FEMA's Digital Vision and Benefits of Digital Flood Hazard Data

IAFSM Annual Conference ~ March 11, 2009 ~ Champaign, IL
Suzanne K. Vermeer, P.E., CFM
FEMA Region V – Chicago, IL
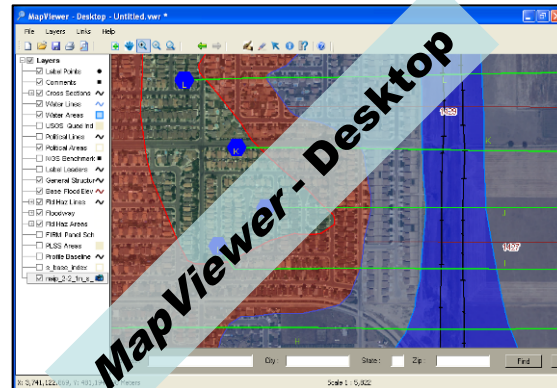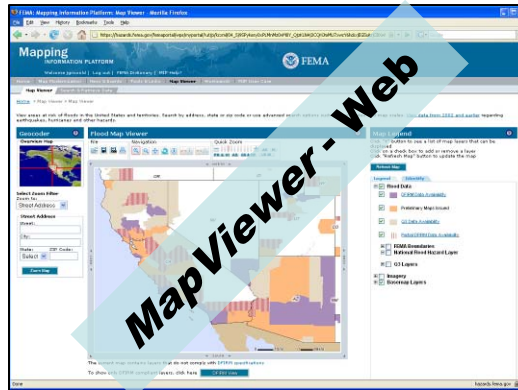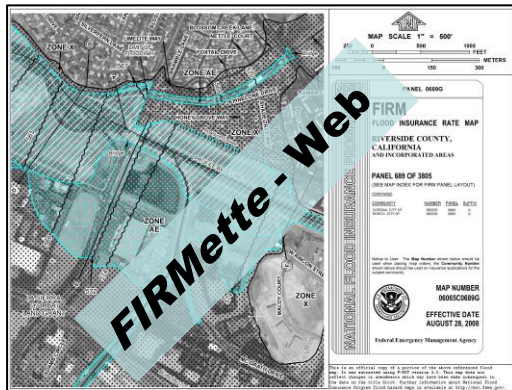
"Risk MAP--Foundation, Transition, Integration"

Digital Map Distribution

- **Beginning on October 1, 2009 customers may order <u>only digital</u> flood hazard reports and data**

- **Notice was posted in Federal Register October 23, 2008**

- **FEMA will continue to provide free digital data to NFIP stakeholders**

- **Overview:**
  - **NFIP and Map Modernization**
  - **What is FEMA's "Digital Vision"?**
  - **What are the advantages of digital flood hazard data?**
  - **FEMA's policy on the use of digital flood data**
  - **What is a DFIRM and the National Flood Hazard Layer (NFHL)?**
  - **What FEMA tools are available to access/view the data?**

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Preview of FEMA Tools

FIRMette - Web

MapViewer - Web

Web Map Services

FIRMette - Desktop

MapViewer - Desktop

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National Flood Insurance Program (NFIP)

The primary goal of the NFIP is to reduce the loss of life and property

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National Flood Insurance Program (NFIP)

- **NFIP is voluntary based on mutual agreement between the Federal government and a local community**

- **If a community <u>adopts</u> and <u>enforces</u> a floodplain management ordinance, Federally-backed flood insurance is available to property owners in the community**

- **NFIP Facts as of 4/30/08 (nationwide)**
  - **Flood policies in force: 5.6 million**
  - **Participating communities: 20,556**
  - **Coverage: $1.1 trillion**

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The NFIP has 3 Main Parts

- **Mapping:** identification of flood hazards

- Floodplain Management: building practices aimed at reducing flood damage

- Insurance: reduce economic impacts

NFIP

Mapping

Floodplain Management

Insurance

- Mapping: Flood Insurance Rate Maps (FIRMs) identify areas with *at least* a 1-percent-annual chance of flooding

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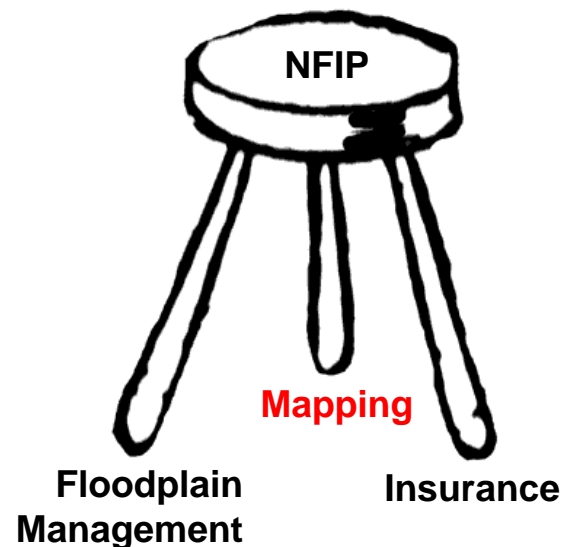
Need for Map Modernization

- **Flood hazards need to be accurately identified**

- **Most existing FIRMs are**

  - **Based on 70's paper mapping technology**
  - **Single layer of map information**
  - **Separate maps for individual communities**
  - **Difficult and costly to change and distribute**
  - **20-30 or more years old**

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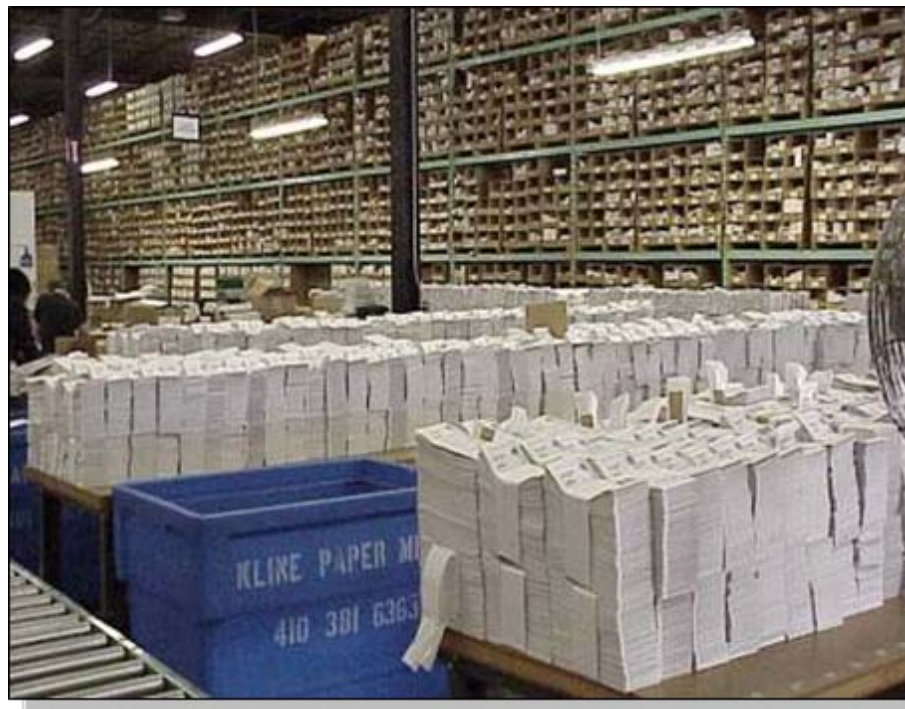
What is Map Modernization?
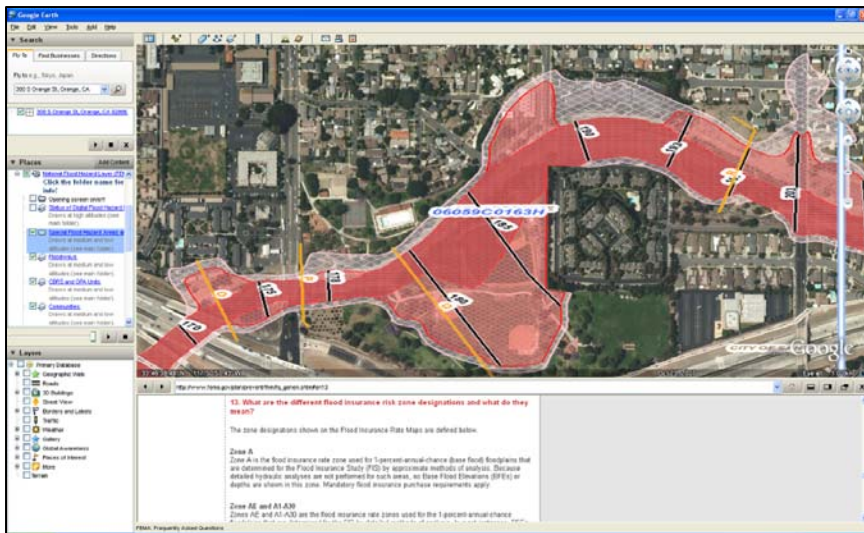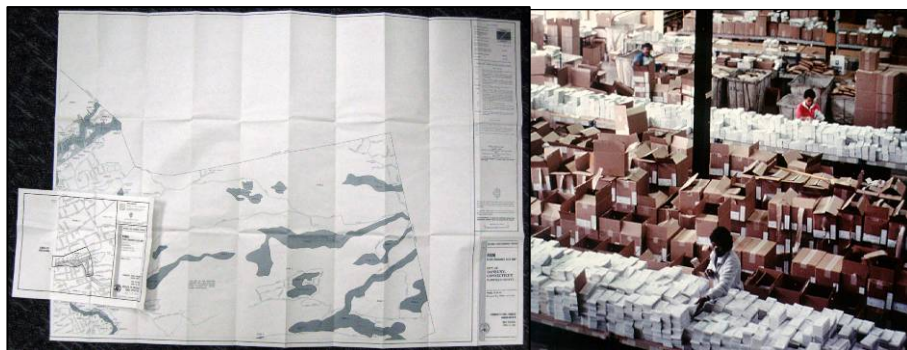
- **5-Year program to modernize FIRMs for:**
  - **92% of population nationwide**
  - **65% of land area nationwide**

