

NEW DECISION SUPPORT TOOLS FOR AERIAL SUPPRESSION

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OVERVIEW

Aircraft are most effective for wildfire suppression when they are deployed quickly. Often the decision to deploy aircraft is made too late and they are of limited benefit to fire containment. Occasionally they are deployed to fires when they are not needed. Two decision tools are being developed to assist those responsible for dispatching aircraft to newly detected wildfires to quickly determine if aircraft will have a positive effect on fire containment. Draft versions of these tools are currently being evaluated. The fire containment decision tools predict the probability of containing a single fire with and without aircraft present. Differences in the calculated probabilities can be used to determine if the benefit of deploying aircraft is significant and justify deployment.

There are two versions of the tool:

Fire containment guide: A booklet containing tables and graphs for estimating the probability of fire containment based on inputs known once the location of a new fire is known;

Fire containment calculator: A computer based (Microsoft excel) application where users can enter fire related variables to generate specific probabilities of fire containment for 3 scenarios.

The tools were developed from a database of more than 500 Australian wildfires that involved aerial suppression. Logistic regression models were used to give estimates of the probability of fire containment within 2, 4, 8 and 24 hours from initial attack for fires burning in grass, forest and shrub dominated fuels. The tools assume that appropriate number of resources is sent to each fire as the models do not account for resource capacity.

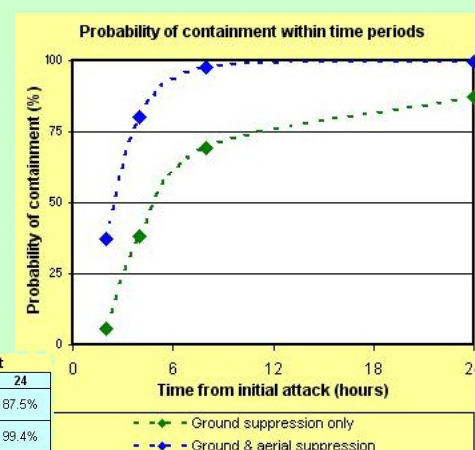
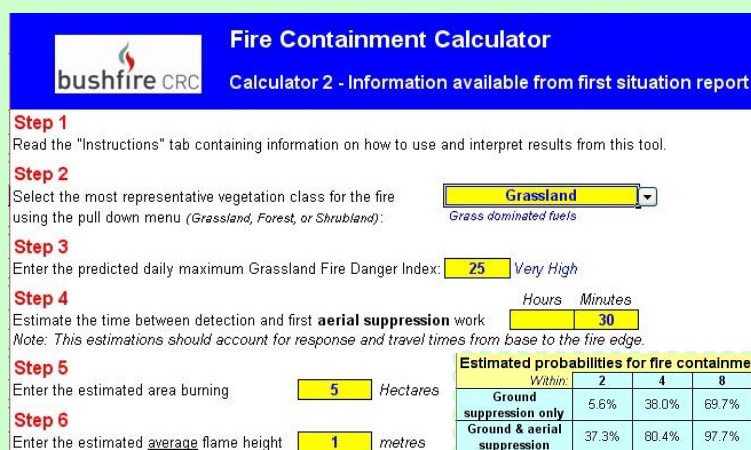
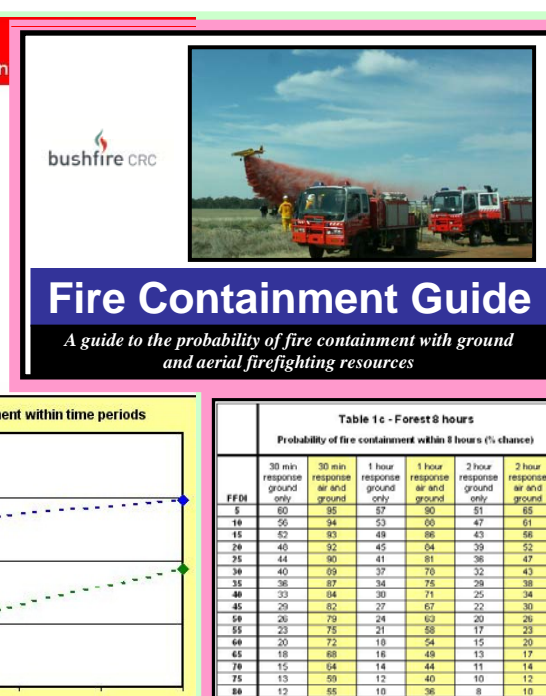
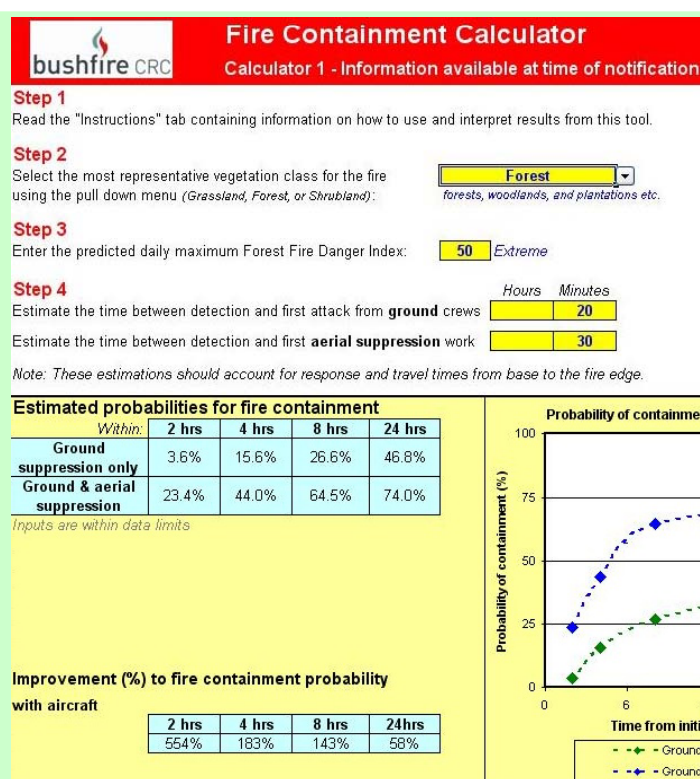
Evaluation copies can be obtained by emailing Matt Plucinski: matt.plucinski@csiro.au

