

**STATE OF ARKANSAS  
RISK MAPPING, ASSESSMENT, AND PLANNING (RISK MAP)  
MULTI-YEAR BUSINESS PLAN (2012 – 2016)  
2016 Update**



Draft Update: December 21, 2016  
Revised: January 25, 2016  
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State of Arkansas  
Risk Mapping, Assessment, and Planning (Risk MAP)  
Multi-Year Business Plan (2012 – 2016)  
DRAFT 2016 Update (12/30/2015)

Cooperating Technical Partner with FEMA Region 6  
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## TABLE OF CONTENTS

|                                  |   |
|----------------------------------|---|
| EXECUTIVE SUMMARY .....          | 1 |
| VISION .....                     | 1 |
| CAPABILITIES .....               | 1 |
| RISK MAP GOALS IN ARKANSAS ..... | 4 |
| OBJECTIVES .....                 | 4 |

### LIST OF APPENDICES

|             |  |
|-------------|--|
| APPENDIX A: | Arkansas CTP QAQC Plan                                       |
| APPENDIX B: | Arkansas HUC8 Watersheds                                     |
| APPENDIX C: | Arkansas CTP Project Priorities / FEMA Grant Funding Request |





## EXECUTIVE SUMMARY

The State of Arkansas has had major disaster declarations for flooding events during each of the last five years, including 2015, except 2012. Since 1990, there have been 24 declarations of major disasters involving flooding in the state. For this and many other reasons the State is compelled to take a larger role in the identification, management, and mitigation of risk in Arkansas and we believe that by committing to work with FEMA as a Cooperating Technical Partner (CTP) we will both accomplish more and accomplish it in a more efficient manner. In September of 2011 Arkansas Natural Resources Commission (ANRC) and FEMA Region 6 executed the Cooperating Technical Partnership Agreement. In Fiscal Year (FY) 2010 FEMA initiated Risk Mapping, Assessment, and Planning (Risk MAP) to deliver quality data that increase public awareness and lead to action that reduces risk to life and property. ANRC will now serve as a partner to FEMA in the performance of select Risk MAP activities and firmly establish a unified front of FEMA and the State for all of the communities of Arkansas. This Arkansas Risk MAP Multi-Year Business Plan (2012 – 2016) provides the initial framework for performing and accomplishing Risk MAP in Arkansas.

## VISION

It is the intent of the State of Arkansas, through the CTP Program, to work with FEMA through the Risk MAP program to identify, mitigate, and manage the natural hazard risks in our state through sound science and engineering practices and effective communication so that all of our citizens are aware of the potential risks in their communities.

## CAPABILITIES

ANRC is the CTP Program Manager, providing coordination and leadership for successful implementation of the Risk MAP grant program throughout the State of Arkansas. Mr. Mike Borengasser, the current NFIP Coordinator, is serving as the CTP Coordinator. Mr. Borengasser has a long-standing relationship with FEMA Region 6 and is a standing member of the Arkansas Floodplain Management Association board.

ANRC has been a proactive state agency since 1963, establishing relationships with local communities, regional planning organizations, other state agencies, the federal agencies, and individual Arkansans. ANRC routinely participates on state committees and commissions related to water and the environment as a member, advisor, or chair agency. These activities allow access to local knowledge that aids in making informed decisions about current conditions, the quality of the available data, and the needs of the communities. ANRC has a vested interest in increasing public awareness and reducing the risk of every Arkansan.

ANRC is committed to adding personnel, as required, to manage the program. See **Staffing Plan**. This includes hiring a registered professional engineer or other qualified professional to work with contractors as the program evolves from developing a State Business Plan to conducting Discovery and implementing watershed studies. During 2014 ANRC was able to fill





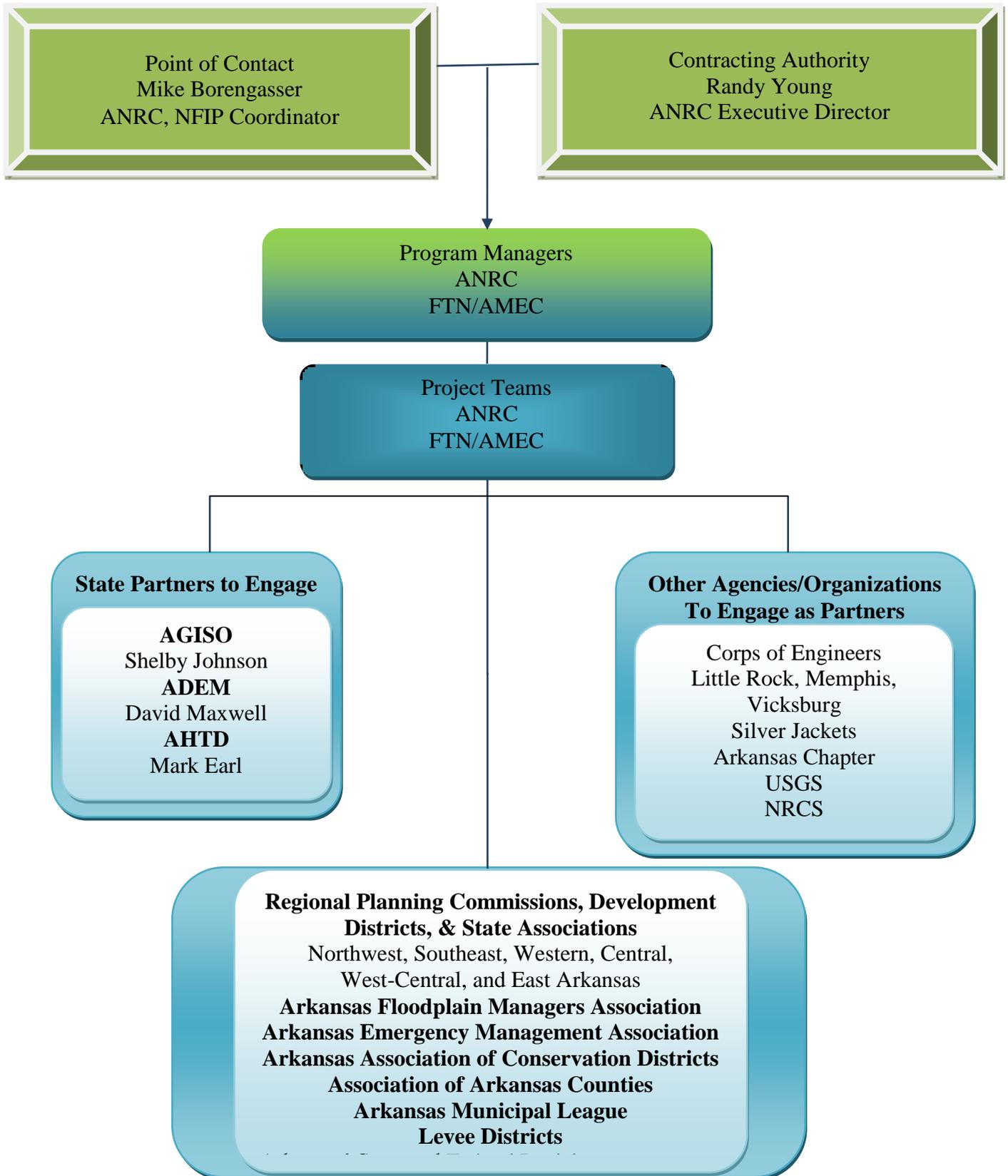
the vacancy in the supervisory position for the ANRC Floodplain Management and Dam Safety Program. The Water Resources Division of ANRC has also retained three staff persons that continue to grow and enhance the capabilities of the Division and the AR CTP Program. Although these 4 staff members are not dedicated to the CTP Program, they bring strong skill sets in hazard mitigation, floodplain management, and engineering, which serve to enhance the capabilities of the ANRC Floodplain Management and Dam Safety Program and Arkansas's floodplain management community. These staff positions include Trevor Timberlake, PE, CFM, to lead the Dam Safety Program and Floodplain Management, Veronica Villalobos-Pogue, who continues to provide expertise in hazard mitigation, Tim Dreher who is serving as the State's Community Rating System (CRS) in-house expert, and Donna Ryles who is building the educational program for floodplain management in Arkansas.

ANRC has also entered into an agreement with FTN Associates, Ltd. (FTN) to assist the State with the Risk MAP program. FTN has been involved with FEMA studies since the mid 1980's, including 40 city or countywide studies throughout the State of Arkansas for FEMA Region 6. Many of these studies were performed by FTN as a Study Contractor to Region 6 during the FEMA Map Modernization program, and their experience covers the items included as part of the Risk MAP Program Management and Flood Study Mapping Activities. To provide additional resources, FTN has teamed with AMEC Foster Wheeler Environment and Infrastructure Americas (AMEC). AMEC has provided production and program management support with State CTP Programs in Kansas, Missouri, Alabama, Kentucky, and North Carolina and brings a wealth of CTP Program experience.

The following organization chart identifies the key participants at the State and other agencies that we anticipate will have key roles in the CTP and Risk MAP.



# Federal Emergency Management Agency, Region 6 Cooperating Technical Partner (CTP) Program Arkansas Natural Resources Commission





## RISK MAP GOALS IN ARKANSAS

ANRC, the State CTP lead agency, has developed the following goals to work toward during its partnership with FEMA Region 6 and involvement in the Risk MAP program. In this, our 2016 Business Plan Update, we kept the goal of working with Region 6 to pursue the post preliminary processing activities (Risk MAP Phase 3) on our current and future projects. We believe that this is an important next step for the State of Arkansas's CTP program so that we can maintain continuity in the project team and build and strengthen the connection and trust between the Arkansas CTP Team and the stakeholders. We will continue to update and refine our goals as the Risk MAP program grows and the State of Arkansas's CTP program becomes established. It is important for us to succeed so that FEMA Region 6 succeeds. The goals we have set are reasonable and achievable and are not dependent solely on FEMA funding.

1. Coordinate a Successful Risk MAP Program,
2. Identify Statewide Data Needs and Prioritization of HUC8 Watersheds through CNMS,
3. Establish Dynamic Discovery Processes,
4. Assist FEMA with Meeting their Metrics,
5. Identify and Reach out to Local Partners / Stakeholders,
6. Identify and Pursue Risk Management and Mitigation Opportunities,
7. Develop Strategies for Levee Outreach / Coordination in Arkansas and LAMP studies, and
8. Provide Post Preliminary Processing activities with Region 6 for current and future projects to provide continuity in the Risk MAP and flood mapping process.

## OBJECTIVES

ANRC has developed objectives that include developing plans and initiating activities in an effort to make progress toward and meet our goals. The successful deployment of some of these activities will include project proposals that will be presented to FEMA for consideration, while others will be achieved through our own resources.

- 1. A successful Risk MAP program requires a program management plan and program staffing plan:**

### Program Management Plan

ANRC has entered into a Cooperative Agreement with FEMA Region 6 and has an excellent working relationship with Region 6 Engineers and other staff.

ANRC has contracted with FTN Associates, Ltd. to conduct Discovery and Risk MAP projects. FTN has a wealth of knowledge, experience and resources working on FEMA mapping activities. FTN also has experience working with ANRC and throughout the State.





A Risk MAP Program requires a competent and involved management team. This requires commitment from the agency leadership as well as adequate staff to manage the program. The agency director, Randy Young, is committed to making Risk MAP a successful program for the benefit of the citizens of the State. Staffing and commitment by the agency will be expanded as the program evolves. Timely and substantive quarterly and annual reports will make sure that the ANRC and its contractor are on schedule and that FEMA is kept informed of the progress. Our reporting will also include updates to the MIP monthly and as required for production tasks.

Currently, staff consists of the NFIP Coordinator (also, State Climatologist) working for ANRC as the CTP Coordinator and the Engineer Supervisor for the Dam Safety/Floodplain Management Section for ANRC as the CTP Program Manager. This has proven effective in the early stages of the AR CTP and Risk MAP process. As the Risk MAP project work has increased, the ANRC staff has become more involved, and we expect that to continue as the CTP Program continues to grow. ANRC's contractor, FTN, conducts the bulk of the production work in collecting information for the State Business Plan, preparing for and conducting Discovery activities, and providing engineering services for flood mapping projects. ANRC and FTN understand they have access to Region 6 engineers and their contractor staff to assist with additional training needs.

It must be recognized that there are both current and potential shortfalls. Since the CTP program entered the "project" stage following Discovery, professional engineering/technical staff are being considered to work with the contractor(s) in executing mapping, risk evaluation, mitigation, and other technical projects. We will continue to partner with communities and agencies to obtain their commitment and matching funds/resources.

#### Quality Assurance / Quality Control (QAQC) Plan

The contractors, FTN and AMEC, are very familiar with QAQC standards for conducting FEMA projects and mapping activities. ANRC staff will be trained in the QAQC procedures as required. An AR CTP Program QAQC Plan has been developed for implementation in the projects managed and performed by the CTP and their contractor(s). A copy of the proposed plan has been provided in Appendix A.

#### Staffing Plan

For the 2016 program year, the principal staff will consist of Trevor Timberlake, Engineer Supervisor for Dam Safety/Floodplain Management, and Mike Borengasser, State Climatologist and NFIP Coordinator. Mr. Timberlake will contribute 2% of his work schedule to CTP Program Manager. Mr. Borengasser will contribute 5% of his time to CTP Coordinator in the role of Program Manager. Additional staffing commitments from ANRC on the production phase will continue to be performed as needed outside of the Program Management funded task. The Staffing Plan will continue to be adjusted as the program and project commitments require for a successful State CTP Risk MAP program.





The ANRC has taken steps to approve an additional engineer /GIS professional position, in principle, within the Division that could be hired for the FY2015-2016 program year, if the responsibilities of the CTP Program warrant the position. The program responsibilities of the CTP engineer/GIS professional will ultimately include CTP Coordinator responsibilities as requirements of the CTP Program increase.

The ANRC staffing will be supplemented by our contractors, as necessary, so that State staffing does not limit our capabilities to perform and participate in Risk MAP. The ANRC will adjust staffing levels when made possible through grant opportunities with Region 6 and other State opportunities to justify and fund increases in staffing.

For the past 4 years, the State's Business Plan has included transition to providing a full-time staff position to manage the CTP program. Over the past 2 years, CTP activity has increased, and will likely do so in the future. There is plenty of work for a full-time staff to manage this program. In addition to the year-to-year program management, there is a need to provide assistance to users/stakeholders who receive the regulatory and non-regulatory products of Risk MAP. Once a watershed is deployed, this opens opportunities to engage communities in mapping, mitigation, outreach, and other activities.