- **Map Modernization was funded in Federal fiscal years 2004 – 2008**

- **2008 is the last funding year for Map Modernization**

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What is Map Modernization?

- **Upgrade paper FIRMs to new GIS-based DFIRM format**

- **Create 1 seamless <u>countywide</u> FIS report and DFIRM**

- **Refit the floodplain and floodway data to more current basemap**

- **Incorporate Letters of Map Revisions (LOMRs)**

Street Basemap

- **Convert the vertical reference datum for flood elevation data (NGVD 29 to NAVD 88)**

Elevations in NGVD29 — Elevations in NAVD88

111' NGVD29 (LFE) — 110' NAVD88 (LFE)

109' NGVD29 (BFE) — 108' NAVD88 (BFE)

Flood Elevation
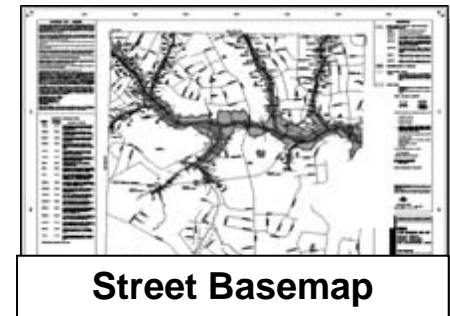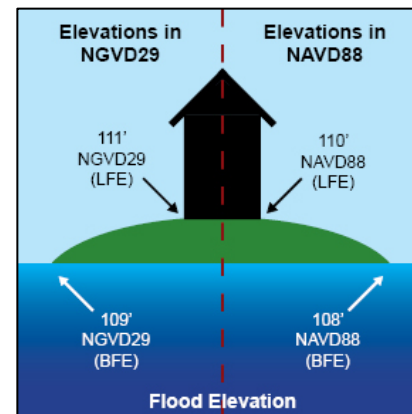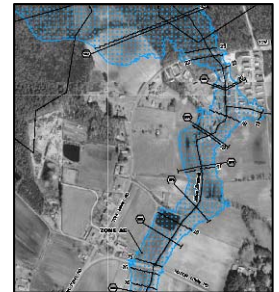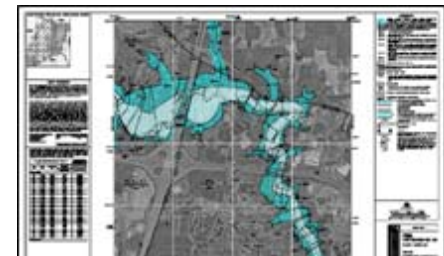
Orthophoto Basemap

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FEMA's Digital Vision

- **Digital flood products are available and easy to use**

- **Stakeholders are aware of the digital products and understand the advantages of the new products**

- **FEMA's production processes are updated to benefit from and focus on digital products**

- **Digital Vision is enabled by FEMA Policy on the *Use of Digital Flood Hazard Data***

FEMA's Digital Vision
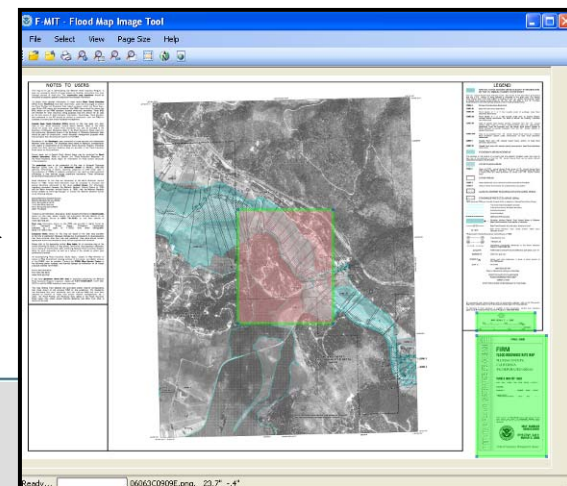
- **Benefits**
  - Reduce the need and demand for paper
  - Provide more outreach to citizens
  - Better integration of data across jurisdictions

- **Goals**
  - Streamlines production of high-quality digital data
  - Updates mapping process
  - More timely data available to customers

For more info, read "Increasing Options with Digital Flood Data" fact sheet

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FEMA's Policy on Use of Digital Flood Data

- **The horizontal location of the special flood hazard area is defined by geographic coordinates shown on a printed FIRM or stored in the DFIRM database**

- **The horizontal location of the flood hazard information is not defined by its relationship to base map features**

- **If there are conflicting interpretations of the precise horizontal location of the areas of special flood hazard, the conflict shall be resolved using the grid coordinates**

No More Paper ...

- **Beginning on October 1, 2009 customers may order <u>only digital</u> flood hazard reports and data**

- **FEMA's MSC will not produce or distribute paper maps or reports on or after this date, other than a single paper copy provided to communities when their maps are updated**

- **Users of paper maps should start planning now to make a transition to digital flood hazard maps and reports**

- **FEMA will convert orders for paper products to the digital equivalent starting on October 1, 2009**

- **No change is anticipated for the distribution of LOMCs**

- **FEMA expects to save $3 to $5 million annually**

FEMA

MSC DFIRM Distribution

- **Prior to DFIRM effective date, the Chief Elected Official (City/Town Mayor or County Council President) of each community receives:**
  - **Hard copy of community FIRM panels**
  - **Hard copy of countywide FIS text/report**
  - **CDs containing:**
    - Digital copy of countywide FIS text/report (.pdf)
    - Digital images of community panels (.png)
    - DFIRM database (GIS data)

- **Digital products will also be uploaded to the MSC**

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Map Service Center (MSC)

- **http://msc.fema.gov**

- **Distribution mechanism for**
  - **Current & Historic Flood Maps (DFIRMs & FIRMs)**
  - **FIS Texts/Reports**
  - **DFIRM & NFHL Databases**
  - **Letters of Map Change (LOMC)**
    - Letters of Map Amendment (LOMAs)
    - Letters of Map Revision (LOMR)
  - **Other Data and Documents**

- **Download tools for viewing DFIRM/NFHL data**

MSC Website

Product Search/ Catalog

Login

DFIRM Database

National Flood Hazard Layer (NFHL)

FIRMette – Desktop **Download**

MapViewer – **Desktop Download**

FIRMette - **Web Tool**

Let's Get Started with the MSC

- **To view MSC products available for a specific address, use the "Product Search by Address" feature**

- **Panels and LOMCs are listed**

- **Click the link in the View column to view panels and create a FIRMette**

Map Item ID	Description	Effective Date	Show LOMC	View	Buy
06059C0443H	ORANGE CO.,UNINC&INC AREAS	02/18/2004	-	🔍	$
LOMC	05-09-0346P-060764	05/05/2005		📄	
LOMC	07-09-0740A-060231	04/12/2007		📄	
LOMC	05-09-0793P-060231	08/31/2006		📄	

