

Blue Moon: Kentucky's Contribution to the FEMA Moonshots

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To Protect and Enhance Kentucky's Environment

Flooding is a concern throughout the Commonwealth of Kentucky



Pineville, Kentucky (2018)



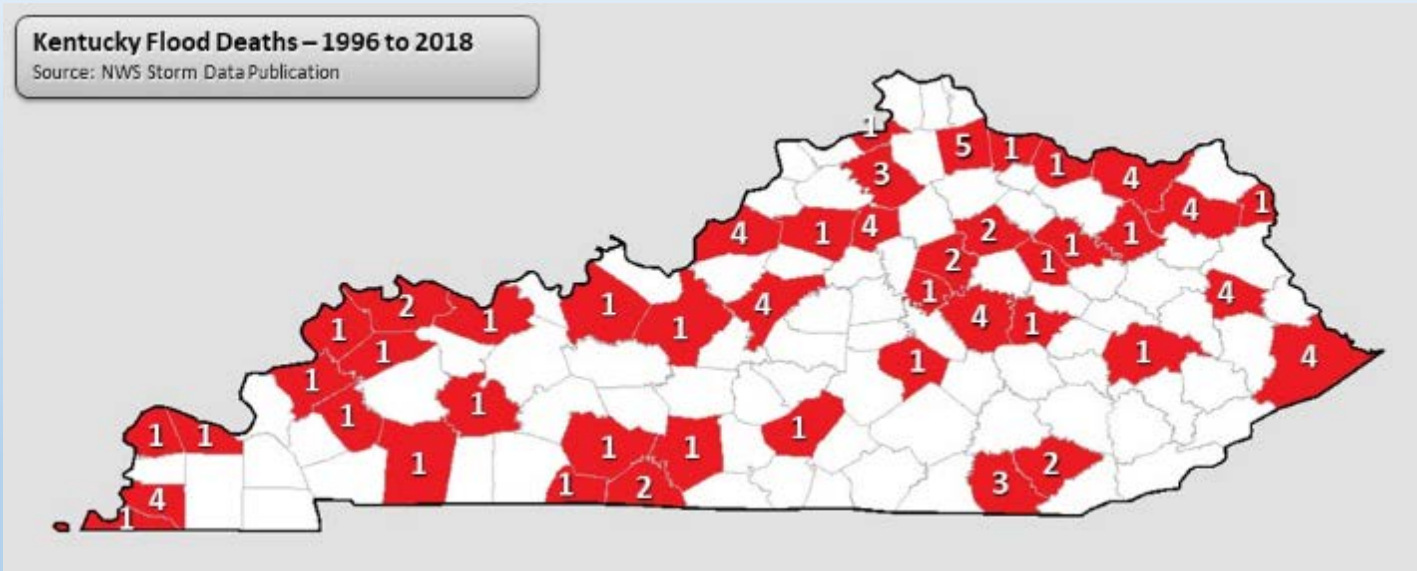
Metropolitan Louisville, Kentucky (2018)

Please follow us along at: <http://arcg.is/1eejv9>



Why do we care?

- KY has had 85 flood deaths from 1996 – 2018
 - 7 in 2018 alone
- KY has 1% of the U.S. population but accounts for 4% of U.S. flood deaths between 1996 and 2018
- 45 Kentucky counties have experienced deadly floods since 1996



Location	Deaths	% of Total
Vehicle	53	62%
Already in Water	15	18%
Mobile Home	8	9%
Outside	6	7%
Permanent Home	3	4%

Source: NWS Storm Data Publication

Source: <https://www.weather.gov/jkl/flooddeathhistory>



Flood Risk Management is essential

- Common goals
- Shared responsibilities
- Respect missions and authorities
- Concise, unified message is a need
- Explore multiple methods of delivery



Flood Risk Management is coordinated across state agencies....

- DOW

- National Flood Insurance Program (NFIP)
- Floodplain permitting
- Flood hazard mapping
- Dam Safety
- 401 Water Quality Certification
- Stormwater
- Clean Water Act
- Safe Water Drinking Act

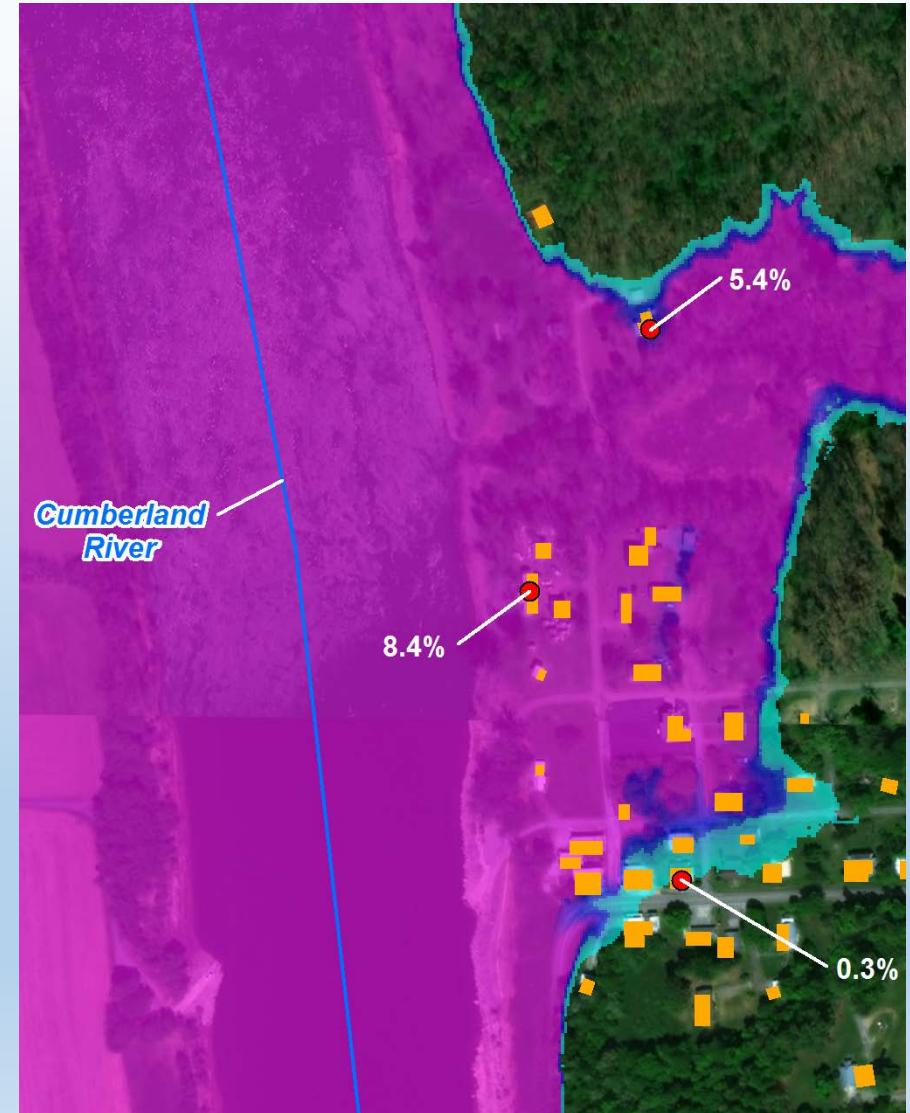
- KYEM

- Response, Recovery, and Mitigation
- Public Assistance
- Individual Assistance
- Hazard Mitigation Assistance programs
 - HMGP
 - FMA
 - PDM

