Discovery Report

Deer-Steele Watershed, 08030209 Bolivar, Issaquena, Sharkey, Warren, and Washington Counties Town of Arcola, Town of Cary, City of Greenville, City of Hollandale, City of Leland, Town of Mayersville, Town of Metcalfe, City of Rolling Fork Mississippi Report Number 01 01/11/2019



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Acronyms and Abbreviations

AAL	Average Annualized Loss
ASPRS	American Society of Photogrammetry and Remote Sensing
CAC	Community Assistance Contact
CAV	Community Assistance Visit
cfs	cubic feet per second
CNMS	Coordinated Needs Management Strategy
CRS	Community Rating System
DEM	Digital Elevation Model
DTM	Digital Terrain Model
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
GIS	Geographic Information System
Hazus-MH	Hazards U.S. Multi-Hazard
LiDAR	Light Detection and Ranging
LOMA	Letter of Map Amendment
LOMC	Letter of Map Change
LOMR	Letter of Map Revision
MDEQ	Mississippi Department of Environmental Quality
MEMA	Mississippi Emergency Management Agency
NAD83	North American Datum
NAVD88	North American Vertical Datum
NFIP	National Flood Insurance Program
PDCC	Preliminary DFIRM Community Coordination
Risk MAP	Risk Mapping, Assessment, and Planning
SFHA	Special Flood Hazard Area
USGS	United States Geological Survey

1 General Information

The goal of the Discovery effort is to understand better local flood risk, current mitigation efforts in place, and to spark watershed-wide discussions about increasing resilience to flooding. Discovery helps communities identify areas at risk for flooding, and solutions for reducing that risk. Through the Risk Mapping, Assessment and Planning (MAP) program, the Federal Emergency Management Agency (FEMA) provides information to enhance local mitigation plans, improve community outreach, and increase local resilience to floods.

The Deer-Steele Watershed Discovery effort involved an analysis of watershed-wide researched data and information discussed at the Discovery meeting. The inclusion of several communities enabled different community officials to meet with each other and hear how the neighboring community is dealing with similar problems they are facing.

FEMA's Risk MAP program provides communities with flood information based on a watershed model and tools that can be used to enhance mitigation plans and better protect citizens. Risk MAP promotes early and frequent communication with project partners (including all affected communities) to approach risk assessment and mitigation planning on a watershed basis. Discovery is a new Risk MAP task that involves data mining, collection, and analysis. This report summarizes the Discovery tasks that were conducted for the Deer-Steele Watershed (HUC # 08030209) in FEMA Region IV.

The FEMA Region IV Discovery data collection entailed a massive collection of tabular and spatial data for all communities from Federal and State sources, as well as information collected through phone interviews and with Discovery data questionnaires sent to each community.

1.1 Background and Statistics

The Region Study Team (RST) Meeting, which occurred on June 18, 2018, assists in the proper pre-planning to ensure that the Risk MAP goals and objectives are met. With Risk MAP's focus on watersheds at a HUC-8 level it is important that the most is made of this phase in the potential projects within the watershed.

Below is a summary of the Project Management Team/Regional Study Team, including team member name, organization, and role in the study that attended the RST:

- Ebony Brooks, FEMA Region IV, Community Engagement and Risk Communication Liaison
- Mariam Yousuf, FEMA Region IV, Mitigation Division/Risk Analysis Branch, Civil Engineer
- Steve Champlin, Mississippi CTP PM, Project Manager for the Deer-Steele study
- Brandon Cummins, Mississippi Department of Environmental Quality, Staff Geologist
- Jimmy Bradley, Mississippi Geographic Information, LLC, Geospatial Manager
- Katie Bryant, Mississippi Geographic Information, LLC, Project Engineer
- Tracey Milton, Mississippi Geographic Information, LLC, GIS Specialist

The Deer-Steele Watershed is located in west Mississippi. The watershed has an approximate area of 813 square miles and is aligned in a north to south orientation. The watershed is uniform from a physiographic perspective with the entire area falling in the Alluvial Plain region. (Stewart, R.A. 2003. Physiographic regions of Mississippi. Handout, Department of Biological Sciences, Delta State University, 6 pp. (with addenda by S.P. Faulkner, 2005). The watershed contains parts of 5 counties: Bolivar, Issaquena, Sharkey, Warren, and Washington.

The Deer-Steele watershed is controlled primarily by Steele Bayou and Deer Creek. Steele Bayou rises from the confluence with Black Bayou in Washington County and flows approximately 72 miles south where it merges with the Little Sunflower River before flowing into the Yazoo River near the Issaquena-Warren County boundary. The eastern border of the Deer-Steele basin is formed by Deer Creek which flows north to south starting at the Bolivar-Washington County boundary and ending approximately 225 miles south where it confluences with the Little Sunflower River in Warren County.

The Watershed's location in Mississippi is illustrated in Figure 1: Watershed Location.

Figure 1: Watershed Location



Most of the communities in the Deer-Steele watershed have received modernized maps as part of FEMA's Map Modernization Program. The current FIS Dates for these communities are given in Table 1.

Community	Affected Areas	Type of Map	Effective Date
Arcola, Town of	All	DFIRM	May 02, 2012
Bolivar County	Small southwester portion	DFIRM	March 21, 2017
Cary, Town of	Western half	DFIRM	March 02, 2012
Greenville, City of	All but eastern portion	DFIRM	May 02, 2012
Hollandale, City of	Western half	DFIRM	May 02, 2012
Issaquena County	All but western portion	DFIRM	February 16, 2016
Leland, City of	Western half	DFIRM	May 02, 2012
Mayersville, Town of	All	DFIRM	February 16, 2016
Metcalfe, Town of	All	DFIRM	May 02, 2012
Rolling Fork, City of	Western half	DFIRM	March 02, 2012
Sharkey County	Western portion	DFIRM	March 02, 2012
Warren County	Parts of the northern portion	DFIRM	July 16, 2013
Washington County	All but portions to east and portions along the Mississippi River	DFIRM	May 02, 2012

Table 1: Current FIS Dates

Areal distribution of the communities within the Deer-Steele Watershed is listed in Table 2. This table lists the communities located in the watershed, their areal extent (in square miles), and the areal percentage that each community occupies in the watershed. Table 2 also shows the communities' population growth from the year 2000 to 2010 and NFIP data. No Native American tribal lands were identified in the watershed.

Table 2: Statistical Information

Name of Community	CID	Area (square miles)	Percent Area of the watershed	Pop Growth (2000-2010)	Mitigation Plan Current?	NFIP (Y/N)	Policies	Coverage	Claims	Repetitive Losses
Arcola, Town of	280178	0.21	0.03%	-33.21%	Y	Y	8	\$ 2,773,800.00	\$ 127,775.79	0
Bolivar County	280011	11.78	1.45%	-15.63%	Y	Y	383	\$ 65,947,400.00	\$ 16,759,986.40	132
Cary, Town of	280154	0.20	0.03%	-27.12%	Y	Y	31	\$ 14,100,600.00	*	0
Greenville, City of	280179	23.94	2.94%	-16.86%	Y	Y	1,373	\$219,866,000.00	\$ 10,362,433.41	44
Hollandale, City of	280180	0.98	0.12%	-21.18%	Y	Y	26	\$ 7,255,000.00	*	0
Issaquena County	280200	290.66	35.74%	-37.98%	Y	Y	188	\$ 24,376,300.00	\$ 7,565,721.68	134
Leland, City of	280181	1.17	0.14%	-18.65%	Y	Y	74	\$ 16,627,700.00	\$ 321,090.59	1
Mayersville, Town of	280329	1.10	0.14%	-33.25%	Y	Y	4	\$ 430,500.00	\$ 78,779.62	0
Metcalfe, Town of	280355	0.95	0.12%	-4.56%	Y	Y	*	*	*	*

Table 2: Statistical Information (cont.)

