

Flood Web Map Application for West Virginia

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West Virginia GIS Technical Center
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Morgantown, WV 26506

ESRI Mid-Atlantic User Group (MUG) Annual Conference 2011
Baltimore, Maryland

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FEMA



Outline

- Introduction, defining the goals & challenges
- Available data and technical resources, features & functions
- Disseminating flood map information
- WV Flood Tool, v. 1
- Migration challenges
- New features & functions
- Development environment
- WV Flood Tool, v. 2
- Web demo (?)
- Conclusions
- Acknowledgments
- Questions

Introduction, goals & challenges

Outcome of discussions ca. 2006 (FEMA, DHSEM, WVGISTC):

- Communicate flood risk to community stakeholders
- Make use of new, high quality statewide GIS data overlays
 - aerial orthoimagery: SAMB 2003, NAIP, DOQQ
 - local resolution streams (SAMB, 1:4,800)
 - roads (SAMB / Census, 1:4,800)
 - elevation (SAMB / USGS NED, 3-meter)
- Incorporate revised flood data from FEMA map modernization
- countywide DFIRM database
- Users realize the power of GIS with less financial burden

Data, resources, features & functions

- New countywide DFIRM Data (GIS conversion of FIRM)
- Up-to-date aerial imagery
- SAMB (2-foot, leaf off)
- NAIP (frequently flown, leaf on)
- Bluestone Dam drainage area lidar/ortho (6-inch)
- Local/County (e.g. Cabell, Monongalia) (6-inch)
- Elevation contour lines (now 10-foot)
- Searchable addressed structures
- Advisory Flood Height (WSEL) in some counties (HEC-RAS)
(depth data added to new version)

Flood map & information dissemination

GIS data (non-flood)

- imagery
- roads
- streams
- elevation

DFIRM databases

WSEL

GIS

ESRI ArcIMS / SDE / Oracle

Web Users



Agency Info



Department of
Security, ERM

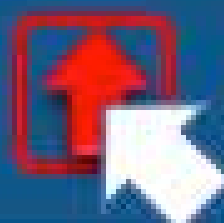


West Virginia
Department of
Homeland Security,
Emergency Management



West Virginia
Center

Launch Flood Tool



Overview

This online mapping tool may be used by floodplain managers, insurance agents, developers, real estate agents, local planners and citizens attempting to make informed decisions about the degree of flood risk faced by particular pieces of property.

The principal function of the Flood Hazard Determination Tool is to provide users with a quick and easy visual determination of an identified location relative to flood hazards. The goal is to reduce the time and costs required to make these initial determinations. However, if there is any doubt in determining whether property is a flood risk, then the user should always consult the FEMA flood maps and seek certified elevation data unless the natural ground is absolutely above the level of the regulatory flood. Remember: if in doubt, it's not



Contact Info

- Robert Perry
- Tim Keaton
- Kurt Davidson

Getting Started
Sales

MAP
West Virginia
2016

WV Flood Hazard Determination Tool

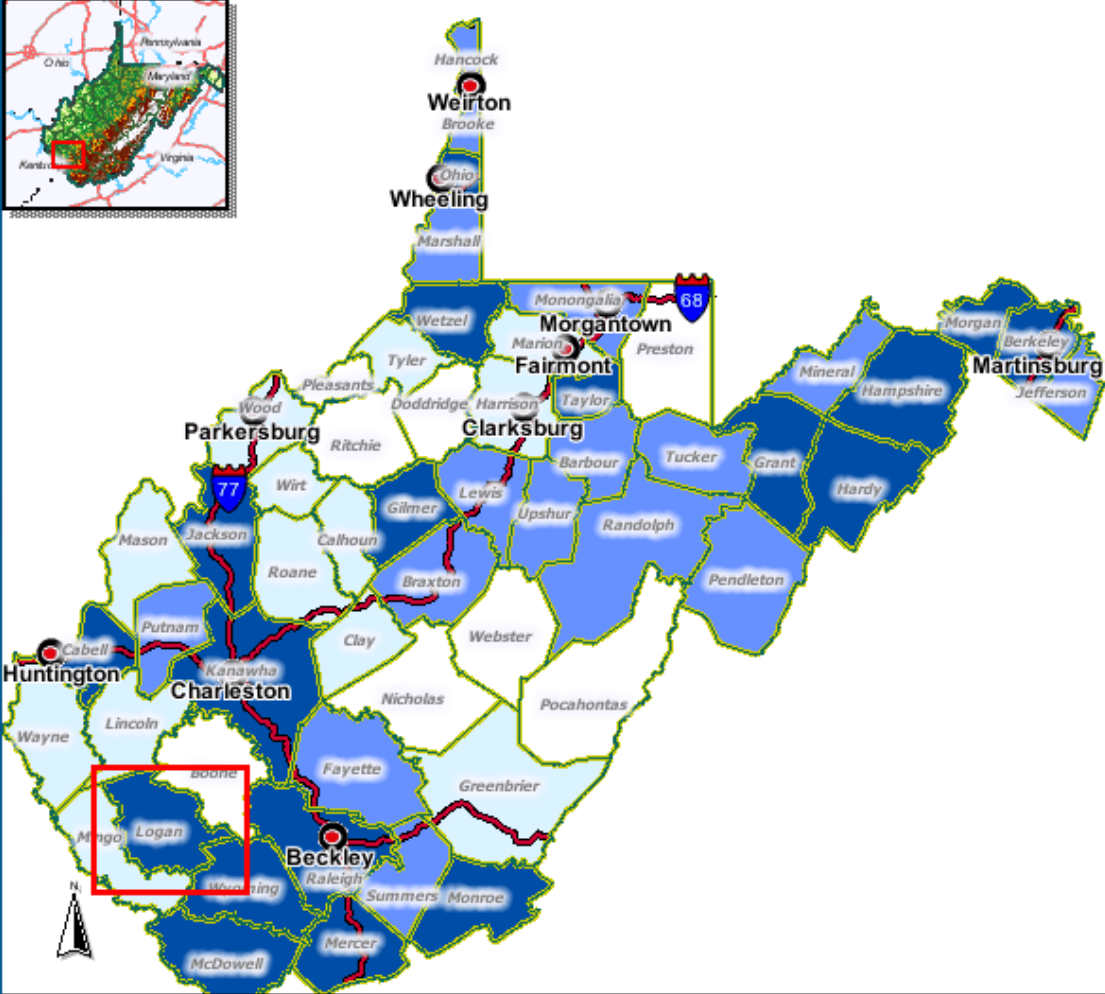
an online mapping resource



MAP WV



[Address Locator](#) [Layers](#) [Help](#) [About](#)



Map created by West Virginia GIS Technical Center. 0 39mi

FLOOD HAZARD TOOL: Click on an identified location using the Flood Hazard Determination Tool to make an initial assessment of flood hazards.

DATA AVAILABILITY: Various formats of flood hazard data are available for 46 West Virginia counties (see FEMA data status graphic).

FEMA Data Status [Disclaimer](#)

- DFIRM
- Provisional DFIRM
- Q3
- No Data

FLOOD HAZARD LAYERS [Disclaimer](#)

- Flood Hazard Area
- Floodway Area
- FEMA Index
- No Data Counties

REFERENCE LAYERS [Disclaimer](#)

BACKGROUND LAYERS

Invisible at current scale.

