711	Hobbs Creek-Caney Creek	1	2	\$ 21,093
11140104	Clear Boggy	111401040102	Headwaters Clear Boggy Creek	1	3	\$ 20,967
11050002	Lower Cimarron-Skeleton	110500020902	Boggy Creek	2	4	\$ 20,814
11060004	Lower Salt Fork Arkansas	110600040604	Lower Osage Creek	1	2	\$ 20,653
11090203	Little	110902030302	Prairie Creek-Little River	1	2	\$ 19,345
11140102	Blue	111401020201	Mineral Bayou	1	3	\$ 19,082
11070206	Lake O Cherokees	110702060204	Ogeechee-Lake O' The Cherokees	1	2	\$ 18,816
11110104	Robert S	111101040104	Middle Sallisaw Creek	1	2	\$ 17,843
11110101	Polecat-Snake	111101010107	Rock Creek	1	2	\$ 16,699
11070206	Lake O Cherokees	110702060401	Wolf Creek-Lake O' The Cherokees	1	2	\$ 15,968
11070209	Lower Neosho	110702090502	Rock Creek	1	3	\$ 15,773
11060001	Kaw Lake	110600010502	Ponca Lake	2	5	\$ 15,527
11050002	Lower Cimarron-Skeleton	110500020802	Upper Deer Creek	1	2	\$ 15,435
11070105	Lower Verdigris	110701050102	Lake Claremore Dam	1	2	\$ 14,693
11100302	Lower North Canadian	111003020106	Choctaw Creek	1	4	\$ 13,625
11100302	Lower North Canadian	111003020301	Rock Creek	1	3	\$ 13,149
11060004	Lower Salt Fork Arkansas	110600040304	Cottonwood Creek	1	2	\$ 12,542
11070107	Bird	110701070104	Buffalo Creek-Bird Creek	1	2	\$ 11,257
11090202	Lower Canadian-Walnut	110902020205	Lower Walnut Creek	1	2	\$ 10,794
11060004	Lower Salt Fork Arkansas	110600040808	Town of Tonkawa-Salt Fork Arkansas River	1	3	\$ 10,527
11050002	Lower Cimarron-Skeleton	110500020101	Sand Creek	1	2	\$ 10,414
11110102	Dirty-Greenleaf	111101020303	Upper Cody Creek	1	3	\$ 7,731
11050002	Lower Cimarron-Skeleton	110500020901	110500020901-Skeleton Creek	1	3	\$ 5,333
11120303	Lower North Fork Red	111203030503	City of Altus-Stinking Creek	1	2	\$ 5,164
11130302	Upper Washita	111303020208	City of Clinton-Washita River	1	2	\$ 4,936
11100302	Lower North Canadian	111003020202	North Deer Creek	1	2	\$ 4,348
11130210	Lake Texoma	111302100302	Little Hauani Creek	1	2	\$ 4,210
11100303	Deep Fork	111003031004	Coal Creek	1	2	\$ 3,595
				955	3100	\$ 60,224,986

Table D.3: Discovery Recommendations (GLOC, LNC, MNC, PS, LVR)

