

# Owen County Transportation Vulnerability Study

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March 8, 2017



# Project Background

- Project funded by FEMA
- Awarded through a competitive process
- Part of FEMA's Risk MAP program
- Goal is to develop a process that can be used for other locations



# The Vision for Risk Map

Through collaboration with State, Local, and Tribal entities, Risk MAP will deliver quality data that increases public awareness and leads to action that reduces risk to life and property



# Indiana Silver Jackets

Bee Risk Aware!



FEMA



Many Agencies... One Solution.



# Project Scope

- Develop GIS tools and processes that can be used to assess potential hazard damage to transportation assets
- Create a process that can be applied to other counties or communities
- Create a process that can help communities identify and prioritize hazard mitigation projects

In Cooperation with the Federal Emergency Management Agency and the  
Indiana Department of Natural Resources, Division of Water

## Flood of June 7–9, 2008, in Central and Southern Indiana

In June 2008,  
flooding damaged  
or destroyed more  
than 650 sections  
of road, 60  
bridges, and 100  
culverts in  
Indiana.



Open-File Report 2008–1322

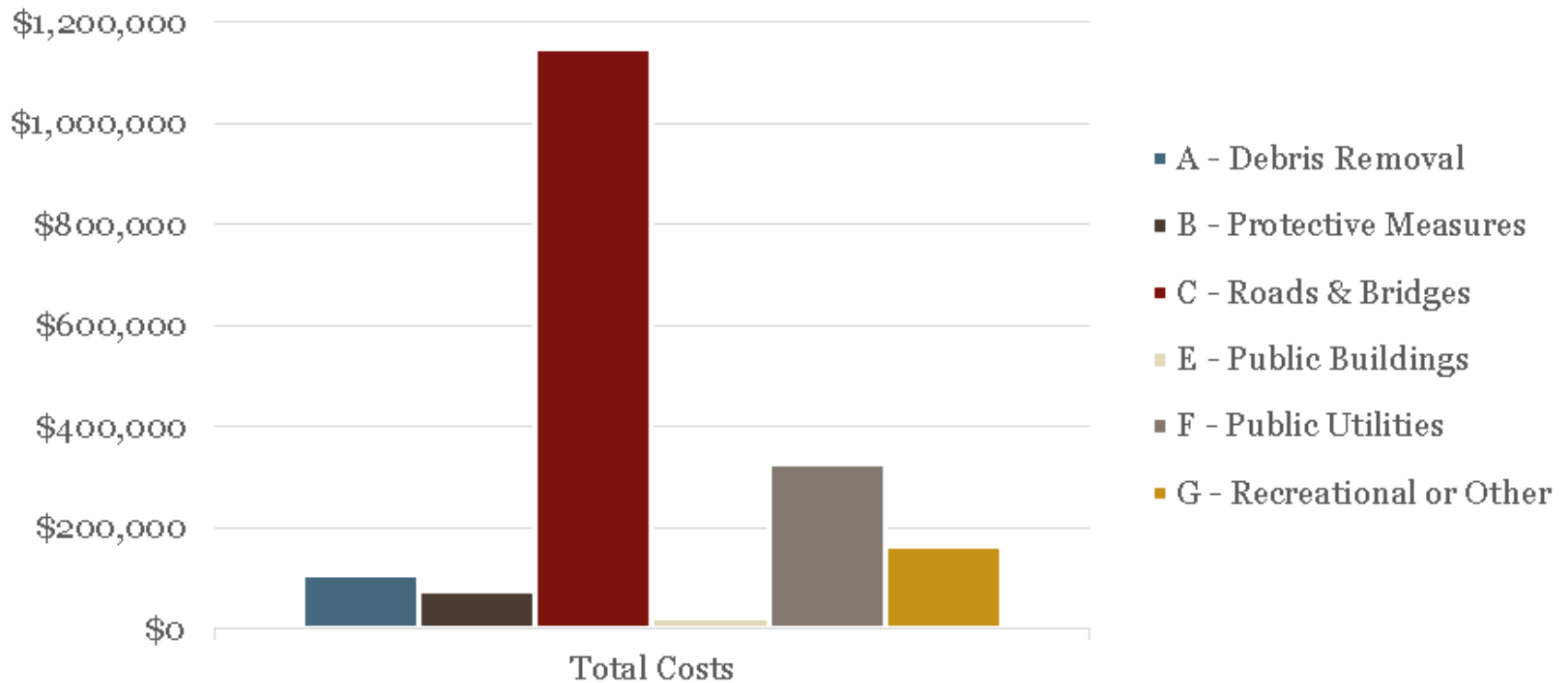
U.S. Department of the Interior  
U.S. Geological Survey

# Public Assistance Data

- Purpose is to provide grants to assist state, tribal and local governments
- Can be used for debris removal, emergency protective measures, repair of publically owned facilities and structures



## Total Obligation Public Assistance





# Project Goals

- Identify top areas of concern within the county
  - We come to the county with knowledge
  - Develop a method to prioritize the issues
- Work with community to develop a plan of action

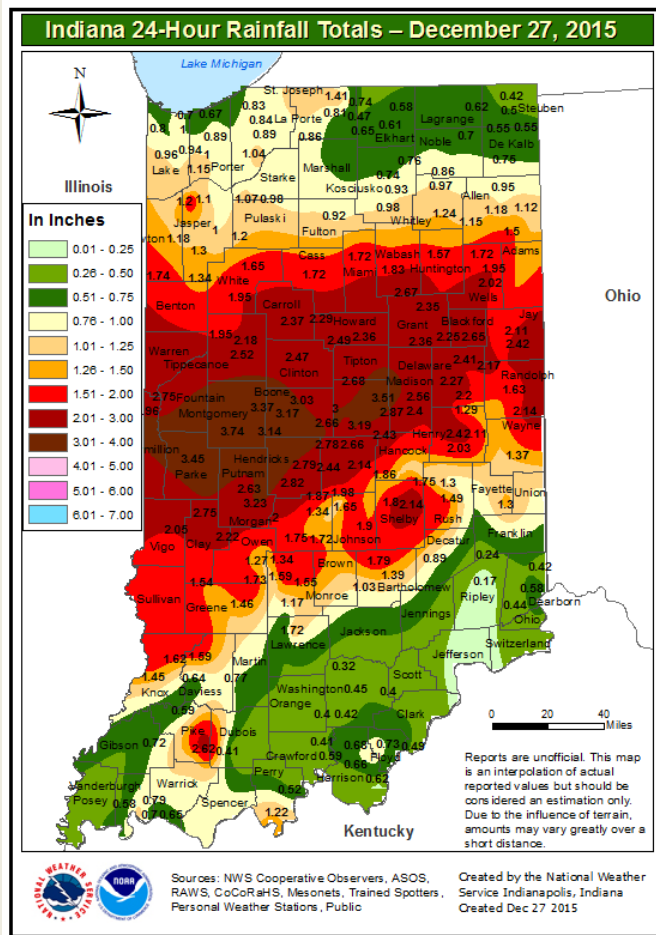


# Phased Approach

- Phase I - Initial Data Collection and GIS Analysis
- Phase II – Community Validation Meeting / Priority Ranking
- Phase III – High Water Event Site Visit (Unplanned)
- Phase IV – Action Completed / Report Compilation



