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Module 5 : Geographic Modelling & Visualisation
Session 5D : GeoPandas
Elliott Coyne

"Smart flies Aer Lingus"



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Agenda for Today

Welcome to QGIS 3

Resources

Files & Assets

Base Maps & Navigation

PSG Follow Along (Chapters 2, 3, 4)

Recap on Projections

Save Features as a New Layer

Symbology

PSG Follow Along (Chapters 6, 7, 8)

Opening CSV Files

Adding Point Data & Labels

PSG Follow Along (Chapters 9, 11, 12)

Adding Shape Files

Table Joins

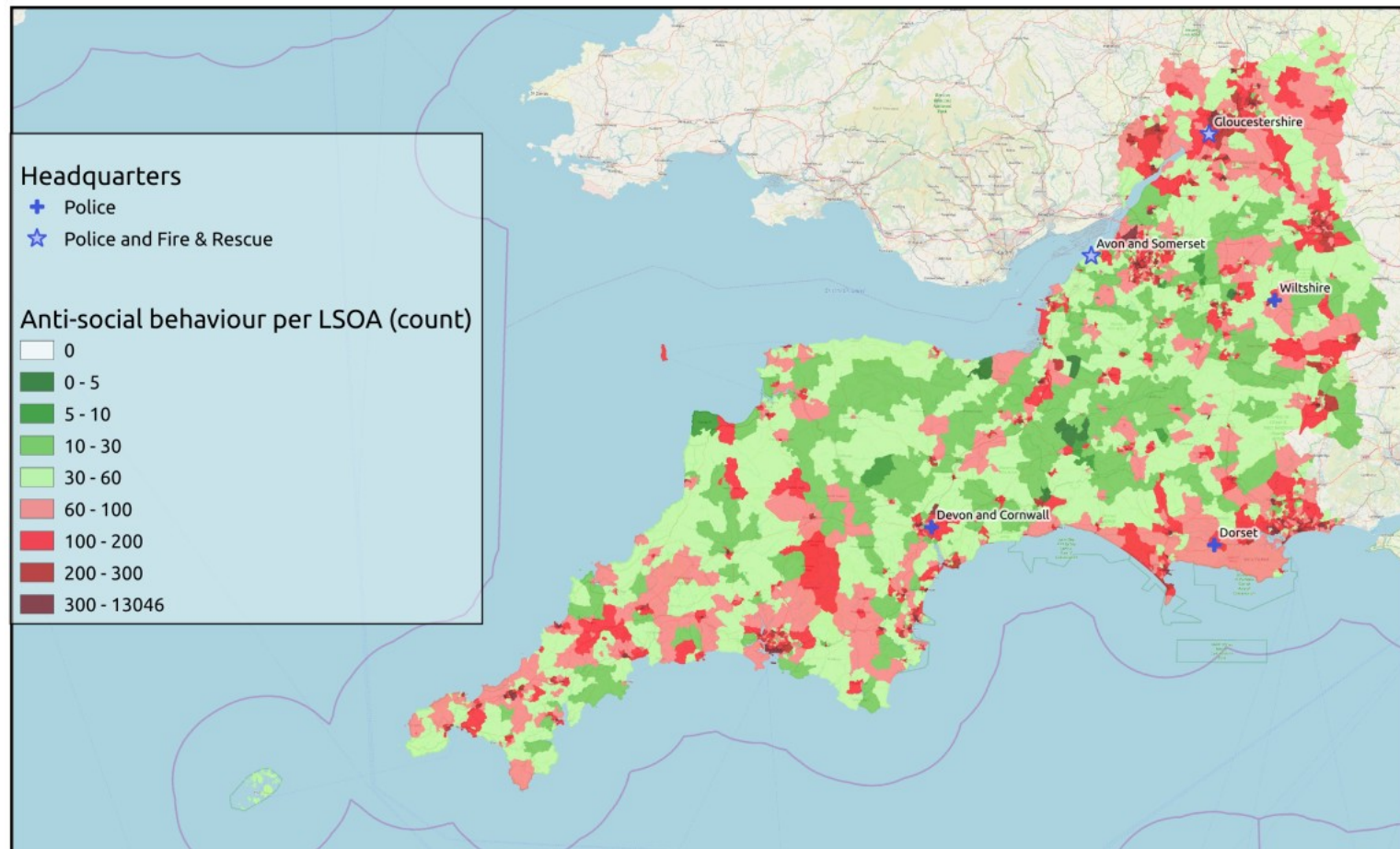
Export Layer Style File

Exporting Map

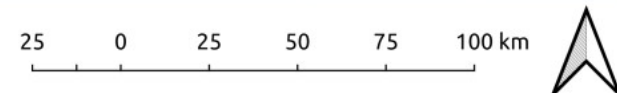
PSG Follow Along (Chapters 13, 14, 15, 16)

What you're aiming for...

