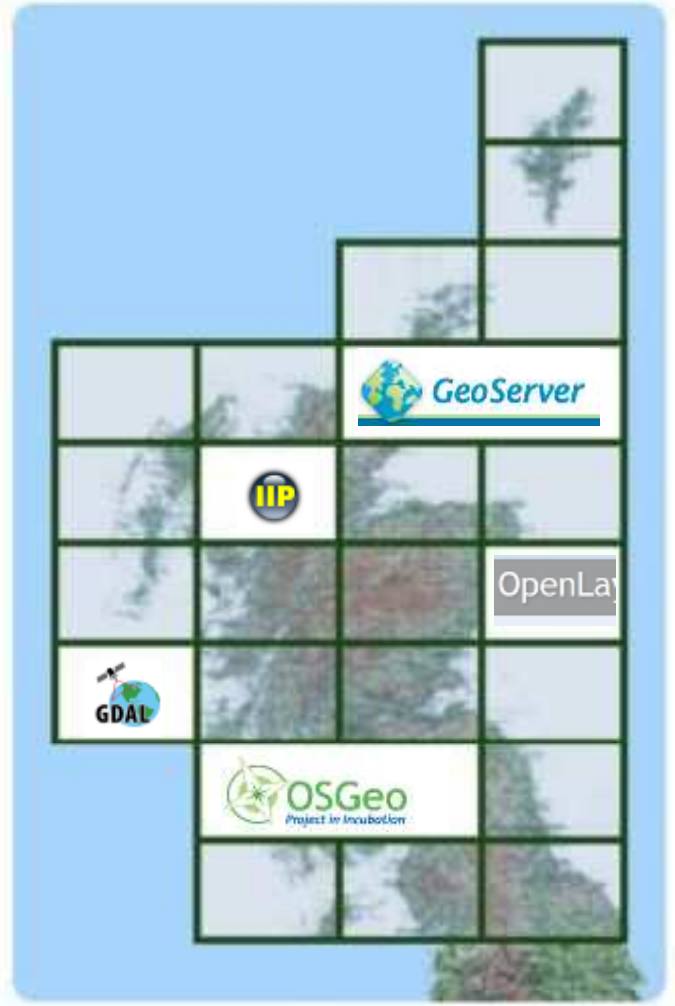
Open source technologies for delivering historical maps online - case studies at the National Library of Scotland

- Background and context
- NLS Case Studies 1 - GDAL/ MapTiler/Georeferencer
- NLS Case Studies 2 - Geoserver / OpenLayers
- Other technologies - IIPImage for JP2 / Omeka.org
- Opportunities for libraries



Chris Fleet, National Librry of Scotland, and Petr Pridal, Klokan Technologies, GmbH

Maps of Scotland website – 44,000 online maps

http://maps.nls.uk

http://geo.nls.uk

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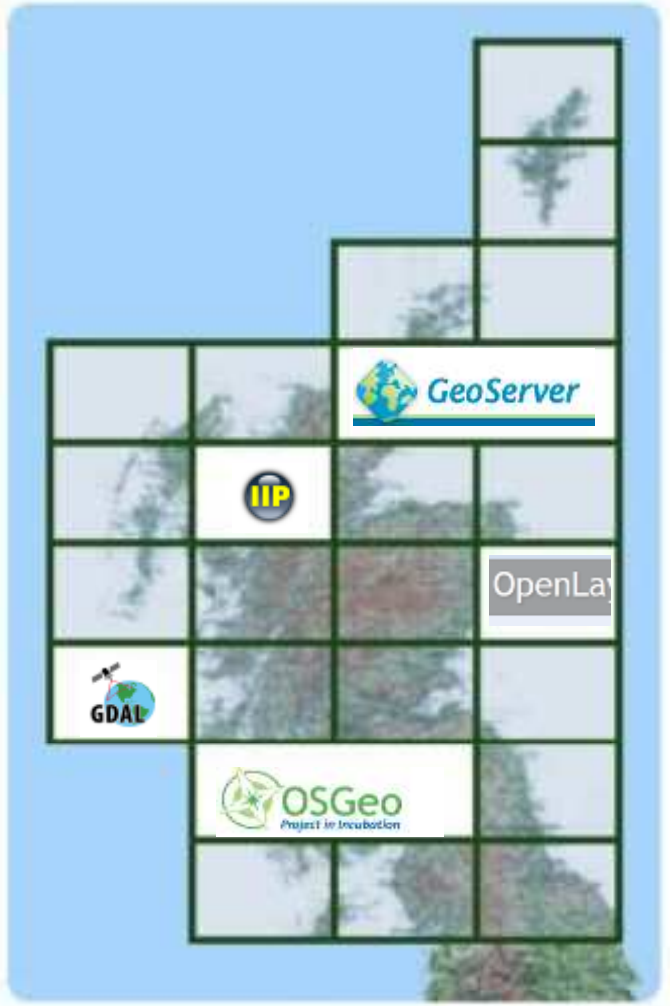
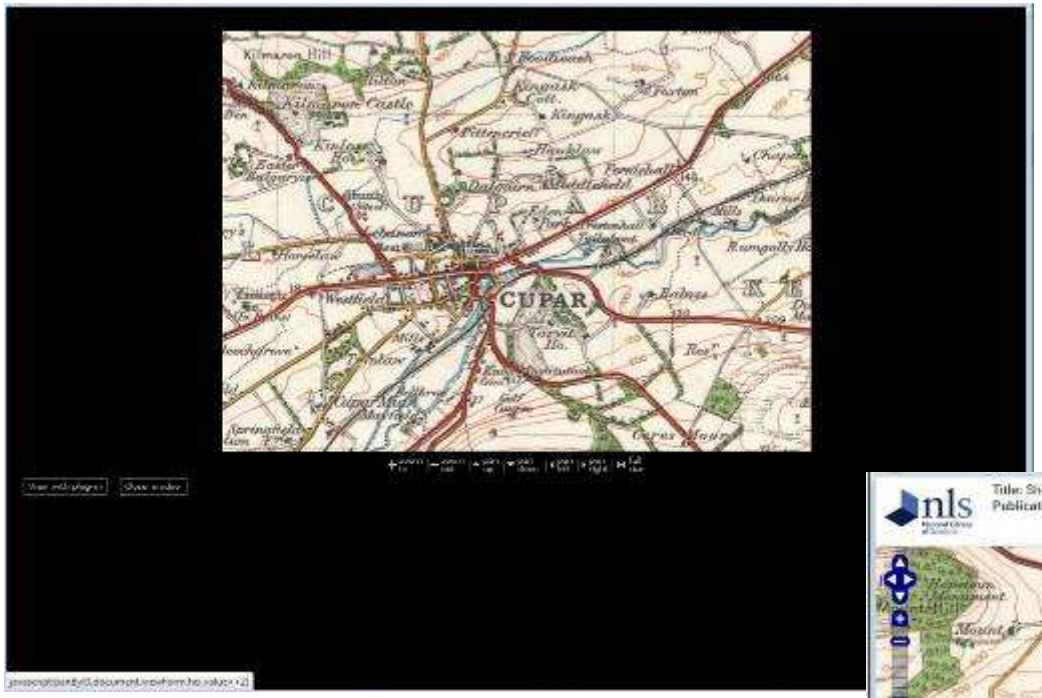


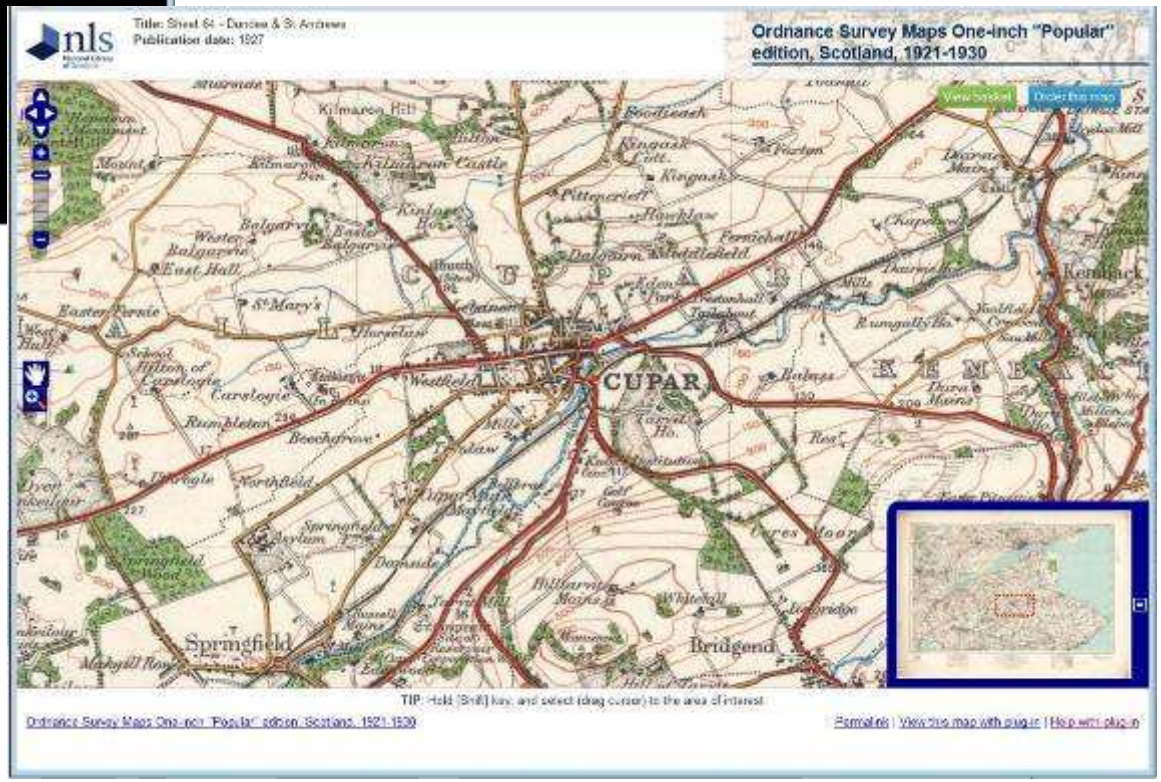
New MrSID OpenLayers Viewer - 2009



LizardTech Express Viewer problems:

- Fixed image extents on screen
- Non-Ajax based viewing
- Limited ability to display image in wrapper
- Printing and downloading limitations
- No Permalink

New customised OpenLayers viewer addresses these problems and uses other open-source Javascript programs including, Protoype, Gears, and XML HttpRequest

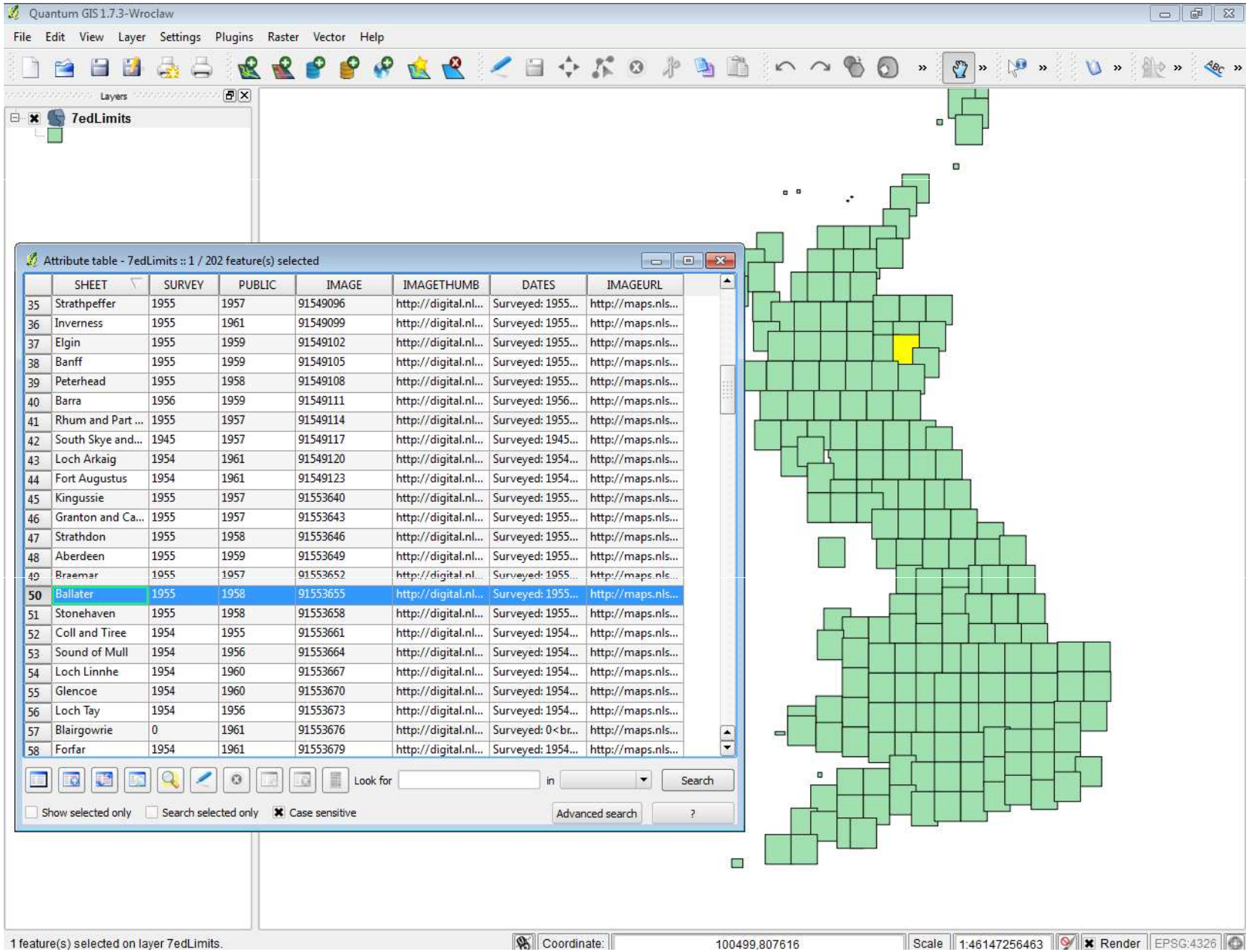


GDAL / OGR open source commands

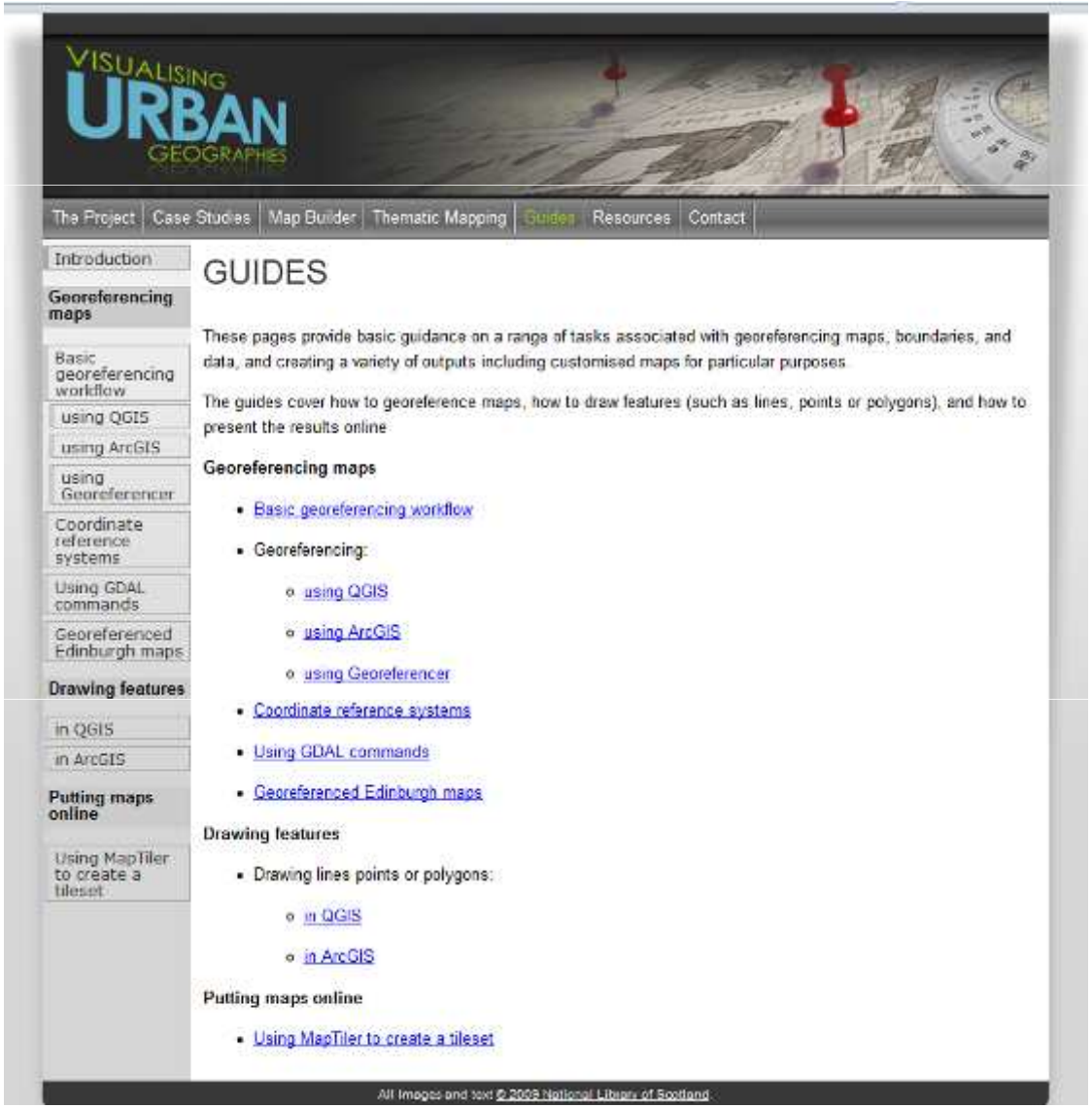
gdalinfo	information about raster image
gdaltindex	create shapefile of raster image extents
gdal_translate	convert raster images between formats
gdaltransform	convert raster images between projections
ogrinfo	information about vector file
ogr2ogr	convert vector files between formats