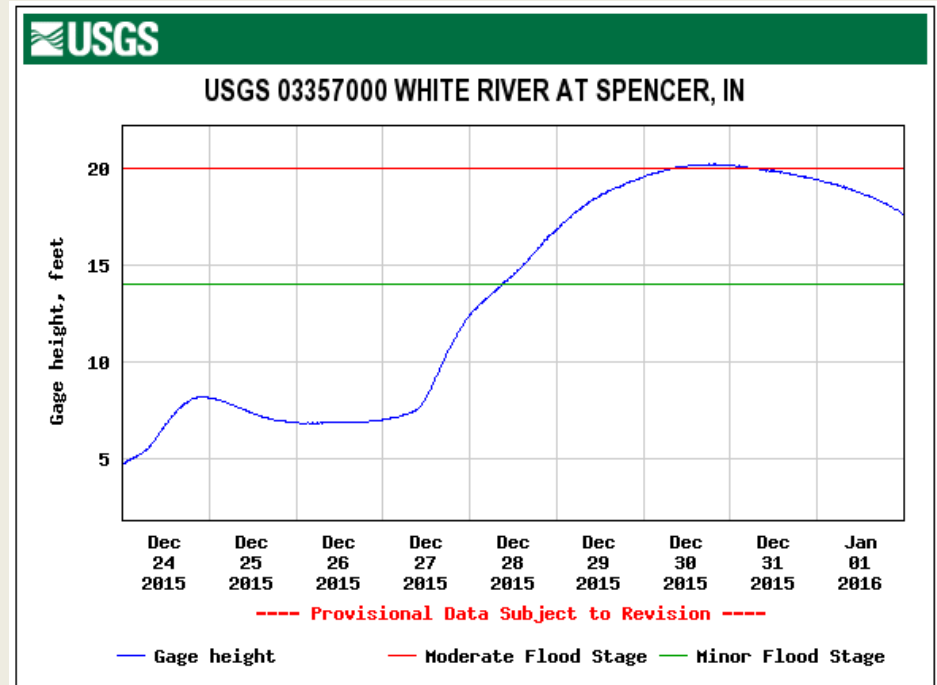
# Site Visit



- NWD – Dec 2015 9<sup>th</sup> wettest on record
- Over 3.5 inches of rain fell during a 24 hour period on December 27<sup>th</sup>
- Unique chance to see things in action

# Site Visit

USGS stream gage in the White River at Spencer recorded heights of just over 20 or at moderate flood stage.



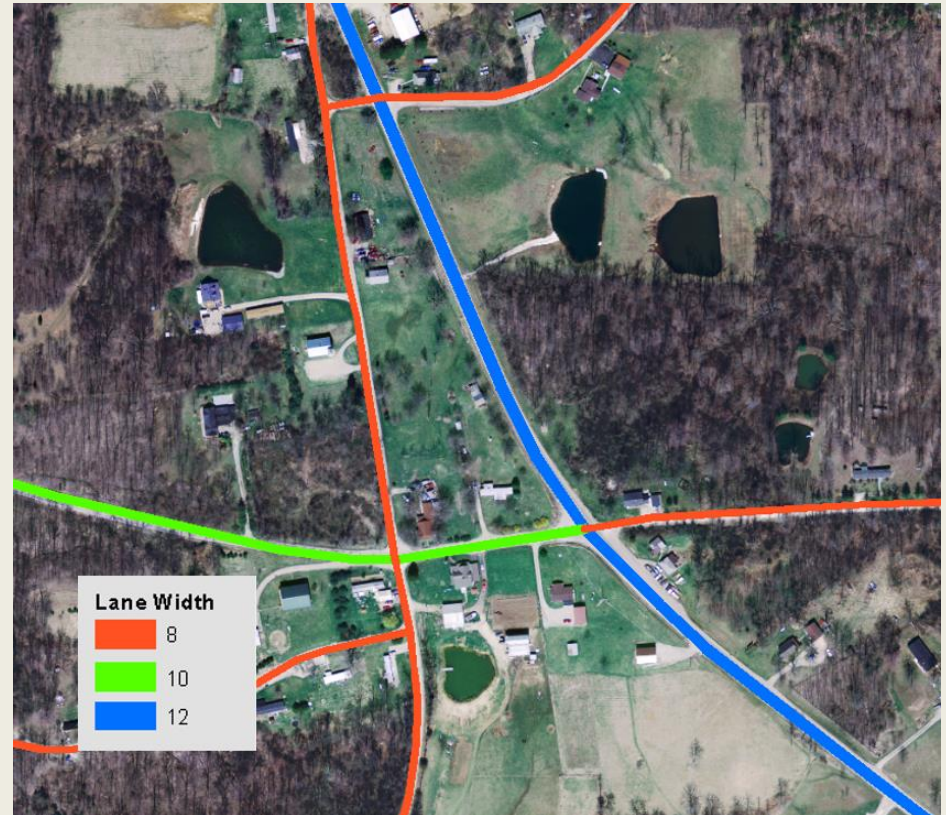
# Data Resources.

- Accurate street and bridge data (INDOT)
- High quality elevation data (GIO)
- New statewide Imagery (GIO)
- Permit Application Data (IDNR)
- Public assistant data (FEMA)
- SFHA (IDNR)
- Flood depth grids (Hazus-MH)



# Centerlines

- Sought highly accurate Centerlines
- Converted to a polygon feature and Segmented based on road width attributes



# Flood Depth Grids

- Ideally would use depth grids generated from H and H modeling of the 100 Year flood.
- For this effort Depth grids were generated using FEMA's Hazus-MH software
- Following frequencies:
  - 10 year, 25 year, 50 year, 100 year and 500 year
  - 10%, 4%, 2%, 1% and 0.2%





