Using Open Source Tools for GIS

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GIS Day at Los Angeles County
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Training Track

Room B-85F, Hall of Administration

10:30-11:20 AM

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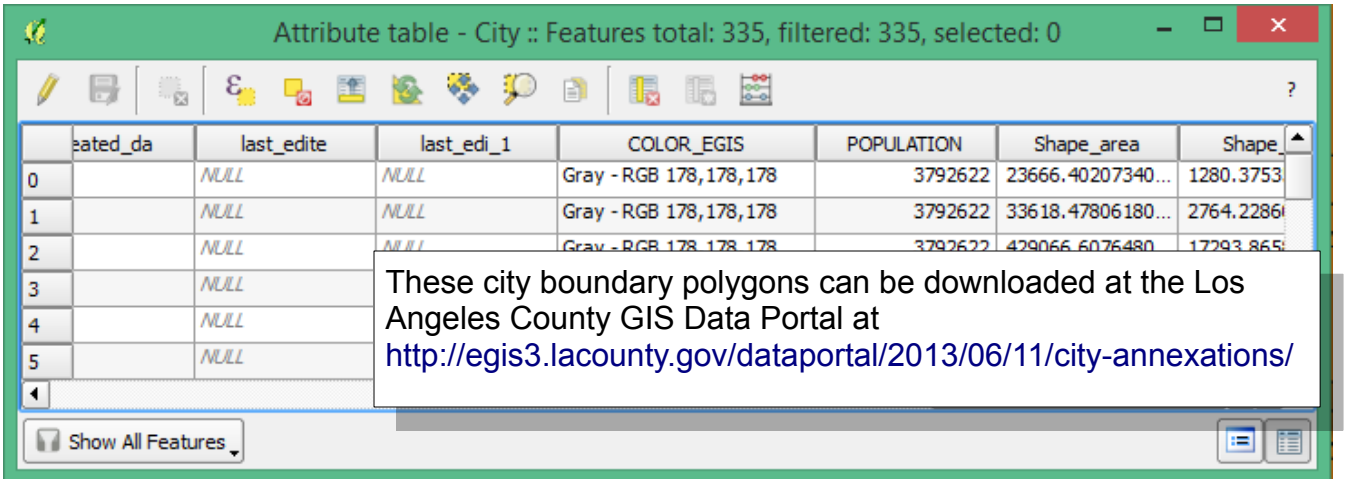
Symbolize a Layer by Attributes

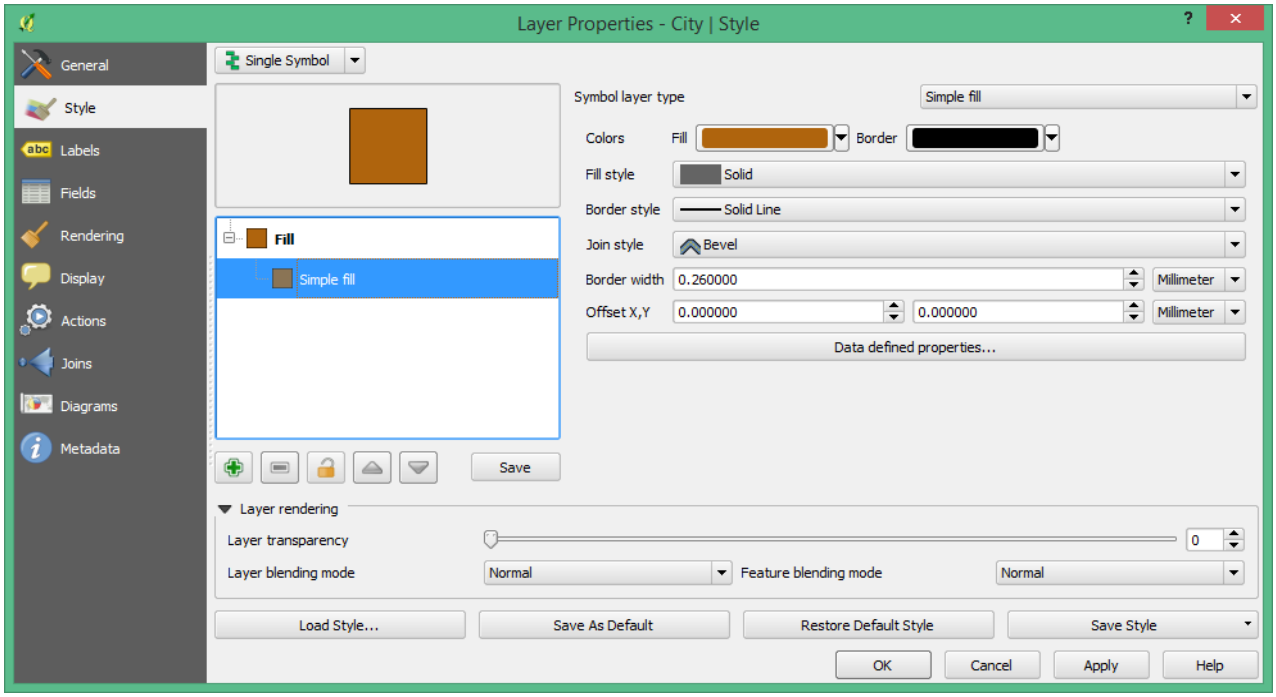
Use the **Add Vector Layer** tool, navigate to **C:\GISDay2014\gis_data\Shapefiles** and add the **City.shp** shapefile. Right-click the layer and select **Zoom to Layer** to see its extent.

Right-click the City layer and select **Open Attribute table**.



Notice the field **COLOR_EGIS**. The right 11 characters contain the RGB values representing the colors used by Los Angeles County GIS websites.

Close the attribute table, right-click the **City** layer, select **Properties**, and select **Style**.

