



GIS Basics for Floodplain Management

2009 Montana Floodplain Resource Seminar

Presenters:

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Todd Klietz CFM, Missoula (City & County) Floodplain Administrator

Mary Guokas, Floodplain Outreach Specialist, MT DNRC Helena

Thank you FEMA.



FEMA

DFIRM 101 Workshop
Demystifying a DFIRM

April 17, 2009
Las Vegas, NV



Break for
Commercial
Announcement!



Brought to you by the National Flood Insurance Program (NFIP)



- Flood damage results when people build and live in floodplains.
- Floodwaters exert powerful forces.
- Unaltered floodplains perform vital natural functions.



The NFIP aims to reduce future flooding damage by:

Identifying risk with **flood maps**

Regulating floodplain development

Providing low-cost flood insurance to compliant communities.



Workshop Will Cover

FEMAs Map Modernization Process

Montana's Map Modernization Program

Navigating FEMAs Mapping Tools

Basic Features/Prices of GIS Programs

Montana's Natural Resources Information System

Using DFIRMs/Installing ArcExplorer



Purpose of Workshop

GIS & DFIRMs
are wonderful.





Where Might it Flood?



An ESRI
aerial view
near Lolo,
MT



206 m

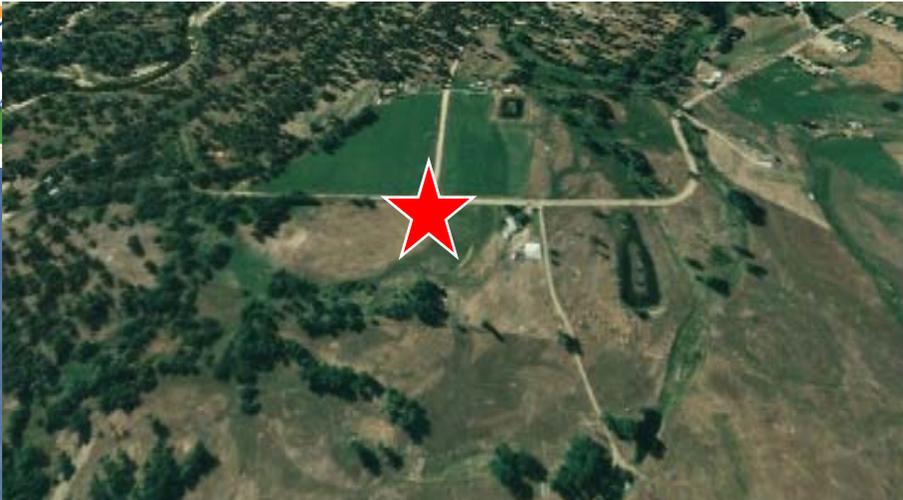
ESRI®



Answer:



A Minor Flood Event Flood in similar location as previous slide.
May 20, 2008

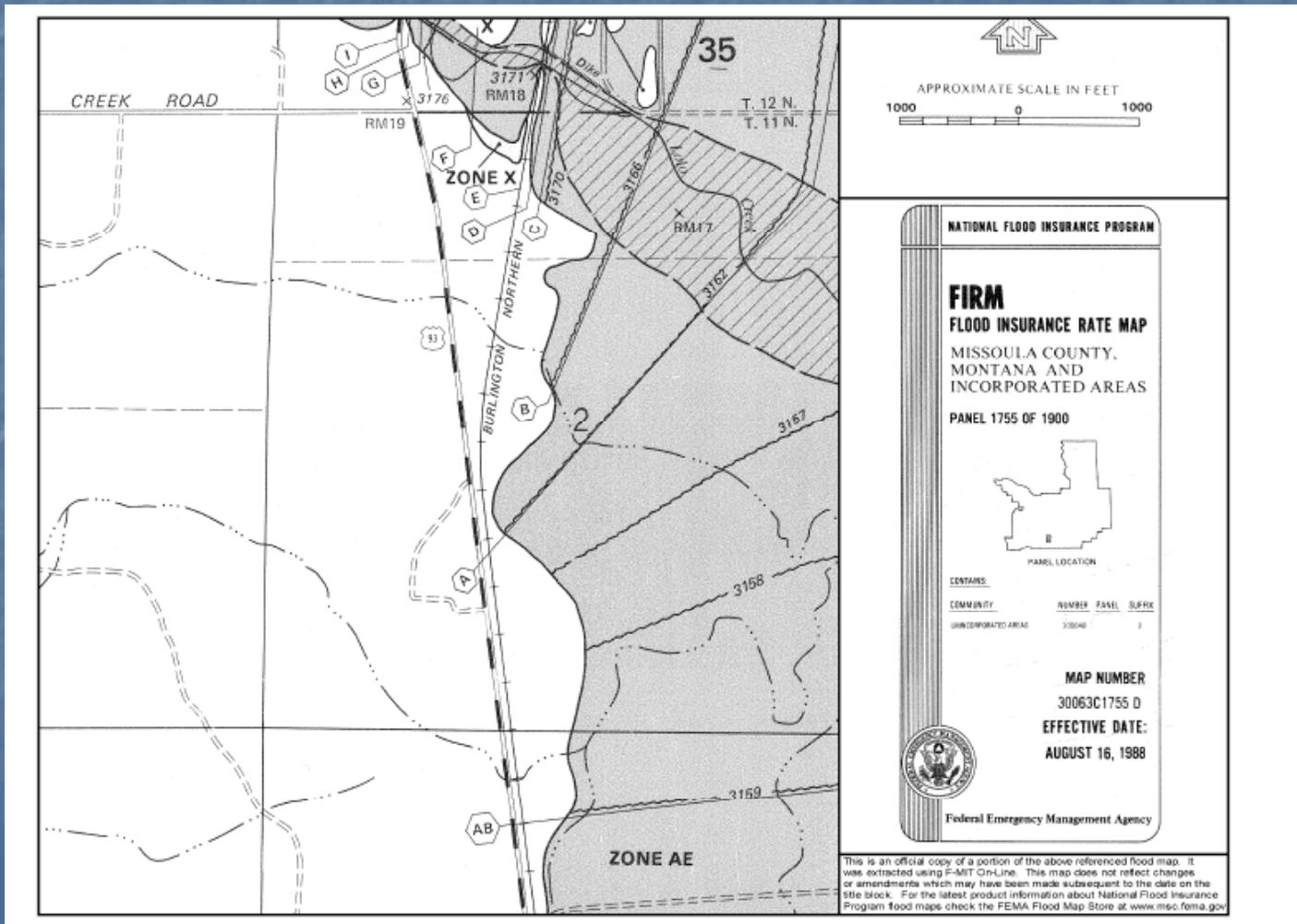


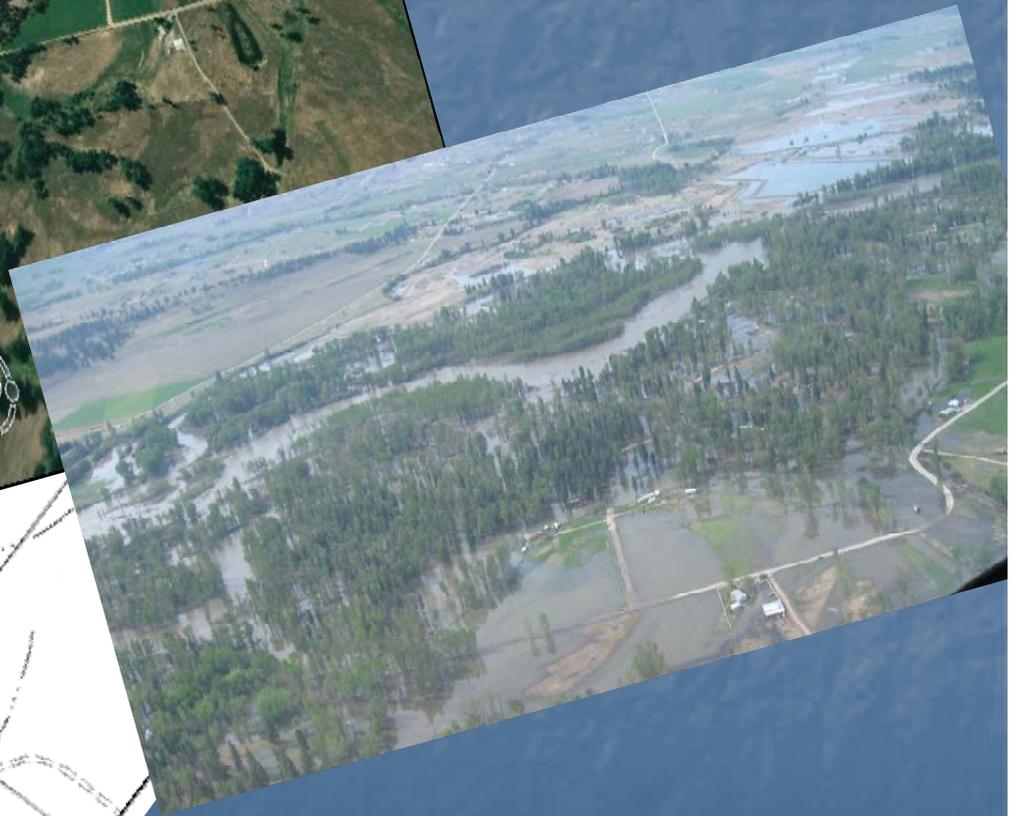
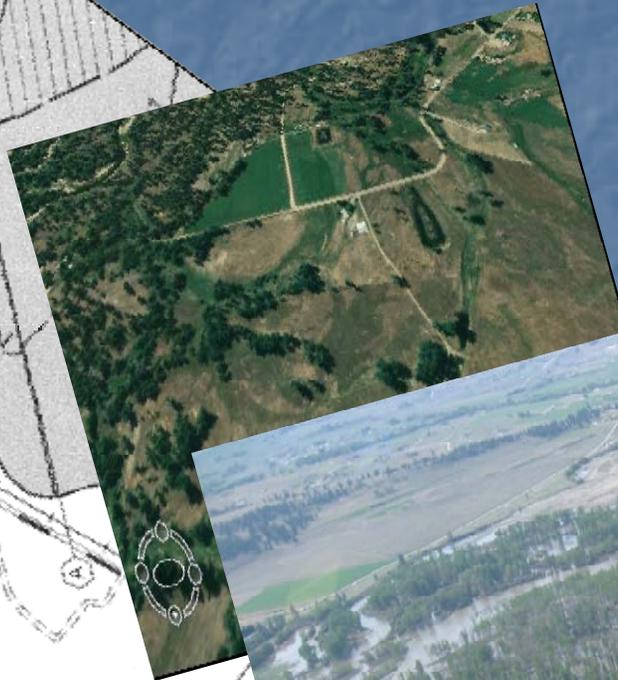
Compare





“Where Might it Flood?”.

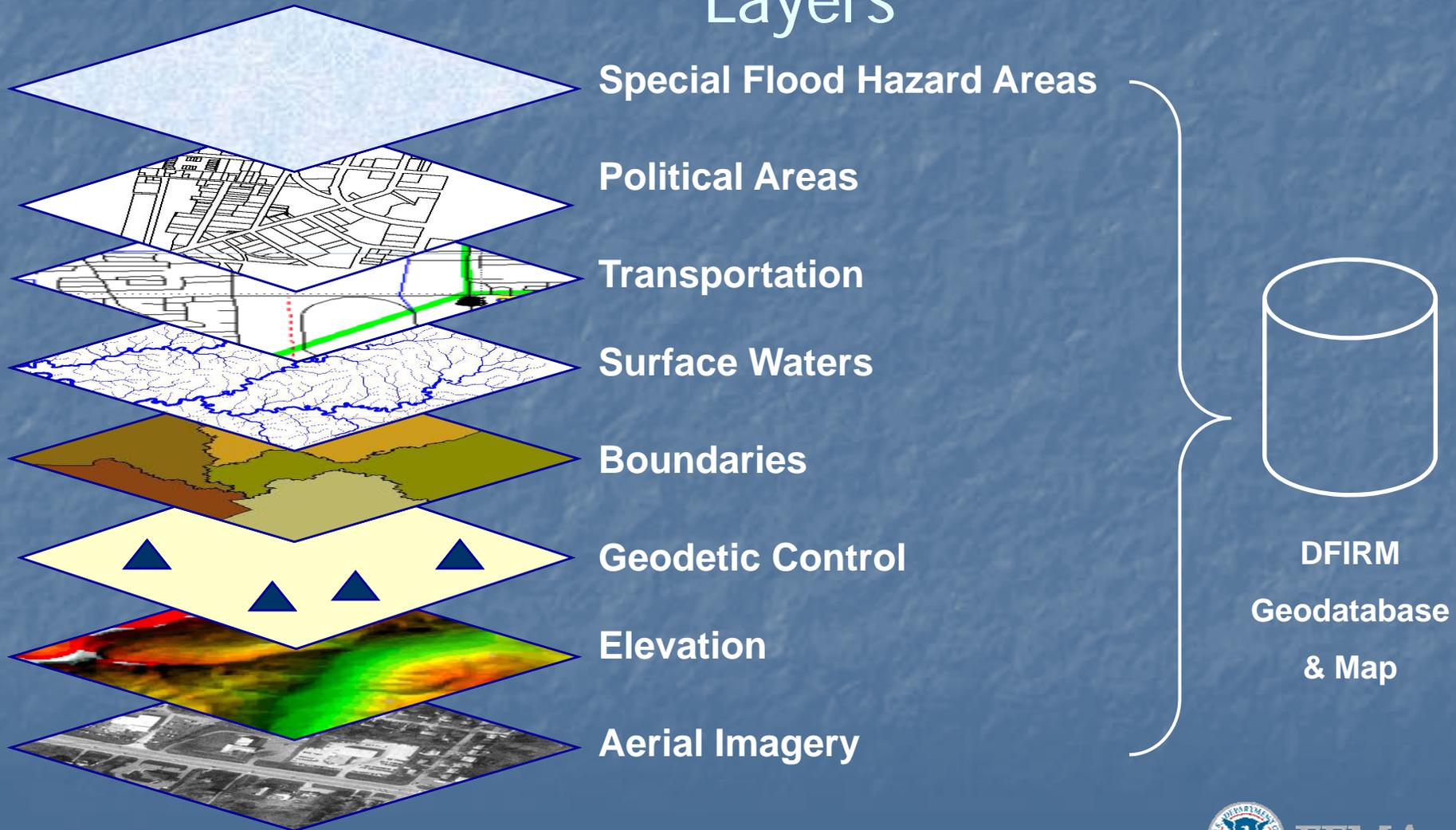






GIS has Layers

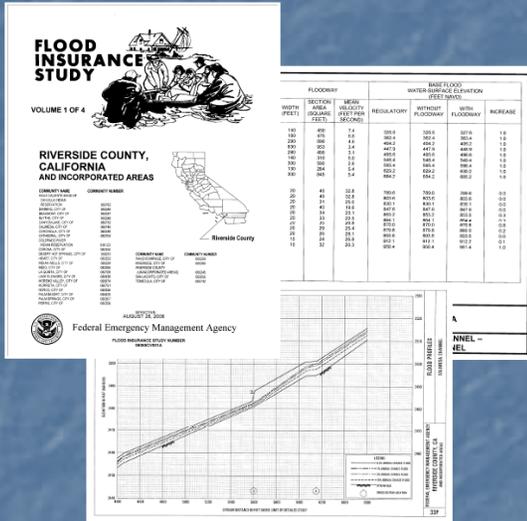
Digital Flood Insurance Rate Maps have Layers



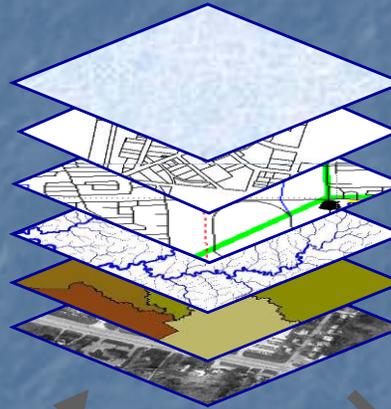


What is a DFIRM?

