

TRANSCRIPT

STANDING COMMITTEE ON THE ENVIRONMENT AND PLANNING

Inquiry into fire season preparedness

Melbourne — 7 July 2016

Members

Mr David Davis — Chair

Ms Harriet Shing — Deputy Chair

Ms Melina Bath

Mr Richard Dalla-Riva

Ms Samantha Dunn

Mr Adem Somyurek

Ms Gayle Tierney

Mr Daniel Young

Participating Members

Mr Greg Barber

Mr Jeff Bourman

Ms Colleen Hartland

Mr James Purcell

Mr Simon Ramsay

Staff

Secretary: Mr Keir Delaney

Witnesses

Dr Richard Thornton (sworn), CEO, and

Mr David Bruce (sworn), Communications Manager, Bushfire and Natural Hazards Cooperative Research Centre.

The CHAIR — I declare open the hearing of the Standing Committee on the Environment and Planning on bushfire preparedness and welcome Dr Richard Thornton and Mr David Bruce from the Bushfire and Natural Hazards Cooperative Research Centre. I am going to ask the secretary to swear you in in the first instance and then we will ask for a short statement. I think you have circulated a printed version of that, but I think we should probably hear it in any event and then we will ask some questions. I appreciate your attendance. Can I ask you to just step through your statement, either as formal words or in an informal presentation.

Dr THORNTON — Thank you. Mr Chairman and committee members, thank you for inviting the Bushfire and Natural Hazards Cooperative Research Centre, or CRC, to appear before you today. First, let me introduce myself. I am the CEO of the organisation, Dr Richard Thornton, and accompanying me is Mr David Bruce, who is our communications manager. I would like to say a few words about us and to reinforce some of the messages that we have made in our submission, which I will make an assumption you have all had a chance to read.

Let me start by outlining who we are and note some of the important relationships we have in Victoria. The Bushfire and Natural Hazards CRC is a research centre registered as a not-for-profit public company limited by guarantee. We are funded under the commonwealth government's Cooperative Research Centres Program from the Department of Industry, Innovation and Science. We started operations in July 2013 and will receive \$47 million over eight years from the commonwealth. This is being matched by funding, cash and in-kind, from our other partners. These partners include all state and territory governments, either as a whole-of-state or through specific agencies.

The partners also include non-government organisations, such as the Australian Red Cross, RSPCA Queensland, Volunteering Queensland, the Australasian Fire and Emergency Service Authorities Council, or AFAC, which also made a submission to this inquiry, and the Fire Protection Association of Australia, as well as many research organisations, including universities, the Bureau of Meteorology and Geoscience Australia. We have more than 200 researchers and 50-plus research students in all states and territories in the centre.

In relation to this inquiry I would just like to declare that we receive funding from the following Victorian government agencies — the MFB, the CFA, the Department of Environment, Land, Water and Planning, Emergency Management Victoria and the Inspector-General for Emergency Management. We also conduct an extensive research program for DELWP under contract, focusing on bushfire issues. I would also like to note that Commissioner Craig Lapsley is a member of our board.

The Bushfire and Natural Hazards CRC has a focus on all natural hazards except those that relate to health and animals. We are also built on the 10 years of research of the previous Bushfire CRC. Indeed I was the research director and deputy CEO of that organisation prior to 2013. While we have a broad-based focus, the bushfire threat to Australia is one of our core hazards, and we spend roughly 20 per cent of our budget addressing this hazard specifically and around 80 per cent when non-specific hazard research is included. We are guided in our work by the National Strategy for Disaster Resilience and focus on nationally significant, systemic and large-scale problems in the natural hazards arena.

Turning to our submissions, there are a number of points I would like to emphasise. Bushfires in Australia, and in Victoria in particular, are a natural, inevitable and vital part of the environment. Our vegetation has evolved with, and indeed promotes and requires, fire as part of its life cycle. This is only a problem as a result of us placing things that we value in the way and not reducing fuel levels until unplanned fires on 'code red' days lead to catastrophic outcomes. That does not mean we cannot do something about their impact; it is just that we have to accept that we cannot eliminate fires from the environment. Indeed nor is that desirable.

What does this mean in practice? We the Bushfire and Natural Hazards CRC consider that any discussion relating to bushfire risk must be seen as one which includes all parties — public and private — across all land tenures. This work must focus on the mitigation of the impacts of fires and building community resilience. This can be achieved using a combination of approaches.

Firstly, the management of fuels in the landscape is critical. This needs to be conducted in a way that addresses the risks to the community rather than just an area-treated basis. Having a target for hectares burnt, however, does create a funding level and a measurable target against which governments can be measured. However, as I stated earlier, this fuel reduction needs to be tenure blind; it is not enough to just reduce fuels on public land and ignore those fuels on private land.

