Federal Flood Risk Management Standard Implementing EO 13690 & State BFE +1, 2, and 3 Risk Assessments

COOPERATING TECHNICAL PARTNERS INFORMATION EXCHANGE WEBINAR

Webinar Participation

All lines will be automatically be muted.



Use the "Q & A" window in the Zoom control panel to submit any questions or comments to the moderator.

Selected questions will be read to the presenters and answered on the live webinar.

Submitted questions not asked during the webinar will be answered by the presenters and posted as a document on the webinar event page at floodsciencecenter.org.

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Certified Floodplain Managers and Certified Planners are eligible for 1 CEC for participating in this webinar.

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Certificates of Attendance will be emailed. Processing will take a few weeks. Please contact cfm@floods.org with any certificate issues only after a few weeks have elapsed.

A follow-up email with a link to the slides and the webinar recording will be sent in about a week or so.

Thank you for joining us!

ASFPM Mapping & Engineering Standards Cmte
Cooperating Technical Partners Subcommittee

Co-chairs: Joanna Rohlf, - Joanna.rohlf @ks.gov
Kansas Department of Agriculture

Dave Guignet - dave.guignet@maryland.gov
Maryland Department of the Environment

Goals: **Identify common concerns**

Provide opportunities for information exchange

Identify training needs

Promote and document the value of CTPs

Agenda

Logistics

Introduction – Alan Lulloff

FFRMS – Andrew Martin & Shannon Riess

Maryland CRAB – Dave Guignet

Questions/Discussion

Questions & Discussion

Alan Lulloff
alan@floods.org

J. Andrew Martin
andrew.martin@fema.dhs.gov

Dave Guignet
dave.guignet@maryland.gov

Poll Question



Please rate this webinar.

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Thank you for joining us! Good bye.

A Flood Resilient Future: The Federal Flood Risk Management Standard

J. Andrew Martin, FEMA HQ Engineering Services Branch (FIMA/RMD)

Shannon Riess, FEMA HQ, Policy Branch, Office of Environmental Planning and Historic Preservation

FEMA

Understanding the Federal Flood Risk Management Standard (FFRMS)



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FFRMS Background

Overview

- The Federal Flood Risk Management Standard (FFRMS) was established in Executive Order 13690 - Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input
- FFRMS is a flexible framework that supplements Executive Order 11988 – Floodplain Management
- Purpose:
  - to address future and current flood risk
  - ensure projects funded with taxpayer dollars last as long as intended
- Accomplished by expanding management from the Base Flood Elevation to a higher vertical flood elevation and corresponding horizontal floodplain

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Executive Order 13690 Requirements – Identifies Three Approaches

- E.O. 13690 identifies three approaches to establish the FFRMS floodplain based on FFRMS criteria:
    1. **Climate-Informed Science Approach:** Utilizing best-available, actionable Hydrology and Hydraulic data and methods that incorporate current and future changes in flood risk based on climate science

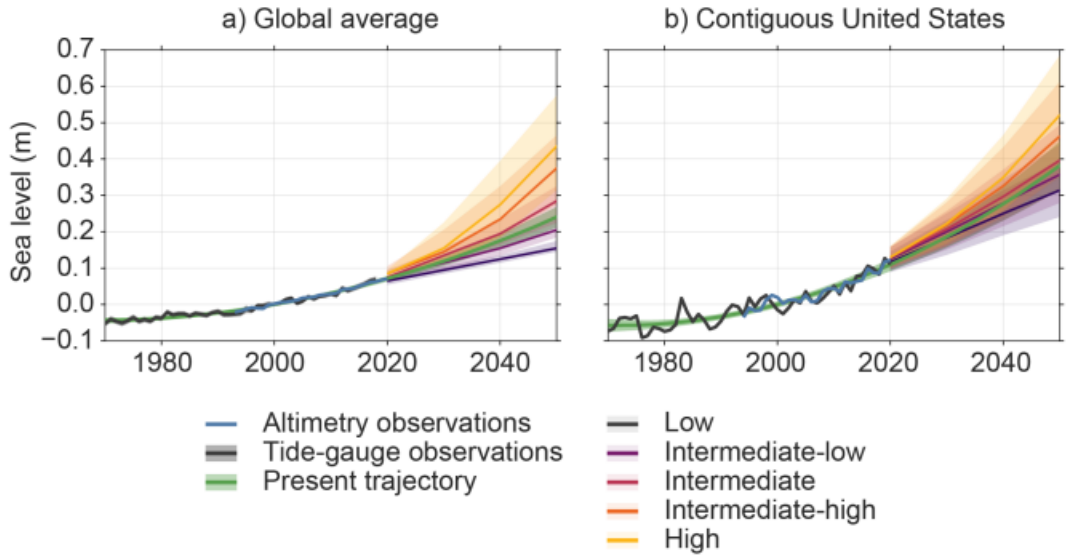
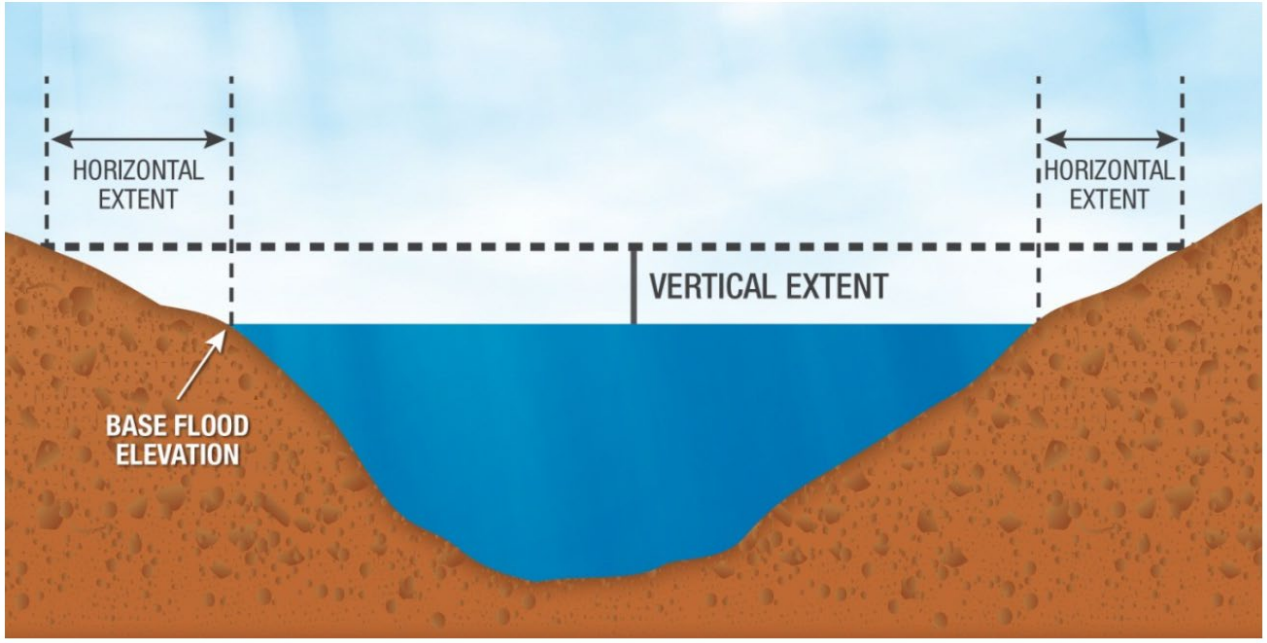


Figure 2.2: Observation-based extrapolations using tide-gauge data and five Scenarios, in meters, for a) global mean sea level and b) relative sea levels for the contiguous United States from 2020 to 2050 relative to a baseline of 2000. Median values are shown by the solid lines, while the shaded regions represent the likely ranges for the observation-based extrapolations and each scenario. Altimetry data (1993–2020) and tide-gauge data (1970–2020) are overlaid for reference.

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Executive Order 13690 Requirements – Identifies Three Approaches

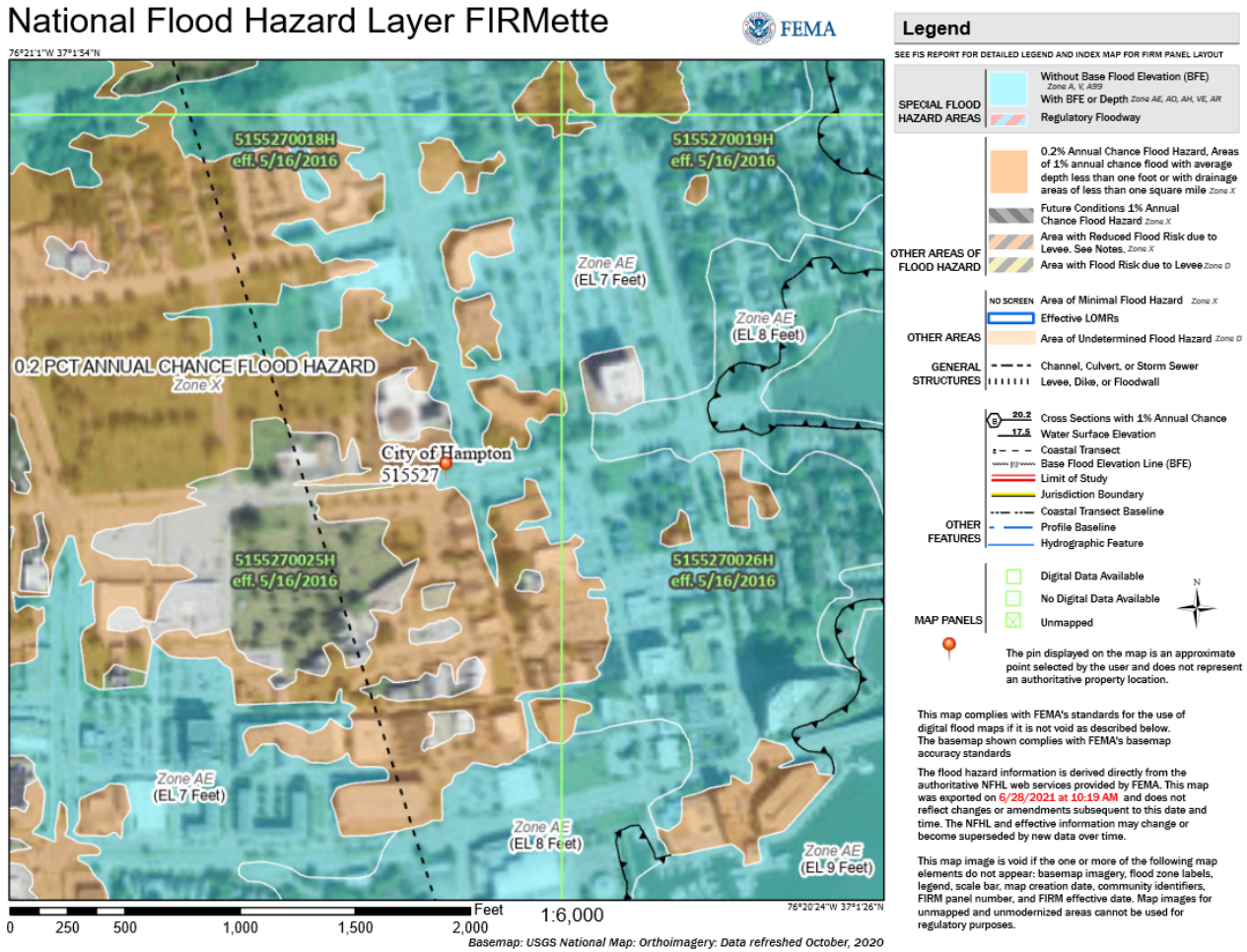
- E.O. 13690 identifies three approaches to establish the FFRMS floodplain:
  2. **Freeboard Value Approach (FVA):** Adding freeboard to the base flood elevation (2 feet for non-critical actions and 3 feet for critical actions)



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Executive Order 13690 Requirements – Identifies Three Approaches

- E.O. 13690 identifies three approaches to establish the FFRMS floodplain:
  3. **0.2%-annual-chance Flood Approach:** Utilizing the 0.2% annual chance floodplain



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Requirements

- Natural systems, ecosystem processes, and nature-based approaches shall be used when developing alternatives, where possible
- March 2023: [Building Community Resilience with Nature Based Solutions]



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Requirements

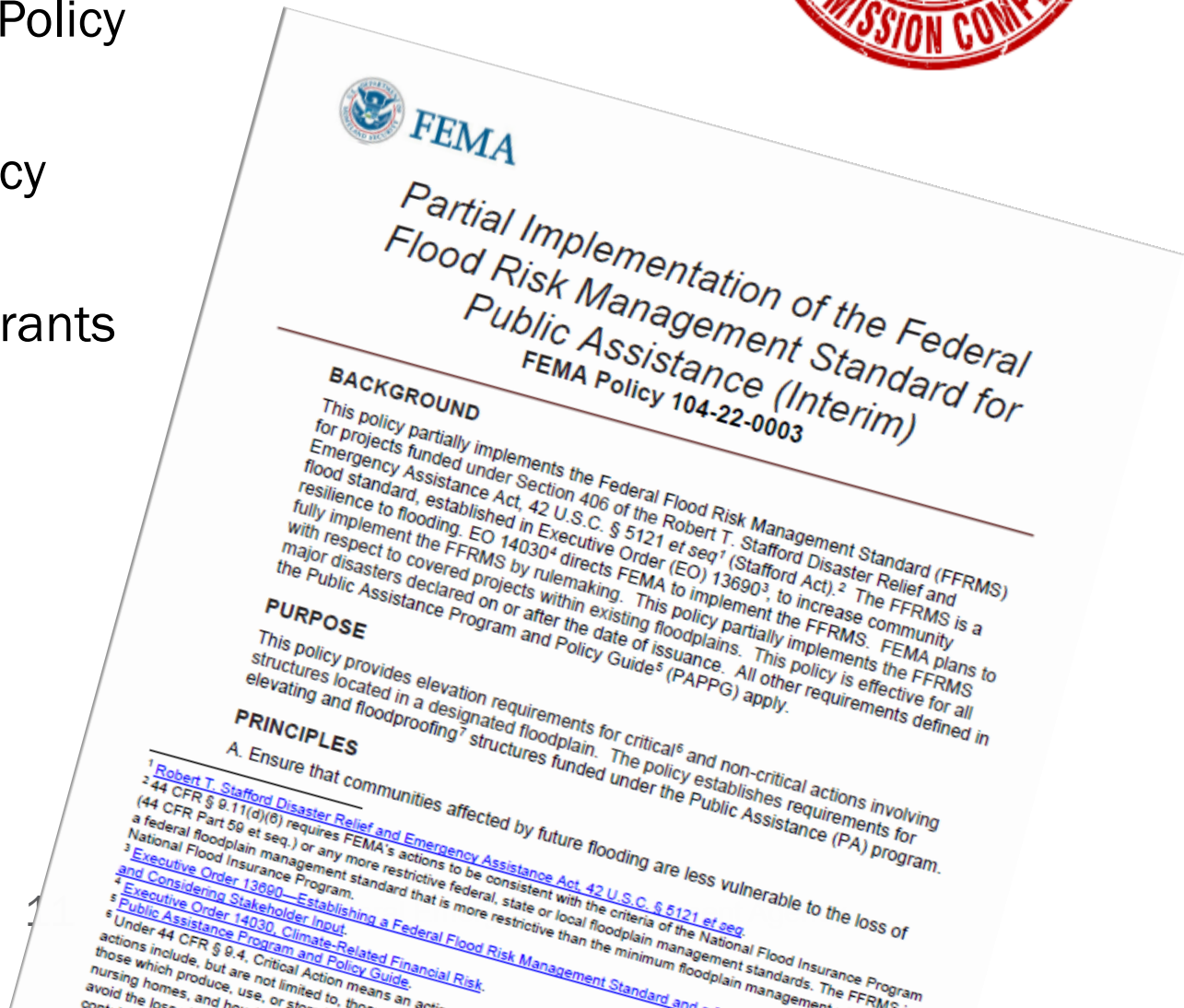
- FEMA proposes to amend its regulations at Title 44 Code of Federal Regulations Part 9 Floodplain Management and Protection of Wetlands to incorporate amendments to E.O. 11988 and implement the FFRMS;
  - This section describes FEMA's process to determine whether the proposed location for an action falls within a floodplain and how to complete the action in the floodplain, in light of the risk of flooding
  - The proposed rule would change how FEMA defines a floodplain with respect to certain actions.
  - Updates to Floodplain Management and Protection of Wetlands Regulations (Fall 2022 Unified Agenda)

Partial Implementation of the Federal Flood Risk Management Standard

Partial Implementation Policies



- Public Assistance Partial Implementation Policy signed June 3, 2022
- Revised Hazard Mitigation Assistance policy issued Dec. 7, 2022
- Grant Programs Directorate effective for grants Beginning in Fiscal Year 2021



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Partial Implementation of the Federal Flood Risk Management Standard for Public Assistance (Interim)

FEMA Policy 104-22-0003

BACKGROUND

This policy partially implements the Federal Flood Risk Management Standard (FFRMS) for projects funded under Section 406 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. § 5121 *et seq*[1] (Stafford Act).[2] The FFRMS is a flood standard, established in Executive Order (EO) 13690[3], to increase community resilience to flooding. EO 14030[4] directs FEMA to implement the FFRMS. FEMA plans to fully implement the FFRMS by rulemaking. This policy partially implements the FFRMS with respect to covered projects within existing floodplains. This policy is effective for all major disasters declared on or after the date of issuance. All other requirements defined in the Public Assistance Program and Policy Guide[5] (PAPPG) apply.

PURPOSE

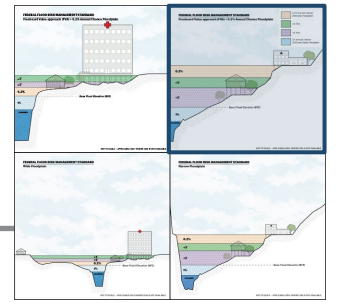
This policy provides elevation requirements for critical[6] and non-critical actions involving structures located in a designated floodplain. The policy establishes requirements for elevating and floodproofing[7] structures funded under the Public Assistance (PA) program.

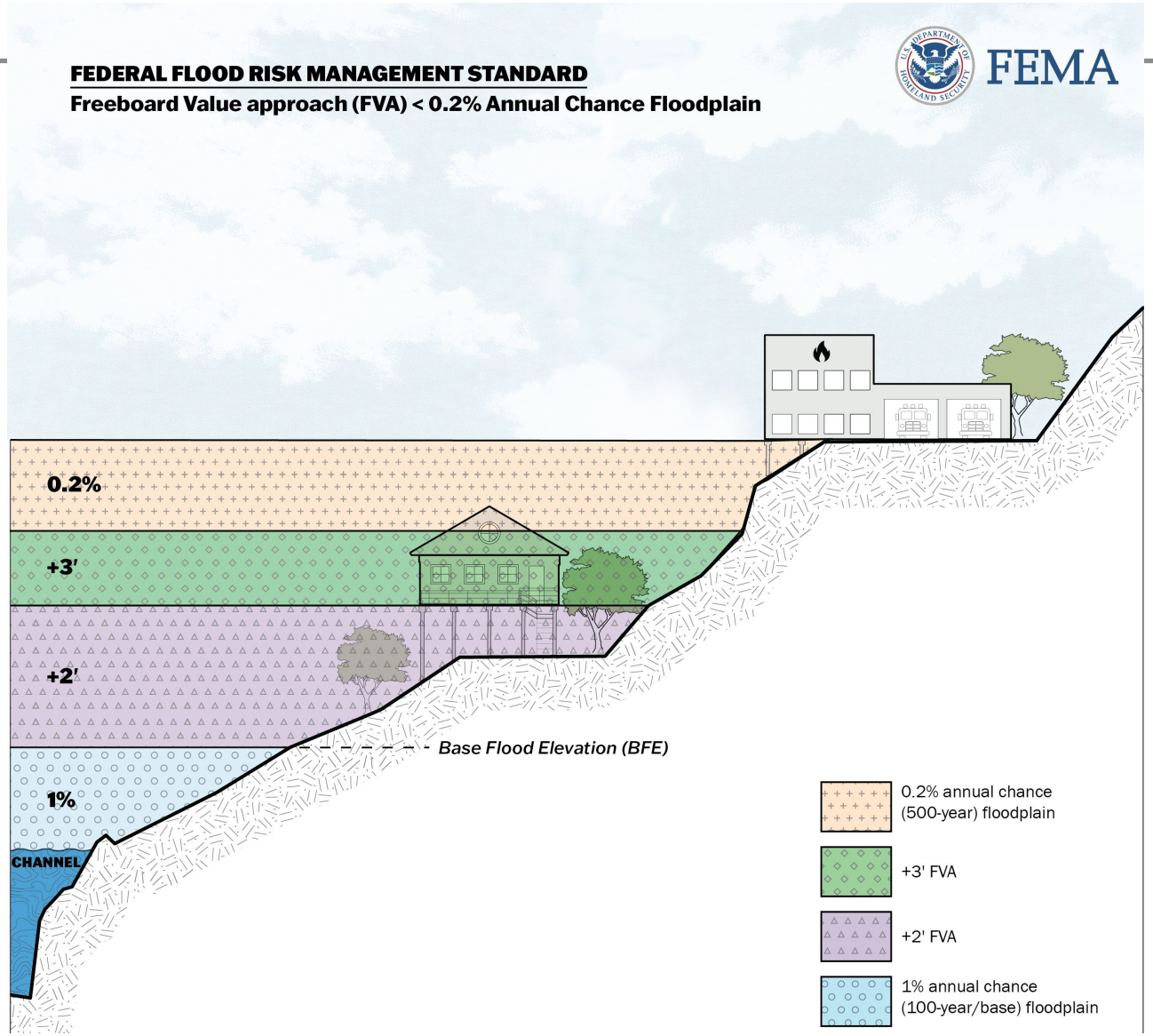
PRINCIPLES

A. Ensure that communities affected by future flooding are less vulnerable to the loss of

[1] Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. § 5121 *et seq*.
[2] 44 CFR § 9.11(d)(6) requires FEMA's actions to be consistent with the criteria of the National Flood Insurance Program (44 CFR Part 59 et seq.) or any more restrictive federal, state or local floodplain management standards. The FFRMS a federal floodplain management standard that is more restrictive than the minimum floodplain management National Flood Insurance Program.
[3] Executive Order 13690—Establishing a Federal Flood Risk Management Standard and
[4] Executive Order 14030, Climate-Related Financial Risk.
[5] Public Assistance Program and Policy Guide.
[6] Under 44 CFR § 9.4, Critical Action means an
actions include, but are not limited to,
those which produce, use, or
nursing homes, and
avoid the

SCENARIO 2: FREEBOARD VALUE APPROACH (FVA) < 0.2% ANNUAL CHANCE FLOODPLAIN





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FFRMS and Floodplain Management



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FFRMS and the Floodplain Management Role

FFRMS & the Interagency

- Floodplain Management Division's (FPMD) role in FFRMS is about Interagency Coordination within the Federal Government
- FPMD works with Office of Environmental and Historic Preservation to understand implementation challenges
- External Coordination
  - Executive Office of the President/Council on Environmental Quality/Office of Science and Technology Policy
  - Flood Resilience IWG; Federal Interagency Floodplain Management TF; MIT FLG; etc.
  - NOAA, tools and technology (RMD, too!)

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Flood Resilience Interagency Working Group

- Formed by the White House Climate Policy Office in response to Executive Order 14030, Climate-Related Financial Risk. Most active group currently.
- Co-led by Council on Environmental Quality (CEQ), Office of Management and Budget (OMB) and FEMA to coordinate federal agencies' implementation of FFRMS and other flood priorities.
- Reports to the cabinet-level National Climate Task Force, which was charged to establish a whole-of-government approach to addressing the climate crisis that "increases resilience to the impacts of climate change."
- FEMA's entry point is Mitigation Directorate's FPMD – we work with FEMA OEHP to understand implementation challenges, and then work with Other Federal Agencies to understand their issues and limitations in implementing the Executive Order.

FEMA

OEHP FFRMS

- Jessica Eleff, FFRMS Senior Specialist
- Shannon Riess, FFRMS Specialist
- *Luke Dodds, FFRMS Specialist (Detailed)*
- *Larissa Hyatt, Water Resources Specialist (Detailed)*

FPMD FFRMS

Jennifer Tylander, Branch Chief, FPMD DOT Branch

Jeff Herd, FFRMS Specialist

New Hire TBA, FFRMS Specialist

Regions: 1—Katie Rand; 2—Chanelle LaCross; 4—Pier Janrhett; 5—Brian Killen; 6—John Garvin; 7—Todd Tucker; 8—Matt Buddie; 10—Roxanne Reale-Pilkenton

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FFRMS FVA Data Development



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FFRMS Data Development Outputs

- FFRMS Freeboard Value Approach (FVA) floodplains utilizing existing digital effective, modeled back flood hazard information nationally
- FFRMS floodplains will include both riverine and coastal areas with digital effective flood hazard information
- FFRMS floodplains are to be developed in raster format only
- Inventory of all existing data developed by FEMA Regions, including Cooperating Technical Partners within those Regions that may meet FFRMS (FVA +2, +3, and 0.2%) standards as well as any other flood hazard freeboard value mapping that may have been conducted

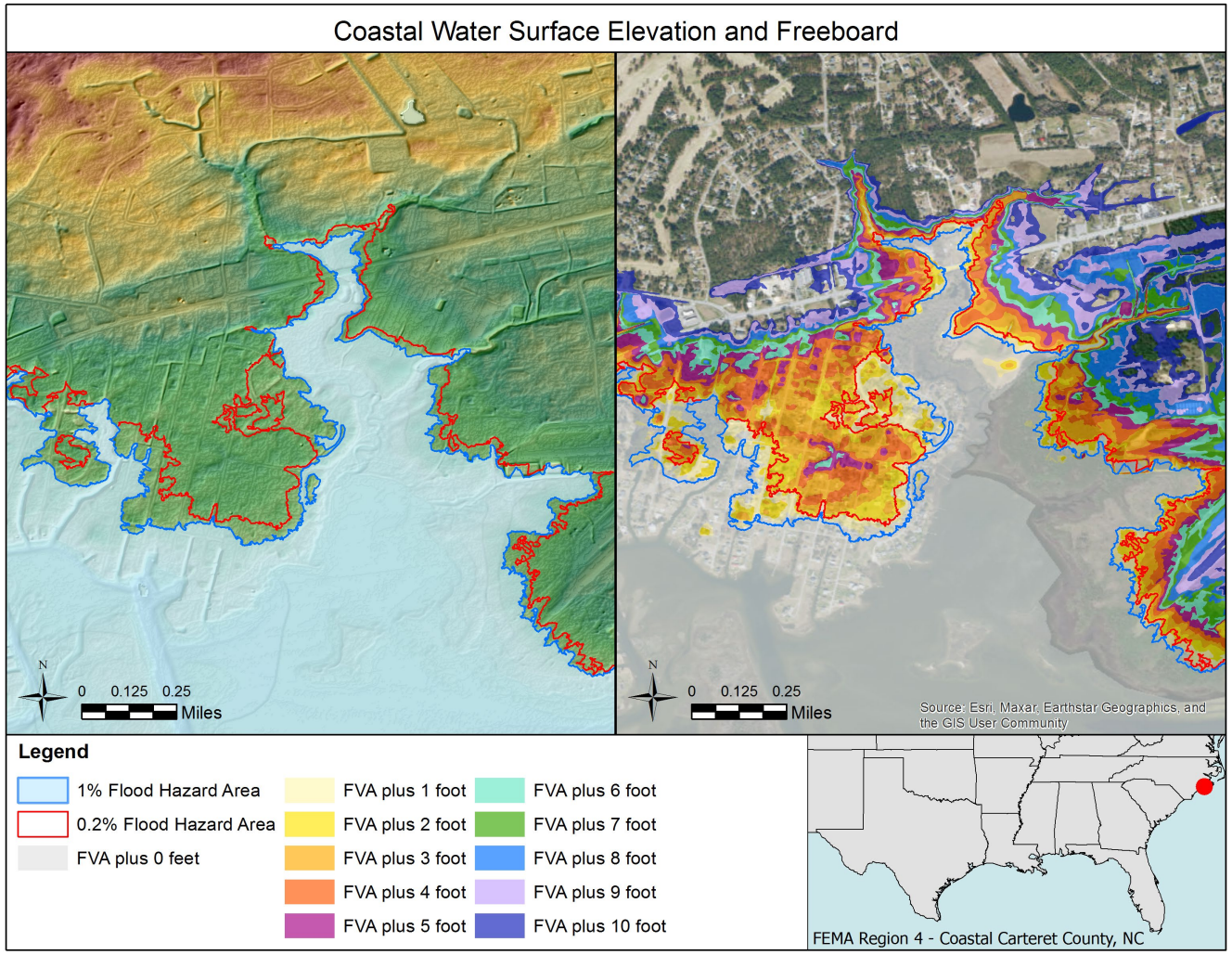
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FFRMS Data Development Outputs

- 1% annual chance flood elevations raster floodplains for FVA +1, +2 and +3 scenarios and associated FVA elevations, using digital effective flood hazard information for areas where Climate Informed Science Approach (CISA) is not yet ready (riverine flood hazards nationally as well as Pacific Ocean and Great Lakes coastal flood hazards)
- Floodplains for Atlantic Ocean and Gulf of Mexico coastal areas (where CISA is nearing readiness) will include freeboard rasters of BFE +1, +2, +3, +4, +5, +6, +7, +8, +9, and +10 scenarios
- NOAA SLR projection ranges can be applied using BFE freeboard floodplains based on project life expectancy; 2050, 2075, etc.
- 0.2% annual chance floodplains

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FVA Example



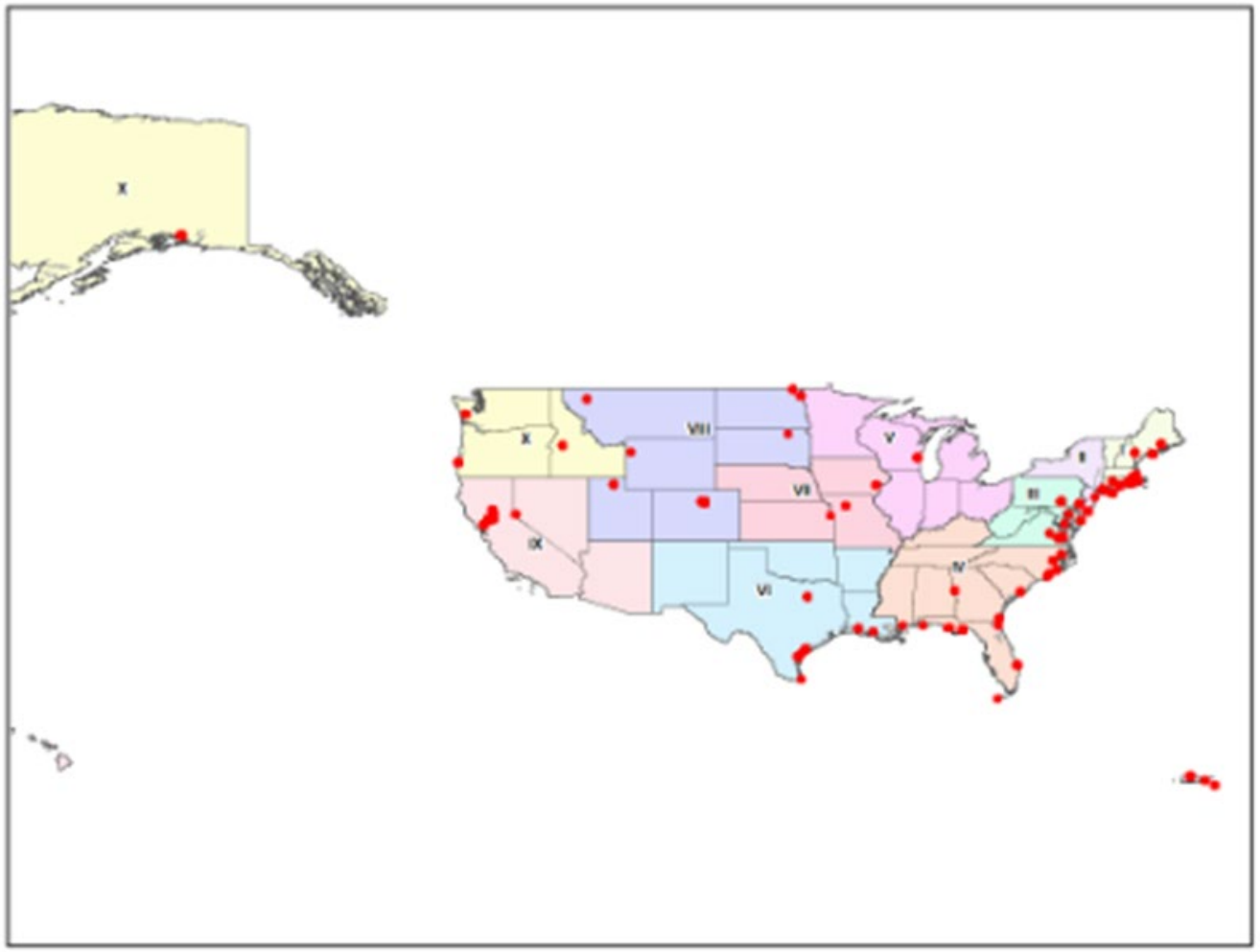
FEMA, FFRMS Pilot Studies, 2022

FEMA



Pilot Projects

FFRMS Pilot Study #1



- Scope:
  - 3 PTS working as one team
- Random sample of 400 sq miles:
  - Max. of 10 sq miles sample grids
  - Atlantic and Gulf coastal flood zones AND
  - Riverine and other coastal and inland flood zones
  - Random samples chosen within parameters
- Utilize best available topography data (DEM)

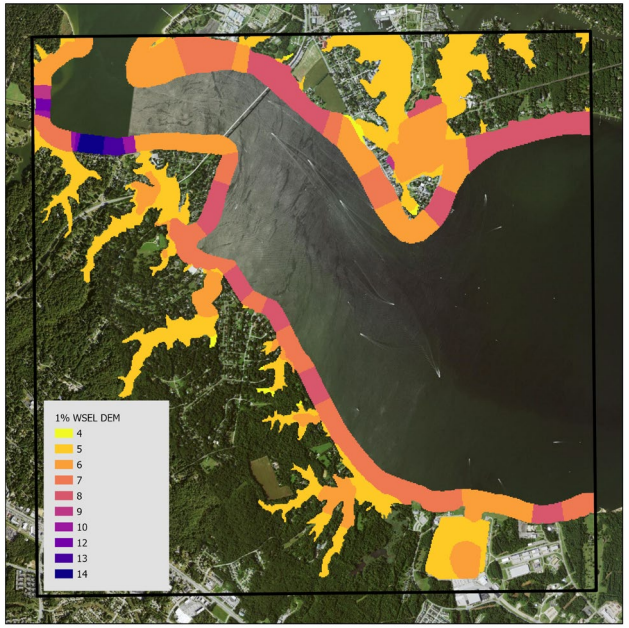
  readily available through the USGS National Map
- Calculate horizontal expansion for each of the

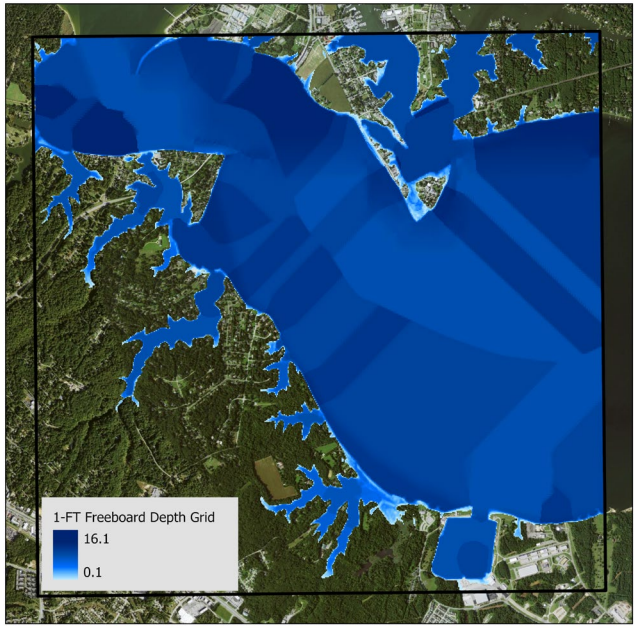
  freeboards
- For 0.2%, calculate both horizontal expansion and vertical difference

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FFRMS Pilot Study #1 – GIS Analysis



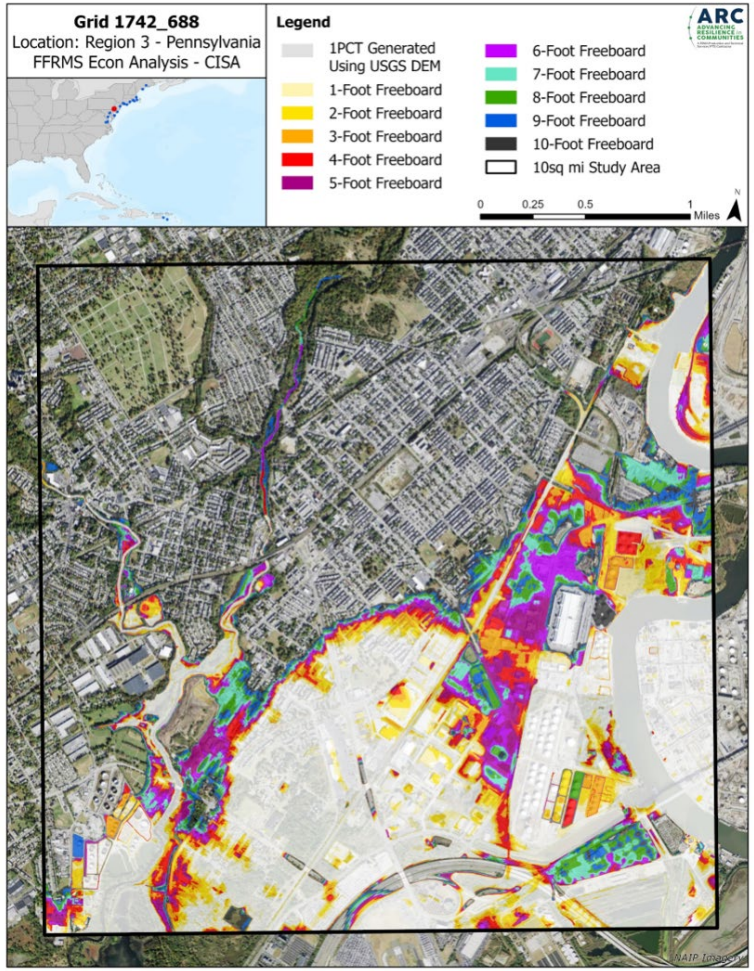


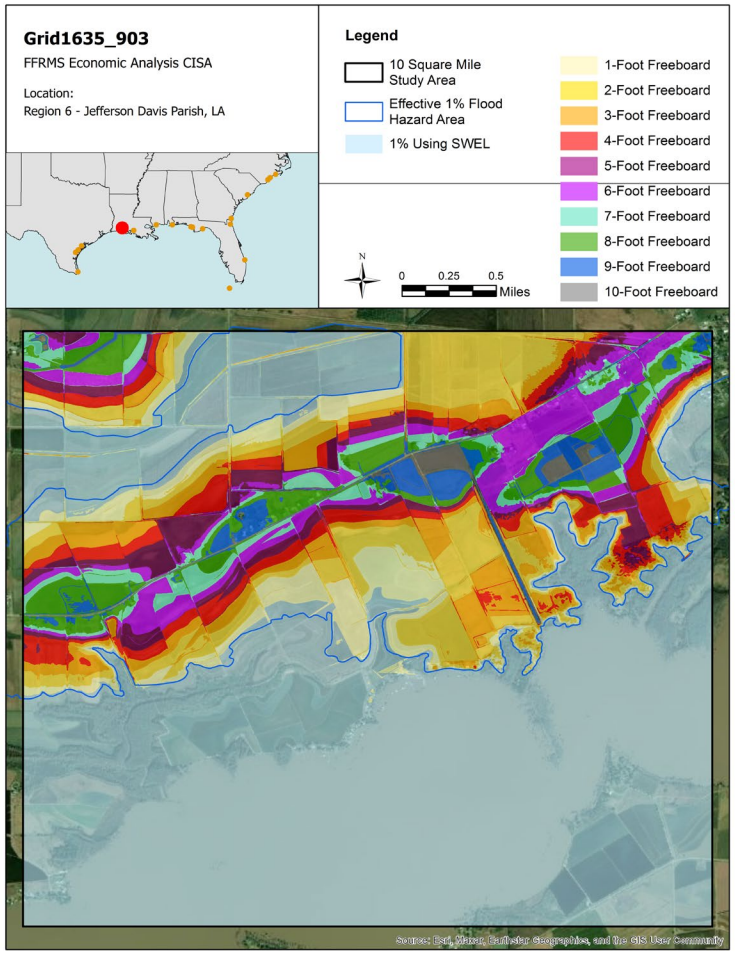




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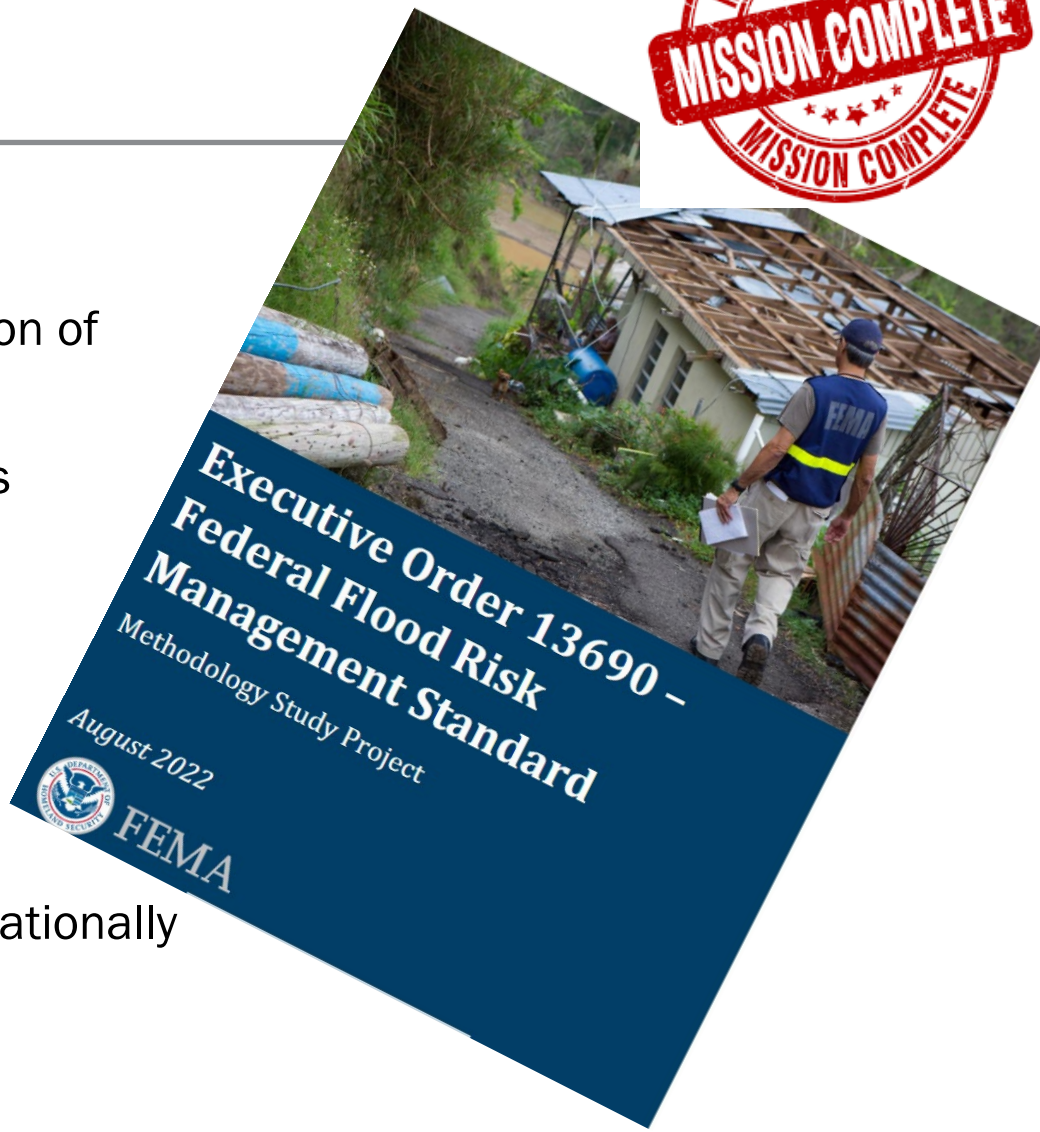
FFRMS Pilot Study #1 - Results





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FFRMS Pilot Study #2



Purpose:

- Provided the Agency an understanding of the construction of horizontal floodplains and recommendations
- Findings informed FEMA's development of specifications

Scope:

- 1-2 sample areas per PTS
- Deliverables:
  - NFHL like floodplain polygons with WSEL attributes
  - Guidance document and how to scale the process nationally

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Locations of Pilot Areas the FVA approach to scale Nationally