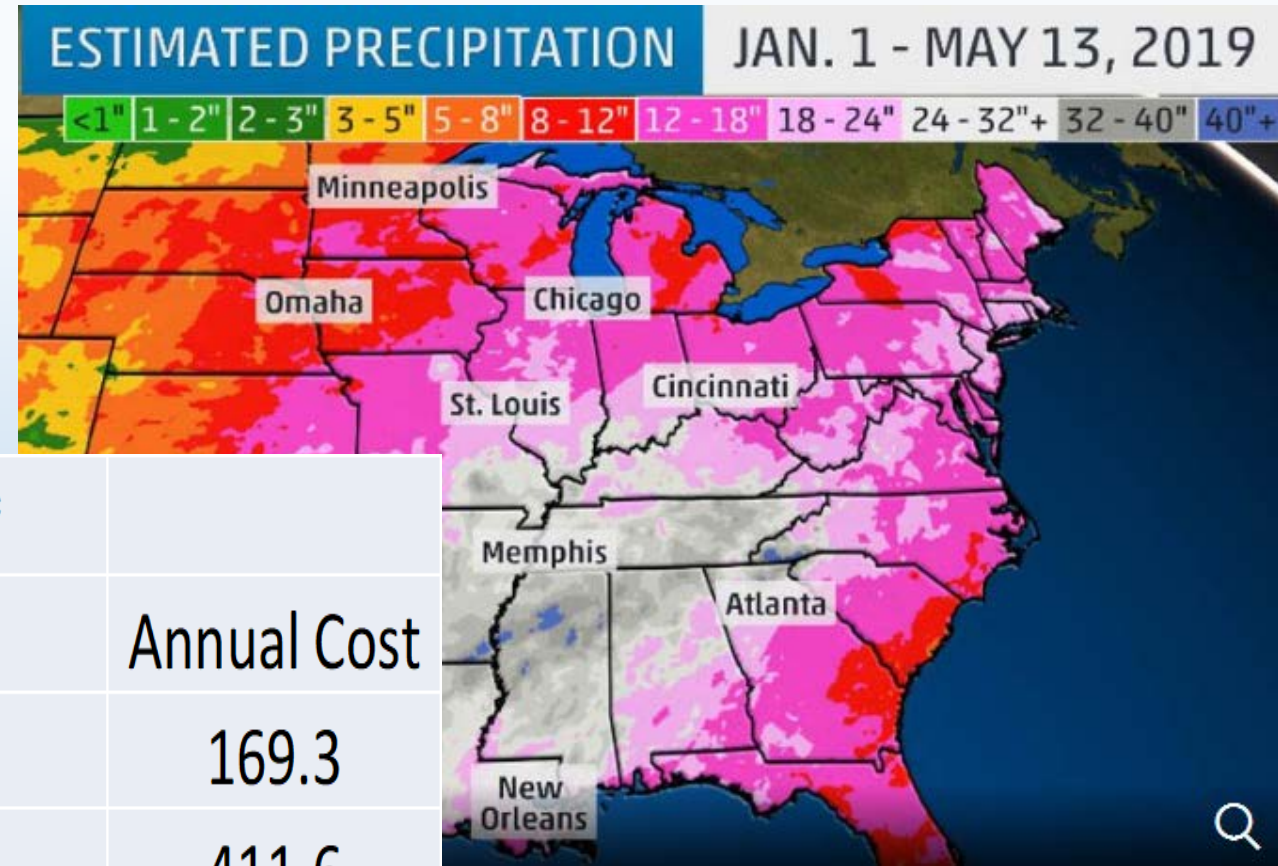


...and delivered to key stakeholders and citizens using Flood Hazard Mapping and Risk Tools

- Risk MAP
 - Mapping
 - Assessment
 - Planning
- Informs floodplain management, regulations, flood insurance, and mitigation
- Ties flood hazard identification, flood risk assessments and hazard mitigation planning together



Disasters are getting worse...



U S Annual Billion Dollar Storms*

Time Frame	Number of Storms	Annual Cost
1980 - 1989	28	169.3
2006 - 2015	90	411.6
2016 - 2018	45	452.7
* CPI adjusted to 2018 (NOAA)		



... and floods don't follow SFHA Boundaries



52 Percent of Flooded Properties From Hurricane Harvey Not in Designated Flood Zones

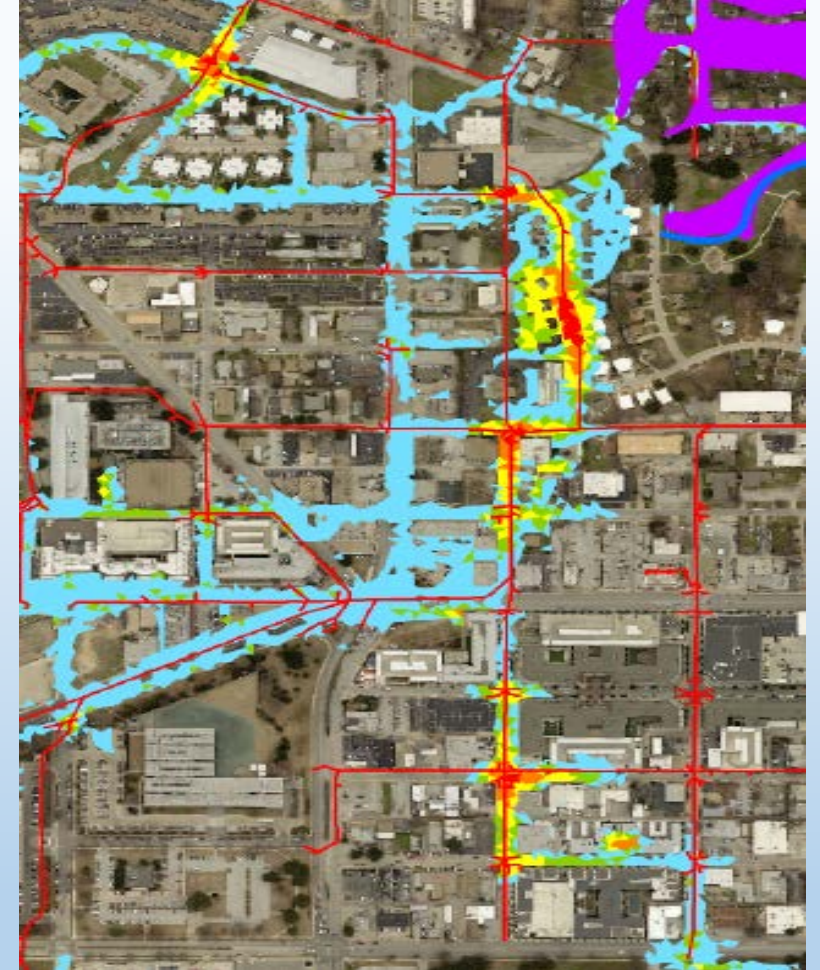
Residential News » [Houston Edition](#) | By [Michael Gerrity](#) | August 29, 2017 9:00 AM ET