Name of Community	CID	Area (square miles)	Percent Area of the watershed	Pop Growth (2000-2010)	Mitigation Plan Current?	NFIP (Y/N)	Policies	Coverage	Claims	Repetitive Losses
Rolling Fork, City of	280304	0.39	0.05%	-13.80%	Y	Y	105	\$ 24,476,800.00	\$ 122,876.93	1
Sharkey County	280092	83.13	10.22%	-24.81%	Y	Y	128	\$ 17,683,200.00	\$ 1,175,197.18	24
Warren County	280316	51.13	6.29%	-1.63%	Y	Y	359	\$ 59,478,600.00	\$18,658,670.79	120
Washington County	280058	376.51	46.30	-15.23%	Y	Y	613	\$110,495,700.00	\$22,046,882.16	145

*Data not reported

Meetings and 44 CFR Part 66 Compliance:

Initial contact with the communities began in February 2018. Following the initial contact, a questionnaire requesting information was sent to the appropriate community contacts. A copy of these questionnaires as well as all information pertinent to community communication is provided in Appendix A.

The purpose of the Discovery meeting is for FEMA, MS, and local community stakeholders to exchange knowledge and information about known flooding risks, risk assessment capabilities, mitigation practices, emergency management actions, and outreach efforts within the watershed. The Discovery Meeting is part of a larger discovery process comprised of a series of meetings and data collection activities culminating in a more holistic picture of the flooding risks within the watershed and each community. The goal of this process is to help communities become more resilient to flooding disasters by identifying where updated flood studies are needed, assessing areas at risk to flooding, determining solutions that can reduce risk, and providing tools that facilitate communication and outreach.

A watershed-wide Discovery Meeting was held on June 26, 2018, at 1:30 PM at the Washington County Convention Center, 1040 South Raceway Road, Greenville, MS. The meeting was set up to facilitate discussion about the Risk MAP program, identify study and mitigation project needs, desired compliance support, and local flood risk awareness efforts. A total of 16 people were in attendance at the meeting, including representatives of Bolivar, Issaquena, Sharkey, and Washington Counties and several municipalities. Additional partners and stakeholders were also in attendance including representatives of MEMA and MDEQ. The discussion was stimulated using the effective FIRM and Discovery Map's display of relevant data available in Appendix B. Attendees cooperatively identified areas of concern where new study information is requested. The final study streams are shown in Appendix C. See Appendix B for pertinent Discovery meeting information including sign-in sheets, meeting notes, presentation and other documentation.

Prior to the Discovery meeting, floodplain administrators for each community were contacted to complete surveys and phone interviews to aid with the Discovery process. These surveys and

interviews pertained to local floodplain management issues, mitigation activities, ongoing flood studies, data availability (including topography, base data, and flood studies), historical flooding, disasters, and more. Contact information for Floodplain Administrators can be found in Appendix B of this report. The Discovery Meeting Map, located in Appendix B, provides a summary of information obtained through community interviews, survey results and other Pre-Discovery data gathering activities.

Part 66 compliance:

The CTP has begun and has on record its Case file and docket?	Χ	YES	NO
The CTP has written record of its initial contact made to the local communities affected by this Risk MAP project?	X	YES	NO
The CTP has written record of its request for additional flood study data and base information from the local communities?	X	YES	NO

National Flood Insurance Program (NFIP) Compliance:

According to the most recent Community Assistance Visits, all participating NFIP communities have adopted Flood Damage Prevention Ordinances that are compliant with the minimum standards established by federal code. Mississippi communities require an official paper copy of a revised Flood Insurance Study from the Map Service Center for adoption.

Local floodplain administrators and County Emergency Management Agency directors were invited to the Discovery meeting and every effort was made to ensure attendance. No updates to the CIS are necessary aside from those that are regularly performed by MEMA Floodplain Management staff.

1.2 Project Summary

The Coordinated Needs Management Strategy (CNMS) analysis revealed several detailed study streams within the watershed that are non-NVUE compliant. Most of these are older studies in and around the municipalities of Washington County with the exception of a portion of Deer Creek which falls in Sharkey County.

This project endeavors to re-study some of the watershed's verified Zone AE studies and also to upgrade a few Zone A streams to AE, both at the request of the communities. The Zone AE studies will be re-studied in an effort to provide updated, more accurate modeling to replace the existing HEC-2 models and to allow for better tie-in to the upgraded Zone A studies upstream. The upgraded Zone A studies are located in developed areas of the City of Greenville and Anguilla. Problems with edge-matching across county boundaries are not as prevalent with the Deer-Steele watershed as have been found in other recent projects. No new studies of currently unstudied streams are proposed at this time.

Approximately 116.5 miles of unverified Zone AE studies including portions of Black Bayou, Deer Creek, and Main Canal will not be studied as part of this project due to limited project funding.

The Discovery Map titled "Mapping Needs: Deer-Steele Watershed", within Appendix B, identifies those stream reaches that are either NVUE compliant, need to be assessed, or are to be studied.

Table 5: List of Study Streams shows which streams have been identified for further study and to what detail the streams will be studied.

Flooding Source Flood Zone		Study Limits	Stream Length (miles)	Proposed Activity	Technical Justification
Bowman Boulevard Ditch	AE	From Delesseps Street to the confluence with Main Canal	3.51	Revised AE w/ floodway	Updated modeling requested by the community
Deer Creek	eer Creek AE From the North west Ang city limit to approximatel miles downstream of Bar Road		1.52	Revised AE w/ floodway	Floodway requested by the community
Robert Shaw Boulevard Ditch AE		From approximately 60 feet downstream of Eureka Street to the confluence with Main Canal	1.26	Revised AE w/o floodway	Updated modeling requested by the community
Robert Shaw A Boulevard Ditch		From Highway 82 to limit of study	0.29	New AE w/o floodway	BFE's strongly desired by city and streamline currently missing from CNMS database
Unknown Stream	А	From approximately 148 feet upstream of Montgomery Place Road to Delesseps Street	0.21	New AE w/o floodway	Unverified per CNMS

Table 3: List of Study Streams

Table 6 provides a mileage count of streams in the watershed based on Type of Study.

Table 4: Total Stream Mile Counts by Type of Study

	Detailed (Enhanced Level 1)	Limited Detailed (Enhanced Level 2)	Approximate (Base Level Study)	Redelineation (Zone AE with Floodway)	Verified Digital Conversion
Effective Flood Insurance Study	195.1	79.9	176.9		
Updated Effective Studies	6.29	0.0	0.5	0.0	0.0
New Studies Identified	0.0	0.0	0.0		

The list of Flood Insurance Rate Map (FIRM) panels that will be updated by the study is presented in Table 7. Graphical depictions of the effective and proposed updated panels are shown in Appendix C.

DFIRM_ID	CO_NAME	FIRM_PAN	SCALE	EFF_DATE
28125C	Sharkey	28125C0102D	6000	3/2/2012
	Washington	28151C0139C	6000	
		28151C0143C	6000	
291510		28151C0144C	6000	5/2/2012
281310		28151C0227C	6000	5/2/2012
		28151C0231C	6000	
		28151C0232C	6000	

Table 5: Proposed FIRM Panel updates

Portions of Issaquena, Warren, and Washington counties located in the Deer-Steele watershed were included as part of the 2017 leaf-off acquisition project and has a pixel resolution of 12 inches.

