Predictive Simulation as a Key Component of an Early Warning System

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For simulation to be used within an Early Warning System to predict the future position of a bushfire, we require that a simulation system be readily usable and generate results rapidly. Simulations must be **fast**, and must be able to be run **immediately** a fire location is known.

With collaborators from the WA land administration authority (Landgate), we have implemented a proof-of-concept Simulation System within ArcGIS using the UWA fire spread simulation software. The key characteristics of the system are **preparation**, **automation** and **fast execution**.

1

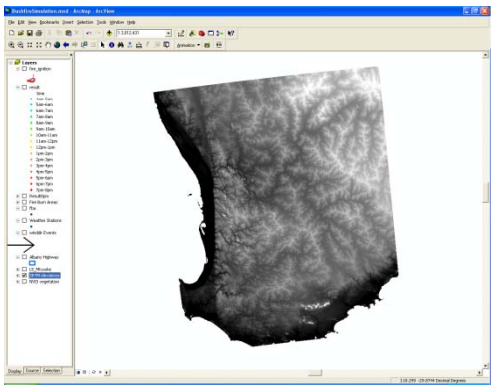
Data sets required for fire spread simulation are prepared and maintained prior to operation. These include:
- topographic maps
- vegetation maps
- fuel load maps
- a rate-of-spread calculation model for each vegetation type

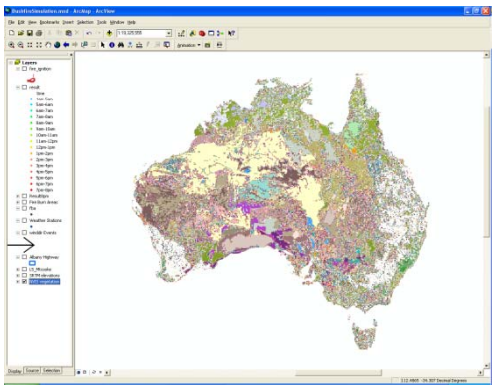
2

During a fire additional data is input:
- current and forecast weather for the area – downloaded automatically from the Bureau of Meteorology
- ignition locations and times (or current fire front location) – entered manually into GIS

3

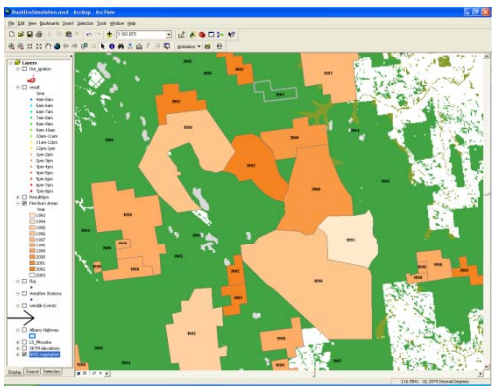
The simulation is then run. The primary output is a fire spread prediction map, showing the location of the fire front a specific future points-in-time (see map on right). As simulation run time is approximately 2-3 minutes, steps 2 and 3 can be repeated as often as new data becomes available.

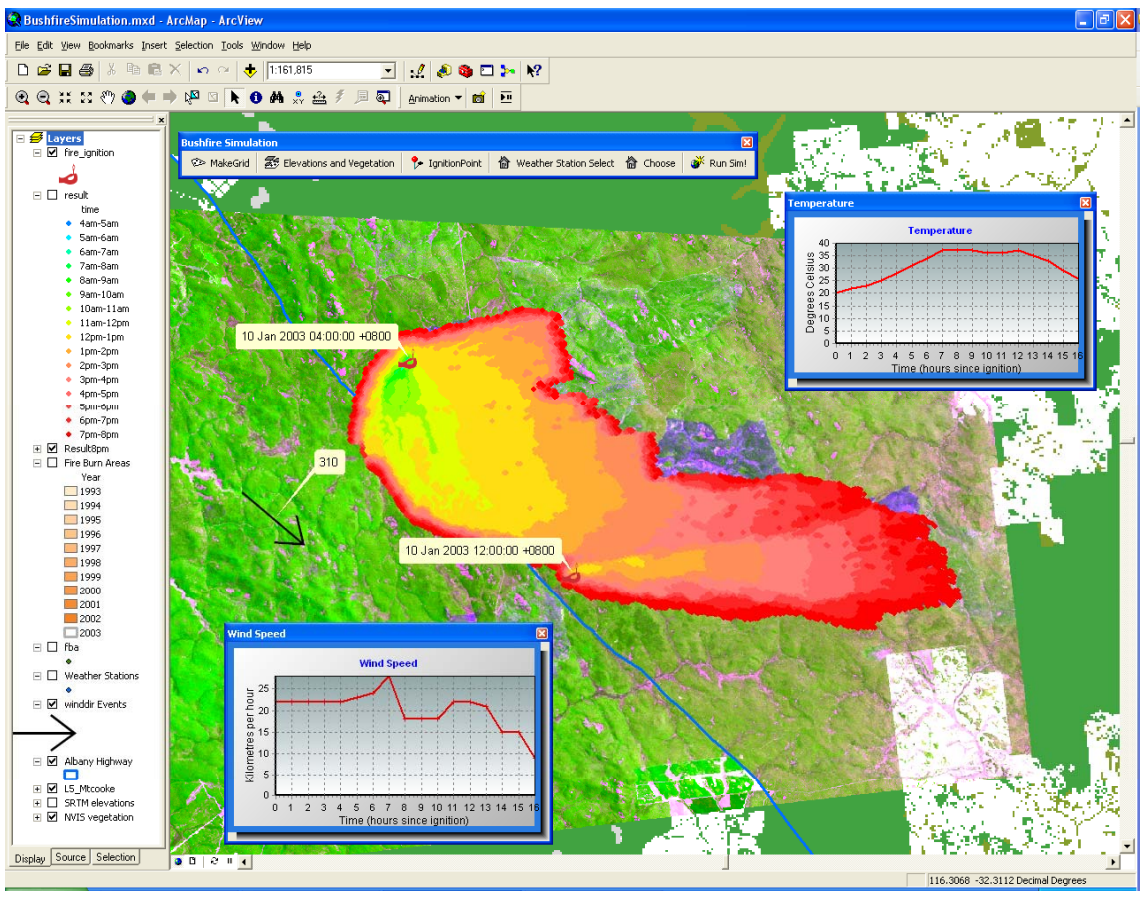




Shown here are examples of pre-prepared maps: land elevation (above), vegetation type (top right) and time-of-last-burn (right).

The output of an example simulation run is shown below.





As the output fire spread map is generated within the GIS, it can be manually reviewed and/or automatically passed on to the alert component of an Early Warning System.