Supporting Information

The grass fuel properties used for the fuel break

Table S1. The specifications of the M-1 (mixed wood) and O-1b (grass) fuel types used in the Prometheus model.

M-1		**O-1b (for landscape)**		**O-1b (for WUI fuel break)**	
Tree height	13 m	degree of curing	60%	degree of curing	10/30/50%
Canopy base height	6 m	fuel load	3.5 t ha^{-1}	fuel load	1.7/3.5/7 t ha^{-1}
Crown fuel load	0.8 kg m^{-2}				
Foliar moisture content	120%				

WRF model verification

Slightly underestimated 2-m air temperature and overestimated 2-m RH values in the WRF forecast model for the Jarbo Gap RAWS location in our study are in good agreement with the WRF simulation with 444 m horizontal grid spacing presented in [28].

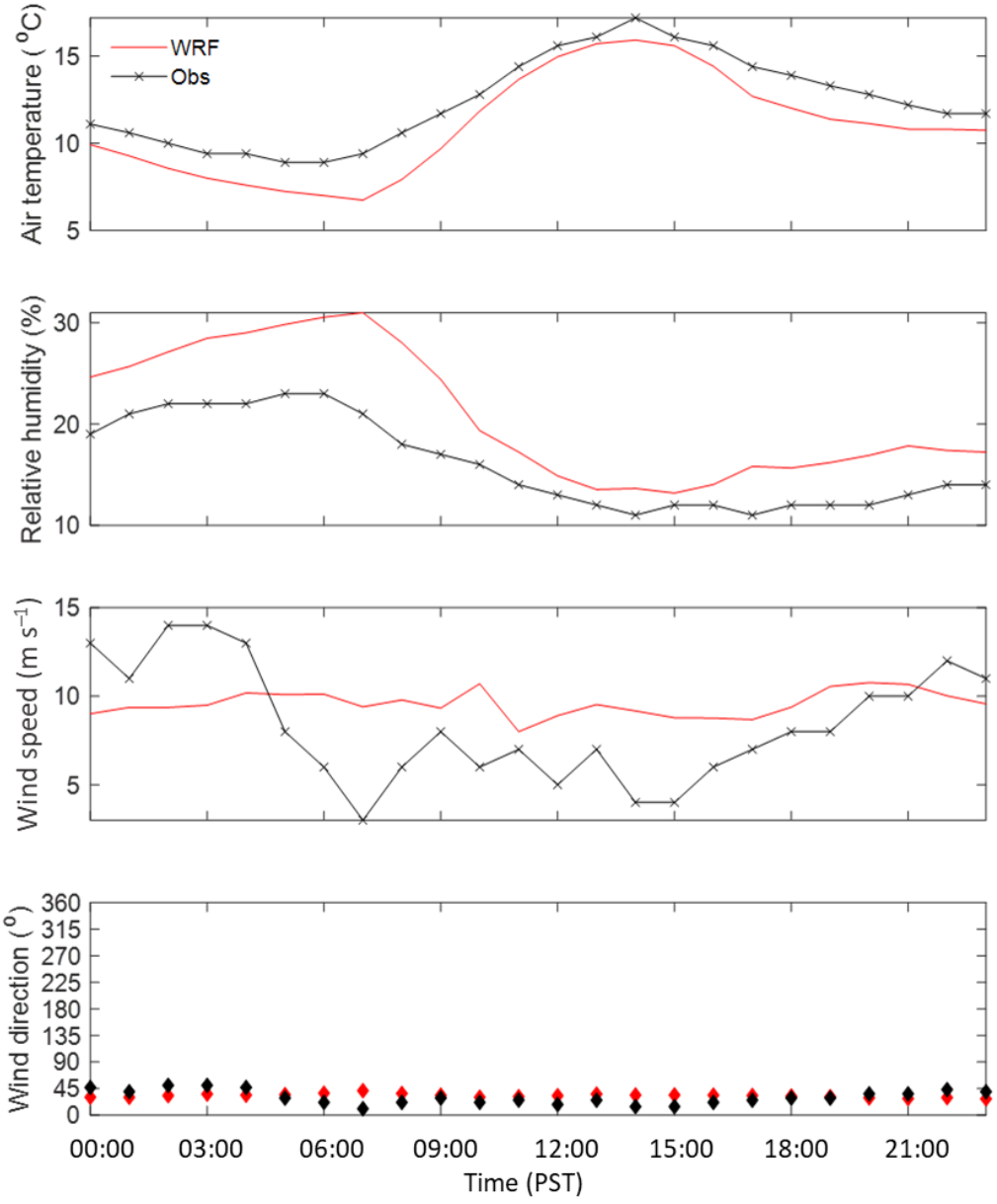

Figure S1. Observed weather data at Jarbo Gap weather station vs. WRF output at the nearest grid point for a sample diurnal cycle. The dashed red vertical line indicates approximate fire ignition time.

Vertical wind profiles of the WRF simulation near the ignition point

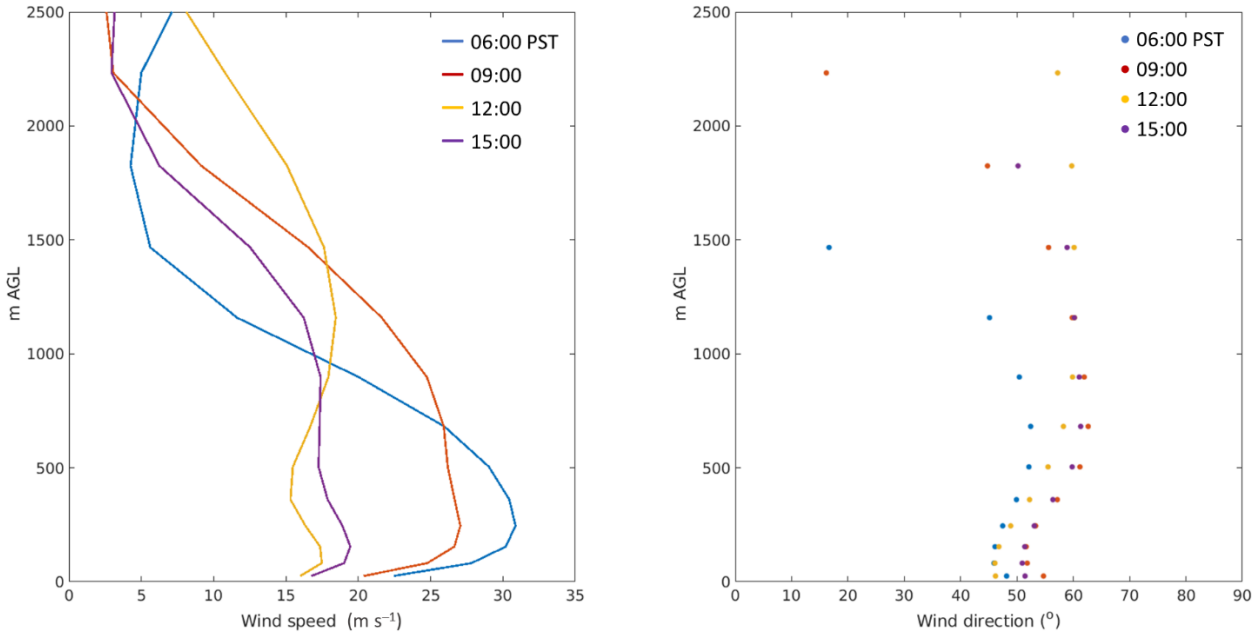

Figure S2. WRF simulation of vertical profiles of (left) wind speeds and (right) wind directions at the upwind weather stream location between 06:00 and 15:00 PST on 8 Nov 2018.