#### Past Staffing

CTP Program Manager:

Program Oversight: 1-2%

CTP Coordinator :

Program Management: 5-10%

Production Assistance: 1-5%

#### Current Staffing (2015)

CTP Program Manager

Program Oversight: 2%

CTP Coordinator

Program Management: 5%

Production Phase: 6%

#### Future Staffing (with current staff) (2016-2017)

CTP Program Manager: maintain at 2%

CTP Coordinator

2016 = 5 – 10%

2017 = 5 – 15%

CTP Engineer / Assistant Coordinator (position under consideration)

2016 = 0%

2017 = 100% (Quarters 3 & 4)

#### Future Staffing (with addition of full time CTP professional) (2016-2017)

CTP Program Manager: maintain at 2%

CTP Coordinator





2016 = 2% (prorated based on hiring date)

2017 = 2% (prorated based on hiring date)

CTP Engineer / Assistant Coordinator (position under consideration)

2016 = 100% (prorated based on hiring date)

2017 = 100% (prorated based on hiring date)

It is our intention to utilize our contracted engineers to support the State in the successful deployment of Risk MAP. The ANRC has selected FTN as our contracted engineering firm to assist us with the CTP Program and to provide any additional support that is required in the interim to ensure the program remains successful.

## **2. Data Needs and HUC8 Watershed Prioritization in Arkansas**

### Understand / evaluate / update / maintain CNMS database

Our initial review of the CNMS database confirmed that there is additional information that is needed to bring the CNMS data up to date to better reflect the status of existing data throughout the State. We will work with Region 6 and their contractors to understand the current data sources and assumptions built into the CNMS database. We will then integrate into the CNMS database the best available GIS data. We believe that by updating and maintaining a current and comprehensive CNMS dataset, the priorities for the State of Arkansas will better reflect the State needs and actual progress in the State in meeting Region 6 metrics for Risk MAP. We will continue to work with the Region to utilize the CNMS database for watershed needs and to assist in database maintenance and training.

### Expand the State's GIS data beyond CNMS

In order to improve the processes for evaluating the state needs and priorities local data must be collected and incorporated into the prioritization process. Because CNMS is a national tool, there are national values that do not reflect more detailed local information that is available. This additional GIS data will include but not be limited to: partner layer, 303d streams, levee inventory, hazard mitigation plan status, topography, other leverage data to be identified, needs, and existing firm status / modernization. This data will be updated annually along with the data collected during the Pre-Discovery Pilot Project.

The State CTP is actively working with the Arkansas Geographic Information Systems Office (AGISO) to establish a relationship for data collection and storage in support of the CTP program and hazard mitigation planning. Currently discussions include the size of the data, storage requirements, and datasets (topographic data, parcels, road crossings, and critical facilities).





### Live CNMS maintenance

The State CTP will become the contact point for any need requests. We will work with FEMA Region 6 and their contractors to keep the national CNMS database up-to-date. We will continue to work with FEMA to promote the CNMS database plan to ultimately make the database available on the State's website.

During 2016 the State CTP will continue to promote the CNMS database as the tool for communities to provide ANRC with their hazard mitigation and mapping needs through ongoing outreach during community visits and association meetings.

### **3. Statewide Levee Initiative**

ANRC is currently exploring the creation of a state levee safety program in order to address issues with levees that are associated with a taxing district (levee district, drainage district, watershed district, etc). These districts collect funds from those protected by their respective levees, but recent flood events have revealed that some taxing districts with levees are either inactive or not performing the necessary activities to maintain their levee(s). It is anticipated that there are a number of levees and/or levee districts that are not currently part of the USACE's National Levee Database or FEMA's Mid-Term Levee Inventory. This inhibits ANRC's effectiveness in understanding flood risk along major streams with levee-protected areas (such as the Arkansas River, Red River, Black River, and White River) and thus, misses key opportunities to promote flood risk mitigation activities and properly plan for Levee Analysis and Mapping Procedure (LAMP) projects. It is proposed that a study be conducted to assimilate data from various sources in order to identify taxing district levee systems in Arkansas that are not currently being tracked by the USACE or FEMA. The steps to be taken to gather this data may include:

- Compilation and review of existing levee data for the state, including sources such as FEMA, US Army Corps of Engineers, Arkansas Highway Department, AGISO, and County Assessor's parcel databases. Data to be gathered includes but not limited to:
  - Total mileage of the project levees (segments and system).
  - Background information on levees.
  - Certification status of the levees (past and present).
  - Status of topographic data (LIDAR) along and behind the levee.
  - Anticipated impacts based on levee certification status.
- Title search using existing ANRC staff for initial effort.
- Review of historical documents and legislation to identify which levee districts has been legally created.
- Mapping/GIS-based methods.
- Survey county officials/staff regarding levees. (County Judges, Emergency Management, Conservation District, Road/Bridge Crew)





After compiling the existing information on these levee systems and assessing their needs, an outreach plan will be formulated to assist levee owners in understanding key flood risk issues, such as the FEMA levee certification process, the LAMP process, operation & maintenance of a levee system, levee owner liability, and other relevant topics. Presently, the AR CTP has proposed to perform a LAMP project on the Arkansas River levees within Pulaski County. The AR CTP proposes to apply the Statewide Levee Initiative in more detail to this proposed project area to develop information needed to perform LAMP. Deliverables for this task would include:

- Outreach Plan and documented results.
- Database of existing levee information, including all source documentation.
- Plan for completion of the statewide database including identification of unknown levees, field reconnaissance data, and continued outreach with levee owners and responsible parties.

#### **4. Meet Risk MAP metrics**

The State of Arkansas is not heavily populated but is all too often the recipient of Federal Disaster Declarations, and people and property continue to be at risk. It is our mission and vision to empower our citizens and communities (stakeholders) so they are aware of the potential risks that surround them and they have the opportunity to be a part of the solution by assisting us in reducing their risk through mitigation actions, awareness education, and quality mapping. Our commitment to the CTP Program provides us an avenue to work with FEMA and our local and state partners, especially the Arkansas Department of Emergency Management (ADEM) and local emergency managers to prioritize the watersheds in the State of Arkansas.

Success in Risk MAP will be measured by our actions, increases in risk awareness, deployment, and new, validated, updated engineering (NVUE). Through mechanisms in place and potential opportunities with FEMA we plan to target the top ten priority watersheds for Discovery activities that will satisfy deployment for FEMA's metrics, and help to identify where mitigation actions can be most effective and where NVUE and risk awareness are deficient. The Discovery activities for the top ten watersheds are planned to be completed within the next three years if project proposals can be prepared and accepted by FEMA, and/or watershed partners are identified to actively contribute to initiating the Discovery Process. We expect that at a minimum we will identify through Discovery those communities who can be provided flood risk data and flood risk outreach to implement policy and/or programs within their community to become more resilient through measureable actions and increased awareness of risk by their citizens. ANRC will routinely contact the stakeholders and partners within the priority watersheds to assist in maintaining an appropriate prioritization scheme, including implementation of local projects and maximizing potential funding opportunities. As a CTP we plan to perform Discovery Meetings annually until all of the HUC8 watersheds predominately located in the State of Arkansas have been completed. The ANRC will be an active participant in all Discovery activities for the watersheds in



Arkansas, including those watersheds where Discovery is led by adjoining states. As a CTP we expect to demonstrate our ability to manage the Discovery process with FEMA for all of the watersheds where the dominant land area is located in Arkansas. We expect that through Discovery activities we will have opportunities to develop proposals for mitigation and/or mapping projects through FEMA. Our coordination efforts for partnering and prioritizing at the watershed level will continue with or without FEMA funding.

## **5. Partner and Stakeholder Relationship Development and Coordination**

### Annual Arkansas State Partners Meeting

ANRC, through the CTP Program, has initiated an Annual Statewide Partner meeting. The first annual meeting was held in April 2012 in association with the Arkansas Floodplain Managers Association (AFMA) Spring Workshop in Jacksonville AR. This partnership development activity is intended to introduce Risk MAP to the state agencies of Arkansas to initiate and spark conversations and opportunity. The participants at each meeting are provided a summary of the meeting as well as access to the materials that will be posted on the ANRC website. The results of the partnership meetings will continue to be to identify who potential partners are, where they are, what they may have to offer, and what needs they may have. Partners will be captured in a GIS layer for easy identification of who needs to be coordinated with in each Discovery activity within a given HUC8 watershed. Each annual meeting provides the opportunity to report back to these partners what is being done, to encourage engagement and sharing of knowledge about the Risk MAP program and the State's CTP commitment with FEMA. The annual state partnering meeting will continue with or without FEMA funding and will continue to be synchronized with the AFMA Spring Workshop.

### State Partnership for Data Storage

ANRC will continue to work with AGISO to fully develop using the capabilities of AGISO as a data clearinghouse and GIS data source for up-to-date flood risk data for the State of Arkansas.



### Arkansas LiDAR Working Group

ANRC and AGISO have recently partnered, with AGISO agreeing to take the lead, on initiating, promoting, and deploying an Arkansas LiDAR Working Group. The LiDAR Working Group is intended to bring together interested stakeholders to coordinate LiDAR collection, identify areas of need, and promote cooperation and cost-sharing opportunities.

The first LiDAR coordinated effort was initiated by ANRC. The first LiDAR Working Group meeting was held at ANRC in August 2014 and included representatives from regional, state, and federal agencies, and private industry. Additional meetings and/or conference calls have been conducted to keep active participants aware of ongoing LiDAR activities throughout the State. The AR CTP Team will play an active role in making the Arkansas LiDAR Working Group successful through the following support activities:

- a) Work closely with AGISO in generating stakeholder interest and participation;
- b) Encourage the establishment of and use of an Arkansas LiDAR listserve;
- c) Assist AGISO with a current and comprehensive Arkansas LiDAR data inventory (LiDAR availability, source, quality level, collection date);
- d) Utilize the Statewide Pre-Discovery Pilot Project to establish priority watersheds for LiDAR collection;
- e) Promote LiDAR partnering, cost-sharing opportunities at all AR CTP activities; and
- f) Utilize other CTP's in Region 6 with existing LiDAR strategies, i.e. New Mexico, to assist the Arkansas LiDAR Working Group and CTP Team in developing the Arkansas LiDAR Strategy.

The AR CTP Team has identified some areas in the state that are known to be lacking quality topography and quality flood maps. We anticipate utilizing the Statewide Pre-discovery Initiative and the LiDAR Working Group to develop a more comprehensive prioritization. Our known priorities are identified below.

- a) Northern Lonoke County (253 sq mi): identified and recording during the Bayou Meto Watershed Discovery. The northern portion of the county is located in the Lower White-Bayou Des Arc watershed, HUC 08020301. This watershed has not been identified as a priority watershed for Discovery at this time; however, Lonoke County and the City of Cabot have documented their interest in improving the quality of their SFHA mapping with better elevation data;
- b) Polk County: The City of Mena has experienced flood losses in recent years and the flood maps have not yet been modernized. Mena is located in the Ouachita Headwaters Watershed, HUC 08040101. Although the Ouachita Headwaters Watershed is not currently identified in the AR CTP Priority List, procurement of LiDAR in the Mena, Polk County area will elevate the watershed in the prioritization scheme. Polk County is 862 sq mi;
- c) Wildlife Management Areas (WMA) throughout the State. Through the LiDAR Working Group we have identified partnering opportunities with the US Fish & Wildlife Service and Arkansas Game and Fish Commission. The AR CTP will



- continue to work through the Arkansas LiDAR Working Group to confirm LiDAR acquisition activities in the state and take advantage of partnering opportunities; and
- d) Beaver Reservoir (Arkansas side): The Beaver Reservoir Watershed is the source of drinking water for Northwest Arkansas, which is the second largest population area in the state. Through meetings with local communities and interest groups, we have identified a need for good topographic data, which could support new and updated detail studies. Additionally, Benton and Washington Counties have recently received new LIDAR data, which would reduce the overall collection area. Beaver Watershed Area for LIDAR collection is 2,000 sq mi.

## 6. Mapping, Mitigation, and Other Engineering Projects

### Mapping

Arkansas is historically elevation data poor which has been a limitation in producing quality maps. ANRC's CTP commitment with FEMA will include assisting in identifying where "good" elevation data exist through outreach and partnering. FEMA has already financed a large area of LiDAR coverage in central and eastern Arkansas. In calendar year 2016, FEMA will finance LiDAR collection in the Lake Dardanelle Watershed. ANRC will work with the communities and with FEMA so that the watersheds included in the coverage area can advance toward mapping, mitigation activities, and other engineering projects identified in Discovery. ANRC will also work with the Arkansas LiDAR Working Group toward advancing the collection and processing of the LiDAR data in those areas when FEMA funds are not available.

Through the CTP program, ANRC will facilitate development of complete seamless statewide modernized data as the HUC8 watersheds are addressed. Many of Arkansas's counties did not have an opportunity to become modernized during the Map Modernization Program. Arkansas has a total of 75 counties and to date 25 counties have not been modernized. As topographic data becomes available in these counties it is planned to integrate their modernization into the watershed based projects as they are initiated.

In addition to counties in Arkansas lacking modernized maps, there are many counties, that although their FIRMs are considered "modernized" the Special Flood Hazard Area (SFHA) boundaries for the Zone A's do not have adequate data behind them to effectively manage the floodplain and/or determine base flood elevations. With newer technology available from the AR CTP Team we believe that it is important to update counties that were "modernized" with low quality elevation data and without the benefit of model backed SFHAs.

### Mitigation Activities

ANRC and ADEM will continue to work together to better integrate emergency management and hazard mitigation with the National Flood Insurance Program (NFIP) and Risk MAP. The updated State Hazard Mitigation Plan (09/2013, Version 5) describes mitigation as the cornerstone of emergency management. Mitigation is the action taken to reduce or eliminate





long-term risk and long-term hazard vulnerability. We believe that through Risk MAP we can take steps to make this happen in Arkansas. As Risk Map products are developed and delivered, they will be integrated into the mitigation process, such as developing and delivering depth grids, spatial Areas of Mitigation Interest (AoMI) and enhanced data sets to be incorporated into HAZUS, which can all be utilized in Hazard Mitigation Plan updates and in public outreach. ANRC is now performing the administration of the non-disaster Flood Mitigation Grant Program (FMA, RFC, and SRL) which will enhance the coordinated efforts between ANRC and ADEM in identifying and implementing mitigation activities in the State. ANRC and ADEM are also working together to improve the tracking of local Hazard Mitigation Plan status and update requirements. Through Discovery activities we anticipate opportunities to develop proposals for mitigation and/or mapping projects through FEMA. Partnering efforts and mitigation grant opportunities will be a focus and priority for ANRC so that mitigation opportunities and activities can continue without FEMA funding, if necessary.