Anti-social behaviour in the South West of England per LSOA (June 2016 - June 2019)



Created in QGIS
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Part 1

Welcome to QGIS 3

Resources

Files & Assets

Base Maps & Navigation

Exercise 1 (*Chapters 2, 3, 4, 5*)

QGIS 3.26 – Buenos Aires

Hands on session!

Refer to accompanying PDF file for detailed instructions.
Official User Guide [HERE](#).

Considerations

Often using a **combination of files** to produce a final map. These can include files with **numerical values** (i.e., 'number of bicycle thefts per LSOA') in addition to polygon Shapefiles (i.e., LSOA boundaries).

LSOA: Approx. 1,500 residents or 650 households

Polygon: Flat two-dimensional shape with straight sides that are fully closed

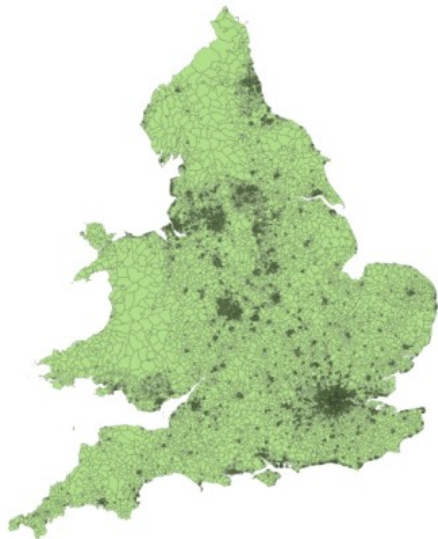
Shapefile












Use preferred web-search engine just *beware of usage Terms & Conditions!*

Examples of sources...

- data.gov.uk
- statistics.gov.uk (geoportal)
- statistics.gov.uk (geoportal)
- [digimap](https://digimap.gov.uk) (May require organisational access)



 LSOA_2001_EW_BGC_V2.dbf	DBF File
 LSOA_2001_EW_BGC_V2.prj	PRJ File
 LSOA_2001_EW_BGC_V2.sbn	SBN File
 LSOA_2001_EW_BGC_V2.sbx	SBX File
 LSOA_2001_EW_BGC_V2.shp	SHP File
 LSOA_2001_EW_BGC_V2.shp.xml	XML Document
 LSOA_2001_EW_BGC_V2.shx	SHX File
 LSOA_2001_EW_BGC_V2_metadata.xml	XML Document

 Lower_layer_super_output_areas_(E+W)_2001_Boundaries_(Generalised_Clippped)_V2.zip

Exercise 1

Become familiar with the relationship between the representation of the layer on the map canvas and in the attribute table.

Work through the notes from Chapters 2 - 5 to become familiar with the QGIS environment.

- 1) Add the suggested toolbars
- 2) Add the suggested panels
- 3) Add the world basemap
- 4) Practice your map navigation skills
- 5) Open & dock the attribute table for world layer
- 6) Practice identifying a specific row in the attribute table with the corresponding polygon in the map canvas, and vice versa.
- 7) Save project. Close QGIS. Reopen QGIS your project.

At the end this exercise your QGIS project should show the useful toolboxes and panels, a single layer (world) listed in the layers panel, the world layer in full zoom on the map canvas, and the world layer's attribute table docked to the bottom of the map canvas.

