

Chapter 03: Finding Data for ArcGIS

Mike Pesses, Antelope Valley College

Good GIS starts with good data. Your analysis and resulting maps will be useless if you don't have the proper inputs.

When you first open ArcMap, you are faced with a haunting white space and dozens of cryptic buttons. You need to add data of some sort to begin to fill that white space and begin to use the many tools that are at your disposal. An analogy is the program iTunes. In and of itself it is somewhat useless. You need to add mp3 files or stream data to actually play music and use the program. This also ties in with the need for good data. You can add music to iTunes to play at a party, but if you add terrible music all of your friends will leave. The Dave Matthews Band is a good example. No one wants to hear that. Now if you play some Exile on Main Street you've got a party. Same thing with GIS data. Dave Matthews quality data will produce bad results; the Stones will give you the answers you want.

Finding Data

The internet has a tremendous amount of data, though a good portion of that is garbage. Anyone who has spent just one hour surfing the web is well aware of this. The same goes for online GIS data. Be careful when you are searching. For example, unless you are working on a professional project, *you should never pay for data*. Most GIS data is produced by government agencies, and therefore is public and should be offered freely. Also, some data may be good, but are at the wrong scale for your intended purpose. For instance, if you are making a map for fieldwork, i.e. one a person will take to explore a riparian study area, you should not use stream data that are used for world maps. The small scale of the data means that the detail is not enough to be of any use in the field.

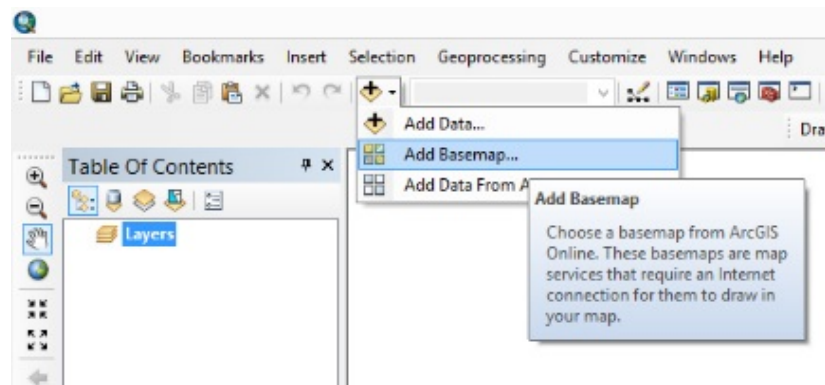
The following sections show some good sources for GIS data, though they might not be the best data for what you have in mind. Ask these three questions when you find a dataset online:

1. Who created this dataset?
2. Is it at the right scale for my purposes?
3. Is it up to date for what I am studying? For example, does it show population densities from 1990, but nothing for the 21st Century?

ArcGIS Online

You can connect to the ESRI servers and download basemaps, a term we use for the underlying data on a map. This can be shaded relief, aerial photos, scanned topographic maps; a basemap basically gives you the context and location for whatever it is you are mapping. For example, if I am mapping crimes in Los Angeles, I could add a premade basemap to show the streets and landmarks.

To access the ArcGIS Online Basemaps, simply click the dropdown next to the yellow “Add Data” button and select “Add Basemap.” You can select any of the available maps and it will be added to your map. While these maps are a nice feature of ArcGIS, they are quite limited. You cannot change them or use them for analysis. It also looks much more impressive if you can make your own basemaps rather than rely on ESRI’s.



World Bank

<http://data.worldbank.org>

The World Bank funds development projects around the world, and provides a wealth of data on demographic, health, economic, social justice, and environmental issues. The data are accessible in tabular form. Bringing the data into ArcGIS will be addressed in Chapter 5, but there is a map viewer that will allow you to preview the data.

