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INTRODUCTION

This guide contains instructions for viewing and querying geospatial data in ArcGIS. The source of the data is Marine Digimap.

You will need access to ArcGIS software to complete this guide. No prior knowledge of ArcGIS is required. However, an understanding of the basic GIS terms such as raster and vector would be good. This information can be found in the following online learning object:

<http://edina.ac.uk/digimap/support/digimapelearning/index.html>

The instructions and images have been prepared using ArcGIS version 10.1.

WHAT WILL I LEARN?

- The key applications used in ArcGIS desktop software
- How to:
 - download marine map data from Marine Digimap
 - add raster and vector map data to ArcMap
 - select data for an area
 - export selected data as a Shapefile
 - amend the symbol for a map layer
 - label a map layer
 - create a simple query to select map features
 - export your map as an image

WHAT DATA DO I NEED?

We cannot provide you with the data from Marine Digimap because of the conditions of the Marine Digimap licence.

Go to Marine Digimap and follow the instructions below to download the data required.

MARINE DOWNLOAD

1. Login to Digimap Collections.
2. Select Marine Digimap > Download > Marine Download.
3. Search for Liverpool.
4. Select Liverpool (Liverpool) from results.
5. Step 1 – click **Select Visible Area**.
6. Step 2 - tick the boxes next to:
 - a. Vector Data – HydroSpatial One.
 - b. HydroView Charts – 1:10000 to 1:20000 scale, as seen in this image:

Step 2. Select Data			
Product		Allowance	
<input type="checkbox"/> Vector Data (1 selected)			
<input checked="" type="checkbox"/> HydroSpatial One	Info	(4/50) tiles	
<input type="checkbox"/> HydroView Charts (1 selected)			
<input type="checkbox"/> Up to 1:10 000 Scale	Info	(2/30) tiles	
<input checked="" type="checkbox"/> 1:10 000 to 1:20 000 Scale	Info	(2/30) tiles	
<input type="checkbox"/> 1:20 000 to 1:75 000 Scale	Info	(5/30) tiles	
<input type="checkbox"/> 1:75 000 to 1:250 000 Scale	Info	(1/10) tiles	
<input type="checkbox"/> Over 1:250 000 Scale	Info	No limit	

7. Click Add to Basket at the bottom of the screen.
8. Name your order and click Request Download:

Basket ? ×

You have selected the following products. Where possible you can click **Change** to select a different version, format or layers:

Product Name	Version	Format	Layers	Options	Preview	Remove
1:10 000 to 1:20 000 Scale	February 2014	TIFF				
HydroSpatial One	February 2014	SHAPE		Change		

Give this download a name:

[Request Download](#)

Email address your downloads are sent to:
 [\[Change email\]](#)

[Add More Data](#) [Clear Basket](#)

You will now receive 2 emails from Digimap.

9. Click on the link in the second email.
10. Tick the box to agree the data is not for navigational purposes.
11. Click Download.

Your download is ready ?

Order Download

Order Name	Status	Order Date	Download Size
liverpool	READY	12-Aug-2014	23.2 MB

I AM AWARE THAT THE MARINE DATA I HAVE CHOSEN TO DOWNLOAD ARE NOT TO BE USED FOR NAVIGATIONAL PURPOSES: [Why not?](#)

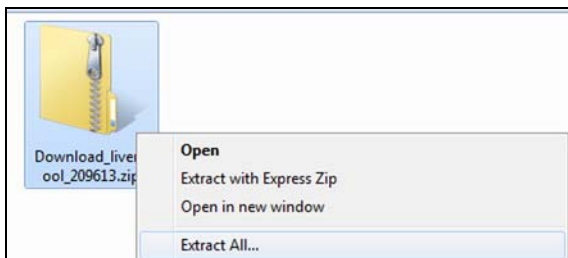
[Return to map](#) [Download](#)

UNZIP DATA FILES

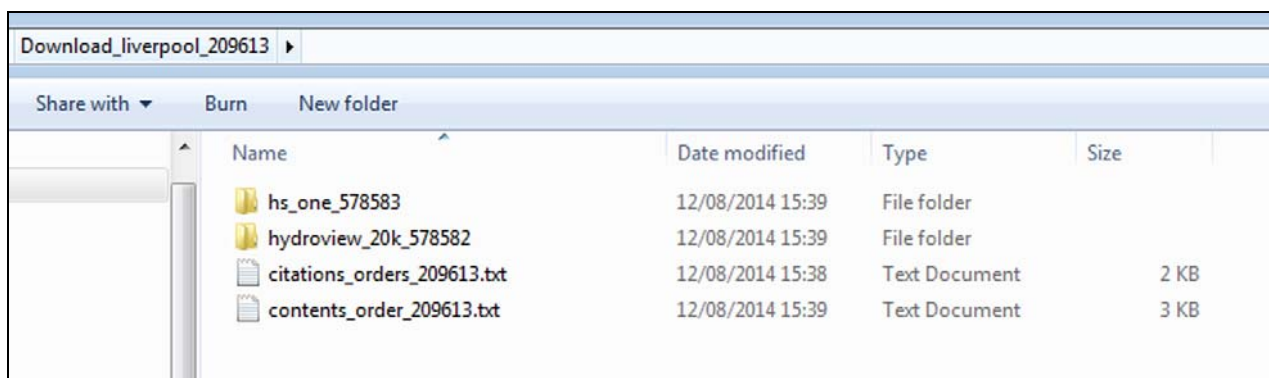
To access the map data, you need to unzip your Digimap download file.

This step will vary depending on the software available on your computer. The following steps describe the process on a Windows desktop computer.

1. Open Windows Explorer or your file manager.
2. Navigate to the folder containing your download file.
3. Right click on the zip file.
4. Look for Extract all or Unzip.
5. Unzip the contents of the file to a new folder.



When you have unzipped your data, you should see two sub-folders within it, similar to the image below:



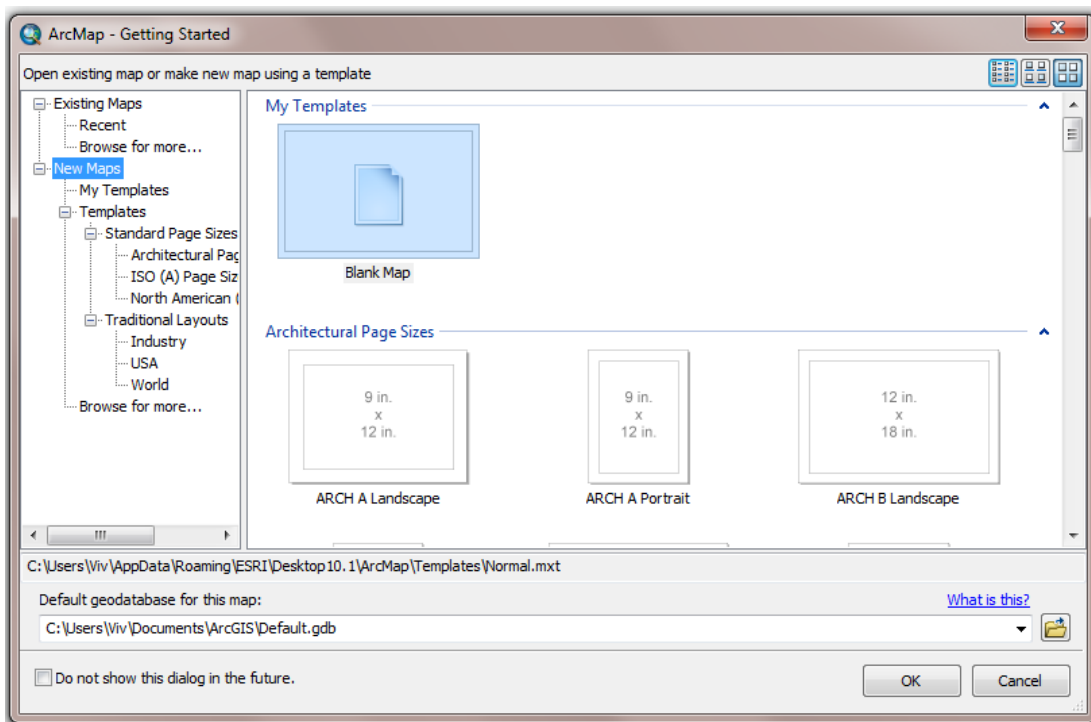
1. **Hs-one** contains the HydroSpatial one vector data.
2. **HydroView_20k** contains the marine charts we will add to our map as background maps.

ADD MARINE CHARTS

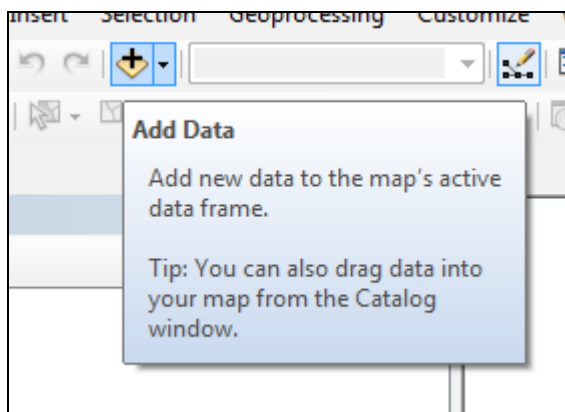
The first thing we want to do is add the marine charts covering the Liverpool area to the map.