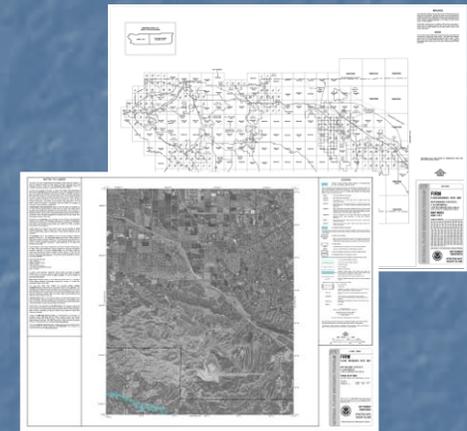
Flood Insurance Study (FIS)
Text/Report (digital & hard-copy)



DFIRM
Database



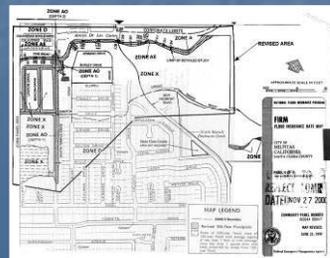
FIRM Panels
(digital & hard-copy)



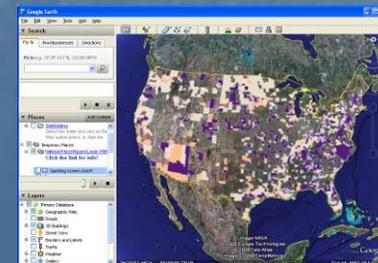
Effective LOMRs sewn
into DFIRM prior
to effective date

Flood Hazard Layer

Letters of
Map Revision
(LOMRs)



Future LOMRs
sewn into
NFHL daily



National
Flood
Hazard
Layer (NFHL)



Google Earth

File Edit View Tools Add Help

Search

Fly To Find Businesses Directions

Fly to e.g., 94043

- Kalispell, MT
- Kalispell, MT
- Helena, MT
- Kalispell, MT

Places Add Content

- Forbidden City, China
- Reichstag, Germany
- Google Campus, US
- National Flood Hazard Layer (FEM)
Click the folder name for info!
- Welcome! button on/off
- Status of Digital Flood Hazard C
Draws at high altitudes (see

Layers

- Primary Database
- Geographic Web
- Roads
- 3D Buildings
- Street View
- Borders and Labels
- Traffic
- Weather
- Gallery

A satellite view of the United States in Google Earth. The map is overlaid with a flood hazard layer, showing various colored regions: purple for high hazard, orange for moderate, and yellow for low. The map is centered on the central United States. On the right side, there are navigation controls including a compass, a hand icon for panning, and a vertical slider for zooming. At the bottom of the map, there is copyright information: "© 2009 Tele Atlas", "© 2009 Europa Technologies", "Data SIO, NOAA, U.S. Navy, NGA, GEBCO", "Image © 2009 TerraMetrics", and coordinates "57°56'24.20\" N 69°12'19.52\" W". The "Eye alt" is shown as "3099.93 mi".

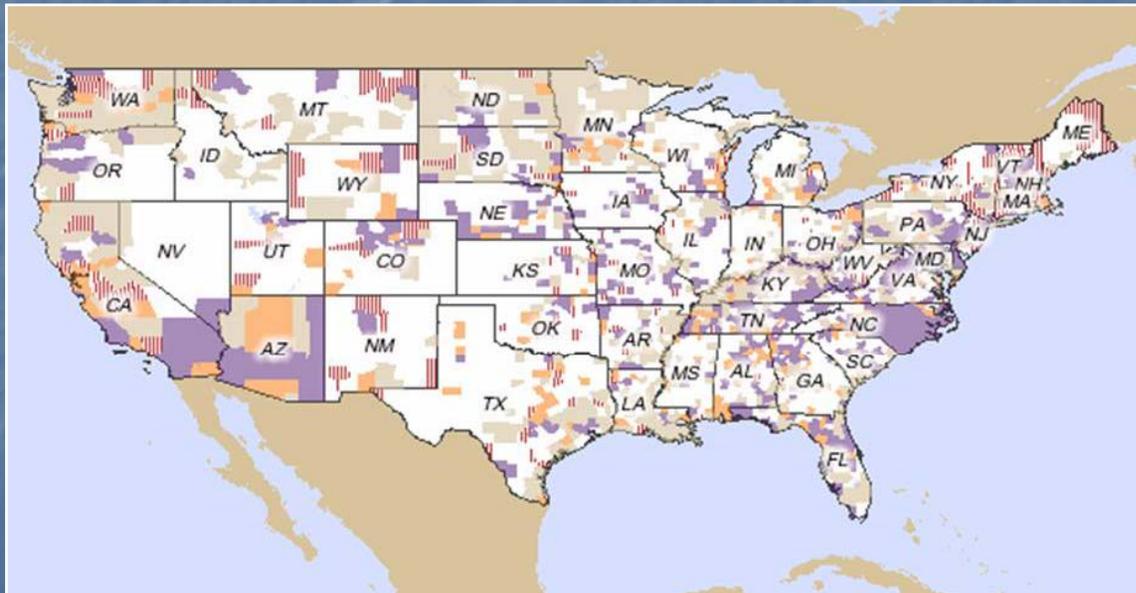
© 2009 Tele Atlas
© 2009 Europa Technologies
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image © 2009 TerraMetrics
57°56'24.20" N 69°12'19.52" W
Eye alt 3099.93 mi

start | Inbox - Microsoft Ou... | 3 Windows Explorer | DFIRM_GIS_Worksh... | Copy of 2008 10 DF... | Google Earth | 2:58 PM



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

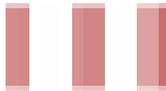
-  [DFIRM Data Availability](#)
-  Preliminary Maps Issued
-  [Q3 Data Availability](#)
-  [Partial DFIRM Data Availability](#)



