Resiliency in Maryland
(And Most Other Places)
Who’s In Charge?
What Are the Results?

ASPFM Conference
Dave Guignet
State NFIP Coordinator
May 21, 2019

Maryland Department of the Environment
In Maryland – No State (or Federal) Agency Has Been Directed to Fully Lead Resiliency
But Several State Agencies Have a Role ... 

- Emergency Management
- Environment
- Transportation
- Insurance Administration
- Housing and Community Development
How Does the NFIP Community Currently Imply Resiliency?

- Freeboard (1-3 feet)
- Higher Standards (setbacks or higher requirements)
- Climate Change (future or ultimate conditions) / Not there Yet!
- Setbacks
  - (All Triggered by Actions Only IF inside the FEMA floodplain)
How Does the NFIP Community Define Resiliency?

- Only Actions that Require Local or State Permit / In the Floodplain / NFIP Authorization

  So – If we only take action in the FEMA floodplain

- Only buildings in the floodplain built higher
- Only buildings in the floodplain built to a higher standard (V-Zone construction in the LiMWA)
- Only new or improved construction will be built higher (And higher means BFE – freeboard) which means **1, 2, or 3 additional feet is our best effort**
As a Result –
Resiliency Stops at FP Limit?

• **Buildings Outside the Floodplain Are NOT Built Higher** (Not Elevated to Include Freeboard)

• **Buildings Outside the Floodplain Are NOT Built Stronger** (No V-Zone Standards Outside LiMWA)

• **And ... Buildings Outside Floodplain Are Not Required to Move Back Further from Floodplain**
As floodplain managers our role must expand...

- People outside the 100 year floodplain are at risk and need to be made aware of it. AND there is very little chance of mitigation $$$ funds becoming available to move, or elevate their homes. How can we make them more resilient to flooding. How can we help them restore their community from the next Harvey or Sandy. ...
We need to inform them that there is Risk and give them affordable options to protect them from flooding or enable them to recover from flooding. One way is to demonstrate their risk outside the floodplain.
• Instead of our current terrible In Vs Out system that has failed miserably over the last 40 years - How about demonstrating their risk beyond the floodplain in increments of depth outside the floodplain.
How Difficult has the recovery been in areas outside the traditional 100 year floodplain - where almost No One has flood insurance ??
So – Let’s Consider Where We ALL Stand in the NFIP Process?

- We Are ALL Following the (Default) FEMA Metric (And Sending the Message) in our Communities that...
  - Flooding Stops at the FEMA floodplain Limits
  - Flooding will not Exceed 3 feet (or the freeboard limit) in my Community
  - The Only people that need Flood Insurance are in the Floodplain and Have a Mortgage

Yes, I know this is An Exaggeration, but by default – This is the Collective Message that We Are Sending
How Does this Relate to Resiliency?

If We Only Follow the Current NFIP Metric..

- In North Carolina only 12% of the homes flooded had Flood Insurance (after 3 Hurricanes in 15 years) In South Carolina less than 10% had Flood Insurance
- Florida’s Upper Panhandle Area Successfully Requested to Be Exempted Out of the State’s Higher Construction Standards
- In Houston 45% of the Homes Flooded by Harvey had Flood Insurance (after 3 Hurricanes in 10 years)
Maryland’s Message about Resiliency Needs to Change...(Why)

- Maryland Is NOT Immune from a Hurricane!
- Maryland has had severe flooding recently from Tropical Storms (Agnes and Irene) and Super Storm Sandy (But No Hurricane)
- Flooding from a Hurricane will probably be greater or exceed our 3 foot Sea-Level Rise Projections
- Maryland’s Coast and Inland Coastal Plain is Very Similar to North Carolina and South Carolina
- Greater Probability of a Hurricane in Next 30 years than No Hurricane and Only 3 feet of Sea-level rise
What Could We Do to Increase Resiliency Now?

- Purchase Flood Insurance Outside the Floodplain
  - Maryland’s Percentage of Flood Insurance Policies Outside the Floodplain is Estimated at 5% (less)
- Purchase Flood Insurance Outside the Floodplain
  - Insurance Outside the Floodplain is about $600/year
- Purchase Flood Insurance Outside the Floodplain
  - Insurance is Almost Immediate (30 days) and Cheaper than Elevating or Relocating
- Purchase Flood Insurance Outside the Floodplain
  - Disaster Assistance typically pays about $6000 for damages to a home owner without insurance versus up to $260,000 plus contents for homes with insurance
Which Community is More Resilient?