Watershed Name	Project Name	Project Length	Project Cost
LNC	Crutcho and Cherry Creek	14.50	
LNC	Pottawatomie Co, Shawnee	40.00	
LNC	Crutcho Creek Trib D	1.10	
LNC	North Canadian River Unnamed Trib, Potawatomi	1.70	
LNC	Brock Creek, OKC	3.60	
LNC	Twin Creek, OKC	4.97	
MNC	Updating the FIRM and FIS for Campbell Creek, Canadian and Oklahoma Counties.	13.00	\$ 317,000
LNC	Lightening Creek	1.50	
LNC	Unnamed Trib, OK County	1.70	
GLOC	Tar Creek	7.50	
LNC	North Canadian River Trib 12, OK County	0.80	
PS	Updating the FIRM and FIS for Joe Creek, Tulsa County.	12.87	\$ 322,000
LNC	North Canadian River Trib 12, OK County	1.35	
LNC	Unnamed Trib to Trib 2	1.10	
LNC	Soldier Creek Tributary 6	1.70	
LVR	Updating the FIRM and FIS for Cat Creek and Dog Creek in Rogers County	14.00	\$ 351,000
LNC	Seminole Co.	81.00	
MNC	Updating the FIRM and FIS for North Canadian River Tributary 14, Oklahoma County.	3.35	\$ 84,000
LNC	Silver Creek Trib 2	1.80	
LNC	Squirrel Creek, Potawatomi	6.80	
LNC	Crutcho Creek Trib G	0.60	
GLOC	Quail Creek	3.33	
LNC	Squirrel Creek Trib 2	1.10	
LNC	Trib A, Seminole Co	3.60	
PS	Updating the FIRM and FIS for Crow Creek, Tulsa County.	1.84	\$ 35,000
LNC	Deer Creek, Potawatomi	4.30	
LNC	Unnamed Trib to Choctaw	0.70	
MNC	Updating the FIRM and FIS for Turtle Creek, Canadian County.	8.30	\$ 208,000
LNC	Unnamed Trib to Wewoka Creek, City of Seminole	0.70	
LNC	North Canadian River, OK County	14.86	
LVR	Updating the FIRM and FIS for Adams Creek, Tulsa and Wagoner Counties	57.23	\$ 1,413,000
GLOC	Belmont Run	3.33	
MNC	Updating the FIRM and FIS for Mustang Creek, City of Mustang and Canadian County.	32.55	\$ 814,000
PS	Updating the FIRM and FIS for Red Fork Creek, Tulsa County.	0.66	\$ 17,000
GLOC	Neosho River	4.90	
MNC	Updating the FIRM and FIS for Purcell Creek, Canadian County.	31.07	\$ 777,000
LVR	Updating the FIRM and FIS for Spunky Creek, Rogers, Tulsa and Wagoner Counties	19.61	\$ 491,000
PS	Updating the FIRM and FIS for Mooser Creek, Tulsa County.	4.74	\$ 119,000
MNC	Updating the FIRM and FIS for North Canadian River, Canadian, Oklahoma and Woodward Co	120.19	\$ 2,616,000
GLOC	Fairground Branch	2.37	
PS	Updating the FIRM and FIS for Elm Creek, Tulsa County.	4.00	\$ 41,000
LVR	Updating the FIRM and FIS for Inola Creek, Rogers County	27.87	\$ 697,000
MNC	Updating the FIRM and FIS for Shell Creek, Canadian County.	28.88	\$ 723,000
GLOC	Lost Creek	3.58	
MNC	Updating the FIRM and FIS for Fourmile Creek, Canadian County.	18.30	\$ 120,000
PS	Updating the FIRM and FIS for Aspen Creek, Tulsa County.	7.14	\$ 72,000
GLOC	Horse Creek	12.36	
LVR	Updating the FIRM and FIS for Commodore Creek- Verdigris River	35.76	\$ 547,000
MNC	Updating the FIRM and FIS for City of Woodward, Woodward County.	22.35	\$ 528,000
PS	Updating the FIRM and FIS for Broken Arrow Creek, Tulsa and Wagoner County.	24.94	\$ 603,000
GLOC	Spring Branch	1.74	
MNC	Updating the FIRM and FIS for Sixmile Creek and Tributary, El Reno and Canadian County.	45.95	\$ 982,000
LVR	Updating the FIRM and FIS for Moss Creek-Verdigris River for Rogers County	50.66	\$ 1,247,000
PS	Updating the FIRM and FIS for Haikey Creek, Tulsa County.	8.23	\$ 157,000
MNC	Updating the FIRM and FIS for Laughlin Lake, Canadian County.	1.22	\$ 3,158,000
GLOC	North Trib to Spring Creek	1.43	
MNC	Updating the FIRM and FIS for City of Watonga, Blain County.	5.99	\$ 114,000
PS	Updating the FIRM and FIS for White Church Creek, Tulsa County.	4.09	\$ 103,000
LVR	Updating the FIRM and FIS for Four Mile Creek for Rogers County	47.26	\$ 309,000
GLOC	Grand Lake	476.00	
MNC	Modernize unmapped segments of North Canadian River, Blain, Dewey and Major County.	84.55	\$ 1,607,000
PS	Updating the FIRM and FIS for Nickel Creek, Creek County.	6.65	\$ 167,000
LVR	Updating the FIRM and FIS for East Coal for Wagoner County	0.11	\$ 3,000
MNC	Updating the FIRM and FIS for South Persimmon Creek, Woodward County.	9.95	\$ 190,000
PS	Updating the FIRM and FIS for Coal Creek, Tulsa County.	20.32	\$ 387,000
MNC	Updating the FIRM and FIS for Indian Creek, Woodward County.	21.44	\$ 408,000
LVR	Updating the FIRM and FIS for Fife Creek for Wagoner County	26.20	\$ 656,000
MNC	Updating the FIRM and FIS for Persimmon Creek, Woodward County.	45.05	\$ 856,000
PS	Updating the FIRM and FIS for Hager Creek, Tulsa County.	4.02	\$ 77,000
MNC	Updating of CNMS for Unverified (0 miles - covered in projects above) and Unknown (123 miles)	123.41	\$ 100,000
PS	Updating the FIRM and FIS for Wilmott Creek, Tulsa County.	1.27	\$ 32,000
LVR	Updating the FIRM and FIS for Lake Claremore Dam for Rogers County	14.77	\$ 242,000
MNC	Confirming of CNMS Verified (700 miles) Stream Segments	156.26	\$ 1,100,000
PS	Updating the FIRM and FIS for Fry Creek, Tulsa County.	5.54	\$ 106,000
LVR	Updating the FIRM and FIS for Salt Creek for Wagoner County	43.73	\$ -
PS	Updating the FIRM and FIS for Harlow Creek, Bigheart Creek and West Bigheart Creek, Osage	20.59	\$ 392,000
LVR	Updating the FIRM and FIS for Port of Dunkin-Verdigris River for Rogers County	14.45	\$ -
PS	Updating the FIRM and FIS for Bixby Creek, Tulsa County.	1.00	\$ 10,000
PS	Updating the FIRM and FIS for Vensel Creek, Tulsa County.	4.57	\$ 115,000
PS	Updating the FIRM and FIS for Polecat Creek, Creek and Tulsa County.	17.07	\$ 427,000
PS	Updating the FIRM and FIS for Haskell Creek, Muskogee County.	7.46	\$ 142,000
PS	Updating the FIRM and FIS for Arkansas River, Muskogee County.	4.62	\$ 116,000
PS	Updating the FIRM and FIS for Coweta Creek, Wagoner County.	15.81	\$ 301,000
PS	Updating the FIRM and FIS for Snake Creek, Tulsa County.	15.65	\$ 392,000
PS	Updating the FIRM and FIS for Rock Creek, Tulsa County.	10.48	\$ 263,000
PS	Updating the FIRM and FIS for Childres Creek, Creek County.	11.20	\$ 213,000
PS	Updating of CNMS for Unverified (5 miles) and Unknown (51 miles) Stream Segments	56.38	\$ 100,000
PS	Confirming of CNMS Verified (700 miles) Stream Segments	1,102.45	\$ 1,700,000

