

West Virginia Flood Tool

www.MapWV.gov/Flood



User Guide

August 2013



FEMA



WV Division of Homeland
Security & Emergency
Management



WV GIS Technical Center

About This Manual

This manual contains information on features and functions of the WV Flood Tool. If you should have additional questions, or require information not contained within this manual, please contact the WV National Flood Insurance Program Offices at the WV Division of Homeland Security & Emergency Management:

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The West Virginia Flood Tool

The WV Flood Tool allows citizens, home owners, floodplain managers, insurance agents, developers, real estate agents, and local planners to make informed decisions about the degree of flood risk for a specific area or property through simply navigating to an area of interest and clicking on location to query information. This application utilizes public, expert, and risk map viewing options to best address the needs of the user.

The online mapping application and documentation can be accessed at the following link:

<http://www.mapwv.gov/flood/>

Features

- Allows users to make informed decisions about the degree of flood risk for a specific area or property. Helps to determine whether a house or business is in an identified 1% annual chance (100-year) flood area.
- Displays and queries flood hazard information including advisory flood height data for Approximate A Zones.
- Displays the approximate elevation of the ground at any location with a vertical accuracy of 10 feet.
- Includes the best available overlay reference layers: addresses, elevation contours, roads, streams, boundaries, etc.
- Displays stream names, HecRas, FEMA FIS (Flood Insurance Study) profiles, mitigated properties, watershed, and parcels data (where coverage is available).
- View high resolution imagery at a scale of 1:282.
- Presents customized map views for the general public and more advanced users.
- Displays and queries HAZUS 100-year flood event information to assist in mitigating flood risks
- Uses the most up-to-date ArcGIS server technology to improve performance and visual appearance of map features.
- We provide a multitude of basemap options for different type of analysis to fit your map's needs.
- Provides multiple ways to locate by interest: address, coordinates, place names, and navigation controls.
- Links specific areas of the map to local floodplain manager contacts or FEMA's online map service center to view official flood maps.



Map Views

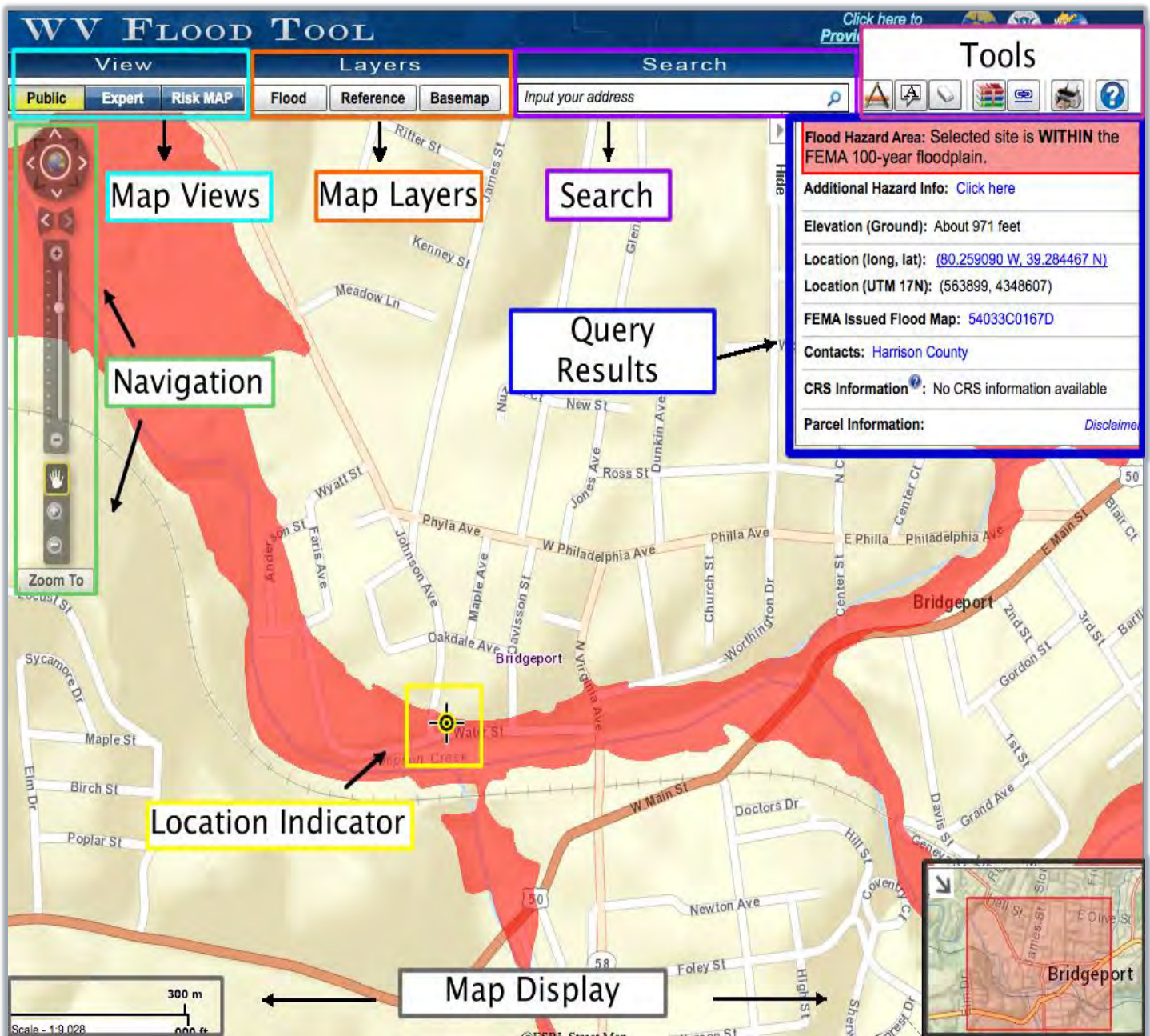
The WV Flood Tool has three customized map views: Public, Expert, and Risk MAP. The public view is the default view displaying flood hazard zones for public use and reference. The Expert and Risk MAP Views are for more advanced users who are familiar with FEMA’s official flood maps and flood mitigation programs for risk mapping, assessment, and planning (Risk MAP). Risk MAP information for local planner and communities includes HAZUS flood loss estimates for buildings and infrastructure.

Operational **flood** hazard/risk layers differ for each view. The data sources of **flood** layers include Digital Flood Insurance Rate Maps from the FEMA Map Service Center, 2010 HAZUS 100-year event models, and HEC-RAS water surface depths generated for Approximate A Zones.

Map View	Targeted Users	Purpose	Flood Layers	Flood Layer Symbols
Public	General Public (Default View)	Allows the general public to obtain quick and easy flood hazard determinations of identified locations relative to flood hazards.	<u>Flood Hazard</u> Hazard Zones	<u>Flood Hazard Zone</u>
Expert	Floodplain managers, insurance agents, developers, planners, informed citizens	Allows users like floodplain managers who are familiar with FEMA flood insurance maps to determine flood hazards for areas of interest.	<u>Flood Hazard</u> Hazard Zones HecRas FIS Profiles X-Section Base Flood Elevation Floodway DFIRM Panel Index	<u>Cross Section (XS) Lines</u> <u>Base Flood Elevation (BFE) Lines</u> <u>Floodway</u> <u>Flood Hazard Zone</u> Approximate Study (Zone A) Detailed Study (Zone AE, AH, AO)
Risk MAP	Public officials, planners, informed citizens	Provides public officials, planners, and other decision-makers with quality data for Risk Mapping, Assessment, and Planning (Risk MAP) that increases public awareness and leads to action that reduces flood risks to life and property.	<u>Risk MAP</u> HAZUS - Total Loss - Total Assets - Total Building Loss - Total Debris - Total Shelter Water Depth Flood Hazard	<input checked="" type="checkbox"/> Risk Layer Total Loss (\$1000) [Slider] Total Building Loss [Slider] <input type="checkbox"/> Water Depth [Slider] value (feet): 0 - 623 <input checked="" type="checkbox"/> Hazard Layer [Slider] <u>Flood Hazard Zone</u> Approximate Study (Zone A) Detailed Study (Zone AE, AH, AO)

General Map Layout

- (1) **Queries:** Query Flood Hazard or Risk MAP information by single mouse click on map
- (2) **Map View:** Public, Expert, and Risk MAP
- (3) **Map Layers:** Flood (Hazard and Risk) , Reference, Base map
- (4) **Search:** Address or City Search
- (5) **Tools:** Measure, Bookmark, Share Map Link, Print, Help
- (6) **Navigation Tools:** Navigation Slider and Zoom To functions
- (7) **Map Display:** Scale and Geographic Coordinates



Queries

Information about flood hazards and flood risks can be queried by a single mouse click!

