



# FEMA NFHL Google Earth Instructions (kml version 3.0)

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

The Federal Emergency Management Agency (FEMA) National Flood Hazard Layer (NFHL) utility allows you to use Google Earth™<sup>1</sup> to view custom combinations of flood hazard information from FEMA’s NFHL<sup>2</sup>. View one, several, or all of the layers available in the application.

The NFHL layers include:

- Flood hazard zones and labels
- River Miles Markers
- Base Flood Elevations (BFEs)
- Cross-sections and coastal transects and their labels
- Letter of Map Revision (LOMR) boundaries and case numbers
- Flood Insurance Rate Map (FIRM) boundaries, labels and effective dates
- Coastal Barrier Resources System (CBRS) and Otherwise Protected Area (OPA) units
- Community boundaries and names
- Levees
- Hydraulic and flood control structures
- Profile and coastal transect baselines
- Limit of Moderate Wave Action (LiMWA)

Additional reference layers include:

- Status of NFHL data availability
- Point locations for Letters of Map Amendment (LOMAs) and Letters of Map Revision Based on Fill (LOMR-Fs)

### Sources of Additional Information

Direct your questions or comments about the FEMA NFHL application to [MIPhelp@riskmapcds.com](mailto:MIPhelp@riskmapcds.com). Please include the words "Google Earth" in the subject of your message. To view and buy flood maps and data visit the Map Service Center Website at <https://msc.fema.gov>.

For information and resources associated with using or requesting changes to FEMA Flood Maps please visit the Flood Hazard Mapping Website at <https://www.fema.gov/national-flood-insurance-program-flood-hazard-mapping>

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

<sup>1</sup> Names of products are provided for descriptive purposes only and do not represent an endorsement by the U.S. Government.

<sup>2</sup> The National Flood Hazard Layer (NFHL) is a computer database that contains the digital flood hazard information from FEMA's flood Map Modernization program. These map data include 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 <https://msc.fema.gov>.

Previous knowledge of FEMA flood hazard information and Google Earth will be helpful in using this application. 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 accuracy<sup>3</sup>.

## Before You Start

You must have Google Earth version 7.3 or higher software installed on your computer. The starting point for obtaining the software is <https://earth.google.com/>. Information about the system requirements needed for your computer to run the software is available through <https://earth.google.com/support/>. A user guide is available at <https://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 at <https://hazards.fema.gov/femaportal/wps/portal/NFHLWMSkmzdownload>. Download the .kmz file to your computer using the instructions provided on the kmz web page. For best performance, please delete or turn off previous versions of the Stay Dry.

<sup>3</sup> 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) 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.)

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 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

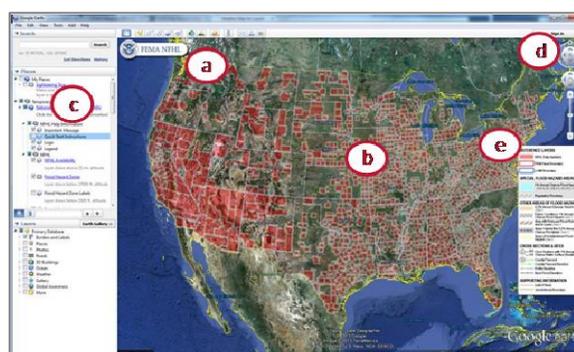


Figure 1. Opening view for the FEMA NFHL utility. Areas of interest include the (a) Quick Start Guide, (b) status map overlay, (c) "National Flood Hazard Layer (FEMA)" folder, (d) navigation controls, (e) eye altitude readout, and (f) map legend.

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 (higher than 25 miles)

- Status of digital flood hazard data coverage
- Political Jurisdictions

- CBRS and OPA areas
- FIRM Panel boundaries
- River Mile Markers

For “medium” and “low” eye altitudes (from 25 miles to maximum zoom)

- Flood Hazard Zones and Labels
- Floodways
- Base Flood Elevations (BFEs)
- LOMR boundaries and case numbers
- LOMA and LOMR-F locations and case numbers
- Cross-Sections and Coastal Transects
- Levees and General Structures
- Profile and Coastal Transect Baselines
- LiMWA lines

### 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 listed below each layer name.

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.

This layer depicts FIRM Panel boundaries, with labels showing the FIRM Panel number and effective date for each area. Users can reference the FIRM Panel number to retrieve FIRMs from the Map Service Center.

### 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 additional information for the layer and, if the layer symbol is not shown in the legend, the symbol used to display the feature.