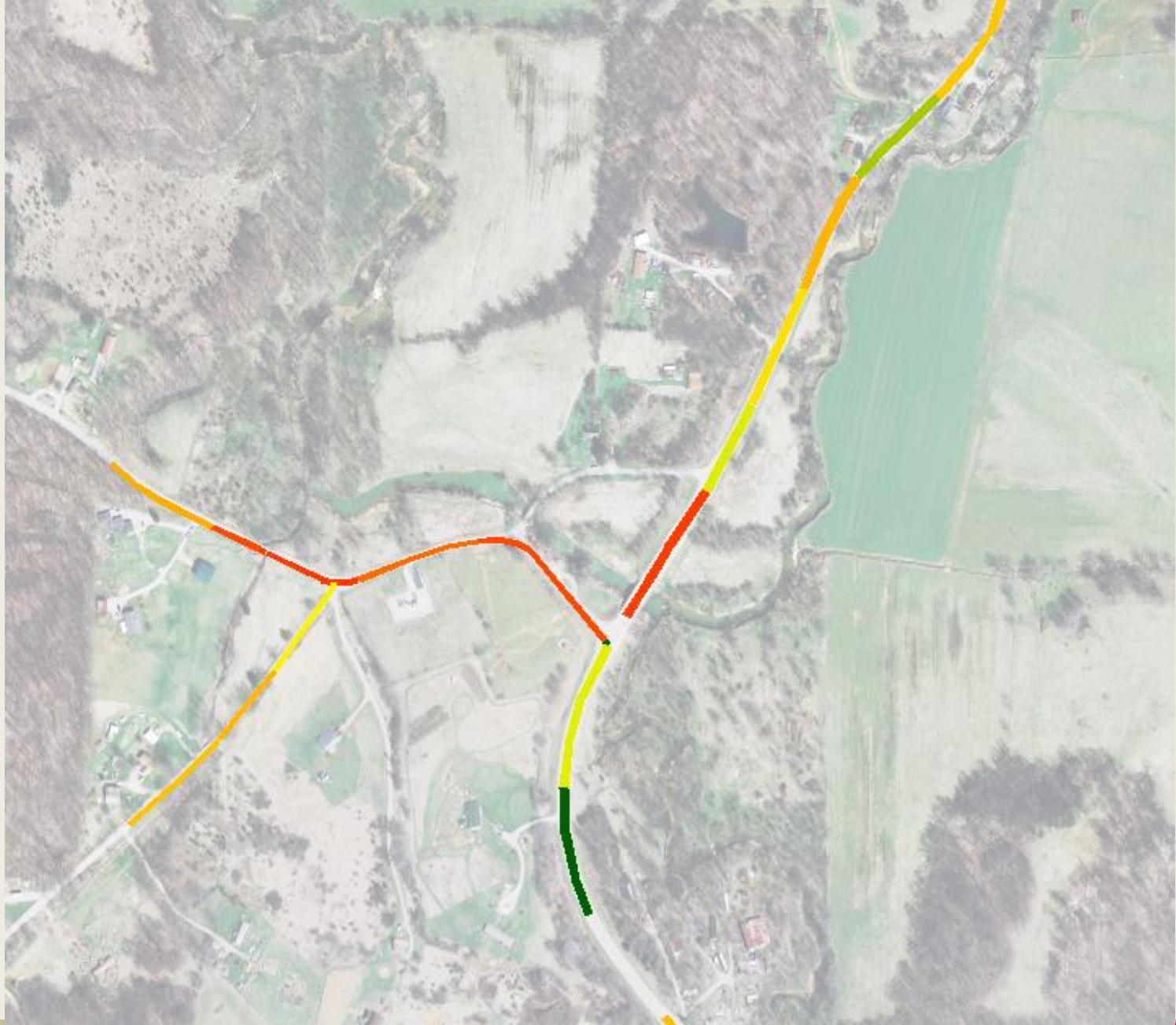
# Analysis

- Resulted in road and bridge segments each with a “Priority” score
- False positives:
  - Boat ramps
  - Use of bridge approach for bridge deck elevation



ts\_TFVA\_Screen

	Width	LANE_WIDTH	OVR_010	OVR_025	OVR_050	OVR_100	OVR_500	TFVA_Score	ValidYN	InValidWhy	SHA
3	14	7	22.104307	23.216982	24.019651	24.703552	26.259218	3919.05698	n	boat ramp	110
3	16	8	13.114432	14.053345	14.705933	15.350647	16.661375	2354.513641	Y	Valid	105
5	16	8	12.804503	13.456666	13.916627	14.333922	15.150085	2270.688917	Y	Valid	84

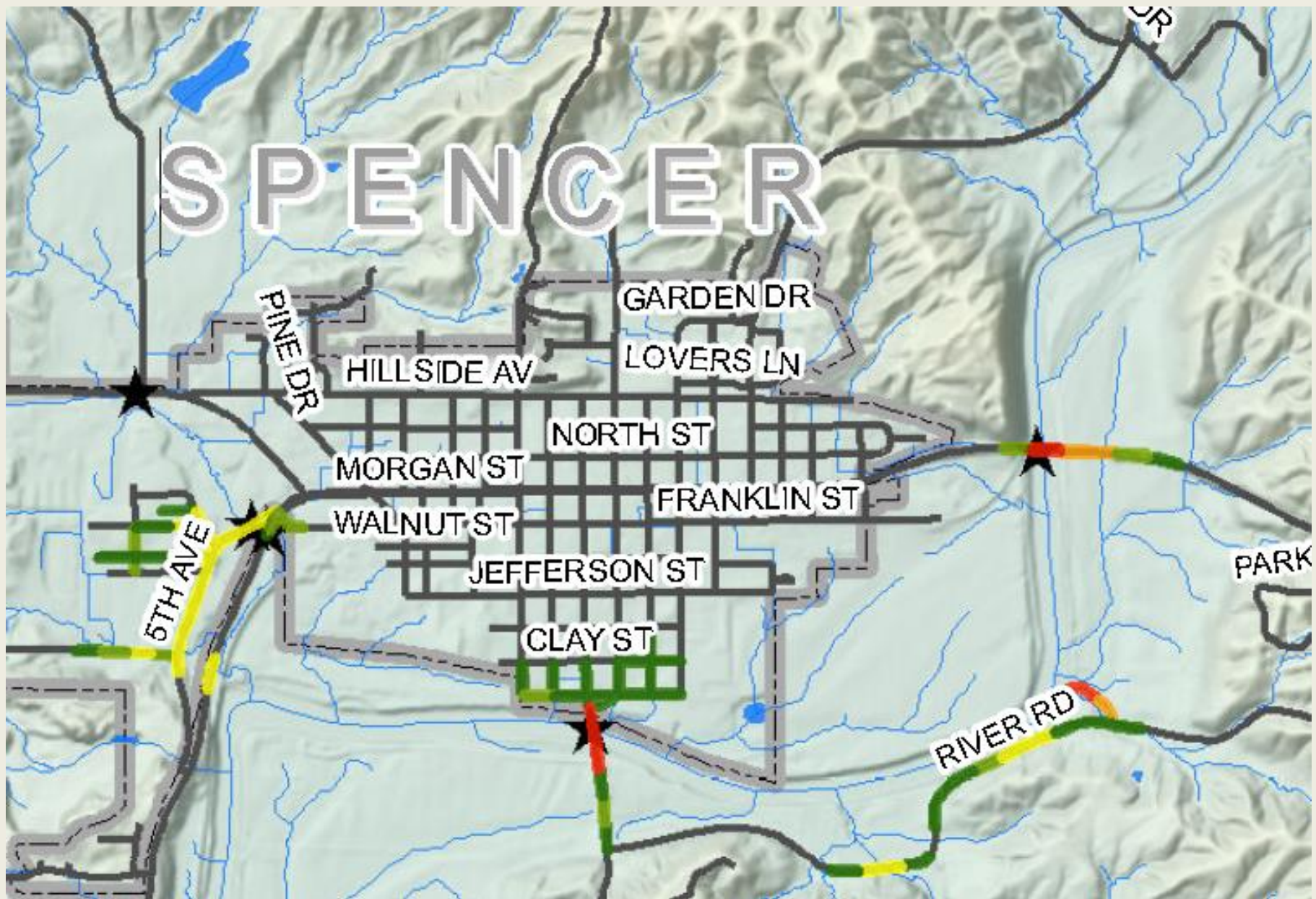


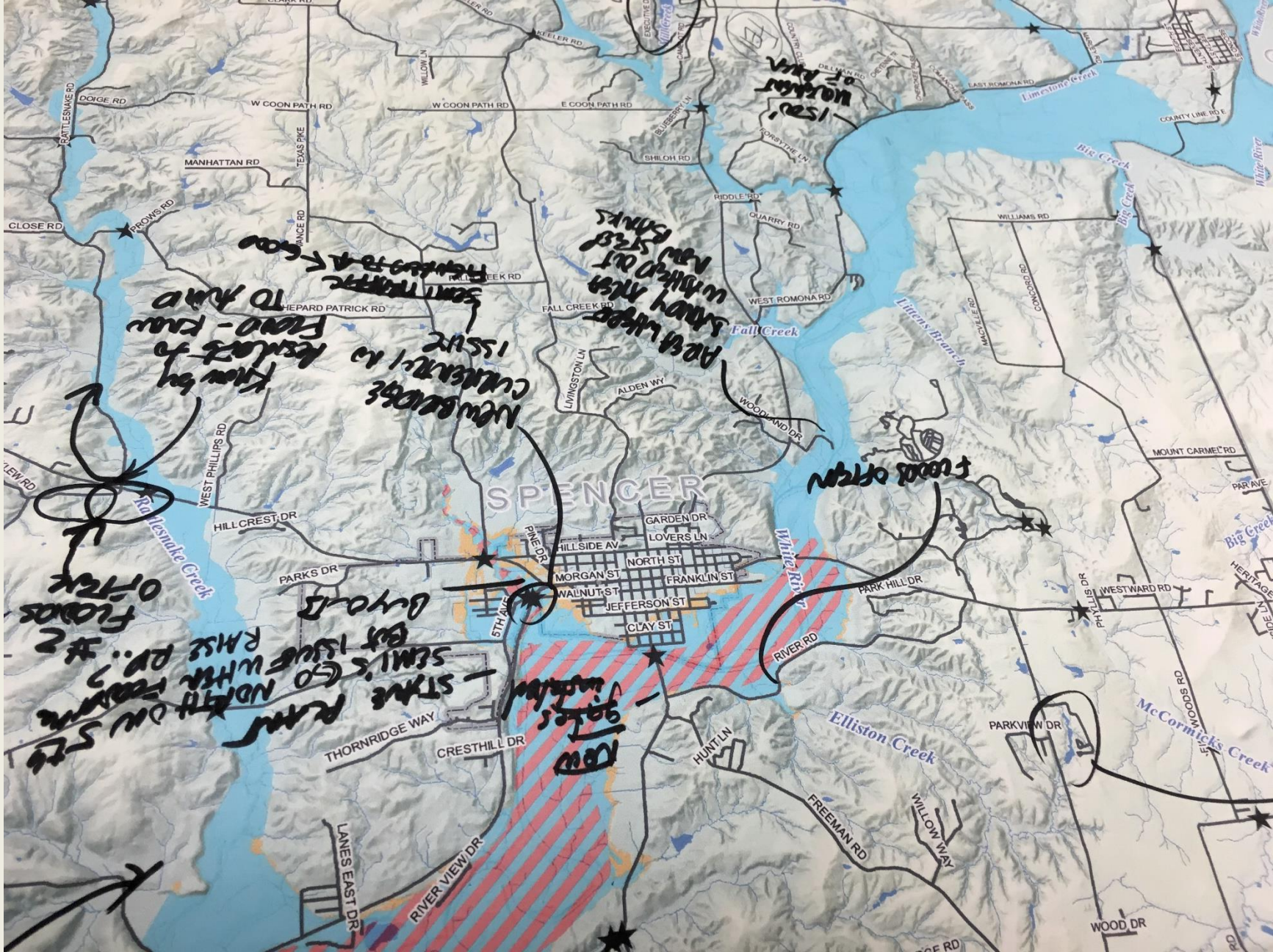
# Community Meeting

- A meeting was held in Owen County on December 7, 2015
- In general, the GIS analysis identified the areas of concern
- Priority ranking was modified during the meeting



# SPENCER

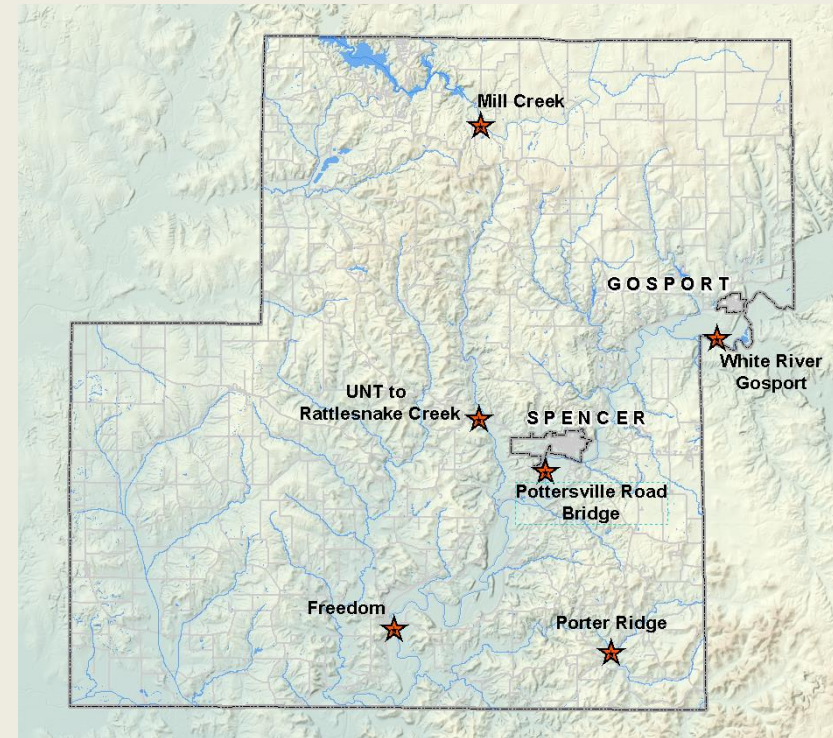




# Sites Selected for Detailed Analysis

Based on GIS analysis, Community Meeting and Site Visit, the following sites were selected for Phase III

