

FEMA MAP MODERNIZATION in the U. S. Virgin Islands

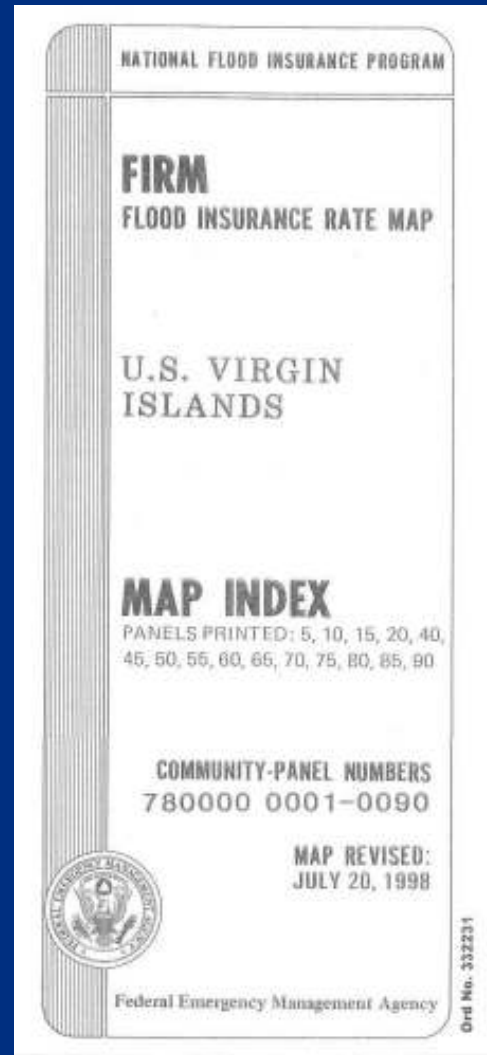


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Community Mitigation Branch
FEMA Region II
June 22, 2006

FEMA MAP MODERNIZATION

- WHAT?
- WHY?
- WHO?
- WHEN?
- WHERE?
- HOW?



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Flood Map Modernization

- Seeks to ensure accurate depiction of flood hazards in areas of high risk
- U.S. Virgin Islands is an area of high flood exposure:
 - 2,202 policies in force in U.S. Virgin Islands (\$308 Million in coverage)
 - \$1.6 Million in annual premium payments
 - 1,552 closed paid losses in U.S. Virgin Islands (\$39 Million in payments)
- Subject to storm surge flooding from Tropical Cyclones
- Subject to hydrologic flooding associated with Tropical Cyclones and severe storms



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What is the FEMA Flood Map Modernization Program?

- FEMA Map Mod is a \$750 Million + program to provide reliable flood maps and data to support the National Flood Insurance Program (NFIP)
- Over 20,000 communities nationwide participate in the NFIP.
- The Multi-Year Flood Hazard Identification Plan (MHIP) details FEMA's 5-year plan for providing updated digital flood hazard data and maps for areas with flood risk. The completion of flood map updates initiated in the plan extends to 2010.
- Map Mod transforms the Nation's flood maps into more reliable, easier-to-use, and readily available digital maps.



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Multi-Year Flood Map Modernization Plan (MHIP)

- Details FEMA's 5-year plan for providing updated digital flood hazard data and maps for areas with flood risk
- The updated digital maps are easier to use and maintain than the existing maps, which are mostly paper.
- They are also easier and less expensive to update.
- The completion of flood map updates initiated in the plan extends to 2010.



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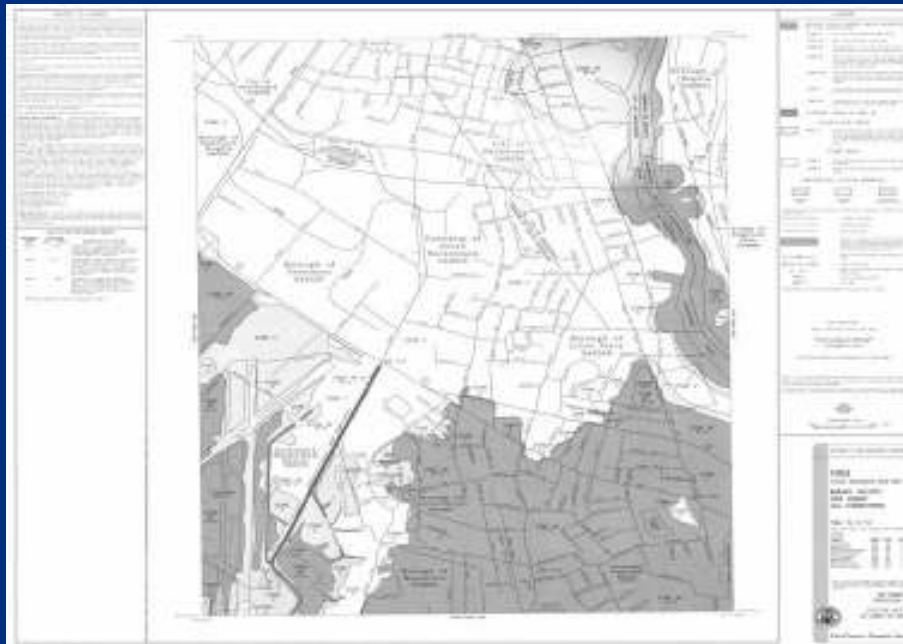
Why Modernize?

