Discovery Report

Lower Pearl River, 03180004
Hancock, Lamar, Marion, Pearl River, and Walthall counties
Cities of Columbia, Picayune and Poplarville
Mississippi
Report Number01

12/04/2012

FEMA

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II. General Information

i. Background and Statistics:

The Lower Pearl River watershed is located in south Mississippi and includes portions of five Mississippi counties (Hancock, Lamar, Marion, Pearl River, and Walthall) and all or part of 3 cities (Columbia, Picayune and Poplarville). The watershed also includes some area in eastern Louisiana (Washington and St. Tammany parishes). A map of the watershed in found in Figure 1.

FIGURE 1: Lower Pearl River watershed

The watershed area is 1,821 square miles. This is the fourth of four HUC-12 watersheds that make up the overall Pearl River basin, which drains a large portion of central Mississippi. Aside from the Pearl River itself, some of the major drainages include Upper Little Creek, Lower Little Creek, East Hobolochitto Creek, West Hobolochitto Creek, Tenmile Creek and Pushepatapa Creek. The estimated 2010 population for the watershed is 77,705 (Mississippi only). The Discovery Meeting was held on February 7, 2012 in at the Pearl River County Emergency

Operations Center in Poplarville. Five of the eight communities were represented at the meeting. Only 1 community requested specific new flood study while at the meeting. Most of the communities in attendance requested digital copies of the flood hazard and flood risk maps, and these were furnished in the days following the meeting. At this time it is planned to update only particular portions of the watershed. There are only 4 Zone AE stream reaches that are categorized as invalid via the CNMS Phase 3 assessment. However, several streams in Marion County with drainage area of greater than 10 square miles are currently unstudied. This is most evident for 6 streams with Zone A SFHA in Lamar County that flow into Marion County and at that point show no SFHA. We plan to provide new base level study for unstudied streams up to at least 10 square miles and correct the gaps and discontinuities across the county boundaries. We also plan to upgrade a large portion of the Pearl River from Zone A to Zone AE. All five counties have modernized, digital flood insurance rate maps. The FIRM status and estimated number of panels requiring update are given in Table 1.

Table 1: FIRM Status

County	Status	Effective Date	Estimated number of updated panels
Hancock	Effective	10/16/2009	1
Lamar	Effective	3/2/2010	2
Marion	Effective	7/18/2011	11
Pearl River	Effective	6/3/2008	13
Walthall	Effective	7/6/2010	3

Community statistical data as related to the National Flood Insurance Program is provided in Table 2: Statistical Information. Most of these data were captured from Community Assistance Visits (CAV) conducted by Mississippi Emergency Management Agency staff. The CAV were completed between 2006 and 2010. The CAV reports are included as Appendix I.

Table 2: Statistical Information

Name of Community	CID	Area (square miles)	Pop Growth (2000 to 2010)	Mitigation Plan current?	NFIP (Y/N)	Policies	Coverage	Claims	Losses
Columbia, City of	280111	6	0%	Expires 2/22/14	Y	217	$15,885K	$2,803K	269
Hancock County	285254	89	2%	Update in progress	Y	4,955	$1,154,985K	$378,636K	5,385
Lamar County	280304	152	42%	Expired 3/12/12	Y	223	$42,155K	$2,721K	179

Name of Community	CID	Area (square miles)	Pop Growth (2000 to 2010)	Mitigation Plan current?	NFIP (Y/N)	Policies	Coverage	Claims	Losses
Marion County	280230	416	6%	Expires 2/22/14	Y	174	$17,910K	$2,214K	239
Pearl River County	280129	514	19%	Expires 9/11/16	Y	844	$163,479K	$4,193K	248
Picayune, City of	280130	12	14%	Expires 9/11/16	Y	162	$57,974K	$2,692K	162
Poplarville, City of	280365	2	15%	Expires 9/11/16	Y	0	$0	$0	0
Walthall County	280307	98	2%	Update in progress	Y	63	$5,443K	$675K	61

Note: Community-wide statistics from CAV Report

Meetings and 44 CFR Part 66 Compliance:

No pre-Discovery meetings were held with communities. Rather, a letter signed by MDEQ and MEMA, along with Risk MAP program information, was mailed directly to primary stakeholders (Community Floodplain Administrators and County Emergency Management Agency Directors), personally inviting them to the Discovery meeting. A copy of this mailing is provided in Appendix G—Community Correspondence. Secondary stakeholders received a general memorandum with much of the same information and meeting invitation.

Part 66 compliance:

The CTP has begun and has on record its Case file and docket? X YES ____ NO

The CTP has written record of its initial contact made to the local communities affected by this map modernization 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

*The above certification indicates that the CTP has begun the Part 66 communication with any local communities affected by this mapping project. This data is stored and available to be supplied to FEMA on request.

NFIP Compliance:

Two of the eight communities' CAV reports identified serious compliance issues. One of these, Walthall County, did not have a compliant flood damage prevention ordinance at the time of the CAV (2007), however that was remedied with an updated ordinance adopted in June, 2010. The other, Hancock County, has a compliant ordinance, but appears to be experiencing problems with enforcement. According to Mississippi State Law, upon issuance of the Letter of Final Determination, affected communities will require a paper map product for their formal ordinance update and adoption proceedings. The local floodplain administrators for Walthall County, Picayune, and Poplarville were not in attendance, although a representative from Pearl River

County, who assists with floodplain management activities, was present. The CTP does not have access to CIS database information at this time, however this access has been requested from FEMA.

