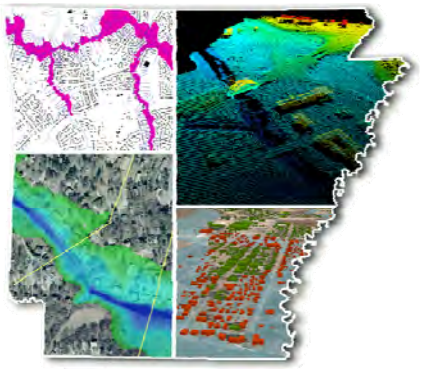
2nd Annual Arkansas State Discovery Partnership Meeting

April 17, 2013

Jacksonville, AR



YOUR HOSTS TODAY

Mike Borengasser, ANRC

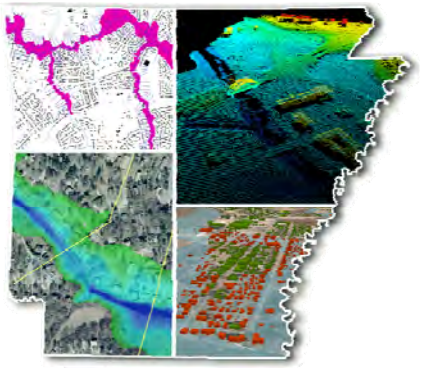
Linda Johnson & MaryBeth Breed,

FTN Associates

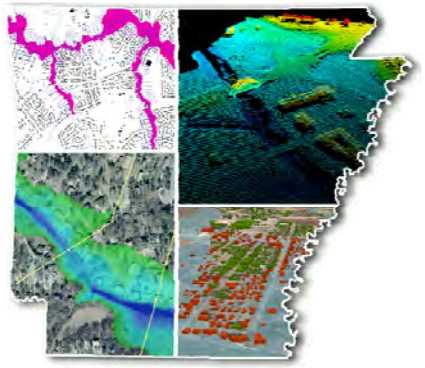
Stephen Noe & Alicia Williams,

AMEC Environment & Infrastructure

Matthew DuBois, FEMA Region 6

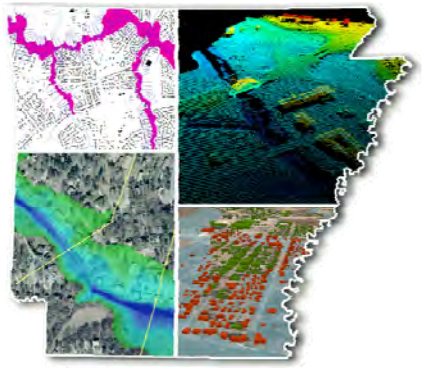


Arkansas Natural Resources Commission becomes a Cooperating Technical Partner with FEMA in September 2011



ANRC's CTP Program
DRAFT Vision Statement

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

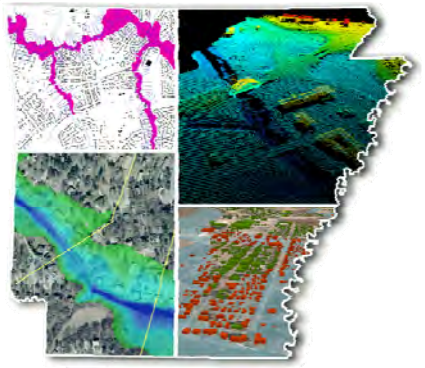


FEMA's Risk MAP Program

Risk MAP

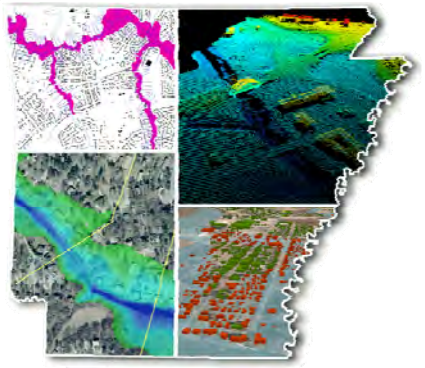
Matthew DuBois

FEMA Region 6

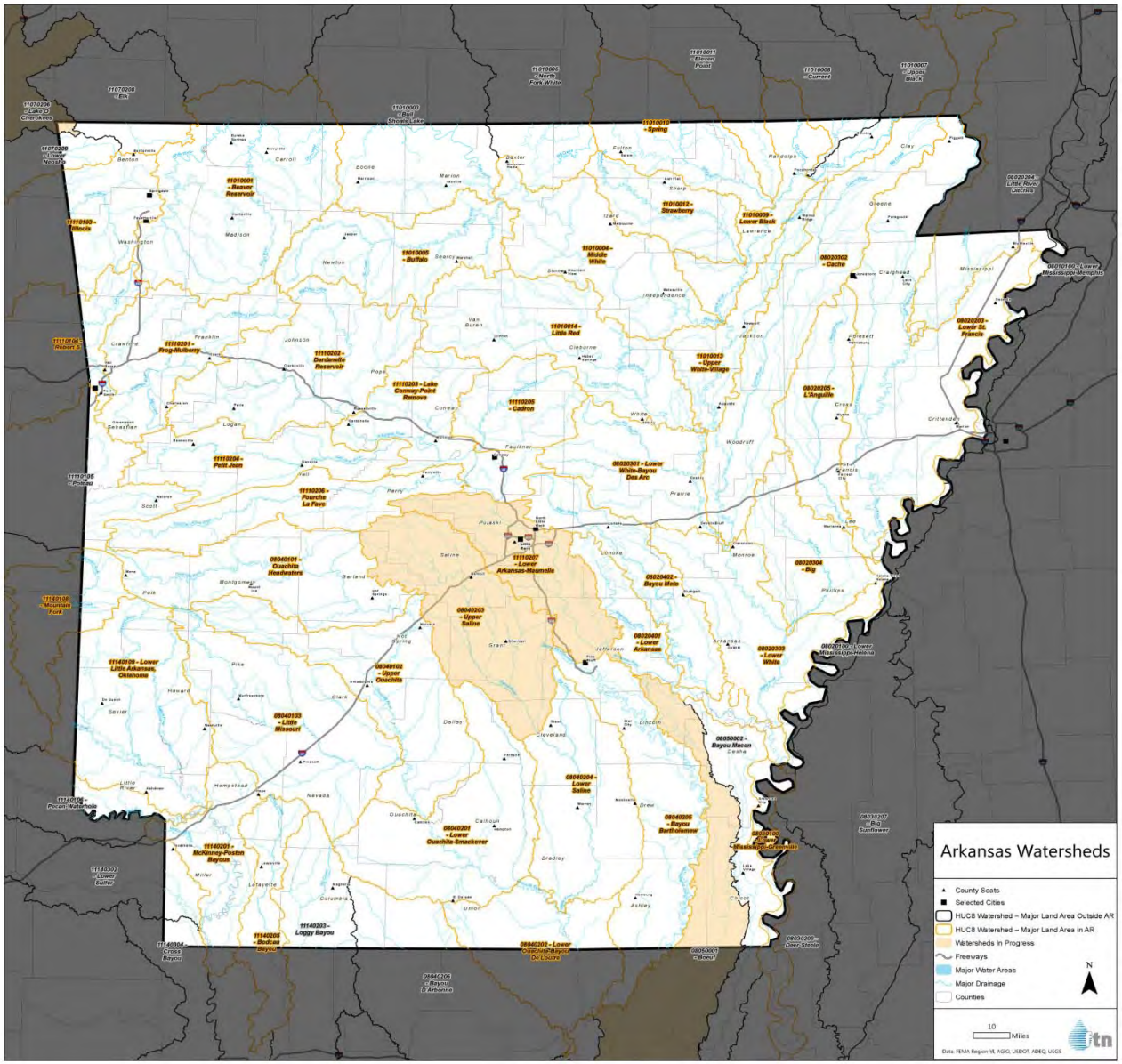


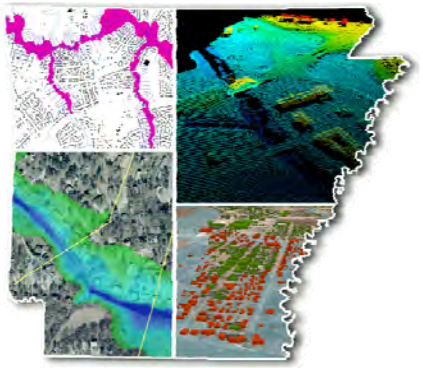
Watershed Based Approach
Hydrologic Unit Code (HUC) 8

FEMA Implements Watershed-Based Studies to develop a complete, consistent, and connected flood engineer analysis within a watershed ~PM59 (FY2010)

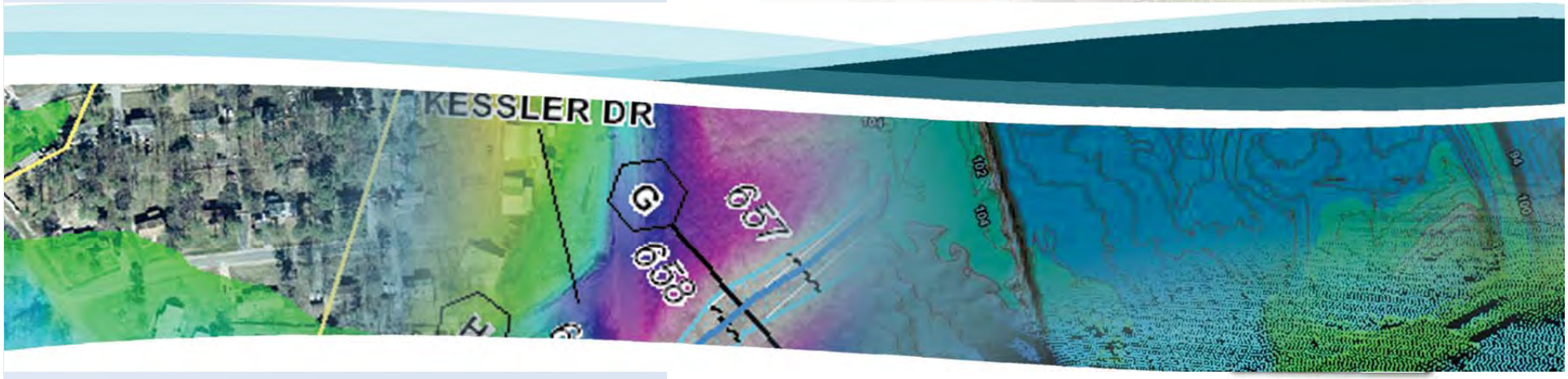


Arkansas Watersheds



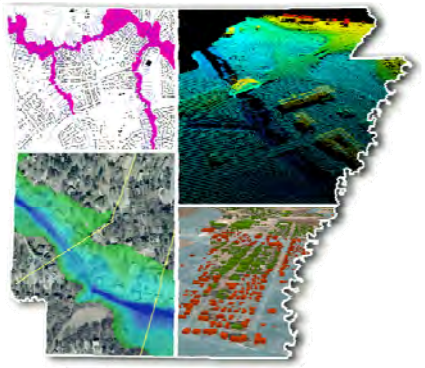


Overview of new flood risk product datasets



FEMA Vision for Risk MAP

- FEMA Risk Mapping, Assessment, and Planning (MAP) Program
  - Implement watershed-based studies that create a more accurate, holistic picture of risk
  - Ensure 80% of the Nation's flood hazards are current
  - Maximize the number of communities that use Risk MAP data and products to develop, implement and/or update their hazard mitigation plans
  - Deliver **quality flood data** that increases **public awareness** and leads to **action that reduces risk** to life and property

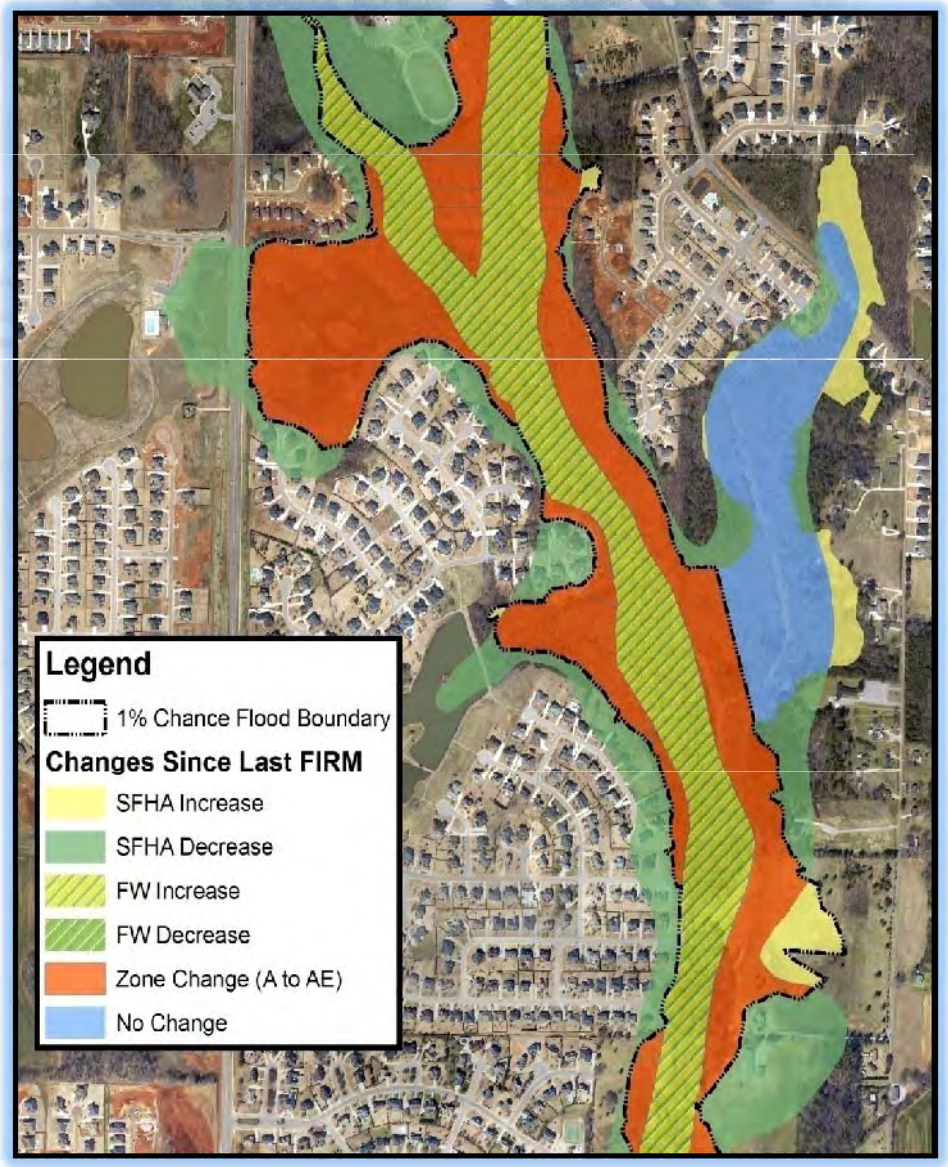


Changes Since Last FIRM Data

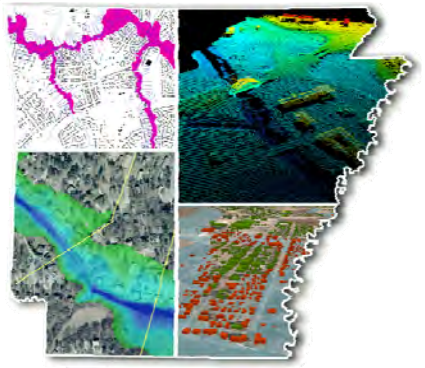
- Polygon areas of change for 1% and 0.2% annual chance floodplains and floodways. Polygons attributed for regulatory zone changes and contributing engineering factors (e.g. changes to peak discharges, modeling methodology).

- Possible enhancements (**data must be locally supplied**):
  - Structures: the total estimated count of affected buildings within the area of change
  - Population: the total estimated affected population within the area of change

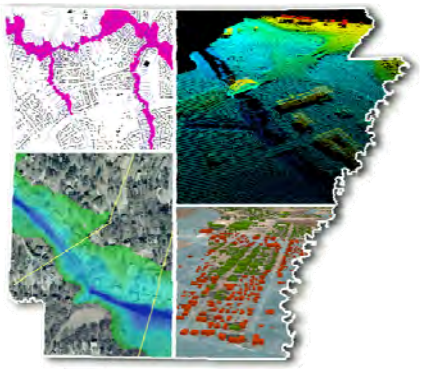
- FRR shows summaries of the increases, decreases, and net change of SFHAs and buildings and population affected



