

2021 Burn Severity Mapping (Same Year Classification)

Burn severity mapping is performed using either Landsat-8 or Sentinel-2 satellite imagery to classify burned areas into four severity classes (unburned, low, medium, and high). This year Forest Analysis and Inventory Branch will begin the analysis in mid-September and run through mid to late October, based on the availability of suitable pre- and post-fire satellite imagery. Given the status of the current year's fires this may not start until mid-October.

Background:

- Burn Severity classification runs are done each year in the fall for fires greater than 100 hectares.
- Burn severity mapping is not recommended to be done during the most active part of the fire season due to changing fire boundaries and the possibility of new or expanding fires enveloping existing smaller fires.
- Pre-fire imagery can be collected for up to 2 years before the fire occurred, during the June 1 to September 30 window. If pre-fire imagery is from the same year that the fire occurred, it must be sourced from June 1 to the day before the fire started.
- Post-fire imagery is always from the same year the fire occurred, ideally after the fire is declared out; otherwise, after it has stopped growing & smoking; Ideally between June 1 and September 30, though early October imagery may be acceptable, assuming there is no snow cover and seasonal vegetation die off is not a concern. In situations where the fire was still active in late September and pervasive cloud cover inhibits post-fire image acquisition, early to mid-November may be used, these fires will be noted.
- Imagery must be free of cloud, shadow, smoke, and snow. Imagery from the same sensor is used for pre- and post-fire images for the same fire (i.e., Landsat-8 & Landsat-8 or Sentinel-2 & Sentinel-2).
- The standard output products include a file geodatabase and a symbolized layer file, as well as georeferenced PDF maps and a kmz file for each fire.
- This information will be made available as per attached availability document.
- The dataset available via the BC Data Catalogue (https://catalogue.data.gov.bc.ca/dataset?download_audience=Public) is NOT the "same year" classification; it is the "one year later" classification – a completely separate burn severity run that will need to be run this fall on last year's fires. Currently the "same year" classification is posted as above. So, while the data will be made publicly available, the distribution method is different.
- The burn severity methodology is based on the Burned Area Reflectance Classification (BARC) product developed by the United States Department of Agriculture (<https://fsapps.nwcg.gov/baer/fag>).
- Project lead: Marc Rousseau, Vegetation Update Group Team Lead (marc.rousseau@gov.bc.ca).

Methodology:

- Select suitable pre- and post-fire imagery or create a cloud/snow/smoke-free composite from multiple images,
- Calculate normalized burn severity ratio (NBR) for pre- and post-fire images,
- Calculate difference NBR (dNBR) where $dNBR = \text{pre NBR} - \text{post NBR}$,
- Apply a scaling equation,
- Apply BARC thresholds and create a 4-class image (unburned, low severity, medium severity, and high severity),
- Apply region-based filters to reduce noise,
- Confirm burn severity analysis results,
- Produce a vector dataset and apply Euclidian distance smoothing, and
- Publish the standard output products via Shared drive location access for internal (BC government) users, and FTP access for external (non-BC government) users.