

FEMA NFHL (version 2.3)

View Custom Combinations of FEMA Flood Hazard Information Using Google Earth™

Purpose and Appropriate Use

The “FEMA NFHL” utility allows you to use Google Earth™¹ to view custom combinations of flood hazard information from FEMA’s National Flood Hazard Layer (NFHL)². View one, several, or all of the layers available in the application. The NFHL layers include flood hazard zones, floodways, Coastal Barrier Resources System (CBRS) and Otherwise Protected Area (OPA) units, community boundaries and names, Base Flood Elevations (BFEs), cross sections and coastal transects and their labels, hydraulic and flood control structures, and Flood Insurance Rate Map (FIRM) and Letter of Map Revision (LOMR) boundaries and numbers. Additional reference layers include the status of NFHL data availability, point locations for Letters of Map Amendment (LOMAs) and Letters of Map Revision Based on Fill (LOMR-Fs), Q3 base flood, and subbasin hydrologic units. Previous knowledge of FEMA flood hazard information and Google Earth will be helpful in using this application.

FEMA publishes new FIRMs in the form of paper maps, digital map images, and digital geospatial flood hazard data like those in the NFHL. When used appropriately, these representations are equivalent to one another and represent official FEMA designations of Special Flood Hazard Areas (SFHAs), BFEs, insurance risk zones, and other regulatory information.

If you plan to use the mapped flood information displayed in Google Earth for official purposes, please ensure that imagery and other map information displayed with the flood data meet FEMA’s standards for map accuracy³.

Before You Start

You must have the Google Earth viewer software installed on your computer. The starting point for obtaining the software is

¹ Names of products are provided for descriptive purposes only and do not represent an endorsement by the United States Government.

² The National Flood Hazard Layer is a computer database that contains the digital flood hazard information from FEMA’s Flood Map Modernization program. These map data include Digital Flood Insurance Rate Map databases and later changes made by Letters of Map Revision. They do not include changes identified by property description. Maps that have not been modernized are not available in the NFHL but can be viewed and ordered from FEMA’s Map Service Center at <http://msc.fema.gov>.

³ A base map shows the location of roads and railroads, streams and lakes, boundaries, structures, and other features. When used with flood hazard data for official purposes, base maps must have a horizontal radial accuracy (Accuracy_r) better than or equal to 38 feet (11.58 meters) as measured using the National Standard for Spatial Data Accuracy. (This measure is equal to maps of scales larger than or equal to 1:12,000 under the old National Map Accuracy Standard.)

<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/>.

Your computer must have a high-speed Internet connection.

Download the “FEMA NFHL” kmz file to your computer to allow the Google Earth viewer to access NFHL data. This file is available through FEMA’s Map Service Center (MSC) at <http://msc.fema.gov>. Click on the link “Using Web Map Service in Google Earth™.” Download the kmz file to your computer using the instructions provided on the web page.

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.

Opening the Application

- First session: Double-click on the “FEMA NFHL” kmz file that you downloaded to your computer. Google Earth will open and display the “FEMA NFHL” welcome button (see area a in Figure 1), a map overlay that shows the status of data coverage (see area b), and the “National Flood

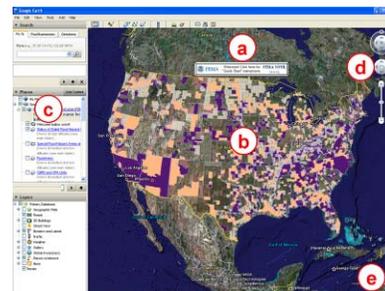


Figure 1. Opening view for the “FEMA NFHL” utility. Areas of interest include the (a) welcome button, (b) status map overlay, (c) “National Flood Hazard Layer (FEMA)” folder, (d) navigation controls, and (e) eye altitude readout.

- “National Flood Hazard Layer (FEMA)” folder under Temporary Places in the “Places” panel (area c). Other important areas are the navigation controls for Google Earth (area d) and the eye altitude (“Eye alt”) readout (area e).

- Subsequent sessions: If you tell Google Earth to save the “FEMA NFHL” application at the end of a session, it will be available when you re-open Google Earth in later sessions. Otherwise, double-click on the kmz file.



Using the Application

■ *What data layers are available, and at what eye altitudes do they display?*

For “high” eye altitudes (from higher than 18 miles in the southern States to higher than 14 miles in the northern States, excluding Hawaii and Alaska):

- Status of digital flood hazard data coverage

For altitudes of approximately 1,000 miles and lower:

- River subbasins and eight-digit Hydrologic Unit Codes (HUC-8)
- The combination⁴ “Subbasins and Flood Hazards” that shows subbasins with coverage status and flood hazard information.