Table D.4: Oklahoma Project Listing for MNC, LVR and PS

HUC 8 Name	HUC 12	HUC 12 Name	Project Name	Project Length	Project Cost	Comp.	Simp.
MNC			Confirming of CNMS Verified (700 miles) Stream Segments	156.26	\$ 1,100,000	N/A	N/A
MNC			Updating of CNMS for Unverified (0 miles - covered in projects above) and Unknown (123 miles) Stream Segments	123.41	\$ 100,000	N/A	N/A
MNC			Updating the FIRM and FIS for City of Watonga, Blain County.	5.99	\$ 114,000	N/A	N/A
PC			Updating of CNMS for Unverified (5 miles) and Unknown (51 miles) Stream Segments	56.38	\$ 100,000	N/A	N/A
PC			Confirming of CNMS Verified (700 miles) Stream Segments	1,102.45	\$ 1,700,000	N/A	N/A
PS	111101010304	Mooser Creek-Arkansas River	Updating the FIRM and FIS for Joe Creek, Tulsa County	12.87	\$ 322,000	68.56	59.00
PS	111101010304	Mooser Creek-Arkansas River	Updating the FIRM and FIS for Crow Creek, Tulsa County	1.84	\$ 35,000	68.56	59.00
PS	111101010304	Mooser Creek-Arkansas River	Updating the FIRM and FIS for Red Fork Creek, Tulsa County	0.66	\$ 17,000	68.56	59.00
PS	111101010304	Mooser Creek-Arkansas River	Updating the FIRM and FIS for Mooser Creek, Tulsa County	4.74	\$ 119,000	68.56	59.00
LVR	110701050303	Adams Creek	Updating the FIRM and FIS for Adams Creek, Tulsa and Wagoner Counties	57.23	\$ 1,413,000	50.40	67.00
LVR	110701050104	Cat Creek-Dog Creek	Updating the FIRM and FIS for Cat Creek and Dog Creek in Rogers County	14.00	\$ 351,000	45.79	54.25
PS	111101010502	Broken Arrow Creek-Arkansas River	Updating the FIRM and FIS for Elm Creek, Tulsa County	4.00	\$ 41,000	42.09	53.50
PS	111101010502	Broken Arrow Creek-Arkansas River	Updating the FIRM and FIS for Aspen Creek, Tulsa County	7.14	\$ 72,000	42.09	53.50
PS	111101010502	Broken Arrow Creek-Arkansas River	Updating the FIRM and FIS for Broken Arrow Creek, Tulsa and Wagoner County	24.94	\$ 603,000	42.09	53.50
PS	111101010501	Haikey Creek	Updating the FIRM and FIS for Haikey Creek, Tulsa County	8.23	\$ 157,000	42.05	33.25
PS	111101010501	Haikey Creek	Updating the FIRM and FIS for White Church Creek, Tulsa County	4.09	\$ 103,000	42.05	33.25
LVR	110701050304	Inola Creek	Updating the FIRM and FIS for Inola Creek, Rogers County	27.87	\$ 697,000	38.49	54.50
MNC	111003010708	Lake Overholser-North Canadian River	Updating the FIRM and FIS for North Canadian River, Canadian, Oklahoma and Woodward County	120.19	\$ 2,616,000	37.10	32.75
PS	111101010111	Nickel Creek	Updating the FIRM and FIS for Nickel Creek, Creek County	6.65	\$ 167,000	35.63	31.50
PS	111101010111	Nickel Creek	Updating the FIRM and FIS for Coal Creek, Tulsa County	20.32	\$ 387,000	35.63	31.50
PS	111101010111	Nickel Creek	Updating the FIRM and FIS for Hager Creek, Tulsa County	4.02	\$ 77,000	35.63	31.50
PS	111101010111	Nickel Creek	Updating the FIRM and FIS for Wilmott Creek, Tulsa County	1.27	\$ 32,000	35.63	31.50
MNC	111003010709	Campbell Creek-North Canadian River	Updating the FIRM and FIS for Campbell Creek, Canadian and Oklahoma Counties	13.00	\$ 317,000	33.17	28.75
MNC	111003010709	Campbell Creek-North Canadian River	Updating the FIRM and FIS for North Canadian River Tributary 14, Oklahoma County	3.35	\$ 84,000	33.17	28.75
MNC	111003010706	North Canadian River	Updating the FIRM and FIS for Turtle Creek, Canadian County	8.30	\$ 208,000	33.12	31.25
MNC	111003010707		Updating the FIRM and FIS for Mustang Creek, City of Mustang and Canadian County.	32.55	\$ 814,000	30.91	N/A
PS	111101010303	Harlow Creek-Arkansas River	Updating the FIRM and FIS for Harlow Creek, Bigheart Creek and West Bigheart Creek, Osage and Tulsa County	20.59	\$ 392,000	30.84	22.00
LVR	110701050306		Updating the FIRM and FIS for Commodore Creek- Verdigris River	35.76	\$ 547,000	30.08	N/A
LVR	110701050204	Spunky Creek	Updating the FIRM and FIS for Spunky Creek, Rogers, Tulsa and Wagoner Counties	19.61	\$ 491,000	29.79	26.50
LVR	110701050405		Updating the FIRM and FIS for Port of Dunkin-Verdigris River for Rogers County	14.45	\$ 362,000	29.12	N/A
PS	111101010305	Posey Creek-Arkansas River	Updating the FIRM and FIS for Fry Creek, Tulsa County	5.54	\$ 106,000	27.96	19.25
PS	111101010305	Posey Creek-Arkansas River	Updating the FIRM and FIS for Bixby Creek, Tulsa County	1.00	\$ 10,000	27.96	19.25
PS	111101010305	Posey Creek-Arkansas River	Updating the FIRM and FIS for Vensel Creek, Tulsa County	4.57	\$ 115,000	27.96	19.25
PS	111101010506	Coal Creek-Arkansas River	Updating the FIRM and FIS for Haskell Creek, Muskogee County	7.46	\$ 142,000	26.21	44.25
PS	111101010506	Coal Creek-Arkansas River	Updating the FIRM and FIS for Arkansas River, Muskogee County	4.62	\$ 116,000	26.21	44.25
PS	111101010506	Coal Creek-Arkansas River	Updating the FIRM and FIS for Coweta Creek, Wagoner County	15.81	\$ 301,000	26.21	44.25
LVR	110701050205		Updating the FIRM and FIS for Moss Creek-Verdigris River for Rogers County	50.66	\$ 1,097,000	26.11	N/A
PS	111101010110	City of Sapulpa-Polecat Creek	Updating the FIRM and FIS for Polecat Creek, Creek and Tulsa County	17.07	\$ 427,000	22.33	10.75
MNC	111003010704		Updating the FIRM and FIS for Shell Creek, Canadian County.	28.88	\$ 723,000	22.32	N/A
LVR	110701050301		Updating the FIRM and FIS for Salt Creek for Wagoner County	43.73	\$ 371,000	21.73	N/A
LVR	110701050402		Updating the FIRM and FIS for Fife Creek for Wagoner County	26.20	\$ 656,000	21.07	N/A
LVR	110701050102	Lake Claremore Dam	Updating the FIRM and FIS for Lake Claremore Dam for Rogers County	14.77	\$ 242,000	19.86	14.75
MNC	111003010703	Purcell Creek	Updating the FIRM and FIS for Purcell Creek, Canadian County	31.07	\$ 777,000	17.54	29.00
LVR	110701050201		Updating the FIRM and FIS for Four Mile Creek for Rogers County	47.26	\$ 309,000	17.31	N/A
MNC	111003010701		Updating the FIRM and FIS for Sixmile Creek and Tributary, El Reno and Canadian County.	45.95	\$ 982,000	16.26	N/A
PS	111101010207	Lower Snake Creek	Updating the FIRM and FIS for Snake Creek, Tulsa County	15.65	\$ 392,000	16.14	10.50
MNC	111003010604		Updating the FIRM and FIS for Laughlin Lake, Canadian County.	1.22	\$ 3,158,000	16.08	N/A
MNC	111003010702	Fourmile Creek-North Canadian River	Updating the FIRM and FIS for Fourmile Creek, Canadian County	18.30	\$ 120,000	14.68	9.25
PS	111101010107		Updating the FIRM and FIS for Rock Creek, Tulsa County.	10.48	\$ 263,000	13.61	N/A
MNC	111003010203	Spring Creek-North Canadian River	Updating the FIRM and FIS for City of Woodward, Woodward County	22.35	\$ 528,000	12.55	17.00
LVR	110701050406	Coal Creek	Updating the FIRM and FIS for East Coal for Wagoner County	0.11	\$ 3,000	11.08	14.50
PS	111101010109	Skull Creek-Polecat Creek	Updating the FIRM and FIS for Childres Creek, Creek County	11.20	\$ 213,000	9.05	10.50
MNC	111003010105		Updating the FIRM and FIS for Persimmon Creek, Woodward County.	45.05	\$ 856,000	8.14	N/A
MNC	111003010206		Updating the FIRM and FIS for Indian Creek, Woodward County.	21.44	\$ 408,000	4.78	N/A
MNC	111003010505		Modernize unmapped segments of North Canadian River, Blain, Dewey and Major County.	84.55	\$ 1,607,000	4.11	N/A
MNC	111003010102		Updating the FIRM and FIS for South Persimmon Creek, Woodward County.	9.95	\$ 190,000	3.87	N/A

Table D.5: Oklahoma HUC 12 Listing for MNC, LVR and PS - 2013 Criteria

		Ranking Weight ==>	1	1	1	1	1	1	1	1			
		Maximum Values ==>	2,338,763	3,196	356	305							
HUC 8	HUC 12	Project	RL properties	RLs Ranks	Population Density Per Square Mile	PD/SM Rank	Effective Study Age	Age Rank	Validation Status	VS Ranks	2012-2013 Projects	Sum	(1-100)
LVR	110701050303	Adams Creek	\$1,666,740	71	445	14	296	83	305	100	X	268	67.00
PS	111101010304	Mooser Creek-Arkansas River	\$1,684,926	72	2,679	84	210	59	63	21	X	236	59.00
LVR	110701050304	Inola Creek	\$1,228,117	53	136	4	356	100	187	61		218	54.50
LVR	110701050104	Cat Creek-Dog Creek	\$ 797,730	34	884	28	234	66	272	89	X	217	54.25
PS	111101010502	Broken Arrow Creek-Arkansas River	\$ 905,214	39	642	20	273	77	238	78	*	214	53.50
PS	111101010506	Coal Creek-Arkansas River	\$ 493,552	21	231	7	188	53	292	96	X	177	44.25
PS	111101010302	Euchee Creek-Arkansas River	\$2,338,763	100	487	15	80	22	95	31		168	42.00
PS	111101010501	Haikey Creek	\$ 140,937	6	2,286	72	169	47	26	8		133	33.25
MNC	111003010708	Lake Overholser-North Canadian River	\$ 58,453	2	3,196	100	36	10	57	19	X	131	32.75
PS	111101010111	Nickel Creek	\$ 508,035	22	776	24	181	51	88	29		126	31.50
MNC	111003010706	North Canadian River	\$ 151,193	6	1,009	32	120	34	163	53	X	125	31.25
MNC	111003010703	Purcell Creek	\$ 580,003	25	741	23	62	17	155	51		116	29.00
MNC	111003010709	Campbell Creek-North Canadian River	\$ 56,993	2	1,240	39	100	28	140	46		115	28.75
PS	111101010206	Duck Creek	\$ 656,021	28	105	3	167	47	105	34		112	28.00
LVR	110701050204	Spunky Creek	\$ 86,697	4	605	19	136	38	137	45		106	26.50
PS	111101010303	Harlow Creek-Arkansas River	\$ 200,318	9	660	21	119	33	77	25		88	22.00
PS	111101010305	Posey Creek-Arkansas River	\$ 166,468	7	973	30	123	35	16	5		77	19.25
MNC	111003010203	Spring Creek-North Canadian River	\$ 23,872	1	266	8	181	51	24	8		68	17.00
PS	111101010108	Euchee Creek	\$ 753,748	32	414	13	45	13	7	2		60	15.00
LVR	110701050102	Lake Claremore Dam	\$ 14,693	1	143	4	125	35	58	19		59	14.75
LVR	110701050406	Coal Creek	\$ 36,110	2	165	5	84	24	82	27		58	14.50
PS	111101010110	City of Sapulpa-Polecat Creek	\$ 299,040	13	442	14	58	16	-	-		43	10.75
PS	111101010109	Skull Creek-Polecat Creek	\$ 76,522	3	206	6	90	25	24	8		42	10.50
PS	111101010504	Concharty Creek	\$ 85,715	4	30	1	50	14	69	23		42	10.50
PS	111101010207	Lower Snake Creek	\$ 206,671	9	111	3	22	6	73	24		42	10.50
MNC	111003010702	Fourmile Creek-North Canadian River	\$ 58,983	3	82	3	93	26	14	5		37	9.25

Appendix E

2013-2017 Schedule of Activities and Budget Projections

Table E.1: Risk MAP Flood Studies (RMFS) Unit Cost Assumptions

Activity Classification and Description			\$/miles	New Detailed	Uppgraded Detailed	Non-Regulatory				
PM and Outreach	Project Administration	FEMA Tracking, Invoicing, Scheduling, Progress Meetings, etc.	10% cost	10% cost	10% cost	10% cost				
Mapping Detailed - HUC-8 Level	Base Map Preparation	Base Map Preparation	\$ 3,535.53	\$ 4,094.15	\$ 4,094.15					
		Independent QA/QC of Base Map	\$ 530.33							
		Base Map Data 1 meter Orthophoto	\$ 4.71							
		Base Map Data 1 foot Orthophotos	\$ 23.57							
	Field Surveys	Field Surveys	\$ 3,100.00	\$ 3,600.00	\$ 3,600.00	\$ 3,600.00				
		QA/QC of Field Surveys	\$ 500.00							
	Detailed Riverine		Hydrologic Analysis (Rainfall Runoff)	\$ 3,000.00	\$ 9,650.00					
			Independent QA/QC of Hydrologic Analysis (Rainfall Runoff)	\$ 300.00						
			Hydraulic Analysis (1D Steady State Analysis)	\$ 3,000.00						
			Independent QA/QC of Hydraulic Analysis (1D Steady State Analysis)	\$ 475.00						
			Floodway Analysis	\$ 1,000.00				\$ 1,175.00		
			Independent QA/QC of Floodway Analysis	\$ 175.00						
			Floodplain Mapping	\$ 1,000.00				\$ 1,125.00		
			Independent QA/QC of Floodplain Mapping	\$ 125.00						
Mapping Limited - HUC-12 Level	Limited Detail Riverine	Hydrologic Analysis	\$ 1,000.00							
		Independent QA/QC of Hydrologic Analysis	\$ 150.00							
		Hydraulic Analysis	\$ 1,600.00							
		Independent QA/QC of Hydraulic Analysis	\$ 300.00							
		Floodplain Mapping	\$ 1,300.00							
		Independent QA/QC of Floodplain Mapping	\$ 200.00							
Mapping Approximate - Conceptual	Base Study - Zone A Analysis	Hydrologic Analysis	\$ 150.00							
		Independent QA/QC of Hydrologic Analysis	\$ 25.00							
		Hydraulic Analysis	\$ 200.00							
		Independent QA/QC of Hydraulic Analysis	\$ 25.00							
		Floodplain Mapping	\$ 150.00							
		Independent QA/QC of Floodplain Mapping	\$ 20.00							
	Non-Regulatory (Risk MAP) Products		Redelineation	\$ -						
			Independent QA/QC of Redelineation	\$ -						
			Changes Since Last Firm	\$ 90.00				\$ 1,240.00	\$ 1,240.00	\$ 1,240.00
			Flood Depth and Analysis Rasters	\$ 150.00						
FEMA Deliverable Production	DFIRM Production, Distribution, and Finalization	Flood Risk Assessment	\$ 1,000.00	\$ 4,300.00	\$ 4,300.00	\$ 4,300.00				
		Flood Mitigation Action Plan and Fully Urbanized Floodplains	\$ 4,300.00							
		Develop Draft DFIRM Database	\$ 225.00				\$ 281.96	\$ 281.96		
		Preliminary DFIRM Production	\$ 23.21							
QA/QC Preliminary DFIRM Production	\$ 3.39									
		Post-Preliminary DFIRM Production	\$ 30.36							
		Total without Administration		\$ 23,166.11	\$ 15,266.11	\$ 10,265.00				
		Administration (10%)		\$ 2,316.61	\$ 1,526.61	\$ 1,026.50				
		Total Cost per Mile		\$ 25,482.72	\$ 16,792.72	\$ 11,291.50				
		Rounded total Cost per Square Mile		\$ 25,500.00	\$ 16,800.00	\$ 11,300.00				

