



Mitigation Technical Support
Transportation Vulnerability Assessment
Owen County, Indiana

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Project Information

- Funded as part of FEMA's Risk MAP program
- Develop GIS tools and processes that can be used to assess and prioritize potential hazard damage to transportation assets
- Create a process that can be applied to other counties or communities



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



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

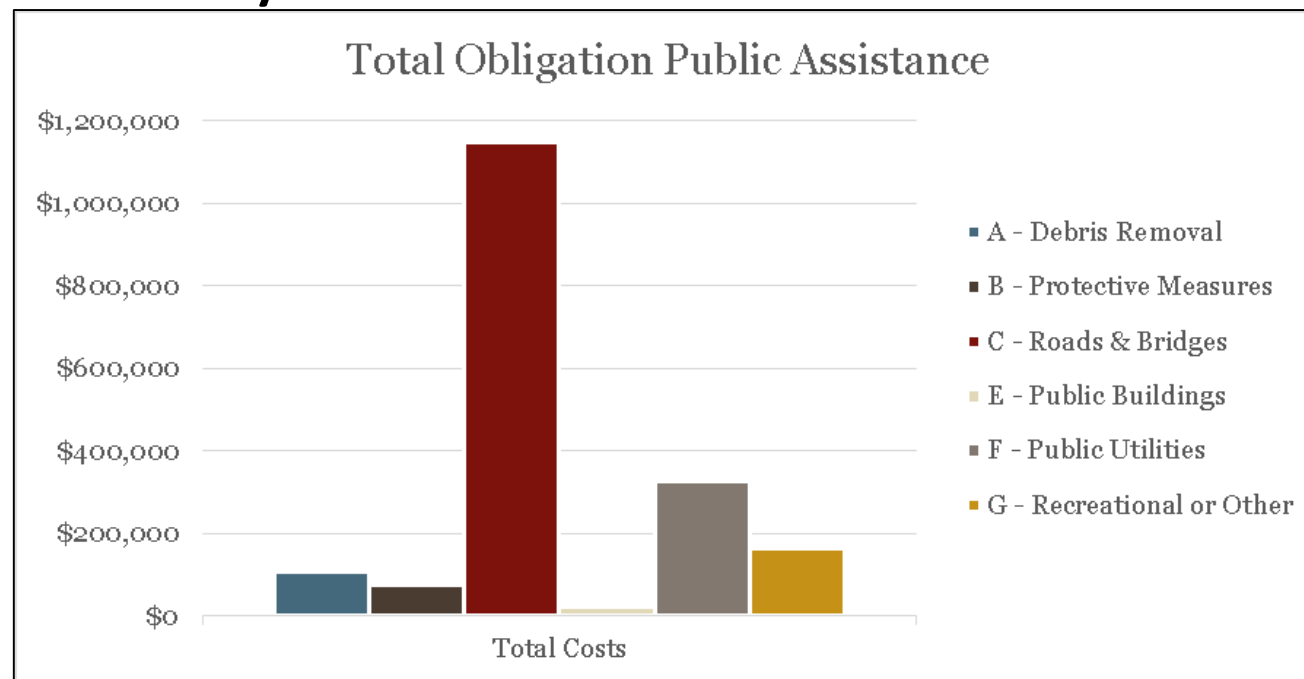


Open-File Report 2008–1322

