

GEOG 357: Fall 2022

Lab 0: General Introduction

Learning Outcomes:

- Login to the GIS lab computers and get a bit familiar with the Catalyst RS software
 - A brief walking tour to review land cover and RS reflections
 - No lab question/answers need to be submitted this week
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1. General GIS lab access

Your names have been sent to Facilities so that your student card will provide access outside lab times. We don't know how quickly they will activate these. The lab is busy (full lab sections) for other courses directly before our lab (Intro GIS – 8-11am)– though there may be empty seats towards the end of that section. There is a lab after the GEOG357 lab although only about half full (Advanced GIS, 3-6pm). The other busy times are Intro GIS: Tuesday 3-6pm and Wednesday 8-11am

2. Catalyst tool bar exploration

Once you are logged in, go to the start button and (start to) type Catalyst (it will find it after ca...).

The Catalyst professional task bar appears with 10 options – we'll likely only use the first 'Focus' which automatically opens an image window. As with other courses, your home folder is on K: and lab data on L: ... all data for the course will be stored in L:\GEOG357

In some cases you may need to copy these files, but not in today's lab as you are only viewing a file, not editing or adding to it.

3. Loading satellite imagery

file → open → pg14sept2011

The native raster file format for this software is .pix although it can also open standard raster files e.g. tif
It is a powerful format that can contain many layers, both raster and vector

The filename is self-explanatory – the date the image was captured. The scene has been clipped to reduce size and the need to pan / zoom too much. The pixels are 30 x 30 metres in size – standard for most Landsat imagery: In this case, it is Landsat 5, which you would know from dates of data availability.

Resize

To get best display, you should be able to see most of the whole dataset without panning; resize the image window - I prefer NOT to maximise as then you have no other space e.g. for instructions.

4. Display Options

The 'RGB' image opens with the first band layer in Red, the second in Green and the third in Blue. However for Landsat, and most imagery these are the blue, green and red bands so they are in reverse order (all software does this e.g. ArcGIS, QGIS), so the first task is to 'flip' bands 1 and 3 into their proper display sequence.

Right-click (rc) on the filename in the list of contents, and selected RGB mapper. In the table move the 'ticks' to put bands 321 (red, green, blue respectively) in the RGB display. Now the display may look rather odd – because it based the colours on the first layers and they have changed. You will ALWAYS need to 'enhance' when you change the input layers.

Enhancement

right-click filename → enhance → root or linear (usually works best) tool bar icon → root or linear
See which gives best contrast. The enhancements will be based on what is displayed onscreen. No data numbers will be changed by enhancement, only how the imagery looks on your screen. Hopefully you can recognize some of the features on the display – e.g forest v fields, industrial v residential.
Notice also the different colours for the Nechako (clear water) and Fraser (silt, mill effluent?). You can also enhance using the icon in the 2nd row below the scissors icon.

Zoom and Pan

Use + and – to zoom in and out, and more useful, use the box symbol to the left of + to outline an area of interest (same as in GIS software); check out the campus and your house areas; zoom in enough to see the pixels. The next box to the left zooms back out to full extent (same as rc -> overview of layer).

View coordinates

Note the UTM coordinates (displayed at the bottom) as you move – scenes are downloaded in the local UTM zone; see Lat/long as well for a point by clicking the +x,y button – what is the lat/long of UNBC ? Note that the 4 decimal second places are 'precision overkill' as each pixel is only about 1 second across.

Measure distance

Measure the approximate E-W and N-S extents using the measuring tool, [or use basic math from the UTM coordinates]; what is it across in kilometres? value is shown in metres, so divide by 1000

Digital Numbers (DN) values

The DN values (0-255) at the cursor position are given for the bands displayed (in R-G-B). These represent the 'brightness' or level of reflection (in this case in a range from 0-255).

Changing the bands displayed

You already flipped bands 1-3 – the visible bands; now change the display to include the near-infrared band (4): rc-> RGB Mapper and show 4-3-2 in RGB and ENHANCE

This will simulate the “false IR look” to show healthy vegetation in red.

One step more: change the RGB mapper again to display 5-4-3 in RGB (and ENHANCE).

This is our optimal display for maximum contrast showing vegetation health and dryness. This should be the ‘default’ or best display for any image scene.

Zoom in on the N-S service road behind the EFL (Enhanced Forestry Lab) – note that the road is not super visible as it is a lot less than 30m wide, but it’s more visible on the 543 combo than 432 or 321. Click on the road and note the DN values, then click either side to see how they compare with forested pixels. Band 3 (B display) is visible reflectance; band 4 (G) is near-IR = vegetation health; band 5 (R) is dryness (‘negative moisture’).

We’ll do a wee walkies out to this site to get a better idea of how we see image features as we do on satellite imagery. The last bit before we go walkabout:

Maps and files tabs

On the top part of the left panel you can see two tabs: maps and files. The default is maps, which enables display options, while ‘files’ shows database information. (For GISgeeks, you could think of them as parallel to ArcMap and Catalog.)

Switch to files tab

Check raster → it will list the bands / channels available (7)

→ right-click filename → properties

You see much fewer options than when you right-click in the maps menu

General gives file size etc.

History and metadata – none given

Projection – UTM and 30m (pixel size)

Generally, the default would be to use the maps tab, and only occasionally the files tab.

Prepare for the wee outing – I’m presuming everyone has safe walking shoes

That’s it for now. Next week, we’ll use Catalyst for image manipulation and exploring DNs. Exit Catalyst and log out – nothing to save and don’t turn off workstations!