-Zoom to Cities- -Zoom to County-

WV Flood Hazard Determination Tool

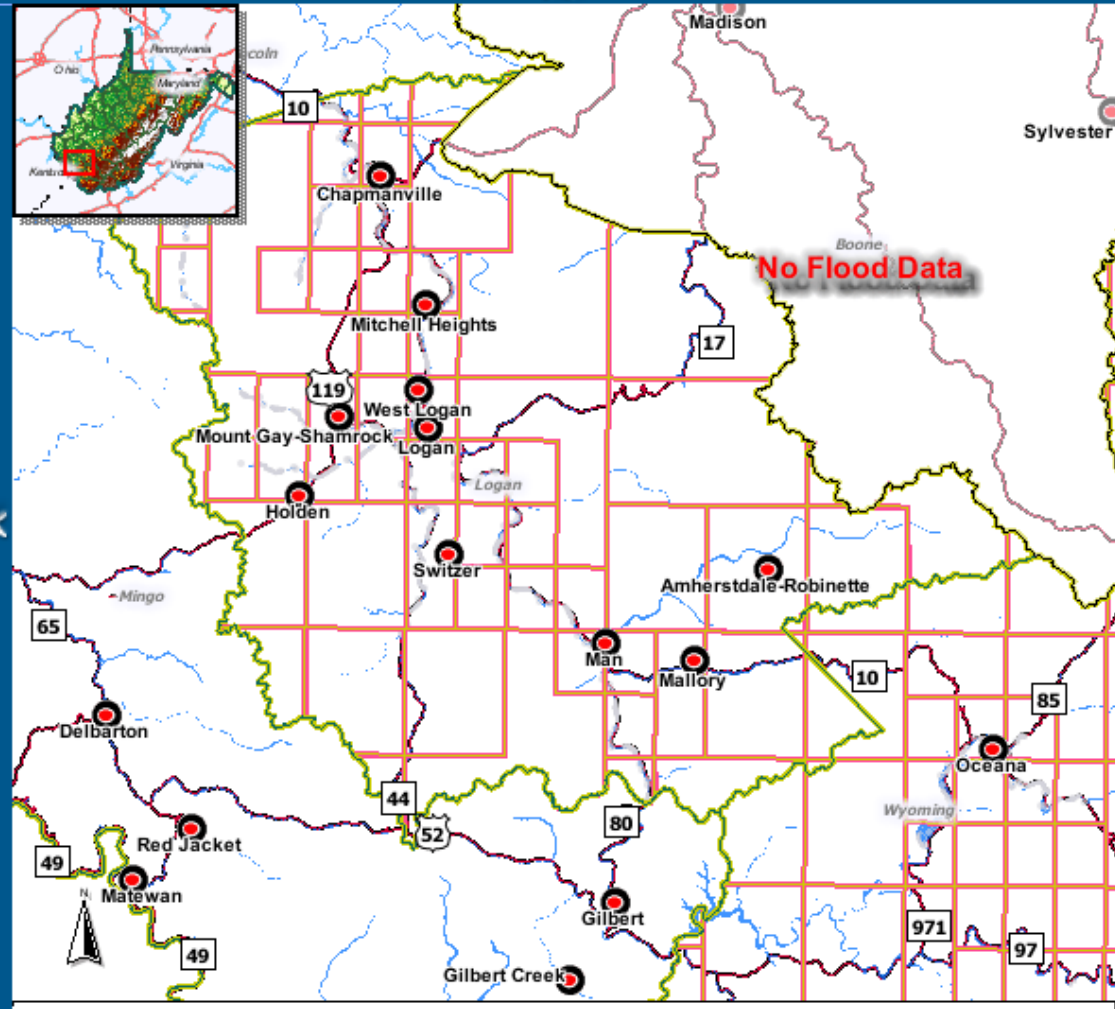
an online mapping resource




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- Flood Hazard Area
- Floodway Area
- FEMA Index [Label Off](#)
- No Data Counties

REFERENCE LAYERS [Disclaimer](#)

BACKGROUND LAYERS

 *Invisible at current scale.*

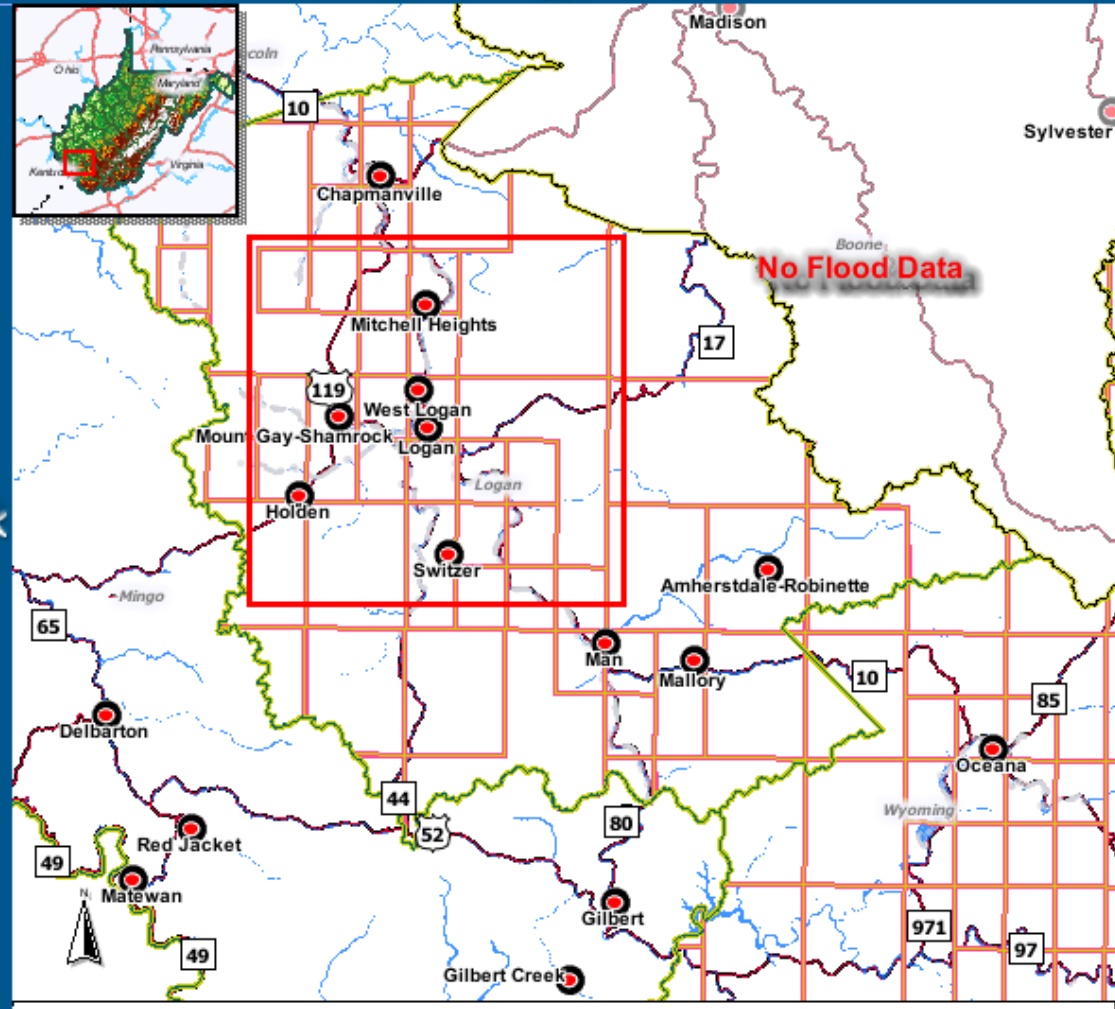
-Zoom to Cities- -Zoom to County-

WV Flood Hazard Determination Tool

an online mapping resource



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0 5mi

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WV Flood Hazard Determination Tool

