



Flood Risk Review (FRR) Meeting

Hardy County, West Virginia
September 15, 2021



FEMA

Agenda

- Welcome and Introductions
- Where We Are - Draft Maps
- Flood Study Update
- Study Impacts
- Using Flood Risk Data
- Floodplain Management
- Risk Rating 2.0
- Discussion



Welcome and Introductions



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Where We Are - Draft Maps

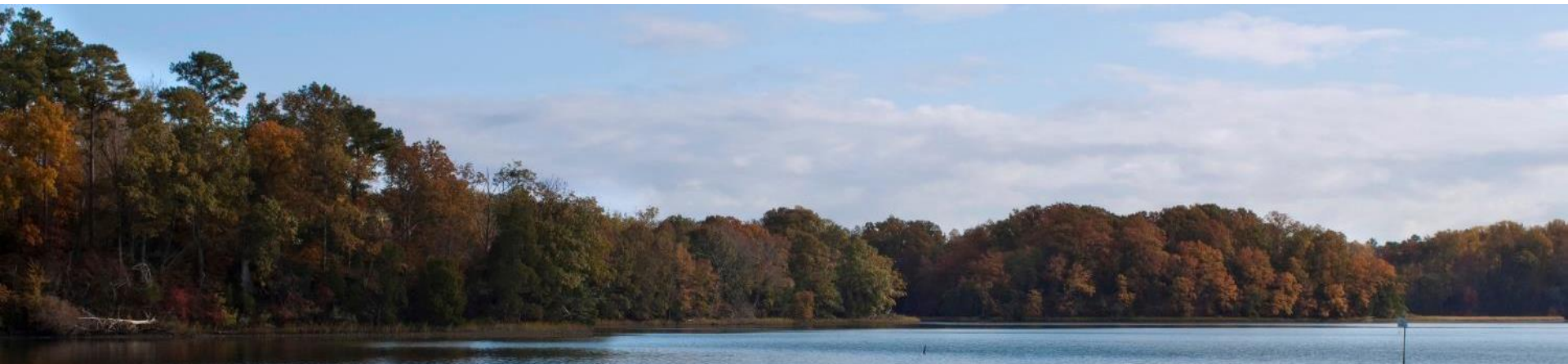


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3 Reasons We Are Here Today

- To preview and discuss the updated Flood Insurance Study (FIS) report and Flood Insurance Rate Map (FIRM) for Hardy County, West Virginia
- To examine the new study areas, discuss how the analysis and mapping have changed since the previous FIRM, and work collaboratively to ensure that the needs of the community and its partners are met. **BECAUSE THE EARLIER YOU KNOW THE BETTER!**
- To present a timeline of next steps



Timeline – Looking Back

**DFIRM
Conversion**
September 2009

**Advisory Flood
Height (AFH) Data**
February 2020

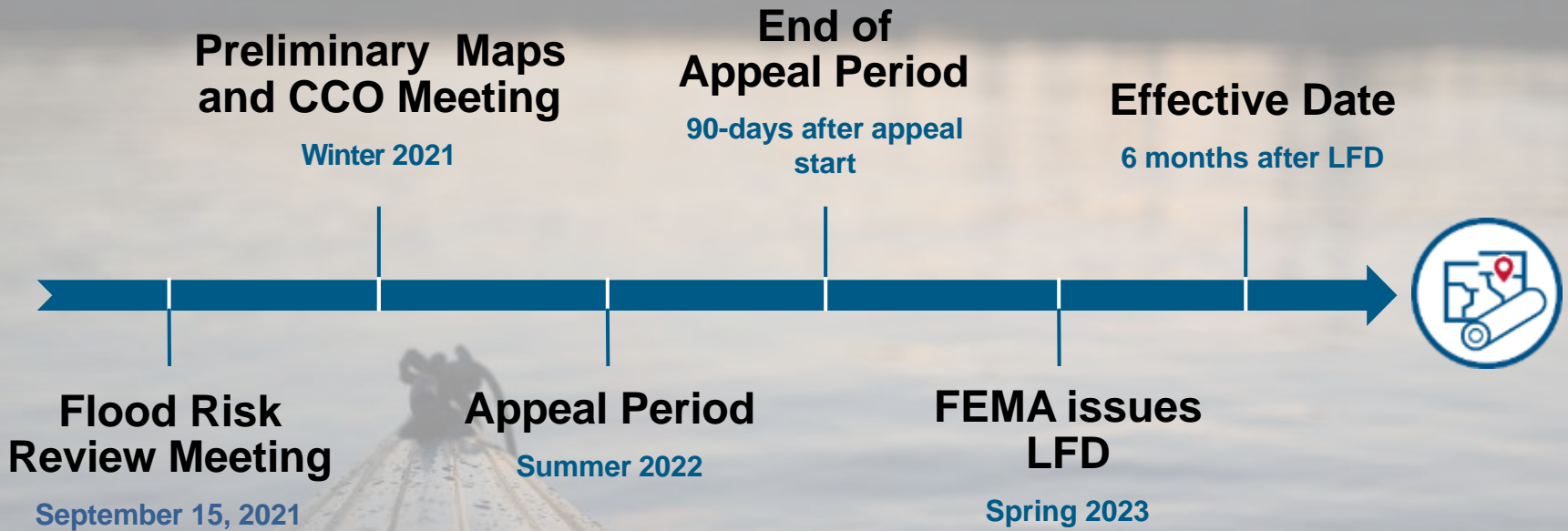
**Flood Risk
Review Meeting**
September 15, 2021

Discovery
September 2018

**Risk MAP
Study
Notification**
July 2020



Timeline – Looking Ahead





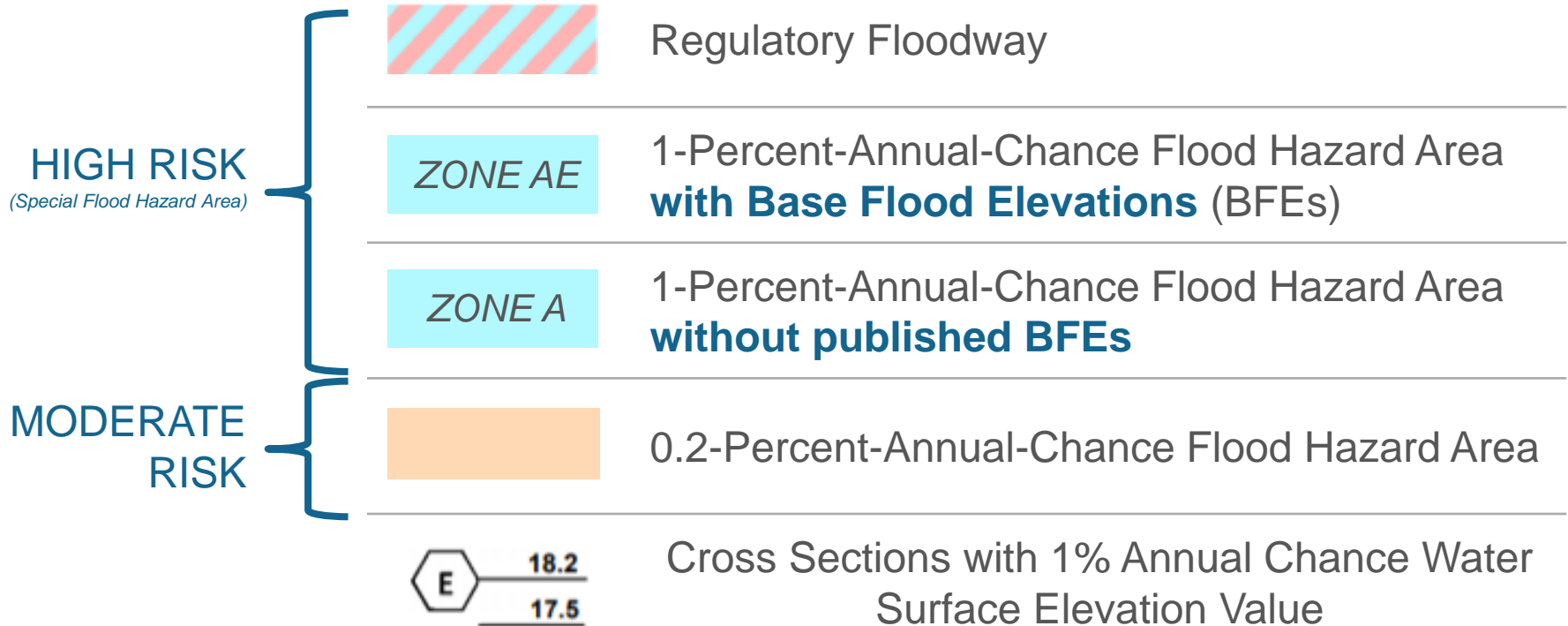
Flood Study Update



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Floodplain Map Overview

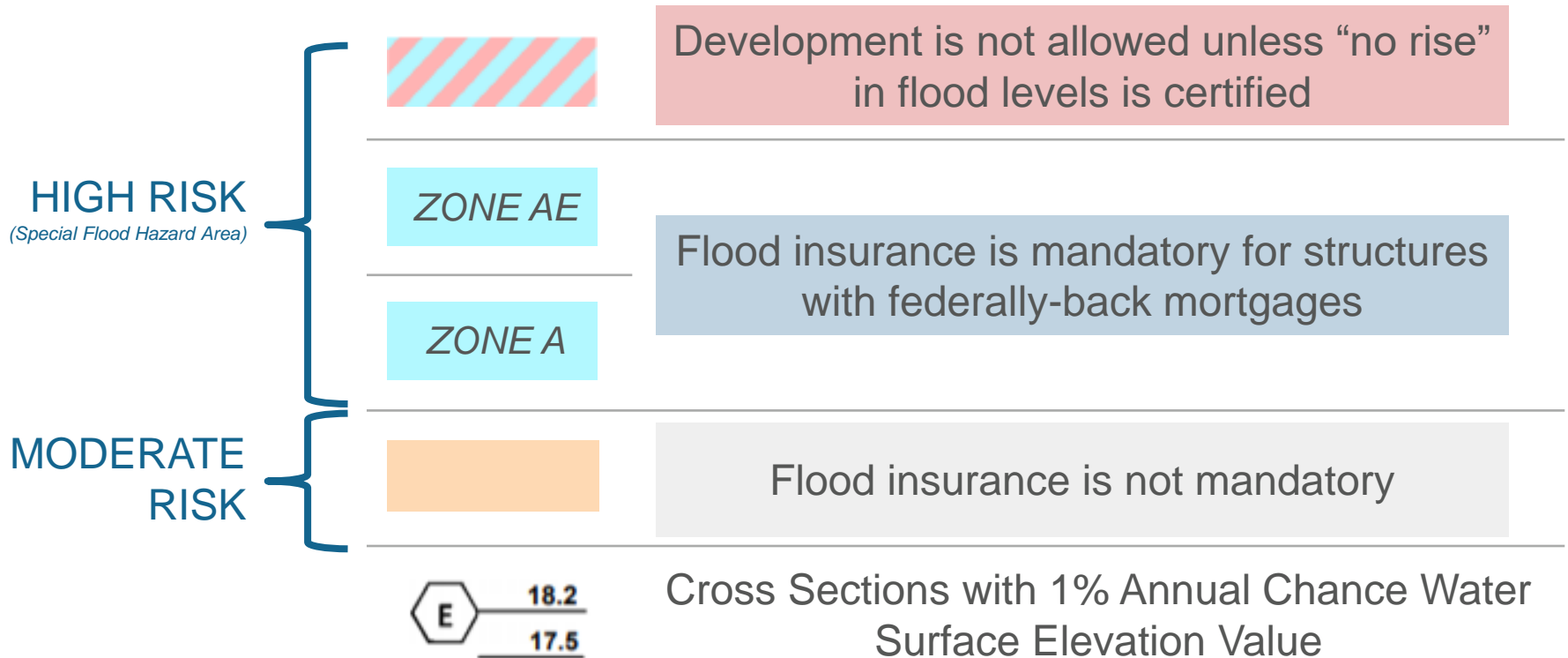


["The 100-Year Flood Zone Explained"](#)



