

Discovery Report

Lower Wabash Watershed, HUC 05120113

*Illinois Counties-Edwards, Gallatin, Lawrence, Richland, Wabash
Indiana Counties- Gibson, Knox, Posey*

Report Number 01

12/31/2011



FEMA



ILLINOIS STATE
WATER SURVEY
PRAIRIE RESEARCH INSTITUTE

DNR

Indiana Department of
Natural Resources



The Polis Center

INDIANA UNIVERSITY-PURDUE UNIVERSITY-INDIANAPOLIS

Project Area Community List

Illinois Communities
Edwards County
City of Albion
Village of Bone Gap
Village of Browns
Village of West Salem
Gallatin County
Village of New Haven
Lawrence County
City of St. Francisville
Richland County
Village of Claremont
Wabash County
Village of Allendale
Village of Bellmont
Village of Keensburg
City of Mount Carmel
White County
City of Grayville
Village of Maunie
Village of Phillipstown

Indiana Communities
Gibson County
Town of Owensville
City of Princeton
Knox County
City of Vincennes
Posey County
Town of Cynthiana
Town of Griffin
City of Mount Vernon
Town of New Harmony
Town of Poseyville
Vanderburgh County
Town of Darmstadt

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I. General Information

The lower reach of the Wabash River serves as the boundary between Illinois and Indiana from its confluence with the Ohio River to approximately 200 miles upstream. The Wabash has always been Indiana's most famous river. Occupying the heartland of the state, the river drains two-thirds of the 92 counties as it flows over 475 miles to its confluence with the Ohio below Mount Vernon, Indiana¹. The watershed encompasses approximately 1,292,892 acres with 46 percent located in Illinois and 54 percent in Indiana².

The main stem of the Wabash River is cataloged by five HUC-8 watersheds in addition to the individual watersheds of its major tributaries. The HUC-8 watershed involved in this project is the Lower Wabash Watershed (HUC-05120113) which covers 1310.57 square miles. This HUC-8 watershed located along the Wabash River begins just south of Vincennes, Indiana and includes area in both Illinois and Indiana. The watershed extends southward covering portions of Lawrence, Richland, Edwards, Wabash, White and Gallatin Counties, (Illinois) and Knox, Gibson, Posey, and Vanderburgh Counties, (Indiana). The Lower Wabash watershed ends where the Wabash River meets the Ohio River above Old Shawneetown, Illinois.

In 2011, the Indiana Department of Natural Resources (IDNR) and Illinois State Water Survey (ISWS) partnered with The Polis Center of Indiana University Purdue University-Indianapolis (IUPUI) and the University of Illinois Extension to complete the Risk MAP Discovery process in the Lower Wabash watershed. The process included data collection and analysis, community/stakeholder meetings and feedback, and development of recommended projects as outlined in this report.

¹ Watershed Restoration Action Strategy for the Middle Wabash - Busseron Watershed, Indiana Department of Environmental Management Office of Water Quality Watershed Management Section, Prepared by Wittman Hydro Planning Associates, Inc., February 1999

² Middle Wabash-Busseron Watershed, United States Department of Agriculture, Natural Resources Conservation Service, Illinois Conservation Security Program, December 2004