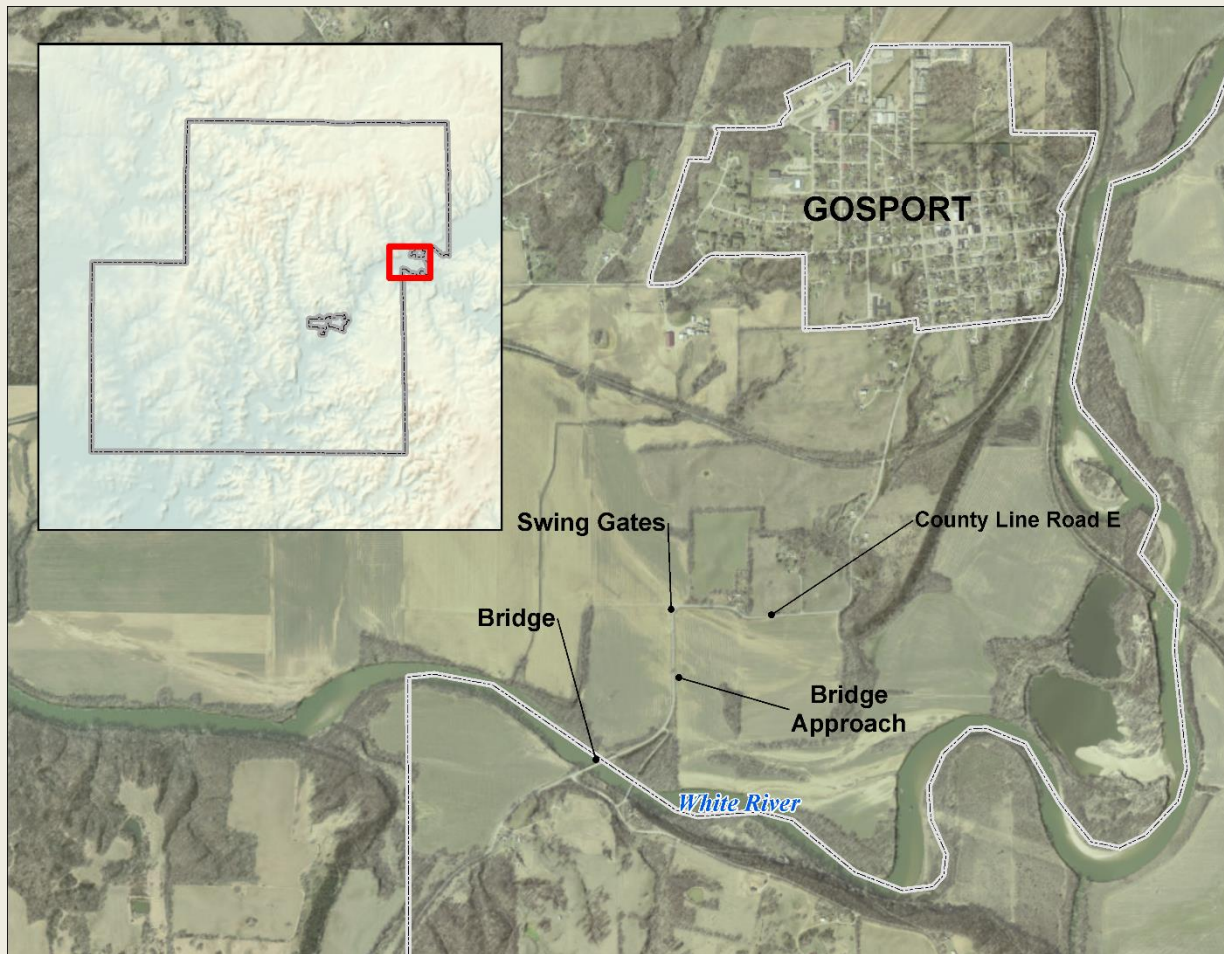
- White River at Gosport
- Mill Creek
- Pottersville Rd Bridge South of Spencer
- Freedom
- Unnamed Tributary to Rattlesnake Creek
- Porter Ridge



# Detailed Analysis

- Perform a detailed analysis of some of the highest priority areas
  - Examining existing models
  - New modeling
  - Depth grids
  - FEH mapping
  - Any additional data

# White River at Gosport





# Identified Issues

- Bridge Approach on County Line Road E floods during times of high flow on the White River
- Occurs 2 to 3 times a year
- Swing gates used to keep traffic off road when flooded
- Swing gates closed when flooding observed