The charts you can view and download in Marine Digimap are strictly not for navigational use. They are in TIFF image format. It is straightforward to add the charts to ArcMap.

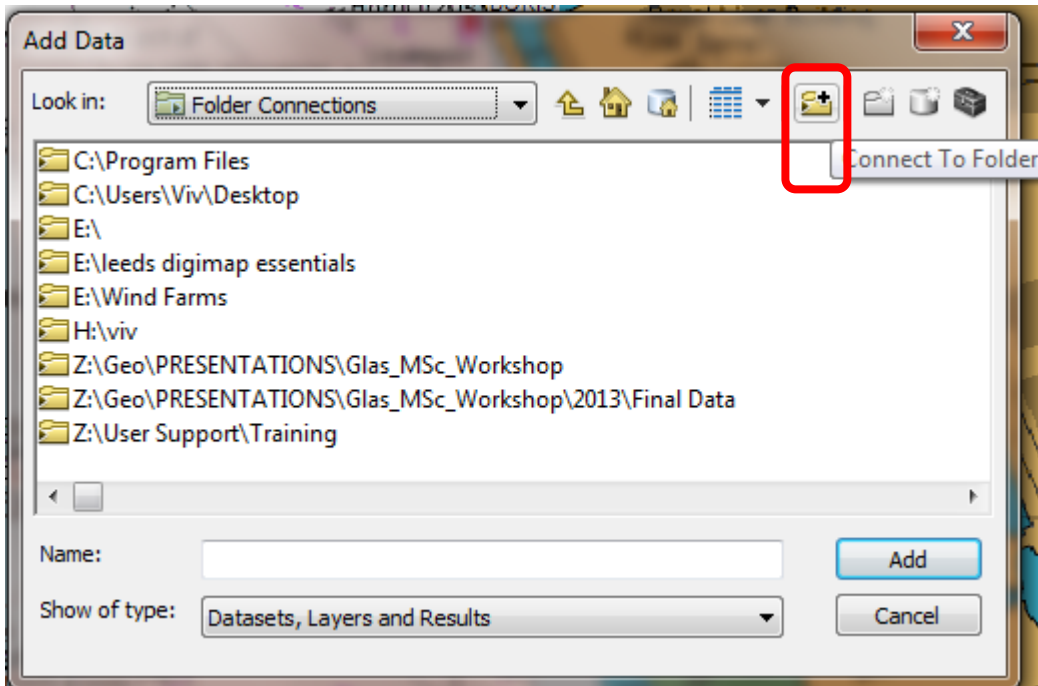
1. Start ArcMap.
2. Select New Maps > Blank map.
3. Click OK.



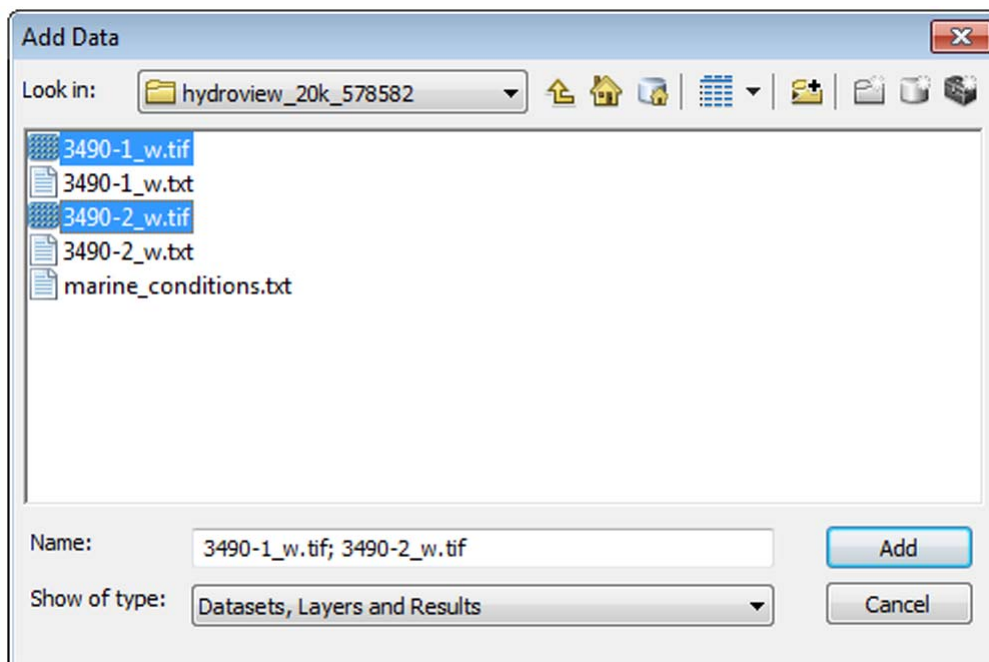
4. Select Add Data.



5. Navigate to the folder with your charts, i.e. the **hydroview_20k** folder.
6. Note: you may have to make a connection to the download folder. ArcGIS does not automatically recognise folders. If you cannot see your folder in the list, click the Connect to Folder button (yellow folder with a plus sign on it), then navigate to the download folder:



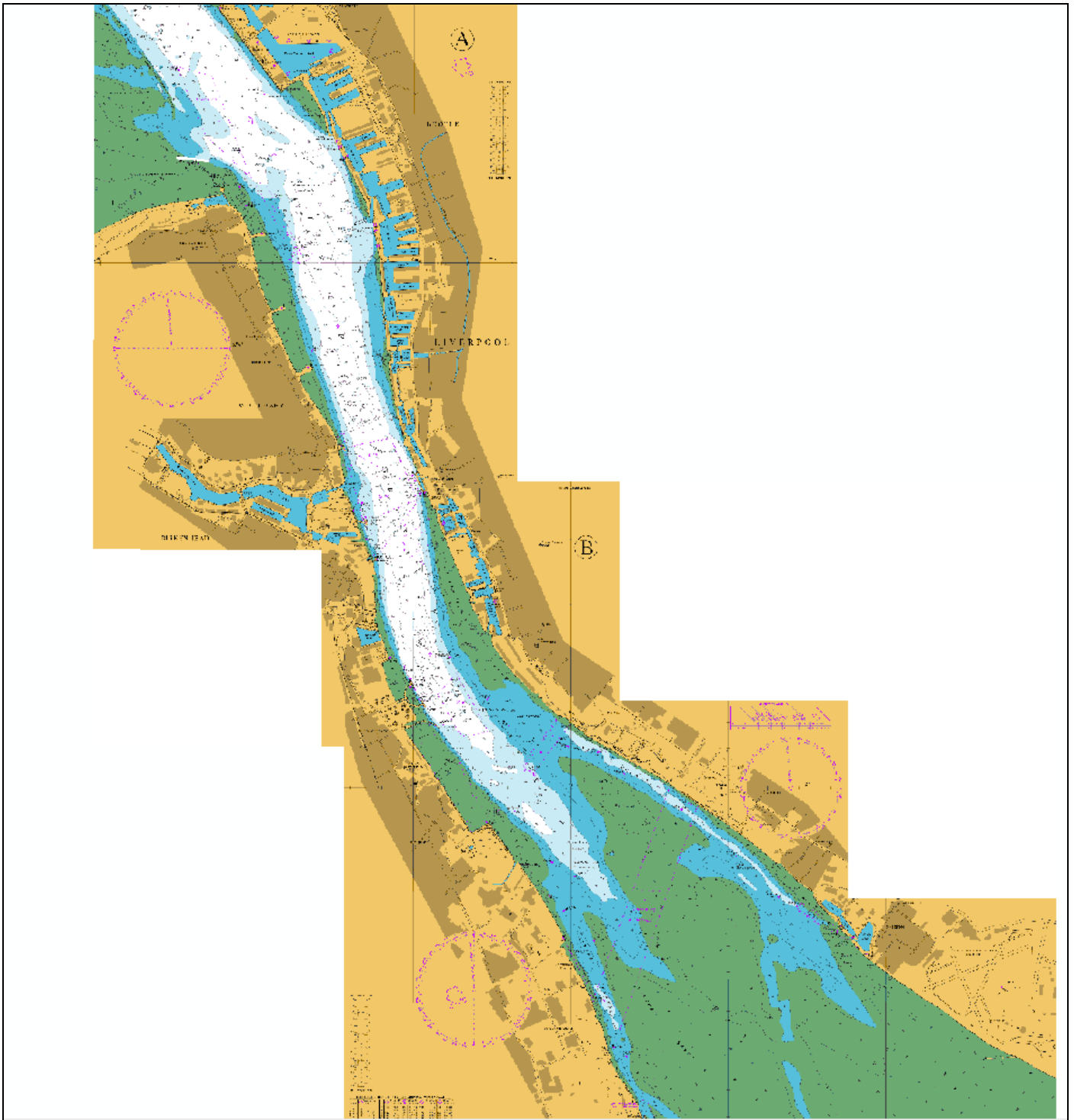
7. Select the 2 .tif files from the HydroView folder.
8. Click Add.