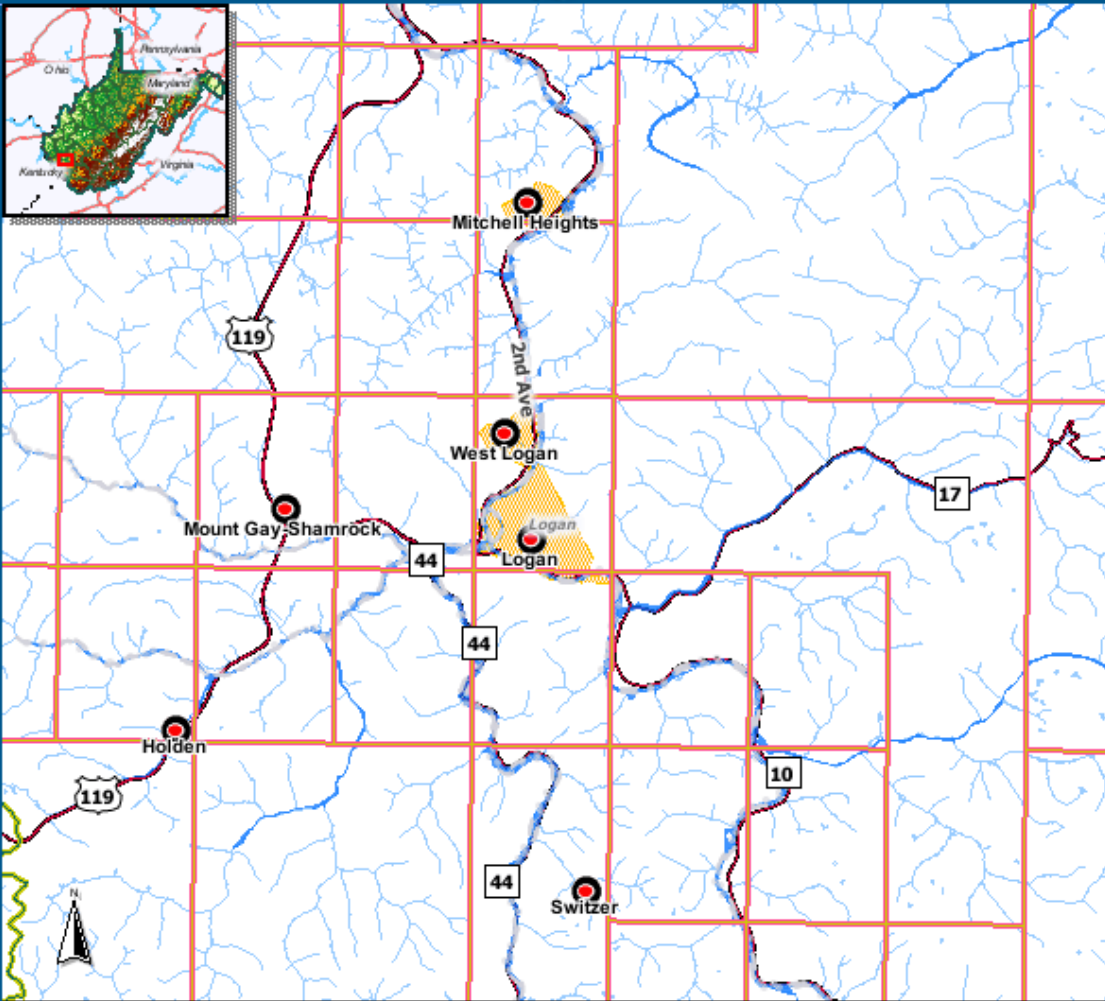
an online mapping resource




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-  Floodway Area
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REFERENCE LAYERS [Disclaimer](#)

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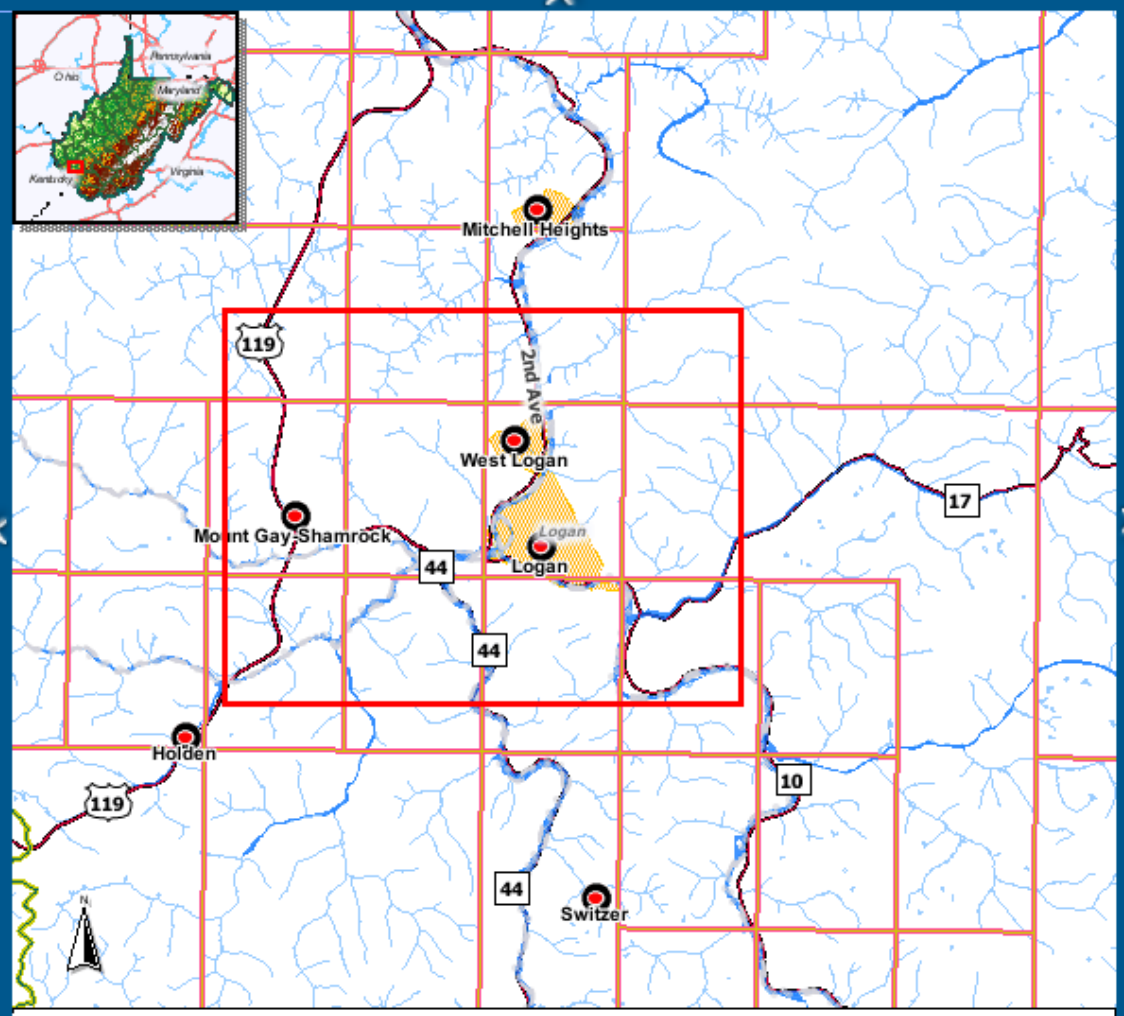
-Zoom to Cities-  -Zoom to County- 

WV Flood Hazard Determination Tool

an online mapping resource



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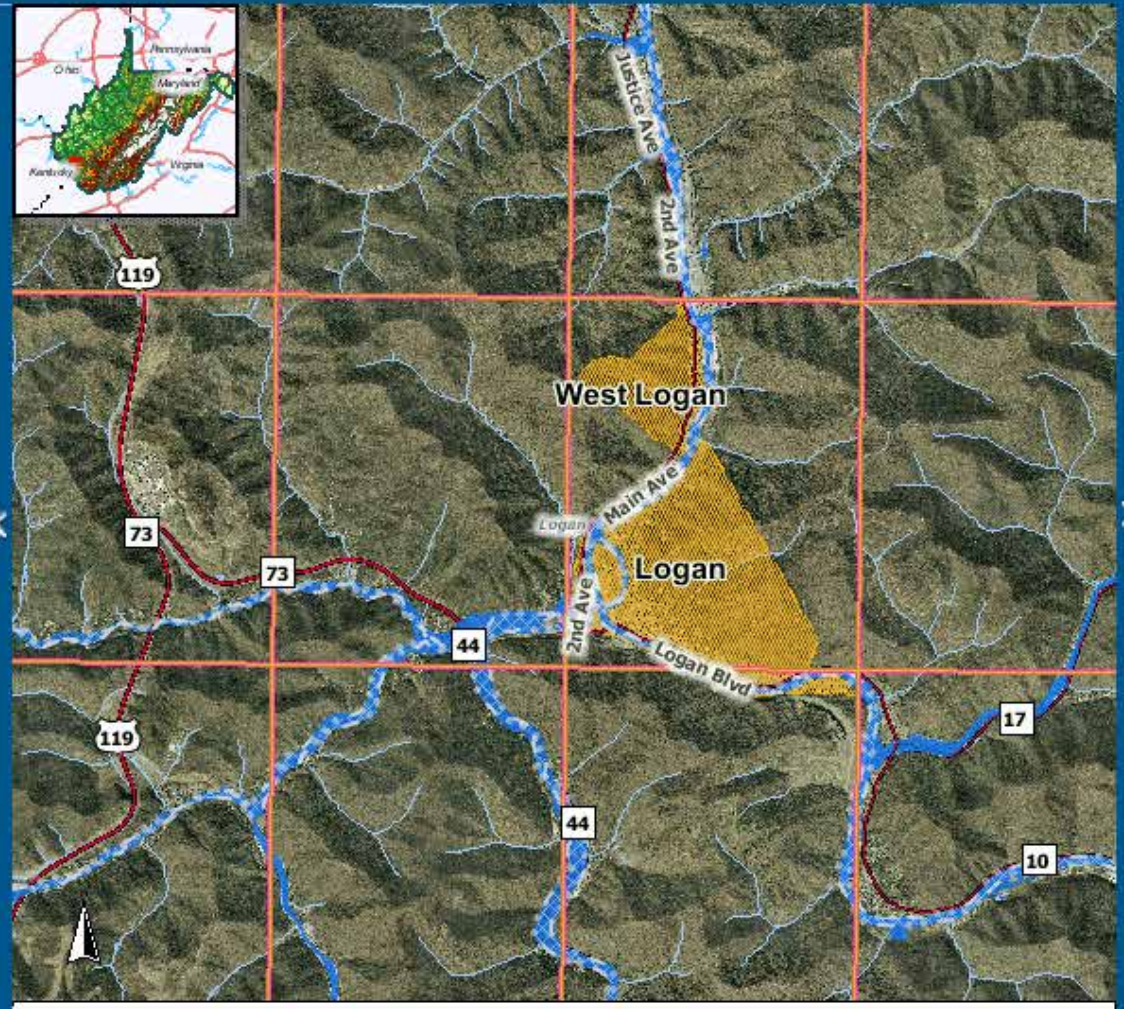
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WV Flood Hazard Determination Tool

