Title	Google Earth Engine Burnt Area Map (GEEBAM)
Alternative title(s)	GEEBAM

Abstract

PLEASE NOTE:

__ GEEBAM is an interim product and there is no ground truthing or assessment of accuracy. *Fire Extent and Severity Mapping (FESM)* data should be used for accurate information on fire severity and loss of biomass in relation to bushfires.__

The intention of this dataset was to provide a rapid assessment of fire impact.

In collaboration with the University of NSW, the NSW Department of Planning Infrastructure and Environment (DPIE) Remote Sensing and Landscape Science team has developed a rapid mapping approach to find out where wildfires in NSW have affected vegetation. We call it the Google Earth Engine Burnt Area Map (GEEBAM) and it relies on Sentinel 2 satellite imagery. The product output is a TIFF image with a resolution of 15m. Burnt Area Classes:

1. Little change observed between pre and post fire
2. Canopy unburnt - A green canopy within the fire ground that may act as refugia for native fauna, may be affected by fire
3. Canopy partially affected - A mix of burnt and unburnt canopy vegetation
4. Canopy fully affected -The canopy and understorey are most likely burnt

Using GEEBAM at a local scale requires visual interpretation with reference to satellite imagery. This will ensure the best results for each fire or vegetation class.

Important Note: GEEBAM is an interim product and there is no ground truthing or assessment of accuracy. It is updated fortnightly.

Please see Google Earth Engine Burnt Area Factsheet

Resource locator

Show on SEED Web Map	Name: Show on SEED Web Map Protocol: WWW:DOWNLOAD-1.0-http--download Description: Display dataset on SEED's map Function: download
Data Quality Statement	Name: Data Quality Statement Protocol: WWW:DOWNLOAD-1.0-http--download Description: Data quality statement for Google Earth Engine Burnt Area Map (GEEBAM) Function: download
GEEBAM Web Map Service	Name: GEEBAM Web Map Service Protocol: WWW:DOWNLOAD-1.0-http--download Description: Link to TIFF imagery Function: download
Vegetation Index Web Map Service	Name: Vegetation Index Web Map Service Protocol: WWW:DOWNLOAD-1.0-http--download Description: WMS for dNVR Vegetation Index

	Function: download
Postfire Satellite Image Web Map Service	Name: Postfire Satellite Image Web Map Service Protocol: WWW:DOWNLOAD-1.0-http--download Description: WMS for Sentinel2 PostFire Satellite Image Function: download
PDF Burnt Area Mapping	Name: PDF Burnt Area Mapping Protocol: WWW:DOWNLOAD-1.0-http--download Description: Google Earth Engine Burnt Area Mapping Function: download
Download Package	Name: Download Package Protocol: WWW:DOWNLOAD-1.0-http--download Description: GEEBAM dNBR Classes v3.1 - TIFF for download Function: download
GEEBAM Factsheet	Name: GEEBAM Factsheet Protocol: WWW:DOWNLOAD-1.0-http--download Description: Information and Methodology Function: download

Unique resource identifier

Code	f3c6e3da-f356-43f9-b8df-19c2e7fc004a
Presentation form	Image digital
Edition	3.1
Dataset language	English

Metadata standard

Name	ISO 19115
Edition	2016
Dataset URI	https://datasets.seed.nsw.gov.au/dataset/f3c6e3da-f356-43f9-b8df-19c2e7fc004a
Purpose	To find out where and how wildfires in NSW have affected vegetation
Status	On going
Spatial representation type	grid

Spatial reference system	
Code identifying the spatial reference system	4283
Spatial resolution	50 m
Topic category	

Keyword set

keyword value	HAZARDS-Fire VEGETATION
Originating controlled vocabulary	
Title	ANZLIC Search Words
Reference date	2008-05-16

Geographic location

West bounding longitude	146.237694
East bounding longitude	154.273533
North bounding latitude	-37.786
South bounding latitude	-27.224148
NSW Place Name	Eastern NSW