This is particularly important as the intensity of fires as they impinge on houses and properties is dominated by the fuels on the lands closest to them, which are usually privately owned. Governments — state and local — need to make it easier for land-holders to reduce their fuels, particularly on smaller blocks. Our research, following major fires in all states in recent years, consistently tells us that community members understood that they lived in bushfire-prone areas but that they did not consider themselves at risk. Indeed this went further. Many considered that if their house was spared, it was due to their heroic efforts; however, if it was lost, then it was due to forces outside their control.

The issue of community education, particularly relating to risk perception and understanding of warnings, has been a continual message from inquiries following events. Our research is helping to address some of these issues, but there is still a lot to do.

The issues relating to community understanding of risk ultimately underpin many of the issues relating to the lack of preparedness and the inability to consider mitigation fully. Importantly, the CRC believes that mitigation will always be better than response and recovery. This is not just an economic argument; mitigation means communities do not have to endure the personal and social losses that come from major disasters.

However, all agencies around the country struggle with the many competing messages from the community, and none are more polarising than prescribed burning. The impact of smoke, the inconvenience of burning during holiday times, the belief that fire damages the environment and the number of issues is immense. What we do know is that too much fire is bad and too little fire is bad, so the answer lies somewhere in the middle — that is, that there is no universal ‘right’ answer for every part of the state. Mitigation is not just about short-term seasonal preparedness; it is about longer term planning. It includes issues relating to land use planning, building back better, building codes for new construction and incentives for retrofitting existing assets. These are all intensely politically charged topics. In fact there is political capital to be gained by providing disaster relief but it is lost when politicians ask communities to undertake their own risk-reduction activities.

Finally, I have not touched on climate change, but it is becoming clear that fire seasons around the world are getting longer. Our partners, both researchers and practitioners, are telling us they are starting earlier and finishing later. This will in the long run have some serious implications for resourcing of fire services. It also reduces the amount of time available to undertake preventative actions, particularly hazard reduction burning. As the climate changes to a warmer and drier one, the occurrence of weather conditions like those seen in Black Saturday and Ash Wednesday or the recent record-breaking years will become more frequent. This will combine with more vulnerable people living in risk areas owing to the growing and ageing population.

These factors will mean that we need to reduce the fuel levels more at a time when the weather windows for doing this are shrinking. We will need to rely on our firefighting resources more when fire seasons in the northern and southern hemispheres start to overlap, potentially reducing the availability of resource sharing. We need to factor in that, in reality, our volunteers, who we rely on for their response to bushfires, only have a finite number of hours over the summer periods to give, and these need to be managed with care lest they are spread too thinly. What all these points lead us to is the importance of better disaster resilience in our communities, a better and more informed approach to mitigation and better building and rebuilding, as well as a recognition that some places where we choose to live may not be appropriate in the near future.

Thank you for allowing me to raise some of the points that I believe are critical in the future considerations for your committee and I am now happy to answer any questions you may have.

The CHAIR — Can I just begin by thanking you for your evidence and note that in many respects it is good that we are starting with your baseline of information. I am indicating today this is the first hearing we have had on our inquiry into bushfire preparedness. The CRC, I think, is a central body and I have no doubt that we will be talking to you and our secretariat will be talking to you for more information as we proceed. We may want to test some of the material that comes before us with your knowledgeable background. But there are a few things — and again I indicate we are coming to this with our own set of views at a point not yet fully informed by the evidence — a few questions, some of which you may not be able to answer now, but you might want to take on notice.

Some of us lived through those periods of the bushfire royal commission, 2009 and some of the earlier significant fires in 03 and 06. Where are we with the recommendations of the bushfire royal commission, and do we think that they are a suitable road map? Do we think that there are gaps in what was recommended there

or there are things that subsequently we need to revisit? That is a big question, I know, and that is why I am saying you might not be able to answer it all now.

Dr THORNTON — Yes, I cannot answer all of those questions and I am happy to take some of it on notice. I do not feel that I am in a position to comment on where the government is at in terms of the progress against the royal commission recommendations and the implementation monitor, which I think has stopped operating now, released its final report last year. On things that we do know and that we are involved with, there was a recommendation about the establishment of a national centre for bushfire research. To some degree the funding that we got from the prime ministerial announcement back in 2013 covered off a lot of the work that the previous Bushfire CRC was trying to do to establish an institute. It ended up being funded out of the CRC program, which is okay. We have guaranteed funding for another five years, so that will tide us over for the time being. That one, I believe, has been addressed.

The fire danger rating recommendations that existed in the royal commission inquiry have been progressed to the Australia-New Zealand Emergency Management Committee. It is listed as a priority issue for that committee, and I know it went through the last ANZEMC meeting but I am not sure whether it went up to the ministerial council. I am not on those committees so I cannot comment on that. I lost the second half of your question, sorry.

The CHAIR — In a sense there was a set of recommendations made, and you have said in effect that you cannot really give us a comprehensive tabulation of where they are. My other point is: were there omissions in that, areas of particular focus you think we should be looking at?