Risk MAP Program Measures:

No verbal commitments by participating communities to reduce flood risk were noted during the Discovery meeting. However, there was general acknowledgement among the attendees that flood risk reduction is an important goal, and there was a high level of interest in the Risk MAP program and the materials presented. Our latest guidance indicates that Risk MAP Commitment Capture Forms are no longer being distributed. On advice of FEMA Region 4, Project Charters were not distributed at the Discovery Meeting, but will be distributed to the communities with their copy of the Discovery report. Only one CNMS Capture Form was returned by a community. It was completed by the Port Bienville Industrial Park (Hancock County) and is included as Appendix G—Community Correspondence. Rather than a study request, the form is requesting a flood barrier be built to protect the 20 or so existing industries from tropical cyclone induced storm surge. There is an impression that the FIRM designation (Zone X) is incorrect, since the area flooding during Hurricane Katrina, however the surge heights from that storm were much greater than 1% annual chance elevation at this location. Follow up solicitations for comments and study requests were made to communities by email on 2/10/12 and 2/22/12 and by letter on 4/17/12.

ii. Project Summary:

The following section provides a more detailed description of the eight communities in the Lower Pearl watershed and some of the flood hazard/flood risk data and information that were researched and compiled for each.

City of Columbia

The City of Columbia is the county seat of Marion County, located on the east bank of the Pearl River. Columbia's location within the Lower Pearl River watershed is illustrated in Figure 2. The principle streams/rivers flowing through the City are the Pearl River, Balls Mill Creek, Dry Creek, Jones Creek and Webb Creek. The 2010 population is 6,576. According to FEMA records, there are 23 repetitive loss properties in Columbia and 8 previously issued letters of map change.

FIGURE 2:
City of Columbia

Columbia is susceptible to flooding from both the Pearl River and flash flooding from localized heavy rainfall. Flooding of the Pearl River affected the city in 1938, 1961, 1974, 1979 and 1983. The Marion County Hazard Mitigation plan cites 9 or 10 instances of flash or small stream flooding in the city between 1999 and 2007. Most incidents are flash flooding due to extended periods of heavy rain, either from tropical storms or stalled frontal systems. Rainfall associated with Hurricane Isaac damaged numerous properties in the City as over 15 inches of rain were recorded, according to the National Weather Service. The downtown area appears particularly susceptible to flooding during prolonged heavy rains, when the storm drainage system becomes overtaxed.

As noted above, a relatively high number of repetitive loss properties are identified in Columbia. Although the exact location of these properties in not always exact, it appears that most of these properties are outside of the FEMA designated flood zones. There is an especially tight cluster of repetitive loss properties in the Main Street/2nd Street area of downtown.

The CNMS database identifies two detailed (Zone AE) streams in Columbia that were categorized as unverified during the Phase 3 assessment. These are Dry Creek and Webb Creek. These are both small streams flowing through the central part of the City, joining just west of Main Street before emptying into the Pearl River. Both streams are unverified due to a combination of secondary element failures. The effective analysis for most of the smaller, detailed study streams in Columbia is 1978.

Potential areas of mitigation interest (AMI) include drainage improvements in the Main Street/2nd Street area. It is probably worthwhile to investigate some other repetitive loss properties in other areas of the City, including Washington Street area (likely due to Pearl River), the North Park Avenue between Azalea Drive and Beatrice Avenue, and the White Street area. The numerous small streams that rise northeast of the City before flowing through it would suggest that there may be good potential for stormwater detention or related projects.

Hancock County

Hancock County is located in the southeastern portion of the Lower Pearl watershed. The principle streams/rivers flowing through the City are the Pearl River, Turtleskin Creek, and Devils Swamp. All of the municipalities in Hancock County, and hence most of the population, is outside of the Lower Pearl watershed to the east. However there are some denser population areas within the watershed, such as Pearlington. The estimated 2010 population within the watershed is 1,590. According to FEMA records, there are

FIGURE 3:
Hancock County

approximately 57 repetitive loss properties within this portion of Hancock County, nearly all of which are found in the Pearlington area. Two especially dense clusters of repetitive loss properties are found just south of Highway 90 in the Florida Boulevard and Tahiti Road areas. There are two previously issued letters of map change in the area.

The greatest flood threat to Hancock County is from storm surge and wave action from tropical storms and hurricanes. Small streams and low lying areas are also susceptible to flooding during periods of heavy rainfall from slow moving frontal systems. Flooding of the low marshy floodplain of the Pearl River occurs in conjunction with heavy rainfall or spring runoff in the Pearl River basin.

The County is in the process of rebuilding and recovery from Hurricane Katrina, which caused substantial damage (>50% of property value) to 2,797 structures (county-wide). Many of these have been demolished. More recently, Hurricane Isaac produced a high water elevation of 9.65 ft (NAVD88) in Pearlington on 8/29/2012. Numerous properties were affected, although specific numbers and locations are unavailable at this time.

The CNMS database did not reveal any unverified study streams for this portion of the County. There is a minor Zone A/AE mismatch on Second Alligator Branch with Pearl River County to the north.

Potential areas of mitigation interest are flood control improvements for the Port of Bienville. Much of the industrial facilities in this area are shown outside the Special Flood Hazard Area, however flood damage did occur during Katrina due to the magnitude of the storm surge. The unincorporated area of Pearlington shows a street named "Levee Street" that runs parallel to Highway 604. However, the effective FIRM does not identify any levees in this area. It may be an elevated road that provides some protection from minor flooding on the Pearl River. Numerous property acquisition projects have been initiated or completed in the Pearlington area and elsewhere in southern Hancock County.

Lamar County

Lamar County is located in the northeast portion of the Lower Pearl watershed. The principle streams/rivers flowing through the county are the Upper and Lower Little Creeks, Gully Creek, and their tributaries. About 35 percent of the county area falls within this watershed, however a much smaller percentage of the County's population resides within this portion. The estimated 2010 population within the watershed is 3,972. According to FEMA records, there are no repetitive loss properties within this portion of Lamar County. There is only one Letter of Map change

FIGURE 4:
Lamar County

previously issued for this area, for a property on Lower Little Creek, near Salt Dome Road.