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BACKGROUND LAYERS

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WV Flood Hazard Determination Tool

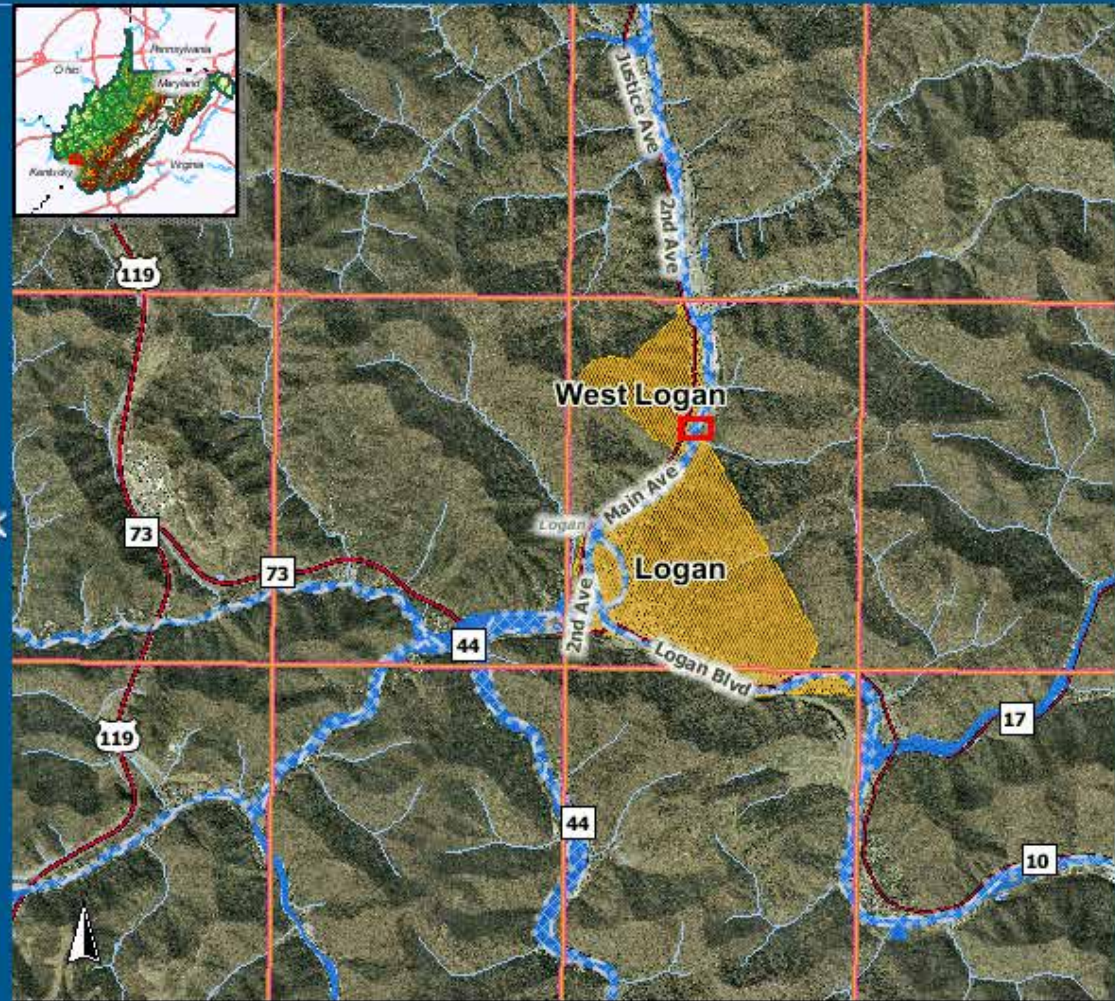
an online mapping resource



MAP WV



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Map created by West Virginia GIS Technical Center.

0 1mi

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BACKGROUND LAYERS

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WV Flood Hazard Determination Tool

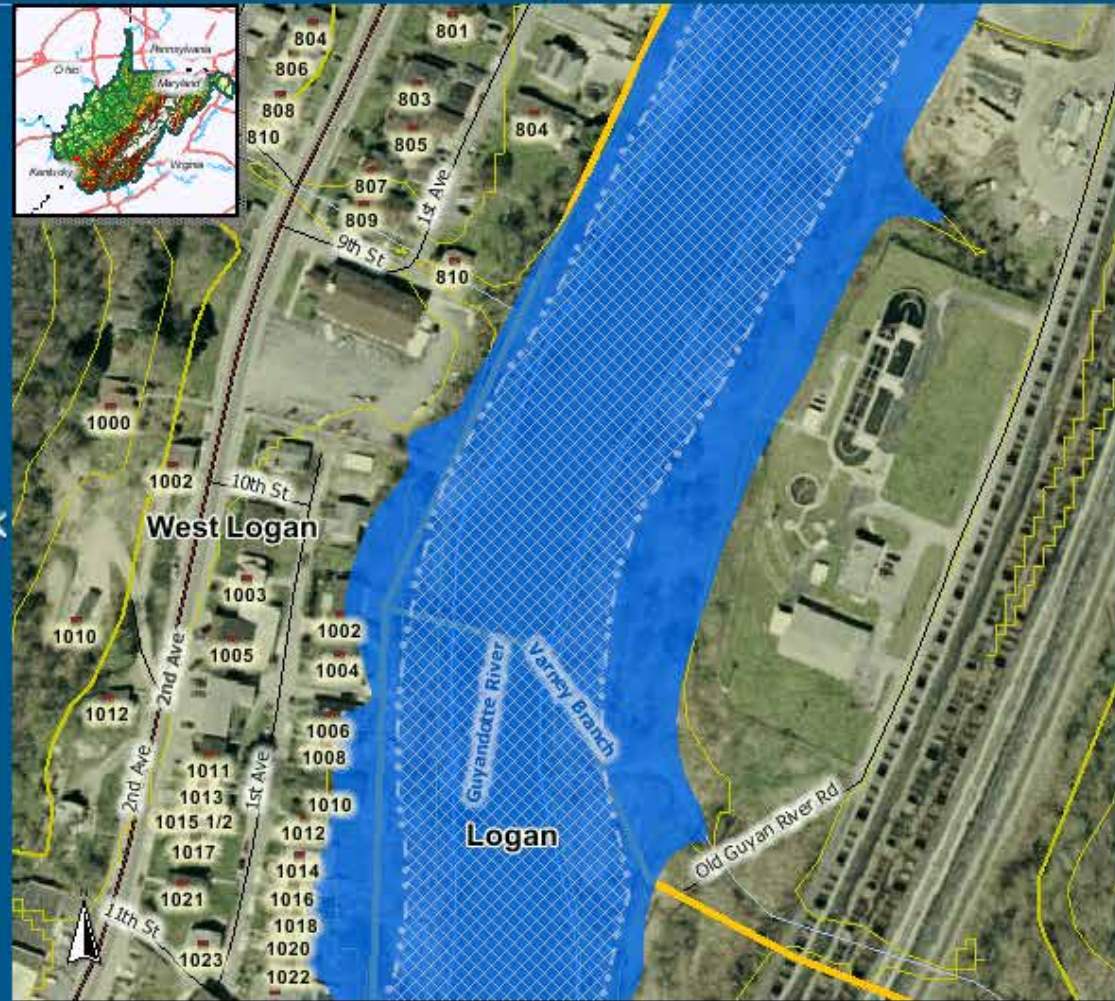
an online mapping resource



MAP WV



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Map created by West Virginia GIS Technical Center. 0 0.027mi

