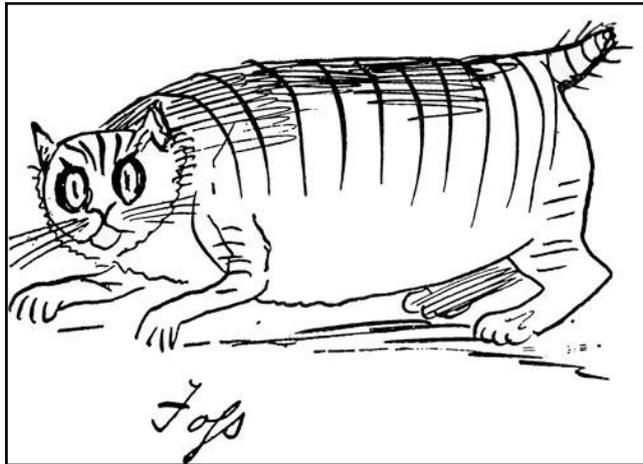


Free and Open Source Software For Geospatial (FOSS4G)

David Lovelace May 2018

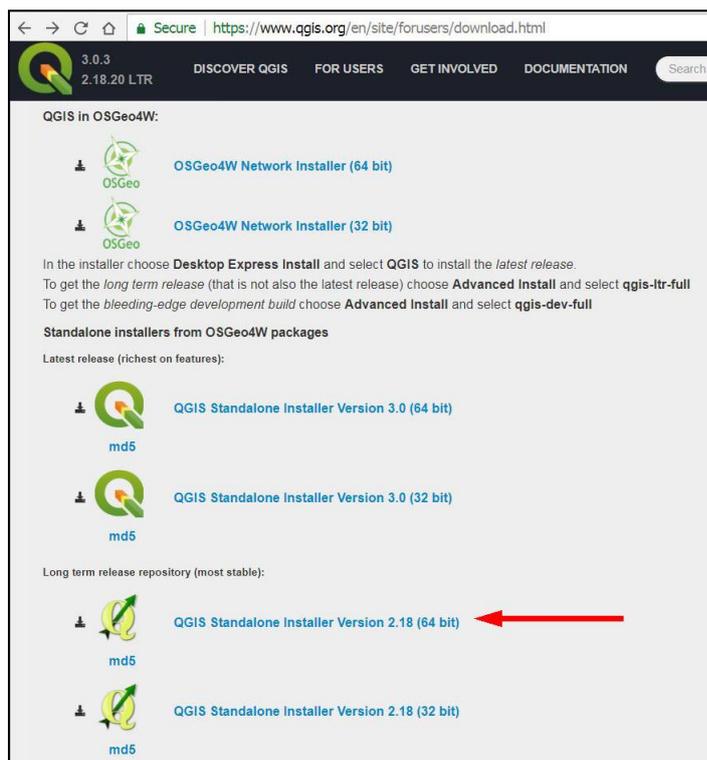


FOSS4G refers to the wide range of free software for processing geo-spatial data which abides by the world wide standards of the Open Geospatial Consortium (OGC). QGIS is a main stream, mature and professional desktop Geographic Information System (GIS) increasingly used and preferred world wide. The following is a list of learning and other resources that I have found useful.

Edward Lear's cat Foss:
<http://www.lear200.com/Foss>

QGIS online resources:

<http://www.qgis.org> is the official QGIS site for installing, learning and using QGIS and is compatible with all major operating systems (Windows, Linux and Mac). For Windows users there are a number of download options but I would advise the 'Long Term Release' (LTR) 'Standalone' version (2.18.20 as of May 2018) if you are starting out, see screen shot below and assuming Windows 64 bit.