Map Panel Search Results

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What is a FIRMette? (*FIRMette* – Web)

- **Select "Make a FIRMette"**
- **Adjust boxes accordingly**
- **Choose output size**
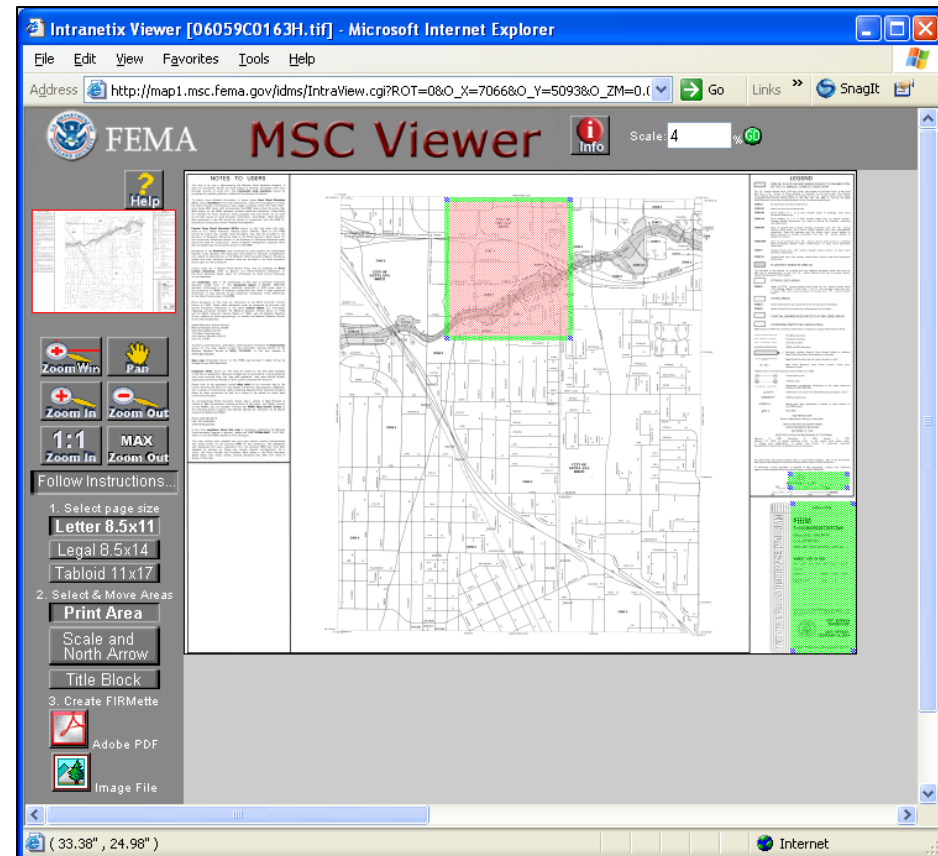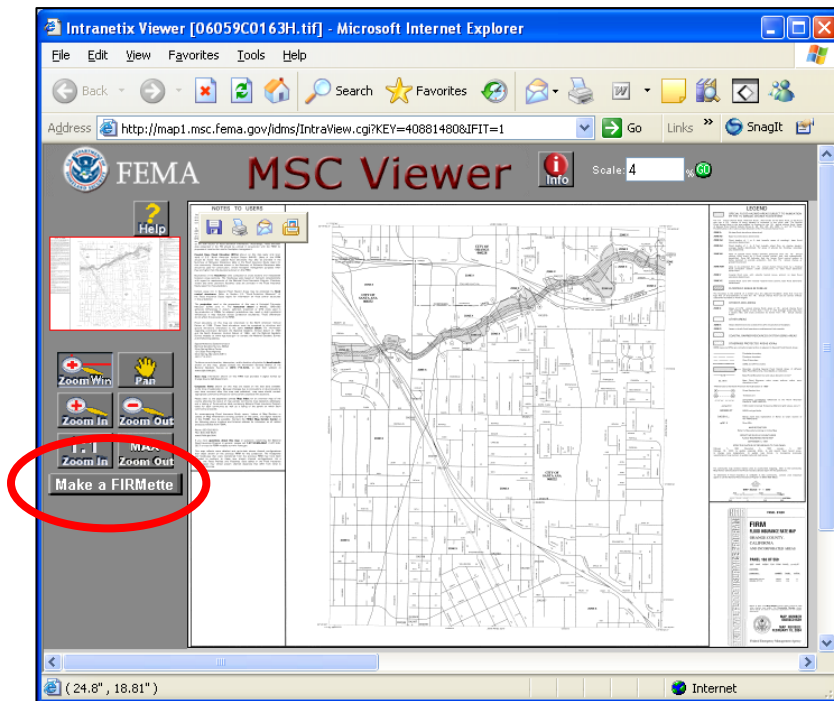
FIRMette – Web

- **Existing Tool**

- **FIRMettes are official**

- **1.1 million FIRMettes downloaded each year**

- **Internet connection required**

- **Most recent FIRM panels in the MSC product catalog are used**
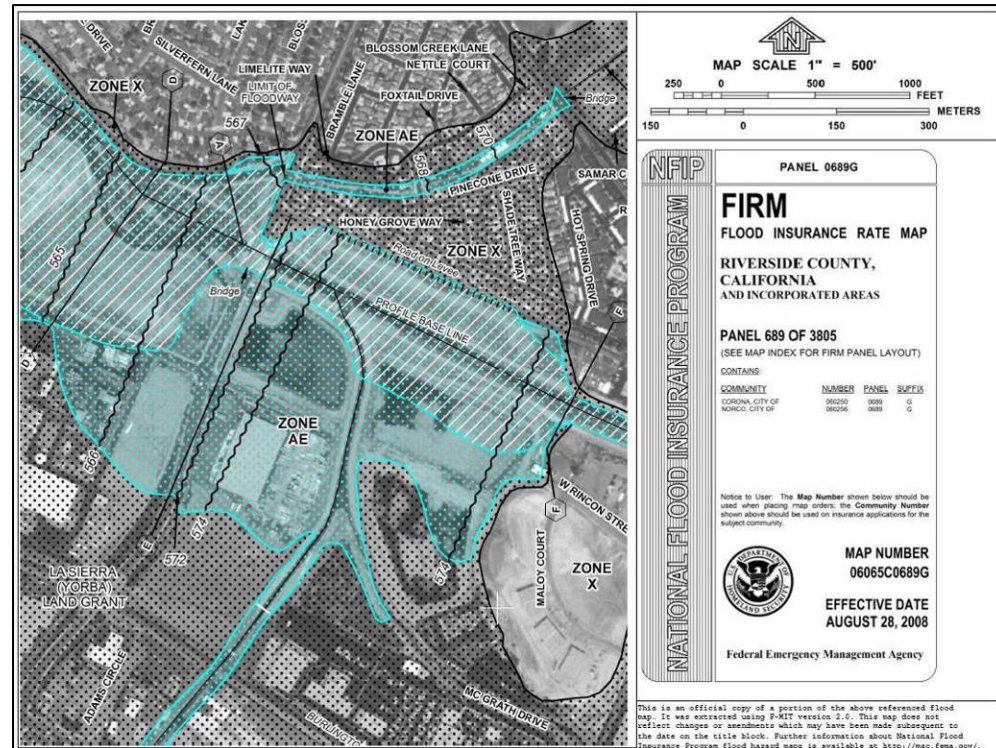
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Creating a FIRMette from Saved DFIRM Images

