

## **TRANSCRIPT PROCEEDINGS**

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### **IN THE MATTER OF THE ROYAL COMMISSION INTO NATIONAL NATURAL DISASTER ARRANGEMENTS**

#### **DAY 8 TRANSCRIPT**

Continued from Tuesday, 16 June 2020, DAY 7

#### **CANBERRA**

**10:00 AM, WEDNESDAY, 17 JUNE 2020**

**Mr A TOKLEY QC, MS D HOGAN-DORAN SC, and MS J AMBIKAPATHY  
appear as Counsel Assisting**

**<RESUMING 10:00 AM>**

COMMISSIONER BINSKIN: Mr Tokley, good morning, are we ready to proceed?

5 MR TOKLEY QC: We are ready to proceed, Chair, Commissioners. This morning we will be having another panel. This panel will consist of representatives we heard from yesterday afternoon but in addition we will have an extra person, Mr Hamish Webb who I will call shortly. The purpose of this morning's panel is to look at the evaluation exercises that are carried out after hazard reduction activities and how  
10 such matters inform future approaches. Without further ado, I will call, first of all, Mr Hamish Webb who's the director, Policy and Planning, Knowledge and Planning Branch, Forest Fire and Regions, Victorian Department of Environment, Land Water and Planning. Good morning Mr Webb.

15 MR WEBB: Good morning, Mr Tokley.

MR TOKLEY QC: Mr Webb, will you take the affirmation or the oath?

MR WEBB: The affirmation, please.  
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**<HAMISH WEBB AFFIRMED>**

MR TOKLEY QC: And I understand we have Mr Williams from South Australia?

25 MR WILLIAMS: Yes, present. Thank you.

MR TOKLEY QC: And Mr Brett Loughlin from South Australia?

MR LOUGHLIN: Good morning, Mr Tokley.  
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COMMISSIONER BENNETT: Welcome back gentlemen, good to see you again.

MR TOKLEY QC: And we have Mr Wassing and Mr Harris from Queensland.

35 MR WASSING: Good morning Commissioners.

MR HARRIS: Good morning, Mr Tokley.

COMMISSIONER BINSKIN: Good to see you back again as well. Thank you.  
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MR TOKLEY QC: Commissioners, as with yesterday. We will be examining topics. Now, there are two topics to be examined in this panel. The first of those topics is the evaluation process carried out once hazard reduction activities have been completed, including the extent to which evaluation informs hazard reduction planning, risk  
45 assessment and further mitigation efforts. So gentlemen, as with yesterday I will give you a heads-up with the topic we are addressing and then we will proceed to address

the topics in turn. I will go from State jurisdiction to State jurisdiction with specific questions in respect of those topics.

5 Now, in respect of the first of those topics, if I could call upon Mr Webb from Victoria. And, Mr Webb, could you please outline the approach taken to evaluating hazard reduction activities once they have been carried out in Victoria?

10 MR WEBB: Yes, thank you, Mr Tokley. In Victoria we carry out evaluation at a number of levels. Delivery, such as did the burn intend - achieve what it was intended. Operational planning: is and has the plan burn program met strategic objectives; and our strategies, are our strategies right and future focus. We also look at, sort of, the programmatic evaluation. Is the overall program achieving its goals? Our approach in Victoria is driven by the code of practice for fire management on public land and, in particular, the two objectives in the code.

15 Objective 1 in the code is to minimise the impact to major bushfires on human life, communities, essential and community infrastructure, industries, the economy and the environment; and human life will be afforded priority over all other considerations. And objective 2 is to maintain or improve the resilience of natural ecosystems and their ability to maintain services, such as biodiversity, water, carbon storage and forest products.

20 Those two objectives drive all of our planning and evaluation work that we undertake. Objective 1, we look at evaluating the risk to life and property and we do that through the annual risk reduction calculations and use of Phoenix fire model which is our computer modelling simulation. Objective 2 is the ecosystem resilience is measured through two metrics: our tolerable fire interval which is how frequently the ecosystem can tolerate burning and growth stage structure, which is a mix of ages of vegetation in an ecosystem. Importantly, these metrics are drawn from our fire history data as the underpinning data and, in particular, the fire extent and severity.

30 We collect that information in two ways: fire extent is the physical severity which we collect through remote sensing aerial photography and satellites is the intensity of the area burnt. These processes are supported by on-ground monitoring programs. So we have a fuel hazard plot program which is a visual assessment of burns and that's looking to changes in fuel loads and stratas. So have we removed bark, have we removed spark fuels? And we also have a number of ecosystem monitoring plots which are about how much is there change to the ecosystem and to the environmental values.

40 We then use those input from those data sources to - in our modelling processes. So for our residual risk and our risk to life and property, we use the Phoenix fire simulation model which is the computer model which uses the fire history data to show what has happened before and after the burn. So how many houses or assets would have been impacted before that burn, and then how many are no longer impacted and how the fire behaved in the area where the treatment as has happened? For our ecosystem modelling we've just released a relatively new tool in the last 12

months which is known as the fire analysis module for ecological values - frankly, it's called FAME for ease - which just draws on all the existing data models that we have. And it can forecast and measure the change to the metrics of ecosystem resilience, the tolerable fire interval and growth stage structure.

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All of this information is then fed back into the selection of our annual fuel management program, so it's the annual program, and as well as the development of the rolling three-year program for joint fuel management project plans as well as the episodic and five-yearly review of our strategic fire management strategies.

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MR TOKLEY QC: Thank you. Now, you mentioned the purposes for which the information is gathered, and did I understand you correctly to say that you gathered that information and assess it against the targets that have been set?

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MR WEBB: Yes, that's correct. So in terms of the residual risk target which, in Victoria, is 70 per cent, that's against life and property, and we use life and property, property as a proxy for life. So we assess how many houses were at risk prior to a burn or a fuel management program being undertaken, and then we assess what changes happened post, post the actual management program and also following the bushfire season. So it's important for us to, sort of, understand what that change looks like.

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MR TOKLEY QC: And we understand that the target that you mentioned, that that's a State-wide target?

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MR WEBB: That's correct. Where we measure it is at a State-wide level. We do - the way we build and undertake our modelling processes and our planning processes, we do break down to region and district levels. And, importantly - and it's a really important part of what we do, because we recognise risk in the fuel types and communities and the available treatments differ across the State. Fuel management, in particular planned burning, can't be delivered everywhere and isn't as effective in all different fuel types. So in areas where it's difficult to undertake fuel management, and that might be because of the interface areas, the terrain, the types of vegetation that we're dealing with, we might have a target that is above, you know, an operational target that is above 70 per cent.

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In those sorts of areas we will make sure that we're targeting other activities such as mechanical fuel treatment but also look at combined with our suppression and community engagement and community preparedness activities that happen outside of the fuel management program as well. So we recognise the different ..... and the need to tailor to local conditions in our planning and our programming.

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MR TOKLEY QC: Thank you, Mr Webb. Does the evaluation process that's undertaken, does that also inform longer-term plans into the future? You've mentioned the annual review and the three-year review.

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MR WEBB: It absolutely does. And importantly also, as I touched on, we analyse the effect of the overall program. So some recent work that we have just completed and are in the process of finalising, we've actually been, you know, looking at the relative contribution of planned burning and bushfire to risk reduction in Victoria, and we've  
5 been able to back cast that last - a number of years, certainly back to the last decade-plus. And from that we're able to show that planned burning, even with major fires in there, is the major - major contributor to reducing - the majority contributed to reducing bushfire risk in Victoria.

10 For example, if we start in, take the period from July 2009 until today and including the summers of the season, you know, we're able to show year-on-year that fuel management has contributed to 66 per cent. Two-thirds of the risk reduction in Victoria is from bushfire risk, and bushfire has contributed a third; and that's despite, you know, just under another additional one million hectares being burnt in that  
15 period by bushfire. That really reinforces to us the importance of a really targeted and balanced fuel management program where fire is set in the right places in the landscape, and close to community as well as breaking up the landscape in the back country to stop these large fires.

20 MR TOKLEY QC: Mr Webb, we heard yesterday from some of the heuristicians talking about fuel modelling and the like, and the impact, for example, that drought might have, where drought might affect fire behaviour and also longer-term outlooks. Does the Phoenix system that you mentioned have regard to such matters as drought?

25 MR WEBB: It does in terms of the availability of fuel, and the underlying dryness is included in the weather inputs into Phoenix. And certainly it's an area, and the conversation you had yesterday with the, sort of, the leading scientists in this area, you know, went to an area of continual improvement in understanding the relationship, both the long-term climate impacts of this drought and what effect that  
30 has on fuel availability, but also the impact and relationship between - between fuel and atmosphere and how those work.

So we're continually trying to invest and improve in our modelling approaches and capability both fulfilling to make it more tailored and more - have more nuance to it  
35 to enable more localised decision-making, but also to reflect that the environment we're dealing with is changing and we need to be forward looking and picking up those changes in our future modelling.

40 MR TOKLEY QC: And do I understand correctly that in the use of the modelling you take into account, obviously, past events? You take into account past events in the modelling, obviously? I'm sorry, can you hear me, Mr Webb? We may have lost him.

45 MR WEBB: I can't hear anything that's coming through to me.

MR TOKLEY QC: Can you hear me now, Mr Webb? I might have to come back to Mr Webb.

COMMISSIONER BINSKIN: That's all right. Let's try and resolve Mr Webb's issue, if you want to go to the other witnesses, yes. And we might give him a call if he can't hear us, just to let him know what we're doing.

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MR TOKLEY QC: I might pause for a minute while we try and resolve Mr Webb. Chair, with your permission, I can move on to --

10 COMMISSIONER BINSKIN: No, let's move on and we will come back to Mr Webb when we resolve that technical issue.

15 MR TOKLEY QC: Yes. Thank you, Chair. If I could turn now to South Australia. Mr Williams, Mr Loughlin, in relation to the first topic which is the evaluation process carried out once hazard reduction activities have been completed, including the extent to which evaluation informs hazard reduction planning, risk assessment and further mitigation efforts, could you please outline the approach taken in South Australia to evaluating such matters?

20 MR WILLIAMS: Yes, thanks, Mr Tokley. In relation to our hazard reduction burns and other treatments, as I mentioned yesterday, our work is driven by our planning approach, and our fire management plans incorporate our zoning principles. Those zoning principles then inform our treatments for mitigation purposes. If we undertake prescribed burns as part of that process, the burn plan program process will identify what evaluations will take place following the treatment and through prescribed  
25 burning or other actions. And that can be everything from obviously spatially mapping, which is what we do as a basic thing, and then identifying the fuel loads subject to completion of those burns, and whether the objectives of the burns have been met, what other treatments that you put in the landscape like weed control or track restoration or other rehabilitation works, and then, if necessary, what longer  
30 term monitoring needs to be undertaken.

All that work is documented and fed into our fire information management system which is then used for future management strategy and future planning for our burn program. Similarly to Victoria, we also have a code of practice that we have in South  
35 Australia, which is a code that is signed up between the Country Fire Service and the land management agencies, and that code outlines that the principles that we want to undertake in the program is protection of life, property and environment, and the maintenance of the ecological systems.

40 So that code underpins all the work we do in that space. Similar to Victoria, we do record species information databases that we can retrieve and use to assess the impacts in terms of final attributes for a particular species in the landscape, and all that's taken into account in our planning. Environmental factors are also considered in our planning and our evaluation for future works.

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MR TOKLEY QC: We heard from Victoria just then that they do an annual review and then a three-year review. How often does that take place in South Australia?

MR WILLIAMS: We have annual - we monitor our fuel loads, particularly our asset protection zones on an annual basis to see whether they need treatment or re-treatment. So we have - the zoning principles outline thresholds for fuel levels that we want to manage to. We monitor those thresholds on an annual basis and we treat, if those thresholds are reached. We also have approval under the Commonwealth's Environmental Assessment EPBC Act to undertake our - improve our environmental appraisal work through our burn planning, and that's audited as well on an annual basis to make sure that those requirements are being met.

MR TOKLEY QC: Does the evaluation inform long-term planning regarding hazard reduction activities?

MR WILLIAMS: Yes, it does. We collect information on how often areas are treated and in what way they're treated. As I said before, the fuel loads that are in those zones that we've indicated in our plans, and then that allows us to develop our three-year rolling program, and our fire management plans themselves have a 10-year horizon, so they're - but the annual work is evaluated and that forms the review of those plans in the longer term.

MR TOKLEY QC: I think you may have possibly answered this question, but does the evaluation assess the effectiveness of the activities that have been carried out?

MR WILLIAMS: Absolutely. So our burn plans, before we implement any works or any other form of risk reduction, will indicate what our objectives are, and we do an assessment post that work to - and we do a visual assessment: we use a visual fuel hazard guide to inform our information there, and that's done on post-burns to ensure that our objectives that we've outlined are met.

MR TOKLEY QC: You mentioned visual assessment. Are there any quantitative targets that are set that you seek to achieve?

MR WILLIAMS: In terms of fuel management, the visual assessment tool has a relationship to tonnes per hectare quantities, which is a - that has been worked out. So we do - there is a relationship there between targets in terms of the fuel loads and the visual assessment tool we use. But in terms of targets for reduction in terms of area, we don't use a target approach. We use a risk-based approach.

MR TOKLEY QC: And is there, similarly in South Australia to Victoria, a residual risk assessment carried out State-wide?

MR WILLIAMS: We don't undertake the same process as Victoria in that regard, no.

MR TOKLEY QC: Thank you very much, Mr Williams. I might now turn to Queensland, please.

MR WASSING: Good morning.

MR TOKLEY QC: Good morning, Mr Wassing, Mr Harris, could one of you please outline the approach to evaluating hazard risk reduction activities in Queensland once they've been carried out?

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MR WASSING: Certainly. So if I start probably with a very brief overview in terms of the broader frameworks and then probably come to the practical aspects in terms of the risk reduction activities specifically, and I think that's important in terms of the context of the question. So we operate our hazard reduction aspects in the context of a broader assurance framework that is set by our Inspector-General, Emergency Management within Queensland, and that has a range of different principles, performance based outcomes and assurance aspects. And particularly with respect to the assurance, three-tier assurance, self-assessment, peer assessment, and then basically reviews, either by inspector-general or by post-event type assessments.

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We then have separate to that, but related and consistent with a broader lessons management framework which looks at all of the aspects that you would expect us to consider in a lessons management framework, about observation and sharing information, analysing that information, the implementation aspects, the monitoring and review aspects, and then fundamentally making sure that new practices or improvement are embedded. They're important. Both of those are really important from a more strategic perspective when we're looking at policy learnings, strategy learnings, systems learnings and the like, and we have a range of different examples that come out of those two areas.

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For example, a good neighbour policy which is a recommendation out of the Inspector-General Emergency Management Review. That is now part of our guidelines in terms of area fire management groups embedded for good practice from Queensland Parks and Wildlife Service. In the same sense from a lessons management framework perspective, we have really good examples from that; those evaluations in terms of systems improvement, from legacy systems to new improvement systems in terms of reporting, and some of the work we're currently doing in terms of improvement, in terms of our governance arrangements, whether that be through the State, regional, or even area fire management groups.

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More specifically to the implementation aspects, yes, we do have assessments in terms of both the prioritisation and the completion of hazard reduction activities and mitigation activities, specific to the cool burn operations that I spoke to yesterday, around hazard reduction, file trail, firebreaks and community engagement activities. In addition to that, we have a fortnightly monitoring assessment through the process of both the planning and particularly the implementation of the cool burn operation. So we have almost a - I wouldn't quite call it real-time but certainly a fortnightly progress aspect that we have oversight of in terms of the progression of those targets.

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And then we also have a post-completion assessment. Now, that can take many different forms. Certainly at a tactical level it would be the assessment of individual activities, the individual hazard reduction burning activities, as it was described in

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Victoria and South Australia. We also use some of our systems of Phoenix and our SABRE system which links to the Phoenix work, which gives a probabilistic aspect in terms of potential. And we use some of those to - based on scenarios of unburnt, burnt and - or other mitigation activities, to see the effectiveness of the individual  
5 burns. We don't do those across all of our mitigation activities but we can target some of those and that's obviously limited by certain capacity, but we can target those.

And then in a third element, we have what I've described as the expected, sort of,  
10 post-season reviews in terms of workshops with our peers at each of the three levels in terms of local, regional and State, and they inform our ongoing improvement exercises into the future.

MR TOKLEY QC: Thank you very much, Mr Wassing. Mr Harris, would you like to  
15 add to anything Mr Wassing has said in relation to the areas under your responsibility, if I may put it that way?

MR HARRIS: Yes. Thank you. My responsibility focused on the areas that we manage, which is our protected area network and our State forests. At a State level  
20 the department is accountable to the government through the establishment of service delivery statements. We have two in regard to fire management targets. One is a planned burn target of greater than 5 per cent of our total protected area of State and forests; and the other one is an annual protection zone targets which are risk based and focus on property, protecting life and property in those areas adjacent to the  
25 estate that we're managing.

All of our fire management information is managed through our data and process fire management system known as FLAME. So, for example, all our planned burn data is managed through that system. A planned burn proposal will be submitted within that  
30 system. As a planned burn is undertaken, a status update will be provided. And then at the end of that planned burn, a report will be done to evaluate whether the objectives of that planned burn has been achieved. That information can be rolled up at a park level, a regional level, or a State level to inform our planned burn program, or hazard reduction activity.

We also manage our parks and forests under a values based management framework, and that sets the management priorities and management standards for the management activity of our areas, including fire management, and it operates under a principle of continued monitoring and assessment of management effectiveness, and  
40 that's done on an annual basis. And we're rolling out a program across our State to manage the effectiveness against those management standards. For example, in fire management that would be looking at the implementation of our fire management zones, which we touched on yesterday, that arise from our fire management strategies, the management of our fire infrastructure and the implementation of our  
45 fire regional planned burn guidelines.

At a more qualitative evaluation we work closely with QPWS and the various bushfire management groups that they have at a State, regional and local area, in particular the area of fire management groups. And we evaluate the work that was done in the past and that informs the future planning for our fire management activities. Working with those groups, so a broader whole-of-landscape approach can be taken. Internally we have fire referral groups which, again, consider previous years' fire history and management activities, and that informs our future programs. Where we have joint management arrangements with First Nations people we understand take a similar process with them and incorporating their traditional knowledge into our fire management practices. And after every fire, be it planned or bushfire, we will undertake post-fire debriefings and operate under a lessons management framework so the lessons learnt can be reported and tracked. Thank you.

MR TOKLEY QC: Thank you very much, Mr Harris. Mr Harris, you mentioned during your answer that there was a 5 per cent target that had been set. Could you elaborate on that a little bit more, please? First of all, what is it 5 per cent of, and then whether the 5 per cent target is also one of the matters that is subject to evaluation or assessment against that target?

MR HARRIS: The 5 per cent target is 5 per cent of the total area of the estate that we manage, which is approximately 650,000 hectares. Over the last 10 years we have achieved that target or exceeded that target. Last year we achieved over a million hectares. That total area is formed - informed by the individual planned burns that are undertaken for - across the estate. Each of those planned burns are developed under a risk assessment process and generally considering protection of life and property. And it's through our FLAME management system that we can evaluate the effectiveness of the planned burns, as I said before, at a local or a broader level.

Mr TOKLEY QC: You mentioned FLAME, that's a modelling system?

MR HARRIS: It's our data management and process system. So both, we're able to access the fire management data that we include in FLAME, but also it includes our processes, our fire management statements, our planned burn guidelines, that information as well.

MR TOKLEY QC: Thank you. Does Queensland also use the Phoenix system or is it --

MR HARRIS: We have access - QPWS have those systems: Phoenix, SABRE, Catalyst. We have access to those systems and we are able to use those systems to inform our planning processes; in particular, when we're working with QPWS through area fire management groups and ocean, and both in a planning and a response capability.

MR TOKLEY QC: Thank you very much, Mr Harris. I might now come back to Mr Webb. Mr Webb, I believe you're back on?

MR WEBB: Yes, Mr Tokley, I'm here. Apologies for that.

5 MR TOKLEY QC: That's no problem. Now, Mr Webb, the question I was going to ask you concerned the sort of settings that were used in the fire simulation models, because I understand that you use what's called Black Saturday as a, sort of, baseline measurement, and I understand that was a situation where the fire index was 130?

10 MR WEBB: Yes, that's correct. If we go back to when we started, and we've been working on computer simulating and fire modelling to inform our decision-making for a long time, sort of, prior to Black Saturday. But Black Saturday, which was the 2009 fires, were, sort of, some of the most extreme fire behaviours that we have seen. So since then we've used that as our underpinning model to derive a kind of a worst case scenario, if you like. That is the worst weather conditions we have experienced  
15 in Victoria from a fire perspective, so we use those as our worst case scenario in that plan.

Importantly, a lot of the improvements work we're doing at the moment is to provide some additional weather streams that are more reflective of the different types of  
20 weather we get here in Victoria and enable us to assess and analyse our program across different fire danger indices and that will really help us to, sort of, understand when fuel management is effective, where it is, and under different fire conditions.

MR TOKLEY QC: Can you hear me, Mr Webb?

25 MR WEBB: Yes, I can hear you, Mr Tokley.

MR TOKLEY QC: Okay. So that was just the end of your answer. I wasn't sure if we had been cut off again.

30 MR WEBB: No, no, sorry. I'll say "out" to finish it off.

MR TOKLEY QC: Thank you very much, Mr Webb. Gentlemen, those are the questions that I had for you, but I suspect there will be some questions from the  
35 Commissioners.

COMMISSIONER BINSKIN: Mr Tokley, is that the entirety of your questions for this group or do you have an evaluation question as well?

40 MR TOKLEY QC: No there is a further topic to come.

COMMISSIONER BINSKIN: For this group?

MR TOKLEY QC: For this group, yes.

45 COMMISSIONER BINSKIN: That's the evaluation?

MR TOKLEY QC: That's the evaluation.

COMMISSIONER BINSKIN: Let's go through that as well. The questions we've got are probably collective from assessment and evaluation, at the end.

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MR TOKLEY QC: Mr Webb, you may have heard the Chair's comments just then? Yes. If you could --

MR WEBB: Yes, sorry.

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MR TOKLEY QC: If you could focus upon the evaluation side in light of what we have already discussed?

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MR WEBB: Yes. So in terms of evaluation - evaluation of the effectiveness, just to clarify the question. The evaluation of the effectiveness of each of the burns or of the overall program?

MR TOKLEY QC: Of the overall program, please?

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MR WEBB: Yes. So we evaluate the effectiveness of the overall program through an annual assessment and that involves applying what we call the fire history, so the area burnt and the various severities of that area burnt will provide us an understanding of, kind of, where fuels sit across the landscape, and the level and amount of those fuels. We will then use that information in our modelling systems to understand what change has occurred to the - to the risk profile and - and that such as, you know, where it's gone up --

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MR TOKLEY QC: Unfortunately, Chair, we seem to have lost Victoria.

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COMMISSIONER BINSKIN: That's all right. We'll keep going with South Australia and Queensland, and we'll get Mr Webb. I hope it's not the State cutting him off as he gets to very important information. But I think it's the technology.

