Using the Normalized Burn Ratio (NBR)

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29.06.2020

Reference:

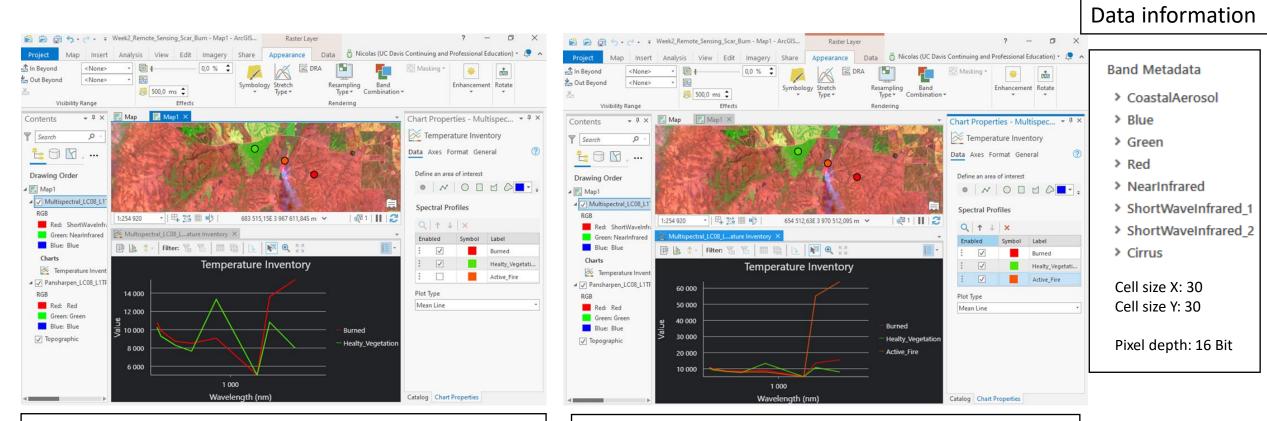
https://www.usgs.gov/land-resources/nli/landsat/landsat-8?qt-science support page related con=0#qt-science support page related con

https://sentinel.esa.int/web/sentinel/missions/sentinel-2

Outlining process

- Spectral profile for Landsat-8 and Sentinel-2 on Kangaroo island during fire
- Normalized Burn Ratio for the Landsat 8 and Sentinel-2 on Kangaroo island before and during fire
- Difference image that highlights the change between the two time periods for the Landsat-8 and Sentinel-2 imagery
- Spectral profile for healthy agricultural vegetation (crop circle) vs.
 bare earth for Landsat and Sentinel-2

Spectral profile for Landsat 8 OLI on Kangaroo island during fire on 09.01.2020



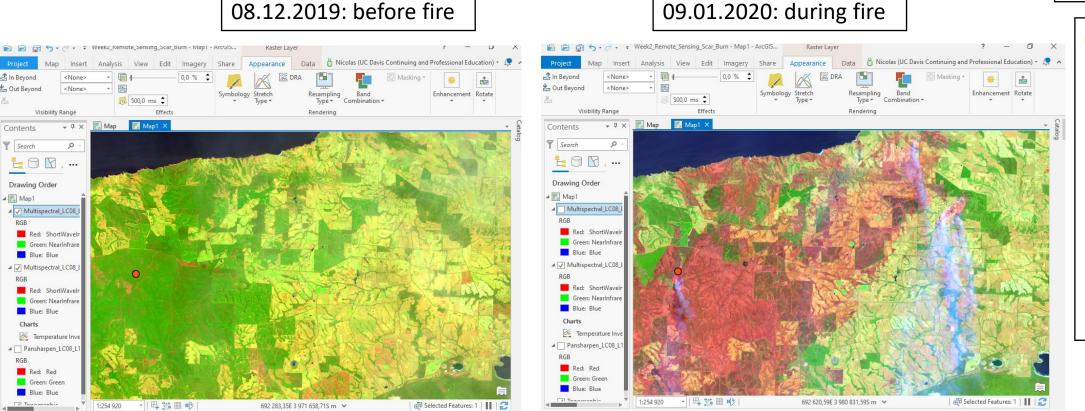
Spectral profile illustrating variable conditions:

- Burned
- healthy vegetation outside the range of fire

Spectral profile illustrating variable conditions:

- Fire
- Burned
- healthy vegetation outside the range of fire

Normalized Burn Ratio for the Landsat 8 on Kangaroo island before and during fire



Data information

- Band Metadata
- CoastalAerosol
- > Blue
- > Green
- > Red
- > NearInfrared
- > ShortWaveInfrared_1
- > ShortWaveInfrared_2
- Cirrus