Impact of non-burnable housing structures on fire spread simulations

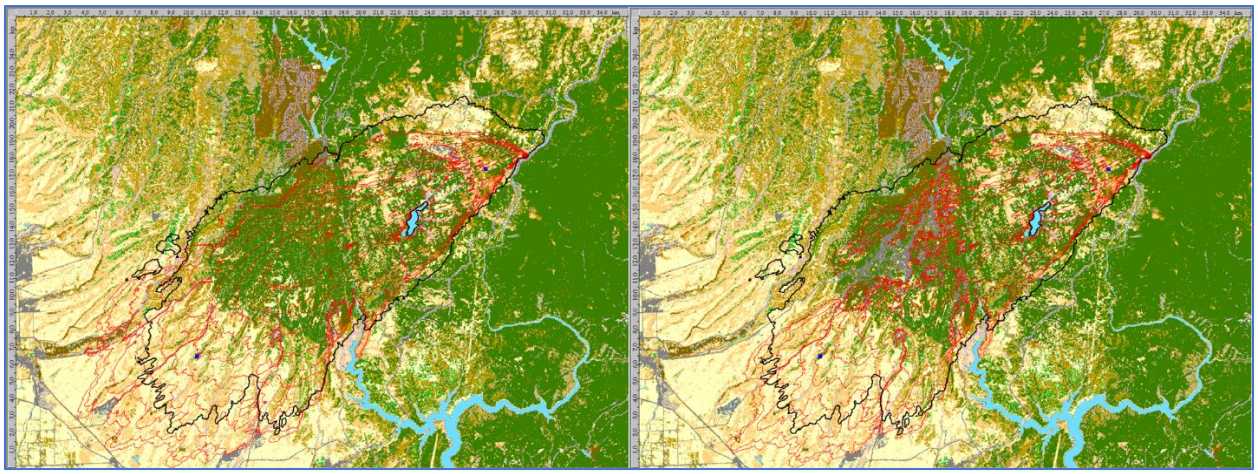

Figure S3. Fire growth simulations (red contour lines) using a fuel patch that replaced non-burnable fuel type (grey color) with a M-1 (90% percent conifer value) fuel type (left) and without a fuel patch (right). The solid black outline shows the observed burned perimeter at 18:00 PST.