Table E.2: Oklahoma Discovery Project Schedule

Project Ranking	HUC 8 Name	No. of Communities	\$/Community¹	Cost
1	Bird	22	\$ 6,500.00	\$ 143,000.00
2	Deep Fork	60	\$ 6,500.00	\$ 390,000.00
3	Little	30	\$ 6,500.00	\$ 195,000.00

Notes:

1. Cost per community includes \$4,000 for Discovery and \$2,500 for Risk

Table E.1: Oklahoma Project Schedule for MNC, LVR and PS

Project Ranking	HUC 8 Name	HUC-12	HUC 12 Name	Project Name	FIS Detailed Project Length	Cost per Mile	Project Cost	FIS Detailed Project Length to be Completed	Cost per Mile	Project Cost	Non Regulatory Project Length	Cost per Mile	Project Cost	Project Ranking
1	Lower Verdigris	110701050303	Adams Creek	Updating the FIRM and FIS for Adams Creek, Tulsa and Wagoner Counties	-	\$ 25,500	\$ -	7.2	\$ 16,800	\$ 120,960	50.0	\$ 11,300	\$ 565,000	268
2	Polecat-Snake	111101010304	Mooser Creek-Arkansas River - Mooser Creek	Updating the FIRM and FIS for Mooser Creek, Tulsa County.	4.7	\$ 25,500	\$ 120,870		\$ 16,800	\$ -	5.1	\$ 11,300	\$ 57,245	236
3	Polecat-Snake	111101010304	Mooser Creek-Arkansas River - Red Fork	Updating the FIRM and FIS for Red Fork Creek, Tulsa County.	0.7	\$ 25,500	\$ 16,830		\$ 16,800	\$ -	6.9	\$ 11,300	\$ 77,596	236
4	Polecat-Snake	111101010304	Mooser Creek-Arkansas River - Crow Creek	Updating the FIRM and FIS for Crow Creek, Tulsa County.	1.8	\$ 25,500	\$ 46,920		\$ 16,800	\$ -	8.1	\$ 11,300	\$ 91,581	236
5	Polecat-Snake	111101010304	Mooser Creek-Arkansas River - Joe Creek	Updating the FIRM and FIS for Joe Creek, Tulsa County.	12.9	\$ 25,500	\$ 328,185		\$ 16,800	\$ -	17.0	\$ 11,300	\$ 192,402	236
6	Lower Verdigris	110701050304	Inola Creek	Updating the FIRM and FIS for Inola Creek, Rogers County	27.9	\$ 25,500	\$ 710,685		\$ 16,800	\$ -		\$ 11,300	\$ -	218
7	Lower Verdigris	110701050104	Cat Creek-Dog Creek	Updating the FIRM and FIS for Cat Creek and Dog Creek in Rogers County	-	\$ 25,500	\$ -	14.0	\$ 16,800	\$ 235,200		\$ 11,300	\$ -	217
8	Polecat-Snake	111101010502	Broken Arrow Creek-Arkansas River	Updating the FIRM and FIS for Aspen Creek, Tulsa County.	7.1	\$ 25,500	\$ 182,070		\$ 16,800	\$ -		\$ 11,300	\$ -	214
9	Polecat-Snake	111101010502	Broken Arrow Creek-Arkansas River	Updating the FIRM and FIS for Elm Creek, Tulsa County.	4.0	\$ 25,500	\$ 102,000		\$ 16,800	\$ -		\$ 11,300	\$ -	214
10	Polecat-Snake	111101010506	Coal Creek-Arkansas River	Updating the FIRM and FIS for Coweta Creek, Wagoner County.	15.8	\$ 25,500	\$ 403,155		\$ 16,800	\$ -		\$ 11,300	\$ -	177
11	Polecat-Snake	111101010506	Coal Creek-Arkansas River	Updating the FIRM and FIS for Arkansas River, Muskogee County.	4.6	\$ 25,500	\$ 117,810		\$ 16,800	\$ -		\$ 11,300	\$ -	177
12	Polecat-Snake	111101010506	Coal Creek-Arkansas River	Updating the FIRM and FIS for Haskell Creek, Muskogee County.	7.5	\$ 25,500	\$ 190,230		\$ 16,800	\$ -		\$ 11,300	\$ -	177
13	Polecat-Snake	111101010501	Haikey Creek	Updating the FIRM and FIS for Haikey Creek, Tulsa County (Little Haikey Creek only)	8.2	\$ 25,500	\$ 209,100		\$ 16,800	\$ -		\$ 11,300	\$ -	133
14	Polecat-Snake	111101010501	Haikey Creek	Updating the FIRM and FIS for White Church Creek, Tulsa County.	4.1	\$ 25,500	\$ 104,295		\$ 16,800	\$ -		\$ 11,300	\$ -	133
15	Polecat-Snake	111101010111	Nickel Creek	Updating the FIRM and FIS for Coal Creek, Tulsa County.	20.3	\$ 25,500	\$ 518,160		\$ 16,800	\$ -		\$ 11,300	\$ -	126
16	Polecat-Snake	111101010111	Nickel Creek	Updating the FIRM and FIS for Hager Creek, Tulsa County.	4.0	\$ 25,500	\$ 102,510		\$ 16,800	\$ -	3.3	\$ 11,300	\$ 37,768	126