The National Academies Report on Urban Flooding (April 2019)

Report Conclusion:

The current costs and impacts to urban flooding merit national attention. Further, flood problems are likely to get worse with continued urban development and population growth in urban areas, as well as with climate change, which is increasing sea level rise and frequency of heavy precipitation events.



Finding: A new generation of flood maps and visualizations that integrate predictions and local observations of flood extent and impact is needed to communicate urban flood risk. Improved methods for updating the maps to keep pace with urbanization and climate change are also needed.



FEMA recognized this in its Strategic Plan



Strategic Plan

Helping People. Together.

Federal Partners • State, Local, Tribal, and Territorial Partners •

2018-2022

Strategic Plan

Federal Emergency Management Agency



With the FEMA Moonshots



Leveraging technology and data will **streamline** the underwriting and policy issuance process

A more credible view of risk will encourage coverage in all risk-prone areas



Offering more mitigation credits will incentivize risk reduction efforts

Intuitive rating variables that clearly communicate risk will highlight mitigation opportunities



Kentucky uses best practices to educate key stakeholders to help drive actions to meet the FEMA moonshots

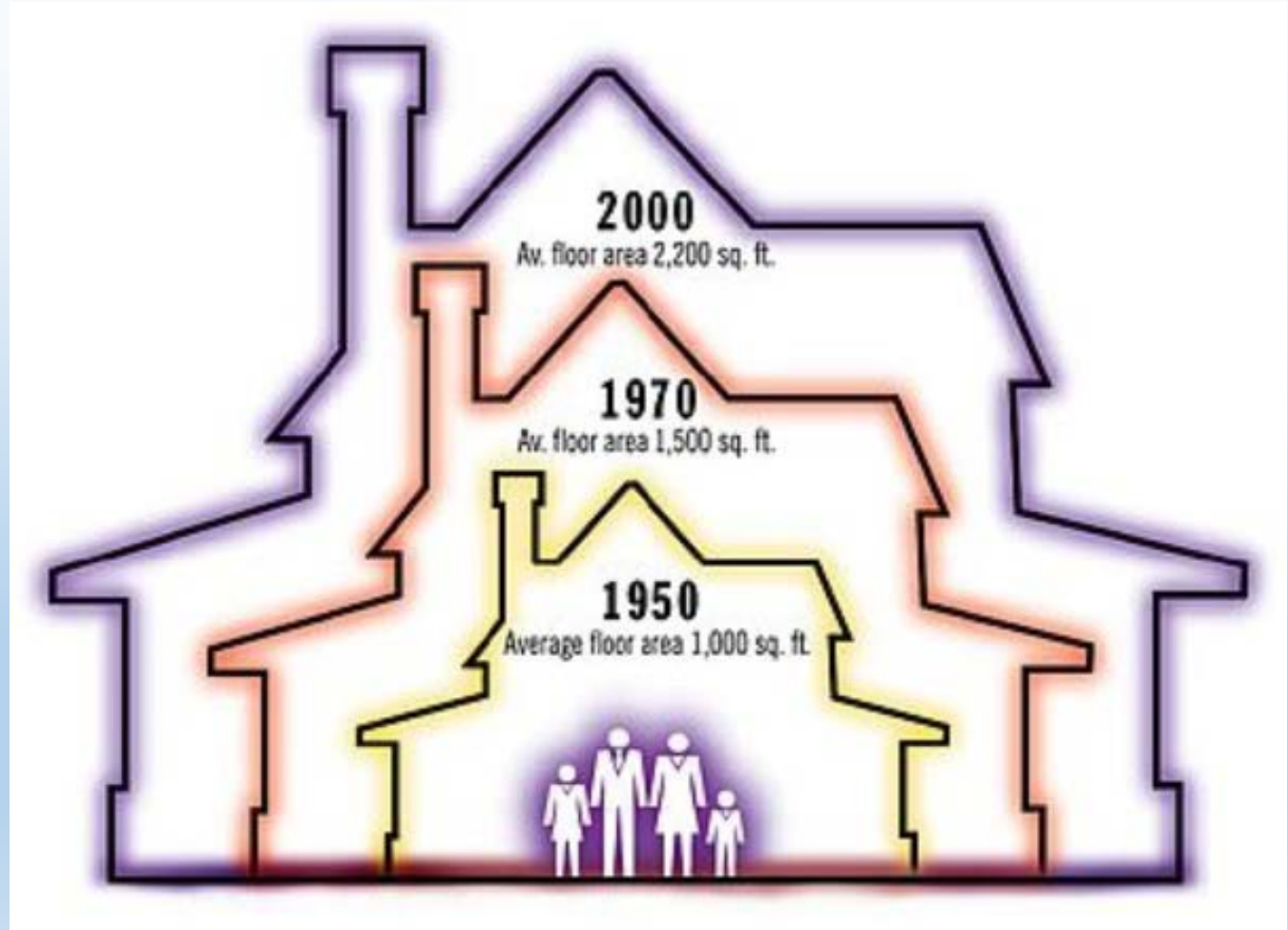
- Communicate Key Messages
- Best Practices
 - DOW Water Maps Portal
 - Interactive Surveys
 - Virtual Reality
 - Structure-based flood risk assessments