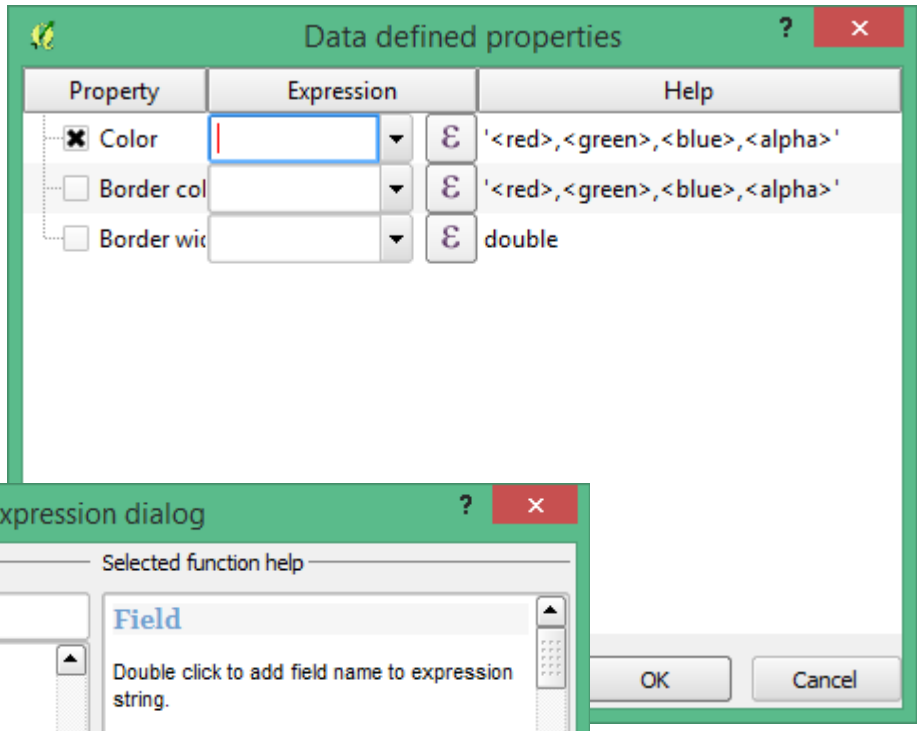


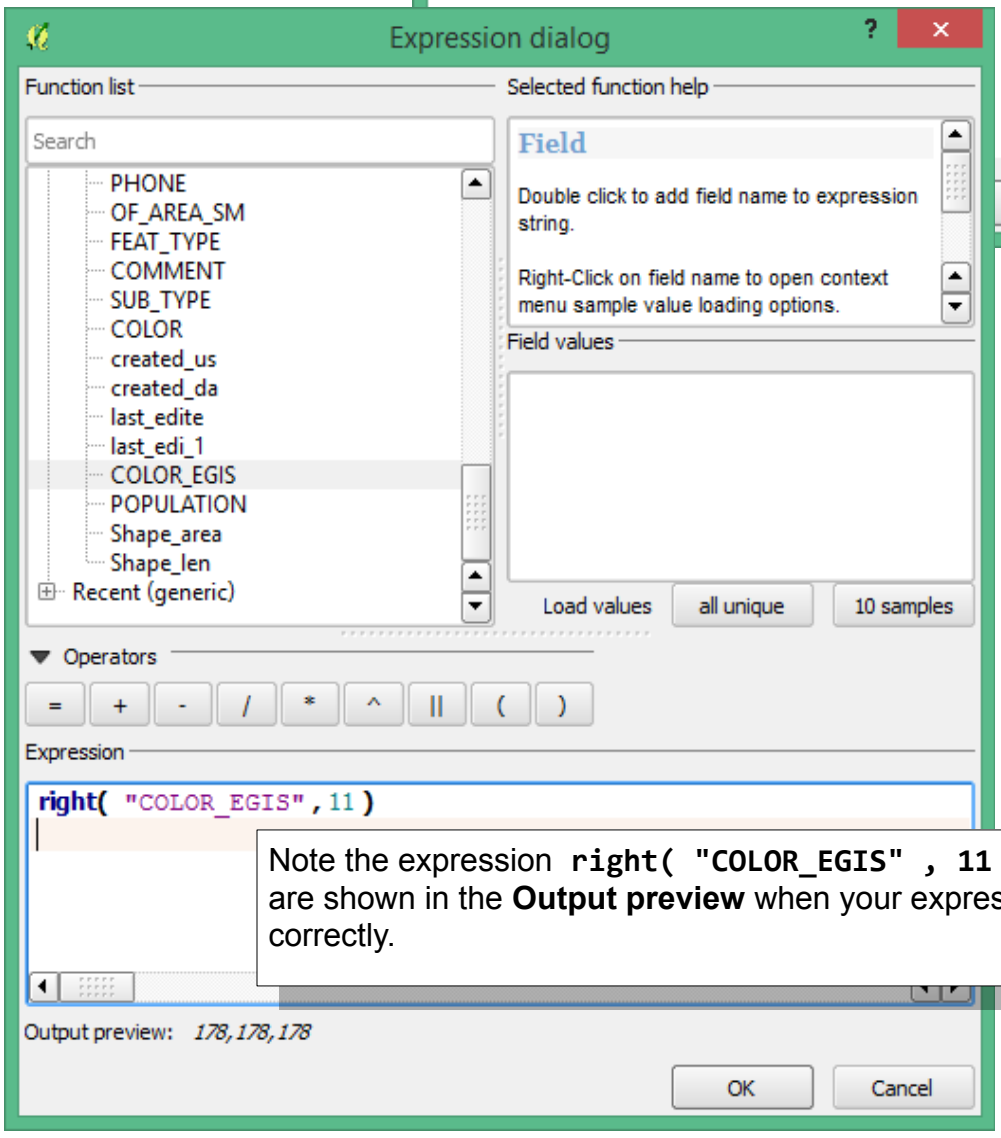
Select **Simple fill** and then select **Data defined properties**.

You will need to build an expression to extract the RGB values in the rightmost 11 characters in the COLOR_EGIS field.

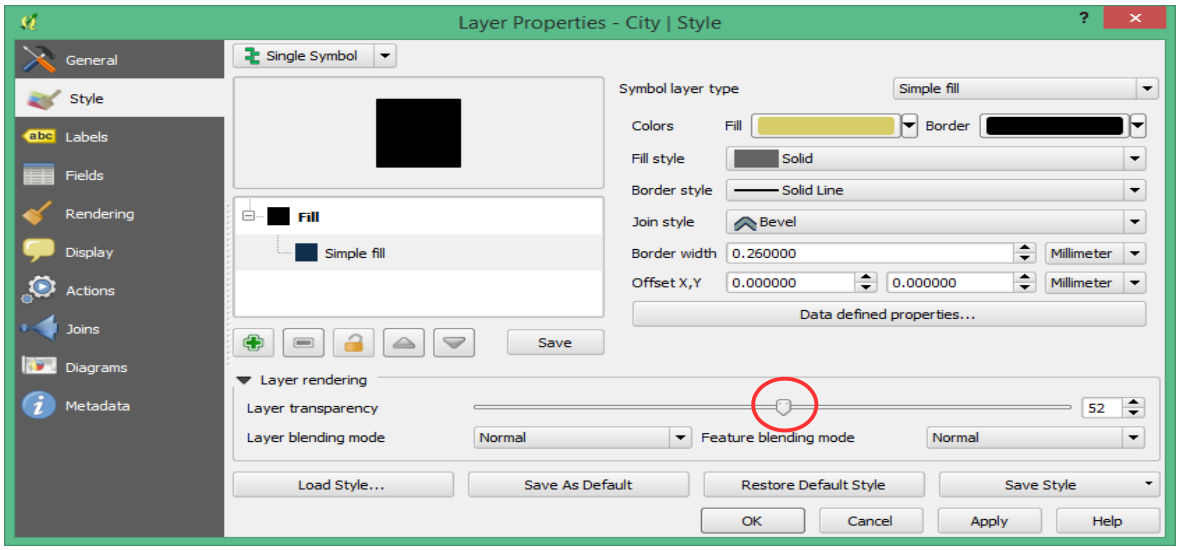
Select the Expression button

to open the expression dialog.