Flood Hazard Tool (available in all views)

Flood Hazard Area: Selected site is **WITHIN** the FEMA 100-year floodplain.

Additional Hazard Info: [Click here](#)

Elevation (Ground): About 1001 feet

Location (long, lat): [\(79.972418 W, 39.650632 N\)](#)

Location (UTM 17N): (588160, 4389486)

FEMA Issued Flood Map: [54061C0113E](#)

Contacts: [Monongalia County](#)

CRS Information ⓘ: No CRS information available

Parcel Information: 10-57 [Disclaimer](#)

Label: 10-57
Root ID: 31-9-10-57-0
District: 9 (Morgantown Corp) Map: 10
Parcel: 57 Suffix: 0
Acres (deed):



- Flood determination (in, close, or out) to flood hazard area
- Stream names
- Additional hazard information
- Advisory flood height information (if available)
- Ground surface elevation
- Location (geographic & UTM coordinates)
- Link to official FEMA floodplain map
- HecRas (data if available)
- Link to local floodplain managers
- Parcel Information

Risk Map (Risk View Only)

Flood Hazard Area: Selected site is **WITHIN** the FEMA 100-year floodplain.

Additional Hazard Info: [Click here](#)

Elevation (Ground): About 808 feet

Location (long, lat): [\(79.968598 W, 39.621317 N\)](#)

Location (UTM 17N): (588525, 4386237)

FEMA Issued Flood Map: [54061C0226E](#)

Contacts: [Monongalia County](#)

CRS Information ⓘ: No CRS information available

Parcel Information: Loading [Disclaimer](#)

Risk Information for the highlighted area, the Census Block: **540610111002045**

[Disclaimer](#)

Active Layer	Total Loss: 207.00
	(thousands of dollars)
	Debris: 43.00
	(tons)
	Building Loss: 128.00
	(thousands of dollars)
	Shelter: 5.00
	(persons displaced)
	Total Assets: 811.00
	(thousands of dollars)
	Depth: (feet)



- Total Loss (thousands of dollars)
- Debris (tons)
- Building Loss (thousands of dollars)
- Shelters (persons displaced)
- Total Assets (thousands of dollars)
- Water Depth (feet)
- Census Block Number

Tools for utilizing the West Virginia Flood Tool



Mouse Button Short Cuts (Navigation)

- **Pan** – Hold down left mouse button and move mouse in desired direction
- **Zoom Out** – Mouse Wheel Scroll Down
- **Zoom In** – Mouse Wheel Scroll Up
- **Zoom to Box** – Holding Shift Key Down, left click mouse button and drag cursor to select rectangular area to zoom.

Find Location (Navigation and Zoom to Location)

- 13 zoom scales from smallest scale of 1:4,622,324 to largest scale of 1:282
- Pan
- Zoom to full extent (click on globe)
- Zoom to previous extent
- Zoom to city, county, or 7.5-minute USGS quadrangle
- Zoom to address, coordinate, or geographic place name



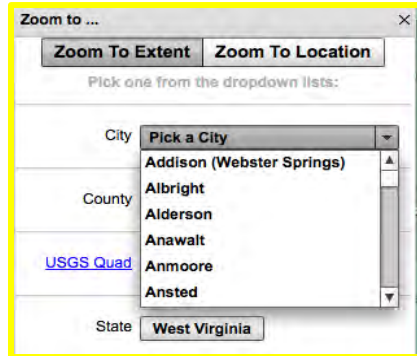
Find Location

(Navigation and Zoom to Location)

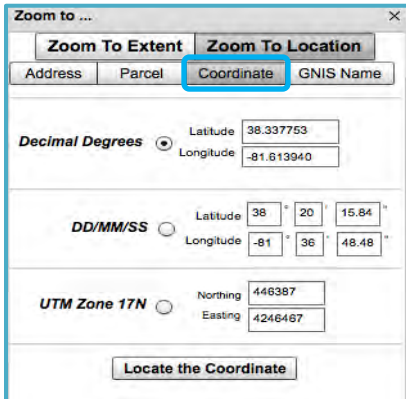
- Search by Address

Zoom To Function

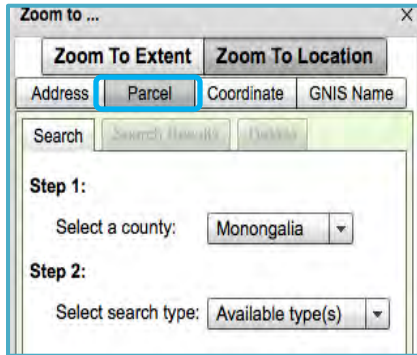
Users can zoom to **extent** and zoom to **location**. Zoom to **extent** allows you to pick a city, county, or USGS quad to zoom to. Zoom to Location allows users to zoom to a select **location** based upon address, parcel ID, coordinates or name



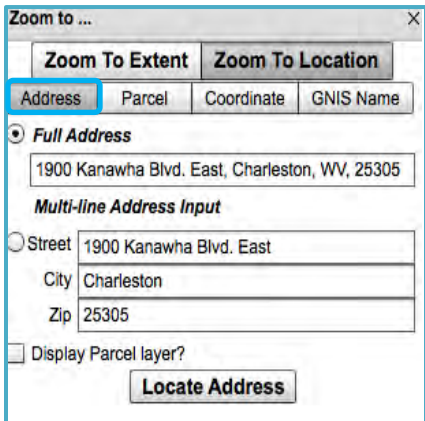
City,
County,
USGS
Quad



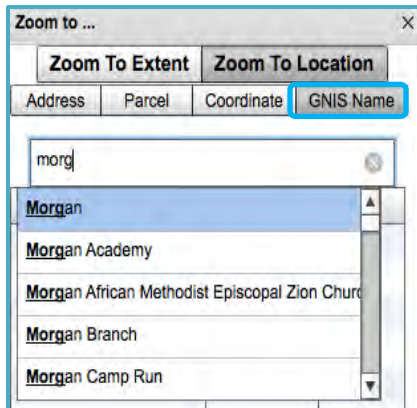
Coordinates



Parcel










Address



GNIS Name

West Virginia Flood Tool Toolbar

Type	Image of Tool	Purpose	Functions
Bookmark		Bookmark	Bookmarks remembered by user's computer
Share Map Link		Bookmark	External links for shared users
Measure		Measures features	Measure lengths or areas of user-defined features. Accessible only for Expert and Risk MAP Views
Print		Publishing	Print 8.5" x 11" inch PDF maps of captured views. Includes legend and disclaimer
Text Markup		Publishing	Make personalized notes and annotations
Clear		Publishing	Clear/ Erase notes made using the text markup tool
Help		Help	WV Flood Tool Help, Contacts, Data Availability
Display	Scale - 1:18,056 x:-80.302214, y:	Dynamic Screen Display	Coordinates and scale level are constantly displayed on screen in lower left-hand corner