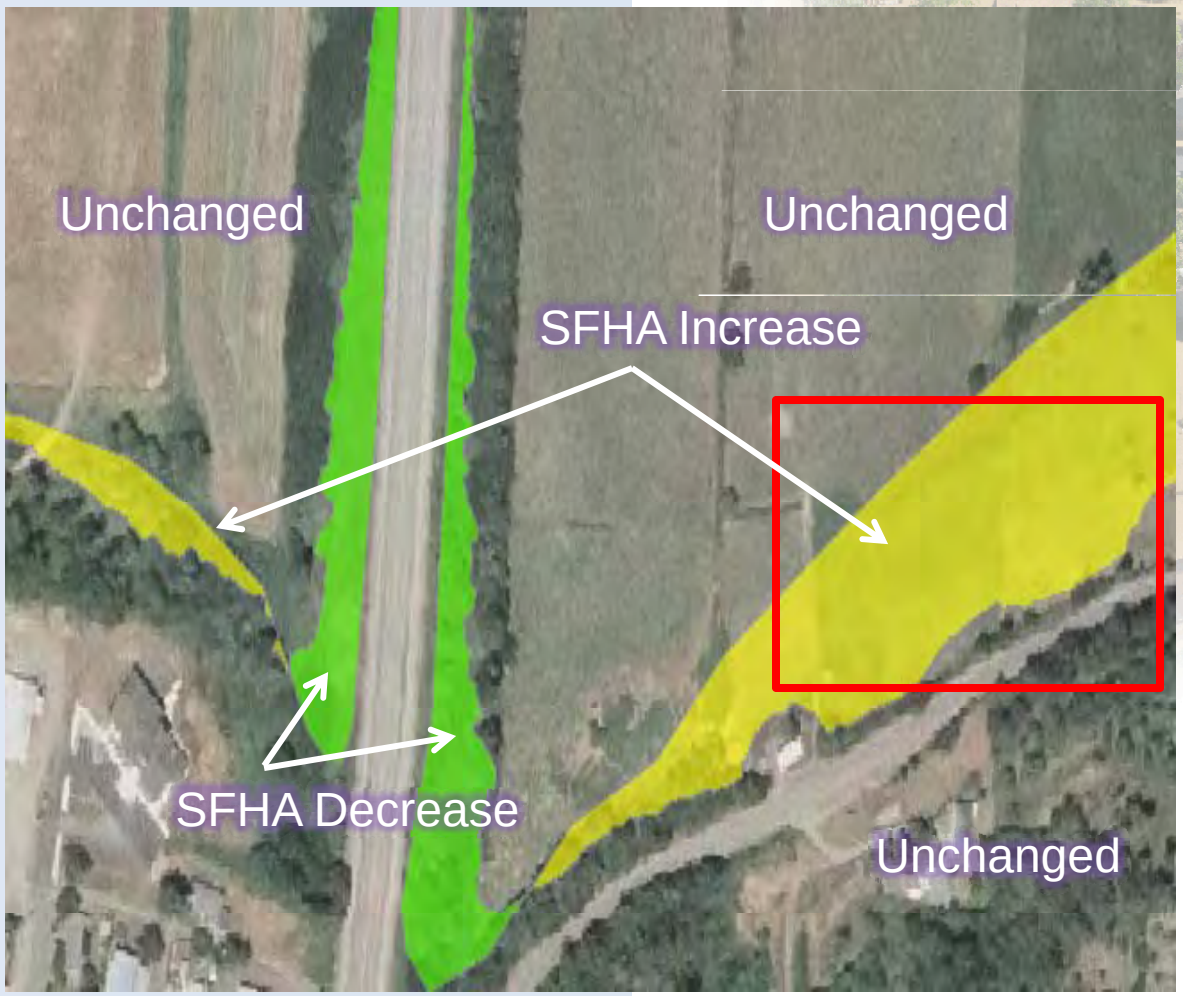
Previous Mapped Floodplain

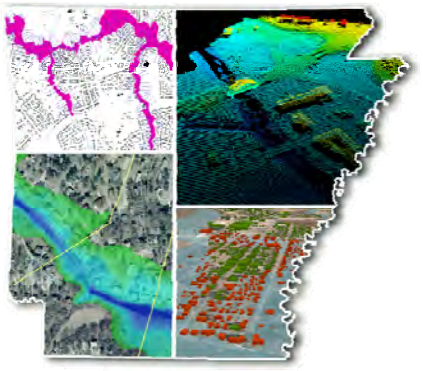


Newly Mapped Floodplain



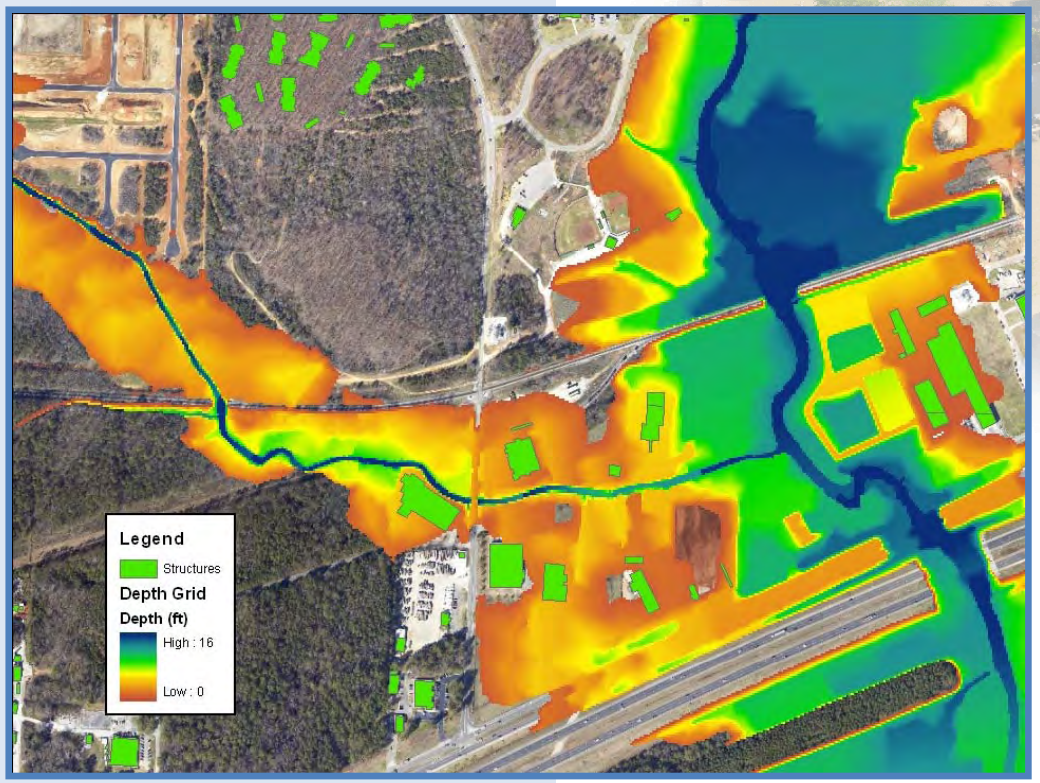
Changes Since Last FIRM

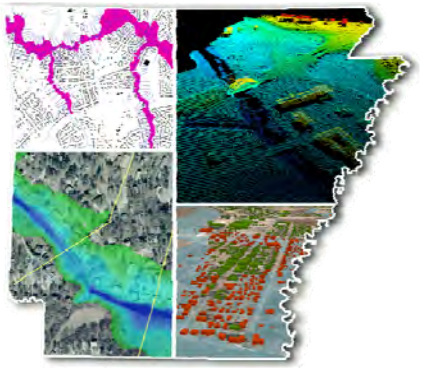




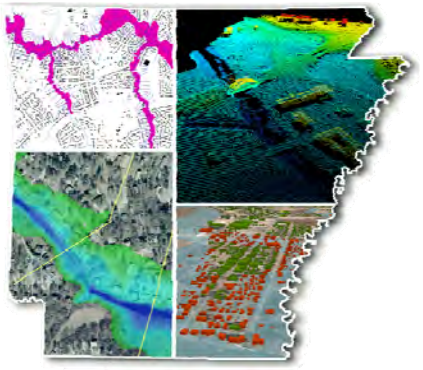
Flood Depth Grids

- Raster (grid) of water depth
- Depth is calculated as the difference (in feet) between the water surface elevation and the ground
- Produced for 10%, 4%, 2%, 1%, and 0.2% annual chance events