# Site Visit



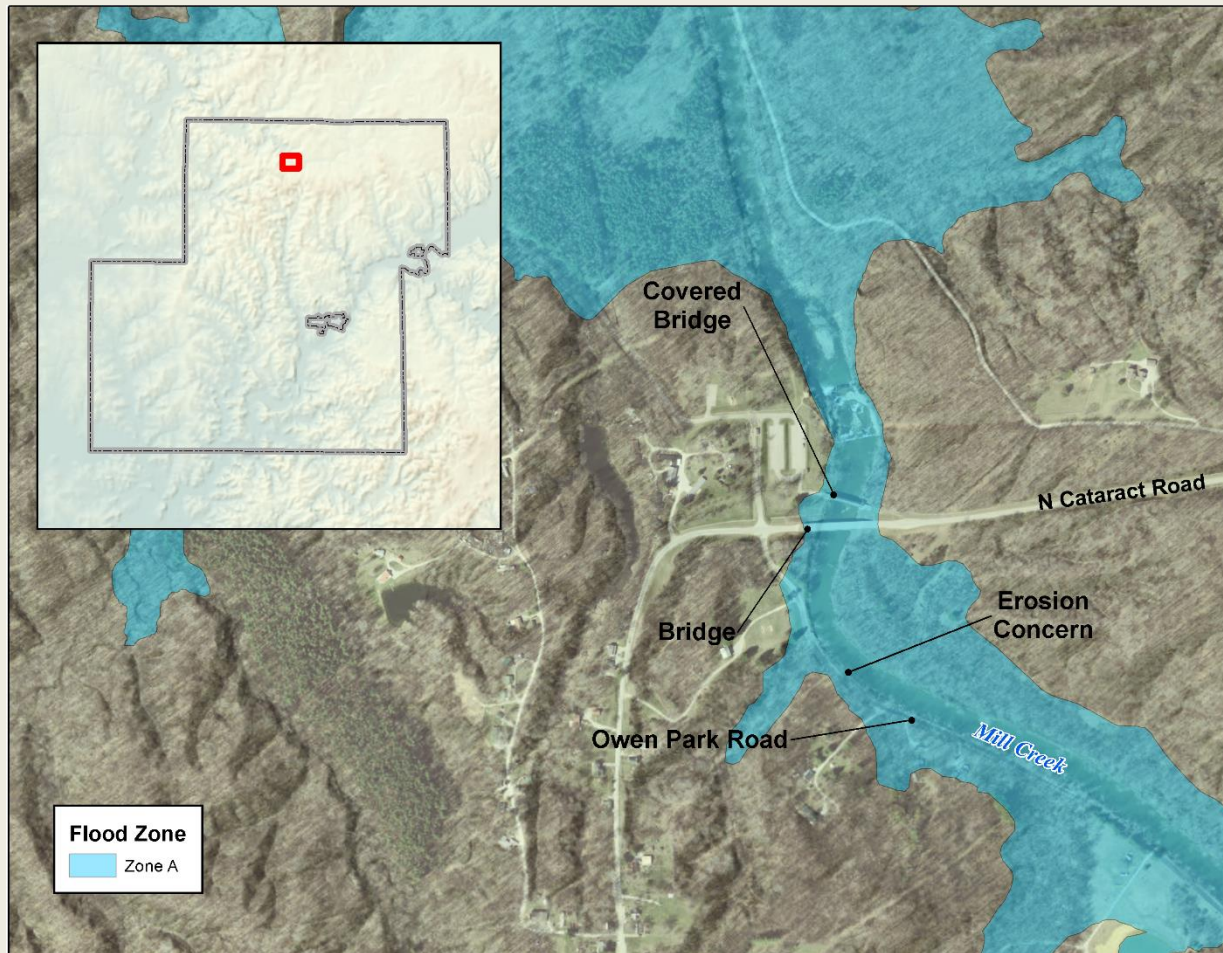
# Site Visit



# Proposed Action

- Model this section of the white River - tie water elevations to the gage at spencer
- Determine at what gage heights the road floods (Confirm NWS gage info)
- Determine the impact of elevating the road on closure frequency
- Help to avoid traffic traveling through flood waters

# Mill Creek



# Identified Issues

- Owen park road is parallel to Mill Creek south of the bridge at N Cataract Road
- Road is within the 1% floodplain
- The entire section is an erosion concern
- High water events have the potential for undermining the road

# Site Visit



# Site Visit



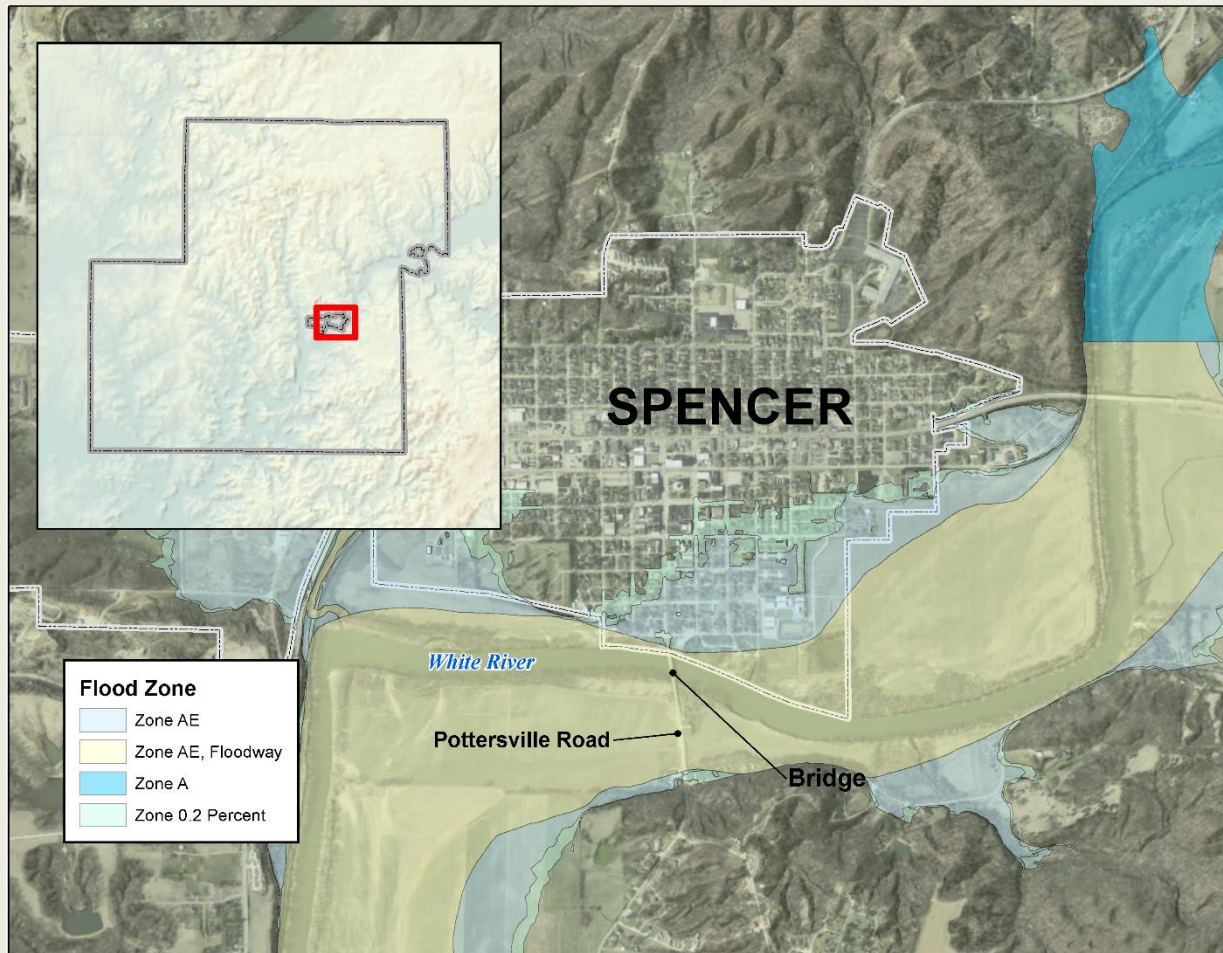


# Proposed Action

- IDNR will look into options for reducing the erosion risk to Owen Park Road.
- Include options for flow diversion, bank stabilization and road realignment.
- Rough cost estimates will be provided for all options