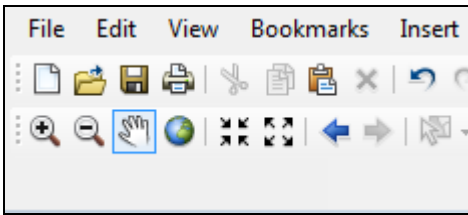
If this is the first time these tiff files have been opened ArcMap may ask if you want to build Pyramids for them.

9. Click Yes when asked if you want to build pyramids, you will need to do this for each tiff file you add.

The tiff files will open up and look like the following map:



10. Use the Zoom and Pan tools to explore the maps.



11. Save your ArcMap project with a meaningful name.

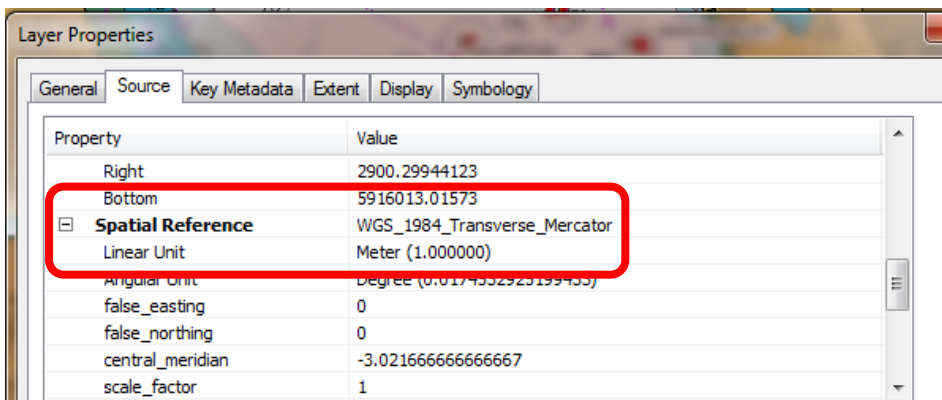
CHECK MAP PROJECTIONS

Before we add more data to our project, we should decide in which geographic projection you want to display the data¹. Once we have added one data set to the project, any subsequent data sets that we add to that project will be converted by ArcMap to be in the same projection.

The projections of the marine charts from Marine Download vary. The larger scale (more detailed) charts are in Transverse Mercator projection. All of the Hydrospatial vector data is in WGS84 projection.

To check the projection of our charts:

1. Right click on **3490-1_w.tif**, in the Table of Contents.
2. Select Properties.
3. Click on the Source tab.
4. Scroll down until you see Spatial Reference – we can see that our projection is WGS_1984_Transverse_Mercator.



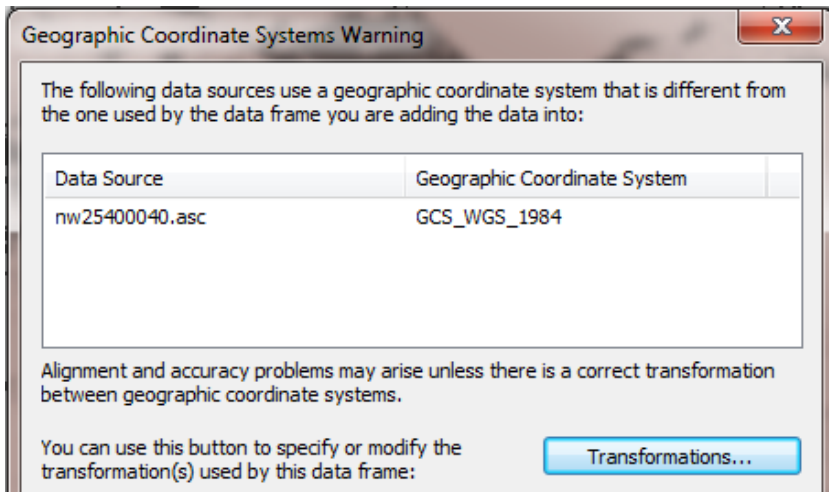
Our charts are in the same projection as the Hydrospatial data that we are about to add, so we do not need to edit it.

¹ To learn about map projections, have a look at the Digimap elearning modules:

<http://wyvis.edina.ac.uk/webhelp/training/training.htm#elearning/eLearning.htm>

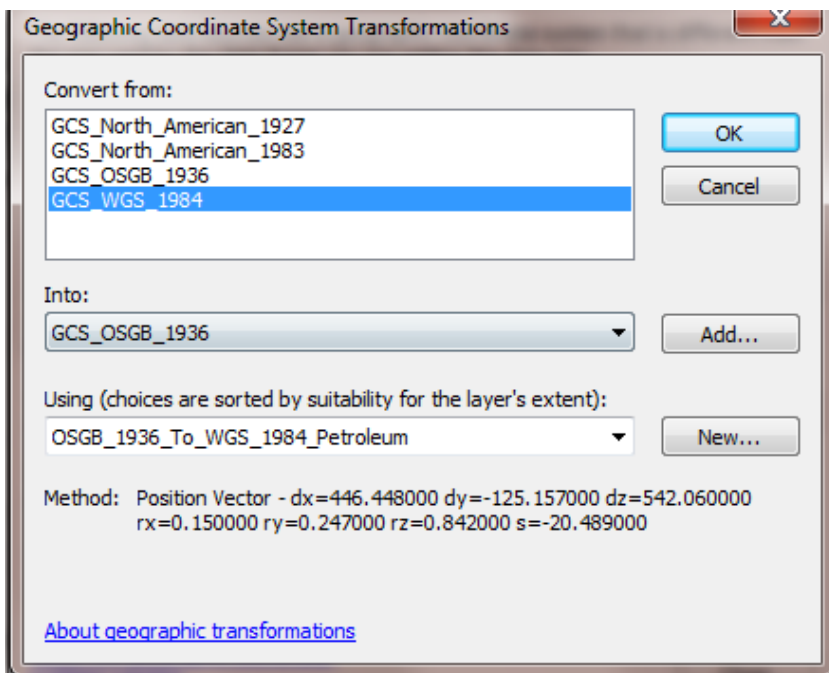
NOTE ON PROJECTION:

1. If you try to add data with a different projection than the existing layer(s), ArcMap may warn you and give you the opportunity to transform the projection:



If you were working with Ordnance Survey data, you may want to display your map data in British National Grid.

The most accurate transformation between WGS_1984 and British National Grid is **OSGB_1936_To_WGS_1984_Petroleum**.



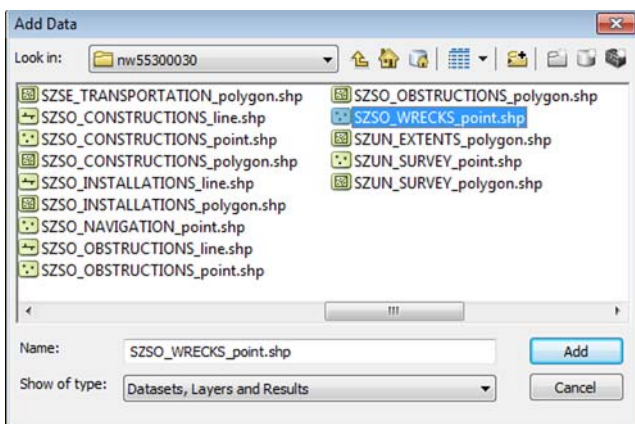
IMPORT HYDROSPATIAL ONE DATA

This is vector map data, downloaded from the Marine Download service in Marine Digimap.

The data is in Shapefile format, which is an ESRI format and compatible with ArcMap.

There is a Shapefile for each different theme. We only want to add one of the themes, **Wrecks point**.

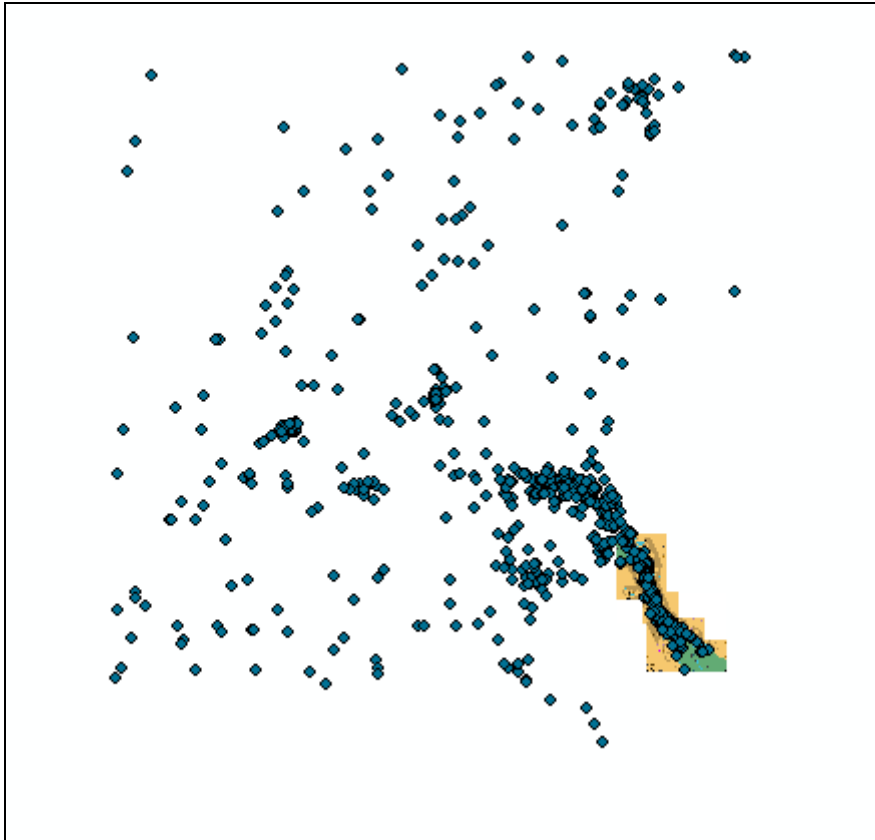
1. Click on the File menu and Select Add Data, or click the Add data icon.
2. Navigate to the download file.
3. Click the sub-folder **hs_one**.
4. Click one of the sub-folders, that start with NW.
5. Select the file ending in **WRECKS_point.shp**. You may need to scroll to find the file.