Lewis County, WA

Weld County, CO

Harris County, TX



Rockingham County, NH

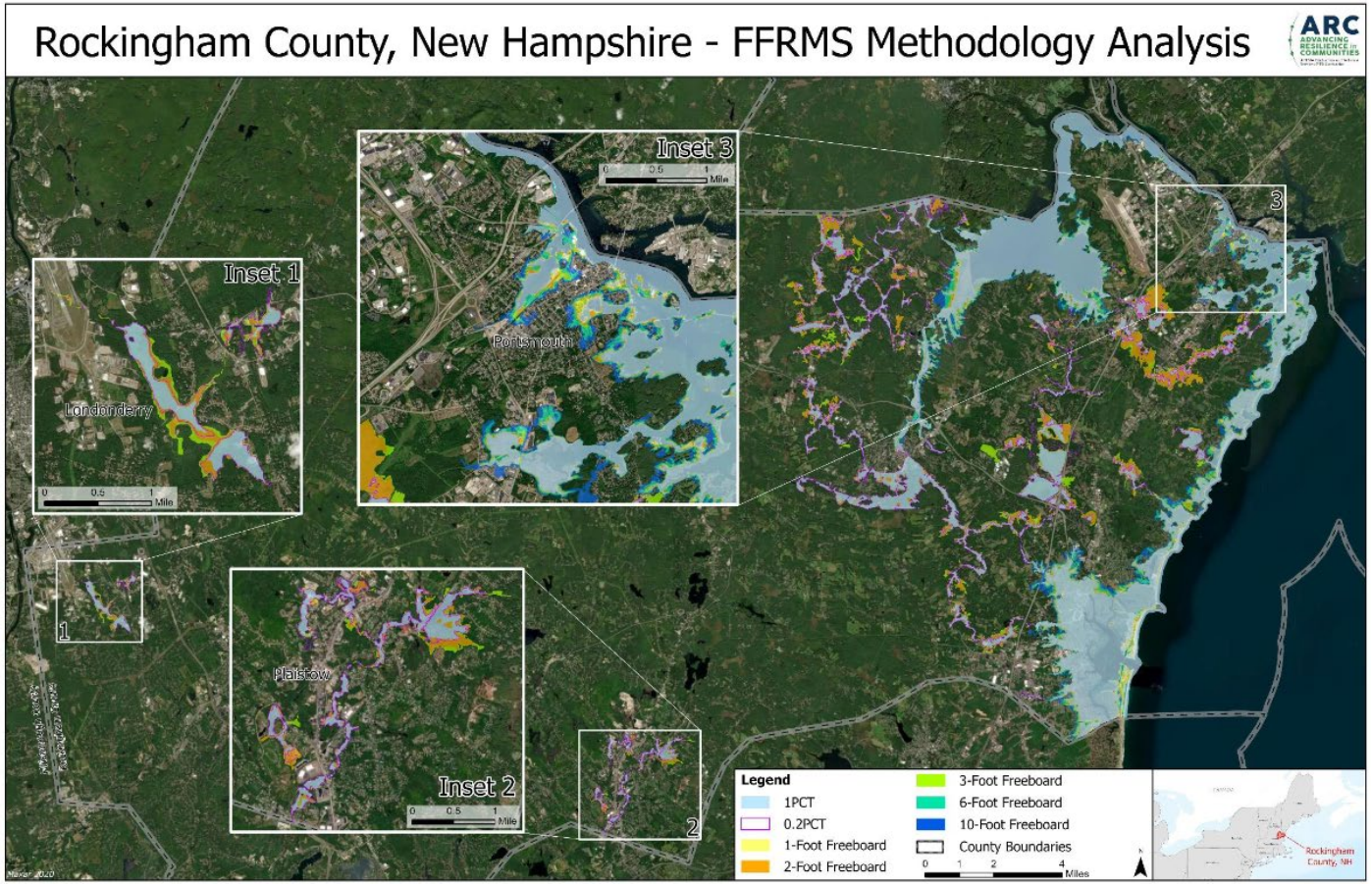
Wyandotte Co, KS

Chatham County, GA

Puerto Rico

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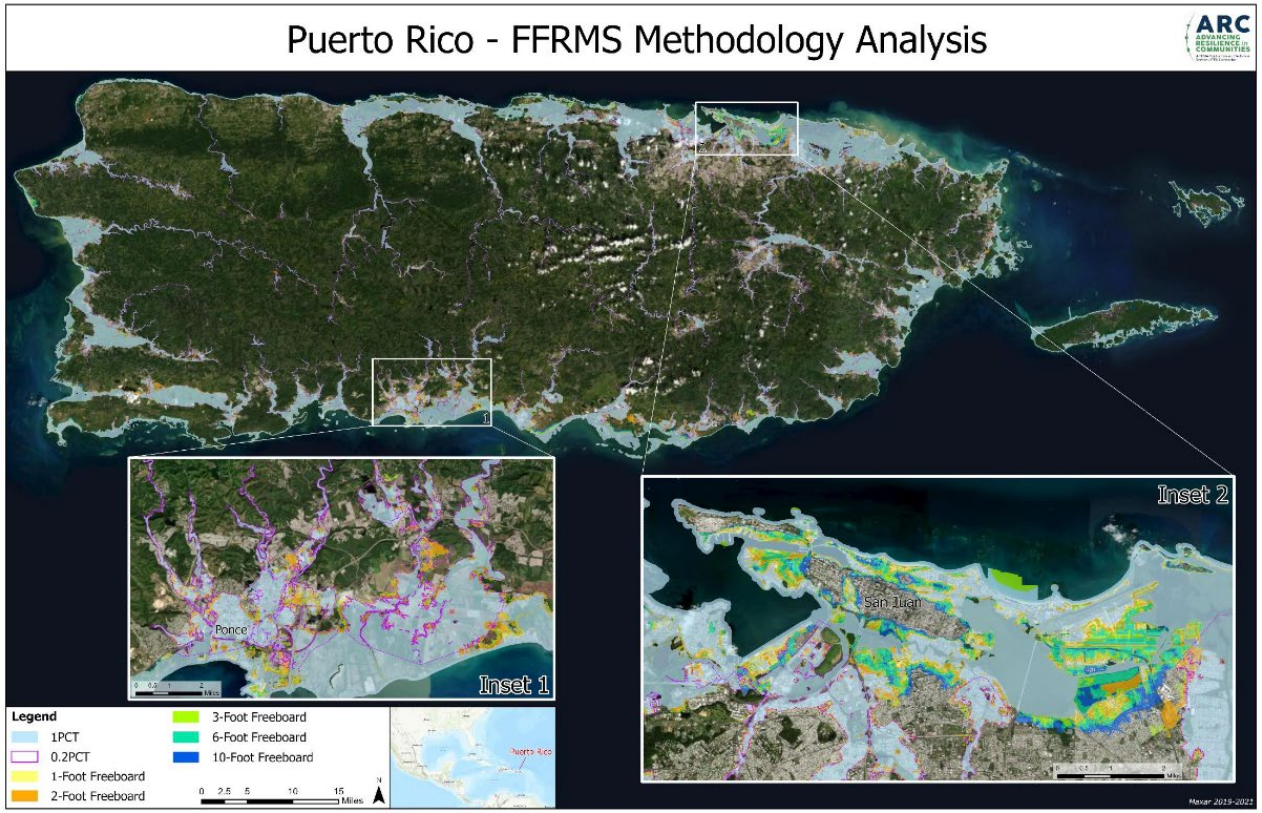
FFRMS Pilot Study #2 - Results



- Utilized existing Flood Risk Products (depth grids and water surface elevation grids)
- Reconciled different datasets across flood study boundaries

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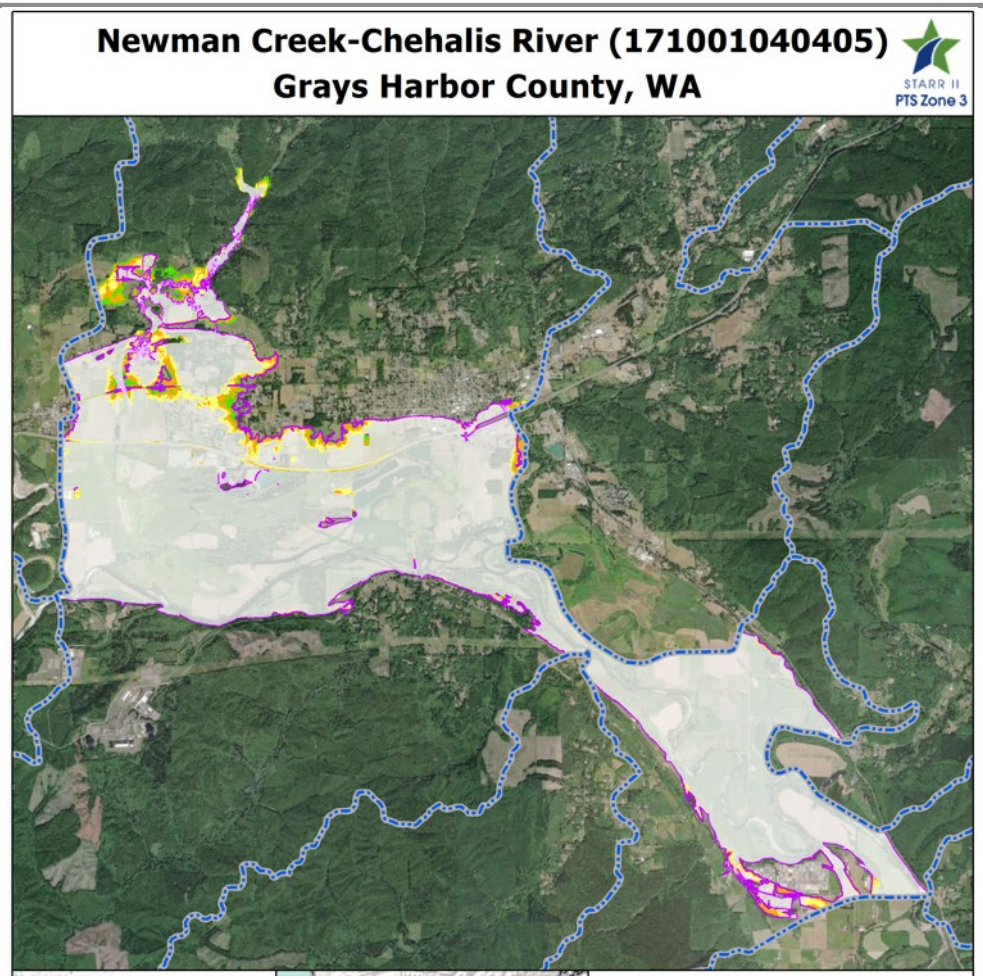
FFRMS Pilot Study #2 - Results



- Best Available Data – Advisory BFE were used for Puerto Rico
- Used multiple DEM sources at different resolutions

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FFRMS Pilot Study #2 - Results



- This area has various Zones mapped on the FIRMs– A, AE, AO and 0.2% Annual Chance
- Various sources (USGS, FEMA's effective Dataset) of Terrain data is available and noticed +3ft difference in elevations
- Portions of the study as water surface elevations in NGVD29. Conversion to NAVD88 is applied.

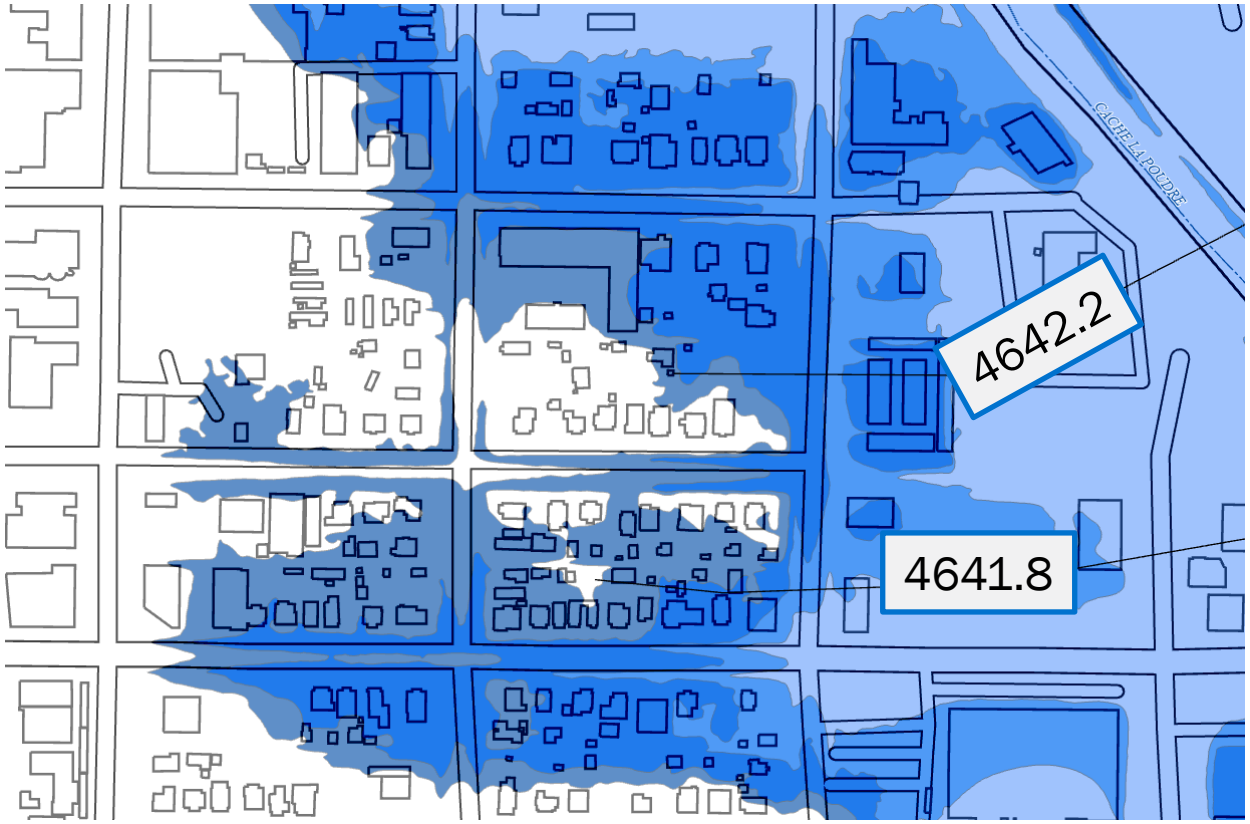
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FFRMS – FVA Known Challenges

1. Merging different flood risk studies
    a. Mismatches at the county boundaries
    b. Areas not modernized
    c. Zone A w/ no XS
    d. Water Surface Elevations not available for Zone AO areas
2. Low resolution USGS DEMs
3. Vertical datum differences between multiple flood risk studies and USGS DEM
4. Flood Control Structures such as Levees and Dams

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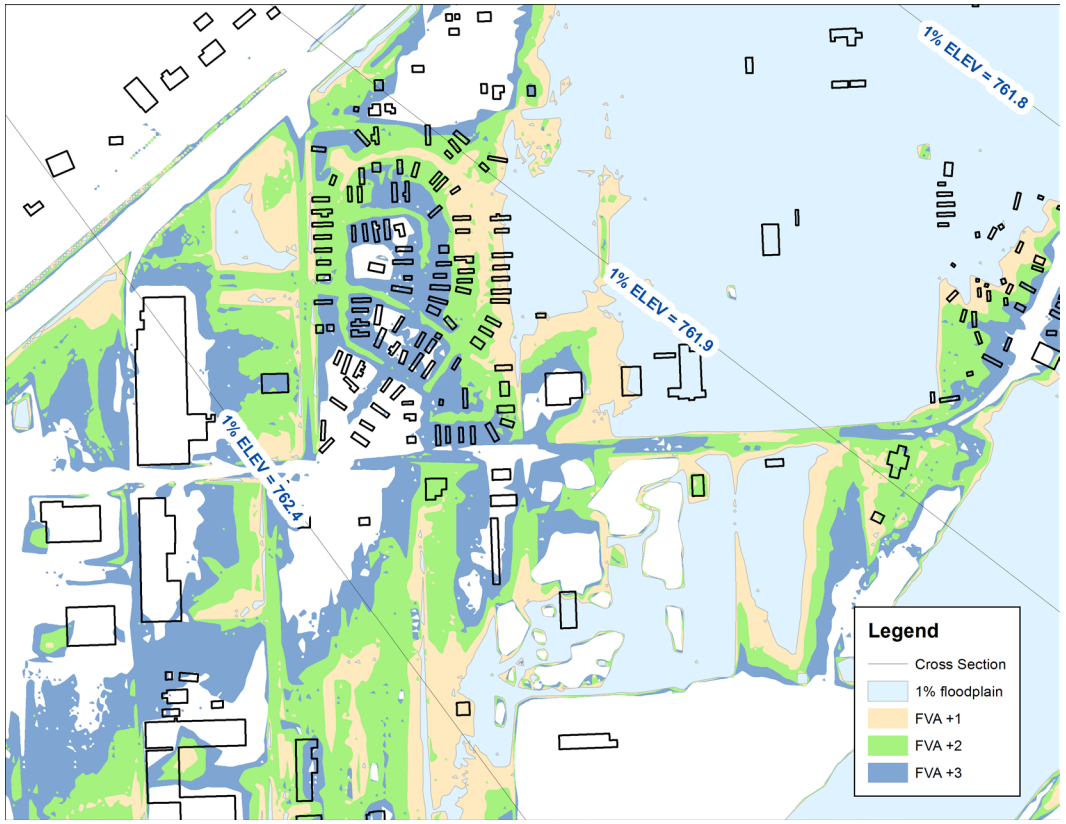
Building Footprints Examples – Weld County, CO