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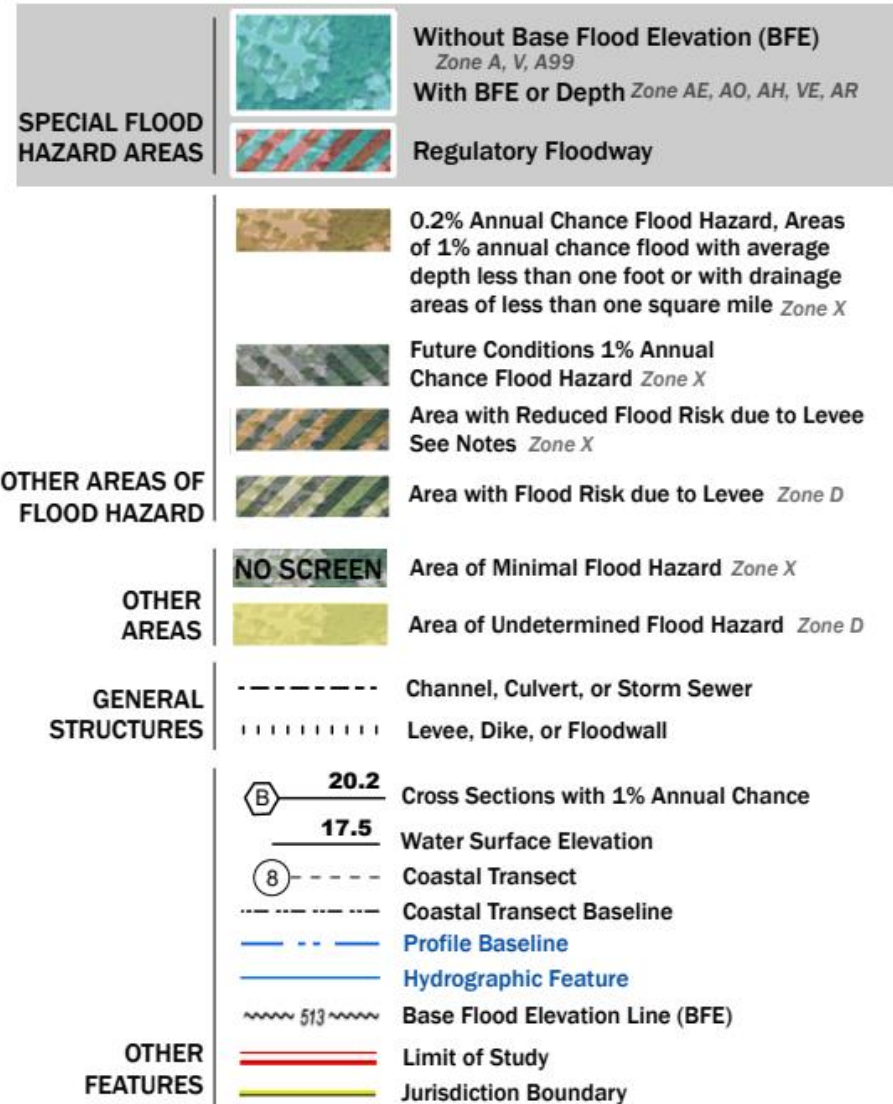
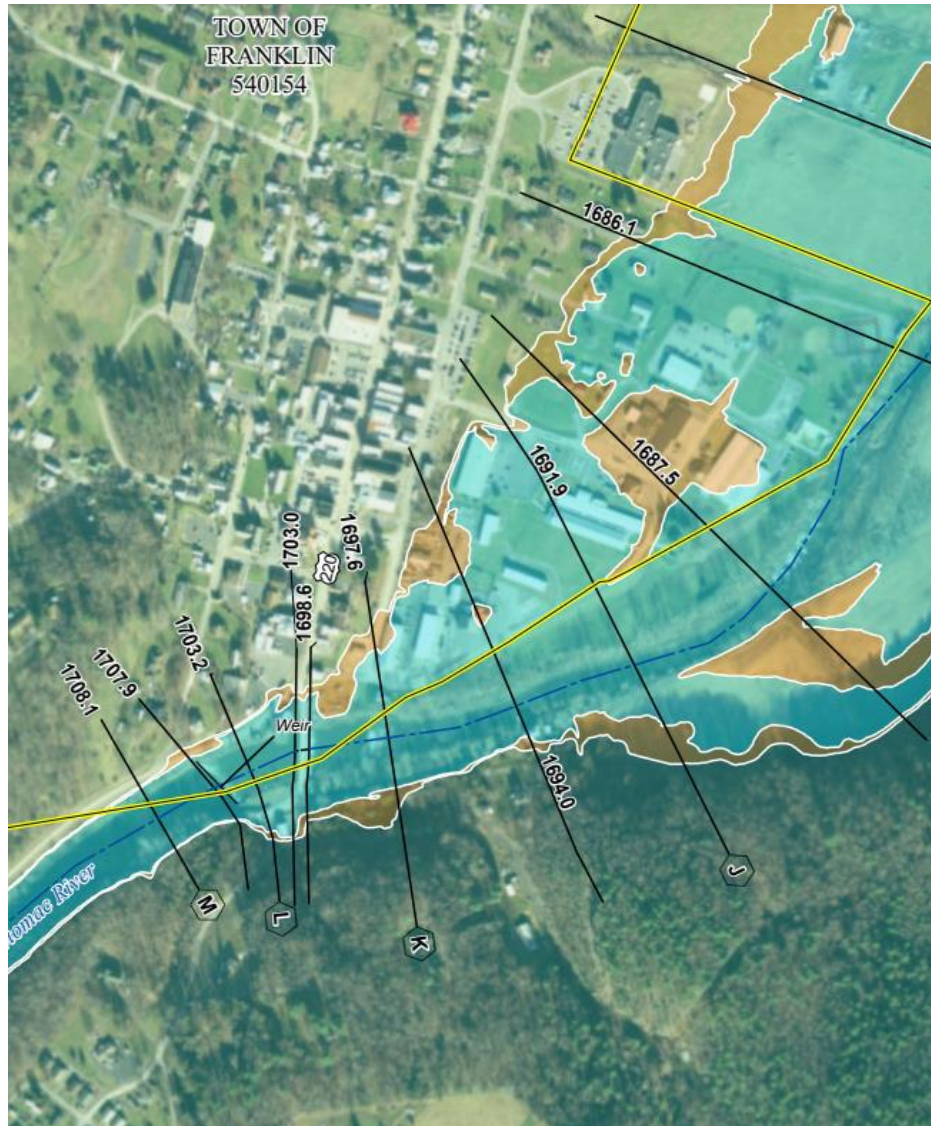
Floodplain Map Overview



[“The 100-Year Flood Zone Explained”](#)



Floodplain Map Overview



Study Overview

Revised Modeling and Mapping, including:

- Updated GIS-based regulatory products, including:
 - Updated maps / database / report formats based on new FEMA guidelines and specifications
- Utilization of high-resolution topographic data (for modeling and mapping)
- ***Model-backed Approximate 'Zone A' Studies – 332 miles***
- Production of associated non-regulatory flood risk datasets

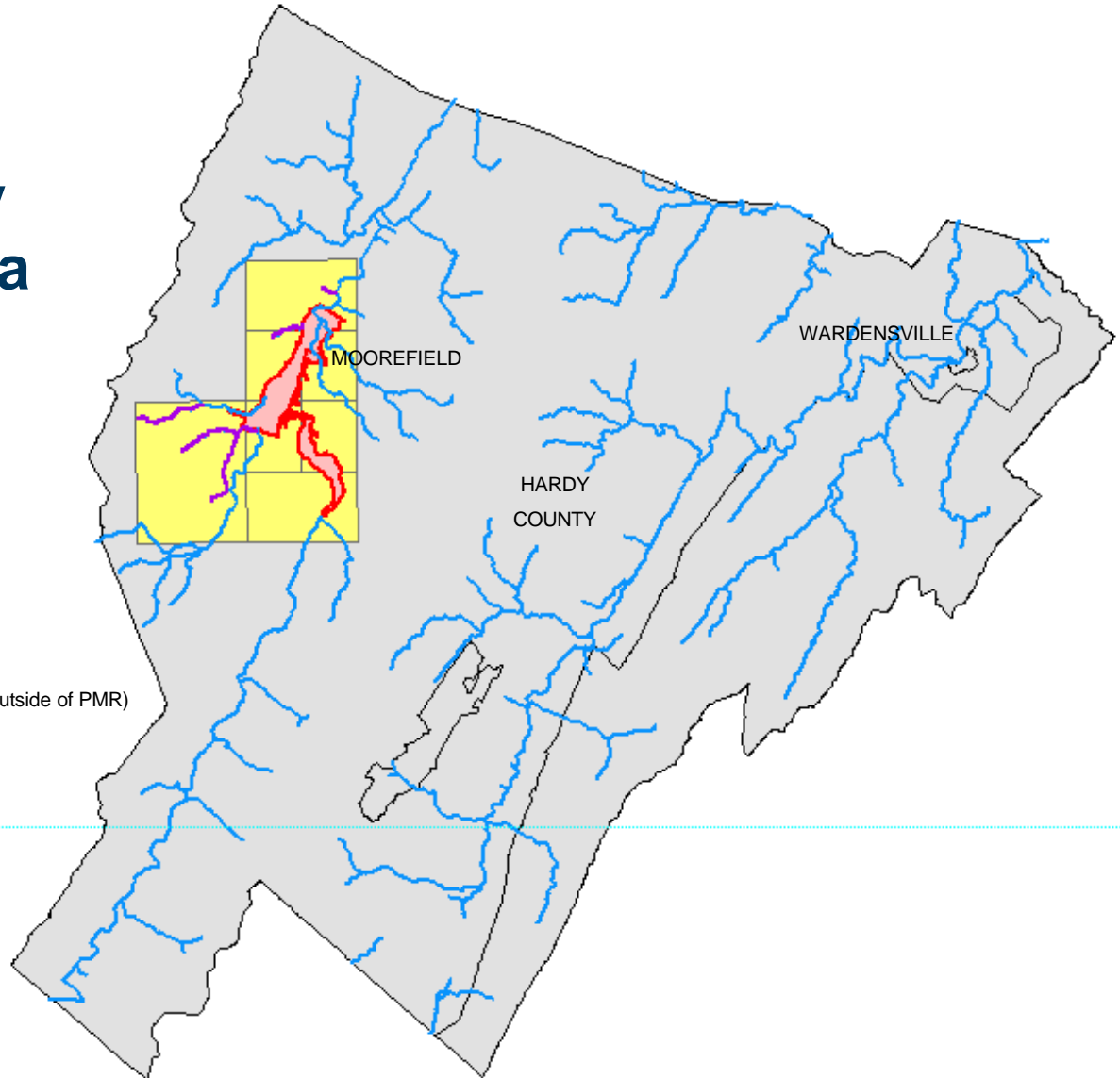
***** Ongoing levee recertification effort in Moorefield **
will follow separate path/update***








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Study Overview

The Hardy County “PMR” Project Area



LEGEND

-  Zone A streams (studied for this project, but completely outside of PMR)
-  Zone A streams (part of the PMR)
-  Zone AE restudy associated with Moorefield Levees
-  Area not included as part of this PMR
-  Hardy County Boundary



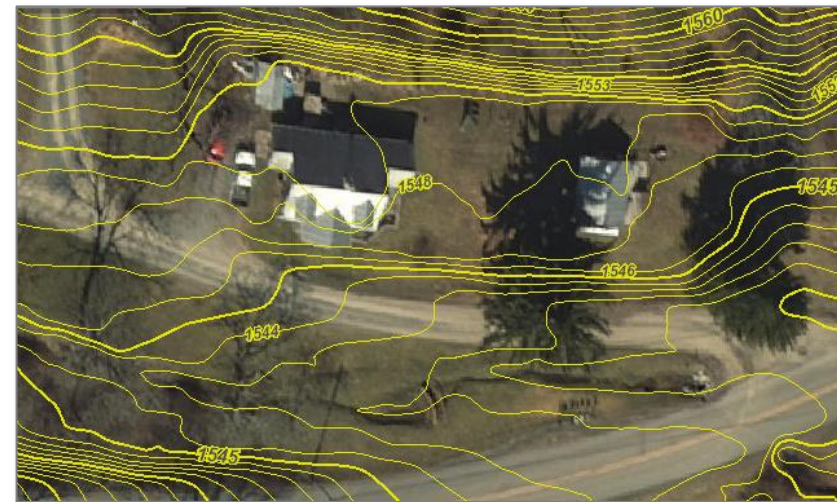
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Topographic Data

