



An intro to FREE Open Source GIS





HELLO!

I am Dallas Alley, CFM

Building and Zoning Director, Swansea, Illinois

IAFSM Board Secretary

dalley@swanseail.org

The background is a detailed historical map of North America and Europe. The left side shows North America with labels for Hudson Bay, James Bay, Montreal, Toronto, New York, and the West Indies. The right side shows Europe with labels for London, Paris, Berlin, Rome, and the Mediterranean Sea. A white rectangular box with a thin blue border is centered over the map, containing the main text and a compass rose.

1.

Why GIS and why Open Source???

Did you say Free???



“

*The application of GIS is
limited only by the
imagination of those who use
it*

*~Jack Dangermond
President of ESRI*



So why GIS and why Open Source GIS




- A Geographic Information System is simply any system for capturing, storing, checking, and displaying data related to positions on the Earth's* surface.
- More simply stated in a GIS, you connect data to geography.

So why GIS and why Open Source GIS



- GIS allows for the management of BIG Data
- GIS makes your job simpler
- GIS maps and cartography are now a normal part of high level communications and strategic decision making.



In the past Geospatial systems were one of those niche technologies that required a great deal of skill and knowledge. Now GIS is easy to use and much more accessible.

So why GIS and why Open Source GIS



- General Reference Maps
 - Show important physical features of an area
 - Include natural and man-made features
 - Usually meant to help aid in navigation or discovery of a location
 - Usually simple

So why GIS and why Open Source GIS



- Thematic Maps (They follow a theme)
 - Focuses on a specific theme or subject area
 - Features on the map represent the phenomena being mapped
 - Spatial features are used for reference

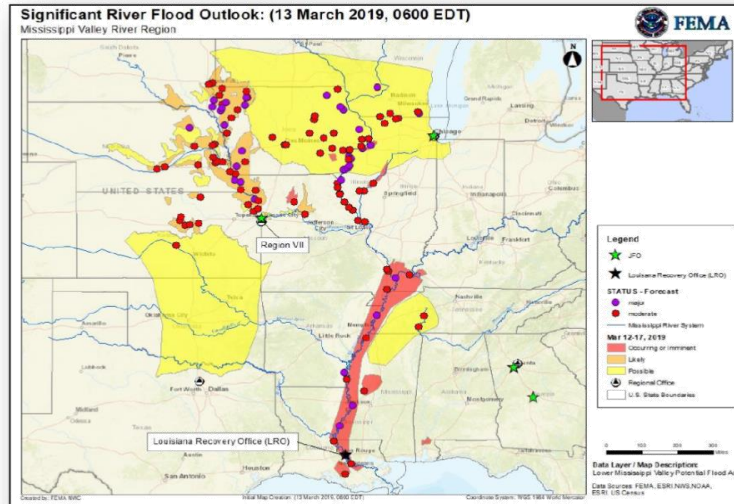
Thematic Maps



Significant River Flood Outlook



FEMA



So why GIS and why Open Source GIS



- Geospatial maps deal in X and Y Coordinates (more and more we also include Z)
- Can include vector points, polyline features, and polygon features
- User can interact through user created queries, analysis of spatial information, manipulation of data contain in maps, and can visually present the results of all these operations

So why GIS and why Open Source GIS



- Google Earth Pro
- ESRI ArcGIS
- MapInfo Pro
- Surfer
- QGIS
- GRASS



GIS is not AutoCAD, GIS relates to maps and CAD relates to objects...
Representing roads and rivers – GIS
Designing a bridge – CAD

If stations are referenced your using
CAD, if latitude and longitude are
referenced your using GIS