Cell size X: 30 Cell size Y: 30

CC11 512C 1. 5C

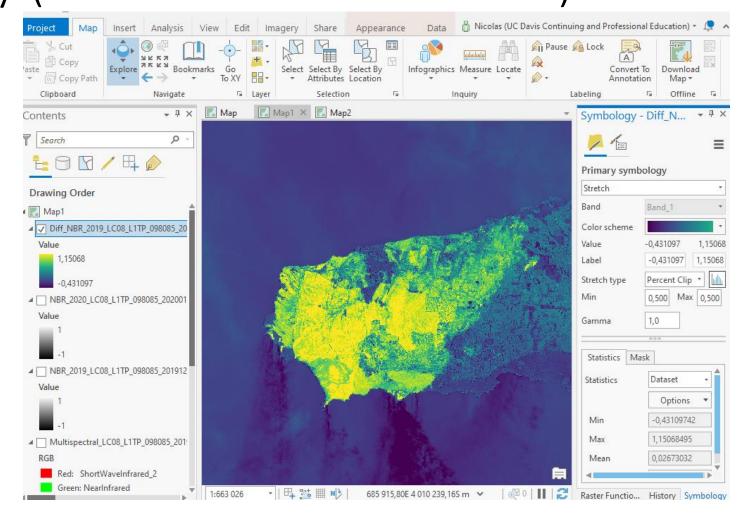
Pixel depth: 16 Bit

- Healty vegetation appears in green and burned area in red
- Difference is clearly visible before and after bushfire extension

Difference image that highlights the change between the two time periods for the Landsat 8 imagery (08.12.2019- 09.01.2020)

 With this new raster, we clearly can see the spread of the bushfire from West to East

 Lighter color shows higher difference between the two time periods



Data information

Band metadata:

Single band corresponding to difference between the NBR

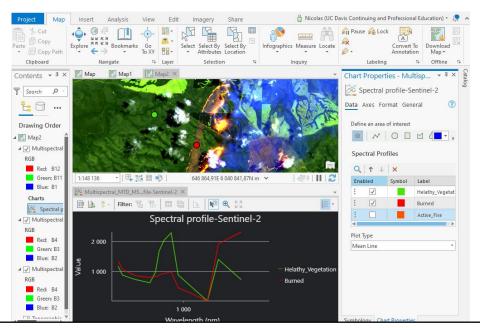
Cell size X: 30 Cell size Y: 30

Pixel depth: 32 Bit

Spectral profile for Sentinel-2 on Kangaroo island during fire on 31.12.2019

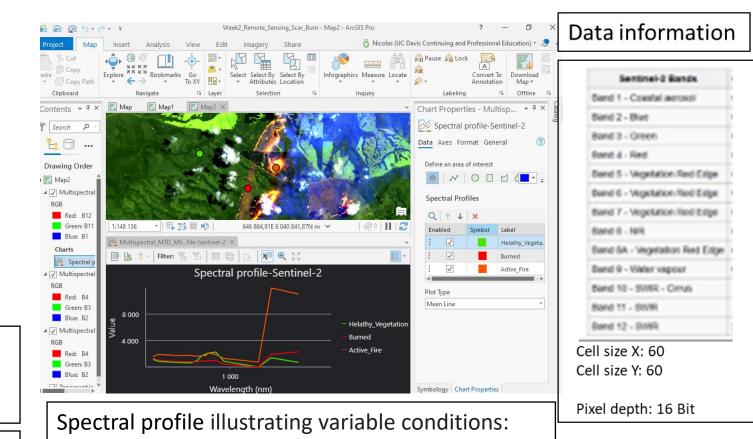
Fire

Burned



Spectral profile illustrating variable conditions:

- Burned
- healthy vegetation outside the range of fire
- The 3 red-edge bands are clearly visible on the healthy vegetation spectral profile which is different from Landsat data



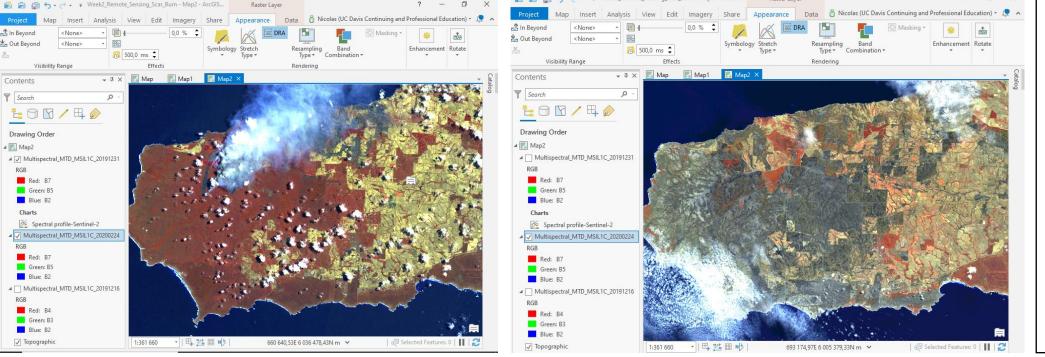
healthy vegetation outside the range of fire