- *FIRMette* **– Desktop can be downloaded**
  - **http://msc.fema.gov**

FIRMette - Desktop

- **Desktop application for FIRMette creation**

- **Uses locally saved PNG and TIF images**

- **Faster than *FIRMette* – Web**

- **Cannot search by address**

- **Must know DFIRM panel number**
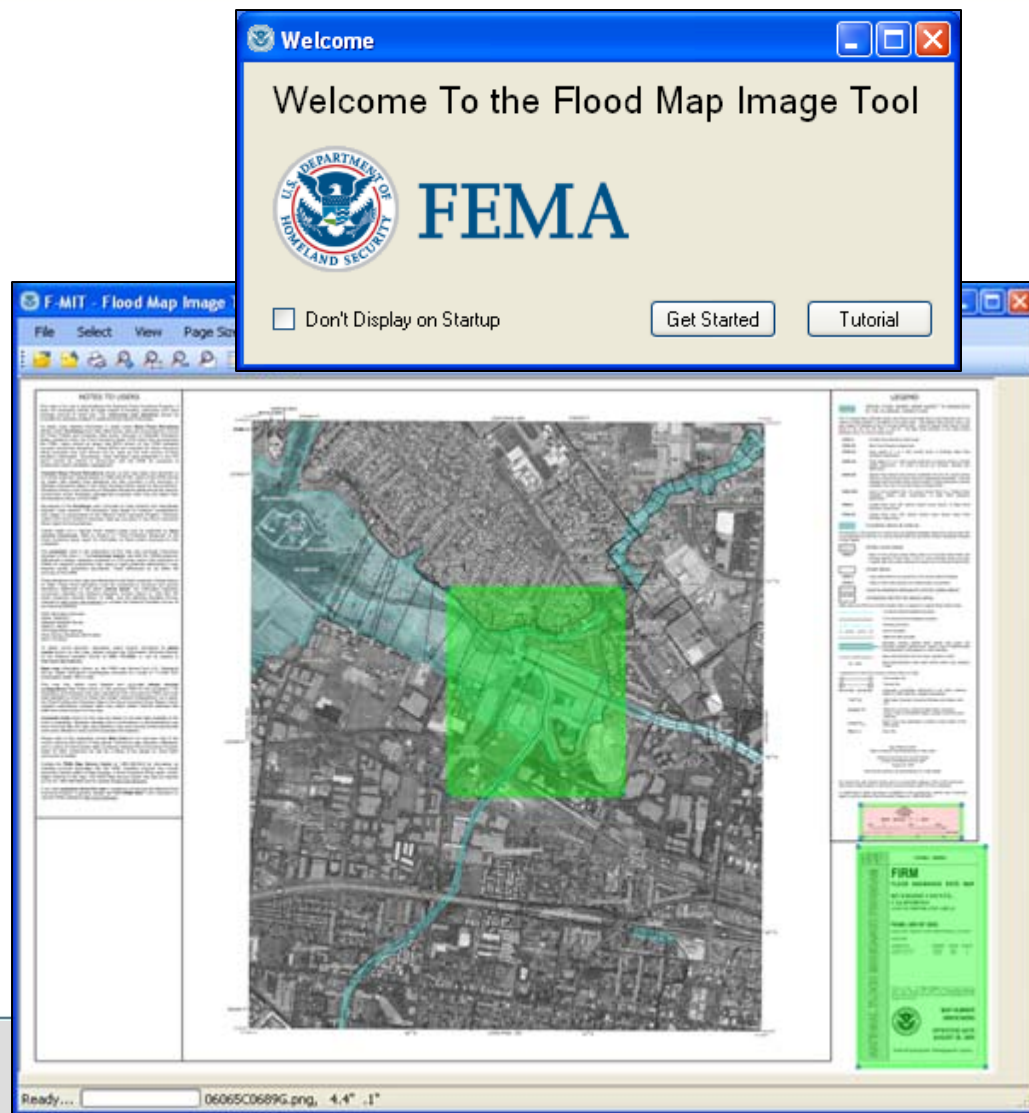
What is a DFIRM?

Flood Insurance Study (FIS)
Text/Report (digital & hard-copy)
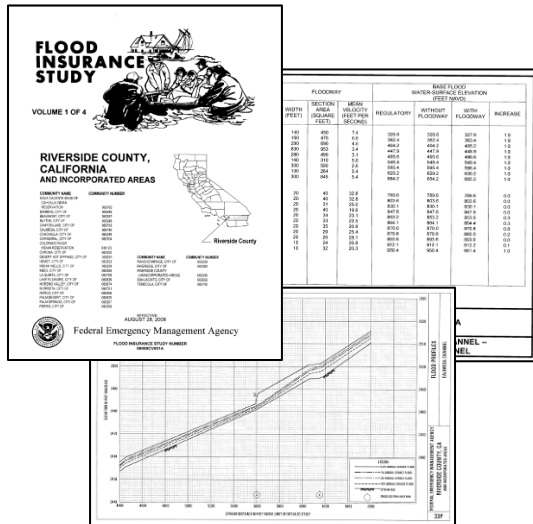
DFIRM Database
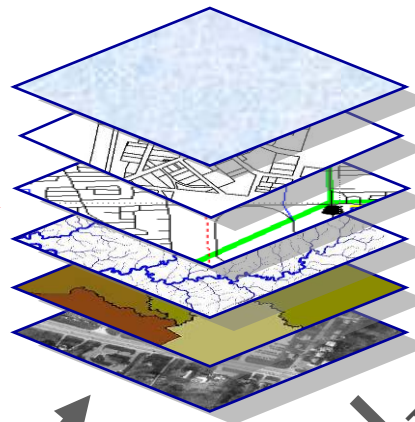
FIRM Panels
(digital & hard-copy)
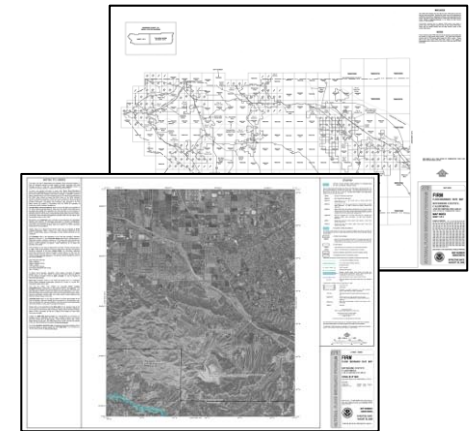
Effective LOMRs sewn into DFIRM prior to effective date

Flood Hazard Layer

Letters of Map Revision (LOMRs)
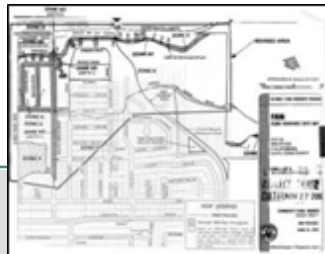
Future LOMRs sewn into NFHL daily
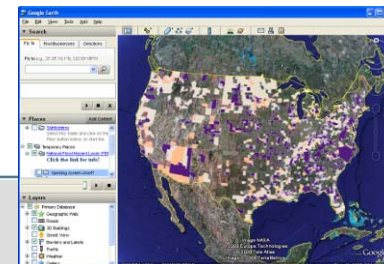
National Flood Hazard Layer (NFHL)

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FEMA's Policy on Use of Digital Flood Data

- **Paper maps, FIRMettes and DFIRM database are interchangeable and equivalent (digital as official)**
  - **Flood zones are defined precisely by geographic coordinates**

- **Allows use of local data with FEMA flood data**
  - **Communities can integrate FEMA flood hazard data with local data without FEMA approval**
  - **Additional responsibility on communities to verify their data meets FEMA's accuracy requirements**

- **Allows for the creation of a National Flood Hazard Layer (NFHL)**

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National Flood Hazard Layer (NFHL)

- **All effective digital flood hazard data for the entire U.S.**
- **New DFIRM and LOMR data sewn in as they go effective**
- **FEMA's online tools for viewing NFHL data always reflect the most current NFHL data**
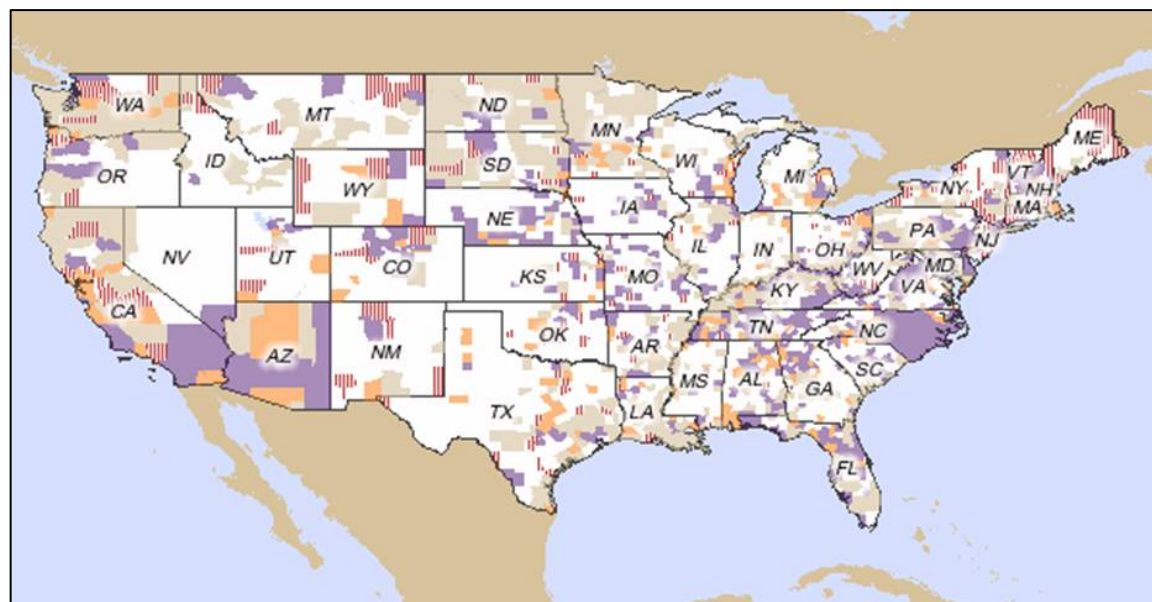
Flood Data

🟪	DFIRM Data Availability
🟧	Preliminary Maps Issued
⬜	Q3 Data Availability
‖‖‖	Partial DFIRM Data Availability

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How Do I View the NFHL?