Dr THORNTON — One thing that I think, and it is difficult to criticise a royal commission, is the major thing from a personal perspective that was missing from the royal commission was the examination of the role of the fuels on private land. The royal commission had a very strong focus on the role of public land and public land fuel management but did not really address issues relating to how, when and how much fuel was needed to be maintained on private land. To us, that seems a strange omission, and our submission sort of addresses that that is actually one of the things that we need to be more aware of. You cannot solve this problem just by looking at public land.

The CHAIR — It is an integrated approach that is required.

Dr THORNTON — Yes. So that whole integrated approach, whether across public or private land. I know there are a lot of impediments to people reducing fuels on private land, whether it is a capability problem in the sense that a lot of people may not know how to use a chainsaw or not have the ability to do that. There are planning issues that have to override some of those things. There are a whole series of impediments, but I think as long as we are taking a risk-based approach that looks at public land and private land as an integrated approach, we will be in a better position.

The CHAIR — Any further evidence you want to put to us on some of those we would certainly welcome.

Dr THORNTON — Yes.

The CHAIR — The other point I have which comes out of your examination of material around the country is: are there things that we should be learning nationally, internationally, to understand the best practice in this area that you would advise the committee on — again I indicate this is our first hearing, so we are novices on a lot of this material at this point — or indeed things that you think we should see specifically inside Victoria?

Dr THORNTON — Okay. To take up the first part of that, I think Victoria has been leading the country in many of the ways in which it has adopted fire spread modelling, for example, into the core business of what the response agencies are doing and in planning and those types of issues. The use of the tool called Phoenix, which came out of the original Bushfire CRC in conjunction with the University of Melbourne and DELWP, or DSE as it was at the time, has led the country and is now being picked up by many other jurisdictions.

Those tools, though, have their limitations. Firstly, they are only as good as the data that goes into them, so fuels data, weather data and those types of things; and secondly, they only work up to a point. Once you start to get extensive fire interaction with the atmosphere they are less predictive. So we are currently doing work around trying to better understand and build the models for 10 years hence, if you like, when computing power allows

you to actually start to use physical based models as opposed to empirical models. That is still a gap in terms of our understanding of being able to predict where extreme fire goes, particularly once we see large-scale spotting, because then we have problems predicting with any certainty how far they may go and which communities will be at risk in the next hour or so. So those are some of the gaps that we know exist in the current tools, and the current operational people understand those risks and take that into account.

The second part of that, though, is community education, certainly from our studies post other fires. We started that process really with the Wangary fires back in South Australia many years ago but really ramped that up with the work that we did post Black Saturday, where we went out and interviewed many residents who were impacted by those fires. We have since interviewed people in Perth, in the Blue Mountains and in Coonabarabran and for various other fires.

The constant message out of that is that the community really are struggling with their comprehension of risk. Now that is a complex task and we are still trying to do research around how we do better risk communication. We constantly hear from people who have been impacted that they heard all the messaging, they knew tomorrow was going to be a code red day and, 'We knew it was going to be a problem but it would be a problem for somebody else'. That risk approach is clearly not getting through in the current form and there is a lot of work still to be done in that space. Certainly the fire agencies and the community education — —

The CHAIR — Is there somewhere we should be looking at to see where they have done that well? We hear, for example, the 'You must leave' messages that are delivered in some other jurisdictions internationally are more forcibly applied by the police than they are here. I have no particular view on this. I am just interested in your — —

Dr THORNTON — I think the royal commission looked at the stay and go policy quite extensively, what was the stay and go. It has led to quite a substantial change across the fire services in Australia in terms of their message of 'Prepare, act and survive'. And the automatic assumption that used to exist of to stay is the safest thing to do has been changed to some extent, that under some conditions that is not the safest thing to do and that people need to get out. One of the things and the corollaries of encouraging people to leave their houses is that we know from research that the single biggest predictor of house survival is the presence of somebody with it, because most houses will burn down from ember attack, so the fires will start small and they can be dealt with when they are small.

So a consequence of moving people out of fire zones is that you will lose more properties, and that balance between the two is something to which I do not know that there is a right answer. Clearly the royal commission and the rest of the agencies and response agencies put primacy of life as no. 1, which is the right thing to be doing, but with that comes the inevitable loss of houses. So I think that is still a balancing act that we need to look at. That is certainly what we see in the US, where they evacuate whole suburbs and lose thousands of houses. So I think it is a balance that we need to understand, where we sit on that.

Ms SHING — Thank you, gentlemen, for your submission and the answers that you have given already in response to the Chair's questions. As has been indicated, this is our first hearing. There is a lot to get through and to that end there may be things that come out of the material that you discuss today that warrant further information to be provided on notice. Thank you for agreeing at the outset that you are happy to do that, and we will be grateful as well for anything further you can provide.