GDAL: using gdaltindex to create a clickable graphic index

Using QGIS to create and edit shapefiles

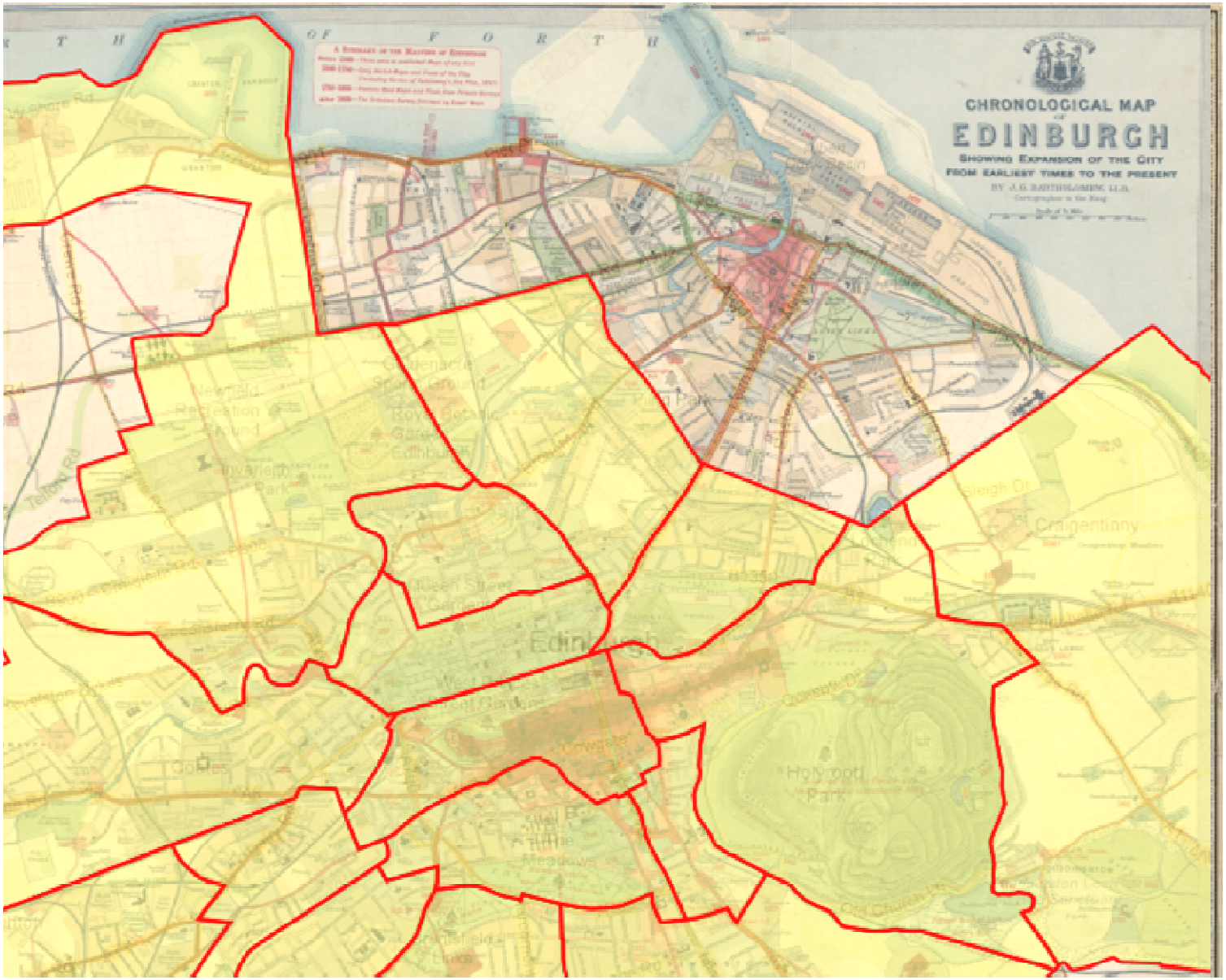


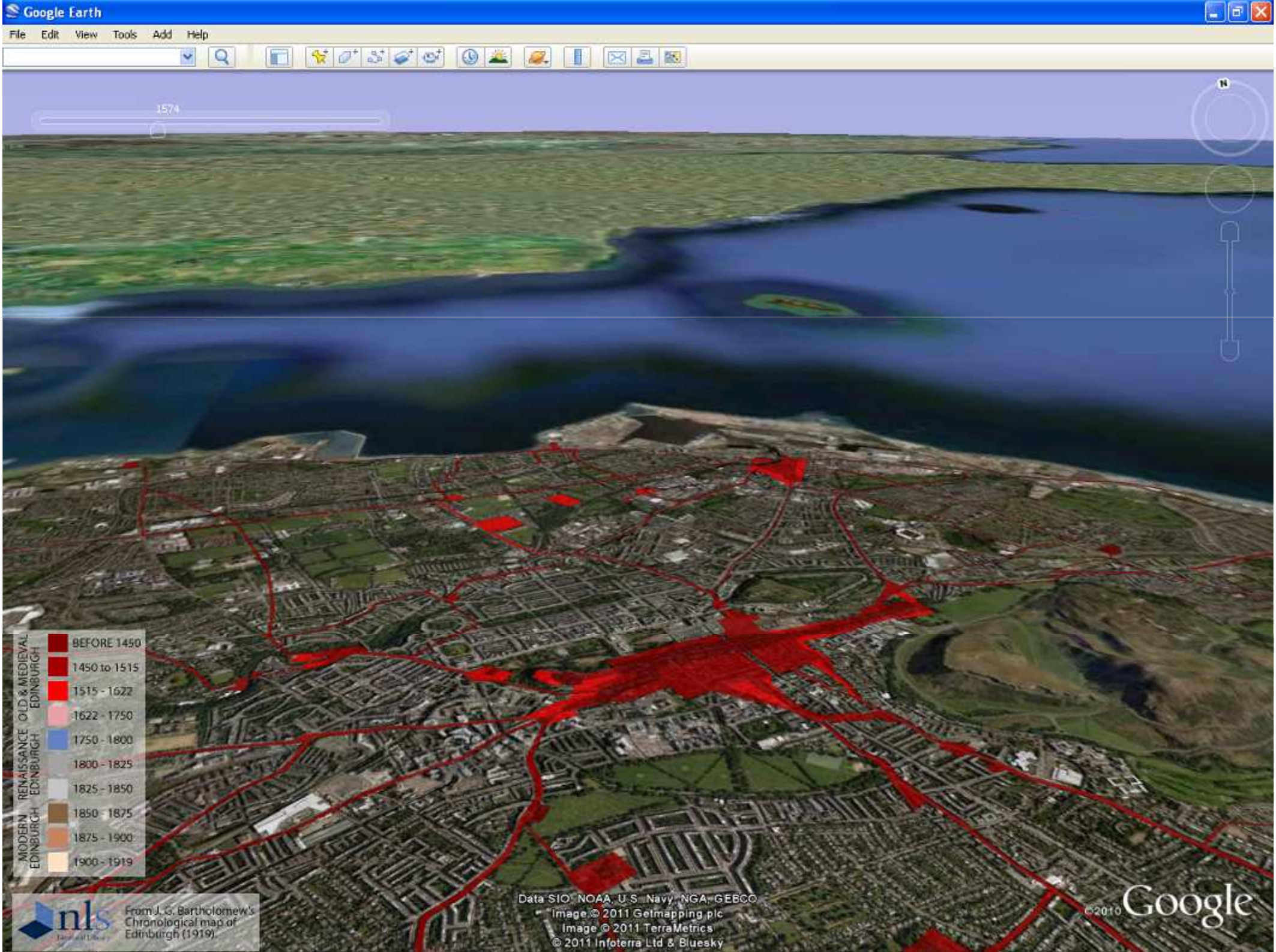
Visualising Urban Geographies - guides to georeferencing workflows using open-source QGIS and MapTiler

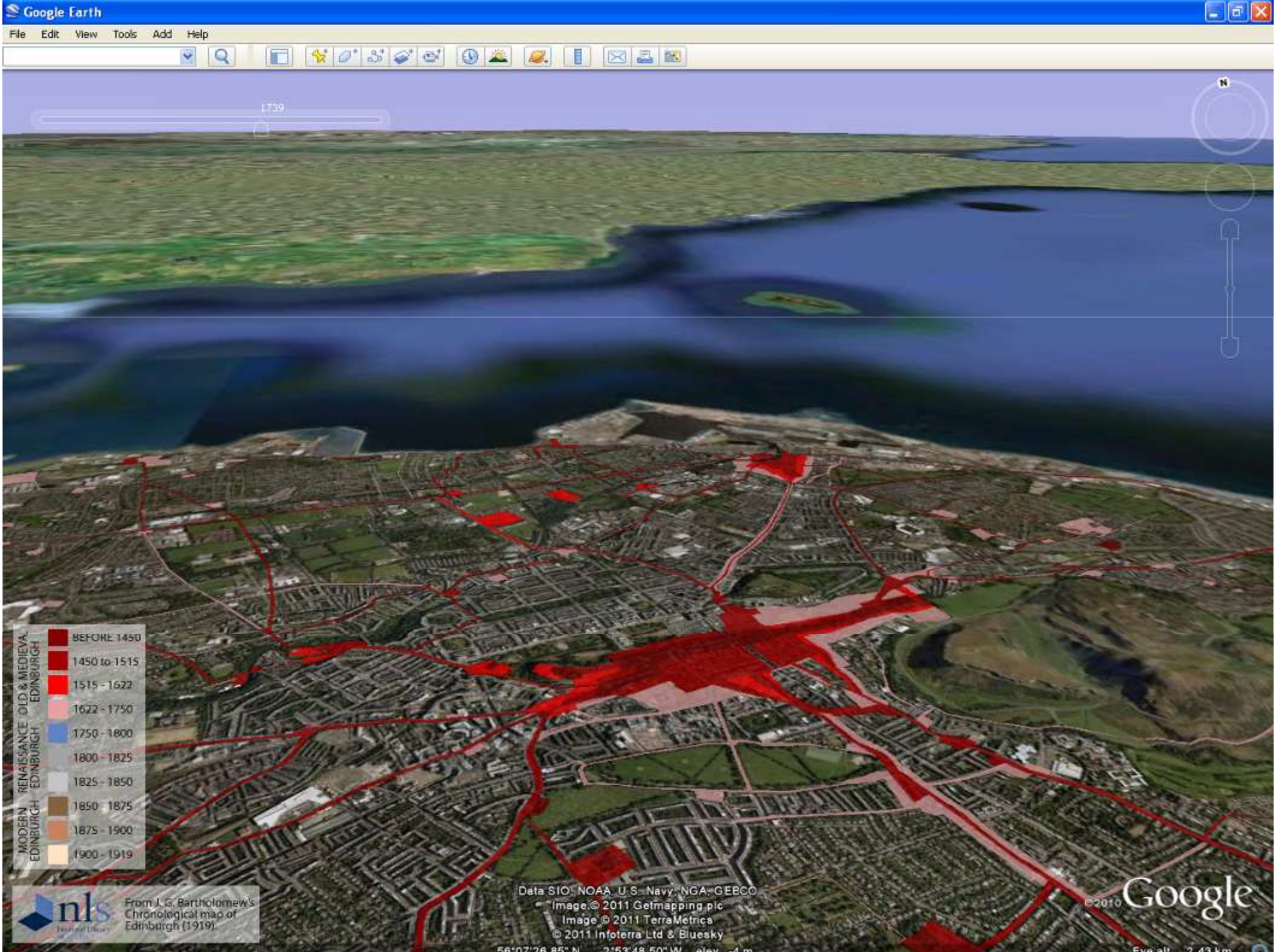


geo.nls.uk/urbhist/guides.html

Using GDAL ogr2ogr - to convert shapefiles (in British National Grid) into KML (in WGS84) for Google Earth




Google Earth
File Edit View Tools Add Help
OLD & MEDIEVAL EDINBURGH
BEFORE 1450
1450 to 1515
1515 - 1622
RENAISSANCE EDINBURGH
1622 - 1750
1750 - 1800
MODERN EDINBURGH
1800 - 1825
1825 - 1850
1850 - 1875
1875 - 1900
1900 - 1919
From J. G. Bartholomew's Chronological map of Edinburgh (1919)
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image © 2011 Getmapping plc
Image © 2011 TerraMetrics
© 2011 Infoterra Ltd & Bluesky
©2010 Google