For “medium” and “low” eye altitudes (from lower than 18 miles in the southern States to lower than 14 miles in the northern States, excluding Hawaii and Alaska):

- SFHAs and other zones (generalized areas of high, medium, low, or undetermined flood hazard)
- Floodways
- CBRS and OPA units
- Communities (boundaries)
- FIRM and LOMR boundaries and numbers
- LOMA and LOMR-F locations and case numbers
- Older (Q3) base flood data
- The combination “Local Flood Hazard Overlay” that shows a flood hazard and selected base map data. (Best at low altitudes.)

For “low” eye altitudes only (from lower than 10,000 feet in the southern States to lower than 8,500 feet in the northern States, excluding Alaska and Hawaii):

- SFHAs and other zones (flood insurance risk zone designations)
- Communities (names)
- BFEs (note that this application does not display static BFEs or flood depths)
- Cross sections and coastal transects, and their identifiers
- Hydraulic and flood-control structures

■ *How do I control the display of the layers?*

Control the display of the layers by turning layers on and off and by changing the eye altitude and tilt of the display.

The controls for turning the layers on and off are in the “National Flood Hazard Layer (FEMA)” folder (see area c in Figure 1). The box (☐) before the layer name shows if the layer is turned on (box is checked) or off (box is not checked) (see area A in Figure 2). Click on the box to turn a layer off or on.

The navigation controls (see area d in Figure 1) allow you to change the eye altitude and tilt of the view. If a layer is turned on, it will display if

the view is within the altitude range (high, medium, or low) for the layer. (The ranges for the layers are provided above.)

When you tilt the display, you reduce the thresholds for the ranges. If a layer “disappears” after you tilt the display, zoom in or reduce the tilt to restore the layer.

If you want to see a sample display for a layer, turn the layer on and double-click on the text “Draws at ...” below the layer name (see the example in area B of Figure 2). The Google Earth viewer will fly to the places picked for the samples (varies by layer among the lower 48 States; Pittsburgh, Pennsylvania; Lewes, Delaware; or Port Neches, Texas) and display a sample map for the layer.

■ *How can I learn the meaning of the map symbols and more information about a layer?*

Click on the hyperlinked layer name in the “National Flood Hazard Layer (FEMA)” folder (see the example “Floodways” in area C of Figure 2) to open a new window that contains the map symbols and other information.

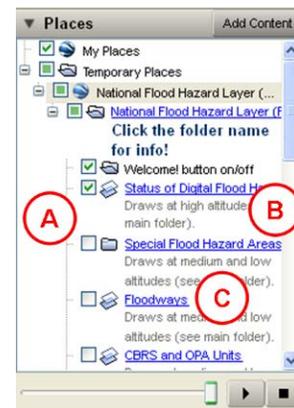


Figure 2. Layer controls in the “National Flood Hazard Layer (FEMA)” folder. Click on (A) the boxes to turn layers on and off, (B) the “Draws at ...” text to view sample data, and (C) the hyperlinked file name to learn about the layer.

Finding the Flood Hazard for Your Location

■ *Goal:* View flood hazard, cross-section, community, FIRM, and LOMR information for an address. (The address *1927 Ocean Street, Santa Cruz, California*, is used for this section.)

1. Change the selection of layers (see area 1 in Figure 3).
 - Turn off the folder “Opening screen on/off” and the layer “Status of Digital Flood Hazard Data Coverage.”
 - Turn on the layers “Special Flood Hazard Areas and Other Zones,” “Communities,” “Cross Sections and Coastal Transects,” and “FIRM and LOMR Boundaries.”
2. Fly to a place of interest (use the “fly to” capability (see area 2a in Figure 3) or the navigation controls (area 2b). Be sure that the eye altitude (area 2c) is in the “low” range. In the example, the address of the place (*1927 Ocean Street, Santa Cruz, California*) was used in the “fly to” capability.
3. Read the map symbols that overlay the place of interest.
 - *If flood hazard information is available*, the map displays the following information (see the map area in Figure 3):

- Flood hazard zones (area 3a): Areas of high flood hazard (all the A (i.e., A, AE, etc.) and V (V and VE) zones) are shown in red tint. Specific flood insurance risk zone designations (e.g. Zone VE or Zone AO) are shown by red line patterns overlaid on the tint. Areas of medium-to-low hazard are shown with pink tint overlaid by pink lines. Areas of low

⁴ A combination is a group of individual layers drawn at one time.