The AR CTP received from FEMA's contractor in Maryland the national Average Annualized Loss (AAL) data which has, and will continue to be, used to integrate additional detailed data to improve the HAZUS information applicable to the State of Arkansas. During the Discovery process this updated HAZUS data may be utilized as a product to deliver to the local communities who could benefit from this data immediately with regard to flood risk awareness and educational opportunities for their citizens. As of this 2016 Business Plan Update, the Hurricane Creek Watershed Restudy; Rock Creek and State Capitol Drain Watershed Restudy; Bayou Meto Tributary 1, Drain 3, and Drain 3S Restudy; and Grant and Saline County, AR DFIRM production have benefitted from updated HAZUS information being added to their Flood Risk Products. As more Risk MAP projects are completed updated AAL data will be more widely available.

For the FY15 (2016-2017) AR CTP Risk MAP Program year, Appendix C includes a copy of the State CTP Project Priorities / FEMA Grant Funding Requests, which documents the Risk MAP activities and project proposals for the AR CTP Program. Future grant proposals will be based on the initial proposal and subsequent grant award. The AR CTP Project Priorities / FEMA Grant Funding Requests included in Appendix C represents the breadth and depth of what the CTP program intends to accomplish in the years ahead through partnerships with FEMA, the State, and local stakeholders.

#### LOMC Partnership with Arkansas Highway & Transportation Department (AHTD)

ANRC will continue to leave open for discussion with AHTD staff the opportunity to develop a LOMC Program Plan for consideration by FEMA. The intent of the program is for ANRC to assist AHTD in LOMC completion and incorporation through FEMA's LOMC Process. AHTD has scheduling limitations associated with funding that hampers the traditional LOMC path through FEMA's LOMC Program. It is the intent of this plan development for ANRC (CTP) and AHTD to be able to complement each agency's skill sets for LOMC publication as necessary.





ANRC and AHTD continue to work together by sharing data and project proposal information. AHTD has provided the CTP Team with hydraulic data in watersheds where Risk MAP is occurring and where projects are planned, and the AR CTP Team keeps AHTD up to date on our future project proposals and awards.

## **7. Strategy for Addressing Levees (LAMP)**

In October 2015, FEMA Region 6 notified ANRC they would be performing Levee Analysis and Mapping Procedure (LAMP) project in Conway and Pope Counties with their contractor. ANRC will assist as needed.

The State CTP is interested in taking a leadership role in the implementation of future LAMP projects in Arkansas. As the State is exploring the potential for a levee safety program, any lessons learned from LAMP could be of value in analyzing other non-accredited levee systems within the State. The CTP Team understands that this procedure would be relevant for at least two counties (Pulaski and Cross) due to ongoing levee issues. The State CTP has established a proven record with Region 6 in the execution and delivery of products and services to date; therefore, we would like to reinforce the State's interest in working with Region 6 in the LAMP process for the current projects in Conway and Pope Counties and for leading LAMP projects in Pulaski and Cross Counties in the future.

The State CTP will use the services of experienced and nationally recognized engineering firms to provide any levee services that we can provide with the assistance of FEMA grants. We have developed a strategy, including engineering cost estimates, to address the deaccredited levees on the Arkansas River through Pulaski County using LAMP. These estimates and a project area figure are included in Appendix C, AR CTP Project Priorities / FEMA Grant Funding Requests. We have identified two project areas in Pulaski County:

1. Baucum Levee, Old River Levee, Plum Bayou (Pulaski County only), and Woodson Levee. These levees, all deaccredited, are located on Pools 5 and 6 of the Arkansas River.
2. Roland Levee, deaccredited and located on Pool 7 of the Arkansas River.

The State CTP Team brings to the LAMP process the local knowledge, local presence, and established relationships with local stakeholders to enable the process to move forward quickly and smoothly. This strategy is discussed in more detail in the State CTP Project Priorities / FEMA Grant Funding Request provided in Appendix C.

The State CTP believes very strongly in providing outreach to the communities and counties in Arkansas, so it is important to the State to be a leader as well as a partner with FEMA in the outreach being targeted to the levee communities. ANRC will also continue to work with our State and US Legislators and local politicians so that a unified and cohesive approach and voice is communicated.





The State of Arkansas, through ANRC, initiated the statewide update to the Arkansas Water Plan. As the Arkansas Water Plan continues toward implementation, the State CTP will endeavor to promote the development and ultimate inclusion of a strong water resource policy that addresses levees. It is in the best interest of the State that where non-accredited levees exist, there also exists a strategy to remedy the potential effects that these levees can cause in the floodplain management, mitigation, and emergency management communities. The State CTP will work closely with the State's leadership on the Water Plan to compose and implement a levee strategy in Arkansas.

## **8. Post Preliminary Processing for AR CTP Projects**

The AR CTP Team has now completed several Risk MAP Phase 2 engineering and flood mapping projects following successful Risk MAP Phase 1 Discovery projects and watershed deployments. During both Phase 1 and Phase 2 the AR CTP Team is building a strong relationship with the communities and watershed stakeholders. We believe that proceeding directly to Phase 3 with the same projects is an obvious transition for the CTP Team to capitalize on the efficiencies and momentum already established. The AR CTP Team has a proven record with Region 6 in the execution and delivery of products and services to date; but more importantly, we have a proven record with the communities. The AR CTP Team has demonstrated to the communities our commitment to them by being available and locally knowledgeable, and personally delivering a quality product, which in many cases they have made an investment in as well.

The State CTP Team includes the contracted services of FTN and AMEC. Both firms have a number of years working with FEMA and are experienced in all facets of production of the Flood Insurance Rate Maps (FIRMs). More specifically, AMEC has been performing the post preliminary process for other States as a CTP contractor, including but not limited to Alabama, Kansas, Missouri, Iowa, and North Carolina. In all of the post preliminary processing projects AMEC has led for State CTPs there have been no recalled or missed BFE notices, no appeals, and no missed or delayed Letter of Final Determination (LFD) dates as a result of the actions of the CTP. We believe that this experience will be translated to Arkansas especially with the rural nature of our state.



# **APPENDIX A**

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## **AR CTP Quality Assurance Quality Control (QAQC) Plan**



## **Arkansas Cooperating Technical Partnership Program Through Arkansas Natural Resources Commission Quality Assurance/Quality Control Plan DRAFT November 2014**

The Arkansas Cooperating Technical Partnership Program (AR CTP) was established between FEMA Region 6 and the Arkansas Natural Resources Commission (ANRC) in August 2011. ANRC selected FTN Associates, Ltd. (FTN) as their AR CTP technical contractor to carry out the technical activities of the AR CTP Grants, in the form of a Mapping Activity Statement (MAS), awarded by FEMA. As part of ANRC's Grant EMW-2014-CA-00162 / Statement of Work (SOW) 6, FTN has developed this Quality Assurance/Quality Control (QA/QC) Plan. This plan sets forth the procedures and guidelines that will be used in ensuring the quality of the technical work completed by FTN, or its subcontractors, as part of the AR CTP Team. FTN will work closely with ANRC in developing products funded by FEMA grants and in the execution of this QA/QC Plan. The QA/QC Plan outlines the steps taken during the project to verify the work follows and agrees with FEMA's current guidelines and standards, including Operating Guidance, Technical References, and Procedure Memorandums.

### **A. PURPOSE OF THE QA/QC PLAN**

This plan outlines the steps FTN will follow for each MAS awarded to the AR CTP to verify and track quality in each step through review of reports and data and submittals.

The QA/QC Plan is intended to accomplish the following:

- a. Verify all deliverables meet the standards and apply the required engineering principals prior to submittal;
- b. Define the roles and responsibilities of FTN staff in the production of technical work;
- c. Describe the tools and milestones to validate technical quality; and
- d. Describe the methods of documentation.

FTN has designated MaryBeth Breed, PH, CFM<sup>®</sup> to be responsible for implementation of the QA/QC Plan.

### **B. ROLES AND RESPONSIBILITIES**

1. ANRC has designated Michael Borengasser, CFM<sup>®</sup>, as the CTP Coordinator who is responsible for all CTP project activity and ongoing coordination with FTN's Project Manager.
2. FTN's Project Manager (PM) assists ANRC in overall project monitoring including: project scope, project budget, timelines and milestones, and execution of the QA/QC Plan.





3. FTN's MAS Manager/Technical Lead, assigned for each MAS, is responsible for monitoring, assessing, recording and reporting on the technical performance during the project. The MAS Manager/Technical Lead will have primary responsibility for completing the initial QC reports and coordinating the review of technical materials. The MAS Manager / Technical Lead will assemble the technical submittal package, including the QC documentation, to the Independent QC Reviewer.
4. FTN's Independent QC Reviewer is responsible for reviewing QC Reports and performing an independent technical review of submitted materials. All deliverables shall conform to a common format consistent with FEMA standards applicable at the time the MAS was executed. FTN's Independent QC Reviewer will verify the submittal is complete and meets current standards, and prepare the QA Report for final approval by the Principal in Charge (PIC).
5. The PIC will review and approve the QA report and submittal package provided by the Independent QC Reviewer.

### **C. TOOLS AND MILESTONES**

Once ANRC has an approved MAS, the CTP Coordinator and FTN PM will establish the MAS Team. FTN's PM will assign the MAS Manager and Independent QC Review for each MAS. The MAS Team will review the scope of work and timeline for deliverables. Using the FEMA Region 6 Integrated Baseline Review (IBR), or one of similar content, the MAS Team will identify QA/QC report milestones for each task. QC Reports will be prepared following a "Checklist" format for technical reviews and QA Reports will verify compliance with the standards and completion of the technical reviews necessary for each task.

Once the MAS Team has been established, the FTN PM will train the entire group in the QA/QC Plan and process. This will serve as an internal "kickoff" meeting and fulfill several other purposes:

- Identify members of the MAS Team
- Familiarize each member with the MAS
- Identify QA/QC milestones and deliverable dates
- Assign each team member their roles for the MAS

The MAS Manager will coordinate a technical review of the materials by qualified staff members. Typically this member will be a Professional Engineer with a strong working experience in the various deliverable subjects (i.e. surveying, hydrology, etc.).

The Independent QC Reviewer, who may be another member of the FTN staff or a subcontractor, will verify the technical review was conducted in accordance with the current standards. The QA reports will be prepared by the Independent QC Reviewer and finalized by the Principal in Charge (PIC).



With each approved MAS, the AR CTP Team will follow the steps below:

1. ANRC and FTN PM review MAS.
2. FTN PM establishes MAS Team.
3. FTN PM will assign the MAS Manager.
4. FTN PM will assign the Independent QC Review.
5. FTN PM will conduct an internal staff “kickoff” meeting to discuss the team assignments and other steps listed below.
6. MAS Team will review task due dates and deliverables.
7. FTN PM will establish QA Report submittal schedule.
8. MAS Manager will perform, or coordinate the performance of, technical reviews of the appropriate MAS tasks. This may include completing a QA/QC Worksheet and or project task checklists.
9. MAS Manager will provide all QC documentation upon completion to the Independent QC Reviewer.
10. Independent QC Reviewer may establish an applicable task checklist from current FEMA standards for each MAS.
11. Independent QC Reviewer will perform technical review of data/products for conformance to the applicable FEMA standards.
12. QA Report prepared by Independent QC Reviewer upon completion of review and provided to PIC.
13. PIC gives final approval of deliverable and certifies that it meets the standards.
14. FTN will submit QA Reports for each deliverable and make them available to the CTP Coordinator.
15. All deliverables will be submitted by FTN to ANRC and / or FEMA Region 6 (at the discretion of the CTP Coordinator).

#### **D. METHODS OF DOCUMENTATION**

The AR CTP QA/QC Plan seeks to document the adherence of technical methods and data to the applicable standards. The MAS Manager will submit the technical QC Reports to the Independent QC Reviewer. Any materials produced to train, communicate, or mentor others on behalf of any FEMA program will be reviewed by ANRC and FEMA prior to delivery to stakeholders or others. These submittals will occur as required by each SOW or MAS and may include the following:

- Global Program Outreach
- Mitigation Planning and Technical Assistance
- Training for State/Local Officials
- Mentoring
- Technical Pilot Projects
- CNMS Database Maintenance
- Project Scoping / Discovery





- Terrain Data Processing
- Field Survey
- Hydrology (draft and final)
- Hydraulics (draft and final)
- FIS Report (draft and final)
- Base Map
- DFIRM Mapping (draft and preliminary)
- DFIRM Database
- Flood Risk Products

The AR CTP Team will perform technical reviews of all deliverables, production data, and models. These reviews will document the adherence of the materials to the standards. If materials do not meet the standards, a meeting of the CTP Coordinator and FTN's MAS Team will discuss each item, identify solutions, and recommend a timeline for resolving the issues. This process should proceed quickly and take no longer than 4 weeks to complete.

Checklists and / or review summaries for each task listed above will be developed based on the applicable standards as appropriate. These checklists will form the basis for the QA/QC Report.

A QA Report will list the parties responsible for the QA/QC review and allows each to sign (certify) that the deliverable meets FEMA's standards for that task.

FTN has developed numerous internal QA/QC checklists for the various tasks assigned for Flood Insurance Rate Maps and Flood Insurance Studies. These internal checklists (examples provided in the Appendix) will be utilized along with any new tools and checklists developed internally or provided by FEMA or its contractors.