Flood Hazard Determination (Public [Default] View)

Using the default **public** view, one can quickly make an initial flood hazard determination by following the steps below:

- (1) **Search** by address or navigate to the location of interest.
- (2) **Validate**, if desired for location confirmation, using other reference or base map layers.
- (3) Click on the map to **query** if a flood hazard zone

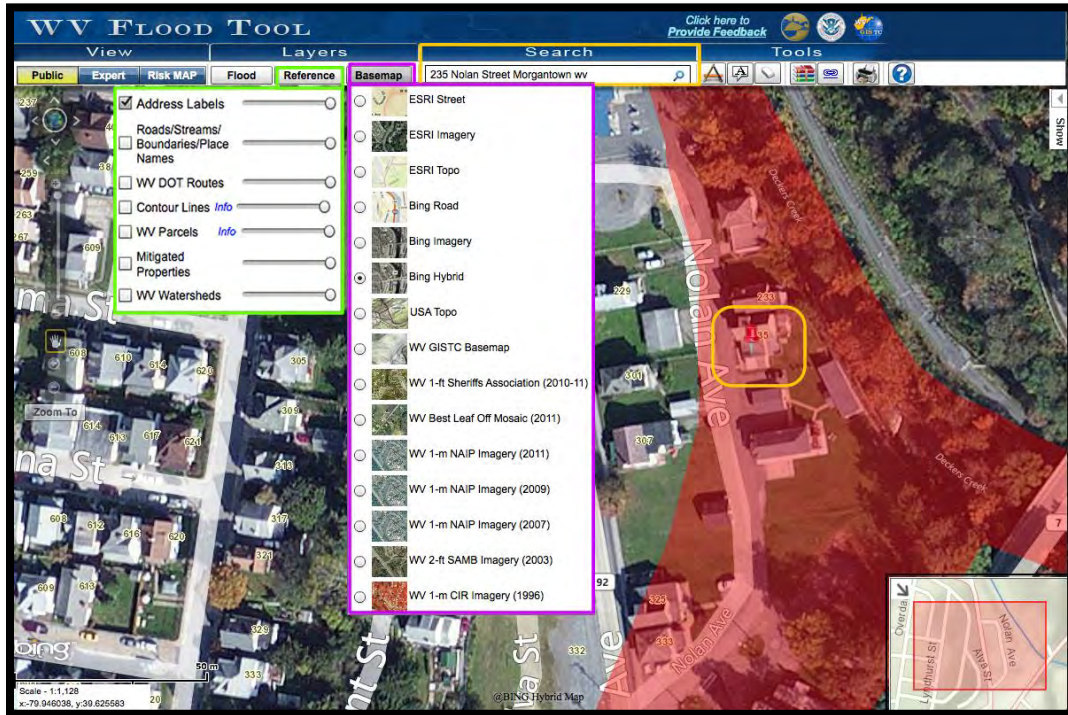


Step 1: The property of interest is 235 Nolan Street, Morgantown, WV.

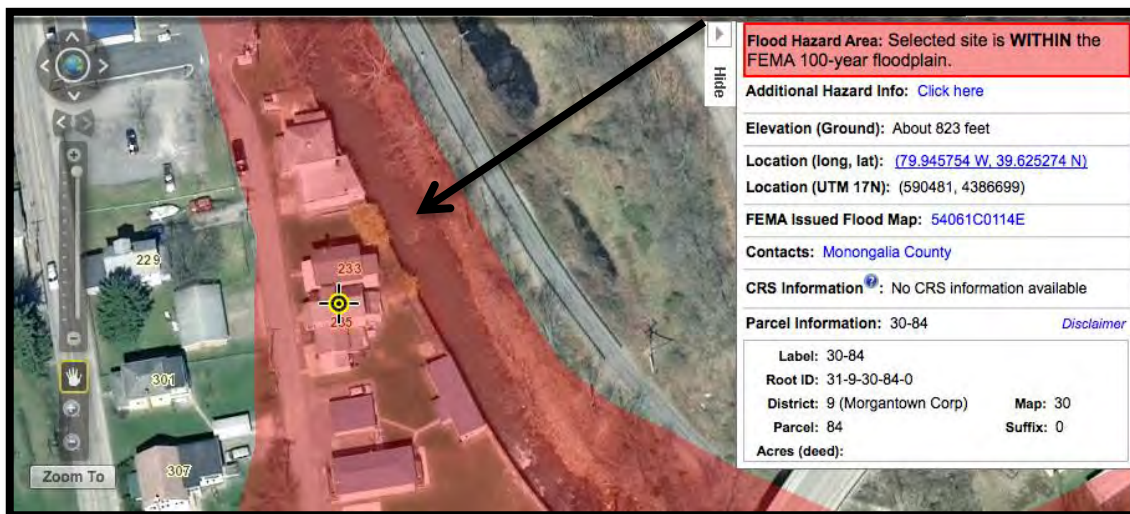
A **search** by address zooms to the Nolan Street property.



Step 2: Validate and confirm the identified location through an alternative **base map** layer or **reference** layer, such as aerial photography or addresses. In this example, additional map layers aerial photography and addresses were both used to confirm the structure location at 235 Nolan Street.

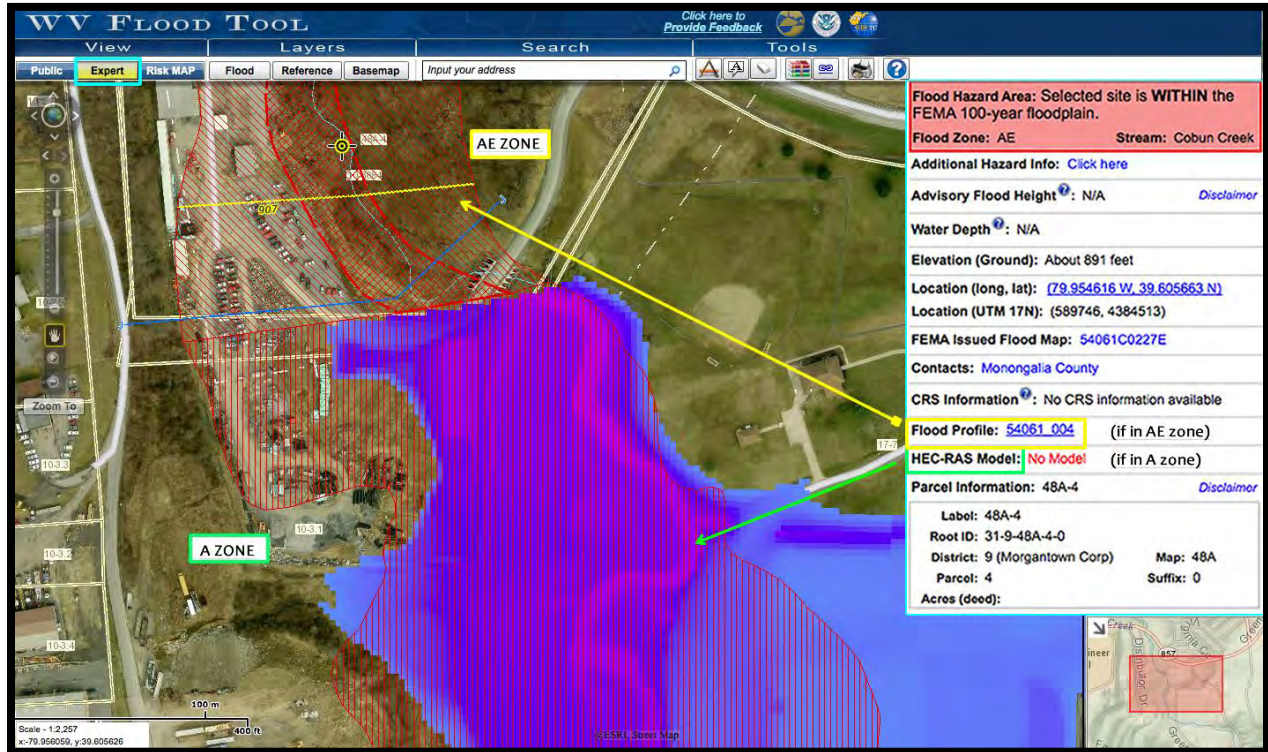


Step 3: Single click on the structure (235 Nolan Street) to determine if it is in a flood zone. The flood hazard query reveals that the property is within a FEMA 100-year flood zone and provides other information including local floodplain manager contacts and a link to the official FEMA flood map