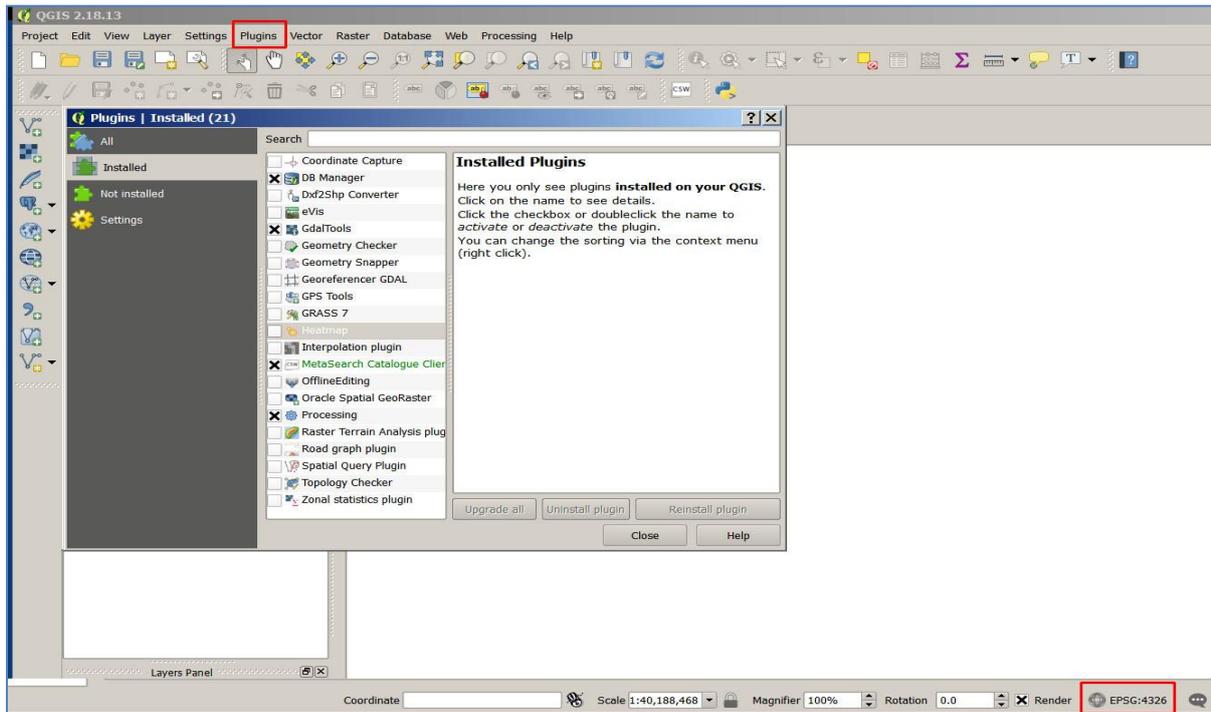


QGIS 3 is a major upgrade released in early 2018 and includes a number of great new features but most user guides remain written for LTR 2.18. Also there may be compatibility problems with some plugins so I would wait until the LTR version of QGIS 3 (due end of 2018) before upgrading.

When downloaded, right click the .exe file 'run as administrator'. Accept default agreement but ignore the offered sample files.

When the installation is complete a folder icon will be placed on the desktop, open to see the short cut link icons to various options – choose the 'basic desktop.'

Plugins: There are over 600 QGIS plugins providing extra functionality and which can be installed via >Plugins >Manage. QGIS comes with a default set of pre-installed plugins which can be enabled or disabled. When first launched, the QGIS plugin manager appears thus:



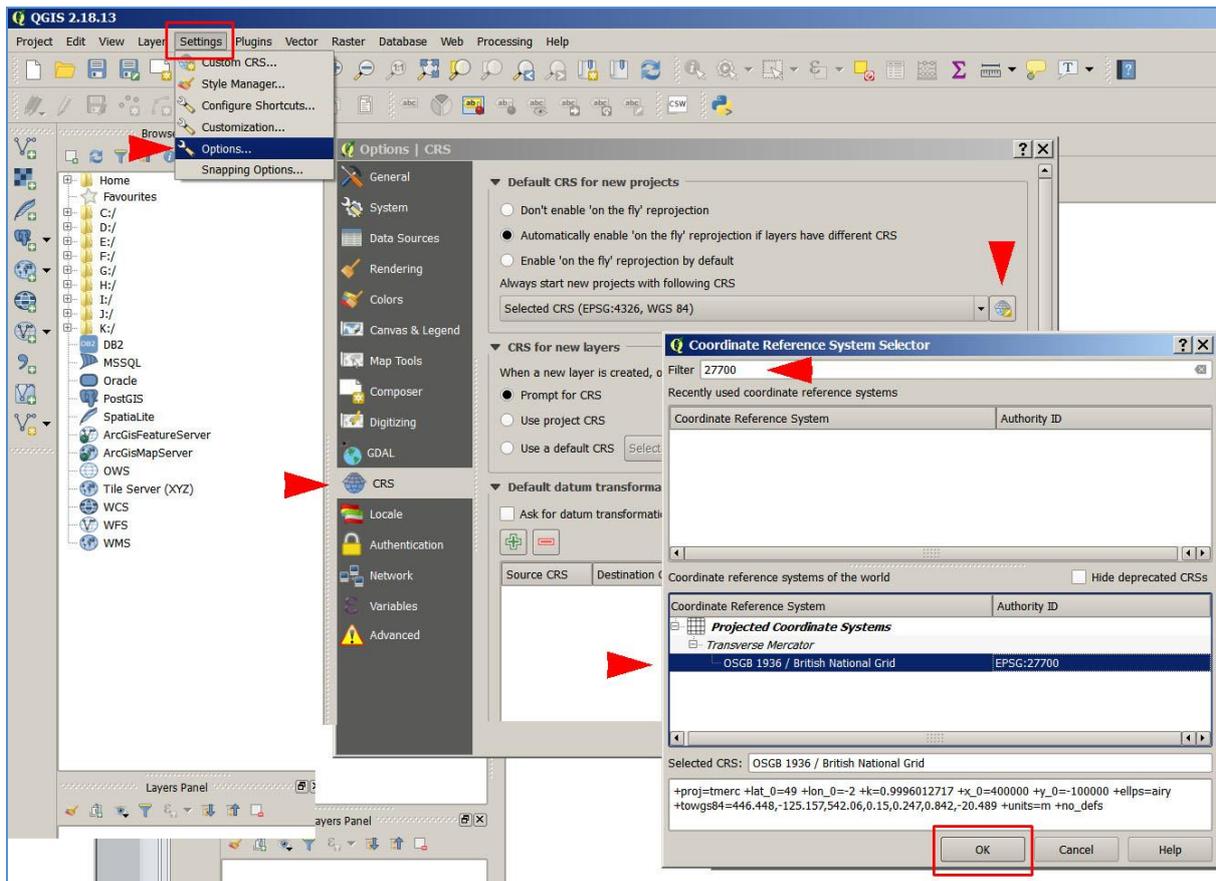
For survey and land management the plugins I would recommend would be **eVis**, **GdalTools**, **Georeferencer**, **Raster Terrain Analysis**, Geotag, mmqgis, QuickMultiAttributeEdit and OpenLayers Plugin (includes aerial imagery). **Green** = pre-installed but may need enabling.

The bottom right box displays the default co-ordinate reference system or CRS 'EPSG:4326'. There are a huge number of CRSs used to project the Earth's spheroid onto a flat map suitable for different regions of the Earth. These coordinate transform algorithms are maintained by the European Petroleum Survey Group (www.epgs.org).

EPSG: 4326 is the world standard Latitude and Longitude or WGS84 and is the CRS used in all GPS units for example. When working in the UK it will be convenient change your QGIS installation's default CRS to that of the Ordnance Survey which is EPSG: 27700: On the top ribbon >Settings > Options > CRS (see over). The CRS dialog box brings up various options including the default 'automatically enable on the fly re-projection' which means that data (eg from GPS unit) with a different CRS will be rendered in the correct location.