One of the issues I would like to touch on is the issue of risk transfer and the way in which risk transfer operates to in fact commute the risk from individual to the government and the way in which you have indicated that that has left Victorians vulnerable in certain circumstances to extreme bushfire events. To pick up on one of the themes that the Chair asked about, are there examples in other jurisdictions where the problem of risk transfer has been addressed, either with success or with areas for improvement — or failure, to be fundamental about it — and what does that in fact look like and what are the applications that might improve the way in which we deal with risk transfer in Victoria?

Dr THORNTON — One of the things the royal commission teased out very much was that there had been a transfer of risk to the state agencies, so people had not necessarily taken their own personal safety in regard. I think that was an interesting take.

Some jurisdictions — and I am not sure which ones you are referring to — where the local councils have been very proactive and have very strong enforcement are trying to push that quite hard. New South Wales, under the RFS, has a process where they can force people to clear land, and if they do not, then RFS will arrange for it to be done and they will be billed back. I think some of those approaches are an interesting approach. Ideally it would be useful if people actually understood their risk, because if they are being forced to do something, it is probably a sign that they do not understand the risk enough. It is all tied up into that whole process of how do we communicate risk in a way that makes fire safety, or to some degree any other hazard safety, at front of mind at some point during the lead-in to a fire season so that people do actually do the things that we know will reduce their risk.

Ms SHING — The private/public land interface is one area where again communities may in fact perceive mixed messaging in relation to the build-up of vegetation and fuel in a fire management sense as being something which is unchecked, or comparatively unchecked, in a public land sense in comparison to the smaller block sizes to which they may be the subject of an order to reduce and remove vegetation. How in your view is it that we can bring the community along in relation to understanding the need to minimise risk and to reduce fuel on their own properties whilst we still have that need for tenure blind fuel vegetation in a public land interface?

Dr THORNTON — I think there are some approaches that could help there. Where you have got public land and you have got private land and maybe you are doing some fuel reduction activities on the public land, why not allow that to work into the private lands that sit next door to it as well? There are those types of approaches. It is difficult because people will see that there is a prescribed burn being done in their property next door and believe that they are safe. I think I made the point in our submission that the majority of people who died in Black Saturday, the final run of that fire was taken over private land. The best way to reduce the intensity and the ember density that comes into a household is to reduce that fuel immediately prior to the lands.

I think there is a false assumption that communities understand fire and how fire works. I think the education campaigns that sit around there, the community education engagement programs that are happening both in Victoria but across the country are actually critical, because at the end of the day you want people to understand how fires will behave when you issue a warning. There should be no point when somebody receives a warning about a fire that that should be a surprise. They should be expecting on a bad day that you might actually be impacted by fire, so there is still work to be done in better understanding how people perceive fire risk and how to communicate risk.

Under the old Bushfire CRC we started some work on risk communication, looking at the health sector and how that has been done — particularly around weight-loss campaigns and asthma campaigns — to work out whether there are any learnings that we can bring from that. Certainly some of those findings have been brought into current practice in terms of communication tools and those types of activities.

Ms SHING — One final thing, if I may, and this goes to the direct issue and challenge of community messaging and community information education, where the gap between what communities understand about fire and what they think they may understand about fire in certain circumstances is often very different. How do we, in your view, best deal with the challenge between the messaging in relation to significant bushfire events on the one hand versus planned burns and the way in which fuel management and abatement occurs as part of the business-as-usual environmental control measures that are in place?

Dr THORNTON — It is difficult. One of the things you can potentially use prescribed burns for is an education tool as well — about this is how fires behave; this is what fires do in the environment. I think fires on a bad day, though, are very different and there needs to be a consistent messaging that is coming from agencies. I think Victoria with its sort of joined-up approach through EMV and the way that DELWP and CFA and others work together is really leading some of the thought processes in those areas.

There is some interesting work out of this year's RFS campaigns, which have used some behavioural insight work out of the New South Wales government. It is interesting because it has actually pulled apart the messaging to try and make it relevant, simple and doable. I think trying to remove some of the complexity of what is needed, which is one of the barriers to people doing things because they actually do not know what the simple things to do may be. I am not an expert by any means in community education, but I think there are still ways we can approach and better understand the ways that communities understand risk.

Ms SHING — Thank you very much. That is very helpful.

Ms DUNN — Thank you for your submission. I just want to touch on a few different elements of your submission and pick up on a couple of things that you have talked about already. Just following on in relation to community education, do you have any views or have looked at the best models of engagement with community, whether it is in fact a more localised one-on-one scenario? My observation is — and I am member of the Dandenong Ranges community, so I am certainly well aware of fire risk — that when our local brigade holds a community meeting, a Fire Ready meeting, in a town that has 2000 people we are lucky to get 20 people show up. It is all credit to those 20, but there is still a lot missing in the mix. I am just wondering, do you have any views on the best and most effective way to engage with people, because it would appear that what is happening at the moment is not really cutting through?