Flood Hazard Determination (Expert View)

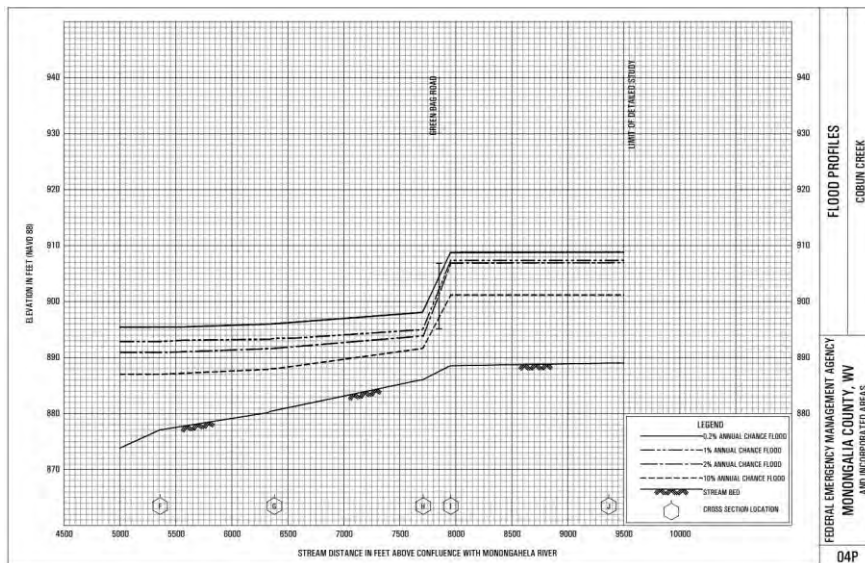
Expert view is intended for floodplain managers, planners, emergency officials, and informed citizens.



The West Virginia flood Tool’s Expert view has all the same functionality of the Public view, and additionally it has FEMA FIS Flood Profiles, and HEC-RAS model package downloads.

After locating an area of interest through the search method of your choice, (Address, parcel, GNIS

Name, or coordinates), and selecting that area, options for Profiles and HEC-RAS packages will be available in the pop-up box.



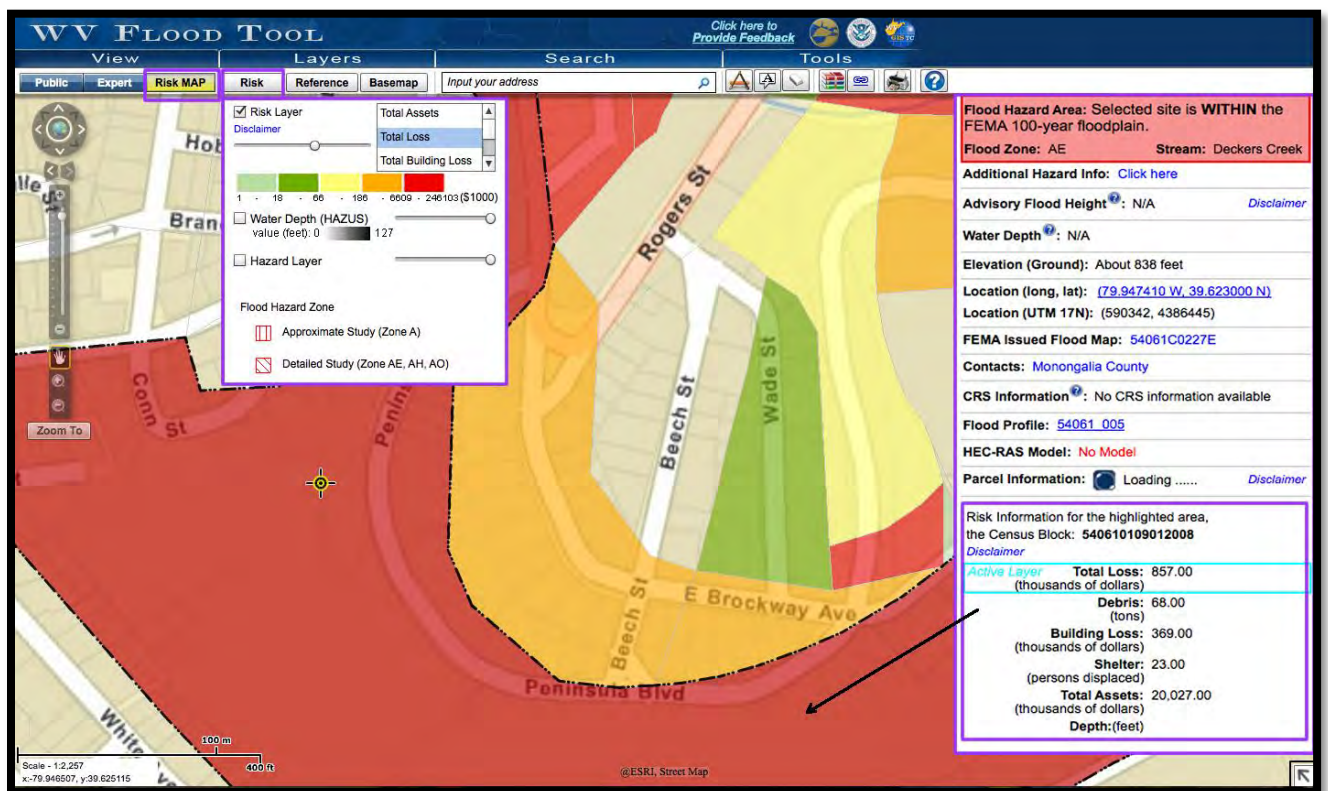
Profiles will display Annual Flood elevations (0.2%, 1%, 2%, & 10%), and Streambed elevations, as well as cross sections, intersecting roads, and the confluences of other streams for reference points.

Flood Hazard Determination (Risk Map View)

Risk Map is intended for Public officials, planners, informed citizens.

The West Virginia flood Tool's risk Map, Provides public officials, planners, and other decision makers with quality data for Risk Mapping, Assessment, and Planning (Risk MAP) that increases public awareness and leads to action that reduces flood risks to life and property. Risk layers are determined through census (block level) and flood data, within the HAZUS model.

When using the Risk map, take notice that the Flood layers options have turned into Risk layer options. Risk layers include Total Loss (Thousands of dollars), Total Assets (Thousands of dollars), Total Building Loss (Thousands of dollars), Total Debris (Tons), & Total Shelter (persons displaced). These features can be selected one at a time, and the active layer will be highlighted on the pop-up box. Risk layers also include a HAZUS water depth layer and the flood hazard layer.



Data Layers

Data layers are divided into three major categories: (1) **base map** or background layers which are cached tile services available for all views, (2) overlay **reference** layers, and (3) the **flood** hazard or risk layers. Many of the layers are scale-dependent and thus only display at certain map scales.