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MR TOKLEY QC: I think it's the technology. Mr Williams, Mr Loughlin, you may have seen that Mr Webb was cut off mid-sentence and he was discussing the evaluation of these matters and how the effectiveness of the activities undertaken is determined and measured. Could you please speak to that, Mr Williams?

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MR WILLIAMS: Yes. Look, we - our evaluation is again done at a plan level and we undertake the works associated with our plan and what that drives through our implementation of our works. We do report - the evaluation then is reported up through the various agencies, through the Department of Environment and Water. And also we have a group called the Government Agencies Fire Liaison Committee, who are made up of ourselves and the Country Fire Service and our land management agencies, and we report to them in terms of the work we undertake. So our three-year rolling program, we implement that as the weather permits and the weather windows permit, and then we undertake individual evaluations of the works

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as per each burn. And then we report that up through the respective agencies to both the CFS and our own agency through those mechanisms.

5 MR TOKLEY QC: Could I ask this question please for clarification? In terms of, having carried out the information gathering exercise on the prescribed - sorry, the hazard reduction activities that have been undertaken, there's obviously an evaluation of that information, and then how is the assessment done of the overall success of such activities against the targets that are sought to be achieved? By "targets" I don't mean percentage targets but the level of protection that's sought to be afforded to the  
10 different protection zones?

MR WILLIAMS: We would - we would link our works to our zoning principles, and so that if we reduced the fuel loads below a certain threshold in those zones that affords the protection that we need to protect the assets and might adjoin those areas  
15 that we were treating. So that's a principles-based approach that we would use to guide our work. So if the objectives were met of the mitigation works, our premise is that the protection has been afforded and the evaluation would be that we've met what we set out to achieve.

20 MR TOKLEY QC: Now, we've heard from some of the community matters that there was a perception that fuel loads were still too high. Would it be possible for a member of the public to have a perception that fuel loads are still too high and yet the targets set for the reduction of fuel load has, in fact, been met through the activities being carried out?

25 MR WILLIAMS: From a perception point of view, most certainly, it's an individual perception, whether the fuel loads are too high or not. We base our work based on the science we gather and the data we collect and the experience we have in what provides an effective fuel reduction to protect life, property and the environment in  
30 terms of what we're trying to achieve. But that - I wouldn't say that that always appeases everyone in their perception of what's a fire fuel load or not.

MR TOKLEY QC: Thank you, Mr Williams. If I could now turn to Queensland, Mr Wassing and Mr Harris?

35 MR WASSING: Yes.

MR TOKLEY QC: And if, gentlemen, if you would address the question that the Chair is interested in, which is the evaluation of these activities against the various  
40 targets, future planning matters that have been - to which they're relevant?

MR WASSING: Certainly. So I would start by saying, by and large, consistent with what has already been described by Victoria and particularly South Australia, for - as part of the evaluation programs we are able to run scenarios, as I briefly mentioned,  
45 in terms of the assessment process, that gives us in an intelligence, if you will, or information in terms of those particular aspects. Particularly for us, in terms of the - recognising our cool burn operations, is targeted to high risk locations. And so

much of our evaluation is focused on the exposure elements of what would be within approximately 100 metres of a particular asset. And again, those assets are fundamentally informed by the area fire management group collective and the stakeholder groups, including the community.

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We also are able to do some of that evaluation in a broader context across the different vegetation types. So we actually have different - or we have guidelines for the different vegetation types that provides guidance to the frequency, or the preferred frequency, and timings of mitigation activities and prescribed burning more broadly, both from a hazard mitigation or a hazard reduction perspective as well as consideration of ecological aspects as well. And so some of those evaluation programs are able to test some of those.

15 And then also our - I think as I described briefly yesterday, also one of the key aspects of our fundamental evaluation is where there's uncompleted works and we consider that in an operational context in terms of making sure that that's still acknowledged in our operational planning as we go into the bushfire season.

20 MR TOKLEY QC: Thank you. Mr Harris, did you wish to add to what Mr Wassing has said?

MR HARRIS: Yes, again from a national park and a safe forest perspective, as I outlined yesterday, those areas have fire management strategies and these management strategies are in place for their protection zones, mitigation zones and conservation zones, and those zones have set objectives in terms of hazard reduction management planned burn program management. For example, in our protection zones there will be a range of activities that are established on an annual basis for the treatment of those zones from prescribed burning through to mechanical treatments of those areas.

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As I alluded to before, within our FLAME management system, a planned burn proposal will have those objectives outlined and we will report on the outcomes of that planned burn and whether those objectives have been achieved and that provides us an evaluation of the effectiveness of the hazard reduction program that we've then implemented. On a broader level, each of our parks are operated under the values based management framework and that has a principle of ongoing evaluation and monitoring assessment of the management effectiveness and that has been rolled out across our State. It's new but it's being rolled out across our State and it will have set management standards that need to be achieved, and we will be able to evaluate the effectiveness of our fire management programs through that system as well.

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MR TOKLEY QC: Thank you, Mr Harris. And now I might return to Mr Webb. Mr Webb, can you hear me?

45 MR WILLIAMS: I can, Mr Tokley. I'm on a different computer now. I've had a reboot and the first time being in the office for a little while, so I do apologise for those IT issues.

MR TOKLEY QC: Not at all, Mr Webb. Mr Webb, I think you were midway through an answer to a question when, unfortunately, you were cut off and we lost you.

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MR WEBB: Yes, I was talking about an evaluation process that we go through. So I described from a risk to life and property, how we take the fire history data and we use that to analyse changes to the risk profile to property. In a similar way, we use that data to analyse and understand changes to biodiversity values. And all our evaluation program, both from strategic through to the operation, was set within our monitoring evaluation framework, which sets out a series of key - key evaluation questions which look at the effectiveness, the impact and the improvement areas for our program. And that goes right down to understanding the objectives as set out in each burn, how each burn delivers and contributes to the overall, sort of, regional objectives that are trying to be achieved.

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And what I mean by that might be, we might have a three or four year program where we're trying to break up certain parts of the landscape, produce the likelihood of a fire, moving from known ignition areas or known, what we will call, ..... system, areas where we know fire, if it gets into there, will escalate and become a significant fire very quickly. We'll be looking at how we break up those. And we will then be evaluating our effectiveness against our strategies and our strategies are set out in our strategic bushfire management plans and described for our fire management zone. So I think chief officer, Chris Hardman, spoke to the zones yesterday, being landscape moderation zones, zones in the back country more where we're trying to target areas that might be ignition points, from lightning in particular, but also to reduce the likelihood of large-scale fires developing.

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And then also bushfire moderation zones where they're areas still a bit more remote from communities, they're sort of three to five kilometres where we're designing to try to break the landscape up in those key movement areas for fire, and then asset protection zones. So those burns and fuel management close to communities. We will evaluate the effectiveness and contribution of each of those to how we're, you know, achieving in meeting our objectives in the code as set out there.

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MR TOKLEY QC: Thank you very much, Mr Webb. Chair, that does conclude my questions on those matters.

COMMISSIONER BINSKIN: Okay. I just want to go through a few questions and I will start off at the higher level, then I will go to my colleagues. So for each of the States and Mr Webb is up, so without giving him a chance to think about it, I just want to put a question to each, a couple of questions. So, first of all, each State has a process of a strategy. You do your hazard reduction activities. You assess that, see how that's going to affect the season. The season occurs. You get the outcomes. You evaluate. Then you put it back into your strategy. The first question I have got for you: looking across our perspective States, for the 2019-'20 fires, where did those strategies have the expected effect and where didn't they, please?

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MR WILLIAMS: Yes, I will start with that. When we're talking fuel management program, often we're moving into a specific season, so when we had indication that the 2019-20 fire season was going to be an above average, in particular in East Gippsland, we kind of - and chief officer, Chris Hardman, spoke to that yesterday - we had that indication in, sort of, July, August last year. Unfortunately, our fuel management program can't really be changed a lot to respond to that seasonal change, and that's because, in Victoria in particular, we can't undertake a lot of spring fuel planned burning. We can undertake roadside slashing and mechanical treatments but they won't look to treat, at large, the landscape.

So our strategic planning has to be - our fuel management program has to look at the long-term in that sense. What we then do is when we pick up those sorts of indicators around dryness and those things, we will go to targeted activities that we can undertake in terms of readiness and prepared. So, how do we bring on additional firefighters? How do we work with the community to inform them of the likelihood of increased risk?

The other work we can do is we can start to identify where in the landscape do we think we have a predisposition to large fires? We do that through understanding the fuel arrangements and fuel availability. So how much, where, what sort of fuels? We also then look at the underlying dryness. So we might look at the soil dryness, we might look at stream run-off and things like that, to use an indication of these areas are primed to go, and we start to think about what can we do there. We might bring in additional aircraft and pre-position them. We bring on early firefighters to position them down there.

So the seasonal side of things, you know, as I said, we have a limited ability to shift an implemented significant fuel management program in that seasonal response, which is where we really need to be targeting and making sure our strategies are looking to make sure we are as well prepared in a fuel management sense as we possibly can over the long-term.

COMMISSIONER BINSKIN: Okay. So I understand all of that and your strategy is long term, but you had this strategy in place for three years, I think. So by the time you've got to July - June, July, it was already going to occur, but that strategy would have looked to at least mitigating - and let's just pick East Gippsland - mitigating East Gippsland. So now you're looking back at it from an evaluation point of view. You did that to have an effect. This is the lessons learnt part: where did it have the expected effect and where didn't it? I know that you would have adapted your operational strategy for the season but surely there's some lessons that you have already taken out of this to roll back into your strategy. I'm just interested in, did the fire go how it was expected in places or didn't it?

MR WEBB: A bit of both. Yes, it did go as expected. And we've done some good case studies that we have gone back and looked at where fuel management had an effect but also where it didn't. And we were able to and there's a good example where



fuel management provided a direct support to protecting communities in and around the Nowa Nowa area. That's an area also known as the Radar Hill burn for us, where we can show and see where fire spread was reduced by the fuel management program. But also we can see the contribution that it had to firefighting effort.

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So we go back each year and we will understand, and try to understand how and where fuel management has been effective but also where it hasn't been effective. Some of the areas we're looking at right now, and we're looking to the Hume areas too, we had a significant number of fires start in the Hume area as well as Gippsland. Why was the Hume area - were we more successful in first attack, and suppression activities in that area, compared to East Gippsland. And a lot of that will come back to the availability of fuels and the underlying dryness and even just the smaller differences that we experienced north of the divide in the Hume region and south of the divide in the East Gippsland region.

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But as part of our review of our strategies, we will be going back and looking at our fuel management and understanding what worked well and what didn't work well and that will be for all of the impacted fire areas across eastern Victoria. And those case studies that I spoke to and I think there's something in the order of six, that we've just finalised and completed, help us to do that and sort of asked those questions why that worked and why that didn't.

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COMMISSIONER BINSKIN: Okay. Thank you very much for your answer. Queensland, are one of you better positioned than the other to give that response or do I need to have both?

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MR WASSING: I can give a very brief one and then I think Mr Harris might be able to speak to the detail of it.

30 COMMISSIONER BINSKIN: Okay.

MR WASSING: To go to the specifics, yes, we've got a couple of case studies that would come to mind that are good indicators from already our lessons management. One would be with respect to Stanthorpe and Applethorpe, which is south-west Queensland. That was an example where, through Queensland Parks and Wildlife Services' contribution to the area fire management group, a location was identified. Very briefly, a hazard reduction burn was performed and, in fact, one of our fires in 2019 that started to the west of that impacted onto that hazard reduction burn, significantly reducing the impact on the township of Stanthorpe as well as post the wind change to subsequent impact damages as well.

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To answer the other part of your question, Commissioner, we are also aware of, from our lessons management, there are some areas of - that burnt in 2019 that had normally traditionally not exposed to bushfire and, in fact, that typically won't burn. And that is, whilst identified in terms of, from a treatment perspective, it also goes to the aspects of what's really important from a Queensland or a lessons management perspective of, in one case we're dealing with the hazard aspect but, really

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importantly, we also need to consider some of the other aspects of exposure elements, e.g., firebreaks and separation from fuel, and also then the community resilience in terms of the vulnerability aspects.

5 So they're the factors that we are still doing, and I think there's opportunity for improvement in terms of better understanding of all the different interplays of building codes, house protection, defendable space, community resilience activities as well as hazard reduction activities.

10 COMMISSIONER BINSKIN: Thanks.

MR HARRIS: Thanks, Mike. Again, from a QPWS perspective, I think the Stanthorpe example that Mike just provided, there were other examples similar to that, where the actions undertaken in terms of preparing for the season, particularly  
15 through implementation of the planned burn program, achieved outcomes where it protected life and property in the community; in particular in the Peregrine fire and also in other fires in the main range, Lamington area as well. During that period there were some 8000 fires across Queensland. Two per cent of those fires occurred on our protected area and State Forest estate and of those - of that two per cent, 75 per cent  
20 of those fires was contained on our estate, largely in response to the - both the extraordinary work that was undertaken by the firefighters and volunteers working on that, but also the hazard reduction arrangements that were in place for those - for those areas.

25 The seasonal outlook that is provided through QPWS informs our preparations. We knew we were in for a bad year so we focused heavily on preparing for that bad year, both in terms of implementing our hazard reduction programs but also being a prepared and response capability.

30 COMMISSIONER BINSKIN: Okay. Thank you very much for that. South Australia, where was the effect that you had expected and where was it not expected?

MR LOUGHLIN: Thank you, Commissioner. Look, in support and in respect of what my interstate colleagues have also said, I just want to make the point, I guess,  
35 that each of the major fires that have occurred in South Australia - and there are about six that we advised that have been our major incidents, including the Cudlee Creek fire in the Adelaide Hills and the Ravine fire complex on Kangaroo Island. Each of those occurred under catastrophic or extreme fire conditions. And, as we heard yesterday from the panel of professors, you know, the absolute experts in this  
40 field, there are limitations on the success of hazard reduction preparation activities as the fire danger index increases.

So where we saw, you know, at multiple times simultaneously half of our State under catastrophic fire danger index, it was both forecast and observed, the effects of, you  
45 know, fuel management and things like that is minimised by the severity of those conditions. So I do just want to make sure we sort of couch any statements with those .....

COMMISSIONER BINSKIN: No, no, I appreciate that and the difficulty of it. I'm just looking to see how you would make that assessment and then you're going to - noting we're actually towards the end of the hazard reduction for this period, for  
5 this year, how you roll those in, those lessons. And so what had an expected effect, noting it was catastrophic, what actually you thought was going to happen and it didn't, and how you roll those lessons in as well.

MR LOUGHLIN: And so in support of that, I suppose during the fire seasons,  
10 thousands of incidents occur during our summer here, and of that six fires of significance occurred and so, you know, it is quite arguable that we had some pretty good successes, numerous fires across the season, particularly those that occurred outside of those worst fire danger days. In those scenarios, we certainly are keen to evaluate and - and identify those successes, make sure that we maintain them. If  
15 there are areas where we go, well, you know what, from our observed experience in the season, more work is required, then we will target that.

Community engagement is obviously one that we target post these, you know, if a community has been impacted by fires. There might be more of a demand for  
20 information from residents in the area and surrounding areas about how they can be better prepared as well. So we focus strategies like that. So I hope that provides, you know, a bit more, I guess, of detail and clarity. It's certainly a continual learning process. And where our bushfire management committees and State bushfire coordination committee are meeting four times a year, there is plenty of  
25 opportunity for us to have those conversations and to try and learn from opportunities.

COMMISSIONER BINSKIN: Okay.

30 MR WILLIAMS: If I can just add?

COMMISSIONER BINSKIN: Yes please.

MR WILLIAMS: If I could just add, Commissioners. In Kangaroo Island,  
35 understanding it was a high impact fire, there are pockets of unburnt vegetation on the island that are unburnt because of previous hazard reduction burning and they have been critical in terms of threatened species conservation and moving forward in terms of the rehabilitation on the island. So we do know that those treatments have provided some unburnt patches within the landscape.

40 COMMISSIONER BINSKIN: Yes, and I appreciate that answer as well, when we're trying to manage the habitats as well. Thank you very much. I will go to my other Commissioners for questions. Commissioner Bennett?

45 COMMISSIONER BENNETT: Thanks Chair. I've got a couple of areas, actually there are three, but one of them I might not have time to get to it but couple of areas I would like to understand. I see that in each case we're getting people, from the fire

commissioner and then the, what they're variously named, the departments that are looking after forests and parks, if I can be generic about it. I don't really understand how they work together in terms of, and I think - dare I say it, I think it arose more with Queensland's description of what happens in terms of which information you  
5 have access to, how you utilise the information, how you work together, and then, if push comes to shove, how the decisions are made, if I can call that, at the interface.

We have some community discussions in the submissions about, they can be anecdotal, I'm not saying they're right or if they're wrong, but anecdotal suggestions  
10 about how it worked at the interface sometimes with two people turning up together or no one, or not working out who's in charge. So I guess I would just like to have a better understanding. I'm primarily interested actually in the use of information, and again from Queensland I mean, you know, it may have been just because of lists but, you know, which modelling systems do you have access to? Which ones do you  
15 apply? Are they the same or are they different and, if so, how does it work? I know it's a very broad sort of question but I think you understand what I'm getting at. So if I could have responses from the States I would be very helpful. South Australia is up, because you're on the screen at the moment.

20 MR LOUGHLIN: Thank you. Look, we are incredibly integrated; it's a very shared responsibility in this State. The various committees we have formalise those relationships, but an informal level as well. We are very closely integrated. The mapping support function and the information that we rely on to provide services in this area is actually provided to us from the Department of Environment and Water,  
25 so seamlessly integrated in that regard. We have not only those formal bushfire management committees and the State Bushfire Coordination Committee, but we also have, at the more tactical level, what we call fire management cooperatives, which is where, you know, the men and women who are planning and implementing these burns and these strategies can meet and discuss and, you know, readjust and  
30 strategise sort of thing at that level as well. Because these BMCs meet four times a year there is that opportunity too that - and, for example, you know, our highly valued volunteers and our firefighting partners from the Metropolitan Fire Service are represented on that committee. If there's an area where they have real concern, and whether that's on council land, whether that's on, you know, national park or  
35 forestry, those are the opportunities to bring those up and say, "This is an area we're concerned about. When is work programmed what kind of work and can we re-prioritise that, if required?" And that cooperation relationship is there. And from a response perspective under the legislation, the operational components, the firefighting components of DW of National Parks actually form a brigade of the  
40 Country Fire Service, and so there's that seamless command and function there as well. So hopefully that answers your question.

COMMISSIONER BENNETT: It does, thank you. Can I turn to Queensland?

45 MR WASSING: Yes, thanks, Commissioner. If I started with, basically a principle, if you will, of the shared responsibility and to really coin the phrase which is commonly used: you own the land, you own the risk. So that's the principle or the

basis of the aspects of mitigation, or the hazard mitigation and the hazard ownership aspect of it. The Queensland arrangements aims to bring together the stakeholders with their available information. We provide the core of those reporting systems in the form of the Phoenix, SABRE and Catalyst systems, as I indicated before.

5 Particularly the Catalyst system is the aspect that provides the integration, if you will, from a data information systems perspective, both from a risk identification and then also a reporting perspective. So that's the common element from an assistance perspective.

10 COMMISSIONER BENNETT: Excuse me for interrupting, just for one second.

MR WASSING: Sure.

15 COMMISSIONER BENNETT: Do you use the same modelling systems, because when you listed them earlier, each of you, you referred differently to Phoenix. I think Mr Harris said, "We have access to and we're able to use it", and maybe it was the lawyer in me, I didn't actually hear you say, "We do use it". Whereas you, Mr Wassing, you actually said you do use it. So it was that sort of differentiation perhaps in my perception that I was focusing on so some degree, about whether you  
20 actually use the same modelling systems or do you use different information systems? I mean, that's one of the questions that led me to ask the overarching question. Thank you.

25 MR WASSING: I understand that Mr Harris might be able to better answer that.

MR HARRIS: While we have access to those systems, it does mean we do use those systems. So they are the same, same systems. So QPWS administers those systems and they provide access to other government organisations including ourselves. So we are able to access and use those systems, and we do, in our planning and response  
30 arrangements with regard to fire management.

COMMISSIONER BENNETT: Okay. And when push comes to shove when there's an interface, I understand you say he or owns the land has the responsibility. When push comes to shove, is there really good integration in terms of the prescribed  
35 burning modelling and if there's a dispute, how do you work it out, I guess?

MR WASSING: Yes, Commissioner. Typically, and it's why the area fire management group is so important from a collaboration perspective, in terms of being able to decide what is the risk environment, the mitigation activities, and  
40 ultimately the decision-making around that. The only - I suppose if I go so far as to say a ban in terms of that would be that at certain times, from a hazard reduction burning perspective, there's certain times of the year that then, through prescribed guidelines that we exceed those guidelines or those thresholds, then it's too risky to undertake a particular activity.

45 In terms of the types of activity it is sometimes a negotiated aspect, particularly when you come to tenure blind aspects, where there's interface of multiple blocks

of private land with other land tenures, that they are very complex and require a lot of work; and that's why our operation cool burn focuses in those areas because they're often the areas that you want to do the greatest amount of work in terms of where fire potentially, from an exposure perspective, may impact on that assessment.  
5 So that takes a lot of time and effort in community engagement.

COMMISSIONER BENNETT: While you're there, that brings me up to the other area I was interested in. I've heard you both discuss the information that you get in and the modelling that you use, but also within a Queensland framework, if I can call  
10 it that way. And I know that you all collaborate, you all talk to each other around the country, you know, with various fora, but you heard yesterday, I think, that the Victorians made a comment, when asked specifically, that they could see a role for the Commonwealth in better modelling systems, maybe ensuring information - you know, provision of information on a national scale, and that that could come in more  
15 at an overarching level perhaps for the - because what I'm hearing is the various States use their own information gathering. You all have access to some common elements but there's a lot of local import, or differentiated import. I mean local, obviously, because there's obviously local considerations that would have to go into a lot of these decisions. But I'm talking more in that broader question of the  
20 information gathering and the modelling use, if I can call it that at this stage. Can you comment on what you see, with the suggestion that came yesterday from Victoria, on the utility or the usefulness of the sort of national input that could go into that, from Queensland's perspective? I'm going to come to the other States.

25 MR WASSING: Yes. Certainly, Commissioner. I believe there is opportunity there in terms of a - from a broader systems perspective and research perspective. There is a role for the Commonwealth with regard to that. I would go so far as to say that it's probably more about - less about prescribed outcomes and performance standards, but more, certainly from a systems and inputs perspective and understanding. And I  
30 would go so far as to say I think part of that is around systems and hazard, but I would come back to also the interplay between other risk elements that are really important in terms of ultimately the protection of life, property and even the environment in understanding building codes, where the best public value is and the best investment in terms of building design to defensible space or separation from at  
35 risk to reduction of fuel hazards and the like.

So to better understand the complexity of all of the intersections of the different elements of risk, I think would be certainly some of the work we're trying to do within Queensland. We've got some really good relationships with many national  
40 bodies now but I think there is an opportunity there.