- Disaster Assistance typically pays about $6000 for damages to a home owner without insurance versus up to $260,000 plus contents for homes with insurance
  - $6000 to Home Owners *Without* Flood Insurance
  - Up to $260,000 to Home Owners *With* Flood Insurance
What Does FEMA PA Pay for After a Disaster?

Roads / Bridges / Culverts Infrastructure:

The basic facilities and installations that help a government or community run, including roads, schools, phone lines, sewage treatment plants and power generation.
Mission:
The Maryland Resiliency Partnership is a collaboration of public and private partners to leverage funding, personnel, and projects to support efforts that integrate hazard mitigation, floodplain management, and coastal and climate resiliency.
Maryland Resiliency Partnership
Current MDE Resiliency Partnership Initiatives

• Continued Enhancement of MD Flood Risk Application
• Collaborative Data Sharing
  • Model and Data Uploads
  • Evolution towards “living floodplains”
• MD Flood Risk Mobile Application Development
• Statewide Freeboard Layers
• 3D Flood Risk Visualization/Augmented Reality
• Flood Forecasting/National Water Model
• Enhanced Hazus Flood Risk Analyses
• Integration of MDE Waterways and FEMA Permitting Process
  • Collaboration with MDSHA
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MD Flood Forecasting Tool

Continental Scale Flood Forecasting

Meteorology

Mapping and Impacts

2.7 million catchments

Hydrology

Hydraulics
Flood Forecasting/National Water Model

- 18 Hour Forecast (short range) – updated hourly
- 10-day Forecast (medium range) – updated every 6 hours
- 30-day Forecast (long range) – updated every daily
Flood Forecasting/National Water Model

National Hydrography Dataset

Addressing Linear Reaches

- Each linear reach is one addressable unit – a ‘street’
- Each reach is assigned a unique Reachcode – the ‘street name’
- Addresses are proportional ‘street’ numbers 0-100 from bottom to top

From Cindy McKay, Horizon System Corporation
Flood Forecasting/National Water Model
Baltimore City
Depth Grids

Sea Level Rise Simulation

Legend
- Example Points
- Flood Depth
- High
- Low

Change View
- Hurricane Isabel
- Isabel + 3ft Rise
- Isabel + 5ft Rise
- Isabel + 7ft Rise
In order to estimate flood losses in Hazus, a depth grid is required:

- Depth grids are now often developed as part of updating FIRMs
- If unavailable, depth grids can be developed in Hazus using elevation data with floodplain data
  - Floodplain data (National Flood Hazard Layer) can be downloaded from FEMA’s MSC Website
- Depth grids can be developed for multiple return periods
  - 1%, 0.2% Annual-Chance-Events
Hazus Estimation for Flood Losses

Hazus provides users the option to perform different types of analyses:

1) General Building Stock (GBS) - More generalized analysis, but easier to perform
   • Input data available for download from Hazus website
   • Flood losses are reported for census blocks (polygons)
Hazus Estimation for Flood Losses

Hazus provides users the option to perform different types of analyses

2) User-Defined Facilities (UDF) – More detailed analysis, but requires additional data and time to put it in a Hazus-compliant format
   • Requires at least parcel/accessor data
   • Flood loss estimates improved if building footprints / aerial imagery used
   • Flood losses are reported for individual parcels or structures (points)
Stream
100-Year Flood

2 ft depth
20% of CB Area

Census Block

1 ft depth
20% of CB Area

GBS Analyses
Methodology

<table>
<thead>
<tr>
<th>Type of Building</th>
<th>Count</th>
<th>Average Building Value</th>
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<tbody>
<tr>
<td>Single Family Residence (Residential)</td>
<td>10</td>
<td>$250,000</td>
</tr>
<tr>
<td>Townhome (Residential)</td>
<td>0</td>
<td>N/A</td>
</tr>
<tr>
<td>Retail (Commercial)</td>
<td>0</td>
<td>N/A</td>
</tr>
<tr>
<td>Light Industrial (Other)</td>
<td>0</td>
<td>N/A</td>
</tr>
<tr>
<td>School (Other)</td>
<td>0</td>
<td>N/A</td>
</tr>
</tbody>
</table>
## Maryland Coastal Flood Loss Estimations (1%-Annual Chance), 2010 AAL verses UDF

