

# Geospatial data management and Visualization IT 6212

## 1. Adding XY events to ArcGIS

- a) Start ArcMap with a new empty map.
- b) In the main menu bar, click **File> Add Data > Add XY Data...**
- c) In the **Add XY Dialog** box:
- d) Click the **Browse** button to go to file location: c:\Databases\GIS4EnvSci\Others\, double-click the Excel file sightings.xlsx, and select the Sightings\$ sheet.
- e) Click the **X field** drop-down arrow and click POINT\_X
- f) Do the same for POINT\_Y .
- g) Click the Edit button to open the **Spatial Reference Properties** dialog box
- h) Define the CS as **WGS\_1984\_UTM\_Zone\_46N** and click **OK**. The x,y coordinates will be automatically transformed to match the CS system of the data frame.
- i) Click **OK**.  
  
The layer name Sightings\$Events appears in the TOC, and the points are drawn as an event theme in the data view.
- j) Right-click the file name and select **Data>Export Data...** save the data on the default geodatabase with the name **Tut2\_xy**

**Q1: Explain what is the default geodatabase. Where is it stored?**

## 2. Georeferencing an image

Start a web browser and download the scanned 1:250000 geological map (250dpi) of southwest Tasmania from the Australian Geoscience Portal at <http://www.geoscience.gov.au/geoportal-geologicalmaps> and save it as sk5505\_sk5507.jpg to your working folder. These images are made available free of charge and are not georeferenced.

1. Start **ArcMap** with a new empty map.
2. Click on the **Add Data** button to add the **sk5505\_sk5507.jpg** image to the view. Build the pyramids.

**Q2: Explain what are pyramids.**

3. . Click **OK** to dismiss the warning message about the missing spatial reference.
4. Open the properties of the **Data Frame** (Layers).
5. Click in the CS tab and expand **Projected Coordinate Systems > National Grids > Australia**, and select **GDA 1994 MGA Zone 55**.
6. Click **OK**.
7. Zoom to the scanned map so the coordinates in the lower left corner can be read.
8. In the TOC, right click the name of the image and select **Zoom to Raster Resolution**. This will give you the display to locate the optimal point.
9. Click **Customize** on the main menu bar, point to **Toolbars** and click **Georeferencing**.
10. On the **Georeferencing** toolbar, click **Georeferencing**. Make sure that the box for **Auto Adjust** is checked.
11. Pan the map so you can see the lower left corner –control point 1. Position the crosshair over the point and click. This enters a **from** control point.
12. Right-click anywhere in the view and select **Input X and Y...**
13. In the **Enter Coordinates** dialog enter 270000 for X and 5150000 for Y. This is the **to** control point. Click **OK**.
14. Zoom to the scanned map using the **Zoom to Layer**.
15. Use the same procedure to enter the following coordinates for control point 2 in the lower right corner: X=460000 Y=5150000.
16. Use the same procedure for adding the coordinates for control points 3 and 4 in top left and right corners.
17. Click the **Link View Table** button.

**Q3: Explain what is the RMS associated to georeferencing process.**

18. On the **Georeferencing** menu, click **Georeferencing**. In the pull-down menu select **Rectify**.
19. In the **Save As** dialog: a. For the output file location, click the **Open File** button
  - a. In the **Select Workspace** dialog, browse to c:\Databases\GIS4EnvSci\results.  
Click the Tasmania folder and click **Add**.

- b. For **Format**, change the file type to **IMAGINE Image**.
- c. Name the new raster **sk5505\_sk5507.img**. Be sure to include the **.img** extension
- d. Click **Save**.

20. Exit **ArcMap** without saving the document.

### On-screen digitizing

- 21. Start **ArcMap** and load **sk5505\_sk55072.img** from **c:\Databases\GIS4EnvSci\results\Tasmania**. This is the previously georeferenced and rectified image.
- 22. Open **ArcToolbox**. Expand **Data management tools>Feature class** and double click **Create Feature class**.
  - a. In the **Create Feature Class** dialog box: a. For **Feature Class Location**, browse to **c:\Databases\GIS4EnvSci\Results\**, click the folder **Tasmania**, and then click **Add**.
  - b. Name the Feature Class as **Lakes**.
  - c. Set the **Geometry Type** to **POLYGON**.
  - d. For **Coordinate System**, click the **Spatial Reference Properties** button. Browse to **Projected Coordinate Systems > National Grids > Australia**, and select **GDA 1994 MGA Zone 55**. Click **Add**
  - e. Click **OK**.
- 23. Zoom in on Lake St Clair in the upper-right part of the map.
- 24. Open the **Editor**. On the **Editor** menu click **Start Editing**.
- 25. Click the **Create Features** window on the **Editor** toolbar. The **Create Feature** window appears beside the data view.
- 26. In the **Create Feature** window, click the layer name **lakes** in the upper section of the window. Click the **Polygon** tool.
- 27. Click the sketch tool **Straight Segment** on the **Editor** toolbar.
- 28. Select points along the boundary of Lake St Clair which can best approximate the shape of the lake. Click once to add each vertex while tracing the boundary of the lake. Add more vertexes to create smoother curves. Double-click to finish the polygon.

29. Click the attributes button on the **Editor** toolbar. Change the ID value from 0 to 1.
30. Select more lakes to digitise.
31. Uncheck the image in the TOC.
32. Exit **ArcMap** without saving the map document.

#### **4. Editing attributes and attribute values**

33. Start **ArcMap** and add the **Lakes** layer that was created in the previous exercise.
34. Open the attribute table by right clicking on the layer name on the TOC.
35. In the **Table options** button select **Add field**.
36. Enter the name of the field: sqkm2
37. In the type pull-down menu select **Double**, precision 20, scale 20.
38. Right-click the name of the field on the table and select **Calculate geometry**.
39. Click **Yes** when the warning message is prompted.
40. In **Property** select the area in square kilometres.
41. Click OK.

**Q4. What is the area (in square km) of Lake St. Clair?**