

Advanced GIS

Computer Science in Modern Biology Workshop 2021

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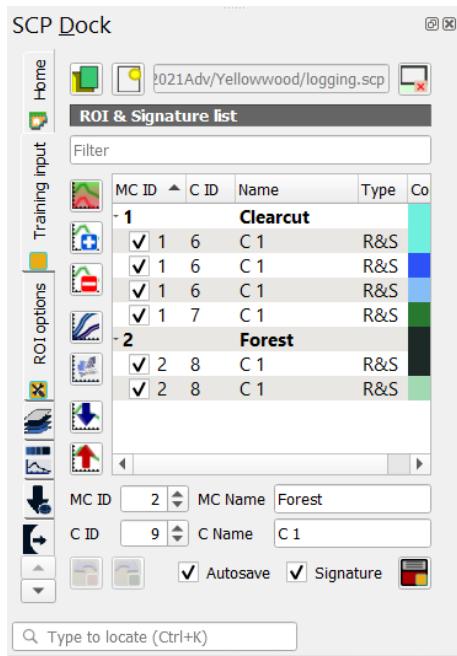
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Using Raster Imagery: Day 2

Part 1: Logging activity? (Review from Yesterday)

Yellowwood State Forest near Bloomington, IN has had major issues with overlogging and protests against management. Let's look at the logging occurring in 2018, the prime of the controversy.

1. Import the Yellowwood Raster File (hint: import bands separately then create a band stack)
2. For this dataset we have a pre-made training input. Instead of creating new training input we are opening the training input logging.scp. This data does not contain all the land cover types seen in the raster image, so let's add those in too.



3. Classify the image with the updated training data, and create a vector shapefile from the classified raster.
4. How much of the forest is logged during this time? The DNR has a policy of no more than 5% of state forests, however this was a private company conducting the logging.

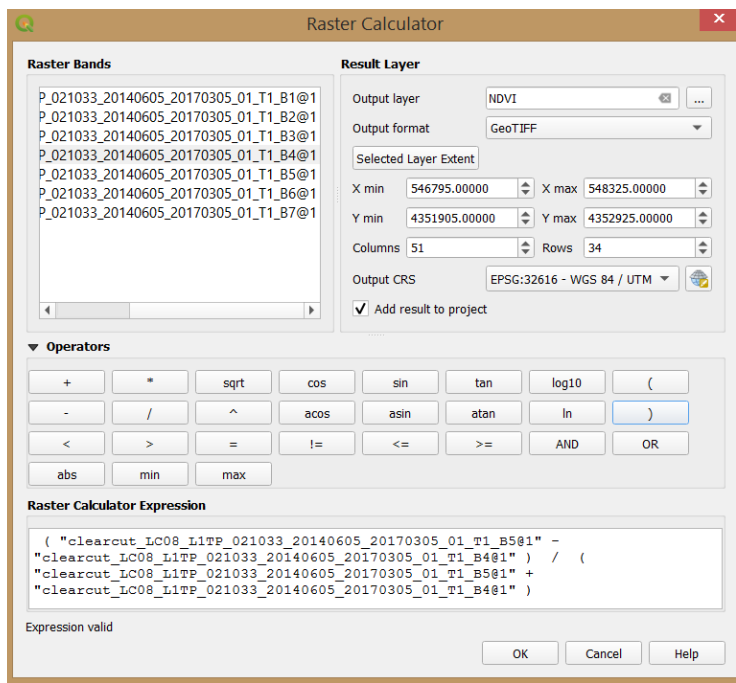
Part 2: Measuring Disturbance Using Greenness

We are pretty good at using training data now! Geographers also use greenness as a measure of disturbance.

1. To start, open the greenness_mapping.qgs. Instead of having to preprocess, this is ready to go!
2. Remember yesterday how we looked at different band combinations? Today we will create two different combinations that are used to measure greenness.
3. To do this we will use the Raster Calculator tool. The first metric will be NDVI:

$$\frac{NIR - Red}{NIR + Red}$$

For Landsat 8, Band 5 = NIR and Band 4 = Red



4. Once we have this new raster we can *Clip* our raster using the shape file with the clearcuts as a *Mask Layer* ;)
5. We can then use the Cell Statistics tool to get a range of pixel values within the shapefiles vs. the entire image. Do these differ/are the shapefiles on a certain end of the spectrum?

How does this compare to EVI?

$$EVI = G * ((NIR - R) / (NIR + C1 * R - C2 * B + L))$$

In Landsat 8, $EVI = 2.5 * ((\text{Band 5} - \text{Band 4}) / (\text{Band 5} + 6 * \text{Band 4} - 7.5 * \text{Band 2} + 1))$.

How does this compare to creating an ROI and making training data within one of the clearcut areas?

Which is a better method?

Can we repeat this with Yellowwood?