

NOAA's Joint Polar Satellite System

JPSS and Tornadoes

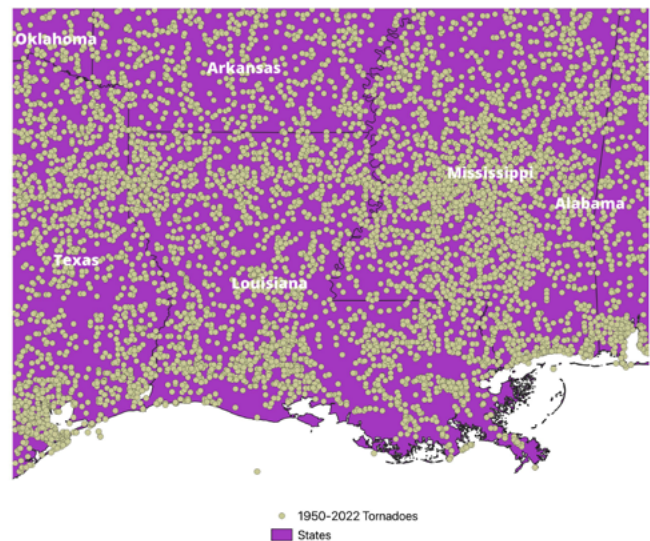
The Joint Polar Satellite System (JPSS) provides data and imagery to scientists, businesses, planners, and government agencies so that they can make maps with helpful information.

GIS stands for **Geographic Information Systems**. These are information systems, typically presented as maps, they keep track of events, facts, activities, objects, and where they are. GIS maps are usually combined with remote sensing (satellite and air photo imagery) and global positioning systems (GPS). A GIS is a map linked to a database. It gives you a cartographic representation of an area, but it also provides additional data about the location and can relate that data mathematically, statistically, and logistically in ways that would be too complicated to process without a computer.

Knowing where something happens is critically important. From building a school to solving an environmental problem, location is a key component. GIS allows the user to make spatial connections when the information is too overwhelming.

Learn more about JPSS at:
www.nesdis.noaa.gov/jpss-education

Tornadoes in Louisiana



Materials

Download and install QGIS:

<https://www.qgis.org/en/site/forusers/download.html>
 QGIS works on most operating systems but is not recommended for tablets or smartphones.

For more information on how to use QGIS you can download a free manual here: https://docs.qgis.org/3.28/en/docs/training_manual/index.html



JOINT POLAR SATELLITE SYSTEM (JPSS)

The Joint Polar Satellite System (JPSS) is a collaborative program between the National Oceanic and Atmospheric Administration (NOAA) and its acquisition agent, the National Aeronautics and Space Administration (NASA).

www.nesdis.noaa.gov/jpss-education

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A GIS is broken into:

- **Themes/layers** – this is all of the geographic information. These two words are interchangeable. They are made up of points, lines, and polygons that are tied to a real place.
- **Attribute Tables** – detailed data related to geographic information. This is a database that goes along with the points, lines, and polygons. Map elements- Scale, North arrow, explanation of symbols
- **Search capabilities**
- **Metadata** – Information about how the data was created. Themes/ layers are the geographic information that you are presenting on the map.

Themes and layers make up the cartographic part of the GIS. The themes are represented as shapes that are called points, lines, and polygons. These components can give you important information without relying on the data tables but they are just the surface of the map. **Points** are used when you have one spot that you want to show. This could be a location of a well, a fire hydrant, or a sighting of a rare bird. **Lines** are anything that can be represented linearly like boundaries, roads, or streams. Anything, where the shape and size are important, can be shown as a polygon. Lakes, buildings, and cities are examples of **polygons**. Behind the scenes of these features are attribute tables. These tables are linked to the points, lines, and polygons and contain data about them. An attribute table can be an extensive database and it will be the information that you use to make your GIS searchable. The more data you have in your tables the more robust your GIS can be. Examples of data in attribute tables can be addresses, names, well depths, numerical statistics, or acreage.

Metadata is data about the data. This is information such as the author, date of data collection, method of data collection, and any known errors. Metadata is vital for troubleshooting errors in your GIS. For example, you wouldn't want to make a flood map with elevation data that had an error of ten feet! Your final product would be inaccurate. You wouldn't build a scientific application using data provided by a group with a known bias. Paying attention to metadata is essential when you are choosing datasets to add to your GIS.

GIS is used for city planning, the government, emergencies, science, marketing, land use, conservation, education, and mapping. Whether you know it or not, GIS already plays a big part in your everyday life.

- Alarm Clock – the power company uses GIS to manage assets and repair lines
- Shower – the water utility predicts water usage
- Marketing in the mail
- Bus routes, trains, Department of Transportation planning
- Choosing the location of a new business
- Food – prices are lower as a result of GIS and precision agriculture

Computers are getting faster which allows us to use GIS more and expands what we can do. GPS accuracy improvements, increased access to high quality remote sensing imagery, and data collection apps on mobile devices have made it easier to collect data that is accurate and useful in the field. Many GIS data sources are available for free online and many agencies like NOAA and NASA are sharing data with the public. The more information you can add to your map and attribute tables the more useful your GIS will be. Internet platforms and open source software are bringing GIS to everyone and making it more user friendly to learn how to use GIS and start making maps.