The National Map

nationalmap.gov

The National Map is a portal for all of the United States Geological Survey’s (USGS) mapping projects. In an effort to streamline resources, the USGS is merging previous data sites into this one. For example, the National Atlas dataset is being merged over. It is a series of 1:1,000,000 data that can be useful for mapping things across the country, and maybe even in California, but not in smaller states or for cities.

There is a lot of information on this website, but the main thing you will want is the *National Map Viewer*, described on the site as a resource for “more experienced map makers and professional geographic information users.” If you have read this far, you can consider yourself “more experienced” than the average person, so click the link!

The National Map

The National Map Viewer and Download Platform

Use *The National Map Viewer* and *Download Platform* to visualize, inspect, and [download](#) our most current topographic base map data and products for free. Managed by the USGS National Geospatial Program (NGP), *The National Map Viewer* provides access to all eight primary data themes of *The National Map* to include US Topo and historical topographic map products. The viewer platform is extended upon the National Geospatial Intelligence Agency's (NGA) Palantir x3 Viewer.

Data include: [Elevation](#), [Orthoimagery](#), [Hydrography](#), [Geographic Names](#), [Boundaries](#), [Transportation](#), [Structures](#), and [Land Cover](#), while products include: [US Topo](#) and [Historical Topo Maps](#). *The National Map Viewer* also allows visualization and identification queries (but not downloads) of Other Featured Data, to include Scanned Topo Maps, Ecosystems, Protected Areas, Gap Analysis Program Land Cover, Wetlands, Public Land Survey System, and National Park Service Boundaries. Also included is a Natural Hazards panel to view hazards-related information, such as for earthquakes, floods, wildfires, and weather, along with the U.S. National Grid for emergency response.

To research and download historical USGS data, such as Digital Orthophoto Quadrangles or older high resolution orthoimagery and Digital Line Graphs, or to access lidar point cloud data, go to [Earth Explorer](#).

[Click here to go to The National Map Viewer and Download Platform !](#)

[Help](#) - What's New, Quick Guide, Base Maps, Map Display, Toolbox, Search, Overlays, Selection, Download

FAQs - [The National Map Viewer FAQs](#)

[Services List](#) - Web map service endpoints used in *The National Map Viewer*

New: [Using TNM services to enable your web and mobile mapping efforts](#)

Recommended Browsers: [Firefox](#) - [Chrome](#) - [Internet Explorer 7 or higher](#)

Can't see Flash? Install [Flash Player](#) or view [text version](#).

National Map website

This site will allow you to download elevation data, imagery, boundary hydrography, and some transportation data. The download process can be a tad cumbersome, but easy once you get the hang of it. The link to download the data will actually be emailed to you during the process. Once you click on that link in the email the download will begin.

USGS The National Map Viewer

Base Data Layers

- ☐ US Topo Availability
- ☐ Geographic Names (GNIS)
- ☐ Structures
- ☐ Transportation
- ☐ Governmental Unit Boundaries
- ☐ Map Indices
- ☐ Hydrography (NHD)
- ☐ National Land Cover Database (NLCD)
- ☐ Elevation Availability
- ☐ Elevation Contours - Small Scale
- ☐ Imagery - 1 meter
- ☐ Imagery - 1 foot
- ☐ Reference Polygons