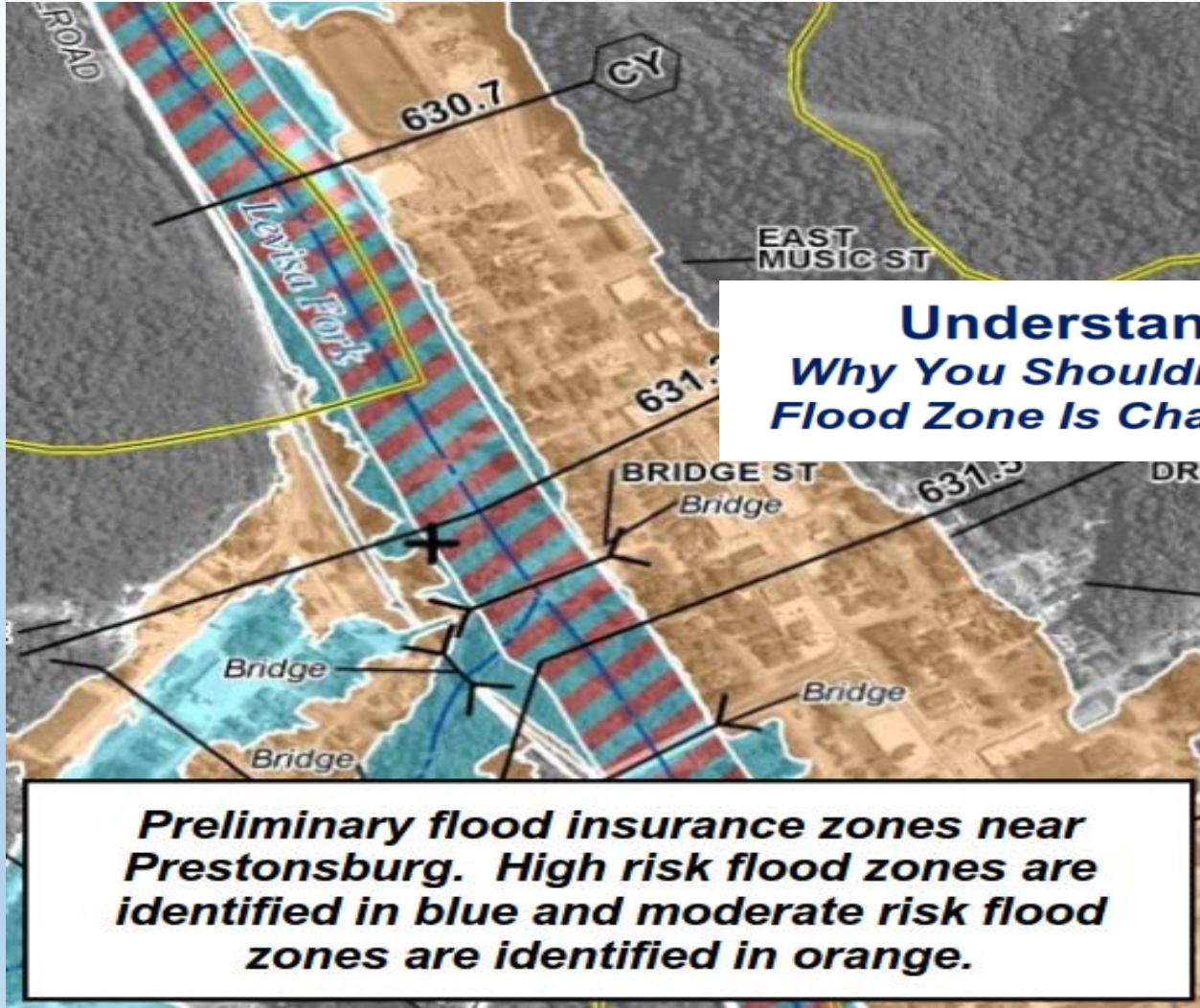
Communicate Key Messages: Explain Insurance Benefits and Implications

Risk Rating and Policy Forms Redesign

- Reflects local flood risk
 - Not just in-or-out of the floodplain
 - Reflect different types of flood risk, including fluvial, pluvial, and coastal surge
- Reflects the cost to rebuild
 - Because of increased housing sizes and related costs, the current system overcharges inexpensive homes
- The best way to reduce flood risk is to transfer a portion to insurance companies



Communicate Key Messages: Explain Insurance Benefits and Implications



Understand Your Flood Risk, Floyd County:
Why You Shouldn't Cancel Your Flood Insurance Policy if Your Flood Zone Is Changing from High Risk to Moderate or Low Risk



Communicate Key Messages: Encourage Mitigation Actions in Communities



Kentucky DOW Water Maps Portal



A wide variety of water-specific web maps, applications, and services are being showcased from this Portal. DOW has compiled these maps as a service to our customers using information from various sources. DOW cannot ensure that the information is accurate, current or complete. Neither the information presented nor the maps themselves are official documents.

Portals, Viewers and Story Maps



Flood Hazard Portal ▼



Water Health Portal ▼



KY Watershed Viewer ▼



Story Map Gallery ▼



HAB Viewer ▼



Forestry - Special Use Waters ▼



Drought Viewer ▼



FEMA flood map project updates ▼



KY Certified Well Driller Webapp ▼

- Flood Hazard Portal
- Water Health Portal
- KY Watershed Viewer
- DOW Story Maps Gallery
- Harmful Algal Blooms (HAB) Viewer
- Special Use Waters
- Drought Viewer
- Flood Map Project Updates
- Certified Well Driller's Webapp