6. Click Add.
7. Repeat this step for the remaining 3 sub-folders.

NOTE that the 4 sub-folders each represent a different map tile – the area you selected covered 4 marine map tiles.

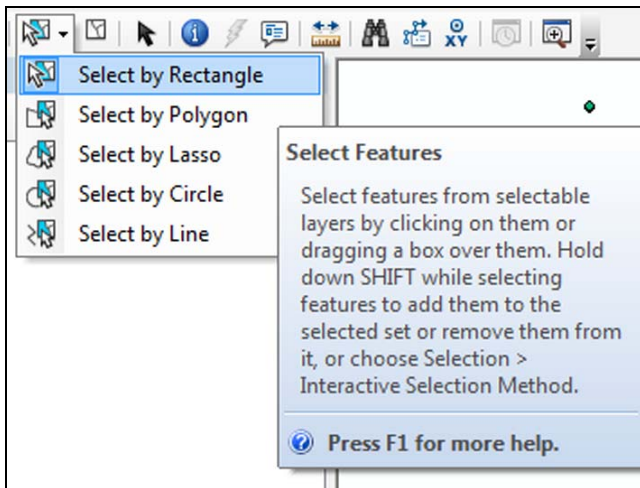
Your map window should look similar to this:



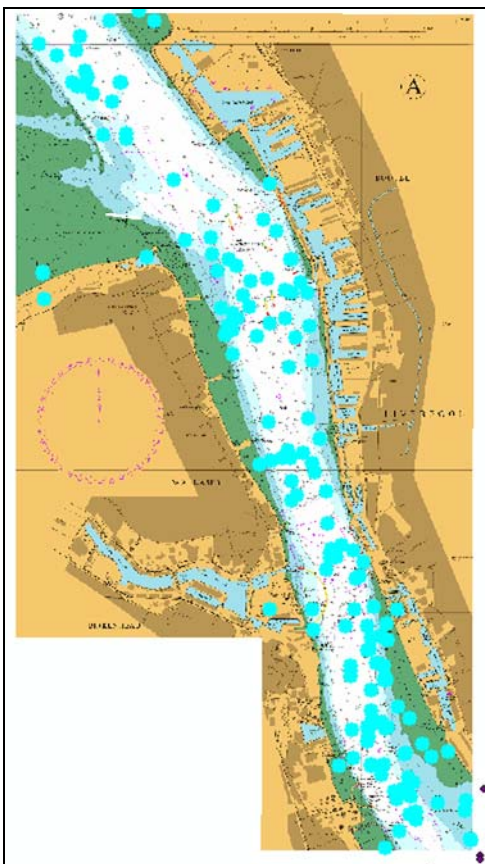
SELECT WRECKS FOR OUR AREA

Our wrecks data covers a large area. We can select wrecks for a small area and export the selection, so that we can use it again.

1. First, zoom in so that you can see the charts clearly.
2. Now click Select > Select by Rectangle.

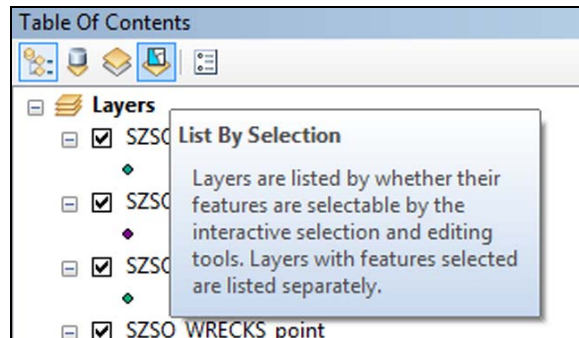


3. Click and drag on the map, to draw a box that covers both marine charts.
4. You should see the wrecks within the rectangle highlighted on the map.

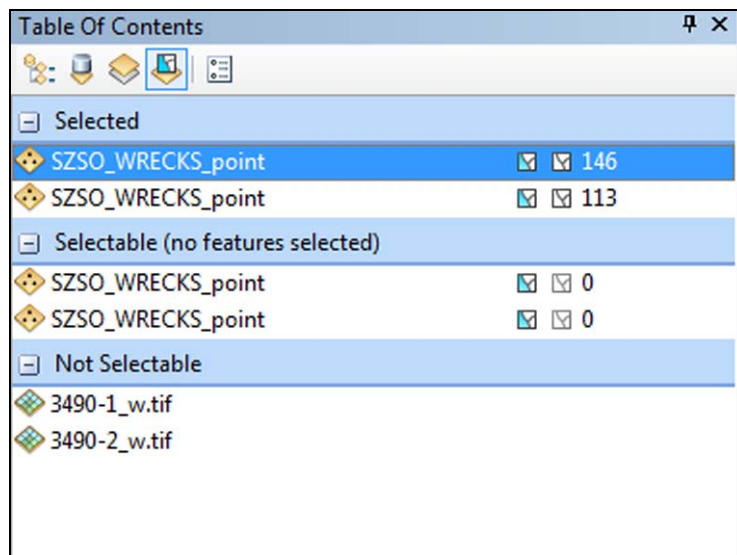


Now let's create a new map layer from the selected data.

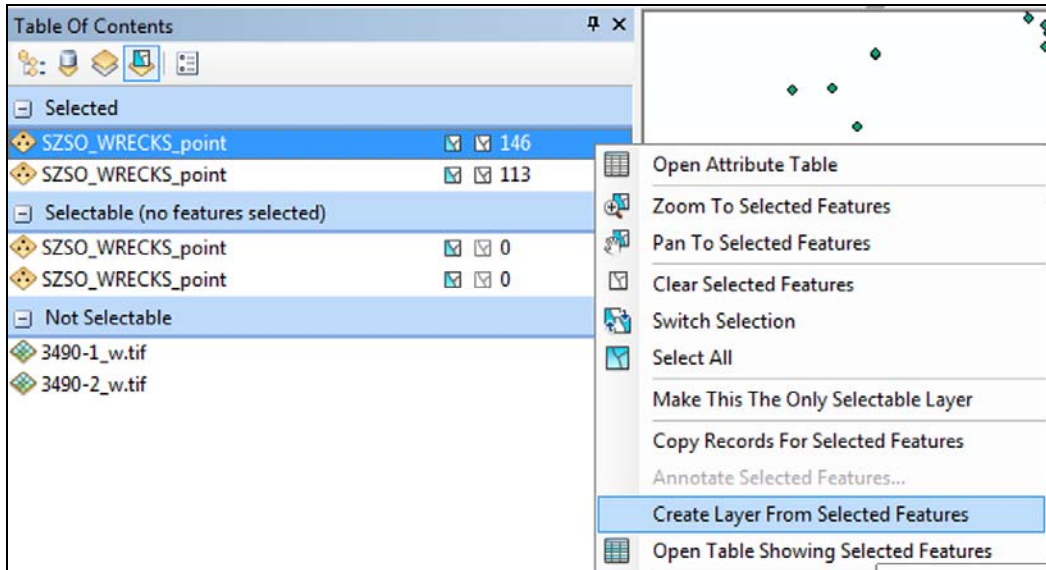
5. First, click the List by Selection tool at the top of the Table of Contents – it's an arrow:



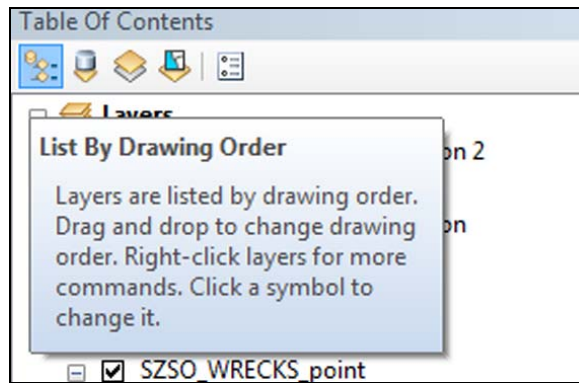
6. You should see something similar to that shown in the image below – in this example, 2 of our WRECKS layers are listed under **Selected** (they have points within our rectangle) and 2 of the wrecks layers are **Selectable** (no points within the rectangle):



