

Progress Report SP 2014-001

Understanding the changing fire environment of south-west Western Australia

Ecosystem Science

Project Core Team

Supervising Scientist	Lachie Mccaw
Data Custodian	Lachie Mccaw
Site Custodian	Lachie Mccaw

Project status as of July 11, 2016, 9:13 a.m.

Approved and active

Document endorsements and approvals as of July 11, 2016, 9:13 a.m.

Project Team	granted
Program Leader	granted
Directorate	granted

Understanding the changing fire environment of south-west Western Australia

L Mccaw, B Ward

Context

Fire environment is the resultant effect of factors that influence the ignition, behaviour and extent of fires in a landscape. These factors include climate and weather, topography, vegetation and fuel, and ignition. The climate of south-west Western Australia is becoming drier and warmer, and reduced autumn and winter rainfall is causing the landscape to become drier, thereby extending the duration of the traditional fire season. A combination of land use, socio-economic and organisational factors has resulted in more widespread extent of lands unburnt for two decades or more, increasing the risk of high severity fires with adverse impacts on the community and the environment. Much of the science linking interactions between climate, fire weather and fire behaviour was established in the 1960s and 1970s, and there is a need to review and update baseline information that underpins bushfire risk management and the program of planned burning undertaken by the Department. This project will draw upon data held by the Department and other organisations with expertise in climate and bushfire science.

Aims

- Provide an objective basis to review and revise management guidelines and practices based on past research and experience during wetter climate phases
- Provide contextual information for investigations of the role and effects of fire in the south-west Australian environment

Progress

- Preliminary analysis of trends in the Soil Dryness Index from 2000 to 2014 suggest that the duration of the peak dryness period when the Index exceeds 150 mm has increased by up to 30 days in the southern forests represented by Bridgetown and Pemberton observation sites. Observations from Pearce, Bickley and Rocky Gully show a reduced number of days in the peak dryness range. These trends would be explained by change in the spatial pattern of summer rainfall.
- The spread and behaviour of the Waroona bushfire in early January 2016 was reconstructed in order to identify significant fuel and weather factors that influenced the behaviour of the fire during different phases of its spread. Findings were presented to the Waroona Special Bushfire Inquiry in April 2016. Fire behaviour data have been made available to the Bushfire and Natural Hazards Cooperative Research Centre for a project on coupled fire-atmosphere modelling, and for a national project evaluating the performance of bushfire simulators.
- In conjunction with Warren Region and Fire Management Services Branch, an adaptive management program has been developed to facilitate and evaluate prescribed burning in young regrowth stands of jarrah and karri. Achievement of prescribed burning objectives is being monitored using ground-based methods and assessment of burn severity derived from satellite remote sensing, and where possible linked to existing Forestcheck monitoring.

Management implications

Understanding the factors that influence the location and timing of bushfire ignitions is important for developing effective management strategies to minimise the risks posed by unplanned fires, and to guide the level of resourcing required for bushfire suppression in different management areas. Lightning is an important cause of bushfire ignition in south-west Western Australia and the area burnt by lightning-caused fires has been disproportionately large relative to the number of ignitions during the past decade. Better understanding of the links between climatic

patterns and lightning ignition could provide advance warning of above-normal activity and the opportunity for improved preparation and resource deployment.

The increased occurrence of large and damaging bushfires in the past five years has led to a re-focus on the importance of managing fuels with prescribed fire. In order to achieve a safe and effective prescribed burning program there is a need to understand how weather and climate influence opportunities for burning, and how these opportunities may be changing over time.

Future directions

- Finalise and submit a manuscript analysing temporal and spatial patterns of lightning ignition for the Warren Region, and continue to investigate climatic factors associated with lightning ignition.
- Further analyse data to investigate trends in fuel moisture content and soil dryness during the past 30 years.
- Prepare a manuscript examining weather and fire behaviour during the Waroona bushfire in collaboration with co-authors from the Bureau of Meteorology.
- Monitor and report on the outcomes of the adaptive management trial of prescribed burning in regrowth forest.