Natural Hazards

Other Featured Data

User Added Content

Favorites

Download Data

Zoom in tool

Click here when you've found what you need

Scale: 1:36,978,595

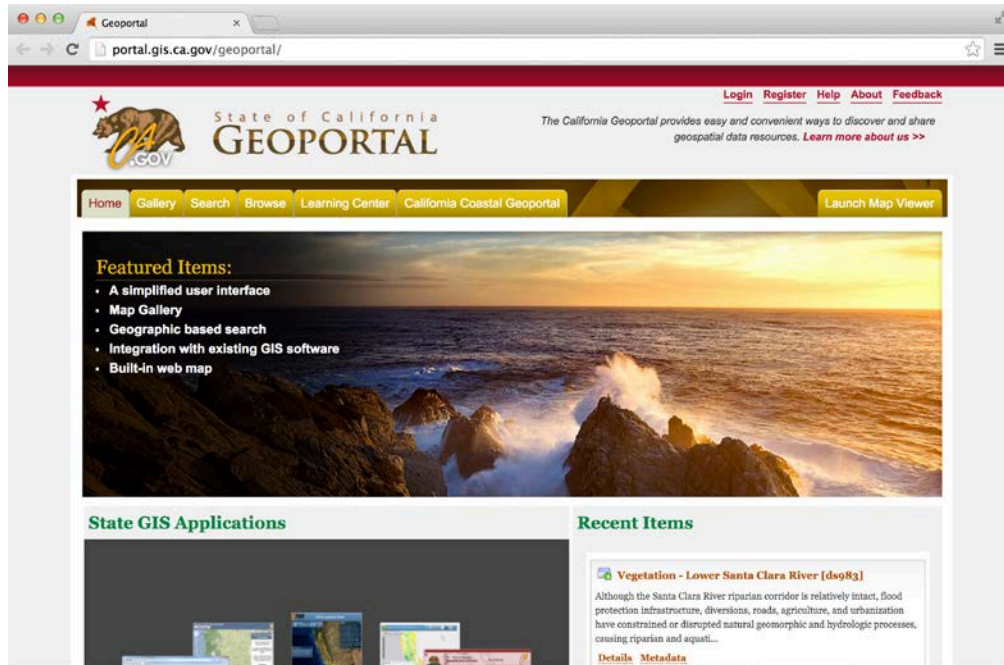
FAQ | Accessibility | EOIA | Privacy | Policies and Notices

The National Map Viewer, from where you actually download the data

State of California Geoportal

<http://portal.gis.ca.gov/>

California has collected a good deal of data for the state in their “Geoportal.” In an effort to make it easier to use, I think the state has made it more confusing, but you young kids may be okay with it. Before the downloadable data were available in list form, but now the state uses a map viewer similar to the USGS and a “searchable” browse feature.



