

# Automated survey design in Distance

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## Workflow:

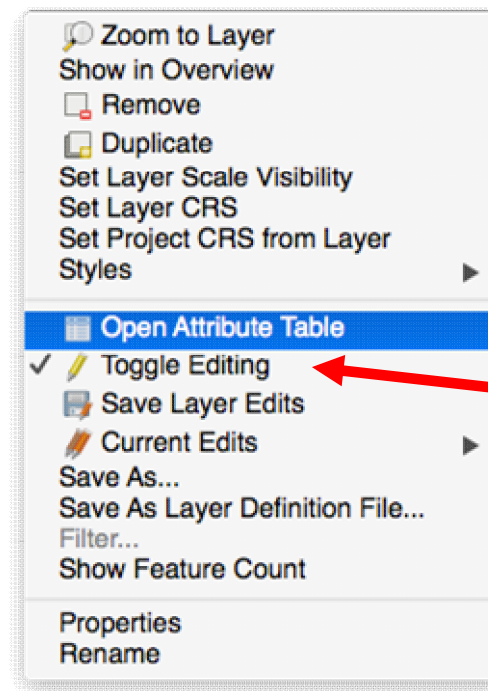
- GIS data preparation (we use QGIS to demonstrate)
  - *Define LinkID*
  - *Project study area*
  - *Divide into strata if necessary*
- Import data from GIS (or type it in!)
- Create coverage grid
- Create design
- Generate example surveys from design (run 2<sup>nd</sup> option)
- Assess even-ness of coverage probability via simulation (run 1<sup>st</sup> option)
- Finally can export GIS data, map or sampler coordinates

# GIS Data Preparation: LinkID

Distance uses the LinkID in the shapefile attributes to associate the different data layers in the distance project.

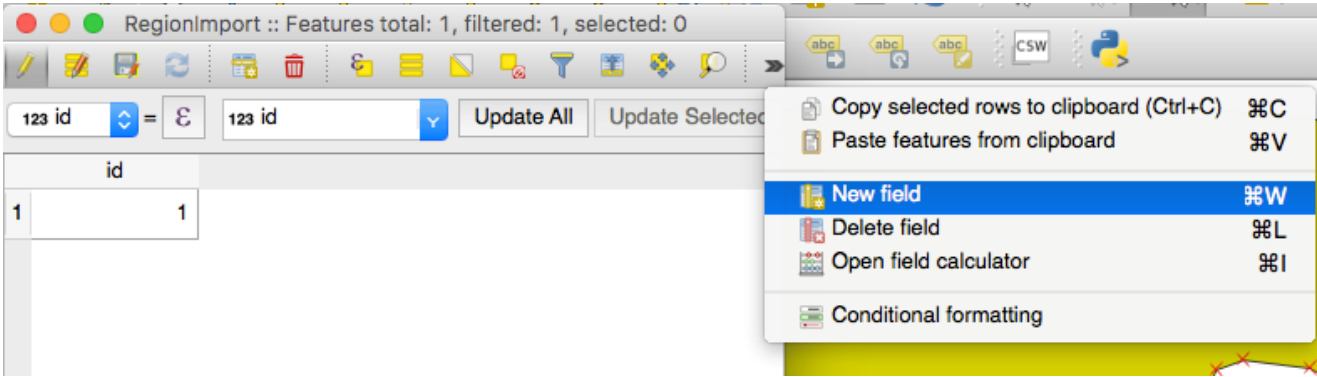
Distance will not be able to use the shapefile until a LinkID had been created with the correct values.