# **APPENDIX**

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## **QAQC Example Documentation**



## Arkansas CTP Final Quality Assurance (QA) Report

By signing the following QA Report, I agree that this deliverable meets current FEMA Standards as presented in \_\_\_\_\_ dated \_\_\_\_\_

Contract/MAS No.: \_\_\_\_\_

Date: \_\_\_\_\_

Project Manager: \_\_\_\_\_

MAS Manager/Technical Lead: \_\_\_\_\_

Independent QC Reviewer: \_\_\_\_\_

Technical Leader: \_\_\_\_\_

| <b>Task for this QA Report</b> |                                   |                                |                    |                                     |
|--------------------------------|-----------------------------------|--------------------------------|--------------------|-------------------------------------|
| <b>Task Description</b>        | <b>Technical Review Completed</b> | <b>Independent QC Approved</b> | <b>QA Approved</b> | <b>Final product due/ submitted</b> |
|                                | DATE                              | DATE                           | DATE               | DATE/DATE                           |

| Certificate of Compliance Form  |                                     |
|---|-------------------------------------|
| <b>Project Name:</b>  |                                     |
| <b>Statement of Work No.:</b>   |                                     |
| <b>Interagency Agreement No.:</b>   |                                     |
| <b>CTP Agreement No.:</b>   |                                     |
| <b>Statement/Agreement Date:</b>  |                                     |
| <b>Certification Date:</b>  |                                     |
| <b>Tasks/Activities Covered by This Certification (Check All That Apply)</b>  |                                     |
|   | <b>Base Map</b>                     |
|   | <b>Topographic Data Development</b> |
|   | <b>Survey</b>                       |
|   | <b>Hydrologic Analysis</b>          |
|   | <b>Hydraulic Analysis</b>           |
|   | <b>Alluvial Fan Analysis</b>        |
|   | <b>Coastal Analysis</b>             |
|   | <b>Floodplain Mapping</b>           |
|   | <b>Flood Risk Assessment</b>        |
| <p>This is to certify that the work summarized above was completed in accordance with the statement/agreement cited above and all amendments thereto, together with all such modifications, either written or oral, as the Regional Project Officer and/or Assistance Officer or their representative have directed, as such modifications affect the statement/agreement, and that all such work has been accomplished in accordance with the provisions contained in <i>Guidelines and Specifications for Flood Hazard Mapping Partners</i> cited in the contract document, and in accordance with sound and accepted engineering practices within the contract provisions for respective phases of the work. This is also to certify that data files submitted for the work summarized above are complete and final. Any revisions made to the already submitted data are included in the final submittal. The content of the files submitted is sufficient for subsequent users with appropriate professional expertise to be able to understand the scientific and technical basis of the analysis and reproduce the findings.</p> |                                     |
| <b>Name:</b>  |                                     |
| <b>Title:</b>   |                                     |
| <b>Firm/Agency Represented:</b>   |                                     |
| <b>Registration No.:</b>  |                                     |
| <b>Signature:</b>   |                                     |
| <p>This form must be signed by a representative of the firm or agency contracted to perform the work, who must be a registered or certified professional in the area of work performed, in compliance with Federal and State regulations.</p>   |                                     |

**Figure M.10-1. Certification of Compliance Form**

To formalize and standardize data entry into the MIP and promote an understanding of required services and deliverables possible in each phase of project delivery, the Region has developed the Integrated Baseline Form. With the number of Mapping Partners and projects on-going the Region has developed the Integrated Baseline Form to assist in understand and align the information within proposals and contracts with the Mapping Information Platform. This tool will aide the MIP Champion in the tracking of dollars associated with Mapping Activities Statement and Contract Task Orders and will aide in future Change Request updates with all Mapping Partners. Centralizing these forms will allow the Region to understand their funding distribution at any point in time, as well as equip the MIP Champion with the required information for MIP set up.

- Form has been created to provide required information entry for both PTS and CTPs. Not all rows within form are required for each contract type.
- If you need additional rows, insert a column ahead of the empty row provided.
- Hide cells versus deleting them to allow update of project in the future as needed.

|  |  |
|--|--|
| <b>P4 Project Identifier:</b>            |  |
| <b>FEMA Project Monitor:</b>             |  |
| <b>Provider Point of Contact (CTP):</b>  |  |
| <b>Provider Point of Contact (PTS):</b>  |  |
| <b>Provider Point of Contact (CERC):</b> |  |

**Regulatory (REG) Project Information** - This MIP project will track efforts necessary for the FIS/FIRM update

|                             |  |
|-----------------------------|--|
| <b>REG Project Name:</b>    |  |
| <b>REG MIP Case Number:</b> |  |

**Risk MAP Products (RMP) Project Information** - This MIP project will track efforts necessary for delivery of Risk MAP Products

|                             |  |
|-----------------------------|--|
| <b>RMP Project Name:</b>    |  |
| <b>RMP MIP Case Number:</b> |  |

**Note: Cells in section below will auto-calculate based on data entry for phases below. Do not overwrite these cells**

|   |   |  |
|---|---|--|
| <b>Project Total Cost:</b> \$           | - | Project cost cells will autopopulate based on your task entries below. The funding distribution will be calculated based on your entry into the Start Date cell. |
| <b>Obligated Funds/Active Funds:</b> \$ | - |  |
| <b>Planning Package (PP):</b> \$        | - |  |
| <b>Undistributed Budget (UDB):</b> \$   | - |  |
| <b>Leverage:</b> \$                     | - |  |

|                   |                               |
|-------------------|-------------------------------|
| <b>Award Fee:</b> | <b>Enter award fee amount</b> |
|-------------------|-------------------------------|

**Phase One - Discovery**

Phase covers the effort to prepare for and hold/attend the Discovery Meeting, as well as the preparation of the Discovery Report, first round of Risk MAP Products and distribution. All costs associated with the Discovery Watershed should be listed below for project set up the MIP.

- Only FEMA dollars should be entered into the MIP during obligation, please enter only the FEMA dollars in each line item cost below.
- Leverage dollars for Discovery phase should also be entered into this spreadsheet and will be entered into the MIP by the Mapping Partner.
- Regulatory (REG) Project "Scoping" task will track the Pre-Discovery, Discovery Meeting and Discovery Report preparation and delivery
- Risk MAP Products (RMP) Project tasks will track preparation and delivery of the Flood Risk Report, Flood Risk Database and Flood Risk Map

| Task  | MIP Project | MIP Task       | Start Date | End Date | Task Cost |
|---|-------------|----------------|------------|----------|-----------|
| Discovery                                     | REG         | Scoping        | 1/0/1900   | 1/0/1900 | \$ -      |
| Pre-Discovery Efforts (Before Meeting)        | REG         | Scoping        |            |          |           |
| First Pass Analysis (Enter Mileage Here)      |             |                |            |          |           |
| Discovery Meeting (Labor Cost)                |             |                |            |          |           |
| Discovery Meeting (Other Direct Costs)        |             |                |            |          |           |
| Discovery Meeting After Action Items          |             |                |            |          |           |
| CNMS Update Submittal & Coordination          |             |                |            |          |           |
| Discovery Report Preparation & Distribution   |             |                |            |          |           |
| Project Management - Phase One                |             |                |            |          |           |
| Flood Risk Database                           | RMP         | Hydraulics     | 1/0/1900   | 1/0/1900 | \$ -      |
| Flood Risk Assessment (HAZUS - AAL)           | RMP         | Hydraulics     |            |          |           |
| Flood Risk Assessment (HAZUS - W/ First Pass) |             |                |            |          |           |
| Areas of Mitigation Interest (AoMI)           |             |                |            |          |           |
| Independent QA for Flood Risk DB              |             |                |            |          |           |
| Flood Risk Report                             | RMP         | Field Survey   | 1/0/1900   | 1/0/1900 | \$ -      |
| Flood Risk Report Preparation                 | RMP         | Field Survey   |            |          |           |
| Independent QA for Flood Risk Report          |             |                |            |          |           |
|   |             |                |            |          |           |
| Flood Risk Map                                | RMP         | Floodplain Map | 1/0/1900   | 1/0/1900 | \$ -      |

|  |     |                |          |          |      |
|--|-----|----------------|----------|----------|------|
| Flood Risk Map(s) Preparation          | RMP | Floodplain Map |          |          |      |
| Independent QA for Flood Risk Map(s)   |     |                |          |          |      |
|  |     |                |          |          |      |
| Flood Risk Outreach                    | RMP | Alluvial Fan   | 1/0/1900 | 1/0/1900 | \$ - |
| Discovery Findings Meeting (Labor)     | RMP | Alluvial Fan   |          |          |      |
| Discovery Findings Meeting (ODCs)      |     |                |          |          |      |
| Flood Risk Outreach Preparation        |     |                |          |          |      |
| Independent QA for Flood Risk Outreach |     |                |          |          |      |
| Leverage                               |     |                |          |          | \$ - |
| Cash Match                             | X   | X              |          |          |      |
| Data Provided                          |     |                |          |          |      |
| In-Kind Services                       |     |                |          |          |      |

**Discovery Phase Deliverables**

**For Initial Form Completion:**  
Please list each deliverable here for reference of the Project Monitor and Study Manager.  
This area should be filled out to include all assumptions, note all data available and detail the scope required (with units) to perform Phase One.  
If this phase has already been completed in a previous contract, please note prior funding year and MIP case number for project area  
If a detailed list of information is included within the MAS or contract Task Order proposal, please provide a reference here to the section this data is available in

**For Change Requests:**  
Include an indication of deliverables and services being removed from previous MAS/Task Order write up  
Include an indication of additional deliverables and services being added from previous MAS/Task Order write up.  
Highlight schedule and budget items that have been adjusted

**Phase Two: Risk Identification and Assessment**  
Phase covers the effort to preparation of Hydrologic and Hydraulic Engineering and associated Risk MAP Products necessary for efforts up to Resilience Meeting. In alignment with the Risk MAP Process Path and Outreach Framework, the Region has identified the listed tasks as required for the Data Development of the Risk Identification and Assessment phase of project delivery. Please leave these tasks within all watershed projects, as this tool will be used throughout the lifecycle to distribute undistributed and planning package dollars after Project Selection has occurred.

- Phase covers from Project Kick-Off efforts through Resilience Meeting efforts.
- Phase DOES NOT include Base Map or DFIRM panel preparation.
- Phase deliverables include FIS partial revision deliveries and ends with a seamless floodplain layer with FBS certification as outlined in the MAS template.
- AAL will be updated with new analysis performed and datatables within the FRR will be updated as required.

| Task                                   | MIP Project | MIP Task       | Start Date | End Date | Task Cost* |
|--|-------------|----------------|------------|----------|------------|
| Develop Topographic Data               | REG         | Topo           |            |          |            |
| Independent QA/QC - Topo               | REG         | Topo QA        |            |          |            |
| Perform Field Survey                   | REG         | Field Survey   |            |          |            |
| Independent QA/QC - Field Survey       | REG         | Survey QA      |            |          |            |
| Hydrologic Data Development            | REG         | Hydrology      |            |          |            |
| Independent QA/QC - Hydrology          | REG         | Hydro QA       |            |          |            |
| Hydraulic Data Development             | REG         | Hydraulics     |            |          |            |
| Independent QA/QC - Hydraulics         | REG         | Hydra QA       |            |          |            |
| Perform Floodplain Mapping             | REG         | Floodplain     | 1/0/1900   | 1/0/1900 | \$ -       |
| Project Management - Phase Two         |             |                |            |          |            |
| Floodplain Mapping                     | REG         | Floodplain     |            |          |            |
| Appeal/Comment Technical Assistance    |             |                |            |          |            |
| Independent QA/QC - Floodplain Mapping | REG         | Floodplain QA  |            |          |            |
| Flood Risk Database                    | RMP         | Hydraulics     | 1/0/1900   | 1/0/1900 | \$ -       |
| 1% Depth Grid                          |             |                |            |          |            |
| Multi-Frequency Depth Grids            |             |                |            |          |            |
| Percent Annual Chance Grid             |             |                |            |          |            |
| Percent 30 Year Chance Grid            |             |                |            |          |            |
| Areas of Mitigation Interest           |             |                |            |          |            |
| Flood Risk Assessment (HAZUS - AAL)    |             |                |            |          |            |
| Independent QA for Flood Risk DB       |             |                |            |          |            |
| OTHER Enhanced Risk MAP Datasets       |             |                |            |          |            |
| Flood Risk Report                      | RMP         | Field Survey   | 1/0/1900   | 1/0/1900 | \$ -       |
| Flood Risk Report Preparation          |             |                |            |          |            |
| Independent QA for Flood Risk Report   | RMP         | Field Survey   |            |          |            |
|  |             |                |            |          |            |
| Flood Risk Map                         | RMP         | Floodplain Map | 1/0/1900   | 1/0/1900 | \$ -       |

|  |     |                |          |           |            |
|--|-----|----------------|----------|-----------|------------|
| <i>Flood Risk Map Preparation</i>                      | RMP | Floodplain Map |          |           |            |
| <i>Independent QA for Flood Risk Map</i>               |     |                |          |           |            |
| Flood Risk Outreach                                    | RMP | Alluvial Fan   | 1/0/1900 | 1/0/1900  | \$ -       |
| <i>Flood Risk Outreach Preparation</i>                 | RMP | Alluvial Fan   |          |           |            |
| <i>Independent QA for Flood Risk Outreach</i>          |     |                |          |           |            |
| Leverage - Risk Identification & Assessment            |     |                |          |           | \$ -       |
|  |     |                | Units    | Cost/Unit | Total Cost |
| <i>Cash Match</i>                                      | X   |                |          |           |            |
| <i>Dataset Provided for Study effort</i>               |     |                |          |           |            |
| <i>In-Kind Services</i>                                |     |                |          |           |            |
| <b>Risk Identification and Assessment Deliverables</b> |     |                |          |           |            |

**For Initial Form Completion:**  
Please list each deliverable here for reference of the Project Monitor and Study Manager.  
If this phase has already been completed in a previous contract, please note prior funding year and MIP case number for project area  
If a detailed list of information is included within the MAS or contract Task Order proposal, please provide a reference here to the section this data is available in

**For Change Requests:**  
Include an indication of deliverables and services being removed from previous MAS/Task Order write up  
Include an indication of additional deliverables and services being added from previous MAS/Task Order write up

| Phase Three: Regulatory Product Update          | MIP Project | MIP Task     | Start Date | End Date  | Task Cost  |
|---|-------------|--------------|------------|-----------|------------|
| Acquire Base Map                                | REG         | Base Map     |            |           |            |
| Independent QA/QC - Base Map                    | REG         | Base Map QA  |            |           |            |
| Develop DFIRM Database                          | REG         | DFIRM DB     | 1/0/1900   | 1/0/1900  | \$ -       |
| <i>Collate Update for Flood Insurance Study</i> | REG         | DFIRM DB     |            |           |            |
| <i>Prepare Database Layers</i>                  |             |              |            |           |            |
| <i>Prepare Flood Insurance Rate Map(s)</i>      |             |              |            |           |            |
| Independent QA/QC - DFIRM DB                    | REG         | DFIRM DB QA  |            |           |            |
| Preliminary Map Production                      | REG         | Prelim       |            |           |            |
| Post Preliminary Processing                     | REG         | Post Prelim  | 1/0/1900   | 1/0/1900  | \$ -       |
| <i>Post Preliminary</i>                         | REG         | Post Prelim  |            |           |            |
| <i>MSC Deliverables</i>                         |             |              |            |           |            |
| <i>Procedure Memo 42 Deliverables</i>           |             |              |            |           |            |
| <i>Project Management - Phase Three</i>         |             |              |            |           |            |
| Flood Risk Database                             | RMP         | Hydraulics   | 1/0/1900   | 1/0/1900  | \$ -       |
| <i>Changes Since Last FIRM</i>                  | RMP         | Hydraulics   |            |           |            |
| <b>OTHER Enhanced Risk MAP Datasets</b>         |             |              |            |           |            |
| Flood Risk Outreach                             | RMP         | Alluvial Fan | 1/0/1900   | 1/0/1900  | \$ -       |
| <i>Flood Risk Outreach Preparation</i>          | RMP         | Alluvial Fan |            |           |            |
| <i>Independent QA for Flood Risk Outreach</i>   |             |              |            |           |            |
| Leverage - Regulatory Update                    |             |              |            |           | \$ -       |
|   |             |              | Units      | Cost/Unit | Total Cost |
| <i>Cash Match</i>                               | X           |              |            |           |            |
| <i>Data Provided for Study effort</i>           |             |              |            |           |            |
| <i>In-Kind Services</i>                         |             |              |            |           |            |
| <b>Regulatory Product Update Deliverables</b>   |             |              |            |           |            |