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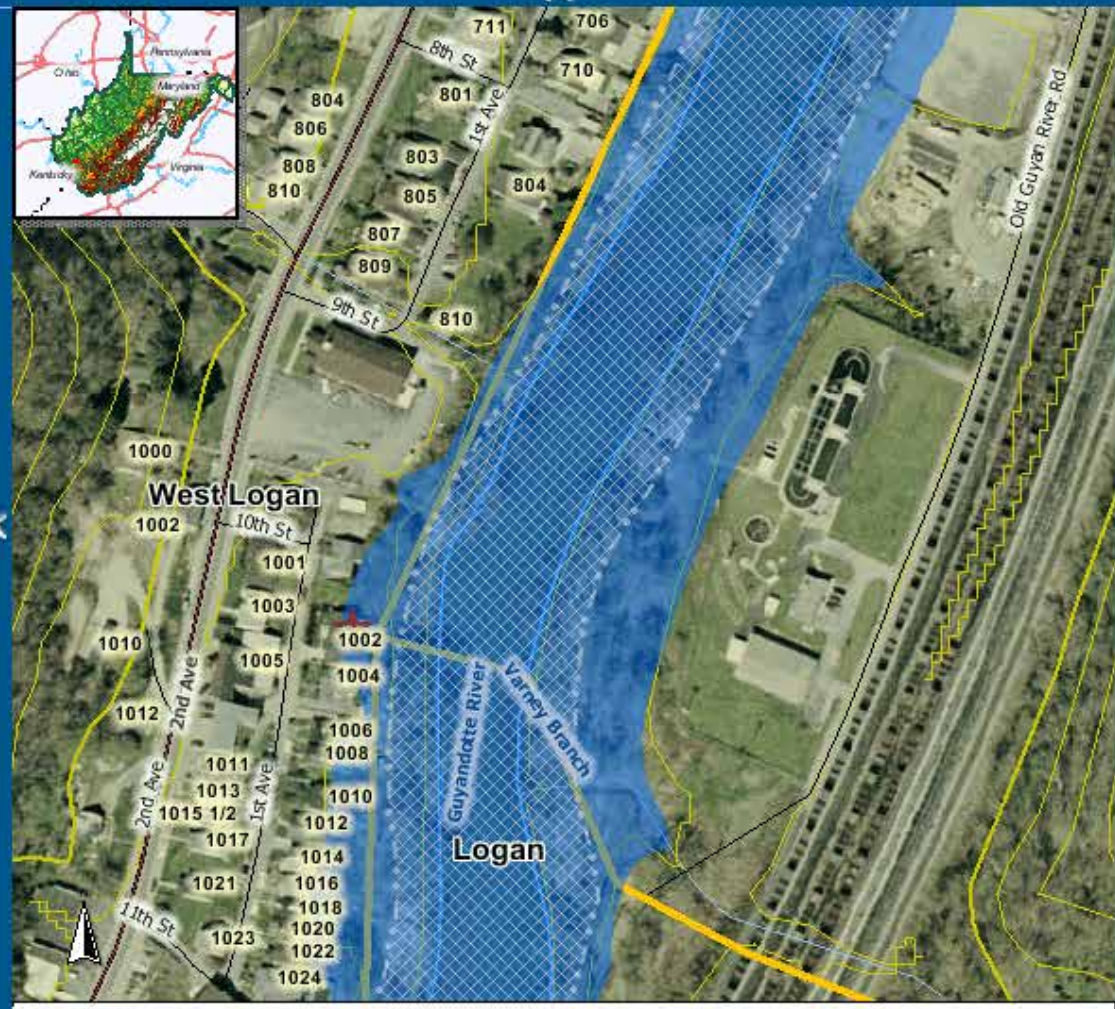
-Zoom to Cities- -Zoom to County-

WV Flood Hazard Determination Tool

an online mapping resource



[Address Locator](#) [Layers](#) [Help](#) [About](#)



Map created by West Virginia GIS Technical Center.

0 179ft

FLOOD HAZARD AREA: Selected location is **WITHIN** the FEMA **100-year** floodplain.

ADVISORY FLOOD HEIGHT: (n/a)

ELEVATION: About 665 Feet.

FEMA ISSUED FLOOD MAP: Map Item ID [54045C0201E](#)

FLOOD HAZARD LAYERS [Disclaimer](#)

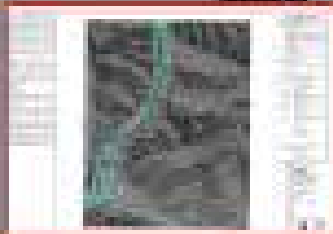
- Flood Hazard Area
- Floodway
- DFIRM Panel Index [Label Off](#)
- No Data Counties

REFERENCE LAYERS [Disclaimer](#)

BACKGROUND LAYERS

Invisible at current scale.

-Zoom to Cities- -Zoom to County-



Make a FIRMette

SEARCH FOR THE RIVER AND FIND THE FIRM
1. In the search bar, type "River" and press Enter.
2. The map will zoom to the first result.
3. Click on the river to view its details.
4. In the details panel, click on the "FIRM" tab.
5. The FIRM data will be displayed.



Layer	Description
Water	Blue
Land	Green
Buildings	Grey
Vegetation	Dark Green
Topography	Brown
Infrastructure	Black



WV Flood Hazard Determination Tool

an online mapping resource



[Address Locator](#) [Layers](#) [Help](#) [About](#)



FLOOD HAZARD AREA: Selected location is **WITHIN** the FEMA **100**-year floodplain.

ADVISORY FLOOD HEIGHT: About 1009ft. Selected location is **WITHIN** an Approximate A zone. [Disclaimer](#)

ELEVATION: About 1000 Feet.

FEMA ISSUED FLOOD MAP: (n/a)

FLOOD HAZARD LAYERS [Disclaimer](#)

- Flood Hazard Area
- Floodway
- DFIRM Panel Index [Label Off](#)
- No Data Counties

REFERENCE LAYERS [Disclaimer](#)

BACKGROUND LAYERS

Invisible at current scale.

Map created by West Virginia GIS Technical Center.