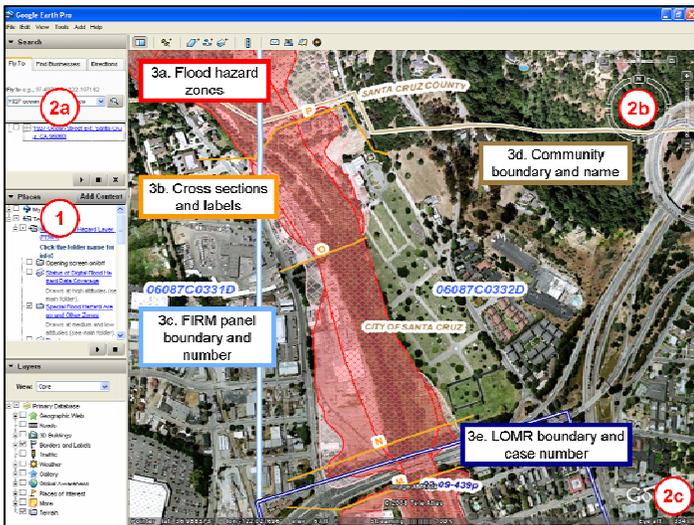


Figure 3. To generate a map of flood hazard information for a place:

- (1) Select the appropriate layers.
- (2) Fly to the community (by using “fly to” (2a) or the navigation controls (2b)). Check the eye altitude (2c) to ensure that it is in the low range.
- (3) Read the map. The sample map shows (3a) flood hazard zones, (3b) cross sections and labels, (3c) community boundaries and names, and (3d) FIRM panel numbers and boundaries, and (3e) a LOMR case number and boundary.

hazard are not covered by tint or lines. The hazard has not been determined for areas covered by gray tint and lines.

- Cross sections (area 3b): When used with the Flood Insurance Study for the community, cross sections are the basis for calculating the BFE. The identifier and path for cross sections are shown in orange in selected flood insurance risk zones. This service does not provide static BFEs or flood depths.
- FIRMs (area 3c): The 11-character number and boundary of map panels are shown in light blue. If only a number is visible, the entire view is within the panel.
- Communities (area 3d): The names and boundaries of communities are shown in brown text and line symbols. If only a name is visible, the entire view is within the community.
- LOMRs (area 3e): The case number and boundary of LOMRs are shown in dark blue. If only a number is visible, the entire view is within the LOMR.

Click on the hyperlinked layer names to interpret the map symbols (see area 1 in Figure 3 for the location of the hyperlinked layer names).

■ If flood hazard information is not available the area is shaded in yellow (see Figure 4). See the MSC web site at <http://msc.fema.gov> to find other flood hazard information for your location.

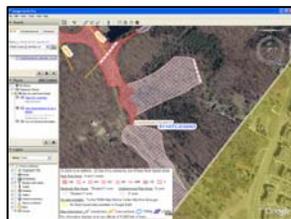


Figure 4. The yellow shading in the lower right means no flood information is available for the area from this service.

Ending the session

When you close Google Earth, it will ask what you would like to do with the “FEMA NFHL” folder. If you:

- Answer “Yes,” Google Earth will add “FEMA NFHL” to your “My Places” folder (see area c in Figure 1). “FEMA NFHL” will be available each time you use Google Earth.
- Answer “No,” Google Earth will not save “FEMA NFHL” internally for later use. You can use “FEMA NFHL” again by double-clicking on the kmz file you saved on your computer.
- Answer “Cancel,” Google Earth will remain open.

Frequently Asked Questions

■ Google Earth viewer controls.

- Cannot see the “FEMA NFHL” folder or “fly to” entry field (area c in Figure 1): Turn on the sidebar. Go to the menu bar (File, Edit, View, etc.) at the top of the Google Earth window, click on View, and click on Sidebar.
- Cannot see the “Eye alt” (eye altitude) readout (area e in Figure 1): Turn on the status bar. Go to the menu bar (File, Edit, View, etc.) at the top of the Google Earth window, click on View, and click on Status Bar.

■ Map display.