Figure 1. Lower Wabash Watershed

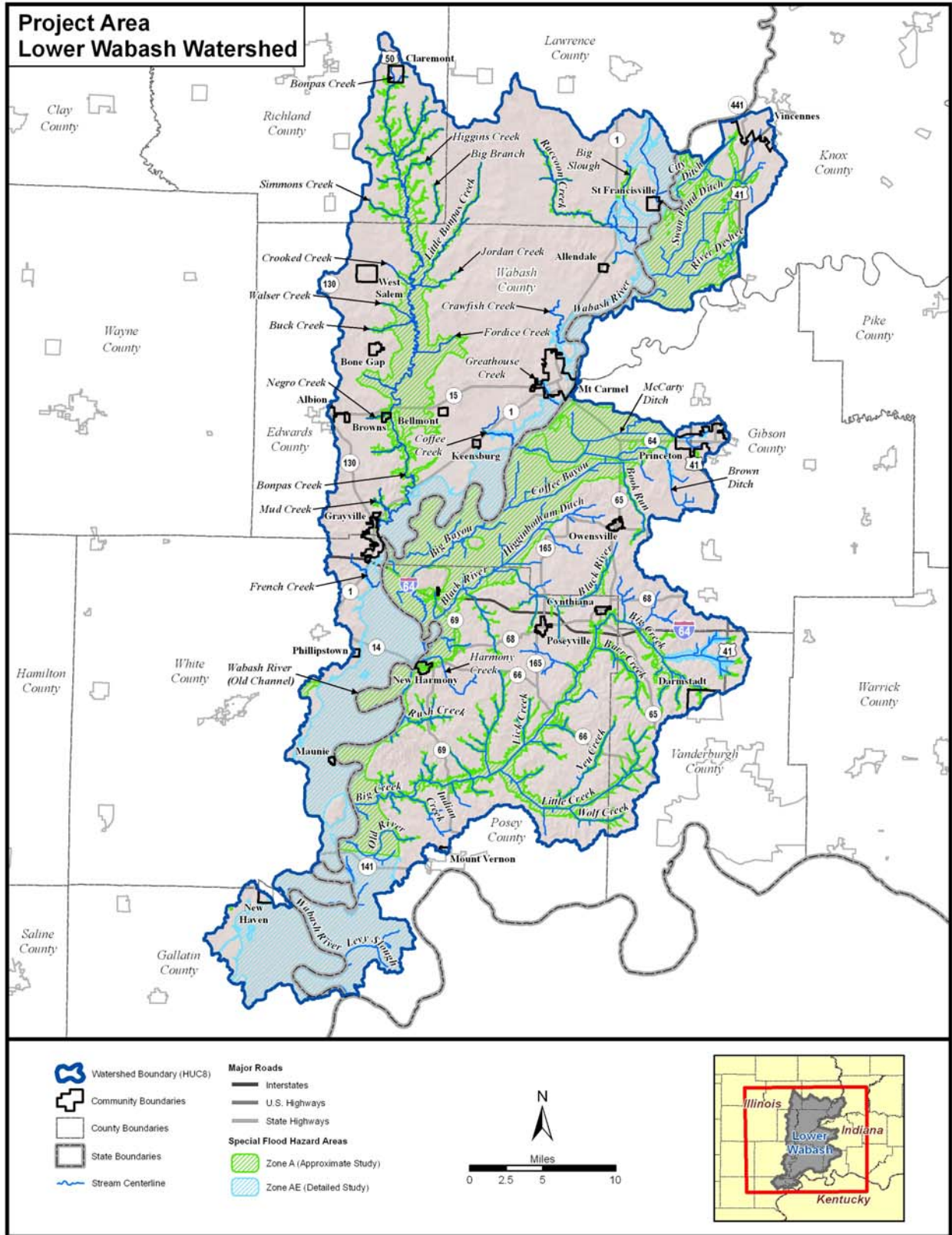


Table 1. NFIP Participation Status

Illinois		
County	Community	Participating?
Edwards	Edwards County	Yes
	Albion	No
	Bone Gap	No
	Browns	Yes
	West Salem	No
Gallatin	Gallatin County	Yes
	New Haven	Yes
Lawrence	Lawrence County	No
	St. Francisville	No
Richland	Richland County	Yes
	Claremont	No
Wabash	Wabash County	No
	Allendale	No
	Bellmont	No
	Keensburg	No
	Mount Carmel	Yes
White	White County	Yes
	Grayville	Yes
	Maunie	Yes
	Phillipstown	No

Indiana		
County	Community	Participating?
Gibson	Gibson County	Yes
	Owensville	No
	Princeton	Yes
Knox	Knox County	Yes
	Vincennes	Yes
Posey	Posey County	Yes
	Cynthiana	No
	Griffin	Yes
	Mount Vernon	Yes
	New Harmony	Yes
Vanderburgh	Poseyville	No
	Vanderburgh County	Yes
	Darmstadt	No

II. Watershed Stakeholder Coordination

The Discovery phase included an investigation of existing terrain, flood hazard data, and flood risk data; broad data mining for development of an initial Discovery map, and detailed data collection to refine the Discovery map. IDNR and ISWS led the stakeholder coordination in Indiana and Illinois, respectively. The Discovery maps were prepared by The Polis Center (Indiana) and ISWS (Illinois). Approximately four weeks prior to the meetings, IDNR and ISWS mailed letters to all invited stakeholders providing a background of the Risk MAP program and an invitation to attend a Discovery meeting.

The project team coordinated six Discovery meetings. Because the project team (ISWS, IDNR, and Polis) partnered on both the Lower Wabash and Middle Wabash-Busseron Discovery projects, the meetings were combined, and three were held in each watershed. The meeting locations included the following:

Lower Wabash locations:

- Mt. Carmel, Illinois (Wabash County)
- Vincennes, Indiana (Knox County)
- New Harmony, Indiana (Posey County)

Middle Wabash-Busseron locations:

- Terre Haute, Indiana (Vigo County)
- Robinson, Illinois (Crawford County)
- Paris, Illinois (Edgar County)

Each meeting was approximately two hours in length and consisted of introductory presentations followed by a break-out session in which stakeholders could review the Discovery map, ask questions, and provide comments and revisions.

Presentations were given describing Risk MAP program goals and objectives, hazard mitigation projects, the Federal Emergency Management Agency (FEMA)'s Community Rating System (CRS), and the Discovery meeting goals and objectives.

For the break-out session, Discovery maps were available for review at approximately six to eight stations, and each station was staffed by IDNR, ISWS, and/or Polis personnel. After reviewing the maps and clarifying any questions, stakeholders completed comment forms that included their contact information and recommended revisions or general feedback. All Discovery meeting and coordination materials, including stakeholder letter, list of stakeholder recipients, attendance sheets, and comment form are available in Appendix B.

III. Data Analysis

The Polis Center met with IDNR, ISWS, and Indiana Department of Homeland Security (IDHS) to determine which types of flood risk data the state agencies could share. Polis has a non-disclosure agreement with IDHS regarding sensitive data, e.g., repetitive loss and insurance claims data, stating that Polis may use the data to accurately depict risk yet retain the privacy of the policy holders and homeowners. A list of the data collected, the deliverable or product in which the data are included, the source of the data, and any pertinent comments is provided in Table 2. Following Table 2, the data are categorized by data that can be used for flood risk products and additional data that benefited the project.

Table 2. Data Collection for Lower Wabash Watershed

Data Types	Description	IL Source	IN Source	Deliverable
At-Risk Essential Facilities	Essential Facilities located in FEMA Special Flood Hazard Areas.	Southern Illinois University	The Polis Center	Discovery Map; Geodatabase
Community Boundaries	Location of community boundaries	U.S. Census Places 2010	Indiana Department of Transportation, 2007; FEMA Digital Flood Insurance Rate Maps	Discovery Map; Geodatabase
County Boundaries	Location of county boundaries	USGS Topographic Maps	Indiana Geological Survey	Discovery Map; Geodatabase
Dams	Location of dams	U.S. Army Corps of Engineers - National Inventory of Dams	Indiana Department of Natural Resources	Discovery Map; Geodatabase
Ice Jams	Location of ice jams	U.S. Army Corps of Engineers - Ice Jam Database	N/A	Discovery Map; Geodatabase
Letters of Map Change	Locations of letters of map change	FEMA Mapping Information Platform Database	FEMA Mapping Information Platform Database	Discovery Map; Geodatabase
Levees	Location of levees considered for accreditation status by FEMA	FEMA Midterm Levee Inventory	FEMA Midterm Levee Inventory	Discovery Map; Geodatabase
Major Roads	Location of interstates and major highways	Illinois Department of Transportation, 2010	Indiana Department of Transportation, 2006	Discovery Map; Geodatabase
Public Assistance (PA)	Locations of PA disbursements	FEMA Region 5	FEMA Region 5	Discovery Map; Geodatabase
Special Flood Hazard Areas	Location of FEMA flood hazard areas	FEMA Flood Insurance Rate Maps	FEMA FIRMs, interim Digital FIRMs produced by IDNR	Discovery Map; Geodatabase
HUC 8 Watershed	Watershed Boundary	USGS National Hydrography Dataset	USGS National Hydrography Dataset	Discovery Map; Geodatabase
State Boundaries	Location of state boundaries	2010 Census	2010 Census	Discovery Map; Geodatabase
Stream Gages	Location of stream gages operated by multiple agencies	USGS	USGS	Discovery Map; Geodatabase