# Pottersville Road Bridge South of Spencer



# Identified Issues

- The bridge approach on Potterville Road, South of Spencer overtops during large events.
- The county has armored the road with concrete to reduce the possible damages
- Armoring did not include any culverts to allow high water beneath the surface



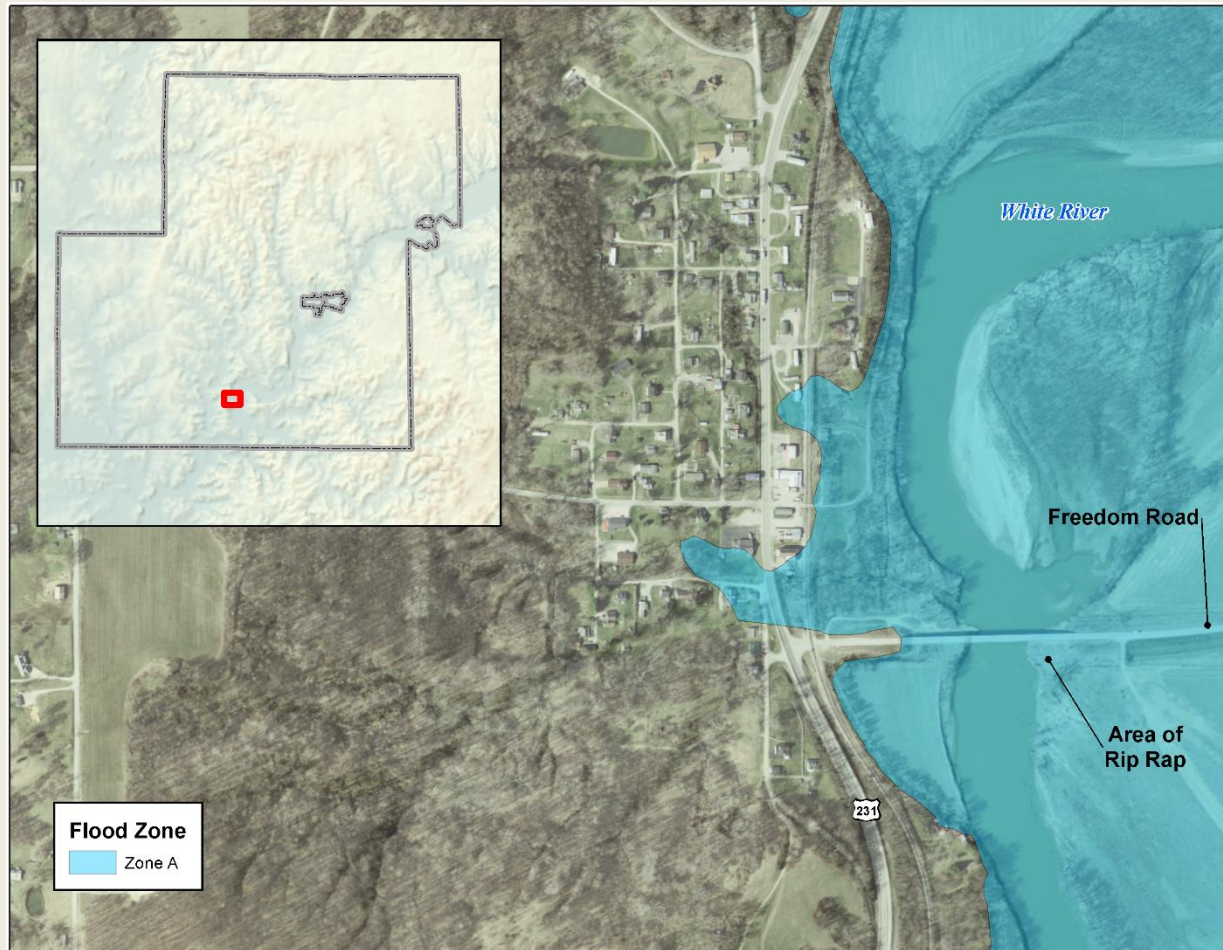
# Site Visit



# Proposed Action

- Determine the frequencies that the approach road over tops and tie these frequencies to the USGS gage
- Use these frequencies to validate the USGS Flood Inundation Mapper built for this location.
- Evaluate the impact of raising the road and adding culverts. This evaluation would include a cost analyses.

# Freedom



# Identified Issues

- Area of erosion on east side of the White River
- Rip rap placed just south of the Freedom Road Bridge
- The rip rap reduces the opening beneath the bridge
- May cause increased flooding and erosion beneath the bridge