The Lamar County Hazard Mitigation Plan (2007) identifies several repetitive loss properties; however they are all located outside the Lower Pearl Watershed. This portion of the County contains no incorporated communities and has relatively low population density. Chronic flood problems do not appear to be a major issue in this area. However, the sudden breach of Big Bay Lake dam in 2004 caused about $2.5 million in damages to homes, businesses and utilities. Most of the damage was within 5 miles downstream of the lake along Bay Creek and Little Lower Creek.

The Special Flood Hazard Area for Lamar County is relatively comprehensive, with flood zones defined for nearly all streams having over 1 square mile drainage area. Most, if not all, of these Zone A streams were established using approximate/automated modeling techniques, such that an unofficial or advisory BFE may be available in the technical support data. At least six streams that exit Lamar County with Zone A flood hazard enter into Marion County with no flood hazard (Zone X). The 2010 County-wide Flood Insurance Study update made use of LiDAR data, acquired in 2005. A Letter of Map Revision is currently underway for Big Bay Lake. This LOMR intends to establish a static BFE for this lake in order to improve floodplain management compliance for the many lakefront homes being built there.

Marion County

Marion County is located in the northern portion of the Lower Pearl watershed. The principle streams/rivers flowing through the county are the Pearl River, Upper and Lower Little Creeks, Clear Creek, Hurricane Creek, Silver Creek, Mays Creek and Tenmile Creek. About 80 percent of the county area falls within this watershed. The estimated 2010 population within the watershed is 17,448. According to FEMA records, there are approximately 10 repetitive loss properties within this portion of Marion County. These properties are widely scattered aside from 3 that are located on Columbia Purvis Road near Spell Drive, just south of Highway 98. A few of the other properties should be confirmed, since the data points do not indicate a structure anywhere nearby. There have been two Letters of Map change previously issued for this area, one in the unincorporated community of Foxworth, and the other near Bell Mill Creek on Old Highway 35.

FIGURE 5:
Marion County

Marion County is bisected north to south by the Pearl River and most flood damage over the years is due to river flooding. Flooding of the Pearl River affected the county in 1938, 1961, 1974, 1979 and 1983. Small stream and flash flooding also occur periodically, due to extended periods of heavy rain from tropical storms or stalled frontal systems. The Marion County Hazard Mitigation Plan cites approximately 15 incidents of flash flooding affecting the some part of the county. A dam failure in Lamar County in 2004 caused some damage to roads and buildings along Lower Little Creek, but most of the major damage was in Lamar County, closer to the dam.

A relatively small percentage of streams in Marion County have FEMA flood zones designated. This is probably due to the relatively low population density in the outlying areas of the County and federal funding constraints. This point is underscored by the average annualized loss data, which predicts losses along streams that have no designated flood zones. It should be noted that none of the effective Zone A stream studies have a hydraulic model basis.

During the Discovery meeting, the floodplain administrator expressed concern about a private dam that was in need of maintenance. The dam impounds the Goss Bunker Hill reservoir on a tributary of Holiday Creek. Apparently the dam is old and the outlet structure is not functioning properly. The County has surveyed or contacted property owners downstream that may be at risk from a dam failure. Subsequent research indicates that this dam is actually in the Middle Pearl—Silver watershed, so it technically should not be included with this project. However, this situation may require more immediate attention and therefore is noted in this report.

Pearl River County

Pearl River County is located in the central portion of the Lower Pearl watershed. The principle streams/rivers flowing through the county are the Pearl River, East and West Hobolochitto Creeks, and their tributaries. About 60 percent of the county area falls within this watershed. Pearl River County has the highest population of all the communities in the study area, with a 2010 population estimate of 32,917. A significant population migration was experienced from Hancock County in the aftermath of Hurricane Katrina.

According to FEMA records, there are approximately 41 repetitive loss properties in this portion of the County. Two of the larger clusters are located just west of Picayune, where Highway 43 crosses West Hobolochitto Creek. Most of the remainder are also within the vicinity of Picayune. There are approximately 20 previously issued Letters of Map Change, and these are similarly

FIGURE 6:
Pearl River County

located. The largest cluster appears to be around Hide-A-Way Lake, just north of the city limits for Picayune. Several others are situated in or near the Pearl River floodplain. According to MDEQ Dam Safety Division, there are 3 dams classified as high hazard potential. Of these, only David Lake Dam does not show as having an Emergency Action Plan developed.

Pearl River County is susceptible to flooding of the Pearl River along its western boundary, typically following prolonged rain within with central Mississippi area. The county also experiences periodic flooding of smaller streams and bayous following localized heavy rain.

Most of the streams in Pearl River County with over 1 square mile drainage area have a flood zone designated. In addition, a LiDAR project in 2005 delivered high-quality topographic data, which was utilized in part for the county's flood insurance study update, completed in 2010. It appears that most of the Zone A streams were digitally converted at that time, so LiDAR provided no benefit in those areas. Two stream studies in the southern part of the county are categorized as unverified, based on FEMA's Coordinated Needs Management System inventory. These are Alligator Branch and Mill Creek, small streams that originate in Picayune and flow south toward the Pearl River. Both streams failed due mostly to hydraulic changes along the stream since the time that they were studied (1987 and 1990, respectively).

The only flood-related mitigation project on record for the County appears to be a property acquisition on J. J. Holcomb Road (Mill Creek). It seems there would be great opportunity for other mitigation actions, especially addressing the repetitive loss properties noted earlier. Some of the highest predictive losses from the Level 1 HAZUS analysis are for census blocks in and adjacent to Picayune.