Dr THORNTON — I think I agree that the messages are not always cutting through, and I do not know how you force people on a Thursday night or a Saturday morning to give up their time to come to a meeting. I think you asked a question about whether it is better to have one-on-one or whether it is the broader base. I think the answer is both. It is a concerted effort. Community engagement is about engagement at a local level with local people picking out the community leaders so that you know that those 20 people who come along to the meeting go away and tell another 20 people. I think it is hard to get into that space, but it does not mean you stop doing the broad-based community education and the TV advertisements.

I think I made the point when I was over in WA just after the Yarloop fires that in Victoria last fire season you could not have denied that you were in a fire-prone area. Every time you turned on the TV, every time you logged into Facebook and every time you were on Twitter Craig's face would pop up telling you about what you needed to know. I think that is important. Similarly with the community-based planning that we want to happen — so each household having a plan — our post-fire research tells us that very few people have actually got a written plan, and they certainly have not got a plan B or a plan C. The research that we did post-Black Saturday found that many people's first plan failed for some reason, whether they had assumed that two people would be in the house or whether they had assumed that their electricity would continue. I think the importance of having multiple plans is really important. How we get people to do that is difficult. I think that is where the RFS approach — it is the first season they have rolled that out this year in New South Wales — seems to be an interesting new approach.

Ms DUNN — Turning to land use and the response post a fire event, certainly building codes have changed around building more flameproof housing, but has your research at all looked at a response in terms of, if primacy of life is the highest order, having mandatory fire bunkers be part of that rebuild in fire-affected communities and high fire danger areas?

Dr THORNTON — We have not done any research into fire bunkers. We know from Black Saturday that a number of people died in homemade fire bunkers that were not impacted by fires, so we need to be very careful. One of the things that came out of the royal commission was a requirement that a standard be developed, and the building codes board developed a standard. I think it needs to be managed very carefully because what that does maybe is give a false sense of security to people too, that they have a fire bunker so, 'We're going to hang around', when they may not have prepared anything else about their house.

Ms DUNN — But it might save their life if it is one that meets Australian standards.

Dr THORNTON — That is right. Yes. I think the other broader issue, though, you mentioned about flame-proof buildings. I think there needs to be a bigger connection between — and this is personal opinion — the way in which the building code operates as opposed to where the building sits in the block, because at the moment the building code is about the building envelope and it is about a safety outcome but it does not address what might be around a property, so that is that linkage between local planning controls and building construction. The building code at the moment only applies to the point of lock-up: you can have all these fire things done to your house and then not maintain them or take them off. So, yes, the building code has got limited scope.

Ms DUNN — In your submission you talk about the target for hectares burnt and that creates a measurable target against which governments can be measured, but I am just wondering in terms of work that you might have looked at, is there a better way to measure community safety outcomes rather than a fairly blunt

assessment of, 'We've burnt that many hectares'. Is there a better approach? If community safety is the key to why we do it, is there a better way to manage and measure that?

Dr THORNTON — The best way of managing that is through the process of doing risk-based planning. My understanding is that through DELWP and through some of the integrated planning that has been going on in Victoria you can set targets for residual risk, and that is being looked at. I would argue strongly that we need to go down a risk-based approach to the reduction of risk. The hectares target is a useful one if you want a blunt object for, firstly, coming up with how much money you give to DELWP to do prescribed burning and, secondly, to see whether it is actually being achieved. But 1 hectare on the urban interface may have much better risk reduction than 100 hectares in a remote area, so we need to understand that too. But that 1 hectare may cost you 10 times as much as doing that 100 hectares too, so there is a balance in that process.

There are many approaches to risk-based planning, and I think Victoria is now starting to move in that direction. Yes, I would support risk-based targets, but I cannot think of any good ones that you can actually measure against.

Ms DUNN — No worries. That is fine. Another area of your submission talks about the nuance. You talk about how too much fire is bad and too little fire is bad and there is somewhere in the middle and there is not a universal right answer. I am just wondering, in terms of the risk-based planning you have just talked about, do you think that this nuance is now being applied as a way to manage planned burning and fire mitigation, taking into account those nuances, depending on where you are in the state?

Dr THORNTON — I think the effort is there to try to make that happen. The example that I could think of is probably the Otway Ranges, where much has been a pilot for DELWP. I think it is always a difficult one because we know we see tree decline, for example, eucalypt decline, in areas of Tasmania and eastern Victoria due to the lack of fire, but we also know that if you have too many high-intensity fires in ash forests, then you will remove the ash forests. So too much and too little is obviously not the right answer. You are always then in that problem area of where do you sit. We have a project in our current CRC that we just started funding about two years ago which is starting to try to do a mapping of what is the right, if you like, level of fire in particular ecosystems.

Ms DUNN — Is it your view at this point — and I do not know whether there is data around for that — that the planned burning that has occurred in the past is actually changing vegetation types in the state and changing, I guess, the microclimates that come with those? The ash forests are a good example of a specific microclimate.

Dr THORNTON — I am not sure I can answer that question. I am not aware of — —

Ms DUNN — That is okay.

Ms SHING — There is a fair bit in it.