**For Initial Form Completion:**  
Please list each deliverable here for reference of the Project Monitor and Study Manager.  
If this phase has already been completed in a previous contract, please note prior funding year and MIP case number for project area  
If a detailed list of information is included within the MAS or contract Task Order proposal, please provide a reference here to the section this data is available in

**For Change Requests:**  
Include an indication of deliverables and services being removed from previous MAS/Task Order write up  
Include an indication of additional deliverables and services being added from previous MAS/Task Order write up

## HEC-RAS QA/QC CHECKSHEET

Project Name: Hurricane Creek Watershed CTP  
 Project Number: 03015-0005-005  
 Creek Name/ID: Hurricane Creek  
 Completed by: KLM  
 Revisions by: **KLM/TSG**

RAS file name: Hurricane\_Creek\_RAS.prj  
 RAS Plan chkd: \*.p02  
 Checked By: LJB  
 Date: 7/21/2014  
 Rev Checked: **8/11/2014**

### GENERAL

|                                    |        |
|------------------------------------|--------|
| CHECKRAS run on files              | ✓      |
| Check Errors and Warnings Table    | ✓      |
| Peak Flows / Flow Change Locations | Note 3 |
| Boundary Conditions                | ✓      |

### CROSS SECTIONS

|  |        |
|--|--------|
| Manning's 'n' values   |        |
| LOB  | ok     |
| Channel  | ok     |
| ROB  | Note 9 |
| Reach lengths  |        |
| LOB  | ✓      |
| Channel  | ✓      |
| ROB  | ✓      |
| Channel length vs stationing<br>(If ROB & LOB > CH, include note)        | ok     |
| Bank Stations  | Note 2 |
| Top widths   | ok     |
| Vertical extensions?   | n/a    |
| Non-structure expansion/contraction<br>(Include note when not = default) | Note 1 |
| Cross Section Modifications  |        |
| Ineffective Flow   | Note 8 |
| Levees (Incl note if not certified)                                      | n/a    |
| Blocked  | Note 8 |
| Review XS Plots  | Note 2 |

### PROFILES

|                                   |        |
|-----------------------------------|--------|
| Crossing water surface profiles   | Note 4 |
| Negative changes in Water Surface | Note 5 |
| Critical depths                   | ok     |
| Bridges / culverts look okay      | Note 6 |

### BRIDGES/CULVERTS

|  |         |
|--|---------|
| Expansion/Contraction at structures<br>(Include note when not = 0.3/0.5) | Note 1  |
| Expansion/Contraction XS spacing   | ok      |
| Deck/Roadway width (< Culvert Length)                                    | ok      |
| Deck/Roadway distance to US XS   | ok      |
| Embankment Slopes  | ok      |
| Verify Survey points / model   | ok      |
| Culvert Length (Should be > than Roadway Width)                          | ok      |
| Ineffective Flow Stations  | Note 8  |
| Piers / Low Chords   | ok      |
| Weir coefficients<br>(Include note when not = default)                   | default |
| Culvert Flow - check if flow in culvert                                  | ok      |
| Culvert entrance/exit losses<br>(Include note when not = default)        | ok      |
| Bridge/culvert modeling approach   | Note 7  |
| Culvert solution criteria (inlet vs outlet control)                      | ok      |
| Verify culverts / bridges against photos                                 | survey  |
| Manning's 'n' in structure vs XS 2 & 3 channel                           | ok      |

### FLOODWAYS

**Floodways are reviewed in full in the FW QAQC page that follows.**

### Comments or Special Considerations:

#### General Comments:

|  |
|--|
| Please clean out excess geometries and plans from the modeling to reduce possibilities for grabbing incorrect files. |
| Please rename RAS model to be HC_RAS.* to match previous naming conventions.   |
| Please remove the 50% and 20% events from the model as they were from a previous project.                            |
| Please rename the plan title to be 5 Flood Plan, Multiple Run, etc.  |

#### SPECIFIC COMMENTS

- 1 C/E values of 0.3/0.5 are typically present for XS 2, 3, and 4 of a structure. RS 33385 is XS 4 of a structure, but it uses normal 0.1/0.3 values. Noted C/E values of 0.4/0.6 at locations throughout the model but the change in not consistent through the structure (e.g. on XS 2 & 3 are different). Please change or document why they differ through a structure.
- 2 RS 33022: bank stantions look to be high compared to survey around the structure. Looks like reviewing we grabbed a couple of points at the

|   |  |
|---|--|
|   | structure.   |
|   | RS 32864: Consider moving LCB up point to better transition between US and DS settings.  |
|   | RS 17270, 16053: Consider moving RCB out one station point.  |
|   | RS 14950: Channel 'n' value appears in overbank. Please review and correct as necessary.   |
| 3 | Please remove flow change locations at 35442, 26771, 22662, and 21288, as these flow changes decrease and are not consistent with the summary of discharges table submitted as part of the hydrology submission.   |
| 4 | From the XS plots, we have a crossing profile that occurs at RS 34553 (Hwy. 5). Please review and correct as necessary.  |
| 5 | There are multiple locations throughout the model that have negative surcharges between cross sections. We need to attempt to remove these from the model, or attempt to get them below -0.05 ft. Noted at least one location had a surcharge of over 0.5 ft.  |
| 6 | Highway 183, Cynamide Rd, Interstate 30 and its service roads, Highway 5, and Westminster Ave structures all have sharp top of road elevation transitions in the overbank. This is likely moving from survey to LIDAR data, the presence of a railing, or both. Please consider smoothing out the top of road in the overbanks and also providing a near vertical edge to structures that have railings on them. |
| 7 | For all structures with piers, consider adding coefficients for the Momentum and Yarnell's methods. While this may not change a lot on the higher flows, it could impact the lower events. (See Boone Road structure for use of these coefficients).   |
| 8 | RS 36456: Based on mapping and road orientation, it appears that the ineffective setting and road embankment in the ROB should be stopped before the adjacent channel, which would allow for effective flow in the overbank.   |
|   | RS 34267, 33874: consider adding ineffective in far LOB elevations for the 100 year and smaller elevations as flooding is backwater  |
|   | RS 33385, - 32686: consider adding additional ineffective in ROB to account for Interstate constriction in the mapping.  |
|   | RS 31615: Noted entire ROB is marked as ineffective, yet from mapping this appears that is should be effective area. Please review.  |
|   | RS 29836: Block in ROB seems high based on mapping. It appears that one could make the argument for a block elevation of approx. 362' which is elevation of high ground around the pond. Please review and adjust as necessary.  |
|   | RS 29437 - 27826: far ROB appears that it could be set to ineffective based on review of mapping.  |
|   | RS 27826 - 25589: Large pond in ROB could possibly be blocked / set to ineffective to a certain elevation to account for existing water, if it does not cause trouble upstream.  |
|   | Please doublecheck elevations of ineffective locations, as we want to set them to match the lowest elevation of the road embankment. See ROB at Boone Road.  |
|   | RS 25441 and 25336: At 25441, far ROB is blocked, yet at 25336 the flow is effective. It appears that you could remove the upstream block based on mapping results.  |
|   | RS 23267: extend LOB ineffective to cover full extent of 500 year event. See station 575.  |
|   | RS 20506: block far ROB away based on mapping  |
|   | RS 19963: Consider ineffective flow for ROB area seperated by high ground based on mapping results.  |
|   | RS 18837: Consider block in LOB area and ineffective settings in part of ROB based on mapping results  |
|   | RS 12781 - 18209: Consider ineffectve settings for flooding in the LOB based on mapping  |
| 9 | RS 24634 - 21769: Consider adding Manning's "n" value for HCT1 tributary channel.  |

TSG Notes:

To keep some surcharges under -0.05 feet Manning's values were raised in some locations ( $\leq 0.005$ ) except for XS 294347 and 29299 where the were raised by 0.01 (0.03 to 0.04) based on pictures of overgrown channel.

Some bridge openings were corrected to be vertical.

The profiles do not cross, however, one internal xs (13322 MO U) has the 1% and 2% flipped -- They appear to be almost identical and fix themselves on the internal ds xs.

Floodway was determined and meets the required specifications.

# Flood Risk Database Quality Control Checklist

Note that each part of the database is not listed here. Tables are only listed if there is a specific item that needs to be checked. Otherwise, the section "Entire Database" is used for all parts of database.

|                                      |   |                            |  |
|--------------------------------------|---|----------------------------|--|
| <b>PROJECT NAME:</b>                 |   | <b>REG CASE NO.</b>        |  |
| <b>CLIENT:</b>                       | FEMA Region VI/Arkansas Natural Resources Commission  | <b>RMP CASE NO.</b>        |  |
| <b>Applicable G&amp;S Section:</b>   | APPENDIX O: Format and Standards for Non-Regulatory Flood Risk Products (March 2012); APPENDIX N: Flood Risk Data Development (January 2012); Flood Risk Database Technical Reference (June 2013) |                            |  |
| <b>QC Reviewer(s):</b>               |   | <b>Date of Completion:</b> |  |
| <b>Responses Completed By:</b>       |   | <b>Date of Completion:</b> |  |
| <b>QC Verification Completed By:</b> |   | <b>Date of Completion:</b> |  |

| Number | Item   | Checked | Comment | Response/Resolution | QC Verification |
|--------|--|---------|---------|---------------------|-----------------|
| 1      | <b>Entire Database</b>   |         |         |                     |                 |
| 2      | Correct version is used  |         |         |                     |                 |
| 3      | Coordinate system is GCS_NAD_1983_NSRS2007.  |         |         |                     |                 |
| 4      | Make sure all fields populated and data appear to be correct.  |         |         |                     |                 |
| 5      | Make sure all lookup tables populated and data appear to be correct.   |         |         |                     |                 |
| 6      | Make sure Null values have appropriate values per p. O-26.   |         |         |                     |                 |
| 7      | Topology has been validated (rules are stored in DB).  |         |         |                     |                 |
| 8      | Metadata file follows standards set forth.   |         |         |                     |                 |
| 9      | <b>S_AOMI_Pt</b>   |         |         |                     |                 |
| 10     | Enhanced dataset. Leave unpopulated if not part of study.  |         |         |                     |                 |
| 11     | Was AOMI data evaluated and approved for use by communities, FEMA Region, State Hazard Mitigation Officer, Floodplain Manager? Send spreadsheet for approval for use.  |         |         |                     |                 |
| 12     | Are the assumptions made in the AOMI entries true based on data presented? For example, does the new floodplain actually show a noted culvert insufficiency?   |         |         |                     |                 |
| 13     | Make sure all fields populated and data appear to be correct.  |         |         |                     |                 |
| 14     | <b>S_CenBlk_Ar</b>   |         |         |                     |                 |
| 15     | Dollar amounts are expressed in whole dollars.   |         |         |                     |                 |
| 16     | Census blocks are not clipped  |         |         |                     |                 |
| 17     | <b>S_CSLF_Ar</b>   |         |         |                     |                 |
| 18     | See checks in CSLF QC Document.  |         |         |                     |                 |
| 19     | <b>S_FRD_Pol_Ar</b>  |         |         |                     |                 |
| 20     | NFIP Status is populated based on data from the FEMA Community Status Book Report. <a href="http://www.fema.gov/national-flood-insurance-program/national-flood-insurance-program-community-status-book">http://www.fema.gov/national-flood-insurance-program/national-flood-insurance-program-community-status-book</a> |         |         |                     |                 |
| 21     | CRS Rating is populated based on Flood Insurance Agent's Manual. <a href="http://www.fema.gov/media-library/assets/documents/34745">http://www.fema.gov/media-library/assets/documents/34745</a>   |         |         |                     |                 |
| 22     | Flood policy numbers and coverage are populated with current data. <a href="http://bsa.nfipstat.fema.gov/reports/1011.htm#DET">http://bsa.nfipstat.fema.gov/reports/1011.htm#DET</a>   |         |         |                     |                 |