Effective



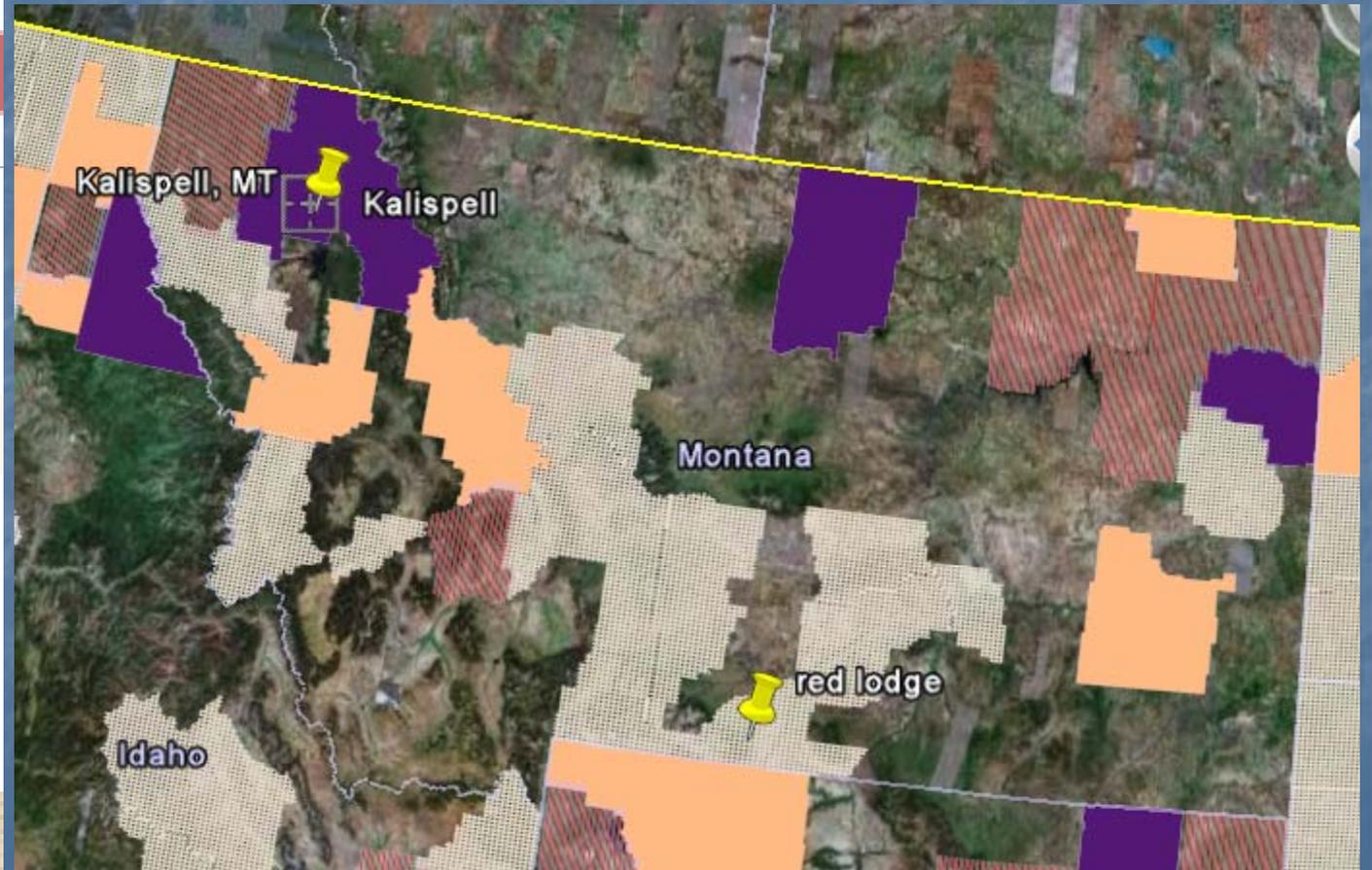
Partial
Portion of
County
Effective



Preliminary
DFIRM

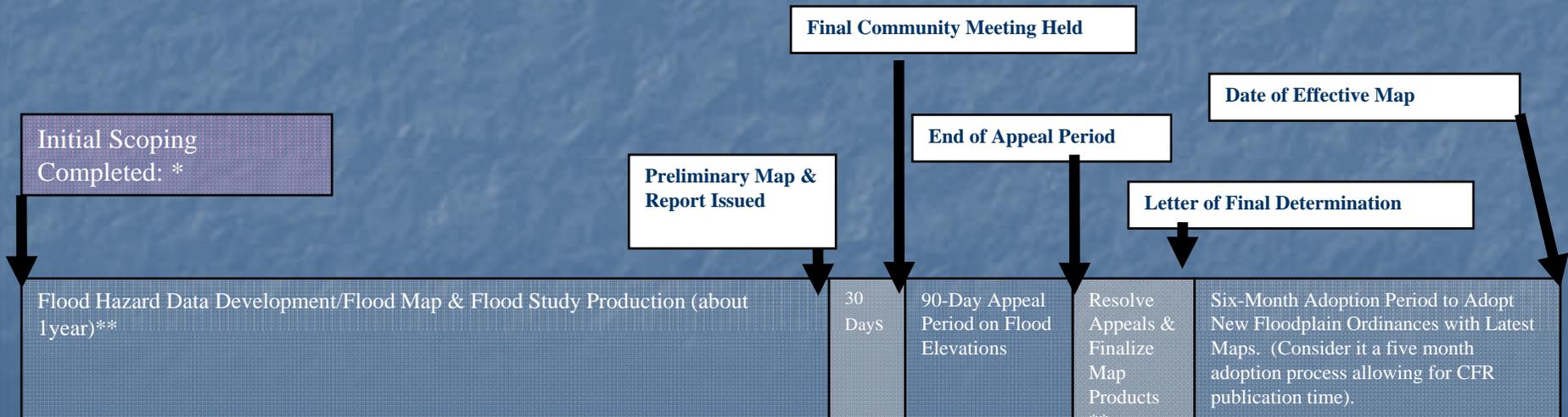


Q3 Data



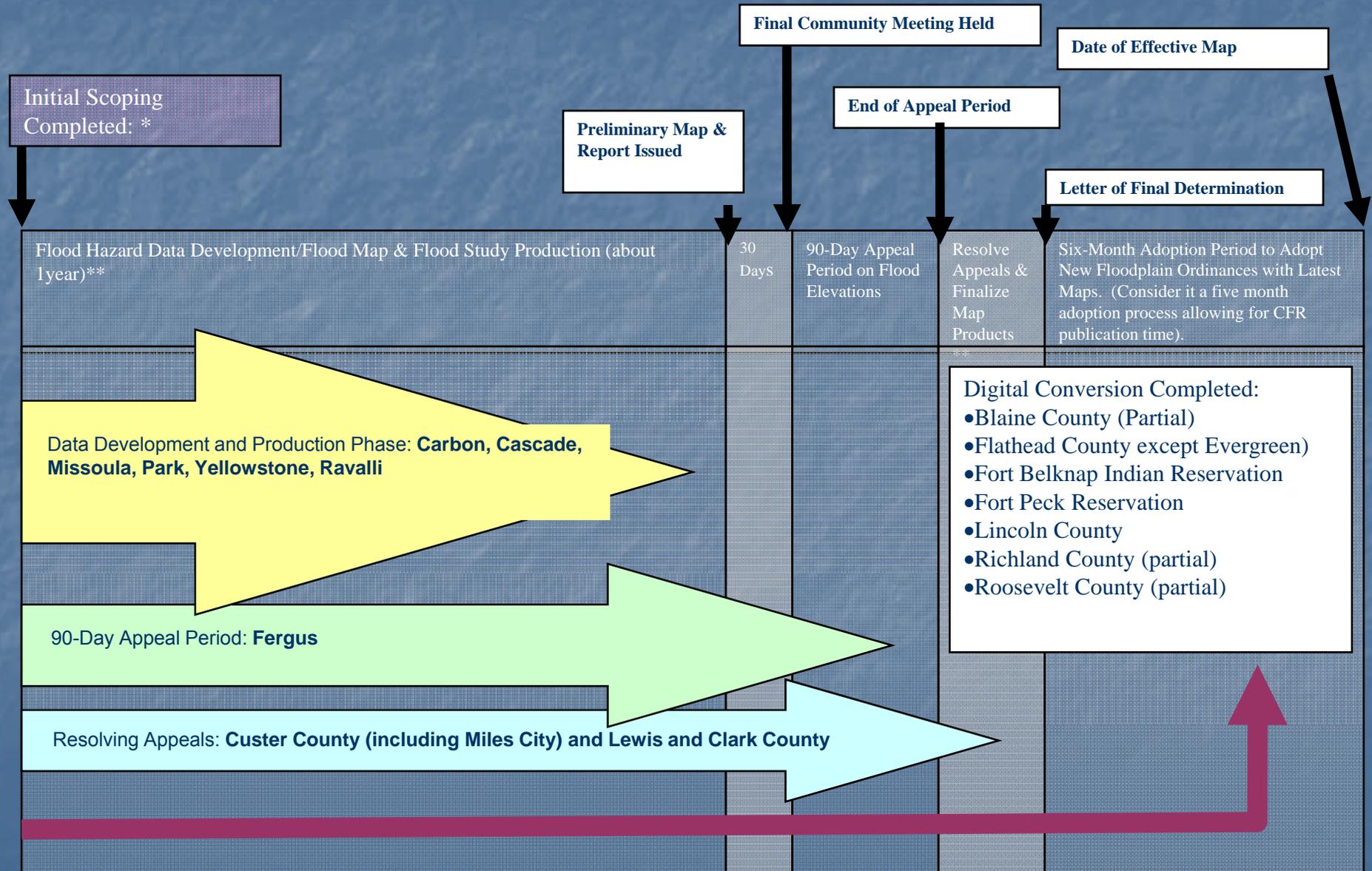


Simplified Timeline of Map Modernization Process



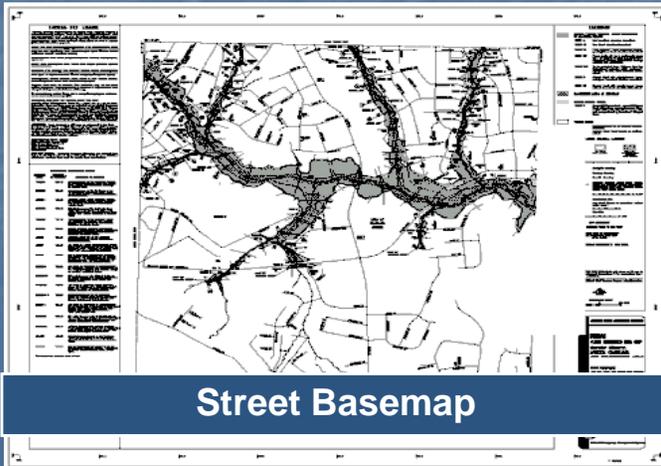


Montana Map Modernization Status July, 2009

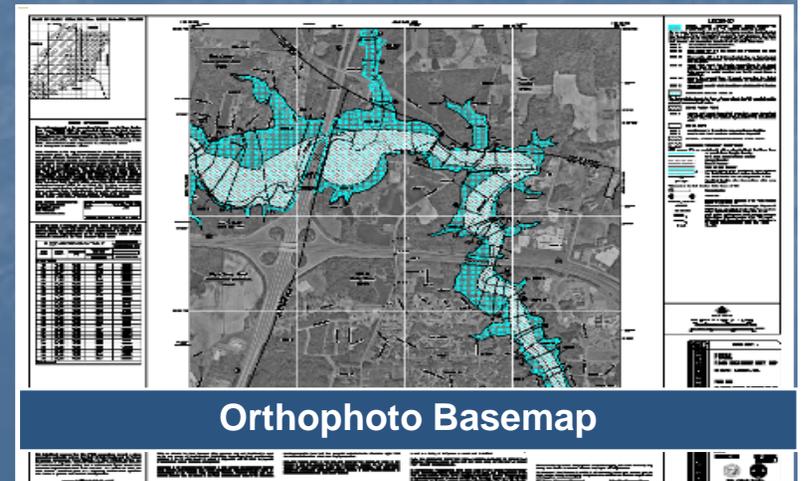




Map Modernization Sales Pitch



Street Basemap

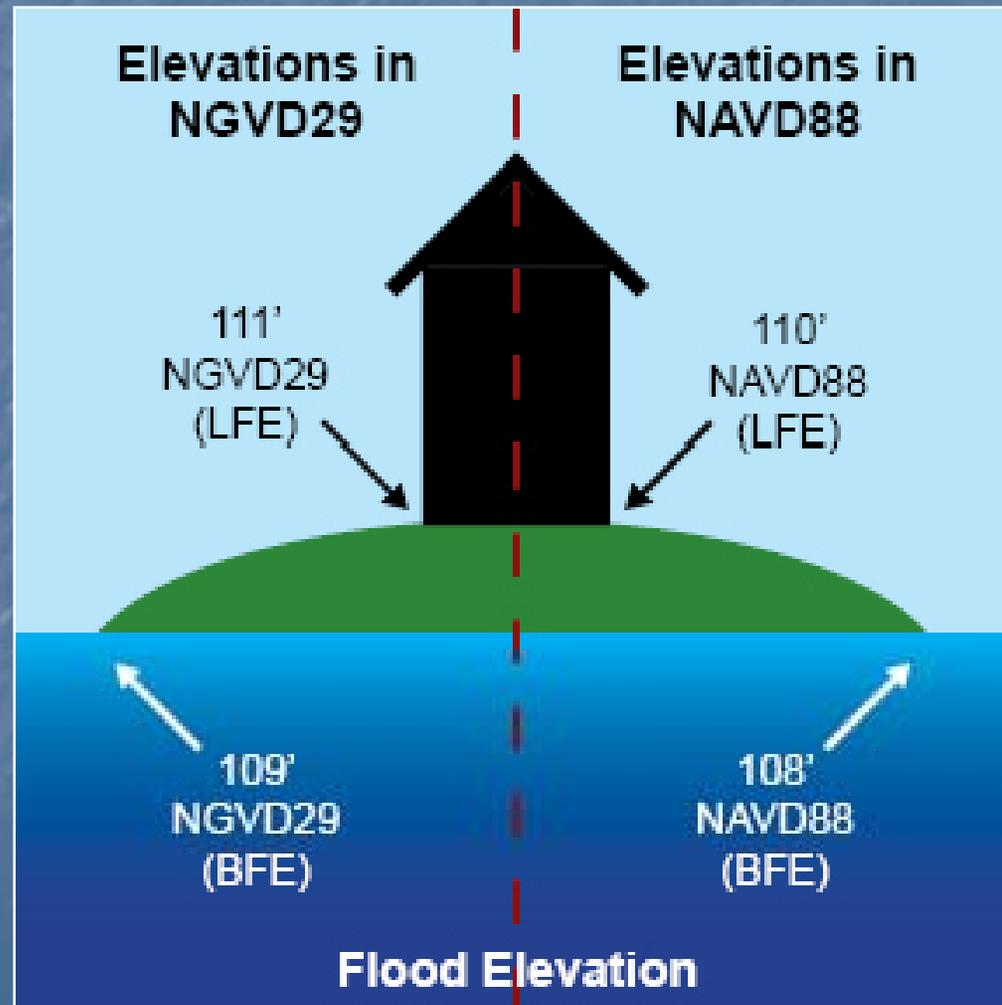


Orthophoto Basemap



What's more modern?

1929 or 1988?





May Reflect New Studies
Reflect Certified or Provisionally
Accredited Levees
Incorporate Letters of Map Revision



No More Paper ...

Beginning on October 1, 2009 customers may order only digital flood hazard reports and data

No change is anticipated for the distribution of LOMCs

FEMA expects to save \$3 to \$5 million annually

(End of sales pitch, maybe).



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

The screenshot shows the FEMA Map Service Center website. The browser title is "FEMA Map Service Center - Microsoft Internet Explorer". The address bar shows the URL: <http://www.msc.fema.gov/webapp/wcs/storeservlet/FemaWelcomeView?storeId=10001&catalogId=10001&langId=-1>. The page header includes the FEMA logo and "Map Service Center". Navigation links include "Product Catalog", "Map Search", "Quick Order", "Digital Post Office", and "Help".