Part 2

Recap on Projections

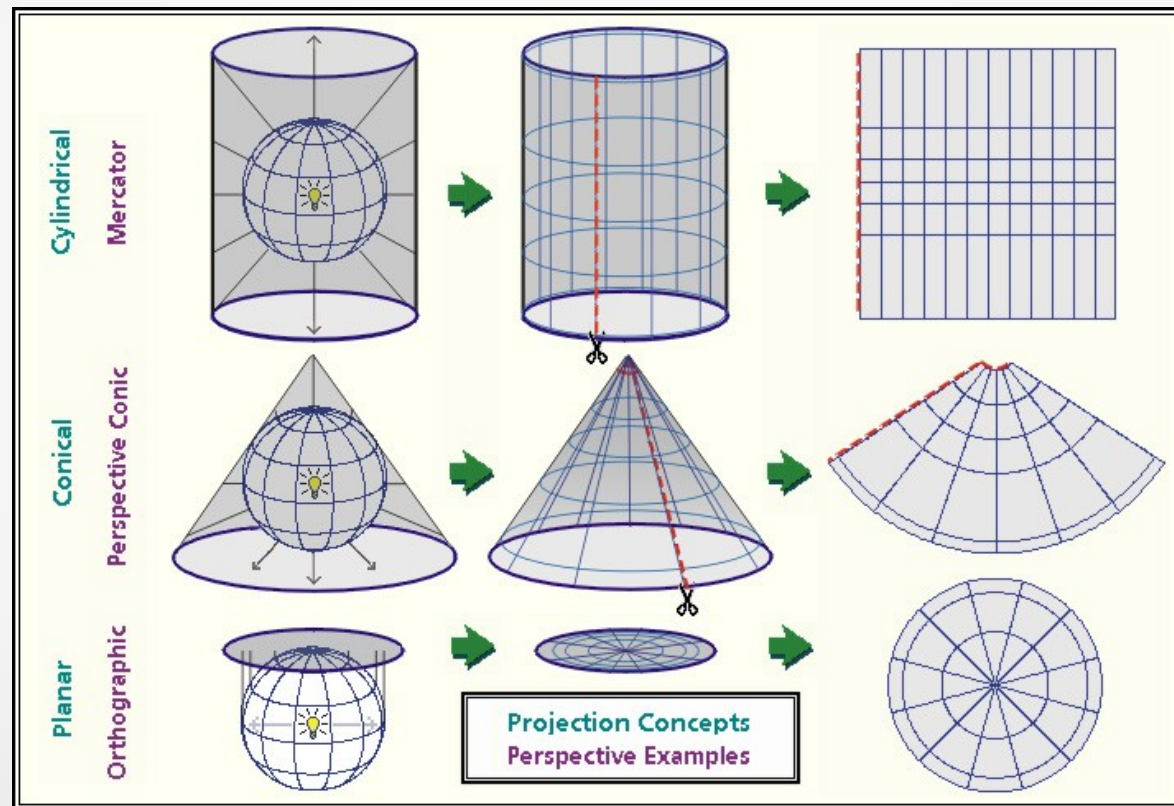
Save Features as a New Layer

Symbology

PSG Follow Along (Chapters 6, 7, 8)

Before We Begin...

“You know nothing about earth...”



Projections



Coordination Reference Systems:

- **EPSG:27700** OSGB 1936 / British National Grid - United Kingdom Ordnance Survey. Co-ordinates are in Eastings (X) and Northings (Y).
- **EPSG:4326** WGS 84 - World Geodetic System 1984. Co-ordinates are in Longitude (X) and Latitude (Y).
- **EPSG:3857** - projection for displaying lat/long as a flat map

Further Reading

- 1) https://www.esri.com/arcgis-blog/products/arcgis-pro/mapping/gcs_vs_pcs/
- 2) <https://www.earthdatascience.org/courses/use-data-open-source-python/intro-vector-data-python/spatial-data-vector-shapefiles/geographic-vs-projected-coordinate-reference-systems-python/>
- 3) https://docs.qgis.org/3.22/en/docs/gentle_gis_introduction/coordinate_reference_systems.html

Exercise 2

Extract some features from the world layer, and save them as a new shapefile. Become familiar with the Layers Styling panel in order to change the appearance of the layer using simple symbology.

Work through the notes from Chapter 6 - 8 to save a new shapefile (just the UK) and add simple styling. The steps that you will cover are:

- 1) Change the project projection to EPSG: 32630 (see Chapter 6).
- 2) From the world layer, select polygons for UK. These are now your "selected features" (see Chapter 7).
- 3) Export selected features to new shapefile called "UK.shp" (see Chapter 7).
- 4) Play with the order of the two layers in the layers panel (world and UK). Toggle between having both/one/none selected (please end with the UK being the only one selected, and zoom to this layer)
- 5) Customise the simple symbology for the UK shapefile (follow Chapter 8).

At the end this exercise your QGIS project should show the UK as land and coast.

Part 3



Opening CSV Files
Adding Point Data & Labels
PSG Follow Along (Chapters 9, 11, 12)

Exercise 3

Add point data from a delimited text file (.csv) and style the points using categorised symbology

Exercise 3A: Follow Chapter 11. Add your Police HQ point data and style each point to represent whether the site is also a Fire and Rescue HQ.

Exercise 3B: Follow Chapter 12. Add a label to each point to state the site's location (using field "Head quarters").

At the end this exercise your QGIS project should show the UK basemap, with 5 points for the locations of the Police headquarters, points styled based on site type, and a label showing the site name.

Part 4



Adding Shape Files

Table Joins

Export Layer Style File

Exporting Map

PSG Follow Along (Chapters 13, 14, 15, 16)

Exercise 4

Become familiar with joining your own data (.csv file) to a corresponding shapefile in order to visualise your data. Use continuous symbology to style the layer

Exercise 4A: Follow notes from Chapter 13 & 14 to

- i) add delimited text file
- ii) add shapefile and
- iii) create a table join.

Exercise 4B: Using the information covered in Chapter 15, choose two columns from the street crime dataset and style them using graduated symbology. Duplicate the layer so that a separate layer is displaying each column (rename each layer).

At the end this exercise your QGIS project should show LSOA crime data for the SW, styled to represent a data field, together with a UK basemap & the 5 locations of the Police headquarters.

Demo Only



Print layout

Practice makes perfect...

Use the files provided in the folder entitled 'Liverpool' to produce a similar style map.

Files:

- *fire_police_stations.csv*
- *merseyside_police.csv*
- *Lower_Layer_Super_Output_Areas_December_2011_Generalised_Clippped__Boundaries_in_England_and_Wales.**