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



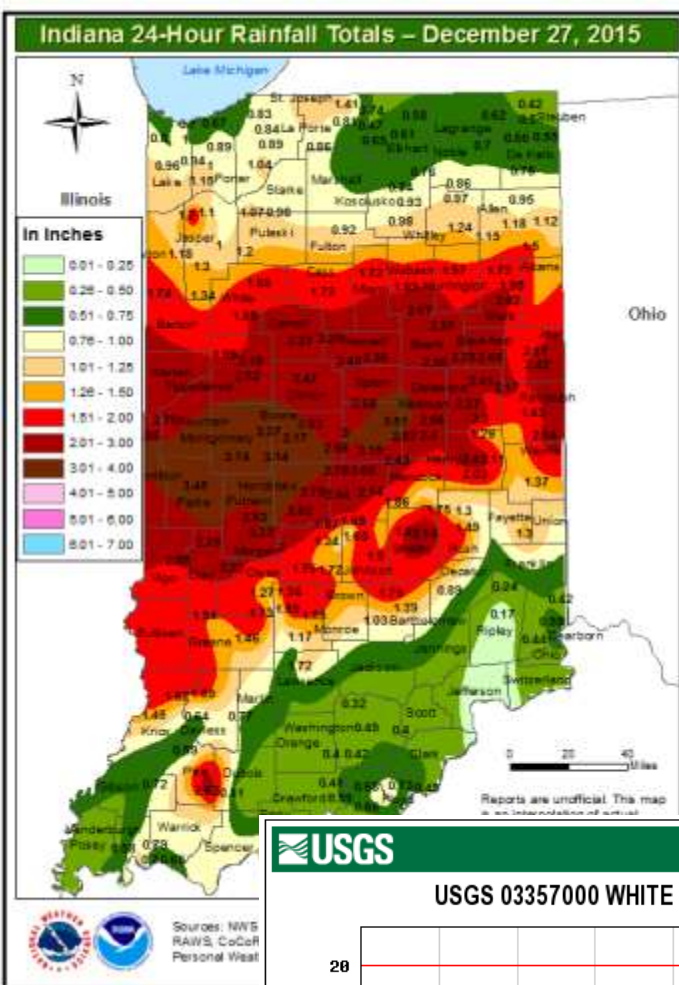


Project Goals

- 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

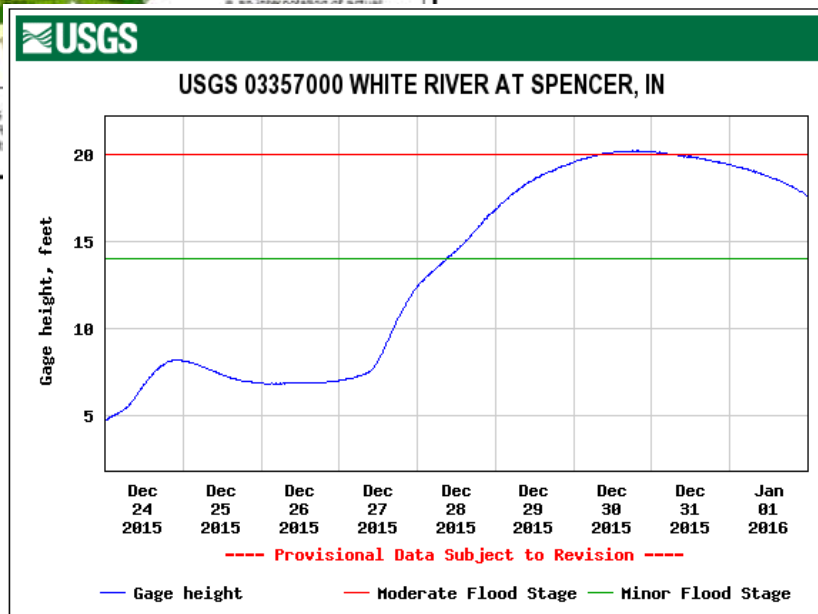
Phased Approach

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



Site Visit

- NWD – Dec 2015 9th wettest on record
- Over 3.5 inches of rain fell during a 24 hour period on December 27th
- Unique chance to see things in action
- 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 with detailed attributes including number of lanes
- Converted to a polygon feature and Segmented based on road width attributes



