

Predicting the probability of human caused bushfire days in south west management regions

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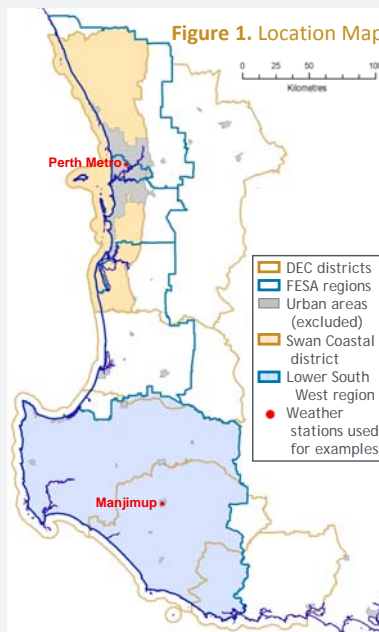
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Bushfire occurrence data from the Department of Environment and Conservation (DEC) and Fire Emergency Services Authority (FESA) have been compiled and used to develop models predicting the probability of a bushfire day (a day with one or more bushfires) for management regions in the south west of Western Australia.

Logistic regression models have been developed for 6 DEC districts and 4 FESA regions using bushfire occurrence data from both agencies from 1 July 2008 until 20 June 2011. The data was processed to contain only vegetation fires attributed to human activity that started outside of urban areas for the DEC "Swan Coastal district" and the FESA "Lower Southwest region" (shaded in Figure 1). The models for these areas utilised data from the Perth metropolitan and Manjimup weather stations respectively.

Models were constructed using weather and day-type variables. Three models were prepared: one for all human ignitions together; one that considered deliberate (arson) fires only; and one that considered deliberate and accidental fires separately.



Models for the example study areas contained the same two variables:

- "daily minimum profile fuel moisture content", calculated using the Matthews (2006) process-based fuel moisture model; and
- "work day", a day-type variable differentiating normal work days (i.e. week days) from weekend days and public holidays.

The distribution of daily minimum profile moisture content for days with and without human caused fires is illustrated in Figure 2. Figure 3 shows the effects of profile FMC on predictions and Figure 4 compares model predictions with observations from the 2010/11 fire season.

Future research

This work is currently focussed on developing models to predict daily bushfires occurrence at a regional scale. Spatial patterns of ignition will be examined in the next phase. Models developed from this data set (1 July 2008 – 30 June 2011) will be evaluated on new independent data from the same regions from 1 July 2011 – 30 June 2012.

Figure 2. Boxplots showing difference in minimum daily profile fuel moisture content (PFMC) on days with and without human caused fires

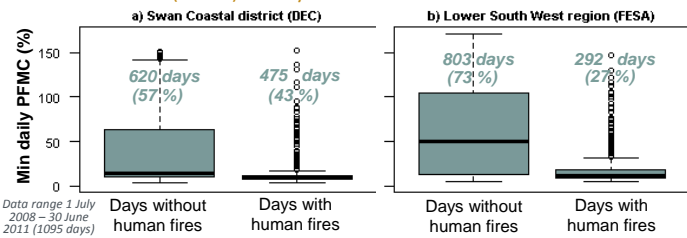


Figure 3. The effect of profile fuel moisture content and work day on the probability of a human caused fire day

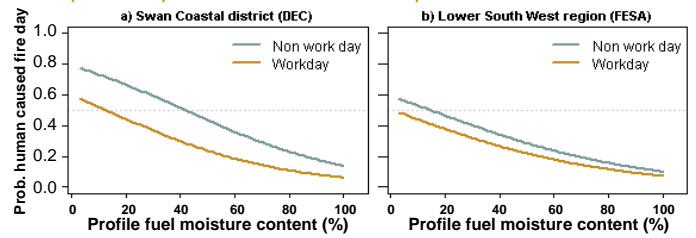


Figure 4. Comparisons of predictions from the three different methods with observations from the 2010/11 financial year