<table>
<thead>
<tr>
<th>County</th>
<th>2010 AAL (GBS Study)</th>
<th>2015 UDF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anne Arundel</td>
<td>$791,900,000</td>
<td>$86,200,000</td>
</tr>
<tr>
<td>Dorchester</td>
<td>$41,700,000</td>
<td>$37,100,000</td>
</tr>
<tr>
<td>Charles</td>
<td>$34,900,000</td>
<td>$9,300,000</td>
</tr>
<tr>
<td>Queen Anne’s</td>
<td>$162,000,000</td>
<td>$21,800,000</td>
</tr>
<tr>
<td>Talbot</td>
<td>$87,100,000</td>
<td>$28,200,000</td>
</tr>
<tr>
<td>Somerset</td>
<td>$434,400,000</td>
<td>$88,500,000</td>
</tr>
<tr>
<td>Worcester</td>
<td>$629,800,000</td>
<td>$36,800,000</td>
</tr>
</tbody>
</table>
**Challenge:** FEMA Conditional Approval Applications (CLOMRs) and MDE Waterways Permits have historically been on separate and disconnected paths.

**Solution/Opportunity:** Develop an integrated process that leverages FEMA/MDE floodplain modeling and mapping information as a common platform.
MDE/FEMA Integrated Permitting Process Benefits

• Enables applicants/stakeholders to work from a common hydraulic modeling platform to promote consistency and efficiency in updated flood study development
• Promotes continuity and improved coordination across both the MDE Waterways Construction and FEMA review processes
• Maximizes efficiencies in review and permit approval processes
• Enables maintenance of improved digital flood risk data to support sound floodplain management and future flood hazard mapping updates
• Mutually beneficial partnership!
MDE/FEMA Process in Detailed Study Areas

MDE/FEMA Integrated Review Process
For projects encroaching on a FEMA detailed (Zone AE) floodplain
* This document provided as a guidance document to supplement FEMA 44 CFR, and is not to be considered regulatory

1. FEMA Model Acquisition
   * Acquire Effective or Preliminary Model/mdflloodmaps.com
   * County-based status provided on MDfloolodmaps.com. Contact MDE if models not available.

2. Update Existing Conditions Hydraulic Model

3. Evaluate Existing vs. Effective/Preliminary WSELS and Consult MDE NFIP Coordinator. Changes in WSELS and/or floodway revisions?

4a. Engage Impacted Community

4b. Proposed Conditions Hydraulic Model Development

5. Existing Conditions vs. Proposed Conditions WSEL increases?

5a. Does Project Encroach on Floodway?
   - No
   - Yes

5b. Zone AE with Floodway
   - No
   - Yes

5c. Existing vs. Proposed WSEL increases > 1.00ft
   - No
   - Yes

6. Does Respective Community Require FEMA CLOMR Per Floodplain Ordinance?
   - No
   - Yes

7. MDE Waterways Flood Study Submission/Approval

8. Construction Bid Advertisement

9. MDE Waterways Flood Study Submission/Approval

10. Proceed with Project Construction

11. Comparison of Post-Construction vs Preliminary/Effective WSELS and Floodplains. Consult MDE NFIP Coordinator to Determine if LOMR Required.

12a. Engage MDE NFIP Coordinator

12b. FEMA Pre-submission Meeting

13. Proceed with FEMA LOMR Submission Process

14. FEMA CLOMR Submission/Approval

15. FEMA CLOMR Submission/Approval 65.12 Compliance

16. FEMA Pre-submission Meeting

17. FEMA CLOMR Community Concurrence

18. MDE Waterways Flood Study Submission/Approval

19. Construction Bid Advertisement

20. Proceed with Project Construction

21. FEMA Follow-up LOMR Submission/Approval

22. FEMA Pre-submission Meeting

23. Engage MDE NFIP Coordinator

24. Submit FINAL Hydraulic Models and Mapping to mdflloodmaps.com

1. Existing conditions hydraulic model referred to as corrected effective model by FEMA
2. Comparison based on 1% annual chance (100-year) water-surface elevations
3. Ultimate development conditions hydrology for the 2-year, 10-year and 100-year events required for MDE waterways permit
4. All flood frequencies shown in the effective Flood Insurance Study are required

Refer to Hydraulics Panel Report Appendix B for Glossary of Terms

Prepared by the Maryland Hydraulics Panel – dated 7-12-18
Summary/Questions?
What’s the Limit or Extent of Flood Damages from a Direct Hit in MD?