

EnvSci 360 – Computer and Analytical Cartography

Lecture 10

Mapping with

Open Source

Desktop GIS Software



What is Open Source?

✦ Sharing (usually free) of technological information

✦ In computing:

- Source code is published and made available to the public
 - Anyone can copy, modify, redistribute
 - Pay no royalties or fees
- Programming languages, operating systems, server and client software, ...
- “Community” cooperation



Why Use Open Source Software?

FREEDOM

- From commercial fees, proprietary code and marketing pressure and “black boxes”

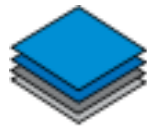


<http://www.cioinsight.com/it-strategy/application-development/slideshows/nine-advantages-of-open-source-software.html>

<https://crowdsourcedtesting.com/resources/pros-cons-open-source-software/>

Open Source GIS Software

- ✦ Desktop
 - MapWindow, Quantum, uDig, OpenJUMP, GRASS, ...
- ✦ Web Server
 - GeoServer, MapServer, ...
- ✦ Database
 - PostgreSQL (with PostGIS), MySQL, ...
- ✦ Software Development Framework
 - OpenLayers, OpenStreetMaps, ...



MAPWINDOW



GeoServer

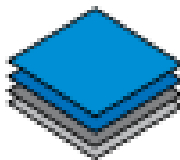


MapServer
open source web mapping



Open Source GIS Software

✦ ESRI is NOT the ONLY game in town!!



MapWindow



MapWindow 5 - D:\dev\GIS-Data\MapWindow-Projects\UnitedStates\Shapefiles\UnitedStates.mwproj

File Edit Layer View Plugins Tiles Help

Legend

- Data Layers
 - cities
 - roads
 - rivers
 - lakes
 - counties
 - states

Identifier

Name	Value
STATES	1 geometries
Polygon	Shape id = 1
Fields	
AREA	147236,028
STATE_NAME	Montana
STATE_FIP30	
SUB_REGIMtn	

Mode: Current layer

Toolbox

- Projections
 - Identify project
 - Reproject sha
- GeoDatabases
 - Import layer
- Geoprocessing
 - Vector Geome
 - Buffer by c
 - Calculate c
 - Convert to
 - Explode sh
 - Exports se
 - Fix shapef
 - Interactive
 - Merge sha
 - Overlay (m
 - Random p
 - Simplify lin
 - Sort shape
 - Spatial qu
 - Validate sh
 - Fake
 - Long task
 - GDAL / OGR tools
 - Add overviews
 - Build virtual da
 - Convert vector
 - Translate raste
 - Warp raster
 - Raster
 - Create grid pro
 - Polygonize gric
 - Zonal overlay :
 - Vector attributes
 - Aggregate sha
 - Calculate area
 - Describe by att

Debug

Level	Message	Time
1	Info	APPLICATION STARTUP
2	Warn	Source geo
3	Warn	Source geo
4	Warn	Source geo

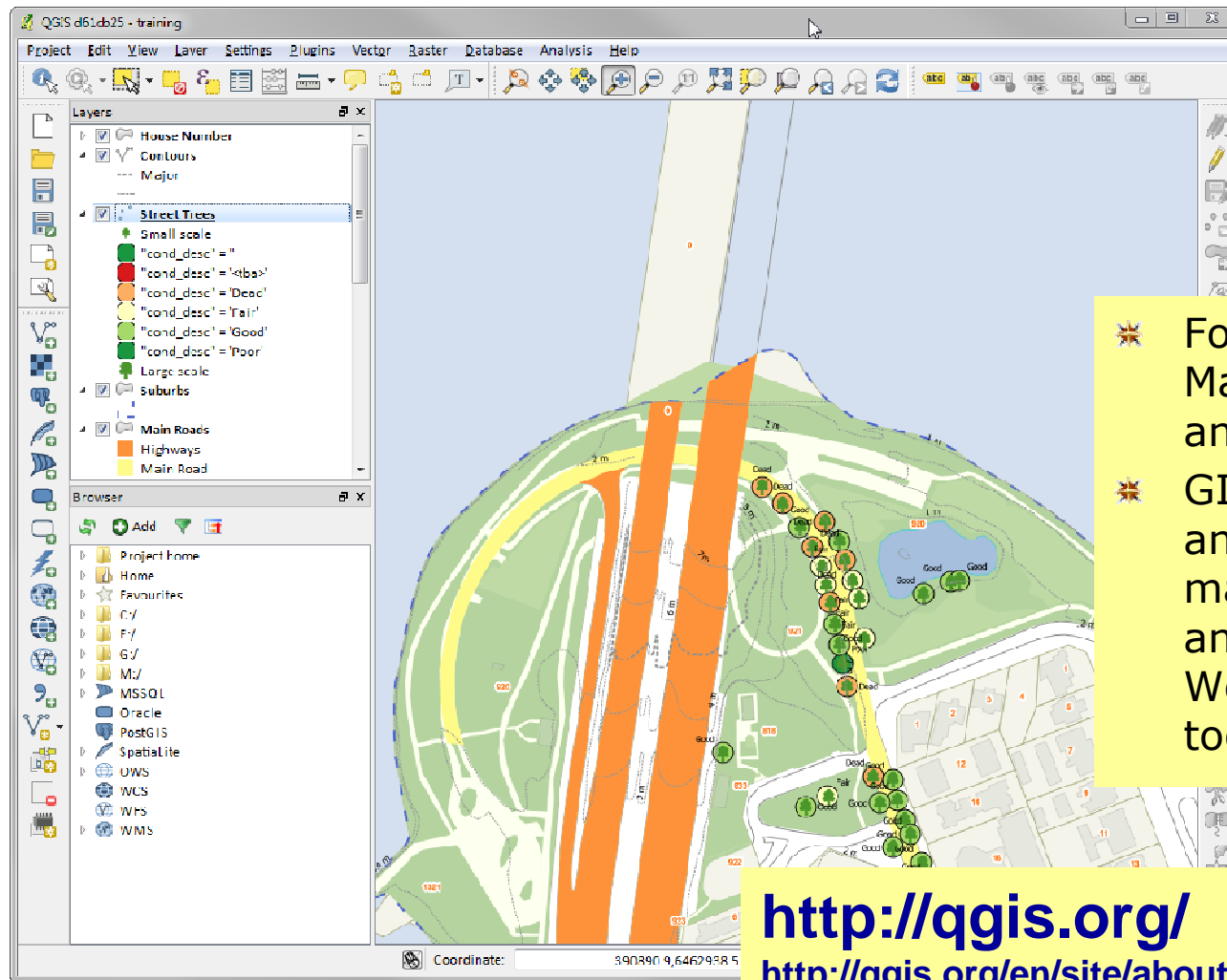
WGS 84 Units: decimal degrees Selected: 0 / 49