COMMISSIONER BENNETT: Thank you very much. I'm being reminded that we're running terribly over time but I do want to find out if the other States would agree with that perspective? Perhaps I will go first to Victoria.

45 MR WILLIAMS: I already said it yesterday.

COMMISSIONER BENNETT: You said it yesterday, Victoria, so I will go first to South Australia.

MR LOUGHLIN: Thank you, Commissioner. Look, we certainly support the  
5 research components. I mean, the Commonwealth is uniquely placed to be able to  
provide that support and ensure that that research is well funded and able to occur.  
The bushfire natural hazard CRC has obviously been doing some tremendous work  
in this regard. Victoria mentioned things like better understandings of things like  
10 pyroconvective fire behaviour and inclusion of that into our various modelling  
systems. We strongly support that and that is something that requires a national  
approach to ensure that that is well understood. So, yes, fully support there being  
coordinated approaches to research and things like that.

As you have touched on, we do talk a lot about the various modelling systems. Our  
15 fire behaviour analysts that each State has are able to be deployed across the country  
and work with each other's, within each other's jurisdictions which, you know,  
speaks to the interoperability of those systems that exist currently, but certainly in  
that research component there is a lot of value.

20 COMMISSIONER BENNETT: Thank you very much. I'm really being pushed for  
time. Victoria, is there anything that you would wish to add?

MR WEBB: You asked - have you got me?

25 COMMISSIONER BENNETT: Yes, got you.

MR WEBB: Just on your first question you asked, the system one I think has been  
answered well. I think one of the ways that we work in Victoria that is really - we  
plan and model tenure blind. So that conversation we had around what do you do on  
30 the interface, we've identified the key areas on that interface that we need to work  
with the community and local agencies and governments. I think one of the real  
strengths that we do work in here, and looked at it more as strength based. So we  
work through the agency that has the connection to the community.

35 So in some places that might be through local government. In some places that might  
be through the parks authority, through the Country Fire Authority, or through  
ourselves and the department. And that way communities are connecting in a way  
that ..... And we integrate all our activities. So that might be weed works that the  
councils are leading that have a fuel management outcome. That might be roadside  
40 works that CFA or local council or local roads authorities are doing. But, really  
importantly, it comes off a single planning process that identifies where that risk is,  
and identifies who and how and the best way to achieve .....

COMMISSIONER BENNETT: Thank you very much.

45 MR WEBB: And we --

COMMISSIONER BINSKIN: All right. Thank you. Commissioner Macintosh?

COMMISSIONER MACINTOSH: Very quickly because I know we're short on time. I've heard you all today tell us about your fuel load monitoring systems, and I  
5 obviously appreciate how important it is for your hazard reduction activities to keep a good eye on those issues. What I heard from you is you use a combination of approaches. One is visual assessment. The second one was plots by which I think, I take that to mean physical measurement in plots. I'm seeing nodding from the gentleman from Victoria, that's good. And then the third one is modelling approaches  
10 whereby I assume you have accumulation curves that run off past events.

Do you see a role or a benefit in having, using satellite imagery or using Lidar as an improved way of capturing data? And do you also see the Commonwealth can play an important role in tracking fuel load across the country using those sorts of  
15 systems? I'll turn first to the gentleman from Victoria because you're nodding.

MR WEBB: Yes. Absolutely. I think the use of - absolutely, I think the use of technology to improve our ability to undertake, you know, quantitative assessment of fuel loads is really important. And there is work happening. There's a project being  
20 led out of RMIT through the CRC on, sort of, fuels 3D, which is about using technology to map fuels. Any platforms that we can use, be that remote sensing, be that drones, be that cameras, actually enable really quick and accurate information. And, importantly, that will really inform our operational planning. So the question earlier about understanding what the season looks like, any of that real-time  
25 information that we can put into our modelling will really improve our operational modelling and better improve our strategic planning for a better understanding of the fuel accumulation.

So I think what we really need here is we can describe the need, and then we need  
30 the opportunity with the Commonwealth in particular to talk about what are the tools and techniques that might be there; probably not going to have a satellite doing this and asking that question. I think we're really interested in having that conversation with a number of the Commonwealth level institutions.

COMMISSIONER MACINTOSH: Thanks, Mr Webb. Do the other jurisdictions have anything to add, or does Mr Webb accurately describe your position as well? Wave if you have major differences. I don't see any, so --

COMMISSIONER BINSKIN: Never wave at a Royal Commissioner. Okay.

40 COMMISSIONER MACINTOSH: Thank you, all.

COMMISSIONER BINSKIN: Thank you.

45 MR WILLIAMS: I would just add --

COMMISSIONER BINSKIN: South Australia, I think.



MR TOKLEY QC: Mr Williams.

5 MR WILLIAMS: I was just going to say I would add that I would support what Victoria said because it would be useful for my planning response and evaluation point of view.

10 COMMISSIONER BINSKIN: Okay. Appreciate that. Thank you. Thank you very much. And, gentlemen, thank you for this morning. It has been very informative.

MR TOKLEY QC: Thank you very much Chair. Gentlemen, the questions that came from Commissioner Bennett and Commissioner Macintosh, in fact covered topic number 2 that we were going to cover. So that has been dealt with. So that completes this morning's panel. Chair, if Mr Harris could be excused but he is also returning  
15 tomorrow, and then if the remainder of the panel participants could be released from their summonses.

COMMISSIONER BINSKIN: The remainder can be released and we look forward to seeing Mr Harris tomorrow.

20 MR TOKLEY QC: Thank you very much, Chair and if we can adjourn for perhaps 15 minutes??

25 COMMISSIONER BINSKIN: 15 minutes. We will adjourn until 11.30 Canberra time. Thank you.

**<ADJOURNED 11:13 AM>**

30 **<RESUMING 11:30 AM>**

COMMISSIONER BINSKIN: Mr Tokley, let's proceed, please.

MR TOKLEY QC: Thank you, Chair. Chair, Commissioners, I will be calling a number of persons from some different States and Territories. I think I will go  
35 through each of them and get them sworn first. So if I can have Mr Rob Rogers, the Commissioner for the New South Wales Rural Fire Service, please.

COMMISSIONER BINSKIN: Mr Rogers, good morning. Good to see you.

40 MR ROGERS: Good morning.

MR TOKLEY QC: And Mr Rogers, will you take the oath or affirmation?

MR ROGERS: Take the oath, please.

45 **<ROB ROGERS, SWORN>**

MR TOKLEY QC: The next is Mr Stefan De Haan, who's the Manager, Fire Management Services Branch, Western Australian Department of Biodiversity, Conservation and Attractions. And Stefan, will you take the oath or affirmation? I'm sorry, Stefan, I couldn't hear you. You may be able to hear me but I can't hear you.

5

MR DE HAAN: I will take the affirmation, please.

MR TOKLEY QC: Thank you very much.

10 <STEFAN DE HAAN, AFFIRMED>

MR TOKLEY QC: The next witness is Ms Georgeina Whelan, who's the Commissioner, the ACT Emergency Services Agency, and Georgeina, will you take --

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MS WHELAN: Good morning.

MR TOKLEY QC: Good morning. Will you take the oath or the affirmation?

20 MS WHELAN: I will take the oath, please.

<GEORGEINA WHELAN, SWORN>

MR TOKLEY QC: And then we have Mr Neil Cooper who's the Senior Director, Fire Management Unit, ACT Parks and Conservations Service. And Mr Cooper, will you take the oath or affirmation?

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MR COOPER: Yes, good morning. The oath. Thank you.

30 MR TOKLEY QC: Thank you.

<NEIL COOPER, SWORN>

MR TOKLEY QC: And then we have Mr Ken Baulch, the Director of Policy and Planning, Bushfires Northern Territory. And Mr Baulch will you take the oath or affirmation?

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MR BAULCH: Good morning.

40 <KEN BAULCH, AFFIRMED>

MR TOKLEY QC: And finally, we have Mr Jonathan Vea, Assistant Director, Planning Services, Northern Territory Department of Tourism, Sport and Culture. And Mr Vea, will you take the oath or affirmation?

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MR VEA: An affirmation, please.

<JONATHAN VEA, AFFIRMED>

<EXAMINATION BY MR TOKLEY QC>

5 MR TOKLEY QC: Thank you very much. Participants, this morning we will be  
going through, I hope, three topics. The first of those topics is your jurisdiction's high  
level arrangements or architecture for the mitigation of natural hazards through land  
management, including the strategic objectives and priorities with reference to  
bushfires. I will announce each of the topics before we address them. I will ask each  
10 of you in turn to speak to those topics, and then at the end of each topic there may be  
some questions from the Commissioners.

If I may turn first to New South Wales, and Mr Rogers, could you please outline the  
State of New South Wales' high level arrangements or architecture for the mitigation  
15 of natural hazards through land management? Feel free to use bushfires as an  
example of a natural hazard, and if you would also please address the objectives and  
priorities for hazard reduction.

MR ROGERS: Certainly. So for bushfires, the Rural Fires Act is the peak Act in the  
20 State of New South Wales. It constitutes what's called a bushfire coordinating  
committee. That coordinating committee has 13 members. It has myself as the chair  
but basically everybody that happens to be involved in bushfires, so land  
management agencies, fire agencies, law enforcement, local government,  
environmental agencies, so everybody that's a player. And that's the peak body for  
25 the State.

Now, as a subset of that, there's what's called local bushfire management committees  
that are established across the State, and they are either single or groups of local  
government areas. And they have similar representation on each of those - on each  
30 on of those committees, and each of those committees is charged with carrying out a  
number of functions. Number one is to have an operations plan on how agencies  
work together in that particular local area in the event of fire.

The other one is to create a fire trail plan for the area. And the other one is a risk  
35 plan, and that risk plan is basically an assessment of that local government or group  
of local government areas and it basically looks at what are the risks in the area, and  
then it basically puts those into a hierarchy of risk, starting off obviously at the upper  
end of catastrophic, major, moderate and then minor. And those - and those risks are  
assessed based on their threat to either human settlements, environmental asset or  
40 other assets.

When you start going into things like human settlement, there's another, then another  
assessment that goes on that basically looks at things of distance between vegetation  
and the settlement itself, the size of the settlement; and that all, I guess, inputs into  
45 the priorities that are assigned to that particular area.

Once those priorities, which are the ones that I ran through before, are assigned, there's then a treatment schedule prepared that basically identifies how we're then going to treat those areas. And that treatment could be from mechanical works, it could be community education, it could be hazard reduction burns, and each of those areas of - sorry, and I should have also said it also creates things like asset protection zones, strategic fire advantage zones and land management zones across the landscape. And within those, obviously the risk areas then those targeted treatments are identified. And then obviously the agency that has responsibility for that land - and if that's say a national park, clearly National Parks would have primary responsibility, but it could be public land like council land, but it could be RFS, it could be private land. But generally agencies work together in getting those works done. I'm not sure if that's covered everything you were looking for?

MR TOKLEY QC: Thanks very much, Mr Rogers. I was wondering do the objectives and priorities vary according to the land tenure, or are they the same, and they only vary according to the nature of the risk?

MR ROGERS: No, they only vary due to the nature of the risk, the land tenure. The only thing that may affect it from a land tenure point of view, you might find on some of the public lands, there may be more known about that land, in which case, say some environmental risks may be highlighted, you know, more comprehensively than it might be on other land.

MR TOKLEY QC: Thank you. In your answer I think that you mentioned the higher order of risk assessment that's undertaken, and so is it fair to say that the objectives and priorities are driven by a risk-based approach to hazard reduction?

MR ROGERS: Yes, absolutely. And those risks, obviously, are first and foremost risk to life and property and obviously then environment. But, you know, we assess where human settlements are, what the risks are to those human settlements and then - and then obviously what we need to do to protect them. But, yes, it's absolutely driven by a hierarchy of risk.

MR TOKLEY QC: Thank you. I imagine that the - we will come to this in the planning process as well - but I imagine that the objectives and priorities may be influenced by circumstances unique to the jurisdiction. For example, the geography or --

MR ROGERS: Well, I think the - and certainly, yes, the risk itself, but also the treatments. The treatments may well need to be tailored to the particular area. And if you look at some of the areas where there's, say, ridge top development, somewhere like Sydney, for example, where you've got ridge top developments, national parks in valleys below that, mechanical treatment is very, very difficult to get in behind homes because if you do clear the vegetation you will cause things like instability on those slopes.

And so things like hazard reduction burns become quite an important part to try and minimise the risk, but very, very resource intensive in trying to get them in, in those areas that are completely surrounded by very densely populated areas and pockets of bushland that still pose quite a hazard if they're ignited in the wrong particular way.

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MR TOKLEY QC: Thank you very much, Mr Rogers. I might now turn to the Australian Capital Territory, and --

MS WHELAN: Good morning.

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MR TOKLEY QC: Good morning. Ms Whelan and Mr Cooper, I would be grateful if you could outline your jurisdiction's high level arrangements or architecture for the mitigation of natural hazards through land management. And, again, please feel free to use bushfire as an example of natural hazards, and also if you would, in your answers, take into account the objectives and priorities for hazard reduction.

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MS WHELAN: Absolutely. So there's a sound framework under which we operate in the ACT, obviously, informed first and foremost by our legislation, the Emergencies Act and then a series of cascading policy and plans that guide our approach. The architecture that we have within the ACT, and I will step through that in a moment, provides a combination of the strategic direction, oversight, governance and informs how we plan and prepare to respond.

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Of course, this is also informed in the ACT by ongoing research and the close working relationship we have with our States and Territories through AFAC. The system under which we operate is captured very comprehensively in the ACT Strategic Bushfire Management Plan. We have had this plan for the last 15 years in the ACT and it's delivered in five-year cycles in accordance with the Emergencies Act, each cycle lasting five years.

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Our plan reflects the continuous and incremental approach we take to bushfire prevention, how we manage and develop emerging firefighting capabilities, and how we balance the needs in terms of the capacity we require across the ACT. Of course, we have a very extensive by the nature of our size and we engage readily with our community. We have significant community engagement and education that complements and it also informs the plan. Now, our plan has five things - I will touch on those in a moment - 12 key objectives and 92 actions that fall out of those 12 objectives. And it's a plan informed by a management approach we take, behaviour of fire across the landscape, is factoring changes to climate and seasonal weather patterns, national and international lessons learned and, of course, as I mentioned before, our community feedback.

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Getting to the question you've just put to us is two sections of the plan. The first one is really articulates the context and our approach to risk management and the second part looks at bushfire risks and how we address that through fuel reduction, fire access, our approach to adaptive management and climate change, and the close

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relationship we have particularly with our land managers, EPSDD who manage 80 per cent of the land across the ACT and inform the approach that we take.

5 Section 1 of our plan clearly articulates the government's arrangements to ensure that we have the oversight and the intersection of a whole of government ..... in the ACT. This includes our security and emergency management senior officials group who provide that strategic direction, our security and emergency management planning group whose membership spans the entirety of the ACT Government directorate and agency, who have a part to play, whether it be in support of or leading on the action, 10 and achieving the directives, and also ensures that we have the linkages in through our legislation.

Key to this then and what falls out of that is a series of plans and sub-plans that guides our actions over that five-year cycle. And we've done this to ensure the ACT 15 can mitigate, plan for, and respond to emergencies such as bushfires. It also clearly articulates to us the importance of our relationship with our strategic partners and as an island within the AC - within New South Wales, our strategic relationship with New South Wales RFS in particular is very important, and the plan outlines the various memorandums of understanding and cross-border relationships and means of 20 managing cross-border issues across the ACT.

Understanding and identifying risks to inform our approach to methodologists and mitigations also articulate the approach we will take to treatment. The SBMP 25 articulates our whole-of-government integrated agency directed approach to this, through a series of cascading plans and activities. First and foremost, the plan identifies our bushfire prone areas in the ACT and clearly articulates our fire and management zones as warranting priority fuel management actions, and also the appropriate access for our fire agencies. The Strategic Bushfire Management Plan also touches upon planning and development control to lower the risk, including land 30 management plan. And the hierarchy of plans and where they sit in our continuum of managing and responding to the risk of bushfire, is outlined in the Strategic Bushfire Management Plan.

This includes our regional fire management plan, our bushfire strategies and the 35 specific actions to be taken. These actions are allocated to the most appropriate area or agency across government and articulates the required outcomes which are then monitored and evaluated through the governance construct we have developed, which oversees the execution of the actions under the Strategic Bushfire Management Plan and also a second layer of governance which is the ACT Bushfire 40 Council, which we report to on a monthly basis.

Overall, the close working relationships between the ACT Emergency Services Agency, our land managers, predominantly at EPSDD, our rural landholders who we remain engaged with throughout fire light programs and the work that we do across 45 the other minor landholders, provides us with the situational awareness, the risks of key high-risk tasks that we must undertake, and then the governance framework

under which we then monitor and provide that level of surveillance to the activities that's undertaken.

5 MR TOKLEY QC: Thank you very much, Commissioner Whelan. Commissioner Whelan, would it be fair to say that the priorities as appears to be the same in other jurisdictions; that is, first and foremost there's the protection of life, property and the environment?

10 MS WHELAN: Absolutely. So life, property and the environment obviously are paramount followed by that balance between understanding the needs of our ecosystem, working with the community and also then factoring in our urban and planning requirements as well.

15 MR TOKLEY QC: And is it fair to say that the objectives and priorities remain the same regardless of land tenure?

MS WHELAN: Yes, they do, and I would say that the approach that we're taking as introduced specifically last year, through our principal land managers EPSCB incidence of residual risk and the approach to a residual risk that management practices, underpinned by our adaptive management values, allow us to maintain, not 20 just the situational awareness, but I think underpins the efficacy of the steps that we take in terms of risk reduction.

25 MR TOKLEY QC: And is it also fair to say that, overall, the approach that's taken is a risk-based approach; that is, the risk to those priorities?

MS WHELAN: Absolutely, it's very much aligned to that.

30 MR TOKLEY QC: To what extent, if at all, are the objectives or priorities influenced by circumstances unique to the jurisdiction, for example, geography?

MS WHELAN: Obviously, geography is a key issue for us and, as I mentioned before, particularly where our risk areas are, the importance of the cross-border relationships and memorandums of understanding that we have with this. 35

MR TOKLEY QC: Thank you very much, Commissioner Whelan. Does Mr Cooper wish to add to anything what the Commissioner has said?

40 MR COOPER: Yes, counsellor, I would like to, if that's okay?

MR TOKLEY QC: Yes, of course.

45 MR COOPER: So, as the Commissioner mentioned, this Strategic Bushfire Management Plan which is the overarching document, my agency, the Parks and Conservation Service, sits under the Environment Planning and Sustainability and Development Directorate, a bit of a mouthful. But in the ACT we manage over 70 per cent of the land in the ACT. Now, the ACT is not that big; however, we are the

major landowner, or land manager. The SBMP, the Strategic Bushfire Management Plan requires the development of an annual bushfire operational plan by every land manager. So obviously ours is quite large. The system is such that the annual bushfire management plan is purely an annual works plan.

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What we needed, and we realised sometime ago, is more of a longer-term look across the landscape. So we developed what we call the regional fire management plan and that's a five-year plan with a 10-year outlook. So it's looking more - because fuel management is more than one year's worth of work. It's an amalgam of each year's subsequent workload. How we did that - you mentioned risk management before. Several years ago we unashamedly talked to our colleagues in Victoria and utilised the residual risk concept that I know was spoken about yesterday. We divided the ACT up into one kilometre grids. We ran 7000 fires, 530,000 simulations because what we wanted to do was to see where we got the best outcome, the most reduction in risk from our activities.

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So, in doing that modelling through Phoenix Rapid Fire and residual risk, we were able to identify where we were best suited to undertake fuel management. Now, that fuel management could be a range of things. As other people have mentioned, it's not just burning. There's chemical, there's physical removing, there's grazing, slashing, etcetera. So we came up with a list of areas that we needed, or we thought we needed to treat to reduce the residual risk across the Territory over a five-year period. That document goes out to public consultation. Everyone looks at it. It has been approved, and now we just draw our annual bushfire operational plan out of that regional fire management plan.

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I suppose one other thing, I know we will talk about risk later on, but we've added to what the Victorians have done and we've used a program called Woodstock which enables us to optimise when and where we undertake that fuel management, taking into account ecological issues, water catchment values and a range of others things. So yes, it is life and property, we know that, but being a land manager, the ecosystem and the environment comes a very strong third. So we've developed our fuel management around making sure that we look after the environment as well.

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MR TOKLEY QC: Thank you very much, Mr Cooper. I will now turn to Mr Stefan De Haan from Western Australia. And Stefan --

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MR TOKLEY QC: Yes, Mr Tokley.

MR TOKLEY QC: -- could you please outline your jurisdiction's high level arrangements or architecture for mitigation of natural hazards through land management? And, again, please feel free to use bushfires as an example of a natural hazard. And would you also, in your answer, refer to the objectives and priorities for hazard reduction?

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MR DE HAAN: Certainly, in terms of how DBCA Parks and Wildlife Service address this issue we operate under the State's strategic control priorities for all



hazards. So, much like the other jurisdictions, protection and preservation of life takes primacy. There are another suite of State strategic patrol priorities below that around communities, critical infrastructure, community livelihoods, and important for us, a land management agency, environmental and heritage values. So I guess that approach is the framework under which we operate in terms of our risk reduction.

Now, in terms of Western Australia, we're obviously a very large State from south to north and west to east, so we do have a variability of approach across our regions. So I guess I will focus largely on what we do in the south-west forests because we've got a long history of risk mitigation in that space, but also touch on, I guess, some of the nuance maybe in some of the non-forest remote regions. So in terms of the south-west forests, I guess we've got a long history, as I mentioned, of 60-plus years of an approach to risk mitigation that has been heavily informed by research, applied science and operational evidence.

And what that has indicated to us is that basically within those forests, if we're able to maintain the broader landscape at a fuel age of about 45 per cent of the lands that we manage at less than six years of age, we will see a significant reduction in the extent of bushfires that occur across that landscape. So that's our, I guess, the overarching approach to how we - how we address some of the more finer scale targets below that. And out of that 45 per cent of less than six years, that roughly equates to us undertaking 200,000 hectares of prescribed burning on an annual basis.

And I guess also I must add in there that we do use a lot of other measures, mechanical mitigation, we control those types of things. But predominantly in the Western Australian context and in the south-west, prescribed burning is our major mitigation tool, backed up by that sound research base that we have.

So then below that nominal 200,000 hectare target, we have land management zones which are basically concentric land management zones around urban environments, town settlements, etcetera. So we have three zones and within those zones I guess the first zone goes from the interface out to about three-and-a-half kilometres and we break down that larger nominal target to aim to achieve about 20,000 hectares of prescribed burning within that immediate zero three-and-a-half K zone around settlements. Then we move out to three-and-a-half K to the 11 K zone where we aim to achieve about 70,000 hectares, and then out into the broader landscape where we aim to achieve about 110,000 hectares. And I guess that breakdown across those three zones is in recognition of how fire behaves in that environment, and particularly in both the dry and wet eucalypt forests, recognises the issues that can be caused by spotting.