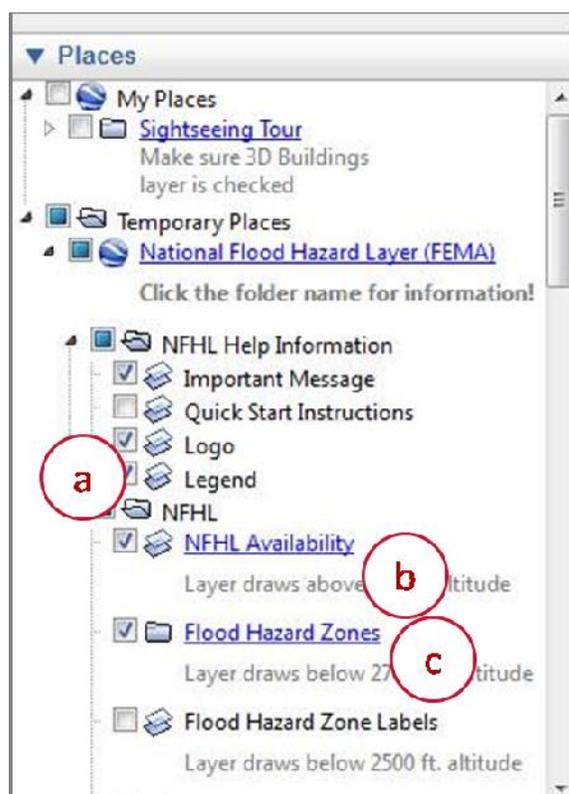


Figure 2. Layer controls in the “National Flood Hazard Layer (FEMA)” folder. Click on (A) the boxes to turn layers on and off, (B) the “Draws at ...” text, and (C) the hyperlinked file name to learn about the layer.

## Finding the Flood Hazard Layer 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).
  - a. Turn off the folder “Quick Start Instructions” and the layer “NFHL Availability”



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 desired range (3) Read the map. The sample map shows (3a) flood hazard zones, (3b) cross sections, base flood elevations, and labels, (3c) FIRM panel numbers and boundaries, and (3d) a LOMR case number and boundary.

- b. Turn on the layers “Flood Hazard Zones”, “Base Flood Elevations”, “Cross Sections and Coastal Transects”, “LOMRs”, and “FIRM Panels” .
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 lower than the layer you would like to view. 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 blue. Floodways are shown by red hatching over the areas of high hazard. Low to moderate risk zones may be orange, black and orange, or yellow dots depending on the zone designation.
- Cross sections and Base Flood Elevations (area 3b): When used with the Flood Insurance Study for the community, cross sections are the basis for calculating the BFE. BFEs are shown at whole-foot values. This service does not provide flood depths.
- FIRMs (area 3c): The 11-character number and boundary of map panels are shown in red with the FIRM panel effective date. If only a number is visible, the entire view is within the panel.
- LOMRs (area 3d): 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.

**If flood hazard information is not available the area will not be colored red when the NFHL Availability layer is turned on. See the MSC Web site at <https://msc.fema.gov> to find other flood hazard information for your location.**

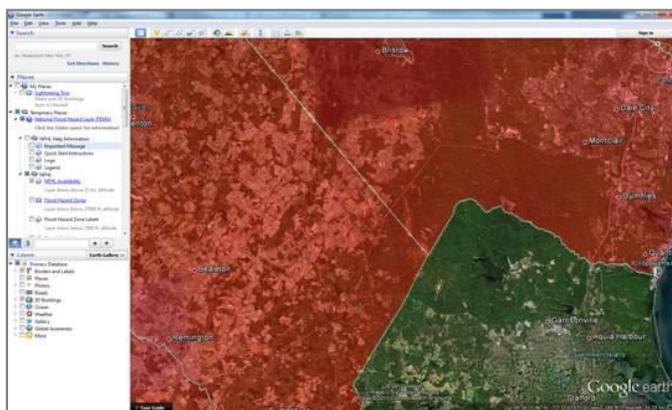


Figure 4. The lack of red shading in the lower right means no flood information is available for the area from this service.

## 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 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

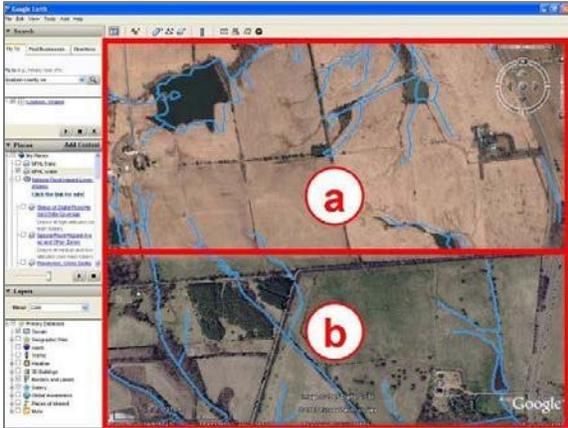


Figure 5. Misregistration between the flood map and imagery for a view in Google Earth. Area a shows a horizontal offset for the streams between the flood hazard data (blue lines) and imagery. The flood hazard data and imagery correctly register in area b. In this case from late 2007, the cause was poor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

from the MSC at [https:// msc.fema.gov](https://msc.fema.gov). If you suspect that the flood hazard data are positioned poorly, please report the problem to [MIPHelp@riskmapcds.com](mailto:MIPHelp@riskmapcds.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



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.

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.

- “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 or (3) reducing the size of your display window (select the minimize button from the upper right corner of the window) if Google Earth fills the entire display window. If you receive the “big red x” repeatedly, the FEMA service is down or very busy; please let us know at [MIPHelp@ riskmapcds.com](mailto:MIPHelp@riskmapcds.com) and try again later.
- Turn off the Quick Start Instructions: Turn the Quick Start Instructions 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 “Quick Start Instructions” (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 “fly to” Pittsburg (or Lewes, Delaware, Port Neches, Texas or the lower 48 States): 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” with software other than Google Earth: Some Geographic Information Systems (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 be found on the [GIS Services for the National flood Hazard Layer](#) web page.