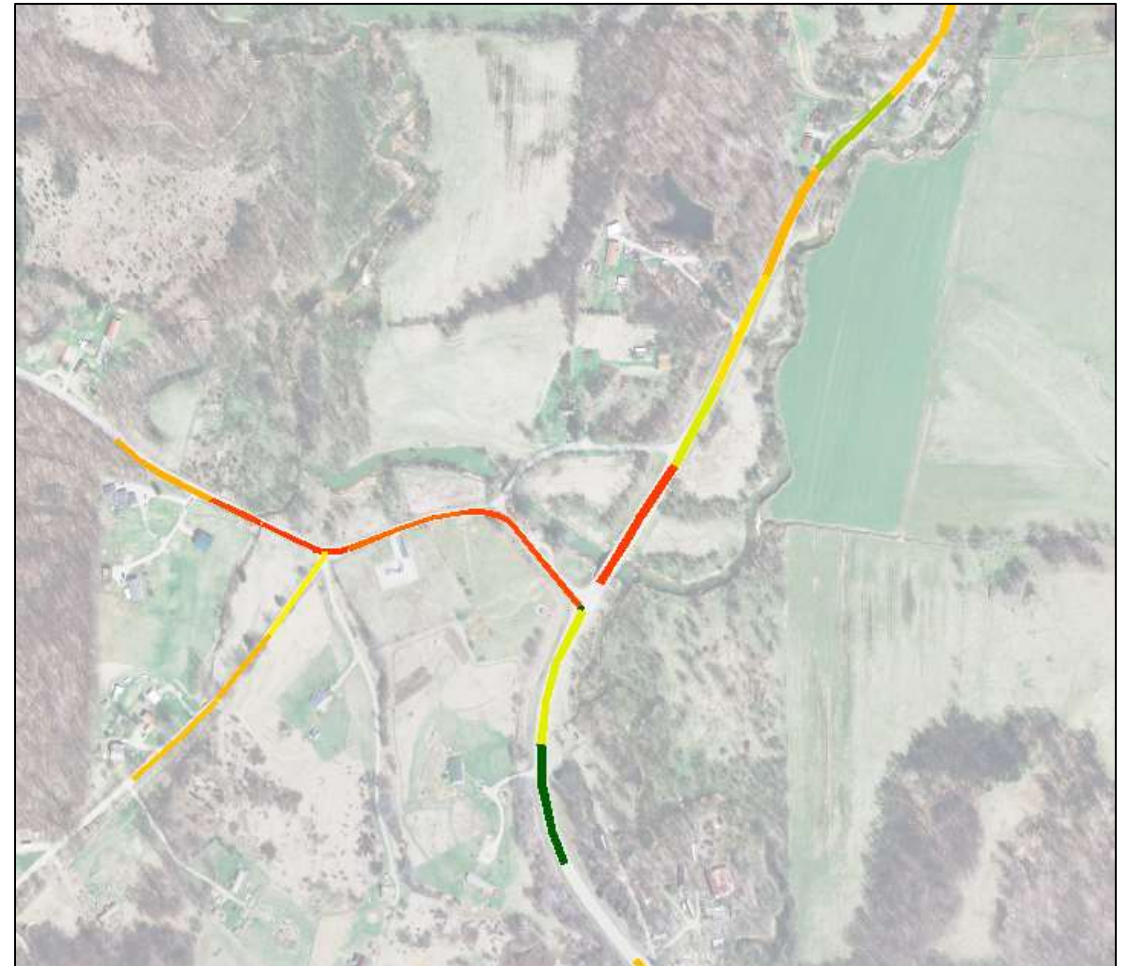


Flood Depth Grids

- 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%

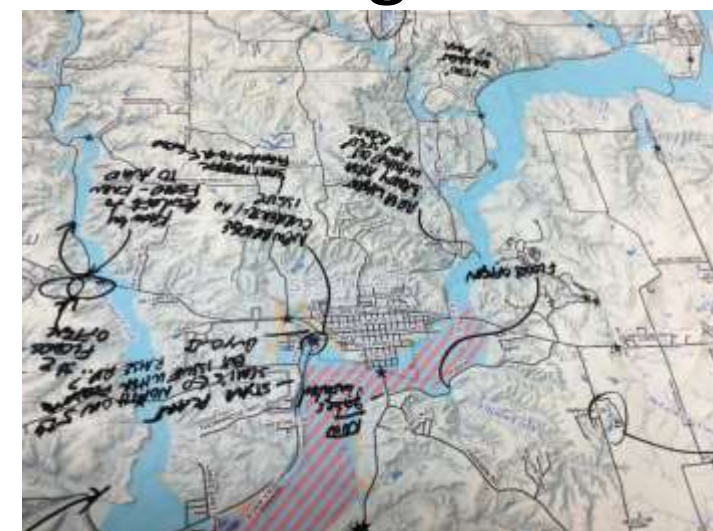
Analysis

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