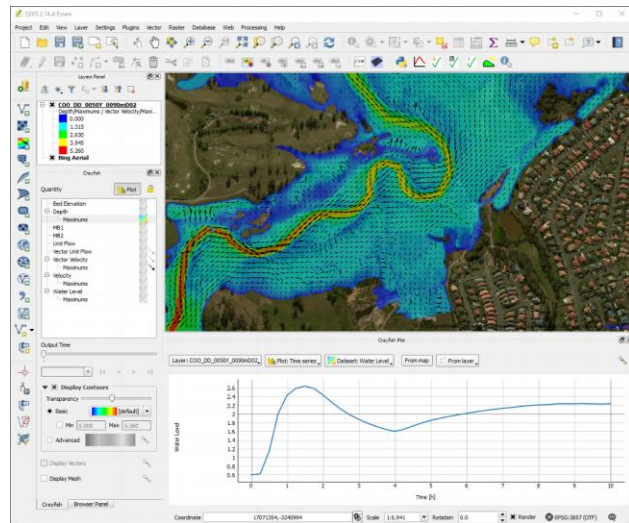
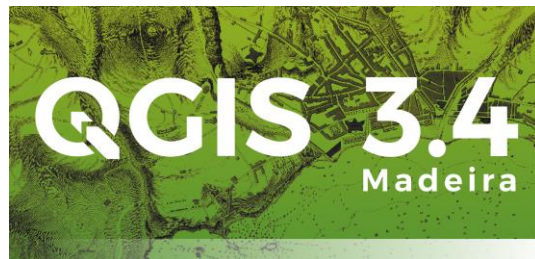
So why GIS and why Open Source GIS



- Open source allows full ownership and control
- Open source provides great flexibility
- Open source provides extreme cost reduction
- The open source community creates a great collaborative approach and gives better solutions to problems.

What is QGIS

- A Free and Open Source Geographic Information System



What is QGIS, and why should I use it?



- QGIS is a professional cross-platform GIS application that is a Free and Open Source and supports the viewing, editing, and analysis of geospatial data. QGIS was originally released in July 2002.
- QGIS is a user friendly Open Source Geographic Information System (GIS) licensed under the GNU General Public License. QGIS is an official project of the Open Source Geospatial Foundation (OSGeo). It runs on Linux, Unix, Mac OSX, Windows and Android and supports numerous vector, raster, and database formats and functionalities.
- QGIS is a volunteer driven project. We welcome contributions in the form of code contributions, bug fixes, bug reports, contributed documentation, advocacy and supporting other users on our mailing lists and gis.stackexchange.com. If you are interested in actively supporting the project, you can find more information under the development menu and on the QGIS Wiki.

What is QGIS – The Good



- Freely available desktop application
- Lots of features
- Works with multiple different data types
- A strong community developing new features and plug-ins.

What is QGIS – The Bad



- A bit buggy at times
- Visual style is slightly clunky
- Features change between versions
- If the user performs unrealistic operations the software will crash (this is true for all GIS platforms)

What is QGIS – The Buggy



- Sometimes things get disorderly - simply zoom out then zoom back in. Redrawing fixes this issue
- Things don't work properly – as with any software just close and restart
- The user is used to operating in ArcMap and cannot figure out how to accomplish a certain task - Google it!!!

What about functionality of QGIS



Integration

PostGIS

GRASS GIS

MapServer

Familiarity

Using Google
Geocoding API, plugins
allow for geoprocessing
that functions similar to
standard tools found in
ArcGIS

Interfaces with MySQL
databases

Plugins

GEarthView

Visibility Analysis (for
D.E.M.s)

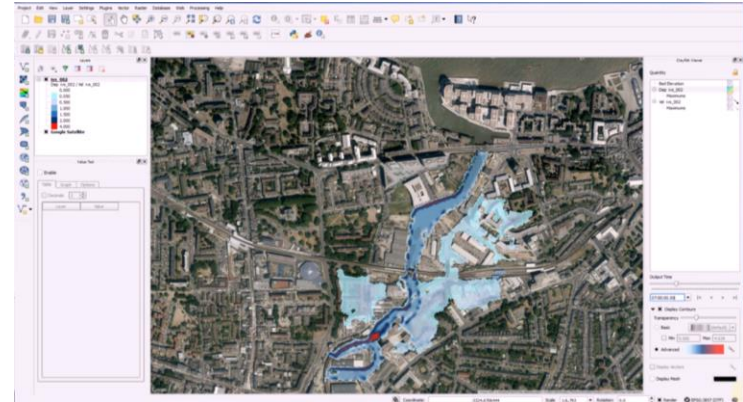
Qgis2web

Crayfish

What the heck is crayfish and why do I care?



- Crayfish is a QGIS plugin developed by Lutra Consulting
- Crayfish is a time explorer for structured and unstructured mesh and vector datasets, users can load time varying mesh.
- Currently crayfish supports several meteorology, hydrology, and oceanography file formats.