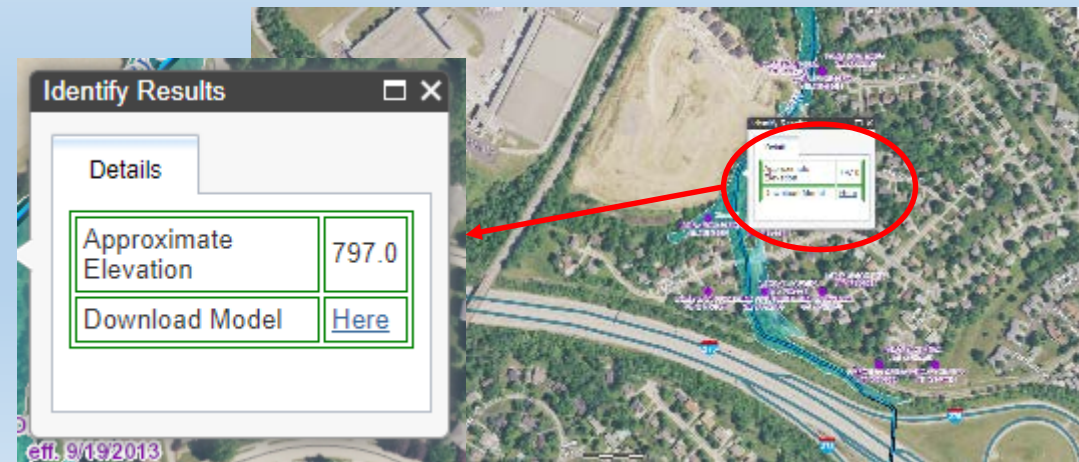
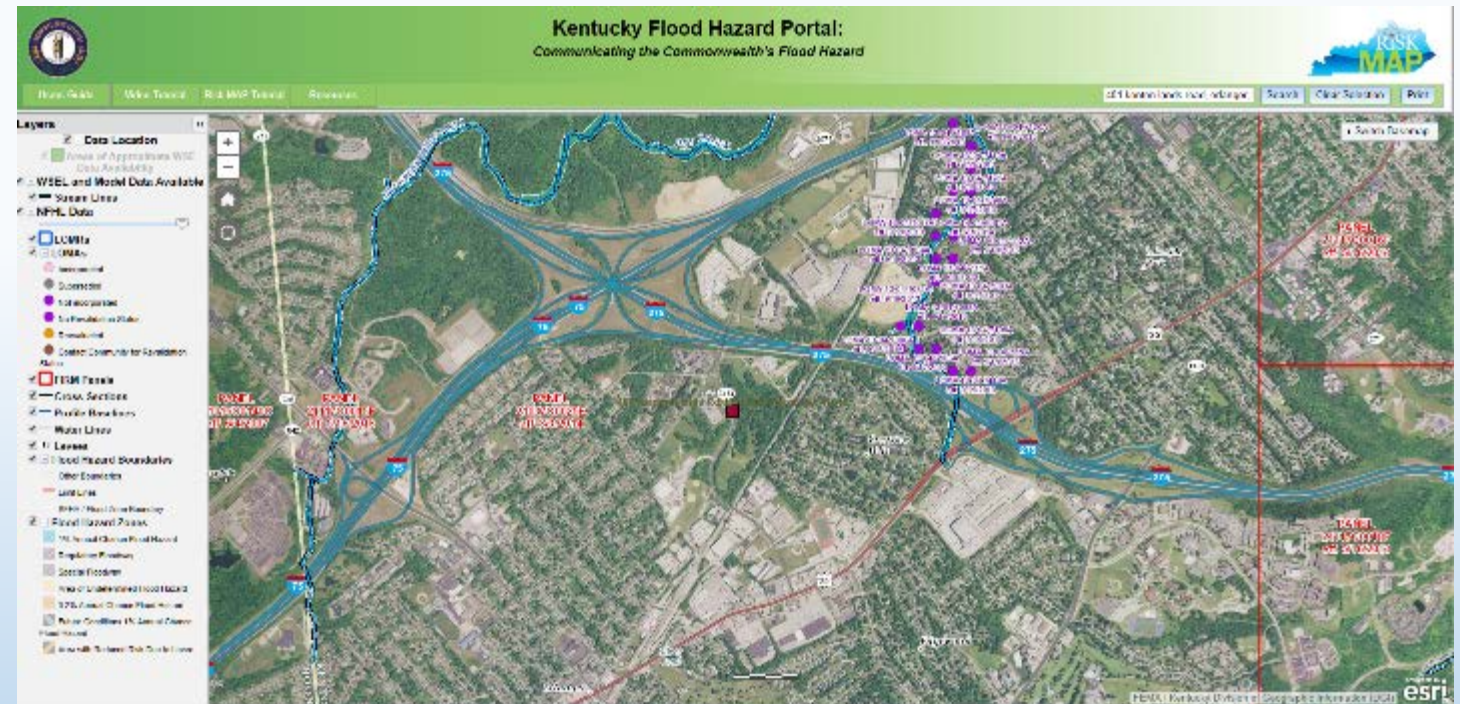
<http://watermaps.ky.gov>



Kentucky Flood Hazard Portal

- Statewide flood hazard areas in a single map
 - Displays the same floodplain as the FEMA GeoPlatform
- Provides: Zone A flood hazard data in 119 counties (excludes Louisville Metro)
 - 1% annual chance flood elevations in Zone A floodplains with a simple click on the stream centerline
 - Hydrologic & Hydraulic reports and HEC RAS models available for download
 - FIS also available for download
- Future Improvements
 - Flood depth grids and other Risk MAP products
 - Dam safety information
 - Mobile-friendly