# Site Visit

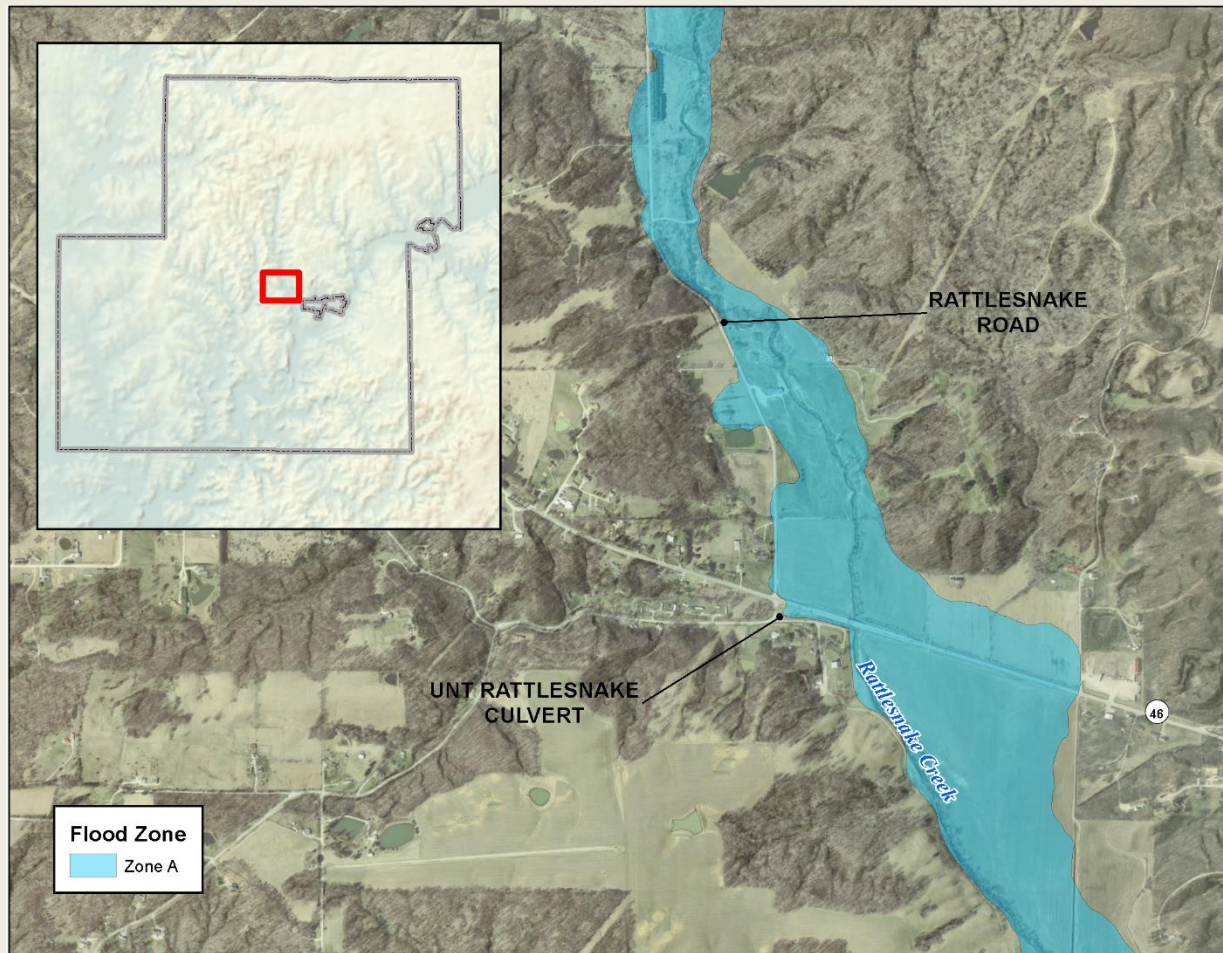




# Proposed Action

- Model the reach with different parameters for the opening beneath the bridge
- Determine impact on flow rates, erosion and flooding
- Investigate additional bank stability methods for reducing erosion
- Cost estimates may be provided should viable alternatives be proposed

# UNT to Rattlesnake Creek



# Identified Issues

- An undersized culvert on a tributary to Rattlesnake Creek overtops frequently
- Access to residences on the south side of SR 46 is limited when culvert is overtopped.



# UNT to Rattlesnake Creek



# Site Visit



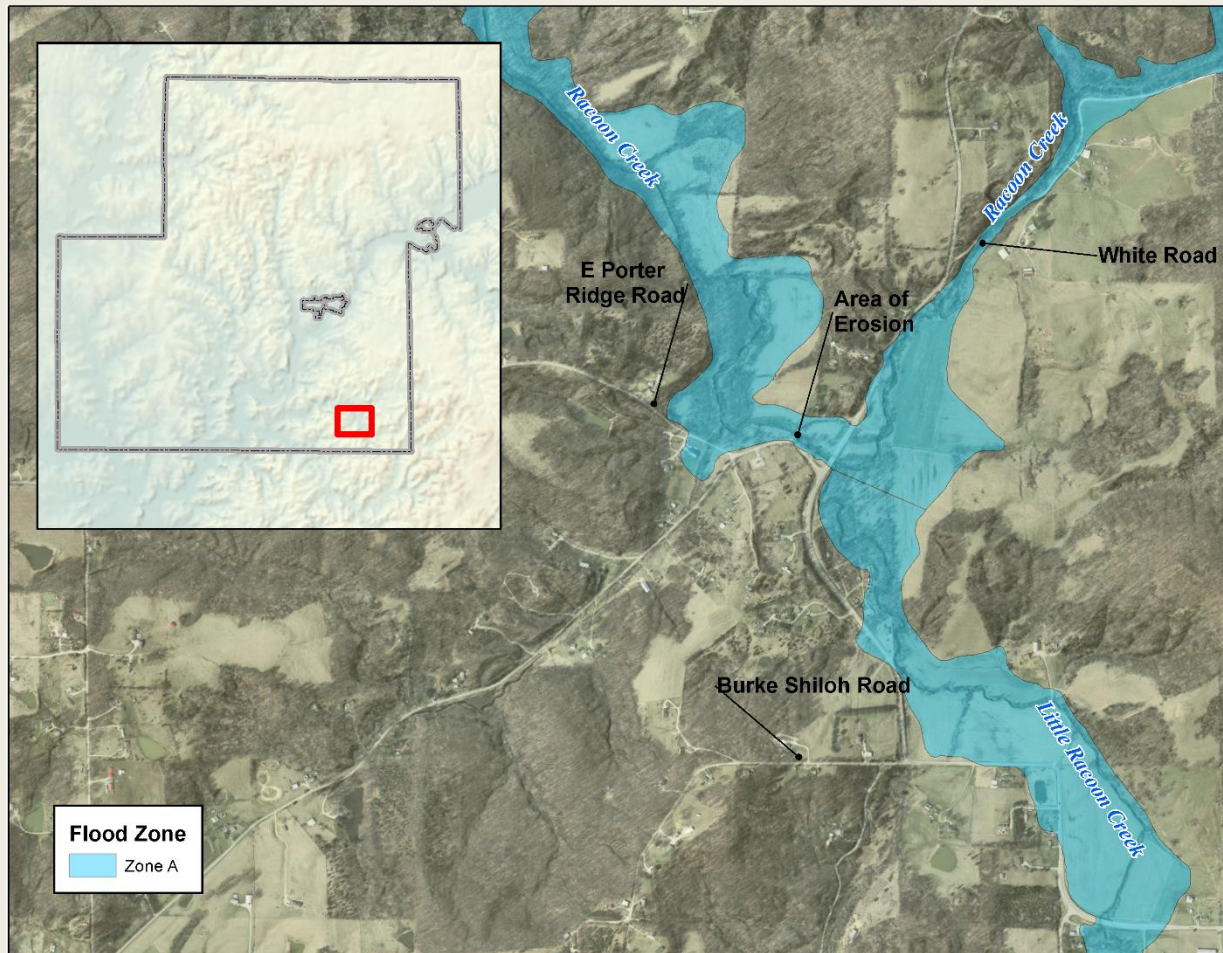
# December Site Visit



# Proposed Action

- Evaluate any potential changes that could be made to alleviate the flooding
- Evaluate what impact would occur if the culvert size was increased on the tributary
- Present an estimate for modifying the culvert should it render a positive impact on flooding

# Porter Ridge





# Identified Issues

- Erosion west of the confluence of Little Raccoon Creek and Raccoon Creek
- An utility building adjacent to Raccoon Creek that is at risk
- An abandoned bridge just west may be constricting flow during flooding



# Site Visit



# Site Visit



# Proposed Action

- Evaluate the flooding and erosion
- Model with increased capacity beneath the active bridge and removal of abandoned bridge.
- If the modeling supports removal of the flow impairments, an approximate estimate for removal will be provided

# Detail Analysis / Report

- Identified actions will be processed
- Where appropriate, estimates for structural mitigation actions will be provided
- Compile a report for submittal to FEMA and County



Thank you for listening.

Questions or Comments?