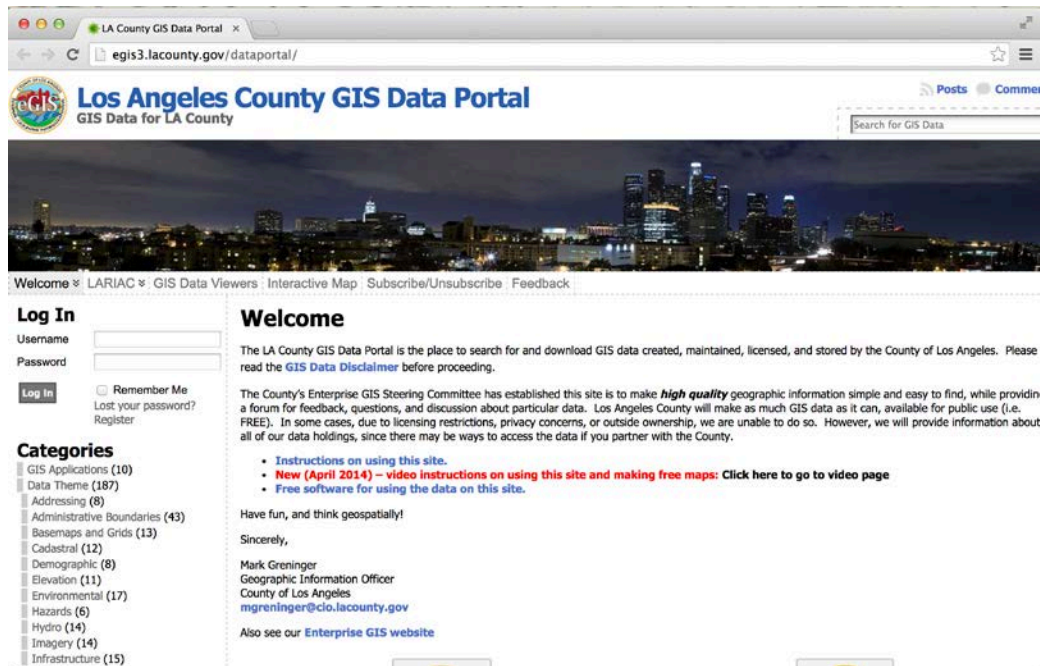
State of California's Geoportal

Ignore the map viewer. It doesn't give us much. The Browse tab is the most useful for the “more experienced map makers and professional geographic information users” as the USGS puts it. Click on it and then select the downloadable data option. You can scroll through the pages of data, though unfortunately they aren't in a friendly order. You can add a word or term to “filter” the results, but unless you know the exact name of a file this can be more difficult than sorting through the unfiltered results. When you get what you want, click on the “open” link and it will begin to download a compressed file of the dataset.

Los Angeles County GIS

<http://egis3.lacounty.gov/dataportal/>

Los Angeles County also maintains a portal for the various data sets to try to have one space for the products of multiple county and city governments in the region. You can use the “Interactive Map” to zoom in and visualize if you must. This site is designed for easier browsing though. Simply, click on the Categories/Data Theme and explore the links to find something that works for you.



US Census Bureau TIGER Files

<http://www.census.gov/geo/maps-data/data/tiger.html>

TIGER stands for Topologically Integrated Geographic Encoding and Referencing, which sounds like someone just wanted to use the word tiger and forced an acronym. The Census Bureau is known for counting the number of people in the country, but they also maintain a database of roads, landmarks, as well as demographic units called blocks and tracts.

Unzipping data

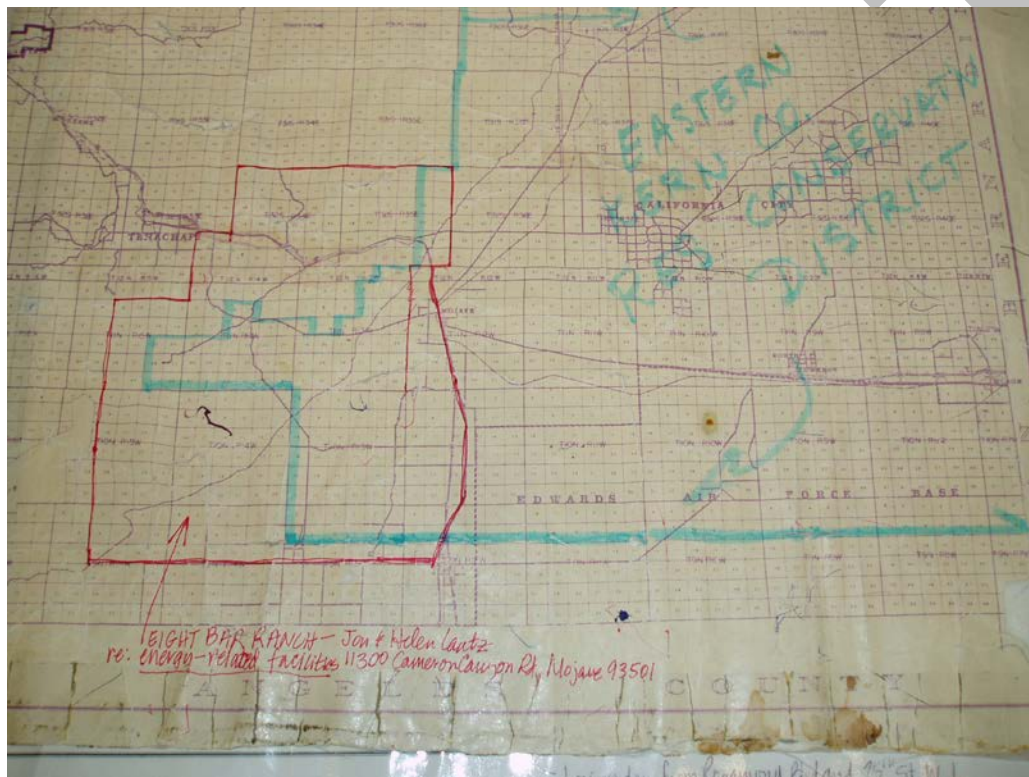
File compression, or “zipping” as it is sometimes called, is a way to shrink the size of a file or files to be able to easily download or email it. If you received a compressed file, you will need to “regrow” or “unzip” the data to be able to use it.