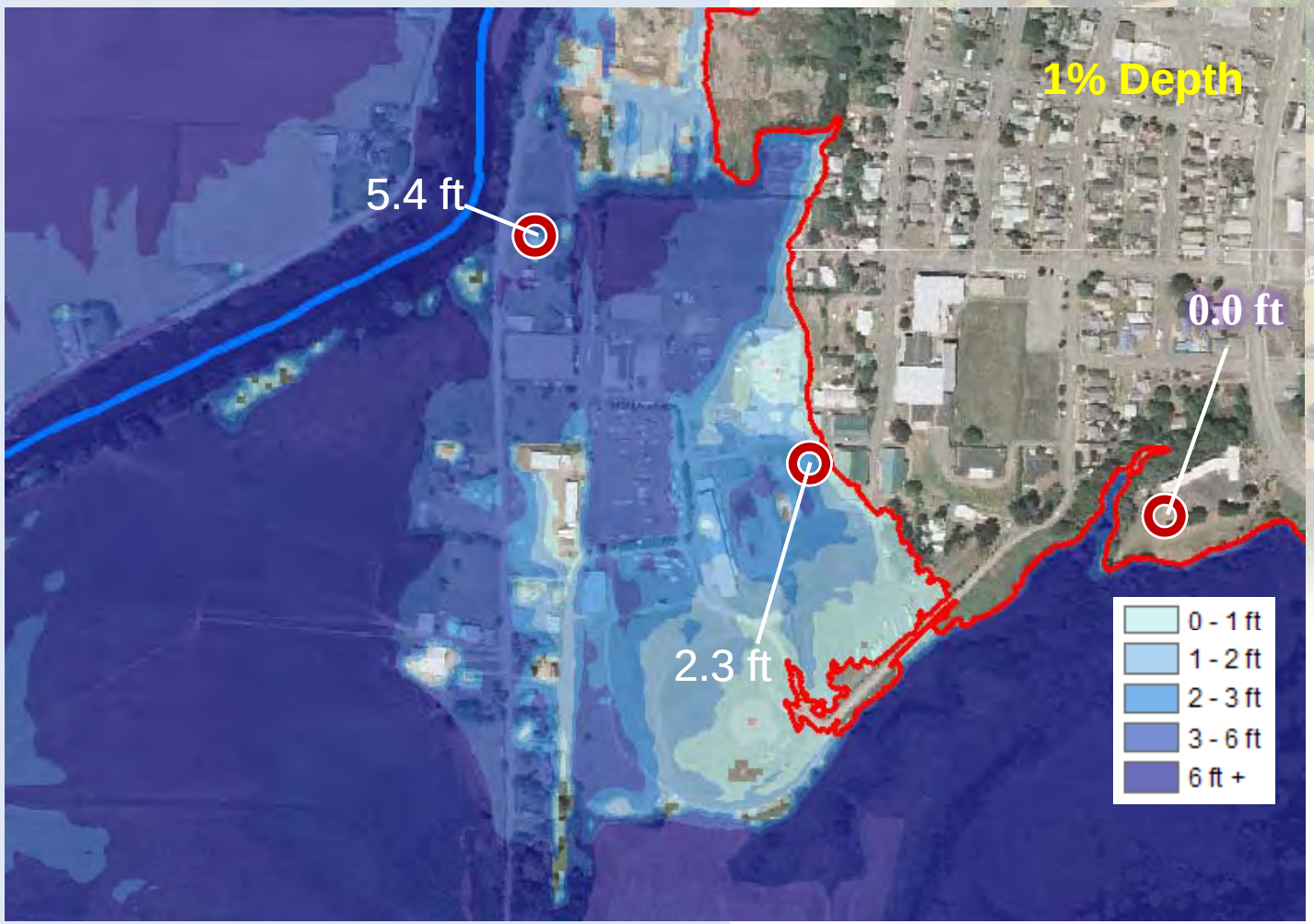


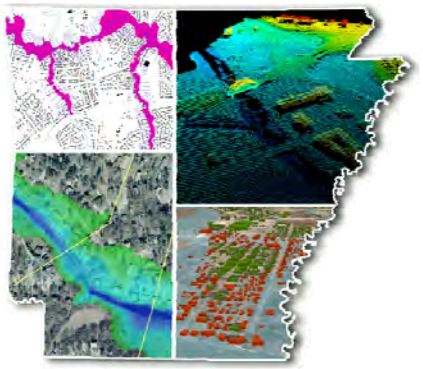


Flood Depth Grids

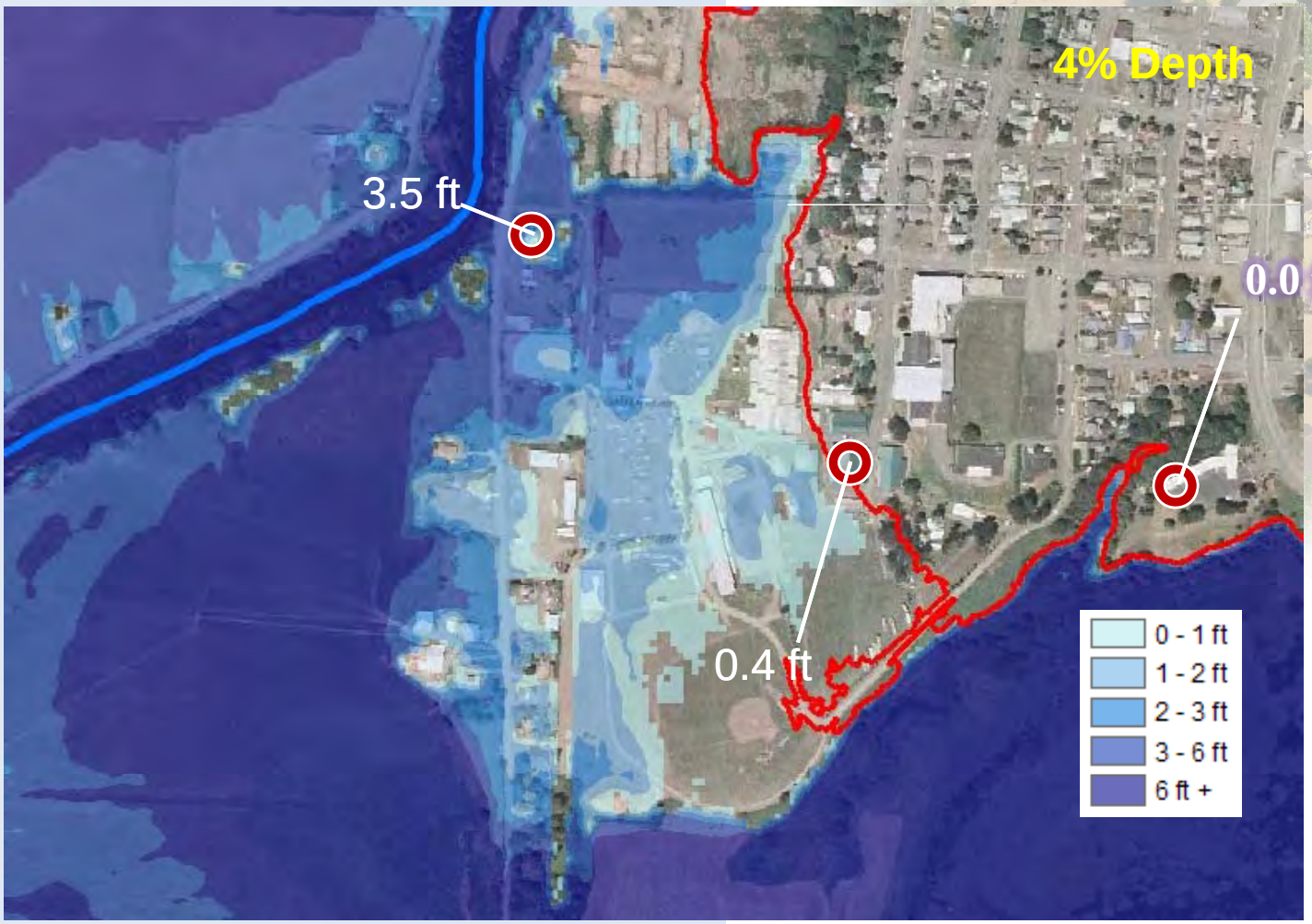


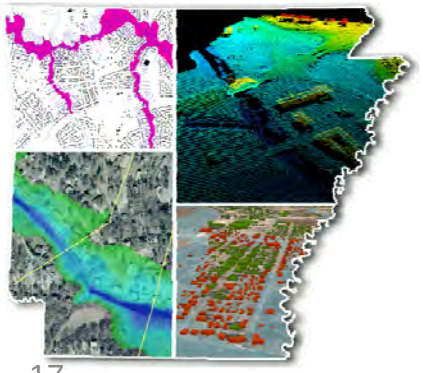
Flood Depth Grids, 100 year



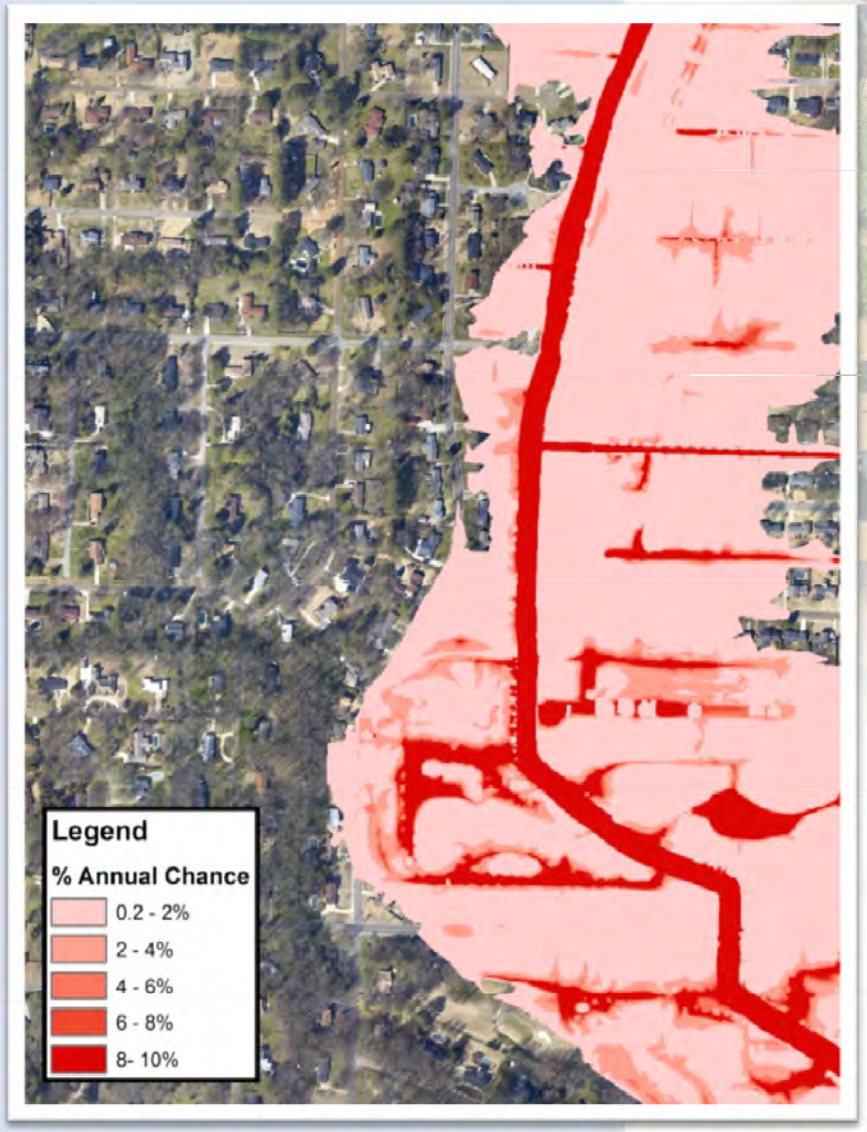


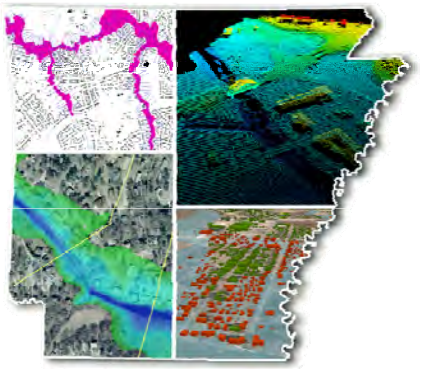
Flood Depth Grids, 25 Year



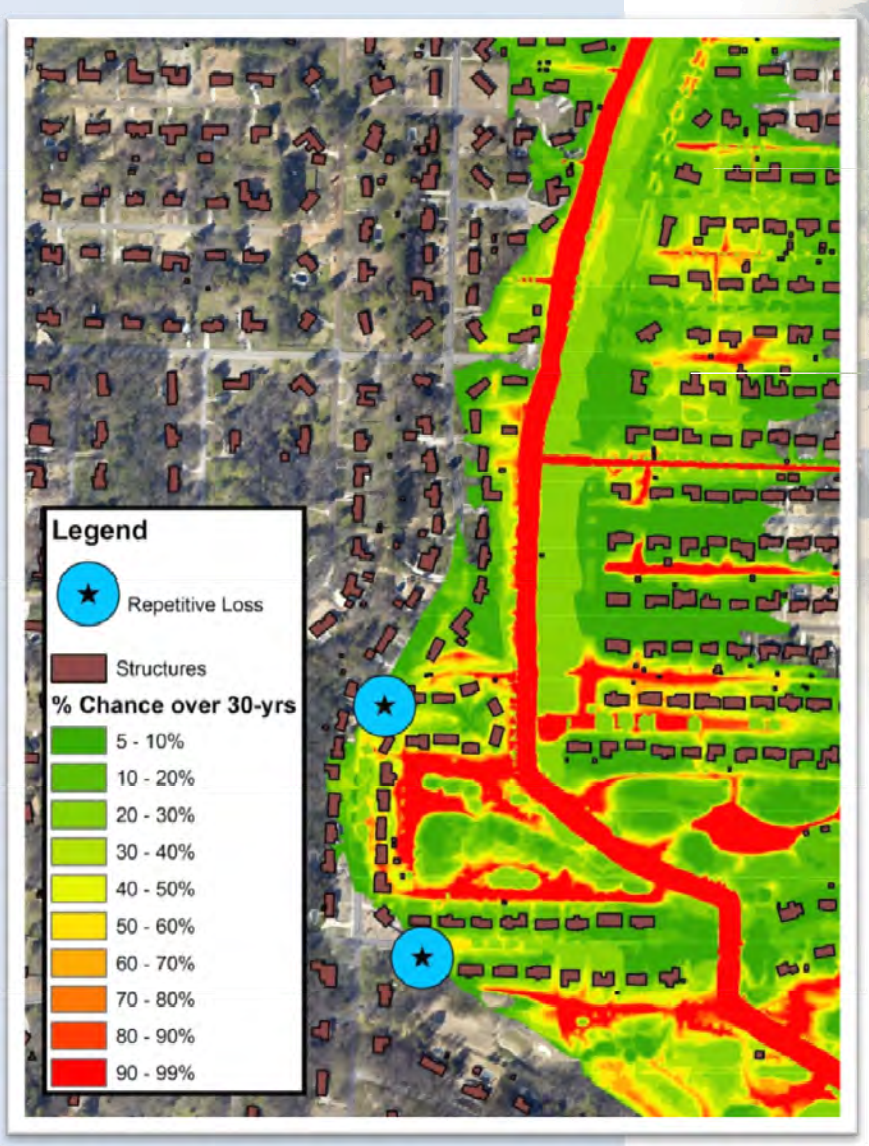


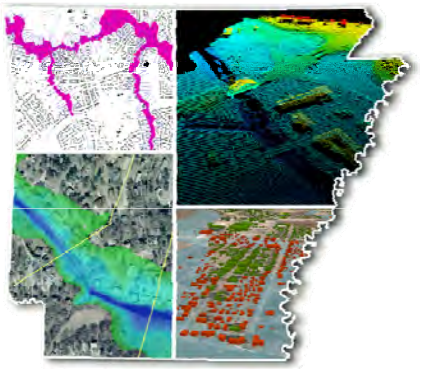
Percent Annual Chance of Flooding



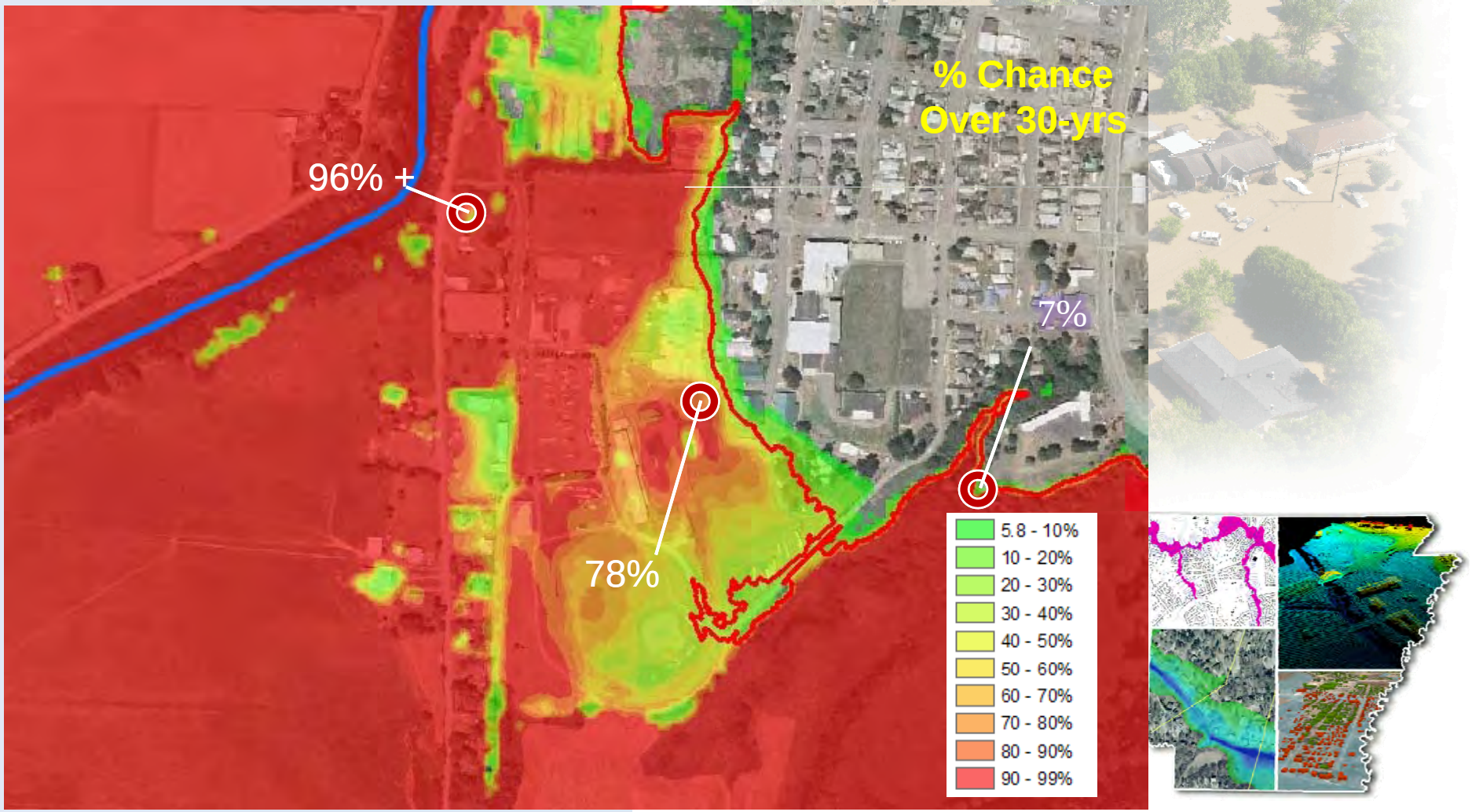


Percent 30 Year Grids

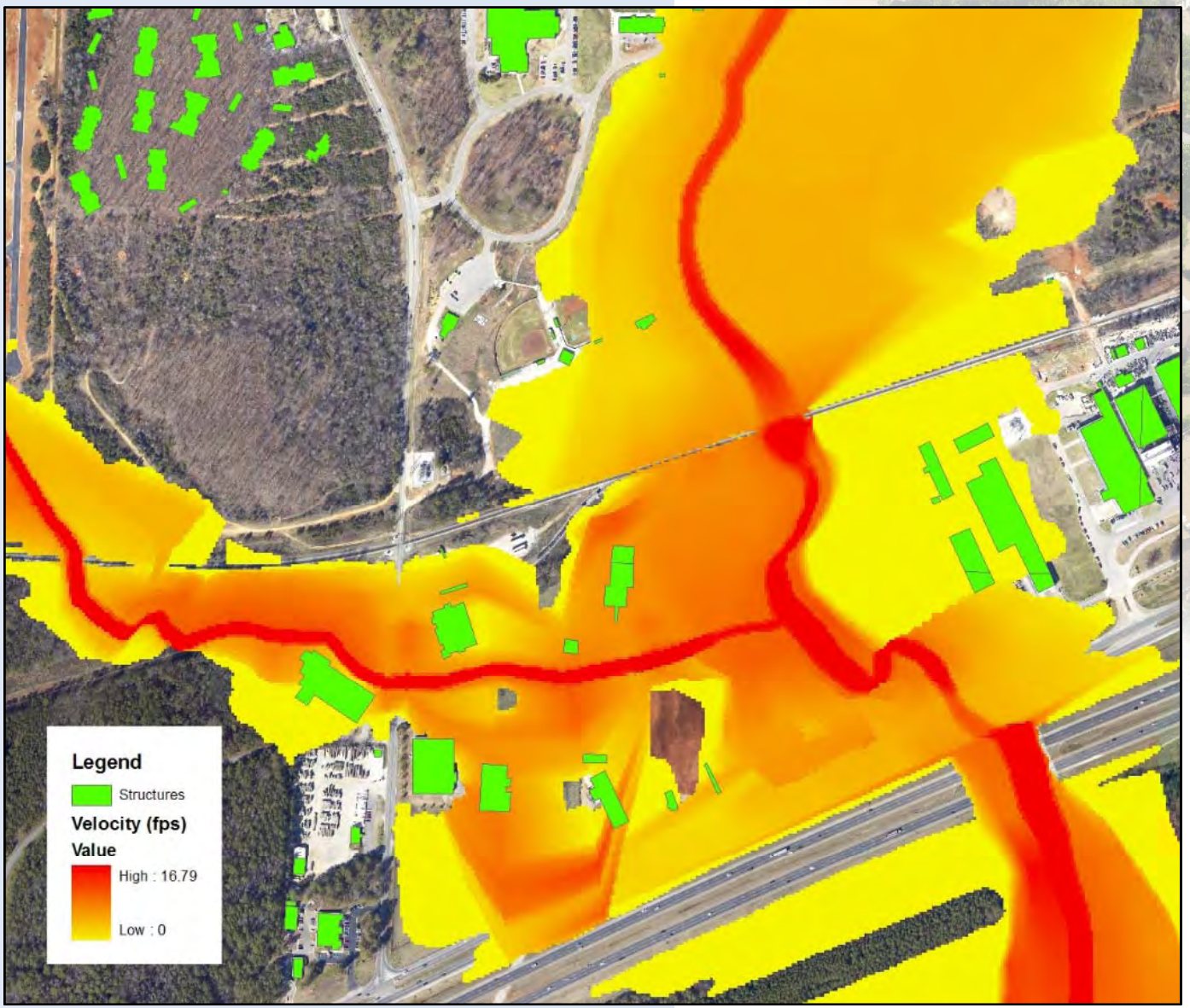


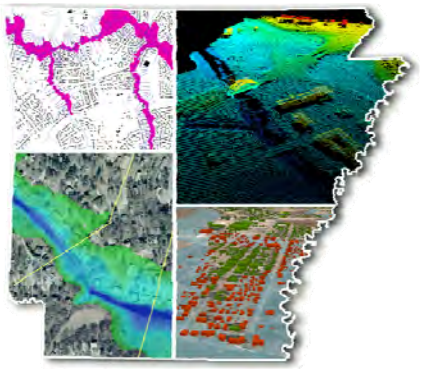


Percent Chance of Flooding Over 30-Yrs



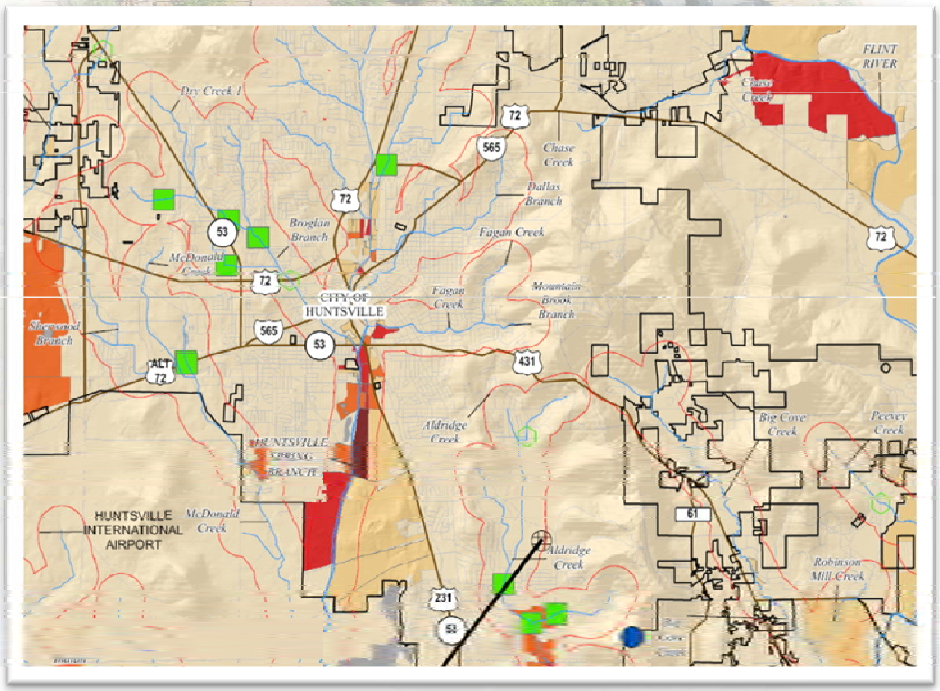
Velocity Grid

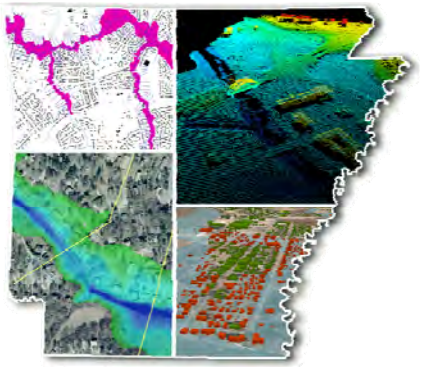




Flood Risk Assessment

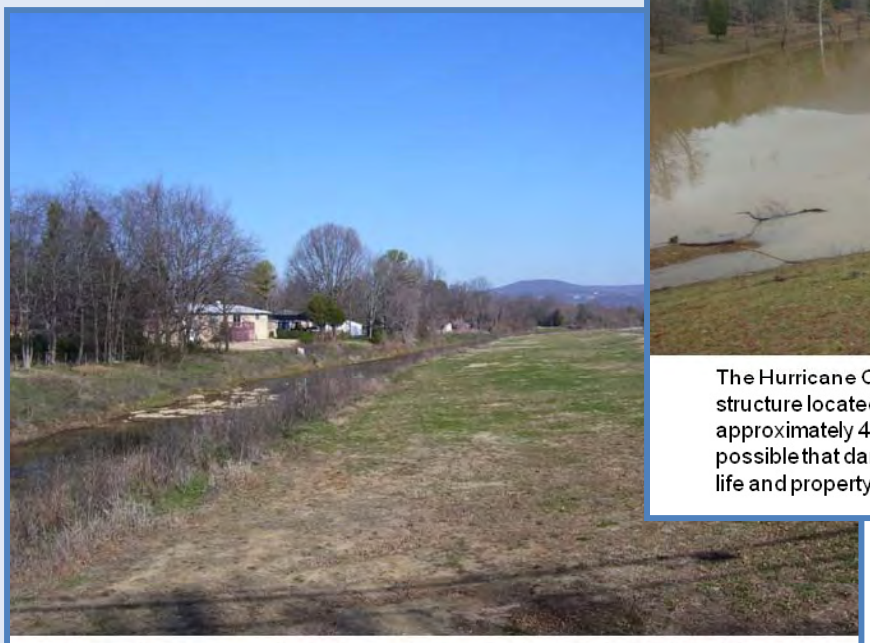
- Flood Risk Assessment Products (where 10%, **4%**, 2%, 1%, 0.2%, input for Average Annual Loss)
- Area (Risk, Very Low to Very High)
- Factors
  - Classification (Residential, Commercial, Other)
  - Average Value (buildings/census block)
  - Population
  - Total Loss
  - Building Loss
  - Content Loss





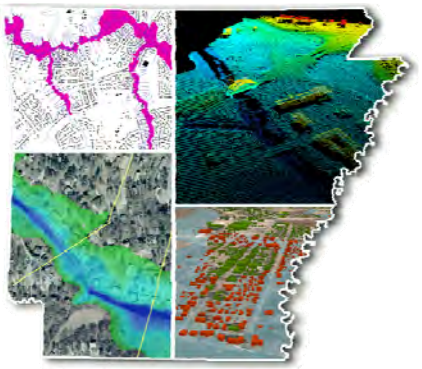
Areas of Mitigation Interest

- Examples: channel improvements, home buy-outs, urbanization, non-regulated flood structures, undersized culverts, pinch points, etc.



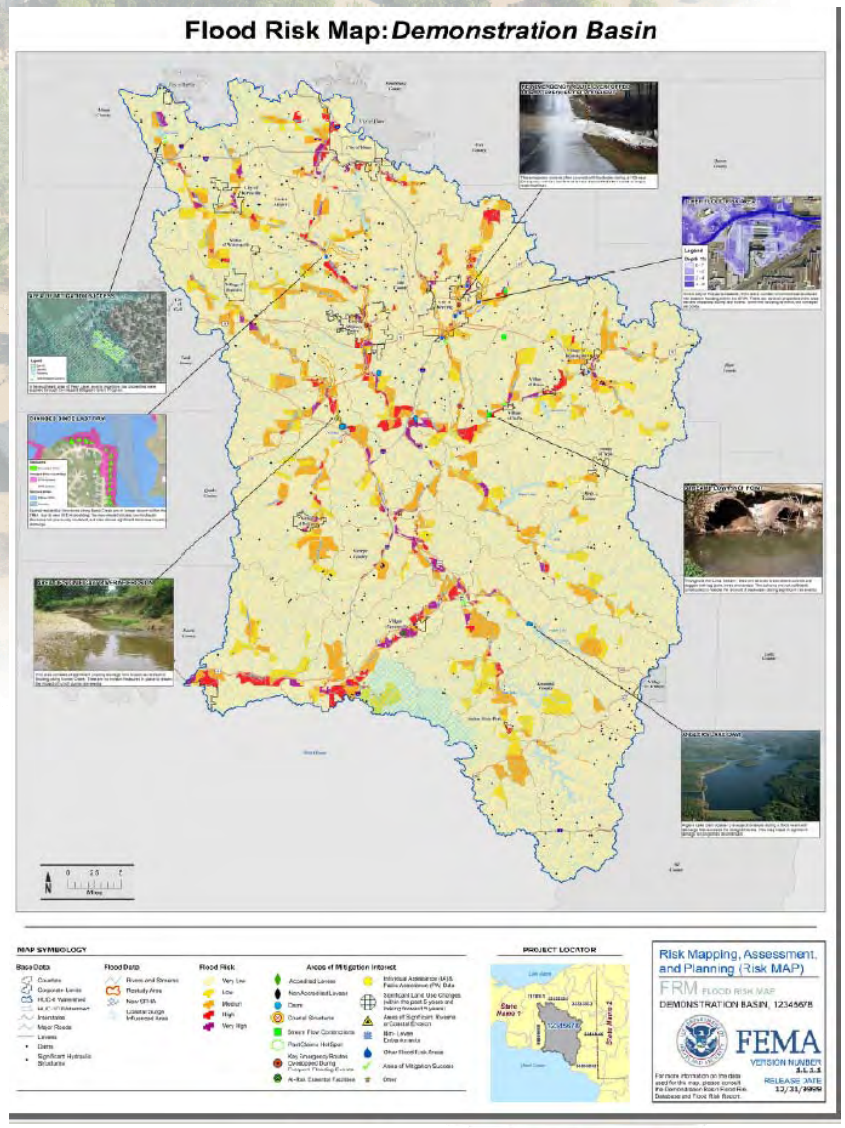
Channel improvements and home buy-outs along Aldridge Creek have successfully removed approximately 800 homes from the SFHA and 50 homes from the regulatory floodway.

The Hurricane Creek Watershed Dam No. 11, an unregulated structure located along Killingsworth Cove Branch, impounds approximately 408 acre-ft of water. During large flood events, it is possible that dams such as this one could overtop, creating loss of life and property downstream.