We have evaluated the blue book dollars as detailed in FEMA's document "Estimating the Value of Partner Contributions to Flood Mapping Projects". An updated estimate of the total partner contribution including Local, State and/or other Federal contributions is presented in Table 8.

Project Task	FEMA Contribution	Partner Contribution	% Partner Leverage	Total Project Cost
Base Map Preparation—Base Map Data (1-foot Orthophotos)	\$17,000	\$ 8,500	33%	\$ 25,500

2 Watershed Stakeholder Coordination

The population in the Deer-Steele Watershed is distributed between 8 autonomous jurisdictions. Many of these jurisdictions have only a portion of their geographic extents within the watershed, including the cities of Rolling Fork, Hollandale, and Leland, and the towns of Arcola, Cary, and Metcalfe. Most of the population in the watershed resides in Washington County. To communicate effectively throughout the life of a possible Risk MAP project in this Watershed, the use of e-mail, telephone, and letters will be essential. A master or central list of stakeholders in the communities within Deer-Steele watershed has been established. This list is included in Appendix A.

Representatives from the local governments, including municipalities, are considered fundamental stakeholders in this process because they have been elected or appointed to represent the interests of the residents of the Watershed. In addition to municipal governments, the county officials of Bolivar, Issaquena, Sharkey, Warren, and Washington counties were invited to participate in the Discovery Meeting. Representatives of various other regional, state, and federal agencies were also encouraged to participate. See Appendix A for a complete list of the stakeholders who were invited to the Discovery Meetings.

The communities invited to participate in the Discovery effort are listed in Table 9. Of these 13 communities, representatives of 12 communities attended. Follow up with communities that did not attend was attempted by letter dated July 6, 2016. An example of the letter is included in Appendix A.

County	Community	Municipality Type
Bolivar	Bolivar County	County
Issaquena	Issaquena County	County
Issaquena	Mayersville	Town
Sharkey	Cary	Town
Sharkey	Rolling Fork	City
Sharkey	Sharkey County	County
Warren	Warren County	County
Washington	Arcola	Town
Washington	Greenville	City
Washington	Hollandale	City
Washington	Leland	City
Washington	Metcalfe	Town
Washington	Washington County	County

Table 7: Communities in the Deer-Steele Watershed

An important phase of Discovery is to request additional information through interviews and data questionnaires. The interviews involved giving community officials information about the Discovery process, and data from various FEMA fact sheets. Communities were asked to

identify "Areas of Concern" that could be addressed during the Discovery meeting (e.g., mapping needs, desired mitigation projects, flood prone areas).

The project team worked with FEMA Region IV and the State National Flood Insurance Program (NFIP) Coordinator and State Hazard Mitigation Officers to compile the stakeholder list for the Deer-Steele Watershed in Appendix A. Community priorities were established through the use of a Community Worksheet, correspondence, and personal discussions during and after the Discovery meeting to identify those streams that the communities wanted studied. Worksheet forms, included in Appendix B, were completed by some communities. The forms provide additional information regarding available community data and flood mapping issues concerning the communities. The Discovery meeting invitation, sign-in sheet, and Discovery presentation are also included as Appendix B.

3 Data Analysis

3.1 Data Available for Flood Risk Products

The collected data can be used in conjunction with results from the hydrologic and hydraulic analysis and mapping to create new Risk MAP products. New Risk MAP products may include water surface elevation grids, depth grids, flood risk grids, and other enhanced data layers. If available, topographic data and building footprints of structures in the floodplain can be used to develop these products and many more. These products can assist local officials, residents, and developers in the creation and update of long-term and economic development plans. The new Risk MAP products are discussed in further detail in Section 5 of this report.

3.1.1 Base Map Data

Base map data includes transportation lines, hydrographic features, political boundaries, and railroads. The political, state and county boundaries for the counties within the Watershed were collected using FIRM databases and the Mississippi Automated Resource Information System (MARIS) data collections.

3.1.2 Topographic Data

Light Detection and Ranging (LiDAR) elevation data is currently available for the entirety of the Deer-Steele watershed. The LiDAR coverage obtained for this area falls under the United States Army Corp of Engineers Delta Phase 1 (2009), flown and processed by Photo Science, Inc. for the State of Mississippi. The data was collected at a nominal point spacing of 1 meter, with a vertical root mean square error of 15.0 centimeters.

The LiDAR coverage for the Deer-Steele watershed is depicted in Figure 2.

Figure 2: LiDAR coverage for the Deer-Steele Watershed



3.1.3 Average Annualized Loss (AAL) / HAZUS

The Hazards U.S. Multi-Hazard (Hazus-MH) tool was used to develop Level I AAL data collected for this Watershed. Hazus-MH is a nationally applicable standardized risk assessment methodology that helps estimate and analyze potential losses from earthquakes, hurricane winds, and floods. Level I uses the default data that is embedded in Hazus-MH and does a basic

analysis. For a basic flood risk assessment, the tool essentially intersects flood hazard and population (census block) polygons.

The AAL data provides a general understanding of the dollar losses associated with a certain frequency of flood events within a county and is used to get a relative comparison of flood risk. The existing Hazus-MH analysis is based on approximate flood boundaries and national datasets. The calculation is based on flood elevation estimates using the 30-meter United State Geologic Survey (USGS) Digital Elevation Model (DEM) and flow rates based on rural regression equations. Only rivers with drainage areas of at least 10 square miles are considered in the analysis. Figure 2 shows the distribution of AAL losses within the Deer-Steele Watershed by county.

AAL data is summarized at the census block level. The AAL data indicating high losses is shown on the Flood Risk Map in Appendix B. Additional information about the Hazus-MH process and tool can be found at http://www.fema.gov/plan/prevent/hazus/hz_overview.shtm.



Figure 3: HAZUS Level I AAL Losses in Deer-Steele Watershed

3.2 Other Data and Information

Available flood hazard and flood risk assessment data for the Watershed was compiled from a search of county and government Geographic Information System (GIS) Web sites and information obtained from the completed questionnaires provided by communities. Table 10: GIS Data Layers Available summarizes the GIS information collected. Hydrography data covering additional areas of the watershed is likely to be developed in the near future and will be utilized for this Risk MAP project as the delivery schedule. Figure 3 also displays recent county orthoimagery collections, coordinated at the State level that can be used to support data development.