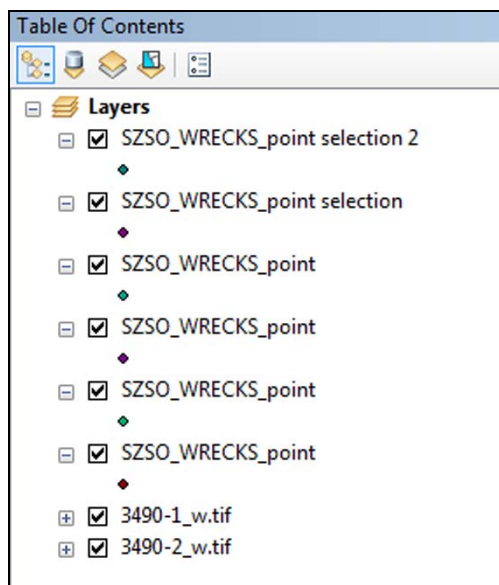
- Now we want to save the selected features as new map layers.
- Right click one of the Selected layers in the Table of Contents.
- Select **Create Layer from selected features**.
- Repeat for the other layer:



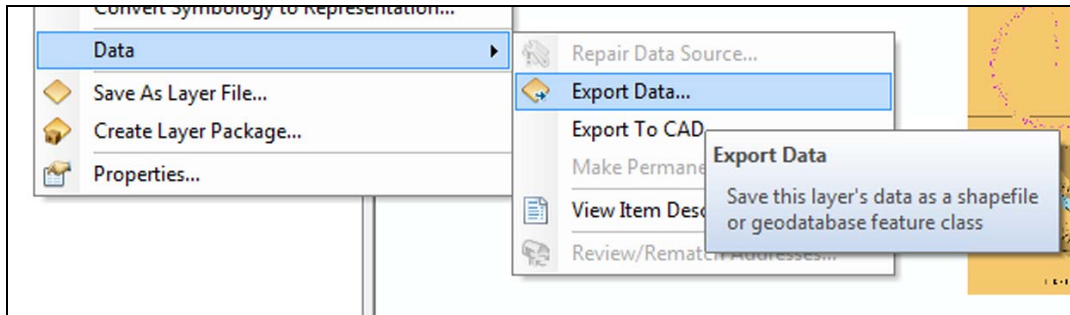
11. Now click the **List by Drawing Order** button on the Table of Contents:



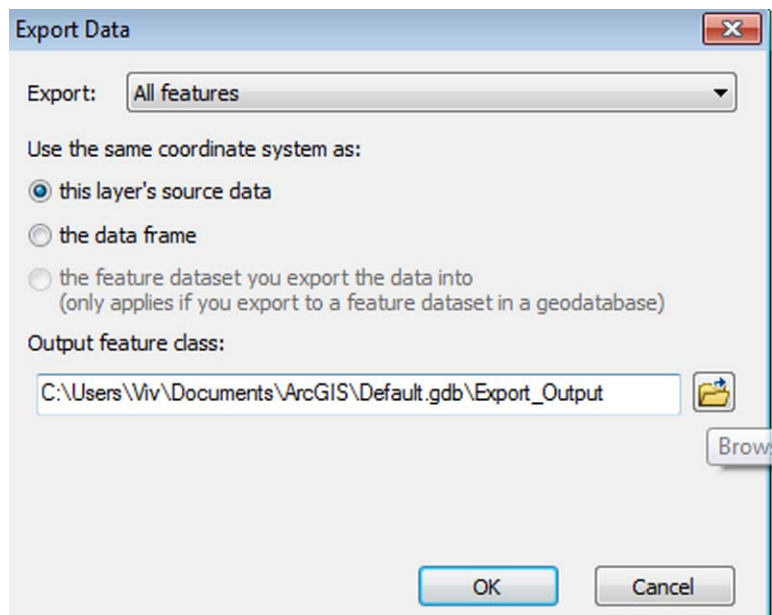
12. You should see that 2 new layers have been added to your Table of Contents.



13. To save these for future use, right click on one at a time and select **Data > Export Data**.



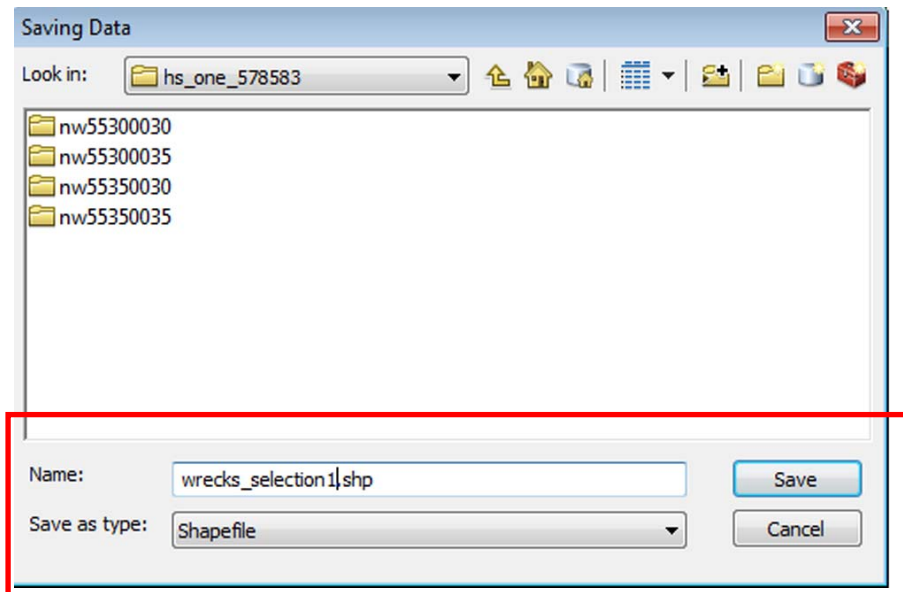
14. Click on the yellow folder icon and select an appropriate folder to save the new file:



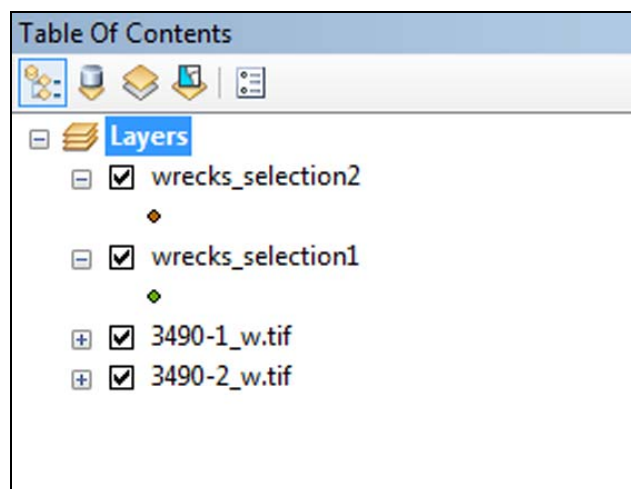
15. Give the file a meaningful name.

16. Select to save the new file as a Shapefile.

17. Click Save.



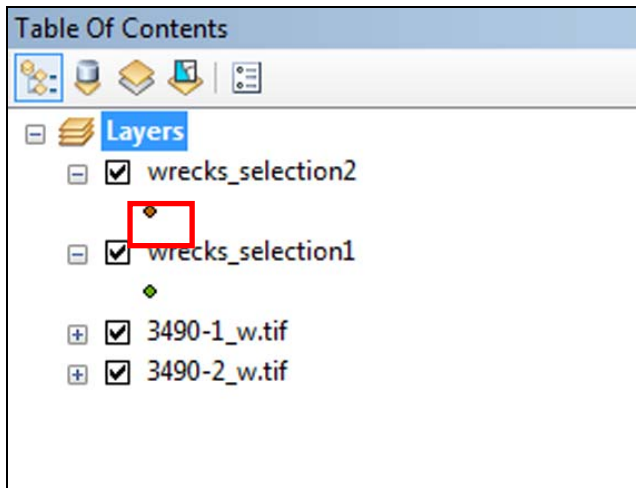
18. Say yes to adding the data to your map as a new layer.
19. Repeat the Export Data steps for the other wrecks selection layer.
20. Now, one at a time, right click and remove the other wreck layers from your Table of Contents. You should end up with the 2 new wrecks layers plus the charts in your table of contents.