2016-17 QL2 FEMA R3 WV Northeast LiDAR Acquisition

LiDAR = Light Detection and Ranging

- *Uses light pulses and GPS to survey elevation data*
- *Improves the level of detail for hydraulic modeling and floodplain delineation*



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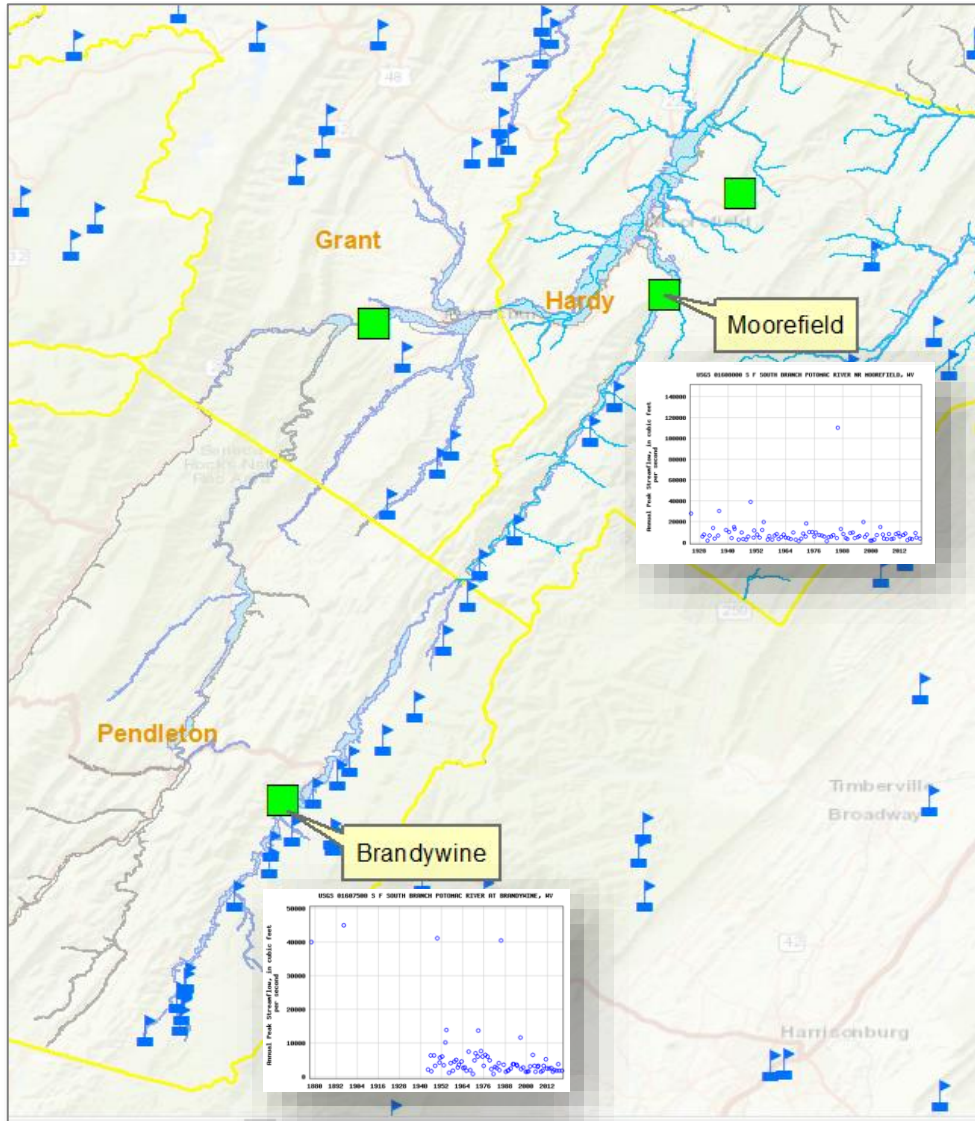
Hydrologic Analyses

Hydrologic Study Method	Study Type	Stream Names	Reach Lengths (<i>Miles</i>)
Gage Analysis weighted with Regional Regression Equations	A	Cacapon River, Lost River, South Branch Potomac River (Lower and Upper Reaches), South Branch Potomac River Tributary 4, South Fork South Branch Potomac River	82.4
Regional Regression Equations	A	All Remaining Zone A Studies	249.3



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Regulation in Watershed



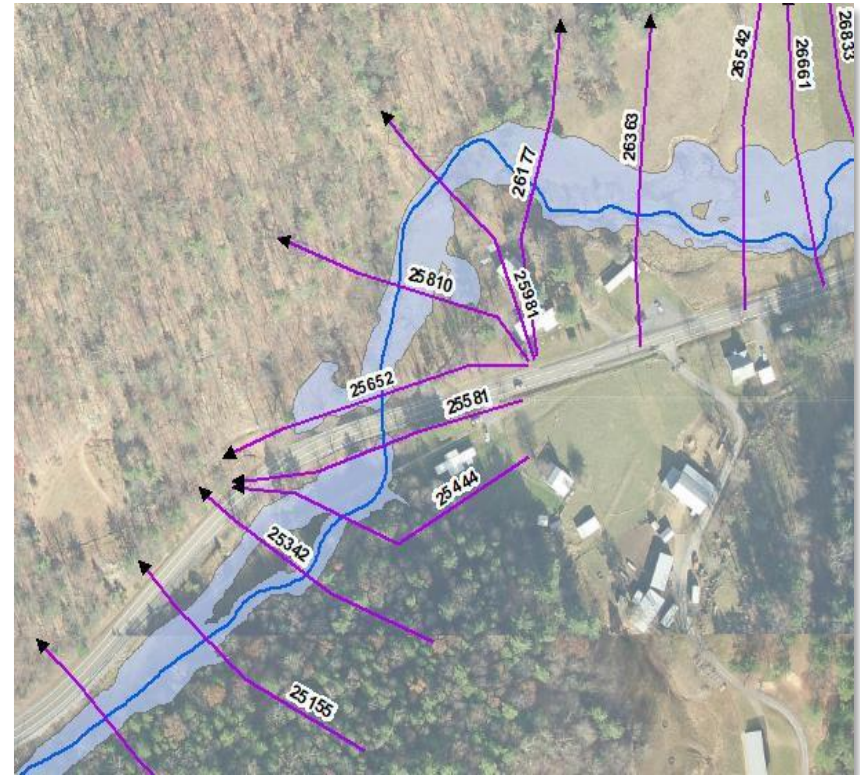
How we accounted for it

- Gage data provides best available hydrologic data
- Post-Regulation analysis of gage at upstream gage (Brandywine)
 - 500-year (0.2%) flood based on full record analysis
- Weighted with full-record analysis at downstream gage (Moorefield)
 - Consistent with previous FEMA studies (including levee accreditation in Moorefield)
- Flood Control facilities are present, but do not definitively control 1% AEP and other extreme events

Hydraulic Analyses

Approximate 'Zone A' Base Level Study (332 miles)

- Generally used in areas with lower development / lower development potential
- Cross-sections generated from LiDAR used for hydraulics:
 - Automated processes
 - Does not include information below normal water surface
 - No structures are modeled
 - No Floodway or BFEs (but modeled XS in FIRM database)
 - Multi-frequency flood values computed but only 1% annual chance on FIRM



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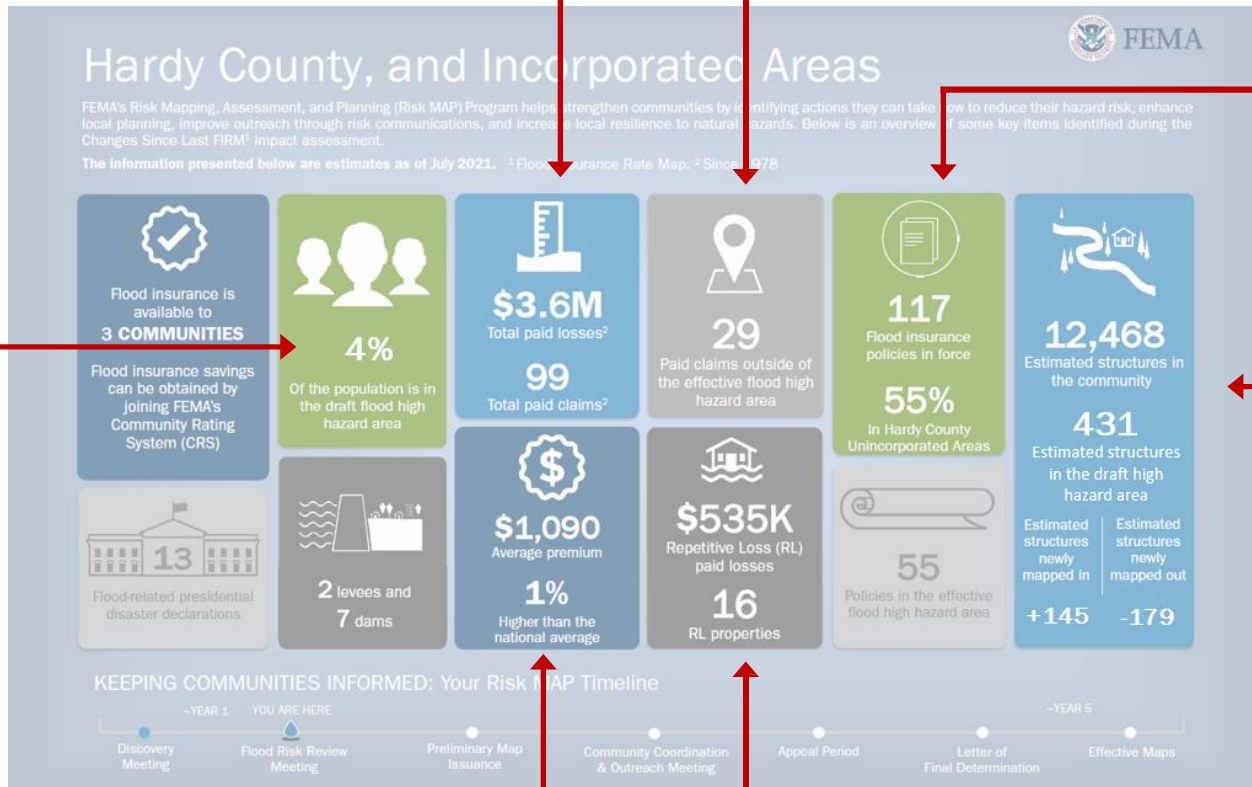
Study Impacts

Flood Risk Dashboard

NFIP FLOOD CLAIM PAYOUTS

CLAIMS OUTSIDE OF SFHA

NFIP FLOOD POLICIES



AFFECTED RESIDENTS

HIGH-RISK STRUCTURES



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AVERAGE PREMIUM

REPETITIVE LOSSES

Flood Risk Dashboard



Hardy County, and Incorporated Areas

FEMA's Risk Mapping, Assessment, and Planning (Risk MAP) Program helps strengthen communities by identifying actions they can take now to reduce their hazard risk, enhance local planning, improve outreach through risk communications, and increase local resilience to natural hazards. Below is an overview of some key items identified during the Changes Since Last FIRM¹ impact assessment.

The information presented below are estimates as of July 2021. ¹Flood Insurance Rate Map. ²Since 1978



KEEPING COMMUNITIES INFORMED: Your Risk MAP Timeline

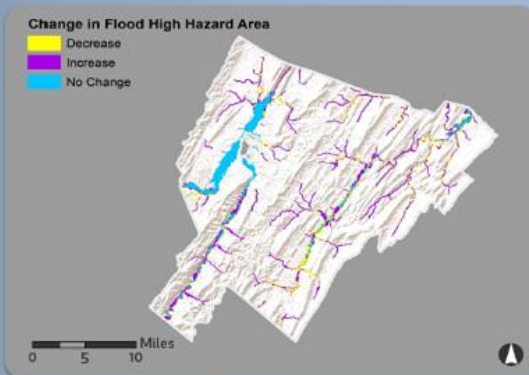


Flood Risk Dashboard



Unincorporated Areas/Hardy County, WV

KNOW YOUR RISK (The information presented below are estimates as of September 2021. ¹Flood Insurance Rate Map. ²Since 1978.)