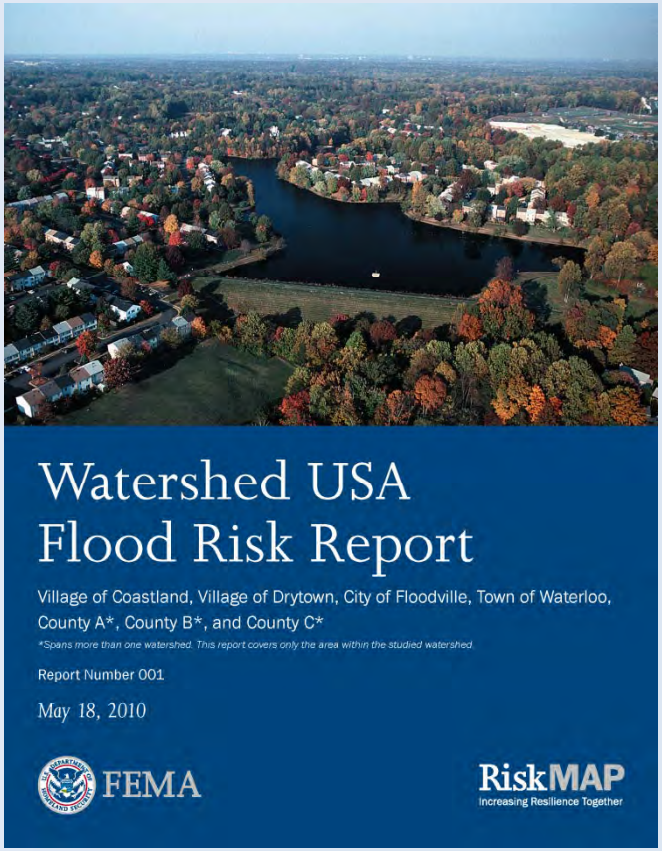


Flood Risk Map

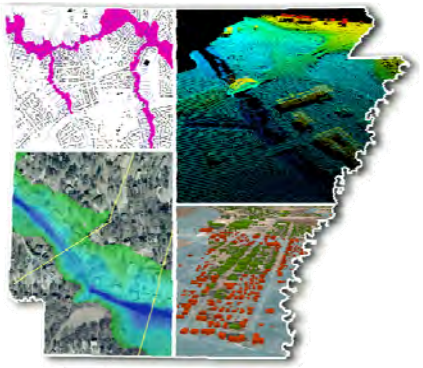
- Watershed level base data
- 2010 Level One HAZUS Provided by FEMA available statewide
- Areas of New Studies will have updated HAZUS results
- Areas of mitigation interest – Hazard Mitigation Plan Data and Community Input



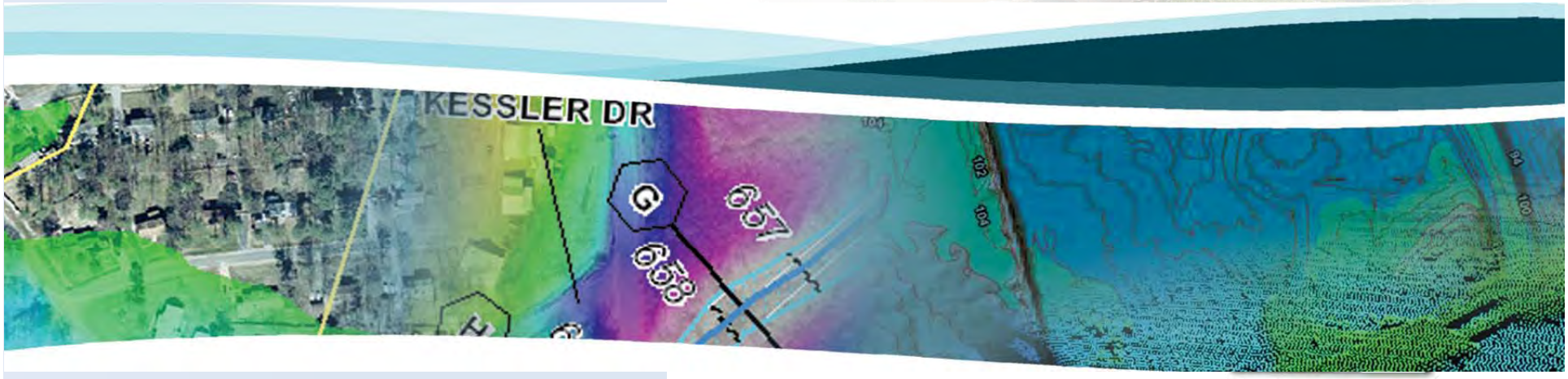
Flood Risk Report



- Provides a summary of all flood risk information in a single source.
- **Developed exclusively from data that resides within the Flood Risk Database (FRD).**
- **Graphics and tables will be directly derived from the FRD.**

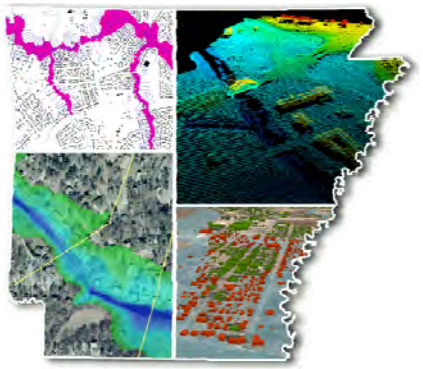


“It’s Really Simple”
Topography, Hydrology, Hydraulics, and Mapping!



Risk MAP Experts

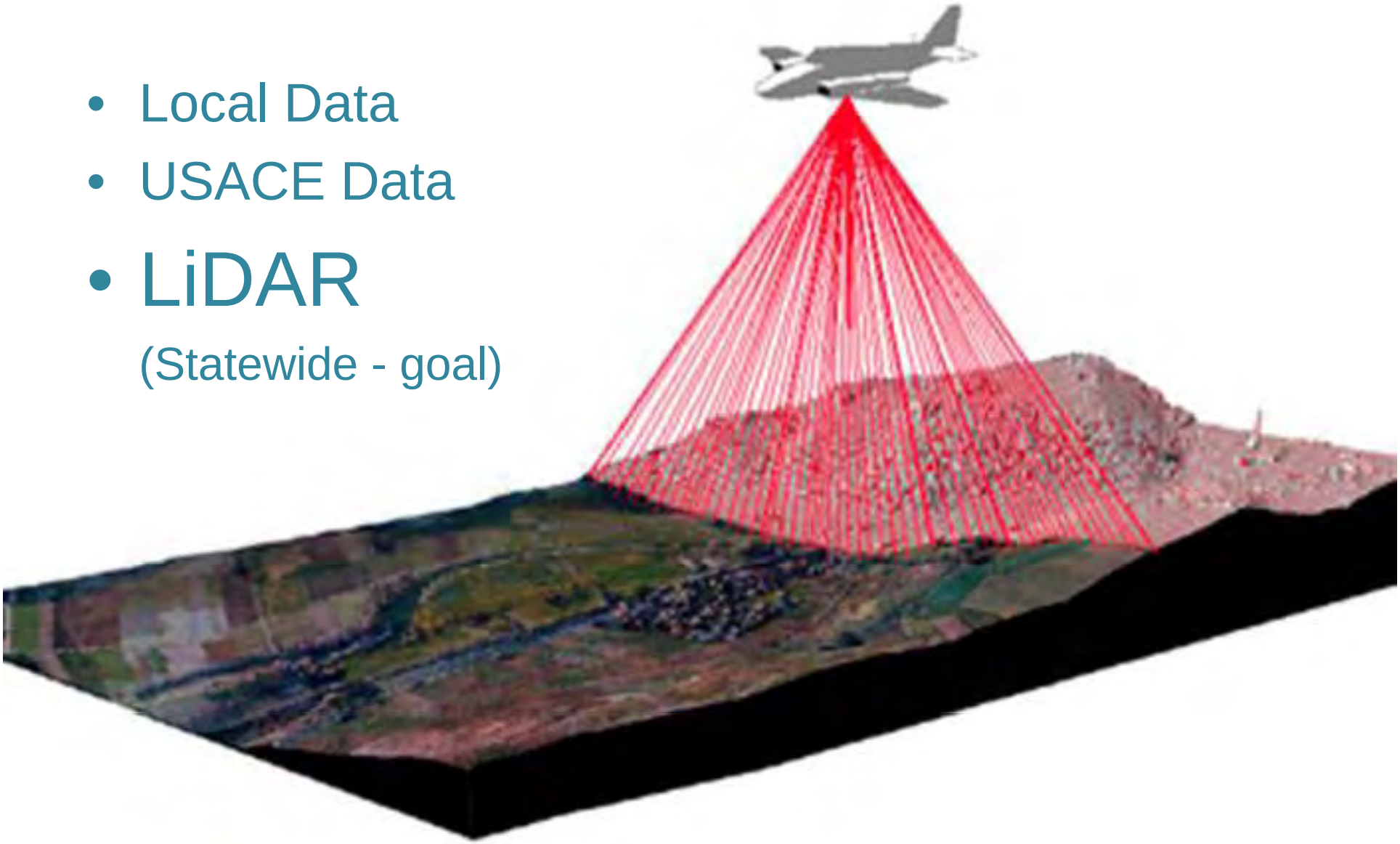
Often Left Scratching their Heads



Topography Data Development

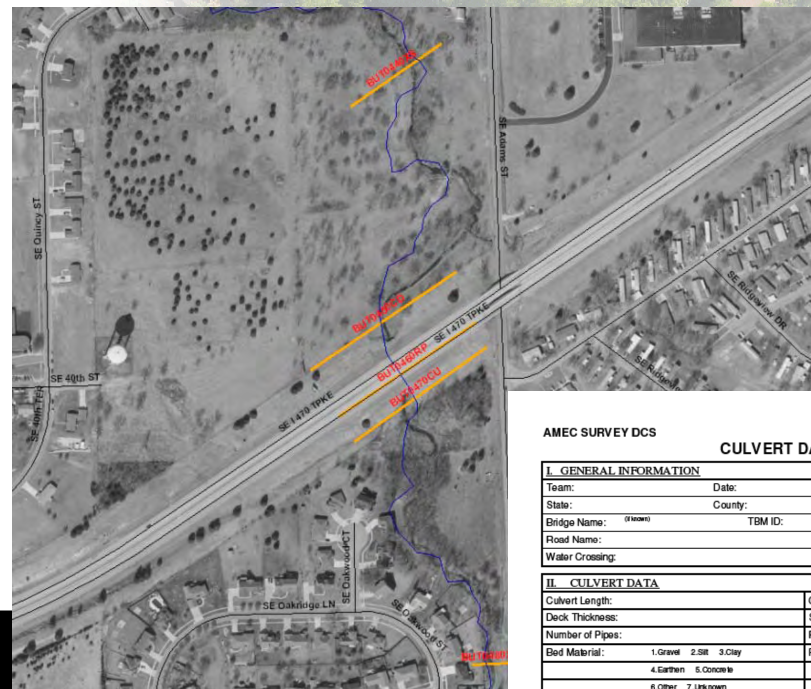
- Local Data
- USACE Data
- LiDAR

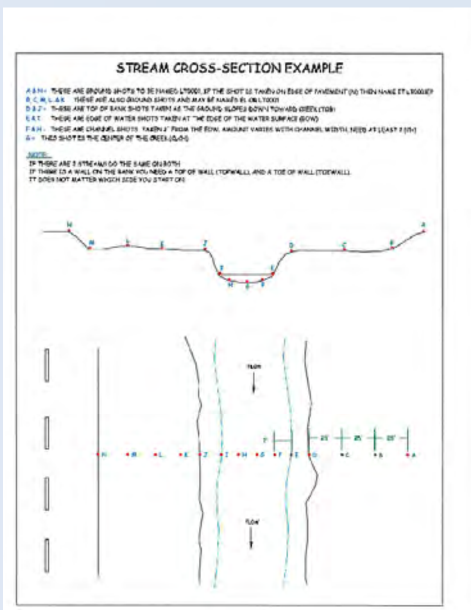
  (Statewide - goal)

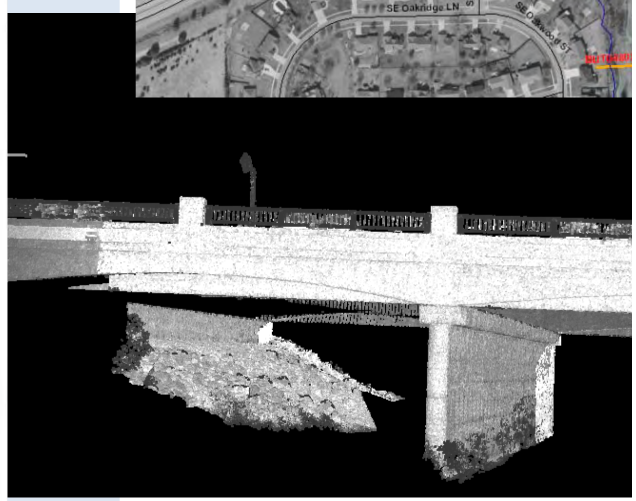


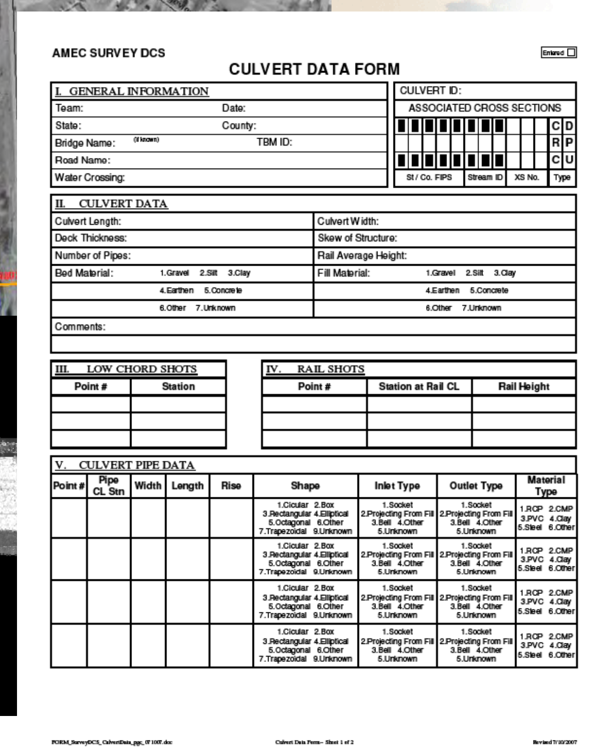
Field Survey

- Hydrographic
- Bathometric
- Conveyance Structures
- DCS Compliant
- NAVD88









AMEC SURVEY DCS

Entered ☐

CULVERT DATA FORM

I. GENERAL INFORMATION	
Team:	Date:
State:	County:
Bridge Name: (if known)	TBM ID:
Road Name:	
Water Crossing:	

CULVERT ID:				
ASSOCIATED CROSS SECTIONS				
			C	D
			R	P
			C	U
St / Co. FIPS	Stream ID	XS No.	Type	

II. CULVERT DATA	
Culvert Length:	Culvert Width:
Deck Thickness:	Skew of Structure:
Number of Pipes:	Rail Average Height:
Bed Material: 1.Gravel 2.Silt 3.Clay 4.Earthen 5.Concrete 6.Other 7.Unknown	Fill Material: 1.Gravel 2.Silt 3.Clay 4.Earthen 5.Concrete 6.Other 7.Unknown
Comments:	

III. LOW CHORD SHOTS

Point #	Station

IV. RAIL SHOTS

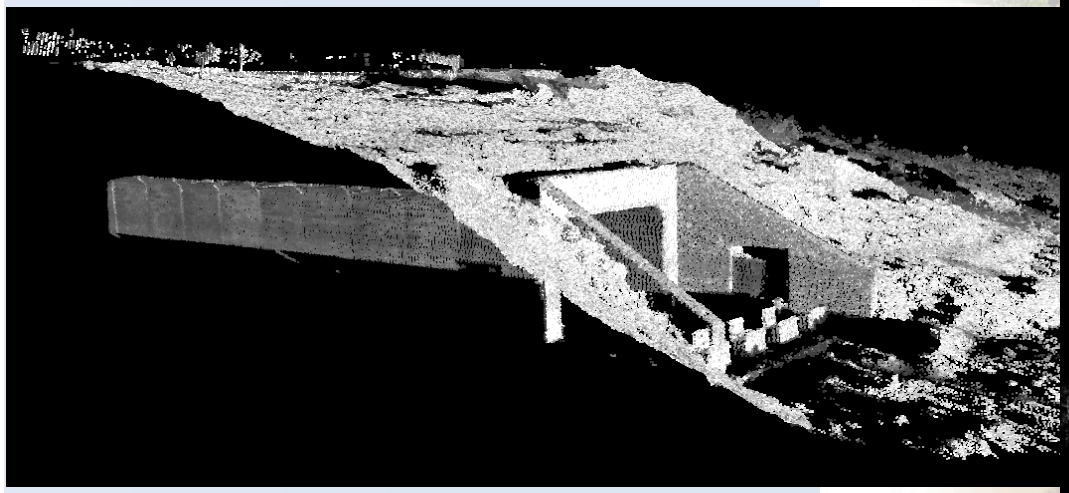
Point #	Station at Rail CL	Rail Height

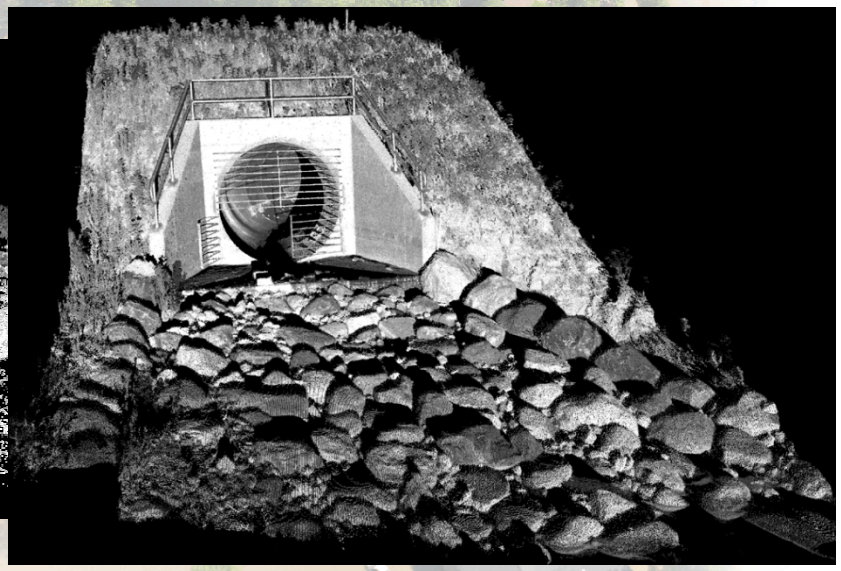
V. CULVERT PIPE DATA

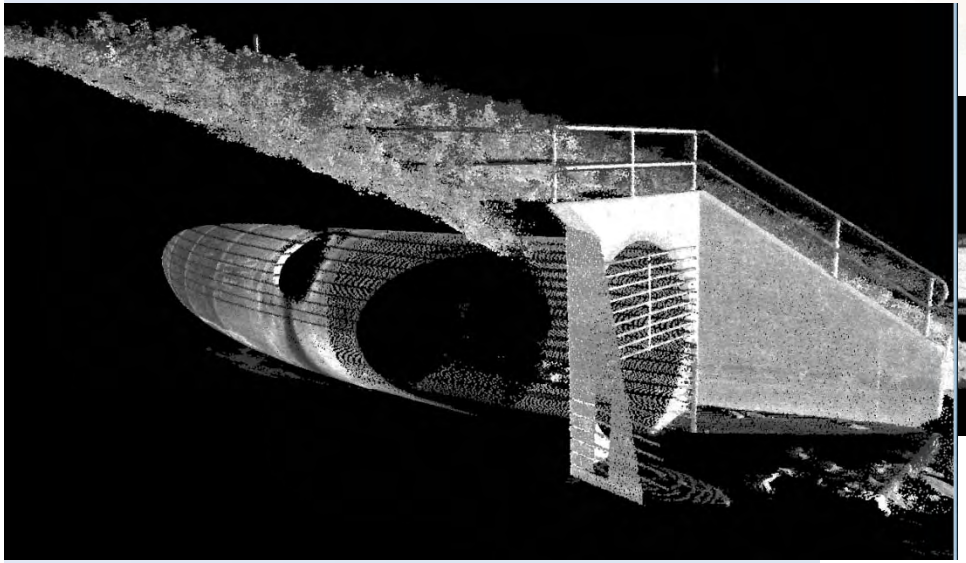
Point #	Pipe CL Stn	Width	Length	Rise	Shape	Inlet Type	Outlet Type	Material Type
					1.Cicular 2.Box 3.Rectangular 4.Elliptical 5.Octagonal 6.Other 7.Trapezoidal 9.Unknown	1.Socket 2.Projecting From Fill 3.Bell 4.Other 5.Unknown	1.Socket 2.Projecting From Fill 3.Bell 4.Other 5.Unknown	1.RCP 2.CMP 3.PVC 4.Clay 5.Steel 6.Other
					1.Cicular 2.Box 3.Rectangular 4.Elliptical 5.Octagonal 6.Other 7.Trapezoidal 9.Unknown	1.Socket 2.Projecting From Fill 3.Bell 4.Other 5.Unknown	1.Socket 2.Projecting From Fill 3.Bell 4.Other 5.Unknown	1.RCP 2.CMP 3.PVC 4.Clay 5.Steel 6.Other
					1.Cicular 2.Box 3.Rectangular 4.Elliptical 5.Octagonal 6.Other 7.Trapezoidal 9.Unknown	1.Socket 2.Projecting From Fill 3.Bell 4.Other 5.Unknown	1.Socket 2.Projecting From Fill 3.Bell 4.Other 5.Unknown	1.RCP 2.CMP 3.PVC 4.Clay 5.Steel 6.Other
					1.Cicular 2.Box 3.Rectangular 4.Elliptical 5.Octagonal 6.Other 7.Trapezoidal 9.Unknown	1.Socket 2.Projecting From Fill 3.Bell 4.Other 5.Unknown	1.Socket 2.Projecting From Fill 3.Bell 4.Other 5.Unknown	1.RCP 2.CMP 3.PVC 4.Clay 5.Steel 6.Other