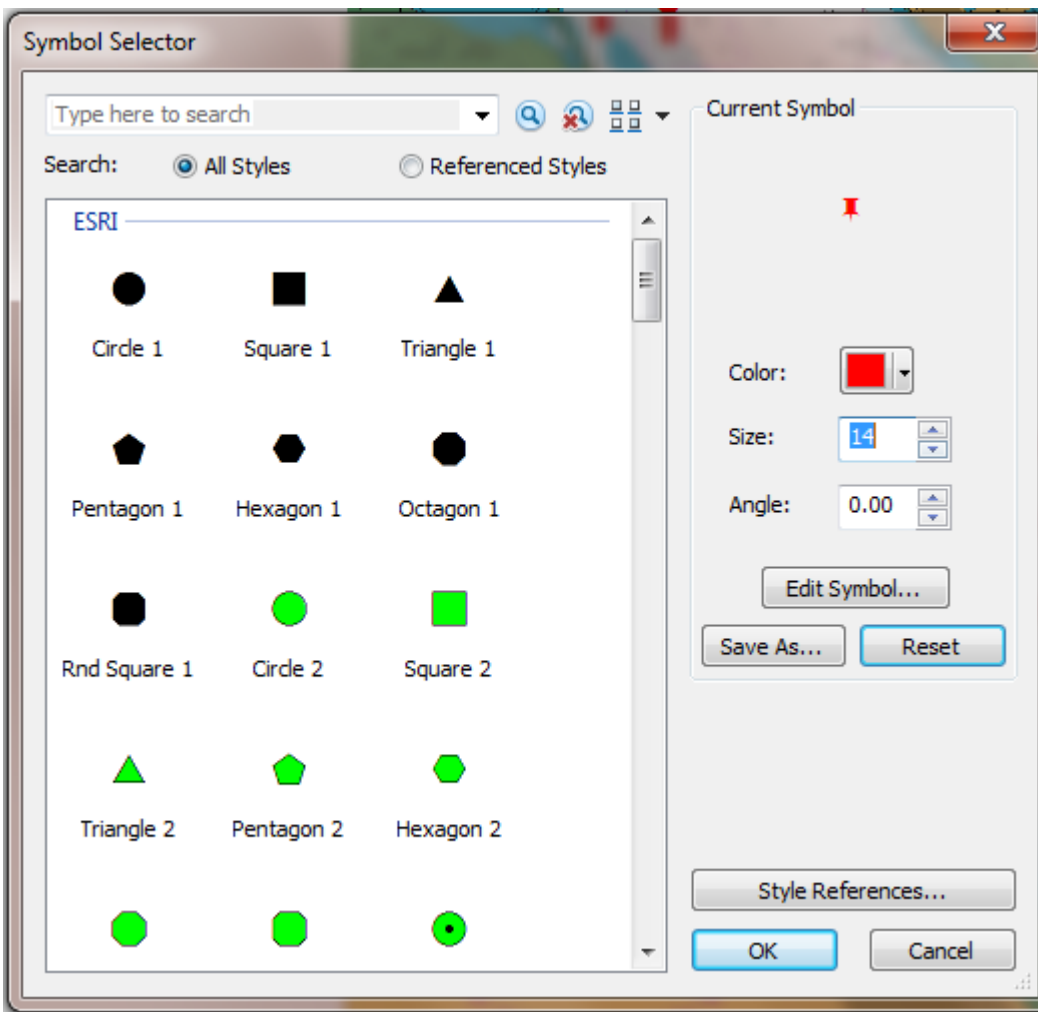
CHANGE WRECK SYMBOL

You can quickly change the symbol used for the wreck points, to make them more visible.

1. Click one of the symbols in the Table of Contents, under the layer name:

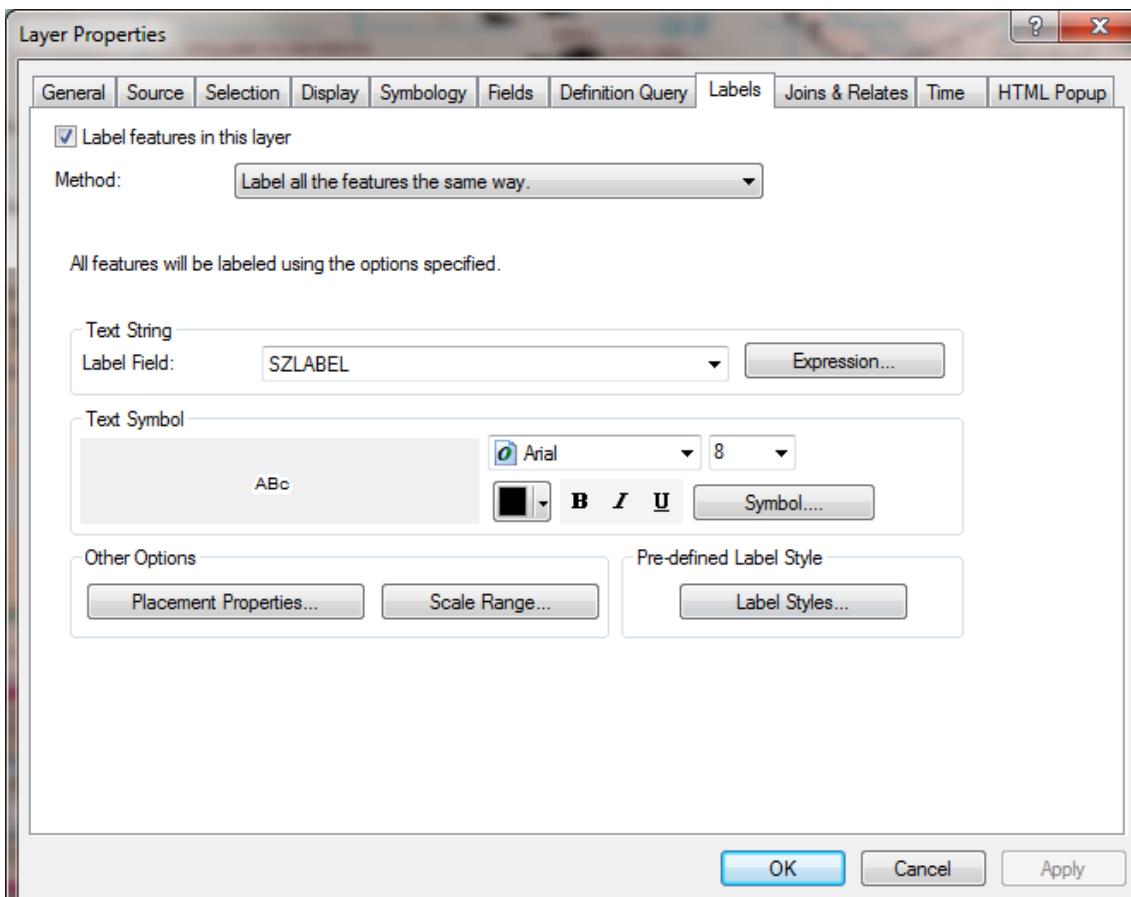


2. The Symbol Selector box will appear. Select a different symbol and colour, e.g. we have chosen a red pin symbol, at a size of 14. You can also type **wreck** in the search box and see what other symbols are available.
3. Click OK.
4. Repeat for other wrecks layer.



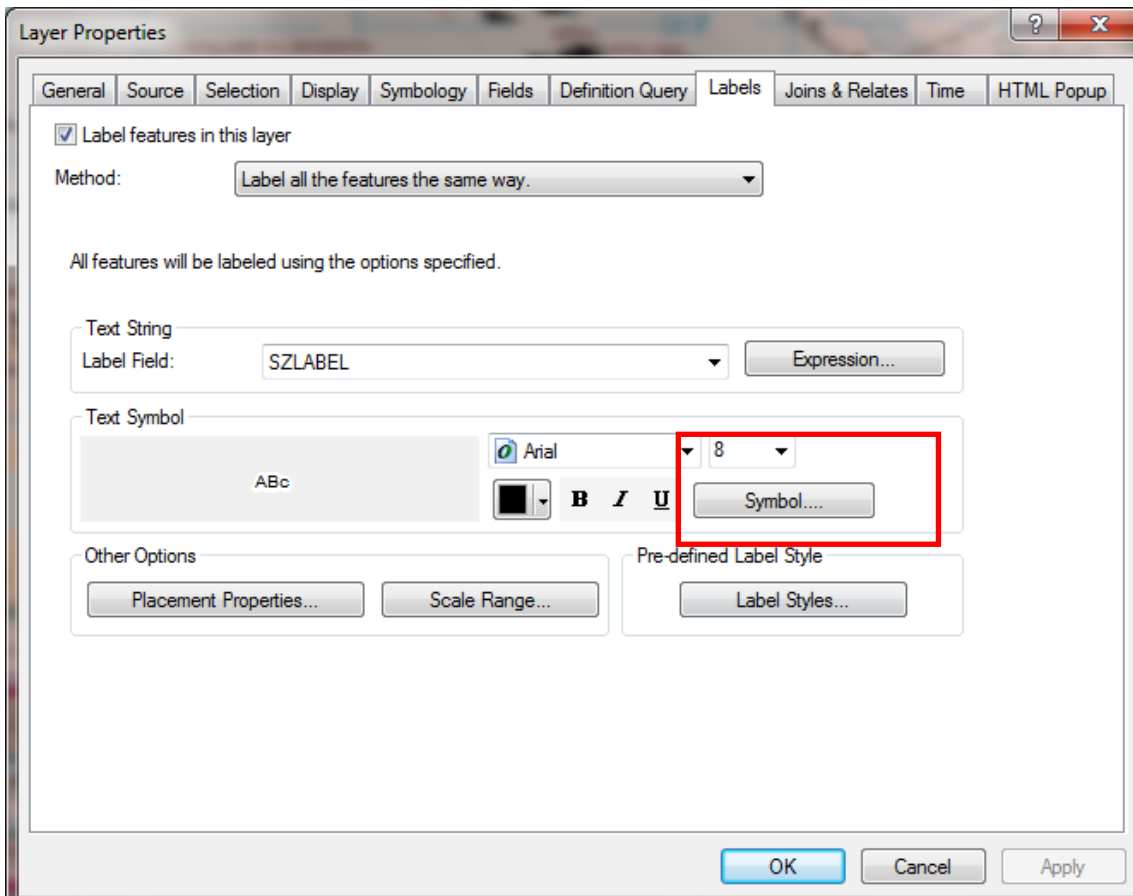
LABEL THE WRECKS

1. Right click one of the Wrecks layers in the Table of Contents.
2. Select Properties.
3. Select the Labels tab.
4. Select Label features in this layer.
5. Select SZLABEL as the label field.
6. Set a font size of 8.