Windows computers do come with preloaded compression software that works on “zipped” files. You will know you’re working with such a file because the file extension is “.zip” (e.g. gis_data.zip). Simply right click on the data file and “unzip” or “extract” the file to be able to use it.

Some websites will offer data that are “double compressed,” often with a “.tar.gz” extension (e.g. gis_data.tar.gz). As of this writing, Windows can’t handle these. You will need to download a program like 7-zip, an open source “file archiver” which can be downloaded from <http://www.7-zip.org>. Once installed, right click on the downloaded file. You will now see an option for 7-Zip. Select “extract here” or “extract files.” This will get rid of the “.gz,” but you’ll get a new file that simply has the “.tar” extension. Repeat the process one more time to be able to access the data.

A Cautionary Tale

I was hired by a planning department to introduce GIS and bring their operations into the 21st century. A planning department handles many things regarding land use within an area, and one of the jobs planners did was to map out a 1,000 foot radius around a project and alert other agencies and property owners. Before GIS, planners would walk to a table that held a stack of about forty maps, locate their project's area on each one, mentally draw out a 1,000 foot circle, and then write out each agency or person that fell within that circle. This seemed like an incredible waste of time to me, and a perfect way to use GIS to streamline work in the office. It was not an easy task however, as you can see from the pictures below. No one really knew just how old the maps were; people just updated them when need be, often using things like thick-tipped highlighters to do so. The maps were also heavily ripped and some of the information had faded so much that the information was lost forever.

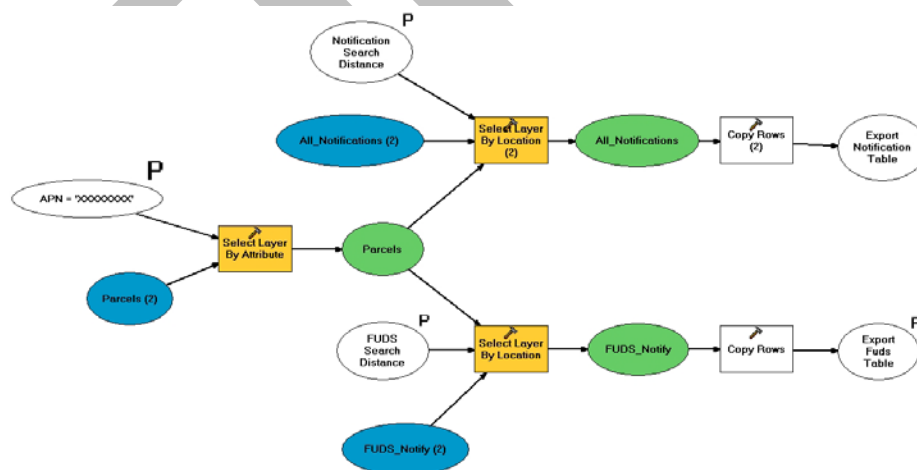


One of the infamous "Notify Maps." Note the thick highlighter line and yes, questionable stains.