The Anchor Lake Dam is located immediately upstream of Interstate 59, such that a sudden, catastrophic failure would impact the Interstate without any benefit of advance warning. The National Weather Service is doing some modeling work on the Pearl River in the Walkiah Bluff area (west of Picayune) and the State will coordinate with them to determine any data that may be useful to this project. The Pearl River County Hazard Mitigation Plan was updated in 2011 and lists 12 specific mitigation actions addressing flooding and drainage. One of these recommendations was channel improvements to Alligator Branch.

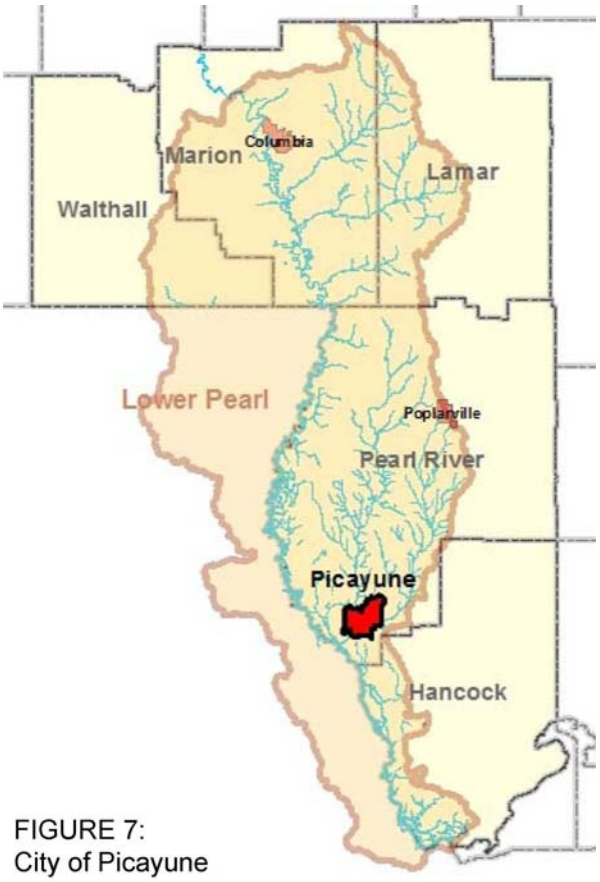

FIGURE 7:
City of Picayune

City of Picayune

The City of Picayune is located in Pearl River County. The principle streams/rivers flowing through the city are Hobolochitto Creek, Mill

Creek, Bay Branch, and Thigpen Creek. Although the Pearl River itself does not flow through the city, high water on the river may exacerbate flooding on some of these streams by hindering the natural drainage. The 2010 population estimate for Picayune is 11,087. Picayune has experienced significant population growth during the last 10 years, especially following Hurricane Katrina. There has been significant commercial and residential development during this time. Picayune participates in FEMA's Community Rating System with a current rating of 8 (10% discounted insurance premiums).

According to FEMA records, there are 21 repetitive loss properties in the City and 3 previously issued Letters of Map Change. Most of the repetitive losses appear to be associated with East Hobolochitto Creek, Mill Creek and Bay Branch. It appears that the majority of the repetitive loss properties in the city are outside of FEMA designated flood zones. The flood insurance study report indicates that serious flooding along Hobolochitto Creek and its east and west tributaries tends to occur on average once every 4 or 5 years. This occurred most recently with Hurricane Isaac in late August 2012. National Weather Service records indicate that Picayune received in excess of 12 inches of rain during the storm, and flooding affecting numerous properties. The USGS gage at West Hobolochitto Creek set a new record stage of 24.6 feet, almost 10 feet above flood stage for this location.

Areas of mitigation interest could include investigation of repetitive loss flooding and corrective action. There is a culvert replacement project in Picayune, which would potentially alleviate some repetitive loss properties in the Woodglen Cove area. This appears to be a very localized flooding problem. With the Hobolochitto tributaries and other larger streams originating well outside of the City, there may be potential for some stormwater management or flood detention projects to lower peak flood discharges, but it would need have to be coordinated closely with the County and Poplarville as part of a comprehensive program.

City of Poplarville

The City of Poplarville is the county seat of Pearl River County. The city is located mostly on higher ground, and actually straddles the divide between the Lower Pearl watershed and the Mississippi Coastal watershed to the east. The 2010 population estimate within the Lower Pearl watershed is 1,374.

The city has no Special Flood Hazard Areas identified on the current FIRM. The city joined the NFIP in November, 2007 in order to make flood insurance available to citizens on a voluntary basis. Per the most recent Community Assistance Visit (2009), no policies are in force and no claims have been paid. There are 2 repetitive loss properties located about 1 mile southwest of the city limits, according to FEMA records.

FIGURE 8:
City of Poplarville

Drainage from Poplarville forms the headwaters for some streams that eventually flow through Picayune. As noted previously, some of the highest flood loss estimates are for areas in and around Picayune, so Poplarville could do well to minimize excess surface runoff to the Hobolochitto tributaries by implementing stormwater best management practices. This could help to lessen the downstream impact of land development that is responding to higher than average population growth in the region.

Walthall County

Walthall County is located in the northwest portion of the Lower Pearl River watershed. The principle streams/rivers draining this part of the county are East and West Fork Pushepatapa Creek and their tributaries. The County seat of Tylertown is located outside of the Lower Pearl watershed. The 2010 population estimate for this portion of Walthall County is 2,744. According to FEMA records, there is only 1 repetitive loss property within the project area, which appears to be located near a tributary of Sandy Hook Creek, near Stogner Road just east of the small community of Improve. There are no Letters of Map Change for this area.

FIGURE 9:
Walthall County

The Southwest Mississippi Hazard Mitigation Plan (2008) cites 4 flooding disaster declarations that are likely to have included Walthall County. Most incidents are likely flash flooding due to extended periods of heavy rain, either from tropical storms or stalled frontal systems.