Data Types	Description	IL Source	IN Source	Deliverable
Composite Risk Analysis	National Flood Risk Analysis HUC Risk Data	FEMA Region V	FEMA Region V	Discovery Map; Geodatabase
Floodplain Activity Data	Locations of DNR permit applications	N/A	Indiana Department of Natural Resources	Discovery Map; Geodatabase
Wabash River Conservation Easements	Conservation Easements along the Wabash River in Indiana	N/A	Indiana Department of Natural Resources	Discovery Map; Geodatabase
2010 Annualized loss	National Hazus study results for flood loss by census block	FEMA Region 5, STARR Team	FEMA Region 5, STARR Team	Geodatabase
Level 2 Hazus annualized loss	Detailed building point analysis from Indiana mitigation planning	N/A	IndianaMap and Indiana Department of Local Government and Finance	Geodatabase
EPA 303d Streams	Streams included in the EPA 303(d) list of impaired streams	U.S. EPA Office of Water	U.S. EPA Office of Water	Geodatabase
Wells in 1% Flood Zone	Wells and borings located within 100-yr or 1% flood zone	Illinois State Geological Survey	N/A	Geodatabase
Wetlands	Location and type of wetlands and deep water habitats	U.S. Fish and Wildlife Service National Wetlands Inventory	U.S. Fish and Wildlife Service National Wetlands Inventory	Geodatabase

i. Data that can be used for Flood Risk Products

Topographic and Imagery Data

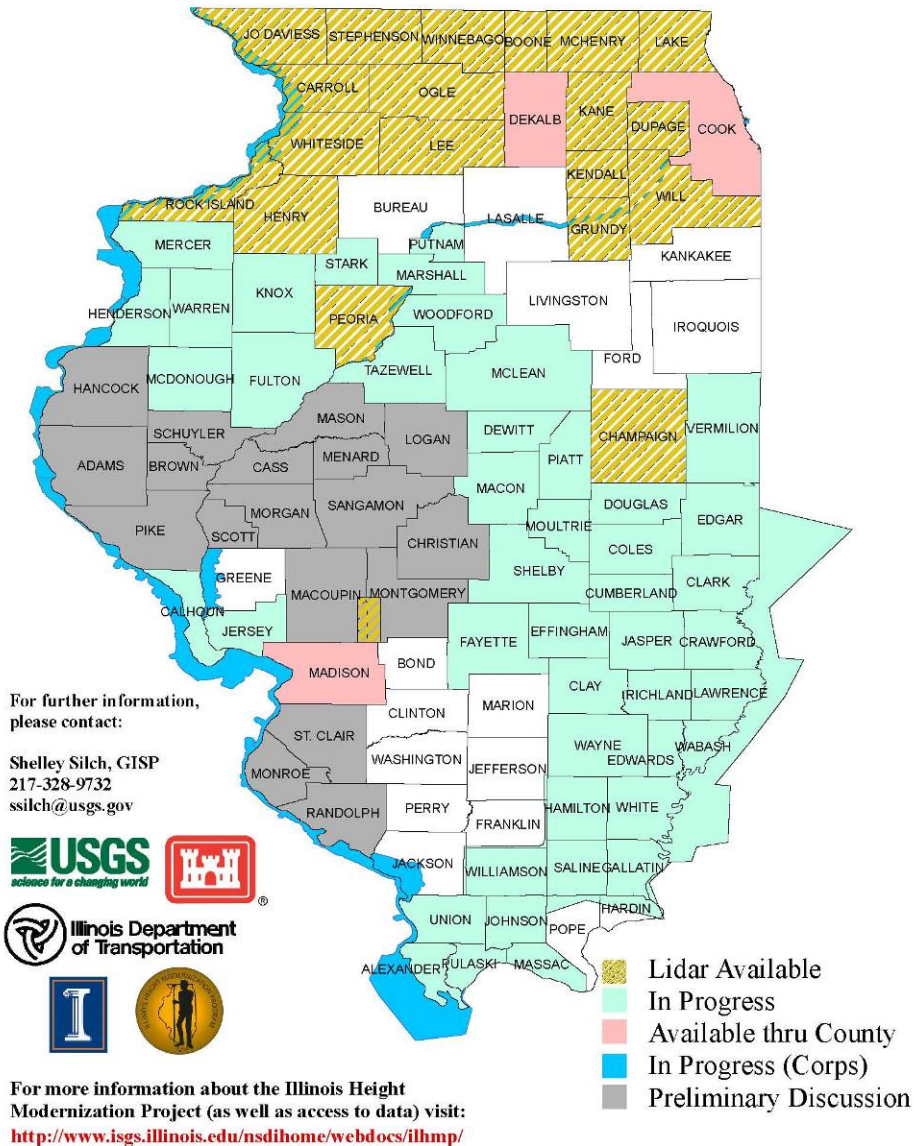
As part of the Illinois Height Modernization effort, the Illinois Department of Transportation (IDOT) is leading LiDAR data acquisition for Illinois counties scheduled by IDOT district. The counties in the Lower Wabash Watershed are within Districts 7 and 9. IDOT District 7 includes Edwards, Lawrence, Richland, and Wabash Counties. LiDAR has been collected in District 7, and processing of the data is underway. There is no known priority list, but data for counties in District 7 will be available as completed. LiDAR projects in IDOT District 9, which includes White and Gallatin counties, have been delayed.

However, FEMA has funded LiDAR acquisition for the Wabash River corridor in conjunction with this Discovery project. The raw data point cloud was obtained in 2011, and the data are currently being reviewed and processed; data will likely be available for use in 2012. FEMA has also funded LiDAR acquisition for the Saline River Watershed, which includes White and Gallatin counties, but no details are currently known on the extent of this data and whether it is countywide or watershed based.