Visualizing flood propagation in
QGIS with Crayfish

So, maybe Open Source GIS is for me...



The greatest feature of Open Source GIS – You can try it out for as long as you want for free. If it doesn't work for you, you aren't stuck in a contract and you haven't wasted money.

Setup is easy!!!



Software

Talk with your IT department about what GIS software will work best for your particular use. If you don't have an IT department, read!!!

Hardware

Make sure your hardware will perform properly with GIS software
(NO LAPTOPS!!!!)

Training

Hit the internet and download the training manual.
Don't forget to participate in the online community.

Realistically what do I need for a free GIS system and what will it cost me???



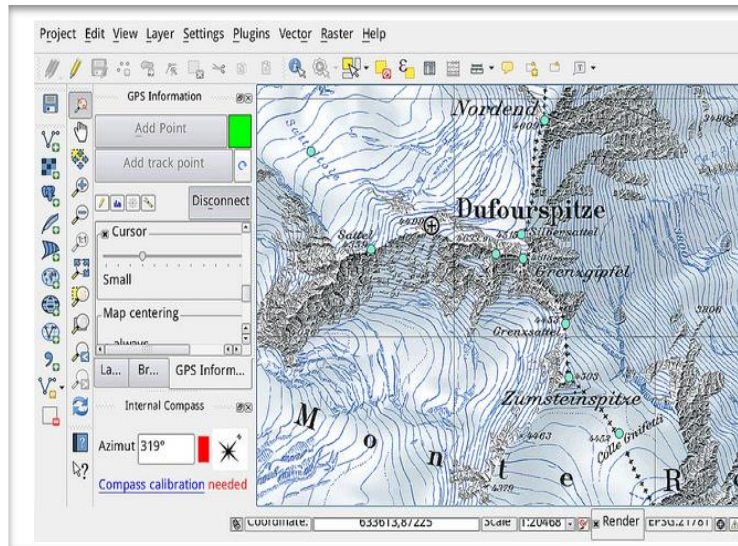
- **Desktop computer**
 - ➔ **Windows 7 or higher**
 - ➔ **Hyperthreaded multi-core processor**
 - ➔ **8 GB RAM (16 is better)**
 - ➔ **Disk space (lots of GB, go ahead and buy a 2 TB external hard drive)**
 - ➔ **Quality graphics processing unit**
- **Dual Monitors (21" or larger suggested)**
- **If your GIS system is going to be network based, you will need to consult your IT department for further guidance.**
- **36" Plotter**

Realistically what do I need for a free GIS system and what will it cost me???



- **Desktop computer \$1000.00**
 - ➔ Windows 7 or higher
 - ➔ Hyperthreaded multi-core processor
 - ➔ 8 GB RAM (16 is better) **\$70.00**
 - ➔ Disk space (lots of GB, go ahead and buy a 2 TB external hard drive)
 - ➔ Quality graphics processing unit
- **Dual Monitors (21" or larger suggested) \$300.00**
- If your GIS system is going to be network based, you will need to consult your IT department for further guidance.
- **36" Plotter \$2000.00**

GIS in the field



In addition to desktop GIS systems, you may benefit from field deployable GIS components

Field Deployable GIS components



- **Qmap**
 - **Currently only Windows tablet compatible**
- **Integration with field data collectors, including GNSS systems.**
 - **Accuracy down to 8 mm Horizontal and 15 mm Vertical (Remember your control points)**
- **Multiple applications**
 - **Utility mapping**
 - **Stormwater systems**
 - **Floodplain analysis**



Wait!!!, what about data???

- **FREE GIS software is great,
but what about the data???**



Wait!!!, what about data???

- Invaluable GIS data is available for free to download from hundreds of reputable sources, including many state and federal agencies.
- Be sure to understand use agreements with any GIS data you acquire.

Sources of Free GIS data

- <https://clearinghouse.isgs.illinois.edu> (LiDAR)
- apps.dot.illinois.gov/gist2/
- <https://www.usgs.gov/products/maps/gis-data>
- <https://www.fws.gov/gis/data/national/>
- msc.fema.gov

More sources of Free GIS data

- <https://www.data.gov/>
- <https://data.nasa.gov/>
- <https://census.gov/geo/maps-data/data/tiger.html>
- NRCS, Metropolitan Planning Organizations, USACE, Other units of government, etc....