So that's the overarching context in the south-west. And then from that we develop a three-year indicative burn program which I guess guides where we will go with our risk reduction measures. What drops out of that is some of those other mitigation techniques that I talked about, but again the focus on prescribed burning. And then that three-year indicative program, I guess there's a fair degree of flexibility built into

that to recognise, I guess, we need to adjust that on an annual basis in recognition of whatever bushfires we may have over our summer months, or based on what our achievements are in risk mitigation.

5 And then that informs our approach to an annual burn program which is more the operational implementation on a yearly basis. And there's a feedback loop from that on an annual basis which I guess informs the redevelopment of the three-year indicative program and both the annual program. So that's in the south-west of the State. And what also informs that process across all regions, including our  
10 south-west regions, are our regional fuel management plans, which I guess identify on a finer scale the regional priorities; priorities around risk related to protection and preservation of life, and obviously a lot of the other land management values that we have in our charter.

15 In recognition of the fact that we've got that quite robust framework in the south-west and have done for some years, in our non-forest regions we have not had that. And that's - that's a recognition of, I guess, where the bulk of the population of Perth is, where, I guess, the distribution of the lands that we manage are, but there is a need to have a more robust framework that we can apply across the State, including the  
20 south-west. And so we're in the process of rolling out, I guess, a more contemporary program that is based on some of those principles that I talked about in the south-west, which sees us breaking the State down into eight bushfire risk management zones that have similar natural and social values.

25 And then, in broad terms, we group the various vegetation types into 13 different fuel types that are based on their structure and arrangement. And then below that in - sort of mirroring that zonation approach that I talked about, we then break that down into a settlement hazard separation zone, critical infrastructure buffer, landscape risk reduction, remote area management zones; and within each of those zones we define  
30 a level of acceptable risk which equates to really, I guess, a target of how much fuel we need to treat to get that acceptable level of risk. For example, in the eucalypt forests in that settlement hazard separation zone within about five kilometres of settlements we would be seeking to have 60 per cent of the fuel less than our threshold intensity or less than six years of age.

35 So that's our broad approach there. And I guess one other thing, I guess, that I need to sort of highlight is we obviously have a framework, but that framework is heavily informed by the embedded research capacity we have in the agency and have maintained for many decades. So I guess there's continuous learning and refinement  
40 as we go there. And what also can't be overstated is the input of professional judgment of fire practitioners as well into that approach.

MR TOKLEY QC: Thank you very much, Stefan. I might now turn to the Northern Territory and to Ken Baulch and Jonathan Vea. And, gentlemen, I will leave it to you  
45 to decide who answers the question or whether it's both of you. But, again, could we start with a brief outline of your jurisdiction's high level arrangements or architecture for the mitigation of natural hazards, through land management and again using

bushfires as an example of natural hazard, having regard in your answers to the objectives and priorities for hazard reduction. Ken, is that convenient for you to answer that question?

5 MR BAULCH: Yes, thank you, counsel. Jonathan, with your permission, I will start off. I think that I will focus on bushfire mitigation. In the Northern Territory the Bushfires Management Act applies across all of the Territory apart from the major urban areas. And so, in effect, it's about 99.8 per cent of the land area of the Territory that the Act applies to. The Act is tenure blind, so it applies equally across all  
10 tenures: pastoral leasehold, freehold, Aboriginal land. And so on. And at its core the Act allocates responsibility for bushfire management to the landowner.

It doesn't aim to exclude fire. It recognises fire as an important land management tool and it allows people, in most cases, to use fire that way. In terms of the structure of  
15 the way, the high-level structure of management of bushfire, the Act establishes a bushfire council which has the role to advise government and the minister on bushfire matters, and it sets up a series of regional bushfire committees. As I said, it doesn't focus on fire exclusion in most cases. It allows the use of fire as a fire - as a land management tool.

20 It's important, I think in the Territory context, to realise that the use of fire to manage land has occurred continuously for millennia, for a very, very long time. The use of fire by traditional owners and their ancestors is widely accepted as a sensible land management approach and a sensible mitigation approach, and it's now widely  
25 adopted by others, other land managers as well in the Northern Territory.

It's common, for example, if I can give an example, the north-west top end of the Territory, where Darwin is and where most of the population and many - much of the infrastructure and assets are, it's not uncommon for 25 to 30 per cent of the land area  
30 of the north-west Top End to be burned early in the season to reduce fuel and to mitigate hazard - bushfire hazards. There are some areas where a higher level of regulatory control is invoked by the Act. These areas are called fire protection zones and they're declared in areas around the major population centres. The higher level of regulatory control really comes down to requirements for establishing firebreaks, and  
35 for needing to obtain a permit before using fire in those areas.

I may not have mentioned that in the wider areas of the Territory, outside of those fire protection zones, you do not need a permit, to obtain a permit before using fire for land management purposes. In terms of breaking down that regulatory framework  
40 a little bit more, the Territory is divided into five fire management zones, and those zones are areas of where there are common social and environmental values, I suppose. There's one in the arid zone, there's one in the grasslands where the major pastoral areas are and so on.

45 The Act also establishes a regional bushfires committee for each one of those zones. And my organisation, Bushfires NT, works closely with those committees to produce regional bushfire management plans for each of those fire management zones. The

plans identify and assess risks and they discuss available resources and treatments for those risks, and they're published and widely promoted to landowners in those regions as they provide a lot of advice and guidance for fire management, and a large part of that advice relates to mitigation activities and where and when they should take place.

At more local level, and purely in the fire protection zone, the Act allows the establishment of volunteer bushfire brigades. It's important to understand that the volunteer brigades in the Northern Territory are better thought of as groups of landowners working together or collaborating to manage fire in their area, rather than, I guess, additions to existing fire management agencies.

My organisation, Bushfires NT, isn't a fire management agency. It's not a response agency. It works with landowners and with those volunteer brigades to help them manage fire on their land. So we work extensively with those - with landowners and volunteer brigades in the fire protection zones to plan hazard reduction activities and to plan and implement hazard reduction activities.

That's, I think, in a nutshell, the structure of fire management in the Territory, but I could perhaps ask Jonathan for a little more detail about how that works on the ground.

MR TOKLEY QC: Thank you, Mr Baulch. Jonathan's answer may be more relevant to topic number two which is about planning, so perhaps we could wait till we get to topic number two. And I will just see if the Commissioners have any questions arising out of topic number one which was the high level arrangements or architecture regarding mitigation of natural hazards through land management.

COMMISSIONER BINSKIN: Yes, I do and it might actually lead the conversation a little bit into the next part as well. And for the witnesses, if you followed yesterday, one of the things that we're interested in is, in that planning and the architecture, it's obviously the delineation of authorities and responsibilities. Now, some of the States have a single fire authority, a bushfire authority, or whatever. Most of the States have a number of authorities that all have actions to do with bushfire mitigation and then the actions during a fire.

Now we're talking about planning at the moment, we're talking about hazard reduction. We had a statement yesterday from one of the witnesses, "You own the land, you own the risk". That's all well and good. That might be the risk mitigation, but actually if something gets out of control off your land you don't own the risk, you've spread the risk to somebody else. And so we're trying to get a good understanding at the architecture level of how that is managed within the States from a coordination point of view.

For example, who looks at what is the critical infrastructure from a State point, from a system point of view, and then how does that flow down? Now, you talk about at the logical level, many of you, a local level, but they look at the critical

infrastructure, they look at assets and all that, and look to put in their plans around it. But is it fair to say that it is left to the local level or is there a higher level decision-making process of delineating that critical infrastructure and flowing that down? And I might go to the New South Wales first, just to talk about that, please.

5 Mr Rogers?

MR ROGERS: Thank you, Commissioner. So in New South Wales, it's - I mean, I think those statements about owning the fuel, owning the hazard are indeed correct, but I do take your point about those hazards can easily spread from a particular land and that applies to private land, public land, you know, a whole range. I guess  
10 our - from a risk planning point of view, we have these local bushfire management committees that are all the players involved, including people like farmers, and the like, to try and bring in those private land owners as well. And in carrying out the work, in executing the risk plan on a five-year cycle, they're obviously expected to  
15 carry out the work that has been assigned to them that they've committed to do.

But there is a reporting regime that happens each time the committees meet and, indeed, the State bushfire committee, Bushfire Coordinating Committee, gets reports on how each of those committees are performing; from a point of view of having  
20 hazard reduction burns, you know, the environmental checks done, the plans done to actually get it - get the work actually done by the mechanical works, there's resources sought to do the burn. So all of those things come into a centralised system at a State level. It's an all-agency system called BRIMS and, basically, that system then  
25 provides reports to the coordinating committee.

And that coordinating committee, chaired by myself, has all of the, you know, very senior members of those agencies, and at that level we talk through how we're going and how we're going as far as achieving those plans, and if they're needing some intervention at that point then obviously that can occur from that level. Taking a  
30 more - I guess a more tactical view of that where you've got, say, a hazard that's not being managed on land, be it public or private, anybody has the ability to complain to the Commissioner of the RFS, myself, about a hazard that someone owns that they're not managing appropriately. And then our agency will inspect that hazard. If we determine that there is indeed a failing on behalf of that landowner in mapping that  
35 hazard, then we will direct that landowner to carry out that work.

So whilst there's a multitude of agencies involved in the, you know, the carrying out of this work, the lead agency in New South Wales is the New South Wales Rural Fire Service, and that's very much enshrined in both the Rural Fires Act but also in the  
40 State Emergency Management Act as well from an operational point of view. So I think it's fair to say that there's - there's quite a tight hierarchal structure that outlines, you know, the responsibilities as it arises at both a local level, land manager, be it public or private.

45 COMMISSIONER BINSKIN: Okay. That's a good answer. I've got a question. Now, when we first looked at this session we actually asked for a New South Wales parks and wildlife representative in this session from a planning point of view and that

didn't occur for various reasons. We have a member this afternoon. I will put this question to them. But to you, I will put it to you, and it will be an example. You don't have to answer it specifically but I will give you the issue that concerns us.

- 5 The one thing that regularly comes up, whether it's interaction with the public, through the public submissions and the like, and it has been a constant, has been a comment or issues with National Park and Wildlife Service where a fire might have started there or might not have started there, but when it got that that land it took off and it was difficult to manage. And so the common views out there were that this  
10 was due to not as much hazard reduction in those areas, firebreaks not being appropriate, fire trails being blocked and the like.

- In those sorts of circumstances - and it could be public land, it could be whatever - it could be whatever, in those sorts of circumstances, as the authority, if you were to  
15 see issues in this planning that you would see as a risk to a coming season or a risk to the strategy not occurring as planned at the high level of the coordination committee, what authorities do you have across departments to be able to try and bring that, your call as a professional on bringing the risk down in an area that you might see?

- 20 MR ROGERS: Well, I guess the authority very much orientates itself towards a hazard against something, so, and I'm paraphrasing here .....

COMMISSIONER BINSKIN: No. That's okay. Yes.

- 25 MR ROGERS: And it's very much about what's at risk. But I mean, if we looked at last season and I know exactly the comments that you're talking about, and obviously I've heard them myself, and I know that there's been similar representations to the State inquiry, for example, that we've been questioned from that inquiry. And I think it's fair to say that what we saw was, where we've had these lightning strikes that  
30 occurred right across the State, from the Queensland border down to the Victorian border throughout that season, and most of the lightning strikes that occurred on the mountain ranges. Most of those mountain ranges are national parks by nature of the very terrain that they're in.

- 35 So I guess there's an entry there where fires start in those areas and we've got to obviously, I think out of this season, look at those areas and work out how we treat those differently. But - so to go to your point I think - I don't think, from a New South Wales perspective, that we're saying that everything we do is great and there's no more - nothing more to do here. I think there is more to do here and I think we  
40 have to learn lessons from this last season, and I think we need to understand and wait for results of inquiries that talks about how we deal with those. And I guess the - and to getting around to the point about authorities, having the authority to do something and the ability to do something is two different things.

- 45 And I guess from a New South Wales perspective we have 48 million hectares of bushfire prone land in the State and, you know, you think about the quantum of that land to treat is quite difficult. 20 million hectares of that are forests. And, you know,

and trying to treat those areas - and I know people like National Parks and Wildlife work very hard, as do other agencies, to try and get as much hazard reduction done as we can.

5 So there, I guess the answer, and I know I've gone a little bit of a long way around  
answering your question, but there's no point in expecting something to be done if it's  
not - if it's not capable of being done. So I think that what we're clearly looking at  
trying to do out of this last season is understand how we might do things differently  
and how we might do things in a different way to achieve a better result. The  
10 complexities of getting hazard reduction done are enormous and, look, I could  
probably talk for some time on this, but I won't stray too far from your question.

COMMISSIONER BINSKIN: No, I appreciate that. And with that question, sort of,  
reading the submissions and what we have, I've read the Bushfire Management  
15 Committee guidance that I think must flow from the Bushfire Coordination  
Committee down on - and I notice it's a dated document. It's back in about 2008, I  
think it was produced, and it left a lot of questions as I went through it. But I noticed  
you gave a very detailed RFS response prior to this, which I won't call up, that had a  
lot more detail in it, and obviously there is a lot more detail that goes into these  
20 planning functions.

I also noted that you're looking to update that guidance to the lower committees. Can  
you just tell us maybe some areas that you're going to go in providing better  
guidance for this planning for the committees so that they can do this hazard  
25 reduction?

MR ROGERS: Yes, certainly. And I think one of the them is the new version risk  
plan that we're piloting at the moment and it's a risk plan that meets the ISA standard  
on risk management, and it basically uses the Phoenix Rapid Fire simulator to  
30 basically simulate a whole lot of fire across the landscape, and then determining what  
assets are at risk and to what levels they're at risk throughout the landscape. And  
rather than using more of a manual method which is - and sort of some more crude  
methods to implement current framework, this will be a bit more consistency right  
across the landscape and it would look at the current fuels, current fuel plus five  
35 years, based on the life of the plan, being five years, and then the fuel load based on  
the projected treatment regime, what the fuel - residual fuel loads that would be left.  
And then it will obviously have a relative risk reduction and then be able to - us to be  
able to focus our resources better in ensuring that we've got the - we can address the  
risk - residual risk as we go into each season.

40 At the moment, I mean, we can look at hazard reductions, where that occurred and  
indeed we do look at those every year when we've got fires occurring and it's  
interesting in the last five seasons, sometimes hazard reductions work really well,  
sometimes they really didn't seem to even pause the fire. I think there's some  
45 significant work, we need to do more looking at the quality of hazard reductions and  
making sure we're adequately reporting those. So I guess this new plan which  
operates on a sort of Bayesian network, which I think has been used in the medical

scenarios, we think from the risk management perspective will be much more superior than what we currently do, and we're trialling that, as I mentioned, at the moment.

5 The other thing I might just mention is the introduction of the Guardian system which will replace our current BRIMS network which will basically be again an all agency in reporting everything that goes on. So there's a one stop shop from a State point of view. The New South Wales government has invested significantly into this system to ensuring that it's going to be available this year indeed to ensure that  
10 there's also a community portal for that. So people will be able to go in there, look into their particular area, see what's occurred, see what's planned to occur, and obviously be in a position to get much better data and information from fire authorities than they've been able to traditionally do.

15 So both of those areas are things that we see as quite exciting for us and be able to deliver a better service to people, and indeed the various fire authorities across the State.

COMMISSIONER BINSKIN: Thank you for that. That's a good segue. What I will  
20 do is I will actually give you a breather. My colleagues will have a couple of questions on information and the like for that. I know colleague on the left will have a bit more he would like to draw out on where you see your strategy going.

If I can go to the island within New South Wales and just to Georgeina and  
25 Mr Cooper just quickly, and so Commissioner Whelan, you've mentioned working closely with RFS and the like, but I also note bordering to the west of the ACT is New South Wales Parks and Wildlife Service land and I know that you work with Mr Cooper very closely in all this. But can you just talk about how you work a strategy where there's actually four agencies all working together for a common  
30 cause here and how you do bring that together? And if there is an issue on a priority, who gets the call on how you try and sort that out?

MS WHELAN: Thank you, Commissioner. So, as I touched upon, ..... question .....  
35 The architecture under which we operate in the ACT lends itself to probably a more robust and reliable ..... and affecting the change or the direction that needs to be undertaken by the various agencies that have been allocated the key objectives and actions under those objectives from the strategic bushfire management plan.

So obviously in my role as the Commissioner of the Emergency Services Agency,  
40 under our umbrella, of course, is Rural Fire Service, urban Fire and Rescue, the State Emergency Service and our ambulance service. The fire management response capability that sits within Parks and Conservation becomes a brigade under the Rural Fire Service once we move into a response phase. Leading up to that, in terms of the allocation of accountabilities and responsibilities, I approve all of the fire  
45 management zone areas of allocation. I also approve all the bushfire operations plan, from all of the land managers that Mr Cooper referred to earlier in the piece.



- And as a consequence of that, I can either work directly with an accountable area for their delivery on those objectives and if we hit a point of friction, where prioritisation has to occur, ultimately through our auditing process, but most importantly our security and emergency management senior operations group is the platform or the mechanism that I would utilise for a higher level officials group to be able to discuss and where I can make my very strong recommendations on prioritisation. And it's an environment where I can articulate the risks associated with a lack of achievement against those objectives, and those actions.
- 10 From a government directorate and agency perspective, that's a very robust framework. We also have a 182 land leaseholders within the ACT, majority of which border on the Namadgi National Park. It's only 182 in comparison to our colleagues from across the country. Having said that, we have what we call our Farm Fire Lives Program which is led by the Rural Fire Service in the ACT, where we have an ability to have direct liaison with the farm holders. We oversee their land management plans which are reviewed on a five yearly cycle. We also engage with those landholders twice a year. So there's an ability for us to work with the landholders in a cooperative and supportive sense on the actions that as individuals they need to undertake.
- 20 But in terms of a New South Wales park, it's very important for us because we have this massive land that sits directly to our west and obviously into New South Wales, and I might just ask Mr Cooper to talk about, just as we have a very strong relationship from a Commission level, ESA level, our service level with Mr Rogers and his team at Rural Fire Service, I might get Mr Cooper to outline the working relationship between New South Wales and ACT from a parks and conservation perspective.

COMMISSIONER BINSKIN: Yes. Thank you very much. Mr Cooper?

- 30 MR COOPER: Thanks, Commissioner, both Commissioner Whelan and the Royal Commissioner. Yes, basically we have an exceptional working relationship with our colleagues in New South Wales parks. We're both land managers, we're both tasked with managing the country on behalf of our traditional owners, and we do that to the best of our ability. To do that we can't treat the ACT as an island in the middle of nowhere. You mentioned before that it's surrounded by New South Wales. Any activities or any risk reduction that we try and achieve in the ACT is greatly influenced by what our neighbours in New South Wales do. Likewise, anything that we do in the ACT greatly impacts our neighbours to the east of the ACT.
- 40 So the residual risk process I mentioned before, it wasn't just - it didn't just include the area covered by the ACT. It ventured out into the landscape, particularly to the north-west which is where our predominant fire weather comes from. That's where we work closely with New South Wales parks, about how we can integrate our respective fuel management programs to achieve the ultimate outcome of reducing risks to the assets in the ACT. And they're involved in that scheduling, we assist in undertaking burns, they assist us, and it's I very good relationship.

Where we want to go into the future is broaden that residual risk modelling even further into New South Wales. So at the moment New South Wales run a three year planning process, New South Wales parks. They're interested in our five year plan with a 10 year outlook, and that will really suit us as well. So as early as next week,  
5 when I'm back from holidays, we will be meeting with some of the New South Wales parks people to further that discussion.

But as the Commissioner Whelan just mentioned before, how we prioritise assets, it's really under the strategic bushfire plan. That sets up the standards and the zones and  
10 then we, as the largest land manager, provide quite a substantial bushfire operational plan which the Commissioner actually approves. So that's linked in with our budget. We identify what we can do within our budget. The Commissioner endorses that. It also goes through our bushfire council and then, as a checking mechanism, the Rural Fire Service audit that externally every quarter. So every three months we get an  
15 audit from the ACT Rural Fire Service with a full audit at the end of the year which is reported to the ACT Government and within the annual report. So it's like a checking mechanism, that we've got to be on our game as well.

And, as the Commissioner said, we're responsible basically for managing fuel on the land that we manage and preventing fire starting or leaving that land. And if there is  
20 fire suppression, fire starts, it is the ESA, the Commissioner's responsibility and we assist the Commissioner by supplying resources and skilled people to help out in that situation.

25 COMMISSIONER BINSKIN: Thank you for that. We appreciate you coming in off your holiday for this. I do note the light reading in the bookcase behind you as well.

If we go to another unique situation, the Northern Territory. I've just got one question for the Territory and for Mr Baulch. You said outside the fire protection zones you  
30 don't need a permit to burn, and understand that for the size of the Territory and the population base. How do you manage those other residual risks or risks that are there for people who are burning outside those zones where it may impact the zones? For example, one that comes to mind is smoke. So how do you control that, and I know from the visit that we had up there that it is - it's not a big issue but it's an issue that is  
35 within the population that they're concerned about. So how do you coordinate and manage that risk in your hazard reduction? You're still on mute, I think.

MR BAULCH: Apologies, Commissioner. When I said that a permit is not required outside of the fire protection zone, in most circumstances that's true, although there  
40 are occasions when we declare a fire danger period, when we consider the fire danger to be very high, it's a seasonal thing and when a fire danger period is declared over an area, then you do require a permit in that area. But during the normal period of mitigation, that wouldn't be the case. So you would not require a permit.

45 As to how that's managed, I guess it's - well, there's no regulatory capacity to manage that. It's monitored and we work with landowners to develop their plans. We - hazard reduction burning as a scale of it, is something that we pay more and more attention

to in recent years, and we are working with landowners to try and limit the amount of land that needs to be burned by using different techniques around mosaic burning rather than across-the-board burning. And I guess, to some extent, that mitigates a little against that problem. But really I have to say that there is no regulatory  
5 mechanism available to us to manage.

COMMISSIONER BINSKIN: Okay. Thank you very much for that. I will just go to Commissioner Macintosh for a couple of questions, please.

10 COMMISSIONER MACINTOSH: Thanks, Chair. I might stay with Northern Territory if I could. We heard yesterday how Buffalo grass is posing a few issues in South Australia and we've also got some information that Gamba grass is an issue in Northern Territory and across the north. I just wonder whether you can give us your  
15 opinion as the extent to which Gamba grass and potentially other weeds is affecting your ability to undertake mitigation activities and plan for bushfires?

MR BAULCH: Gamba grass is a serious problem for us, and it - as I'm sure you know, you will have heard that Gamba grass results in fuel loads in the region of five, six times greater than - than native grasses. And it also cures much later than  
20 native grasses, which means that attempts to control it with hazard reduction burning are fraught because by the time it's cured sufficiently to be burned successfully, it's often too late. It's too late in the season. Everything else is cured, the weather's changed, the winds are stronger and the risk is much greater.