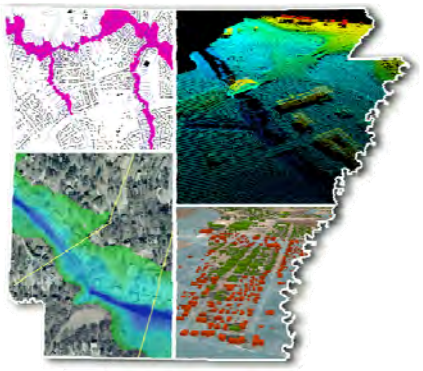
FORM_SurveyDCS_CulvertData_ppc_071007.doc Culvert Data Form– Sheet 1 of 2 Revised 7/10/2007

Point Cloud Surveys



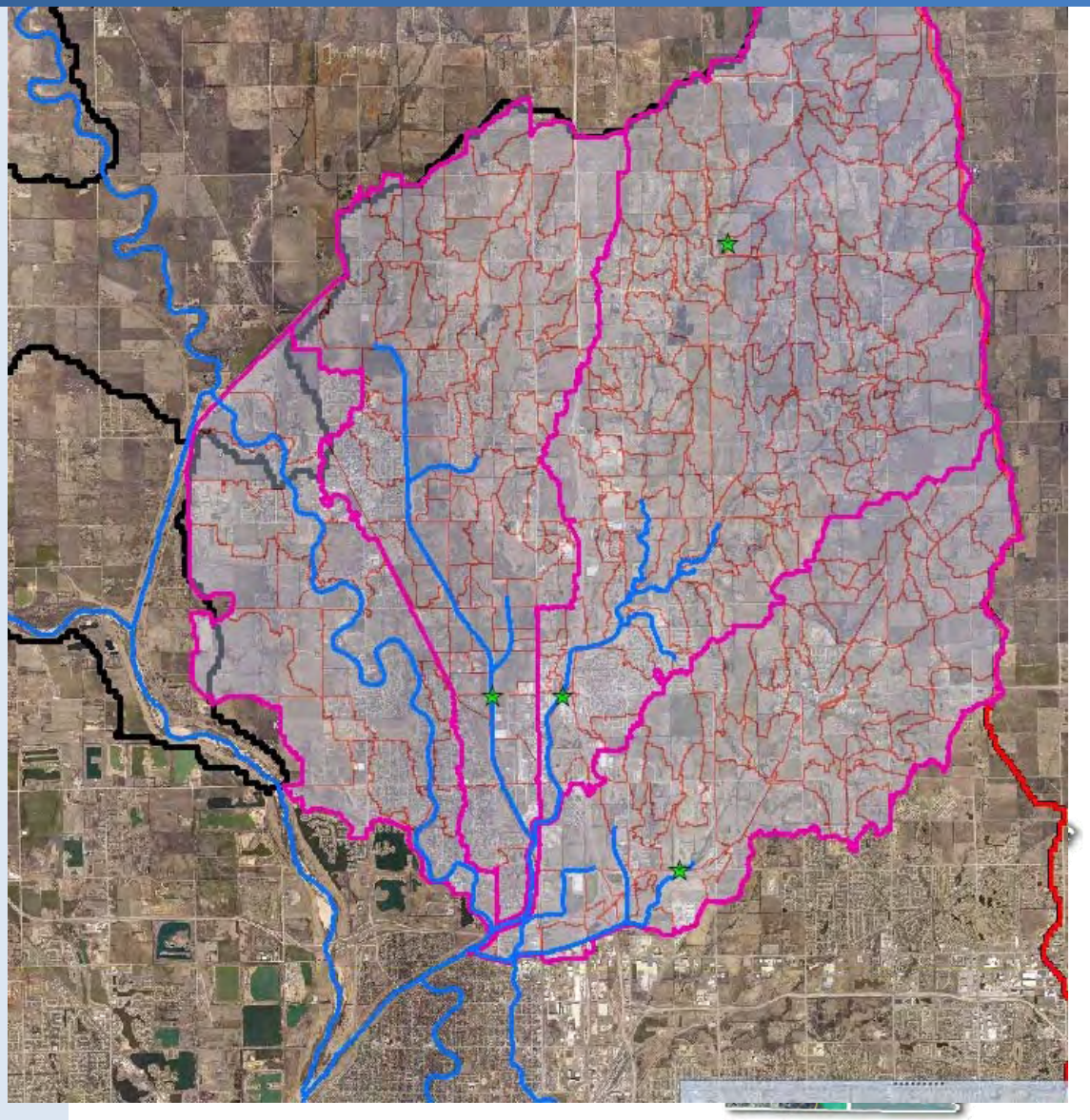




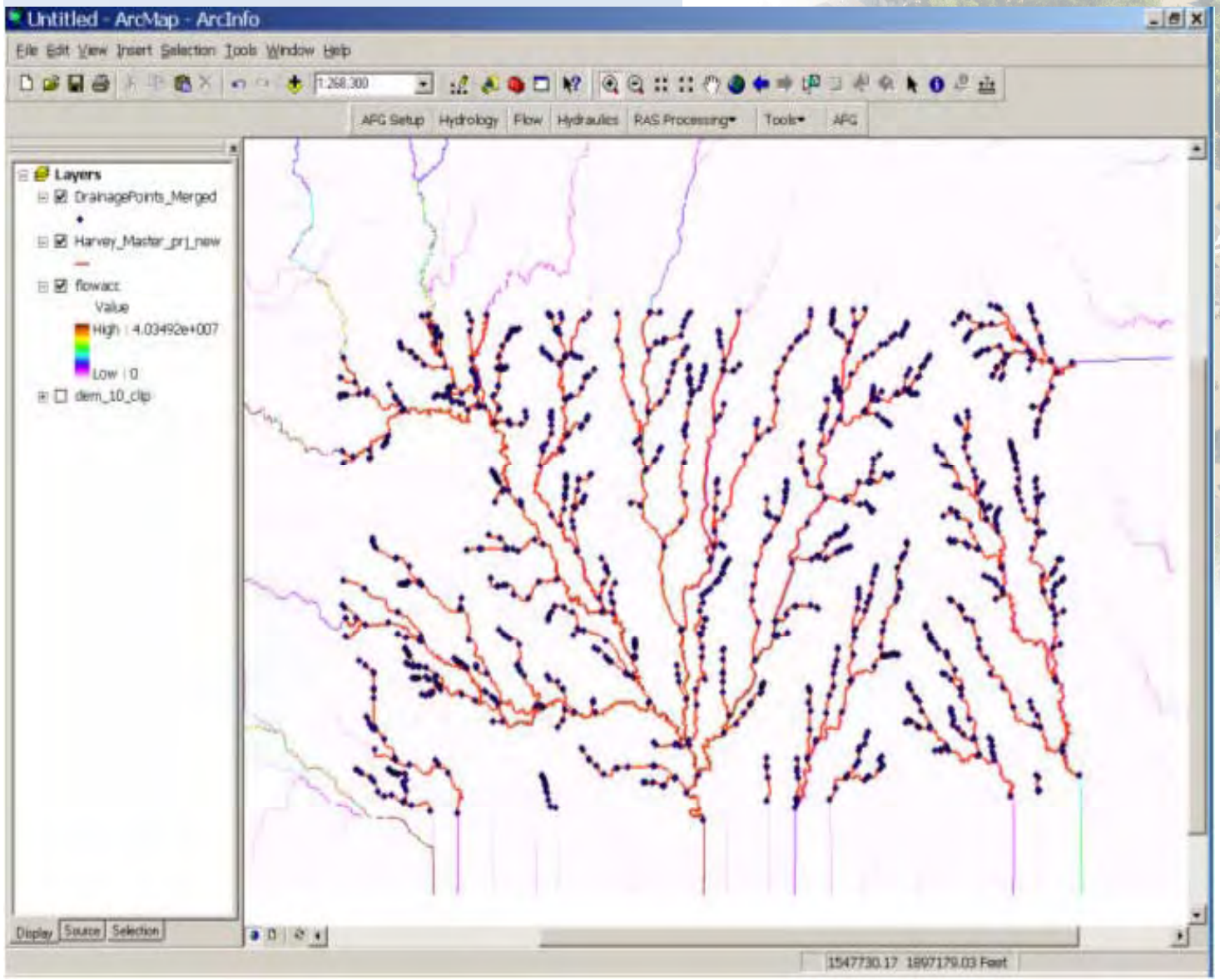


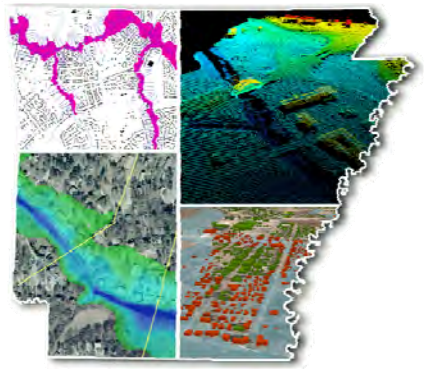
Hydrology – Typically up to 1 sq mile DA

- Detailed calibration process
- Storage/Peak sensitive Checks
- Steady vs Unsteady flow modeling



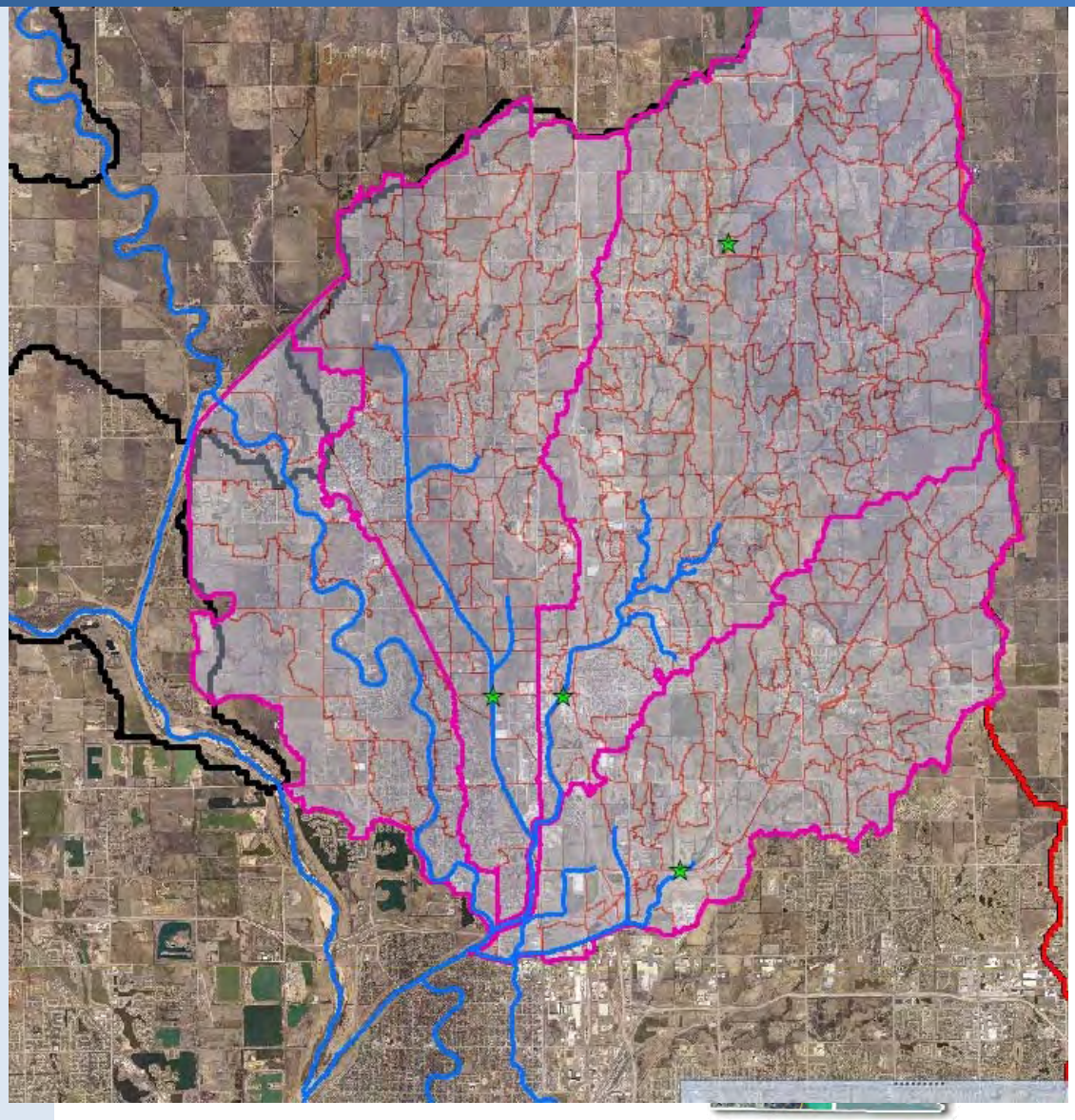
10% Drainage Point Network
Multi-Frequency (10, 25, 50, 100 and 500 Year Events)





Hydraulics – HEC-RAS

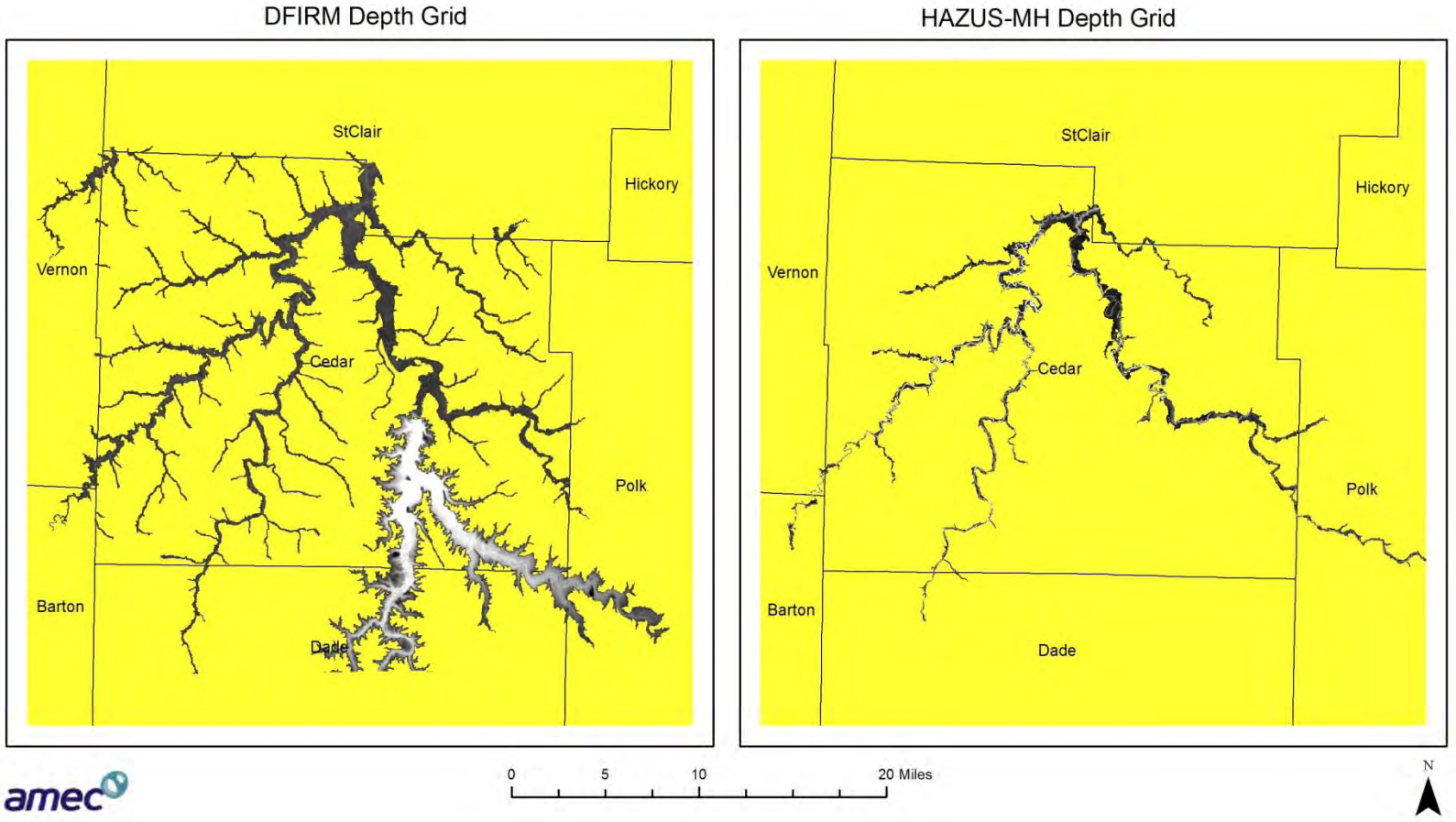
- Potential Unsteady Flow Analysis
- Usually the Streams are Backwater sensitive
- Water surface elevations calibrated to gage locations if at all possible.
- Detailed Geometry descriptions



Depth Grids

Updated Local Plans (5) Rolled up to State Plan (3)

Cedar County, MO: Depth Grid Comparison



Partnering

ARKANSAS
Economic Development Commission

adhe
ARKANSAS DEPARTMENT OF HIGHER EDUCATION

Arkansas Game & Fish Commission

Arkansas Department of Education
Leadership Support Service

ARKANSAS DEPARTMENT OF RURAL SERVICES

ADEQ
ARKANSAS
Department of Environmental Quality

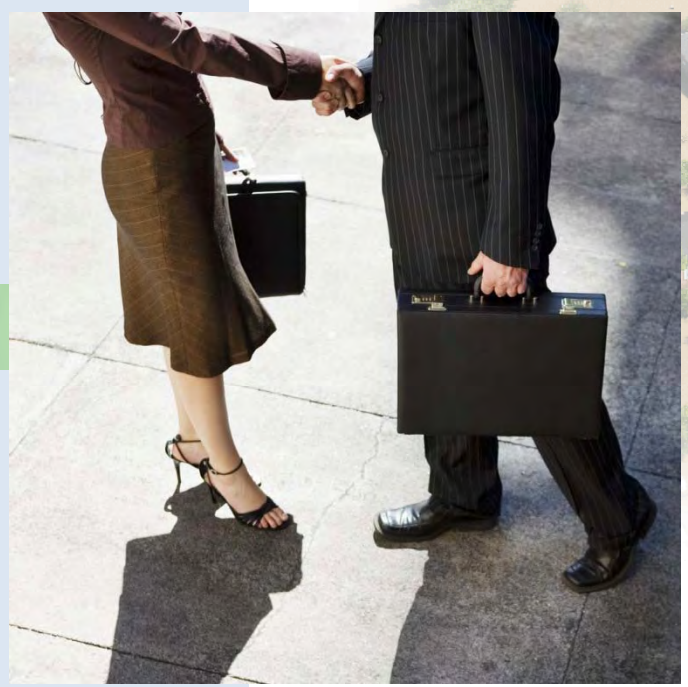
NRCS Helping People Help the Land

ARKANSAS FORESTRY COMMISSION
Arkansas Agriculture Department

US Army Corps of Engineers

SILVER JACKETS Many Agencies One Solution

FEMA



AOGC

ARKANSAS STATE & NATIONAL PARKS

Arkansas State Parks

NWARPC
Northwest Arkansas Regional Planning Commission

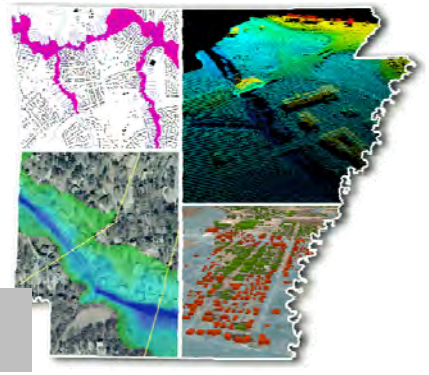
WAPDD, INC.