- Flood hazard conditions are ever-changing.
- Many existing flood maps may not reflect current conditions or natural changes in the environment.
 - Most existing flood maps are more than 10 years old.
- New maps can take advantage of revised data and improved technologies for identifying flood hazards.
- Up-to-date maps more closely identify actual risk.
- Local communities and various stakeholders desire more timely updates of floodplain maps and easier access to the data

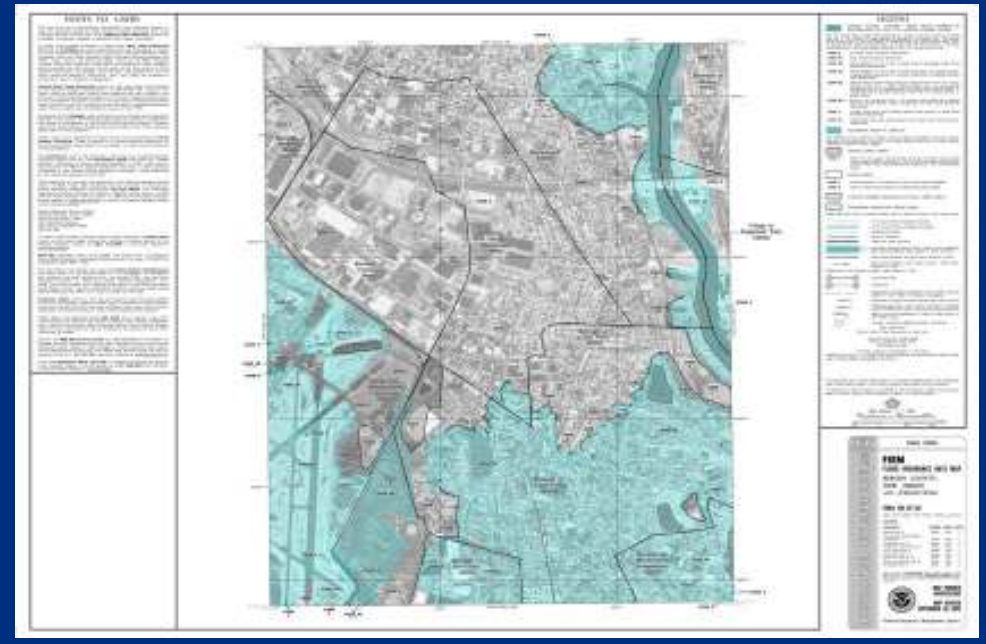


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DFIRMs are a significant improvement over current FIRMs



Old FIRM



New DFIRM



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Who will make it happen?

- Map Modernization is a collaborative effort that cuts across all levels of government and includes other organizations.
- Data is shared with other Federal agencies.
- The FEMA-contracted National Service Provider, known as the Mapping On Demand Team, will improve consistency throughout the Nation and streamline the goals of Map Modernization through innovation and partnerships.
 - Michael Baker Engineering is currently the National Service Provider.
- The Cooperating Technical Partners (CTP) Program is a collaboration among qualified NFIP communities, state and regional agencies to maintain up-to-date flood maps and other flood hazard information.



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When ?

- The Map Modernization project began in Fiscal Year 2004.
- Map Mod is a 5 year plan and is scheduled to be completed in Fiscal Year 2010.
- The Map Mod Adoption Process consists of:
 - Presentation of preliminary maps to a community
 - 2 Public Notices in community papers
 - Appeal/Protest period
 - Resolution of appeals
 - Letter of Final Determination
 - Map Adoption
 - Effective Date



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Map Modernization in the USVI

- The end product of Map Modernization is the production of digital flood maps (DFIRMs) that incorporate the latest advanced technologies and the best available data.
- The DFIRM production process consists of:
 - New storm surge and coastal analysis.
 - Redeliniation of all detailed riverine flood analysis.
 - GIS format with DFIRM database.
 - Orthophoto base combining floodway and floodplain data on one map.



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GIS Format

Components of a DFIRM in GIS Format:

- Base map
- Topographic data
- Flood hazard theme
- Metadata
- Flood Insurance Study (FIS) report
- Back-up data (models, etc.)

Special Flood Hazard
Areas

Land Ownership

Transportation

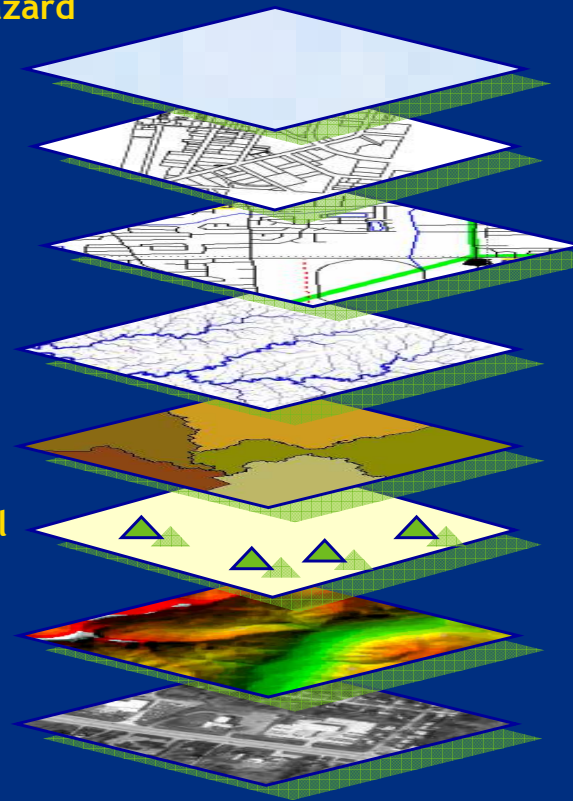
Surface Waters

Boundaries

Geodetic Control

Elevation

Aerial Imagery



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Coastal Restudy Scope of Work