25 So it's a serious problem for us and the Territory has a number of strategies in place to limit the spread of Gamba grass and to - I think eliminate is probably not quite the right term. I don't think there's a program in place to eliminate Gamba grass at the moment, but there's certainly strategies to limit its spread and to reduce its impact. You know, distribution of herbicides, weed management plans that require  
30 landowners to manage Gamba grass at different levels in different parts of the Territory and so on.

COMMISSIONER MACINTOSH: Can I just jump in?

35 MR BAULCH: They're the strategies that --

COMMISSIONER MACINTOSH: Could I jump in and ask you how good are your information systems that are tracking the spread of Gamba grass? Do you have good data on that that's helping you carry out those management activities?

40 MR BAULCH: I believe so. The weed management branch of the same department that we're a part of does a lot of work in that space. There's a lot of independent research being done as well, and a lot of collaboration between those researchers and the weed management people. I think they've got a pretty good handle on its extent  
45 and rate of spread.

COMMISSIONER MACINTOSH: Great. Thank you. I could talk about it all day but I know we're on a tight time frame. I will turn to Mr Rogers if I could and pick up from where the Chair left off. It sounds to me, from what you just said about your proposal to adopt the new system to assessing where and how to carry out fuel management activities, that this new system will look something like what the ACT does and what Victoria does, ie, a quantitative simulation-based approach to identifying where to carry out prescribed burning activities in the landscape. Is that a fair assessment or a fair statement?

10 MR ROGERS: Look, I can't answer you to be honest because I haven't looked at the ACT or Victorian system in any detail. So I can't really honestly give you an answer, except to say that it looks at potential ignition sources across the landscape, what the potential risk is, and therefore where we should target our work. So I don't know, you know, to what level they're - they overlap. I don't know. I think it's fair to say the principles certainly sound the same.

COMMISSIONER MACINTOSH: And you end up with a quantitative measure on residual risk. Is that where it ends up?

20 MR ROGERS: Yes, correct.

COMMISSIONER MACINTOSH: Yes. Okay. Thank you very much.

COMMISSIONER BINSKIN: Mr Tokley, we will keep going, please.

25 MR TOKLEY QC: Thank you very much, Commissioners. Participants, we will now go to topic number two which concerns the plan process for hazard reduction, including the types of hazard reduction activities or methods undertaken in your jurisdiction and an outline of how and why hazard reduction activities or methods are selected as an appropriate mitigation treatment. Now, in providing some of the answers that you've provided to topic number one, I think you've touched upon many of these matters. But could I ask you to, in giving your answers to topic number two, have regard to the types of hazard reduction activities you undertake or manage. For example, whether it's mechanical, fuel reduction or hazard reduction by burning, and then briefly outline the planning process for how and why hazard reduction activities are selected as an appropriate mitigation treatment. And if I may, I might start with Western Australia and Mr De Haan.

40 MR DE HAAN: Thank you, Mr Tokley. So I guess again I will just reinforce, I guess, some of the challenges we have in Western Australia because of the size of the State and for DBCA the lands that we manage. So there's no one-size-fits-all approach when it comes to mitigation, but in terms of, I guess, the lessons we've learned over time at a landscape level, prescribed burning is certainly one of the primary tools that we have in our armoury.

45 So I guess I will touch on that one first. Again, I will use the south-west context in relation to that. I talked about our framework and I guess fuel age being an indicator

of risk for us, and regional fuel management plans and how that informs our sort of indicative and annual burn program. But I guess once we've got to that phase where we've identified areas of risk, predominantly through aligning assets, be they human assets or environmental assets or other forest values against where fuel ages may be suboptimal in terms of a risk reduction sort of outcome, we then drill down into actually deciding on the type of hazard reduction.

So in a forest-type setting we do use some of those other measures, mechanical mitigation, and the sort of places that we might consider those would be areas that may be challenging to burn against, you know, urban interface or the like. We might use some localised mechanical mitigation, certainly supplement that with upgrade and maintenance of strategic breaks and the like.

But the reality is, again, from 60 plus years of experience, backed by sound research and an evidence-based approach, you know, we're quite certain here in WA that that landscape-scale approach needs to be applied to the sort of level that we apply that. So that really informs how we decide on the type of hazard mitigation we will conduct in the south-west setting but also across the State. And I guess that's a very broadbrush overview.

But if we look at some of the remote areas, the non-forest areas, well, that's where we do start to identify, due to, I guess, the topography, due to some of the remoteness, due to the type of fire behaviour, that other types of mitigation are more prevalent in those areas of the State in terms of chaining, mulching, chopper rolling, those types of things that we use. I guess a very similar approach to what we do when we come to build our prescribed burning program, we take a strategic approach to where we undertake those activities, you know, because as you can imagine they're a linear type activity in the main. So we look at where we will get fires, human or, you know, lightning-caused fires or accidental and the sort of fire weather that we would expect in some of those zones and try to build our strategic mitigation programs, mechanical mitigation programs around that. And that's the same sort of context that we build our prescribed burning program on.

MR TOKLEY QC: Thank you very much, Mr De Haan. In having regard to the planning process, you've mentioned a number of matters. Are there any set targets in terms of percentages that you aspire to achieve each year, using prescribed burning or --

MR DE HAAN: Yes, certainly. I guess I would go back to that south-west setting where we have some defined targets, albeit I touched on the fact that we're rolling out a broader framework across the rest of the State, but in the south-west we aim to achieve 45 per cent of the lands that we manage in a forest setting to have a fuel age of less than six years. And then we have a - that target is a nominal target comes out of that of approximately 200,000 hectares to achieve a year, noting that, you know, for a range of factors, we won't always achieve that, so it's more about the long-term trend that we aim to achieve. And within that larger target, in recognition of, I guess, the environment that we find ourselves in these days with urban settlement area,

urban interface, other assets, we have those - that larger target broken down against those three land management zones that we talked about previously.

5 But I guess, importantly for us, as a land manager and with that evidence that we've  
certainly had here in Western Australia, is, you know, we have a significant focus on  
the interface, but what can't be overstated is the importance of that landscape-scale  
approach that we have. And to do that, we're talking about undertaking large  
landscape-scale burns in the vicinity of 2000, 3000 hectares, up to 8000 or 10,000  
10 hectares. So that we have a mosaic of fuel ages across the lands that we manage, and  
that provides pretty important outcomes when it comes to fire suppression. Often  
when we get lightning strikes we can suppress them very quickly in those areas or  
when fires actually get up and start running, we have got lower fuels to work off as  
they progress. And fundamentally, as an agency such as ours with a very broad  
15 charter in terms of conservation land management also, applying that mild intensity  
fire in a mosaic pattern across the landscape would achieve a multitude of outcomes  
for biodiversity conservation, for other land management functions, forest  
management, etcetera.

20 So it's very - it's very important that we maintain a multifaceted approach and, as  
such, whilst we don't shy away from the fact that some of our burns are hazard  
reduction activities, many of them are multiple objective burns, but in the context of  
those safe strategic priorities that I talked about, the priority of the protection and  
preservation of life.

25 MR TOKLEY QC: Thank you very much, Mr De Haan. I might now go to the  
Northern Territory to Mr Baulch and Mr Veal and, gentlemen, if you could address  
the topic of the planning process, in particular having regard to the types of hazard  
reduction activities that might be undertaken, and outline the how and why of hazard  
reduction activities being selected?

30 MR BAULCH: Perhaps if I can just start briefly and then go to Jonathan for some  
more detail. The hazard reduction burning is by far the most used tool in the  
Northern Territory for bushfire mitigation. The preference for planned burning  
largely comes down to economics and achievability, I suppose. It's a relatively cheap  
35 way to mitigate against late season bushfires, and it's a very effective method. I guess  
the vast scale of the land area of the Northern Territory and the sparse or the limited  
population and development in much of the area are factors in that preference for  
burning, as is the history and the tradition of using those techniques successfully  
across the Territory over a very long time.

40 I'd probably first comment that the area of Arnhem Land where many carbon  
abatement projects are under way, since those carbon abatement projects came along  
and programs of planned burning and establishing mosaic burning came about, that  
area of the Territory has gone from a very poorly managed area in terms of bushfire  
45 management to probably one of the best managed areas now in the country. If you  
look at the fire activity in Arnhem land, late season destructive fires are very rare.  
There's been great improvements in biodiversity and all sorts of other measures. But

at a more - down to a more land management perspective, I could perhaps ask Jonathan.

5 MR VEA: Yes, thanks, Ken. Thanks, Mr Tokley. Yes, within a parks context, we've - we're managing 87 parks and reserves across the Territory with a broad spectrum of requirements in those landscapes from the arid zone through to the Top End. And there are significant parallels with - obviously with Mr De Haan and his explanations of their management, their planning, their management in Western Australia.

10 But initially I will just sort of point out with our planning and then through explaining our planning, I could then lead to the mechanisms of fire management and within the - within our parks estate. Under your - under the Territory Parks and Wildlife Conservation Act there's - our work is geared around our plans of  
15 management and joint management plans for our key parks and reserves. And they set the objectives and the key values, and the key threats through participatory processes, particularly with traditional owners and the public.

20 And by doing so provides a 10-year framework of what's important in those landscapes, how will we govern those landscapes with traditional owners and other stakeholders, and what are the key values to conserve and to protect and - and, through that process, there's a definition of what the key threats are. But it's kept quite high level and it's geared for a 10-year commitment.

25 Following those plans of management or joint management plans prepared with traditional owners, we then have a framework of - of integrated conservation strategies which are five-year strategies which integrate how we will manage fire, weeds and feral animals in an integrated way. As you've mentioned, Gamba grass, for example, there's a high connectivity between the management of Gamba grass  
30 with fire. So we integrate how we manage these landscapes in a comprehensive way. And these provide a very strategic focus of - and quite specific measurable achievable, realistic and time bound targets for those landscapes geared around the key principle values, which are specifically defined for that park estate, for our key park - for our priority parks and for those key - and for those parks.

35 In that space they define what the priority of - for those achieved values for that park in principle of - in - sorry, they define those key parts in a very clear - they're very clear about what those values are. And in those values, it certainly defines the values around , you know, keeping the - the visitor assets are protected, the traditional  
40 owners' heritage assets and their aspirations for managing their country are present and also the biodiversity values. And in so, it defines the preferred fire regimes associated with those key values.

45 And that provides us a basis for then actually framing up appropriate - appropriate targets in those landscapes for those vegetation communities, for example. And, in doing so, it then allows us to actually then frame appropriate management targets for the implementation of fire, to retain particular fire regimes for fire tolerance, fire

intolerance and in between species - habitats. And so we have - it enables us to have a very proactive framework for managing fire. So rather than simply managing risk outright, it's about managing those values, accepting fire is a natural part of the landscape and ensuring that we have got a mosaic and an appropriate patchwork across the landscape, consistent with the framework that Mr De Haan explained.

But - and so this framework is - this values-based framework then allows us to evaluate those key risks to those values. And those threats have been evaluated in terms of their risk and our ability to manage those risks, and that gives us mechanisms for how we will strategically manage those key values and mitigate those risks. For some of these - and then that strategic framework has been defined. We've got management targets we need to attain, and monitoring mechanisms to then address on a yearly basis. Those five year strategies then allow us to have annual operational plans that then rangers are responsible for delivering, and prescribed burning is a key framework for managing those habitats and protecting those landscapes.

But because of the scale of the Territory, while there might be some areas where mechanical clearing is provided, such as in the boundaries of some parks, the main method is by aerial incendiaries to manage the - to reinforce the boundary, I guess to protect the interface between our park and our neighbours to ensure that we've been good managers, and retaining fire, doing our best to retain fire on our parks estate. And then we break up the landscape using the roads and using vehicle, by vehicles, strengthening the fire - the breaks within our parks estate, and then using aerial incendiaries to actually reinforce those - to break up those landscapes but also to create a patchwork appropriate to the vegetation communities within the parks estate.

So, by doing so, we then have a system of rangers having a very clear direction about what they need to achieve in a landscape, what they need to protect, and also each year they then monitor the outcomes through NAFI which is an online system to evaluate their prior history and evaluate their success. And then those reports are developed to see if their fire - if they've addressed the key fire regimes to the appropriate standards, and that's reviewed on an annual basis and forms the next plans at an annual level for the next year.

It's - but so we're creating an adaptive cycle of management that mitigates the risks by being very proactive in how we manage our landscape and if we don't manage our landscape, that's when the risks for bushfire are elevated. Yes, so it's a holistic system based around planning that really drives our management and the methods we actually use to get best effect.

MR TOKLEY QC: Thank you very much, Mr Vea. I may now turn to the Australian Capital Territory. And Commissioner Whelan and Mr Cooper, if you wouldn't mind addressing the planning process. You may have covered some of these matters already in your outline, so don't feel you have to cover the same ground again. But we're really looking at the types of hazard activities that might be undertaken and



then the selection process around those, and why one method or treatment might be chosen rather than another.

5 MS WHELAN: Thank you. And we will look at focusing on those areas for you. As  
I mentioned earlier, the EPSDD are responsible for our five-year regional fire  
management plan but also have a 10-year outlook. That allows us to have the  
foundations or the bases under which we move forward in a planning sense for the  
activities that we will undertake. Last year, EPSDD made a strong recommendation  
10 that we move to a residual risk approach to managing the, not just the selection of the  
treatments, but also to inform how we would evaluate the effectiveness of the  
program that we were putting in place. And so over the last couple of years we've  
really tried to focus on the fact that our planning processes, through the RFCT down  
through the regular engagement auditing processes that provide governance between  
the Emergency Services Agency and our largest landholder are robust, and also very  
15 transparent to the community. But it's also at the same time starting to influence what  
our practices for fuel load management should be across the estate we know as the  
ACT.

20 The factors that have informed and influenced clearly are life and properties, but  
they're also looking at important aspects such as the ecology, our water catchment  
areas, obviously our high risk and high value items, or capability for us. Within the  
Namadgi National Park we have a lot of cultural sites. We are mindful of the impact  
climate has had on our ..... and the fact that that is influencing and shaping how we're  
looking at the treatments we will undertake to mitigate the risks of bushfires, and  
25 also looking at how we balance, you know, the management of our ecosystem and  
fuel loads across the landscape.

But what comes out of that for us in terms of our planning process and taking a  
residual risk approach or methodology is that we're now in a position to be better  
30 able to select location and treatment, reduce risk, rather than just having a  
hectare-by-hectare approach to our bushfire operations and management. It also  
allows us to apply what are our finite resources to achieve a better outcome and a  
longer-term outcome for the community. So, in terms of what's informing the  
treatment, first and foremost, as I said, community safety; secondly, the health of our  
35 landscapes, particularly from an ACT perspective because of our heavy reliance on  
the limited water catchment areas that we have; the efficacy of the burn and what it is  
that we're actually achieving, and putting in place an ability to measure the outcome.

40 So that as we revise our fire management plans, our five-year cycle, it's informing  
our 10-year outcome or our 10-year outlook. And this is what Mr Cooper referenced  
before, and I will get him to talk in more detail about the technical aspects of  
selection and then applied treatment. But ultimately, what we're trying to do is realise  
adaptive management processes and techniques. It's very easy to talk about residual  
risk. It's easier to use adaptive management as a throwaway line, but it's a fusion of  
45 the science, the data and, as the practitioners say, the art of land management and  
fuel load management actually gives us the most effective outcome, rather than just  
chasing what is a percentage of an activity undertaken, whether it's actually from a

prescribed burn perspective or utilising other treatment. But I will hand over to Mr Cooper to talk about the more technical aspects of the selection.

MR TOKLEY QC: Thank you, Commissioner Whelan. Mr Cooper?

5

MR COOPER: Thanks, Commissioner Whelan, and counsel. Yes, I won't go over too much ground that I've already covered. As we mentioned, the regional fire management plan is where we look at what we plan to do over the next five to 10 years. It's at that stage where we undertake a lot of consultation with conservation research and a number of other bodies, plus the community, to determine, after we have undertaken the residual risk process, to determine how - what method is most appropriate to manage the fuel in that landscape to achieve the desired objective.

When it gets down to the nitty-gritty, and I will use burning as the example, we've developed a number of tools. We have 750 permanent fuel plots that we measure each year. So that gives us an idea right across the ACT of how the fuel is accumulating. We have about half a dozen fuel moisture plots that we measure twice a week during the burning period. So that's where teams go out, grab samples, bring them back and we get an indication of what the fuel moisture is doing. So that's giving us a picture of availability to undertake burning, and that's with the small fine fuels but also the heavier fuels. We put that together.

We've got six or seven weather monitoring station set up so we're feeding constant weather streams through. We undertake flammability mapping. So we work very closely with the CRC and that flammability mapping is quite an important thing because it identifies, it's based on highly erodible sites. We want to try and avoid those in our prescribed burning; we don't want to cause more problems than we started with. So we're able to plan our burning around those sites that we've worked with Melbourne University and the CRC that identify those high erodible sites.

30

All this gets pulled into what we call the prescribed burn decision support tool. So before any burn is undertaken, it's a comprehensive process that our fire behaviour analysts go through. It was developed here in the ACT. It looks at what resources we've got, where the smoke's going to go, what it's going to do. It looks at the weather now and over the next few days. It looks at fuel dryness. And it brings all that together in a systematic and repeatable and auditable manner to make a decision on whether a burn should go ahead or not. I've been in a situation where we've been briefing crews in the morning and we've run that prescribed burn decision support tool and it has come up with a negative. So we've stood the crews down because the smoke's been going in the wrong way or something hasn't been in the right area to proceed. Then we proceed with the burn but, most importantly, that's not where it stops. And I think a number of people have talked about continuous improvement.

40

We do post-burn monitoring so we use satellites to do burn intensity. So we get burn intensity mapping, it gives us an indication of what burnt, what didn't and to what extent. And that has been very useful at the moment for the - on the national level, to indicate what sort of carbon output we're having. So rather than saying we burn 1000

45

hectares, did we? And our burn intensity mapping can tell us whether that burnt, didn't burn, and how intense that was. That then feeds back into our data layer.

So for fire suppression, we know if an area has been fuel reduced effectively or not. In some cases it may lead us to redoing or re-burning a particular site. So it's a comprehensive program that includes a whole range of things right from the initial regional fire management plan, right the way through to implementation and then assessing whether we're successful or not on feeding back through that loop.

10 MR TOKLEY QC: Thank you very much.

MR VEA: Sorry, one more thing, and it was remiss of me before not to acknowledge our liaison with New South Wales RFS. I mentioned New South Wales Parks but we work exceptionally closely with New South Wales RFS for burns over the border. We're part of their bushfire fuel management committees, and I apologise, it was remiss of me not to mention that.

MR TOKLEY QC: Thank you, Mr Cooper. Commissioner Rogers, thank you for waiting so patiently. In terms of the planning process for hazard reduction, if you could turn your mind to the topic, which was the planning process for hazard reduction including the types of hazard reduction activities undertaken or methods used, and an outline of how and why the reduction activities or methods are selected as an appropriate mitigation treatment. I suspect that's in your high level overview, you have addressed some of those matters already, but to the extent to which you would like to approach it in a more detailed way, please feel free to do so.

MR ROGERS: Certainly. Thank you, Mr Tokley and I won't go over the risk plan process because I think I did cover that before. But I think in looking at the typical types of treatments, in our risk management process, the current one we have, we have asset protection zones. We have strategic fire advantage zones and we have land management zones. Now, predominantly in areas like land management zones which is obviously the broader landscape, that's mostly done by either burning or, in some cases, grazing. There's very broad scale treatments.

When you get to strategic fire advantage zones, they're more areas that might be pinch points. It might be an area leading up to communities but not immediately adjacent to them. And, again, that's mostly done by burning because again it's trying to reduce a broader area but in a more targeted way than a land management zone. And then we get to asset protection zones and a lot of those are right up against the infrastructure, be it habitable assets or it might be other sort of infrastructure, power infrastructure, things like that. And those typically are more mechanically related, where access allows. Because mechanically you get obviously a lot of bang for your buck because you can totally clear that area away. It's normally areas that have been repeatedly treated in that way. So you're not looking at complex environmental checks or anything like that, because it has been something that's been pretty well established practice over many years. So they're typically what happens in most of those areas.

In some cases then local government particularly might do weed spraying alongside roads to kill vegetation along the sides of the roads, and that sometimes is followed up by burning, but often not, it's just killing the vegetation. And I think what - the  
5 other thing that's important is that they're both at a Commonwealth and a State level, there's funding that provided to the agencies that are carrying out that work to ensure that they can complete those activities.

10 One of the other things that I think is also one of the complexities that we need to, apart from the type of hazard reduction, if I may, is the timing of that hazard reduction, how easy it is to get done. So I might just use, for example, if I may --

MR TOKLEY QC: Yes.

15 MR ROGERS: -- counsel, just talk about the challenges of carrying out that hazard reduction in areas like the Sydney basin.

MR TOKLEY QC: Yes.

20 MR ROGERS: And I did briefly touch on this, that you've got ridge top development, and then you've got national parks in all the valley systems and obviously people love the natural amenity that Sydney provides like that. And if Sydney was a brand new landscape and we were planning it out, we probably wouldn't do it in the way that it's designed now. But it's something that built over  
25 many, many years, so it is what it is. But in trying to carry out hazard reduction activities, you've got asset protection zones behind homes but you can't get mechanical tools in there, you've got to burn that. And they're very resource intensive. But apart from being resource intensive, the timing is very tough to get right. And I think Neil talked a little bit about that in the smoke management. And  
30 somewhere like Sydney, and it's interesting when we get, as a State accused of not doing enough hazard reduction, but then with we do hazard reduction often in Sydney areas or the surrounds of Sydney, smokes out Sydney.

35 So it's called the Sydney basin for a reason, and that is that it's like a basin and the smoke goes in there and it gets trapped often by an inversion layer overnight and the next morning there's a heavy layer of smoke over the city. And it provides some real health consequences to people. They're not just people having a whinge: the smoke gets in their washing, it's actually quite serious health issues. And there's been some research that has been done, and I think by Tasmanian University, into the health  
40 effects. And, indeed, there's been an increase in hospital admissions when we've got hazard reductions and it has negatively impacted on some air quality in the Sydney basin, and indeed, some premature deaths.

45 So I guess in the balance of the arguments of increasing hazard reduction, it's easy to say, with some consequential side to that, that I think as a community we need to talk about, and we need to have a conversation about how much will the community tolerate, and what are the circumstances in which case the overriding need to do

hazard reduction overrides individual's health. And so I think they're conversations that need to be had, and they should be aired in the Commission, in my view.

5 MR TOKLEY QC: Thank you very much, Commissioner Rogers. Chair, that concludes my questions for topic two. I was wondering if there was some questions from Commissioners?

10 COMMISSIONER BENNETT: I have one question, if I may, and I'm picking up, Mr De Haan mentioned a couple of times the less than six year growth that they aim for in the south-west. And my understanding is that that's because five to six years is about the time over which it takes for a prescribed burn, for there to be regeneration of the fuel load. And also, and it has always intrigued me because I think the other information we've been given is that in that time frame, in some cases what grows back is more flammable either by reason of being younger and, therefore, more oils  
15 or a different and more highly flammable material can regrow after the burn.

