This tutorial was designed by the University of Durham as part of the EU ForestSAFE project.

CLEARFELL IDENTIFICATION

Introduction

One thing that Remote Sensing can do quickly is highlight areas of clearfell. Clearfells tend to be significant chunks of woodland and we know that their area can be clearly delimited from high-resolution imagery types such as aerial photos. This practical provides you with an opportunity to explore a variety of Medium–Low-resolution satellite images to determine whether this same delimitation would be possible with other, less expensive, imagery types.

1. To open ArcGIS-ArcMap, go to your **Start menu** (bottom left corner of your screen), select **All Programs**, **ArcGIS**, and finally, double click on **ArcMap**.

2. Once the window is open, you will be prompted to start ArcMap with options.

3. Select **An existing map** (if not prompted, simply **Go to File – Open).**

4. Then scroll down to the drive from which the **FC Tutorials** folder can be accessed

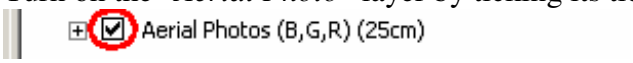
5. Open the **FC Tutorials** folder and the **practical 1-2-6** folder. Double click to open the project file entitled **3Part_Practical_Edinburgh_2005.mxd**

6. Once the files are loaded, click the button labelled "**1. Identifying Clearfell**" to activate the first section.

7. If not already on, turn on (by checking the tickbox ringed in blue below) the Evaluation Boundary Layer.

8. Click the "Zoom to Boundary" button on the Toolbar to zoom to the outer extent of the case study area.

9. Turn on the "*Aerial Photo*" layer by ticking its tick box (circled in Red)



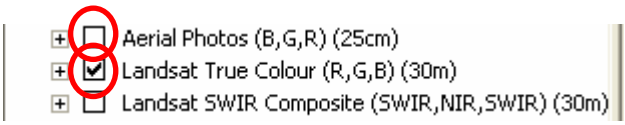
This may take some time to load.

From the aerial photos it is possible to tell at a glance where felling has occurred.

10. Turn on the ClearFell Truth to locate examples of ClearFells.

5. Having gained an impression of the lie of the land, **turn off the aerial photo** layer and **turn on the "Landsat True Colour"** image using its check box.

(to see the colour scale, Click on the plus sign to the left).



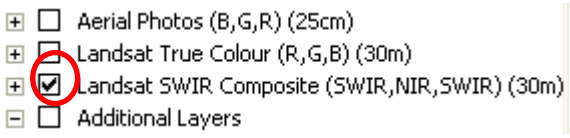
6. Landsat has a 30m spatial resolution compared to the 25cm resolution of the Aerial Photos. By turning the Aerial photo layer on and off, compare the two images for their ability to identify clearfell.

>>> Is it still possible to identify clearfell with this resolution of imagery?

Comments:

7. Now turn OFF **the aerial photo** layer and the **"Landsat True Colour"** .

8. Turn on the **"Landsat SWIR Composite"** image using its check box.



The SWIR (Shortwave Infrared) composite uses areas of the electromagnetic spectrum that are not visible to the human eye. Areas that appear pink in the image are reflecting a lot of radiation in the Near Infra Red part of the spectrum - a common response of vegetation, especially grasses. Areas that appear green or blue are reflecting less in the Near Infra Red and more in the Shortwave Infrared. This area of the spectrum reflects changes in moisture content of soils and vegetation.

For a description of the different parts of the electromagnetic spectrum (how light is divided into colours, NIR and other radiation types), type or copy the following link in a web browser:

http://www.ccrs.nrcan.gc.ca/ccrs/learn/tutorials/fundam/chapter1/chapter1_3_e.html

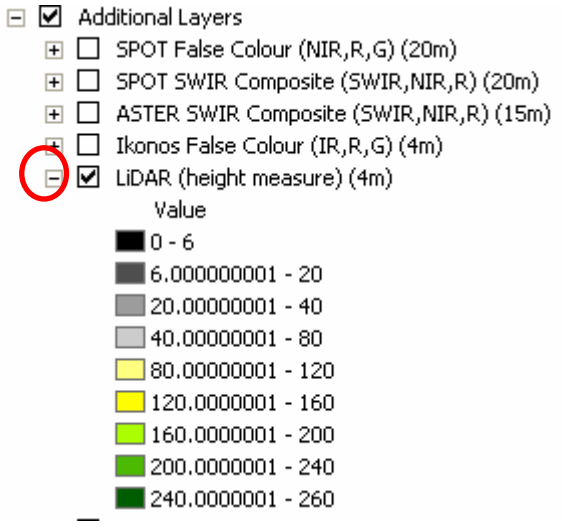
>>> How does the SWIR Composite compare with the True colour image for highlighting areas of clearfelling?

Comments:

9. Have a look at the additional layers (first tick the Additional layer box on and clicking the others off)

10. Expand the additional layers (Click the plus sign). In particular, have a look at the LiDAR image, which provides tree height information (heights are given in cm).

(To see the colour scales, Click on the plus sign to the left of the selected image. Once the layer is expanded, the plus sign become a minus sign).



11. You may compare other sources of image data for the same purpose.

Summary questions

>>> Is the identification of clearfell a task that you would undertake in practice?

>>> How would it be undertaken?

Comments:

>>> How much time / funding would be allocated to the task?

Comments:

>>> Having compared the images could you see Satellite Imagery such as Landsat being employed for this task?

>>> If so what are the benefits it brings?

Comments:

>>> If not what dissuades you?

Comments: