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Impact of the 2019-20 Fires on the Proposed Gardens of Stone State Conservation Area (Newnes, Wolgan and Ben Bullen State Forests) Version 2

Report to Blue Mountains Conservation Society

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1. Introduction

The year 2019 was Australia's hottest and driest on record (Abram *et al.* 2021) and culminated in the catastrophic 'Black Summer' bushfires of spring and summer 2019-20. More than 23% of the temperate forests of south-eastern Australia were burnt in this one fire season, making the scale of the fires unprecedented both for Australia and globally (Boer *et al.* 2020). One of the worst affected areas was the Greater Blue Mountains World Heritage Area and surrounds, including the proposed Gardens of Stone State Conservation Area (SCA), which encompasses Newnes, Wolgan and Ben Bullen State Forests. The proposed SCA has a total area of 34,330 ha.

This report documents the extent and severity of the 2019-20 fires in the proposed SCA based on a QGIS analysis of spatial data from the NSW Government's Fire Extent and Severity Mapping (FESM) project (<https://datasets.seed.nsw.gov.au/dataset/fire-extent-and-severity-mapping-fesm>). FESM is a collaborative project between NSW Department of Planning, Industry and Environment and NSW Rural Fire Service. It is a semi-automated approach to mapping fire extent and severity through a machine learning framework based on Sentinel 2 satellite imagery (Department of Planning, Industry and Environment 2020).

An earlier version of the report (Smith 2020) was based on FESM Version 2 (19-3-2020) mapping. However, the FESM mapping has since been updated and the current FESM Version 3 (18-12-2020) is substantially different. For example, the estimated proportion of the proposed Gardens of Stone SCA burnt at extreme severity has increased from 6% (Version 2) to 34% (Version 3). It has thus been necessary to update the earlier report. Fire severity classes used in the FESM mapping are described in Table 1 and illustrated in Photos 1-4.

Table 1. FESM fire severity classification
(canopy scorch is when the leaves are killed by the heat of the fire but not consumed)

Severity class	Description	% foliage fire affected
Unburnt	Canopy and understorey both unburnt	0% canopy and understorey burnt
Low	Burnt understorey with unburnt canopy	>10% burnt understorey >90% green canopy
Moderate	Partial canopy scorch	20-90% canopy scorched
High	Complete canopy scorch (with or without partial canopy consumption)	>90% canopy scorched <50% canopy consumed
Extreme	Complete canopy consumption	>50% canopy biomass consumed



Photo 1. Extreme severity fire, Bell (complete canopy consumption)



Photo 2. High severity fire, Mt Tomah (complete canopy scorch)



Photo 3. Moderate severity fire, Narrow Neck Plateau (partial canopy scorch)



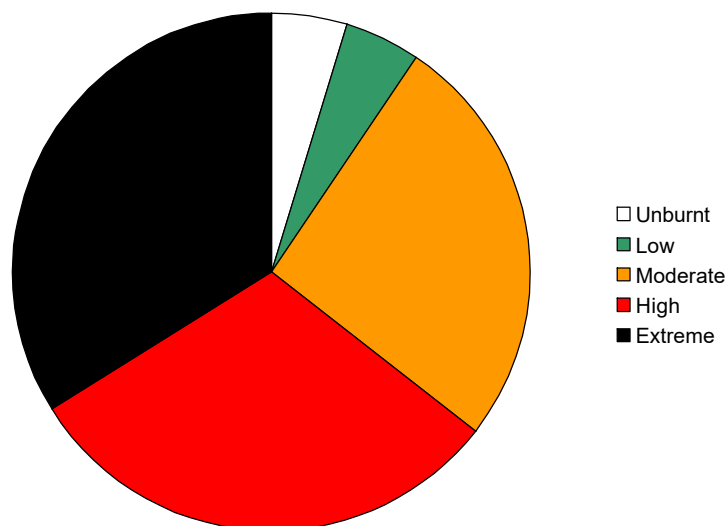
Photo 4. Low severity fire, Evans Lookout (understorey burnt, canopy unburnt)

2. Impact on Native Vegetation

Table 2. Impact of the 2019-20 fires on the proposed Gardens of Stone SCA (34,330 ha)

Fire severity	Area (ha)	Percentage of GOS SCA
Low	1,645	5
Moderate	8,988	26
High	10,423	30
Extreme	11,672	34
Total burnt	32,728	95
Unburnt	1,602	5

Figure 1. Severity of the 2019-20 fires in the proposed Gardens of Stone State Conservation Area



3. Impact on Native Fauna

Estimates of the numbers of animals impacted by the fires were obtained using estimates of fauna densities in NSW by Johnson *et al.* (2007). The majority of animals impacted are likely to have died as a result of the drought, the fires and the shortage of food, water and shelter after the fires.

Table 3. Fauna impacted in the proposed Gardens of Stone SCA (32,728 ha burnt)

Fauna group	NSW density per ha	Number impacted by 2019-20 fires
Mammals (excluding bats)	17.5	573,000
Birds	20.7	677,000
Reptiles	129.05	4,224,000
Total	167.25	5,474,000

References

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**Proposed Gardens of Stone State Conservation Area
(Newnes, Wolgan and Ben Bullen State Forests)
Impact of 2019-20 Fires (data source FESMv3 18-12-20)**