A relatively small percentage of streams in Walthall County have FEMA flood zones designated. This is probably due to the relatively low population density in the outlying areas of the County and federal funding constraints. Similar to Marion County in this respect, the average annualized loss data, which predicts losses along streams that have no designated flood zones, greatly underscores this deficiency.

Project Scope

New or updated flood study is proposed for a total of 24 stream reaches in the Lower Pearl watershed. Most of the study mileage is composed of new study in Marion and Walthall counties and updated study of the Pearl River. As previously noted, several streams of significant size in Marion and Walthall counties are currently unstudied, and therefore are in Zone X merely by default. The Level 1 HAZUS analysis predicted losses along these streams up to the 10 square mile drainage area threshold used by the HAZUS program. Performing baseline

studies on these particular streams will facilitate a Level 2 HAZUS analysis, such that meaningful comparisons between the pre and post-project loss estimates can be made. Other study reaches are proposed based on the CNMS Phase 3 assessment, reconciling mismatched flood zones across county boundaries, and eliminating Zone A areas sandwiched between Zone AE, and similar discontinuities that were recognized during the analysis. The specific study reaches are listed in Table 3.

TABLE 3: Proposed Study Reaches

Stream Name	Reach Length (miles)	County (Community)	Study Type	Justification
Alligator Branch	3.2	Pearl River	LDS	Unverified per CNMS Phase 3
Bay Creek	2.1	Lamar	LDS	Community request
Beaver Dam Creek	3.7	Lamar	A	Large (>10 sq.mi. drainage) unstudied stream, Level 2 HAZUS
Clear Creek	9.3	Lamar	A	Unstudied gap between mouth and upstream Zone A
Dry Creek	2.3	Marion (Columbia)	Detailed	Unverified per CNMS Phase 3
East Fork Pushepatapa Creek	11.9	Walthall	A	Large (>10 sq.mi. drainage) unstudied stream, Level 2 HAZUS
Graves Creek	6.4	Lamar	A	Large (>10 sq.mi. drainage) unstudied stream, Level 2 HAZUS
Harper Creek	4.1	Marion	A	Unstudied gap between mouth and upstream Zone A
Hobolochitto Creek	4.6	Pearl River	Detailed	Eliminate Zone A between upstream and downstream Zone AE, highest AAL
Hurricane Creek	6.3	Marion	A	Large (>10 sq.mi. drainage) unstudied stream, Level 2 HAZUS
Lower Little Creek	3.5	Lamar	LDS	Community request
Lower Little Creek	11.8	Marion	A	Unstudied gap between mouth and upstream Zone A
Middle Fork Creek	0.5	Marion	A	Unstudied gap between mouth and upstream Zone A
Mill Creek	4.0	Pearl River (Picayune)	Detailed	Unverified per CNMS Phase 3
Mill Creek No. 3	2.5	Marion	A	Unstudied gap between mouth and upstream Zone A
Mill Creek No. 3 Tributary 1	0.3	Marion	A	Unstudied gap between mouth and upstream Zone A
Pearl River	56.8	Hancock/Pearl River/Marion	LDS	Upgrade half of Zone A between upstream and downstream Zone AE, leveraged NWS modeling. Study gap addressed at Pearl River/Hancock boundary.
Polk Creek	0.3	Marion	A	Unstudied gap between upstream and downstream Zone A
Richland Creek	0.7	Marion	A	Large (>10 sq.mi. drainage) unstudied stream, Level 2 HAZUS
Sandy Hook Creek	4.4	Marion	A	Large (>10 sq.mi. drainage) unstudied stream, Level 2 HAZUS

Second Alligator Branch	0.6	Hancock/Pearl River	LDS	Reconcile Zone A/AE mismatch at County boundary
Silver Creek	7.2	Marion	A	Large (>10 sq.mi. drainage) unstudied stream, Level 2 HAZUS
Tenmile Creek	12.7	Marion	A	Large (>10 sq.mi. drainage) unstudied stream, Level 2 HAZUS
Upper Little Creek	5.7	Marion	A	Large (>10 sq.mi. drainage) unstudied stream, Level 2 HAZUS
Upper Little Creek	19.2	Marion	A	Unstudied gap between mouth and upstream Zone A
Webb Creek	1.2	Marion (Columbia)	Detailed	Unverified per CNMS Phase 3
West Fork Pushepatapa Creek	5.9	Walthall	A	Large (>10 sq.mi. drainage) unstudied stream, Level 2 HAZUS

The total proposed study mileage from Table 3 is 191 miles. This includes 112.7 miles of approximate (Zone A) study, 12.1 miles of detailed (Zone AE with floodway) study, and 66.2 miles of limited detail (Zone AE) study. A compilation of study stream mileages (existing and proposed) is provided in Table 4. Under this plan of work, the total number of Zone AE stream mileage would increase by 77.6 miles. The total number of Zone A mileage would increase by 78.7 miles.

Table 4: Total Stream Mile Counts by Type of Study

	Coastal	Enhanced	Limited Detailed	Base	Redelineation	Verified Digital Conversion
Effective Flood Insurance Study	4.3	75.4	117.5	662.7		
Updated Effective Studies	0	12.1	66.2	34	0	0
New Studies Identified	0	0	0	78.7		

Table 5 below lists the existing (effective) NVUE compliance mileage for the Lower Pearl watershed and the expected NVUE compliance mileage after the study is complete. As part of the Discovery process, all studied stream miles have been categorized as *Verified* or *Unverified*.