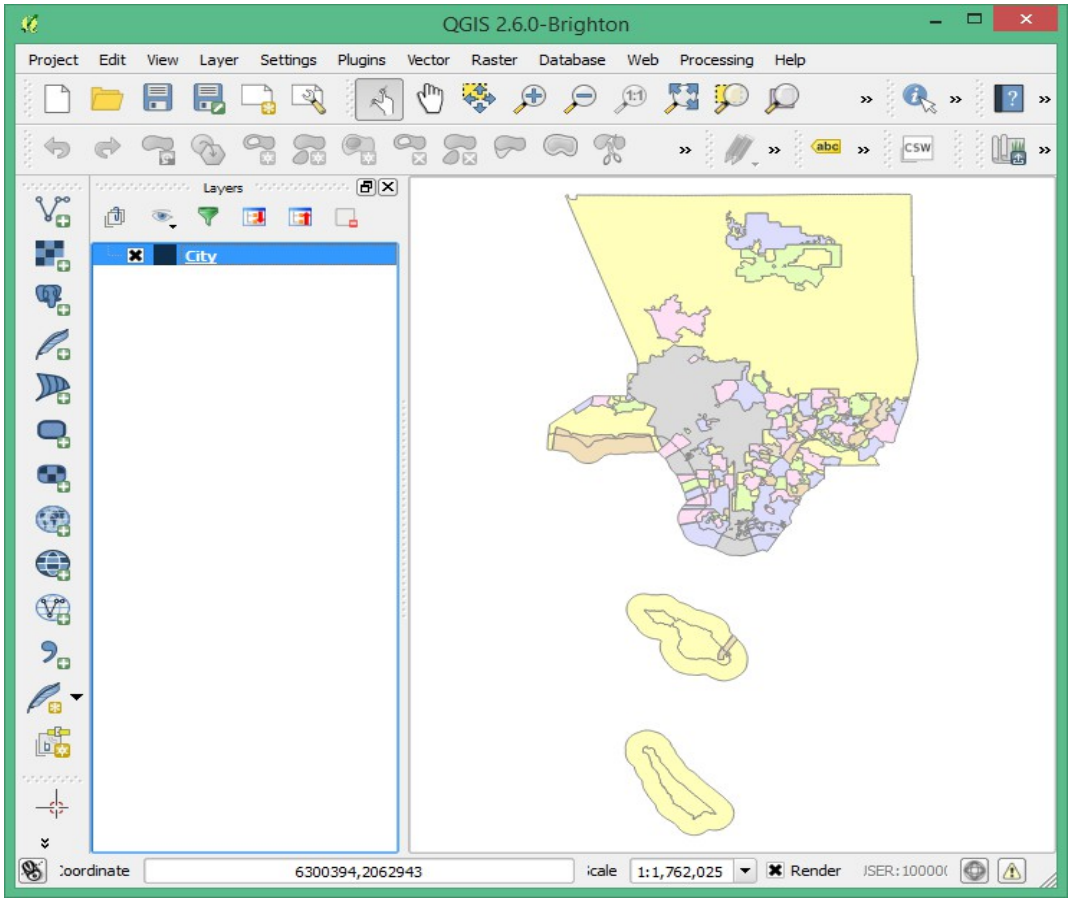




Note the expression **`right( "COLOR_EGIS" , 11 ).`** Sample results are shown in the **Output preview** when your expression is written correctly.



Move the **Layer transparency** slider to the middle to make your layer half transparent.



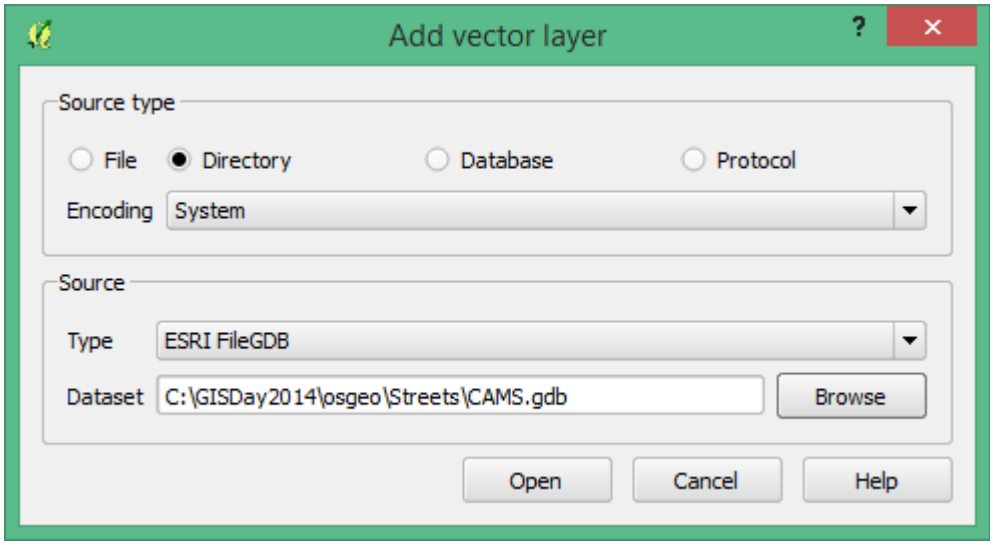
Congrats! Your shapefile is beginning to resemble cities as symbolized by numerous Los Angeles County websites!

Adding Street Data

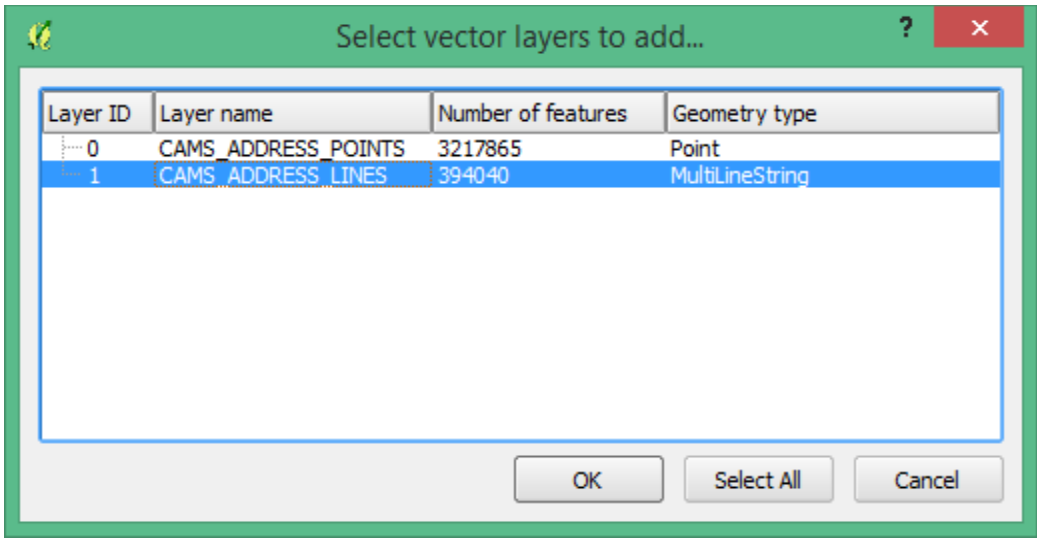
In this step, you will add streets, provided by the Countywide Address Management System (CAMS). This data is freely available for downloading at the Los Angeles County GIS Data Portal as an Esri file geodatabase. See http://egis3.lacounty.gov/dataportal/2014/06/16/2011-la-county-street-centerline-street-address-file/.

First, zoom into a part of L.A. County, near and around Santa Clarita and San Fernando.