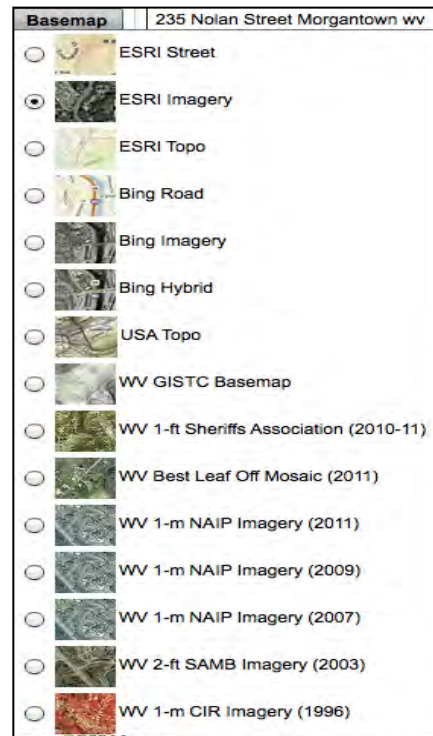
(1) Base Map Layers

Largest map scales 1:2,257 and 1:282 cached on WVGISTC servers

Base Map	Server	Type	Largest Scale Displayed
ESRI Streets (Default)	ESRI / WVGISTC*	Roads	1:1,128
ESRI Imagery	ESRI / WVGISTC*	Imagery	1:1,128
ESRI Topo	ESRI	Topographic	1:1,128
Bing Road	Bing	Roads	1:1,128
Bing Imagery	Bing	Imagery	1:1,128
Bing Hybrid	Bing	Roads & Imagery	1:1,128
USA Topo	ESRI	Topographic	1:18,056
WV GISTC Basemap	WVGISTC	Detailed Topographic	1:1,128
WV 1-ft. Sheriffs Imagery (2010-2011)	WVGISTC	High Resolution Imagery (mostly leaf-off)	1:282
WV Best Leaf-Off Mosaic (2011)	WVGISTC	Imagery (leaf-off)	1:1,128
WV 1-m NAIP Imagery (2011)	WVGISTC	Imagery (leaf-on)	1:2,257
WV 1-m NAIP Imagery (2009)	WVGISTC	Imagery (leaf-on)	1:4,514
WV 1-m NAIP Imagery (2007)	WV DEP	Imagery (leaf-on)	1:4,514
WV 2-ft. SAMB Imagery (2003)	WVGISTC	Imagery (leaf-off)	1:1,128
WV 1-m CIR Imagery (1996)	WV DEP	Color Infrared Imagery (Leaf-on)	1:4,514

Road base map layers are useful for viewing the named features of roads, streams, and other points of interest. *Topographic* base layers are helpful for viewing the terrain. Photographic or satellite *imagery* base layers are useful for viewing structures and high resolution pictures of the earth’s surface.

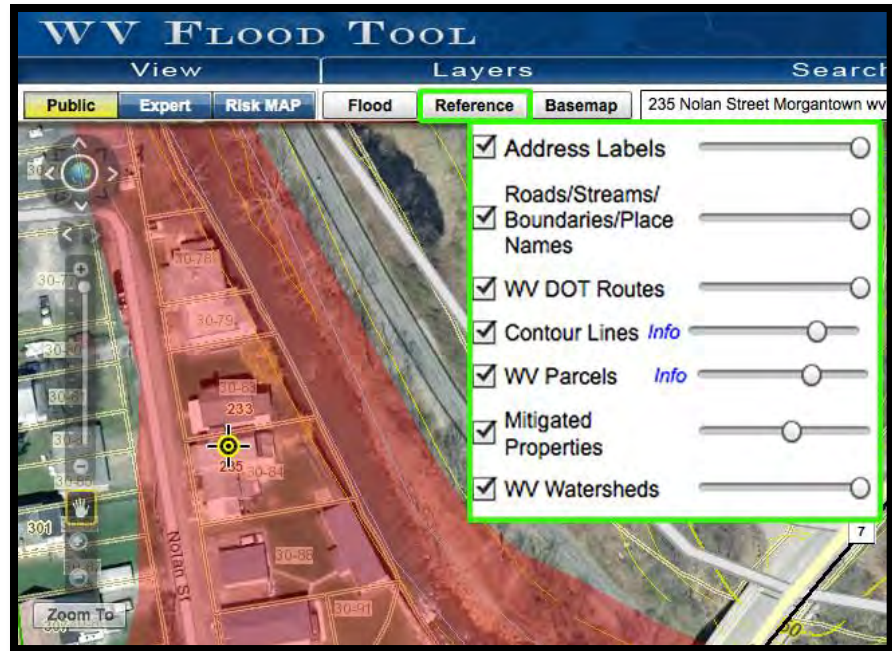
All the imagery is natural color except for the 1996 color infrared imagery. Imagery may have been captured with the leaves on or off. The ESRI and WV Best Leaf- Off contain the highest resolution imagery. The acquisition dates of the commercial ESRI and Bing imagery are not known.



(2) Reference Layers

Data Group	Data Layer	Date Created	Published Service Type
Elevation (+/- 10 vertical feet)	3-meter grid	2003	Query
	10-ft contour	2003	Cached
Elevation	2-ft Contour	2011	Cached
Addresses	Streets(WV DHSEM / SAMB) Sites(WV DHSEM / SAMB)	2012	Geocoding & Cached
Reference	Hydrography (Local resolution + 24k NHD labels)	2011	Cached
	Transportation	2011	Cached
	Place Names (GNIS Census)	2010	Cached
	Incorporated Areas	2008	Cached
	Parcels	Varies by County	Cached
	WV Mitigated Properties	2013	Cached
	WV HUC-8 Watersheds	2004	Cached

Overlay **reference layers** are generalized and more detailed at zoom-out and zoomed-in scales, respectively, with all layers displayed at the largest zoom-in scale of 1:282. Layers are turned on or off by clicking on the check box. Reference layers are available for all map views, and the user can control the transparency of each reference layer. New reference layers may be added to the WV Flood Tool in the future.