- **Go to the MSC web site:**
  - **http://msc.fema.gov**
- **Click hyperlink for** *MapViewer* **- Web**

MapViewer – Web

- **Search by address or community name**

Is this Location in a Special Flood Hazard Area?

- **E-Z Identify and E-Z Print tools create flood hazard reports**

- **Flood zone determination is official for Lat-Long coordinates (not address)**

- **FIRM panel information is provided**

Can I get information on a LOMA or LOMR-F? (*MapViewer* – Web)

- **Use Identify tool to select a LOMA**
- **Click hyperlink in legend (if LOMA is online)**

Digital LOMRs are Current and Seamless in the NFHL

- **Revised study**
- **Need to look at two maps using paper FIRM**

Revised by LOMC

Effective FIRM

MapViewer - Web

- **Advantages**
  - View seamless layer of all effective DFIRM data
  - Address search to point on map
  - Can produce a simple report to determine if a clicked point is in a SFHA

- **Considerations**
  - NFHL not available until effective date
  - Does not show local data

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MapViewer - Desktop

- **Downloading *MapViewer* - Desktop**
  - **http://msc.fema.gov**
- **Click on the hyperlink for Desktop DFIRM/NFHL Viewer**

A Non-Proprietary GIS Tool (*MapViewer* - Desktop)

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MapViewer - Desktop
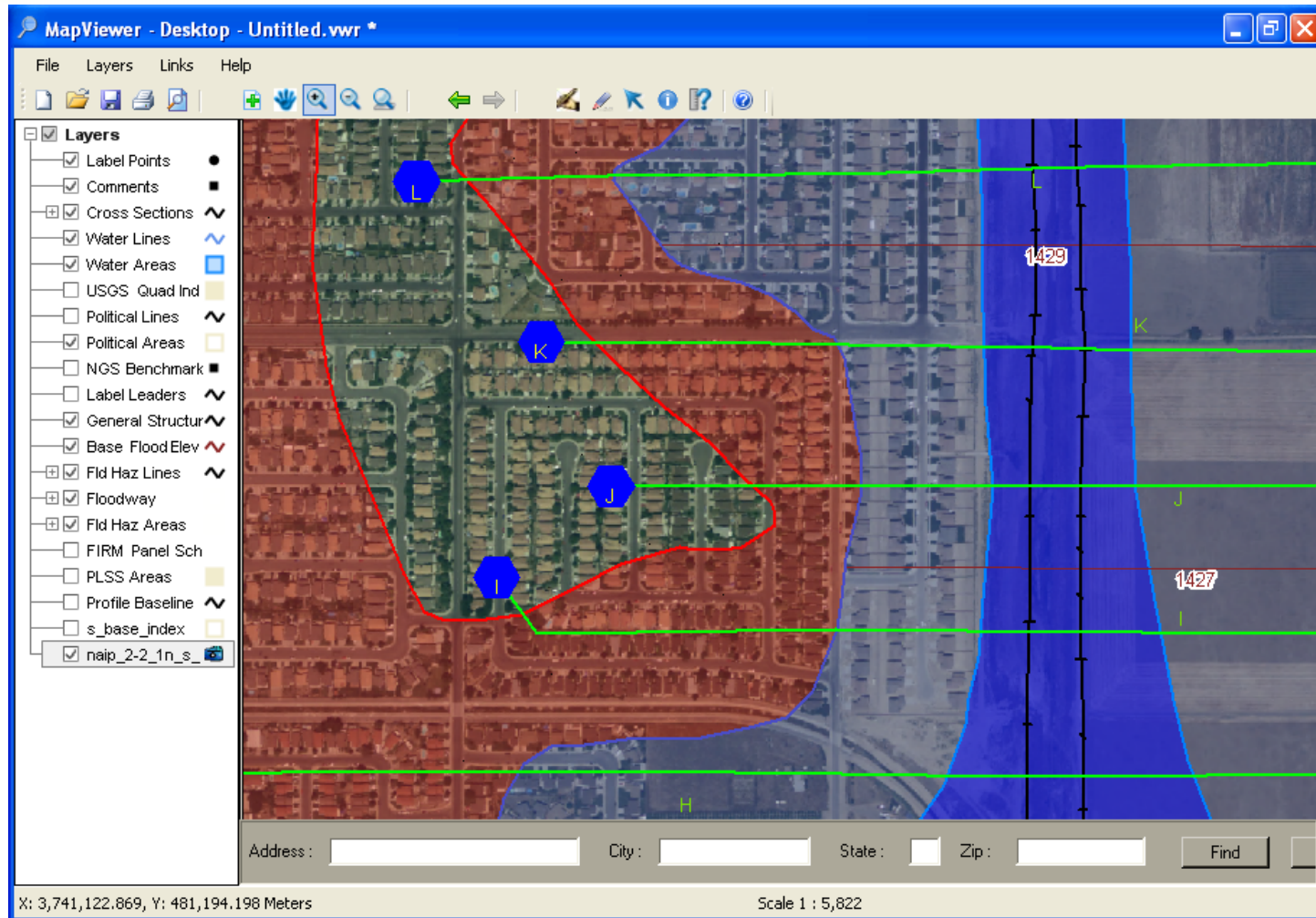
- **Intended for communities to use to comment on a preliminary DFIRM during 30 day comment period**
  - View locally stored DFIRM data
  - Address search to point on map
  - Automatic symbology and labels
  - Add your own imagery

- **Considerations**
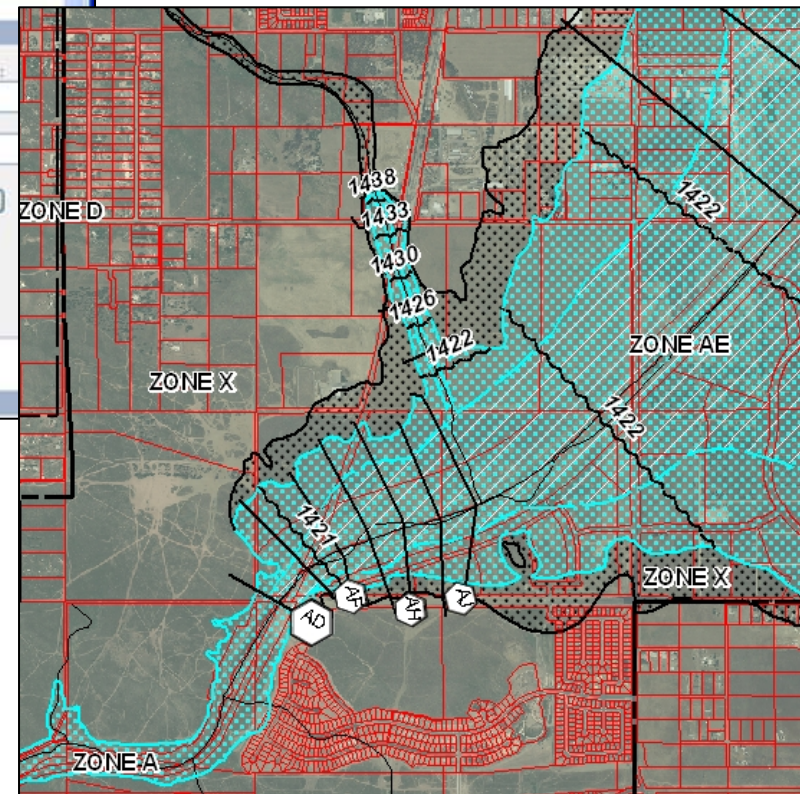 - Was designed as a data review tool, not an analysis tool