Community Meeting

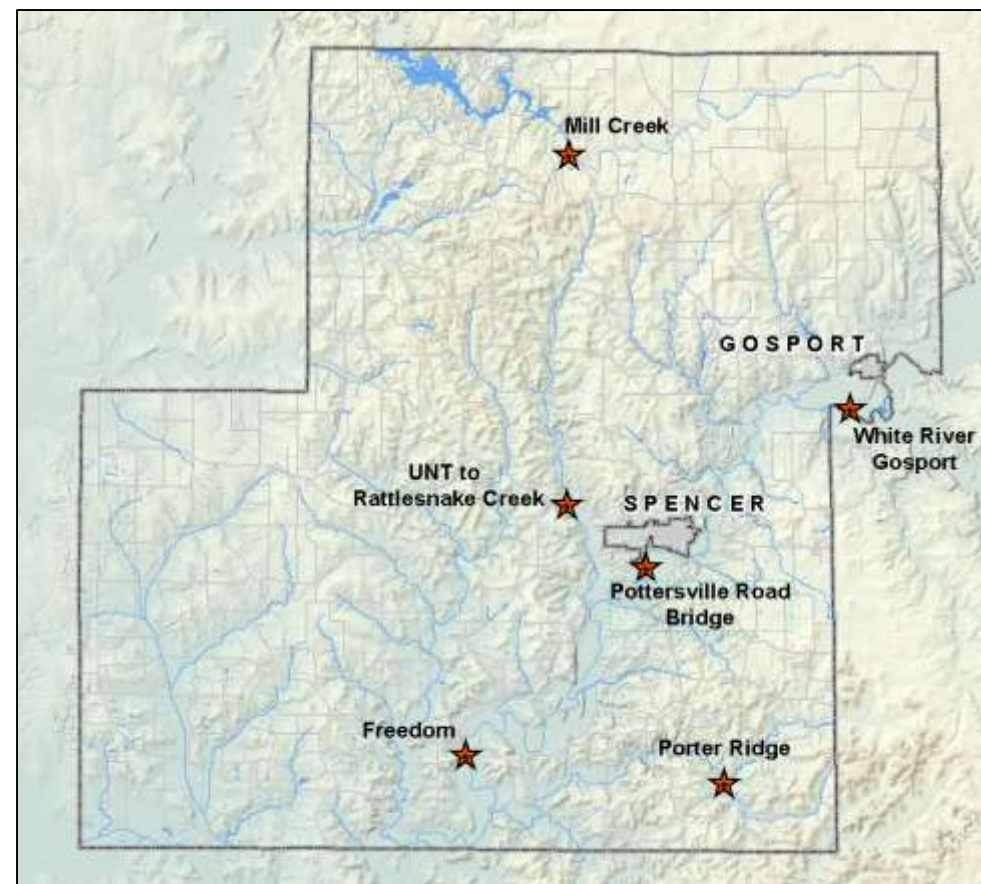
- A meeting was held in Owen County on December 7, 2015
- In general, the GIS analysis identified the areas of concern
- Priority ranking was modified during the meeting