- Coastal Restudy Summary:
 - The current Effective study did not evaluate hazard risk from waves in detail
 - There is a significant increase of coastal 1% annual chance water surface elevations
 - V Zones are now delineated throughout all three islands



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Components of the Coastal Restudy

- **New Stillwater Elevations (SWEL)**
 - Derived from the USACE's state-of-the-art ADCIRC (Advanced CIRCulation Storm Surge Model) and EST (Empirical Simulation Technique).
 - ADCIRC is a GIS based model.
 - Storm surge elevations modeled for actual and historical storms such as:
 - Donna (1960)
 - Hugo (1989)
 - Lenny (1999)
 - EST used to derive 100 year (and other return periods) storm surge elevations from the modeled ADCIRC results.
 - Wave Setup (piling up of water) added to Stillwater Elevations.
 - Offshore reef systems taken into account



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Components of the Coastal Restudy

(Continued)

- Updated Erosion Analysis
 - Storm-induced erosion only.
- Updated Inland Wave Propagation Analysis
 - Wave heights determined using the WHAFIS 3.0 (Wave Height Analysis for Flood Insurance Studies) computer model.
 - Uses basic approximations for wind speeds, wave breaking criterion, and controlling wave height.
 - Detailed field reconnaissance performed to determine land use.
 - Aerial imagery and GPS used in a GIS (ArcMap) to locate exact shore transect locations.



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Components of Coastal Restudy

(Continued)

- Updated Wave Runup and Overtopping Analysis
 - RUNUP 2.0 computer program is used for runup analysis of mildly sloping shores.
 - ACES (Automated Coastal Engineering System) developed by the USACE is used for runup analysis of vertical or near vertical cliffs.
- Updated Flood Insurance Study and DFIRMs
 - Approximate V and A zones will be replaced with VE and AE zones and Base Flood Elevations determined by the coastal analysis.
 - DFIRMs will use an Orthophoto base.
- CHAMP (Coastal Hazard Analysis and Modeling Program) is a computer program that performs coastal engineering analyses for coastal flood hazard assessment.



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CHAMP

- CHAMP analysis consists of 3 steps:
 - Project Info and Data Entry.
 - Modeling.
 - Summary Graphics and Tables.
- Project Info and Data Entry
 - transect description and general transect characteristics.
 - Transect data entry – enter ground profile and elevation data.
- Modeling
 - Erosion treatment – analysis of transect data for expected storm-induced erosion for quantities and geometries.
 - Wave Height Analysis (WHAFIS 3.0) – analysis of wave heights to establish wave crest elevation.
 - Wave Runup Analysis (RUNUP 2.0) – analysis of wave runup elevation.



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CHAMP

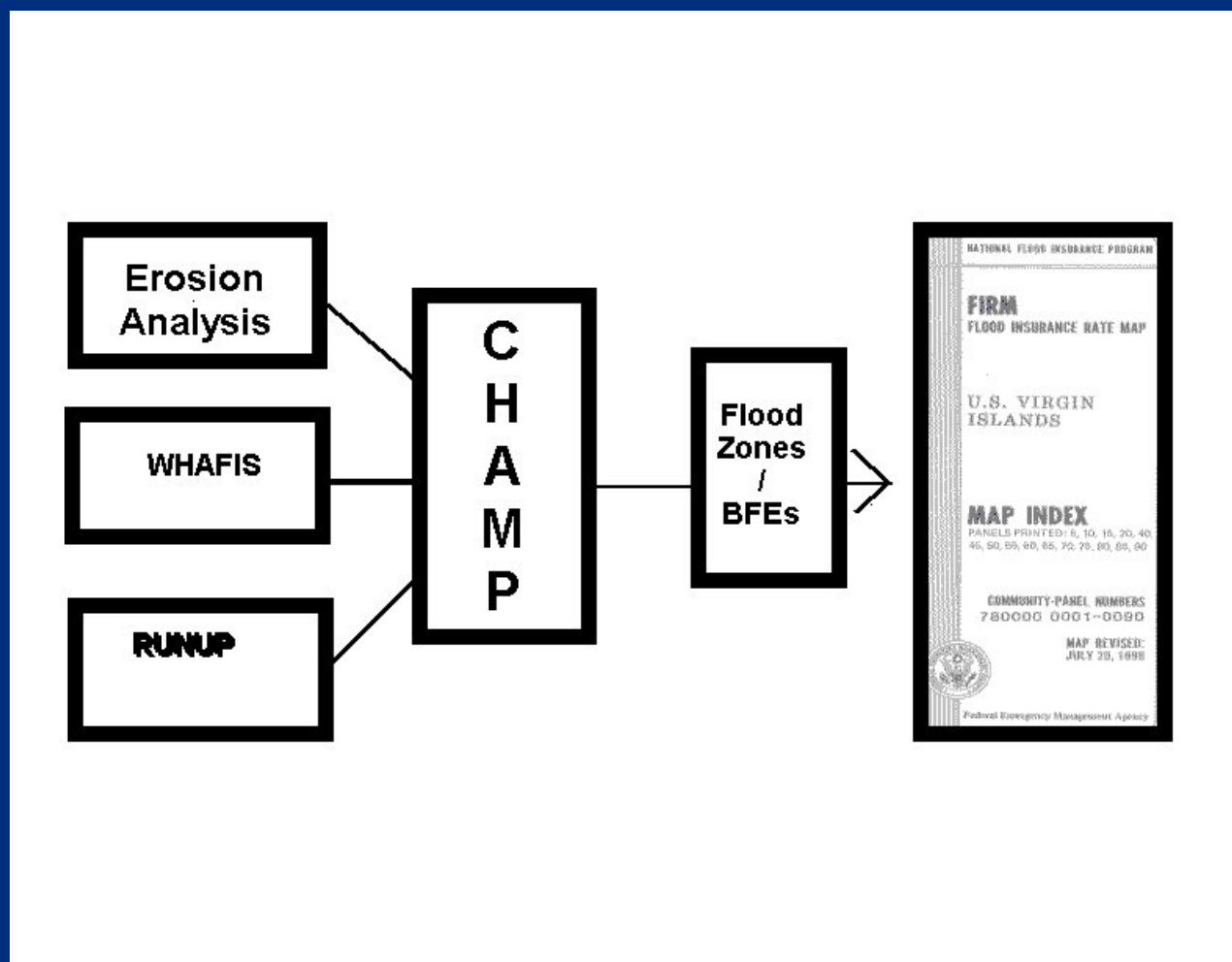
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- Summary Graphics and Tables
 - View the results of the analyses for a selected transect.
 - The tables