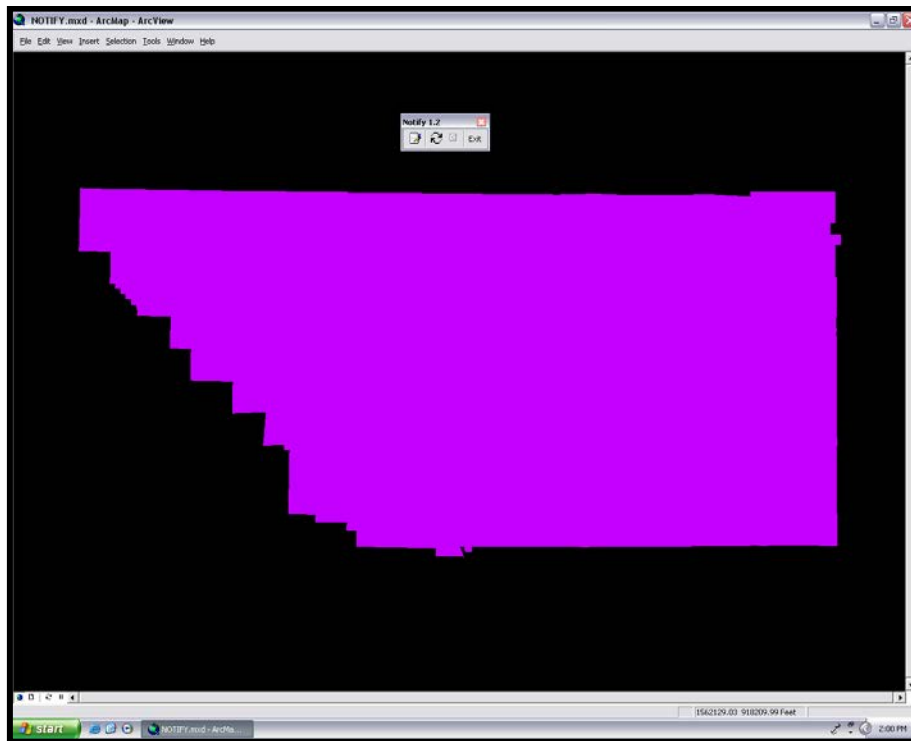
Another "Notify Map." Too ripped to send through the scanner, and so faded that a lot of information was lost.

I scanned as many of these as I could and digitized the data into a geodatabase, with the idea that planners could type in their project and have the computer do the work. Once the data were digitized, I constructed a workflow for the computer and turned it into a simple button for planning staff to press and then enter in some relevant information. The output was a Microsoft Excel table with the names and addresses of people needing to be notified. This table could then be used to automatically generate address labels.



The workflow for the notification program as outlined in ESRI's Model Builder.

So when all of this was done, the planners (many of whom were not “more experienced map makers and professional geographic information users”) got a very simplified interface with which to work.



What the planners saw

They pressed a button and up popped a window that requested certain information. The whole process now took two minutes.

A screenshot of a 'FUDS Notify' dialog box. It contains several input fields and buttons. The fields are: 'APN = "XXXXXXXX" (optional)' with a text box and a 'SQL' button; 'Notification Search Distance (optional)' with a text box and a 'Feet' dropdown; 'FUDS Search Distance (optional)' with a text box and a 'Feet' dropdown; 'Notification Export Table' with a text box and a folder icon; and 'FUDS Export Table' with a text box and a folder icon. At the bottom are buttons for 'OK', 'Cancel', 'Environments...', and 'Show Help >>'. The background of the dialog box features a faint globe graphic.

This window popped up when the planners clicked the “notify” button. APN was for their project’s property. FUDS referred to a separate Federal project that we later incorporated with the notification process.

Now here's the word of caution. The new interface was clean and looked very official, but the data were still the same! While the planners could now save time, it was important not to lose sight of the fact that the data was pretty poorly implemented and maintained before this. For example, the highlighter lines on the maps were actually one half mile thick on these maps due to the scale. This took some work on my part to figure out the intent of these lines. The digital data therefore were only as good as me.

So just because the data are digital and come from a government office does not mean that they are infallible. Question the data you find to ensure that your work is not doomed from the beginning!

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