The main content area is divided into several sections:

- Product Search by...**: Includes a search form with fields for "Address" and "Map Panel ID". The "Address" section has a dropdown for "1) Select a Product:" (set to "Flood Maps") and input fields for "2) Enter an Address:" (Street, City, State, Zip). A "Search By Street Address" button is present.
- New to the FEMA Map Service Center?**: Lists links for Homeowner's Renters, Real Estate Flood Determination Agents, Insurance Agents, Engineers/Surveyors, and Federal/Exempt Customers.
- What are you looking for?**: Lists links for Flood Maps, FIRMettes, DFIRM Databases, MapViewer - Web (DFIRM Viewer), and Documents, Publications & Forms.
- More Information**: Lists links for How do I find the flood map for my area?, What is a FIRMette?, How do I find a LOMC?, Definitions of FEMA Flood Zone Designations, Product Information, Price List, How to Order, and Need Assistance?
- Announcements**: "New Fees Beginning October 1, 2007". Text: "Please contact the MSC Customer Service Center by telephone at 1-800-358-9616 or by e-mail at FEMA-MSCSERVICE@dhs.gov for questions or additional information."
- Free Map Viewer**: Text: "The Map Service Center now has version 2.2 of the F-MIT viewer available for download. This new version supports FIRMette creation for both two color and black and white maps. You can download it here."
- Desktop DFIRM/NFHL Viewer**: Text: "FEMA is developing a simple tool for viewing GIS flood data. A beta of this tool can be downloaded here."
- Log On**: Includes fields for "User ID (email address):" and "Password:", "Log on" and "Clear" buttons, and links for "Forgot Password?" and "Register".
- NFHL**: "National Flood Hazard Layer (Learn more)". Links: "View the NFHL Online using MapViewer - Web", "Order NFHL GIS Datasets by state on DVD", "Use Web Map Service in your own GIS application", "Use Web Map Service in Google Earth™", "Got Comments?".
- FIRMette Tutorial**: "Learn how to create FIRMettes. They're free!". Includes a small map image.
- Product Catalog**: Lists several items with case numbers and effective dates:
 - City of St. Peters, City of St. Charles, St. Charles County, Missouri Letter of Map Revision Available (Case Number: 08-07-0068P, Effective date: October 30, 2008)
 - San Bernardino County, California Letter of Map Revision Available (Case Number: 07-09-1957P, Effective date: November 19, 2007)
 - City of Grand Forks, North Dakota Letter of Map Revision Available (Case Number: 07-08-0331P, Effective date: August 2, 2007)
 - City of Sacramento, Sacramento County, California Letter of Map Revision Available (Case Number: 07-09-0266P, Effective date: February 21, 2007)



FEMA Map Service Center

Product Catalog | Map Search | Quick Order | Digital Post Office | Help

Product Search by...

Address **Map Panel ID**

1) Select a Product:

2) Enter an Address:
 Street:
 City:
 State: Zip:

New to the FEMA Map Service Center?

- Homeowners/Renters
- Real Estate/Flood Determination Agents
- Insurance Agents
- Engineers/Surveyors
- Federal/Exempt Customers

What are you looking for?

- Flood Maps
- FIRMettes
- DFIRM Databases
- MapViewer - Web (DFIRM viewer)
- Documents, Publications & Forms

Log On

User ID (email address) :

Password :

[Forgot Password?](#)
[Register](#)
[Why register?](#)

Announcements

New Fees Beginning October 1, 2007

Please contact the MSC Customer Service Center by telephone at 1-800-358-9616 or by e-mail at FEMA-MSCSERVICE@dhs.gov for questions or additional information.

Free Map Viewer

The Map Service Center now has version 2.2 of the F-MIT viewer available for download. This new version supports FIRMette creation for both two color and black and white maps. You can download it [here](#).

Desktop DFIRM/NFHL Viewer

FEMA is developing a simple tool for viewing GIS flood data. A beta of this tool can be downloaded [here](#).
[\(learn more\)](#)

San Bernardino County, California Letter of Map Revision Available
 Case Number: 08-09-1595P
 Effective date: August 29, 2008

City of St. Peters, City of St. Charles, St. Charles County, Missouri Letter of Map Revision Available
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 Effective date: October 30, 2008

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City of Grand Forks, North Dakota Letter of Map Revision Available
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 Effective date: August 2, 2007

City of Sacramento, Sacramento County, California Letter of Map Revision Available
 Case Number: 07-09-0266P

NFHL

National Flood Hazard Layer (NFHL) [\(learn more\)](#)

View the NFHL Online using [MapViewer - Web](#)

Order NFHL GIS Datasets by state on DVD

Use [Web Map Service](#) in your own GIS application

Use [Web Map Service](#) in Google Earth™

[Got Comments?](#)

FIRMette Tutorial

Learn how to create FIRMettes. They're free!



[Click here to learn how to create a FIRMette.](#)

Product Search/
Catalog

Login

DFIRM Database

National Flood Hazard Layer (NFHL)

FIRMette – Desktop Download

MapViewer – Desktop Download

FIRMette - Web Tool



EDDie: Express Document Delivery

The screenshot shows the FEMA Map Service Center header. On the left is the FEMA logo. In the center, the text "FEMA" is displayed in large white letters, and "Map Service Center" is displayed in smaller white letters. Below this is a dark red navigation bar with white text links: "Product Catalog | Map Search | Quick Order | Digital Post Office | EDDie | My Account | Help". The "EDDie" link and a "Log off" button are circled in red. On the right side of the header is the EDDie logo, which consists of a red speech bubble containing the word "EDDie" and three horizontal white lines below it.

The screenshot shows the search filters section of the FEMA Map Service Center. It has a blue header "Search by Item Id" with a search input field and a "Go" button. Below that is another blue header "Search by Region" with a link "Show FIPS/CID codes". There are three dropdown menus: "CALIFORNIA", "KERN COUNTY", and "All Communities". At the bottom, there are four blue buttons with white text: "Flood Insurance Rate Maps (FIRM)", "DFIRM Databases", "Flood Insurance Studies (FIS)", and "Letters Of Map Change (LOMC)".

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

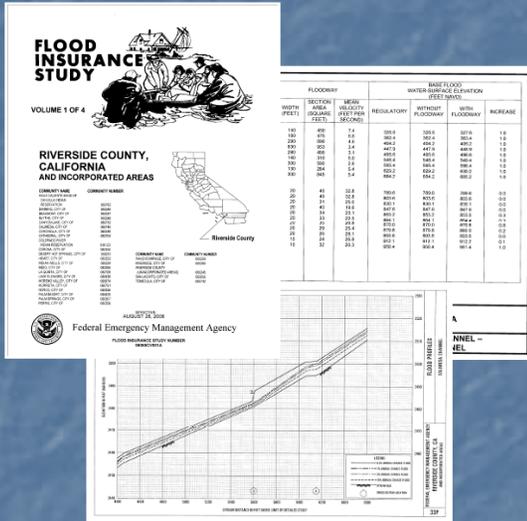
Flood Insurance Studies (FIS)

Letters Of Map Change (LOMC)

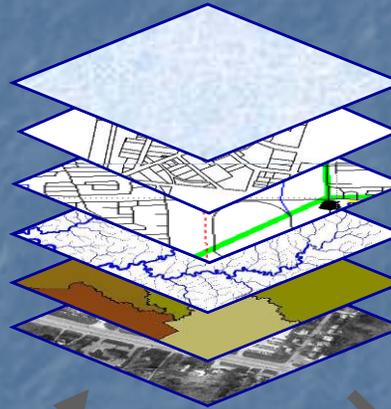


What is a DFIRM?