Data Types	Deliverable/Product*	Vertical/ Horizontal Datum	Use Restrictions Y/N?	Source	Regulatory / Non- regulatory
Demographics	Geospatial Data/Reports	n/a	n	U.S. Census Bureau	Non- regulatory
Insurance Policies	CAV reports	n/a	У	MEMA Floodplain Management Bureau	Regulatory
Mitigation Plans	PDF Document	n/a	n	Mississippi EMA	Non- regulatory
Claims Data	CAV reports	n/a	у	MEMA Floodplain Management Bureau	Regulatory
Letter of Map Change (LOMCs)	Excel Spreadsheets	n/a	n	FEMA Mapping Information Platform	Regulatory
Repetitive Loss	Discovery Map Geodatabase	undefined	у	FEMA RIV	Regulatory
Significant/High Hazard Dams	Discovery Map Geodatabase	NAVD88/NA D83	n	MDEQ—Dam Safety Division USACE	Regulatory
Boundaries: Community	Discovery Map Geodatabase	NAD83	n	Mississippi Automated Resource Information System	Non- regulatory
Boundaries: County and State	Discovery Map Geodatabase	NAD83	n	Mississippi Automated Resource Information System	Non- regulatory
Boundaries: Watersheds	Discovery Map Geodatabase	NAD83	n	U.S. Geologic Survey	Non- regulatory
Effective Floodplains: Modernized SFHAs	Discovery Map Geodatabase	NAD83	n	FEMA's Regional Flood Hazard Layer	Regulatory

Table 8: GIS Data Layers Available

Data Types	Deliverable/Product*	Vertical/ Horizontal Datum	Use Restrictions Y/N?	Source	Regulatory / Non- regulatory
Future or recent highway improvement, bridge, culvert, levee locations	Discovery Map Geodatabase	NAD83	n	MDOT—Bridge Division	Non- regulatory
Hydrography	Discovery Map Geodatabase	NAD83	n	Mississippi Digital Earth Model	Non- regulatory
Mitigation Projects: Recent, ongoing, planned, desired FEMA/OFA/local projects	tion Projects: nt, ongoing, ned, desired A/OFA/local projects		n	FEMA RIV	Non- regulatory
Stream Gages	Discovery Map Geodatabase	NAD83	n	U.S. Geologic Survey, USACE	Non- regulatory
Study Needs: FEMA	Discovery Map Geodatabase	NAD83	n	Coordinated Needs Management System (CNMS)	Regulatory
Study Needs: Recent, ongoing, planned, desired FEMA/OFA/local studies	Discovery Map Geodatabase	NAD83	n	various	Regulatory
Topographic Availability	Discovery Map Geodatabase	NAD83	n	Mississippi Digital Earth Model	Non- regulatory
Transportation: Railroads	Discovery Map Geodatabase	NAD83	n	Mississippi Automated Resource Information System	Non- regulatory
Transportation: Roads	Discovery Map Geodatabase	NAD83	n	Mississippi Digital Earth Model	Non- regulatory
Community Contacts	Excel Spreadsheets	n/a	n	Local websites, State/FEMA updates	Non- regulatory
Cadastral	PDF Document	undefined	У	Local (Holmes, Leflore)	Regulatory
Digital Orthophotos	Discovery Map Geodatabase	NAD83	n	Mississippi Digital Earth Model, US Department of Agriculture	Non- regulatory
Publicly Owned Lands Data	Discovery Map Geodatabase	NAD83	n	Mississippi Automated Resource Information System	Non- regulatory
ETJ Data	Discovery Map Geodatabase	NAD83	n	Mississippi Automated Resource Information System	Non- regulatory

Table 8: GIS Data Layers Available (cont.)



Figure 4: Mississippi Local High-Resolution Imagery

In order to tie the NDEP/NDOP websites with the MIP, you have to go into the NDEP/NDOP websites and enter the <u>MIP case number</u> in the multi-line text box with the label "**Is there a specific description of the area you would like to provide**?". Exact location could be in 3 (or so) screens when creating a Tracker entry.

Filename Format: MIPCASE[case number]

National Digital Elevation and Digital Ortho Program Project Tracking System: After the elevation and imagery data is obtained the following project tracking systems should be updated with the following required information.

National Digital Elevation Program (NDEP) Project Tracking System (https://hazards.fema.gov/metadata/NDEP/)

- Data Collection Status: Complete, In work, Planned, or Proposed.
- Vertical Datum: should be NAVD88
- Vertical Accuracy: RMSE per FEMA G&S App-A
- Approx. Planned Posting Spacing: smallest dist. Between points in gridded elevation dataset
- Elevation Data Model: e.g., mass point/breaklines, regular grid, etc...
- Data Collection Method: e.g., cartographic, photogrammatic, LiDAR
- Surface Mapped: usually bare earth
- Use restrictions

National Digital Orthophoto Program (NDOP) Project Tracking System (<u>https://hazards.fema.gov/metadata/NDOP/</u>)

- Data Collection Status: Complete, In work, Planned, or Proposed.
- Image Resolution:
- Vertical Accuracy: in meters
- Data format
- Image Bands:
- Leaf Condition: on/off
- Grid System:
- UTM Zone:
- Horizontal Datum:
- Use restrictions

For further guidance and information about NDEP and NDOP, please contact the RSC.

3.2.1 Mitigation Plans/Status and Mitigation Projects

A Hazard Mitigation Plan is a document that assesses the potential hazards which could occur within communities and it typically includes a detailed list of "Mitigation Actions" that could be taken to prepare the communities for these possible hazards. The Plan must be updated every 5 years and it includes detailed descriptions of mitigation goals and project implementation. The status of current hazard mitigation plans is shown in Table 11 below.

The development and formal adoption of an approved Hazard Mitigation Plan by localities is necessary for Hazard Mitigation Grant Program and Pre-Disaster Mitigation Program eligibility. This requirement is prescribed in the Disaster Mitigation Act of 2000. Some of the larger communities develop single-jurisdictional plans, while smaller communities elect to be covered under a county or regional multi-jurisdictional plan. For the Deer-Steele watershed, Bolivar, Issaquena, Sharkey and Washington Counties and their respective municipalities are covered under regional plans while Warren County has adopted its own county plan.

Community Hazard Status		Plan Developer	Plan Type
Bolivar County	Effective until Jan. 2020	True North Emergency Management, LLC	Regional Multi- Jurisdictional
Issaquena County	Effective until Jan. 2019	Central MS Planning and Development District	Regional Multi- Jurisdictional
Sharkey County Effective until Jan. 2019		Central MS Planning and Development District	Regional Multi- Jurisdictional
Warren County	Warren County Effective until Jan. 2022		County Multi- Jurisdictional
Washington County	Effective until Jan. 2020	True North Emergency Management, LLC	Regional Multi- Jurisdictional

Table 9: Status of Hazard Mitigation Plans

3.2.2 CNMS and NFIP Mapping Study Needs

The Coordinated Needs Management Strategy (CNMS) is a FEMA initiative to update the way FEMA organizes, stores, and analyzes flood hazard mapping needs information for communities. CNMS defines an approach and structure for the identification and management of flood hazard mapping needs that provides support to data-driven planning and the flood map update investment process in a geospatial environment. The goal is to identify areas where existing flood maps are not up to FEMA's mapping standards. More information about CNMS can be found at the following location: http://www.fema.gov/library/viewRecord.do?id=4628.

Table 12 summarizes draft results of the validation analysis obtained from CNMS.

Table 10:	Current	Status	in	CNMS	
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	Approximate			D	Total	
County	Valid	Unverified	Unknown	Valid	Unverified	Stream miles
Bolivar	0	0	0	0	0	0
Issaquena	0	0	0	79.9	42.7	122.6
Sharkey	0	42.3	0	6.1	49.4	97.8
Warren	0	20.1	0	5.8	0	25.9
Washington	0	140.3	0	68.3	67.1	275.7

Valid: validation status is assigned to NVUE (Newly Validated or Updated Engineering) compliant, or all model backed approximate studies, all digital detailed streams which have been through Phase 3 analysis and passed all critical elements, and failed no more than 3 secondary elements, as well as all 'bulk valid' study reaches. Bulk valid study reaches are defined as those which are new or updated during/since Map Mod – roughly 2003.