Figure 2. Illinois LiDAR Status

Lidar Status for Illinois

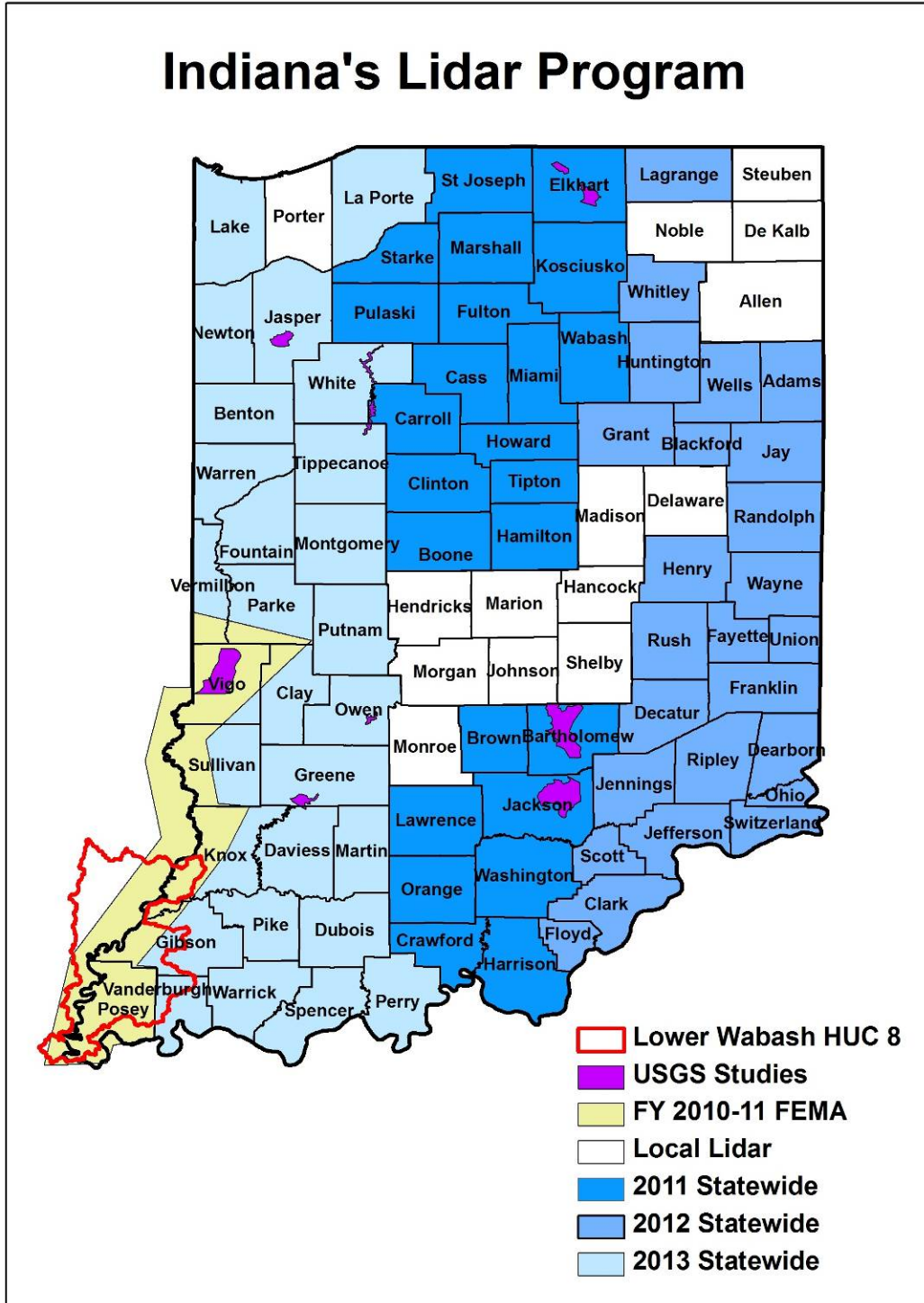
October 2011



Additionally, imagery at 1' pixel resolution (4-band imagery) and United States Geological Survey (USGS)-compliant LiDAR data for the entire state of Indiana will be completed by 2013. Currently LiDAR elevation data and digital orthophotography is available for counties located in the central tier of the state. Figure 3 illustrates the status of LiDAR activity in Indiana.

Figure 3. LiDAR Activity in Indiana

Indiana's Lidar Program



USGS Gages

The project team identified USGS stream gages in the watershed. The locations of the gages are shown on the Discovery map and listed in Table 3.

Table 3. USGS Stream Gages

Gage Number	Station Name and Location	Years of Record (Peaks)
03377500	WABASH RIVER AT MT. CARMEL, IL	130
03378000	BONPAS CREEK AT BROWNS, IL	70
03378500	WABASH RIVER AT NEW HARMONY, IN	23
03378550	BIG CREEK NEAR WADESVILLE, IN	1

Average Annualized Loss (AAL) Data

In 2010, FEMA completed a Level 1 Hazus flood analysis to determine average annualized losses for the entire United States. The analysis was based on USGS 30-meter DEM and Hazus default inventory data. The purpose of the study was to identify relevant riverine and coastal flood risk across the U.S. To determine the annualized risk, the study analyzed the 10-year (10%), 50-year (2%), 100-year (1%), 200-year (0.5%), and 500-year (0.2%) Hazus flood losses. These data are included in the flood risk database for Illinois and Indiana.

Additionally, The Polis Center, as part of the local Multi-Hazard Mitigation Plan (MHMP) risk assessment process, used approximate building locations derived from GIS parcel maps and E911 address points with Indiana Department of Local Government and Finance (IDLGF) building information, including replacement costs, to refine the analysis for Indiana. The individual structure losses were calculated using Hazus flood depth damage curves and the results aggregated by census block. Both data sets are included in the flood risk database. The detailed building point, Level 2 analysis for Indiana will be used for subsequent analyses.

ii. **Other Data and Information**

Mitigation Plans/Status, Mitigation Projects

MHMPs are prepared for unincorporated and incorporated communities within Indiana and Illinois counties. The plans include comprehensive mitigation strategies intended to promote flood-resilient communities. The project team reviewed the mitigation strategies in available MHMPs to determine which, if any, were relevant for the Discovery process. Table 4 lists the MHMPs, their status, and their availability for review.

Table 4. MHMPs: Status and Availability

County	MHMP	Hazus	Issue Date	Expiration Date	Available for Review
Illinois					
Edwards	Y	Y	2009	2014	Y
Gallatin	Y	Y	2010	2015	Y
Lawrence	N	N/A	N/A	N/A	N/A
Richland	In progress	N/A	N/A	N/A	N/A
Wabash	N	N/A	N/A	N/A	N/A
White	Y	Y	2009	2014	Y

County	MHMP	Hazus	Issue Date	Expiration Date	Available for Review
Indiana					
Gibson	Y	Y	2009	2014	Y
Knox	Y	Y	2009	2014	Y
Posey	Y	Y	2009	2014	Y
Vanderburgh	Y	N	2006	2011	Y

Essential facilities are the facilities that can impact the delivery of vital services, cause greater damages to other sectors of a community, or put special populations at risk. They include schools, fire departments, police departments, emergency operations centers (EOC), and care facilities. The assessment of the flood risk posed to essential facilities within the watershed is an important aspect of the MHMPs. Essential facilities that are located within the 1 percent-annual-chance floodplain were quantified and identified as at-risk structures. The exact number of essential facilities that are considered at-risk is not always quantifiable due to the limited detail presented in the MHMPs. The number of essential facilities estimated to be within the 1 percent-annual chance floodplain was determined by overlaying the essential facilities points included in the MHMPs with the latest flood hazard data. However, the risk of flood damage is limited by the detail and accuracy of the most recent flood map. In Indiana, four essential facilities within the watershed are considered at-risk and should be identified as an Area of Mitigation Interest. These facilities are included in the following table.

