

Assignment 7: Band Ratios

(60 Points Total)

Data available under Resources>Burn Ratio.

The 2016 Sand Fire occurred in the Angeles National Forest east of Los Angeles, California. It began on July 22, 2016. The fire was not contained until August 3, at which point it had burned an estimated ~35,000 acres. You have been provided with two Landsat 8 Operational Land Imager (OLI) scenes. The pre-fire scene ([sand_fire_pre_4_17_2015](#)) was collected on April 17th, 2015 while the post-fire scene ([sand_fire_post_4_12_2017b](#)) was collected on April 22nd, 2017. These data have been processed to surface reflectance. Use these data to calculate the difference normalized burn ratio (dNBR), answer the following questions, and generate the deliverables. You will need to calculate the dNBR and reclassify the result as follows:

Unburned	< +.1
Low Severity	+ .1 to +.27
Moderate Severity	+ .27 to +.66
High Severity	> .66

These data were generated at a 30 m spatial resolution and these are the band designations:

Band 1 = Blue Edge

Band 2 = Blue

Band 3 = Green

Band 4 = Red

Band 5 = NIR

Band 6 = SWIR1

Band 7 = SWIR2

Questions

1. Provide the equation for the difference normalized burn ratio (dNBR). **(5 Points)**

$$\text{NBR} = \frac{(NIR - SWIR2)}{(NIR + SWIR2)} \quad \text{dNBR} = \text{Pre-Fire NBR} - \text{Post-Fire NBR}$$

2. Based on the spectral reflectance of forests vs. burned areas, explain why this ratio is useful for detecting fire scars. **(20 Points)**

Forests will have a high NIR reflectance and a low SWIR2 reflectance. In contrast, burned areas will look more like bare soil with a high SWIR2 reflectance and a low NIR reflectance.

3. Describe the process you used to create the dNBR. A reader should be able to follow your description to replicate the analysis. **(20 Points)**

Use Raster Calculator to build the two ratios and then subtract them. Use Reclassify to recode to the severity classes.

Deliverables

- Create a map of your output. **(15 Points)**
 - Include a title, north arrow, and scale bar. **(2 Points)**
 - Include the reclassified dNBR layer. Make the “Not Burned Class” hollow, and display one of the Landsat 8 scenes under the result. **(5 Points)**
 - Make sure the legend differentiates the “Low Severity”, “Moderate Severity”, and “High Severity” classes. **(5 Points)**
 - The map should be overall neat, well organized, and use the space well. **(3 Points)**

2016 Sand Fire Burn Severity Project