Unknown: validation status is also "to be assessed", or digital non-model backed approximate studies, all non-digital studies (detailed and approximate), and a very small number of digital detailed studies for which further information is needed from the Region in order to determine validation (such as some playa systems, etc.).

Unverified: validation status is assigned to existing detailed flood hazard studies for which at least 1 critical or more than 4 secondary deficiencies have been identified. See definition for the "VALID" validation status to note exceptions. An "UNVERIFIED" study may either be assigned resources for restudy in a future FY, or is currently being restudied.

The CNMS analysis includes community requests for additional studies. Within the CNMS geodatabase, there is a dataset called 'S_Request_Ar' that documents these requests.

3.2.3 Socio-Economic Analysis

More than 70% percent of the watershed population is located within the city of Greenville. Of the unincorporated areas, Washington County has the highest percentage of total population for the watershed (10.27%). None of the other counties comprises more than 4% percent of the total watershed population. Population density in and out of the municipalities leans heavily towards inside as roughly 84% of the total watershed population lives within city limits. Specific population breakdown of the watershed is given in Table 13.

County	FIPS Code ¹	CID ²	Community Name 2010 Watershed Population ³		% of Total Population within Watershed
Bolivar	28011	280011	Bolivar County 135		0.28
Issaquena	28055	280200	Issaquena County	572	1.17
Issaquena	28055	280329	Mayersville, Town of	544	1.11
Sharkey	28125	280154	Cary, Town of	87	0.18
Sharkey	28125	280304	Rolling Fork, City of 587		1.20
Sharkey	28125	280092	Sharkey County	334	0.68
Warren	28149	280316	Warren County	1,778	3.63
Washington	28151	280178	Arcola, Town of	368	0.75
Washington	28151	280179	Greenville, City of	34,363	70.21
Washington	28151	280180	Hollandale, City of	2,702	5.52
Washington	28151	280181	Leland, City of	1,435	2.93
Washington	28151	280355	Metcalfe, Town of	1,011	2.07
Washington	28151	280058	Washington County	5,025	10.27
TOTAL				48,941	100%

 Table 11: Population Statistics in the Deer-Steele Watershed

Source: U.S. Census Bureau, 2010 ¹ FIPS = Federal Information Processing Standard ² CID = Community Identification (Number) ³ Denotes estimated population of the community within the Deer-Steele Watershed

Table 14 lists the median and mean incomes in counties within the watershed. Most of these counties' median family income fall well below the state median of \$40,528 with the exception of Warren County, which is comparable to the state median.

County	Median Family Income (dollars)	Per Capita income in past 12 months (in 2016 dollars)
Bolivar	27,457	16,595
Issaquena	24,306	17,282
Sharkey	28,878	15,430
Warren	40,475	22,110
Washington	28,452	17,800

Table 12: Income Statistics in the Deer-Steele Watershed

The percent of employment by industry in the Deer-Steele Watershed counties is listed in Table 15. These figures are estimates derived from whole-county data. Accurate total watershed population figures could not be calculated based on the Census provided data and it should be noted that employers were not required to report data if only a small number of employers exists within any specific field for a county. Most of the working population in the watershed is employed in the counties of Bolivar, Warren, and Washington with the most popular industries being health care, retail trade, accommodation and food services, and manufacturing.

Table 13: Percentage of Employment in the Watershed by Industry

Industry Employment Groups	Bolivar County	Issaquena County	Sharkey County	Warren County	Washington County
Agriculture, forestry, fishing, and hunting	0.74%	*	1.17%	0.34%	0.28%
Mining, quarrying, and oil and gas extraction	*	*	*	*	*
Utilities	0.55%	*	*	0.63%	0.81%
Construction	3.04%	*	1.43%	2.12%	3.06%
Manufacturing	19.11%	*	*	19.09%	8.18%
Wholesale Trade	4.20%	*	10.51%	2.53%	5.38%
Retail Trade	16.75%	*	18.29%	15.92%	19.90%
Transportation and warehousing	6.01%	*	2.20%	5.10%	5.08%
Information	0.94%	*	0.78%	1.20%	1.46%

Industry Employment Groups	Bolivar County	Issaquena County	Sharkey County	Warren County	Washington County
Real estate and rental and leasing	1.39%	*	3.63%	1.04%	0.93%
Professional, scientific, and technical services	2.01%	*	2.08%	2.45%	2.37%
Management of companies and enterprises	*	*	*	0.34%	1.04%
Administrative and support and waste management and remediation services	4.76%	*	3.50%	3.40%	5.38%
Educational services	1.31%	*	*	1.19%	1.44%
Health care and social assistance	18.58%	*	28.66%	15.27%	20.38%
Arts, entertainment, and recreation	1.31%	*	*	0.75	2.72%
Accommodation and food services	11.11%	*	6.23%	22.45%	13.64%
Other services (except public administration)	4.40%	*	14.66%	3.77%	5.45%
Industries not classified	*	*	*	0.02%	*

 Table 13: Percentage of Employment in the Watershed by Industry (cont.)

*Data not reported or non-specific placeholder designated

Figure 5 lists the Industries in the Deer-Steele Watershed Counties contributing to the total annual payroll.

It should be noted that these economic figures are based on the entirety of the county/community, and not just the portion located in the Deer-Steele Watershed. In many cases, employers were not required to report payroll data to the Census if only a small number of employers exist within a given industry or occupational field such as the case for Issaquena County, which only reported a Total Annual Payroll of \$1,715,000 and no figures categorized by industry. In addition, it should be noted that in some cases, industry categories have been combined to reflect the economic figures provided.



Figure 5: Total Annual Payroll in Deer-Steele Watershed by County





3.2.4 Community Rating System (CRS)/NFIP

The NFIP's CRS is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS: reduce flood losses, facilitate accurate insurance rating, and promote the awareness of flood insurance. A point system is used to determine a CRS rating. The more measures a community takes to minimize or eliminate exposure to floods, the more CRS points that are awarded and the higher the discount on flood

insurance premiums. A Class 1 provides a 45% premium reduction and a Class 10 provides no reduction. The national average is Class 8.

All communities within the Deer-Steele watershed are participants in the NFIP. Of these 13 participants, the City of Greenville (with a rating of 9) is the only one listed in the CRS Program as of October, 2016. During the Discovery meeting, participation in the CRS and NFIP was encouraged and brochures with additional information on the CRS and NFIP were provided.

3.2.5 Levees/Dams

Major levee systems that exist in the Deer-Steele watershed include portions of the Mississippi River Levee system and the Yazoo Backwater-Yazoo River RB Levee system which creates the southern border of the watershed. Information for these 2 levee systems as they pertain to the Deer-Steele watershed can be seen in Table 16 below.

LEVEE NAME	COUNTIES	CERTIFICATION ISSUES	COMMENTS
MS East Levee	Bolivar, Washington, Issaquena, Warren	None	None
Yazoo Backwater Levee – BMLC	Issaquena, Warren	Not certified	Currently unaccredited due to failed inspection dated 8/29/2012

The inventory of regulated dams, as well as the inventory of dams with permits are available from the MDEQ Division of Dam Safety. According to records, there are no high or significant hazard dams located in the Deer-Steele Watershed and only 2 low hazard dams. These dams, the Leland Sewage Lagoon Dam and Bledsoe Lake Dam, are both located in Washington County. Ensuring regular inspection and maintenance, raising public awareness, and making sure that the Emergency Action Plan is up to date are the most important steps to take to reduce risks associated with dam failure. Hosting a public meeting to educate residents about the risk of living downstream of dams and the value of maintaining a dam or providing remediation services are two additional steps to manage risk.