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Back to the Basics: Getting the Data

- **Can be purchased on CD**

- **Also available for download on the MSC**

EDDie: Express Document Delivery
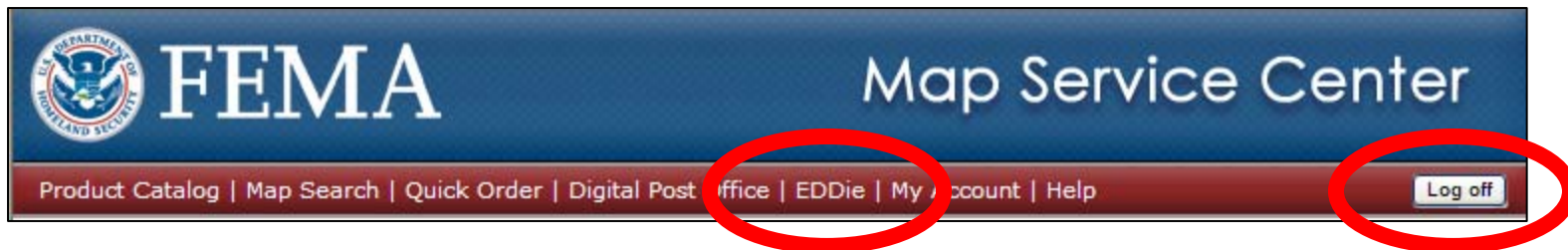
- **For federal, state and local government employees**
- **One account per community**
- **Provides faster and easier access for download of**
  - **Flood Insurance Rate Maps (FIRM)**
  - **DFIRM Databases**
  - **Flood Insurance Studies (FIS)**
  - **Letters Of Map Change (LOMC)**

DFIRM Database Components

- **A DFIRM database is a collection of digital data required to produce a Flood Insurance Rate Map (FIRM)**

- **Important Layers**
  - **Base Flood Elevations**
  - **Cross Section Locations**
  - **Flood Hazard Areas/Lines**
  - **Political Boundaries**
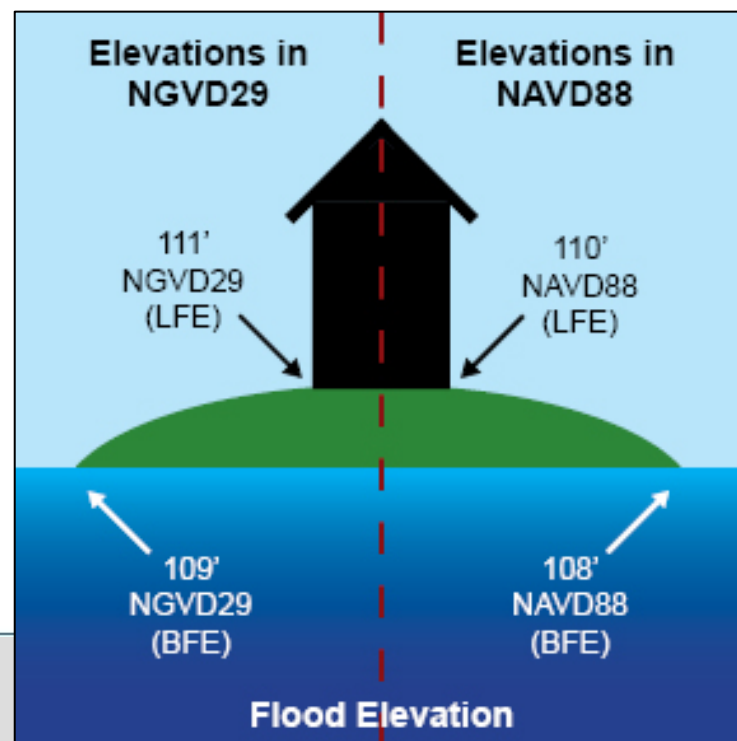 - **Water Areas/Lines**
  - **Basemap**
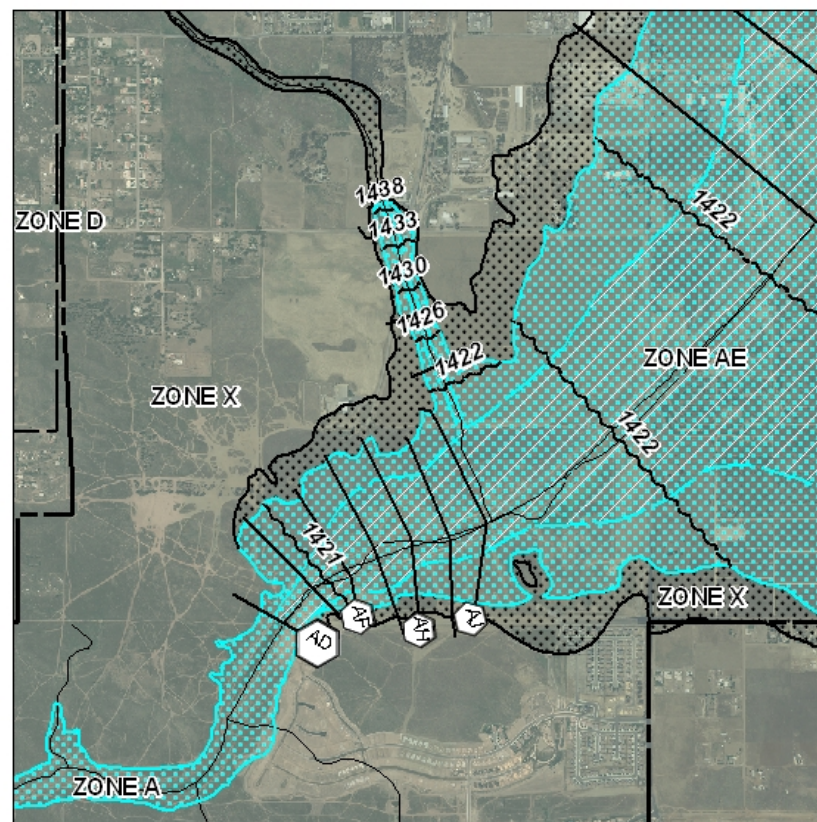
Projection and Datums

- ## DFIRM Projection
  - **UTM or State Plane (projection is chosen by community during scoping)**
  - **Reprojection required to use with other projections**

- ## Datums
  - **NAD83 (horizontal datum)**
  - **NGVD29 to NAVD88 conversion (vertical datum)**
    - Vertical datum elevation changes are relative to each other

Elevations in NGVD29 | Elevations in NAVD88

111' NGVD29 (LFE)

110' NAVD88 (LFE)

109' NGVD29 (BFE)

108' NAVD88 (BFE)

Flood Elevation

- **Effective DFIRM databases are rolled into the NFHL**
  - DFIRM database is a snapshot of the information on the printed map product

- **THE NFHL is updated continually with LOMRs**
  - Updated NFHL GIS data are released monthly

- **NFHL GIS data are delivered on DVD**
  - Order through the MSC
  - No charge for the data