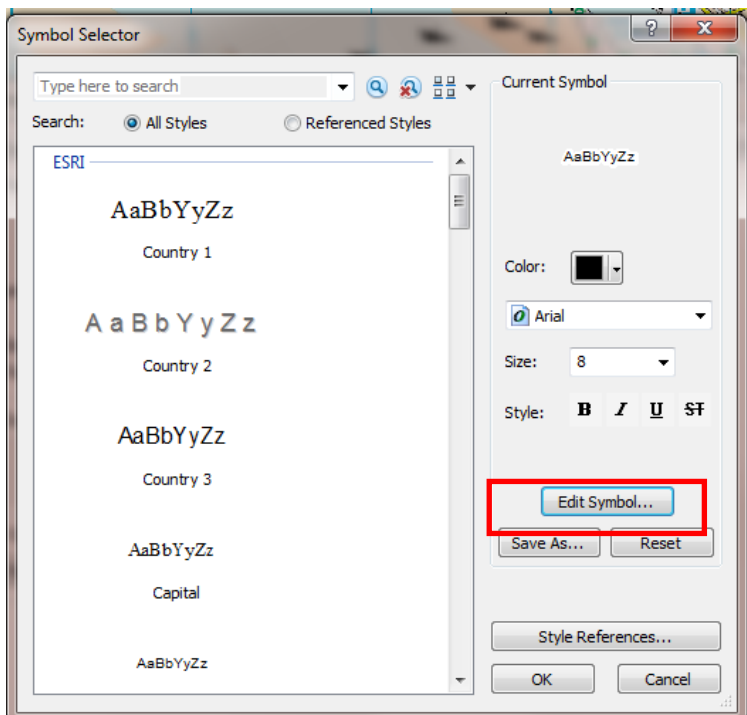


If you wish, you can apply a halo so that your labels are more clearly visible:

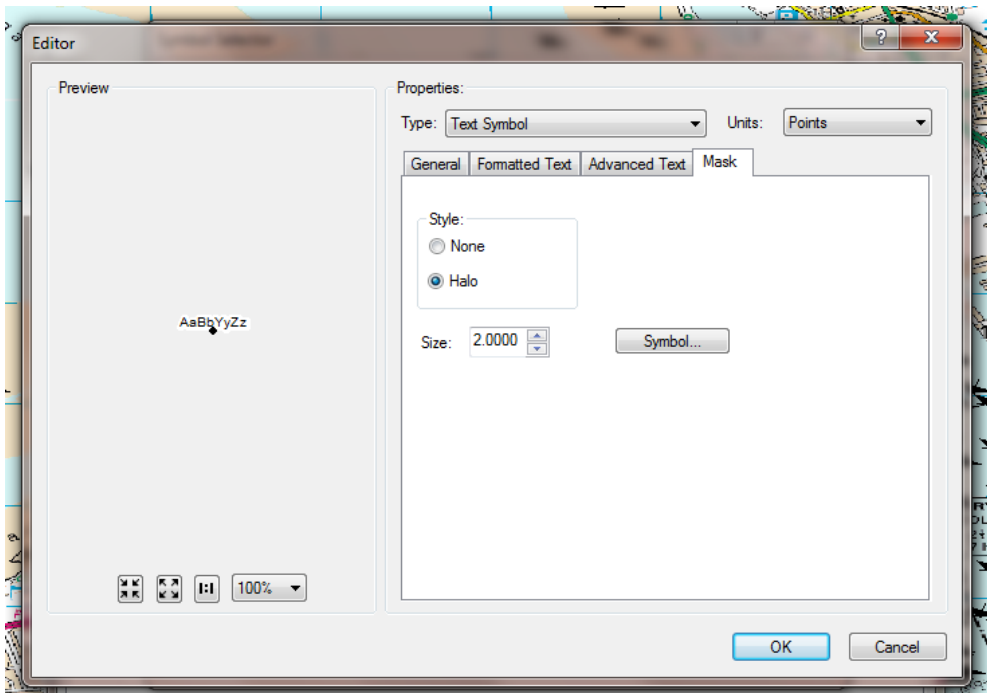
7. To do this, click Symbol on the properties tab:



8. Click Edit Symbol .



9. Click the Mask tab and select the Halo button.
10. Click OK.
11. Click OK twice more.



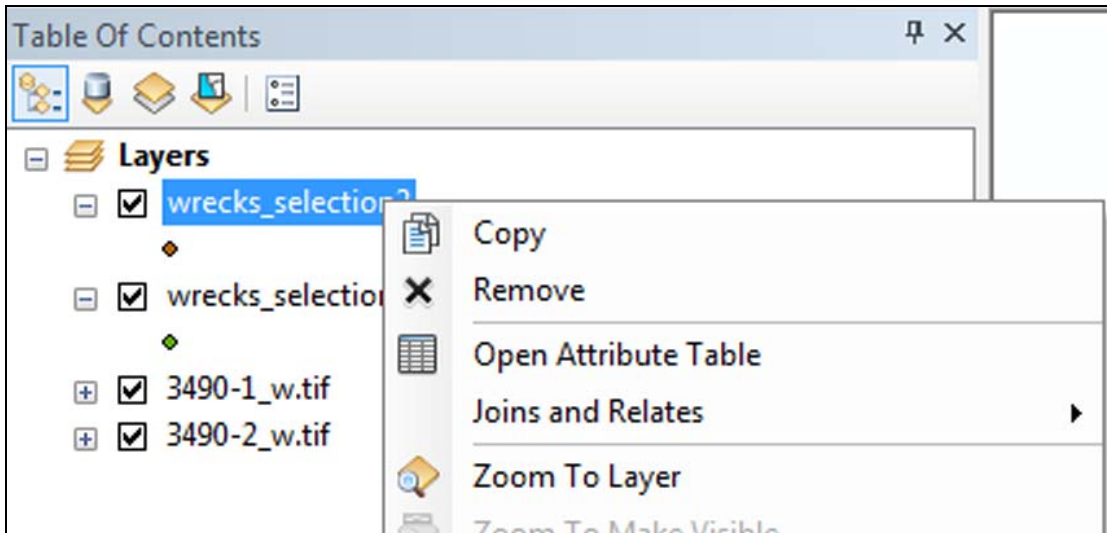
You should be able to zoom in and see labelled wreck points, as shown in this image:



EXPLORE THE HYDROSPATIAL ONE DATA

If you want to find out more about the wrecks, you can try a couple of things.

1. Right click one of the wrecks layers and select Open Attribute Table:



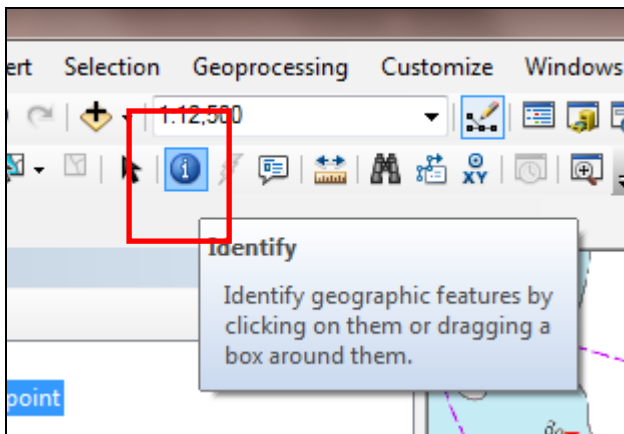
2. If you scroll right in the table, you will find a field **DATSNK**, which tells you the date of sinking:

ATLST	DATSNK	DEBRIS
75	26/07/1899	
76	29/08/1873	
	11/01/1951	
80	05/02/1891	
75	01/04/1896	
	16/08/1977	
55	??/09/1895	
	23/08/1898	
78	10/12/1977	
94	22/12/1894	
	29/06/1920	
86	30/04/1898	
	08/10/1897	
	??/??/1923	
	14/09/1881	

3. Close the attribute table.

You can also click on individual wreck points to generate information.