6/19/1985
Initial FIRM¹ date

9/2/2009
Effective FIRM¹ date

\$475K
Total paid losses²

47
Total paid claims²

66
Flood insurance policies in force

41
Policies in the effective flood high hazard area

11,030
Estimated structures in the community

363
Estimated structures in the draft flood high hazard area

5%
Of the population is in the draft flood high hazard area

19%
Of households spend 30% or more of their income on housing

4
Paid claims outside of the effective flood high hazard area²

\$150K
Repetitive Loss (RL) paid losses²

4
RL properties²

13
Flood-related countywide presidential disaster declarations

Estimated structures newly mapped in: **+145**

Estimated structures newly mapped out: **-178**

KEEPING COMMUNITIES INFORMED: Your Risk MAP Timeline

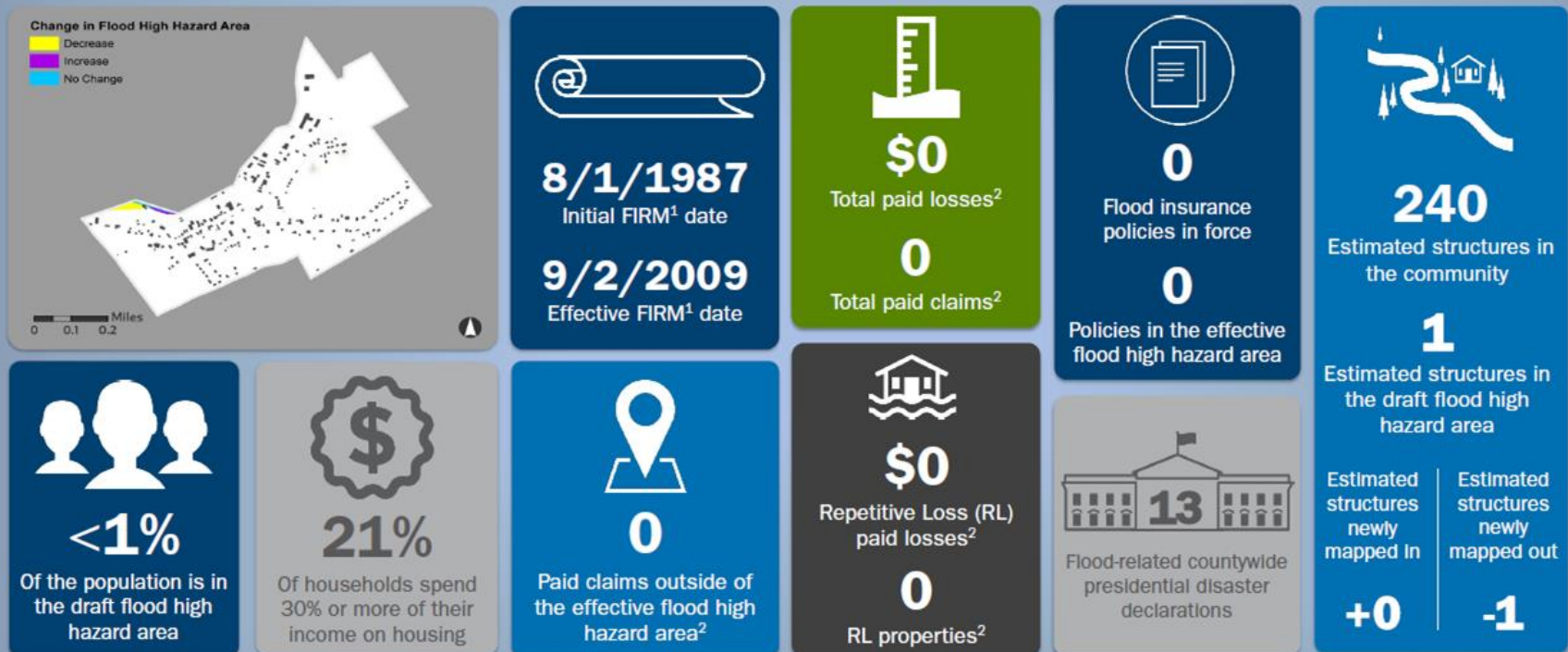


Flood Risk Dashboard



Town of Wardensville/Hardy County, WV

KNOW YOUR RISK (The information presented below are estimates as of September 2021. ¹Flood Insurance Rate Map. ²Since 1978.)



KEEPING COMMUNITIES INFORMED: Your Risk MAP Timeline



Significant Impacts Overview

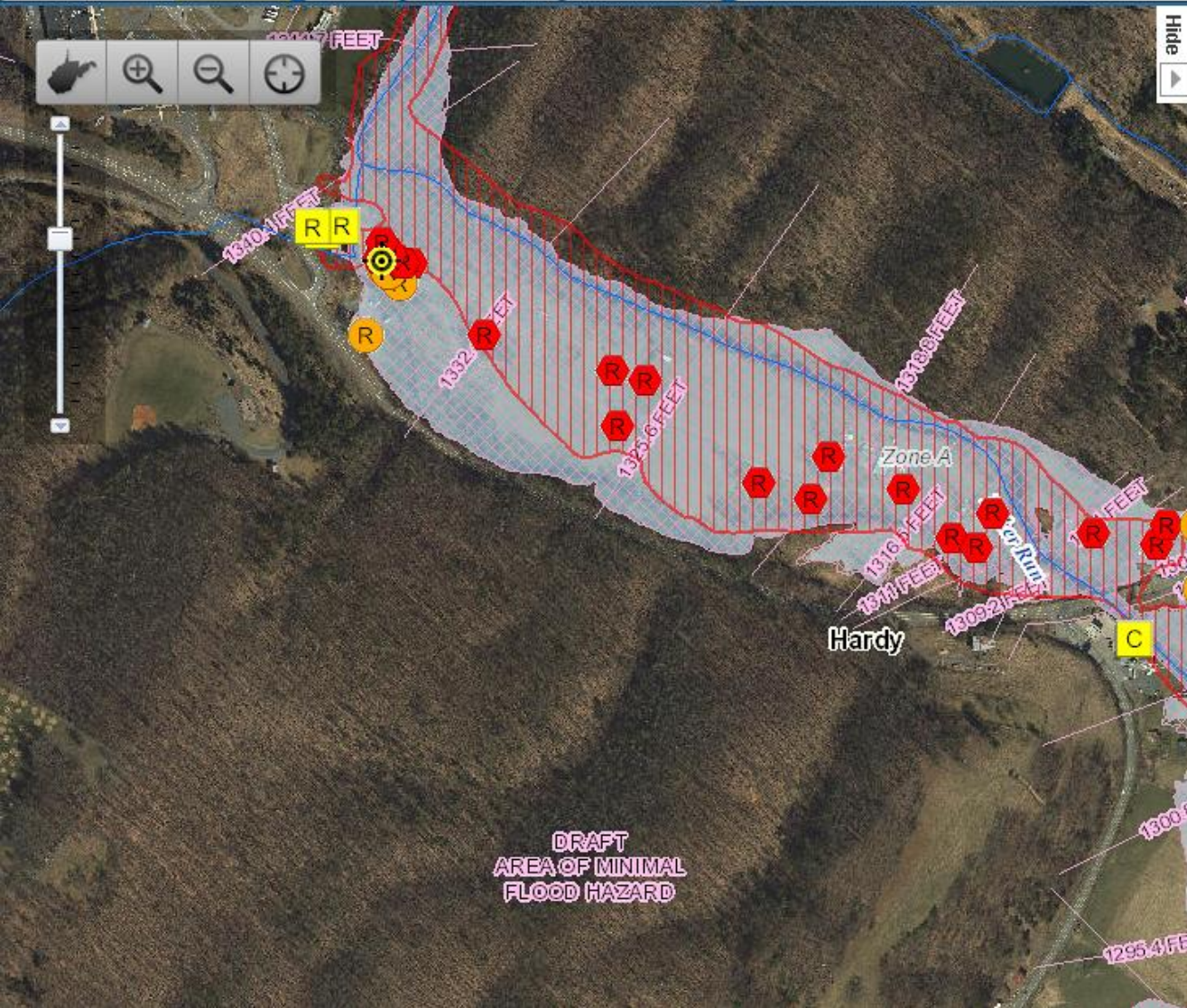
- Compared to effective NFHL, **widening and narrowing of the 1-percent-annual-chance floodplain (SFHA) extent** was observed throughout the county.
- Extended study reaches (with drainage areas of 2 square mile and greater, and not on current effective FIRM) result in new properties within the SFHA.
- Most streams experienced both **increases and decreases** when comparing the computed model WSELs to the current regulatory base flood elevations.
- After the map update, an **estimated total of 364 structures** (excl. Moorefield) are expected to be in the SFHA.
- **Slightly more structures will be mapped out (-179) than mapped in (+145).**



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🖨️
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Flood Hazard Area: Location is **WITHIN** the FEMA 100-year floodplain. Advisory Flood Heights available.

Flood Zone: A (Advisory Flood Heights available)

Stream: Baker Run

Watershed (HUC8): Cacapon-Town (2070003)

FEMA's Flood Map: [54031C0200G](#) [📄](#) [📄](#) [NFHL](#)

Map Effective Date: 9/2/2009

Contacts: [Hardy](#)

Flood Height: About 1336.9 ft (AFH) NAVD88 ⚠️

Water Depth: About 1.5 ft (Source: HEC-RAS)

HEC-RAS Model: [baker_run](#) [📄 All Models](#)

Flood Profile: N/A

Community: Hardy County

Freeboard: 2 ft **CRS Class:** 10 **CID:** 540051

Location (lat, long): (39.044859, -78.756626) WGS84

Location (UTM 17N): (4324149, 694146) WGS84

External Viewers: [🗺️](#) [📄](#) [📺](#) [📄](#)

Elevation: 1335.5 ft (Source: [FEMA 2016-17](#)) NAVD88

Address:

Parcel: No Parcel | Assessment ⚠️

Flood Risk Information [Related Resources](#)

Flood Risk Assessment: [N/A](#)

3D Flood Visualization: [N/A](#)

How Did the Floodplain Maps Change?

FEMA Region 3 Changes Since Last FIRM (CSLF) Viewer:

<https://arcg.is/1y44Ov>

Change in Floodplain Extents:

- Purple – Increase
- Blue – Still Floodplain
- Yellow – Decrease

FEMA Region III Changes Since Last FIRM (CSLF)

Find address or place

About

annual chance floodplains designated on the Flood Insurance Rate Maps (FIRMs) during a map update. The Changes Since Last FIRM (CSLF) coverage allows local community officials to use advanced mapping capabilities to view and analyze their community with a new perspective.

In developing effective floodplains, the data goes through three stages. The first stage is draft data, in which the earliest possible changes to the regulatory flood map are identified. Following the draft stage is preliminary data, which is for review and guidance purposes only, but closer to the final product. Finally, pending data is produced which reflects upcoming changes after a letter of final determination has been issued.

Instructions:

1. Find a location by using the top left search bar. You can search by address, county, or zip code. You can also reference the polygons on the map to locate areas where CSLF data is available.
2. When zoomed in far enough the CSLF layer will be turned on. For more information or to download a GIS file, click the increase or decrease colors on the map.

Legend:

- Pending Data Available
- Preliminary Data Available
- Draft Data Available

Increase in Flood Extent

Decrease in Flood Extent

Still Floodplain

600ft
-78.837 38.927 Degrees



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National Flood Hazard Layer

Visit <https://www.fema.gov/national-flood-hazard-layer-nfhl> for multiple options to view and download NFHL data.

Accessing the National Flood Hazard Layer

Map Service Center

Access localized National Flood Hazard Layer data by searching FEMA's Map Service Center.

[FEMA's Map Service Center](#)

NFHL ArcGIS Viewer

Or you may view, download, and print current local digital effective flood hazard data in an ArcGIS map.

[NFHL Viewer](#)

In the [NFHL Viewer](#), you can use the address search or map navigation to locate an area of interest and the NFHL Print Tool to download and print a full Flood Insurance Rate Map (FIRM) or FIRMette (a smaller, printable version of a FIRM) where modernized data exists. Technical GIS users can also utilize a series of dedicated GIS web services that allow the NFHL database to be incorporated into websites and GIS applications. For more information on available services, go to the [NFHL GIS Services User Guide](#).