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



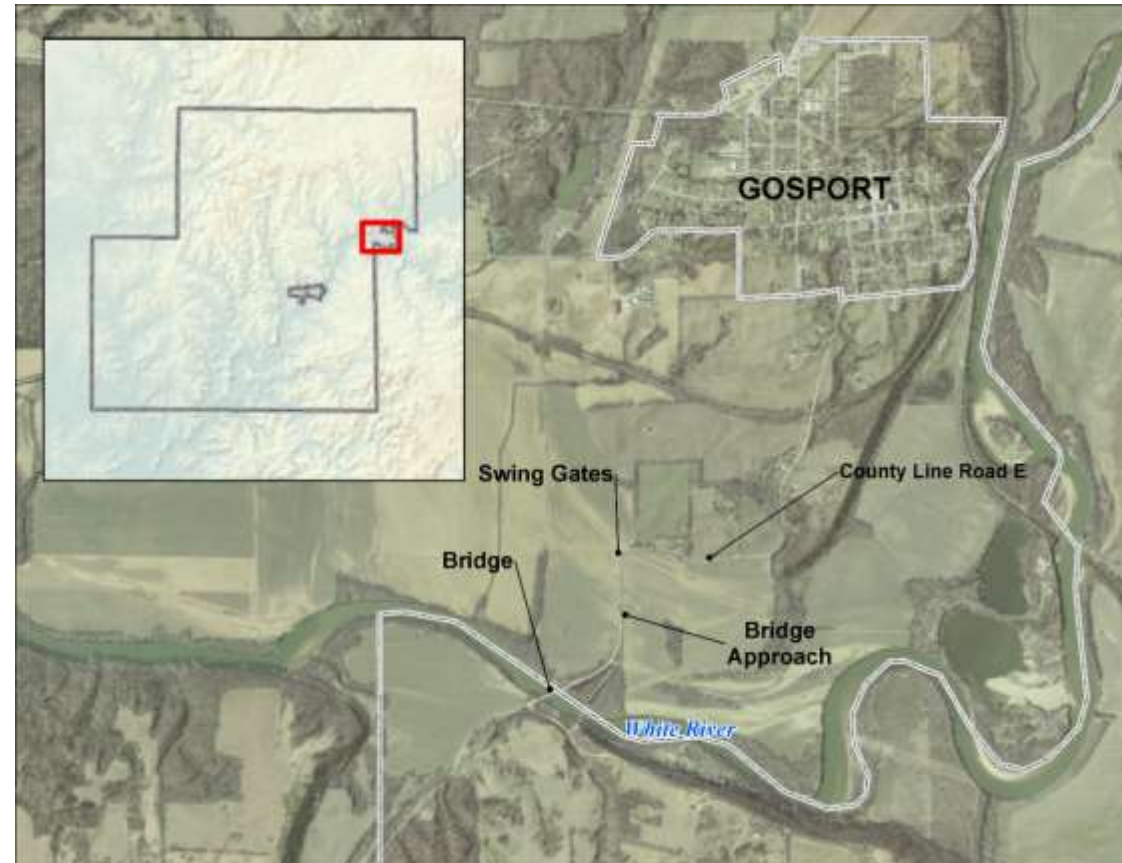


Detailed Analysis

- 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

- 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



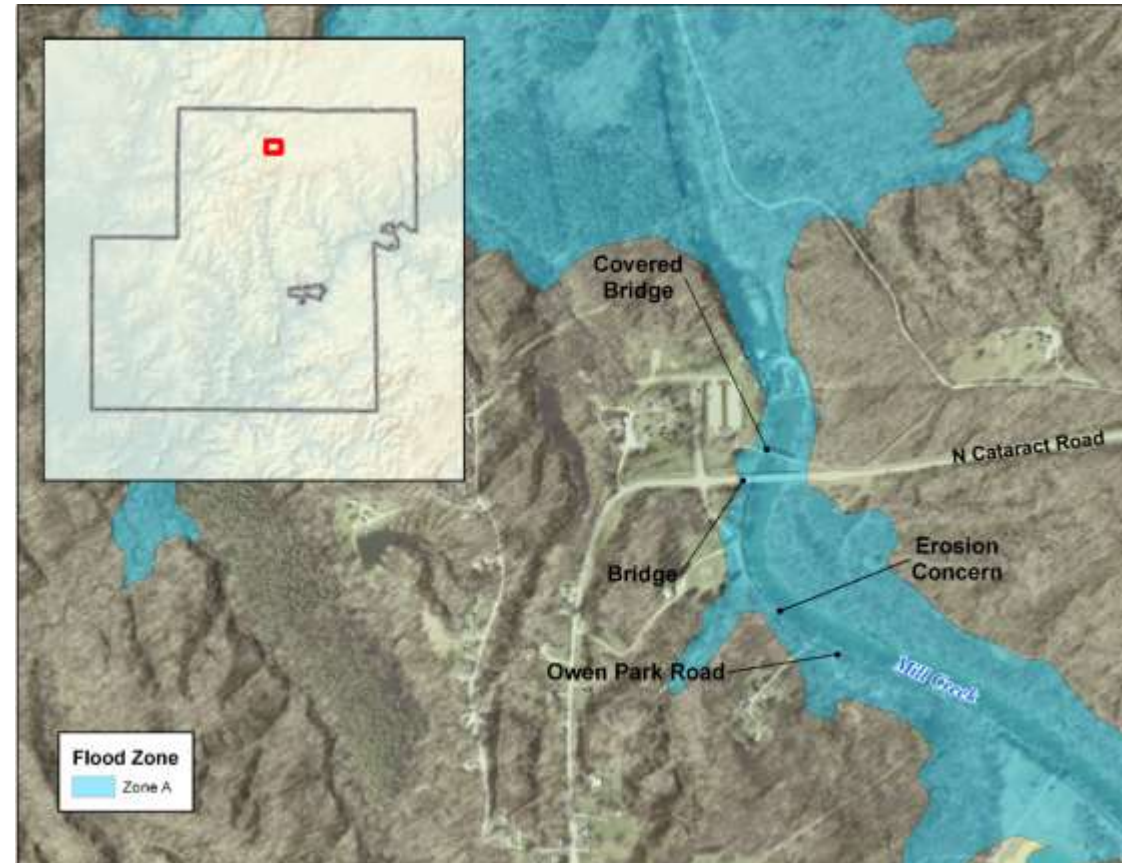
Proposed Action

- 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



Mill Creek

- 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