It that might be and I wouldn't mind a comment on that, but the real question I've really got is, do any of the other State and Territories presently represented have that concept as a target, of looking at a conscious effort to keep the fuel load at less  
20 than - or the regrowth at less than six years before you go back for a fresh go at it? I appreciate that the areas involved could have a huge impact on that. The forest, even just taking the forest areas of course, but whether that is a target or some or all of the jurisdictions that you are managing? Perhaps if I could ask New South Wales first. Mr De Haan, you've already made your comments, so I'm taking that as a given  
25 unless you want to add something later, but I just ask the others to comment briefly on that.

MR ROGERS: Did you want me to answer first?

30 COMMISSIONER BENNETT: Yes, please, thank you. Thanks, Mr Rogers.

MR ROGERS: Look, I mean, the age of fuel is certainly something that is looked at and we have what's called a fire frequency threshold which looks at the cyclic rate of fuel and how often it ought to be burnt to, obviously, not start to change species and  
35 the like, to try and make sure that we manage that. But I've got to say for a six-year rotation would be something, yes, quite problematic for New South Wales.

COMMISSIONER BENNETT: Is there any part of New South Wales, I understand you couldn't do it throughout the whole State, but is that factored in at all to your  
40 planning for even pockets within New South Wales?

MR ROGERS: Well, certainly - and that comes down to the zoning. So the asset protection zone where typically that's up against human infrastructure - human settlement or other infrastructure, the target for protection zones is less than 5 tonnes  
45 per hectare. So that's quite a low fuel load. But in saying that, that's not saying we achieved it all the time, but certainly that's the target, and that takes it to something

quite low as far as being able to carry a fire. So that's probably in the order of what you're talking about.

5 So yes, we do have that as the target, but that's obviously quite a narrow strip. That could be 100 metres, for example, against assets as opposed to broad swathes of land; and, you know, just simply the size of the State makes that difficult to do when you think of the size of New South Wales and, indeed, that's not even as big as obviously some States in the country.

10 COMMISSIONER BENNETT: Thank you. I don't know if anybody else wishes to comment on that. Perhaps you could raise your hand if you wish to. Thank you, Mr Cooper.

15 MR COOPER: Yes, thank you, Commissioner. The ACT, as I mentioned before, is quite small. The registration type in the ACT is much different to the vegetation type in Western Australia. What we prefer to do is based on a residual risk. So we still run the model, look at what the residual risk is, and then see what treatments and where give us the best reduction in risk to the Territory assets. The fuel load itself, we measure through use of Lidar and our permanent plots. And it varies so much. It  
20 varies in one location from aspect, the northern aspect to the southern aspect. So certainly I understand fully and agree with how Western Australia deal with their fuel ages there but we operate a little bit differently, given our different fuel type and different situation.

25 COMMISSIONER BENNETT: Okay. Thank you very much. I think that probably applies in the Northern Territory as well. Thank you very much.

COMMISSIONER BINSKIN: Well, we have got Northern Territory with their hand  
30 up too.

COMMISSIONER BENNETT: Sorry, Mr De Haan wanted to add something as well. I'm terribly sorry.

COMMISSIONER BINSKIN: Let's go to the Northern Territory first. Yes.  
35

MR DE HAAN: I was going to quickly say Northern Territory is very large and has a great range of different climatic and vegetation environments. And so I think Mr De Haan was talking about the south-west --

40 COMMISSIONER BENNETT: He was.

MR DE HAAN: -- of Western Australia when he was talking about the target, and we certainly don't have targets of that nature here. As I mentioned before, you know, in the north-west Top End where each year, 25 to 30 per cent of it is burned as part  
45 of planned burning operations. Obviously, the maths don't work for --

COMMISSIONER BENNETT: I wasn't trying to catch you off. I appreciate that the Northern Territory was a very different geographical situation too. Thank you. Thank you very much.

5 MR DE HAAN: We are vastly different across the Territory.

COMMISSIONER BENNETT: Mr De Haan, did you want to add something? I think you also wished to make a comment.

10 MR DE HAAN: Commissioner, I just wanted to quantify a couple of things there. That it's important to recognise in what I talked about with 45 per cent of landscape at less than six years, that's not actually a six-year rotation that we actually burn off. So with the composition of the fuel ages with that approach and the spatial and  
15 temporal approach that we take, we would actually be seeing sort of a 12-year rotation for the majority of areas.

And just coming back to that first comment that you made about the regeneration post-fire, and particularly in relation to mild intensity prescribed burning, it's very clear in the Western Australian context that that reduction of fuel doesn't create  
20 issues in those intervening years up to a certain stage. Very different sometimes in different vegetation types and in a bushfire setting, we have a very intense bushfire come through and very, very heavy regeneration, depending on the fuel type, and that can lead to increased fuel issues. Thank you.

25 COMMISSIONER BENNETT: Thank you very much for that clarification, I appreciate it.

COMMISSIONER BINSKIN: Thanks for the clarification. Thank you very much, Mr Tokley.

30 MR TOKLEY QC: Chair, there was one other topic I was hoping to cover, but I think that what I can achieve is to cover that topic together with the other topics we're going to cover in the evaluation part of the panel. There is only one other person joining us on the evaluation panel, so it may be most convenient for all  
35 participants to have a break now and for us to resume in an hour's time or an hour and 10 minute's time.

COMMISSIONER BINSKIN: Let's go an hour and 10 minutes. So let's adjourn and we will resume at 1430 Canberra time.

40 MR TOKLEY QC: Thank you very much.

COMMISSIONER BINSKIN: We will see everyone in the panel at 1430 Canberra time. I will let everyone else do the maths. Thank you.

45 <ADJOURNED 1:21 PM>

**<RESUMING 2:30 PM>**

COMMISSIONER BINSKIN: Mr Tokley, let's proceed, please.

5 MR TOKLEY QC: Chair, Commissioners, thank you. This afternoon we will be  
doing the, what's called the back-to-back panel from this morning's hearing. There  
was one topic left over from this morning's hearing, which we can address this  
afternoon as well, and to some extent, the topics roll into one another. We need to  
add one person to the panel, and that's Ms Naomi Stephens who's the Acting  
10 Executive Director, Park Operations, New South Wales National Parks and Wildlife  
Service. Now, Ms Stephens is also the Program Director, Future National Parks and  
Wildlife Service. Good afternoon, Ms Stephens.

MS STEPHENS: Good afternoon.

15 MR TOKLEY QC: Ms Stephens, will you take the oath or affirmation?

MS STEPHENS: The affirmation, please.

20 MR TOKLEY QC: Thank you.

**<NAOMI STEPHENS, AFFIRMED>**

**<EXAMINATION BY MR TOKLEY QC>**

25 MR TOKLEY QC: Thank you very much. Participants, the approach this afternoon  
will be same as it was this morning. We will go through a number of topics. Each  
person will be asked to speak in turn and then at the end of that topic the  
Commissioners may have some questions for you. The first of those topics concerns  
30 the technology and information used during the strategic planning of hazard  
reduction activity, and I just want to give you a heads-up on where we're going after  
that, into the second and third topics because they do, to some extent, overlap.

The second topic concerns the assessment and evaluation process that is carried out  
35 once hazard reduction activities have been completed, including the extent to which  
assessment and evaluation informs future hazard reduction planning and risk  
assessment and further mitigation efforts. And at the end of those two topics, I will  
then ask you to turn your minds to whether the information that's used in those  
processes could be better provided or better coordinated. So whether there might be a  
40 need for some national coordination, some nationally consistent standards, and  
whether the information would provide a practical benefit to your jurisdiction in  
mitigating hazard risk. So without further ado, I propose to turn to the first of those  
topics, which is the technology and information used during the strategic planning of  
hazard reduction activities, and might I first turn to Mr De Haan from Western  
45 Australia.



MR DE HAAN: Thank you, Mr Tokley. I guess in terms of the information that we use with some of our strategic planning, talking about our mitigation program initially focused on the internal inputs. I guess there's a lot of data that we utilise that the agency holds itself, or is held by other agencies. And these days, GIS systems  
5 and the like play an integral role to some of our planning. So if you hark back to what I was talking with pre-year indicative planning and annual burn planning, there's a number of, I guess, inputs into that process, largely around assets, some of them human assets, you know, population centres, critical infrastructure, transport corridors, and also as a land management agency, many elements of our conservation  
10 business in terms of species and communities and ecosystems that inform the approach that we take to developing that plan, based on the general premise that I discussed previously.

And then on top of that, I guess I made a heavy focus on fuel age as a significant risk  
15 indicator for us here in Western Australia, in terms of the land that we manage, and that's obviously quite integral in terms of building our program. As I mentioned prior to lunch, that, you know, we've got a long history I guess in implementing a landscape-scale program, both in the south-west and other areas of the State. So we've got a long history of fuel age data, both from prescribed burning activities and  
20 bushfire that helps inform that process.

Then in terms of some much the other information, I guess some of the more critical information when it comes to mitigation particularly around prescribed burning is obviously weather related factors. So albeit that we monitor various things ourselves,  
25 you know, the bulk of that information comes from the Bureau of Meteorology and that is - that is critical in allowing us to undertake the sort of mitigation activities that we do here in WA and that's, I guess, twofold. There's the longer-term forecasting, I guess, with the various seasonal outlooks that I guess provides a good indication of where the climate and the underlying conditions may be at. And then once we get  
30 into closer to the operational phase, there's obviously more detailed weather related information that comes into it.

And then - then I guess albeit, you know, we have a significant focus on the mitigation activity that we undertake on land that we manage, we have a number of  
35 information inputs from local government, other government agencies such as Department of Fire and Emergency Services, public utilities, etcetera, that we seek out, or they provide for a shared platform. And then I guess not at the strategic level but more the operational tactical level of how we undertake some of those activities, there's a lot of information that we gather over a period of months when we're  
40 actually undertaking individual burn planning, and that's around what the fuel load and the various considerations that apply at the local level. And often, you know, technology is used to capture that, be it remote sensing in some of the remote areas or utilisation of various platforms by staff on the ground. That's a fairly broad  
45 overview there, Mr Tokley.

MR TOKLEY QC: Thank you very much, Mr De Haan. Could you comment, please, upon to what extent you're taking into account changing climate conditions?

MR DE HAAN: Yes, certainly. You know, the changing climate is a challenge for all of us, I guess, across the nation, and here in WA, we're no different. And in terms of one of the other things that I touched on before, that I guess we are very fortunate as an agency here that we have an embedded fire science program with a number of fire scientists and, as an agency as a whole, an embedded science capacity of conservation scientists. So a lot of work that is being done by that group and also by I guess the tertiary sector, is helping inform the approach that we take to hazard management moving forward.

And albeit that climate change is certainly at the forefront of all of our minds, given what we've experienced over recent years, here in WA, certainly in the south-west, we can see a significant drying trend in terms of decreased rainfall and underlying soil dryness that, sort of, started probably in the 1970s. So again, through the use of that underpinning science that we have and continuous learning approach that we've taken, you know, our mitigation program has been evolving and adapting, you know, for the best part of the past 35-odd years.

So where that ends up, I guess nobody knows, but what we certainly strongly believe here in Western Australia is that mitigation and, like I said, particularly a significant focus on prescribed burning is still going to be integral moving forward in terms of whatever climate change holds for us because - and because of the diversity of the State, that climate change will have different impacts in different areas of the State. It may be drier in some, it may be wetter in others. And it may impact on certain sensitive ecosystems that may require us to consider, I guess, different levels of strategic planning, potentially looking at using mitigation and fire to protect sensitive ecosystems or it may even be down to that very operational level of an individual burn where we, sort of, utilise different tactics in terms of lighting, the timing of the lighting, all those sorts of things based on some of those issues that are becoming apparent through climate change.

MS PRITCHARD: Thank you, De Haan. Mr De Haan, could I ask you to elaborate a little bit more on the fuel load aspect of it because I understand that you take fuel age as a proxy for fuel load; is that correct?

MR DE HAAN: Yes, that's correct. I guess, you know, touching on a lot of that science over many decades we're very confident in a number of areas throughout the State that, particularly the south-west, of what that fuel age actually equates to in terms of a fuel load. So we've got some very good models and some very robust data on that. So whilst we do need to drill down into the finer scale when it comes to, I guess, the planning of individual burns, as a fairly accurate surrogate that fuel age in that strategic planning sense allows us to identify where some of our greater areas of risk are.

MR TOKLEY QC: Thank you, Mr De Haan. I might now turn to the Northern Territory, please. And could I ask you, Mr Baulch or Mr Veal, if you could speak to the topic of the technology and information used during the strategic planning of

hazard reduction activities and the primary inputs in terms of information? You might have to unmute yourself, Mr Baulch.

MR BAULCH: Sorry, Mr Tokley, that's twice I've done that now.

MR TOKLEY QC: Thank you.

MR BAULCH: I might start off and I'm sure Jonathan will have something to add. But I think the technology and information that we use in planning, we have in turn information from - within our department, within the Northern Territory government agencies, that gives us a picture of land use, of vegetation types, of the distribution of assets and infrastructure, and other environmental and fire diversity values that are really important to us. But in terms of estimating fuel loads, the history of fire in an area is extremely important and we rely heavily on a service out of the Charles Darwin University called the NAFI website. That's the North Australian Fire Information website. This is the site that's been offered by the Charles Darwin University for many years now, and it provides - it's based on satellite remote sensing data, and it provides very detailed fire scar information, going back over 20 years.

It has tools that have been developed in the website for fire managers to use that make it very easy to access the information. You can define an area very precisely and you can define what information you want for that area very precisely and very easily. It's a very useful tool for fire managers, not just at our level but at the - right down to the individual property level. The NAFI site also provides hotspot information, almost real-time hotspot information, for identifying fire activity and tracking it, which is also a huge benefit for owners of larger properties.

We also rely heavily on information and systems from the Bureau of Meteorology. So the information about, you know, the longer-term climate information. Our weather patterns have a huge impact on fuel loads. We're very subject to the El Niño La Niña cycle. We get very good information from BOM, the Bureau of Meteorology, forecasting movements in that space. We also, at more of a weather level rather than a climate level, we get very good forecasts. We use the BOM subscription service to get spot weather forecasts when we're getting down to the details of an individual burn and at a particular time of the week or the day even.

So we rely heavily on that data from BOM. I think the other thing I would say about BOM and some of their longer-term forecasts, climate change is impacting all of us. We notice it, I guess, in terms of changes to the length and severity of our fire seasons. We - that's incredibly important to us when it comes to planning mitigation actions or prescribed burning, in that the length of the season impacts on the window of time that's available for us to conduct that burning safely.

So if we have a wet season that finishes early and the fire season consequently starts early, it gives us a much shorter time into which we have to squeeze the planned burning that we wish to be done; and, of course, having a shorter window means if

you need more resources because more of it is happening concurrently in order that it can be done within that time. But perhaps for - for a perspective on the more specific land management perspective on planning, perhaps I could ask Jonathan to have a word.

5

MR TOKLEY QC: Yes. Certainly. Mr Vea?

10 MR VEA: Thanks, Mr Tokley. Thanks Ken. For our NT parks estate, we use a lot of information and - to organise and identify our strategic priorities across our most important parks. As I mentioned earlier, I described our integrated conservation strategies and they pull together all the biodiversity data that has been collected by departments like Department of Environment and Natural Resources and their - and their large spatial datasets around the most important biodiversity values. We also pull together all of our - what underpins our planning is largely the vegetation layers and the vegetation, a clear delineation of the vegetation communities across our key parks estate and then also the determination of the appropriate fire regimes that are preferred by those habitats.

20 We also bring in and incorporate spatially the threatening processes into that space and bring in, for example - there's an example of this in - within Ms Sally Egan's statement provided to the Commission from Parks and Wildlife in annexure SE7 which is the Integrated Conservation Strategy for Litchfield National Park, and in that it provides very clear layers of information that were provided both to the fire and the vegetation communities. But also, most importantly, Gamba grass and it presents and identifies how Gamba grass as a - where the threats from Gamba grass are clearly - clearly address and threaten key vegetation communities within Litchfield National Park.

30 That example - so all of these layers information are brought together and evaluated by the experts and they're brought in spatially using geographical information systems and they're mapped. So they're able - so through this technology and this data we're able to, sort of, identify very clearly what the key - the key objectives are, the key priorities within the landscape, and where the strategic initiatives need to be undertaken over that - over the course of five years.

35

We then - it also then - we also use technology and information in our annual operational plans. Again as Ken was mentioning the need to utilise NAFI, and NAFI provides a basis for us to actually then identify, looking at - consider the fire histories and use that to identify the tactical burning regimes that are required within a park on an annual planning cycle.

40

45 We're also able to use NAFI where - to evaluate post-burn, to identify where - what the relative successes of those prescribed burning processes are. And NAFI is also then used to work with bush groups like Bushfires NT and neighbours to identify where the weak points are and the possible risks are of - of - in the planning prior to a bushfire season. So it's an essential tool right through our management cycle, both at an annual operational level, at our operational cycle around our strategic five-year

level and it's also about trying to achieve those objectives that have been defined in those plans of management.

5 Other technologies we use, we're very reliant on an annual scale for the Bureau of Meteorology, and also increasing reliance on and support from Bushfires NT and their bushfire emergency management system, and that helps manage the incidences where prescribed burning and fire management that we've conducted has been - is not as successful as hoped and incidents are being managed. And they are managed in an integrated way with - with other agencies, and it's under the leadership of  
10 Bushfires NT and their coordination. But their - their bushfires emergency management system which is a WebEOC, is central to managing those incidences.

15 MR TOKLEY QC: Thank you very much, Mr Vea. I might now turn to New South Wales, please, and Commissioner Rogers and/or Ms Stephens, I would be grateful if you could turn your minds to the technology and the information that's used during the strategic planning hazard reduction activities. I'm happy for one or either or both of you to answer the question.

20 MR ROGERS: Certainly, counsel. And I will try not to go over ground that has already covered by our colleagues throughout the nation in the interests of time. But I think it's fair to say that certainly things like capturing fire history and hazard reduction history, and then using that to form fire frequency threshold mapping, to inform local areas about the age of fuel in order to inform burn programs, when areas  
25 are due for burning, we've obviously got things like fuel moisture monitoring that goes on across the State constantly. We've got that reinforced with things like satellite curing, things like grasslands, to ensure that, you know, we're keeping across all types of fuel classification and knowing.

30 And there's some products that certainly are being - have been trialled but have proven to be relatively accurate where maps can be produced at a State level of areas that are suitable to be burnt in a given week, at the beginning of a week. So there's quite a level of inputs and technology that goes into, I guess, producing those maps and those inputs, but most of that has been covered by our colleagues interstate. Do  
35 you want add anything, Naomi?

MS STEPHENS: I will just briefly say that we prepare reserve fire management strategies in New South Wales for national parks estate. We go through a similar process to what you've been hearing, using information layers, out of geographic  
40 information system to put those strategies together; that we then - we have a system called Elements which is a fire information management system, which is directly integrated into the Rural Fire Service BRIM system which is the overarching State system. We use the information in our system and in BRIMS to look at annual fire histories and then we prepare annual burn programs based on the information that  
45 we - that we get from those systems, and the information that we collect post-burn goes back into those systems and informs us in the future.

MR TOKLEY QC: Thank you very much, Commissioner Rogers, Ms Stephens. I will turn now to the ACT and to Commissioner Whelan and Mr Cooper, and your comments, please, on the technology and information used during the strategic planning of hazard reduction activities?

5

MS WHELAN: Thank you, Mr Tokley. So from a strategic planning perspective within the ACT, obviously the risk posed by fuel loads and the impacts and of the treatments that we utilise or apply across the landscape needs to be informed by best use of technology to ensure that not only do we have priority on community safety but, again, in the treatments applied, that we have that balance between managing the ecology, the values, our vital assets and the community at large. There are a number of technology and practices that we apply across the ACT.

15 In terms of technology, like our colleagues across the country, we use satellite, we use LIDAR data, clearly a close working relationship with the Bureau of Meteorology and leveraging off research, both internationally and across Australia But I think the key to it is, and I will get Mr Cooper probably to lead on this, it's the fusion between the use of technology, access to technology, and how our practitioners combine that with their expertise and their experience and 20 understanding the land in which they live, work and operate. And as a combination of both, I think it's where we get maximum output. But I will hand over to Mr Cooper for a more detailed response.

MR TOKLEY QC: Thank you, Commissioner Whelan. Mr Cooper, just before your 25 begin your answer, I think it will feed in naturally to topic two, which is topic one being the planning side of it, topic two is the assessment and evaluation side of it. It sounds to me like you will be able to address both topic one and two in your answer.

MR COOPER: Yes, counsel, that's fine. Thanks, Commissioner Whelan. Just 30 flowing on from what the Commissioner ESA was just saying, the ACT parks have set up an intelligence unit. So there's a range of tools that we need to bring together to look at our strategic burning. I've already mentioned the residual risk approach to identify the areas well in advance, up to sort of 10 years in advance, of where we feel we get the best bang for the buck. But then it's a matter of looking at how and when 35 to implement that.

Our intelligence unit that we've set up incorporates a system of weather stations, remote weather stations across the ACT, six or seven. We've set up a website with Tasmania, so that's on the web and available for people to see. We've also got 40 a SODAR, which is a machine that gives us winds at different elevations. Work closely with New South Wales RFS with monitoring of wind directions, temperatures with balloons, weather balloons, so - and again working closely with the BOM to do that.

45 As I mentioned before, we've got 750 permanent plots which give us fuel loads across the Territory. On top of that we overlay with fuel moisture sampling, where samples are physically taken in the field, brought here back to an oven to work out

what the moisture content is of the light fuels and the heavy fuels. Commissioner Rogers mentioned about the curing - satellite curing data. We work in with Victoria and others on that. Lidar is a key to what we do, so that gives us some idea of fuel loads across the Territory as well.

5

I mentioned the prescribe burn decision support tool which brings all this together to then determine is it right to go ahead or isn't it. And that's including a whole lot of things like soil erosion, you know, what we need to be careful of, what we need to avoid, how we can do a lighting pattern to avoid that. The fire behaviour analysts that we've got provide regular updates throughout the burning period. To all our stakeholders, both personally through emails but also our website, that's open to the public which has right up-to-date information, the same information that we have, we put on the website. So it's involving the whole community.

10  
15 We've also, I suppose, without sort of going on too much, developed a system called Samara, and we're working with ESA - have come on board with that, so that's working really well. And that system allows us to do forward planning, look at what resources we've got, what training those resources have, the qualifications, their availability, fatigue. So we put all that together to come up with our program which then delivers the prescribed burn on various places across the ACT.

20  
25 Once the burn is completed, we then use satellite data to do burn severity mapping, so it gives us an idea - a very accurate idea of what burnt, what didn't, and at what intensity. That then feeds back into our annual bushfire pre-suppression resource atlas, which everyone has. So then we've got up-to-date data of what the fuel loads are there from the previous year. And we also do, as I mentioned before, the vegetation analysis for the erosion. So I think that probably covers most of the things that I would like to mention.