Table 5. Essential Facilities in 1 Percent-Annual Chance Floodplain

Name	Facility Type	Location
South Terrace Elementary School	School	Wadesville, IN (Posey County)
Griffin Fire Department	Fire Department	Griffin, IN (Posey County)
Point Township Volunteer Fire Department	Fire Department	Mount Vernon (Posey County)
Station 21 Decker Township Fire Department	Fire Department	Decker, IN (Knox County)

None of the identified essential facilities located within the study region in Illinois fell within the 1-percent-annual chance floodplain.

Numerous locations of roads overtopping during flood events were identified during the data collection and Discovery meeting process.

Numerous dams exist within the watershed, but only some are mentioned in the MHMPs as flood control structures. No dams located within the study region in Illinois are identified as high hazard dams, a classification of dams in which failure or misoperation has the highest risk to cause loss of human life and significant damage to buildings and infrastructure. In Indiana, four high hazard dams are located within the watershed.

Table 6. High Hazard Dams in Watershed

Dam Name	County	Community
Mater Dei Provincialate Dam	Vanderburgh	Kasson
North Lake Estates Dam	Vanderburgh	Kasson
Bittner Lake Dam	Vanderburgh	Evansville North
Gibson Generating Plant Dam	Gibson	Keensburg

CNMS and NFIP Mapping Study Needs

ISWS and IDNR applied geospatial technologies to coordinate the management of mapping needs. The Coordinated Needs Management Strategy (CNMS) contains data for stream reaches to support existing and proposed flood mapping activities. An update and analyses of the CNMS data for the Lower Wabash- watershed are complete. Analyzed studies have been identified in Illinois as “VALID,” “UNKNOWN,” and “UNVERIFIED.” In Indiana, IDNR uses different CNMS status terminology, which includes “IN PROGRESS,” “VALIDATED,” “UNKNOWN,” “UNMET NEED,” and “REQUIRES ASSESSMENT.”

Illinois Prioritization Methodology

To provide a basis for prioritizing mapping needs in the watershed, a methodology was determined to rank streams based on several criteria. There are a number of flooding issues in the Lower Wabash Watershed. The method used in Illinois to identify streams of concern was to perform a spatial analysis of the data to determine where there are combinations of potentially invalid or unverified engineering data, high risk, and community concerns. Three sources of information were used for this initial screening task. The CNMS Phase III data are a geospatial database of stream reaches attributed with an assessment of the engineering analyses as valid, unverified or unknown. The FEMA National Flood Risk Analysis HUC Risk Data spatial data were used to provide relative risk ranking. It is a Census Block Group GIS layer that contains aggregated flood claims data along with ten weighted parameters used to compute relative national risk (1 to 10 with 1 being highest risk) by Census Block Group. Study requests contained in CNMS as well as local mapping concerns collected at the Discovery meeting were used to identify areas of known flooding issues.

A subset of stream segments was created by combining those stream segments identified as having engineering analyses that may no longer be valid (CNMS unverified) and any stream segment where comments collected indicate that the Special Flood Hazard Area (SFHA) mapping is inaccurate or inadequate. This subset of stream segments was then intersected with the HUC Risk Data and separated into two categories: high concern for those segments which flow through Census Block Groups with Risk Rankings between 1 and 5; medium concern for those segments which flow through Census Block Groups with Risk Rankings between 6 and 10. Stream segments outside the combined set were categorized as low concern. The entire list of study needs including stream names, floodplain zones, stream lengths, and categories of concern are provided in Appendix E. Final ranking of CNMS scores are stored in the geodatabase as well as a GIS feature class derived from the CNMS named Streams of Concern.

Table 7. Illinois Concern Categorization

Level of Concern	CNMS Status	Study Request	FEMA Risk Decile
<i>High</i>	Unverified	Yes/No	1-5
	Unknown	Yes	1-5
<i>Medium</i>	Unverified	Yes/No	6-10
	Unknown	Yes	6-10
	Valid	Yes	1-10
<i>Low</i>	Valid	No	n/a
	Unknown	No	n/a

Indiana Prioritization Methodology

To prioritize the mapping study needs listed in Section i and Appendix E of this report, the project team used a flood risk ranking methodology that assembles flood risk metrics along a floodway to deterministically rank all stream reaches within the watershed. The methodology tabulated values (by min, max, sum, or count) for three required risk categories and three optional risk categories, and then calculated a total score for each CNMS reach. The required risk categories include 1) CNMS status, 2) local mapping request, and 3) FEMA risk decile score.

Because Indiana had compiled additional flood risk data sets, these were included in the ranking methodology as optional categories. The optional categories for this watershed include the following:

- 1) Hazus level 2 annualized losses: individual building Average Annualized Loss (AAL) scores summed for each CNMS reach
- 2) Essential facilities (EFs) at risk: schools, fire stations, police stations, EOCs, and care facilities located within the special flood hazard area
- 3) Permit requests related to floodplain activity including:
 - a. Flood insurance determination
 - b. Miscellaneous study
 - c. Flood insurance study
 - d. 100-year discharge
 - e. Permit amendment
 - f. New levee
 - g. Levee
 - h. Outfall structure – stormwater
 - i. LOMA/LOMR letter for FEMA
 - j. Bank protection – riprap
 - k. Permit revision
 - l. Erosion control
 - m. Dam

The following table describes the scoring matrix.

Table 8. Indiana Scoring Matrix

REQUIRED CATEGORY 1: CNMS STATUS	
Validation	Score
IN PROGRESS, VALIDATED, UNKNOWN	0
All Other Values	1
UNMET NEED	2
REQUIRES ASSESSMENT	3
REQUIRED CATEGORY 2: LOCAL MAPPING REQUEST	
Study Requested	Score
No	0
Yes	2
REQUIRED CATEGORY 3: FEMA RISK DECILE	
Minimum Risk Decile	Score
0	0
6-10	1
1-5	2
OPTIONAL CATEGORY 4: HAZUS LEVEL 2 AAL	
Sum AAL	Score
0	0
< \$10,000	1
> \$10,000	2
OPTIONAL CATEGORY 5: EFs IN SFHA	
Count EFs	Score
0	0
> 0	2
OPTIONAL CATEGORY 6: PERMIT ACTIVITY IN FLOODPLAIN	
Count Select Permits	Score
0	0
1-5	1
> 5	2

Final ranking of CNMS scores are stored in the geodatabase as well as a GIS feature class derived from the CNMS.