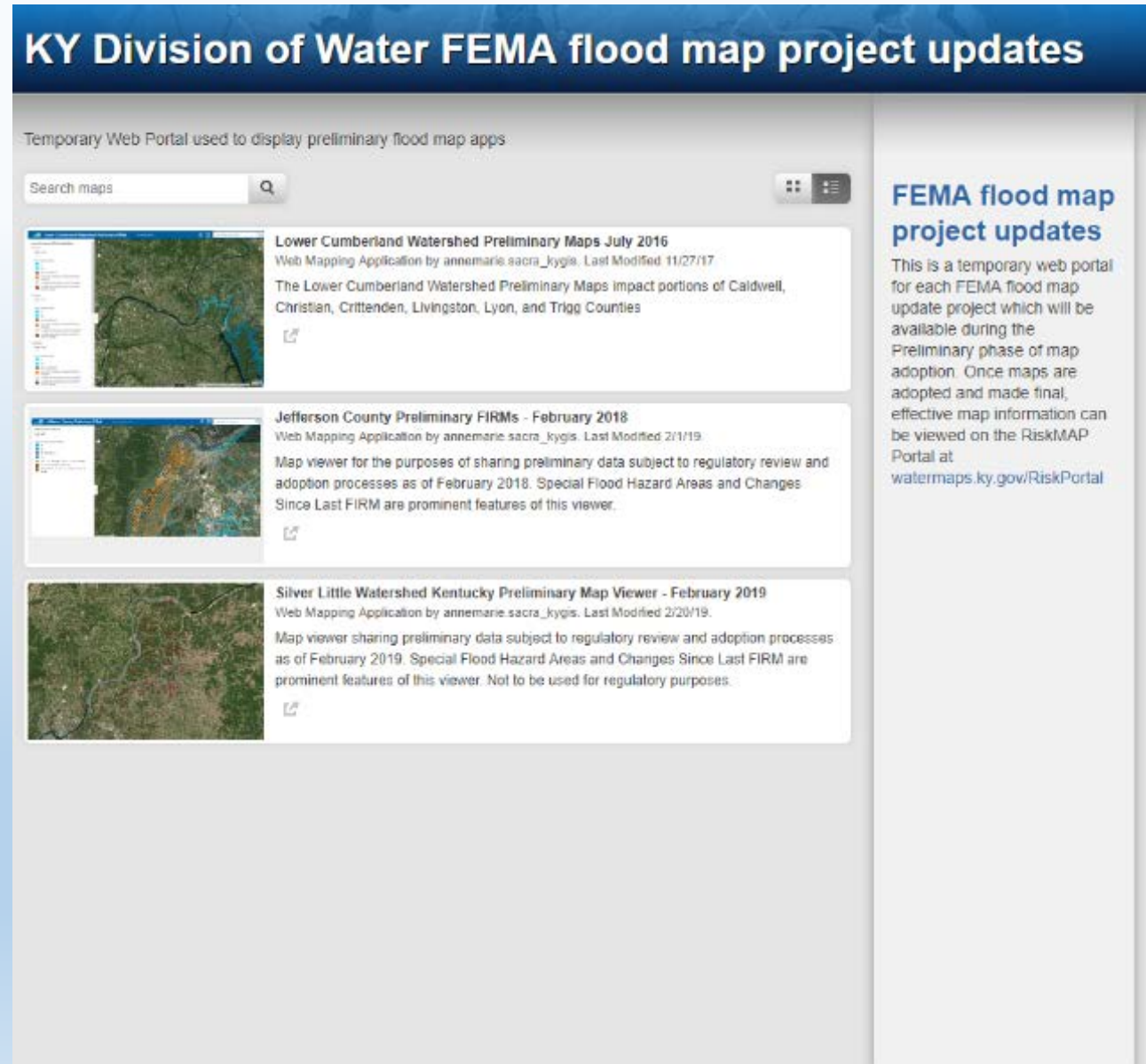
<http://watermaps.ky.gov/RiskPortal/>



Flood Map Project Updates

- DOW is in the process of revising flood hazard maps for several watersheds in the Commonwealth
- Preliminary maps for communities to review
 - Not Effective for Regulatory Use
 - May be used as best available data
- Three studies currently available for review
 - Lower Cumberland watershed
 - Jefferson County (Louisville Metro)
 - Silver-Little Kentucky River watershed
- Generally, not all FIRMs are updated during this process

<http://watermaps.ky.gov/>



The screenshot shows a web portal titled "KY Division of Water FEMA flood map project updates". Below the title, it states "Temporary Web Portal used to display preliminary flood map apps". There is a search bar labeled "Search maps". The main content area lists three map applications:

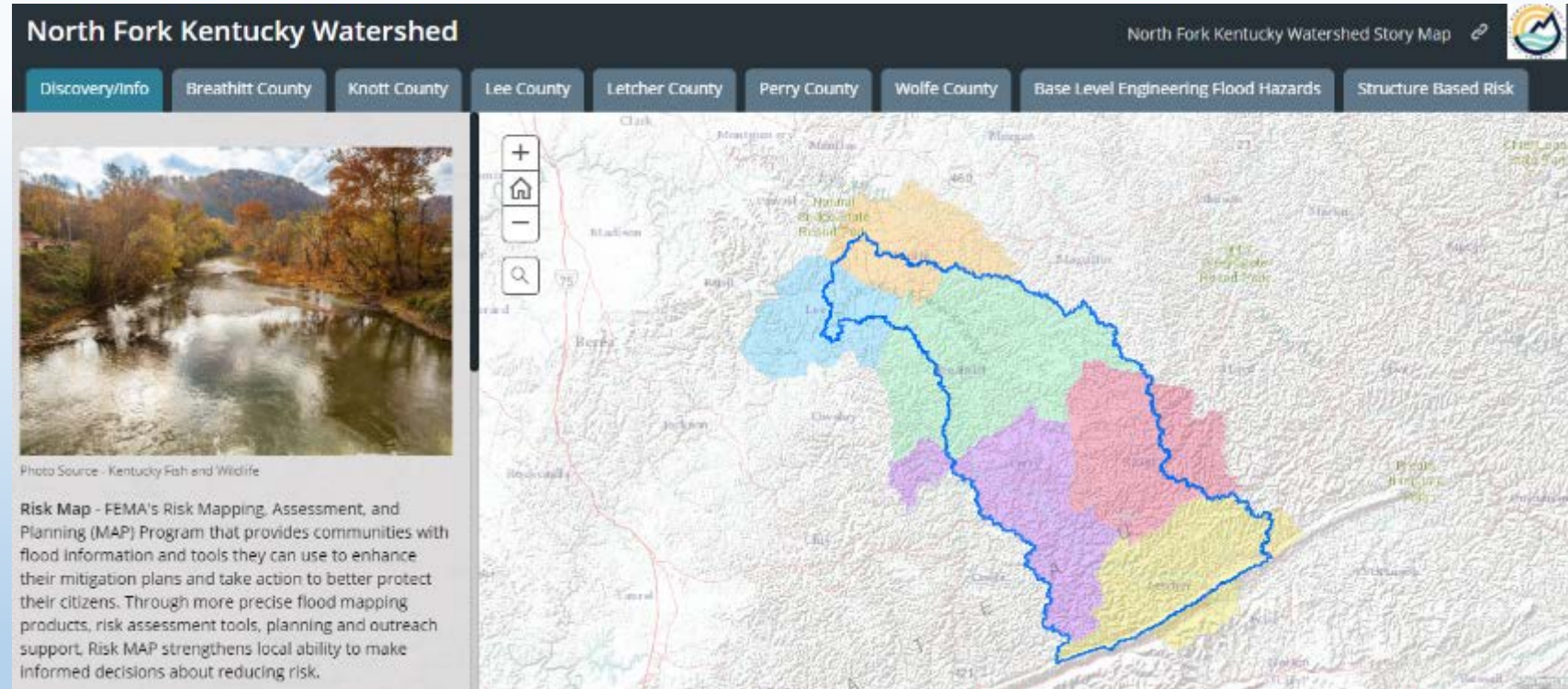
- Lower Cumberland Watershed Preliminary Maps July 2016**
Web Mapping Application by annemarie.sacra_kygis. Last Modified 11/27/17.
The Lower Cumberland Watershed Preliminary Maps impact portions of Caldwell, Christian, Crittenden, Livingston, Lyon, and Trigg Counties.
- Jefferson County Preliminary FIRMs - February 2018**
Web Mapping Application by annemarie.sacra_kygis. Last Modified 2/1/19.
Map viewer for the purposes of sharing preliminary data subject to regulatory review and adoption processes as of February 2018. Special Flood Hazard Areas and Changes Since Last FIRM are prominent features of this viewer.
- Silver Little Watershed Kentucky Preliminary Map Viewer - February 2019**
Web Mapping Application by annemarie.sacra_kygis. Last Modified 2/20/19.
Map viewer sharing preliminary data subject to regulatory review and adoption processes as of February 2019. Special Flood Hazard Areas and Changes Since Last FIRM are prominent features of this viewer. Not to be used for regulatory purposes.