Click of the CRS icon to the right of the 'Always start new projects with following CRS' box. This brings up the CRS selector – type '27700' into the 'filter' box which will select the British National Grid, click so that it appears in the 'Selected CRS' box, 'OK'.

When creating a new GIS project you will see that the default CRS has changed to 27700.



The learn how to use QGIS, go to the top of the QGIS web page, go to “For Users” which links to the “QGIS user guide”, “Training manual” and the “QGIS Tutorials”. There is also a comprehensive book list, various blog sites by QGIS geeks and the all-important Plugins. With a bit of patience these are all you need but I include some resources that I have found useful as follows:

For data to play with you can download some Herefordshire example files I’ve created from www.r5r.eu/awir.html this web page includes various resource documents (including this one) as well as my presentation to the 2017 Ancient Tree Forum conference on digital methods relevant to tree and landscape recording.

The Ordnance Survey has now embraced FOSS4G and has test data, examples and its own QGIS tutorials see

<https://www.ordnancesurvey.co.uk/innovate/masterclasses/>

Other on line GIS resources:

<http://www.qgistutorials.com/en/index.html> Uses version 2.8 but OK for basics

<http://www.baruch.cuny.edu/confluence/display/geoportal/GIS+Practicum>

link to good general tutorial manual (July 2016) and one for QGIS Rasters

<http://www.lutraconsulting.co.uk> private UK consultancy with free stuff including its own plugins and a blog

<http://www.digital-geography.com> regularly updated mainly FOSS4G

<http://monde-geospatial.com/> more general GIS but also articles on FOSS4G

<http://gis.stackexchange.com> stumped by a GIS problem? someone else may have solved it.

Web mapping: A huge subject I won't cover here but the main Open Source packages are Leaflet, Open Layers and Geoserver which have many online resources. Rudimentary web maps can be made easily and directly from within QGIS by the qgis2web plugin which generates an entire web map for you with a few mouse clicks and can then be uploaded onto your host server.

Some free UK and Herefordshire data sources:

<https://www.ordnancesurvey.co.uk/opendatadownload/products.html>

You can order data sets for all UK or just the 100km square containing Herefordshire. For the latter choose the SO specific data sets by clicking the 'SO' square on the map and/or scroll down list on the right of that map – click the box to choose DVD or download (best unless slow connection). When you've selected what you want click 'next' at the bottom of the page, fill in online form and wait for email which has all the download links (which remain live for 3 days).

General Government data:

<https://data.gov.uk> go to 'mapping'.

I have found it to be better and quicker to use the EA's catalogue web page:

<http://environment.data.gov.uk/ds/catalogue/#/catalogue>

Under "Spatial Data Catalogue" choose source organisation (eg Natural England) and the format (eg shape file) and in the Layer you can type your search term (eg ancient). These three filters isolate the Ancient Woodland Inventory for England for download.

<http://r5r.eu/awir.html> Herefordshire ancient woodland inventory revision web page but I've added some example files to play about with (see under 'Herefordshire FOSS4G'): there's a zip file with county, parish and ancient woodland polygons, 10k grid squares and some simple style files + a basic gazetteer background raster. Download and unzip to convenient folder on your system. This document is also on this section of this web page. Also included are some articles from a workshop by Rebecca Bennett on using LIDAR-derived DTM (Digital Terrain Model) data in QGIS (uses an older version)

LIDAR and DTM data:

<http://www.geostore.com/environment-agency/survey.html> This is the portal to the free LIDAR-derived DTM (Digital Terrain Model – bare earth) and DSM (Digital Surface Model - tops of things) from the Environment Agency. You can download pre-processed jpg files 'composite' files which gives a very basic overview of the terrain but if to get the most out of DTM/DSM you must do the processing and visualisation yourself so you need the 'tiles' option which are the actual height data matrix for each tile in text file format (asc).

