FireDST: BUILDING COMMUNITY RESILLIENCE BY SIMULATING THE UNCERTAINTY IN BUSHFIRES.

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In 2011 the Bushfire CRC funded a major collaborative project called FireDST (Fire Impact & Risk Evaluation – Decision Support Tool). The project involves the Bureau of Meteorology, University of Melbourne, CSIRO and Geoscience Australia. This poster displays results from one of the major project achievements so far, the development of a proof of concept uncertainty driven interactive bushfire simulation tool. FireDST is based on the quantitative bushfire risk assessment framework that was developed to address the demand for improved bushfire risk information in Australia (Jones et al., 2012).

The FireDST tool has demonstrated the usefulness of producing, grouping and displaying a range of bushfire scenarios for any bushfire ignition. For example the ignition point may be uncertain so several different ignitions can be simulated. As well, there are always uncertainties in the fuel load and weather conditions. Each one of these uncertainties is simulated and the cumulative result can be displayed as a likelihood of the fire spread over an area of potential fire impact.

Figure 1 displays a FireDST result for the 2009 Black Saturday Kilmore fire and includes an ensemble of 30 scenarios constructed by examining the uncertainty in the forecast meteorology and ignition point. FireDST can also include vegetation uncertainty (i.e. type, load and dryness) as well as hybrid ensembles (weather and vegetation uncertainty). Figure 1 also shows that the actual fire reconstruction in yellow (Gellie et.al. 2012) is fully contained within the probabilistic fire spread. The user is able to refine this potential area as conditions change or as new information arrives. Figure 1 includes small graphs of the population potentially impacted by the FireDST model output. The graphs show the total population estimate, population over 65, under 5 years old and those in need of assistance. Figure 2 shows the ensemble impact information for the houses in the northern section of the Wandong postcode.

To build a picture of how resilient a community is likely to be to the impact of bushfires, we can aggregate multiple FireDST ensembles using the most likely bushfire scenarios. For instance we can use different fire weather for the worst known fire days with a credible range of fuel scenarios and differing potential ignitions across the landscape.