On the right side of the portal, there is a section titled "FEMA flood map project updates" with the following text: "This is a temporary web portal for each FEMA flood map update project which will be available during the Preliminary phase of map adoption. Once maps are adopted and made final, effective map information can be viewed on the RiskMAP Portal at watermaps.ky.gov/RiskPortal".



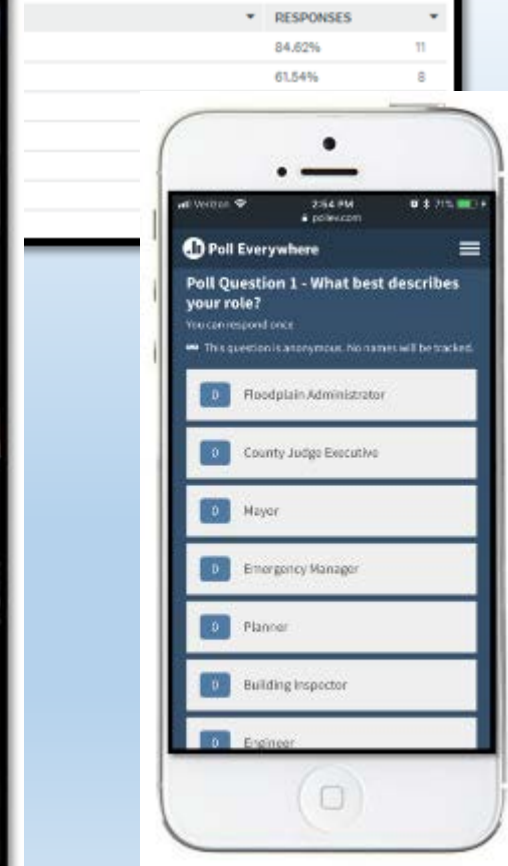
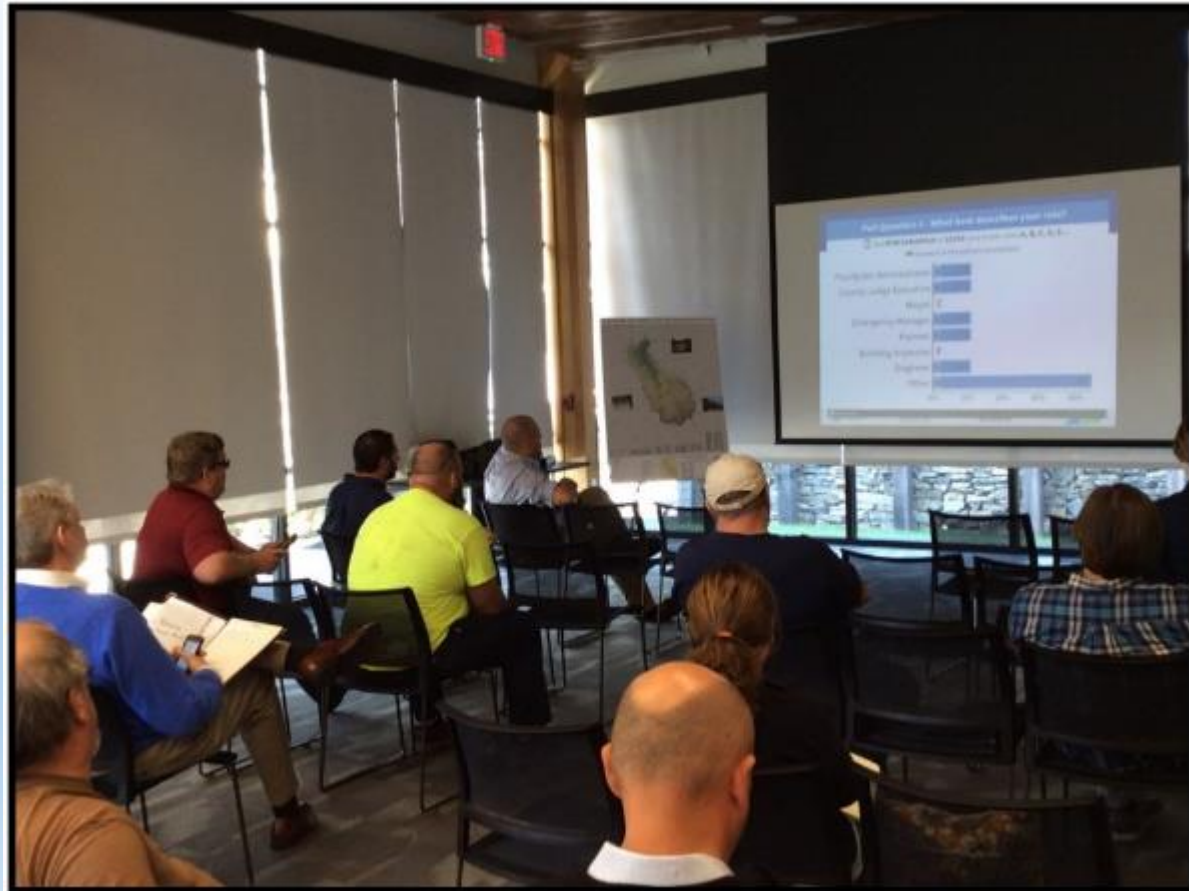
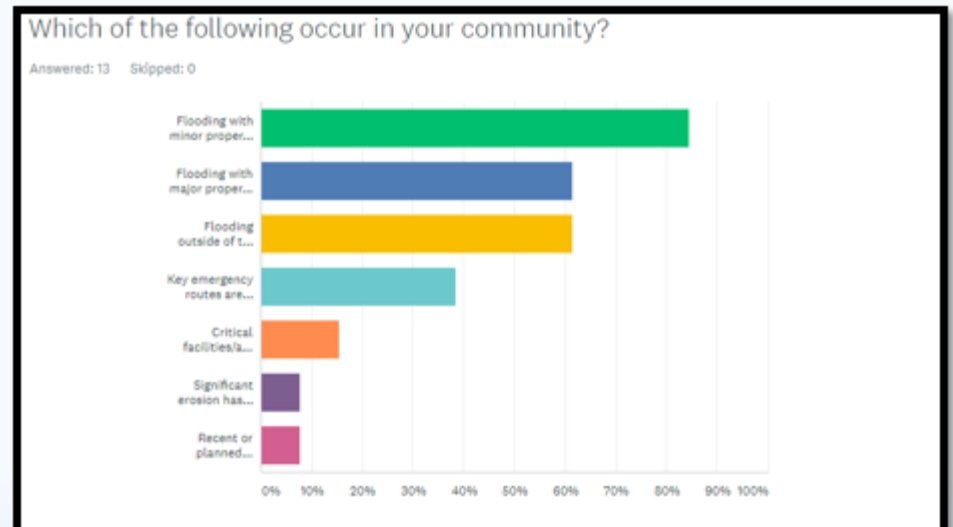
Story Maps