Vertical extent information

Minimum value	-100
Maximum value	2228
Coordinate reference system	
Authority code	urn:ogc:def:cs:EPSG::
Code identifying the coordinate reference system	5711

Temporal extent

Begin position	2020-12-20
End position	N/A

Dataset reference date

Resource maintenance

Maintenance and update frequency	Unknown
Contact info	
Contact position	Data Broker
Organisation name	NSW Department of Climate Change, Energy, the Environment and Water
Telephone number	131555
Email address	data.broker@environment.nsw.gov.au
Web address	https://www.nsw.gov.au/departments-and-agencies/dcceew
Responsible party role	pointOfContact

Lineage

GEEBAM relies on a time series of Sentinel 2 images. Sentinel-2 (S2) is a wide-swath, high-resolution, multispectral imaging mission with a global 5-day revisit frequency. The S2 Multispectral Instrument (MSI) samples 13 spectral bands: visible and NIR at 10 meters, red edge and SWIR at 20 meters, and atmospheric bands at 60 meters spatial resolution. It provides data suitable for assessing state and change of vegetation, soil, and water cover. The SWIR bands at 20 meter mitigates smoke and haze in the atmosphere. The Google Earth Engine Burnt Extent Mapping (GEEBAM) represents the difference between the NBR (Normalized Burnt Ratio) before and after fire. It is based on a cumulative difference between imagery collected before the fires in July 2019 and the most recent imagery available from January 2020. The Normalized Burnt Ratio (NBR) NBR is an index designed to highlight burnt areas in large fire zones. The formula is similar to normalized difference vegetation index (NDVI), except that the formula combines the use of near infrared (NIR) and shortwave infrared (SWIR) wavelengths. Normalized Burnt Ratio Delta dNBR is the difference between the pre-fire and post-fire NBR (dNBR or ΔNBR). A threshold of dNBR is chosen through visual interpretation to create GEEBAM classes. A higher value of dNBR indicates increased likelihood that the area has burnt, while areas with negative dNBR values may indicate regrowth following a fire. The formula used to calculate dNBR is illustrated below: Results Thresholds have been selected based on air photo interpretation to summarise the data (Table 1). dNBR values can vary from case to case. Use at a local scale this requires visual interpretation with reference to satellite imagery and air photos in order to obtain the best results (Figure 1). A user may wish to use the thresholds or classes provided or they may choose to create their own classes. For example, a user may wish to create their own class of low dNBR values where there has been little change before and after fires.

We recommend that post-fire recovery activity use DPIE's Fire Extent and Severity Mapping (FESMv2) The DPIE Fire Extent and Severity Mapping (FESMv2) is trained and tested a on a set of 2017-1918 fire season case study fires. It also and offers an independent cross-validation assessment (i.e. predicting severity classification of new fires not used to train the model). The FESMv2 severity mapping consistently delineates severity class thresholds between fires with adherence to the API classification rules. It should be used in preference to GEEBAM where available.

Data type: 16bit unsigned raster (dNBR), 8bit unsigned raster (dNBR) with attribute table containing burnt area mapping classes, 16bit unsigned raster false colour Sentinel 2 image with 3 bands. Satellite Data: Sentinel top-of-atmosphere reflectance, Level-1C orthorectified top-of-atmosphere reflectance, dataset availability: 2015-06-23 – present. Pixel size 15m Base Imagery GEEBAM_v2p1_v6E_15m_20191201_20200105_b3.tif (pre-fire).

Limitations on public access

Responsible party

Contact position	Data Broker
Organisation name	NSW Department of Climate Change, Energy, the Environment and Water
Telephone number	131555
Email address	data.broker@environment.nsw.gov.au
Web address	https://www.nsw.gov.au/departments-and-agencies/dcceew
Responsible party role	pointOfContact

Metadata point of contact

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Metadata date

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Metadata language