Google Earth
File Edit View Tools Add Help
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MODERN EDINBURGH
RENAISSANCE EDINBURGH
OLD & MEDIEVAL EDINBURGH
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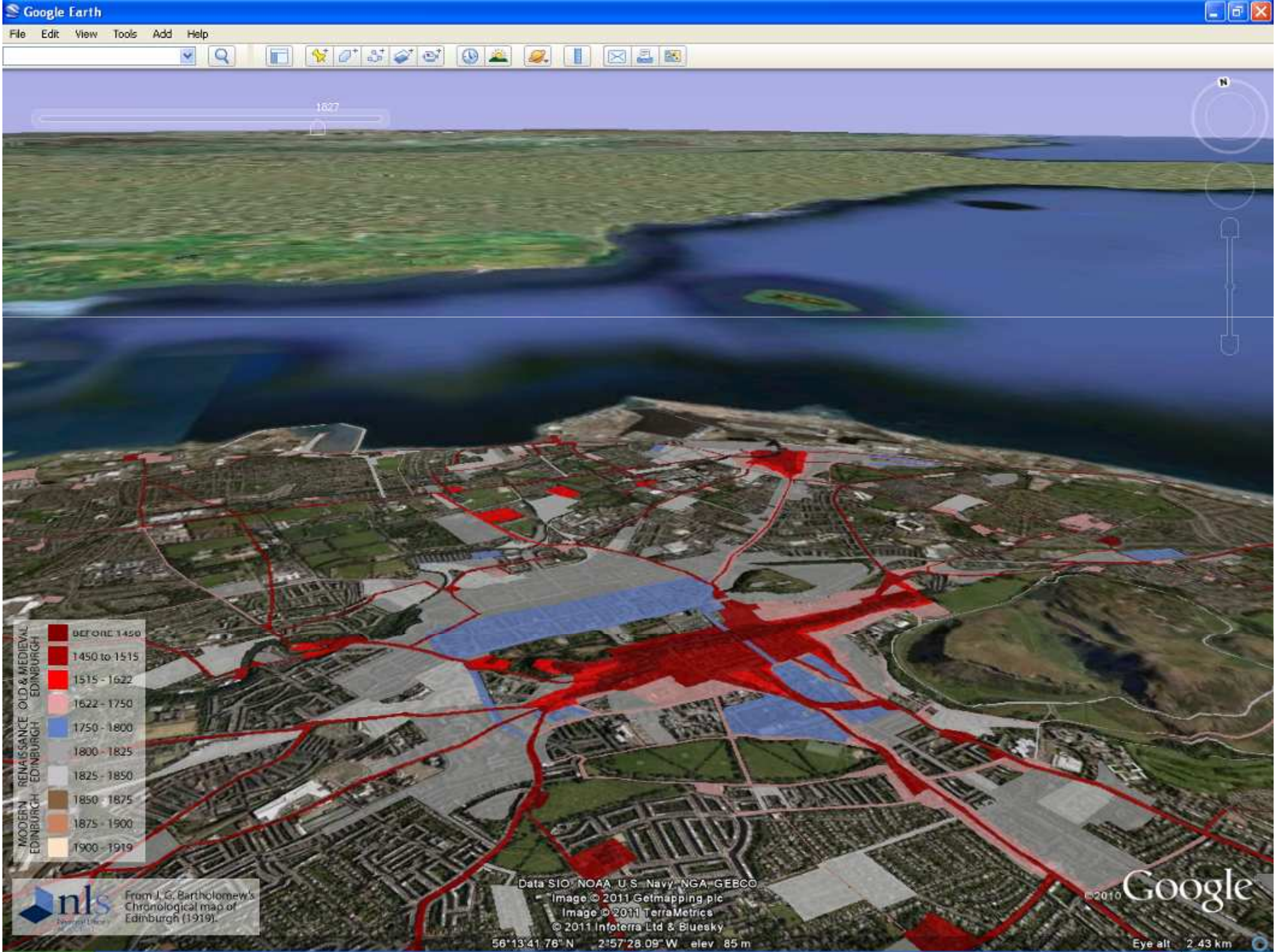
Google Earth
File Edit View Tools Add Help
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OLD & MEDIEVAL EDINBURGH
RENAISSANCE EDINBURGH
MODERN EDINBURGH
BEFORE 1450
1450 to 1515
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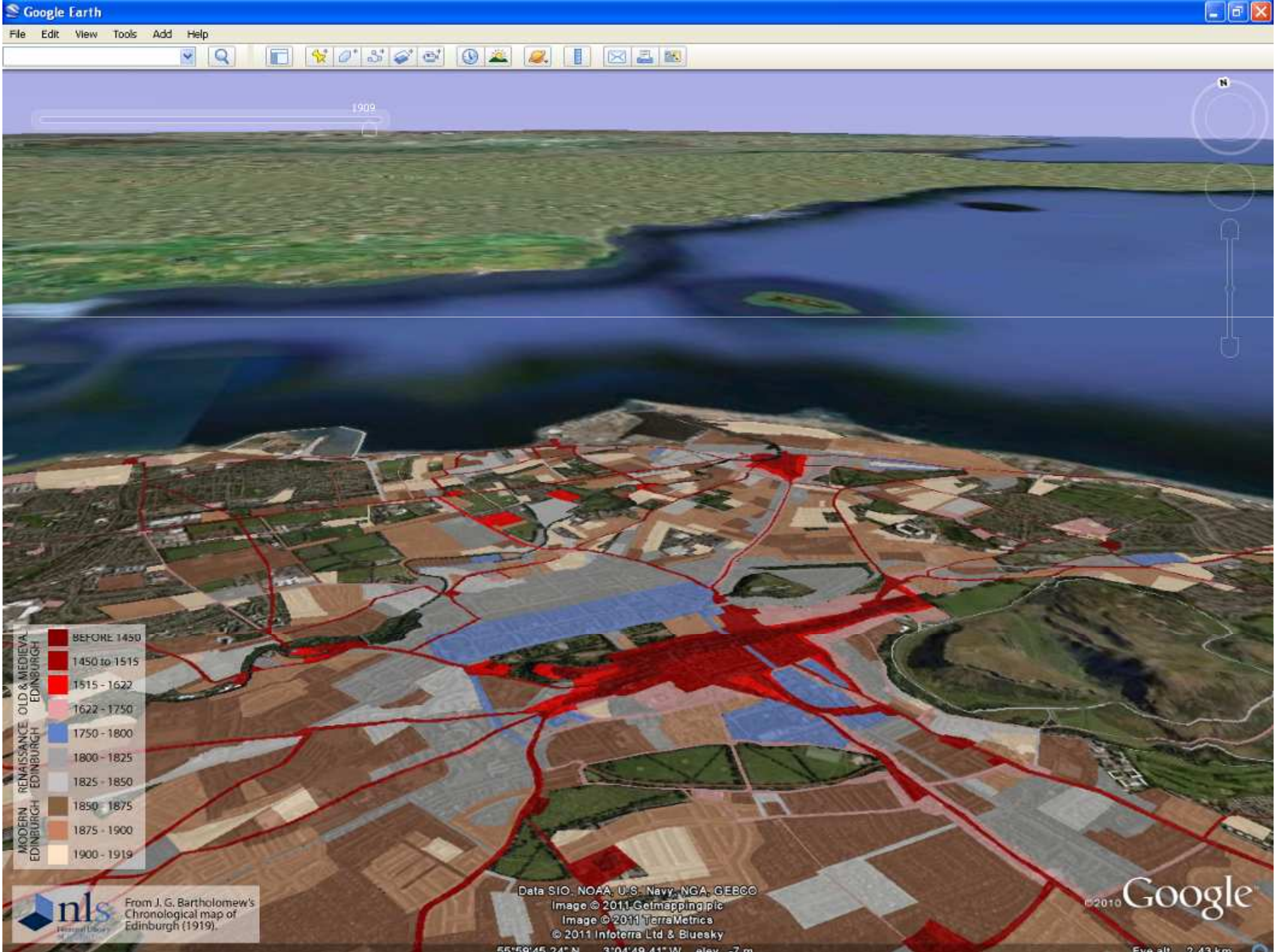
1875 - 1900
1900 - 1919
nls
From J. G. Bartholomew's Chronological map of Edinburgh (1919).
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image © 2011 Getmapping plc
Image © 2011 TerraMetrics
© 2011 Infoterra Ltd & Bluesky
56°13'41.76" N 2°57'28.09" W elev 85 m
©2010 Google
Eye alt 2.43 km


Google Earth
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OLD & MEDIEVAL EDINBURGH
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NLS Map Georeferencer

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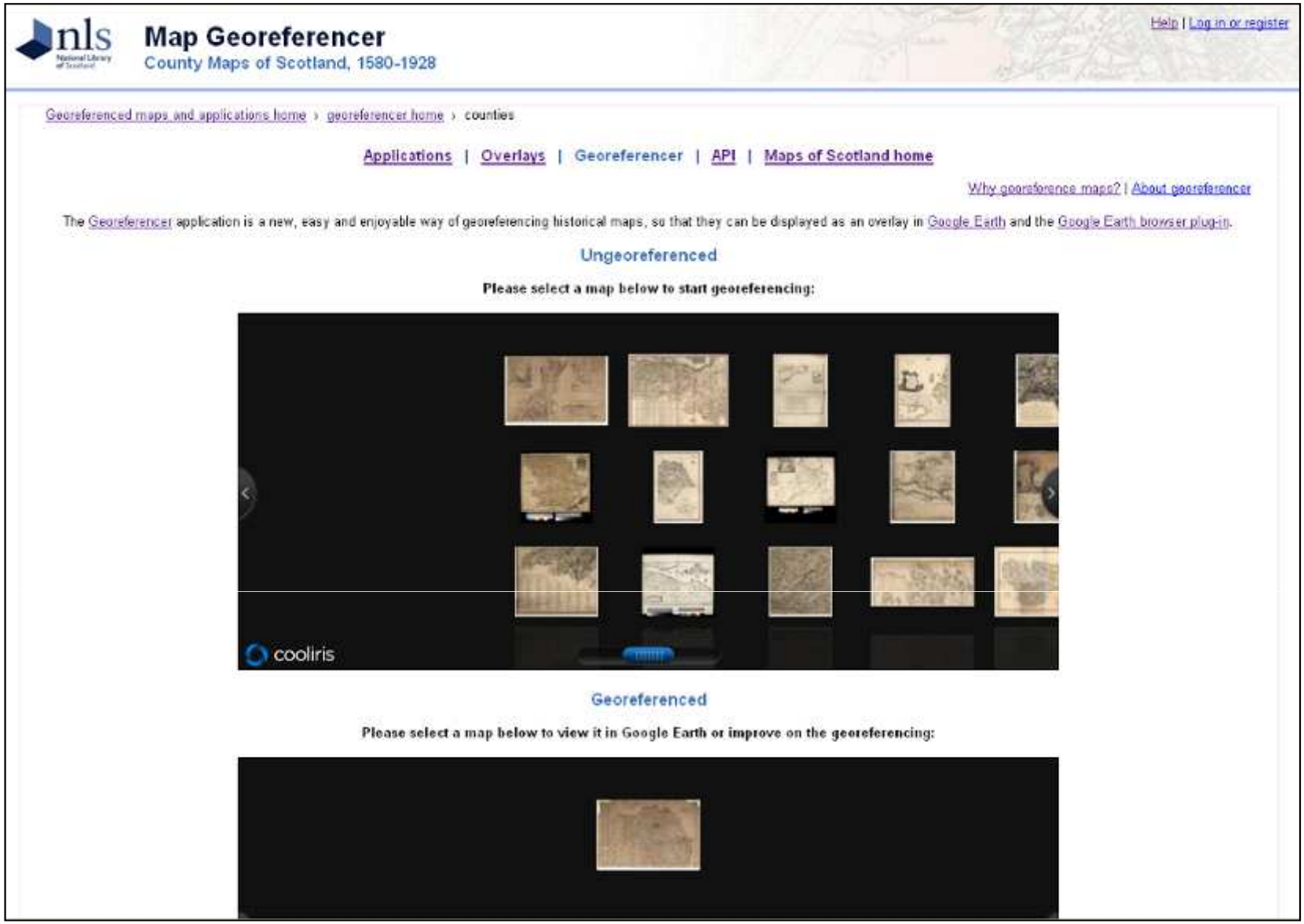
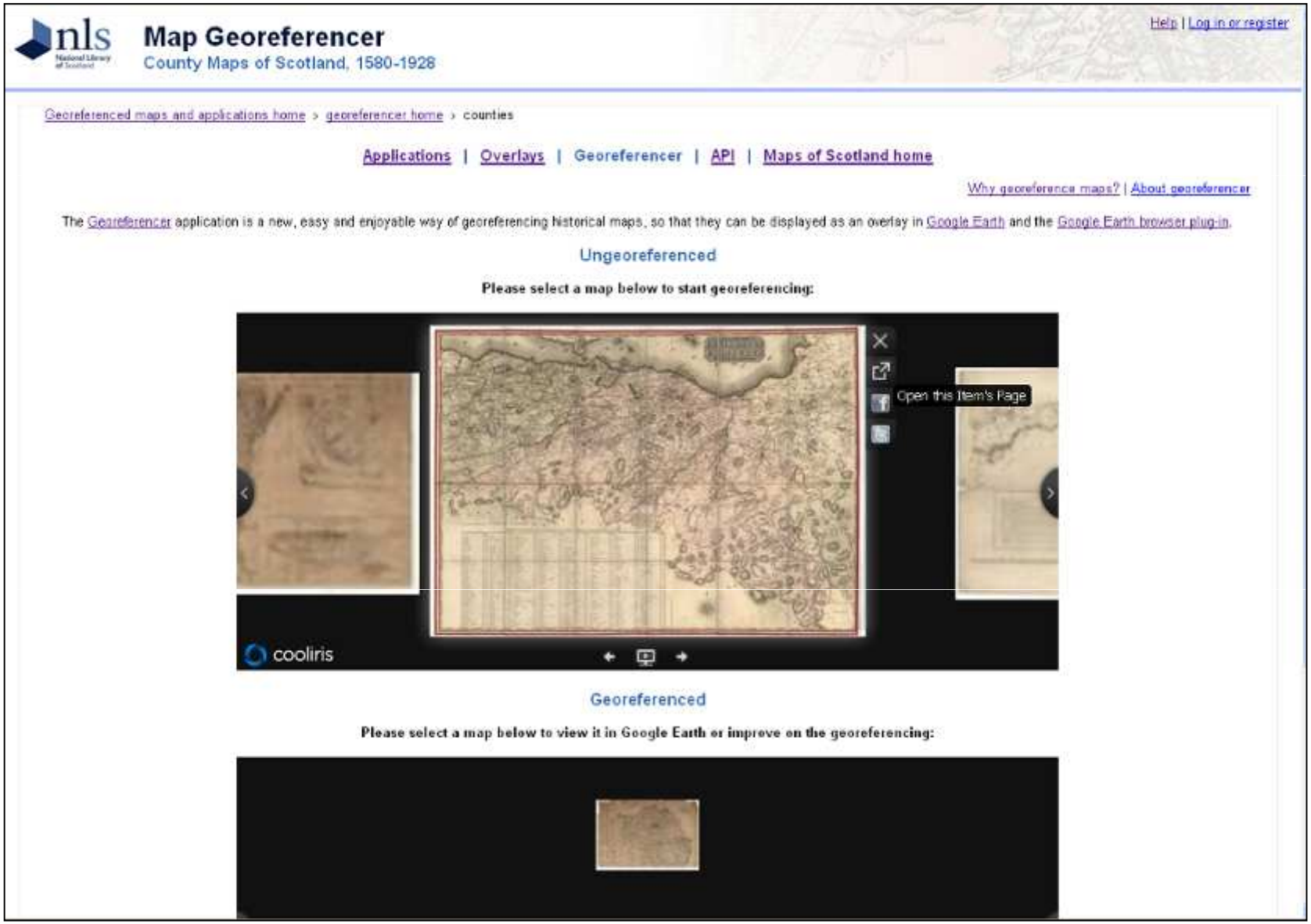
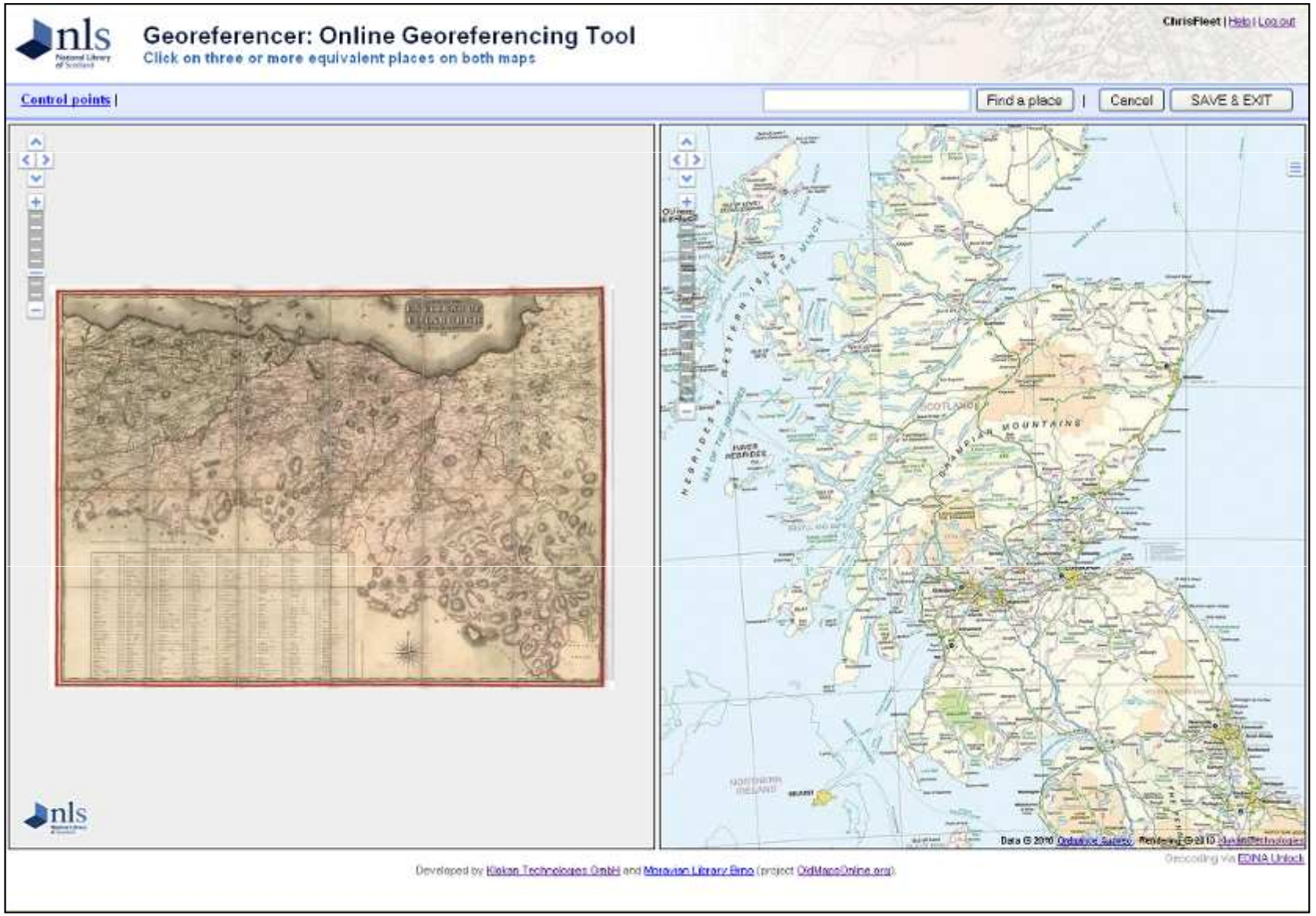