1:36978669 OpenStreetMap

Windows-based free and open source software
GIS data viewer, editor, map-making tools
May be customized

<http://www.mapwindow.org/>

Quantum GIS (aka QGIS)



✦ For Windows, Mac, Linux, BSD and Android

✦ GIS data viewer and editor, with map-making, analysis, and Web-publishing tools

<http://qgis.org/>
<http://qgis.org/en/site/about/screenshots.html>



uDig



uDig User-friendly Desktop Internet GIS

The screenshot displays the uDig software interface. The main map shows a network of power lines and structures. A table titled 'Energy production forecast' is visible, with the following data:

Id	Label
1	Generator biogas: BIO
2	Generator wind: FW1

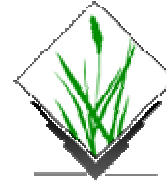
Below the map, a line graph titled 'RES production - Generator sunny: PV' shows energy production in kWh over time. The graph includes data for 'Forecast active energy RE' (red), 'Active Energy' (blue), and 'Temperature' (green). The x-axis represents dates from 15-Jul to 22-Jul, and the y-axis represents kWh from 0.0 to 15.0.

- Runs on Windows, Mac OS X, Linux
- GIS data viewer and editor with scripting
- Emphasis on OpenGIS standards for internet GIS, WMS and WFS

<http://udig.refractions.net/>



GRASS GIS



- ✦ "Geographic Resources Analysis Support System"
- ✦ Runs on Windows, Mac OS X, Linux
- ✦ Raster and topological vector data in 2-D and 3-D, analysis, image processing
- ✦ Works with QGIS

The screenshot shows the GRASS GIS interface. The main window is titled "GRASS GIS Map Display: 0 - Location: nc_spm_06". It displays a colorful topographic map with a network of roads. A context menu is open over the attribute table, showing options like "Edit selected record", "Insert new record", "Delete selected record(s)", "Delete all records", "Select all", "Deselect all", "Display selected", "Extract selected", and "Reload". The attribute table has the following data:

cat	MAJORRDS_	ROAD_NAME	MULTILAN	PROPYEA	OBJECTID	SHAPE_LEN
10	10.0	NC-98	no	0	10	8446.822876
11	11.0	NC-98	no	0	11	14876.323626
12	12.0	NC-98	no	0	12	11610.268716
13	13.0		no	0	13	11828.121704
14	14.0		no	0	14	5524.875869
15	15.0	NC-98	no	0	15	4739.53603
16	16.0	NC-96	no	0	16	8586.517385
17	17.0		no	0	17	12073.33628
18	18.0		no	0	18	10178.42291
19	19.0		no	0	19	4375.530882
20	20.0		no	0	20	6491.037831
21	21.0		no	2025	21	9781.033301
22	22.0		yes	0	22	12315.177857

The bottom of the map display shows coordinates: 640595.27, 220432.01.

<http://grass.osgeo.org/>

Resources

- ✦ Open GeoSpatial Consortium
 - <http://www.opengeospatial.org/>
- ✦ Open Source GIS
 - <http://opensourcegis.org/>
- ✦ Open Source Geospatial Foundation
 - <http://www.osgeo.org/>
- ✦ List of Open Source GIS software:
 - http://en.wikipedia.org/wiki/List_of_geographic_information_systems_software#Open_source_software
 - http://en.wikipedia.org/wiki/Comparison_of_GIS_software