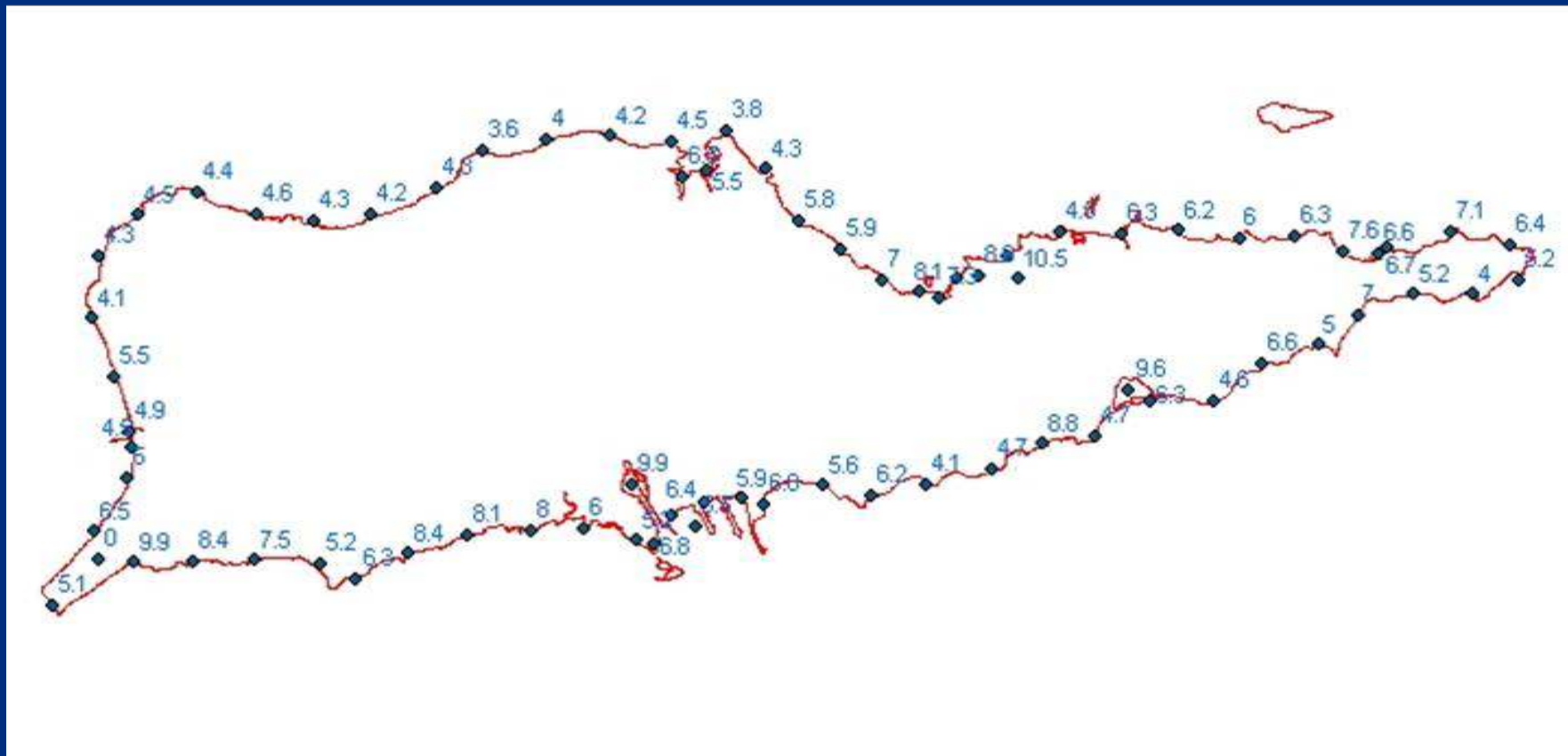
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The Coastal Restudy Process Flowchart