Table 5: NVUE Compliance for Lower Pearl Watershed

	Zone AE			Zone A			Coastal	
	Verified	Not Verified	Unknown	Verified	Not Verified	Unknown	Verified	Not Verified
Effective Stream Mileage	183.9	9.0		144	518.7		4.3	0
Stream Mileage to Remain Unchanged by This Study	183.2	0.0		140.5	453.6		4.3	0
Mileage that is Updated by This Study	0.7	9.0		3.5	65.1		0	0
Mileage that is Redelineated by This Study*	0.0	0.0		0	0		0	0
Mileage That is Added by This Study (New or Leveraged)	68.6	0.0		78.7	0		0	0
Total Stream Mileage After Current Study	261.5	0.0		219.2	453.6		4.3	0

**Only Verified streams should be redelineated, and only with justification of the change*

All of the proposed study mileage will meet the Floodplain Boundary Standard in accordance with the Risk Classification for the study area. Most of the new study is located in Risk Classification C. However in Columbia and Picayune, approximately 1 mile and 12 miles of the revised studies are in Risk Classifications A and B, respectively. The mapping associated with these studies will adhere to the higher standards as described in Procedural Memorandum No. 38 (PM 38) and any relevant updates. Most of the Map Modernization projects were completed before PM 38 was implemented in 2007. Therefore, only the studies completed in Marion County were assessed with regard to the Floodplain Boundary Standard, which includes approximately 110 miles of study. It is very likely that a majority of studies in Lamar and Hancock counties, as well as AE Zones in Pearl River county would meet the FBS standard if they were assessed, due to the higher quality topographic data that was available for in those areas.

Table 6 provides an estimate of how the proposed engineering and mapping work, once completed, would contribute to some of FEMA's national metrics. All new and updated stream studies are presumed to satisfy both the Floodplain Boundary Standard (FBS) for mapping quality and the New, Verified, or Updated Engineering (NVUE) standard for engineering quality. The Area to be mapped under the various County FIS updates is estimated by computing the number of square miles based on the anticipated width of the new Special Flood Hazard Area multiplied by the length of each proposed study stream reach. The mapped

population is estimated by summing the population within each community, based on the census blocks that lie mostly within the watershed boundary, than prorating and summing those populations based on ratio of total area to anticipated mapping area for each community.

Table 6: National Metrics

ITEM	DESCRIPTION	VALUE
Floodplain Boundary Standard	*Estimated number of stream miles that will meet FBS for the new FIS*	191
Updated Effective Studies, New, Verified, or Updated Engineering (NVUE)	*Estimated number of miles that will meet NVUE requirements for the new FIS*	480.7
Area	*Area in square miles being mapped with new FIS*	244
Population	*Population being mapped with new FIS*	29,502

Based on the proposed scope of work, a portion of all 5 County-wide Flood Insurance Studies would require updating. The magnitude of the revision would vary. Table 7 provides a list of the FIRM panels that would likely be updated for each County as a result of this work, along with the percentage of total panels for each County that would be revised. This gives a notion of how extensive the revision would be for a particular County FIS.

Table 7: Proposed FIRM Panel Revisions

Countywide FIS	**Panels Affected (Scale:** 12000, 24000**)**	**Total Updated Panels**	**Percent of Total Panels**
Hancock	0185	1	1%
Lamar	0200, 0225	2	5%
Marion	0100, 0165, 0175, 0200, 0250, 0260, 0275, 0300, 0325, 0350, 0375,	11	52%
Pearl River	0240, 0245, 0355, 0360, 0365, 0370, 0480, 0485, 0495, 0515, 0560, 0580, 0585	13	17%
Walthall	0250, 0275, 0300	3	21%

Anticipated partner contributions in the form of geospatial data, engineering, outreach, or other potential mapping activities are compiled in Table 8. The Table is formatted based on FEMA's document entitled "Estimating the Value of Partner Contributions to Flood Mapping Projects 'Blue Book'" version 3.0, September 2011. The unit costs are also

taken from this document. Most of the contributions are in the form of enhanced topographic data and base mapping elements.

Table 8: Partner Contributions

Project Element	Unit	Unit Cost	Units	Total Cost
Topographic Data Development (Rolling)	Square miles	$200	1,850	$370,000
Indep. QA/QC of Topo Data (Rolling)	Square miles	$30	1,850	$55,500
Base Map Data 1-foot orthophoto	Square miles	$100	925	$92,500
Base Map Data 1-meter orthophoto	Square miles	$20	762	$15,240
Base Map Data road/street centerlines	Square miles	$10	762	$7,620
Base Map Data building footprints	Square miles	$247	925	$228,362

Partner sources of topographic data are two types: 1. LiDAR available for Hancock, Lamar, and Pearl River counties and 2. Stereoscopically compiled 5-foot elevation contour for Marion and Walthall counties (see Table C for details on these datasets). Although higher resolution orthophotography is available for Hancock and Pearl River counties, these datasets would most likely be dismissed in favor of a lower resolution, but more recent aerial imagery.

Value for topographic data development and QA/QC thereof is claimed for the entire watershed since it is likely that hydrologic engineering will be necessary for all or nearly all of the watershed. Value for Base Map data is limited to an estimate of the area covered by the updated FIRM panels with the exception of building footprints. Units for building footprints are further limited by their availability in only Pearl River and Hancock counties. These data would be available for more refined flood risk assessments for those two counties. The latest FEMA blue book does not include costs for building footprint data so the costs shown are based simply on the 2009 Gulf Region Base Mapping project data. It must be further noted that these partner contributions should not be credited as actual CTP matching funds since all of these projects were primarily funded through federal grants, rather than state or local monies.

