

Assessing the Legacy Effects of Wildfire on Eucalypt Canopy Structure of South Eastern Australia

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Abstract : Fire-tolerant eucalypt forests are one of the major forest ecosystems of south-eastern Australia and thought to be highly resistant to frequent high severity wildfires. However, the impact of different severity wildfires on the canopy structure of fire-tolerant forest type is under-studied, and there are significant knowledge gaps in relation to the assessment of tree and stand level canopy structural dynamics and recovery after fire. Assessment of canopy structure is a complex task involving accurate measurements of the horizontal and vertical arrangement of the canopy in space and time. This study examined the utility of multitemporal, small-footprint lidar data to describe the changes in the horizontal and vertical canopy structure of fire-tolerant eucalypt forests seven years after wildfire of different severities from the tree to stand level. Extensive ground measurements were carried out in four severity classes to describe and validate canopy cover and height metrics as they change after wildfire. Several metrics such as crown height and width, crown base height and clumpiness of crown were assessed at tree and stand level using several individual tree top detection and measurement algorithm. Persistent effects of high severity fire 8 years after both on tree crowns and stand canopy were observed. High severity fire increased the crown depth but decreased the crown projective cover leading to more open canopy.

Keywords : canopy gaps, canopy structure, crown architecture, crown projective cover, multi-temporal lidar, wildfire severity

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