4. Click on the Identify tool:



- Then click on any wreck point on your map – a box with information is generated. Note that this information is the same fields as those you viewed in the attribute table:

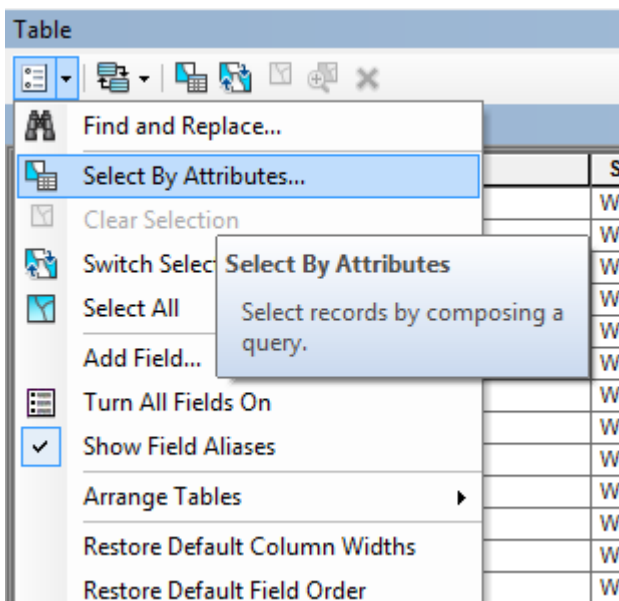
Field	Value
FID	478
Shape	Point
SZLABEL	DUNVEGAN CASTLE
SZFEATURE	WRECKS
SZFEATCODE	15902
SZFEATDESC	Wreck, dangerous wreck
SZLEVEL	7
SZSOURCE	UKHO Wrecks & Obstructions
SZDATASET	70637
SZID	637000001079431
SZGEO	P
SZSCALE	0
SZAPPENDED	22/04/2010
SZPUBLISH	30/03/2010
SZUPDATED	29/09/2010
CATWRK	dangerous wreck
CLASSF	Unclassified

Identified 1 feature

QUERY ATTRIBUTE DATA

You can select different map features by querying your attribute data. Let's try and select some wrecks that are visible when the water level changes.

1. Right-click one of your wrecks layers.
2. Select Open Attribute table.
3. Click Select by Attributes from the drop down at the left.



4. Double click WATLEV.
5. Click the equal sign =
6. Now click Get Unique Values – this will pull all possible values from the field WATLEV into that box.
7. Double click 'covers and uncovers' to add this to the query.
8. Finally click Apply.

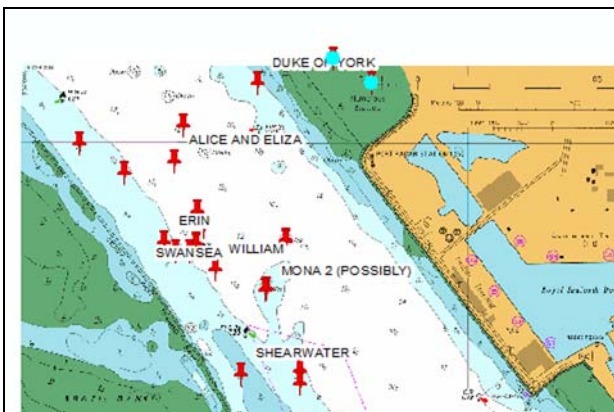
If you scroll to the far right of the attribute table and scroll down, you should see any incidence of the field 'covers and uncovers' highlighted in blue, similar to the image below:

VERLEN	WATLEV	SCAMIN	NINFO
0	covers and uncovers	0	
0	covers and uncovers	0	
0	covers and uncovers	0	
0	covers and uncovers	0	
1.2	covers and uncovers	0	
0	covers and uncovers	0	
0		0	
0		0	

9. Close the Attribute table.

10. You should see the selected wrecks highlighted in blue on your map, similar to the image below.

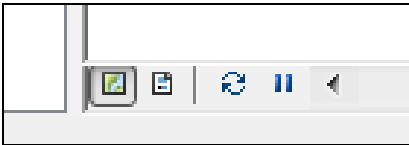
11. You could export the selected records if you chose to, using the Data > Export Data function.



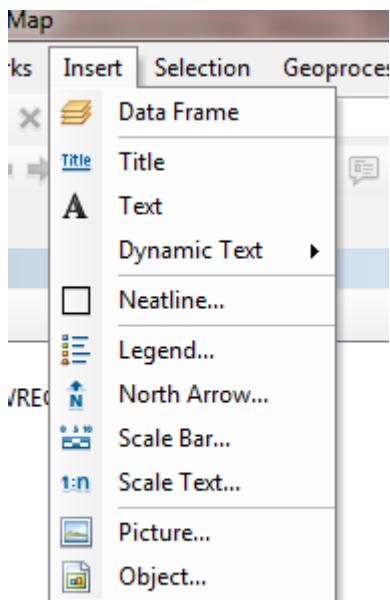
EXPORT YOUR MAP

You can print your map directly from ArcMap, but you may wish to export it in order to have an image that you can use in other documents.

NOTE: There are two possible views in ArcMap – Data view or Layout View. You can switch between views at the bottom left of the map display area, using the icons:



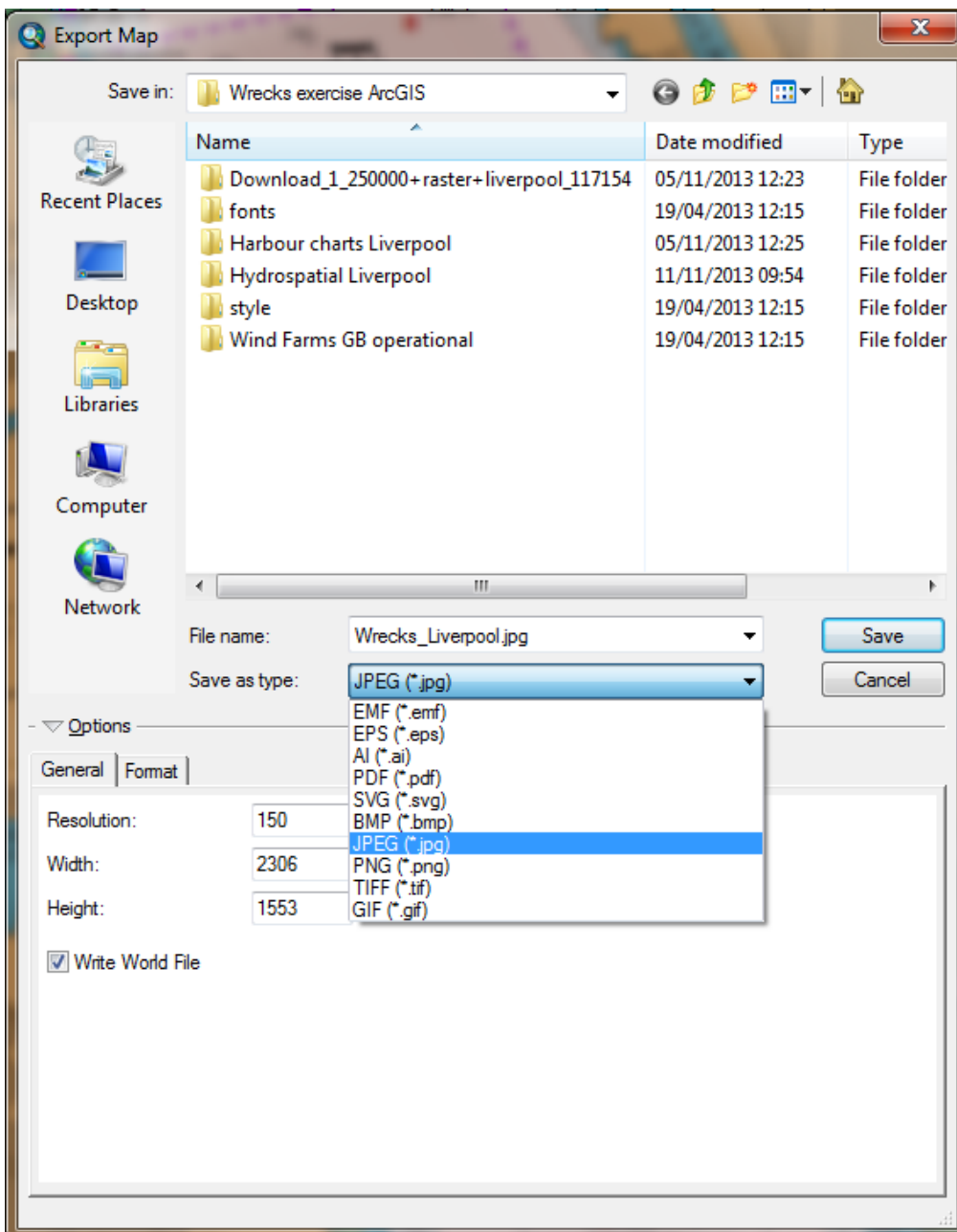
- Data View – in this view you add map data and do any map analysis.
- Layout View – in this view you can prepare a map for printing, for example by adding a title, scale bar, north arrow etc, using the Insert menu.



You can export your map in either view.

1. Click File > Export.
2. Select to save your file in a suitable folder.
3. Give your file a name.
4. Select the file type – in this image we have chosen JPG.

5. Select a resolution.
6. Tick Write World File – this will create world files, that contain the geographic coordinates of your map. If you wish to use your exported file in GIS, you will need these.
7. Click Save.



You should now have a map image that you can use in a document, or use as part of another GIS project.