Normalized Burn Ratio for the Sentinel-2 on Kangaroo at the start and during fire

31.12.2019: at the fire start

24.02.2020: during fire

Data information



Sentinel-Bilands

Band 1 - Coental serosol

Band 2 - Bluc

Band 3 - Green

Band 5 - Vegetation Red Edge

Band 6 - Vegetation Red Edge

Band 6 - Vegetation Red Edge

Band 6 - Vegetation Red Edge

Band 9 - Water vegetation Red Edge

Band 9 - Water vegetation

Band 11 - SWIR - Cerus

Band 11 - SWIR - Cerus

Band 12 - SWIR - Cerus

Cell size X: 60

Cell size Y: 60

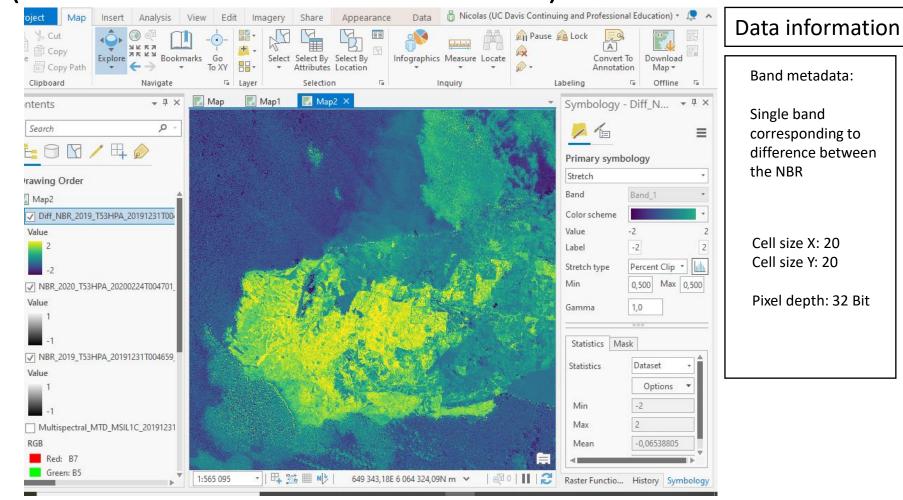
Pixel depth: 16 Bit

- Healty vegetation appears in red and burned area in black
- Difference is clearly visible at the start and after bushfire extension

Difference image that highlights the change between the two time periods for the Landsat 8 imagery (31.12.2019 - 24.02.2020)

 With this new raster, we clearly can see the spread of the bushfire from West to East

 Lighter color shows higher difference between the two time periods



Spectral profile for healthy agricultural vegetation (crop circle) vs. bare earth for Landsat and

Sentinel-2 08.12.2019 → → → Week2_Remote_Sensing_Scar_Burn - Map1 - ArcGIS... Raster Layer View Edit Imagery Share Appearance Data 🗓 Nicolas (UC Davis Continuing and Professional Education) 🕶 Enhancement Rotate Visibility Range Rendering Contents Chart Properties - M... ▼ 7 × Y Search Spectral Profile-Landsat LON/H Data Axes Format Gene ... ? Drawing Order 0 N O -- | 日本 🍱 III N | 707 301,83E 3 952 702,39S m ∨ | 🚭 0 | II | 🥃 ■ NBR_2019_LC08_L1TP_098085_20191208 Spectral Profile-Landsat Multispectral_LC08_L1TP_098085_2019 Plot Type Red: ShortWaveInfrared_1 Spectral Profile-Landsat Bare_soil ■ Multispectral_LC08_L1TP_098085_20200 Red: ShortWaveInfrared 2 Green: NearInfrared 1 000

16.12.2019 Analysis View Edit Imagery Share Appearance Data 🖞 Nicolas (UC Davis Continuing and Professional Education) 🔻 🔔 🔥 Enhancement Rotate 500.0 ms 🕏 Map Map1 Map2 x Chart Properties - M... * 7 X Spectral Profile_sentinel-2 t = 1 T ... Data Axes Format Gene 🚥 🕐 Define an area of interest **Drawing Order** 0 | 1 0 0 0 -■ Multispectral_MT RGB Spectral Profiles Red: B7 Ⅰ □ □ □ □ □ □ □ 726 630.24E 6 037 879.46N m 🗸 💮 Selected Features: 1 Green: B5 Blue: B2 Multispectral_MTD_MS...file_sentinel-2 × Agriculture Spectral profil Bare Soil Spectral Profile_sentinel-2 ■ Multispectral_MT Red: B7 4 000 Mean Line Green: B5 Blue: B2 ✓ Multispectral_M Bare_Soil Red: B11 Blue: B2 Charts Wavelength (nm

Landsat-8

• Sentinel-2

 We see that Sentinel-2 has a finer resolution to define healthy agriculture with red-edge bands