17	Polecat-Snake	111101010111	Nickel Creek	Updating the FIRM and FIS for Nickel Creek, Creek County (unverified Section only).	6.7	\$ 25,500	\$ 169,575		\$ 16,800	\$ -		\$ 11,300	\$ -	126
18	Polecat-Snake	111101010111	Nickel Creek	Updating the FIRM and FIS for Wilmott Creek, Tulsa County.	1.3	\$ 25,500	\$ 32,385		\$ 16,800	\$ -		\$ 11,300	\$ -	126
19	Middle North-Canadian	111003010706	North Canadian River	Updating the FIRM and FIS for Turtle Creek, Canadian County.	-	\$ 25,500	\$ -	8.3	\$ 16,800	\$ 139,440		\$ 11,300	\$ -	125
20	Middle North-Canadian	111003010703	Purcell Creek	Updating the FIRM and FIS for Purcell Creek, Canadian County.	31.1	\$ 25,500	\$ 792,285		\$ 16,800	\$ -		\$ 11,300	\$ -	116
21	Middle North-Canadian	111003010708	Lake Overholser-North Canadian River	Updating the FIRM and FIS for North Canadian River, Canadian, Oklahoma and Woodward County.	120.2	\$ 25,500	\$ 3,064,845		\$ 16,800	\$ -		\$ 11,300	\$ -	131
22	Middle North-Canadian	111003010709	Campbell Creek-North Canadian River	Updating the FIRM and FIS for Campbell Creek, Canadian and Oklahoma Counties.	13.0	\$ 25,500	\$ 331,500		\$ 16,800	\$ -		\$ 11,300	\$ -	115
23	Middle North-Canadian	111003010709	Campbell Creek-North Canadian River	Updating the FIRM and FIS for North Canadian River Tributary 14, Oklahoma County.	3.4	\$ 25,500	\$ 85,425		\$ 16,800	\$ -		\$ 11,300	\$ -	115
24	Lower Verdigris	110701050204	Spunky Creek	Updating the FIRM and FIS for Spunky Creek, Rogers, Tulsa and Wagoner Counties	11.3	\$ 25,500	\$ 288,023		\$ 16,800	\$ -		\$ 11,300	\$ -	106
25	Polecat-Snake	111101010303	Harlow Creek-Arkansas River	Updating the FIRM and FIS for Harlow Creek, Bigheart Creek and West Bigheart Creek, Osage and Tulsa County.	20.6	\$ 25,500	\$ 525,045		\$ 16,800	\$ -	14.9	\$ 11,300	\$ 168,877	88
26	Polecat-Snake	111101010305	Posey Creek-Arkansas River	Updating the FIRM and FIS for Vensel Creek, Tulsa County.	4.6	\$ 25,500	\$ 116,535		\$ 16,800	\$ -	9.5	\$ 11,300	\$ 107,147	77
27	Polecat-Snake	111101010305	Posey Creek-Arkansas River	Updating the FIRM and FIS for Bixby Creek, Tulsa County.	1.0	\$ 25,500	\$ 25,500		\$ 16,800	\$ -		\$ 11,300	\$ -	77
28	Polecat-Snake	111101010305	Posey Creek-Arkansas River	Updating the FIRM and FIS for Fry Creek, Tulsa County.	5.5	\$ 25,500	\$ 141,270		\$ 16,800	\$ -		\$ 11,300	\$ -	77
29	Middle North-Canadian	111003010203	Spring Creek-North Canadian River	Updating the FIRM and FIS for City of Woodward, Woodward County.	22.4	\$ 25,500	\$ 569,925		\$ 16,800	\$ -		\$ 11,300	\$ -	68
30	Lower Verdigris	110701050102	Lake Claremore Dam	Updating the FIRM and FIS for Lake Claremore Dam for Rogers County	14.8	\$ 25,500	\$ 376,635		\$ 16,800	\$ -		\$ 11,300	\$ -	59
31	Lower Verdigris	110701050406	Coal Creek	Updating the FIRM and FIS for East Coal for Wagoner County	0.1	\$ 25,500	\$ 2,805		\$ 16,800	\$ -		\$ 11,300	\$ -	58
32	Polecat-Snake	111101010110	City of Sapulpa-Polecat Creek	Updating the FIRM and FIS for Polecat Creek, Creek and Tulsa County.	17.1	\$ 25,500	\$ 435,285		\$ 16,800	\$ -		\$ 11,300	\$ -	43
33	Polecat-Snake	111101010109	Skull Creek-Polecat Creek	Updating the FIRM and FIS for Childres Creek, Creek County.	11.2	\$ 25,500	\$ 285,600		\$ 16,800	\$ -		\$ 11,300	\$ -	42
34	Polecat-Snake	111101010207	Lower Snake Creek	Updating the FIRM and FIS for Snake Creek, Tulsa County.	15.7	\$ 25,500	\$ 399,075		\$ 16,800	\$ -		\$ 11,300	\$ -	42
35	Middle North-Canadian	111003010702	Fourmile Creek-North Canadian River	Updating the FIRM and FIS for Fourmile Creek, Canadian County.	14.0	\$ 25,500	\$ 357,000		\$ 16,800	\$ -		\$ 11,300	\$ -	37
Total					437.6		\$ 11,151,533	-	\$ 495,600		114.8		\$ 1,297,616	