III. Watershed Stakeholder Coordination

Stakeholder coordination for the Lower Pearl River watershed was conducted by first completing an extensive table of watershed contacts. The table includes a tab for State-wide contacts and one for Watershed-specific contacts. State-wide contacts would largely remain consistent regardless of the location of the Discovery project within Mississippi, while Watershed-specific contacts would vary. The following State and Federal agencies compose the State-wide contacts list:

State: Mississippi Department of Environmental Quality
Mississippi Emergency Management Agency
Mississippi Department of Transportation
Mississippi Insurance Commission
Mississippi Development Authority

Federal: Federal Emergency Management Agency (Region IV)
U. S. Geological Survey
Natural Resource Conservation Service
U. S. Army Corps of Engineers
National Oceanic and Atmospheric Administration
Office of U.S. Senator Cochran
Office of U.S. Senator Wicker
Office of U.S. Representative Harper
Office of U.S. Representative Palazzo

Below is a list of Watershed specific contacts:

Community Chief Executive Officers
Community Floodplain Administrators
County Emergency Management Agency Directors
County/Regional Economic Development District Directors
NRCS District Conservationists

While the overall list of stakeholders is broad and inclusive, the Regional Study Team identified a "short list" of primary contacts consisting of community Floodplain Administrators and county Emergency Management Agency Directors. Initial contact with these primary stakeholders was made via personal letter signed by MEMA and MDEQ with appropriate attachments, including a map of the Lower Pearl watershed and its member communities, a FEMA brochure giving background on the Risk MAP Program, and a Coordinated Needs Management Strategy request form. This mailing was sent approximately 5 weeks prior to the Discovery meeting.

About 1 week following this mailing (4 weeks prior to Discovery meeting), a general invitation was extended to all of the remaining stakeholders listed above in the form of a memorandum. These memos were sent via e-mail to all contacts for whom we had a verified e-mail address. For those contacts for whom we did not have e-mail, the memos where sent by regular mail. The

body of the memo and supporting attachments were similar to the letter and attachments sent to primary stakeholders.

About 2 weeks prior to the meeting, an e-mail reminder was sent to all stakeholders for whom which we had on file a verified e-mail address. Examples of all correspondence, as well as the full list of meeting invitees, can be found in Appendix G—Community Correspondence.

IV. Data Analysis

This section outlines the data that has been collected in conjunction with the Discovery process to date. Some datasets are known to exist and are accessible but have not yet been acquired. Very little if any new community-based data has been obtained. Post-Discovery meeting follow up yielded no new data from the communities. Most of the data is from State and Federal government sources.

i. Data that can be used for Flood Risk Products

This subsection describes specific data that may be used in the development and support of new Flood Risk Products for the Lower Pearl watershed. There exists a variety of topographic data throughout the watershed. These various types and their details are listed in Table 9 below.

Table 9: Topographic Data Sources

Topographic Dataset Type	Coverage Area	New/Existing OR Leveraged	Accuracy & Year Acquired	Source/ Data Vendor	Contact Information
LiDAR	Hancock County	Existing FEMA Post-Katrina LiDAR	RMSE 36.3cm Vertical Accuracy; 1.22m Horizontal Accuracy; 2006.	Public domain, Woolpert, LLC for FEMA	Steve Champlin-MDEQ, Office of Geology
LiDAR	Pearl River County	Existing USACE LiDAR	RMSE 23.5cm Vertical Accuracy; 1.22m Horizontal Accuracy; 2003.	USACE for Pearl River County	Steve Champlin-MDEQ, Office of Geology
LiDAR	Lamar County	Existing Camp Shelby LiDAR	RMSE 18.5cm Vertical Accuracy; Meets FEMA G&S Appendix A Horizontal Accuracy requirements, 2007.	Public domain, Earth Data for State of MS	Steve Champlin-MDEQ, Office of Geology
Points and Breaklines	Hancock, Pearl River counties	Existing MDEM Stereo-compiled topo	DEMs from 6” pixel orthos; support 2' contours. Data captured in 2007.	Public domain, Earth Data for State of MS	Steve Champlin-MDEQ, Office of Geology
Points and	Lamar,	Existing	DEMs from 2-ft pixel	Public domain,	Steve

Breaklines	Marion, Walthall counties	MDEM Stereo-compiled topo	orthos; support 5' contours. Data captured in 2006.	Earth Data for State of MS	Champlin-MDEQ, Office of Geology

There are some areas where more than 1 topographic dataset is available for use. Presently, we intend to use Lidar for Hancock and Lamar counties and use the 2-ft stereo-compiled points and breaklines data for Pearl River county. The reason for favoring the points and breaklines for Pearl River county is the more recent collection date which may capture some of the development that occurred after Hurricane Katrina. If further assessments indicate that the Lidar accuracy advantage outweighs the age disadvantage, then the Lidar may still be used, especially in less developed areas. The Lidar accuracy advantage is expected to outweigh the slightly older collection date for Lamar and Hancock counties.

The Mississippi Digital Earth Model has also collected building footprints in Hancock and Pearl River counties for structures that are at least 100 ft x 100 ft in size. These were digitized from 6" pixel aerial imagery flown in 2007 and will be available for refined HAZUS analyses for these counties.

ii. Other Data and Information

In addition to the topographic data described in the previous section, other GIS data layers have been inventoried and assessed for the project, as given in Table 10. Most of the layers originate from either the Mississippi Digital Earth Model (MDEM) or the Mississippi Automated Resource Information System (MARIS).

At this time, only Pearl River County is known to have digital parcel data. Hydrographic data (waterlines/waterbodies) were produced as part of the MDEM stereo-compiled topographic data outlined in the previous section. County and municipal boundaries were updated in the fall of 2010. The National Agriculture Imagery Program (NAIP) 2012 collection is due to become available in November, 2012. Transportation data is available from MDEM's road centerline project for Hancock and Pearl River counties, digitized from 2007 imagery. For the remaining counties, transportation features are derived from the most recent TIGER database. Additional MDEM roads data may be available for incorporating into final mapping products. No extraterritorial jurisdictions are known for the study area, based on a review of the Community Status Book for Mississippi.