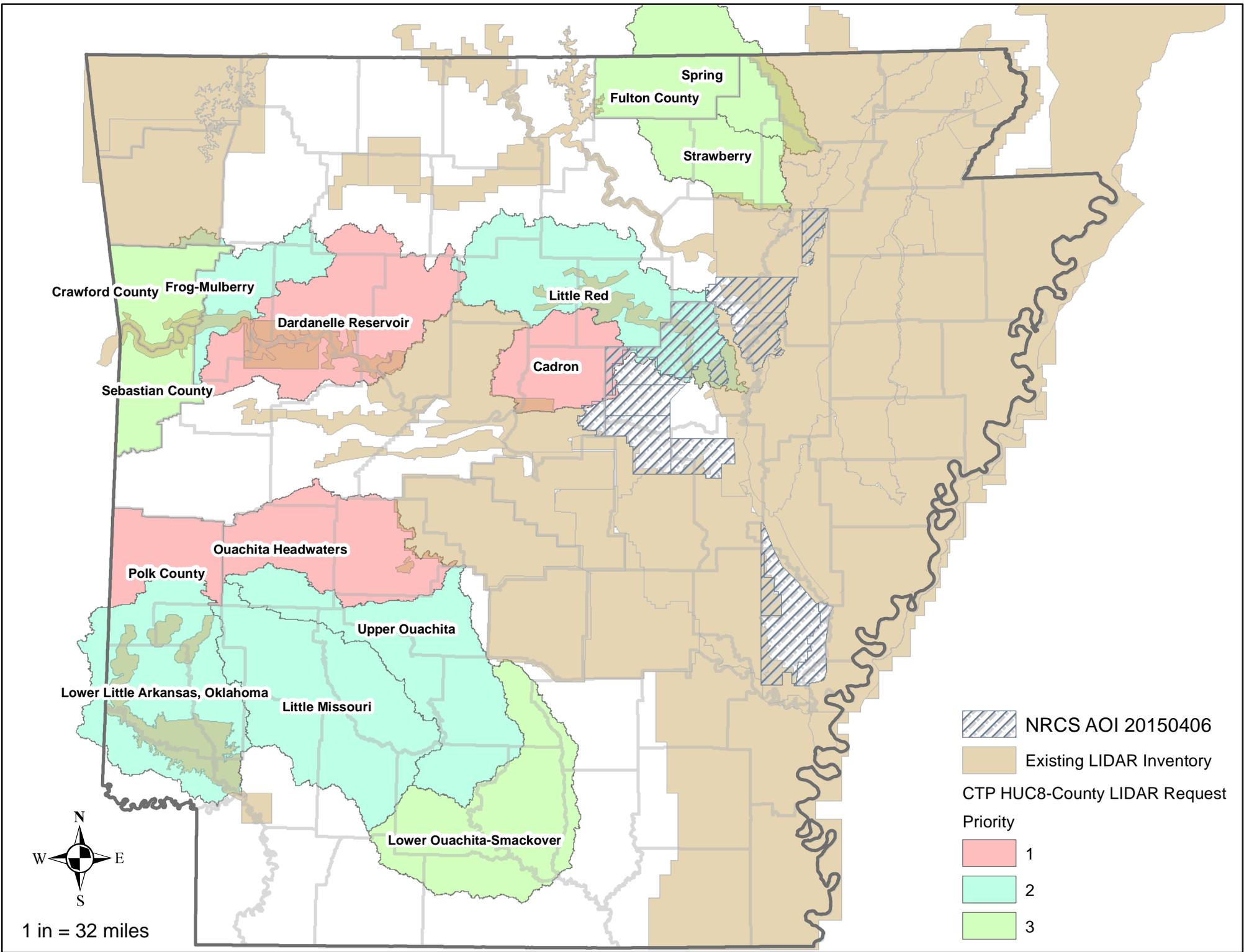
| Number | Item  | Checked | Comment | Response/Resolution | QC Verification |
|--------|---|---------|---------|---------------------|-----------------|
| 23     | Past declarations should be totaled at county level. Each community listed should have the same number. <a href="http://www.fema.gov/disasters/grid/state-tribal-government">http://www.fema.gov/disasters/grid/state-tribal-government</a> |         |         |                     |                 |
| 24     | <b>S_FRD_Proj_Ar</b>  |         |         |                     |                 |
| 25     | Includes only communities that are affected by the flood risk information. The entire county is only included if applicable.  |         |         |                     |                 |
| 26     | <b>S_FRM_Callout_Ln</b>   |         |         |                     |                 |
| 27     | Digitized FROM a centroid of the callout box TO the feature being highlighted.  |         |         |                     |                 |
| 28     | <b>S_HUC_Ar</b>   |         |         |                     |                 |
| 29     | Includes watersheds in and around the project area - not clipped at county boundary.  |         |         |                     |                 |
| 30     | Includes HUC8, 10, and 12   |         |         |                     |                 |
| 1      | <b>S_UDF_Pt</b>   |         |         |                     |                 |
| 2      | Enhanced dataset. Leave unpopulated if not part of study.   |         |         |                     |                 |
| 3      | <b>FRR_Custom</b>   |         |         |                     |                 |
| 4      | Stores custom text written for the communities in Section 3 of the FRR, Flood Risk Analysis Results.  |         |         |                     |                 |
| 5      | Stored as an Office Open XML 2.0 compliant markup fragment.   |         |         |                     |                 |
| 6      | <b>L_AOMI_Summary</b>   |         |         |                     |                 |
| 7      | Enhanced dataset. Leave unpopulated if not part of study.   |         |         |                     |                 |
| 8      | There should be a record for each community and a record for totals for study.  |         |         |                     |                 |
| 9      | <b>L_Claims</b>   |         |         |                     |                 |
| 10     | Claims data is current.   |         |         |                     |                 |
| 11     | There should be a record for each community and a record for totals for study.  |         |         |                     |                 |
| 12     | <b>L_CSLF_Summary</b>   |         |         |                     |                 |
| 13     | Check calculations using the S_CSLF_Ar feature.   |         |         |                     |                 |
| 14     | There should be a record for each community for each area of change (SFHA, NONSFHA, FLOODWAY, CHHA) and a record for totals for study.  |         |         |                     |                 |
| 15     | Area is shown in square miles.  |         |         |                     |                 |
| 16     | <b>L_Exposure</b>   |         |         |                     |                 |
| 17     | Dollar amounts are expressed in whole dollars.  |         |         |                     |                 |
| 18     | Direct HAZUS outputs by census blocks are aggregated in order to come up with totals.   |         |         |                     |                 |
| 19     | There should be a record for each community and a record for totals for study.  |         |         |                     |                 |
| 20     | Values calculated from clipped census blocks and areas weighted.  |         |         |                     |                 |
| 21     | <b>L_Local_GBS</b>  |         |         |                     |                 |
| 22     | Enhanced dataset only used if there is more specific General Building Stock data provided for the study.  |         |         |                     |                 |
| 23     | <b>L_RA_AAL</b>   |         |         |                     |                 |
| 24     | Calculations in HAZUS crosswalk spreadsheet.  |         |         |                     |                 |
| 25     | Dollar amounts are expressed in whole dollars.  |         |         |                     |                 |
| 26     | Values are not area-weighted and are at census block level.   |         |         |                     |                 |
| 27     | For RETURN_PER, in addition to one record for each percent chance event (10%, 2%, 1%, 0.5%, 0.2%) used in the assessment, a record should be included for the average annualized event.   |         |         |                     |                 |
| 28     | <b>L_RA_Refined</b>   |         |         |                     |                 |
| 29     | Calculations in HAZUS crosswalk spreadsheet.  |         |         |                     |                 |
| 30     | Dollar amounts are expressed in whole dollars.  |         |         |                     |                 |
| 31     | Values are not area-weighted and are at census block level.   |         |         |                     |                 |

| Number | Item   | Checked | Comment | Response/Resolution | QC Verification |
|--------|--|---------|---------|---------------------|-----------------|
| 32     | <b>L_RA_Composite</b>  |         |         |                     |                 |
| 33     | Refined HAZUS data takes precedence over AAL data.   |         |         |                     |                 |
| 34     | AAL results are used where depth grids do not cover.   |         |         |                     |                 |
| 35     | Dollar amounts are expressed in whole dollars.   |         |         |                     |                 |
| 36     | <b>L_RA_Summary</b>  |         |         |                     |                 |
| 37     | Compiled using L_RA_Composite.   |         |         |                     |                 |
| 38     | Dollar amounts are expressed in whole dollars.   |         |         |                     |                 |
| 39     | Direct HAZUS outputs by census blocks are aggregated in order to come up with totals.                              |         |         |                     |                 |
| 40     | There should be a record for each community and a record for totals for study.                                     |         |         |                     |                 |
| 41     | <b>L_RA_UDF_Refined</b>  |         |         |                     |                 |
| 42     | Enhanced dataset. Leave unpopulated if not part of study.  |         |         |                     |                 |
| 43     | <b>Rasters</b>   |         |         |                     |                 |
| 44     | Cell size is 10m.  |         |         |                     |                 |
| 45     | All have UTM projection.   |         |         |                     |                 |
| 46     | Horizontal datum is NAD83 (NSRS 2007), meters.   |         |         |                     |                 |
| 47     | Includes Hillshade, Depth_xxxpct, Pct30yrChance, PctAnnChance, etc.  |         |         |                     |                 |
| 48     | Correct naming conventions were used.  |         |         |                     |                 |
| 49     | Depth grids correctly handle negative values as NoData.  |         |         |                     |                 |
| 50     | Grids have full coverage with the preliminary S_Pol_Ar and superimpose on each other.                              |         |         |                     |                 |
| 51     | There are no "dry" or "NoData" areas in the depth grids that are shown as in a floodplain on the Preliminary maps. |         |         |                     |                 |
| 52     | Backwater areas are mapped within the grids.   |         |         |                     |                 |
| 53     | Spot check grid cells against topography.  |         |         |                     |                 |

# **APPENDIX B**

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**Arkansas HUC8 Watersheds**



# **APPENDIX C**

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**AR CTP Project Priorities / FEMA Grant Funding Requests**

## Arkansas CTP – FEMA Grant Funding Requests

### 1. ANNUAL PROGRAM MANAGEMENT - \$225,535

#### a) Business Plan Update (2016) - \$8,000

The Multi-Year Annual Business Plan was originally submitted to FEMA in September 2012. Annual updates have been prepared for 2013, 2014, and 2015 previously. This information has been used to develop a proposed project plan, including cost estimates and cost sharing for grant opportunities in the future years of Risk MAP (2016 – 2017).

The goal for the 4<sup>th</sup> Annual Update is to incorporate changes to the State Business Plan based on the successes and/or lessons learned from the previous year(s), and information gathered from outreach with communities, other state agencies and in-state federal agencies.

#### b) Annual Program Management Activities - \$37,403

- Coordination with FEMA
- Coordination with in-state Federal Agencies
- Coordination with State Partners
- Coordination with Communities
- Outreach meetings, calls, correspondence
- Management of Discovery and Risk Map Projects
- Management of Other Engineering Projects
- Management of CTP contract with FTN.

#### c) Data Updates: CNMS and Statewide Pre-Discovery Datasets - \$5,000

Continue the CNMS database reviews and updates utilizing FEMA's PTS contractor and FEMA Region 6 to address inconsistencies in the stream networks across the state. ANRC plans to continue to provide updates on the database as well as ongoing maintenance of the data. An accurate CNMS database is essential to properly identify the priorities for the State of Arkansas. The improved dataset will assist in the development of the Risk MAP programs and products that will enable Region 6 to meet and exceed their Risk MAP metrics. The State CTP will incorporate the changes that occur in FY 2015 per the results of ongoing efforts by the CTP and the Region. CNMS updates will be captured through outreach events at the state and local level.

Last fiscal year, the State CTP completed the Statewide Pre-Discovery Pilot Project. As some of the datasets included in the initiative need to be updated periodically, ANRC plans to continue to provide updates on the database as well as ongoing maintenance of the data. The updated datasets will allow the Pre-Discovery Initiative to remain up-to-date; thus allowing future Discovery efforts to be completed in a more efficient manner.

#### d) Focused Outreach Activities - \$10,000

Focused outreach activities will continue to include an annual State Partners meeting. The ongoing goal of the meeting is to establish new partners and engage existing partners

with an open dialogue about the State CTP Risk MAP program and planned projects. Getting partners excited about the program and the potential for data sharing, as well as cost sharing, is a critical element to program's success. Additional focused outreach activities will include developing and maintaining local partnerships to acquire existing data, identify projects needed, advance flood risk reduction and promote ongoing mitigation efforts throughout the State of Arkansas.

Outreach will continue beyond the annual meeting to include association meetings of a variety of agencies, such as the Arkansas Emergency Managers Association, Arkansas Municipal League, and Arkansas Floodplain Managers Association.

Additional outreach will be focused on those communities that have progressed through Discovery to assist them in understanding the Risk MAP program. It will also be focused on identifying and encouraging mitigation actions as a result of Discovery and the Flood Risk Products provided.

The AR CTP, AGISO, and other governmental agencies are working together to continue the statewide LiDAR Working Group, which was established in previous years. The success of this working group is a top priority for both agencies and we hope will demonstrate the effectiveness of collaboration.

**e) Statewide Levee Initiative – \$47,000**

ANRC is currently exploring the creation of a state levee safety program in order to address issues with levees that are associated with a taxing district (levee district, drainage district, watershed district, etc). These districts collect funds from those protected by their respective levees, but recent flood events have revealed that some taxing districts with levees are either inactive or not performing the necessary activities to maintain their levee(s). It is anticipated that there are a number of levees and/or levee districts that are not currently part of the USACE's National Levee Database or FEMA's Mid-Term Levee Inventory. This inhibits ANRC's effectiveness in understanding flood risk along major streams with levee-protected areas (such as the Arkansas River, Red River, Black River, and White River) and thus, misses key opportunities to promote flood risk mitigation activities and properly plan for Levee Analysis and Mapping Procedure (LAMP) projects. It is proposed that a study be conducted to assimilate data from various sources in order to identify taxing district levee systems in Arkansas that are not currently being tracked by the USACE or FEMA. The steps to be taken to gather this data may include:

- Compilation and review of existing levee data for the state, including sources such as FEMA, US Army Corps of Engineers, Arkansas Highway Department, AGISO, and County Assessor's parcel databases. Data to be gathered includes but not limited to:
  - Total mileage of the project levees (segments and system).
  - Background information on levees.
  - Certification status of the levees (past and present).
  - Status of topographic data (LIDAR) along and behind the levee.
  - Anticipated impacts based on levee certification status.
- Title search using existing ANRC staff for initial effort.

- Review of historical documents and legislation to identify which levee districts has been legally created.
- Mapping/GIS-based methods.
- Survey county officials/staff regarding levees. (County Judges, Emergency Management, Conservation District, Road/Bridge Crew)

After compiling the existing information on these levee systems and assessing their needs, an outreach plan will be formulated to assist levee owners in understanding key flood risk issues, such as the FEMA levee certification process, the LAMP process, operation & maintenance of a levee system, levee owner liability, and other relevant topics. Presently, the AR CTP has proposed to perform a LAMP project on the Arkansas River levees within Pulaski County. The AR CTP proposes to apply the Statewide Levee Initiative in more detail to this proposed project area to develop information needed to perform LAMP. Deliverables for this task would include:

- Outreach Plan and documented results.
- Database of existing levee information, including all source documentation.
- Plan for completion of the statewide database including identification of unknown levees, field reconnaissance data, and continued outreach with levee owners and responsible parties.

**f) ANRC Risk MAP & CERC Coordinator for Risk MAP Deployment**

Based on the programs past successes and continued growth (funding and projects), ANRC believes that this reflects the need for an additional staff person to continue and grow. Additionally, ANRC believes that given the time and continued support from FEMA through program management and project activities, ANRC can pursue an additional staff person to become a part of the AR CTP Program. The purpose of this position would be to handle increased Risk MAP duties, including handling the Community Engagement and Risk Communication (CERC) activities as there is a need to provide assistance to users/stakeholders who receive the regulatory and non-regulatory products of Risk MAP.

**g) Mitigation Data Management through AGISO**

The AR CTP Program has been working with AGISO since the inception of the program to develop a relationship of partnering that will benefit the State of Arkansas and its hazard mitigation stakeholders. During the 2016 Program Year it is anticipated that AGISO will take on a more active role, primarily through the LiDAR Working Group, but also in their hosting and management of Mitigation and Statewide Pre-Discovery Data collected during the Pre-Discovery Pilot Project. We believe expanding the State's role through other agencies demonstrates the collaborative spirit of the CTP Program and will allow the program to expand to reach a more diverse group of stakeholders. This is accomplished with AGISO's strong ties to the Arkansas University Systems and the geographic information system users.