You can also use the address search on the [FEMA Flood Map Service Center \(MSC\)](#) to view the NFHL data or download a FIRMette. Using the "Search All Products" on the MSC, you can download the NFHL data for a County or State in a GIS file format. This data can be used in most GIS applications to perform spatial analyses and for integration into custom maps and reports. To do so, you will need GIS or mapping software that can read data in shapefile format.

FEMA also offers a download of a KMZ (keyhole markup file zipped) file, which overlays the data in Google Earth™. For more information on using the data in Google Earth™, please see [Using the National Flood Hazard Layer Web Map Service \(WMS\) in Google Earth™](#).

Draft National Flood Hazard Layer

The [Draft National Flood Hazard Layer](#) is for early awareness of possible changes to regulatory flood map information. Until the data becomes effective and it appears in the National Flood Hazard Layer, the data cannot be used to rate flood insurance policies or enforce the federal mandatory purchase requirement.

Preliminary Flood Hazard Data

Preliminary flood hazard data provides the public an early look at their home or community's projected risk to flood hazards. Preliminary data may include new or revised Flood Insurance Rate Maps (FIRM), Flood Insurance Study (FIS) Reports and FIRM Databases. [View your community's preliminary flood hazard data.](#)

Pending Flood Hazard Data

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The background of the slide features a photograph of the West Virginia State Capitol building, a large white neoclassical structure with a prominent gold dome. The building is set against a backdrop of rolling hills and trees with autumn foliage. A semi-transparent white rectangular box is overlaid on the center of the image, containing the main title. At the top of the slide, there is a blue header with a white topographic map pattern.

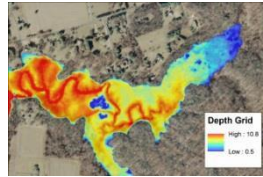
Using Flood Risk Data to Identify and Reduce Risk



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Types of Flood Risk Products



Flood Depth & Analysis Grids

Changes Since Last FIRM



Water Surface Elevation Grids

Flood Risk Assessment /
Economic Loss Calculations

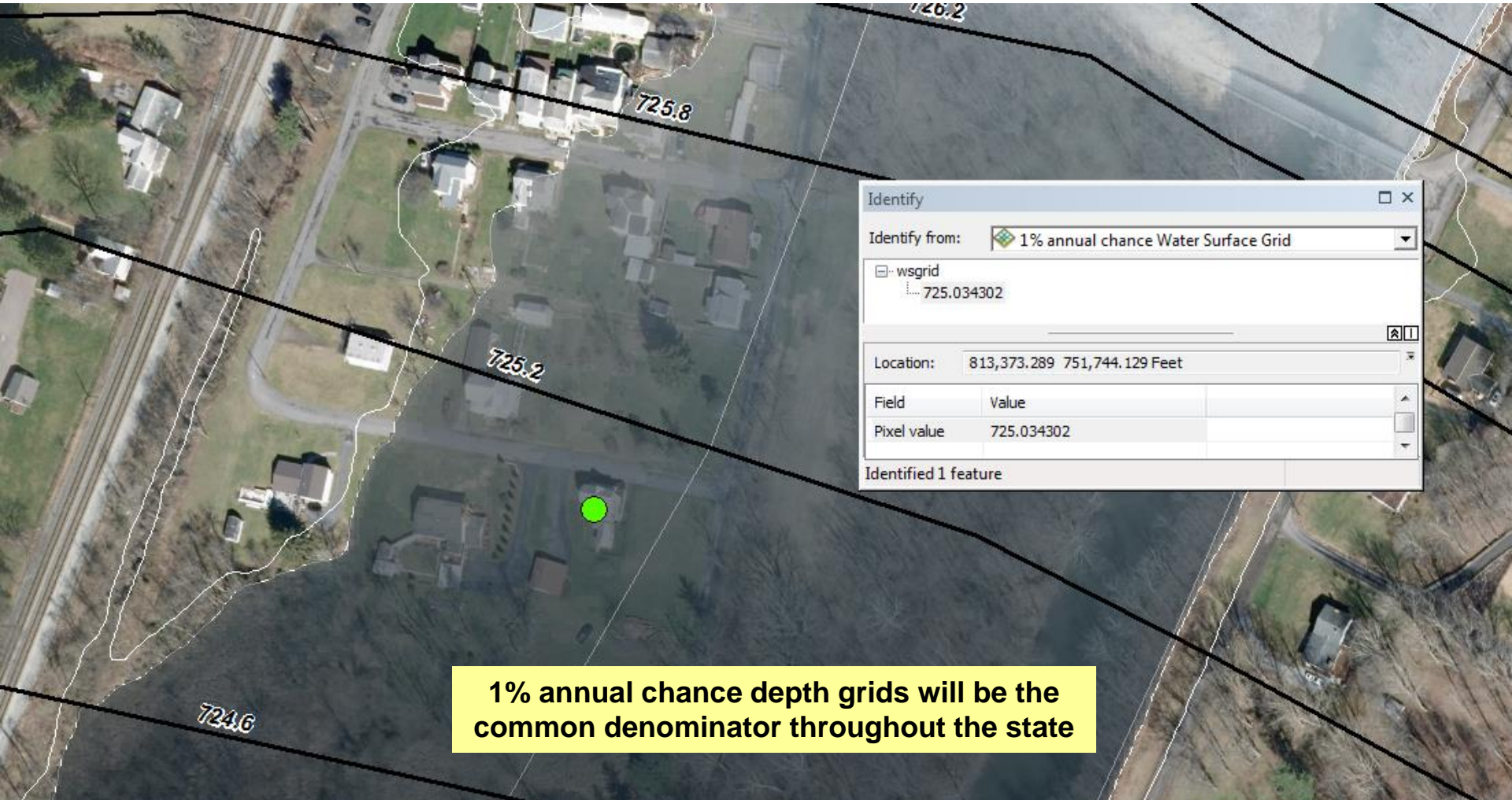


Areas of Mitigation Interest



Water Surface Elevation Grids

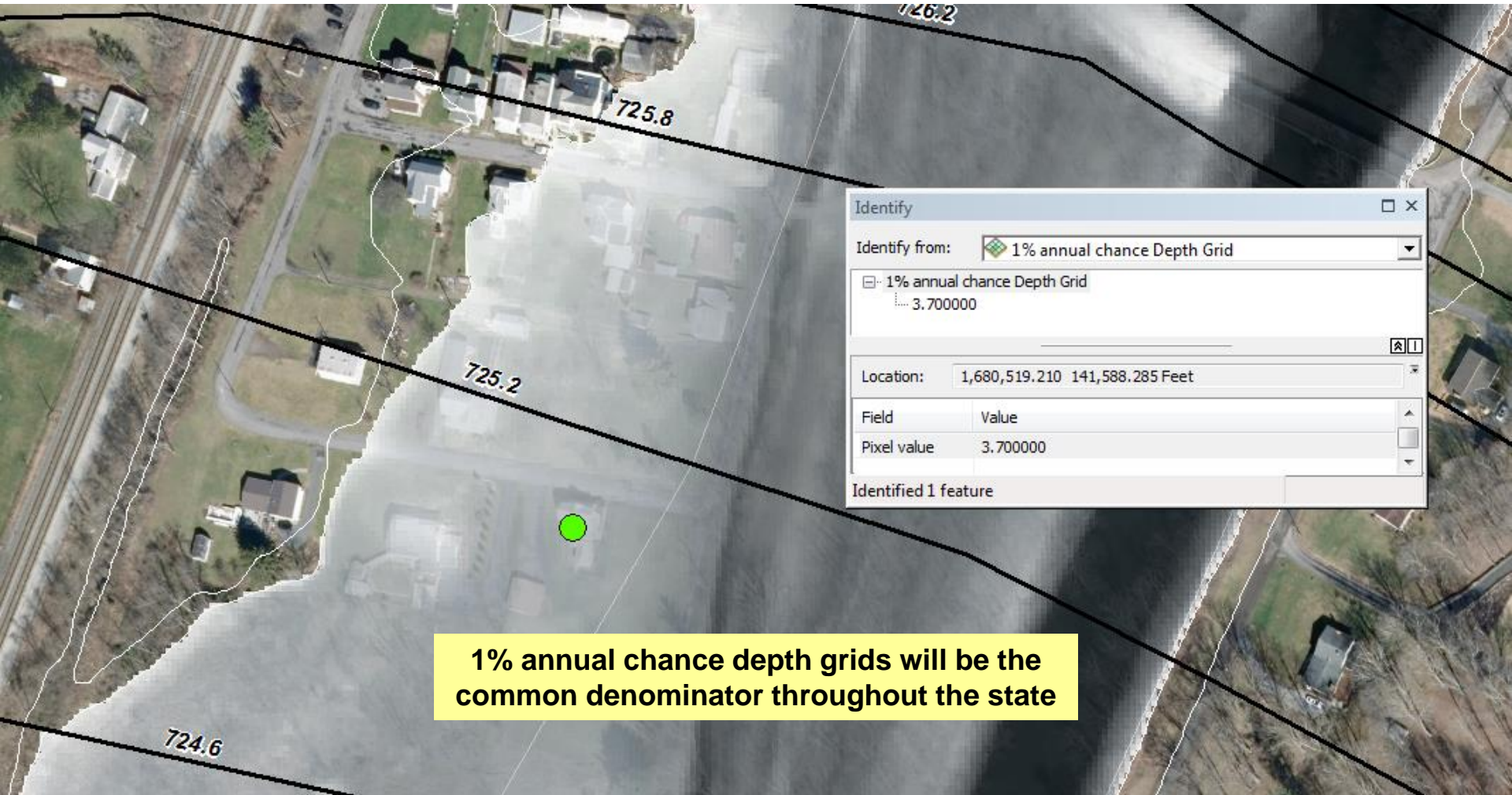
Represent the continuous water surface elevations as determined at modeled cross-sections and interpolated values between cross sections



1% annual chance depth grids will be the common denominator throughout the state

Depth Grids

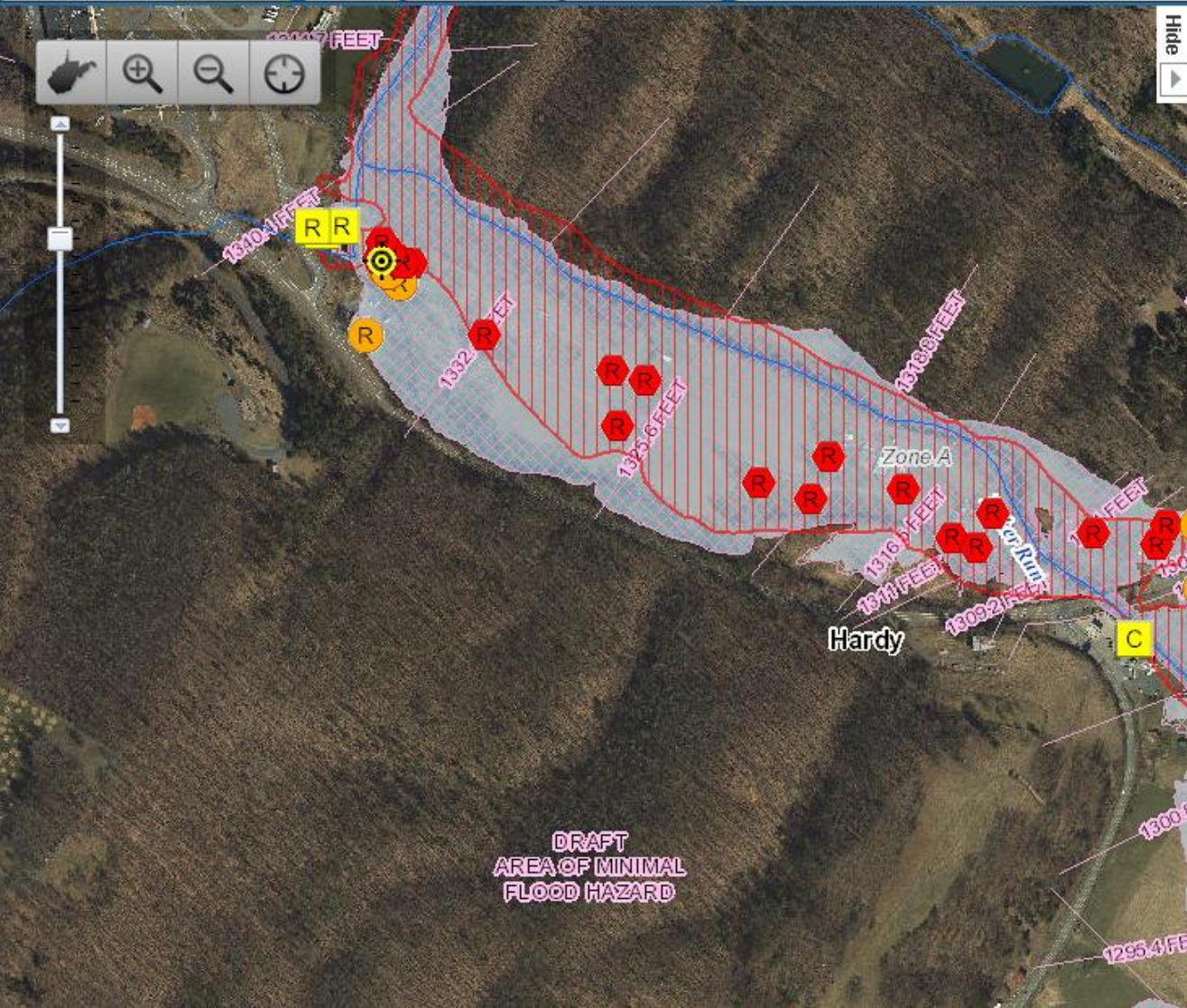
Represent the difference between the ground surface and the water surface elevations