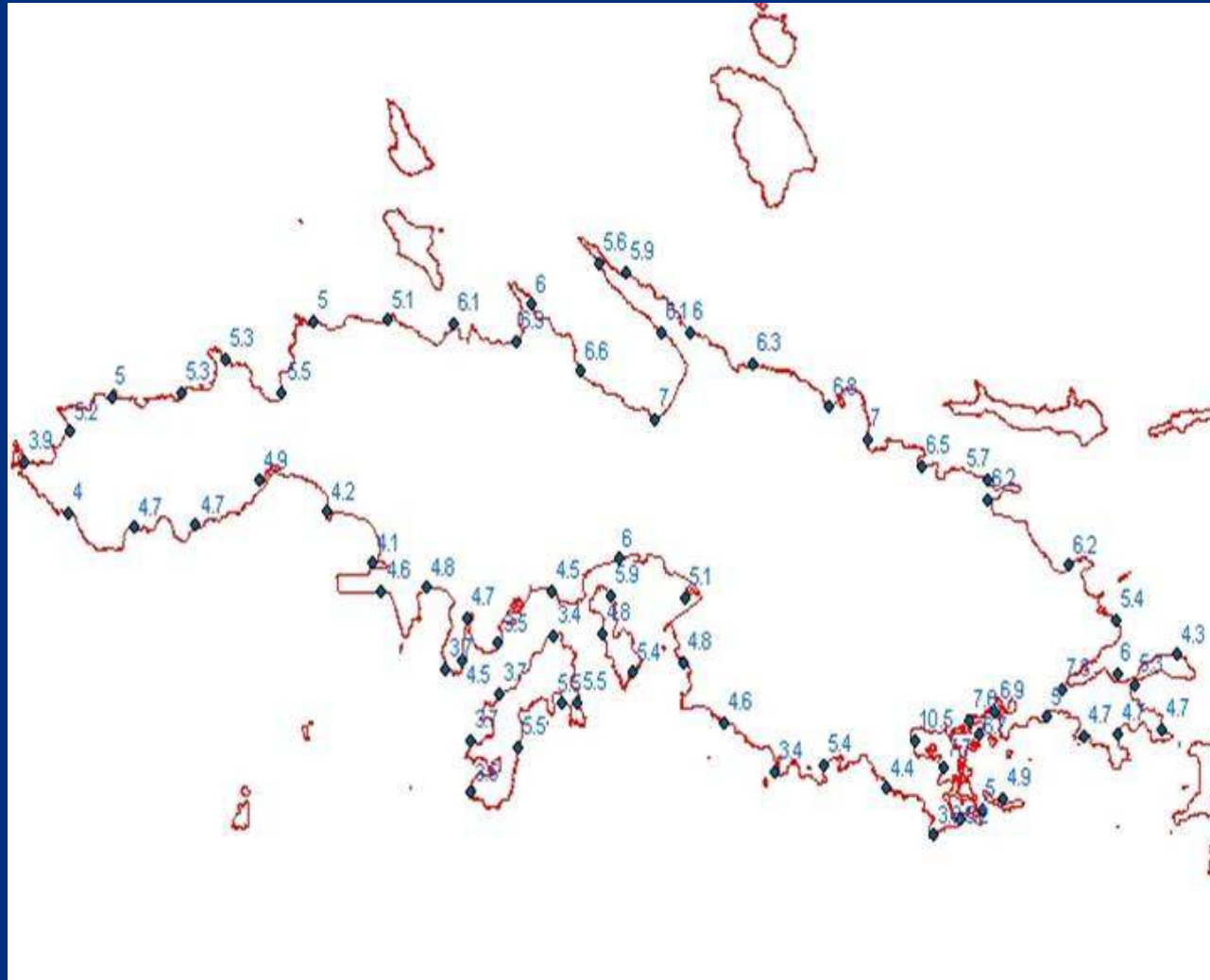
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St. Croix Storm Surge (in feet)