- Freeboard grids of 0, +1, +2, and +3 are shown
- Note how many additional buildings are with +2 and +3 free board – in dark blue and grey areas

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Building Footprints – Wyandotte County, KS



- Freeboard boundaries of 0, +1, +2, and +3 are shown
- Note how many additional buildings are with +2 and +3 free board – in green and dark blue areas

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FFRMS – FVA Lessons Learned/Best Practices

1. Utilizing existing FEMA's non regulatory products checks will provide consistent quality of the final datasets and a thorough review of the source data (NFHL and Terrain source) is required
2. Prioritizing the data delivery is critical and planned to use
    a. Climate and Economic Justice Screening Tool (CEJST) and
    b. National Risk Index (NRI)
3. The automated GIS mapping process for FFRMS floodplains is best performed at the watershed or county level
4. FEMA has the tools, resources and a detailed process to develop FFRMS products

FEMA

Comments or Questions

Andrew Martin
FEMA HQ, Engineering Services Branch
Andrew.Martin@fema.dhs.gov

FEMA

Maryland
Department of
the Environment

Maryland's Coast Smart CRAB A Practical Tool for Using FEMA's FFRMS Standards (100 year + 3 feet)

ASFPM

June 2023

Dave Guignet, State NFIP Coordinator

Maryland Department of the Environment

Maryland's CRAB: Uses FEMA's FFRMS tools for 100-year + 3 feet

(Or) Using FEMA Guidelines to…

- Work with Other State Agencies on Maryland's Coast Smart Council to Implement Higher Standards in Coastal Areas for State Construction and Spending

Maryland
Department of the Environment

Maryland's CRAB: Uses FEMA FFRMS tools for 100-year + 3 feet

As a Result …

- Integrates State Agencies with local FEMA standards And Exceed FEMA Standards in Coastal Areas
- Communities Have a Road Map to Follow for Higher Standards that Uses FEMA Guidelines and Combines with Other FEMA Requirements (critical facilities)

Maryland
Department of the Environment

Brief History of Resiliency In Maryland

- **January 2012: MDE and DNR Coordinated on an Executive Order for 2.0 foot freeboard**
- **May 05, 2014: HB 615 -** The Coast Smart Council law ensures Maryland follows standards to **make safe and fiscally-wise investments when building or updating State agency structures located in vulnerable coastal areas.** The law does not affect schools, roads or local government projects using local funding, only structures built or funded by State agencies.
- Originally Used Category 2 Storm Surge Limits

Maryland
Department of the Environment

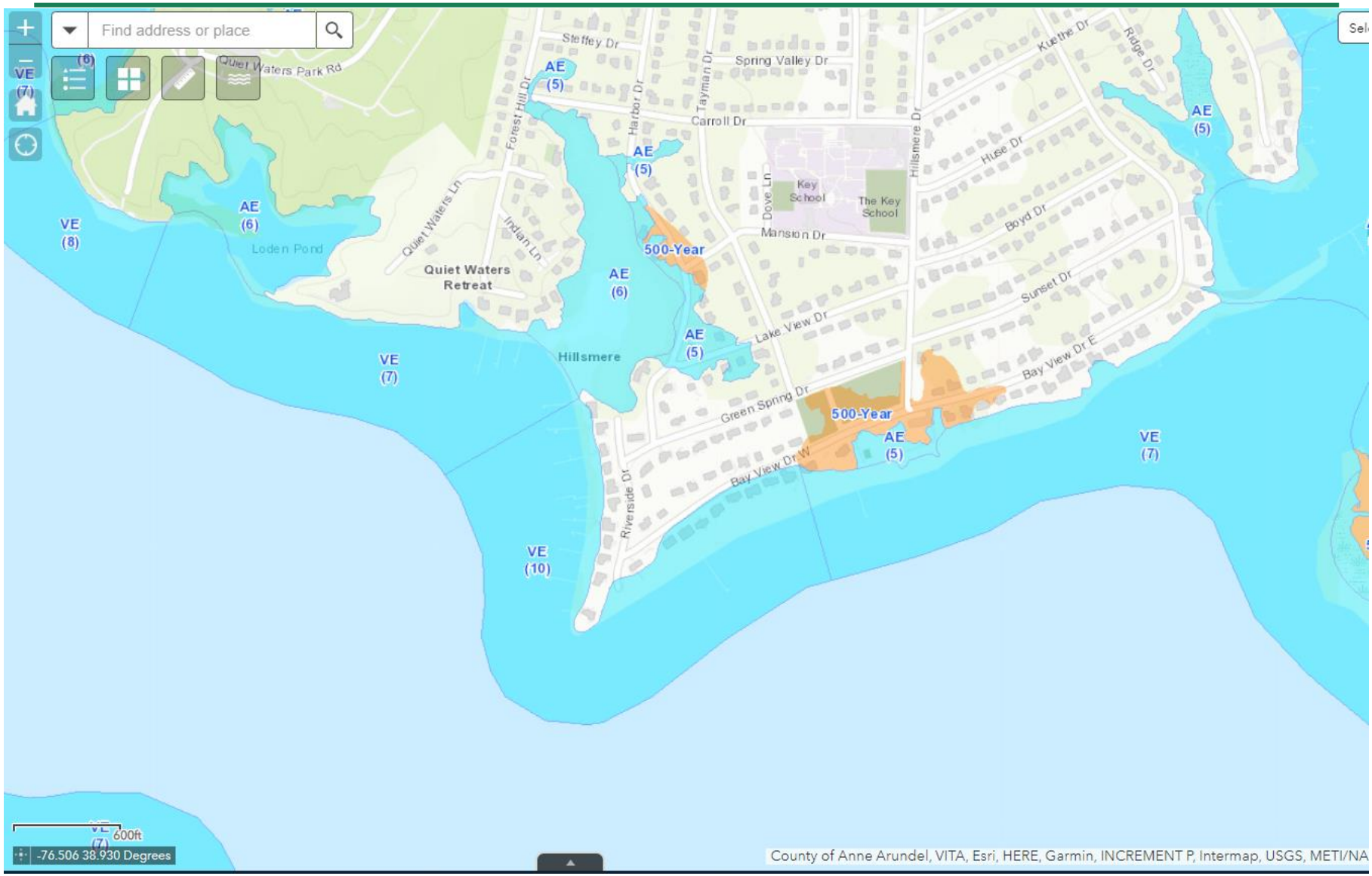
Brief History of Resiliency In Maryland

- **January 2016: FFRMS was Implemented by Presidential Executive Order (100-year + 3 feet / Up and Out)**
- **August 2016: Coast Smart Council began steps to Integrate FFRMS Into State Construction Guideline (100-year + 3 feet / Up and Out)**
- **Sept. 2020: State Coast Smart Updated**

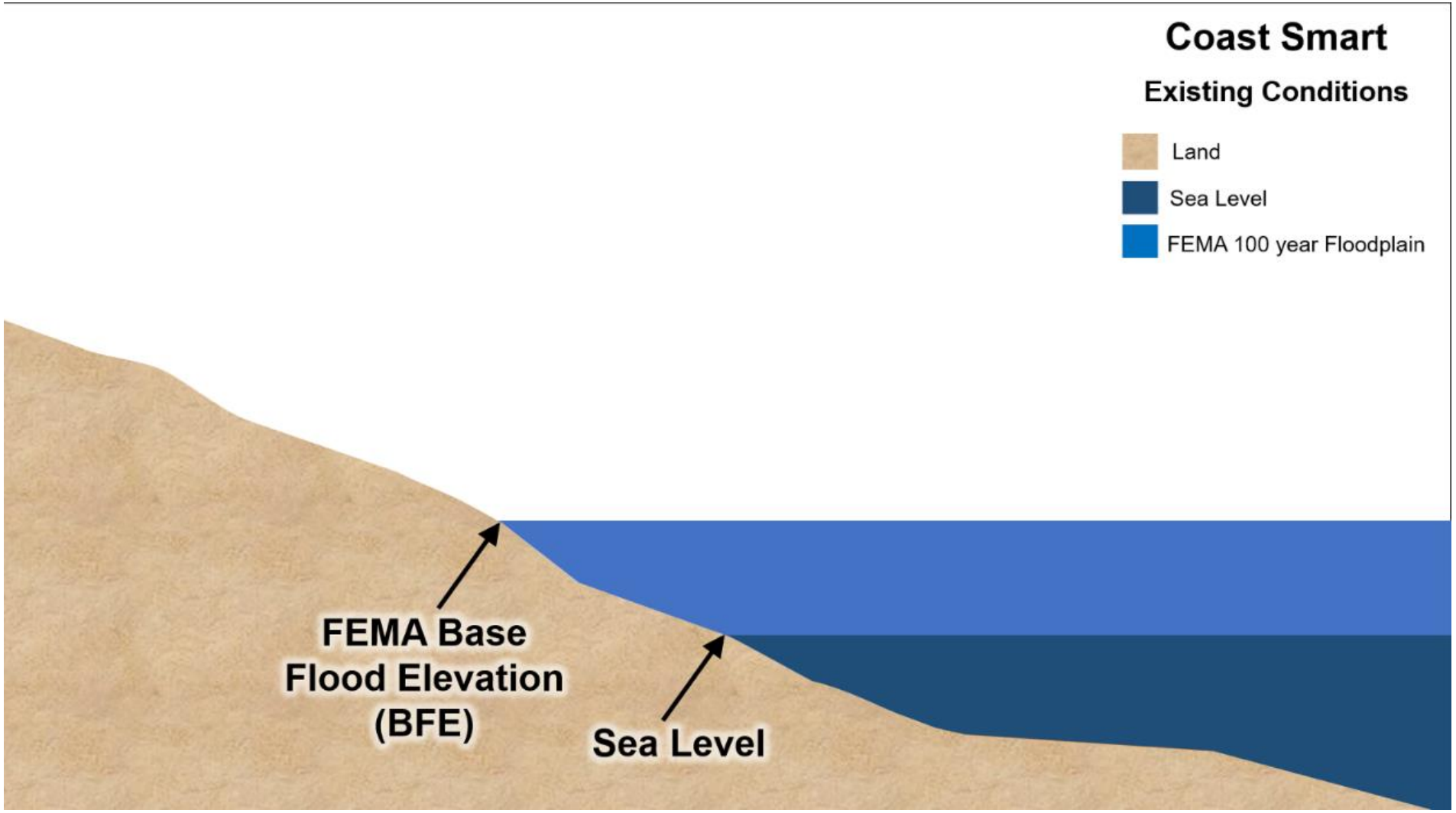
Maryland
Department of the Environment

Current Horizontal Floodplain:

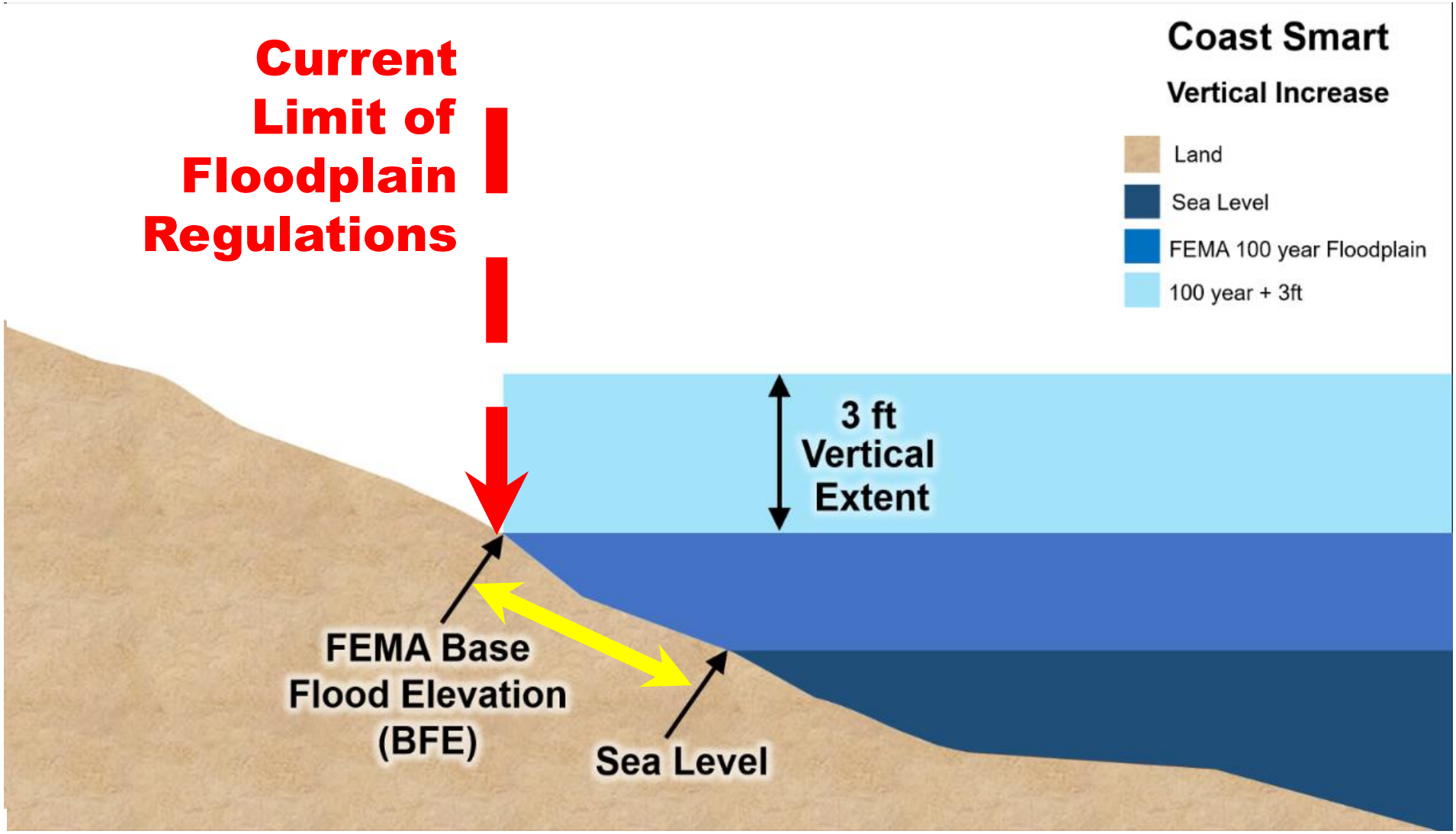
Partial View of FEMA Floodplain



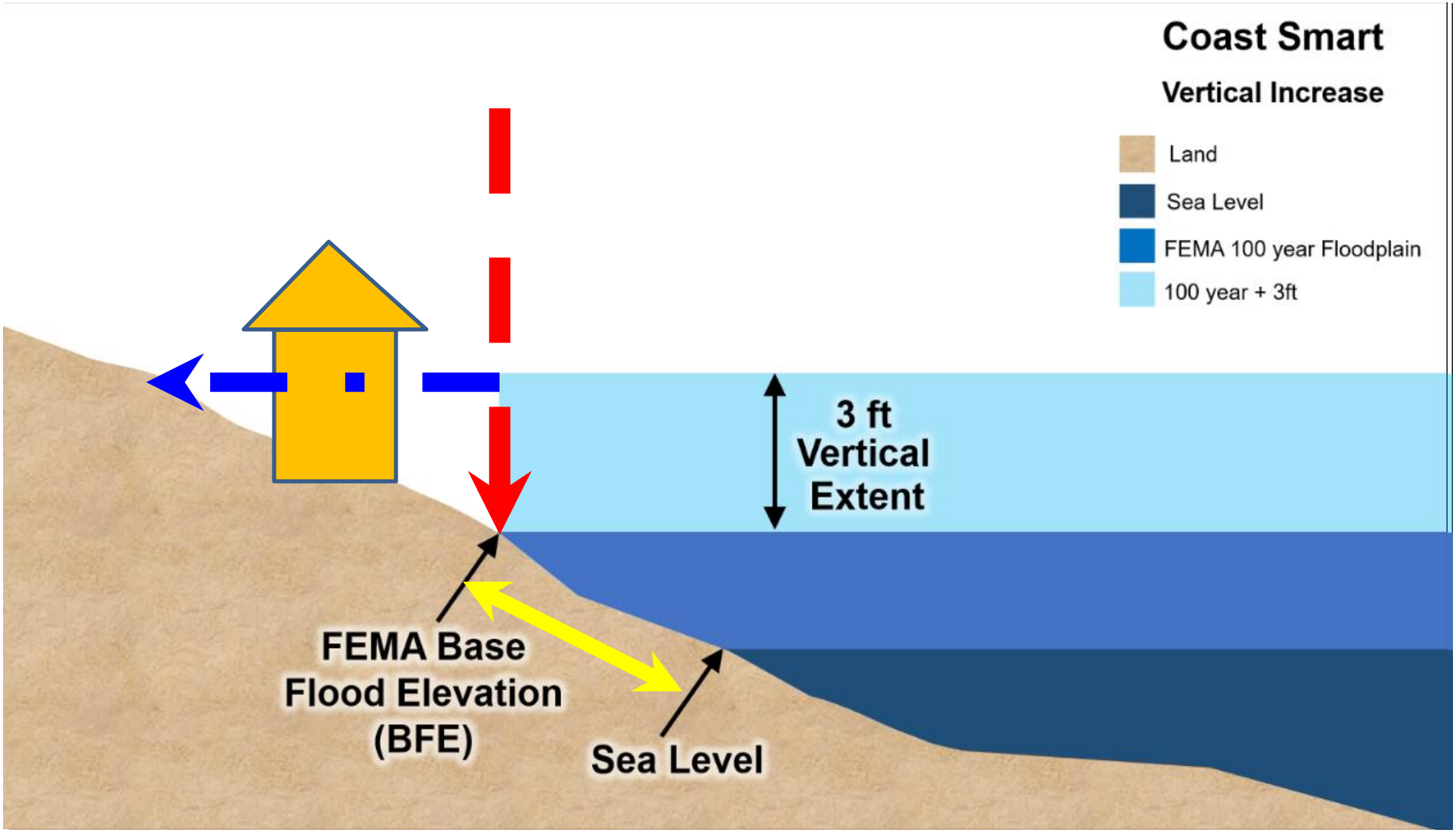
Development of 100 year + 3 feet : Profile View of FEMA Floodplain and Open Tidal Waters



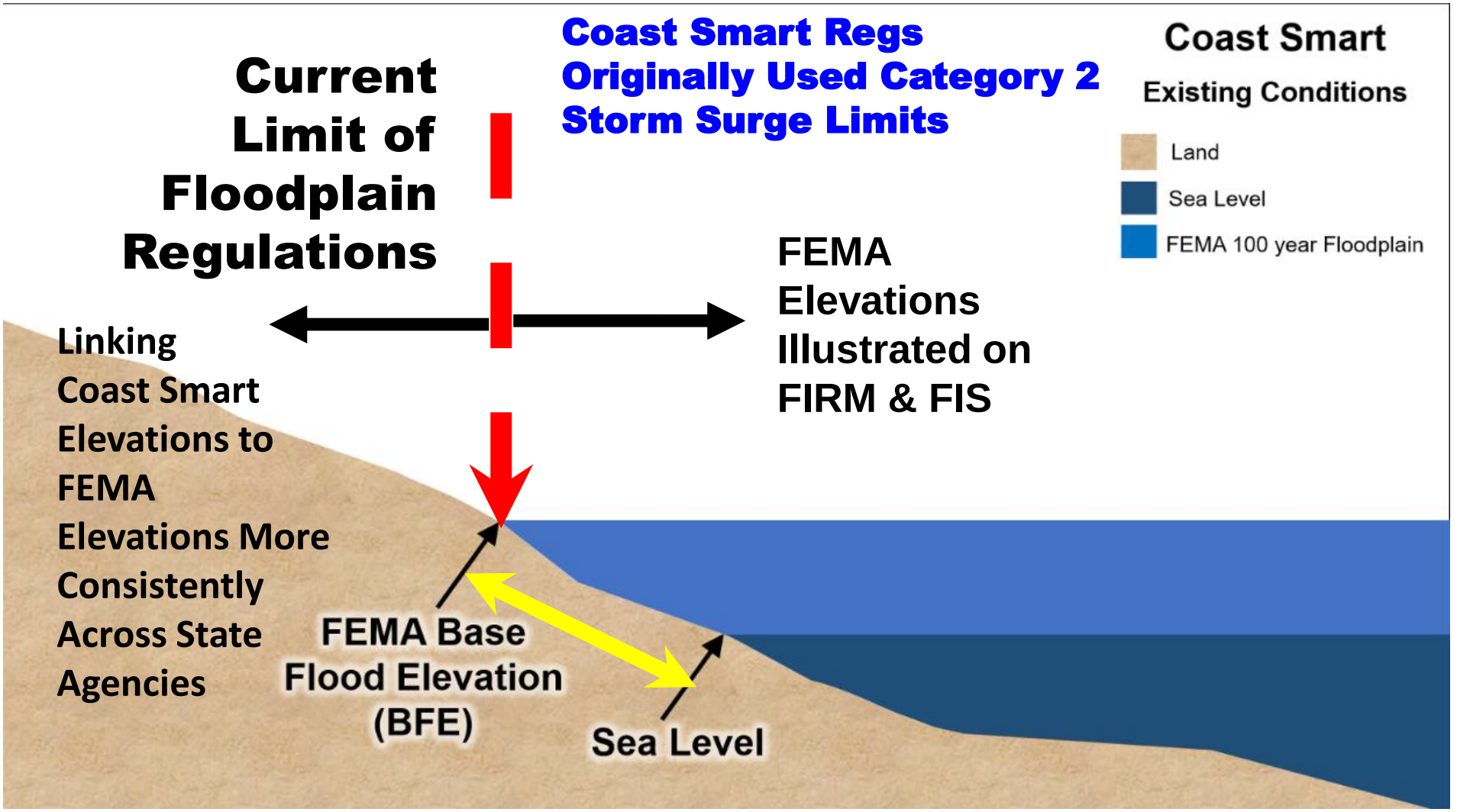
State and Many Communities Were Using a Freeboard Requirement of (1, 2, or 3 feet)



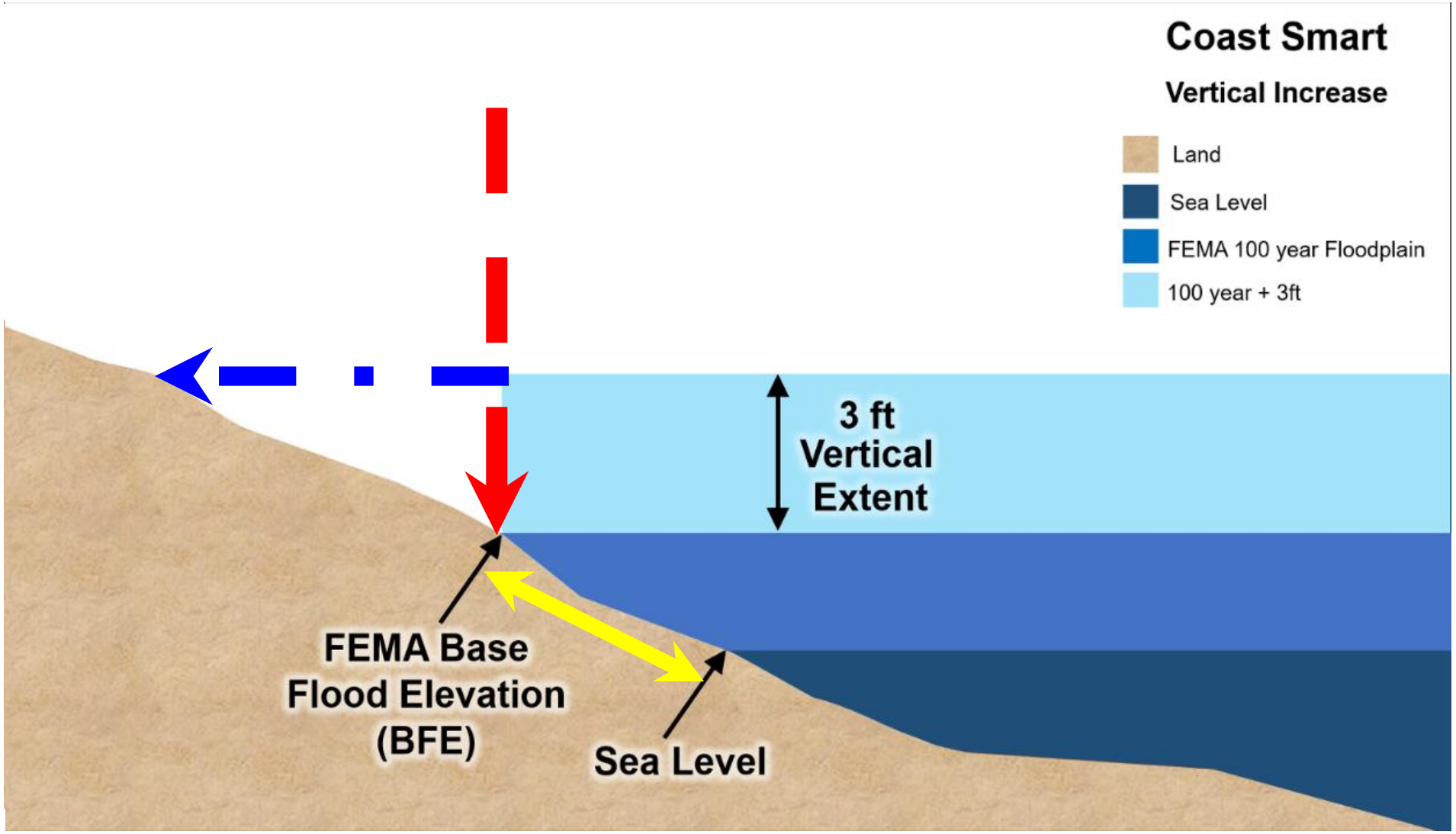
Coast Smart Pre 2014: State and Most Floodplain Management Regulations Do Not Regulate Outside the Floodplain when Freeboard is Used



1 Set of Guidelines: Establishes One Elevation that Can be Used for All State and Federal Grants and Aligns the State Agencies with the Local FEMA Regs

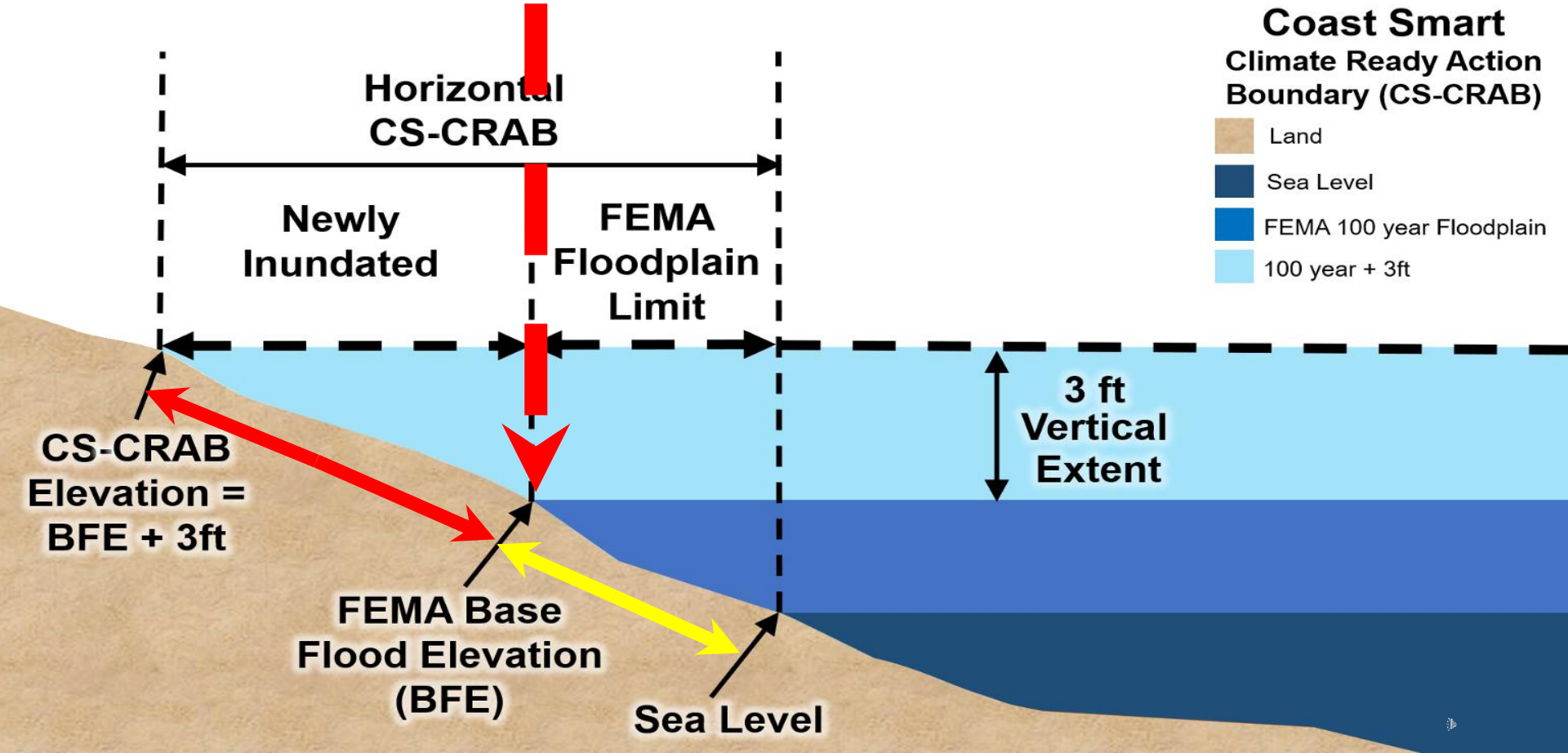


Coast Smart 2020… State Projects (Identify and Look Beyond the Floodplain)