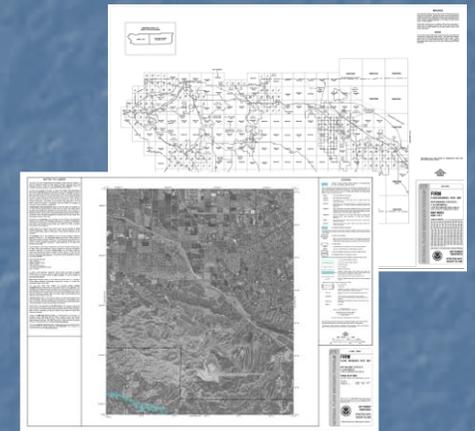
Flood Insurance Study (FIS)
Text/Report (digital & hard-copy)



DFIRM Database



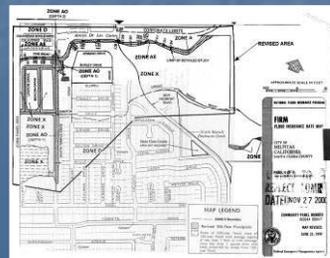
FIRM Panels (digital & hard-copy)



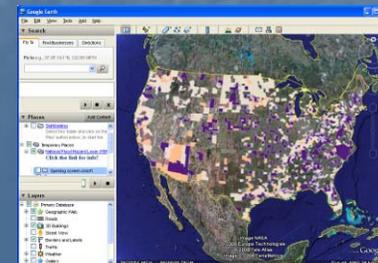
Effective LOMRs sewn into DFIRM prior to effective date

Flood Hazard Layer

Letters of Map Revision (LOMRs)



Future LOMRs sewn into NFHL daily



National Flood Hazard Layer (NFHL)



DFIRM Products

Products that don't change

Paper FIRM (Map)

FIRM Scan (Image of Map)

Viewed with *FIRMette* - Web and *FIRMette* - Desktop

DFIRM Database

Accessed with GIS software and *MapView* - Desktop

Product that changes (with map revisions)

National Flood Hazard Layer (NFHL)

MapView - Web, *MapView* - Desktop, WMS, Google Earth
KMZ

Available through the above tools or as a monthly statewide
shape file



DFIRM Database ► NFHL

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

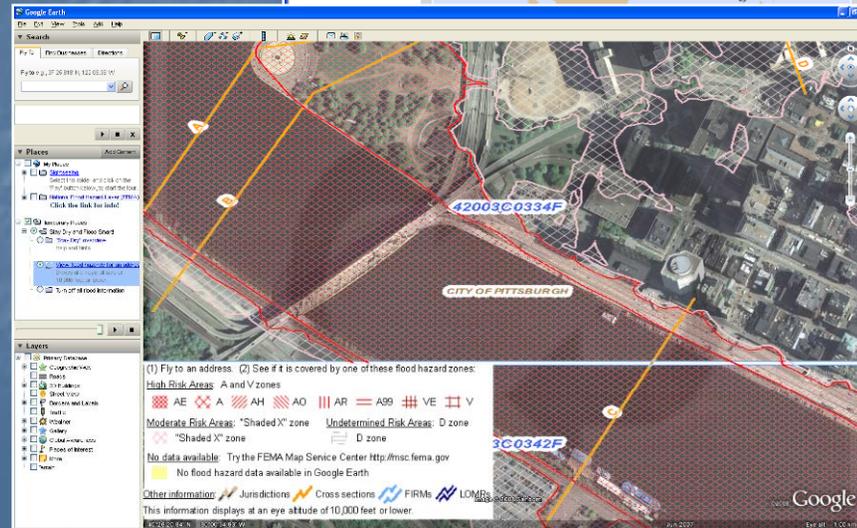
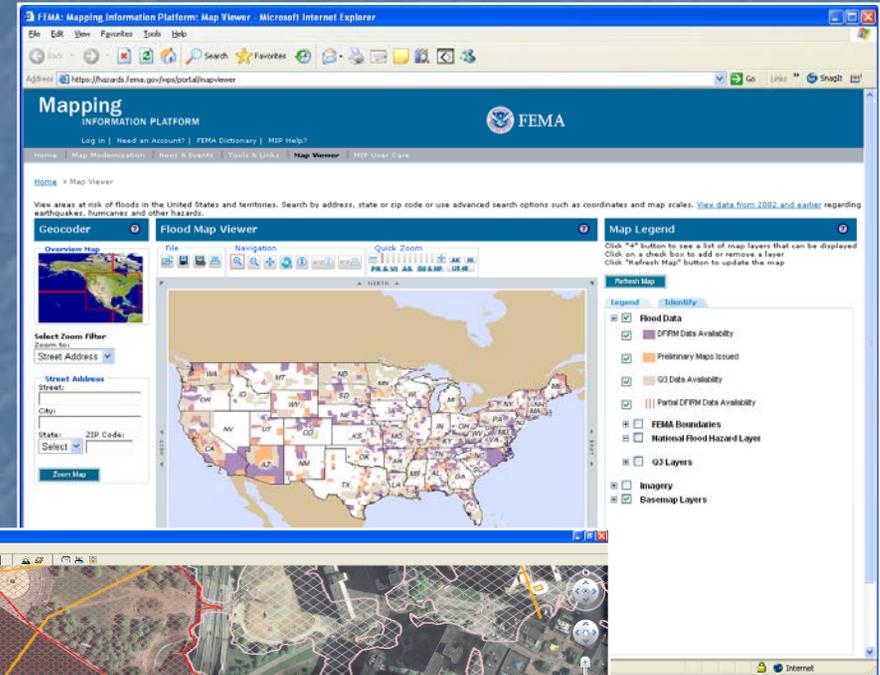
Order as many as you need



NFHL Web Map Services (WMS)

Web Map Services
(WMS)