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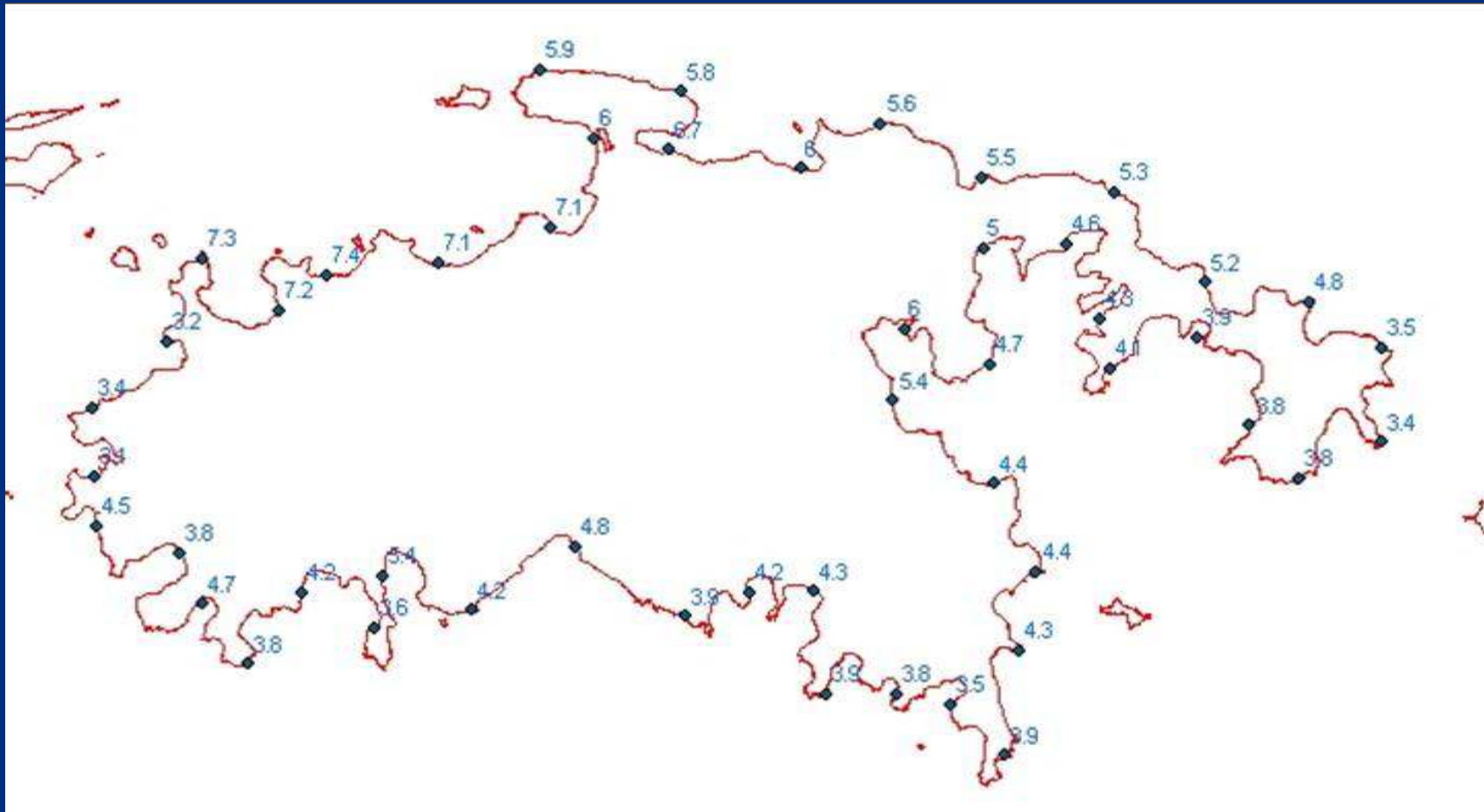
Saint Thomas Storm Surge (in feet)



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Saint John Storm Surge

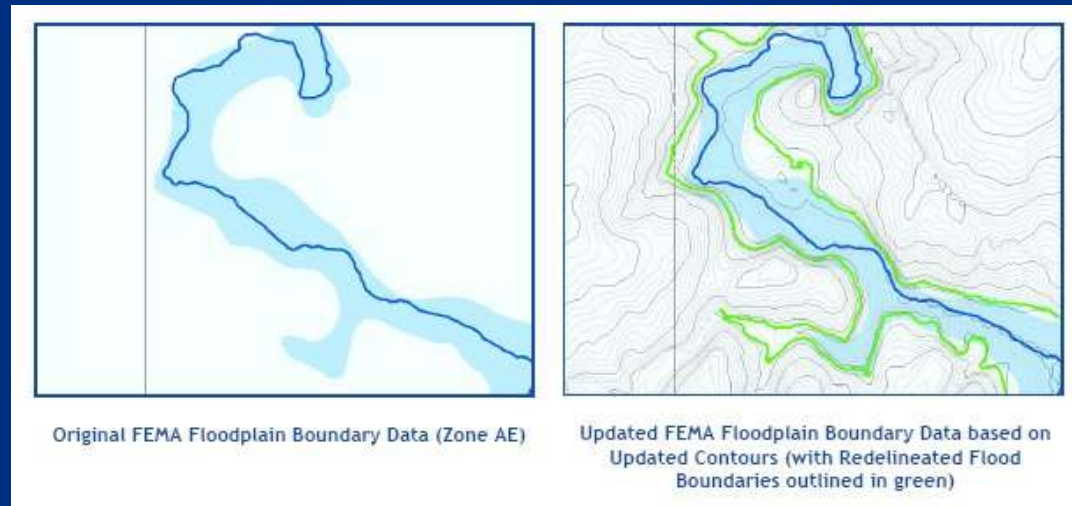
(in feet)