GeoStor

ADEM
ARKANSAS DEPARTMENT OF EMERGENCY MANAGEMENT

USGS
science for a changing world

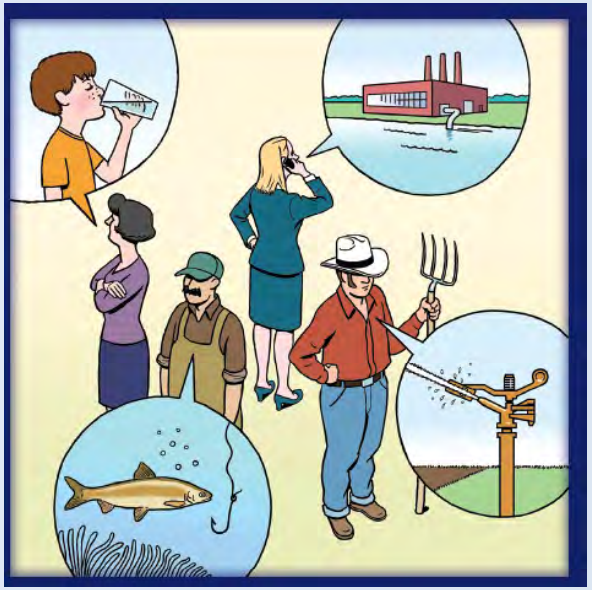
AHTD
ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT



ARKANSAS MUNICIPAL LEAGUE - GREAT CITIES MAKE A GREAT STATE

THANK YOU FOR JOINING US TODAY

Benefits of Partnering

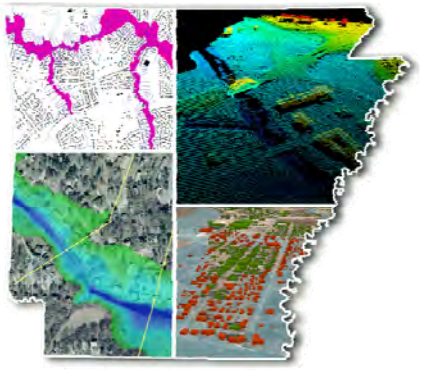


Prioritization / CNMS

Data Sharing

Leverage

Collaboration

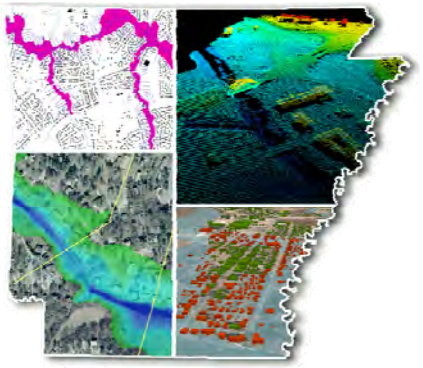


Coordinated Needs Management Strategy (CNMS)

"CNMS defines an approach and structure for the identification and management of flood hazard mapping needs that will provide support to data-driven planning and the flood map update investment process in a geospatial environment."

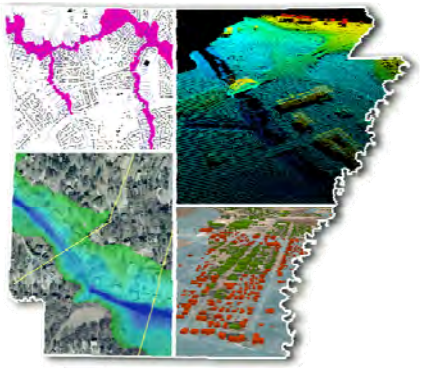
-CNMS Database User's Guide V 4.2

-DRAFT CNMS Database User's Guide V 5.3
currently under review



What is CNMS?

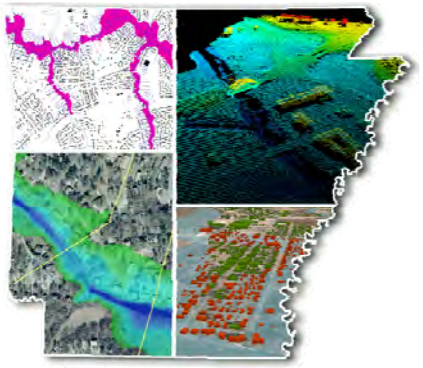
- FEMA's geospatial Special Flood Hazard mapping "inventory"
- Organizes, stores, and analyzes flood hazard mapping needs information for communities
- **Influences map update decisions (priorities)**
- Standardizes how we collect map update data before, during, and after map production
- "Living" Database
  - AR CTP will facilitate database updates



What is CNMS?

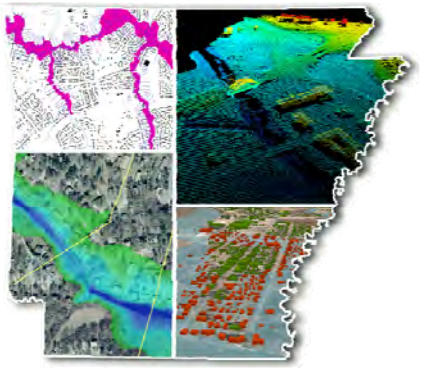
Stream Assigned a **VALIDATION STATUS**

- VALID: Model backed, zero critical and fewer than four secondary elements identified.
- UNVERIFIED: Model backed with least one critical, or four or more secondary elements identified; or not model backed
- UNKNOWN: An evaluation is planned or in queue, or no definitive determination of the validity
- ASSESSED: If a flooding source in an unmapped area is considered for a new study,

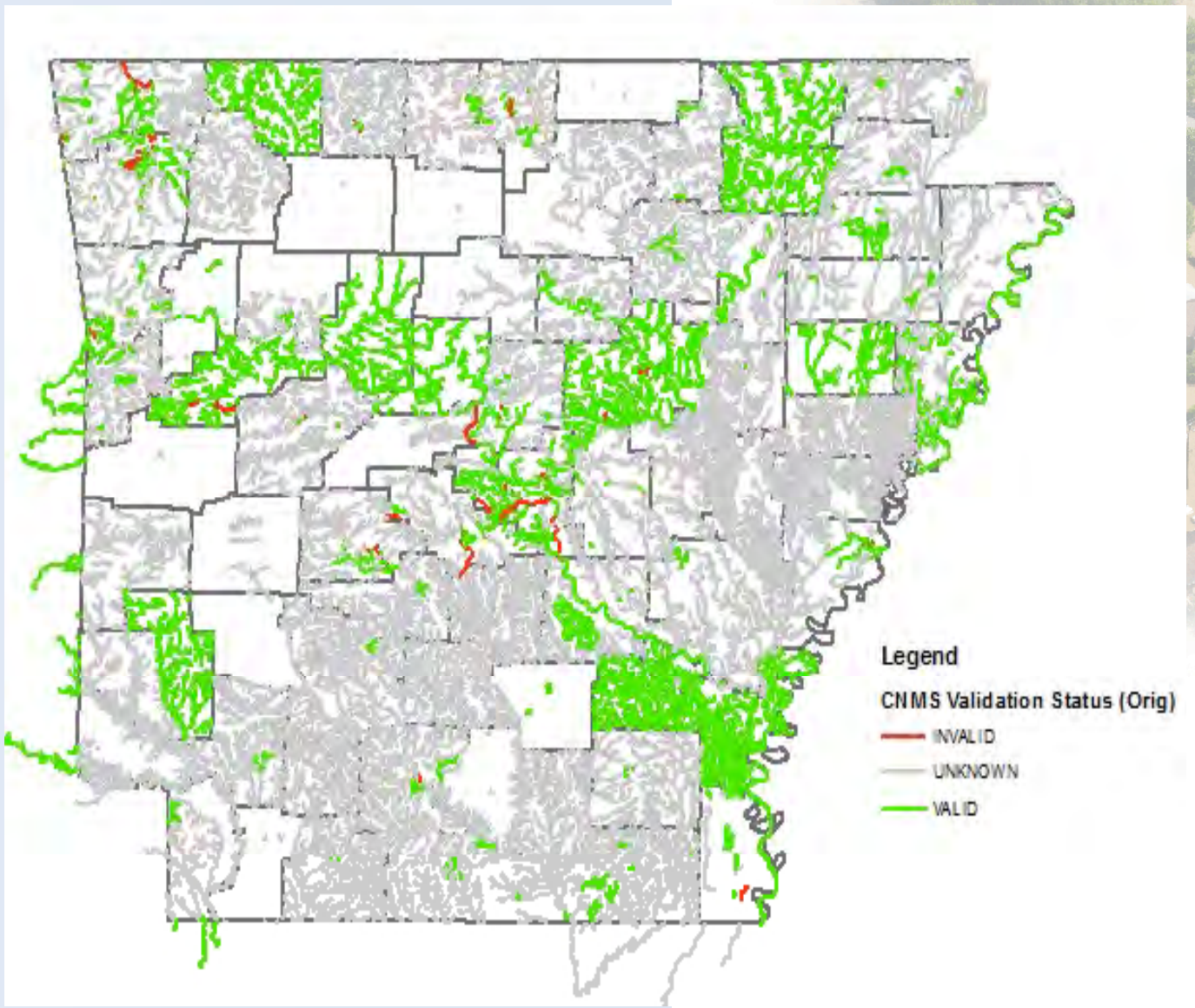


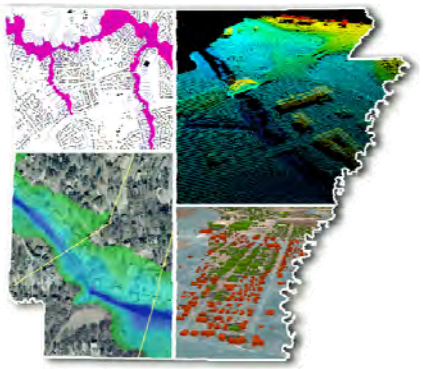
What is CNMS?

- Critical Elements:
  - Major change in hydrology data (major flood event, updated peak discharges, outdated methodology)
  - Addition / removal of major flood structure (dam)
  - Channel reconfiguration / major fill or scour
  - Five or more new / removed hydraulic structures
- Secondary Elements (not all inclusive list):
  - Repetitive losses
  - 1 to 4 new / removed hydraulic structures
  - Isolated channel improvements
  - Better topography
  - Change in land-use (>50%), vegetation, land-use

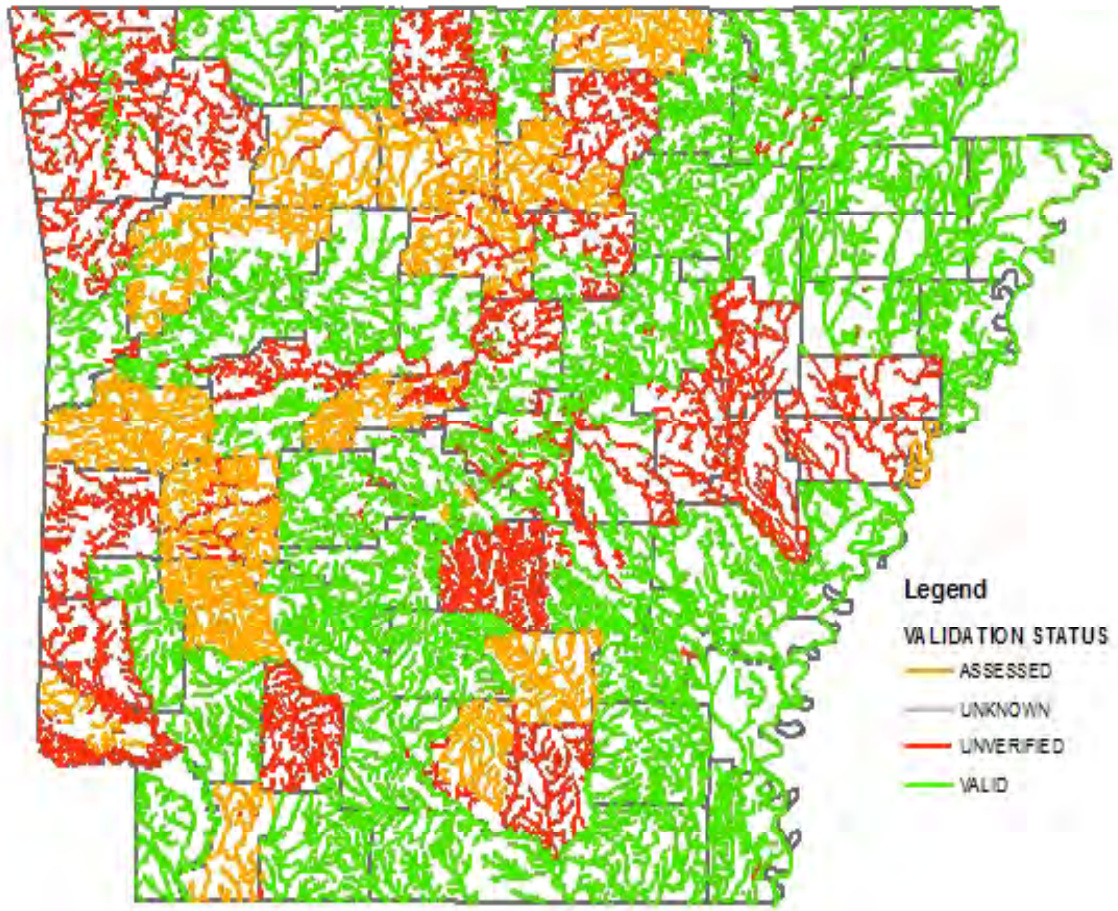


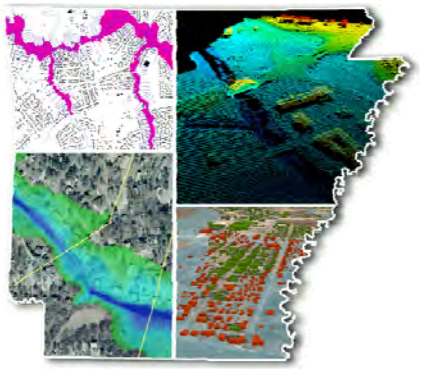
What is CNMS?





Where are we with CNMS?

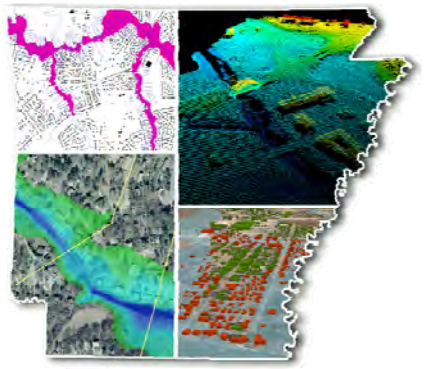




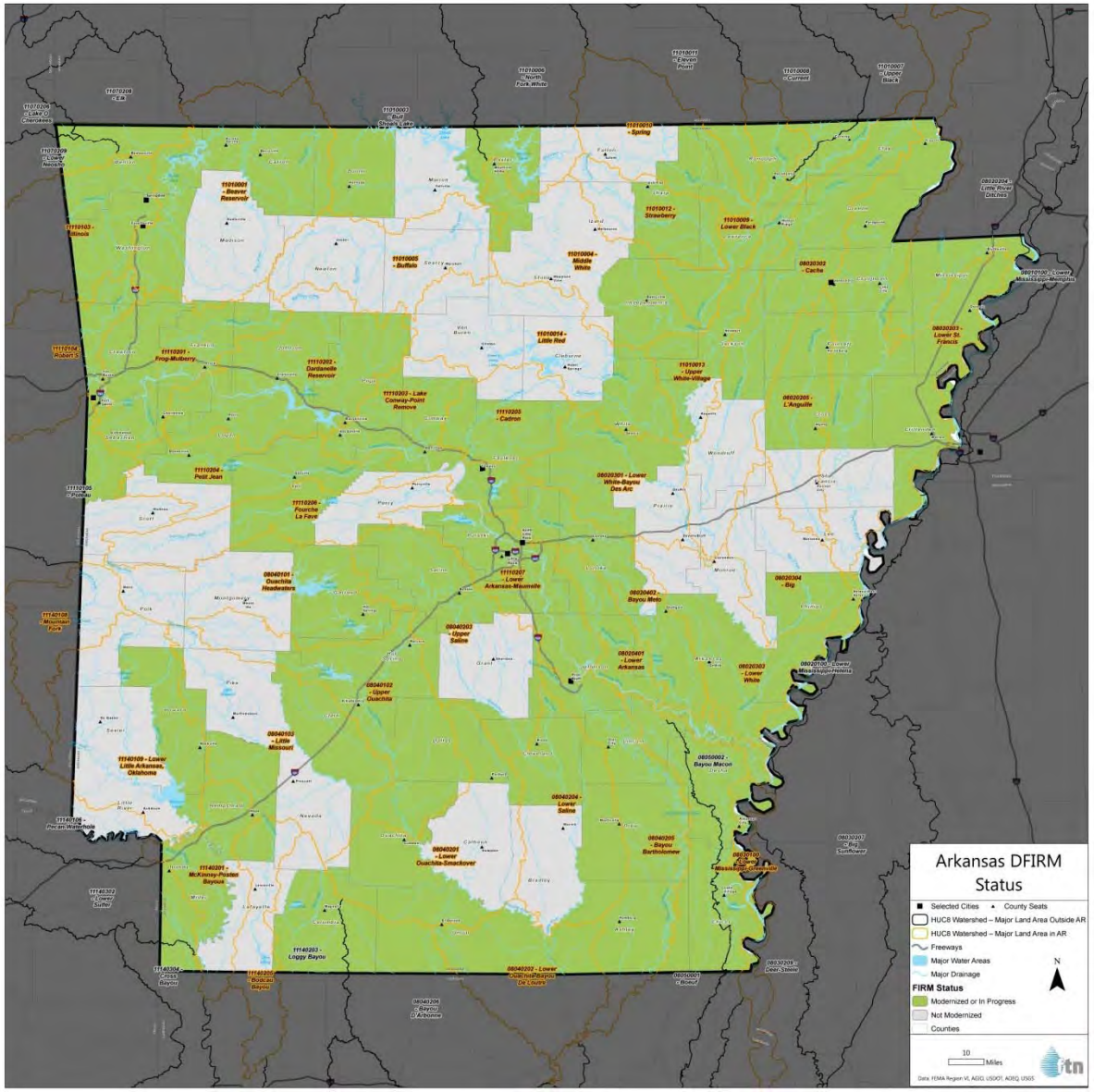
Data Sharing

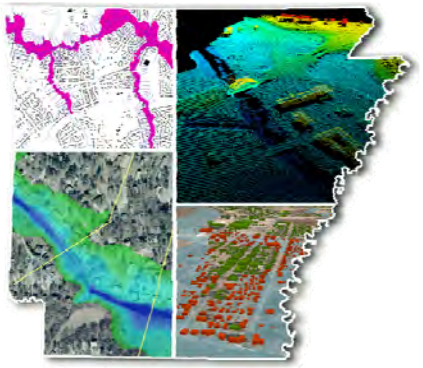
DFIRM Data

(49 / 75 modernized or in progress)