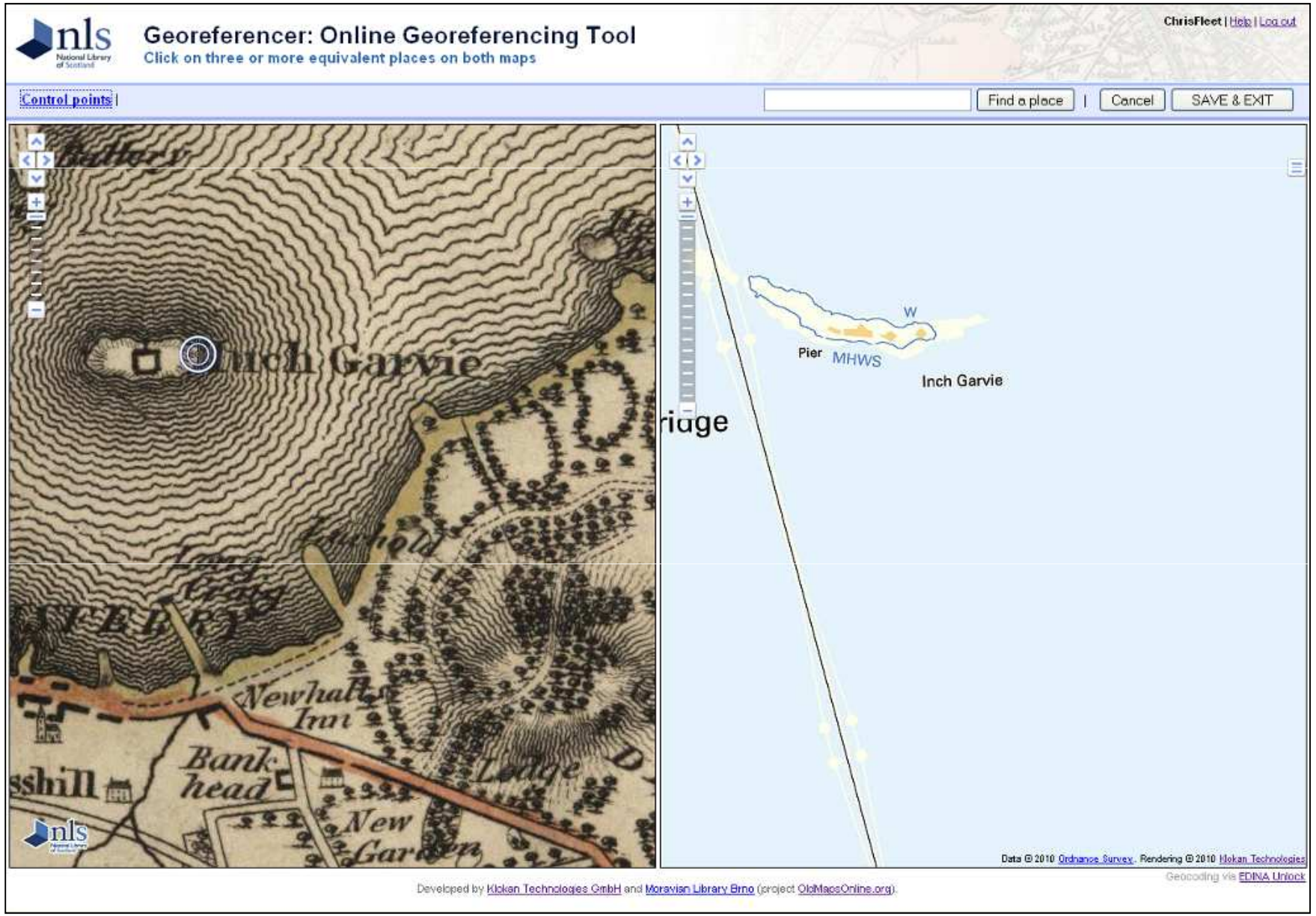
NLS Map Georeferencer – selecting a map



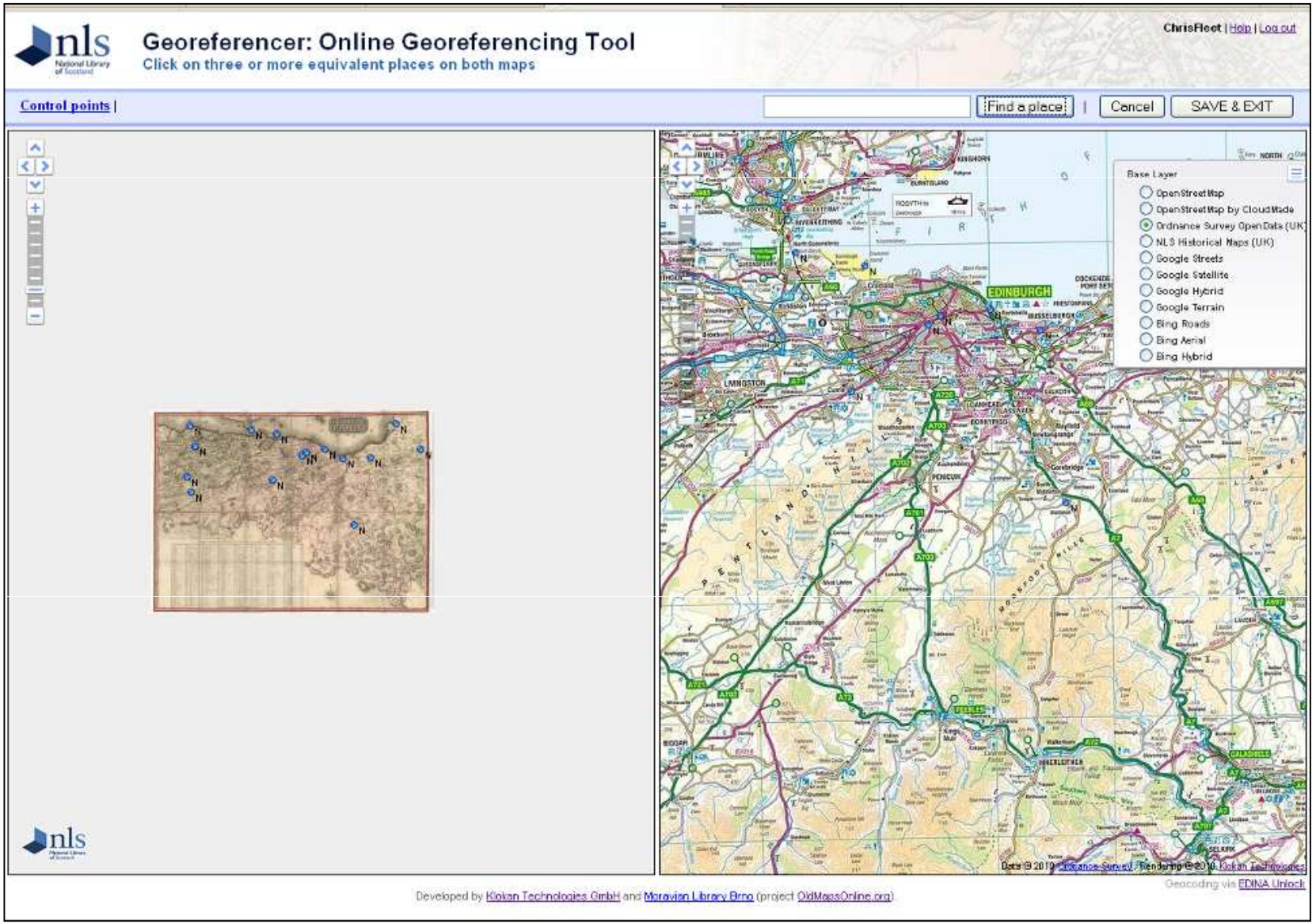
NLS Map Georeferencer – split-screen for georeferencing



NLS Map Georeferencer – adding control points



NLS Map Georeferencer – saving…



NLS Map Georeferencer – viewing results in Google Earth browser plugin

Tools: MapTiler and Tileserver

http://www.maptiler.org/

http://www.tileserver.com/

MapTiler – Tile Map Service mosaics

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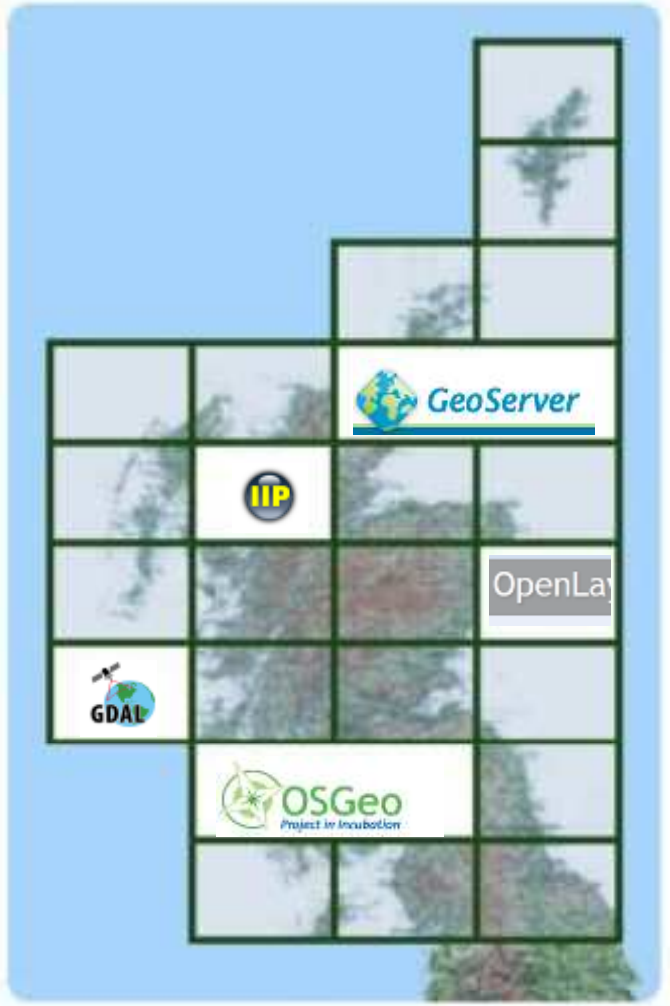
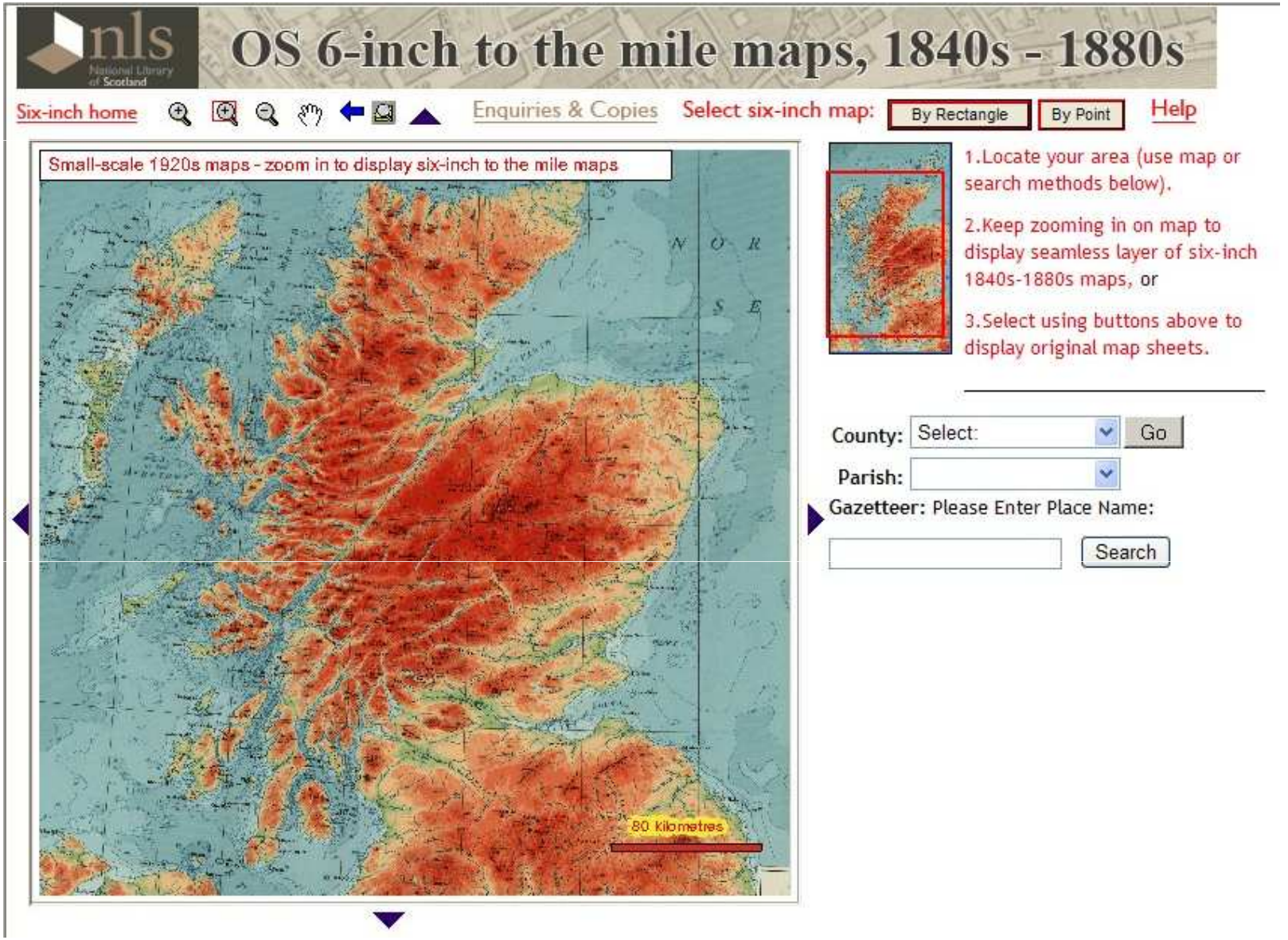