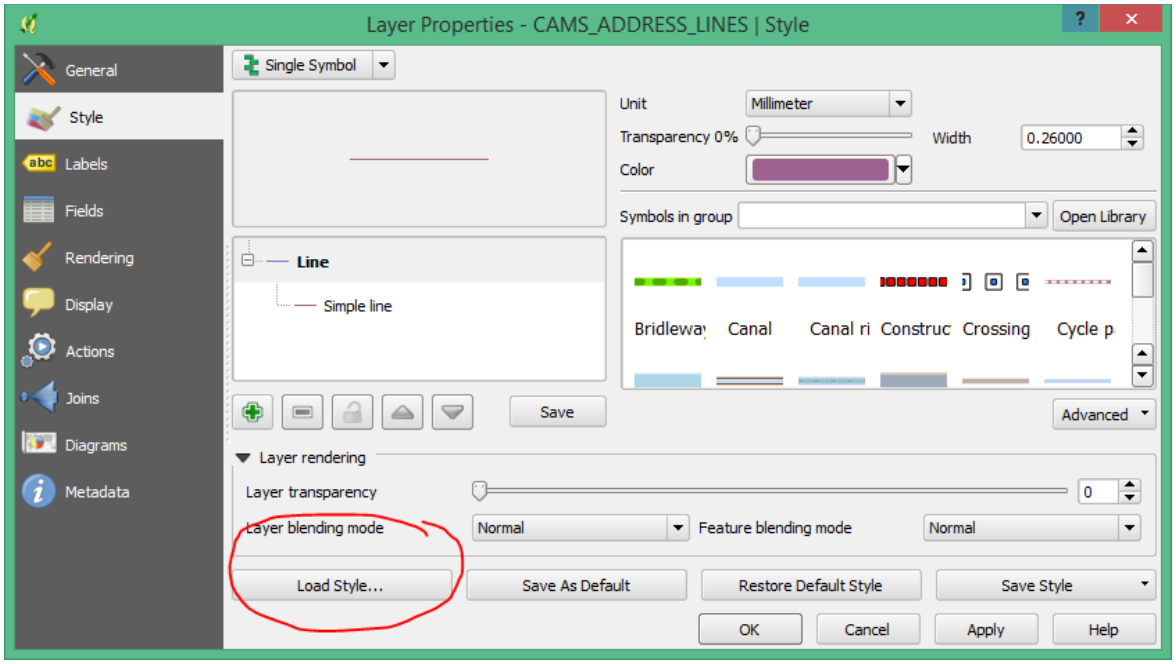
In QGIS, select the **Add vector layer** tool. Select **Directory**, and **ESRI FileGDB** as your Source Type. Navigate to and select **C:\GISDay2014\osgeo\Streets\CAMS.gdb**, then select **Open**.

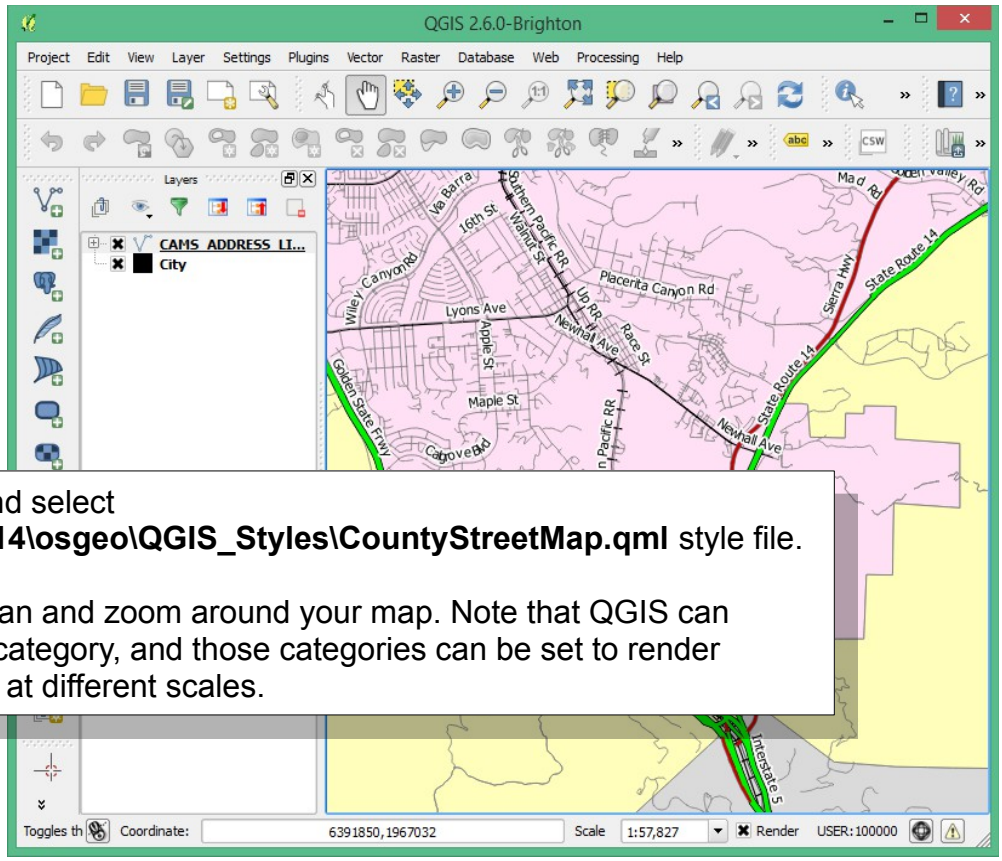


Next, select the **CAMS_ADDRESS_LINES** feature class and select **OK**. (*DON'T select the CAMS_ADDRESS_POINTS feature class.)*



To symbolize this data, right-click the street layer and select **Properties**, then **Style**. QGIS has a wide variety of symbologies. To save time, select the **Load Style** button.





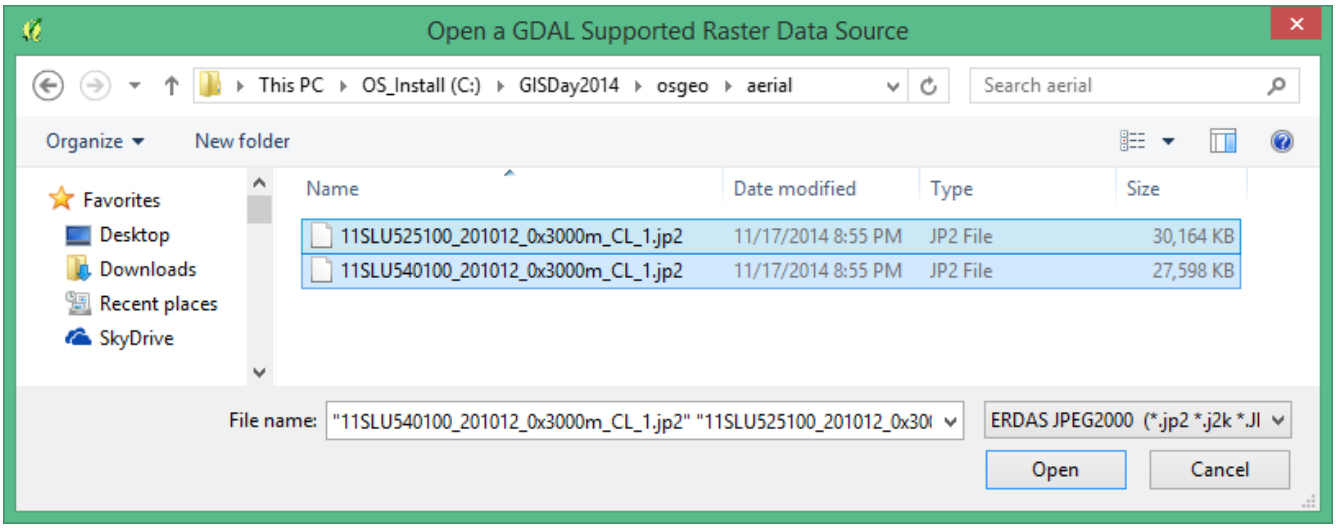
Navigate to and select **C:\GISDay2014\osgeo\QGIS_Styles\CountyStreetMap.qml** style file.