or MNC, LVR and PS

HUC-12	HUC 12 Name	Project Name	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
110701050303	Adams Creek	Updating the FIRM and FIS for Adams Creek, Tulsa and Wagoner Counties	57 \$ 685,960					
111101010304	Mooser Creek-Arkansas River - Mooser Creek	Updating the FIRM and FIS for Mooser Creek, Tulsa County.	5 \$ 178,115					
111101010304	Mooser Creek-Arkansas River - Red Fork	Updating the FIRM and FIS for Red Fork Creek, Tulsa County.	1 \$ 94,426					
111101010304	Mooser Creek-Arkansas River - Crow Creek	Updating the FIRM and FIS for Crow Creek, Tulsa County.	2 \$ 138,501					
111101010304	Mooser Creek-Arkansas River - Joe Creek	Updating the FIRM and FIS for Joe Creek, Tulsa County.	13 \$ 520,587					
110701050304	Inola Creek	Updating the FIRM and FIS for Inola Creek, Rogers County		28 \$ 710,685				
110701050104	Cat Creek-Dog Creek	Updating the FIRM and FIS for Cat Creek and Dog Creek in Rogers County		14 \$ 235,200				
111101010502	Broken Arrow Creek-Arkansas River	Updating the FIRM and FIS for Aspen Creek, Tulsa County.		7 \$ 182,070				
111101010502	Broken Arrow Creek-Arkansas River	Updating the FIRM and FIS for Elm Creek, Tulsa County.		4 \$ 102,000				
111101010506	Coal Creek-Arkansas River	Updating the FIRM and FIS for Coweta Creek, Wagoner County.		16 \$ 403,155				
111101010506	Coal Creek-Arkansas River	Updating the FIRM and FIS for Arkansas River, Muskogee County.			5 \$ 117,810			
111101010506	Coal Creek-Arkansas River	Updating the FIRM and FIS for Haskell Creek, Muskogee County.			7 \$ 190,230			
111101010501	Haikey Creek	Updating the FIRM and FIS for Haikey Creek, Tulsa County (Little Haikey Creek only)			8 \$ 209,100			
111101010501	Haikey Creek	Updating the FIRM and FIS for White Church Creek, Tulsa County.			4 \$ 104,295			
111101010111	Nickel Creek	Updating the FIRM and FIS for Coal Creek, Tulsa County.			20 \$ 518,160			
111101010111	Nickel Creek	Updating the FIRM and FIS for Hager Creek, Tulsa County.			4 \$ 140,278			
111101010111	Nickel Creek	Updating the FIRM and FIS for Nickel Creek, Creek County (unverified Section only).			7 \$ 169,575			
111101010111	Nickel Creek	Updating the FIRM and FIS for Wilmott Creek, Tulsa County.			1 \$ 32,385			
111003010706	North Canadian River	Updating the FIRM and FIS for Turtle Creek, Canadian County.			8 \$ 139,440			
111003010703	Purcell Creek	Updating the FIRM and FIS for Purcell Creek, Canadian County.			31 \$ 792,285			
111003010708	Lake Overholser-North Canadian River	Updating the FIRM and FIS for North Canadian River, Canadian, Oklahoma and Woodward County.				120.2 \$ 3,064,845		
111003010709	Campbell Creek-North Canadian River	Updating the FIRM and FIS for Campbell Creek, Canadian and Oklahoma Counties.				13 \$ 331,500		
111003010709	Campbell Creek-North Canadian River	Updating the FIRM and FIS for North Canadian River Tributary 14, Oklahoma County.				3 \$ 85,425		
110701050204	Spunky Creek	Updating the FIRM and FIS for Spunky Creek, Rogers, Tulsa and Wagoner Counties				20 \$ 288,023		
111101010303	Harlow Creek-Arkansas River	Updating the FIRM and FIS for Harlow Creek, Bigheart Creek and West Bigheart Creek, Osage and Tulsa County.				21 \$ 693,922		
111101010305	Posey Creek-Arkansas River	Updating the FIRM and FIS for Vensel Creek, Tulsa County.				5 \$ 223,682		
111101010305	Posey Creek-Arkansas River	Updating the FIRM and FIS for Bixby Creek, Tulsa County.				1 \$ 25,500		
111101010305	Posey Creek-Arkansas River	Updating the FIRM and FIS for Fry Creek, Tulsa County.				6 \$ 141,270		
111003010203	Spring Creek-North Canadian River	Updating the FIRM and FIS for City of Woodward, Woodward County.				22 \$ 569,925		
110701050102	Lake Claremore Dam	Updating the FIRM and FIS for Lake Claremore Dam for Rogers County						15 \$ 569,925
110701050406	Coal Creek	Updating the FIRM and FIS for East Coal for Wagoner County						0 \$ 376,635
111101010110	City of Sapulpa-Polecat Creek	Updating the FIRM and FIS for Polecat Creek, Creek and Tulsa County.						17 \$ 2,805
111101010109	Skull Creek-Polecat Creek	Updating the FIRM and FIS for Childres Creek, Creek County.						11 \$ 435,285
111101010207	Lower Snake Creek	Updating the FIRM and FIS for Snake Creek, Tulsa County.						16 \$ 285,600
111003010702	Fourmile Creek-North Canadian River	Updating the FIRM and FIS for Fourmile Creek, Canadian County.						14 \$ 399,075
Total			77 \$ 1,617,589	69 \$ 1,633,110	96 \$ 2,413,558	120 \$ 3,064,845	90 \$ 2,359,247	73 \$ 2,069,325

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