ESRI ArcIMS applications – 2004-2011



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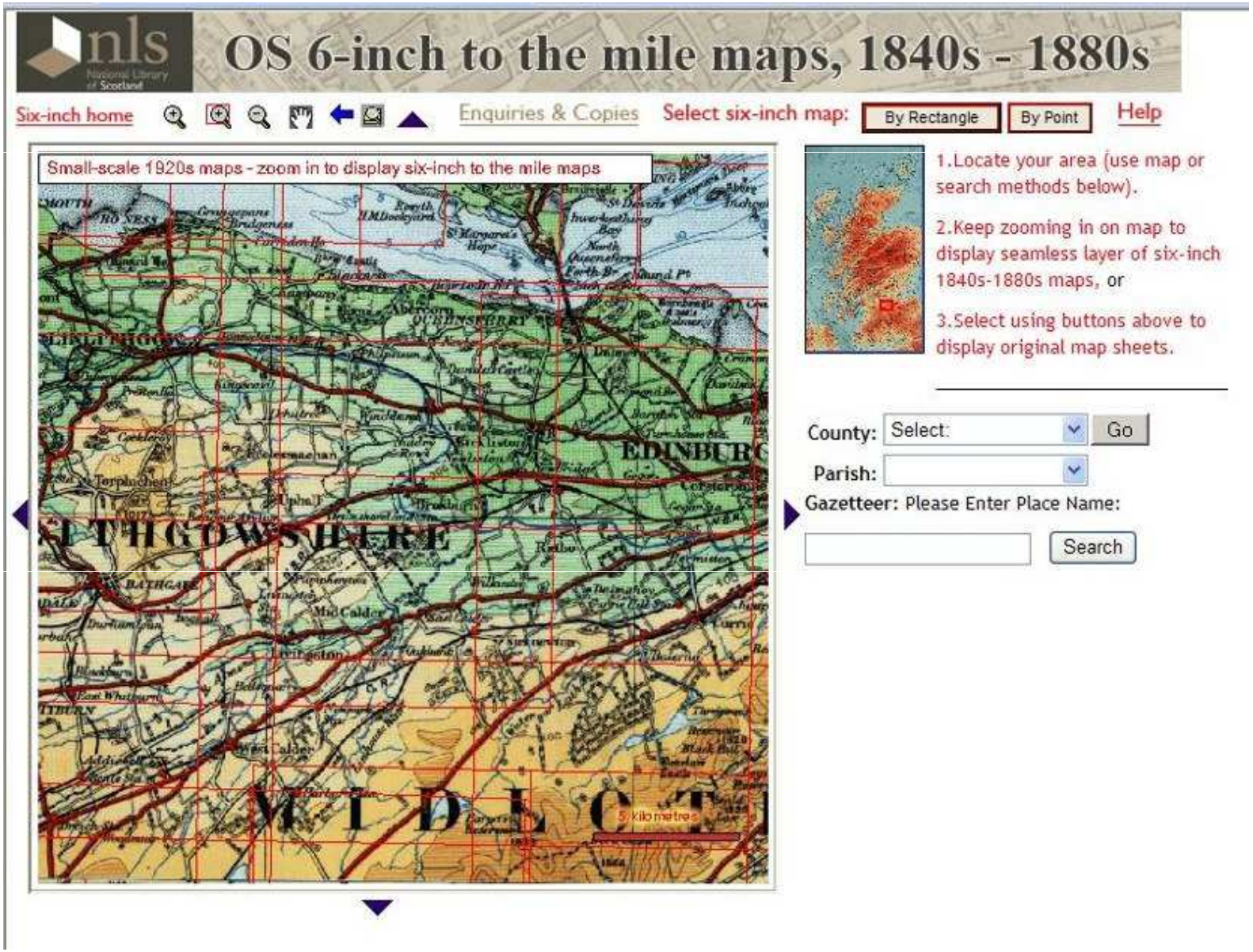
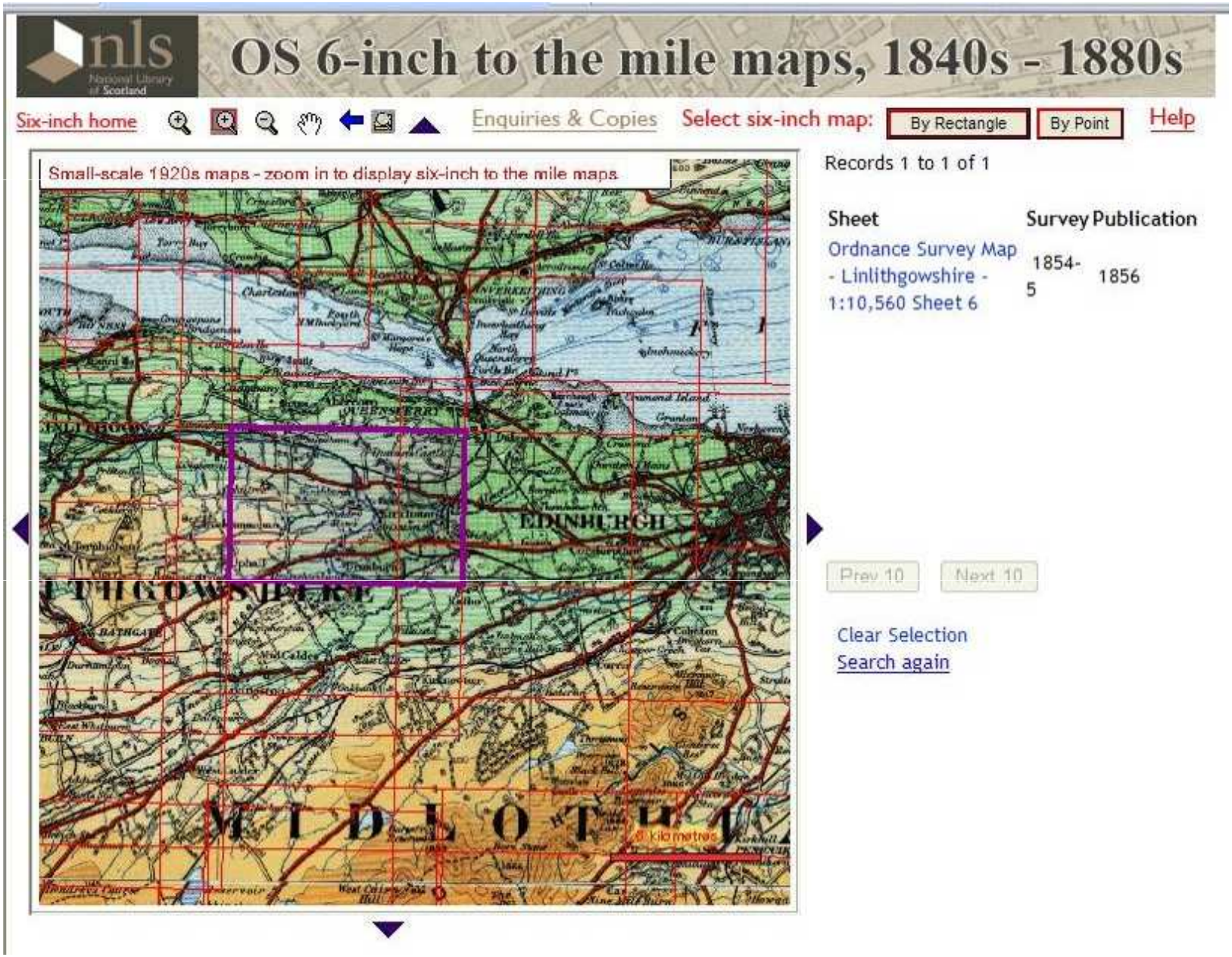
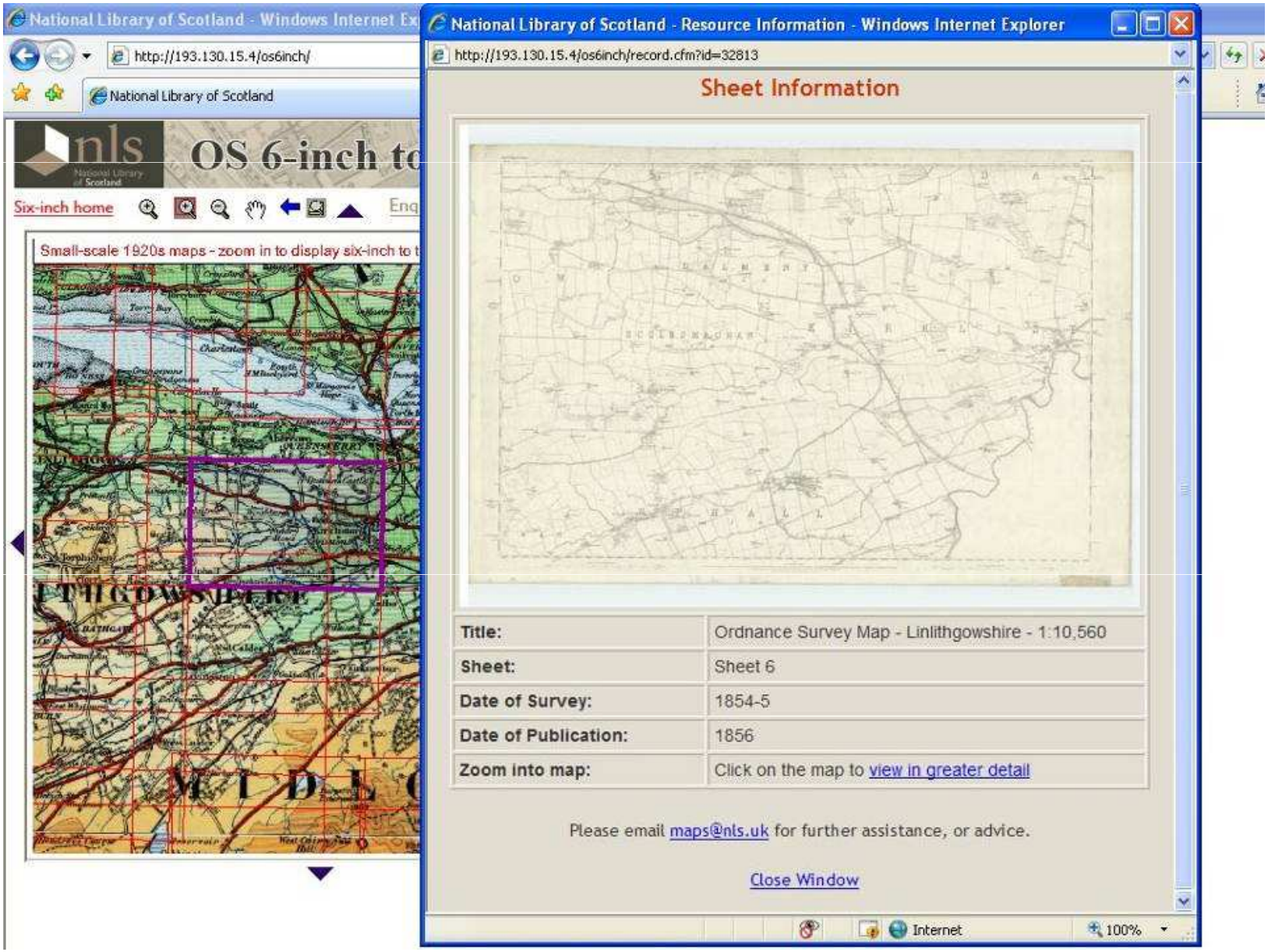