THE DEPLOYMENT DECISION PROCESS

The fire containment tools only give estimates of the benefit of aircraft based on the probability of fire containment. Aircraft can also be of benefit in non-containment roles such as in property protection. A list of considerations for deploying aircraft is given below. The containment tools assist with step 2. Aircraft may still be worth deploying when their impact on containment is minimal if they can assist with reducing the fires impact on the community.

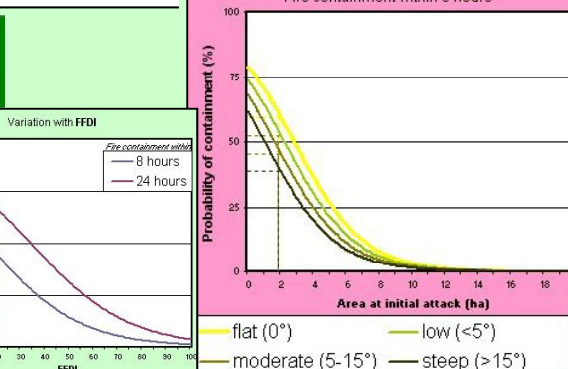
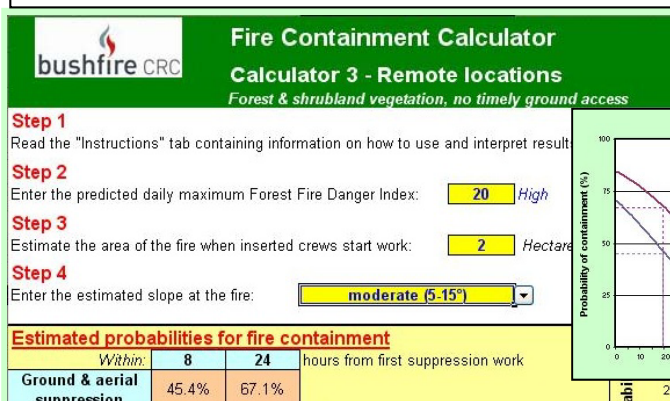
- Step 1) Assess practicality** - are aircraft an option? Consider issues such as aircraft availability, weather, safe flying conditions. *If the conditions are not practical go to step 6.*
- Step 2) Assess the probability of containment success** - will aircraft improve the probability of containment? Consider issues such as fuel and weather. *Use fire containment guide or calculator to estimate the probability of success.*
- Step 3) Consider community impact** - is there a risk to life, property, or environment that aircraft could lower?
- Step 4) Task the aircraft** - can aircraft be integrated with other resources in the incident action plan?
- Step 5) Address sustainability issues** - have the other issues such as the needs of ground support and air operations team, community information and cost been addressed?
- Step 6) Document decision** - for accountability requirements and future reference.

If steps to 1,4,5, 6 and either or both of 2 and 3 are satisfied, then deployment can be justified



FIRE CONTAINMENT CALCULATOR

The format of the fire containment calculator allows for three different scenarios to be considered based on the available input information. The first scenario considers a newly reported fire with some location information. Predictions for the first scenario are made using maximum daily fire danger index and estimates of time between detection and initial attack for aerial and ground resources. The second scenario represents a time when there is more information is available on the fire, allowing additional inputs (flame height and area burning) to be used. The third scenario is designed for fires in remote locations that cannot be easily accessed from the ground. Containment probability estimates for the third scenario are made using maximum daily fire danger index, area burning at initial attack and slope. Graphs showing the effects of each input parameter are used to illustrate their influence on containment probability. Tables list the estimated probabilities for fire containment with and without aircraft and the percent improvement aircraft make to the probability of containment within four time classes (2, 4, 8 & 24 hours) See examples of the input pages.



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