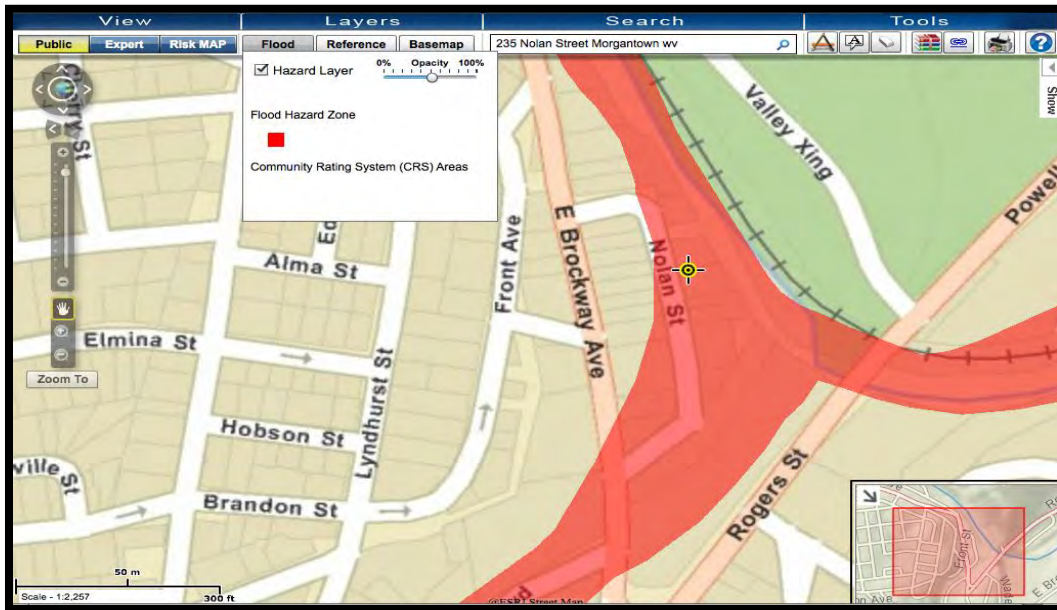


(3) Flood Layers

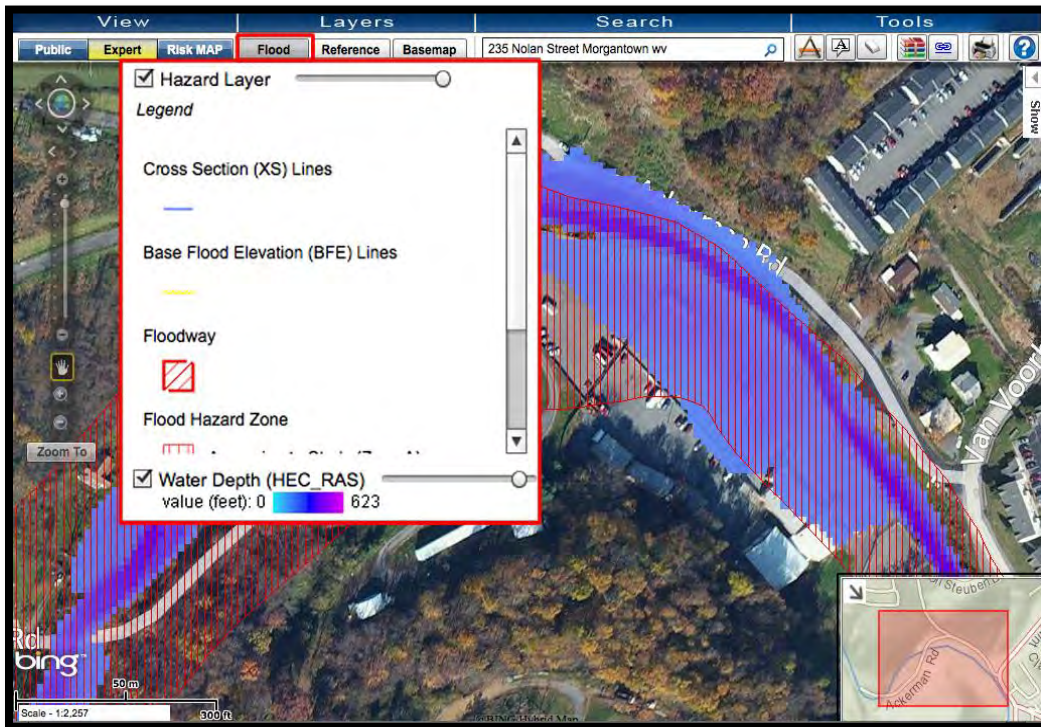
Flood layers, which encompass information about flood hazards and mitigating flood risks (Risk MAP), are primarily compiled from the FEMA Map Service Center and FEMA/WV DHSEM contractors. All flood layers have a transparent slider bar and legend symbol. Operational flood layers are reset to the default settings when the user selects another view.

Data layer	Source	Views	Published Service Type
Flood Hazard	FEMA	All	Dynamic & Query
Floodway	FEMA	Expert	Dynamic
FIS (Flood Insurance Study) Profiles with Cross Sections/ BFE's	FEMA	Expert	Dynamic
Panel Index	FEMA	Expert	Dynamic
Flood Risk Layers	2010 HAZUS Level 1 for 100-year Flood Event	Risk	Cached
Water Depth	HAZUS (55 counties) & HEC-RAS (13 counties)	Risk	Dynamic & Query
Water Surface Elevation (Advisory Flood Height)	HEC-RAS from AMEC (? counties)	Public, Expert	Query
DFIRM Status	FEMA	Public, Expert	Dynamic

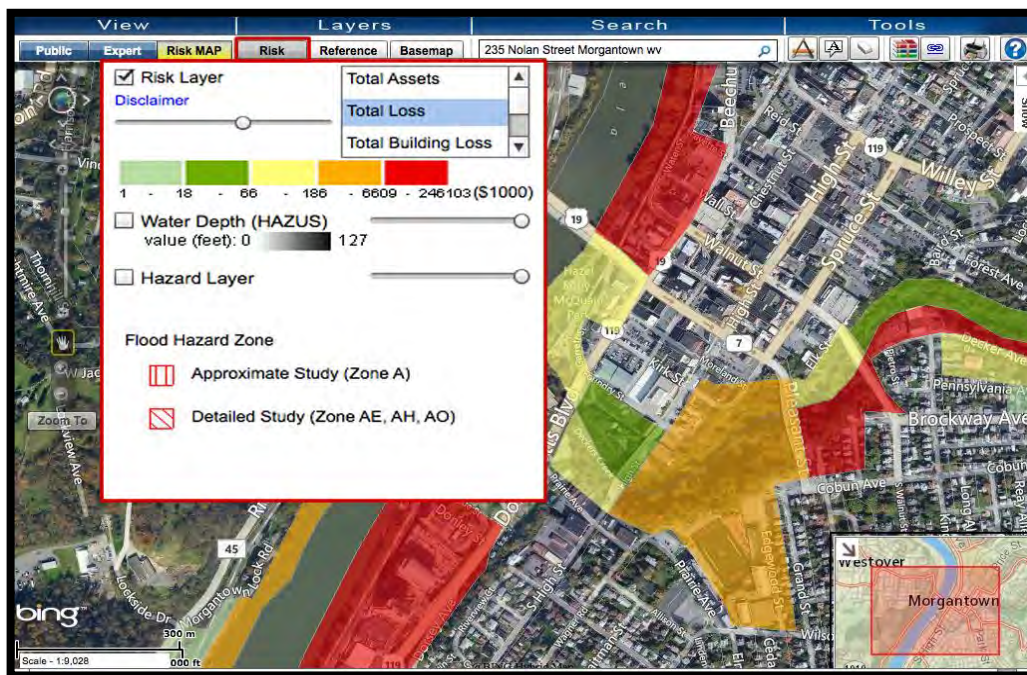
(a) Public View – Flood Hazard Layer



(b) Expert View – Flood Hazard Layer



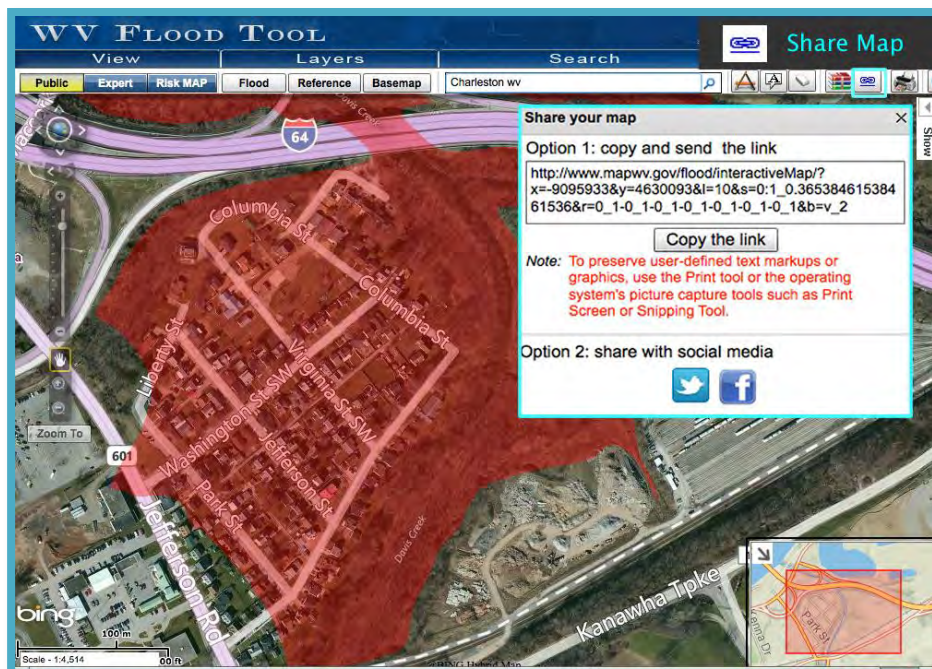
(c) Risk Map – Flood Hazard Layer



Share Map Link

Share a map view of interest with others using the **Share Map Link** tool. By pressing **Copy the link** button, the current view is copied to the computer’s clipboard. One can then share this link with others