Ms DUNN — It was a big question. I was not sure if you had looked at it or not.

Ms SHING — Just give 140 characters or fewer if you would like.

Dr THORNTON — Yes, I could do it on Twitter. I am not aware of prescribed burning having changed some of those areas, and I think wildfires certainly have had that impact, where we have had two wildfires, whether it was 2003 followed by 2006, across the same areas where large-scale reseeding has had to go on because you would have lost the alpine ash forests. So those types of large-scale wildfire. But I cannot think of anything that comes to mind about prescribed fire having done that.

Ms DUNN — Thank you. The other area I wanted to touch on is in the work that you do — the human element in that — in relation to fires, and that is around accidental fires, arson or poorly maintained infrastructure and where that fits in terms of managing Victoria's risks and, I guess, mitigating in the long term.

Dr THORNTON — In the previous Bushfire CRC we did quite a bit of work on bushfire arson. I understand that following us is the Monash group looking at arson. We in the current centre — with one exception, which is a PhD student who has just started who is looking at arson — are certainly not doing anything in relation to poorly maintained infrastructure, whether it is power or rail or whatever it might be. We have nothing in that space at the moment.

Ms DUNN — Thank you. There are only a couple of other areas that I wanted to touch on. One is: do you have any views in relation to the fire towers and fire tower operators across the state?

Dr THORNTON — I would not know how much they cost. We did do a project — I am trying to remember how long ago it was, probably just after 2009, probably 2010 — where we did a comparison of camera-based detection systems. That is on the Bushfire CRC site if you want to find the report, and I can certainly send it on.

Ms DUNN — Yes, that would be good, thank you.

Dr THORNTON — That basically indicated that under the conditions we looked at there was very little to be gained to move them to camera-based systems where you already have the infrastructure in place for fire towers. That was tested both in the Otways and in the state forest areas around Tumut. There was very little benefit at that time. We have not looked at the camera system since then, so I cannot comment on what the current situation is.

Ms DUNN — That is fine. The last thing I just wondered if you could clarify for us is because you talk about reducing fire fuel throughout your submission. I am just wondering: practically, what does this mean? I know I am told as a resident what fire fuel is. It is often about things that are smaller than my little finger, for example, and twigs and bark and leaf litter. I am just wondering, from your organisation's point of view, what would be your definition of 'fire fuel'?

Dr THORNTON — I do not know that there is a definite definition; it depends upon the day and the temperature. But clearly leaf litter, twigs and those types of things that you talk about — —

Ms SHING — Anything that burns.

Ms DUNN — I do not know if it is as straightforward as anything that burns; it is the stuff that catches fire really quickly that is a really big problem.

Dr THORNTON — Yes, that is important for ignition. So if you have removed that sort of fuel, then that is fine. Leaf litter and other fuels grow over time and they reach an equilibrium. Prescribed fire reduces that. The other part of fuel is of course the bark on some of our stringy bark trees. That leads to more intense fires if you do not reduce it. You can reduce leaf litter in many different ways — mechanical and various other things — but removing bark is actually more difficult, and the only way really to do that on a large scale is through prescribed fire. Also what you are trying to do is to reduce the intensity and rate of the spread of fires, so reduction of fuels that may burn during bad days includes things which are live at the moment, so some of the live fuels. Of course in grassland areas that is completely different because obviously the grass is the fuel in those areas.

Ms DUNN — Thank you so much for that.

Mr YOUNG — If only we had some sort of animal that grazed on fire fuels and reduced the chances of ignition. I just want to touch on a couple of things. You mention in here that other methods of fuel reduction are selected thinning and mechanical removal, so I was wondering if you could just elaborate on those methods. But also it says that they are more labour-intensive and therefore more expensive. I have had experience recently with other forms of mechanical removal, and that is in community firewood collection on public land, so if you could just touch on that and whether you think that that is an appropriate use of the community in fuel reduction in some areas.

Dr THORNTON — I would prefer not to get into the politics of whether it is firewood from national parks or otherwise. Fuel reduction is a good thing to do. It is a political decision from my perspective if it is collected. Wood collection and those types of firewood collection from national parks is a political decision; it is not science based, so I would prefer not to comment on that.

But mechanical thinning, particularly in managed forests — so plantations and those types of things — is used quite extensively. On steep hills you can use various mechanical means to reduce fuels, like chains and various other ways of pulling vegetation out. It does not have a lot of the benefits that fire has for the soils, for example, or that fire has for some of the vegetation, but it may be the only way that you can do it close to infrastructure, for example. So I am not going to answer your question about firewood, with respect.

Mr YOUNG — That is more than enough of an answer for what I need. In the section in your submission about the impact of land tenure, you have talked about the role of private land ownership and how we can sort of couple that or marry it up with the role of public land fire prevention. Why do you think that there is a problem with private ownership lands performing fuel-clearing procedures? Is it the same sort of thing that we see with the problems with native vegetation clearing on, say, farmland? Is it a similar sort of stigma that people do not think they are allowed to clear certain things on their own property?