3.2.6 Stream Gage Information

The USGS, along with agency partners, provides surface water flow data for locations within the Deer-Steele watershed. Table 17 lists the period of record, gage identification number, and location for both current and historical stream gages in the Deer-Steele watershed. Two gages are located within the Deer-Steele Watershed.

Period of Record	Gage ID	Gage Location	County	Latitude	Longitude
2001-2014	0728875070	Deer Creek east of Leland, MS	Washington	33.40111111	90.89194444
1946-1983	07288770	Deer Creek near Hollandale, MS	Washington	90.84638889	33.14972222

Table 15: Stream gages in the Deer-Steele Watershed

3.2.7 High Water Marks and Historic Flooding

The gages presented in the previous section have a historical high measurement that can be gleaned from the record. For the USGS stage gages, the record stage is listed for most stations.

Historic flooding events that have affected communities in the watershed are presented below.

3.2.7.1 Bolivar County Historic flooding

The Bolivar County FIS identifies the county as a place of almost yearly flooding caused by its location in the Mississippi Delta Region. However, the construction of the Mississippi River levee system provided much relief, with the first levee segment, from Desoto County to the Coahoma/Bolivar County boundary, being certified by the Vicksburg District of the United States Army Corp of Engineers on February 15, 2011.

The City of Cleveland still has flooding issues caused primarily by Pecan Bayou and Bear Pen Canal during short, intense rainfall events with historical flooding of Pecan Bayou recorded in March 1973, May 1974, and May 1975.

The City of Cleveland also had notable historic flooding in 1973 caused by West Main Canal, which is influenced by high water on the Big Sunflower River.

3.2.7.2 Issaquena County Historic flooding

The Issaquena County FIS identifies the Mississippi River as the major source of flooding for Issaquena County.

The 1973 Mississippi Valley Flood heavily impacted the area, which exposed faults in previous Mississippi River improvements. This would result in higher stages caused by the Project Design Flood. Sixty-nine miles of Mainline Levee in the Mississippi Levee District were required to be raised including the levee near Mayersville, which was found to require a maximum raise of 8 feet.

3.2.7.3 Sharkey County Historic flooding

The Sharkey County FIS identifies the Mississippi River as the major source of flooding for Issaquena County.

The 1973 Mississippi Valley Flood heavily impacted the area, which exposed faults in previous Mississippi River improvements. This would cause higher stages along the river subjected to the Project Design Flood. Sixty-nine miles of Mainline Levee in the Mississippi Levee District were required to be raised as a result.

3.2.7.4 Warren County Historic flooding

The Warren County FIS indicates that the main causes of flooding affecting Warren County are overflow from the Mississippi, Big Black, and Yazoo Rivers. Localized flooding along tributary streams in the county also occur. Intense, localized rainfall or accumulation of water due to lack of drainage because of extended periods of high stages on the Yazoo and Mississippi Rivers also contribute to flooding issues.

Most of Warren County's historic flooding has occurred in or around the City of Vicksburg. As of 2013, the Mississippi River had exceeded its bankfull stage of 42 feet at Vicksburg 54 times since 1901, with the highest stage being 58.4 feet recorded in May 1927. Along with the Mississippi River exceeding stage, the City of Vicksburg also has flooding in lower lying areas along Stouts Bayou.

Since 1936, the Big Black River at Bovina has exceeded its bankfull stage of 28 feet 97 times. Its highest stage was recorded on May 24, 1983, at 40.8 feet.

3.2.7.5 Washington County Historic flooding

The Washington County FIS suggests the natural terrain of the county is the primary cause of flood problems. With most of the county falling in the Mississippi Delta region, it's confined between the Mississippi River levees on the western side and Deer Creek Ridge on the eastern side. Water sources such as Main Canal and Black Bayou also have minimal capacity. Overflows commonly move across individual drainage divides causing the direction of the overflow to be generally unpredictable.

In September 2008, Washington County was afflicted by over 11 inches of rain from Hurricane Gustav. The City of Greenville was especially affected by flooding.

3.2.8 Declared Disasters

The major disaster declarations for the areas within the Deer-Steele Watershed that included a flooding component are listed in Table 18. FEMA's disaster declaration for Mississippi Disaster history can be viewed at: http://www.fema.gov/disaster/

Date	Disaster Type	Affected County	Incident Begin Date	Incident End Date
2016	Severe Storms and Flooding	Bolivar, Issaquena, Washington	03/09/2016	03/29/2016
2011	Flooding	Bolivar, Issaquena, Sharkey, Warren, Washington	05/03/2011	06/17/2011
2014	Severe Storms, Tornadoes, and Flooding	Warren	04/28/2014	05/03/2014
2012	Hurricane Isaac	Warren	08/26/2012	09/11/2012
2010	Severe Storms, Tornadoes, and Flooding	Issaquena, Warren	04/23/2010	04/24/2010
2008	Hurricane Gustav	Bolivar, Issaquena, Sharkey, Warren Washington	08/28/2008	09/08/2008
2008	Severe Storms and Flooding	Bolivar, Warren, Washington	03/20/2008	05/19/2008
2005	Hurricane Katrina	Bolivar, Issaquena, Sharkey, Warren, Washington	08/29/2005	10/14/2005
2004	Hurricane Ivan	Warren	09/13/2004	09/20/2004
2003	Severe Storms, Tornadoes, Flooding	Issaquena, Warren	04/06/2003	04/25/2003
2001	Severe Storms, Tornadoes, Flooding	Bolivar, Sharkey, Washington	11/24/2001	12/17/2001
1997	Flooding	Bolivar, Warren, Washington	04/04/1997	04/21/1997
1991	Severe Storms, Tornadoes, Flooding	Bolivar, Issaquena, Sharkey, Warren, Washington	04/26/1991	05/31/1991
1991	Severe Storms and Flooding	Bolivar, Washington	02/17/1991	03/21/1991
1990	Severe Storms, Tornadoes, Flooding	Warren	12/19/1990	01/14/1991
1983	Severe Storms, Tornadoes, Flooding	Issaquena, Sharkey, Warren, Washington	06/01/1983	06/01/1983
1979	Severe Storms, Tornadoes, Flooding	Issaquena, Sharkey, Warren	04/16/1979	04/16/1979
1975	Heavy Rains and Flooding	Issaquena, Sharkey, Warren	04/04/1975	04/04/1975
1973	Heavy Rains, Tornadoes, and Flooding	Bolivar, Issaquena, Sharkey, Warren, Washington	03/27/1973	03/27/1973

Table 16: Disaster Declarations in the Deer-Steele Watershed

3.2.9 Floodplain Management CAV and CAC

Statewide Community Assistance Contacts (CAC) and Community Assistance Visits (CAV) serve as an evaluation and review process between FEMA/MEMA and local officials to ensure that each community adequately enforces local floodplain management regulations to remain in compliance with NFIP requirements. CAVs are also a way to provide technical assistance to communities. Table 19: CAVs Performed within the Watershed lists the most recent CAVs

performed within the Deer-Steele watershed. All communities have had a CAV report completed in the last five years with the exception of the Town of Metcalfe which has yet to have a CAV performed.

Most communities have improved their programs now that they have a better understanding of floodplain management obligations. Copies of the CAV reports for the communities are included in Appendix E.