When done, pan and zoom around your map. Note that QGIS can symbolize by category, and those categories can be set to render independently at different scales.

Adding Aerial Imagery

Next, you will add one foot (0.3 meter) resolution orthoimagery jpeg 2000 tile samples from the *National Map*. Los Angeles County hosts some information on this free data on its GIS Data Portal at http://egis3.lacounty.gov/dataportal/2013/02/28/2011-lar-iac-imagery-public-domain-1-foot-free/.

In QGIS, select the **Add Raster Layer** tool, browse to the folder **C:\GISDay2014\osgeo\aerial**, and select all the files with a *.jp2 extension.

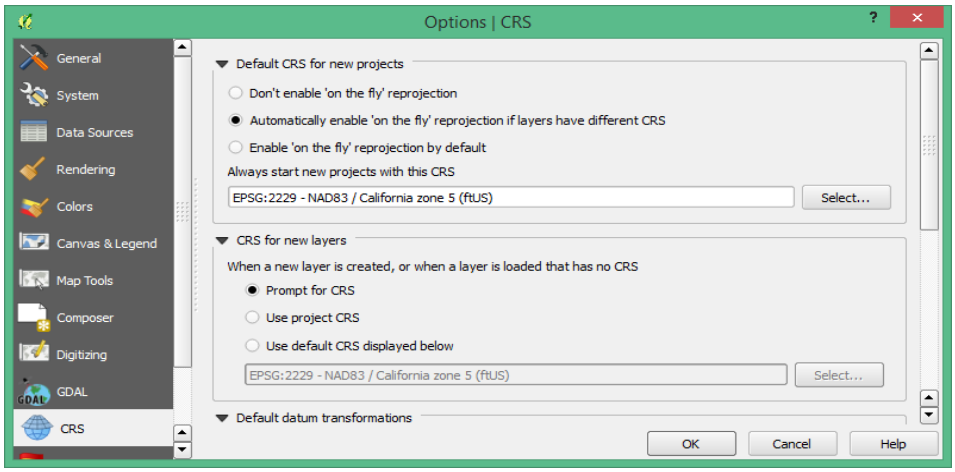


Note: These image files are stored in a different map projection than most vector shapefiles you download from Los Angeles County's GIS Data Portal:

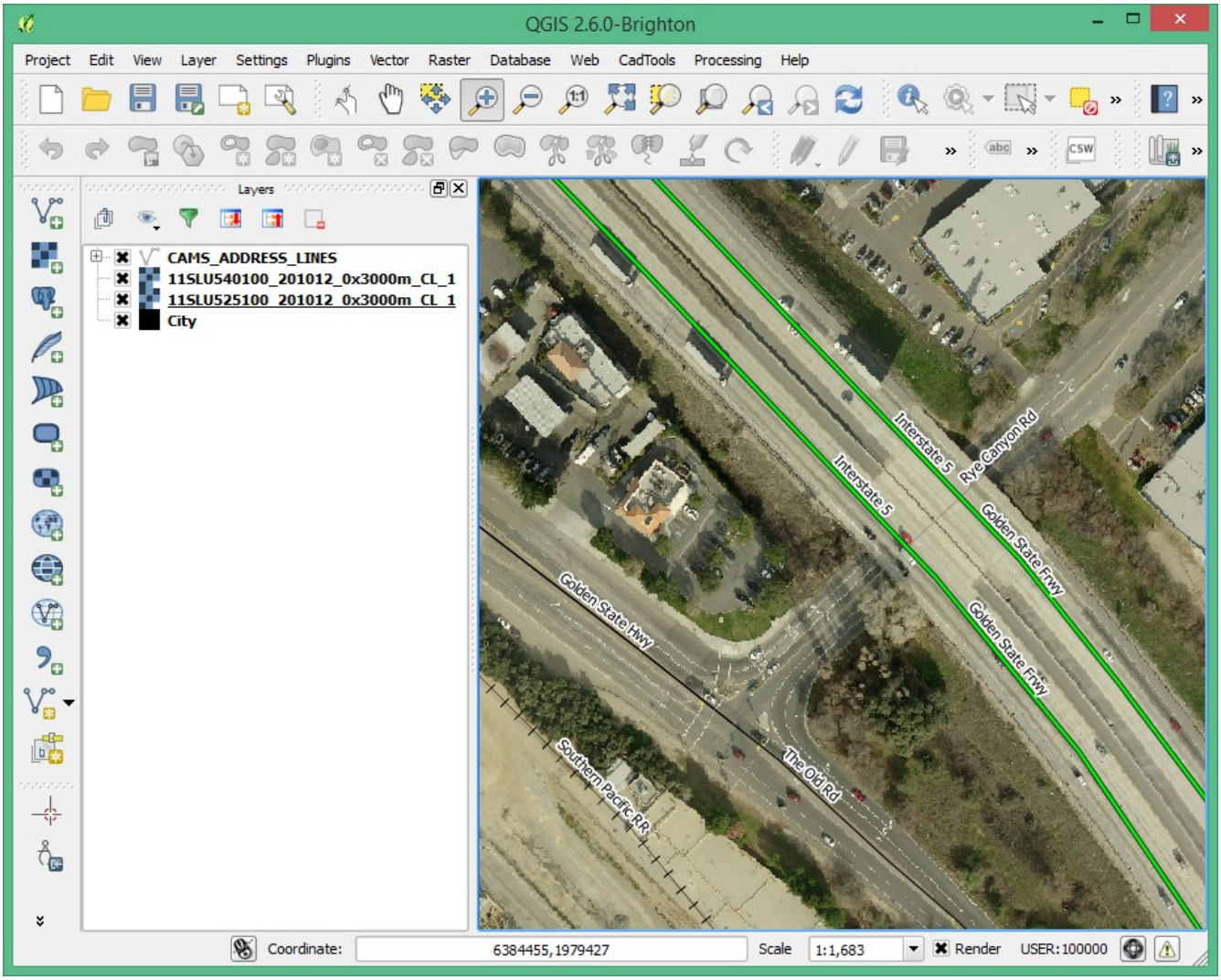
Data	Coordinate System	Units	EPSG
National Map Imagery	NAD83 / UTM zone 11N	Meters	26911
City.shp	NAD83 / California zone 5	U.S. Survey Feet	2229

If QGIS does not project these datasets on the fly, Go to the **Settings** menu, and select **Options**, then **CRS**.

This example uses California Zone 5 as the default projection.



Turn on these layers, pan and zoom to areas along the Golden State Freeway, Rye Canyon Road and Magic Mountain Parkway.