Dr THORNTON — It is not something where we have done a lot of research into the why, but I think there are many things. If people do not understand the risk or do not understand what the risk to their property is, there will be no incentive for them to personally do that. At the end of the day people live where they live because they like the environment that they live in, so it has got to be something that has got a benefit to them to say, 'I'm going to remove the undergrowth which I see in front of me', for example, so that sort of risk perception versus private amenity is a project that we started to look at in the Bushfire CRC because that is one of the barriers to people actually doing something. The US has done some work around trying to change that messaging, so if you want to see the wildlife, maybe if you have less trees in the way or undergrowth in the way, you may be more likely to see that deer or that other animal that you really want to see. So there are messaging things around there.

There are issues of competency in terms of individuals. If it is an elderly person on a block of land, they may not be competent to use a tractor, may not have a tractor or may not be competent to use a chainsaw or whatever it might be. It does not matter what the legislation is about their ability to be able to clear or not clear if they do not have the ability to do it. Then you have the issue about how you remove whatever it is you are chucking out and those sorts of issues. The US in some places, again, has had systems where there are neighbourhood clean-up days. They take away rubbish. There is no point in chopping it down and leaving it round your house; it defeats the purpose. There is a number of approaches to those issues.

And, importantly, if you live on a 30-acre block, for example — excuse the imperial; I come from a British background — how do you do prescribed burning on a 30-acre block and guarantee it does not get away? That is where you really need integrated planning across numbers of properties, and particularly that the property is not insured if you light a fire and it gets away.

Mr YOUNG — Just one more thing: in that same section on the impact of land tenure you have talked about private land but you have not really talked about public land. Have you done any research on the impact of different types of public land tenure and the ability to actually perform fire preventive measures in those?

Dr THORNTON — There is a lot of work that has been done by the public landowners, so people like DELWP, around the country on the effectiveness of prescribed burning and how that can be done. In fact we have got a bunch of projects that look at that, particularly under the contract that we have for DELWP. Land tenure comes up if you look at inquiries in WA, in South Australia and in New South Wales. Land tenure and management of fuels across land tenure comes up time and time again as being an issue. Victoria probably is not quite as bad as, say, WA, where you have got a whole lot of unallocated Crown land and mining leases and a whole lot of other things, but certainly that land tenure issue and how you work across land tenures to benefit everybody is an ongoing issue. I am not sure how you fix it, but it is something that needs fixing.

Mr SOMYUREK — I refer to the innovative and certainly high-tech work that the CRC has been doing with respect to predicting the path of the fires. Can you walk us through some of the specifics of that work and perhaps any future research that may be integrated into Victoria's future fire response?

Dr THORNTON — There are two elements to that. The existing system, if you take it back 20 years ago, used to be that you have the McArthur fire spread meters and a fire behaviour analyst would sit down and solve those for the current fire that is burning and could give you the rate of spread, the flame height and all those types of things. That was a fairly laborious process, and it also only gave you one point on the fire.

The next thing that was done under the Bushfire CRC and had been done in the US with various other models was to automate that and to make it more like a real fire spread, so you solve those equations at multiple points around the fire front so that you can work out at some point in the future much more rapidly where the fire is going to be. They still relied, though, on the fire behaviour models that we had before.

So the next step that we need to understand is that certainly on extreme fire days, whether that is code red days or days with fires that interact with the atmosphere, where you end up with large plumes, pyrocumulus and various others, those simple fire spread models do not work as well. You can get a broad direction, but certainly you get behaviours which are not predictable by those models, so the CRC's work is twofold, one of which is to look at a physics-based approach to modelling, so those previous models are what we call empirical models, so that you — —

Ms BATH — Could you speak up just a little bit, because I cannot hear you.

Dr THORNTON — Sorry. That empirical model is where you take a set of data, you fit a curve to them and you use that curve. Fire is a physical process. You should be able to model it using physics, so we have got a project that is working with a bunch of international groups to look at how you physically model fire and whether you can do that.

The other side to that equation is how you integrate that into the atmosphere. As you will know, the Bureau of Meteorology in modelling the atmosphere uses a supercomputer, so we are adding a physical fire modelling approach which also uses a supercomputer with a bureau supercomputer-type infrastructure to try and solve the fire issue. Now that will not be tenable for fire operations probably for 10 years, so we need faster computers, we need better capability of doing that, but we are starting the work now to build a capacity in Australia to be able to do that. So that is where we are at the moment. For the time being the rollout of things like Phoenix and similar models, whether it is Aurora in WA or whether it is Prometheus in Tasmania or whatever it might be, will be the state of play for the next five or six years or so.