Figure 4. CNMS Rankings in Geodatabase

REACH_ID*	CNMS_Score	FEMA_Score	FEMA_Value_Min	FEMA_Value_Sum	AAL_Score	AAL_Value	EF_Score	EF_Value	Permit_Score	Permit_Value	Discovery_Score
1805100012	1	1	9	9	2	71	0	0	0	0	3
1812900008	2	1	10	10	2	25	0	0	2	7	6
1808300144	2	1	10	30	2	17	0	0	2	4	7
1812900006	1	1	9	38	1	8	0	0	2	10	5
1812900038	2	0	0	0	1	7	0	0	2	12	6
1808300067	1	0	0	0	1	5	0	0	2	9	5
1816300074	1	0	0	0	1	2	0	0	1	2	3
1805100042	2	0	0	0	1	2	0	0	0	0	3
1812900034	1	1	9	19	1	1	0	0	1	1	4
1805100068	2	1	10	10	1	1	0	0	1	1	5
1812900077	2	0	0	0	0	0	0	0	0	0	2
1812900072	0	0	0	0	0	0	0	0	1	1	1
1812900069	0	0	0	0	0	0	0	0	0	0	0
1812900118	0	0	0	0	0	0	0	0	0	0	1
1812900068	0	0	0	0	0	0	2	1	1	2	3
1812900058	0	0	0	0	0	0	0	0	0	0	0
1812900070	2	0	0	0	0	0	0	0	0	0	2
1812900042	2	0	0	0	0	0	0	0	0	0	2
1812900076	0	0	0	0	0	0	0	0	0	0	0
1812900074	0	0	0	0	0	0	0	0	0	0	0
1812900073	2	0	0	0	0	0	0	0	1	2	3
1812900066	0	0	0	0	0	0	0	0	0	0	0
1812900009	2	0	0	0	0	0	0	0	1	2	3
1812900121	2	0	0	0	0	0	0	0	0	0	2
1812900000	2	0	0	0	0	0	0	0	1	2	3
1812900009	2	0	0	0	0	0	0	0	2	4	4
1812900007	2	0	0	0	0	0	0	0	0	0	2
1812900007	0	0	0	0	0	0	0	0	0	0	0
1812900005	2	0	0	0	0	0	0	0	0	0	3
1812900060	2	0	0	0	0	0	0	0	1	1	4
1812900025	2	0	0	0	0	0	0	0	2	10	5

Socioeconomic Status

Land use in the Middle Wabash-Busseron watershed is primarily agricultural. The project team intersected the HUC 8 watershed boundary with 2010 Census block data and aggregated the data by the individual counties and communities within the watershed to determine socioeconomic statistics. Community fact sheets are available in Appendix C. The approximate population of the Lower Wabash watershed is 126,006 with a median age of 40. Approximately 16.3 percent of the population is 65 years or older. The estimated population distribution is 94.9% Caucasian, 2.6 percent African American, 1.2 percent Hispanic, and 0.1 percent American Indian. The average unemployment rate is 6.4 percent, and the mean household income is \$44,873. The top three industries employing residents are 1) manufacturing, 2) educational, health, and social services, and 3) retail trade³.

Community Rating System (CRS)

No communities in the Lower Wabash Watershed participate in the CRS program.

Levees

Several levees exist in the study area that provide the county with some degree of protection against flooding.

In the vicinity of Mt. Carmel, flood protection measures are provided by the Mount Carmel Local Flood Protection Project and include a system of levees, floodwalls, and pumping stations.

³ U.S. Census Bureau. Census 2000-2009. <http://factfinder.census.gov>. Retrieved 2011-10-20.

This project was initiated in December 1966 and was completed in October 1968.⁴ This levee system provides some level of protection against flooding and is shown as a provisionally accredited levee (PAL) on Wabash County’s 2011 DFIRM.

There are several other levees depicted on the Wabash County, IL DFIRM. One levee is along Little Bonpas Creek, and a larger levee system is located north of Grayville and is between Bonpas Creek and the Wabash River.

The England Pond Levee located north of St. Francisville in Lawrence County, IL affords some degree of protection from flooding along the Wabash and Embarras Rivers in the study area. This levee system is not accredited and does not show protection on the Lawrence County 2011 DFIRMs.⁵

The Vincennes/Brevoort Levee in Indiana is over 40 miles long and protects communities from flood waters from the Wabash and White Rivers. Much of the land protected by this levee is agricultural; however, it also protects portions of the City of Vincennes. The PAL (Provisionally Accredited Levee) designation has not yet been issued for this levee, but the communities in the area are in the process of collecting certification materials.

Floodplain Management/Community Assistance Visits (CAVs)

As the state coordinating agencies for the National Flood Insurance Program, the Indiana Department of Natural Resources, Division of Water, and the Illinois Department of Natural Resources, Office of Water Resources, conduct Community Assistance Visits (CAVs) as part of their floodplain management programs. A CAV typically consists of a tour of the floodplain to assess any recent construction activities, a review of the local permitting process, and evaluation of the local floodplain ordinance. A meeting with the local floodplain official is held to discuss the NFIP, the local permitting process, any recent flood events, training opportunities, and any program deficiencies. Table 7 lists the communities in the watershed and the date of their latest CAV or Community Assistance Call (CAC).

Table 9. Recent CAV/CACs

Community	CAV	CAC
Illinois		
City of Mt Carmel	3/26/2010	N/A
Edwards County	N/A	9/18/2000
Village of Browns	N/A	9/17/1998
White County	4/6/2006	9/17/1998
City of Grayville	N/A	6/17/1997
Gallatin County	6/11/2004	8/18/1997
Village of New Haven	N/A	6/29/1995

⁴ Federal Emergency Management Agency. *Flood Insurance Study: Wabash County, Illinois (Unincorporated Areas)*. Washington, D.C.: August 15, 1984.

⁵ Federal Emergency Management Agency. *Flood Insurance Study: Lawrence County, Illinois, Unincorporated Areas*. Washington D.C.: August 1, 1984.

Community	CAV	CAC
Indiana		
Gibson County	N/A	6/22/2005
Town of Princeton	N/A	12/5/2006
Knox County	2/14/2008	5/27/2008
City of Vincennes	N/A	5/27/2008
Posey County	11/22/2004	5/27/2008
City of Mount Vernon	9/22/2004	5/27/2008
Town of New Harmony	6/28/2004	5/27/2008
Vanderburgh County	6/30/2010	N/A

Regulatory Mapping

As part of FEMA’s Map Modernization program, IDNR has recently updated a number of countywide maps throughout the state of Indiana. Table 8 lists the Map Modernization activity in the Lower Wabash watershed.