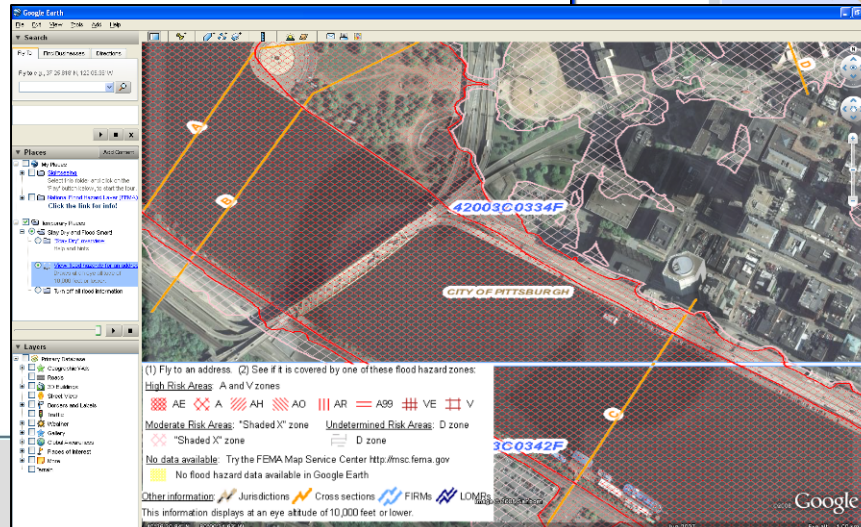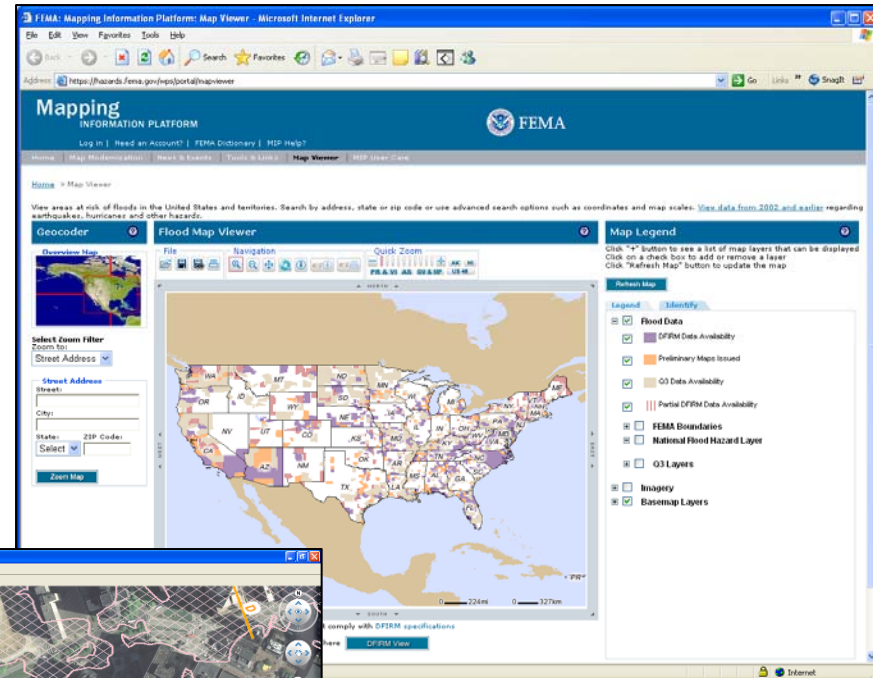- **NFHL is available by State**
  - Order as many as you need

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How do I get NFHL Updates?

■ **Web Map Services (WMS)**

■ **Google Earth**
  - **Two KMZ files available**

Stay Dry KMZ: the Basics
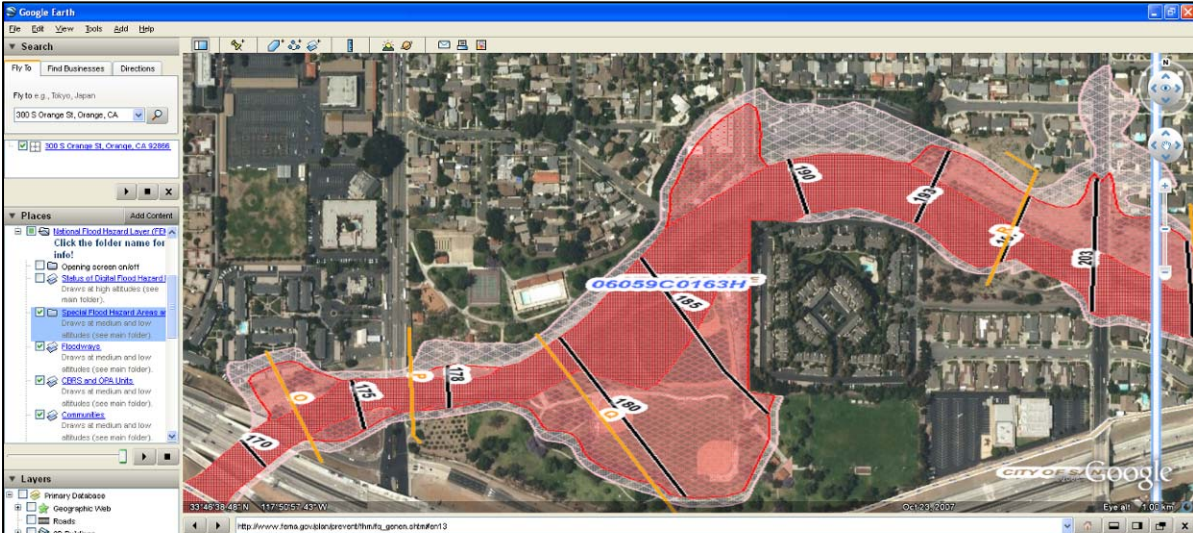
- **Stay Dry KMZ shows**
  - **SFHAs**
  - **LOMRs**
  - **FIRM Boundaries**
  - **Cross Sections**
  - **Jurisdictions**

- **Can't reorder/hide specific layers**

- **Basic floodplain information**

- **Easy to understand**

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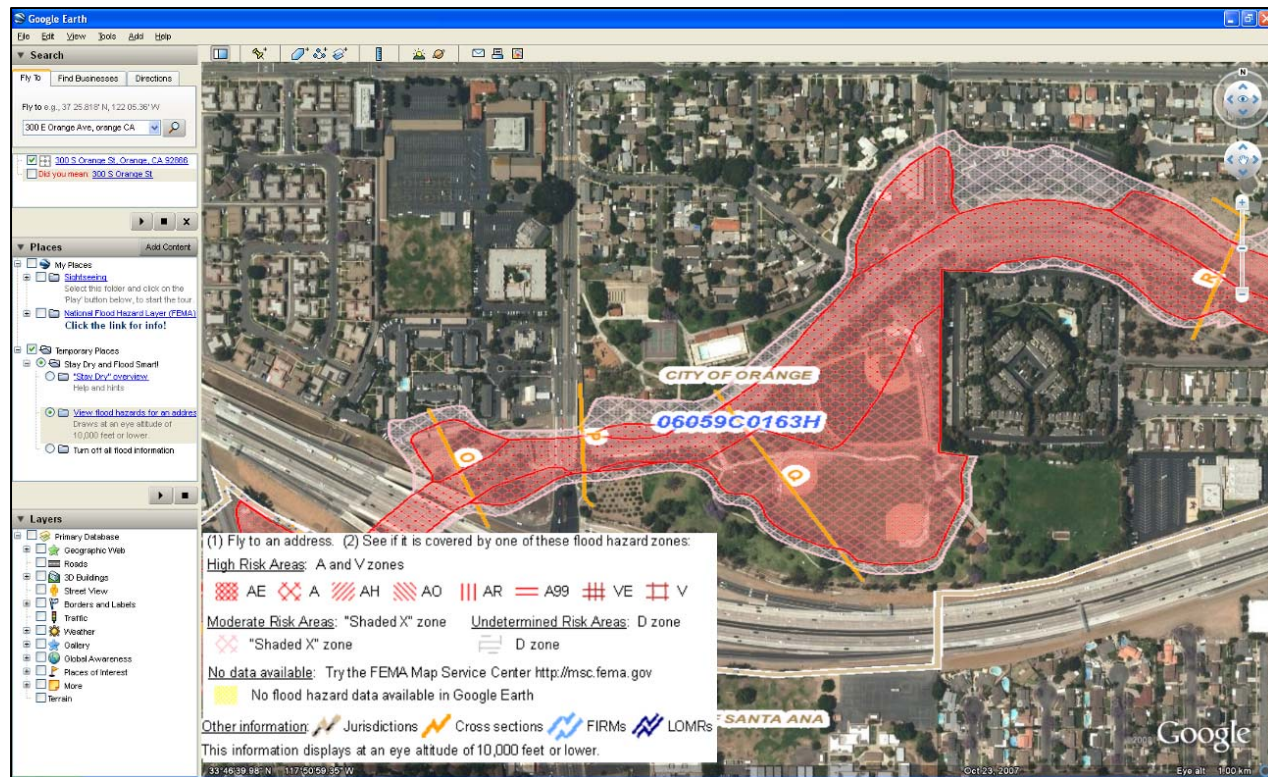
NFHL KMZ: Beyond the Basics

- **NFHL KMZ shows**
  - **Stay Dry layers +**
  - **BFEs**
  - **LOMA/LOMR-Fs**
  - **Floodways**
  - **Flood Control Structures**

- **Can reorder layers**

- **Can hide/show legends**

- **Hyperlinks to supplemental data**

Google Earth NFHL Guidance

- **Start at the MSC**
  - **http://msc.fema.gov**

How to use Web Map Services

- ## In Google Earth
  - **Access either of the 2 KMZ files on the MSC web site**

- ## In your own GIS application
  - **Guidance provided on MSC web site**

- **Use Add Data → GIS Servers within ArcMap to add the NFHL data**
  - **URL for the WMS's is on the MSC web site**
  - **As with all WMS's, the data are read-only**

NFHL service

The "NFHL" service provides access to most features in the NFHL and has map symbols that highlight flood hazards.