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🔗
🖨️
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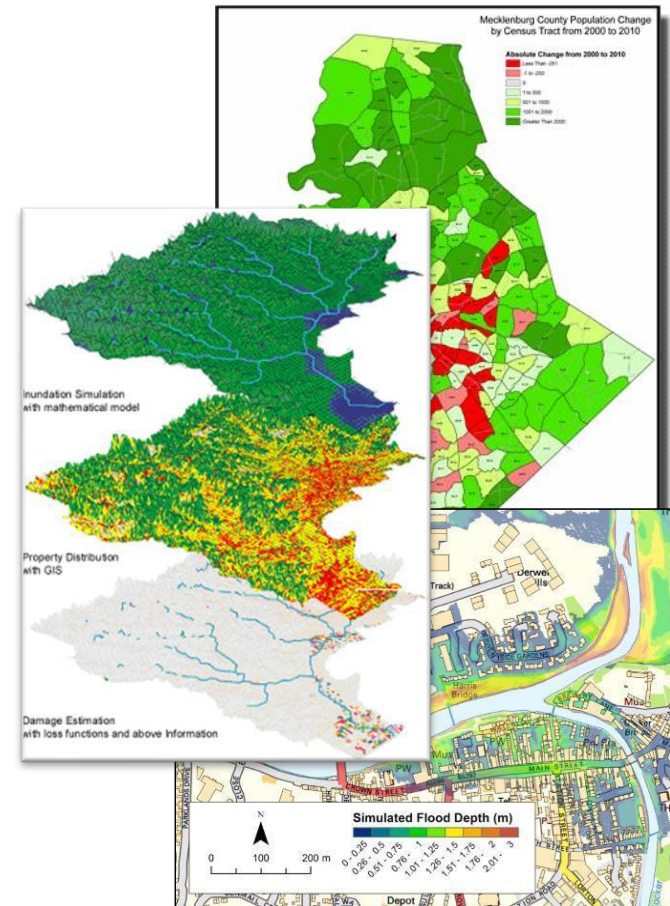
Flood Risk Information [Related Resources](#)
Flood Risk Assessment [🗺️](#) N/A
3D Flood Visualization [🗺️](#) N/A

Flood Hazard Mitigation Planning



Using FRPs to Manage Development

- Structure-based depth of flooding analyses
- Prioritization of mitigation action
- Residential/commercial density in the floodplain
- Location/inundation area of historic events
- Properties with insurance policies and as a percentage of the population
- Areas of population growth
- Areas requiring protection





Floodplain Management



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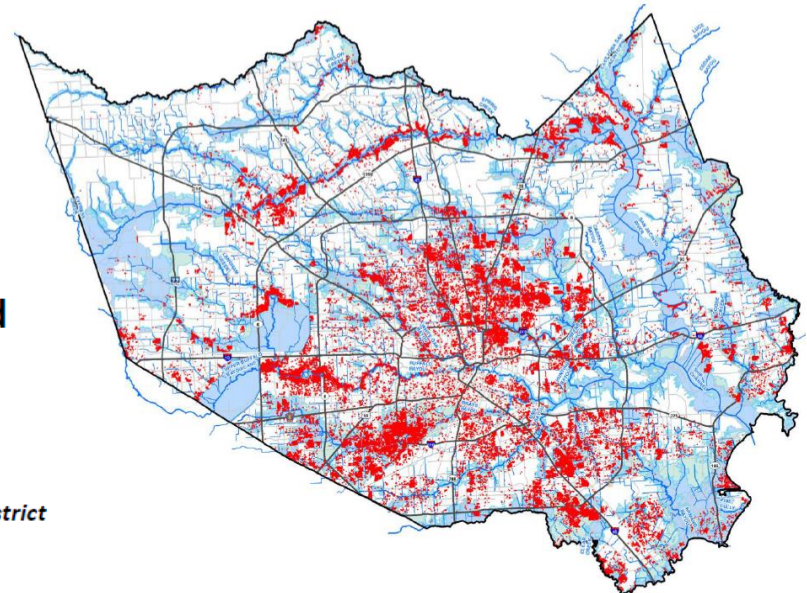
Flood Risk Doesn't Stop at a Line

- 25% of all flood insurance claims come from outside high-risk areas.
- Your community can regulate to standards higher than the NFIP minimum standards. Consider strengthening regulations using:
 - 0.2% annual chance flood
 - “Freeboard”
 - Buffer around Special Flood Hazard Area (SFHA)
 - Flood depth grids

HURRICANE HARVEY GREATER HOUSTON

154,170 Homes Flooded

32% < 100-yr
23% > 100 yr, < 500 yr
46% > 500 yr



FEMA

SOURCE: Harris County Flood Control District

Floodplain Management

- **Permits are Required for ALL Development in the floodplain!**
- Development means any **manmade change** to improved or unimproved real estate
- Build it **right** and insurance premiums will be more affordable
- Build it **wrong** and premiums will be very expensive



Taken from U.S. Route 48 Bridge, Hardy County, West Virginia (Eastern Panhandle Working Fires)



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Floodplain Management

- Communities must regulate based on FIRMs
- Development should be reasonably safe from flooding
- Permits are required for all development
- State/federal permits are required
- Elevate and/or construct with flood-resistant materials
- Locate and design mechanicals to minimize or eliminate flood damage
- Locate and design public utilities and facilities to minimize or eliminate flood damage



A Zones: top of lowest floor (residential) elevated to or above the base flood level



Risk Rating 2.0

Risk Rating 2.0

- Transformational leap forward for NFIP
- Since the 1970s, flood insurance rates have been predominantly based on relatively static measurements, emphasizing a property's location / elevation within a zone on a FIRM
- Risk Rating 2.0 will consider more flood risk variables (including cost to rebuild) to more accurately reflect property-specific flood risk



www.fema.gov/NFIPtransformation



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Risk Rating 2.0

PHASED IMPLEMENTATION

Phase I

Beginning Oct. 1, 2021, new policies will be subject to the new rating methodology. And existing policyholders eligible for renewal will be able to take advantage of immediate decreases in their premiums.

Phase II

All remaining policies renewing ***on or after April 1, 2022***, will be subject to the new rating methodology.

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Risk Rating 2.0

WHAT IS NOT CHANGING?

- Limiting Annual Premium Increases (no more than 18%)
- Using FIRMs for Mandatory Purchase and Floodplain Management
- FEMA is maintaining some features to simplify the transition to Risk Rating 2.0 by offering premium discounts to eligible policyholders:
 - Offer premium discounts for pre-FIRM subsidized and newly mapped properties
 - Policyholders will still be able to transfer their discount to a new owner by assigning their flood insurance policy when their property changes ownership.
 - Discounts to policyholders in communities who participate in the [Community Rating System](#) will continue.



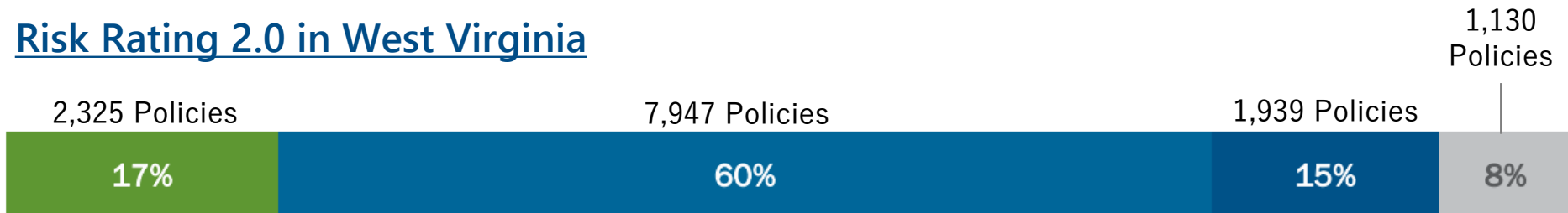
FEMA

Risk Rating 2.0

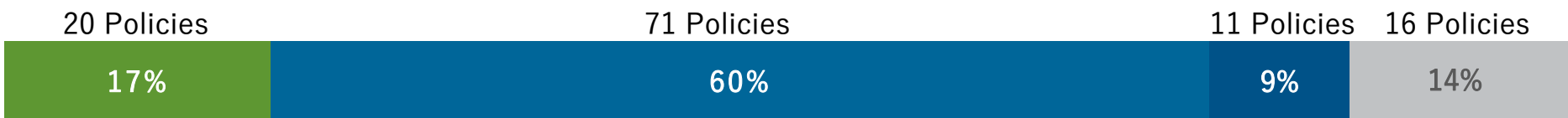
FEMA's core mission and programs continue to emphasize purchasing flood insurance and pursuing mitigation options to achieve resiliency. While there are many policies in force in West Virginia, there are still opportunities to increase participation in the program to improve resilience, as shown in the table below.

NFIP Policies in Force in WV	Properties in WV Not Covered by NFIP Policy	Average NFIP Claim Payout in WV in the Past 10 Years	Average Individual Assistance Claim Payout in WV in the Past 10 Years
13,300	700,000	\$15,500	\$4,000

Risk Rating 2.0 in West Virginia



Risk Rating 2.0 in Hardy County



- Immediate Decreases
- Average \$0 - \$10 Per Month Increases (\$0 - \$120 Per Year)
- Average \$10 - \$20 Per Month Increases (\$120 - \$240 Per Year)
- Average >\$20 Per Month Increases (>\$240 Per Year)

Risk Rating 2.0 Data Analysis for States and Counties is accessible at:

[Risk Rating 2.0 State Profiles](#)

Risk Rating 2.0

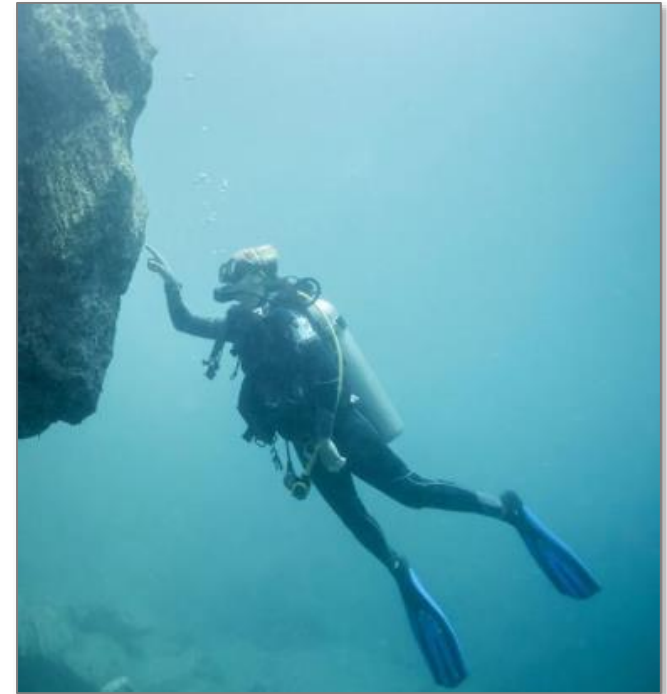
For a deeper dive into Risk Rating 2.0:

- [FEMA Risk Rating 2.0 – Recorded Webinar](#)
(Aug 2021)

Tony Hake - Director for the Transformation of the National Flood Insurance Program (NFIP)

Andy Neal - Chief Actuary of the National Flood Insurance Program and Branch Chief of FEMA's Federal Insurance and Mitigation Administration's Actuarial and Catastrophic Modeling branch.