A word of caution about Free GIS data

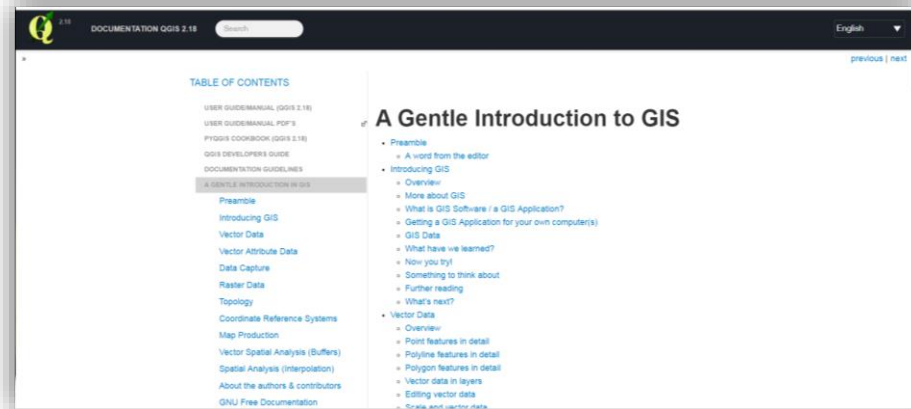
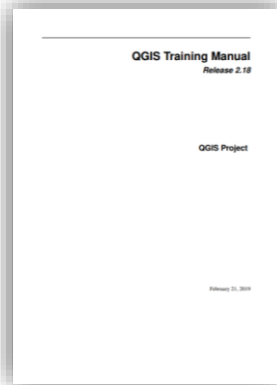
- Free GIS data, as well as purchased GIS data is only a tool. As a GIS user you must understand your data and the limitations of that data. Just because the government provides a dataset doesn't mean you can solely rely on it.



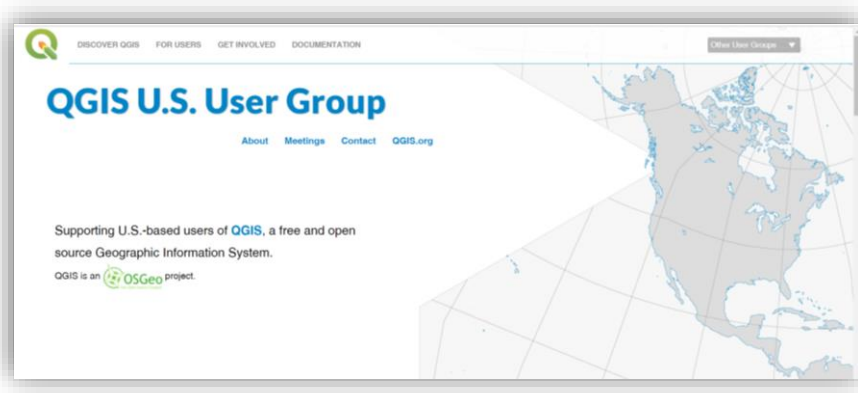
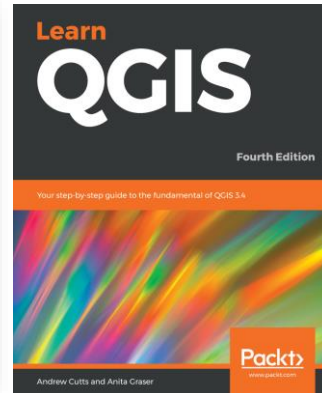
In new to GIS so how can I get help

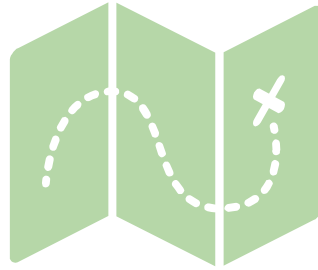


- With purchased software typically comes purchased training, when you transition to Open Source you typically cant pay that company to train you.
- All is not lost – your now a member of the Open Source community.



In new to GIS so how can I get help





THANKS!

Any questions?

You can email me at dalley@swanseail.org