Community	Reviewer	CAV Date	Notes
Bolivar County	MEMA	10/01/2013	Serious issues identified related to administration/enforcement and the local floodplain management program. Corrective action taken.
Issaquena County	MEMA	05/18/2016	Serious issues identified related to administration/enforcement. Corrective action taken.
Mayersville, Town of	MEMA	01/29/2013	No violations discovered during last CAV
Cary, Town of	MEMA	01/31/2013	Minor issues identified related to administration/enforcement.
Rolling Fork, City of	MEMA	08/15/2017	Serious issues identified related to administration/enforcement and the community's floodplain regulations. Corrective action taken.
Sharkey County	MEMA	09/28/2016	No violations discovered during last CAV
Warren County	MEMA	02/12/2015	No violations discovered during last CAV
Arcola, Town of	MEMA	02/25/2010	Minor issues identified related to administration/enforcement. Corrective action submitted for compliance
Greenville, City of	MEMA	077/20/2017	Serious issues identified related to administration/enforcement and the local floodplain management program as well as minor issues related to the community's floodplain regulations. Corrective action submitted for compliance
Hollandale, City of	MEMA	01/30/2013	No violations discovered during last CAV
Leland, City of	MEMA	02/05/2015	No violations discovered during last CAV
Washington County	MEMA	07/18/2017	Serious issues identified related to administration/enforcement and the local floodplain management program as well as minor issues related to the community's floodplain regulations. Corrective action submitted for compliance

Table 17: CAVs Performed within the Watershed

3.2.10 Effective Regulatory Mapping and LOMC

All counties in the Deer-Steele watershed have effective, modernized FIRMs and FIS. Digital databases are readily available for all of these counties. The effective dates for the current FIRMs for these communities are listed in Table 20.

County	Community Name	Product Types	FIRM Effective Date
Bolivar	All Jurisdictions	FIS & FIRM	03/21/2017
Issaquena	All Jurisdictions	FIS & FIRM	02/16/2012
Sharkey	All Jurisdictions	FIS & FIRM	03/02/2012
Warren	All Jurisdictions	FIS & FIRM	11/05/2008- 07/16/2013
Washington	All Jurisdictions	FIS & FIRM	05/02/2012

Table 18: Effective FIRM/FIS Reports for Non-Coastal Communities

A Letter of Map Change (LOMC) is a letter that reflects an official revision to an effective NFIP map. LOMCs are issued in place of the physical revision and republication of the effective FIRM. LOMCs in the Watershed were identified and Table 21 lists the number of LOMCs in each county within the watershed. This LOMC count includes Letters of Map Amendments (LOMA), Letters of Map Revisions (LOMR), Letters of Map Revision based on Fill (LOMR-F), and Conditional LOMR. No Conditional LOMAs or Conditional LOMR-Fs were included. Clusters of LOMCs indicate a need for updated maps.

Table 19: Letters of Map Change Identified in the Watershed

County	Community Name	LOMC Туре	Number of Cases
Issaquena	Issaquena County	LOMA	1
Washington	Greenville, City of	LOMA	10
Washington	Washington County	LOMA	1

3.2.11 Ordinances

Communities and counties within the Watershed have wide discretion in the implementation of local ordinances. The Watershed's local jurisdictions have a patchwork of regulations regarding development within known flood hazard areas that can range from ordinances with minimum NFIP requirements to strong, pro-active ordinances that not only regulate and protect new and improved development in existing Special Flood Hazard Areas (SFHA), but seek to mitigate the growth of SFHAs caused by increased runoff from developed areas and the degradation of natural flood control areas, such as wetlands and forests.

It is presumed that the NFIP-participating communities within the watershed have floodplain management regulations in place and have a mechanism for updating their ordinances. Additional information about local ordinances was requested at the Discovery meeting. During

final phases of this Risk MAP project the community ordinances will be reviewed and recommendations will be provided.

3.2.12 Flood Insurance Policies and Repetitive Loss

This Discovery project also gathered data regarding the flood insurance policies and repetitive losses in the Watershed through the NFIP. Table 22: NFIP Statistics in the Deer-Steele Watershed lists the details of the number of flood policies, total coverage amount and the total cost of repetitive losses within the Deer-Steele Watershed communities. It should be noted that all data entries except repetitive loss properties are based on the full geographical extents of the community, not just the portion within the watershed.

Name of Community	CID	NFIP (Y/N)	Policies	Coverage	Claims	Repetitive Losses
Arcola, Town of	280178	Y	8	\$ 2,773,800.00	\$ 127,775.79	0
Bolivar County	280011	Y	383	\$ 65,947,400.00	\$ 16,759,986.40	132
Cary, Town of	280154	Y	31	\$ 14,100,600.00	*	0
Greenville, City of	280179	Y	1,373	\$219,866,000.00	\$ 10,362,433.41	44
Hollandale, City of	280180	Y	26	\$ 7,255,000.00	*	0
Issaquena County	280200	Y	188	\$ 24,376,300.00	\$ 7,565,721.68	134
Leland, City of	280181	Y	74	\$ 16,627,700.00	\$ 321,090.59	1
Mayersville, Town of	280329	Y	4	\$ 430,500.00	\$ 78,779.62	0
Metcalfe, Town of	280355	Y				
Rolling Fork, City of	280304	Y	105	\$ 24,476,800.00	\$ 122,876.93	1
Sharkey County	280092	Y	128	\$ 17,683,200.00	\$ 1,175,197.18	24
Warren County	280316	Y	359	\$ 59,478,600.00	\$18,658,670.79	120
Washington County	280058	Y	613	\$110,495,700.00	\$22,046,882.16	145

Table 20: NFIP Statistics in the Deer-Steele Watershed

*Data not reported

3.2.13 Comprehensive Plans

Not all Counties in the watershed have county-wide comprehensive plans. According to Mississippi Code of 1972, a "Comprehensive plan" means a statement of public policy for the physical development of the entire municipality or county adopted by resolution of the governing body, consisting of the following elements at a minimum:

(i) Goals and objectives for the long-range (twenty (20) to twenty-five (25) years) development of the county or municipality. Required goals and objectives shall address, at a minimum, residential, commercial and industrial development; parks, open space and recreation; street or road improvements; public schools and community facilities.

(ii) A land use plan which designates in map or policy form the proposed general distribution and extent of the uses of land for residences, commerce, industry, recreation and open space, public/quasi-public facilities and lands. Background information shall be provided concerning the specific meaning of land use categories depicted in the plan in terms of the following: residential densities; intensity of commercial uses; industrial and public/quasi-public uses; and any other information needed to adequately define the meaning of such land use codes. Projections of population and economic growth for the area encompassed by the plan may be the basis for quantitative recommendations for each land use category.

(iii) A transportation plan depicting in map form the proposed functional classifications for all existing and proposed streets, roads and highways for the area encompassed by the land use plan and for the same time period as that covered by the land use plan. Functional classifications shall consist of arterial, collector and local streets, roads and highways, and these classifications shall be defined on the plan as to minimum right-of-way and surface width requirements; these requirements shall be based upon traffic projections. All other forms of transportation pertinent to the local jurisdiction shall be addressed as appropriate. The transportation plan shall be a basis for a capital improvements program.

(iv) A community facilities plan as a basis for a capital improvements program including, but not limited to, the following: housing; schools; parks and recreation; public buildings and facilities; and utilities and drainage.

Bolivar County: According to currently available sources, Bolivar County has not developed or adopted a Comprehensive Plan.

Issaquena County: According to currently available sources, Issaquena County has not developed or adopted a Comprehensive Plan.