- [FEMA Risk Rating 2.0 – Fact Sheet](#)
- ASFPM Member Webinars



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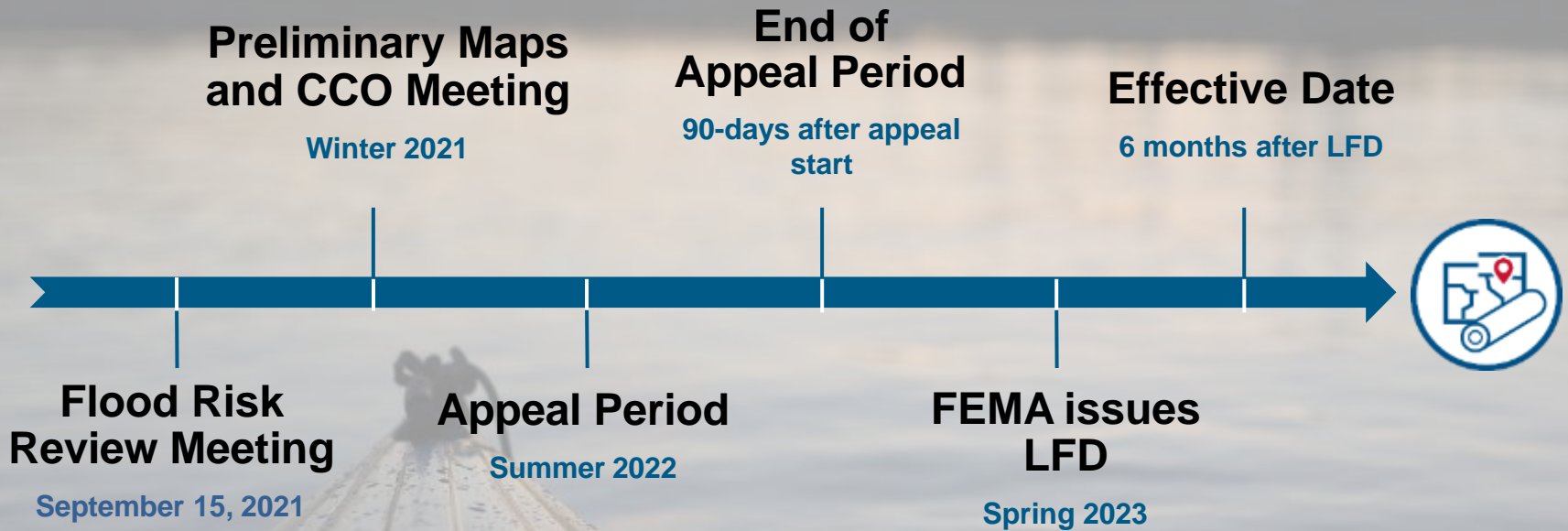
Discussion



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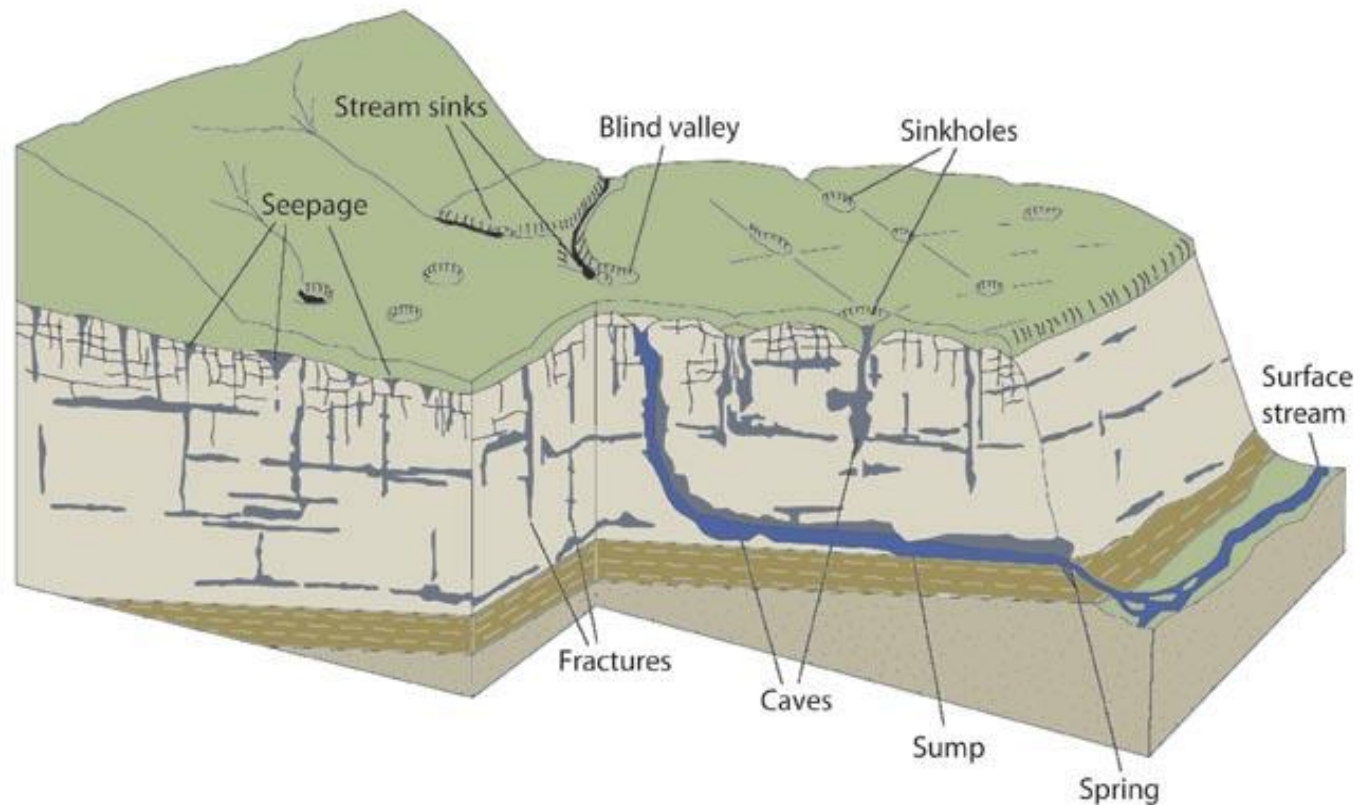
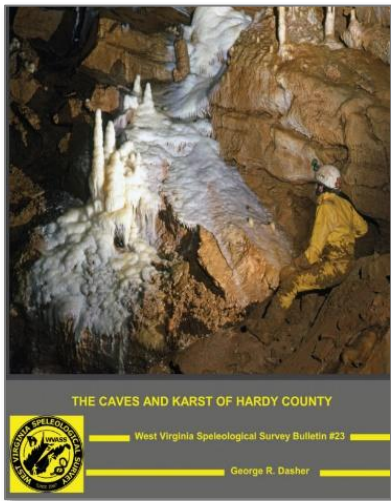
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Timeline for Hardy County



Karst in Hardy County

Karst topography is formed from the dissolution of soluble rocks such as limestone, dolomite, and gypsum. It is characterized by underground drainage systems with sinkholes and caves.



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Karst in Hardy County



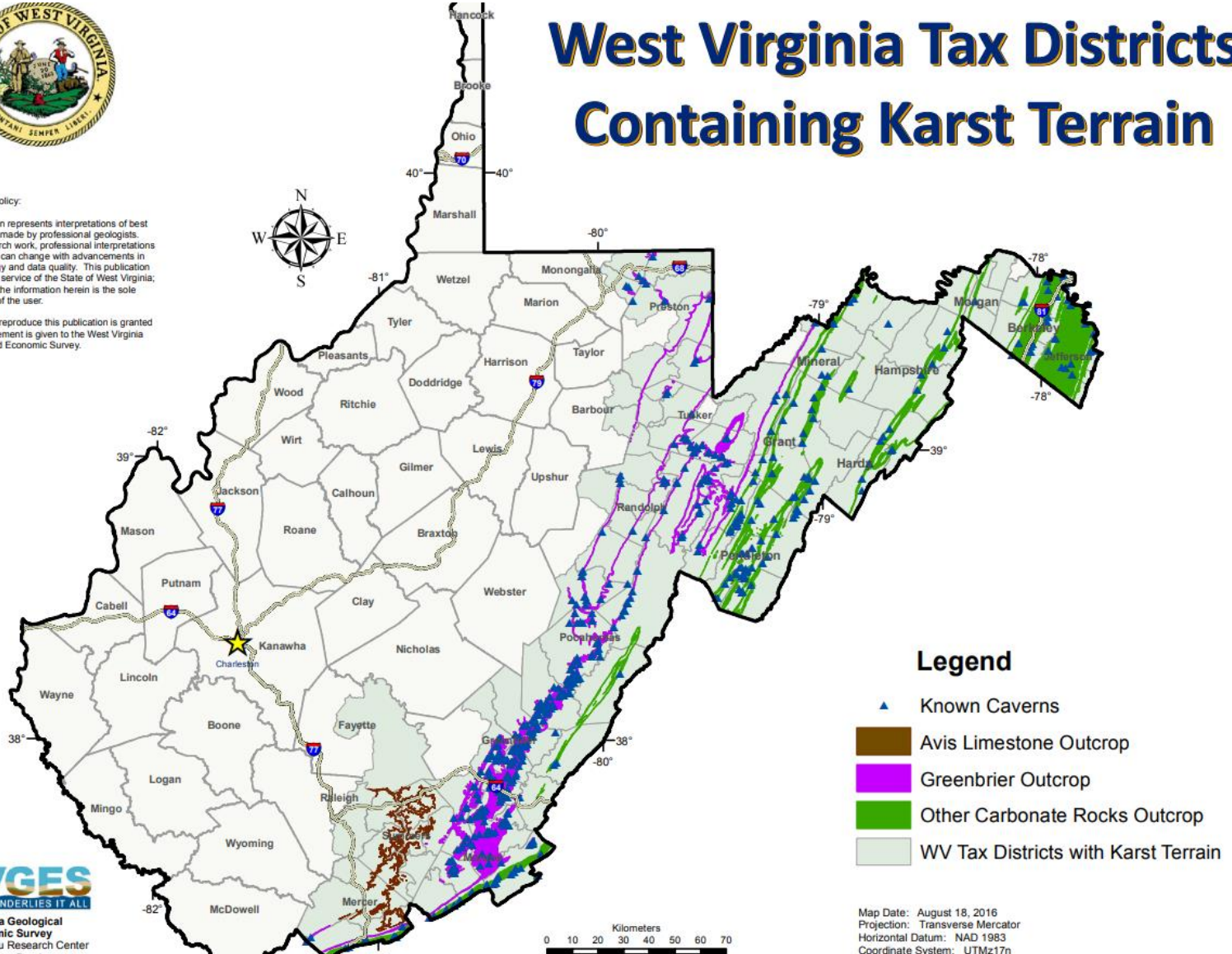
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West Virginia Tax Districts Containing Karst Terrain