30 MR TOKLEY QC: Thank you very much, Mr Cooper. Mr Cooper, because you've touched upon the question of evaluation of prescribed burns, what I would like you to consider, and just give an answer to, is whether you also look at the effectiveness of the activities that have been undertaken, both in the short-term and in the long-term, and whether that has an effect on the overall consideration of activities, both short-term and long-term?

35  
40 MR COOPER: Yes. Most certainly, and it was remiss of me not to mention that. So once we have undertaken our fuel management activities, we re-run the residual risk model to include the data that we have back from the post-burn assessment, from the burning, but also other areas where we may have modified the fuel. We just recently, and, in fact, as recently as this week, re-run the residual risk for the ACT to incorporate the Orroral Valley fire and the impacts that has had on residual risk across the Territory. So all that feeds back in, in a continuous improvement process to continually monitor where - and guide us as to where our operations are best suited to offer a degree of protection against the undue damage from wildfire.

45

MR TOKLEY QC: Thank you very much, Mr Cooper. I might now move back to New South Wales, if I can, please, and Commissioner Rogers and Ms Stephens. Once some hazard reduction activities have been undertaken, is there then a process undertaken to assess the effectiveness of those particular activities and is the  
5 information that's gathered from that assessment process then fed into an overall assessment of the effectiveness of the activities State-wide, both in terms of the future planning process and the selection of mitigation activities?

10 MS STEPHENS: Yes, it is, as you would expect. We set objectives for our burns, and we also do pre-prescribed burn measurement of fuel loads and assessment of risks. Following a burn, just as Neil Cooper mentioned in ACT, we undertake severity mapping where we map the burn within our ..... parks, it's within our Elements system. We have an end-to-end planning process within the Elements system. From the day we come up with the idea of the burn and test the burn, it goes  
15 into that system, and then the planning and all the documentation preparing to undertake the burn, and then the assessment and evaluation is all recorded in our Elements system. And in the end, it's also uploaded into BRIMS which is a State-wide system. So we test the burn in terms of meeting immediate objectives. There might be objectives that relate - there probably will be objectives that relate to  
20 reduction in fuel and reduction in risk, but in our case big parks we will also have environmental objectives within the burn, and we will test those outcomes, both in the short-term and in the long-term.

25 That information gets uploaded into our system and it goes into BRIMS and it's then used to inform us in reviewing our reserve fire management strategy. It's also a five-year cycle but it's also used to review, at the end of every year when we are reviewing our annual works program, we will look at the information that has come out of this, that's come out of our burn program, but also look at the fire history that has come out of a wildfire season and we will re-run our fire histories and assess  
30 where we're out in terms of the need for locations for strategic burns in the following year.

I think probably I wanted to really stress, is that specifically with our burns we also test our prescriptions. We set prescriptions for our burns and we are keen to see that  
35 we are meeting the prescriptions of the burns. We're looking for best practice and continuous improvement process in terms of undertaking our burns, and we are then very - and we monitor over time and report on the effectiveness of the burns in meeting the environmental objectives that we have set.

40 In terms of assessment we undertake a visual fuel assessment as part of a post-burn assessment as well as mapping of the severity and ensuring that we review the fuel load information that we have for that area, and then we will monitor that over time to see what the response to the burn has been.

45 MR TOKLEY QC: Could I ask you about the assessment of the fuel load? How is that undertaken, please?



MS STEPHENS: Prior to the burn or post-burn?

MR TOKLEY QC: Prior and post, please?

5 MS STEPHENS: Both. So in terms of the - a large scale, we would do that through a  
visual assessment. We have a visual assessment guide and we apply that. But we also  
have a physical fuel measurement process which we would - which we will use at  
certain locations across the burn. And then we will go back to those locations  
10 post-burn to test the fuel levels as well as once again undertaking the visual fuel  
assessment process.

MR TOKLEY QC: Right. And do you use satellite imagery in the planning process,  
either pre or post?

15 MS STEPHENS: We certainly use satellite imagery in a lot of ways in fire  
management, and we will use satellite imagery for fire severity mapping, post-hazard  
reduction burning as well as post-wildfire, yes. We use satellite data for anything  
which it's applicable to. It will really depend on scale and timing but we would use  
any data that's available from satellites, we will use in both planning of the burns and  
20 then doing post-burn evaluation and assessment.

MR TOKLEY QC: Thank you. And Mr Cooper I think mentioned Lidar. It may have  
been mentioned by some of the other participants. Do you also use Lidar in your  
processes?

25 MS STEPHENS: Yes, we do. Lidar is another source of information and we use that  
also, particularly more in post-wildfire assessments but we also will use it for hazard  
reduction burning as well.

30 MR TOKLEY QC: Thank you very much. Now, to Western Australia, Mr De Haan.  
Stefan, you've heard, I think, what the other participants have said. Would you  
comment upon your post-hazard reduction activities as to their assessment and  
evaluation?

35 MR DE HAAN: Certainly, Mr Tokley, and look, I think there's very close  
similarities to what has been outlined by those other jurisdictions, but I guess  
fundamentally, again, harking on the fact that WA is a very large space. You know,  
our agency has legislative responsibilities for almost 27 million hectares of land, and  
then we have a further 90-plus million hectares of land that we have fire mitigation  
40 responsibilities for on allocated Crown land and unmanaged reserves. So the use of  
technology, satellite technology and remote sensing is quite critical to our post-burn  
or post-mitigation activity assessment.

I guess where and how that is used depends on the location in the State. We certainly  
45 use platforms like NAFI, as the NT touched on. And then maybe in the south-west,  
use of remote sensing more at a finer scale of individual burns; more about burnt,  
unburnt, I guess. So that provides, I guess, the broadbrush information about areas

burnt across the State. And then we start to drill down into it in a more regional and local setting. So once we really have those areas that we undertook the mitigation activities on, and again focus on burning but a very similar premise, you can use some mechanical mitigation.

5 Once we've gathered some of that data remotely, we then move more into the - a more intense alternative operational assessment, and that may be about how the burns have or have not met objectives, be they related to hazard reduction or be they related to other specific management purposes, be it biodiversity, conservation, be it certain forest management practices, etcetera. Some of that is informed with the  
10 remote data but a lot of that really needs more individual burn-by-burn assessment undertaken by our staff, sometimes utilising technology to assist with that.

So I guess there's that element of the assessment. And then as, I think Naomi mentioned from new South Wales, that feeds back into that planning loop where  
15 again I touched on our three-year indicative and our annual burn program that some of the evaluation that we've undertaken at a broad-scale and at an individual burn scale will then influence how we plan and implement our next round of mitigation. And I think the other element that we're fortunate enough to have within DBCA that is not necessarily always purely focused on our individual burn level, but we have a  
20 number of, I guess, longitudinal studies in terms of ongoing fire research undertaken by our fire scientists, that provide information into that evaluation and assessment program. That is more about the longer-term planning rather than the here and now because, as you can appreciate, it takes a while for that data to be worked through and then to inform operational practice.

25 And I guess the final one in terms of evaluation, albeit not necessarily the type of evaluation that you want, is more around what you might consider case studies. So over the course of our bushfire seasons, unfortunately, given the fire prone environment that we have, we get plenty of opportunities to test how effective our  
30 mitigation measures have been. So, you know, if we talk about prescribed burning, there's many examples where we can actually clearly show that it has had an effect on protecting values, community values or general land management values, or there may be times where, for various reasons, it hasn't been as effective as we liked. So that's quite an integral part to our evaluation process as well, and that continuous  
35 learning approach that I talked about previously.

MR TOKLEY QC: When the information that has been assessed and evaluated suggests that the steps that were undertaken may not be as effective perhaps as they could have been or they didn't meet set targets, what do you do with that information  
40 after that? How do you use it?

MR DE HAAN: Well, I guess, again, it's at all different scales. Some of the evaluation we may undertake about our mitigation activities is almost what you would call live evaluation immediately following the undertaking of the activity  
45 around prescribed burning, where through the use of largely through our spotted detection fleet which operates across the south-west, we get, I guess, mapping of burns that we've undertaken, burnt, unburnt, and we can determine whether, in terms

of some of the burn objectives we may have around percentage burnt, whether we've actually achieved that or, in terms of burn security, whether we have the adequate level of burn security. So we use that live evaluation, so to speak, to potentially inform our options in terms of undertaking more ignitions within those - within those burn areas.

Then in terms of what might be more cure evaluation, I guess, there is a section within our prescribed fire plans where we actually document letters, and then they feed into those processes that I talked about previously, which is other sort of - the three-year indicative, the annual burn program, and also, I guess, particularly in a regional setting, some of those local lessons learnt through evaluating the mitigation programs, feedback into our regional fire management plans that I talked about as well.

MR TOKLEY QC: Thank you very much, Mr De Haan. I will now go to the Northern Territory and to Ken and Jonathan. Mr Baulch - I'm sorry, I interrupted you. You probably heard what the others had to say and so we're interested to hear your perspective on matters. I imagine, given that the oversight role that Bushfires NT plays, that to the extent to which there is assessment and evaluation, it's largely carried out at the landowner level and then feeds up perhaps to the organisation?

MR BAULCH: Yes, there's certainly a lot of the evaluation assessment done at landowner level. There's also - Bushfire NT is also involved in a broader level of assessment of burning. And I will be quick here. We use the similar tools to what I was talking about in the planning - at the planning end. So we rely heavily on the NAFI website again to look at burn history. That's a fairly coarse measure of the effectiveness of burning, the extent of the burning. That's quite often supplemented or validated, perhaps, later by observation.

We consult with stakeholders, often not until the following year's planning process, to put together our assessment of previous years' burning. I think that we're also starting to interpret finer scale information ourselves within Bushfires NT rather - there's a supplement to the information we get from NAFI, looking at different sources of satellite data right down to the individual burn level. Probably I just want to comment as well on something that we lack, which is any remote-sensing method of measuring fire severity or fire intensity.

We tend to rely on an estimate based on the time of year of the fire which isn't always accurate. We would dearly love to have a better system available to give us some measure of fire intensity and, of course, its implication for impact on biodiversity and other environmental values. And just because everybody else does, I thought I should point out that we don't use LIDAR. I think it's out of scope for us.

MR TOKLEY QC: Thank you very much, Mr Baulch. Mr Veal, did you want to add anything to what Mr Baulch has said?

MR VEA: Thanks, Mr Tokley. Yes, as a land manager responsible for NT parks across the NT, we do have a system that we have regarding assessment and evaluation, and it can be formally described as MERI program or a monitoring, evaluation, reporting and improvement, so phases. At a - for our - for our most important parks we have a process, a comprehensive process of monitoring at - where the Department of Environment and Natural Resources, Flora and Fauna Unit, they conduct on a cyclic basis, three, or roughly three or five year cycles, comprehensive biodiversity monitoring of the key biodiversity values of the park. And also they use that - they've been conducting this work going back for the last 20 years on some of our most important parks. Supplementing that rangers conduct in a few of our parks plot monitoring surveys on an annual basis to evaluate the responses in key habitats.

And with that, rangers are monitoring the fire history and evaluating their success of prescribed burns and are evaluating the extent of wildfires on their parks, and matching it against the strategic targets that have been identified for the park and for the habitats. I guess in terms of the evaluation reporting improvement, a good example of work that we do that defines that is presented to the Commission in annexure SC4, which is the Litchfield National Parks Annual Fire Report and it provides a good example and a representative example of one of our more important parks and a good example of how we iterate - how we evaluate the - against the targets for work that's done and the use and the mapping of NAFL, and the mapping of the prescribed what was expected, in terms of the prescribed burns, what was the percentage of early season dry - of the success of prescribed burns; also, the extent of the wildfires, and also against the habitat conditions on that - on each - on the key habitats of the park.

And so it provides a good example of the - you know, it provides just a good example of that, evaluation reporting and improvement that could be demonstrative to the Commission of how we approach our work in the Territory. These reports are then - then assessed by - by senior management. And then they're - and that review is then incorporated into the future prescribed burns for the next year, and then evaluated also on a five-yearly basis through our integrated conservation strategies. The success of those fire reports also - I guess the prescribed burning is also used by our regional fire groups who are pre-planning for the wildfire seasons, often in - around July or August in preparation for the wildfire season on an annual basis as well.

So we've certainly got a - as one of the landowners, land managers for the Territory, we do certainly have an adaptive management framework that, yes, that we're still working on, still refining, but it's a basis for how we operate.

MR TOKLEY QC: Thanks very much, Mr Vea. Commissioners, those were my questions in relation to topics one and two. You may have some questions of the participants?

COMMISSIONER BINSKIN: And then we're going to talk about technology and role of the Commonwealth?

MR TOKLEY QC: Yes.

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COMMISSIONER BINSKIN: Why don't we flow into that now because we've been talking about information systems and the like.

MR TOKLEY QC: Certainly.

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COMMISSIONER BINSKIN: And I think it would be an important segue and then we will ask questions at the end.

MR TOKLEY QC: Thank you, Chair. Mr Veal, I don't know if you heard the Chair's comments, but I was wondering if you have any views on whether there is any role for the Commonwealth of Australia to play in terms of the coordination of nationally consistent standards in relation to the provision of information which both informs the planning and the evaluation exercises that are undertaken in the Northern Territory?

20

MR VEAL: The systems that we've developed are - are developed in our own space looking at best practice around us. At the moment we - we do recognise that having benchmarks and - and other standards that we could apply to our landscapes would be - would be extremely valuable as we're, you know, as we're sort of developing these systems independently, to be honest, and certainly advice from the Commonwealth around standards would be - would be useful.

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MR TOKLEY QC: Thank you very much, Mr Veal. Mr Baulch, did you wish to add anything to Mr Veal's answer?

30

MR BAULCH: Just in terms of the role of the Commonwealth, we, and I think everybody has mentioned that we rely on the technology from the Bureau of Meteorology for a lot of really important information. And I guess for us, the NAFI website that I've mentioned a few times, it's such a key part of what - of the information provided in what we do, that it provides a service that goes across a number of States, including the Territory and Queensland and Western Australia.

35

And so it's difficult for a single jurisdiction to take responsibility for it, if you like. And I know that the service really struggles to keep its head above water financially. It moves from funding cycle to funding cycle, and it gets some support from the Commonwealth at different times, and it's currently, I think, only until 30 June this year receiving funding from the Commonwealth for its web service. I probably see a role for the Commonwealth to look at some of those sorts of public service and incredibly important data providers to either coordinating the funding of them or finding a way to fund that sort of service. It's not a huge amount of money and it provides an incredibly important service for us.

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45

MR TOKLEY QC: Thank you, Mr Baulch. Stefan De Haan, in terms of the information that you use that's obtained from, for example, the Commonwealth of Australia or other information, do you see the opportunities - any opportunities for national coordination regarding the information that you take into account in terms of planning and evaluation?

MR DE HAAN: Look, I think there's always opportunities there. I've got a fairly robust system in Western Australia that I think, like myself and everybody else has touched on, an organisation like the Bureau of Meteorology is critical to the delivery of the mitigation business, let alone the response side of things. So we have a fantastic working relationship with BOM and they deliver a very high quality product for us: there is no dispute about that. And I guess we've been looking at where we can value add and improve our mitigation business. And our last spring season, we funded and trialled an embedded meteorologist purely to do with the implementation of our mitigation program.

Now, I think we may be the first agency to do that. That approach has certainly been embedded in the response part of the business for a long time. So, you know, there may be opportunities to explore there because weather and accurate forecasting and forecasters having a detailed understanding of fire mitigation and all the factors involved in that, can really help, I guess, identify windows of opportunity for burning and help better with our smoke management, and also, conversely, you know, can identify and value add around decisions when you shouldn't be undertaking that activity.

Also in relation to BOM, you know, we're very keen to get the air quality forecasting system. Both ourselves and the first assistant referred to as AQF<sub>x</sub> that has been utilised by some jurisdictions in Australia, and there's a number of things that BOM are working through before it can be operationalised here in WA. It's a little way off yet but that's going to be another critical tool because, as people have touched on, smoke is certainly an issue and a very valid issue for the community. So any way that we can manage that better and have better tools at our disposal is something that we would be advocating strongly for.

I guess also when you look at an organisation like the bushfire natural hazard CRC and the bushfire CRC before that, they do some great work in terms of improving knowledge across the entirety of this sector. And, you know, there might be some benefit in a greater level of support into operationally implementing some of the work that they actually produce because I guess the nature of the - the type of organisation is - they get it to a certain point and then it's up to the jurisdictions to put a significant investment sometimes into some of the technology and research that they've done to try and operationalise it in the State, which is not unreasonable. But also it would certainly be beneficial, I think, to all jurisdictions if they could sometimes take some of that work a little bit further and, you know, that could relate to things like better implementation of remote-sensing technology. It certainly could relate to some more sophisticated spatial soil moisture products and there's probably a suite of others.

And probably the last thing I guess I wanted to touch on is probably not so much Commonwealth support per se, but for a State like Western Australia, and we're an isolated State, even more isolated than usual at the moment, organisations like AFAC that bring together the various jurisdictions for information sharing, knowledge exchange, are quite critical. And given, as I say, our isolation, we can be a bit insular sometimes, so it's fantastic to actually share that knowledge with those collaborative groups and we're actively involved within AFAC. And on a similar vein, Mr Cooper in the ACT chairs the Forest Fire Managers Group, which we're part of, and they report up through the Commonwealth. And they're a group of land management jurisdictions around Australia, and with input from New Zealand as well, and it provides a very similar forum to what I talked about with AFAC with a more purely land management focus, but there's a fair bit of cross-over with those AFAC collaborative groups. That's probably all I had to say, Mr Tokley.

MR TOKLEY QC: Thank you very much, Mr De Haan. Do you obtain any information from the CSIRO or Geoscience Australia?

MR DE HAAN: Yes, yes. There's probably an oversight there. So I guess that information through those organisations largely feed into our fire science program. So I guess they're the direct link. So we are certainly heavily involved with that. And you know, something that you may or may not have heard about previously was the development of the dry eucalypt forest fire models known as Project Vesta and, you know, it's a very, very strong collaborative working relationship with CSIRO and our scientists here some years ago to, I guess, develop and operationalise them for using in a Western Australian context. And they now underpin some of our response planning and predictions. So I think - I think that's probably a very good example of that type of Commonwealth-State collaboration and can deliver results to end users.

MR TOKLEY QC: Thank you very much, Mr De Haan. I might go to New South Wales now and Commissioner Rogers and Ms Stephens.

MR ROGERS: Thank you.

MR TOKLEY QC: Yes, in light of what you've heard already, Commissioner Rogers and Ms Stephens, if you wouldn't mind commenting upon what you've heard and perhaps adding to it if you wish to do so?

MR ROGERS: Certainly. I would certainly echo everything that our colleague in Western Australia has spoken about with regard to the importance of the bureau and AFAC and bodies like that. I think one other thing that I would add where the Commonwealth are already adding a lot of value is things like projects like the new fire danger rating system that CSIRO and the Bureau of Meteorology are involved in, and I chair that group that's moving that along.

One thing I would like to say, though, that the Commonwealth I think could address is that jurisdictions like New South Wales - I mean, we pay to have a forecaster in

our State centre year round. And I think - that's so that we can address things like mitigation activities as well as fire activity. And I think the things like the service provision of the BOM, and it's not a criticism of the BOM itself because I think they're very much pushed into that model of getting a return on investment, but I think that they - that could be examined as part of how they can add value.

I think otherwise sharing of information across borders is something that we see that the Commonwealth could be involved in, certainly at a principle level. I'm not a supporter of having one national system, just simply because I think that that can very well stifle innovation that happens among jurisdictions. And I think we've heard this morning and this afternoon some great work that's actually occurring across the country, and I do fear that if we try to have one national system, I think you might lose that, and I think we've just got to make sure that we don't stifle that.

And I think the only other thing that I might just add is that some of the Commonwealth legislation, the Environmental Protection and Biodiversity Conservation Act, that's certainly something where the Commonwealth, from a private individual trying to get hazard reduction work done, New South Wales certainly provides streamlined environmental approvals to private individuals trying to do that work. But we can't provide that approval for Commonwealth Acts and that does leave individuals exposed. And I think that that's another way the Commonwealth could actually assist States and Territories, and indeed individuals, to get work done, by allowing States to, you know, within appropriate instruments, provide approvals under Commonwealth legislation for environmental matters.

Naomi, do you have --

MS STEPHENS: Look, I think just to confirm what everyone has said, that the value of AFAC, the value of the bushfires natural hazards CRC, how much we implement the work they do, and we're part of their collaborative networks. And it would be great to see confirmation of Commonwealth funding for those institutions and entities going forward because of the extraordinary value that we get from them. Thank you.

MR TOKLEY QC: Thank you very much, Commissioner Rogers and Ms Stephens. Now to the ACT and Commissioner Whelan and Mr Cooper.

MS WHELAN: Thank you, Mr Tokley. If I could just echo the comments from Commissioner Rogers, obviously we're not a supporter of a one size fits all, and that's because our landscapes vary and our risks vary. However, where there is a key role for the Commonwealth, it is ensuring and supporting, that each State and Territory does have access to best practice. We have heard this afternoon some absolutely outstanding innovations that we're seeing nationally; not seeing that in every State. That's one area that could be supported.

Clearly, the value of research and turning research into real capability, as it translates, quite often the lag time between the quality of the research and replication and the application of that, I think there is a a more timely application process. And



that's what I think is a role for the Commonwealth. And finally, again if I can echo the comment of my colleagues around the Bureau of Meteorology, certainly we have piloted short-term ..... the subject matter of expertise from the BOM. But certainly having regular access, probably in fact all year round, so that we can best utilise the subject matter expertise and the technology that the bureau offer and the interpretation particularly of that information and its supports that apply to fire behaviour management, understanding our weather patterns and a whole bunch of other challenges we are now facing is something that we heard consistently throughout that definitely was unprecedented, but we used this term: the fire didn't behave in the manner which it was predicted.

It was so extreme, variations were so profound, and that's where I think the subject matter expertise all year round, such as those in the Bureau of Meteorology, have worked side by side with the practitioners within the agencies, particularly in the planning, and the planning of the risk mitigation strategies as well.

MR TOKLEY QC: Thank you very much, Commissioner Whelan. And Mr Cooper, finally.

MR COOPER: Thank you, counsel.

MR TOKLEY QC: Is there anything you wish to add to what the Commissioner has said?

MR COOPER: Yes, there is. Yes, thanks. I suppose from our view, or from my view being a land manager, I tend to think that we should focus a lot more on prevention and tools that provide that value rather than big flashy new trucks and shiny helicopters. So I've got four or five points here. It's been mentioned already by my esteemed colleagues about the Bureau of Met. But I think over the years, as Commissioner Rogers mentioned, there has been a refocus, sort of a funding cuts, etcetera, to a user pay system. That has a real impact on a small agency such as myself and other land management agencies to the point that a lot of the BOM focus is during the fire suppression period and not the shoulder periods, which is crucial for us to have that information to be able to deliver prescribed burning.