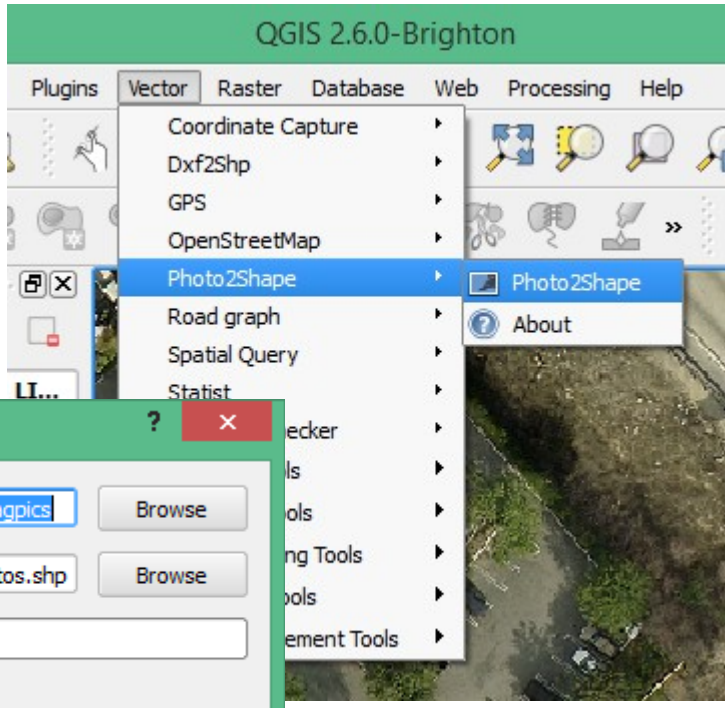
Geotagged Photos

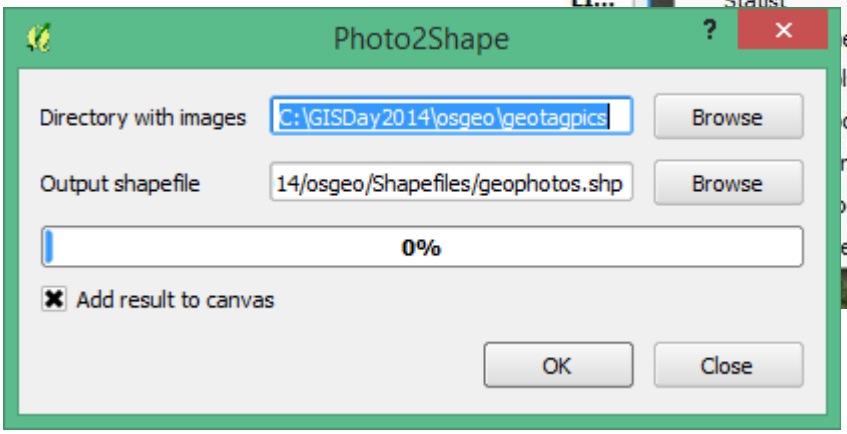
Some digital cameras and cell phones are equipped for taking photos with GPS coordinates and the azimuth of the camera's orientation at the time the picture was taken. In this step you will use a QGIS plugin, called *Photo2Shape* for converting these photos into a hyperlinkable shapefile.

If you haven't installed this plugin, go to the **Plugins** menu and select **Manage and Install Plugins**. Look for and select the **Photo2Shape** plugin and install it.

See this video for an example of adding a QGIS Plugin.

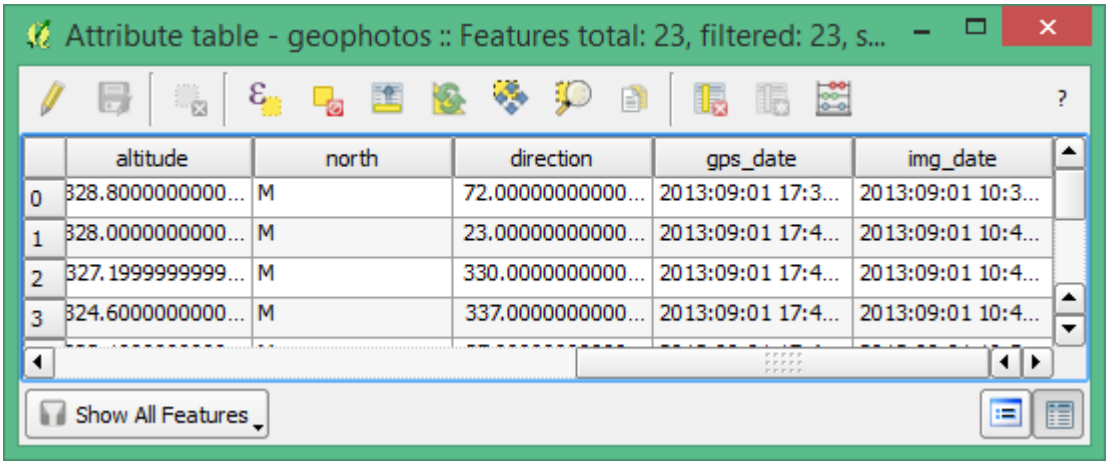
When ready, go to the **Vector** menu and select the **Photo2Shape** tool.





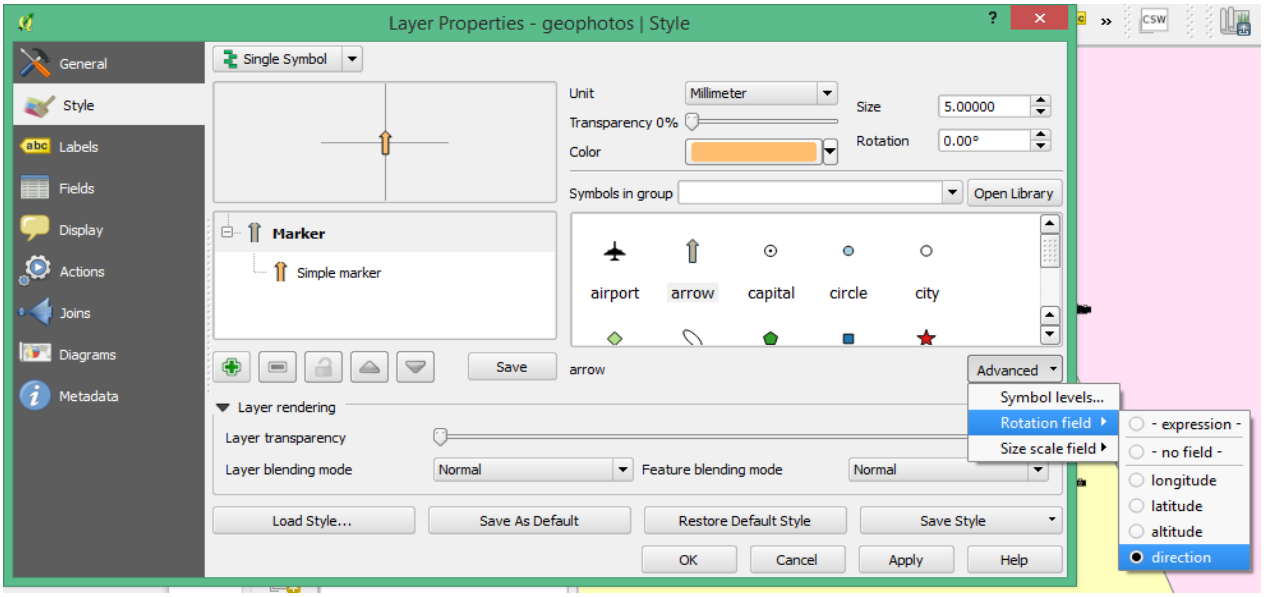
Navigate to **C:\GISDay2014\osgeo\geotagpics** as your directory with geotagged images. This example selected **C:/GISDay2014/osgeo/Shapefiles/geophotos.shp** as the shapefile to be created.