Ms BATH — I think Mr Somyurek touched on something that I was interested in as well. Thank you for your submission, Dr Thornton. With respect to the Phoenix program, I have had a meeting with DELWP. They have come in and said that as part of their fire Safer Together risk management-based approach they are using Phoenix in conjunction with yourself. First of all, I would be very much interested to see that simulation happening, so I do not know if it is possible for us to get either a PowerPoint presentation or something; I do not know if that exists. But that would interest me because it would give us a great deal of background behind that then. You mentioned then that you have looked internationally and seen what models are working overseas and have been adapted. How much would DELWP be using that as part of their fire strategy around a risk-based approach? That is one part. How can they measure the success of these simulators because they are theoretical? Two, is there similar topography et cetera, for example, that you have run in terms of Gippsland because Gippsland has a lot of wooded areas with towns basically tucked into the valleys. What I am looking for is the reliability of modelling in relation to that. That is one area I have. Could you make comment on that, please?

Dr THORNTON — If you want to see it running, I suggest you contact DELWP or EMV because it is used in the state control centre. There is no point in us showing you. If you want to see it in operation, I suggest you talk to DELWP, EMV and CFA.

In terms of the accuracy of the model, there is a national program underway at the moment to compare a range of models. Phoenix is one of those. In parts of Tasmania, although they have used Phoenix as well, they have taken on a Canadian system called Prometheus because it suits their vegetation better. WA, also under the Bushfire CRC, developed a separate simulator called Aurora. CSIRO, through one of our projects and internally in CSIRO, has developed another simulator called Spark. Those four models are currently the subject of a nationally funded piece of work being led by the Bureau of Meteorology to compare and contrast how well each of those does in predicting fires they have not seen before. So where we have data from previous fires, we run those models over them to look at how well they work. So that validation set is now what is underway with a lot of those to be able to look at where improvements need to be made, if you like.

I agree the areas in Gippsland, particularly the steep terrain and those types of areas, are some of the ones where it is sometimes difficult because of their meteorological factors to predict in which direction a fire is going to go and where it is going to spot, because you have a whole load of terrain-induced winds, so you might find the wind is actually going in the opposite direction to the prevailing wind.

Ms BATH — I guess, Dr Thornton, it would be used as part of a toolkit along with experts et cetera. Is that your suggestion?

Dr THORNTON — Absolutely. The whole point of that type of system, whether it is Phoenix or any other system, is that it is a decision support tool. It is not a decision tool. It needs to be used in combination with the fire behaviour analysts to be able to determine what it really means and what its limitations are.

Ms BATH — This is my last question, Chair, because I know we are getting run for time. The bulk of your main submission that you presented to us earlier says:

It is important that whatever targets are put in place that these are based on the best available evidence and scientific research. They should be measurable, achievable and articulated in such a way that the community understand their residual risk.

Could you explain that a little bit further and make comment on that?

Dr THORNTON — The first part is what you would expect a research entity to say: this is based on the best science and the best evidence. I think it goes without saying that that is where we want to be. The importance of being able to articulate the residual risk, if you like, comes back to the issue that fires are inevitable and everything we do will never eliminate the fire risk. There will always be some residual risk. If a fire starts very close to your house, there may be nothing that the fuel reduction that you have done before away from your house does, so there will always be some residual risk. Being able to communicate that as part of the community education process is important. That means, to take a step back, and partly I think it comes to the question I was asked earlier, ‘How do we measure the effectiveness of fuel treatments’, and the impact on risk is critical to understanding that. We have some projects that are starting to look at how we do some of those trade-offs so you understand what you are trading off, whether it is public amenity against public safety or environmental values against water values or whatever it may well be. So you get a better view of all those trade-offs so you can actually better communicate that.

Ms BATH — I have got heaps of others, but I think it is time to let go.

The CHAIR — I have got 19 too.

Mr RAMSAY — I have just one quick one. In relation to your submission in relation to fuel loads on private land and your reference to Black Saturday, I am just wondering what other constraints you have observed in relation to land tenure and fire prevention. My specific question would be: have you done any research or had feedback in relation to the current state’s native vegetation clearing guidelines that may be having a constraint against fuel reduction and fuel load reductions, and the Native Vegetation Act itself?

Dr THORNTON — Not directly. So on the interaction of EPBC and fuel reduction, we have not done anything in that space at all.

Mr RAMSAY — Do you see the current guidelines being a constraint to reducing fuel loads, particularly around private land?

Dr THORNTON — Some of the guidelines, whether it is local council-imposed fuel reduction or environmental issues, may restrict. There was some work that we did under the Bushfire CRC that looked at some occasions where there was some criticism around — this was a legal study — residents not being able to clear, but at some point it comes back to: did they actually ask the right questions of the right people in order to be able to do the things that they wanted to do? So there were issues around some of those constraints that may be perceived constraints and may not be real, but we have not done that policy work around understanding the interaction of policy and people’s behaviour.

The CHAIR — Can I thank you, Dr Thornton and Mr Bruce, for your evidence. I have no doubt we will be in touch further on a number of these points, the secretariat in particular.

Dr THORNTON — Thank you, and thank you for the opportunity.

Witnesses withdrew.