Also as part of FEMA’s Map Modernization program, ISWS has recently updated several of the countywide FIRMs throughout the state of Illinois. Many of these maps are effective or in the final stages of map adoption. While these maps are in a digital format, they do not necessarily reflect newer hydrologic or hydraulic study information and therefore may not be the most accurate representation of flood risk within the watershed.

Table 10. Map Modernization Activity

County	Status	Effective Date
Edwards County, IL	Not Modernized	N/A
Gallatin County, IL	Effective	12/2/2011
Lawrence County, IL	Effective	7/18/2011
Richland County, IL	Not Modernized	N/A
Wabash County, IL	Effective	12/16/2011
White County, IL	Final	2/16/2012
Gibson County, IN	Preliminary	N/A
Knox County, IN	Not Modernized	N/A
Posey County, IN	Preliminary	N/A
Vanderburgh County, IN	Effective	3/17/2011

IV. Risk MAP Needs and Recommendations

The project team presented the Discovery map and discussed the results of the data collection and analysis with the watershed stakeholders in detail during the Discovery meetings. This section addresses the areas of concern and interest within the Lower Wabash watershed that could be addressed with Risk MAP projects.

i. Floodplain Studies

IDNR and ISWS have completed a number of DFIRM projects as part of the Map Modernization program. With input from community stakeholders, IDNR and ISWS have identified several areas in which new or updated studies are recommended. The proposed new study areas and types (detailed or approximate) are listed in Table 9.

The goal of the floodplain mapping program is to have a high quality, model-based floodplain mapped for all streams that drain greater than 1 square mile. While the mapping needs listed in the following table are the highest priority stream reaches for modeling, there are other mapping needs that also need to be included in any project proposed for this basin. These needs are fully documented in CNMS. Appendix E lists the additional mapping needs required to meet this goal.

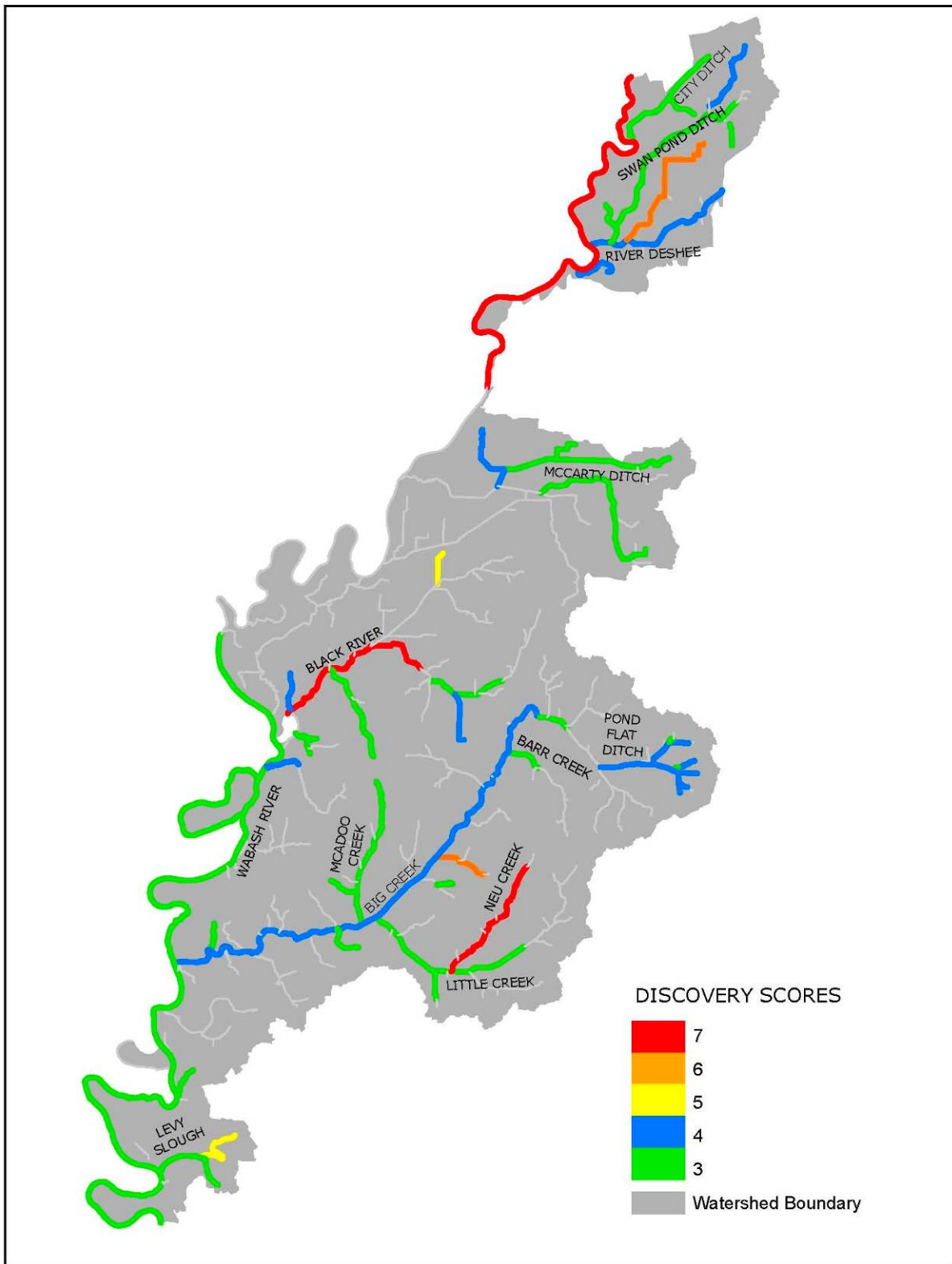
Table 11. Mapping Needs, Illinois

Flooding Source	Study Length (Miles)	Study Type
Big Slough	5.65	Approximate
Crooked Creek	1.48	Approximate
Crooked Creek	0.88	None
Fordice Creek	3.32	Approximate
French Creek	4.26	Approximate
French Creek	0.79	None
Greathouse Creek	0.51	Approximate
Greathouse Creek	1.21	Detailed
Greathouse Creek	1.24	None
Negro Creek	2.13	Approximate
unnamed	2.18	None
Wabash River	48.69	Detailed
Wabash River	8.57	Detailed
Wabash River	52.60	Detailed
Wabash River	15.01	None