ESRI ArcIMS applications – 2004-2011



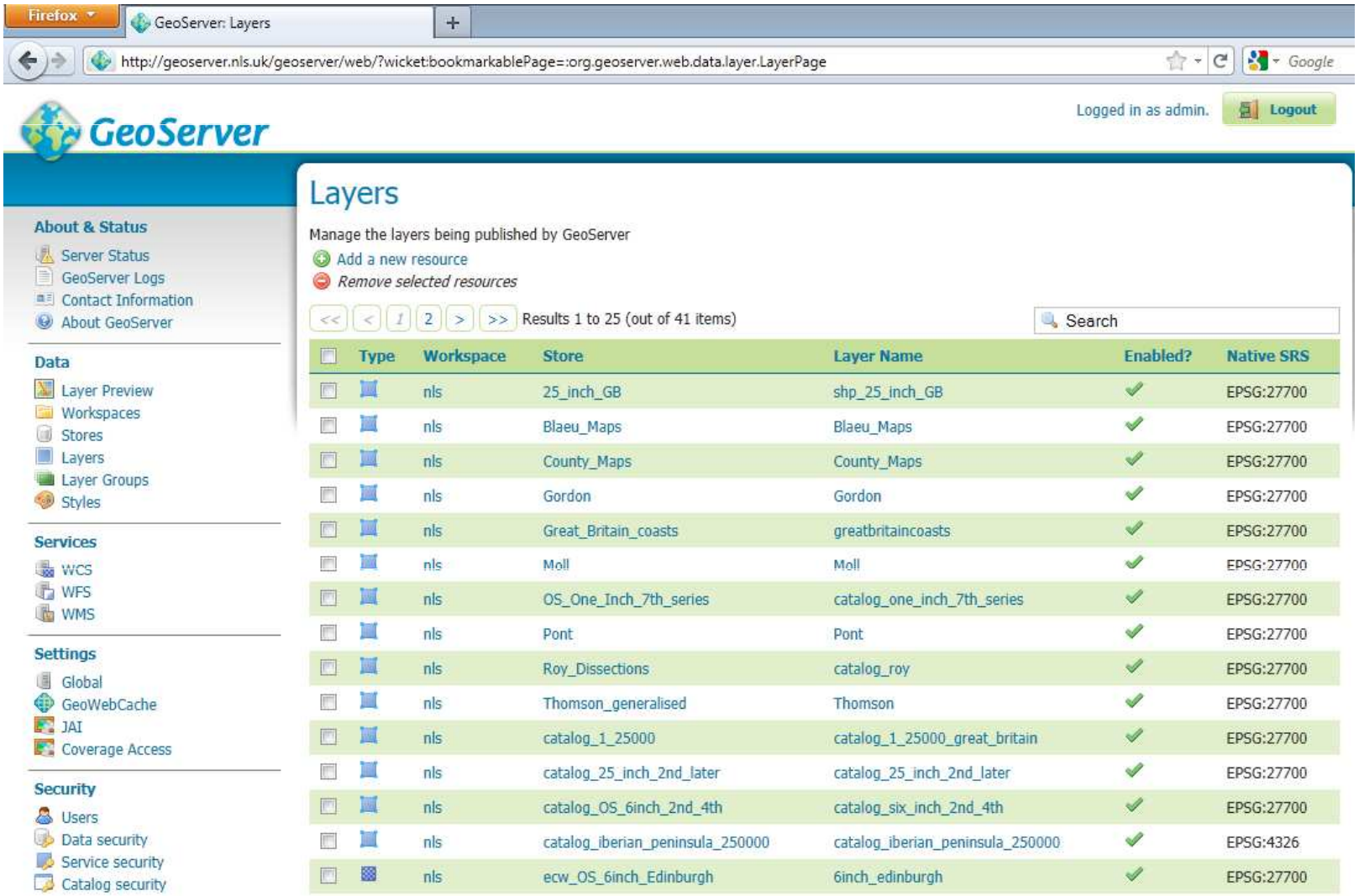
ESRI ArcIMS applications – 2004-2011



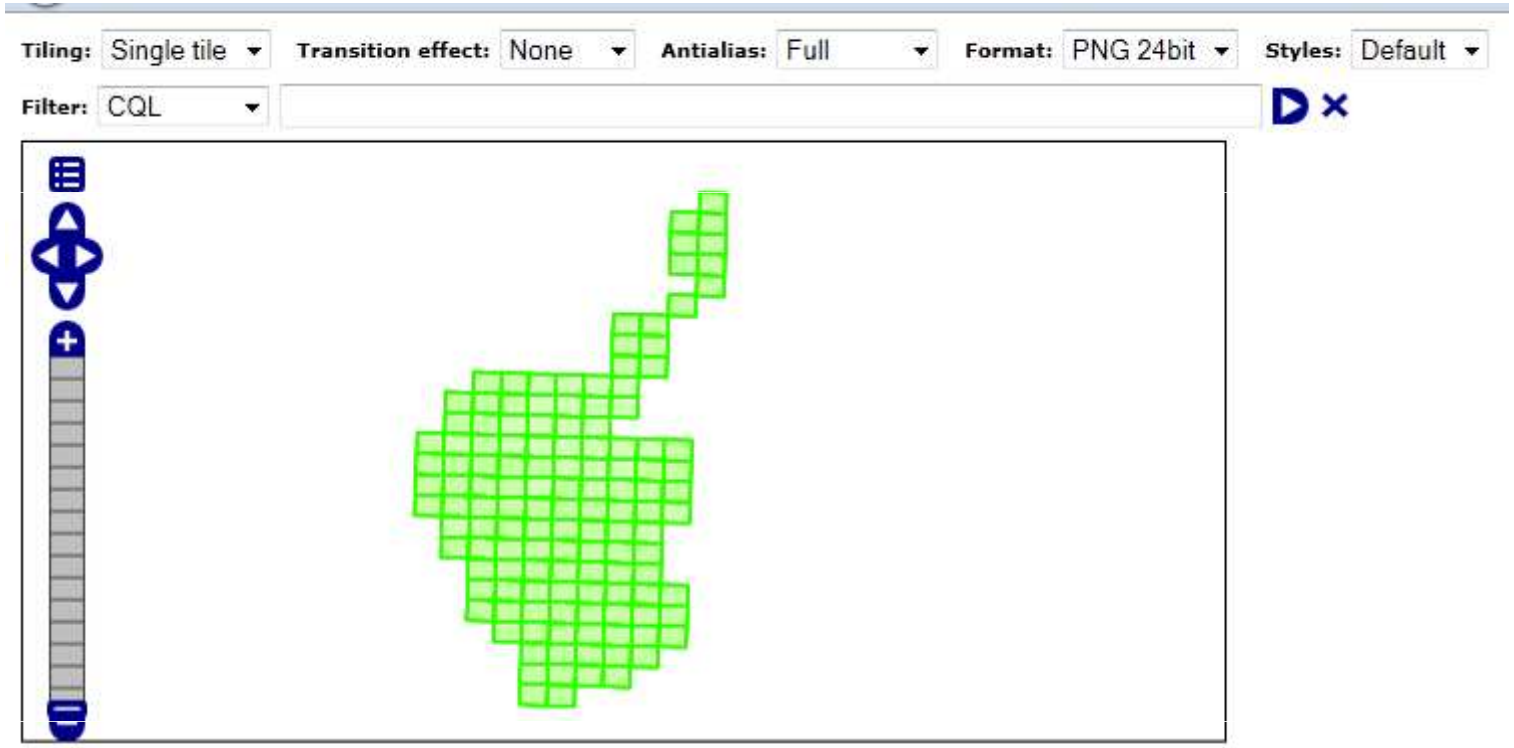
Problems of ArcIMS

- Expense – annual licensing costs of ca £5,000 - £6,000
- Limited web-mapping functionality
- Instability – difficulty in handling high usage spikes
- Fixed screen for map interface (500 x 500 px)
- Basis on British National Grid rather than Spherical Mercator

GeoServer – adding shapefiles as layers



GeoServer – previewing shapefiles and fields



CATALOG_1INCH_1ST_3RD

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catalog_1inch_1st_3rd.155	74488618	1894	1897	http://digital.nls.uk/dc4/7448/74488618.jpg	Peebles (24)
catalog_1inch_1st_3rd.286	74488619	1901	1905	http://digital.nls.uk/dc4/7448/74488619.jpg	Peebles (24)
catalog_1inch_1st_3rd.415	74400780	1894	1897	http://digital.nls.uk/dc4/7440/74400780.jpg	Peebles (24) - with coloured parish

GeoWebCache – for rapid display

GeoWebCache

Layer name:	Enabled:	Grids Sets:	
nls:6inch_edinburgh Seed this layer	true	EPSG:900913 EPSG:4326	OpenLayers: [png, gif, png8, jpeg] OpenLayers: [png, gif, png8, jpeg] KML: [png, gif, png8, jpeg, kml]
nls:6inch_edinburgh_pyr Seed this layer	true	EPSG:900913 EPSG:4326	OpenLayers: [png, gif, png8, jpeg] OpenLayers: [png, gif, png8, jpeg] KML: [png, gif, png8, jpeg, kml]
nls:Blaeu_Maps Seed this layer	true	EPSG:900913 EPSG:4326	OpenLayers: [png, gif, png8, jpeg] OpenLayers: [png, gif, png8, jpeg] KML: [png, gif, png8, jpeg, kml]
nls:County_Maps Seed this layer	true	EPSG:900913 EPSG:4326	OpenLayers: [png, gif, png8, jpeg] OpenLayers: [png, gif, png8, jpeg] KML: [png, gif, png8, jpeg, kml]
nls:Dmu_2004_region Seed this layer	true	EPSG:900913 EPSG:4326	OpenLayers: [png, gif, png8, jpeg] OpenLayers: [png, gif, png8, jpeg] KML: [png, gif, png8, jpeg, kml]
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nls:Moll Seed this layer	true	EPSG:900913 EPSG:4326	OpenLayers: [png, gif, png8, jpeg] OpenLayers: [png, gif, png8, jpeg] KML: [png, gif, png8, jpeg, kml]
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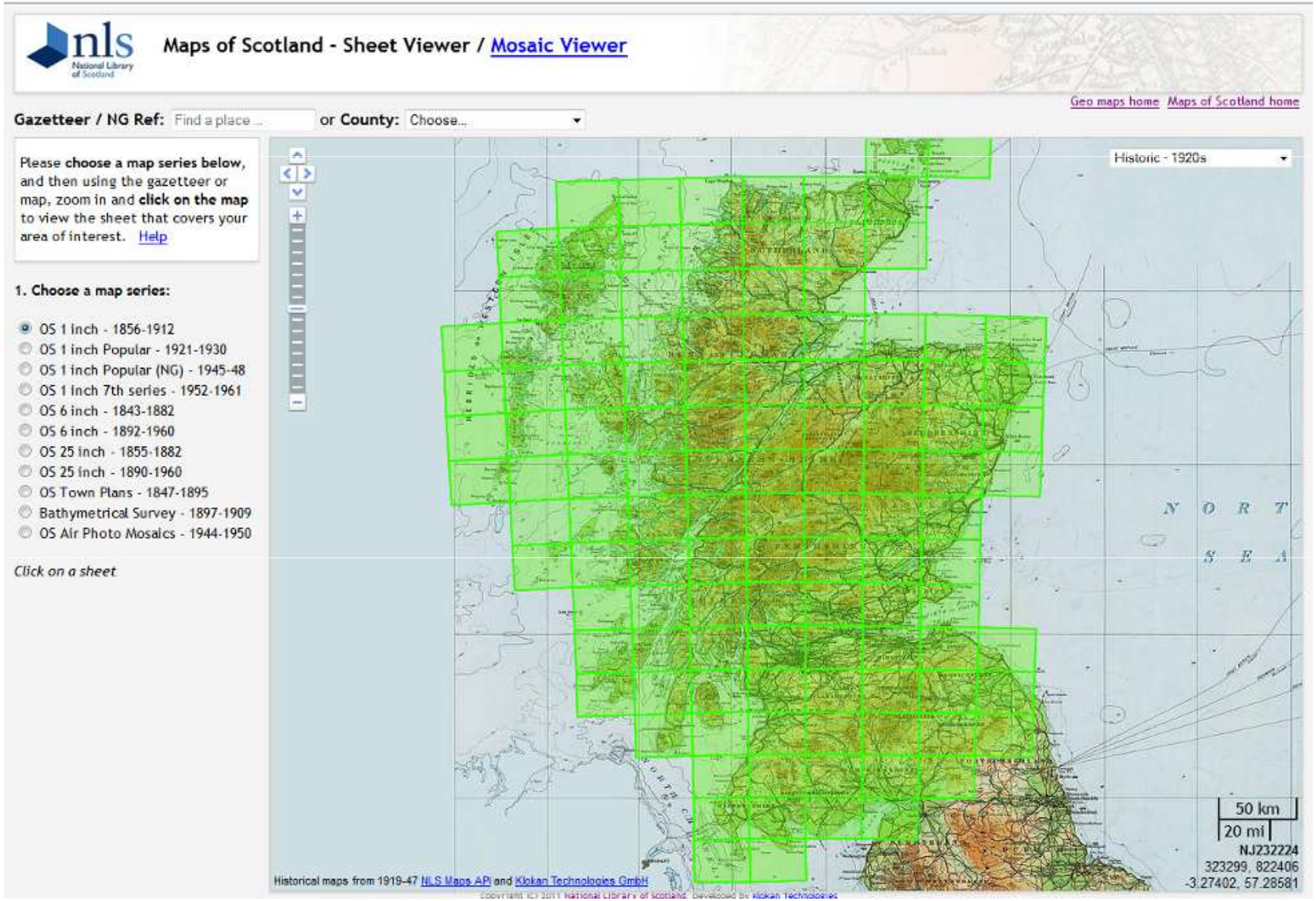
nls:Roy_Lowlands Seed this layer	true	EPSG:900913 EPSG:4326	OpenLayers: [png, gif, png8, jpeg] OpenLayers: [png, gif, png8, jpeg] KML: [png, gif, png8, jpeg, kml]

GeoServer / OpenLayers Sheet Viewer



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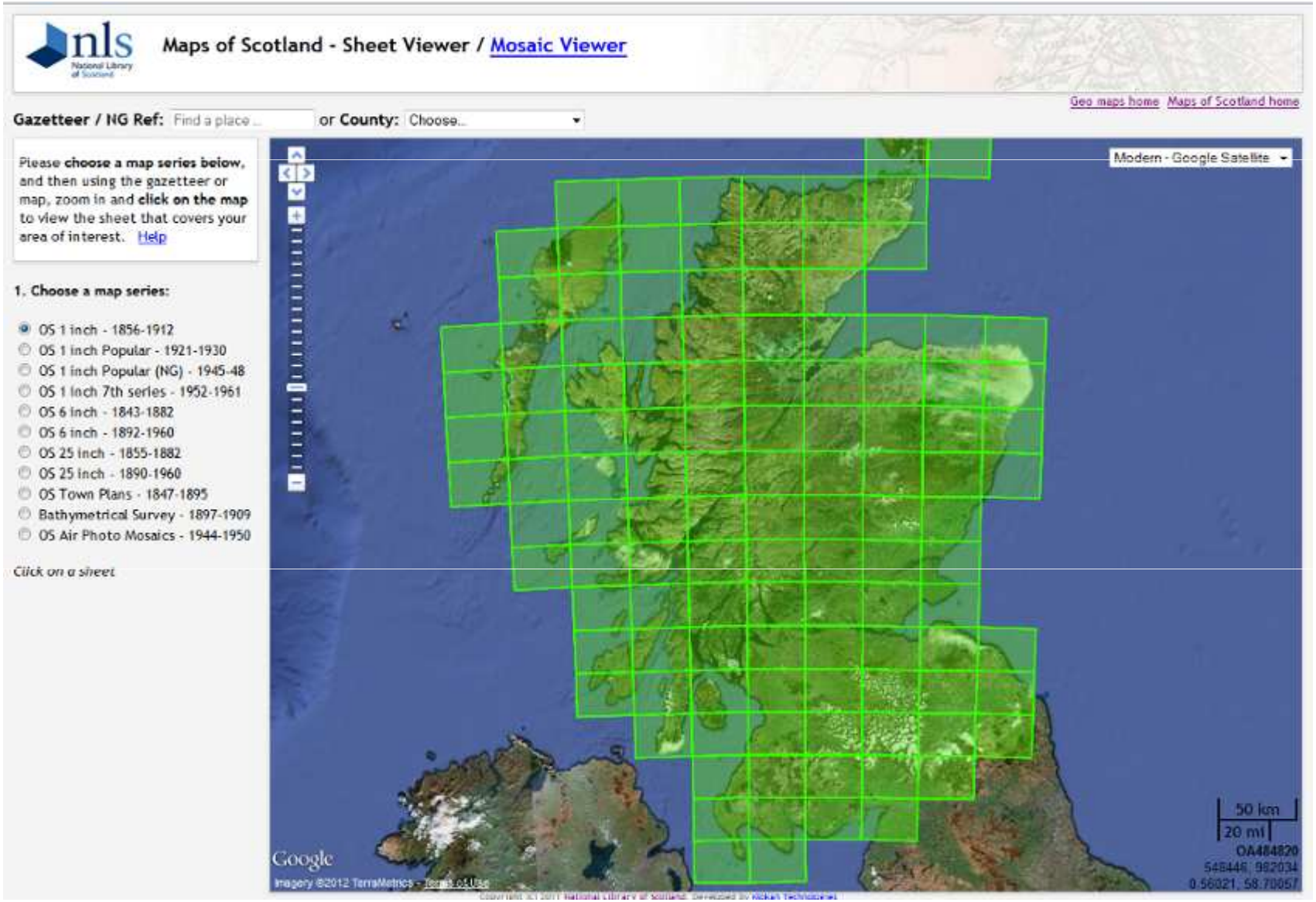