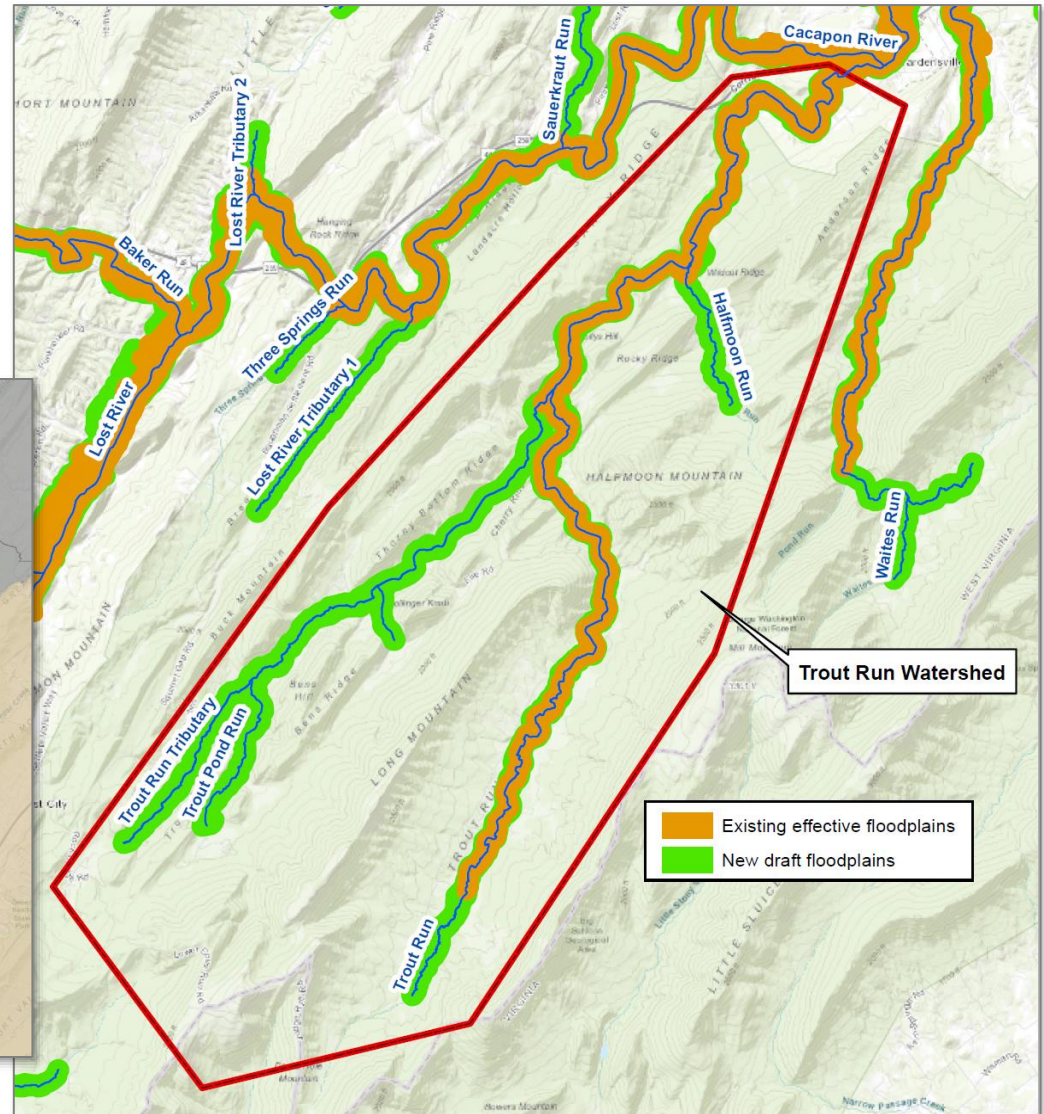
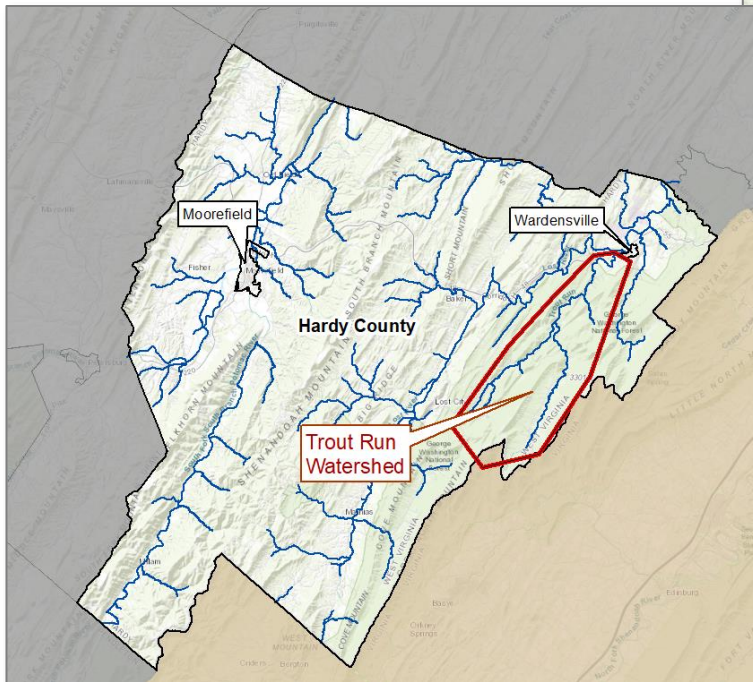
Legend

- Known Caverns
- Avis Limestone Outcrop
- Greenbrier Outcrop
- Other Carbonate Rocks Outcrop
- WV Tax Districts with Karst Terrain

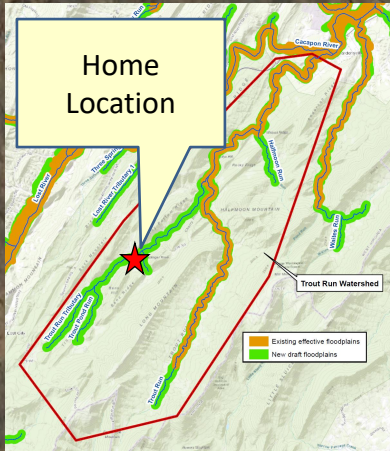
Map Date: August 18, 2016
 Projection: Transverse Mercator
 Horizontal Datum: NAD 1983
 Coordinate System: UTMz17n

Karst in Hardy County

The scope for this project expands beyond the current effective floodplain extents



Karst in Hardy County



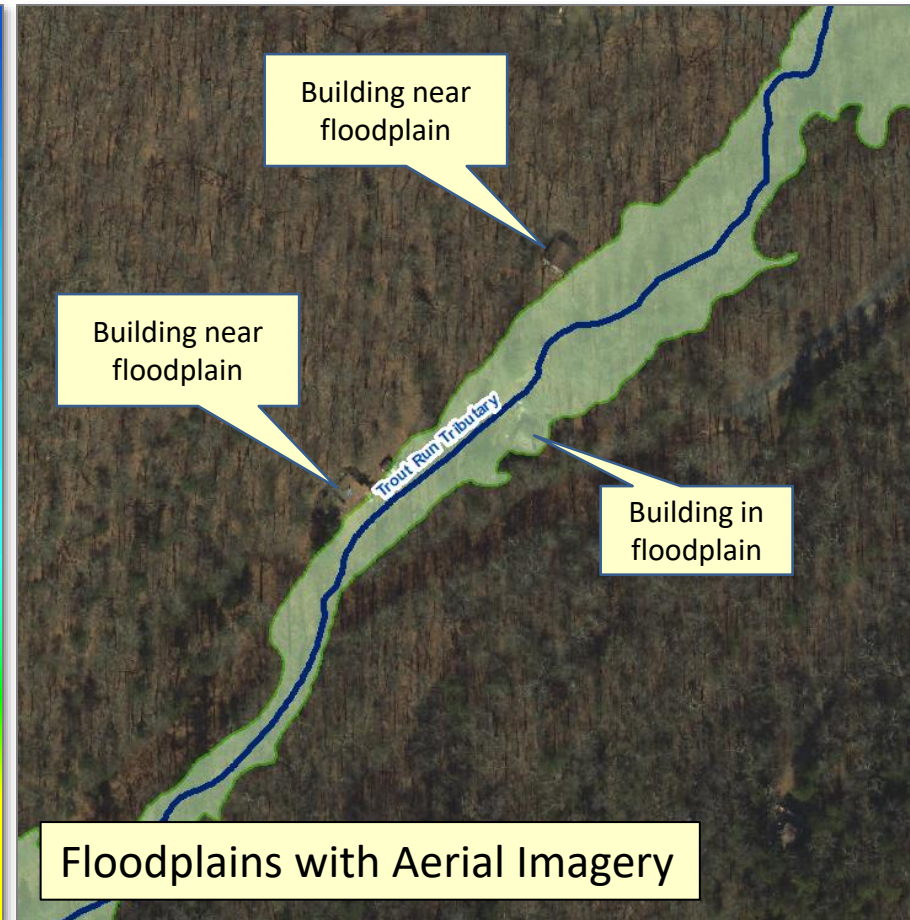
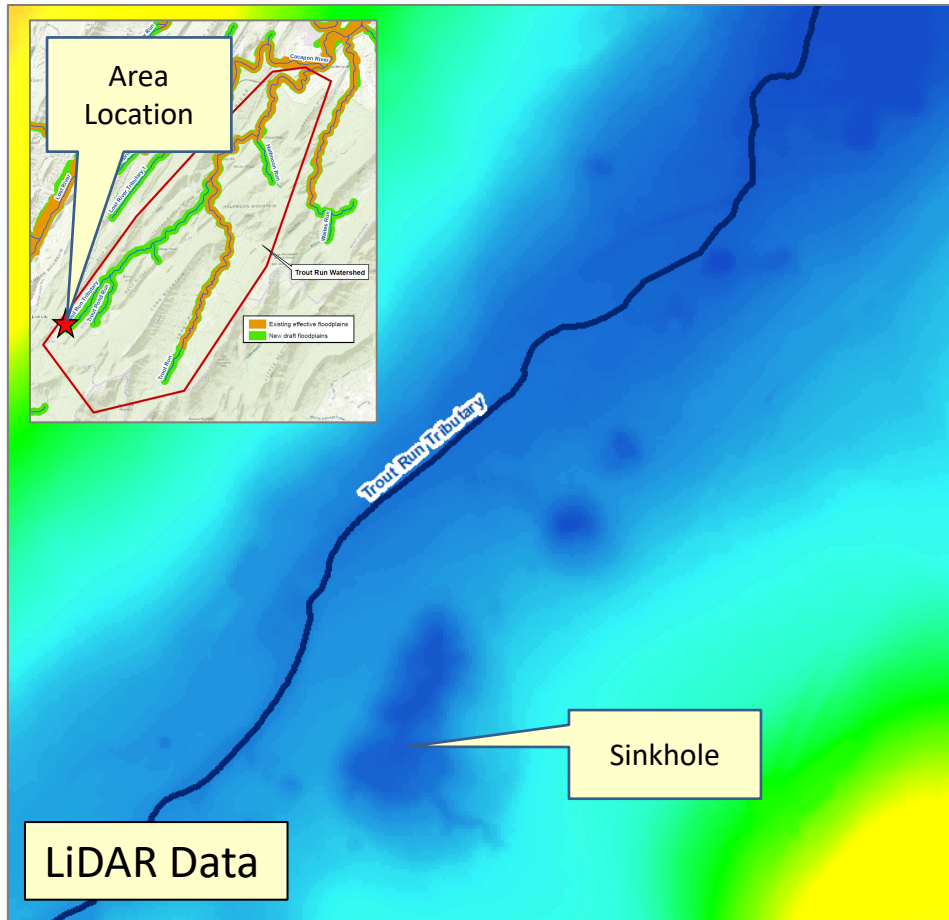
Home in floodplain

- Streams in this area are not well-defined in the LiDAR and may partially run underground
- Surface flow is not visible on aerial imagery
- Flooding may still occur during large rainfall events

Karst in Hardy County



Karst in Hardy County



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RiskMAP
Increasing Resilience Together

Karst in Hardy County

Options for floodplain management
in karst areas (Trout Run Watershed)

- **Map floodplains as Zone A**
 - Flood insurance is mandatory for properties with federally-back mortgages
- **Map floodplains as Shaded Zone X**
 - Flood insurance is optional



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We want to hear from you!

- 30-day review and comment period
- WV Flood Tool:
<https://www.mapwv.gov/flood>
- Review the materials we will be sending you
- We are available to answer questions
- Talk about mitigation actions in your community
- ***Thank you for your participation!***



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For More Information



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