Sharkey County: According to currently available sources, Sharkey County has not developed or adopted a Comprehensive Plan.

Warren County: According to currently available sources, the City of Vicksburg in Warren County has developed a Comprehensive Plan but Warren County itself has not.

Washington County: According to currently available sources, Washington County has not developed or adopted a Comprehensive Plan.

4 Risk MAP Products for the Deer-Steele Watershed

New products will be part of the Risk MAP project. During previous flood studies, three main types of products were generated: DFIRM Database, FIS Report, and DFIRMs. Risk MAP will continue to create these products. Additional new flood risk data and products will be created based on the new flood data; however, they will not be regulatory products. These additional products, including flood risk maps and flood risk reports, will be delivered to stakeholders. The new datasets will help to communicate the risk to the affected individuals and will help community officials communicate flood risk.

During this FIS study, several meetings will be held with the communities, such as a Resilience Meeting, which will provide guidance on integrating Risk MAP products into local planning efforts. A Consultation Coordination Office Meeting where the new FIRMs, FIS and Risk MAP products will be presented to local officials. An Open House for the public will follow the Preliminary DFIRM Community Coordination (PDCC) Meeting. In addition, there is an optional Flood Study Review Meeting that can be requested by the communities to review and comment on draft floodplain boundaries.

Proposed Enhanced Products

This Risk MAP analysis will provide state and community officials with the following Flood Risk Products:

- Flood Risk Report: a summary of flood risk data for the watershed and each community
- Flood Risk Map: high level overview of specific flood risk data for the watershed
- Flood Risk Database: relational database that stores all flood risk data.

Separate datasets will reside within the Flood Risk Database including:

- Changes since the last FIRM, which include the Horizontal Changes and Results Grid
- Depth Grids for the 10-, 4-, 2-, 1-, and 0.2-percent-annual-chance events, the "Percent Annual Chance" grid, and the "Percent 30-Year" grid.
- A refined Flood Risk Assessment with revised AAL results
- Areas of Mitigation Interest

4.1 Changes since Last FIRM

Changes Since Last FIRM will show horizontal flood boundary change between effective and previous flood boundaries, which will help to count the structures and population impacted by the change. Information about the engineering, such as whether new engineering was performed and how the updated topographic data was applied, will also be included. This additional information will help communicate the changes of the new maps and help communities to better understand their accuracy.

4.2 Flood Depth and Analysis Grids

Flood Depth Grids will be generated for the 10-, 4- 2-, 1-, and 0.2-percent-annual-chance flood events. Each individual grid cell will have a depth value assigned, based on a comparison of the flood elevation and available terrain data. A depth grid represents the likelihood of "getting wet." This will help to communicate hazards for a non-technical user.

The Percent Annual Chance Grid is an effective communication tool for helping local residents understand the probabilities associated with specific flood frequency events. Used in conjunction with the Percent 30-Year Chance Grid, local stakeholders may gain a better understanding of the relative probability of being flooded for any given location within the mapped floodplain.

Similar to the Percent Annual Chance Grid, the Percent 30-Year Chance Grid provides valuable insight into the potential for being flooded in any given location within the mapped floodplain within a period of time (30-years) equivalent to the standard period of time that home mortgages are held. This grid is very useful in dispelling misconceptions that there is little chance of being flooded by (for example) the 1-percent-annual-chance flood event during the life of a mortgage.

4.3 Flood Risk Assessment

A refined HAZUS analysis may be provided as part of the project based on the newly created depth grids. It will provide dollar losses, percent damage, and business disruption based on census blocks. Hot spots will be identified incorporating such factors as previous repetitive loss claim areas, undersized culverts, bridge openings, new developments in the floodplain, and locations of successful mitigation projects for potential hazard mitigation. Unless the communities can provide more detailed infrastructure data, it would be based on the 2010 Census data.

In order to create reliable HAZUS data it is very important that the community provide up to date data, such as essential facilities, building counts, highway and railroad bridges, population, water system facilities, military installations, location/categorization, and replacement value information. The availability of locally-developed building locations will be a key factor in determining whether a refined HAZUS analysis will be a worthwhile undertaking for this project.

4.4 Areas of Mitigation Interest

The Areas of Mitigation Interest (AoMI) dataset is intended to communicate areas and issues associated with flood risk reduction opportunities or success stories. This dataset allows local stakeholders to gain a more holistic picture of flood risk related issues that may impact them.

AoMI may include information such as:

• Key emergency routes overtopped during frequent flood events,

- Past claims "hot spots," including flood claims and properties on the FEMA Repetitive Loss/Severe Repetitive Loss lists, and Individual Assistance/Public Assistance data,
- Areas of significant riverine erosion,
- Locations of at-risk essential facilities and vulnerable locations.
- Areas of mitigation success, or
- Other flood risk areas not identified on the FIRM.

The following mitigation options may be recommended in the AoMI documents:

Property Protection Measures

- Buy outs
- Flood proofing
- Relocation
- Structure elevation

Education and Outreach Measures

- Brochures
- Booths at fairs and festival
- Annual meetings

Prevention Measures

- Flood ordinance,
- Stormwater programs
- Building codes

Natural Resource Protection Measures

- Wetland and stream restoration
- Riparian buffer ordinances

Structural Project Measures

- Levees
- Dikes
- Floodwall
- Culvert replacement
- Bridge Replacement
- Stream maintenance

Emergency Services Measures

• Reverse 911

• Swift water rescue equipment

The flood risk report and flood risk maps will be created prior to the issuance of preliminary maps. A fact sheet at the end of the report will summarize the results of the risk assessment process rolled up to the watershed level. Risk maps will contain all the visual data that was created as part of the Flood Risk Assessment stage, which will help to visualize the risk and promote risk awareness. All the above mentioned new products aim to identify mitigation actions and to reduce vulnerability.

5 Discovery Meeting

A watershed-wide Discovery Meeting was held on June 26, 2018, at 1:30 PM at the Washington County Convention Center, 1040 South Raceway Road, Greenville, MS. The meeting was set up to facilitate discussion about the Risk MAP program, identify study and mitigation project needs, desired compliance support, and local flood risk awareness efforts. A total of 16 people were in attendance at the meeting, including representatives of Bolivar, Issaquena, Sharkey, and Washington Counties and several municipalities. Additional partners and stakeholders were also in attendance including representatives of MEMA and MDEQ. The discussion was stimulated using the effective FIRM and Discovery Map's display of relevant data available in Appendix B. Attendees cooperatively identified areas of concern where new study information is requested. The final study streams are shown in Appendix C. Additionally mitigation projects options, compliance issues, and ideas on how to improve the local flood risk communication programs were discussed during the meeting. See Appendix B for pertinent Discovery meeting information including sign-in sheets, meeting notes, presentation and other documentation.

Appendices

Appendix A: Community Information

- Community Contact List
- Community Discovery Data Questionnaire
- Community Correspondence
- LOMC Analysis
- Community Provided Responses to Questionnaires

Appendix B: Discovery Meeting

- Flood Hazard Map
- Flood Risk Map
- Mapping Needs
- Potential Loss
- Discovery Meeting Presentation
- Meeting Minutes
- Sign-in Sheets
- Invitation Letters
- Draft Project Charters

• Deer-Steele Watershed Proposed FIRM Panel Revisions

• CNMS Summary Spreadsheet

Appendix E: Collected Discovery Data

- Hazard Mitigation Plans
- Grant Information
- CAV
- CRS

Appendix F: Quality Assurance/Quality Control Plan

• QA/QC Plan