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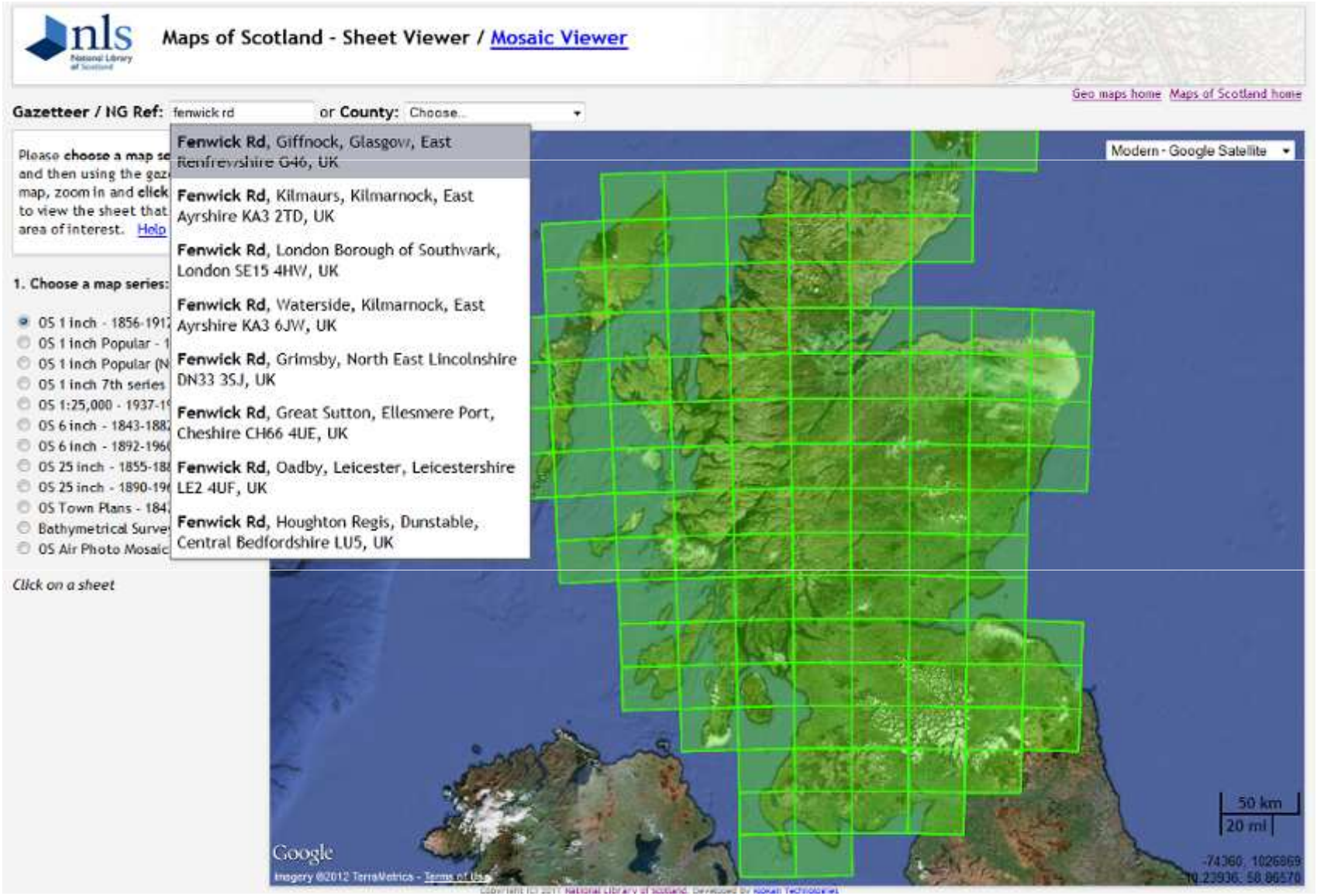
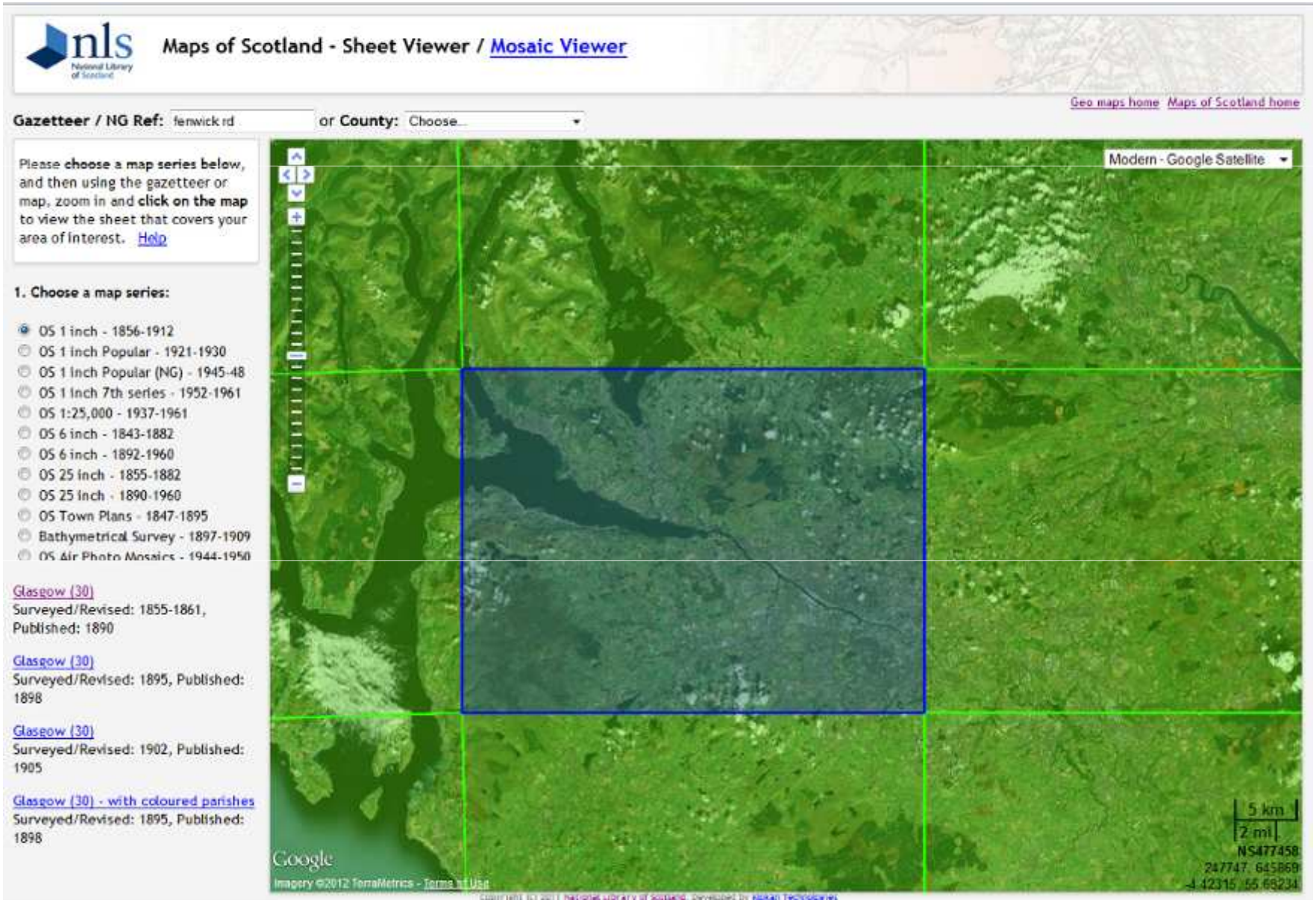
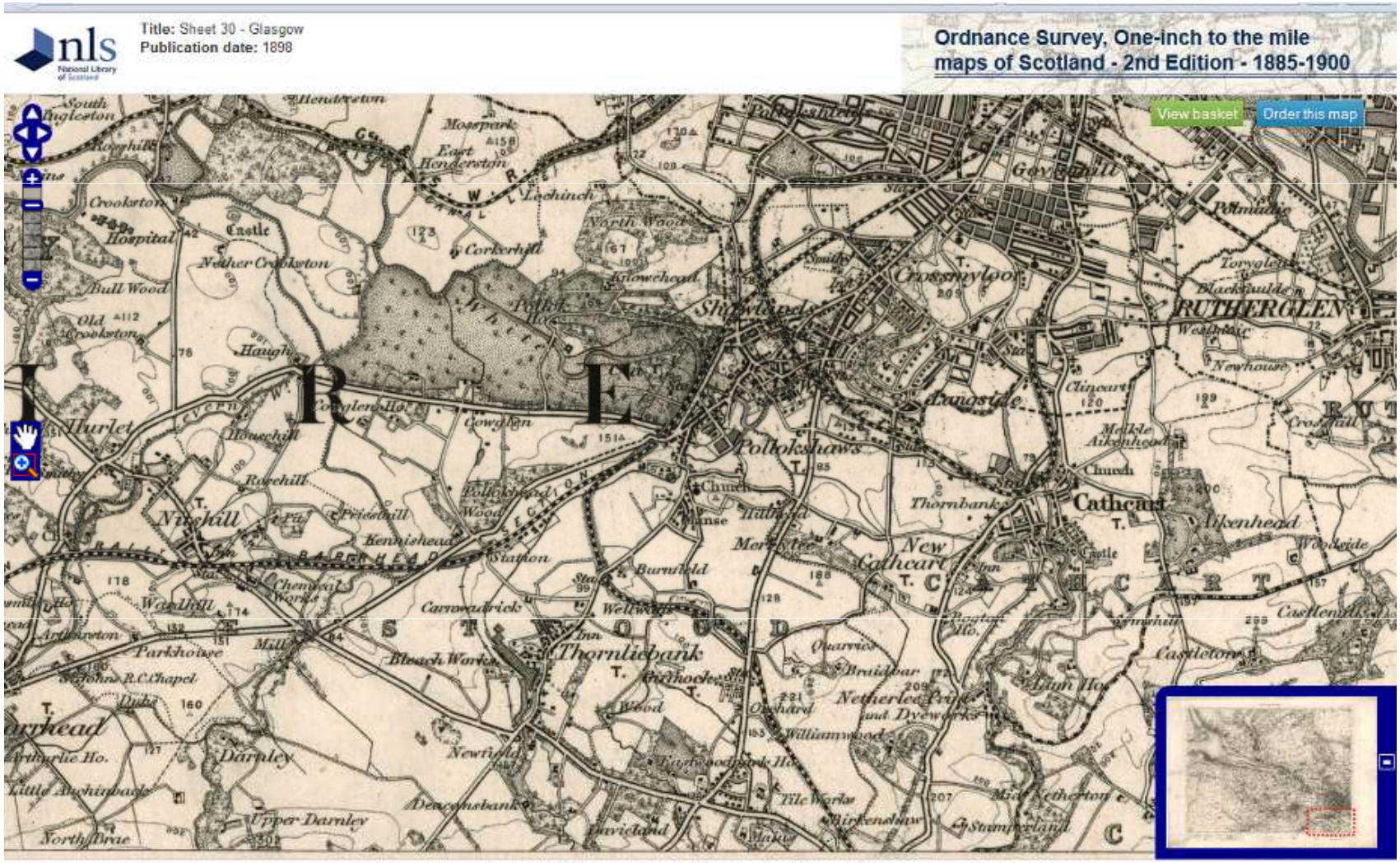