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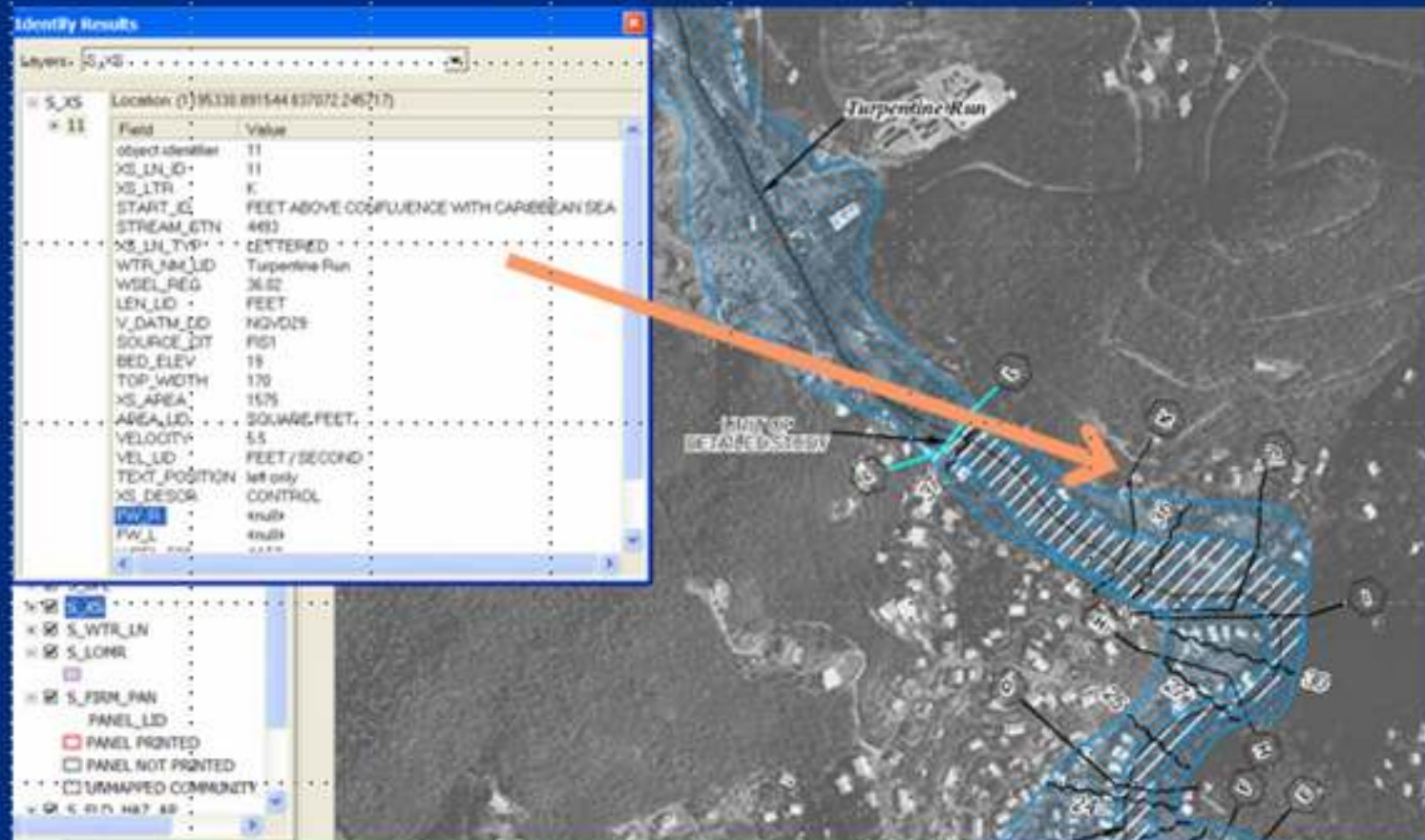
Riverine Analyses Overview

- Riverine Flood Hazard Zones were determined by using Redelineation.
- Redelineation defines new flood hazard zones by incorporating the best available topography into existing floodplain boundaries, modifying the flood hazard zones.



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DFIRM Database



Example of a DFIRM Transect Database Record



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Preliminary Maps

- After flood hazard zones have been extracted from Coastal and Riverine Analyses, Preliminary Maps are prepared and formatted into preliminary DFIRMs.
- The Preliminary Maps are presented to the community representatives and the Post Preliminary phase of Map Modernization commences.



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Post Preliminary Map Process

- Preliminary (draft) maps and study for the USVI issued 02/21/2006.
- These maps and study present new Base Flood Elevations.
- These elevations will be published twice in local newspapers to notify property owners of update.



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Post Preliminary Map Process

(Continued)

- Following second publication date, 90-day Appeal Period begins
 - Anyone may register an appeal against preliminary maps, but must be made through U.S. Virgin Islands
 - Appeal must be based on scientific grounds or technical information
- When appeals are resolved, or if there are no appeals, a Letter of Final Determination will be issued by FEMA
 - Territory has six months from date of letter to amend local law to reference the new map
 - New BFEs become rule-making document for flood insurance and floodplain management
 - Final printed maps, study, and digital data distributed to users