These DTM and DSM data sets are only 2m horizontal resolution (but about 10 cm vertical resolution) for most of Herefordshire (there are a few 1m areas) which is low by current standards but with suitable processing useful results can be obtained.

For example I discovered a previously unknown Iron Age Fort in Herefordshire:

www.r5r.eu/hansnett.html

Processing and visualising DTM/DSM is a topic which I might write about sometime, but for now see articles by Rebecca Bennett which I've put on <http://r5r.eu/awir.html> above.

Raw LIDAR comes as 3D "point cloud data" which is starting to be released on the above web site and for which you will need the correct software:

<https://rapidlasso.com/LAStools/> this point cloud processing software is free with certain restrictions.

Videos and presentations:

There are many QGIS tutorials and videos online but make sure they are using a recent version of QGIS - 2.14 or above. Try to get the most out of the official QGIS web site (above) first though.

Videos of talks at recent FOSS4G conferences are well worth looking at:

Presentations from the 2015 QGIS conference Seoul

<https://vimeo.com/album/3605087>

Presentations from the 2015 QGIS conference University of Copenhagen:

<https://qgis2015.wordpress.com/program/>

Vimeo videos from the 2014 FOSS4G conference:

<https://2014.foss4g.org/schedule/sessions/> click on the "watch this presentation"

September 2013 FOSS4G at Nottingham

<http://2013.foss4g.org/> >archived material > Videos on YouTube

A selection of free online websites for historical maps

(Thanks to Gwyneth Guy for putting this together)

The first survey drawings for the 1" maps made by the OS between 1780 and 1840; (Herefordshire and neighbouring areas date to c1815). They have been geo-referenced and can be viewed with Google Earth overlay.

<http://www.bl.uk/onlinegallery/onlineex/ordsurvdraw/index.html>

The titles given are not helpful; better is to find the reference number on the index and search for the number. <http://www.bl.uk/images/maps/osdindex.jpg>

The National Library of Scotland (NLS) has a great collection of early maps including the first edition 6-inch and 25-inch to the mile c1885 maps:

<http://maps.nls.uk/series/index.html>

For Wales:

<http://historicwales.gov.uk/>

There is an on-going project to digitise and publish online Welsh Tithe maps. They date to c1840 and the accompanying apportionment document details the field name, acreage, and land use for each plot. Only one for Radnorshire up so far, but plenty for Breconshire. Again they can be viewed with various historic and modern map or satellite overlays.

<http://cynefin.archiveswales.org.uk/en/tithe-maps/>

For a large collection of historic maps world wide:

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

Historic Environment records (inc parks and gardens) for England. Set the map view first and then tick the desired boxes under the what/when and resources tabs

http://www.heritagegateway.org.uk/gateway/advanced_search.aspx

Other free sites:

<http://www.sabre-roads.org.uk/maps/> has the whole country at 1:50,000 Ordnance Survey maps and at 1:25,000 for the 20th century Ordnance Survey maps the amongst many other useful map editions.

<http://www.wheresthepath.org.uk> has a useful side-by-side viewer.

<http://www.charlesclosesociety.org/onlinemaps>

<http://gridreferencefinder.com/>

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

http://www.davidrumsey.com/luna/servlet/view/all/where/England?sort=pub_list_no_initialsort%2Cpub_list_no_initialsort%2Cpub_date%2Cpub_date (Lots of old maps not published online elsewhere and also includes a useful side by side geo-referencer)

<http://www.bl.uk/reshelp/findhelprestype/webres/scanned/> (some other online resources)

For general zipping and unzipping I recommend <http://www.7-zip.org/>

Avoid the unnecessarily heavyweight WinZip that keeps trying to sell you upgrades & such.

Any queries or comments, typos, links that don't work etc, contact me at:

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