Right-click to view this new shapefile's attribute table and note the **filepath** and **direction** fields.



The default symbology created by the Photo2Shape plugin looks like small cameras. For this exercize, you will need to change that.

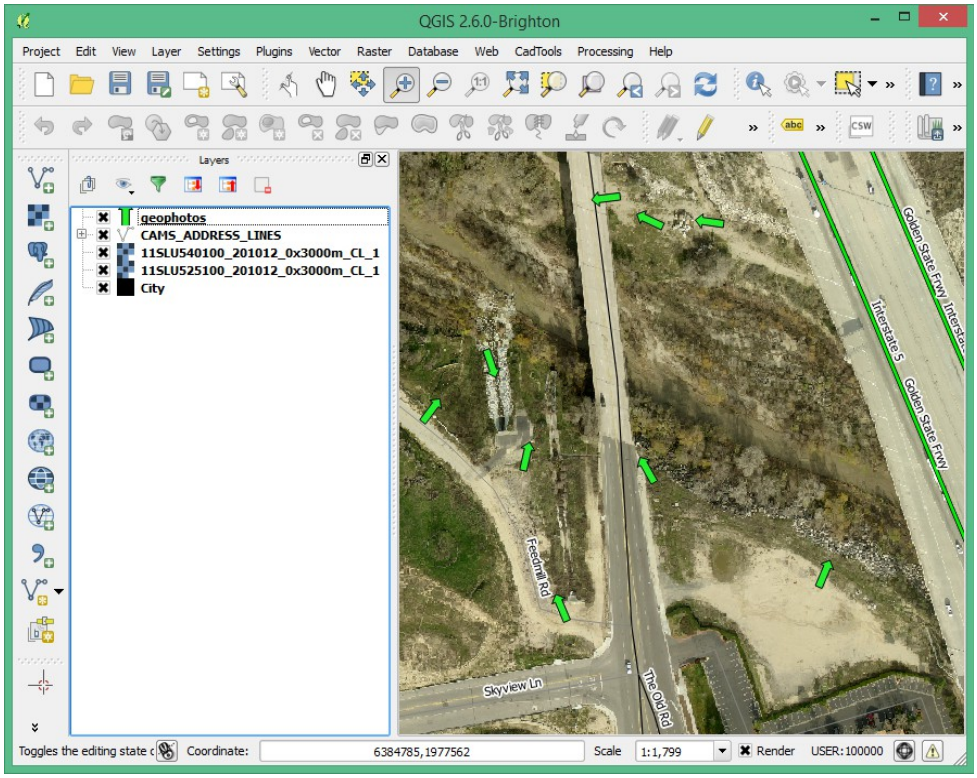
Right-click the geophotos layer, select **Properties**, and select **Style**.



Select the arrow marker. Select **Advanced**, **Rotation** field, then **direction**. For each geotagged photo, the shapefile contains the GPS azimuth that the camera was pointing in the **direction** field.

In the example to the right, the arrow symbol was enlarged and changed to green to better appear on top of aerial imagery.

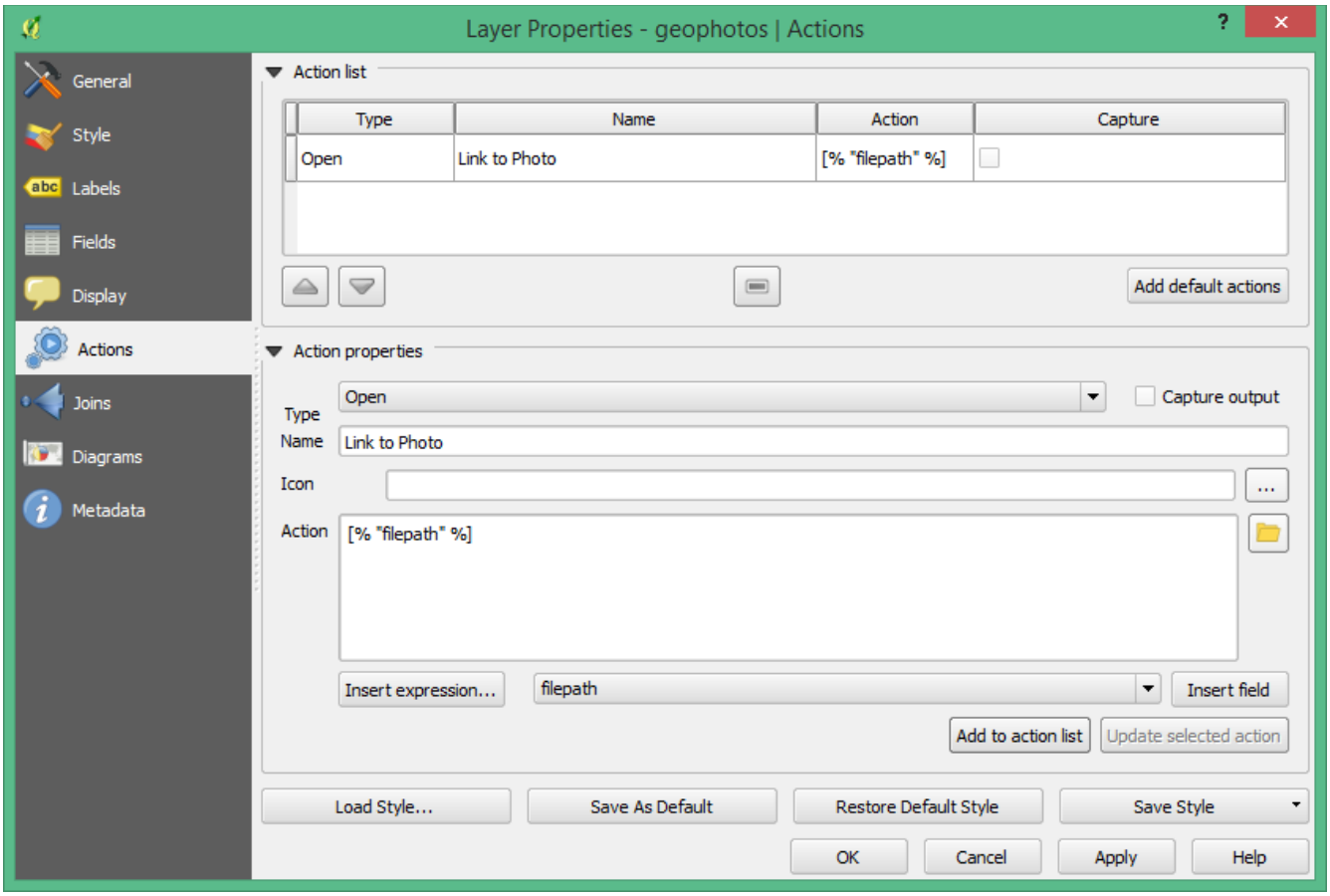
When collecting geotagged photos in the field, it is always best practice to make sure your camera is capable of storing the camera's orientation as well as its location!