Dominant fuel types inside the observed burn perimeter

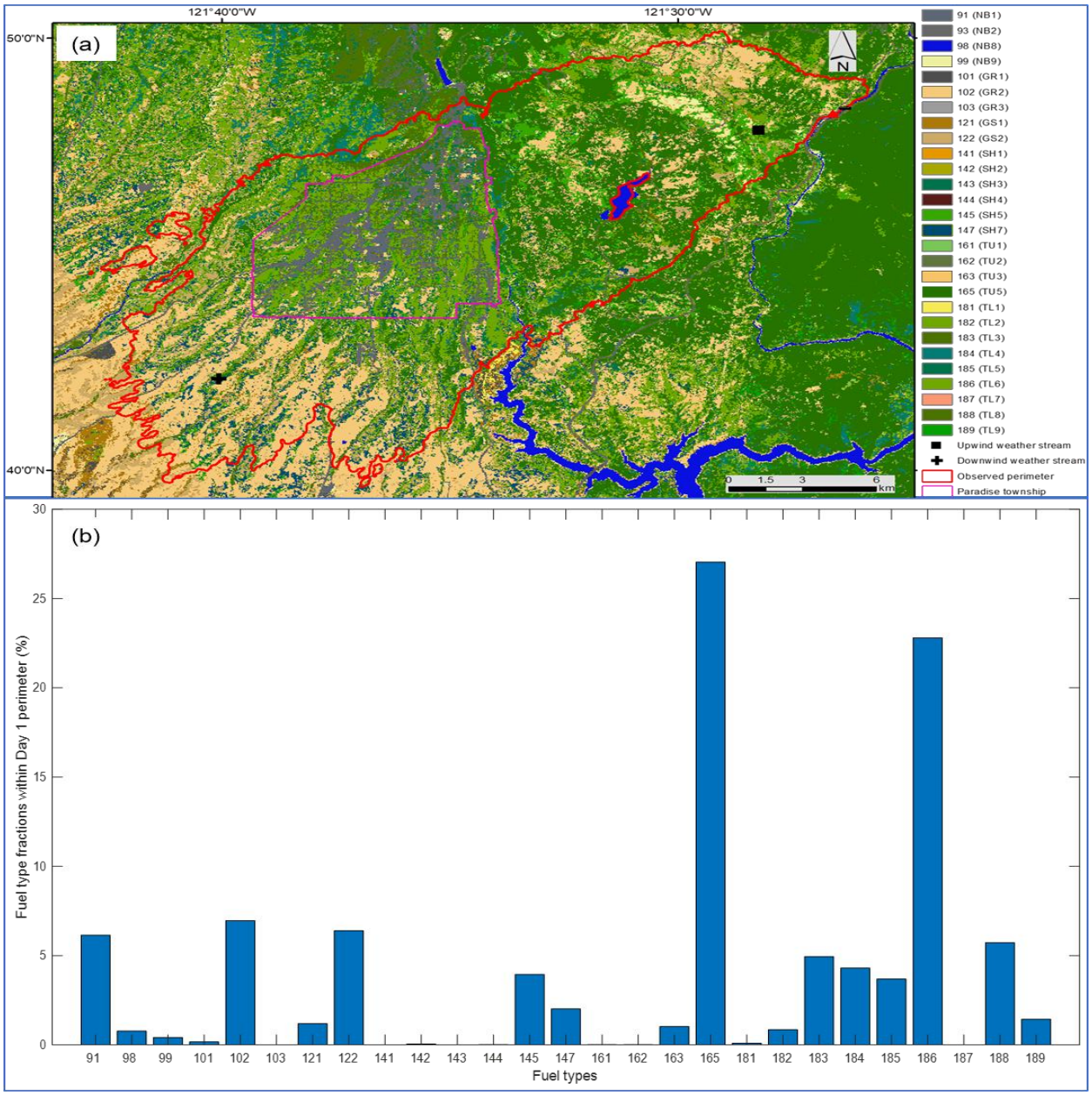

Figure S4. (a) Vegetation map of the study area created using Scott and Burgan fuel model data downloaded from the LANDFIRE website. (b) a fuel distribution inside the observed burn perimeter (red contour outline in (a)).

Impact of FFMC on fire spread

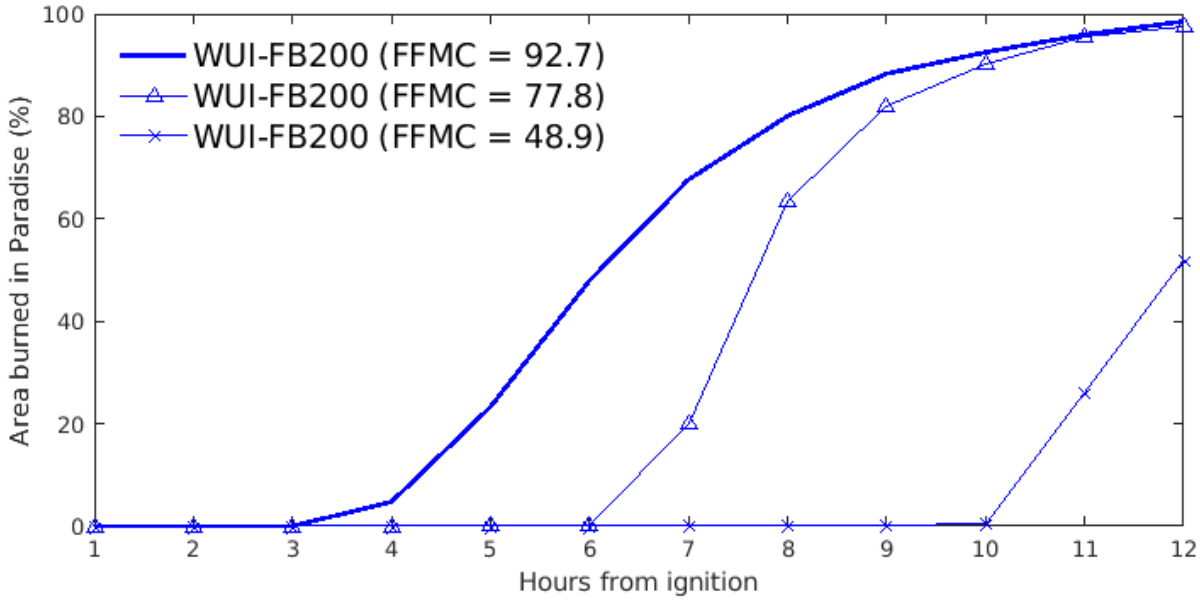

Figure S5. Percent of area burned in Paradise (inside the magenta polygon in Figure 1) vs. time after ignition in hours for the 200 m WUI fuel break runs with different FFMC values.