0 655ft

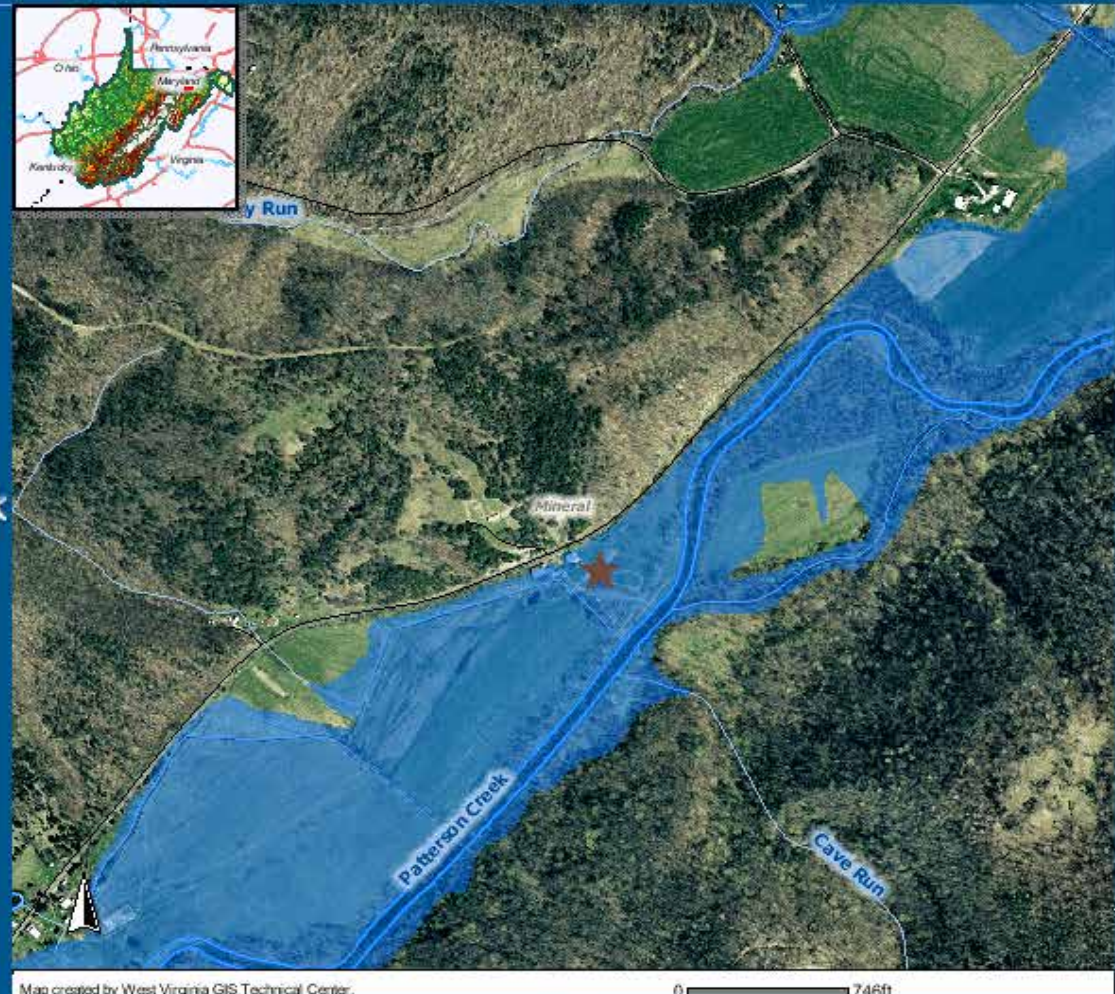
-Zoom to Cities- -Zoom to County-

WV Flood Hazard Determination Tool

an online mapping resource



[Address Locator](#) [Layers](#) [Help](#) [About](#)



FLOOD HAZARD AREA: Selected location is **WITHIN** the FEMA **100-year** floodplain.

ADVISORY FLOOD HEIGHT: About 809ft. Selected location is **WITHIN** an Approximate A zone. [Disclaimer](#)

ELEVATION: About 805 Feet.

FEMA ISSUED FLOOD MAP: (n/a)

- FLOOD HAZARD LAYERS** [Disclaimer](#)
- Flood Hazard Area
 - Floodway
 - DFIRM Panel Index [Label Off](#)
 - No Data Counties
- REFERENCE LAYERS** [Disclaimer](#)
- Addressable Structures
 - Major City
 - Populated Place
 - Local Roads
 - Secondary Roads
 - Primary Roads
 - 4800 Local Resolution River/Stream
 - 4800 Local Resolution Water Body
 - Incorporated Place
 - County Boundary
- BACKGROUND LAYERS**
- Invisible at current scale

Map created by West Virginia GIS Technical Center. 0 746ft

-Zoom to Cities- -Zoom to County-

Migration challenges

- Support for ArcIMS sunsetting
- Need to find new platform
- Select functionality and data to bring forward
- Explore new tools and visualization techniques
 - Flood depth query and visualization
 - Risk MAP data layers (HAZUS)
 - User environment tailored to end users
 - Markup capability
 - Share link to map extent
 - Enhanced printing

Flood map & information dissemination

GIS data (non-flood)

- imagery
- roads
- streams
- elevation

DFIRM databases

- Risk / HAZUS
- Depth

GIS

ESRI ArcGIS Server / Flex API

Web Users

ArcGIS Server Development Environment

- Data served via ArcGIS Server version 10.0
- Published via REST services
- Available for consumption in ESRI software
- Application developed using ESRI's ArcGIS Server Flex API version 2.2

Benefits:

- Flex based upon the Flash platform
- Large install base – nearly everyone has Flash installed
- Automatically cross browser and cross platform
- Quick development/update time

ArcGIS Server Development Environment

(continued)

- Cons (Flex API):
 - Requires Flash installed to work
 - Limited translation to mobile market
- Server
 - Running on new VM servers with 48GB of RAM, 45TB of Storage

What's the new Flood Tool look like?

New and Improved Version

WV Flood Tool

Remember: When In Doubt, It's not Out!

[Launch Tool](#)

Agency Information



[Department of Homeland Security, FEMA](#)



[West Virginia Division of Homeland Security and Emergency Management](#)



[West Virginia GIS Technical Center](#)

Overview

The West Virginia Flood Tool is designed to provide floodplain managers, insurance agents, developers, real estate agents, local planners and citizens with an effective means by which to make informed decisions about the degree of flood risk for a specific area or property.

The principal function of the Flood Tool is to provide users with a quick and easy approximate determination for an identified location relative to flood hazards. The goal is to reduce the time and costs required to make these estimates. However, if there is any doubt in determining whether property is a flood risk, then the user should always consult the FEMA flood maps and seek certified elevation data unless the natural ground is absolutely above the level of the regulatory flood. **Remember: if in doubt, it's not out!**

Map Views

The WV Flood Tool has three customized map views: Public, Expert, and Risk MAP. The Public View allows the general public to obtain quick and easy flood hazard determinations of identified locations, whereas the Expert View and Risk MAP View are for more advanced users who are familiar with FEMA's official flood maps and mitigation programs for flood risk

West Virginia Flood Tool: Disclaimer

Disclaimer

Mapping Services provided by the WV Flood Tool herein are for reference only. The user of this information understands and acknowledges that the data may be inaccurate or contain errors or omissions and the user assumes full responsibility for any risks or damages resulting from any use of or reliance upon this data. WVDHSEM and their Agents or Affiliates do not guarantee the accuracy or reliability of the data generated from this service.

The user of this information should always consult official FEMA flood maps and certified elevation data if there is any doubt of a property's flood risk. Please consult with your local, county, and/or community floodplain administrator for availability of official DFIRMs in your county. These maps are available online at <http://www.msc.fema.gov>.

Click I Agree button to continue, and click I Don't Agree button to leave.

