**Bushfire risk management**

Hi, my name is Susanna Billous and I work for the New South Wales Rural Fire Service in the Bushfire Risk Management Planning Team. The Rural Fire Service is one of the key bushfire authorities in New South Wales, which is a state in the southeastern corner of Australia.

Coordinated fire management in New South Wales is set out under the Rural Fires Act 1997. The Rural Fires Act establishes Bushfire Coordinating Committee. The Bushfire Coordinating Committee is a committee that has representatives from the key land management agencies, firefighting authorities, and emergency services, and it establishes the Bushfire Management Committees, which are the local committees that also have representation from those local bushfire management authorities, land management agencies, and firefighting agencies.

There are 52 bushfire management committees in New South Wales, and each of these committees has a number of responsibilities under the Rural Fires Act.

One of those responsibilities is the development of a bushfire risk management plan. Now, the objective of a bushfire risk management plan is to assess the bushfire risk to all asset types within a committee area and develop treatment strategies to reduce or mitigate those bushfire impacts.

The treatment strategies identified in the bushfire risk management plan are then implemented by the Bushfire Management Committee members over a five-year period.

The bushfire Risk Management plan is a legislative document, so the committee members and agencies have a responsibility to carry out the treatments set out within that plan.

My team within the Rural Fire Service sets out the policy and procedures for the development of a bushfire risk management plan, and we support the committees to undertake and develop their plans.

The Bushfire Management committees are provided with quantitative data that helps them to understand bushfire risk.

We use an ignition probability Model to identify ignition points within the landscape. Our probability model looks at the incidents of ignitions from lightning as well as human induced. We run every ignition through a fire simulation model many times under a number of different weather scenarios. We use Phoenix Rapid Fire as our fire characterization model, and this gives us an understanding of potential fire behavior.

The orange colors in this animation are showing potential fire intensity or flame height, and the red colors are showing spotting distance by running thousands of ignition points under lots of different weather scenarios. We can start to understand the potential fire behavior across a bushfire management committee area.

We then map all of the assets in a bushfire management committee area that is the residential assets special fry protection purpose such as schools, hospitals, nursing homes, economic assets such as agriculture, utilities, power lines, plantations, and in commercial and industrial areas, as well as environmental assets such as threatened species and cultural assets such as Aboriginal assets and sites. We use a Bayesian network model to determine the potential impact on each of our asset types.

So we look at the vulnerability of our different asset types and we determine a risk rating. We produce a series of maps which show the current risk for each asset group. So there's a risk map that shows the risk to human settlement. There's a map that shows the risk to environmental assets, one for cultural assets and one for economic assets. This is an example of the residential or human settlement risk. The map on the left shows the risk to residential houses in the Coffs coast bushfire management area. Red grid squares show the highest probability of risk. Orange is high, yellow is moderate, purple is low, and blue is lowest.

These maps are produced at a landscape scale, and so they give a bushfire management committee an understanding of the probability of risk at a landscape scale. They're not intended to be used for individual household assessments.

The map on the right shows how that risk might change or increase over a five year period. The only difference between the two maps is the fuel load, so over the five year period, we increase the fuel load to determine what the risk might be if no wildfire or hazard reduction treatments were undertaken.

These maps that are produced for each asset category help a bushfire management committee to understand their bushfire risk.

However, however, we have to balance these risk maps with local knowledge and experience. So each bushfire management committee is given their risk maps, but then reviews those risk maps and adds their local knowledge. For example, vulnerability of populations, access to houses, so areas that have only one road in and one road out. They also have locally important environmental species that might not have been considered in the data. It is really important for the Bushfire Management Committees to add their own knowledge to this data and to create a plan that's locally relevant and also practical to develop a bushfire risk management plan.

The Bushfire management committee first identifies focus areas. You can see the areas in yellow on the left that are the focus areas for the Coffs Coast Bushfire Management Committee. These are areas that the Bushfire Management Committee has identified as being of significant risk and required treatment in their five-year plan. It is impossible to reduce the risk across a whole bushfire management committee area, so the Bushfire Management Committee prioritize these areas for each of those focus areas.

The Bushfire Management Committee identifies treatment strategies that will reduce the risk. Their treatment strategies are high level objectives such as community preparedness or engagement, fire trails, pre-incident plans, ignition prevention programs, and of course hazard reduction burning.

The Bushfire Management Committee maps out their fuel management plan, so you can see the map on the right shows where the Bushfire Management Committee proposes to undertake fuel management treatments such as prescribed burning.

The bushfire management committees also maps the mechanically cleared areas, which are called asset protection zones.

We put their proposed fuel management treatments back into the computer model, and we can look at the potential effectiveness of those treatments. We can assess where risk might be reduced as a result of those fuel managed areas.

So the focus areas have specific treatment strategies, but the whole bushfire management committee has a fuel management plan.

So if we look at our ignition model, again, we map all of the probable ignition points and we run them all through a fire simulation model.

We use a Bayesian network model to determine risk for each of the asset groups. This is the residential risk with orange and red being the highest, and this is the environmental risk for that same area.

Bushfire management committee identify focus areas or areas of concern, and they identify key treatment, treatment strategies or objectives to reduce the risk in those areas. They map their fuel management plan, which is the blue and green areas. These are the areas that will be burnt in the five year period.

We then run the model again, but this time with reduced fuel areas in place, and we can get maps that show where risk is being reduced as a result of that fuel management plan. This allows a bushfire management committee to evaluate their fuel management plan and determine whether it needs to be changed.

The final product is a five year bushfire risk management plan. The plan includes a series of maps which throw the current risk for each asset type. It includes the focus areas, a description of why they have been identified as a focus area, and what the treatment strategies will be in those focus areas. And it also includes a fuel management register. That is the five year plan of our fuel management program, which includes our burns, our fire breaks, and our asset protection zones.

This plan goes on public exhibition for 42 days, and so the community can comment and provide feedback on the plan. The community's feedback is considered by the Bushfire Management Committee before the Bushfire Management Committee endorse the plan.

That plan then goes to the state level bushfire coordinating committee for approval once signed off or approved. This plan becomes a legislative document under the Rural Fires Act, and therefore the Bushfire Management Committee members have a responsibility to undertake the treatments within the plan.

These plans are coordinated plans that help us to understand bushfire risk and identify risk mitigation strategies or treatments. All of our bushfire risk management plans are available on the Rural Fire Service website.

Please see the link in the slide below. Thank you.