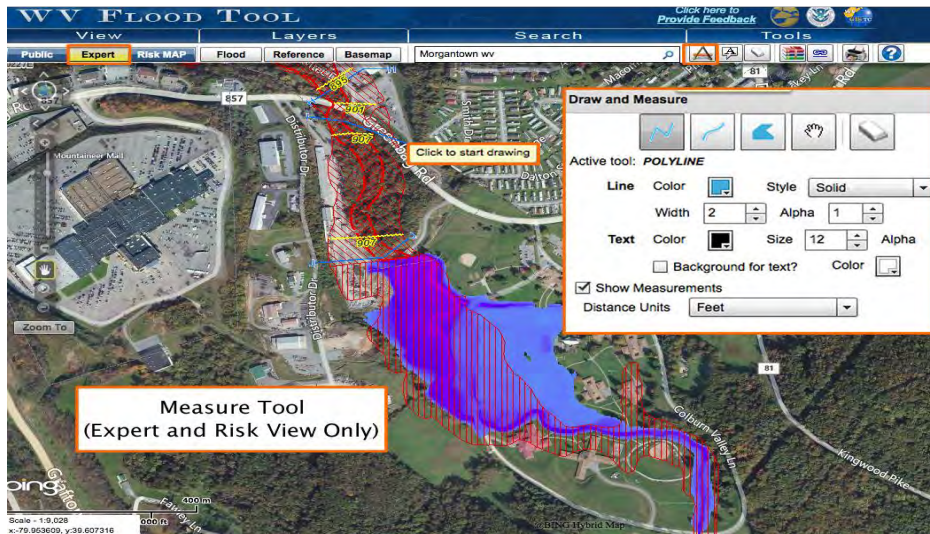
by pasting the web page address in an email to others. Below is a map link URL generated of the Charleston area from the Expert View.



URL Link generated:
<http://www.mapwv.gov/flood/v2beta/?x=-9096820.214817071&y=4630728.759807807&l=9&s=1:1 1&r=0 1-0 1-0 1-0 1&b=v 2>

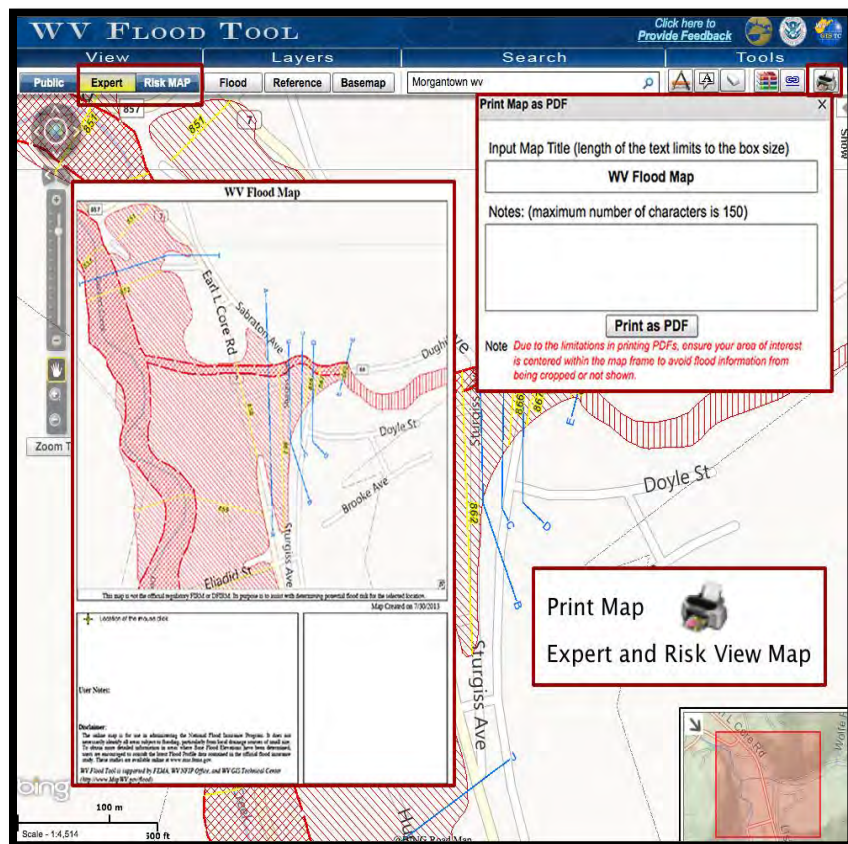
Measure

The **Measure** tool calculates lengths or areas of user-defined features. This tool is accessible only for the Expert and Risk MAP Views.



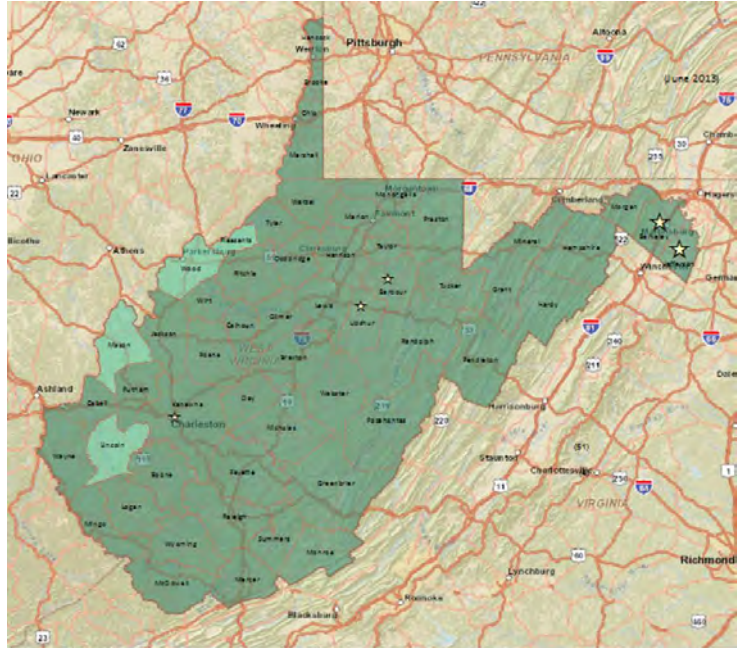
Print

The **Print** tool captures a picture of the screen and outputs an 8.5" x 11" inch PDF map with a legend, scale, creation date, and disclaimer. The user has the option to add a customized map tile.