Google Earth
Two KMZ files
available





Stay Dry KMZ: the Basics

Stay Dry KMZ shows

SFHAs

LOMRs

FIRM Boundaries

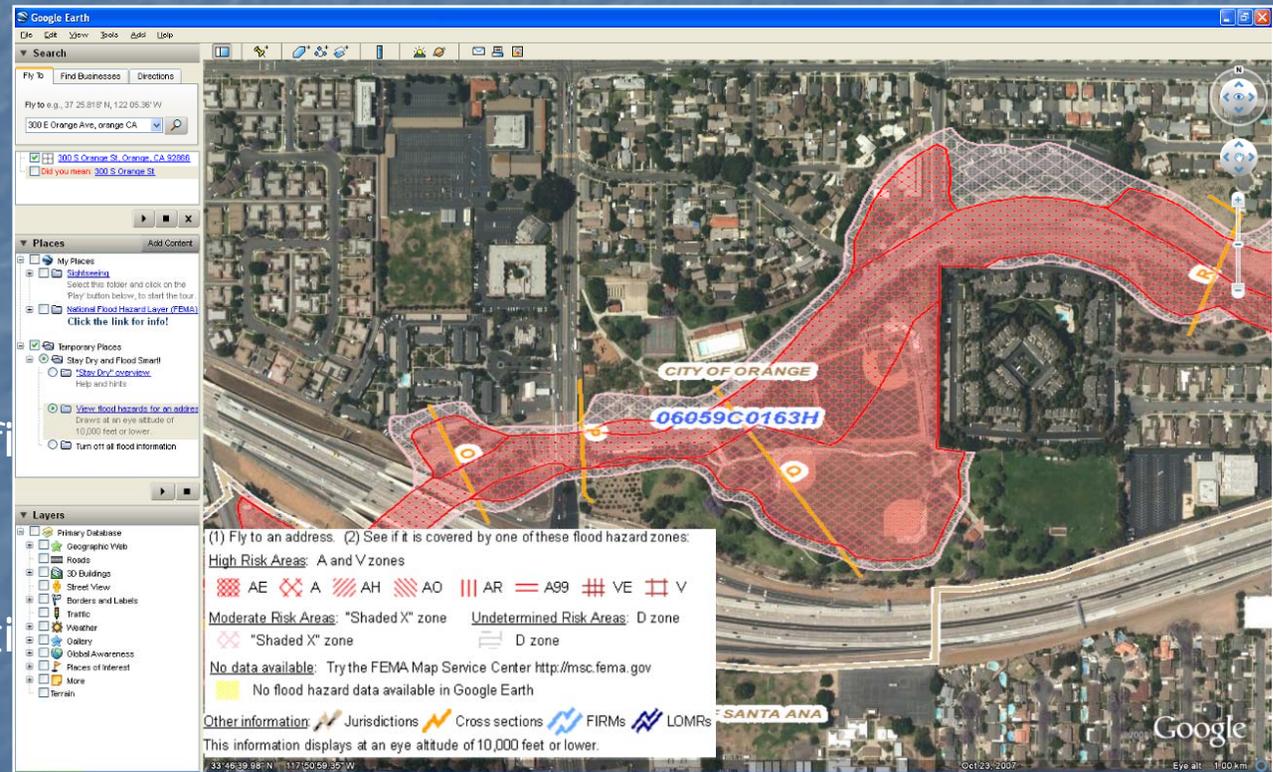
Cross Sections

Jurisdictions

Can't reorder/hide specific layers

Basic floodplain information

Easy to understand





Google Earth NFHL Guidance

Start at the MSC

<http://msc.fema.gov>

NFHL

National Flood Hazard Layer (learn more)

View the NFHL Online using **MapViewer - Web**

Order **NFHL GIS Datasets** by state on DVD

Use **Web Map Service** in your own GIS application

Use **Web Map Service** in Google Earth™

Got Comments?

FEMA: Mapping Information Platform: NOPAGETAB_NFHLKMZ - Microsoft Internet Explorer

Address: <https://hazards.fema.gov/femaportal/wps/portal/NFHLWMSkmzdownload>

Mapping INFORMATION PLATFORM

Log in | Need an Account? | FEMA Dictionary | MIP Help?

Home | Map Modernization | News & Events | **Tools & Links** | Map Viewer | MIP User Care

Public Reports

Home > Tools & Links

Tools & Links

Using the National Flood Hazard Layer Web Map Service (WMS) in Google Earth™

Google Earth is a popular Internet application through which users can view maps. This web site provides zipped Keyhole Markup Language (.kmz) files through which users can view map overlays created from FEMA's National Flood Hazard Layer on Google Earth images.

You must already have the Google Earth application installed on your computer to use these files. The starting point for obtaining the software is <http://earth.google.com>. Information about the system requirements needed for your computer to run the software is available through <http://earth.google.com/support>. A user guide is available at <http://earth.google.com/userguide>.

FEMA offers two applications: "Stay Dry" and "FEMA NFHL." Each is described below, and each has its own .kmz file. For optimum performance, please do not open both, and do not have more than one copy of each, in Google Earth at the same time.

To use the .kmz files, first save them to your computer. Do this by right-clicking on a hyperlinked file name below, choosing "Save Target as" (Internet Explorer) or "Save Link As" (Firefox), changing the file name if you wish (be sure that the file name has the extension .kmz), and clicking on save.

After saving the file, double-click on the file on your computer. This action should start Google Earth and provide the opening view for the application.

If you plan to use mapped flood information displayed in Google Earth for official purposes, insure that imagery and other map information displayed with the flood data meet FEMA's standards for map accuracy.

Some Geographic Information System (GIS) software can import GIS data encoded in the kmz format used for these applications. This technique is unlikely to work with the kmz files provided below. If you are interested in using the NFHL in GIS software, use the NFHL GIS data or NFHL Web Map Service. Both are available through the MSC at <http://msc.fema.gov>.

FEMA anticipates future improvements to the .kmz files, so please revisit this page occasionally to obtain the latest version.

Stay Dry

"Stay Dry" is a focused application that provides basic flood hazard map information from FEMA's National Flood Hazard Layer for an address. It allows you to view flood hazard zones, cross sections and their labels, community names and boundaries, Flood Insurance Rate Map numbers and boundaries, and Letter of Map Revision case numbers and boundaries.

For best performance please delete or turn off previous versions of the "Stay Dry" or "FEMA NFHL" folders that you have loaded in Google Earth before using the new version of "Stay Dry."

[Stay Dry v2.0.kmz](#)

[Stay Dry Google Earth Application Instructions](#)



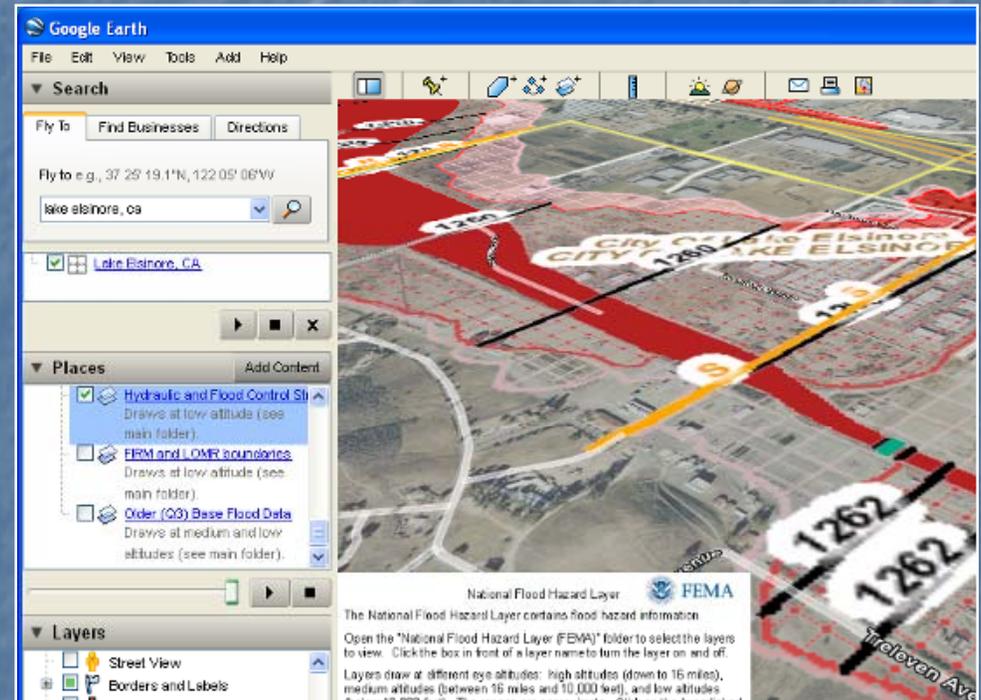
How to use Web Map Services

In Google Earth

Access either of the 2 KMZ files on the MSC web site

In your own GIS application or Arc Explorer—Take it away Todd

Guidance provided on MSC web site





Google Earth WMS's

The screenshot shows the Google Earth desktop application. The main window displays a 3D map of Lake Elsinore, California, with a red-shaded flood hazard area overlaid. The interface includes a menu bar (File, Edit, View, Tools, Add, Help), a search bar with the text "lake elsinore, ca", and a "Layers" panel on the left. The "Layers" panel shows a folder named "National Flood Hazard Layer" which is expanded to show sub-layers: "Order (00) Base Flood Data" and "Order (01) Flood Hazard". A tooltip for the "National Flood Hazard Layer" is visible at the bottom right, providing information about FEMA's National Flood Hazard Layer and its different drawing altitudes.

*Google Earth
Demonstration*

National Flood Hazard Layer FEMA

The National Flood Hazard Layer contains flood hazard information. Open the "National Flood Hazard Layer (FEMA)" folder to select the layers to view. Click the box in front of a layer name to turn the layer on and off. Layers draw at different eye altitudes: high altitudes (down to 16 miles), medium altitudes (between 16 miles and 10,000 feet), and low altitudes (below 10,000 feet). The image is copyrighted by FEMA.