Right click on study area layer name in the Layers Panel and select 'Open Attribute Table'



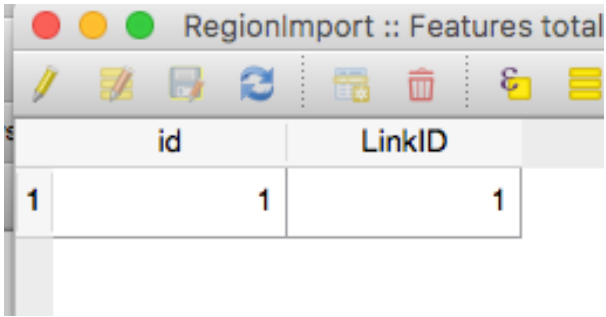
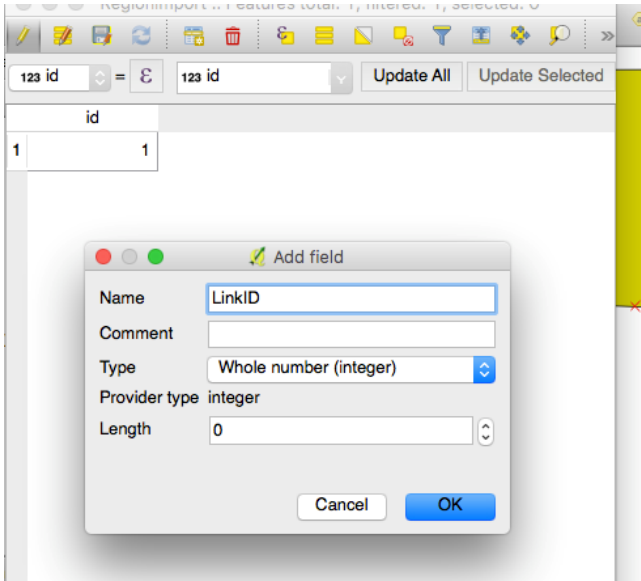
Note we are in editing mode

# LinkID



Create a new Field

Call it "LinkID"



Give the LinkID a value of 1

# GIS Data Preparation: Projection

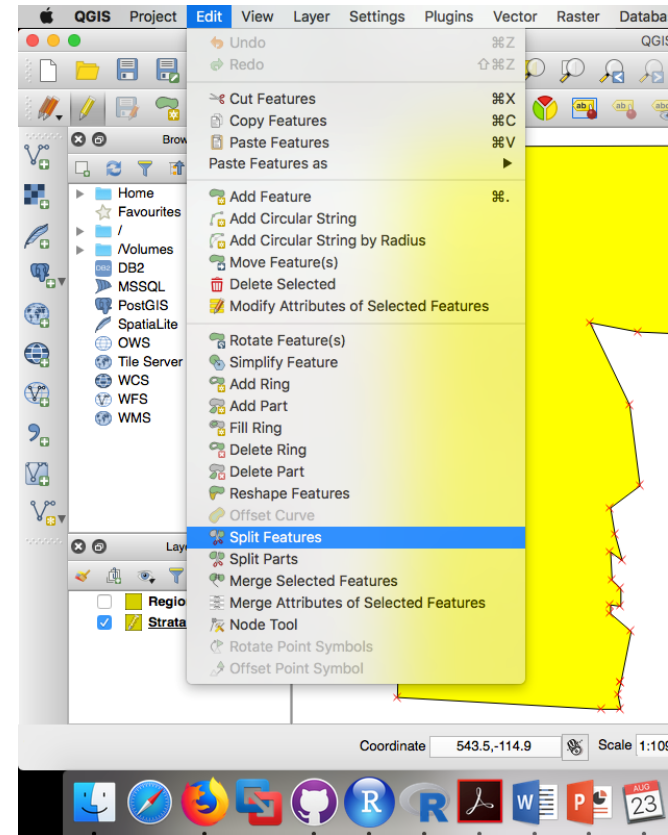
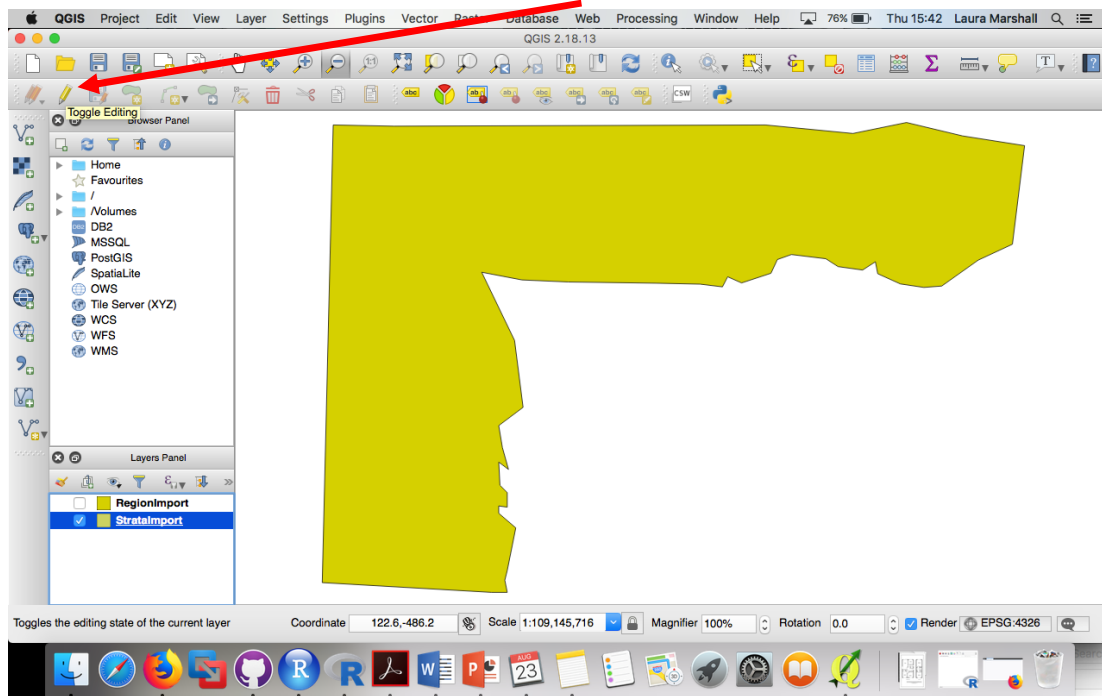
We recommend that GIS data for Distance is projected onto a flat surface before being imported. Distance can project on the fly but this will slow things down.