## **2. DISCOVERY, BASE LEVEL ENGINEERING, AND PHASE 1 RISK MAP PRODUCTS - \$370,091**

**Discovery Meetings:** In order for Arkansas to assist FEMA Region 6 in meeting the metrics for Risk MAP deployment, it is important to perform Discovery Meetings. These meetings are instrumental in evaluating and documenting the needs within the State of Arkansas, but more importantly for encouraging partnerships in data and funding going forward. The top five priority watersheds were identified in Arkansas where performing Discovery Meetings and developing Flood Risk Products will open the doors to future opportunities for collaboration with multiple partners for engineering and mitigation projects. These watersheds were identified as the top priorities based on our knowledge of potential partnerships which optimize cost sharing opportunities of any funds awarded through FEMA's grant program by combining them with local community planned projects and because of recent flood events that have elevated the need to deploy the watersheds. Existing projects have also been identified that are underway in these watersheds that further reinforce the need to perform Discovery to capture and assist with mitigation opportunities that will further the Region's advancement of obtaining its metrics.

**Base Level Engineering (BLE):** BLE is an initial analysis using automated methodology to generate "approximate" hydraulic models and mapping at the watershed level for use at the Discovery Meeting in establishing talking points and discussion. The BLE procedures and deliverables are still in development with FEMA, so the AR CTP is indicating its commitment to work with FEMA in preparing and providing this analysis by including it in our project proposals.

**Phase 1 Flood Risk Products:** Upon completion of the Discovery activities for the watersheds the AR CTP Team will prepare version 1 of the Flood Risk Products, which includes the Flood Risk Map, Flood Risk Database, and Flood Risk Report. These products will be delivered to the communities and to the Map Service Center and will be updated as Phase 2 projects are performed in the watershed.

### **a) Priority 1: L'Anguille (HUC8: 08020205)**

#### **Discovery, BLE, and Phase 1 Flood Risk Products - \$81,336**

The L'Anguille Watershed largely includes portions of the following counties: Craighead, Cross, Lee, Poinsett, St. Francis, and Woodruff. There are 13 incorporated communities in the watershed, which is sandwiched between the Cache and Lower St. Francis Watersheds, and the population centers include all or portions of Forrest City, Jonesboro, and Wynne. Flood risks and opportunities for mitigation exist throughout the watershed. The L'Anguille Watershed includes one county, Craighead, who is working with preliminary DFIRMs and is part of the FEMA Region 6 Seclusion process, whereby portions of the county will be mapped based on the older effective mapping until the Levee Analysis and Mapping Process (LAMP) can be performed in the county. Lee, St. Francis, and Woodruff counties do not currently have modernized FIRMs. A Discovery Meeting in this watershed will initiate the Risk MAP process allowing progress toward identifying Risk MAP products that would be effective in reducing and/or mitigating flood risk in the watershed. Topographic data (LiDAR based) has been developed and is being processed throughout the watershed. The City of Jonesboro has

also recently invested in additional LiDAR. The Arkansas Silver Jackets Team is also committed to solving some of the State's flood risks and is currently focusing efforts on the White, Black, Cache, and St. Francis Rivers, that may provide mitigation benefits to the nearby L'Anguille Watershed. Defining and developing these partnership opportunities as well as performing Discovery in this watershed, and the adjacent watersheds of the Lower St. Francis and Cache Watersheds, allows for an opportunity to combine meetings for efficiency and to achieve cost savings.

Repetitive losses in the counties largely included in the L'Anguille Watershed have exceeded \$6.6 million from 1978 through February 2012, and there are over 2,400 policies. These reported values include entire counties, which may or may not be wholly located in the watershed.

Craighead, Cross, Poinsett, St. Francis and Woodruff Counties have Hazard Mitigation Plans that expired, however at the writing of this Business Plan Update Woodruff and Poinsett Counties have updates underway. Lee County has no known Hazard Mitigation Plan.

In the L'Anguille Watershed, 619 miles of stream have been included in the CNMS database<sup>1</sup>. Of the 619 stream miles, 115 stream miles are classified valid and the remaining 504 stream miles have been designated as having an unknown status, neither valid nor unverified.

**b) Priority 2: Lower St. Francis (HUC8: 08020203) - \$129,914**

**Discovery, BLE, and Phase 1 Flood Risk Products - \$86,914**

**Analysis and Mapping Procedures for Non-Accredited Levees (LAMP) (East Bank St. Francis Floodway to Big Lake Floodway West Levee System (System #11) and the Big Lake and St. Francis River East Levee System (System #12) - \$43,000**

The Lower St. Francis Watershed largely includes portions of the following Arkansas counties: Clay, Craighead, Crittendon, Cross, Greene, Lee, Mississippi, Phillips, Poinsett, and St. Francis. The Lower St. Francis Watershed spans the eastern side of Arkansas and includes 50 incorporated communities within Arkansas. The population centers located in the watershed includes all or portions of Blytheville, Forrest City, Jonesboro, Marion, Paragould, and West Memphis. The Lower St. Francis Watershed also extends into portions of the following Missouri Counties: Bollinger, Butler, Dunklin, Stoddard, and Wayne, and the communities of Bethany, Cardwell, Dexter, Dudley, Holcomb, Kennett, and Puxico. Flood risks and opportunities for mitigation exist throughout the watershed. The St. Francis Watershed includes several counties working with preliminary DFIRMs (Clay and Craighead) and that are part of the FEMA Region 6's Seclusion Process, whereby some of the effective mapping is being retained until a LAMP project can be initiated. The counties affected by Seclusion include Clay, Craighead and Greene. Lee and St. Francis Counties do not currently have modernized FIRMs. A Discovery Meeting in this watershed will initiate the Risk MAP process allowing the transition toward an effective DFIRM to be more efficient for those counties

where levee issues are unresolved, and identifying other Risk MAP products that would be effective in reducing and/or mitigating flood risk in the watershed. Topographic data (LiDAR based) has been developed and is being processed throughout the watershed. The City of Jonesboro has also recently invested in additional LiDAR. The Arkansas Silver Jackets Team is also committed to mitigating some of the State's flood risks and is currently focusing efforts on the White, Black, Cache, and St. Francis Rivers. Defining and developing these partnership opportunities, as well as performing Discovery in this watershed, and the adjacent watersheds of the L'Anguille and Cache Watersheds, allows for an opportunity to combine meetings for efficiency and to achieve cost savings. The northernmost portion of the St. Francis Watershed is located in the State of Missouri, which is an active CTP in Region 7. The State of Missouri, through their Emergency Management Agency (SEMA) has worked closely with AMEC Environment & Infrastructure, a member of the Arkansas CTP Team. This inter-state / inter-regional familiarity provides welcome coordination opportunities for the Discovery process.

Greene County has recently been selected by FEMA to start a LAMP Project. This project is being done by FEMA outside of the AR CTP Program.

Repetitive losses in the Arkansas Counties largely included in the St. Francis Watershed have exceeded \$17 million from 1978 through February 2012, and there are over 5,000 policies. These reported values include entire counties which may or may not be wholly located in the watershed.

Clay County has a current approved Hazard Mitigation Plan. At the writing of this update, Craighead, Crittenden, Cross, and St. Francis Counties have expired Hazard Mitigation Plans. Phillips County's Hazard Mitigation Plan is pending adoption. Mississippi and Poinsett Counties are working on updates. Greene and Lee Counties have no known Hazard Mitigation Plan. The status of the hazard mitigation plans for the Missouri Counties is not included.

In the Lower St. Francis Watershed, 890 miles of stream have been included in the CNMS database. All of the 890 stream miles have been designated as having an unknown status, neither valid nor unverified. In the eastern half of Arkansas there are some concerns from FEMA Region 6 on the number of stream miles and their validation status. The CNMS mileage of this watershed will be reviewed, revised, and confirmed with the Region during Discovery.

Additionally, as part of the Lower St. Francis Watershed, the State CTP, through a strong partnership with FEMA, would like to implement a special project. This project would utilize BLE data developed as part of the Discovery process and expand it, as necessary, to perform an engineering analysis for the East Bank St. Francis Floodway to Big Lake Floodway West Levee System (System #11) and the Big Lake and St. Francis River East Levee System (System #12); thus determining the upper and lower terminus of mapping that could be expected as part of the ongoing levee certifications. As the State CTP lists the Lower St. Francis Watershed as a high priority, we believe that this type of analysis, along with focused outreach at the Discovery stage and our local presence and relationships will be very important to the success of this task. This approach has been proposed by FEMA Region 6 personnel as a way to allow existing projects that have

been held up by levee certification an opportunity to continue moving forward to regulatory product stage.

**c) Priority 3: Cache (HUC8: 08020302)**

**Discovery, BLE, and Phase 1 Flood Risk Products - \$81,350**

The Cache Watershed largely includes all or portions of 30 communities in Arkansas and Missouri. The larger communities are the Cities of Brinkley, Jonesboro, Newport, Piggott, and Walnut Ridge. The Arkansas Counties located in the Cache Watershed include Clay, Craighead, Cross, Greene, Jackson, Lawrence, Monroe, Poinsett, Prairie, Randolph, and Woodruff. A small portion of the Cache Watershed extends into Missouri and includes a portion of unincorporated Butler County, Missouri. The largest population center in Northeast Arkansas, Jonesboro, is partially located in the Cache Watershed. Flood risks and opportunities for mitigation exist throughout the watershed. The Cache Watershed includes Clay, Craighead, and Jackson counties working with preliminary DFIRMs. Woodruff, Monroe, and Prairie Counties are not yet modernized, and Woodruff County is working with FIRM maps nearly 25 years old. A Discovery Meeting in this watershed will initiate the Risk MAP process to identify Risk MAP products that would be effective in reducing and/or mitigating flood risk in the watershed. Topographic data (LiDAR based) has been developed and is being processed throughout the watershed. The City of Jonesboro has also recently invested in additional LiDAR. The Arkansas Silver Jackets Team is also committed to solving some of the State's flood risks and is currently focusing efforts on the White, Black, Cache, and St. Francis Rivers. Defining and developing these partnership opportunities as well as performing Discovery in this watershed, and the adjacent watersheds of the L'Anguille and Lower St. Francis Watersheds, allows for an opportunity to combine meetings for efficiency and to achieve cost savings. The northernmost portion of the Cache Watershed is located in the State of Missouri, which is an active CTP in Region 7. The State of Missouri, through their Emergency Management Agency (SEMA) has worked closely with AMEC Environment & Infrastructure, a member of the Arkansas CTP Team. This inter-state / inter-regional familiarity provides welcome coordination opportunities for the Discovery process.

Repetitive losses in the counties largely included in the Cache Watershed have exceeded \$20 million from 1978 through February 2012, and there are over 5,000 policies. These reported values include entire counties which may or may not be wholly located in the watershed.

Clay County has a current approved Hazard Mitigation Plan. At the writing of this update, Craighead, Cross, and Lawrence Counties have expired Hazard Mitigation Plans. Phillips County's Hazard Mitigation Plan is pending adoption. Jackson, Monroe, Poinsett, Prairie, and Woodruff Counties are working on updates. Greene and Lee Counties have no known Hazard Mitigation Plan. The status of the hazard mitigation plans for the Missouri Counties is not included.

In the Cache Watershed, 1,665 miles of stream have been included in the CNMS database<sup>1</sup>. Of the 1,665 stream miles, 88 stream miles are classified valid, and the remaining 1,577 stream miles have been designated as having an unknown status, neither valid nor unverified. In the eastern half of Arkansas there are some concerns from

FEMA Region 6 on the number of stream miles and their validation status. The CNMS mileage of this watershed will be reviewed, revised, and confirmed with the Region during Discovery.

**d) Priority 4: Dardanelle Reservoir (HUC8: 11110202)  
Discovery, BLE, and Phase 1 Flood Risk Products - \$77,491**

The Dardanelle Reservoir Watershed largely includes portions of the following counties: Franklin, Johnson, Logan, Newton, Pope, Searcy, and Van Buren. The largest population centers in the watershed are Clarksville and Russellville. Several smaller communities are located in the watershed including Altus, Branch, Caulksville, Charleston, Coal Hill, Dardanelle, Denning, Dover, Hartman, Hector, Knoxville, Lamar, London, Morrison Bluff, Paris, Ratcliff, Scranton, Subiaco, and Wiederkehr Village. Flood risks and opportunities for mitigation exist throughout the watershed. The Dardanelle Reservoir Watershed includes Lake Dardanelle, formed upstream of the Dardanelle Lock and Dam, which is on the Arkansas River serving navigation and hydropower.

The outer limits of the Dardanelle Reservoir Watershed are located in the counties of Newton, Searcy, and Van Buren, which are the only counties in the watershed that do not have modernized FIRMs. While a Discovery Meeting in this watershed will initiate the Risk MAP processes allowing progress toward an effective DFIRM for these counties, the primary reason is based on the mitigation activities being undertaken by several of the communities within the watershed, including but not limited to the City of Russellville. The City of Russellville has recently acquired updated topographic data (LiDAR based) that can/will be used in drainage improvement and mitigation activities. The US Army Corps of Engineers in Little Rock along with the City of Russellville may have an opportunity to develop a partnering program to address some of the flooding issues within Russellville. In addition, the U.S. Forest Service has contracted watershed studies in the Ozark and Ouachita National Forests which may include additional data sharing opportunities. Initiating Discovery in this watershed will enable the Arkansas CTP to develop and utilize these partnership opportunities and collaborations. In addition, performing Discovery in this watershed and the adjacent watershed, Lake Conway-Point Remove, allows for an opportunity to combine meetings for efficiency and to achieve cost savings.

Flood losses in the counties largely included in Dardanelle Watershed have exceeded \$1.8 million from 1978 through October 2012. Currently there are over 500 policies documented within these counties. These reported values include entire counties which may or may not be wholly located in the watershed. The only repetitive losses recorded within the counties wholly or partially included in the watershed are located in Franklin and Van Buren counties.

Franklin, Johnson, and Pope Counties have current approved Hazard Mitigation Plans. Logan, Newton, Searcy, and Van Buren Counties have no known Hazard Mitigation Plans.

In the Dardanelle Reservoir Watershed, approximately 792 miles of stream have been included in the CNMS database<sup>1</sup>. Of the 792 stream miles, 548 stream miles are

classified valid and the remaining 244 stream miles have been designated as having an unknown status, neither valid nor unverified.

