GEOG432: Remote Sensing, Fall 2018
Environmental Change assignment (10%)
Due: Tuesday 09 October

Procedure

Pick your area from personal knowledge / google maps, google earth time lapse etc..

1. General notes:

Picking the two image scenes will likely take the longest time in the assignment

Cloud cover: The two images should ideally be cloud-free; these are easier to find in sunnier locations. Options are e.g. 0%, <10% and < 20% - beyond 20% is less desirable; remote cloudy places e.g. Iceland, Greenland have fewer options than places to the south.

Years: you are looking for change – ideal if its longterm, but it doesn't have to cover the entire 1984-2018 period; it's better to have a good contrast than a long period.

Dates: The ideal is same time of year. A smaller year span but with closer date of year / season is likely to show better. Images should be free of seasonal snow – unless that is your theme, but that's not really an environmental change.
In Canada, a date range might be June 15-September 15 (July 25-Sept10 in mountains); adjust for different areas – winter images in Canada and most places are not very useful.

Landsat 7 ETM+ images after May 2003 are striped and of little use

Area relative to scene edges: Some areas will be nicely placed in the middle of an image, while others may be on the edge, and not fit your screen as well. Technically if it's in Canada, there is 50% scene overlap, so it could be on the edge of one scene, and the middle of another, in an E-W direction. Scenes are 'cut' along a N-S swath, so some places may be tough to get images simply because they are always near a 'join' or scene top/bottom edge. In such a case, you might be best to pick another area

Viewer/Download sites:
Earthexplorer requires downloading LandsatLook georeferenced scenes (~10mb) and then clipping to a smaller sub-area. The websites seem to access slightly different archives so if you can't find what you want on one, you could try the others.

LandsatLookViewer: Since March 2017, the LandsatLook Viewer enables clipping the image onscreen before downloading, which saves some steps, but may not be as easy in other ways, especially image preview. The viewer only uses the georeferenced Look images, which is just what we want (while the other sites include formats we don't want – for now anyway). Below I highlight the LandsatLook process, and then the alternatives. On one occasion, this method was a snap, another time, we just could not make it work..
.

2. LandsatLook Viewer: https://landsatlook.usgs.gov

Change Days of Year e.g. June 15-September 15 for Canada (different for tropics/south)
Change Maximum Cloud Cover to 0% or 10% or less (depending on area)
Tick boxes for Landsat 8 OLI and Landsat 4-5TM (and maybe Landsat 7 1999-2003)

Zoom into area - generally < 1:1million, i.e. 1:144k or 289k
You want to show your area of interest, but not excessive area beyond, but you don't want to zoom in so much, you can see the pixels (fuzzy)
Your image frame should be landscape format (to correspond with ppt format)

Click 'showimages'
Image enhancements – I like the 3 Std Dev stretch (none can be dull)

Select your two image scenes - you can play the image sequence and stop it when it displays your image, and then:

Export (download) images icon in the USGS LandsatLook menu
Panel on right gives image size – it should be ~ 1000-2000 x 600-1500
Too much zoom and its pixelated, too large area and you can't see your changes (unless they are spread across a scene)

Select **jpg** in the new dropdown and Web Mercator (not Geographic)
Export
Download Image
-> right-click on image – save image as – navigate to folder and save
Do them both in this manner WITHOUT changing zoom – just changing the image

Insert (picture) each into a new ppt document with two blank slides; insert only, don't move them around or adjust, as then you'll never get them to realign
Add date /year on each slide (insert-text box)

3. EarthExplorer/Glovis/remotepixel

These require downloading entire scenes and then clipping to size in Geomatica

3a. Remotepixel.ca -> satellite search link for Landsat 8 images 2013-2018

Zoom to area - select by clicking on chosen scene location, and an icon appears below giving the satellite path/row. Clicking on this displays the options by date. Select the USGS icon on your chosen scene(s) - this will connect to the EarthExplorer download site; you will need to login (account=geog432, password=class2018), and click the wee green download icon for the LandsatLook georeferenced image. Save to your folder.
It downloads as a .zip, so unzip (double-click on its icon) – you only need the first .tif file

Viewing Landsat scenes for download

http://remotepixel.ca

https://earthexplorer.usgs.gov/

https://glovis.usgs.gov/

3b. EARTHEXPLORER: = the generally preferred option

You need to fill in search criteria, Data sets and additional criteria as below:

Enter placename under address/place (enter) .. it should show up with location if its major; click on the blue lettering so the red marker identifies the location
Change data range to summer months if needed

Data sets: Landsat -> Collection level 1
It appears you can pick all L8, L7 and L5 but you should only pick one for each search
Additional criteria: cloud cover : Less than 10%

Click results – brings up the search results – click on scene images for zoom view .. again
Click on icon with green arrow (download) – when you have the best choices (see below)
You will need to login to download

GLOVIS was the site we used to use, and NASA indicated it would be decommissioned, but its back and redesigned. We haven't used it yet, but feel free to try and boldly go ...

4. Scene download

After selecting the scene download option (with green arrow):
This brings up a new window asking for a user name and password
The class group username is: **geog432**
The password is**: class2018**

Click on the green download arrow
Select 'download' button for Landsat look Images with geographic references (~ 10mb) –
You should then be prompted to save (and pick your geog432 folder *) – it is a .zip file
You may need to select in browser: tools-> options for 'always ask me where to save'

Before you unzip the file, you will see its contents –3 TIF files– you will need the first listed (that is not identified with TIR – thermal IR) along with any matching filenames that have may have .aux and .wld extensions (this may have been discontinued - it was an earlier way to provide georeferencing.

5. Viewing/subsetting in Geomatica

Start a new project in geomatica and open the two TIF (or JPG) files:
The two should perfectly align
Change your display to be ~ 3 x 2 ratio ‘landscape’ image - as above it should be approx 2000 x 1500 or 1600 x 1100 or 1000 x 600 ... zoom as much as you can, but not fuzzy

Zoom and pan to an area of interest that should fit on a screen without having to pan
Select an image subset … enhance as needed and when satisfied , Choose:

Tools-> Clipping/subsetting .. check the rasters box in the new window, and enter a new name for the clip .. it can be .tif format
On the right panel, change definition method dropdown to Use Current View
The red inset below should now show your chosen area, and click on Clip to make it so

Repeat for the second image, ensure its for the same area /current view - don't move around - if something does change you can clip the second image to the first by choosing 'select a file' for definition method and browse to your first clip.

enhance as needed so they match as closely as possible - except for the changed areas
file-> export map to save each image as JPG (change 'save as type' dropdown from AI)
Select JPG format, and display resolution to 100dpi

6. Adding to powerpoint

Open a new presentation with 2 blank slides
Insert (picture) each into a blank slide; insert only, don’t move them around or adjust, as then you’ll never get them to realign

Note: somehow it usually fills the slide; if they are either too big or small, then use:
click on an image, then right-click -> size and position option to modify size - use EXACTLY the same parameters for each of the two slides

Add location / date /year on each slide (insert-text box)

Phew !
That took hours to write and about 10 minutes to execute when the Force is with us - it also helps if Scott is with us .... :)