Here we refer to QGIS for working with the study region shapefile but other GIS software could be used. R can also be used for projecting shapefiles.

- First ensure a Geographic Coordinate System is defined
- Project data on to a flat surface  
Eg. Albers Equal Area Conical Projection

# GIS Data Preparation: Dividing study area

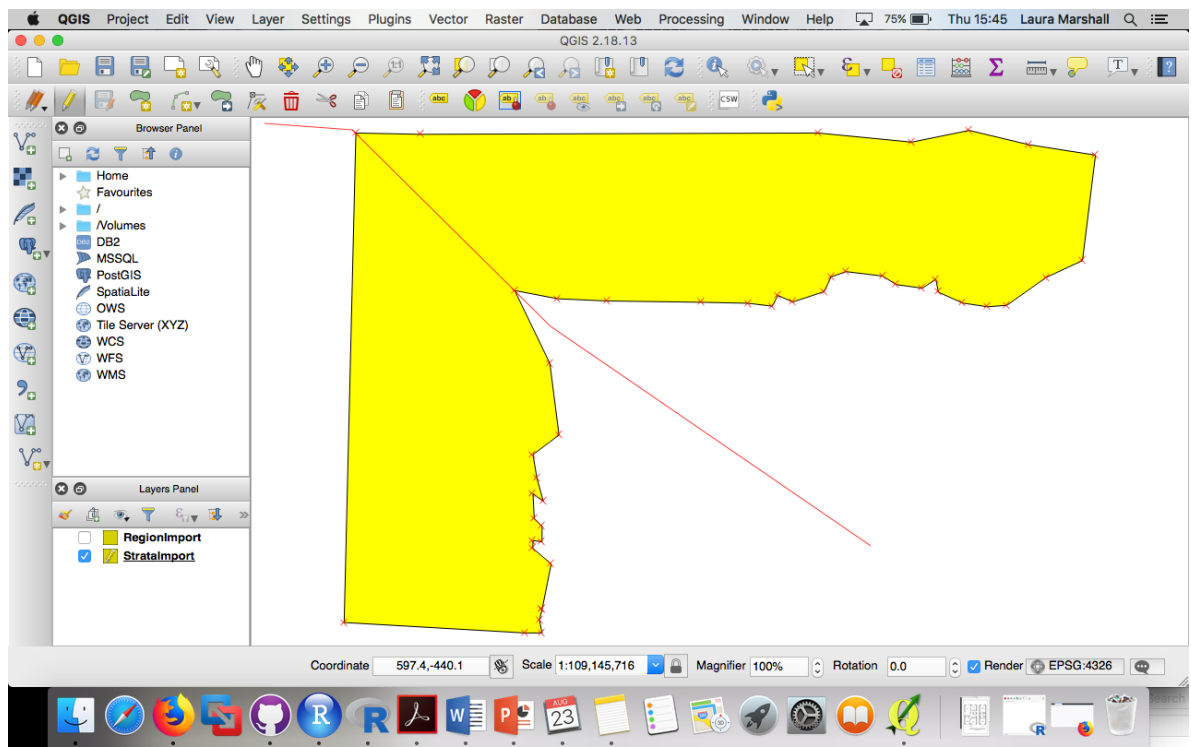
Open Study\_ar shapefile and duplicate the layer, then turn on editing mode



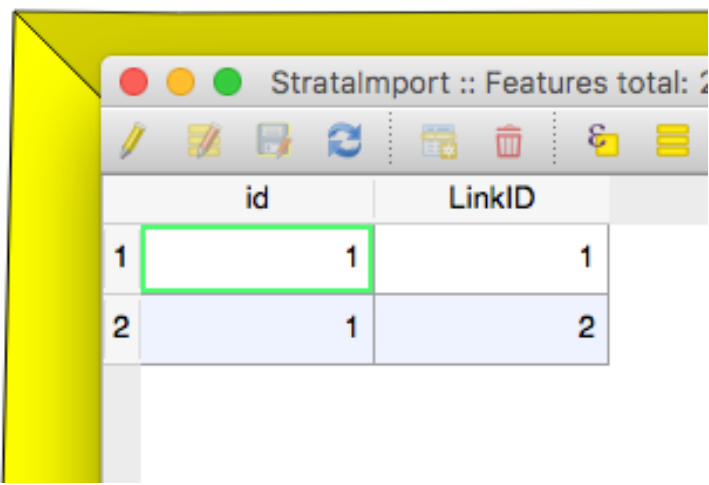
From Edit menu choose to 'Split Features'

# Dividing study area (cont.)

Right click to start and put in way points, left click to finish



Update LinkID column in attribute table

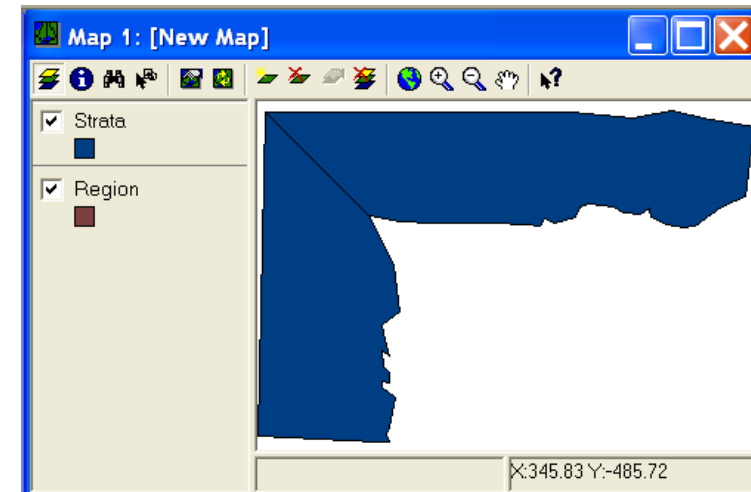


StrataImport :: Features total: 2

	id	LinkID
1	1	1
2	1	2

# Import Data into Distance

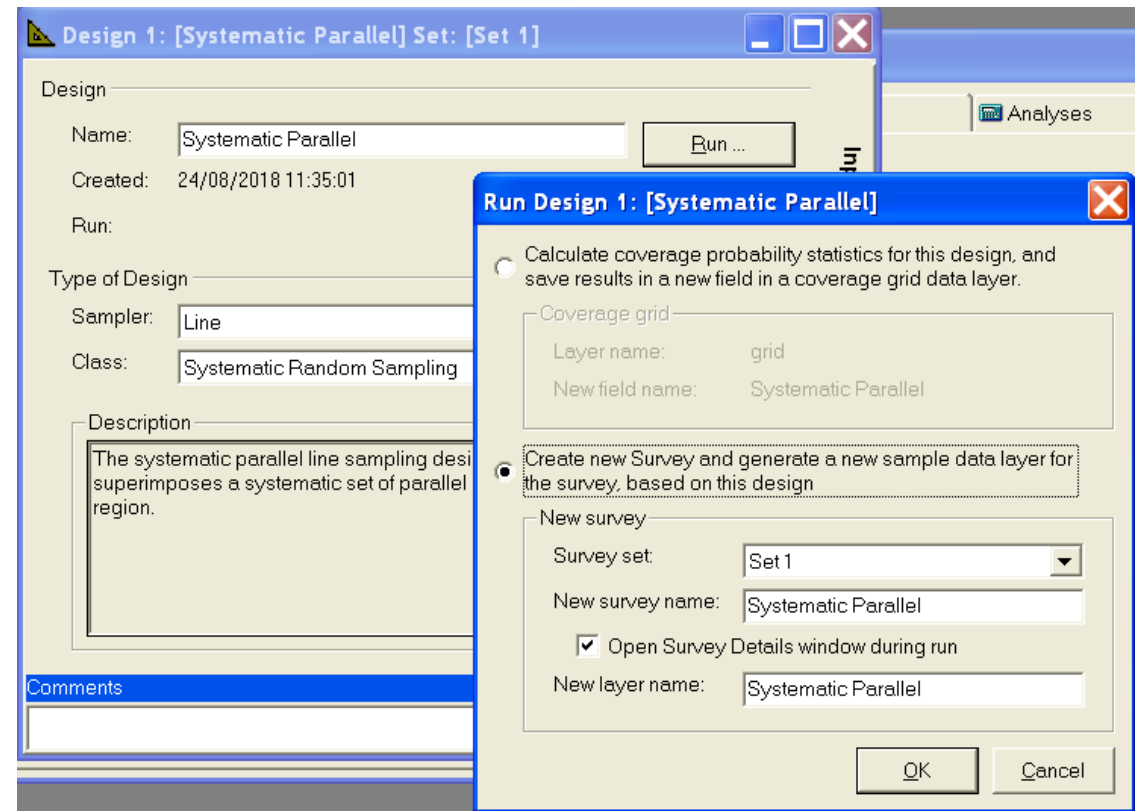
- Distance help ‘Importing Existing GIS Data’
- Create a new distance project (‘Design a Survey’)
- Create a strata layer if necessary
  - Add correct number of strata
- Close project
- Replace the empty shapefiles created in the Distance project .dat folder with those manipulated in QGIS
  - Note: You may need to rename your files to match those created by Distance
- Create maps to check shapefiles have imported correctly





# Survey Design in Distance (Chapter 6 of Distance Manual)

- Create coverage grid layer
- Create design
- Generate example surveys from design (run 2<sup>nd</sup> option)
- Assess even-ness of coverage probability via simulation (run 1<sup>st</sup> option)
- Finally can export GIS data, map or sampler coordinates



# Things to Remember

- You **MUST** create and correctly number the **LinkID** field in the attributes table of the study area and strata shapefile.
- Advisable to project shapefile before importing to Distance
  - *QGIS, other GIS software or R*
- ‘Cut Polygon Features’ in QGIS to divide area into strata
- Distance help ‘Importing Existing GIS Data’
- Remember to assess even-ness of coverage probability
- Can also use the simulation engine in Distance to optimise your survey design (Chapter 13 of Distance Manual)