### **3. OTHER ENGINEERING PROJECTS: \$3,547,922**

- Phase 2 Risk MAP Restudy – Craighead County, AR: \$360,060
- Lower Arkansas Maumelle Watershed / Phase 2 & 3 Projects: up to \$643,280
- Bayou Meto Watershed / Phase 2 & 3 Projects: up to \$1,067,158
- Illinois Watershed / Phase 2 Projects: up to \$1,025,925
- LAMP on Arkansas River: \$ 451,499

#### **a) Phase 2 Risk MAP Restudy, Craighead County, AR: \$360,060**

- Community of Bay 2D work area: \$87,000
- Incorporation of existing LOMC/PMR (Butler’s Ditch): \$10,125
- Incorporation of LDS study (near Bono, AR): \$4,500
- Incorporation of updated FEMA Zone A modeling: \$12,200
- Remaining Craighead County Phase 2 (Updated modeling, Non-Regulatory Products, Outreach, etc): \$149,435
- Incorporation of Jonesboro study data and bring up to FEMA standards: \$96,800  
or
- Redelineation of Jonesboro study area (assumes USACE data does not get incorporated): \$15,000

In recent fiscal years, FEMA Region 6 has conducted revised studies for Zone A areas throughout the county and a preliminary study to review the need for a restudy of the floodplain near Bay, Arkansas. The result of the revised Zone A studies did not include ongoing Seclusion areas throughout the County, and the preliminary 2D hydraulic analysis shows that the current, effective 1-D modeling significantly overestimates the floodplain in the wide, flat floodplain around Bay. The State CTP, and its contractor, have reviewed the preliminary 2D analysis around Bay and agree that the results of the preliminary study reveal the need for a more detailed study, which will require a more complex 2D analysis to be conducted in this area. The CTP would like to be involved in the development of this modeling and the associated outreach activities. Since that time, the City of Jonesboro has undertaken a large study performed by the USACE. As part of this Phase 2 study, the CTP proposes to work to incorporate the previous FEMA analyses; incorporate the City of Jonesboro data, bringing it up to FEMA standards as appropriate, or redelineate and map existing floodplains to new topographic data; incorporate existing Letters of Map Change since the previous preliminary FIRM data was developed; perform updated Zone A analyses within the Seclusion areas of the

county; and perform modeling and mapping updates associated with non-accredited levee systems. The performance of modeling and mapping associated with non-accredited levee systems can be included with the ongoing Discovery and Special projects work within the priority watersheds listed by the CTP. We believe that our technical abilities and focused outreach, as well as our local presence and relationships, will be very important to the success of this task.

**b) Lower Arkansas – Maumelle Watershed (HUC8: 11110207): \$643,280**

(Local match contributions to be explored through ongoing outreach with Pulaski County and the City of Little Rock)

- Phase 2 Risk MAP Restudy Little Maumelle River: \$450,038
- Phase 2 Risk MAP Restudy Coleman Creek: \$145,462
- Phase 3 Risk MAP Physical Map Revision Rock Creek: \$29,880
- Base Level Engineering Modeling (Pulaski County – Zone As) - \$17,900

Additional task and schedule information is available upon request.

FEMA and their national contractor conducted Discovery Meetings and activities in the Lower Arkansas – Maumelle (LAM) Watershed, prepared a Discovery Report identifying the priority areas within the LAM watershed, and completed Flood Risk Products for the LAM Watershed. The LAM watershed includes the largest population center in the State, Pulaski County. The ANRC, utilizing the established CTP Program, is proceeding with performing Risk MAP activities outlined in the Discovery Report and/or Flood Risk Report in cooperation with the communities and stakeholders within the community.

Phase 2 Little Maumelle River – The City of Little Rock and Pulaski County have expressed concerns regarding the hydrologic analysis that is reflected on the effective maps which has been retained on the Pulaski County, AR preliminary FIRMs. In order to confirm the validity of the Little Maumelle River flows and the resulting SFHA, the City and County are considering a collaborative relationship with the State CTP to perform a restudy of this watershed. There has been a renewed interest in development in the SFHA's of the Little Maumelle River, which warrants a renewed interest in confirming the appropriate risk along this river. An updated Phase 2 Little Maumelle River restudy is estimated to cost approximately \$450,038, which is due largely the high profile interest in the areas surrounding the river. Based on the local knowledge, we anticipate higher than normal outreach and communication efforts for this effort.

Phase 2 Coleman Creek – The City of Little and the University of Arkansas at Little Rock (UALR) are planning a series of mitigation actions including but not limited to stream restoration, channel improvements, road crossing reviews and updates where appropriate. A Phase 2 Risk MAP restudy of Coleman Creek would be instrumental in the development of a strategic plan for the Coleman Creek system. There is no historical model data available, digital or hard copy, from the FEMA Data Library. Several different consulting firms in the Little Rock area have been involved in design and hydraulic model development on Coleman Creek, however, there is not a complete model to date. To perform a complete restudy (which could be augmented by available data) is estimated to cost approximately \$145,462.

Phase 3 Rock Creek – During 2015 the AR CTP Team updated Rock Creek through Little Rock in cooperation with the City of Little Rock. Rock Creek is a large watercourse that traverses nearly the entire City of Little Rock from west to east. It was identified as an important restudy due to the age of the study, development through the City, and inconsistencies in the hydrology identified by different organizations. The upper end of State Capitol Drain was also included in the restudy in order to update the Zone A SFHA's to detailed Zone AE with floodways. For future consideration, the AR CTP and the City agree that the restudy efforts along Rock Creek may uncover additional needs on the tributaries to Rock Creek.

In order to continue the forward progress of the restudy with Rock Creek and update the SFHAs a Phase 3 Risk MAP Physical Map Revision would be anticipated which is estimated to cost approximately \$29,880. It is important to the AR CTP and to the City that we continue the forward momentum generated with the restudy of Rock Creek and the smaller tributaries so that the community residents will benefit from the new updated analysis.

Base Level Engineering (BLE) modeling is becoming a useful tool for communities when allowing development in Approximate Special Flood Hazard (Zone A) Areas. Pulaski County recently completed its countywide Digital Flood Insurance Rate Map (DFIRM) update. However, much of the data on the maps is based off of old contour based terrain or was digitized based on ongoing levee certification issues. Additionally, the Lower Arkansas Maumelle Watershed was deployed during the early stages of the RiskMAP program, prior to the BLE requirement. As such, Pulaski County has been experiencing increased growth and questions in the approximate Zone A areas of the County. The CTP believes the development of BLE modeling for the County would be a beneficial and cost effective approach for better floodplain management, without updating recent DFIRM maps.

**c) Bayou Meto Watershed (HUC8: 08020402): \$1,067,158**

(Local match contributions are being explored through ongoing outreach with Sherwood, Jacksonville, Jefferson County and Lonoke County.)

- Phase 2 Risk MAP Restudy, Bayou Meto Tributary 2: \$57,703
- Phase 2 Risk MAP Restudy, Bayou Meto / Kellogg Creek: \$689,700
- Phase 2 Risk MAP FIS Update Jefferson County: \$154,172
- Phase 2 Risk MAP FIS Update Lonoke County: \$165,583

Additional task and schedule information is available upon request.

Phase 2 Bayou Meto / Kellogg Creek – The City of Sherwood, in an effort to mitigate the frequent flooding of Jax-Cato Road at Kellogg Creek which has cut off access to a local subdivision for several days, is interested in evaluating roadway and culvert design considerations to reduce the length of time the roadway is underwater and restricting access, but also to develop some potential mitigation actions that could reduce the flooding losses to the homes. The City of Sherwood understands that this may be a multi-year endeavor in order to eventually reduce and/or remove the homes from risk of flooding, but the first step is to elevate the road and size a hydraulic structure to lessen

the occurrences of road closings. This project is also being considered for a FEMA Grant now that the Pulaski County Hazard Mitigation Plan update has been approved. Kellogg Creek is a tributary to Bayou Meto, which has been included in the proposed estimate, however, as we continue to review this project we expect to better define the scope and cost. The estimated cost does not include any construction. At this time the Phase 2 Risk MAP project associated with this mitigation action is \$689,700.

Phase 2 Bayou Meto Tributary 2 – As a result of existing work completed during 2015, the City of Jacksonville has determined a new area of need and is interested in teaming to convert existing Zone A mapping to detailed Zone AE with Floodway along Bayou Meto Tributary 2. Much of the area along the floodplain is currently rural; however, there is an increased pressure to begin development. With that increased pressure for development, the City would like to have Base Flood Elevations to aid in responsible floodplain development. At this time the Phase 2 Risk MAP project associated with this project is \$57,703.

Phase 3 Jacksonville/Cabot – During 2015 the AR CTP performed new studies in Jacksonville and Cabot on streams identified during Discovery as needed to be updated. This includes Bayou Meto Tributary 1 and Drain 3 and Drain 3S in Cabot. These communities have expressed a very strong desire to move forward with map revisions so that the actual flood risk is updated on their FIRMs. It is also important to the AR CTP that we continue the forward momentum generated with these restudies so that the community residents will benefit from the new updated analysis.

Phase 2 Update Jefferson and Lonoke Counties – During the Bayou Meto Discovery both Jefferson County and Lonoke indicated the desire to have the ability to determine base flood elevations on their FIRMs. These counties are considered modernized; however, they were completed prior to the advent of automated methodology and hydraulic models that accompany the FIRMs of later studies. In addition, the topography used was not detailed. Both of these counties would benefit from an updated FIS Restudy. FEMA Region 6 has funded the acquisition and processing of LiDAR elevation data for Jefferson County to be completed and delivered by December 2015. To perform an FIS update for Jefferson County with the newly acquired topography is estimated to cost \$154,172. An FIS update for Lonoke County would require that additional quality elevation data be collected in the northern half of the county. Once the county has quality topography, an FIS update is estimated to cost \$165,583.

**d) Illinois Watershed (HUC8: 11110103): \$1,025,925**

(Local match contributions are being explored through ongoing outreach with the stakeholders in the Illinois Watershed.)

- Phase 2 Risk MAP FIS Update Benton County: \$514,292
- Phase 2 Risk MAP Restudy, multiple streams (Bentonville): \$158,078
- Phase 2 Risk MAP Restudy, multiple streams (Rogers): \$116,996
- Phase 2 Risk MAP Restudy, multiple streams (Lowell): \$100,353
- Phase 2 Risk MAP Restudy, multiple streams (Springdale): \$136,206

Additional task and schedule information is available upon request.

Phase 2 Update Benton County – During the Illinois Watershed Discovery, Benton County indicated the desire to have the ability to determine base flood elevations for approximate zones on their FIRMs. This county is considered modernized; however, it was completed prior to the advent of automated methodology for the development of hydrologic and hydraulic modeling that accompanies current FIRMs. In addition, the topography used was first generation LIDAR data. Additionally, Benton County has recently contracted to gather new LIDAR data as part of an ongoing grant. This county would benefit from an updated FIS Restudy. To perform an FIS update for Jefferson County with the newly acquired topography is estimated to cost \$514,292.

Phase 2 Risk MAP Restudy (multiple streams in Bentonville) – During the Illinois Watershed Discovery, the City of Bentonville provided multiple locations (approximately 8.8 miles total) where new and/or updated studies would be preferred. These areas are subject to growth and development pressure. Any new studies within these areas would be performed with updated LIDAR data currently being gathered by Benton County. At this time the Phase 2 Risk MAP project associated with this project is \$158,078.

Phase 2 Risk MAP Restudy (multiple streams in Rogers) – During the Illinois Watershed Discovery, the City of Rogers provided multiple locations (approximately 4.8 miles total) where new and/or updated studies would be preferred. These areas are subject to growth and development pressure. Any new studies within these areas would be performed with updated LIDAR data currently being gathered by Benton County. At this time the Phase 2 Risk MAP project associated with this project is \$116,996.

Phase 2 Risk MAP Restudy (multiple streams in Lowell) – During the Illinois Watershed Discovery, the City of Lowell provided multiple locations (approximately 3.4 miles total) where new studies would be preferred. These areas are currently approximate zones that the community would like base flood elevations on, or the community believes these areas to be incorrectly mapped. Any new studies within these areas would be performed with updated LIDAR data currently being gathered by Benton County. At this time the Phase 2 Risk MAP project associated with this project is \$100,353.

Phase 2 Risk MAP Restudy (multiple streams in Springdale) – During the Illinois Watershed Discovery, the City of Springdale provided multiple locations (approximately 6.0 miles total) where new and/or updated studies would be preferred. These areas are areas of approximate zones that the community would like base flood elevations on to address development pressure. Any new studies within these areas would be performed with updated LIDAR data currently being gathered by Benton County. At this time the Phase 2 Risk MAP project associated with this project is \$136,206.

#### **4. Analysis and Mapping Procedures for Non-Accredited Levees (LAMP) on Arkansas River: \$451,499**

- a) Arkansas River: Baucum Levee, Old River Drainage District Levee, Plum Bayou Levee, and Woodson Levee, Pools 5 and 6, Lower Arkansas Maumelle Watershed HUC8 11110207: \$321,206
  - Year 1 Outreach / Initiation of LAMP: \$42,412
  - Year 2 Outreach / Stakeholder Meetings / Coordination: \$40,259

- Year 2 Engineering Analysis through Draft Map: \$238,535
- b) Arkansas River: Roland Levee, Pool 7, Lower Arkansas Maumelle Watershed HUC8 11110207: \$130,293
  - Year 1 Outreach / Initiation of LAMP: \$22,295
  - Year 2 Outreach / Stakeholder Meetings / Coordination: \$24,638
  - Year 2 Engineering Analysis through Draft Map: \$83,360

The State CTP would like to be a strong and active partner with FEMA in the implementation of the LAMP, including the outreach and engineering, in Arkansas.

The State CTP, and its contractor, have reviewed the LAMP Guidance and believe a 2-year project plan can be developed that will result in draft FIRMs being available for review by the affected jurisdictions within that time frame. Year one would include the outreach strategy, development of the project team and stakeholder groups, and initiation planning meetings. We believe that focused outreach, as well as our local presence and relationships, will be very important to the success of this task. We have identified the outreach strategy as a “Year 1” task; however, it is believed that this could be accomplished in less than 1 year. A draft estimate of the outreach and engineering services to apply LAMP on the above listed levees on Arkansas River has been prepared.

The State CTP has learned that the US Army Corps of Engineers (USACE) may be updated modeling on the Arkansas River during 2015 - 2016. A member of USACE’s contract team is also a part of the AR CTP Team, which should allow for collaborative project activities to be realized more efficiently.