Table 12. Mapping Needs, Indiana

Flooding Source	Study Length (Miles)	Discovery Score
Wabash River	55	7
Neu Creek	33	7
Black River	27	7
UNT Big Creek (Posey #5)	26	6
Vieke Drainage System Ditch	11	6
UNT Levy Slough	10	5
Thompson Ditch	10	5
Pond Flat Ditch Lateral "A"	9	4
Pond Flat Ditch Lateral "D"	9	4
Big Creek	9	4
Pond Flat Ditch Lateral "B"	9	4
Coon Creek	8	4
River Deshee	8	4
UNT Wabash River (Knox #2)	8	4
Oliphant Ditch	7	4
Mantle Ditch	7	4
Pond Flat Ditch	7	4
UNT Black River (Posey #9)	7	4
Harmony Creek	6	4
UNT Black River (Posey #1)	6	4

Figure 6. Indiana Mapping Needs Priority



ii. Mitigation Projects

In the Discovery meetings, community stakeholders identified several locations in which mitigation projects could reduce the impacts of flooding. Topics of mitigation interest included levees, roads that frequently flood, significant riverine erosion, at-risk essential facilities, streamflow constriction, and recent and/or future development. The following mitigation projects were identified. A more comprehensive list of community strategies and feedback is available in Appendix B.

Table 13. Mitigation Projects

Community	Subject(s)	Project	Status
White County, IL	Overtopped roads	Construct new bridge to replace structure washed out in 2011 flooding	Incomplete
Lawrence County, IL	Overtopped roads, future development	Elevate Westport Auto 15 feet	Incomplete
Edwards County, IL	Other	Mitigate drainage issues around Bonpas Creek	Incomplete
Allendale, IL	Overtopped roads	Elevate several roads that are subject to frequent flash flooding	Incomplete
Lawrence County, IL	Area of mitigation success	Establish Wetland Restoration Program	Complete
Lawrence County, IL	Other	Encourage all communities to participate in NFIP	Incomplete
White County, IL	Other	Conduct hydraulic study for I-64 over Wabash River	In progress
Wabash County, IL	Levees	Raise levee above flood stage	Incomplete
Mount Carmel, IL	Other	Relocate manufactured homes at Route 1 and Division Street	Incomplete
Richland County, IL	Levees	Address construction of private levee on East Bank of Bonpas Creek; increases flooding on Berryville Lane	Incomplete
Maunie, IL	Other	Conduct study to mitigate widespread flooding of Big Wabash River	Incomplete
Grayville, IL	Streamflow constriction	Clean debris from Bonpas Creek	Incomplete
New Harmony, IN	Area of mitigation success	USGS monitor velocity and depth at high flood stage	In progress
New Harmony, IN	Area of mitigation success	Complete wellhead protection study	Complete
Posey County, IN	Overtopped roads	Elevate several roads that flood frequently	Incomplete

Community	Subject(s)	Project	Status
Griffin, IN	Overtopped roads	Elevate Old Griffin/New Harmony road	Incomplete
Posey County, IN	Overtopped roads	Mitigate widespread flooding in Point Township	Incomplete
Posey County, IN	Riverine erosion	Mitigate significant riverine erosion	Incomplete

V. **Appendix and Tables**

Appendix A: Summary of Communities

Appendix B: Discovery Meeting Materials

Appendix C: Community Fact Sheets

Appendix D: Discovery Map

Appendix E: Comprehensive List of Mapping Needs

Appendix A: Summary of Communities

Jurisdiction	CID	Total Population	% Pop in Watershed	Total Land Area (sq mi)	% Land Area in Watershed	NFIP Status	CRS Rating	Mitigation Plan Status
Illinois								
Edwards County	170937	2720	50.2	222.6	44.9	Yes	N/A	Y
Albion	170866	1988	30.3	2.2	30.3	No	N/A	Y
Bone Gap	171103	246	100	0.6	100	No	N/A	Y
Browns	170226	134	100	0.3	100	Yes	N/A	Y
West Salem	171104	897	100	1.6	100	No	N/A	Y
Gallatin County	170900	1866	6.2	328.1	12.1	Yes	N/A	Y
New Haven	170246	433	47.4	1.3	47.4	Yes	N/A	Y
Lawrence County	170409	6634	23.9	373.8	30.9	No	N/A	N
St. Francisville	170801	697	100	0.8	100	No	N/A	N
Richland County	170995	5894	14.9	361.7	16.1	Yes	N/A	N
Claremont	171317	176	100	1.1	100	No	N/A	N
Wabash County	170938	3702	100	227.3	97.4	No	N/A	N
Allendale	171348	475	100	0.3	100	No	N/A	N
Bellmont	171349	276	100	0.3	100	No	N/A	N
Keensburg	171350	210	100	0.3	100	No	N/A	N
Mount Carmel	170672	7284	100	5.0	100	Yes	N/A	N
White County	170906	5323	11.5	501.6	19.3	Yes	N/A	Y
Grayville	170683	1666	100	2.2	100	Yes	N/A	Y
Maunie	170684	139	100	0.2	100	Yes	N/A	Y
Phillipstown	171369	44	79.4	0.3	79.4	No	N/A	Y
Indiana								
Gibson County	180434	32,834	42.8	498.8	36.7	Yes	N/A	Y
Owensville	185253	1,281	100.0	0.6	100	No	N/A	Y
Princeton	180073	8,485	82.4	5.1	82.3	Yes	N/A	Y
Knox County	180422	37,970	40.4	523.6	14.1	Yes	N/A	Y
Vincennes	180120	17,958	67.5	7.5	59.4	Yes	N/A	Y
Posey County	180209	26,244	68.2	419.1	78.2	Yes	N/A	Y
Cynthiana	180632	702	100.0	0.4	100	No	N/A	Y
Griffin	180305	236	100.0	0.1	100	Yes	N/A	Y

Jurisdiction	CID	Total Population	% Pop in Watershed	Total Land Area (sq mi)	% Land Area in Watershed	NFIP Status	CRS Rating	Mitigation Plan Status
Mount Vernon	180389	7,044	18.5	2.9	6.4	Yes	N/A	Y
New Harmony	180210	1,037	100.0	0.6	100	Yes	N/A	Y
Poseyville	180633	1,104	100.0	0.6	100	No	N/A	Y
Vanderburgh County	180256	174,544	8.1	236	28.7	Yes	N/A	Y
Darmstadt	180629	1,205	68.5	4.6	36.6	No	N/A	Y