Arkansas DFIRM Status





Data Sharing

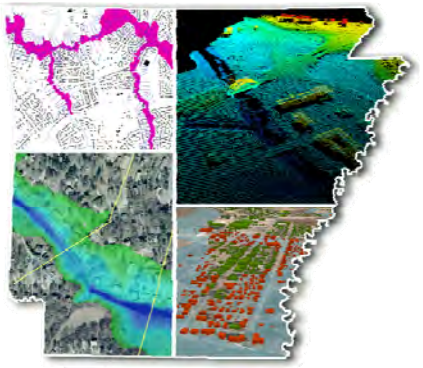
Hazard Mitigation Plans

(45 have a plan,

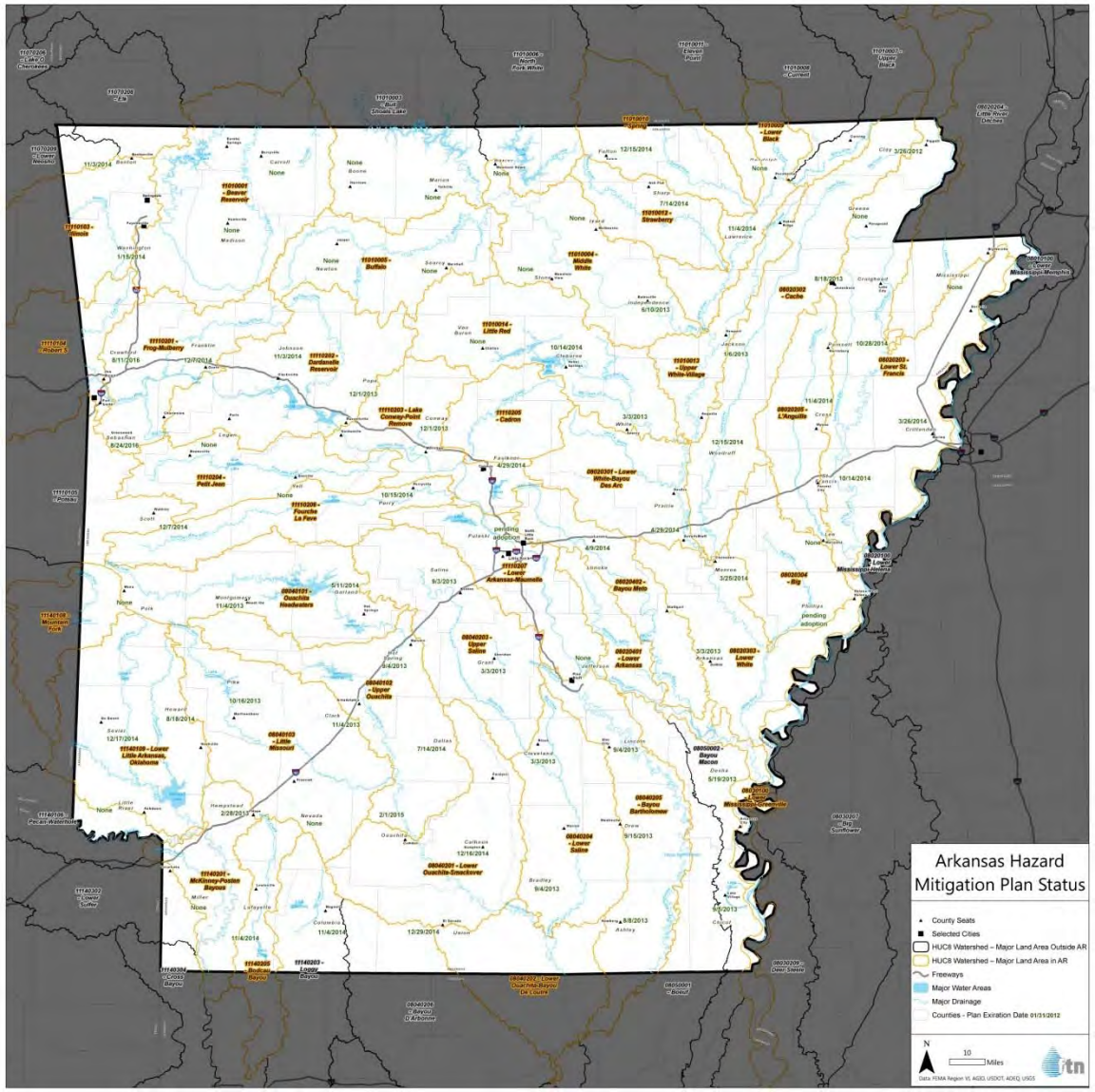
7 plans expired,

2 plans pending adoption,

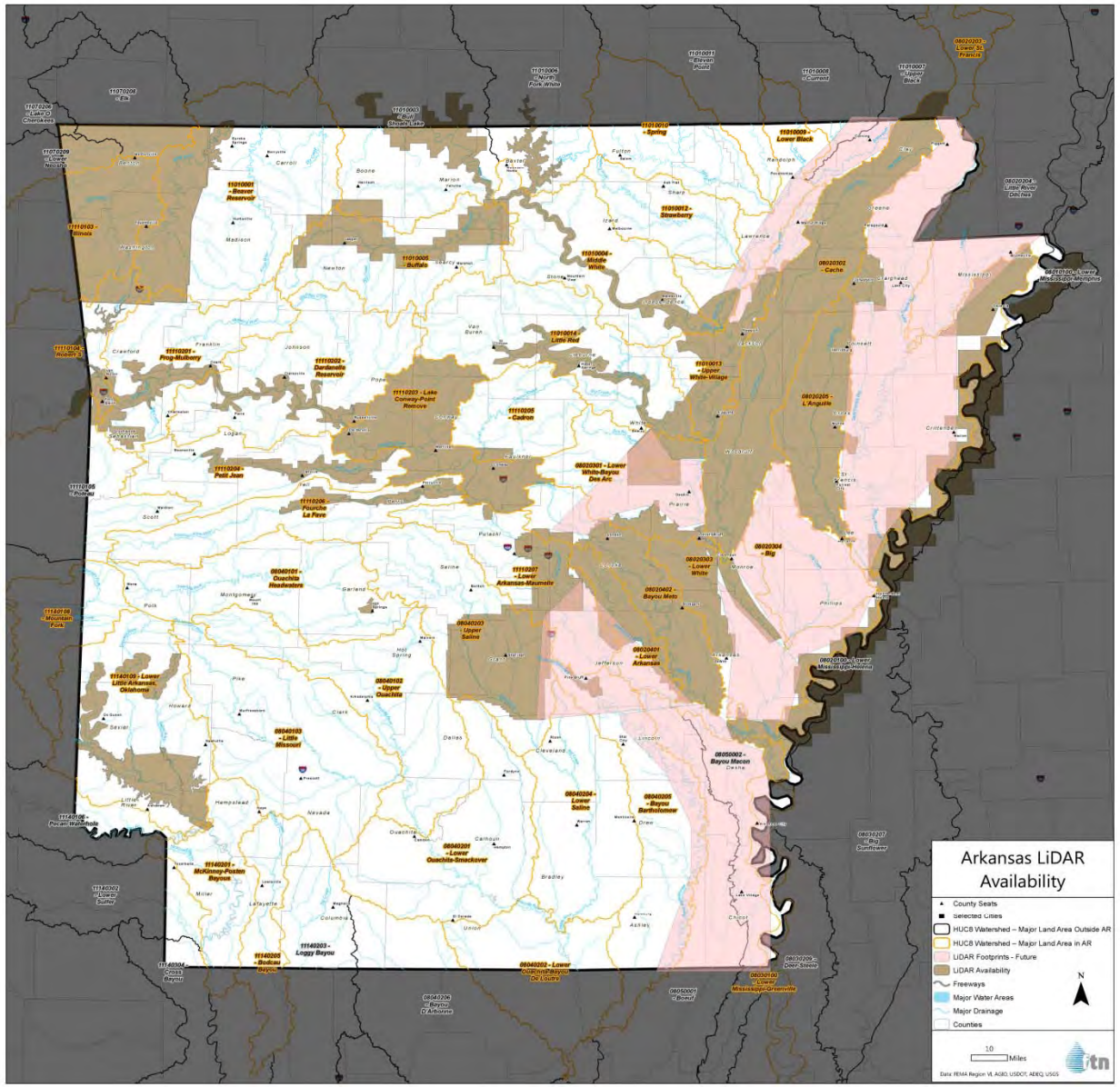
21 have no plan)

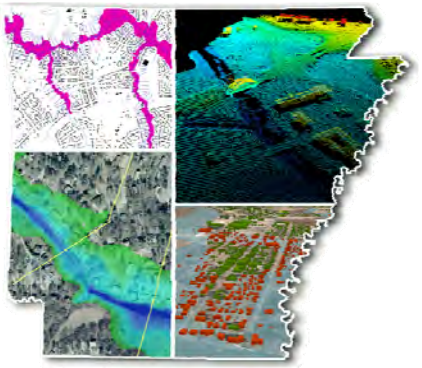


Arkansas Hazard Mitigation Plan Status

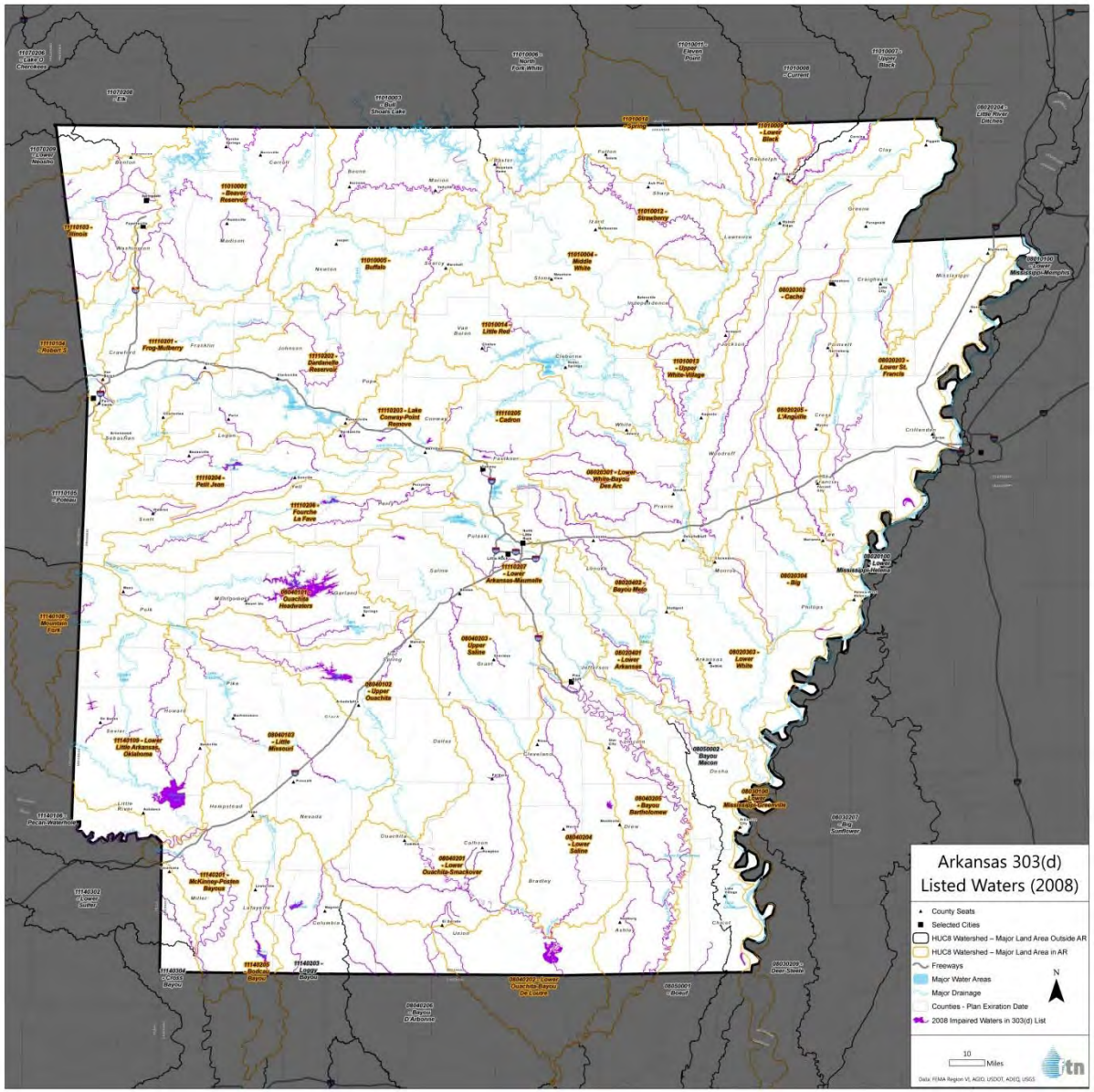


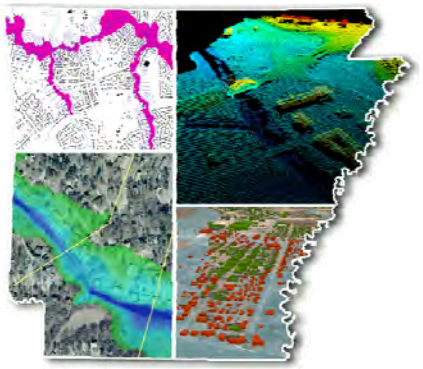
Data Sharing / LiDAR





Arkansas 303d Listed Waters





LEVERAGE

Estimating the Value of Partner Contributions to Flood Mapping Projects

"Blue Book"

Version 3.0

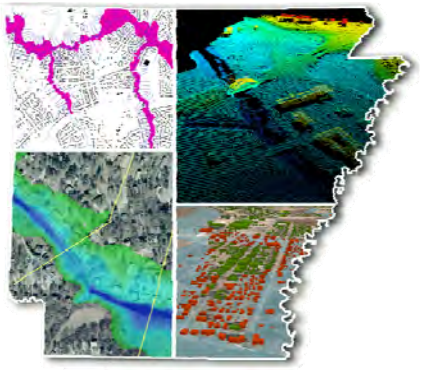
September 2011

FEMA

COST SHARING

IN-KIND SERVICES

DATA PROCUREMENT OPTIONS



LEVERAGE

6. Unit Costs

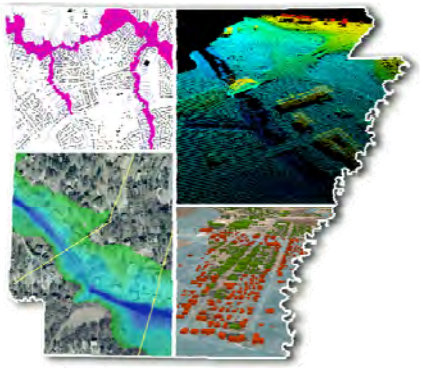
Table 1. Unit Cost Factors

Project Element		Unit	Unit Cost ($/unit)
Discovery	Discovery	Community[1]	4,000
Risk Communication and Outreach	Outreach	Community	2,500
Field Surveys	Field Surveys and Recon	Linear miles	3,100
	Quality Assurance/Quality Control (QA/QC) for Field Surveys	Linear miles	500
Topographic Data Development	Very Flat Terrain		
	- Less than 1,000 sq. mi.	Square miles	500
	- Greater than 1,000 sq. mi.	Square miles	300
	Independent QA/QC Very Flat Terrain		
	- Less than 1,000 sq. mi.	Square miles	80
	- Greater than 1,000 sq. mi.	Square miles	50
	Rolling to Hilly Terrain		
	- Less than 1,000 sq. mi.	Square miles	250
	- Greater than 1,000 sq. mi.	Square miles	200
	Independent QA/QC for Rolling or Hilly Terrain		
	- Less than 1,000 sq. mi.	Square miles	40
	- Greater than 1,000 sq. mi.	Square miles	30
	- Greater than 4-foot contours	Square miles	60
Base Map Preparation	Base Map Preparation	Project	15,000
	Independent QA/QC of Base Map	Project	2,250
	Base Map Data 1-meter Orthophoto	Square miles	20
	Base Map Data 1-foot Orthophotos	Square miles	100

[1] Based on average of ten communities, may vary from project to project.

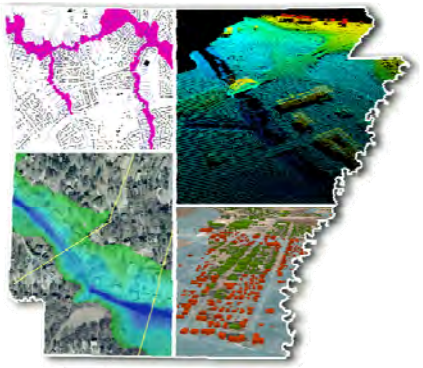
NEXT STEPS

- 2014 - 3rd ANNUAL ARKANSAS STATE PARTNERSHIP MEETING
  - Mid April 2013 (precedes AFMA Spring Conf.)
- OUR PROJECTS
- YOUR PROJECTS?