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Post Preliminary Processing

■ Summary of Map Actions

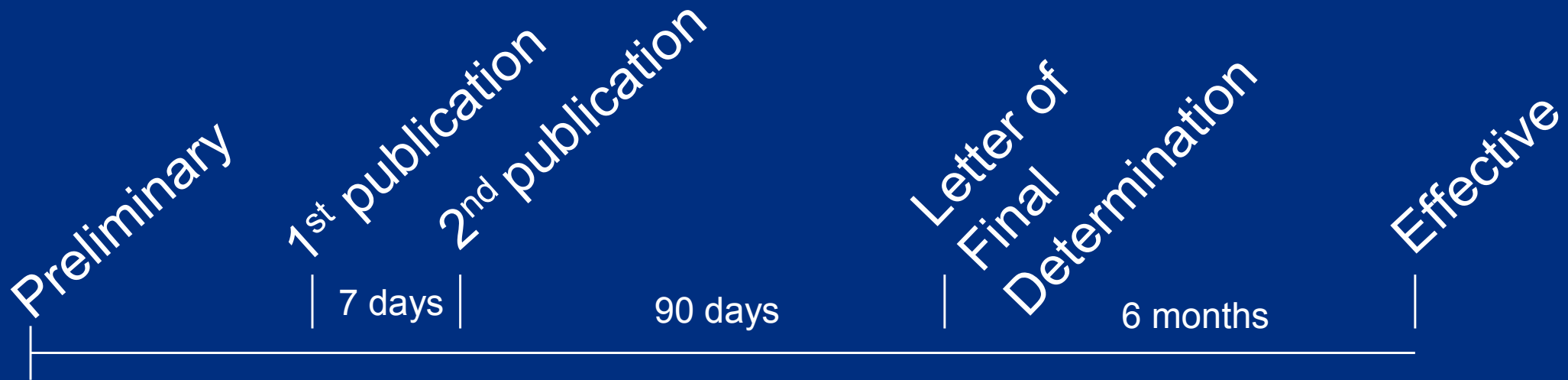
■ Background

- FEMA periodically issues Letters of Map Change (LOMCs)
 - These may be Letters of Map Amendment (LOMAs) or Letters of Map Revision (LOMRs)
- LOMCs are legally binding changes to the map
- Many LOMCs are not typically reflected in the new FEMA maps due to scale constraints
- Some LOMCs are superceded when a new map is issued
- Summary of Map Actions contains assessment of all existing LOMCs vis a vis the new FEMA maps



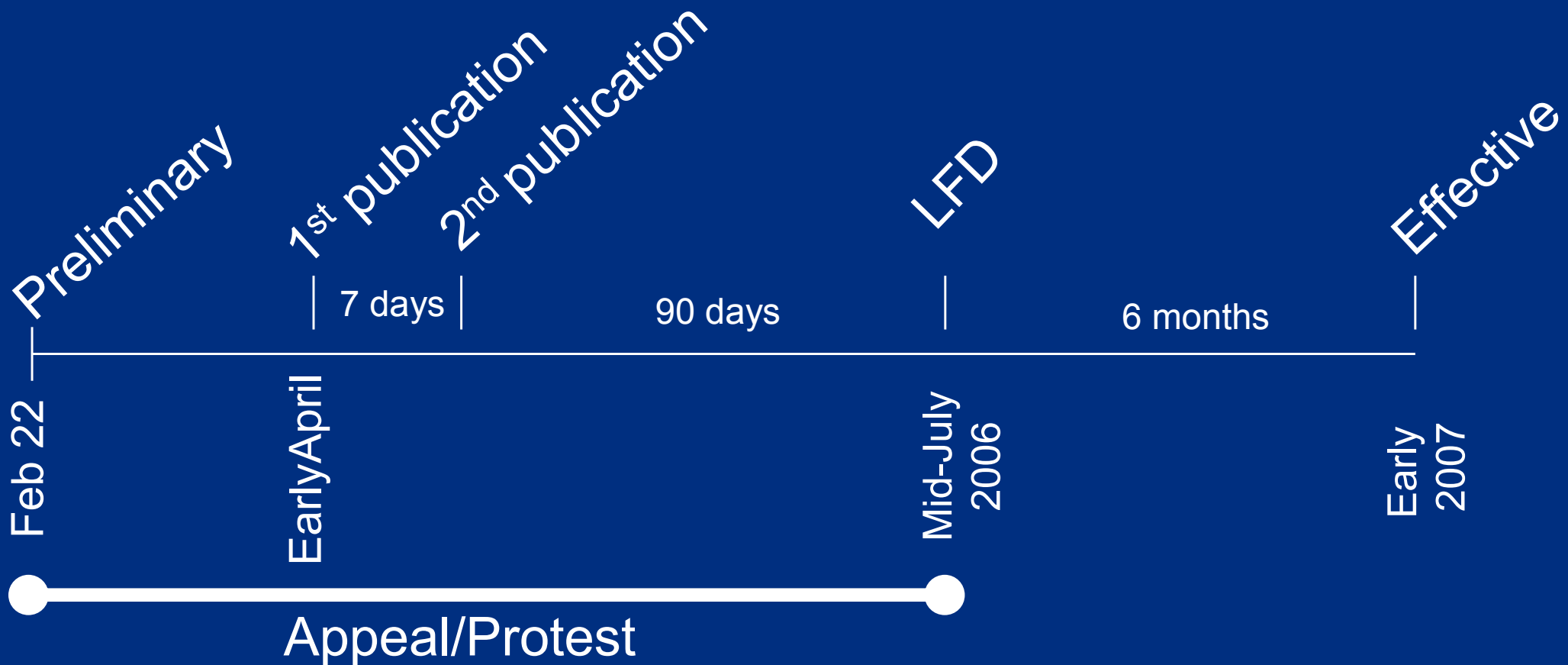
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Post Preliminary Processing Timeline



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Post Preliminary Processing Virgin Islands Timeline



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When do the flood maps become effective?



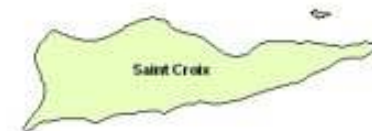
Puerto Rico

Effective 04/19/2005



U.S. Virgin Islands

Effective 01/15/2007



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Conclusions

- The Map Modernization Program will be an important improvement to the identification and management of flood hazards in the nation.
- The benefits of the program include:
 - The use of advanced technologies and better data to identify actual risk.
 - The digital DFIRM format makes the flood hazard maps more reliable, easier-to-use, and readily available for communities, planners, and property owners.
 - Future updates to the DFIRMs will be less cumbersome and more flexible than the older paper maps.
 - Since many of the new DFIRMs utilize orthophoto basemaps, identification of individual structures and other features in relation to flood hazard zones will be more user –friendly.
- The Map Mod Program in the U.S. Virgin Islands represents a significant step forward in the protection of the people and property of the Territory from the threat of wind and flood damage to lives and property.



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