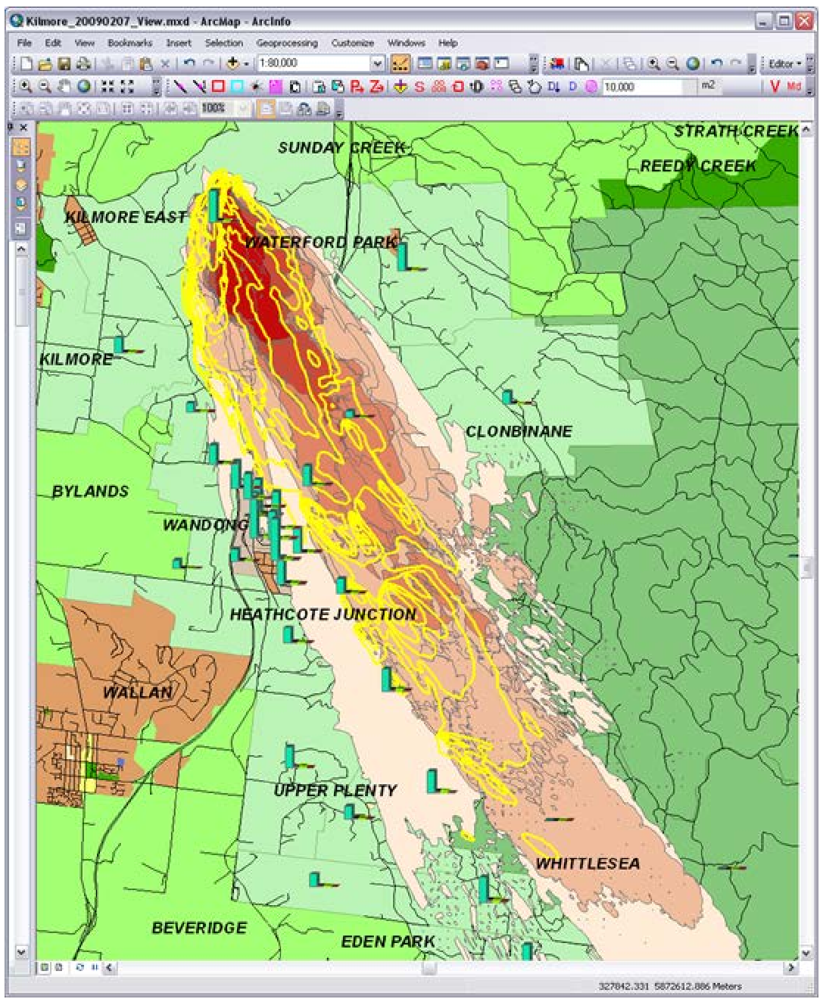

Figure 1. FireDST output for an ensemble of 30 scenarios to 15:45 with the actual fire reconstruction shown as the yellow isochrones. The probabilistic fire shape colours are cream (<=25%), light brown (>25% to 50%, brown (>50% to 75%) and red (>75% to 100%)

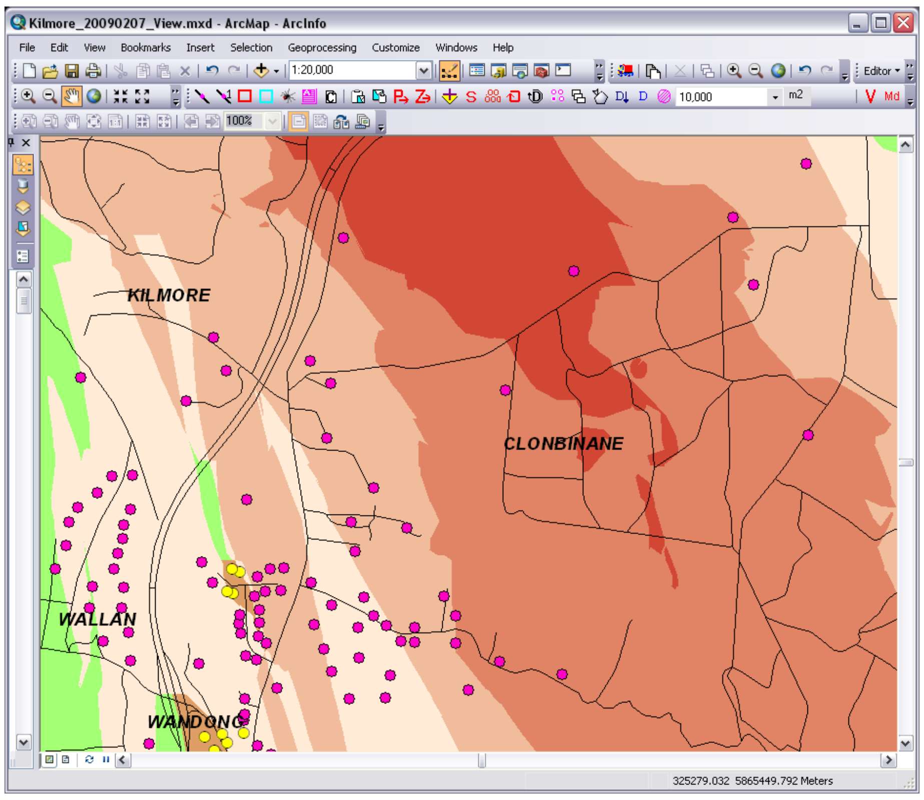

Figure 2 – FireDST probabilistic fire shape showing the simulated impact on houses to the north of Wandong. Houses marked in purple were simulated as destroyed in all simulations and yellow as undamaged in all simulations. There were no houses that were partially damaged or destroyed in this example.

References

Gellie, N., Gibos, K., Mattingley, G.,Wells, T., Salkin, O., "Reconstruction of the spread and behaviour of the Black Saturday fires, 7th February 2 009", Department of Sustainability and Environment, Government of Victoria, Draft Version 3.3, 4/4/2012.

Jones T., Woolf M., Cechet B., French I., "Quantitative bushfire risk assessment framework for extreme fires", Australian Meteorological and Oceanographic Journal 62 (2012) pp171-178.

Further information on the project can be obtained at www.bushfirecrc.com/projects/2-1/risk-assessment-decision-toolbox

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