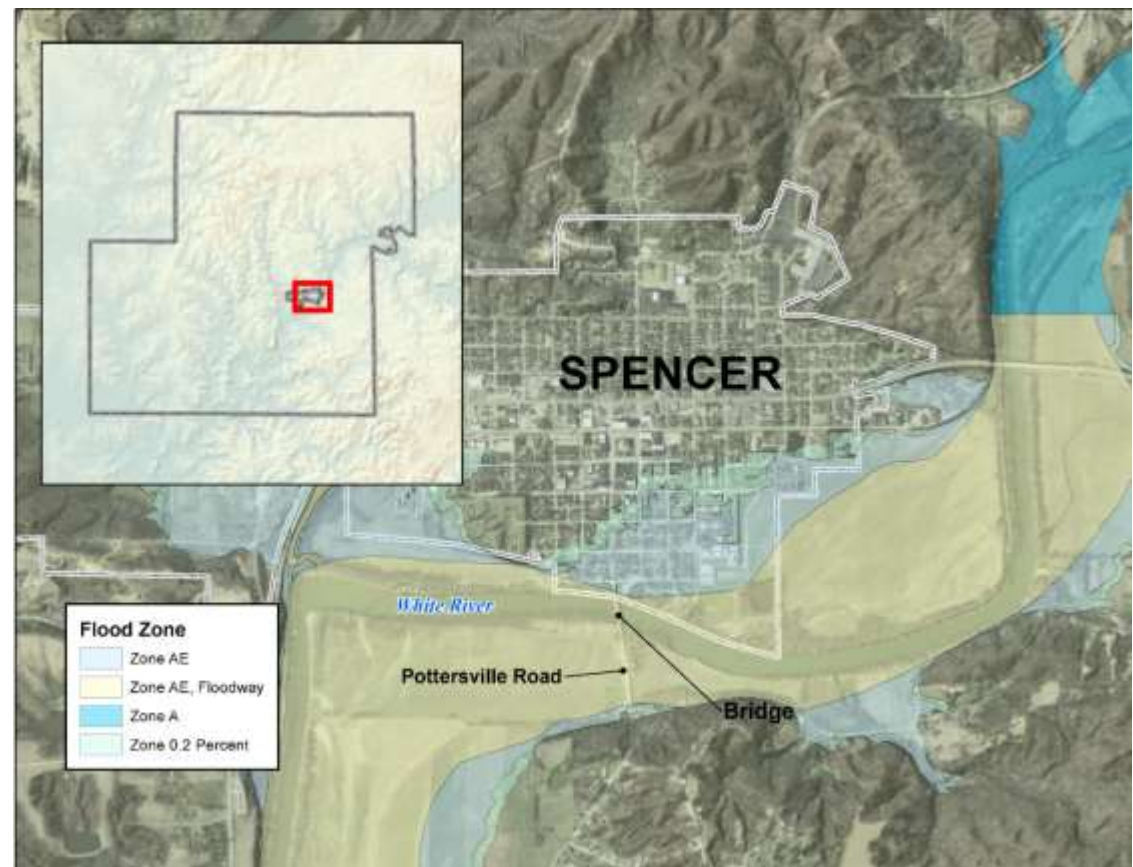
Proposed Action

- 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

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



Proposed Action

- Determine the frequencies that the approach road over tops and tie to the USGS gage
- Use frequencies to validate the USGS FIM built for this location.
- Evaluate the impact of raising the road and adding culverts including a cost analyses.