- The map display has a confusing set of overlays that you do not remember turning on: Inspect the status of all the layers in the “Places” panel. Be sure to turn on only the overlays you need, and **turn off** all other layers and applications that display FEMA flood data (like FEMA’s Stay Dry application).
- The flood map and Google Earth imagery do not register: For some areas, the flood map overlay and the imagery in Google Earth do not register (see Figure 5). This situation might occur

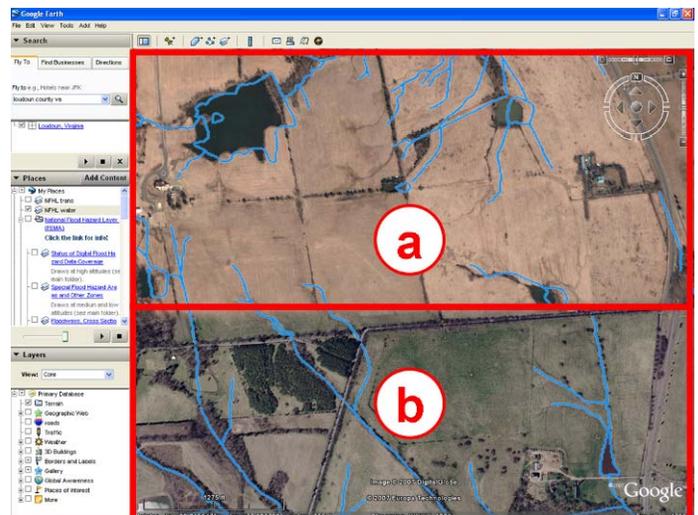


Figure 5. Misregistration between the flood map and imagery for a view in Google Earth. Area a shows a horizontal offset for the streams between the flood hazard data (blue lines) and imagery. The flood hazard data and imagery correctly register in area b. In this case from late 2007, the cause was poor registration of imagery in Google Earth in area a, which was later corrected.

because of poorly positioned imagery in Google Earth, poorly positioned flood hazard data, or other reasons. If there is a problem at your location, please use another flood hazard map product available from the MSC at <http://msc.fema.gov>. If you suspect that the flood hazard data are positioned poorly, please report the problem to MIPhelp@mapmodteam.com.

- *The flood map and Google Earth elevation values do not match:* Both the flood hazard mapping process and Google Earth (see Figure 6) use terrain (elevation) data. It is extremely unlikely that the terrain data used to map flood hazards and those in Google Earth are the same. The elevation values in flood maps can be measured in feet or meters, and using different vertical datums. These differences in elevation data may result in discrepancies in views of flood hazard and terrain in Google Earth.



Figure 6. Three-dimensional view of flood hazard areas for Pittsburgh, Pennsylvania. Both flood hazard mapping and Google Earth use terrain data, but the data most likely are different. There may be discrepancies in views that display flood hazard and Google Earth data.

- *“Big red X” on the map display:* Google Earth did not receive one or more map overlay(s) from the FEMA Web Map Service that provides the images. Sometimes the problem is temporary, and you can fix it by (1) changing the view a little (zoom in or out or nudge the view left or right) or (2) exiting Google Earth and restarting it. If you receive the “big red x” repeatedly, the FEMA service is down or very busy; please let us know at MIPhelp@mapmodteam.com and try again later.
 - *Turn off the Welcome! Button:* Turn the Welcome! Button on and off by going to the “Places” panel (see area c in Figure 1), looking in the “National Flood Hazard Layer (FEMA)” folder, and clicking on the box in front of “Welcome! button on/off” (see area A in Figure 2).
- *Map navigation.*
- *Use other information to “fly to” a location:* Google Earth allows other location information (e.g., latitude and longitude coordinates) to be substituted for an address in the “fly to” capability (see area 2a in Figure 3).
 - *Double-clicking in the “Places” panel unexpectedly caused Google Earth to “fly to” Pittsburgh (or Lewes, Delaware, Port Noches,*

Texas, or the lower 48 States): Double-clicking in the National Flood Hazard (FEMA) folder in the “Places” panel flies the map view to an area where sample data are available. You can go back to your previous location by entering the location under the “Fly to” in the Search panel, clicking a location listed under “Fly to,” or panning and zooming the map.

■ *The FEMA NFHL kmz file.*

- *Using the kmz file with software other than Google Earth:* Some Geographic Information System (GIS) software can use data in a kmz file. This technique is *not* likely to work with the FEMA NFHL kmz file. If you are interested in working with the NFHL data with GIS software, use the NFHL GIS data or NFHL Web Map Service. Both are available through the MSC at <http://msc.fema.gov>.

Sources of Additional Information

Questions or comments about the FEMA NFHL application: Direct them to MIPhelp@mapmodteam.com. Please include the words “Google Earth” in the subject of your message.

To view and buy flood maps and data: See the MSC web site at <http://msc.fema.gov>.

For information and resources associated with using or requesting changes to FEMA Flood Maps: See the Flood Hazard Mapping web site at <http://www.fema.gov/plan/prevent/fhm/index.shtm>.

For general information about flood risk, flood insurance, and the National Flood Insurance Program: See the FloodSmart web site at <http://www.floodsmart.gov>.