WV FLOOD TOOL



View

Layers

Search

Tools

Public

Expert

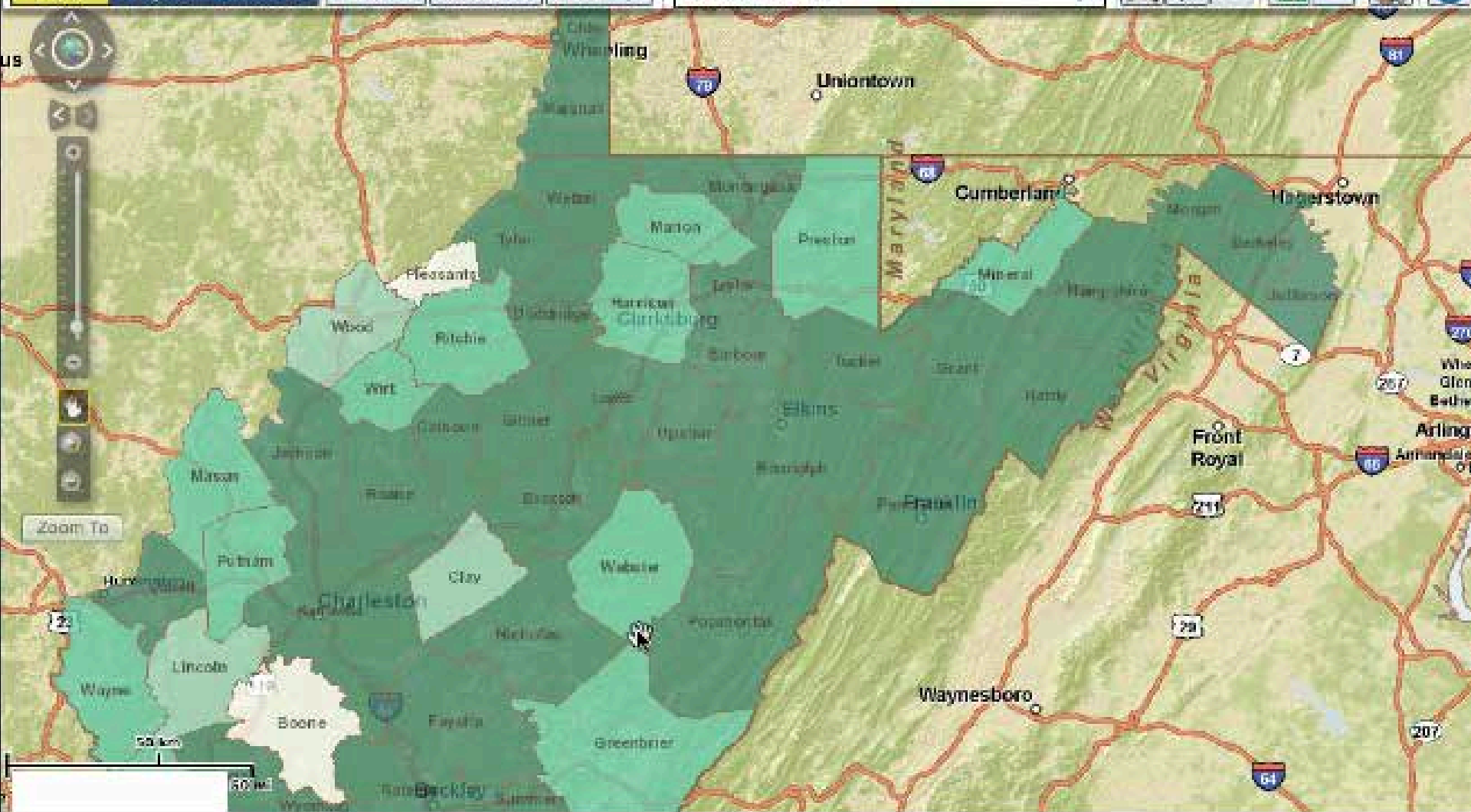
Risk MAP

Flood

Reference

Basemap

Input your address



WV FLOOD TOOL



View

Layers

Search

Tools

Public

Expert

Risk MAP

Flood

Reference

Basemap

185 poplar dr morgantown



Scale - 1:4,025
x-78.884093, y-39.813143

WV FLOOD TOOL



View

Layers

Search

Tools

Public

Expert

Risk MAP

Flood

Reference

Basemap

186 poplar dr morgantown



Scale - 1:4,025
x - 78.980050, y - 39.811839

WV FLOOD TOOL



View

Layers

Search

Tools

Public

Expert

Risk MAP

Risk

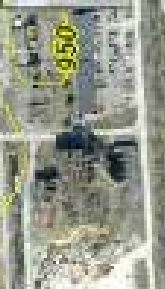
Reference

Basemap

185 poplar dr morgantown



Zoom To



400 m

Scale - 1:4,325
x - 78.955079, y - 39.813178

WV FLOOD TOOL



View

Layers

Search

Tools

Public

Expert

Risk MAP

Risk

Reference

Basemap

185 poplar dr morgantown

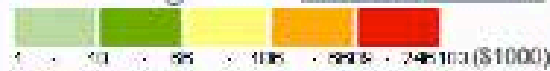


Risk Layer

Total Assets

[Disclaimer](#)

Total Loss



Water Depth (HEC_RAS) value (feet): 0 623

Water Depth (HAZUS) value (feet): 0 127

Hazard Layer

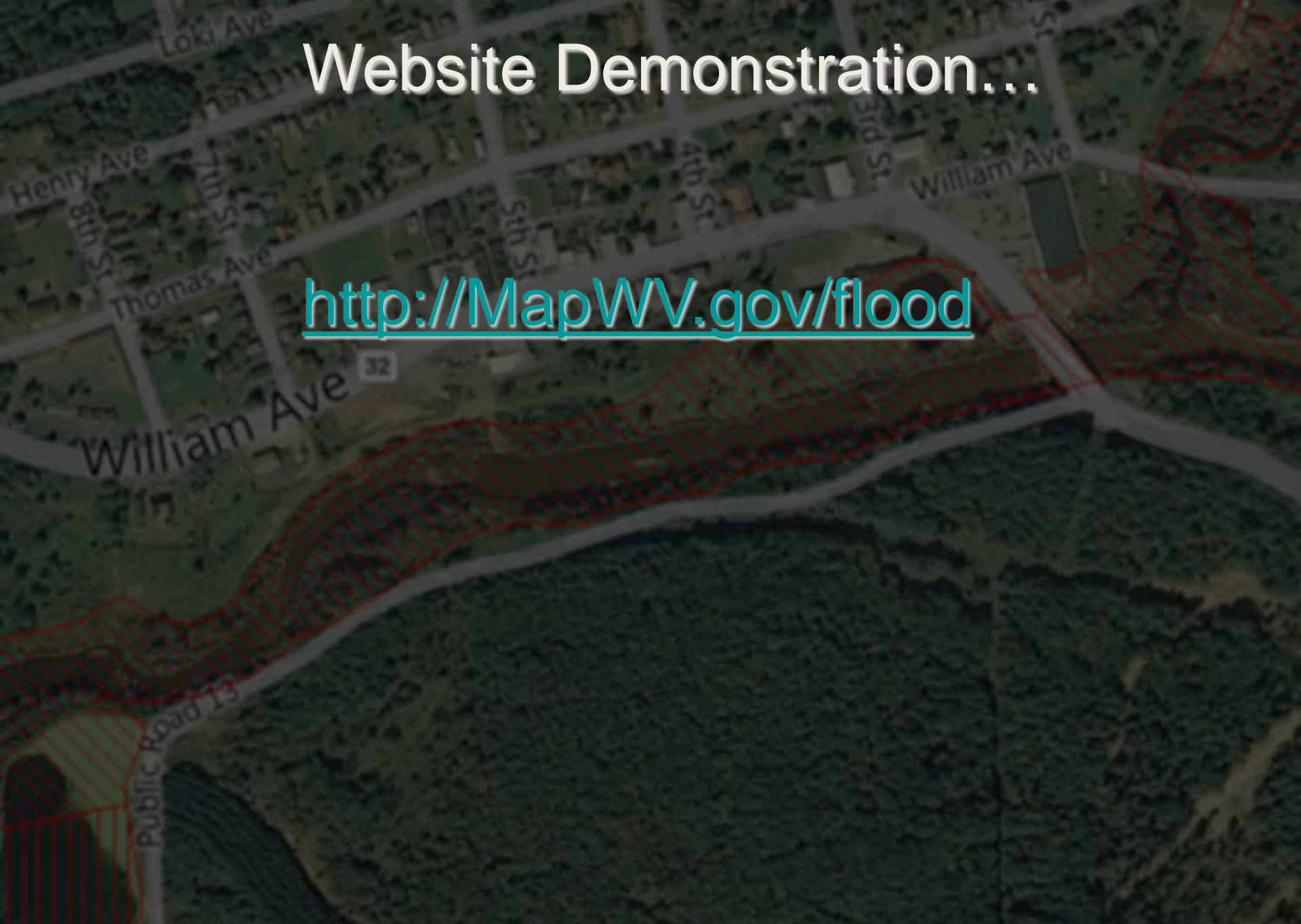


Zoom To

Scale - 1:4,325
x: -78.888212, y: 39.813182

Website Demonstration...

<http://MapWV.gov/flood>



Conclusions

- Early success
 - Meet most needs & goals
 - Positive feedback
- New tool also successful, though challenges remain
 - Advanced users embrace new appearance & function
 - Some users nostalgic about old version of tool
 - Need for outreach & training

Outreach/Training for 2011-12

(1) User Manual and Quick Start Guide

(2) Live training through classrooms and webinars

- Series of short training videos
- Press Release through WV DHSEM
- Outreach to potential flood tool users (real estate, banking, county & local FPMs, etc.)
- Online flood tool survey

DATA – Updates for 2011-12

(1) Updated DFIRM Data – 12 counties updated by 1 Nov 2011

- 4 counties - Effective DFIRM (33 to 37)
- 4 counties – Preliminary/draft DFIRM (12)
- 4 counties- Advisory Flood Height (5 to 9)

(2) Other Flood Data (May 2012)

- Mitigated Properties (WV DHSEM)

(3) Base Map & Reference Layers (June 2012)

- Parcels for 2 counties
- Statewide 2011 NAIP imagery
- 4 counties- Advisory Flood Height (5 to 9)

Vision for Improvements

(1) Additional Flood Hazard Data

- Bridges and other flood structures
- Advisory Flood Heights for Approximate A Zones
- Floodplain/Base Elevation Data for Detailed Study Areas
- Mitigated areas

(2) 2-ft Contours and Higher-Resolution Elevation Grids (logistical challenges!)