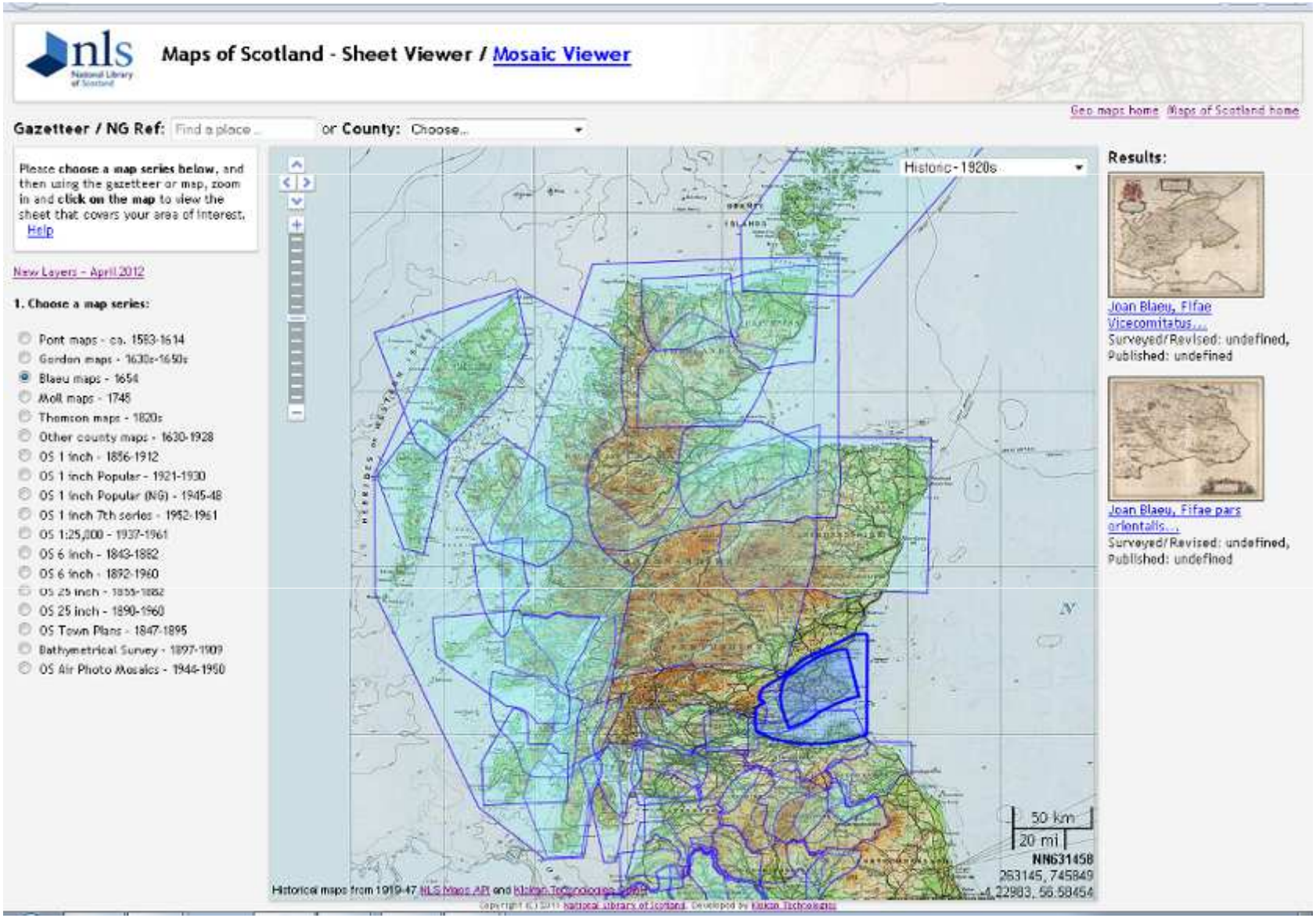
GeoServer / OpenLayers Sheet Viewer



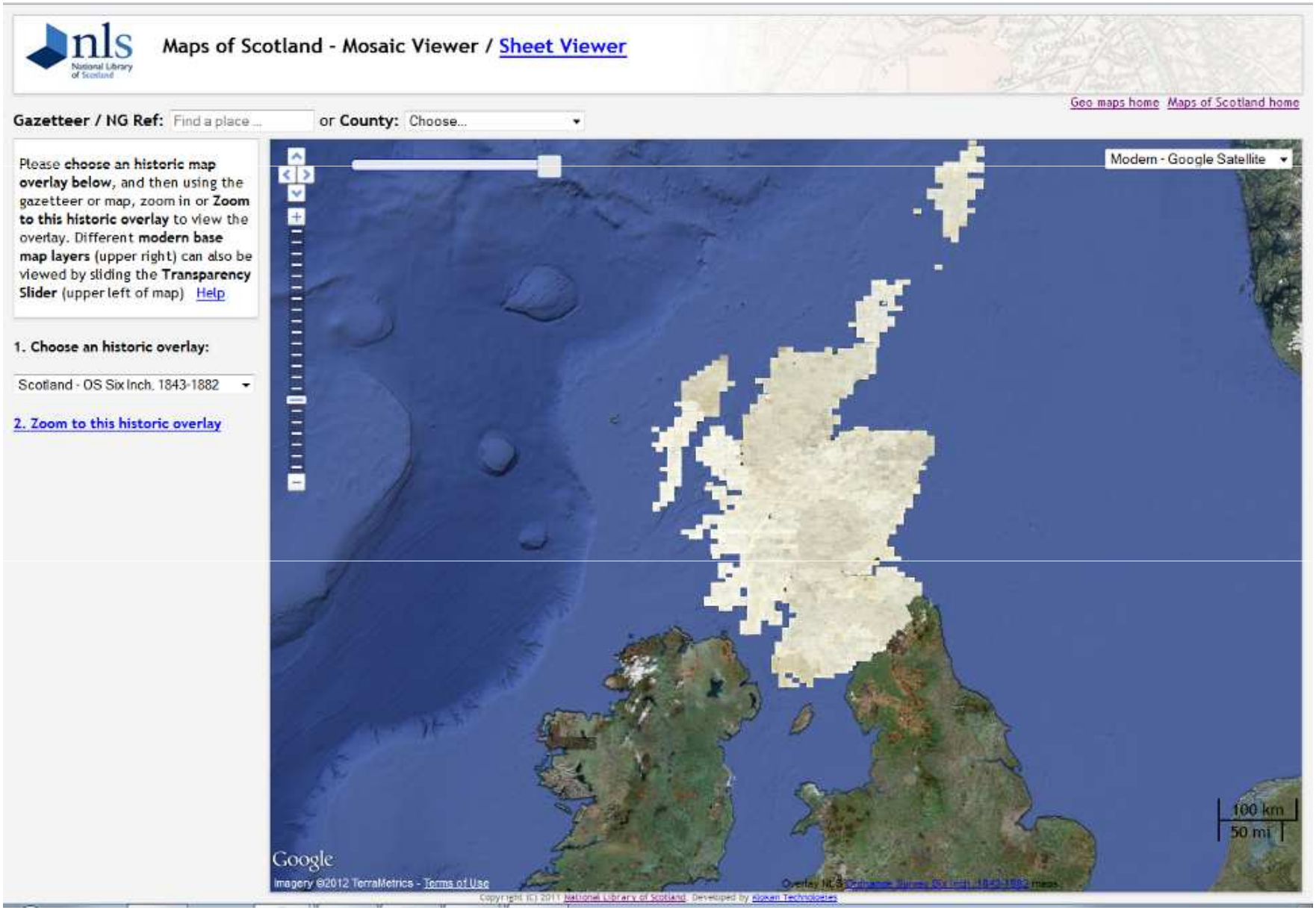
OpenLayers MrSID Viewer



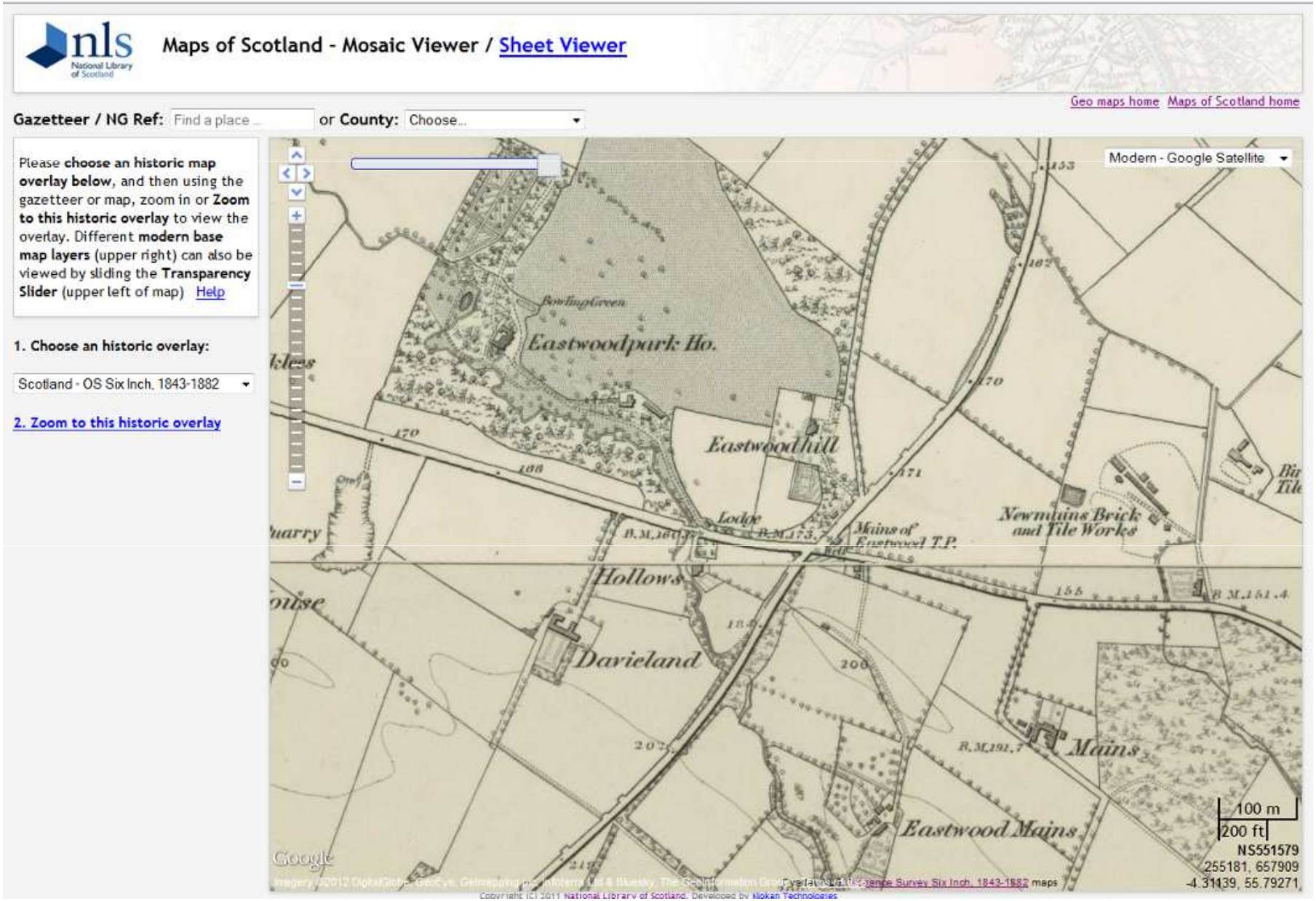
GeoServer / OpenLayers Sheet Viewer



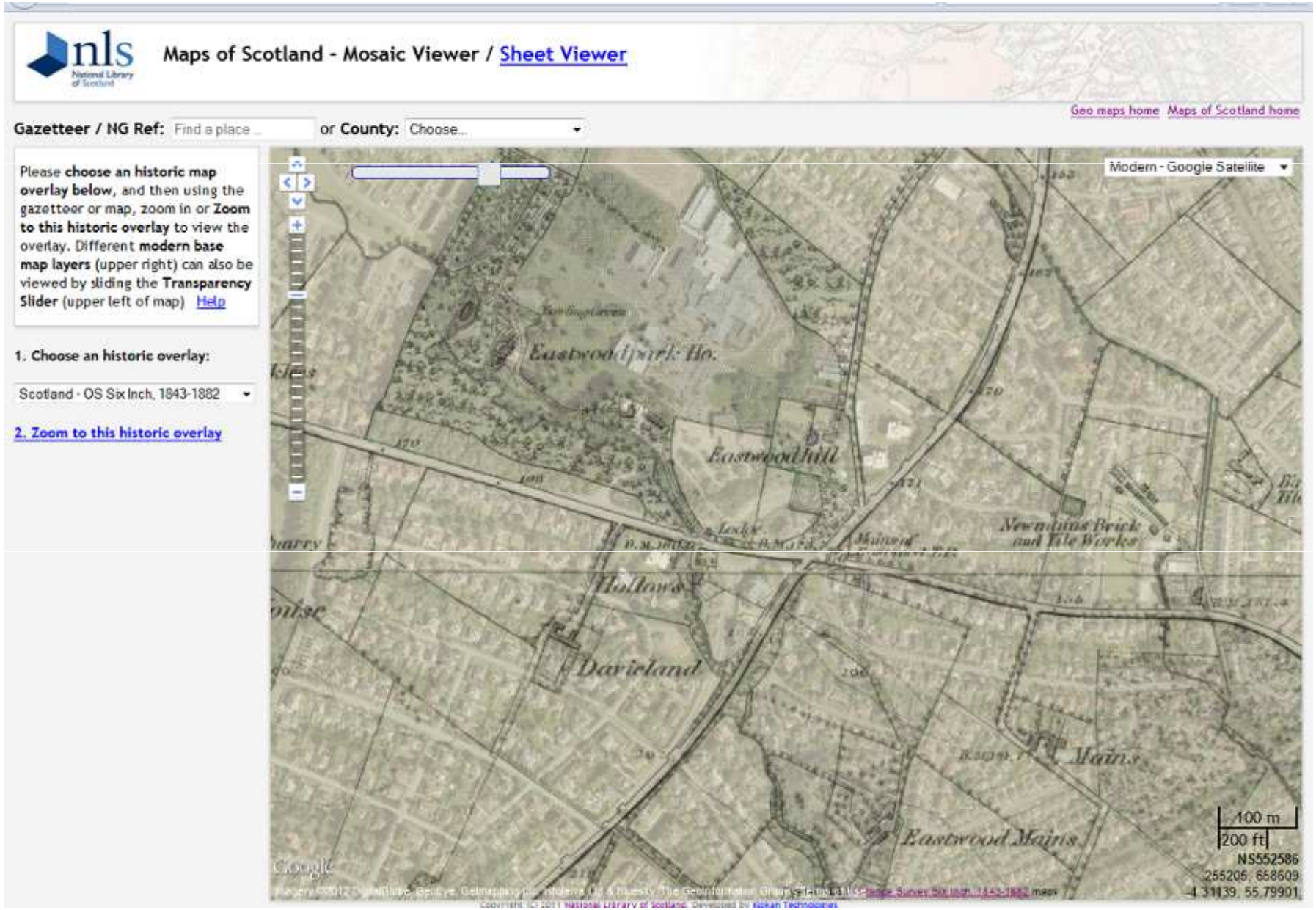
GeoServer / OpenLayers Mosaic Viewer



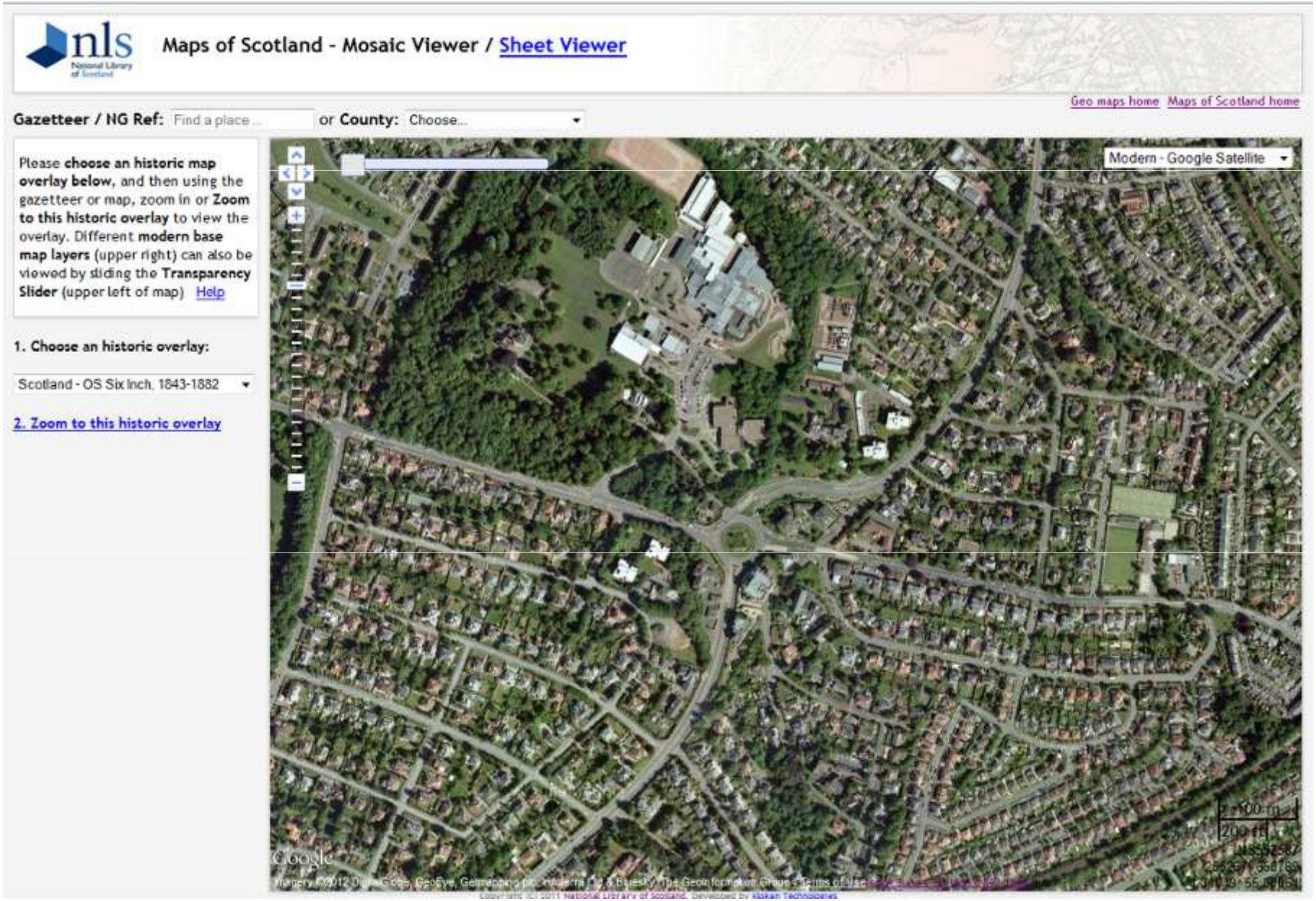
GeoServer / OpenLayers Mosaic Viewer



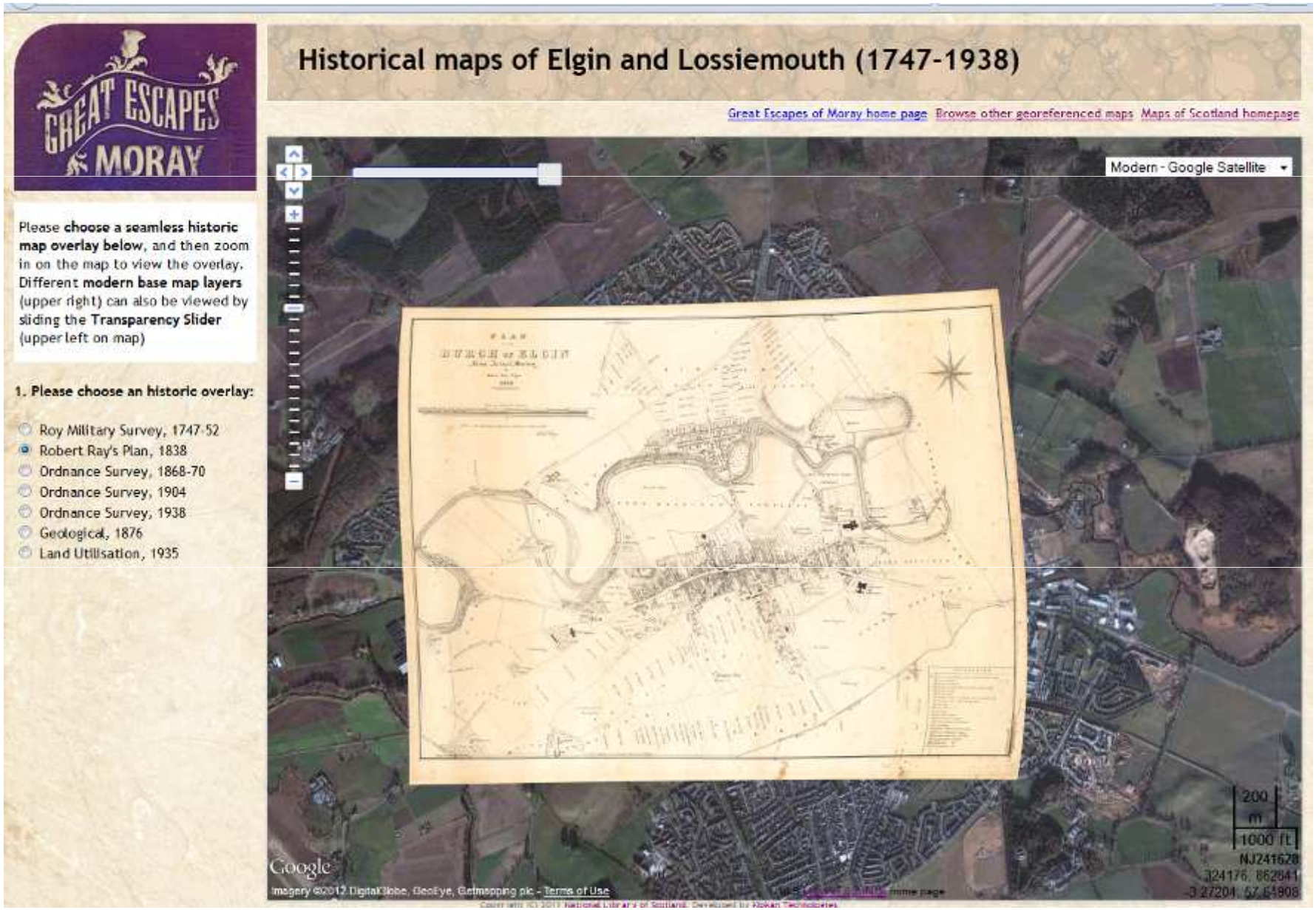
GeoServer / OpenLayers Mosaic Viewer



GeoServer / OpenLayers Mosaic Viewer



GeoServer / OpenLayers Mosaic Viewer



Conclusions

Advantages of open-source software:

- cheaper, more open standards-compliant
- delegated development and customisation
- greater opportunities for collaboration
- improvements in functionality and aesthetics of applications

Disdvantages of open-source software:

- greater need for programming knowledge
- fewer bespoke applications, and more need for development
- more time-consuming to develop and support
- possible need for paying for external development