Embedded meteorologists are great but we can't really afford those. And most importantly from the Bureau of Met is the smoke modelling aspect. All of us are under pressure to managing smoke when we undertake prescribed burning. There was some work done towards the smoke modelling component but that, you know, a number of us put significant money into that. And again, as I said, for a small agency, that takes money away from boots on the ground and actually delivering stuff in the field. So that's somewhere I think that the Commonwealth may be able to assist.

It hasn't really been mentioned specifically, but really the whole fire sector needs to have a national independent research entity to collectively undertake nationally driven research which is driven by the requested desires by the end users.

Currently we have a bushfire and natural hazards CRC due to be wound up fairly soon. There is some conjecture about what will replace that. But I think it would be not a good look if nationally we didn't have some entity to take on that role, because that area there, in particular that developed not only our research but our future  
5 scientists in fire. A PhD program - I don't plan to be around another 10 years, I'm hopefully down the coast writing letters to the editor about why people aren't doing prescribed burning - but we really need that next generation of PhD students to come through to take over.

10 I think the models that we use, we've mentioned those, a lot of us have mentioned the models quite a bit. There's some really quite complex algorithms in those models, and we run the risk of some of those being run or kept on someone's laptop in an office as opposed to a central repository where they can be updated. All new research, etcetera, can go into that, so sort of like a central place to run those  
15 algorithms on quite complex computer systems. And that's for prescribed burning not as well as fire suppression. So we've really got to focus on that prescribed burning component.

The second last one I think is Geoscience Australia could certainly be involved  
20 in - there's been a number of people mentioning Lidar. There may be some opportunity there to do that across the country in a more central and wholistic way, which takes some of the pressure off some of the agencies in trying to fund that quite expensive information gathering, because Lidar is just a picture of the vegetation at a point in time. It doesn't last forever, and you need to run it again. So there may be  
25 some value around that. And I guess, lastly, over the years we've had numerous inquiries post large fire events. One of those produced the national fire policy statement - coincidentally sitting over my right shoulder. It has got a number of --

COMMISSIONER BINSKIN: It's what I referred earlier. Yes, thank you.  
30

MR COOPER: Fancy that. It was signed off by all State leaders and the Prime Minister, and it has got about 14 objectives. Now, the forest fire management group which Mr De Haan mentioned before sits under, you know, the Commonwealth process, and trying to deliver that, those 14 goals. We are actually running a  
35 conference in a week or so's time to look at how we can develop KPIs against those objectives and some way that will allow, sort of, national auditing and reporting, etcetera. If there could be some sort of assistance in implementing that national policy statement, I think would be quite good. Thank you.

40 MR TOKLEY QC: Thank you very much, Mr Cooper. Chair, no further questions from me.

COMMISSIONER BINSKIN: Mr Cooper, entertaining as always, so thank you very much for that. Mr Tokley, you covered some of the questions that I brought up this  
45 morning on the management of effect and the like, but there's one that I would just like to --

MR TOKLEY QC: Of course.

5 COMMISSIONER BINSKIN: -- to go back to Ms Stephens and just give her a chance - an opportunity to respond something raised this morning. Hopefully she had a chance to hear that. But just to repeat it, it was along the preparedness side of it, and the comment that was made yesterday about you own the land, you own the risk. But as we were discussing sometimes if your risk isn't managed it translates to other people.

10 And talking with Mr Rogers this morning, Ms Stephens, we were talking about wherever we've been there are obviously people with a thousand opinions but there's a common one that pops up regarding New South Wales parks and wildlife and it's about, in the preparedness sense about hazard reduction not necessarily having been done, the fire trails, firebreaks and preparation and fire trails being blocked and the  
15 like. So I would just like to just give you a chance to talk about, in a sense, build on a bit more on what you had talked about before about preparedness. But some of the limitations, some of the issues that you, in your particular area, face in trying to get that preparedness levels for the coming season, to be able to manage that in accordance with the New South Wales strategy. Does that make sense?

20 MS STEPHENS: Yes, it does. So thank you very much, Commissioner, for the opportunity to talk about parks performance in this area, in New South Wales. If - I would say we have a very strong framework around preparedness and undertaking hazard reduction work. We - obviously the State, through the RFS, has State-wide  
25 targets for hazard reduction hectares and properties protected. We also operate under the Rural Fires Act which is a real strong piece of legislation that puts a really good framework for coordinated and cooperative arrangements in the State for all work, not just the response but also for preparedness and for undertaking hazard reduction work.

30 We have a 10 year strategy for managing fire in New South Wales national parks. It's been in place now for nine years and it provides us with overarching objectives for the work that we do in managing fire in the parks with the focus both on ecological and cultural heritage health of our parks. So also on undertaking preparation and  
35 hazard reduction work.

We prepare with the fire management strategies for all our reserves, and I referred to that earlier, the work we do with information, geographic information systems and work we do gathering data and talking to the community about their concerns in  
40 relation to our reserves, when they go into our reserve fire management strategies. And then we prepare a three year burn programs. And those burn programs are reviewed every year on the basis of the work that's been achieved. All that feeds into our State-wide bushfire risk management plans which are prepared and across tenure, overarching role of managing risk to the community in New South Wales.

45 So it's a good, strong framework. We also have a very strong culture, as an organisation, in preparing and undertaking hazard reduction. I think that probably

the - the statistics speak for themselves. Of prescribed burn undertaking fire agencies in New South Wales, 79 per cent of that burning is undertaken on national parks estates, led by parks in cooperation partnership with the RFS, fire and rescue, and the neighbours and community, but that's a pretty strong indicator of how committed we are.

We have a target set for us by government which is 135,000 hectares a year at a five year rolling average. And over the last seven years, we have undertaken 137,000 hectares of burning per year, plus another 2000 hectares of mechanical work. So on average we are achieving about 139,000 hectares a year against a five year rolling target of 135,000. So we're certainly setting the target, we're meeting the targets that have been set by us, for us by government.

Obviously the inquiry that we're now going through in New South Wales and the Commission, the Royal Commission both will give us recommendations in New South Wales and we will very seriously consider those recommendations and we'll implement under - in cooperation with the RFS the recommendations and if there's an increase in effort required National Parks and Wildlife Service will address that.

We also have a very good record in terms of maintaining our fire trail network. We have about 31,000 hectares of fire trail networks of parks in New South Wales, and over the last three years between 2016 and 2019 we've undertaken maintenance work on 21,000 hectares of that 31,000 hectares. We also, in preparation for each fire season, we drive every hectare of our fire trail network to ensure that it's in a state where it can be accessed by all fire authorities in a situation where you're confronted by wildfire.

We're currently undertaking work on our fire trail network to assess its current condition and we're working to upgrade that fire trail network under a system that's been implemented by the RFS, the fact planning system, and our - the government of New South Wales has given us \$125 million over the next 10 years or so for us to implement the upgrade to ensure that our fire trail network continues to provide the services required to the community for people to access our parks to undertake fire management.

So we had a good record ..... in terms of containing fires that burnt on our parks. If you look at the land that burnt outside the national parks estate, 71 per cent of those fires started outside the parks estate, and 29 per cent started on parks estate and travelled off. So in terms of looking at meeting our legislative responsibilities to work to, to stop the spread of fire from our reserves, we did quite well. And for the land that burnt in New South Wales, 44 per cent of all the land that burnt was burnt by fire that started on national parks estate, and 56 per cent of all land burnt started - was started by fire that started outside our estate.

We also, as people have been saying, we invest in increasing knowledge and sharing information. We have a science group within DPIE that works specifically on fire. We invest in the bushfire risk management research hub which is funded by parks in

cooperation and partnership with the RFS. We invest in the Bushfire Natural Hazards CRC and the work that they do and we are actively engaged in AFAC projects, including the national fire project which was a big project that focused on prescribed burning. And I think all of that is evidence of our commitment and our strong culture and we are very committed as well to working with our neighbours, our partners and with Aboriginal communities to ensure that we address the risks of bushfire on our reserves.

COMMISSIONER BINSKIN: Thank you for giving us that summary. Really appreciate it. I think it's a good chance to get it on the record for people to be able to have that as a baseline as we go into the next few weeks, where we start talking about LGAs and the like where it's been raised around the place. But I appreciate you taking the chance with that. And also we had one of your colleagues a couple of weeks ago talk about the success of cultural protection, like the Wollemi Pines and all that. So I appreciate that and I'm sure it's going to come up again as we talk about coordination, more as we get closer to State boundaries and things, which is more where we're working in that coordination side of it, but I appreciate you taking the time to give us a summary of the efforts that you've put in. Thank you.

That's my questions. Commissioner Macintosh?

COMMISSIONER MACINTOSH: One of, if you don't mind, Chair, in three parts. We heard yesterday from researchers about the importance of landscape-scale longitudinal studies on the effectiveness of prescribed burning and other fuel management activities on reducing risks. So not just those post prescribed burn analyses but looking at whether prescribed burn and other fuel management activities actually bring about the end result that they're designed to bring about. And I wondered, just going quickly around the jurisdictions, about whether you see value in those sorts of analyses?

Secondly, are you or do you intend to carry out those analyses, and if you're not, could you give us an idea about why not? So what are the barriers to doing that sort of work? And if I could turn probably firstly to New South Wales, given you're there, and you do, in the documents we've got before us, make mention of the fact that you're doing analysis on bushfire behaviour in the 2019-2020 season but you said that it's not yet complete and it suggests that it didn't always stop fire and that's on NSW.500.001.0014, if you want to pull it up, if that helps and gives some context.

COMMISSIONER BINSKIN: Don't worry, Mr Rogers, we won't test you on this. We will just wait to get it up so you can see it.

COMMISSIONER MACINTOSH: Second paragraph, last sentence, and it says:

*"While analysis is ongoing..."*

Yes, that bit there. So coming back to the question, I'm just wondering whether you find value in landscape-scale longitudinal analysis on the effectiveness of prescribed

burning and reducing risk? If yes, are you doing it? And if not, what are the barriers to doing it?

5 MS STEPHENS: Yes, look, there absolutely is value in that and there is quite a lot of work going on looking into the fire behaviour in the 2019-'20 season. The bushfires - the bushfire risk management research hub which works out of the University of Wollongong, University of Melbourne and University of Western Sydney, they're doing some very detailed analysis of the work of what occurred in the '19-'20 season and Ross Bradstock may have spoken about that yesterday, I'm not  
10 sure. But in - as well as that, we're also doing a lot of work with our science group on the impacts on the reserve of what's occurred and its relationship to the prescribed burning that has been done, as well as recent fire history, in terms of whether recent fire history has acted - has had an impact on the spread of the fires as well.

15 We have some good examples where prescribed burning did have an impact on the fires that impacted in '19-'20, but we certainly have situations where we would have expected that recent burns would have had more of an impact on the spread of the wildfire and we're very keen to look at that over time to see if we can get greater understanding and we can improve the prescribed burning we do in the future to  
20 address the situation as we identify it through this work.

COMMISSIONER MACINTOSH: Just to jump in, on top of that, do you have a standing ongoing system to ensure that this analysis is done on an ongoing basis at a landscape scale?

25 MS STEPHENS: Within national parks we do an analysis of all our prescribed burning and when - where it impacts with wildfire and we do look at every burn in the context of the impact that it had, go back to see whether the burn met the objectives that were set for the burn, whether they were undertaken within  
30 prescription, whether after the burn we felt that they met objectives, and then what the impact has been in terms of the intersection with the wildfire when it occurs, yes, and we've been doing that since we introduced our Elements information system which was back at 2012. So we're building an evidence base around - around what kind of impact we're having on wildfire. And obviously hazard reduction burning  
35 also contributes to providing access, safe access to firefighters in a wildfire situation. That's probably something we haven't looked at as closely but I think we will in the future.

COMMISSIONER MACINTOSH: Thanks very much. I might just turn quickly to  
40 Mr Cooper because I notice he's got an interest in this, or anyone from the ACT just to comment on that about the value of longitudinal landscape-scale assessments of what prescribed burning is actually doing, and if you're doing it, and if you're not doing it whether you see value in setting up systems to ensure that is done on a systematic basis?

45 MR COOPER: Yes, most certainly. So in the ACT, we've been undertaking post-burn severity for at least the last six years and it's a great sort of dataset for our

long-term planning. The effectiveness of prescribed burning, you know, it's dependent on so many things. It's on the location in the landscape, the vegetation type, the time that the main fire gets there, the time since it's been burned, suppression activities that may or may not have been undertaken.

5

But certainly in one instance in our own situation here in the ACT at Orroral Valley, I happened to be the incident controller at the time, and the fire came through, hit an area that we had undertaken some prescribed burning in over a number of years, and that held up in that location for four to five days. Eventually the conditions were such that it got around that, but it prevented that fire spreading further basically through our only other section of water catchment in the ACT and straight through to New South Wales.

Like Mr De Haan mentioned previously, as a land manager we're looking holistically right across the landscape. So we're undertaking fuel management for a range of functions and that any prescribed burning program is an amalgamation of what you do each year. So anywhere in the landscape you will have a mosaic of one-year-old, two-year-old, three-year-old right the way out to 15, 20-year-old fuel. And what we're trying to do is decrease that intensity, and we can see where that's worked in our own situation here in the ACT where the fire still kept going, it still burnt very hot, but the ecological aftermath of that is far less than it would have been if we hadn't have undertaken the prescribed burning. So yes, we're certainly committed to that and committed to ongoing research to further advise our program into the future.

COMMISSIONER MACINTOSH: Thanks very much, Mr Cooper. Does anyone from the other jurisdictions have anything to add or do you disagree with anything that's been said? I know we're short on time, so if any of you violently disagree, then raise your hand. If you broadly agree then I think we will leave it and move on. I think there's someone raising their hand there, I see.

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COMMISSIONER BINSKIN: Georgeina.

MS WHELAN: Yes, I would say that what we are very good at is evaluation - evaluation post an event, and a review of whether we apply recommendations from reports undertaken. In terms of real advocacy of research in longitudinal study, I think there's more work to be done nationally. I think we all have - are happy in contributing to research or support those research activities, but I don't think we're actually taking a national approach informed by a hierarchy of risk nationally.

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I think we have very good professionals out there who are very interested and are developing either individual research or institutional research, but I don't think we truly have a national approach. And, given the complexity of the environment thin which we're going to be living, working and operating ..... where particularly as we undertake far more mature residual risk assessments and we're going to be looking for alternative ways in which we can treat risk or, in fact, have to make a decision not

45

to treat, I think that should be evidence based and I think there's a body of research that certainly we should be doing over the next 10 to 15 years to inform that.

COMMISSIONER MACINTOSH: Thank you very much.

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COMMISSIONER BINSKIN: Thanks, Commissioner, I appreciate that very, very much. Commissioner Bennett.

10 COMMISSIONER BENNETT: I just have one question. There was some reference made to the effectiveness of prescribed burning and in the context of weather changes. I may have missed it, but I was just wondering about simulations and computer modelling where one can take some of those potential variations into account to predict, and I was just wondering if you are making use of that, that sort of technology, and whether you would see a benefit in having a national level of  
15 modelling into that regard available to you, to utilise? Commissioner, you're up on the screen, why don't you start, for the ACT?

COMMISSIONER BINSKIN: There's a few Commissioners there.

20 COMMISSIONER BENNETT: A few Commissioners, sorry. Commissioner Whelan.

MS WHELAN: Thank you, and I will I'm looking at the screen at Mr Cooper but I know he can't see me back. Absolutely, I think there is a wealth of opportunity to  
25 really understand how we can make best use of modelling, both in .....

COMMISSIONER BENNETT: Sorry for interrupting for a second. If you could do the first part first. The first question is are you making a lot of use of that sort of simulation and modelling is really the main question because I don't recall with the  
30 discussion on technology that that was specifically covered, and I - I mean, it may have been out of context but I just want to get an understanding of whether you are using that and what you see the potentials for the use of that nationally, perhaps?

MS WHELAN: So we use that. We definitely used that in the last fire season, and  
35 what we realised was, though, it is resource intensive and you've actually got to invest in it. It's not a natural by-product of our fire management structure; something that, from an ACT perspective, we've had to heavily invest in. At the moment our ability to do that resides in parks and conservation in Mr Cooper's area but is already an early learning that has come out of our review process, (a) the value of it,  
40 having undertaken it last year, but (b) the fact that we need to exploit it more fully into the future, which means we need to resource it better.

COMMISSIONER BENNETT: Thank you. Mr Cooper, if you want to add quickly to that. I'm just looking at the time then I will go to the others. I think you were put it  
45 into the mix there by the Commissioner.



MR COOPER: Yes, that's fine. I'm happy for that. Yes, we use modelling extensively. As the Commissioner mentioned, she covered fire suppression. I guess our main role, we supply qualified and professional fire behaviour analysts to undertake that to the ESA during the fire season, during suppression. But also our  
5 main part is the modelling outside the fire season. So we run a - as I mentioned, quite earlier on this morning, I think we did about 10 and a half - 50 - no, 530,000 simulations of fire across the landscape with different weather scenarios and different fuel scenarios, so --

10 COMMISSIONER BENNETT: Did you predict what happened?

MR COOPER: I beg your pardon?

15 COMMISSIONER BENNETT: Did you predict what happened?

MR COOPER: Yes, most certainly. Now, when I'm saying that is that the modelling predicted a fire risk in that area down to the south of the ACT, and we had programs in place to implement activities to minimise that risk. Now, the fire happened  
20 halfway through the year. As I said, it's amalgamation. It went through some areas that we burnt. I just mentioned before that one of the things that held that fire up and prevented it being a damn sight larger was the fact that we had already undertaken some of that work, and that was identified through modelling.

25 COMMISSIONER BENNETT: Well that's very helpful. Thank you very much. Thank you, Mr Cooper. New South Wales?

MR ROGERS: Yes, certainly, obviously, during a fire scenario we use, extensively we use modelling. And it's something that's between national parks and RFS. We have quite a lot of people trained in that and we support other States and Territories  
30 as they support us. And I think that level of portability and skill set is becoming quite specialised within the country, and we've got some really, really good and smart people. I think some of the emphasis, though, on prescribed burning on modelling and potential modelling of prescribed burns, I think is probably in its infancy as far as the existing models. And certainly more work could go into the existing Phoenix,  
35 Spark, the CSIRO product, and, you know, and potentially a joining of those. And I think the Western Australian product - I can't think of its name, sorry, at the moment - and some work would go into there to look at potential prescribed burn behaviour, because I don't think that they're necessarily that great at that at this point in time. Naomi, do you?

40 MS STEPHENS: Yes, I will just briefly mention the work of Ross Bradstock at the University of Wollongong under the bushfire natural hazards CRC. They've just completed and published a prescribed burning atlas for south-eastern Australia. And what it does is, you've seen its modelling, to provide information that land managers,  
45 people undertaking prescribed burning, planning prescribed burning, can use to look at the effectiveness of different mitigation strategies that they might undertake, such

as prescribed burning. So that's definitely an example of where modelling has been used to inform planning for prescribed burning before it occurs, yes.

5 COMMISSIONER BENNETT: Thank you very much. I think that was a segue to Mr De Haan actually, as the Commissioner mentioned, Western Australia.

MR DE HAAN: Thank you. Thank you, Commissioner. Apologies for dropping in and out there. I did say we are isolated here in WA.

10 COMMISSIONER BENNETT: That's all right. You're back.

MR DE HAAN: It came through and then we lost all technology, but in terms of I guess modelling, yes, certainly something that we use and is an important tool for us. The one thing I would just say with a degree of caution in terms of a national  
15 approach is that I guess the complexities of fire models, fire behaviours, the differing vegetation types, I guess our challenge is the ability to get a one-size-fits-all approach. Here in WA we've got various models but I guess the pre-eminent one that Commissioner Rogers, I think, was referring to is Aurora, which I guess runs very similarly to something like Phoenix Rapid Fire but is underpinned by a large number  
20 of different models and vegetation types that are reflective of the Western Australian environment. So it's a useful tool and we do have other models that we use and not necessarily in the same format. But our prescribed burning is underpinned by some pretty seminal research that was done in the '70s and '80s, to inform some of our prescribed burning but challenging to get the one size fits all...

25 COMMISSIONER BENNETT: This might be a naive --

MR DE HAAN: -- I think challenging to get the one size fits all. Sorry, Commissioner.

30 COMMISSIONER BENNETT: This might be a naive question, and you may not be the person who knows the technical answer, but if you can have a model for use throughout Western Australia with the very different landscapes and vegetations that you have there and weather patterns, why can't you have one that goes beyond  
35 Western Australia to other States by simply plotting those variables?

MR DE HAAN: Well, I guess technically it may well be feasible. As you say, I'm probably not the best person to answer that. I think it would probably add a significant degree of complexity, not that I was involved in the early days of sort of  
40 Aurora and Rapid Fire Phoenix, I think there was the appetite to try to do that, but it proved a little bit too hard. So at a fork in the road I think they sort of went two separate ways. But yes, it might be more appropriate for somebody more expert in that space to outline how feasible it is.

45 COMMISSIONER BENNETT: Thank you very much for your assistance. I will come back to you, Mr Cooper. I'm going to go first to the Northern Territory, see

what about what their position is on the use of simulations and modelling in that context?

5 MR BAULCH: At this point in time we don't use, in relation to modelling to any great extent. As others have mentioned, it's a fairly resource-intensive activity like, and our limited resources don't really make that feasible for us at this point in time.

10 COMMISSIONER BENNETT: Thank you very much. Mr Cooper, you wanted to add something, I think. I think we have to then close it down.

MR COOPER: Yes. No, just very quickly, thank you, Commissioner. Just want to make mention of the fire prediction group that sits under AFAC and most of the people who are on this panel have people involved in that group. They're the ones looking at the national models, what may be appropriate, can we get one, is it more  
15 appropriate to keep Aurora in WA with a different fuel type and have a separate one for the east. So that is being collectively looked at by the agencies through AFAC.

COMMISSIONER BENNETT: Thank you very much, Mr Cooper. Back to you, Chair.

20 COMMISSIONER BINSKIN: Thank you. And Commissioners, managers and directors, thank you very much for the time this morning and this afternoon. We got a lot out of that last session, in particular the last hour or so. So we do appreciate your time very, very much. Mr Tokley.

25 MR TOKLEY QC: Thank you Chair, thank you very much. Chair, that concludes this afternoon's session. Ms Stephens is coming back tomorrow. So if Ms Stephens could be excused on the basis that she is returning tomorrow.

30 COMMISSIONER BINSKIN: Just have to hang on a sec. Just see if we've got anyone coming in down the back. Any messages from afar? No. So no one's - yes, thank you.

35 MR TOKLEY QC: So if Ms Stephens could please be excused but to return tomorrow. And then could all of the remaining panel participants be released from their summonses.

COMMISSIONER BINSKIN: So Ms Stephens excused until tomorrow and the rest are released from their summons. Again, thank you very much. We appreciate you  
40 taking the time and all the effort in the preparation. Thank you.

MR TOKLEY QC: And chair, if we could now adjourn until 10 am tomorrow morning?

45 COMMISSIONER BINSKIN: We will adjourn until 10 am tomorrow morning Canberra time. Thank you.

**<ADJOURNED 4:10 PM TO THURSDAY, 18 JUNE 2020 AT 10 AM>**