Freedom

- 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



Proposed Action

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



UNT to Rattlesnake Creek

- Rattlesnake Road runs along Rattlesnake Creek and is often overtopped during flooding events
- An undersized culvert on a tributary to Rattlesnake Creek is suspected as contributing to the volume of flooding



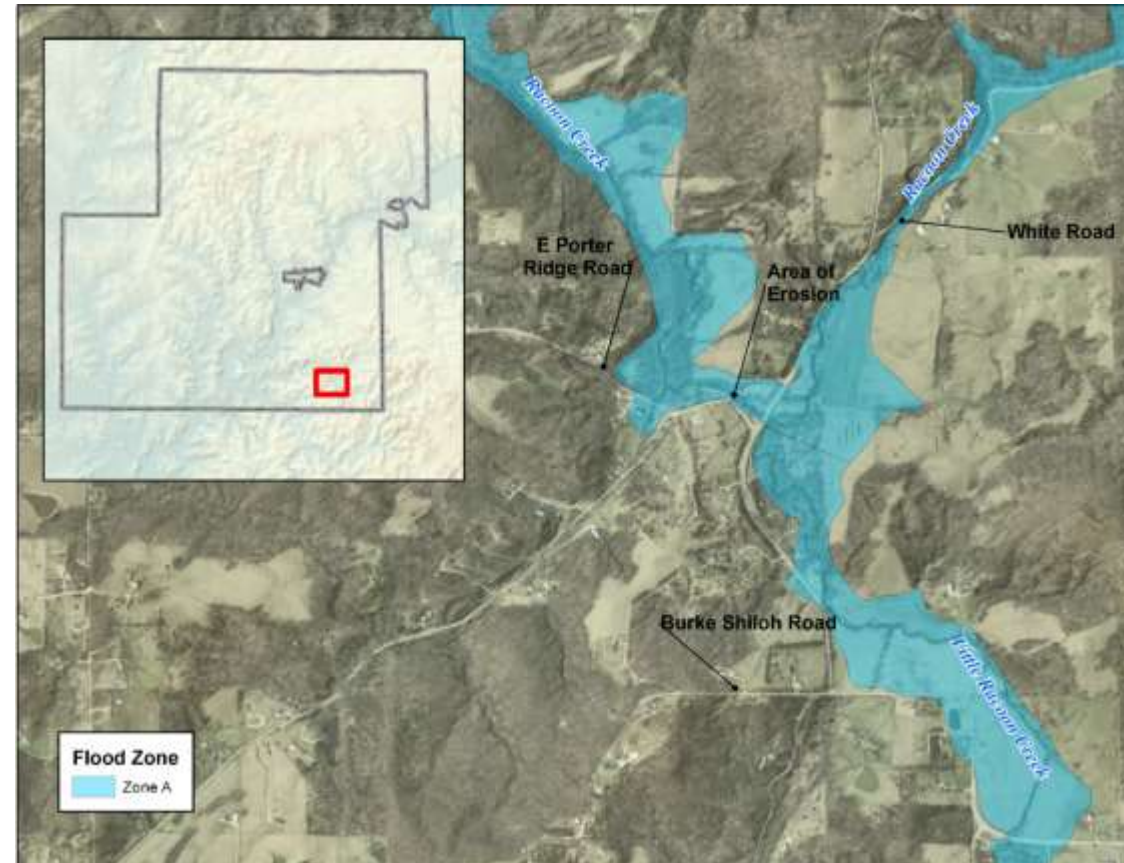
Proposed Action

- 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

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



Proposed Action

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





Current Project Status

- Identified actions currently being processed by DNR
- Estimates for structural mitigation actions are being determined
- Report is being compiled for submittal to FEMA and County



Thank you for listening.
Questions or Comments?