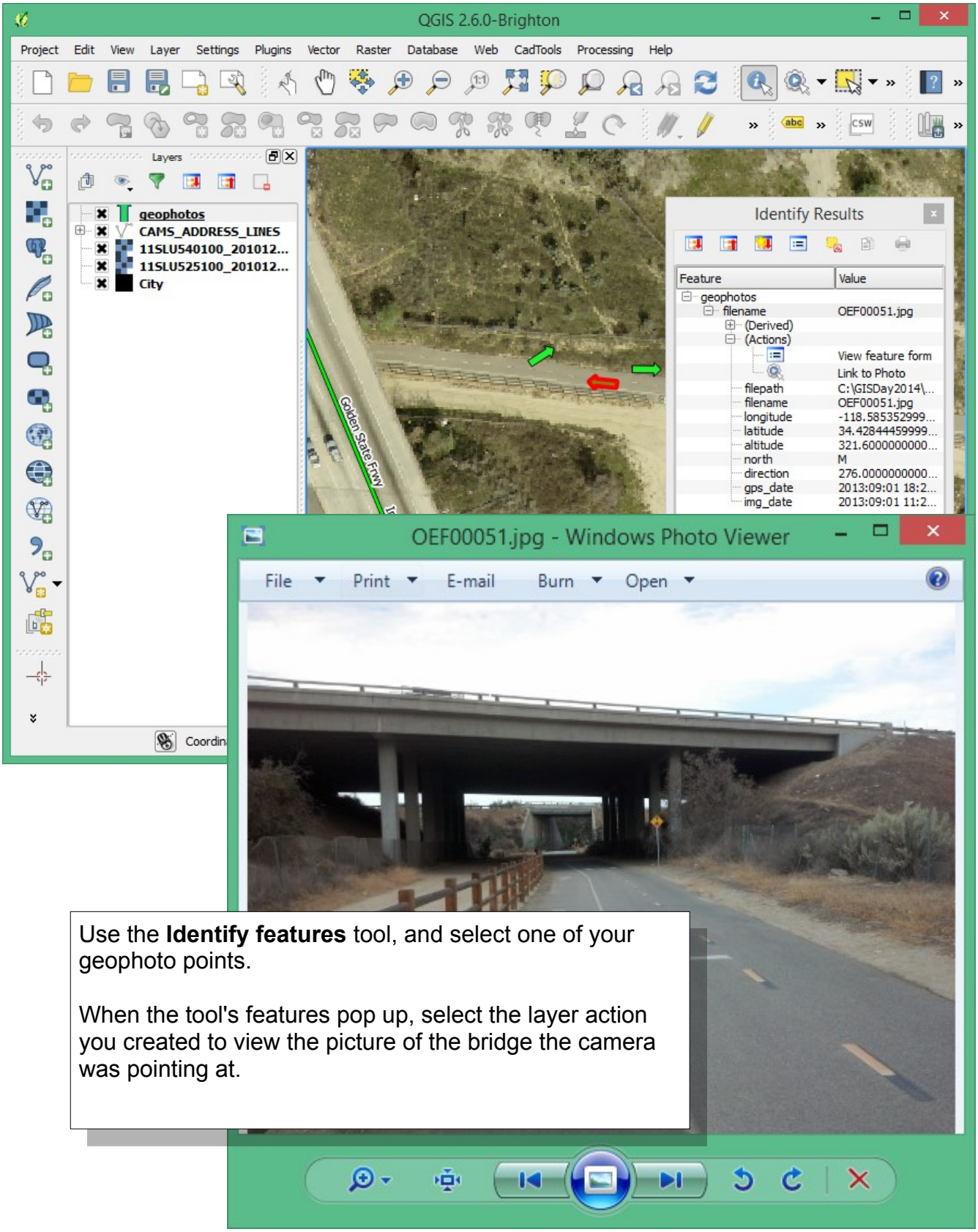
Link Your Stuff!

Our final step is to set up a *Layer Action* so QGIS can hyperlink your GIS features to your geotagged image files.

Right-click the geophotos layer, select **Properties**, and select **Actions**.



Select **Open** as your action Type, name your action "**Link to Photo**", select the field **filepath**, and click the **Add to action list** button, and select **OK** when done.



Use the **Identify features** tool, and select one of your geophoto points.

When the tool's features pop up, select the layer action you created to view the picture of the bridge the camera was pointing at.

Resources

Los Angeles County GIS Data Portal – Includes data, applications, and videos. The vast majority of GIS data internally used by Los Angeles County is freely available to the General Public for downloading at no charge. Two notable exceptions are Assessor Parcel data and aerial imagery supplied by the Los Angeles Region Imagery Acquisition Consortium (LAR-IAC) program. Listed below are data sources we used.

GIS Data Portal	http://egis3.lacounty.gov/dataportal/
Public Domain Imagery	http://egis3.lacounty.gov/dataportal/2013/02/28/2011-lar-iac-imagery-public-domain-1-foot-free/
City Boundaries	http://egis3.lacounty.gov/dataportal/2013/06/11/city-annexations/
Streets & Addresses	http://egis3.lacounty.gov/dataportal/2014/06/16/2011-la-county-street-centerline-street-address-file/
Geophotos, Styles, etc.	ftp://dpwftp.co.la.ca.us/pub/mpm/GIS_Day_2014/GISDay2014Data.zip
Imagery used today	ftp://dpwftp.co.la.ca.us/pub/mpm/GIS_Day_2014/aerial.zip

GIS Data Portal's Instructional Videos page, see http://egis3.lacounty.gov/dataportal/about/videos/

eGIS Website – News, tips and tricks are listed. http://egis3.lacounty.gov/eGIS/

eGIS Open Source GIS page – Includes short basic articles for open source newcomers. http://egis3.lacounty.gov/eGIS/county-gis-projects/open-source-gis/

L.A. County Preferred Technologies for GIS - Most county employees use ArcGIS Desktop by default. Open source GIS applications are listed as "emerging technologies". http://egis3.lacounty.gov/eGIS/2014/09/24/la-county-releases-preferred-technologies-for-gis/

QGIS Home Site – For free software and documentation on the world's most popular open source GIS desktop software, visit http://www.qgis.org.

OSGeo is the organization created to support the collaborative development of open source geospatial software, and promote its widespread use. http://www.osgeo.org/

FOSS4G 2014 – All of the 187 General Sessions of the annual international open source GIS conference are available here. https://2014.foss4g.org/schedule/sessions/

Integrating Open Source Tools Into Traditional GIS Shops - At FOSS4G 2014, Sara Safavi provided useful tips in this video recorded presentation. http://vimeo.com/106224203

FOSS4G North America – The upcoming regional open source GIS conference will be held near San Francisco, March 9-12. https://2015.foss4g-na.org/

Boundless – The company offers commercial technical support and free online workshops for open source GIS, see http://workshops.boundlessgeo.com/. Numerous additional companies are listed in the QGIS Help menu.

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