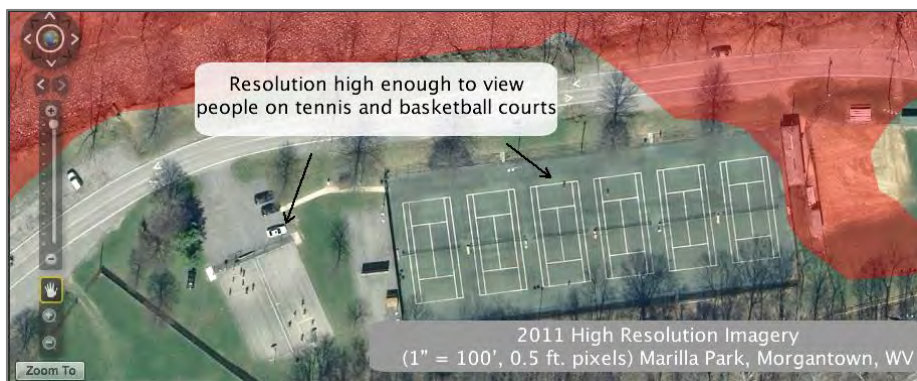
Status Graphic – Digital Conversions of Flood Layers

A flood data status graphic is displayed at the highest zoomed out scales of the Public and Expert Map Views. The graphic displays information about the conversion of counties to FEMA's digital flagship product, the Digital Flood Insurance Digital Rate Maps (DFIRM). The WV GIS Technical Center and its partners update the WV Flood Tool with new digital flood data as it becomes available, with updates usually done every six months.



Best Leaf-Off Imagery Mosaic

Leaf off imagery is ideal for locating structures. Presently the best statewide leaf-off imagery is the 2003 SAMB imagery collected at 1:4800-scale and 2-ft pixel resolution. To improve the spatial and temporal resolutions of the SAMB imagery, other organizations have contributed local resolution imagery, resulting in a mosaic of the best leaf-off imagery in West Virginia. Currently the best leaf off imagery mosaic includes 1"=100' orthophotos Brooke, Cabell, Hancock, and Monongalia Counties; and 1"=200' orthophotos for the Charleston Area. Please email Kurt Donaldson at kdonalds@wvu.edu if you would like to have better quality local resolution leaf-off imagery incorporated into the WV Flood Tool.



WV Geocoding Services (Address Matching)

The customized Address Locator of WV Flood Tool cascades through three locator services to find the best address match: (1) WV Site, (2) WV Street, and (3) Nationwide Commercial Locator

Steps to Create WV Locator Services: The WV GIS Technical Center, in cooperation with the WV Division of Homeland Security and Emergency Management (WVDHSEM), periodically creates the statewide address locator services for building sites (points) and streets. The address locators are based on data from the Statewide Addressing and Mapping System (SAMS) maintained by WVDHSEM. To create the locator services, first the addressing information is extracted from the addressing and mapping system. Next, programming scripts are executed to generate statewide Site and Street Locator Services.

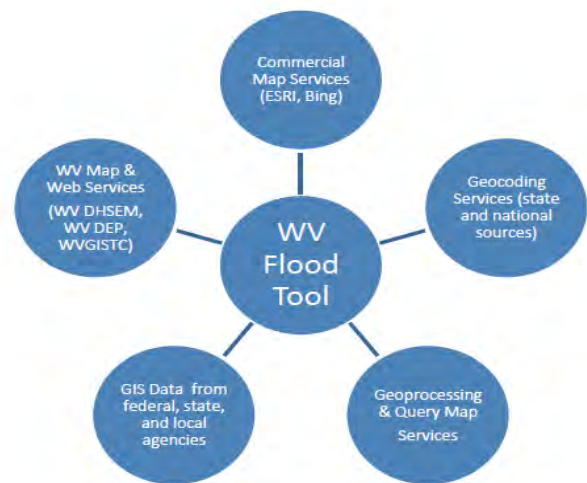


Accuracy: The WV Site Locator Service address matches to the building point (centroid) and is the most spatially accurate locator service in the Nation. However, the accuracy of this service is dependent upon the completeness and accuracy of the data in the Statewide Addressing and Mapping System. In 2010 it was estimated that the Site Locator Service has a 50% successful rate for address matching to building points, but in the future the site address matching should improve as the reference data becomes more complete.



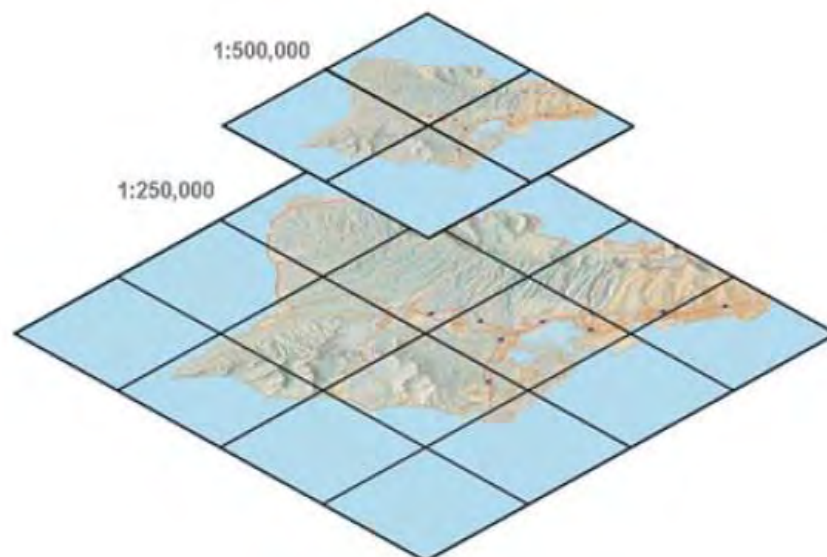
Data and Web Map Services

The WV Flood Tool consumes GIS data and map servers from many agencies. The shared data and services allow the WV Flood Tool to be more robust in the breadth of capabilities offered to users. In addition, most map layers are cached to distribute online maps faster



Map Caching

Map caching is a very effective way to distribute online maps faster. When you create a map cache, the server draws the entire map at several different scales, and stores copies of the map images as tiles. The server can then distribute these tiled images whenever someone asks for a map. It's much quicker for a map server to hand out a cached image than to draw the map each time someone requests it. Another benefit of caching is that the amount of detail in the image doesn't noticeably affect how quickly the server can distribute the copy.



Contact Information

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Capitol Complex
Building 1, Room EB-80
1900 Kanawha Blvd. East
Charleston, WV 25305-0360

Phone: 304-957-2571
Fax: 304-558-8902
Website:
<http://www.dhsem.wv.gov/mitigation/floodplain/Pages/default.aspx>

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Hazard Mitigation Project Officer
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WVDHSEM
Capitol Complex
Building 1, Room EB-80
1900 Kanawha Blvd. East
Charleston, WV 25305-0360

Phone: 304-957-2571
Fax: 304-558-8902
Website:
<http://www.dhsem.wv.gov/mitigation/Pages/MitigationPlanning.aspx>

WV GIS Technical Center (System Administration of Flood Tool)

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330 Brooks Hall
P.O. Box 6300
Morgantown, WV 26506
Website: <http://wvgis.wvu.edu/>

Browser Specifications and Other Related Software

Requirements: The online mapping application requires a broadband connection, a modern browser, and Adobe Flash Player. To use all of the features and functions of the online application, please ensure you are using Internet Explorer 7 or greater, or any other modern browser such as Mozilla Firefox or Google Chrome. Adobe Flash Player must be installed for the application to work properly.

Trouble Viewing Application during Start-Up: If you are experiencing trouble viewing the application, then make sure you have the latest version of a modern browser or choose an alternative browser. Also make sure the Adobe Flash Player plug-in or add-on to your browser is the most recent version and correctly installed. The most recent version of Adobe Flash Player can be downloaded from <http://www.flash.com>.

Application Stops Working: If the application stops working, restart the application by pressing the refresh button on the browser or re-launch the application. If problems still exist viewing the Flood Tool, then contact the WV GIS Technical Center for system administrative support. Refer to the contact information below.

Question about Flood Information: For questions about flood hazards and mitigation of flood risks, please contact your local floodplain manager or WV NFIP Assistant Coordinators. Refer to contact information below.