Table 10: GIS data layers available

GIS data available	Source (ie, State, Local, Federal)	Acquisition Date	Vertical Datum	Horizontal Datum	Use Restrictions?
Cadastral Data	Local (Pearl	2008+/-	n/a	unknown	yes

	River Co.)				
Hydrography	State	2006-2007	NAVD88	NAD83	no
Flood Hazard Information	Federal	2004-2009	NAVD88	NAD83	no
County Boundary Data	State	2010	n/a	NAD83	no
Municipal Boundary	State	2010	n/a	NAD83	no
Digital Orthophoto	Federal	2012 (pending)	n/a	NAD83	no
Publicly Owned Lands Data	State	2010	n/a	NAD83	no
Transportation Data	State	2010	n/a	NAD83	no
Elevation Data	See Table 8				
ETJ Data	n/a	n/a	n/a	n/a	n/a

Once the elevation and imagery data is obtained from the anticipated sources, the National Digital Elevation Program (NDEP) Project Tracking System and the National Digital Orthophoto Program (NDOP) Tracking Systems will be updated with information required.

During the Discovery phase, a review of current mitigation activities in the Lower Pearl watershed was conducted. Based on this review, only 2 mitigation projects are underway or recently completed. One is a property acquisition and the other is a drainage improvements project. Both are located in the City of Picayune.

The NWS Lower Mississippi River Forecast Center has performed some studies of flooding in the lower Pearl River around Walkiah Bluff, MS. This work was initiated in 2009 in response to Pearl River County officials, who had expressed an interest in obtaining more information and guidance on flooding in this area, where approximately 175 homes are located along Parkside Drive, Oak Point Road, and neighboring areas. The flood forecasting for some events is complicated due to a split river channel, along with the construction of weirs and a navigation channel along the western edge of the floodplain. This previous NWS work will likely be useful in supporting or verifying the Lower Pearl river study that is currently planned as part of this RiskMAP project, and MDEQ will continue coordination with NWS as appropriate.

According to FEMA's Mapping Information Platform, a Letter of Map Revision is underway for Big Bay Lake in Lamar County. The revision is planned to replace the Zone A with a Zone AE for the entire lake area such that properties around the lake will have a more reliable base flood elevation for insurance and permitting. The study is being completed by Aqua Engineering Services.

iii. Project Status

The project schedule is significantly delayed as compared to Table 6.1—Mapping Activities Schedule in the Mapping Activities Statement No. FY10.09. This is due to a couple of reasons. First, the MAS template was based on a traditional MapMod project schedule and did not account for the additional research and analysis that comprise the pre-Discovery phase, as opposed to a standard Scoping phase. Second, between the time the MAS was executed and the commencement of work, the State of Mississippi required some time to internally reassess its role as a Cooperating Technical Partner under Risk MAP, as the specifics of the Risk MAP program began to take shape. With a much greater emphasis on mitigation and planning elements in the overall Risk MAP vision and goals, MEMA and MDEQ needed to examine and clarify their respective roles and ensure that a firm commitment to pursuing these objectives was put forth by all partners, within the context of their own established goals, visions, and functions. An updated MIP Baseline Budge Form is included to provide a project schedule with more realistic project delivery dates, taking into account the delays previously explained.

Project Funding

No changes to project funding are known or anticipated at this time. The Lower Pearl watershed received about $400,000 in grant funding under FY 2010 allocation. Deducting the costs for Discovery activities, an engineering and mapping budget of about $340,000 is a reasonable target for the present scope of work. The total funding obligated to the MIP under this project is **$397,500**. The development of Risk MAP Products is funded under a different Mapping Activity Statement. It is likely that as Discovery activities proceed on the other two FY 2010 watersheds and additional needs come to light, the working budget may need to be revised slightly.

Unmet Needs

As noted in the project scope description, 4 study streams were determined to be unverified during the CNMS Phase 3 validation process. An updated study is planned for all of these streams. To date, only 2 community requests have been received, both for Lamar County. The request for upgrade to Zone AE for Lower Little Creek/Bay Creek is intended to be met based on previous Letters of Map Change in that area. However the request for Zone AE upgrade for Polk Creek is not planned due to lack of a clear justification. No other community mapping needs are known to exist at this time.

V. Discovery Meeting

The Lower Pearl River Discovery meeting was held on February 7, 2012 at the Pearl River County Emergency Operations Center in Poplarville. The meeting was attended in person by representatives from Mississippi Department of Environmental Quality, Mississippi Emergency Management Agency, Federal Emergency Management Agency, local government staff, and CTP's mapping contractor. Additional FEMA staff attended the meeting by remote access. The meeting lasted from 9 am to approximately 11:30 am. A copy of the sign-in sheet and meeting minutes is included in Appendix G.

It was noted that the meeting space was not quite adequate for use as a work area in reviewing and marking up the Discovery maps. There were several tables but much of the space on these tables was occupied by communication equipment. The maps were too large to place flat on the tables so the maps were taped up onto the walls. Ideally, the maps should be placed on tables where the can be reviewed and marked up more comfortably by several participants. A more thorough evaluation of the meeting space and equipment should be completed for future Discovery meetings.

VI. List of Appendices

Appendix A: Discovery Flood Hazard Map

Appendix B: Discovery Flood Risk Map

Appendix C: Map of Effective Studied Streams (with Panel Scheme)

Appendix D: Map of Proposed Studied Streams (with Panel Scheme)

Appendix E: Community Contact List

Appendix F: Community LOMC List

Appendix G: Community Correspondence

Appendix H: Discovery Meeting Minutes and Sign-In Sheet

Appendix I: Community Assistance Visit Reports

Appendix J: Community Flood Damage Prevention Ordinances

Appendix K: Excerpts from Community Hazard Mitigation Plans