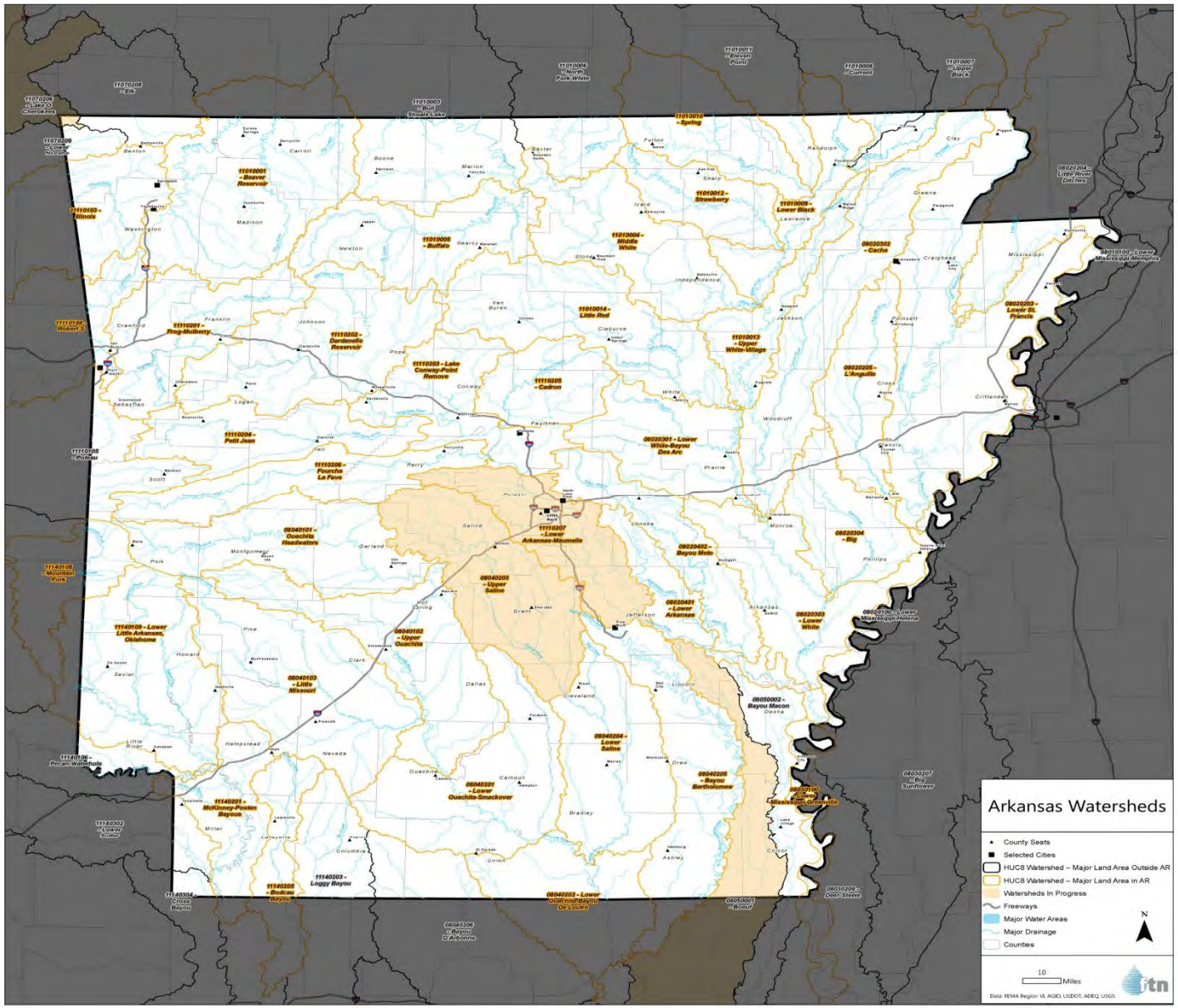


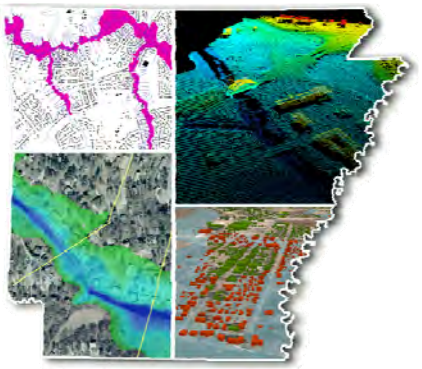
OUR PROJECTS / CURRENT

- LOWER AR – MAUMELLE (AR / FEMA)
  - Discovery Closeout / On-hold due to Levees
- BAYOU BOEUF (LA)
  - Discovery Closeout / Project Selection
- UPPER SALINE
  - Discovery Meetings (04/23-24/2013)



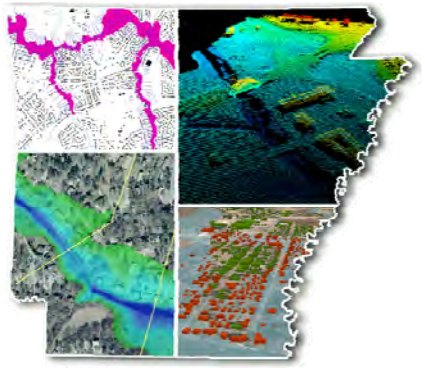
OUR PROJECTS / CURRENT



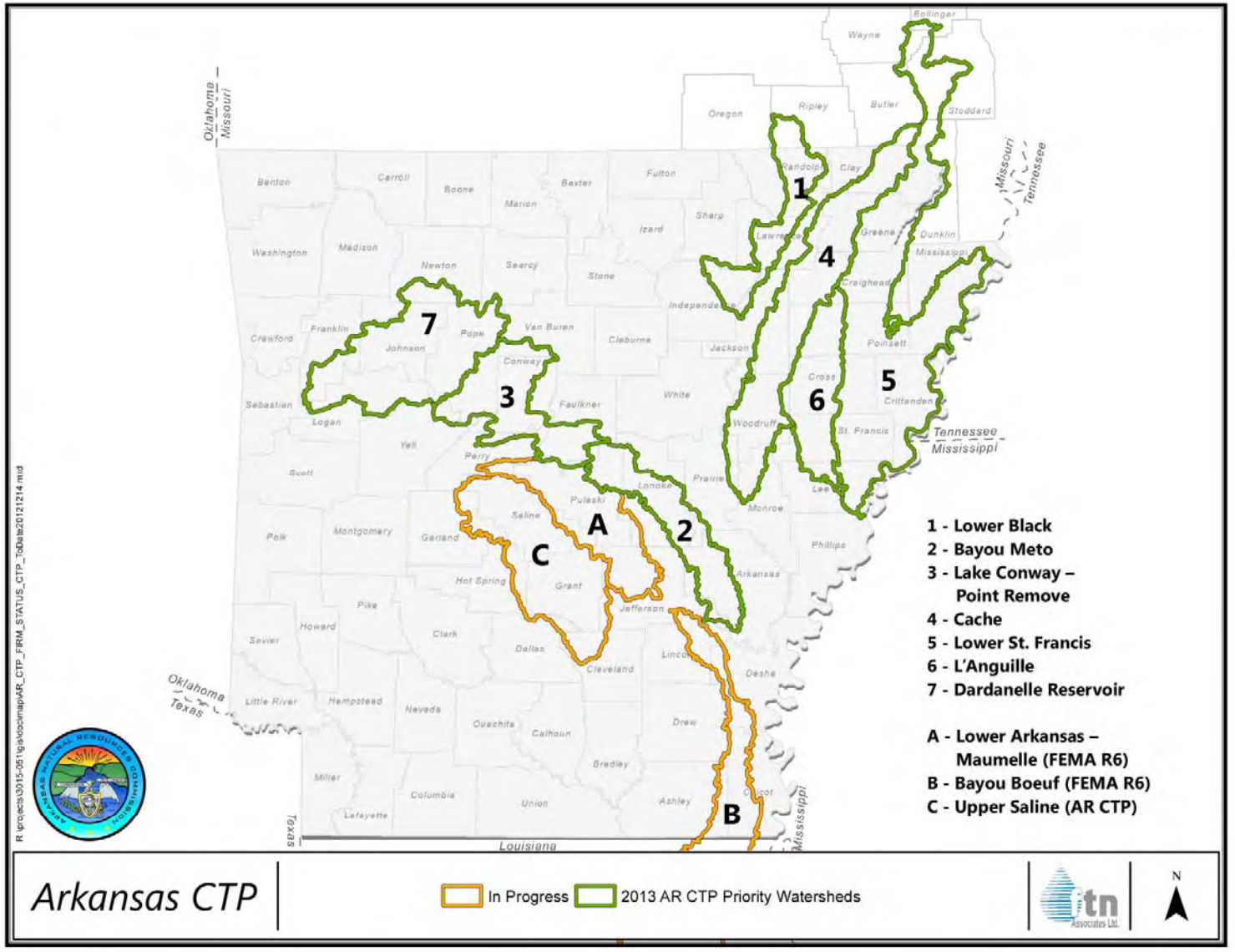


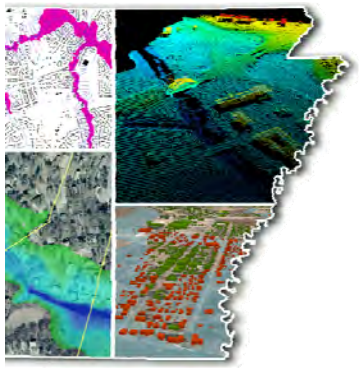
OUR PROJECTS / PROPOSED

- FY2013 PRIORITY WATERSHEDS
  - Lower Black
  - Bayou Meto
  - Lake Conway – Point Remove
  - Cache
  - Lower St. Francis
  - L'Anguille
  - Dardanelle Reservoir



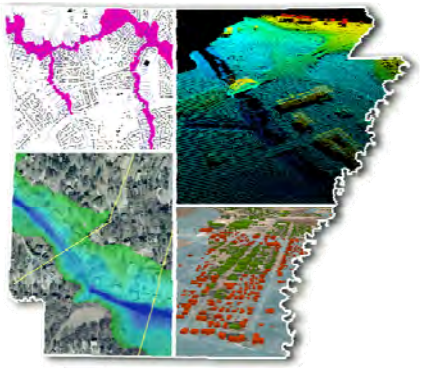
OUR PROJECTS / PROPOSED





OUR PROJECTS / PROPOSED

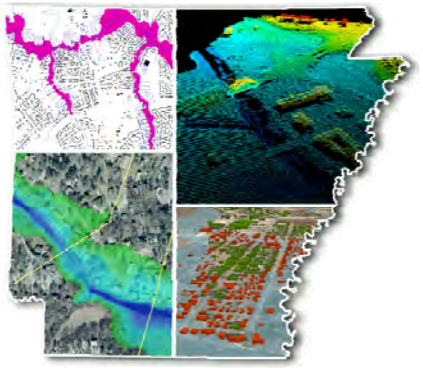
- Lower Black
- Bayou Meto
- Lake Conway – Point Remove
- Cache
- Lower St. Francis
- L’Anguille



OUR PROJECTS / PROPOSED

#1 Lower Black

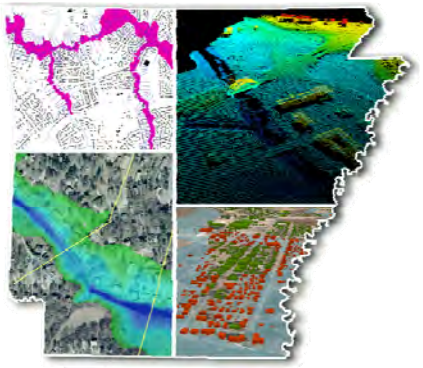
- AR Silver Jackets collaborative project
- City of Pochahontas / Randolph County levee work
- Flood losses
- Other partnering opportunities



OUR PROJECTS / PROPOSED

#2 Bayou Meto

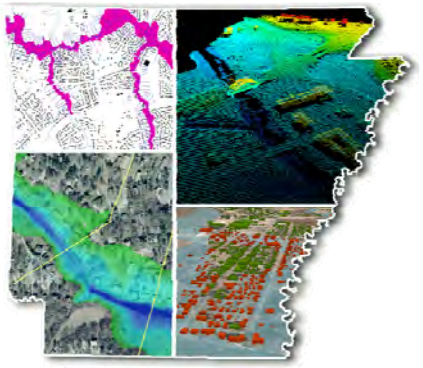
- Elevation data availability
- Recent flood losses / infrastructure impacts (Sherwood, Jacksonville, Cabot, Pulaski County)



OUR PROJECTS / PROPOSED

#3 Lake Conway – Point Remove

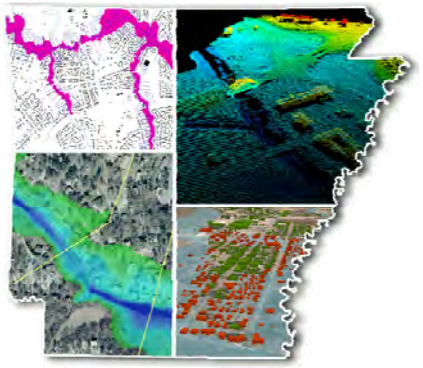
- Elevation data availability
- Partnering opportunities
- Proximity to Bayou Meto Watershed (cost-savings through efficiencies in meetings)



OUR PROJECTS / PROPOSED

#4 Cache

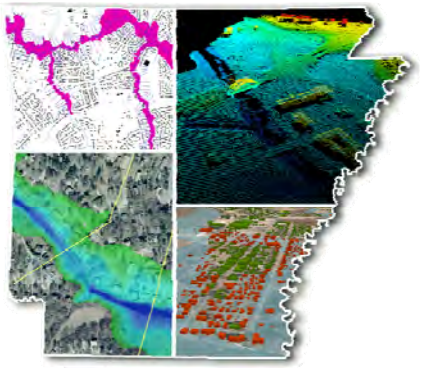
- AR Silver Jackets collaborative project
- Flood losses / infrastructure impacts
- Elevation data availability
- Other partnering opportunities
- Proximity to Lower Black Watershed (cost-savings through efficiencies in meetings)



OUR PROJECTS / PROPOSED

#5 Lower St. Francis

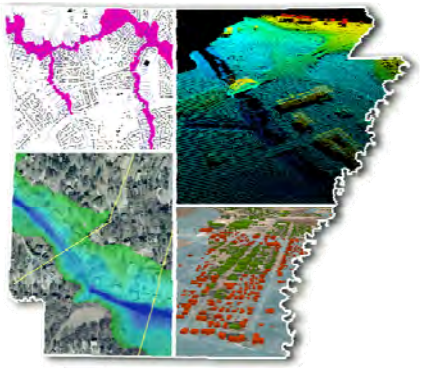
- Flood losses
- Elevation data availability
- Partnering opportunities
- Proximity to Cache Watershed (cost-savings through efficiencies in meetings)



OUR PROJECTS / PROPOSED

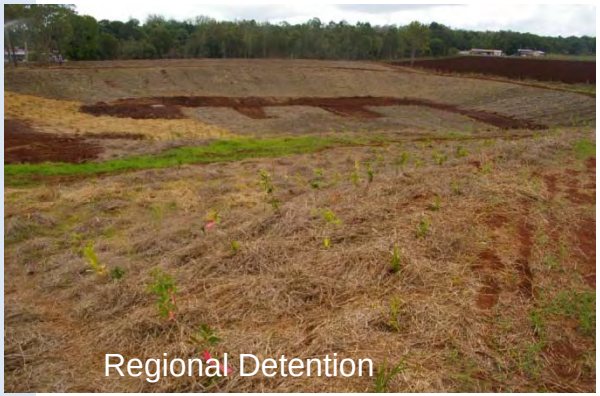
#6 L'Anguille

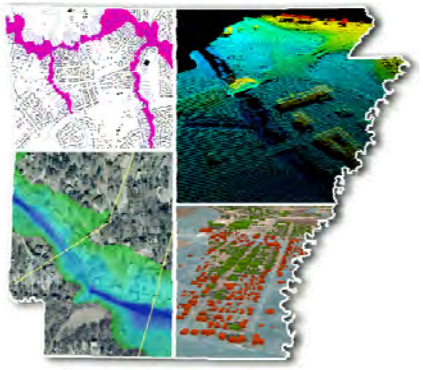
- Flood losses
- Elevation data availability
- Partnering opportunities
- Proximity to Lower Black and Cache Watersheds (cost-savings through efficiencies in meetings)



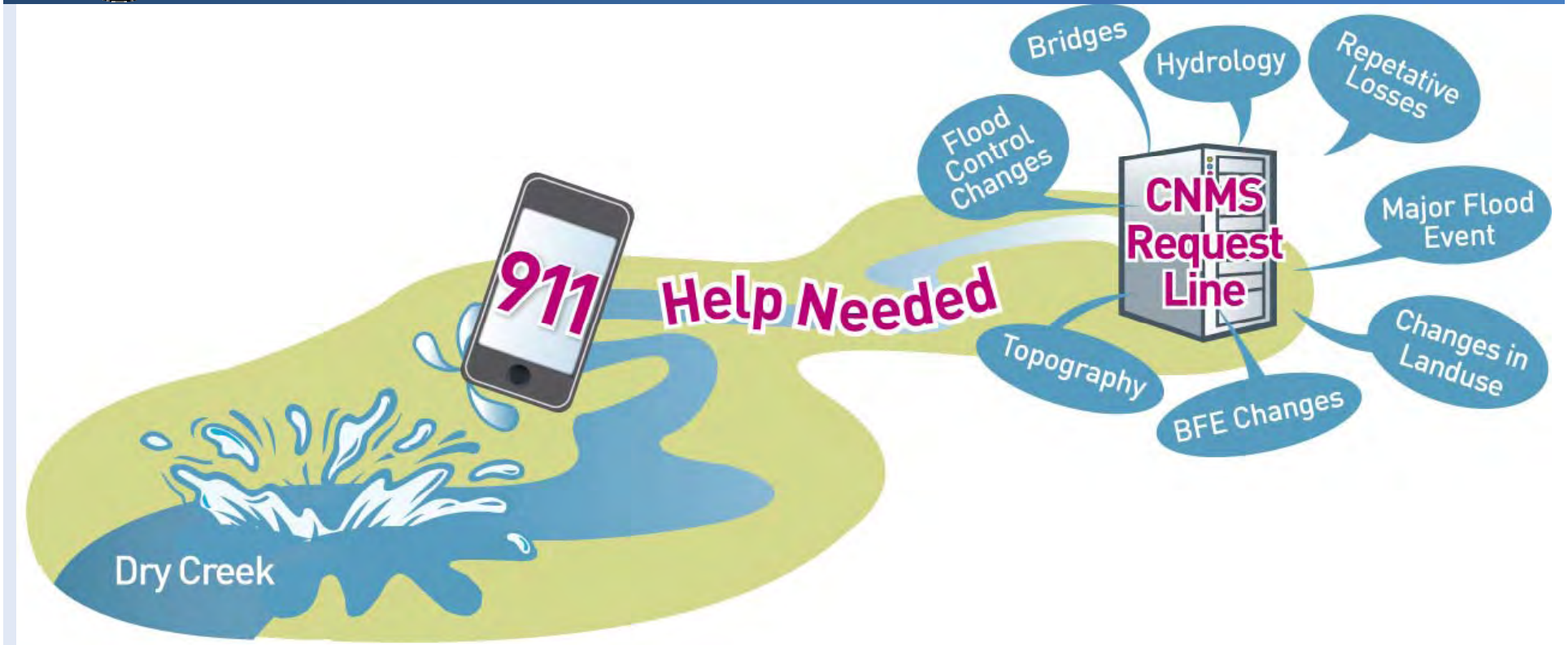
Your Projects?

- Flood Mitigation
- Data Collection Efforts (LiDAR, Topography, Aerial Photography, GIS based data)
- Engineering Studies / Drainage Reports
- Transportation Improvements

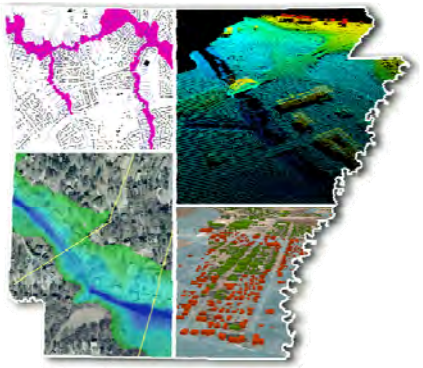




Coordinated Needs Management Strategy



Your flooding sources “Hot Line”




That's all Folks!

PARTNERING DISCUSSIONS