Materials

You will need

Download and install QGIS:

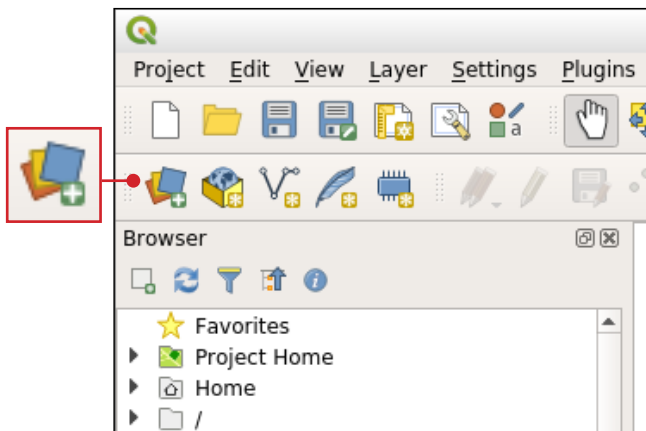
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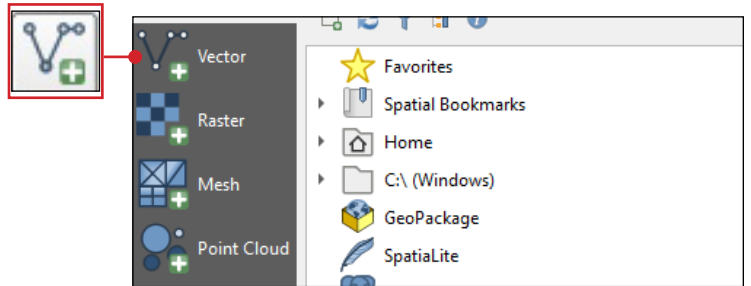
Exploring Tornadoes with GIS

For this activity, you are going to make a GIS map of tornado touchdowns in your state.

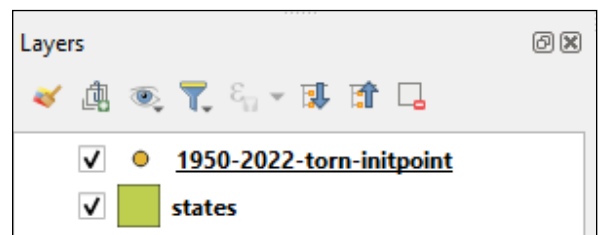
1. Open QGIS and press “**New**”
2. Next, you’ll need the data.
You’ll be using the shape files from this site:
<http://www.spc.noaa.gov/gis/svrgis/>
3. Download tornadoes using the “**Initial Points**” link. Unzip the folder and add it to the folder you’d like to use to store your data.
4. Go to the bottom of the page and click under “**Additional Information**”: States. Download the “states” file from the link. Unzip the folder and save it to your data folder.
5. Click the “**Open Data Source Manager**” button. This button is located in the top left corner of the screen in the second row of buttons.



6. To load your datasets click the “**Vector**” tab to open the data source manager.



7. Click the file course type and select the “...” in the lower right of the Vector Datasets Source option.
8. Navigate to your .shp file and select it.
9. Click “**Open.**”
10. Click “**Add**” to load the data into the Layers panel.
11. Repeat these steps to add your second shapefile and then choose “**Close**” to go back to your map. When you load the “states” data you may get a pop up notification about conversion systems.
12. Accept the highlighted suggestion by clicking “**OK**” to proceed.
13. Click “**Save As**” to save your project.
14. Make sure that the layers are in this order from top to bottom:



You can drag and drop the titles to reorder the layers.

15. Next, because this is national information, zoom into the state you're interested in using the zoom tool from the top tool bar. You can use the tool that looks like a hand to pan around.



16. Go to the Layer menu in the lower left and right click on "states." Choose "Show Labels" from the menu. Scroll down to choose options for the font, font size, and color and then click "Apply." You can close this box by clicking the small x in the upper right corner.

17. Go back to the layer menu and right click on your tornado layer. Choose "properties" from the menu. Change the color of your tornado symbols by using the "Color" dropdown menu. Click "Apply" and "OK" to return to your map.

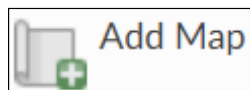
18. Click on "Project" and select "Layout Manager" from the menu. The layout manager dialog box will pop up.

19. Under the words "New From Template" select "Empty Layout" and press "Create."

20. Name your map and press "OK."

21. The Print Layout should open up to reveal a blank map. You may need to zoom in to make the white rectangle larger.

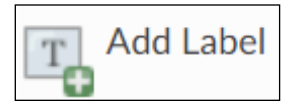
22. Click the "Add Map" button from the menu on the left. Nothing happens.



23. In the blank white square of your map click in the upper left corner and drag a box down to the bottom right corner to fill the space. Leave space at the top and bottom for the title, explanation of symbols, and scale bar. This is where your map will populate. It will be zoomed in to the position it is in your project screen. If you don't like how it looks you can click the map and move it around or use the boxes on the edges to resize the image. You can also make adjustments in the main project window that will now be mirrored in your map layout.

24. Go to the Layout Menu and save your project.

25. Click the "Add Title" button to add a title on your map.



26. Click on the map where you'd like to place your title, accept the suggested values in the dialog and resize the title if needed.

27. You can use the "Item Properties" tab in the side panel to change the font and color of your title.

28. To add a Legend to the map click the "Add Legend" Button

29. Click on where you would like to add the legend and accept the values shown in the "New Item Properties" window or use the "Arrangement" drop down menu to adjust your symbol placement.

30. Save your map.

31. Now that your map is completed you can share it with others by printing it or saving it using the "Print Layout" or "Export as Image" buttons.