NFHL WMS Instructions

The URL for the WMS Capabilities file is:

http://hazards.fema.gov/wmsconnector/wmsconnector/Servlet/NFHL?REQUEST=GetCapabilities&SERVICE=WMS
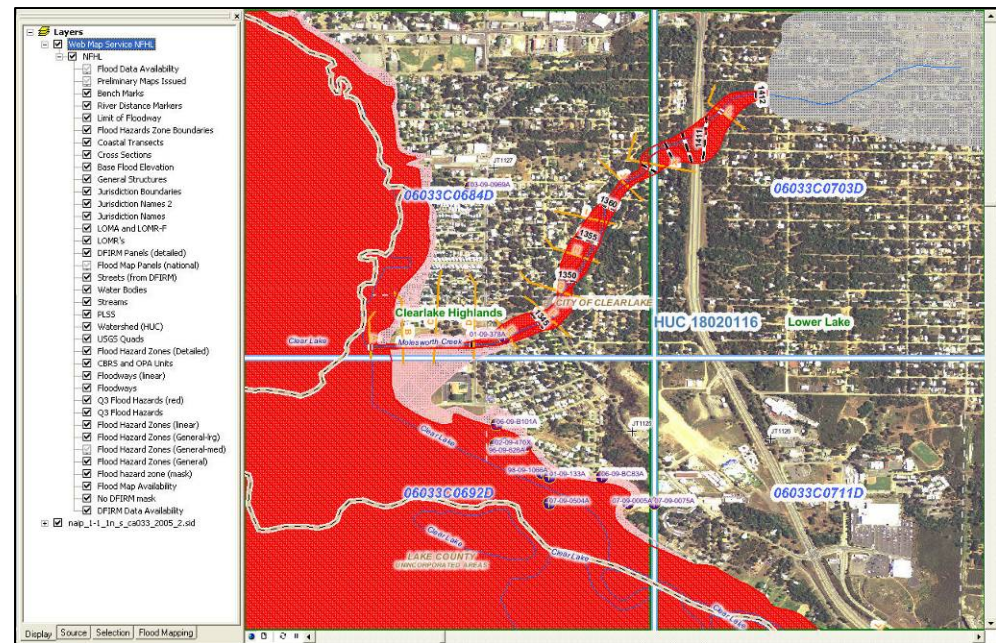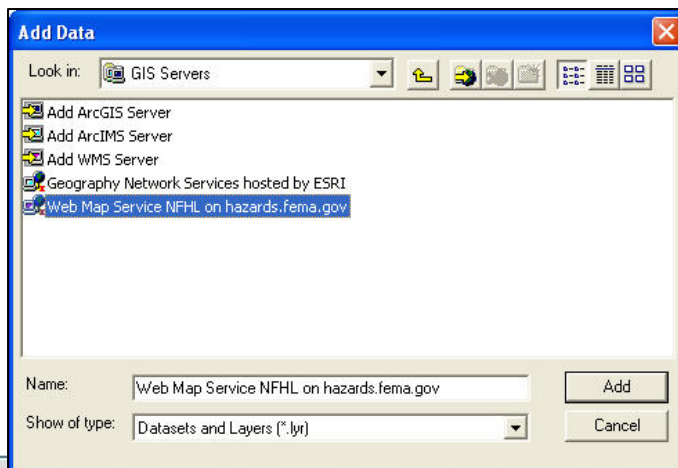
Use the Right Tool for the Job

Web Map Services

FIRMette - Web

MapViewer - Web
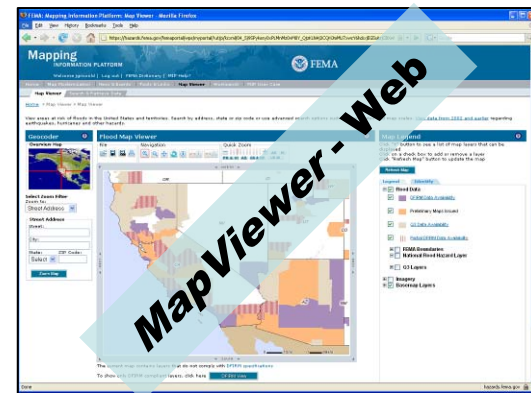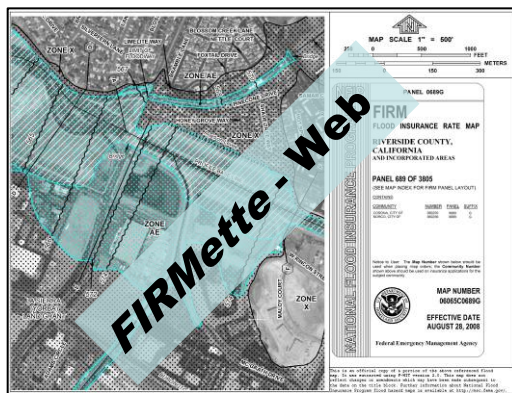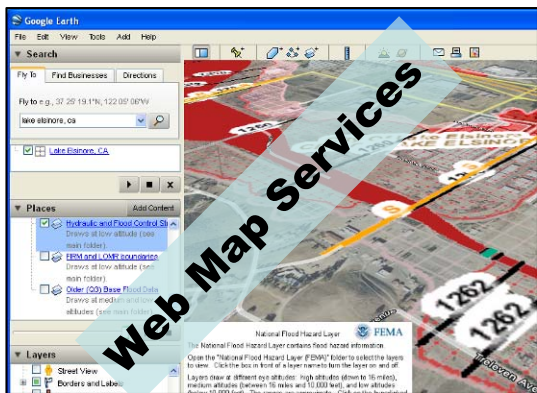
- **Tools benefit Floodplain Administrators, the general public and other stakeholders**

- **Perform flood zone determinations, data queries/visualizations and more**

- **Both on-line and desktop tools are available**

- **Local installation of GIS software is not required**

FIRMette - Desktop

MapViewer - Desktop

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Other Applications
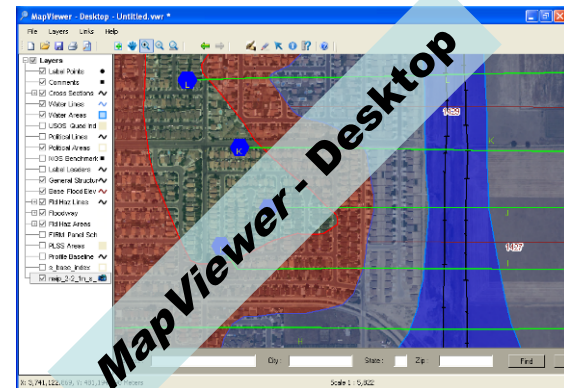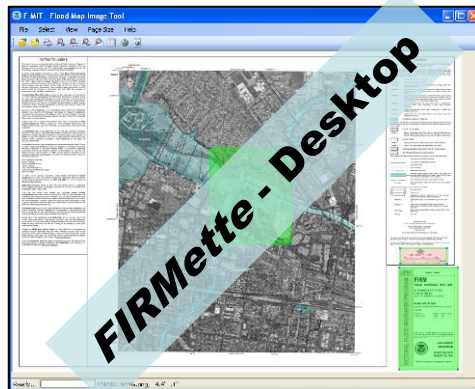
- **Risk Assessment: HAZUS-MH**
  - **Analyzes potential losses from floods, hurricane winds and earthquakes**
  - **Produces estimates of hazard-related damage before or after a disaster**

- **Hydraulic Modeling:**
  - *HEC-GEO RAS*, *FLO-2D*, *MIKE* **and other products**

- **Planning:**
  - **Zoning, land use, city planning with CAD and other GIS products like** *AutoCAD*, *ArcGIS*, *MapInfo*, *GeoMedia, …*

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FEMA Map Assistance Call Center (FMAC)

- **877-FEMA MAP (877-336-2627)**
- **FEMAMapSpecialist@mapmodteam.com**

- **FMAC provides info about DFIRMs, NFIP rules and procedures:**
  - **Requirements for Letters of Map Change (LOMCs), Physical Map Revisions, Appeals, Protests, and Community Compliance**
  - **Preliminary and Revised Preliminary FIS's and Maps**
  - **Requests for Technical and Administrative Support Data**
  - **LOMC Revalidation and Re-issuance Letters and Process**
  - **Map Change and Data Request Processing Fees**
  - **Letters of Determination Review (LODRs)**

FEMA

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