- Simplifies engagement
- Facilitates consistent interaction between stakeholders
- Provides robust tools in a simple interface



Interactive Surveys

- Engages stakeholders
- Surveys provided at beginning, middle, and end of flood hazard mapping projects
- Goal is to assess stakeholder development over project lifecycle



Virtual Reality

Crittenden County, Kentucky – No Flooding



Virtual Reality

Crittenden County, Kentucky – 1% Annual Chance Event



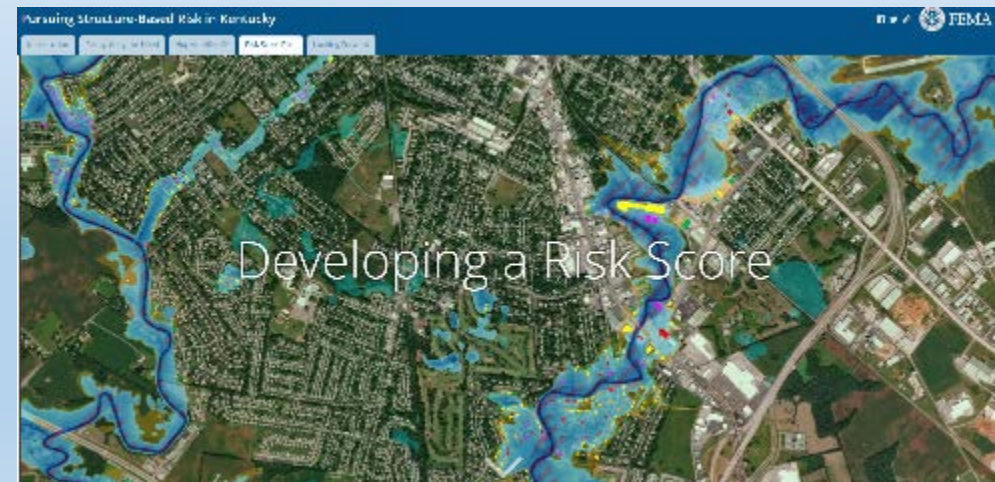
Virtual Reality

Crittenden County, Kentucky – 0.2% Annual Chance Event



Structure-based flood risk

- DOW focused on defining a methodology with the following objectives:
 - May be implemented with currently available data;
 - Is cost effective;
 - Produces a risk score that is not skewed towards high-value assets (i.e. is independent of structure value);
 - Has the flexibility to be applied to structure values to help floodplain administrators and community officials quantify projected flood damage and losses



Structure-based flood risk

- Average Annualized Percent Loss (AAPL)
- AAPL is a risk score and coefficient that is specific to a structure.
- May be produced from datasets created through Risk MAP program and other available public data.
- AAPL is derived from the relationship of how much damage a structure is projected to sustain during a flood event and the probability of that event happening.
- Damage to a structure is expressed as the percent of a structure's value that is lost during a flood event.

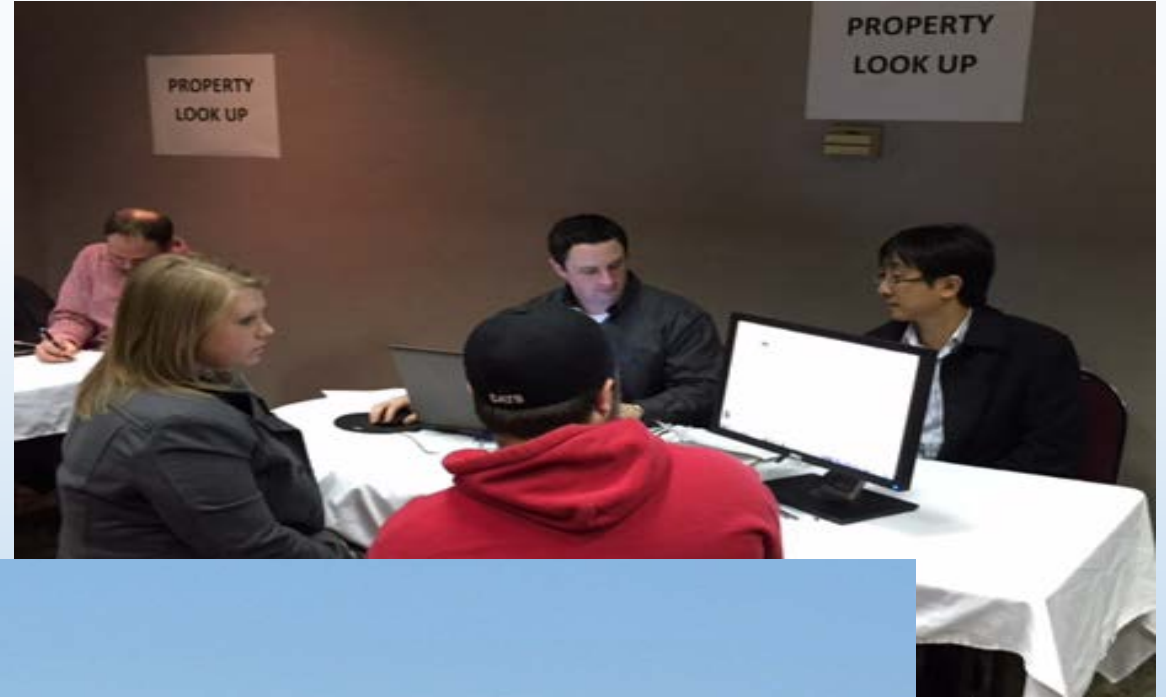


Structure-based flood risk



How do we bring it together? Promote six categories of mitigation!

- Prevention
- Property Protection
- Structural Projects
- Emergency Services
- Public Outreach
- Natural Resources



How do we bring it together? Collaboration!



Questions?



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