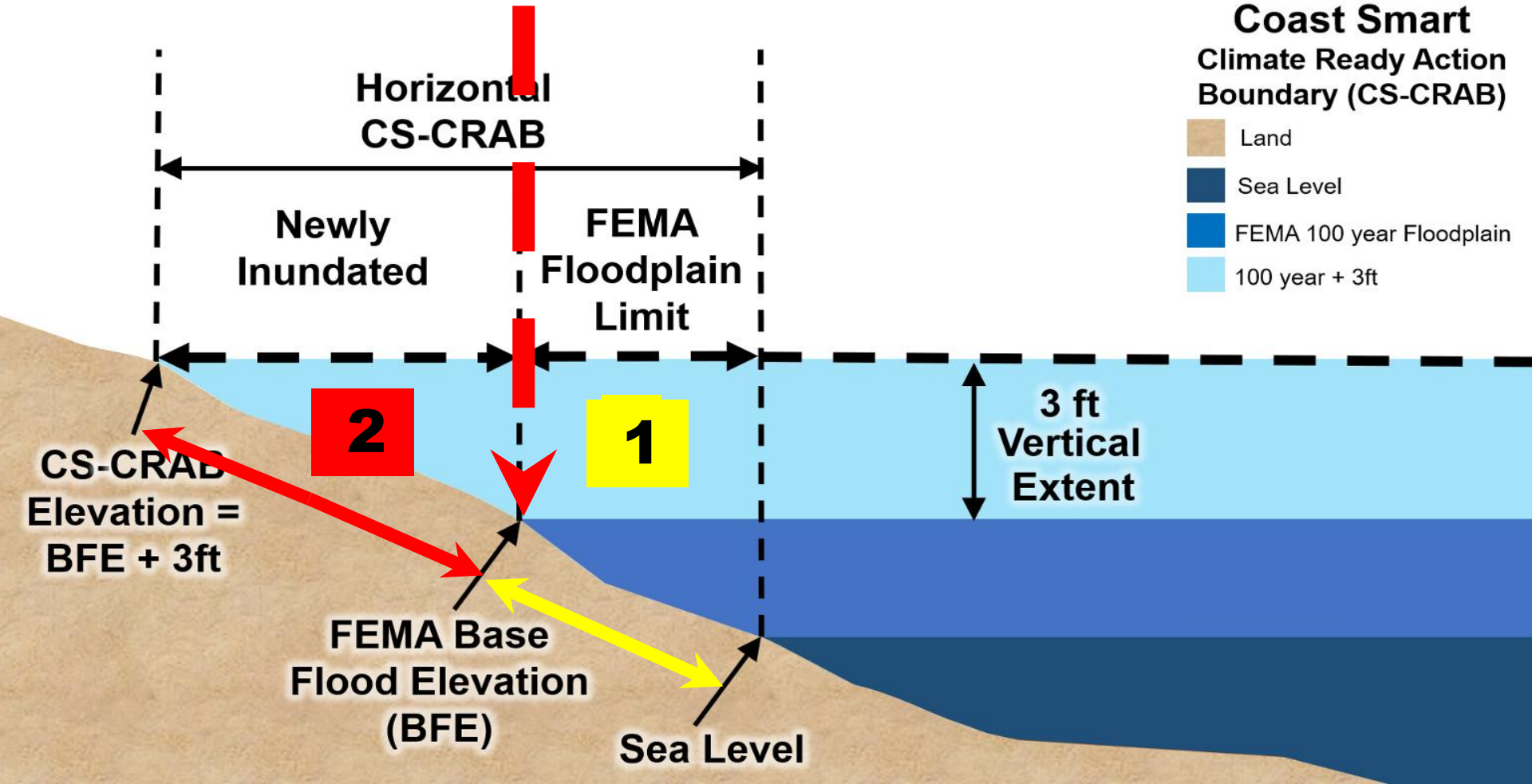


CRAB: Climate Ready Action Boundary Established A Defined Landward Limit And An Elevation for Resiliency

Coast Smart CS - Crab must be Used for State Funded Or Construction Projects over $ 500 K

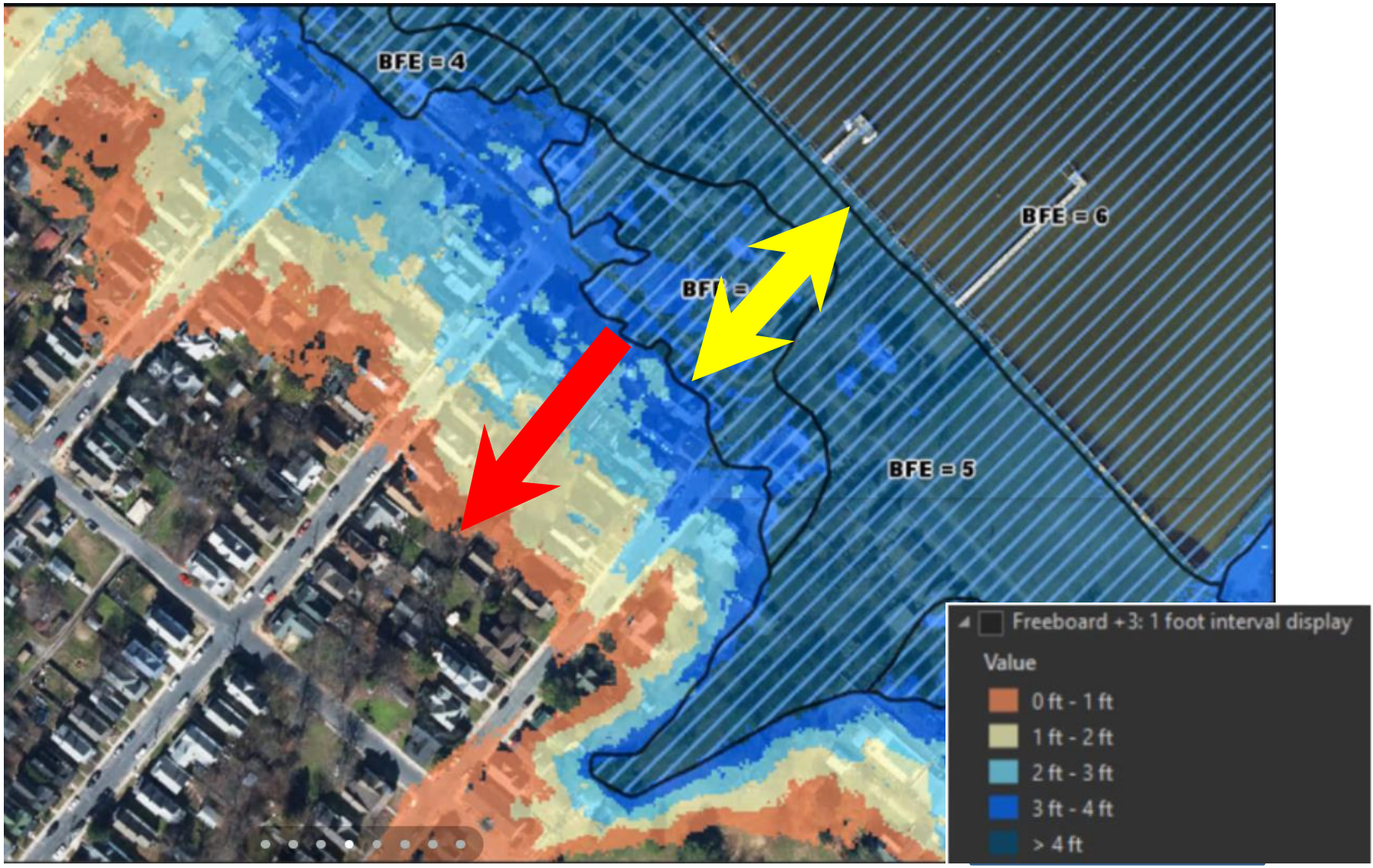


CRAB: Climate Ready Action Boundary Established A Defined Landward Limit And An Elevation for Resiliency



What Does the CRAB Look Like In Plan View on a Map ? ...

(Note: 2X or More Buildings in CRAB !)



Partial View of CRAB Available as…

Story Map

https://storymaps.arcgis.com/stories/bd1ab6827c77457a9c6aec5ca1eb4af2

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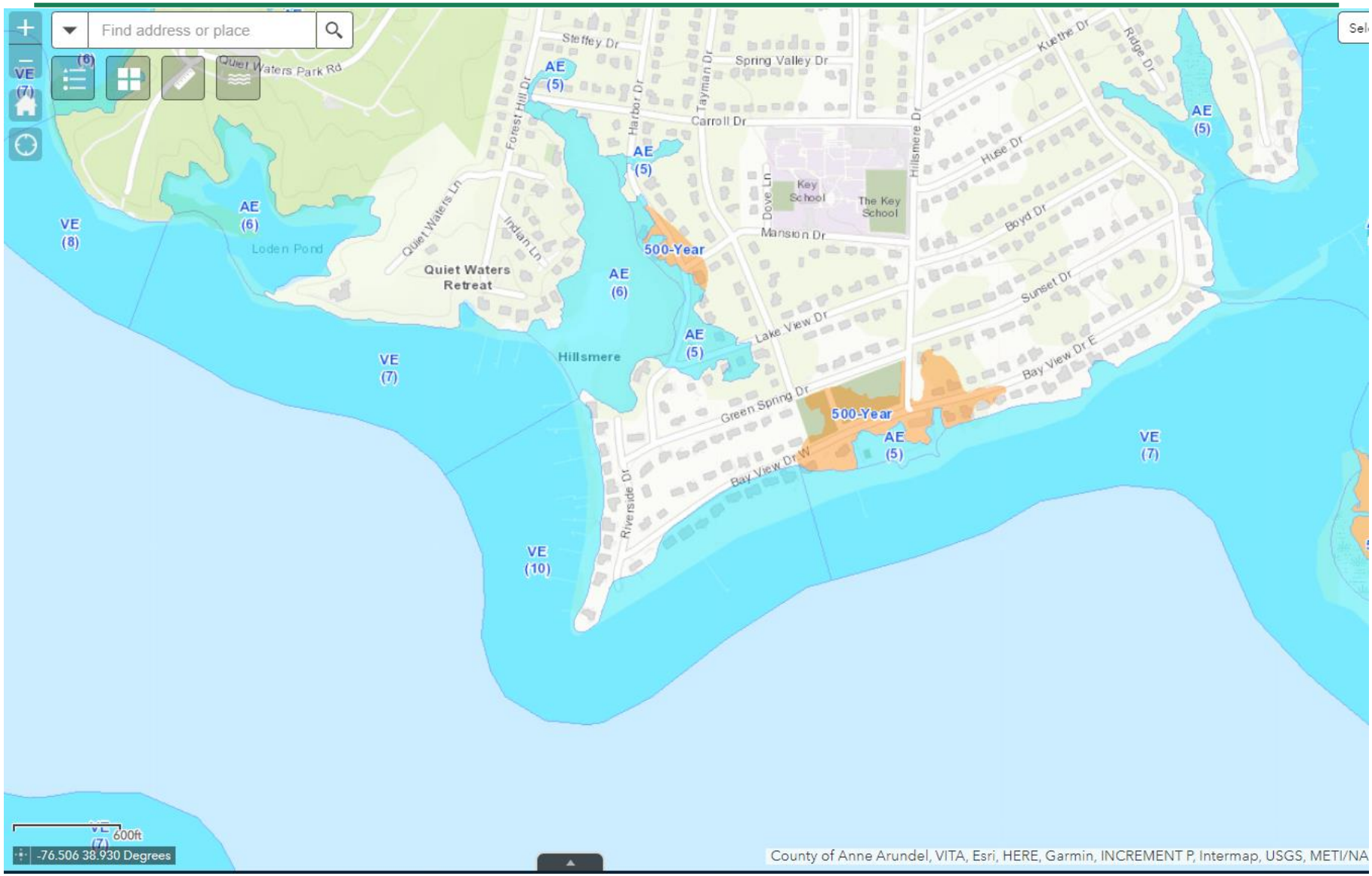
Full Data on MDfloodmaps.com

https://mdfloodmaps.net/crab/

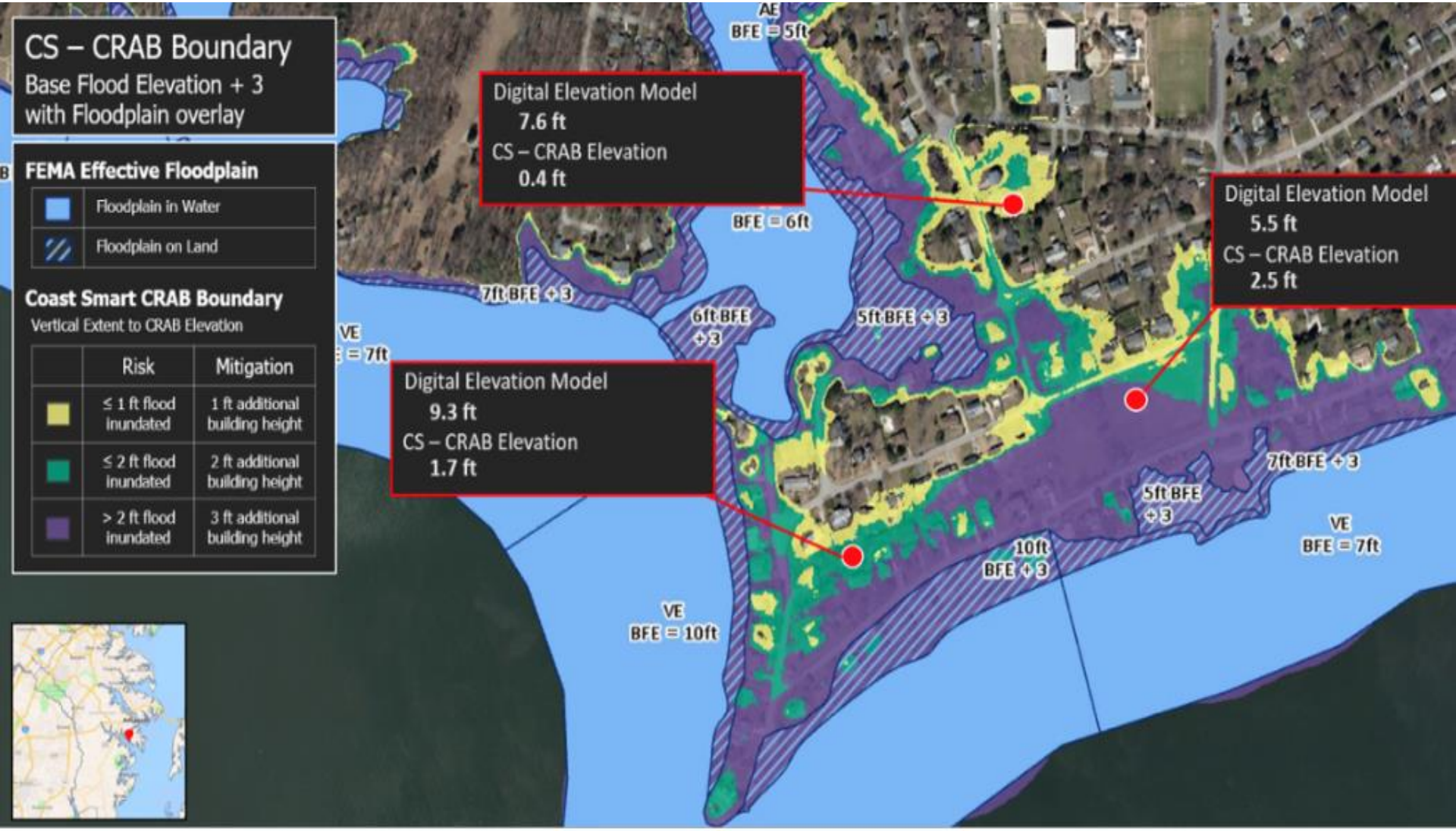
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Current Horizontal Map Tools:

Partial View of FEMA Floodplain

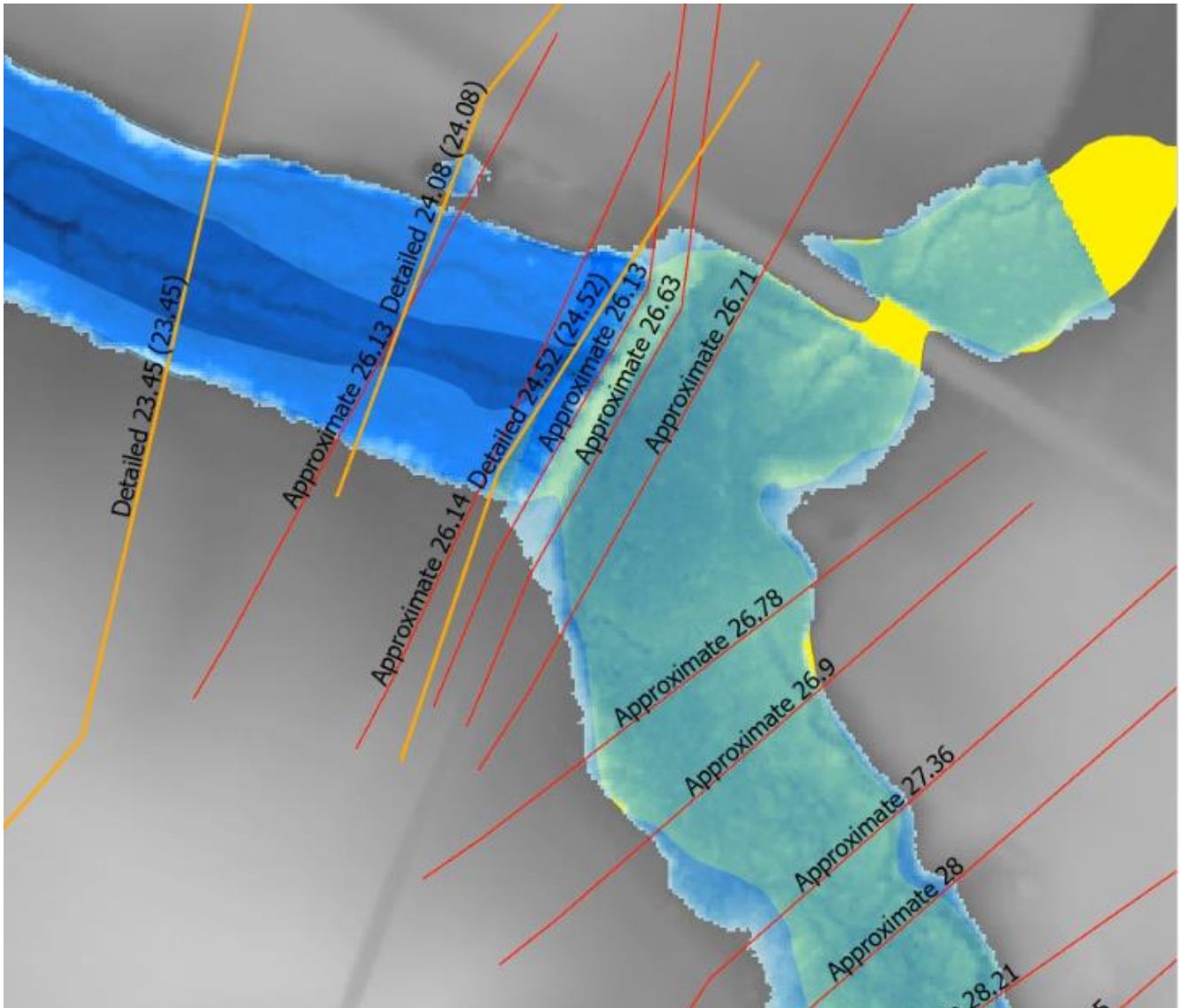


Tidal Process Completed and Posted
Grid Based on Distance from Source



Riverine Areas R-CRAB Developed for Information

Tin and Cross Section Based on Interpolating Between XS



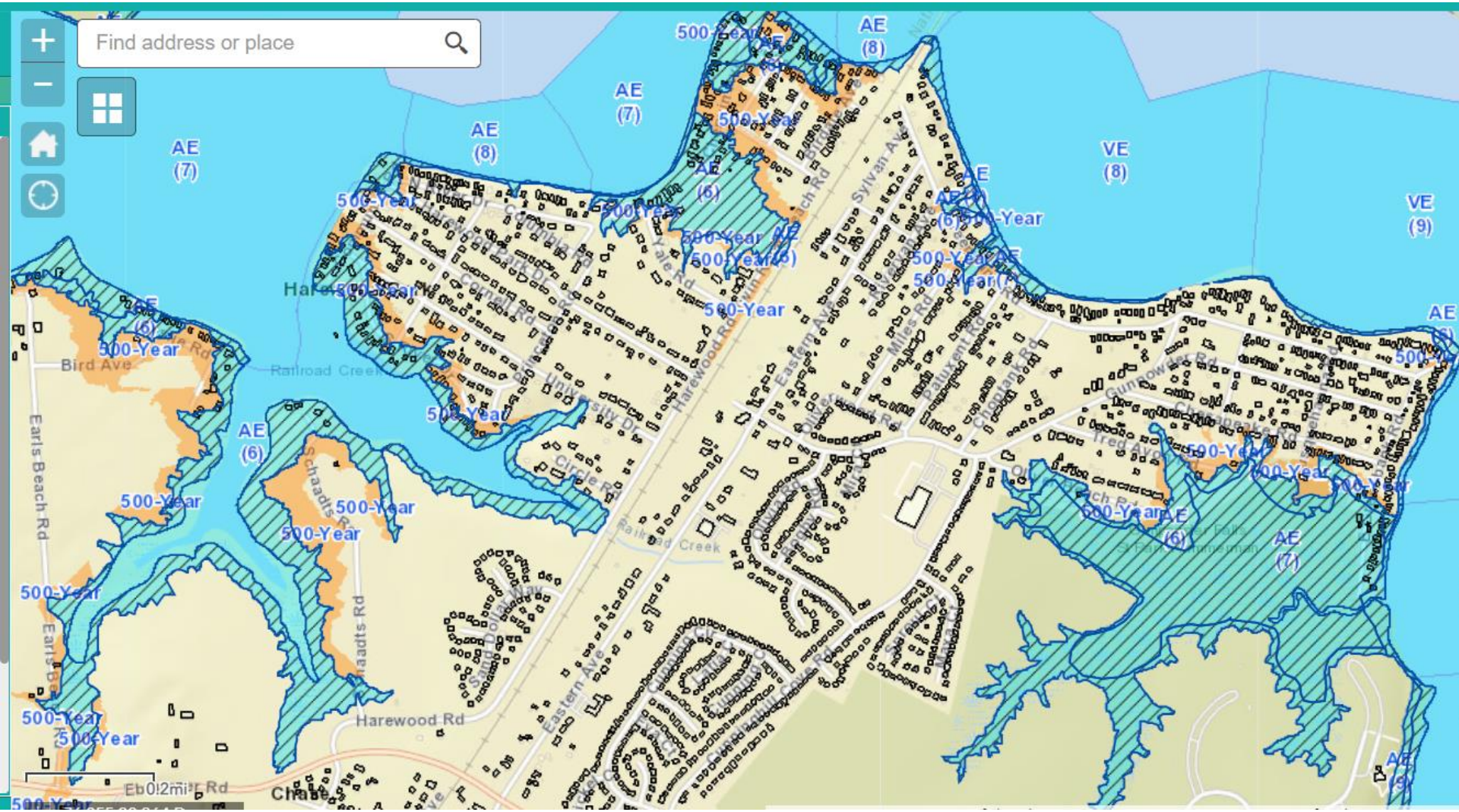
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Upon Completion …

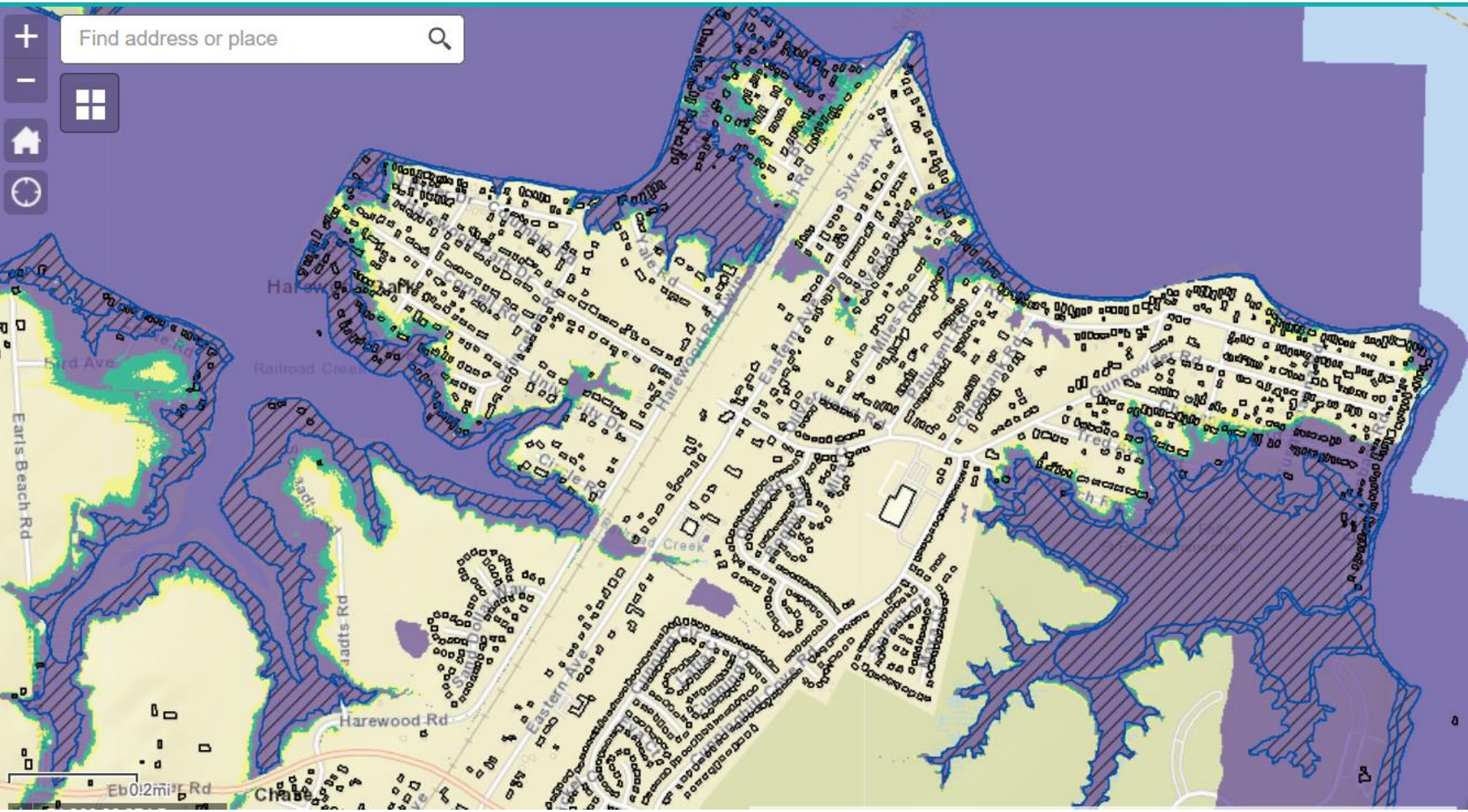
- Statewide 2-foot and 3-foot Depth Grids
- Statewide Freeboard Layer with wider Horizontal Limits (FFRMS ?)
- White Paper that explains GIS processes used via model builder (Internal Edits Underway)
- Map and Data Layer Available for Any Community to Adopt Higher Standards (Several Counties Have Inquired)

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Existing 100-year Floodplain
in Tidal Area with Building Footprints



Maryland CRAB / 100-year + 3 ft
(Federal Flood Risk Management Standard)



Comparing the Results

- Number of Buildings in 100-year Floodplain
- Number of Buildings in 100-year + 3 feet
  - FFRMs / Maryland CRAB
- On Average FFRMS / Maryland CRAB
  - 70 % Higher than 100-year Floodplain
- Why ? (general observation)
  - People Still Like the Water
  - People Don't Like to Pay for Insurance

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Coastal Floodplain Comparing the Results …

Coastal 100-year floodplain: 40,336 building footprints

Coastal 100-yr + 1 foot: 49,117 buildings / 21.8% over 100-year

Coastal 100-yr + 2 foot:57,498 buildings / 42.% over 100-year

Coastal 100-yr + 3 foot: 64,031 buildings / 59 % over 100-year

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Riverine Flooplain
Comparing the Results …

Riverine 100-year floodplain: 13,908 building footprints

- **Riverine 100-yr + 1 foot: 17,881 buildings / 28.5 % over 100-year**
- **Riverine 100-yr + 2 foot: 21,597 buildings / 55% over 100-year**
- **Riverine 100-yr + 3 foot: 25,726 buildings / 85% over 100-year**

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Riverine Floodplain
Comparing the Results …

Combined Coastal and Riverine 100-year floodplain: 54,244 building footprints

Combined Coastal and Riverine + 1 foot: 66,998 buildings / 23.5 % over 100-year

- **Combined Coastal and Riverine + 2 foot: 79,095 buildings / 45 % over 100-year**
- **Combined Coastal and Riverine + 3 foot: 89,757 buildings / 69 % over 100-year**

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Comparing the Results (By County)

Number of Buildings Affected by County

County	Coastal BFE	Coastal BFE Plus 3	Riverine BFE	Riverine BFE Plus 3	Combined BFE	Combined BFE Plus 3	% Increase
Allegeny	N/A	N/A	1062	2077	1062	2077	95
Anne Arundel	4635	8473	389	898	5024	9371	86
Baltimore	3344	5517	454	947	3798	6464	70
Baltimore City	204	396	433	759	637	1155	81
Calvert	989	1330	6	16	995	1346	35
Caroline	168	400	390	675	558	1075	92
Carroll	N/A	N/A	652	1031	652	1031	58
Cecil	931	1445	429	715	1360	2160	59
Charles	689	1562	214	392	903	1954	116
Dorchester	3401	4161	35	115	3436	4276	25
Frederick	N/A	N/A	1734	2578	1734	2578	49
Garrett	N/A	N/A	385	732	385	732	90
Harford	248	469	511	1134	759	1603	111
Howard	N/A	N/A	611	1253	611	1253	105
Kent	969	1549	50	83	1019	1632	60
Montgomery	N/A	N/A	353	945	353	945	167
Prince Georges	35	98	4210	6652	4245	6750	59
Queen Annes	1997	4193	7	33	2004	4226	110
Somerset	5488	6050	0	21	5488	6071	11
St Mary's	2115	3736	129	254	2244	3990	78
Talbot	2799	6907	13	113	2812	7020	150
Washington	N/A	N/A	1356	2299	1356	2299	70
Wicomico	1528	2694	220	814	1748	3508	100
Worcester	10796	15051	265	1190	11061	16241	47
Statewide	40336	64031	13908	25726	54244	89757	68

Rough Risk Estimates

- **Currently – Maryland has about $ 15 Billion Property Insured via the NFIP (from CIS)**
- **Adding 20% for property inside the floodplain that do not have a mortgage / Estimate $ 18 Billion within exiting 100-year Floodplain …**

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Rough Risk Estimates

- **Extrapolating the numbers …**
- **$ 30.6 Billion at Risk within 100+3 ft. statewide (70 % Increase over $ 18 Billion)**
- **Then Add:**
  - **Increased damages (depths)within the Floodplain**
  - **Riverine Areas with less than 1.0 Square Mile**
  - **Areas with undersized or aging storm drains**
  - **Pluvial Areas**
  - **Areas below High Hazard Dam**

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Questions / Comments

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