(3) Demographic/Population Data

(4) Flood Data Web Services (streaming download of data)

(5) Mobile Application?

Home Flood Maps Links About Help

[Log in](#) or [Sign Up](#)

JUL 14 *All West Virginia flood monitoring stations reporting normal.

Search by Zip Code

Flood Monitoring Station

West Virginia Tygart Valley Tygart Valley River at Belington, WV

History Forecast **Gage Feet** Current: **NORMAL CONDITIONS**
 9.09 05/19/2011 11:00AM
 17 19 21 23 25

Overlays

Special Concerns



History and Return Intervals

GAGE FEET	CREST YEAR	RETURN INTERVAL, YEARS
18	1967	10
19	1994	
20	1912, 1996	50
21		100
22	1888	500



National Water Information System: Web Interface

[USGS Water Resources](#)

Data Category:

Real-time

Geographic Area:

United States

GO

[News](#) updated April, 2011

USGS 03072000 Dunkard Creek at Shannopin, PA

PROVISIONAL DATA SUBJECT TO REVISION

Available data for this site

Time-series: Real-time data

GO

STATION.--03072000 DUNKARD CREEK AT SHANNOPIN, PA

LOCATION.--Lat 39° 45'33", long 79° 58'15", Greene County, Hydrologic Unit 05020005, on left bank 1,300 ft upstream from highway bridge at mine buildings at Shannopin, 1.2 mi north of Dunkard, 3.5 mi upstream from mouth, and 4 mi southwest of Greensboro.

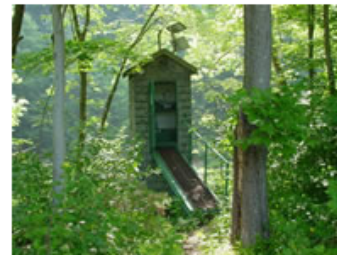
DRAINAGE AREA.--229 mi².

PERIOD OF RECORD.--October 1940 to current year. Prior to December 1940 monthly discharge only, published in WSP 1305.

GAGE.--Water-stage recorder. Datum of gage is 806.25 ft above sea level (levels by U.S. Army Corps of Engineers).

REMARKS.--Some regulation at low flow by mine pumpage above station. U.S. Army Corps of Engineers satellite telemeter at station.

COOPERATION.--Funding for the operation of this station is provided by the Pennsylvania Department of Environmental Protection, the U.S. Army Corps of Engineers, Pittsburgh District, and the U.S. Geological Survey. This station managed by the Pittsburgh Field Office.



Acknowledgments



West Virginia Division of Homeland Security
and Emergency Management



FEMA



Questions?



WV Flood Hazard Determination Tool Development

Team:

Kurt Donaldson: Project Manager
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Evan Fedorko: Data coordination & development (water surface elevation,
Risk MAP/HAZUS)
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Frank Lafone: Application design & development
frank.lafone@mail.wvu.edu

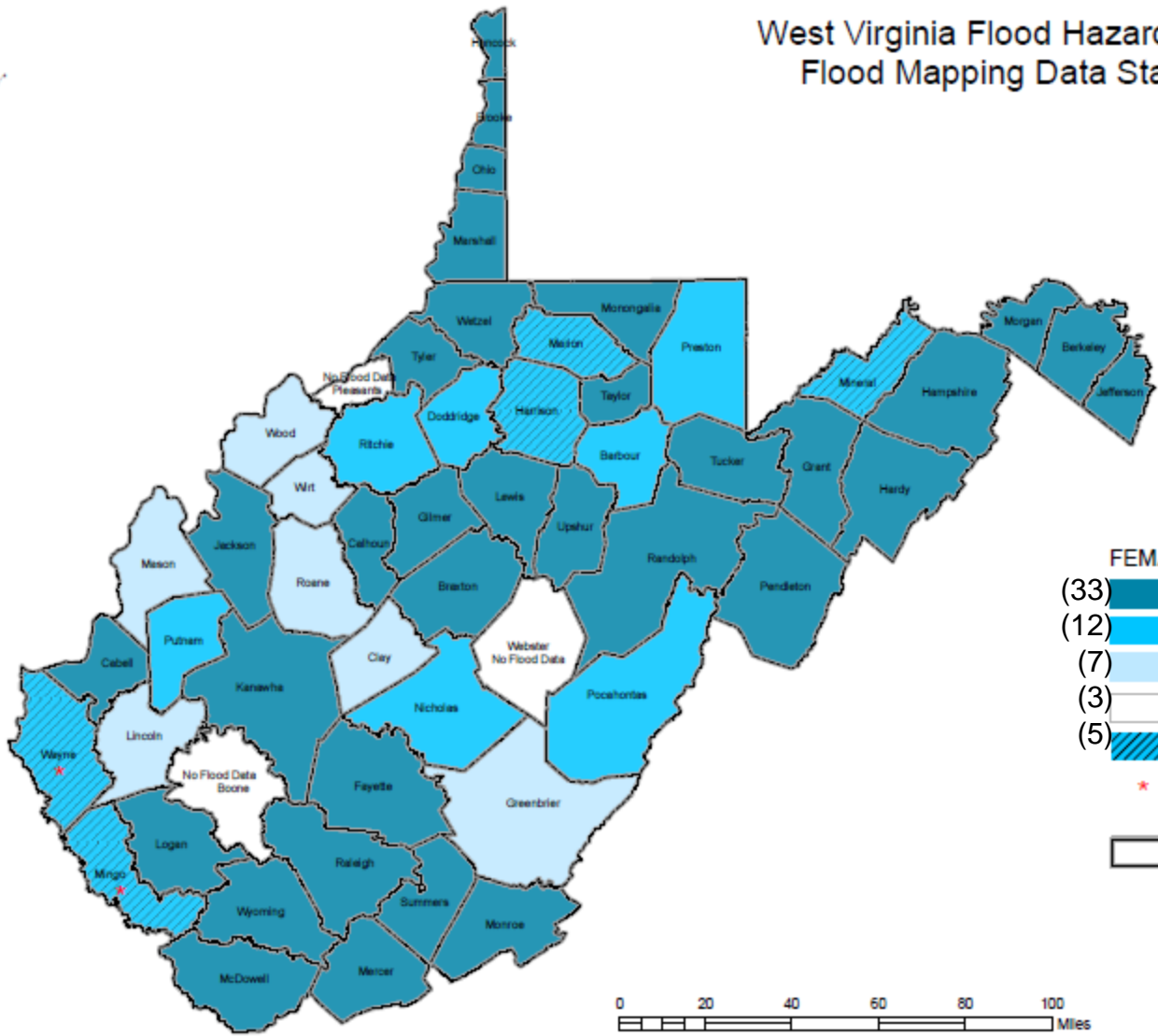
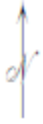
Xiannian Chen: Application development & implementation
xiannianchen@gmail.com

Kevin Kuhn: Address locator data & services development
eric.hopkins@mail.wvu.edu

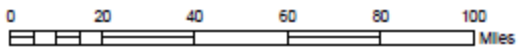
West Virginia GIS Technical Center
WVU Department of Geology & Geography
Morgantown, WV 26506



West Virginia Flood Hazard Determination Tool Flood Mapping Data Status, August 2010



- FEMA Flood Mapping Status**
- (33) Effective DFIRM
 - (12) Preliminary/Draft DFIRM
 - (7) Q3
 - (3) NoData
 - (5) Modeled A Zone / Water Surface Elevation
 - ★ Incomplete Floodplain Data Layer
 - County Boundary



August 2010

DFIRM Mapping Status per WVGISTC Flood Tool

Effective with next data update (October-November 2011)

