REPORT OF PROCEEDINGS BEFORE

PORTFOLIO COMMITTEE NO. 7 - PLANNING AND ENVIRONMENT

INQUIRY INTO KOALA POPULATIONS AND HABITAT IN NEW SOUTH WALES

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At Macquarie Room, Parliament House, Sydney on Monday 9 December 2019

The Committee met at 9:15

PRESENT

Ms Cate Faehrmann (Chair)

The Hon. Mark Buttigieg
The Hon. Catherine Cusack
The Hon. Ben Franklin
The Hon. Shayne Mallard
The Hon. Mark Pearson (Deputy Chair)
The Hon. Penny Sharpe

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The CHAIR: Welcome to the fourth hearing of the Portfolio Committee No. 7 inquiry into koala populations and habitat in New South Wales. The inquiry is examining the current status of koala populations and their habitat and focusing on the impacts and effectiveness of existing policies relating to land management reform, forestry and the environment. Before I commence I would like to acknowledge the Gadigal people, who are the traditional custodians of this land. I would also like to pay respects to elders past and present of the Eora nation and extend that respect to other Aboriginal people present.

Today is the fourth of several hearings we plan to hold for this inquiry. We will hear today from key environmental organisations such as the Nature Conservation Council of NSW, Science for Wildlife and the Port Macquarie Koala Hospital, as well as independent koala experts, Dr Dan Lunney and Mr Vic Jurskis. We will also hear from Indigenous fire experts, Mr Oliver Costello and Mr Victor Steffensen. We will hear from representatives from the National Parks and Wildlife Service. Before we commence I would like to make some brief comments about the procedures for today's hearing.

Today's hearing is open to the public and is being broadcast live via the Parliament's website. A transcript of today's hearing will be placed on the Committee's website when it becomes available. In accordance with the broadcasting guidelines, while members of the media may film or record Committee members and witnesses, people in the public gallery should not be the primary focus of any filming or photography. I also remind media representatives that you must take responsibility for what you publish about the Committee's proceedings. It is important to remember that parliamentary privilege does not apply to what witnesses may say outside of their evidence at the hearing and so I urge witnesses to be careful about any comments you make to the media or to others after you complete your evidence as such comments would not be protected by parliamentary privilege if another person decided to take an action for defamation.

The guidelines for the broadcast of proceedings are available from the secretariat. All witnesses have a right to procedural fairness according to the procedural fairness resolution adopted by the House in 2018. There may be some questions that a witness could only answer if they had more time or with certain documents to hand. In these circumstances witnesses are advised that they can take a question on notice and provide an answer within 21 days. I remind everyone here today that Committee hearings are not intended to provide a forum for people to make adverse reflections about others under the protection of parliamentary privilege. I therefore request that witnesses focus on the issues raised by the inquiry terms of reference and avoid naming individuals unnecessarily. Witnesses are advised that any messages should be delivered to Committee members through the Committee staff.

To aid the audibility of this hearing I remind both Committee members and witnesses to speak into the microphones. The room is fitted with induction loops compatible with hearing aid systems that have telecoil receivers. In addition, several seats have been reserved near the loudspeakers for persons in the public gallery who may have hearing difficulties. Audience members should be mindful that noises and interruptions make it difficult for witnesses to communicate with the Committee and I request that audience members refrain from talking for the duration of the hearing. I note that photos and videos may not be taken whilst the hearing is underway except by authorised representatives of the media. If you would like a photo of today's proceedings please approach the secretariat. Finally, could everyone please turn their mobile phones to silent for the duration of the hearing.

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MARK GRAHAM, Hotspots Ecologist, Nature Conservation Council, before the Committee via teleconference, affirmed and examined

The CHAIR: Mr Graham, we are here in the Macquarie room in New South Wales Parliament. Members of the public and the media are present in the room and the proceedings are being recorded by Hansard. Would you like to make a short opening statement?

Mr GRAHAM: Certainly. I wish to bring to the attention of the Parliament a matter of immense concern for the future of so many of the North Coast koala populations. In the last three months a substantial proportion of all koala habitat has burnt. Most of that has burnt hot, it has burnt fast and it has significantly impacted upon areas of known national koala significance and some of the largest known colonies of koalas on the coastline of New South Wales, in particular in the Port Macquarie area. I draw to the attention of the Parliament that there are really only a few areas now of significantly unburnt blocks of koala habitat, one of which is the coastal koala colony centred upon Bongil Bongil National Park.

I would like to draw to the attention of the Parliament to the fact that there have been operational matters associated with these fires that have caused significant additional harm to koalas and their habitat. In particular, a series of broad back-burn operations undertaken on the Dorrigo plateau by the Forestry Corporation of New South Wales to protect their plantation assets. One of those operations was a back-burn of some 30 kilometres in distance which escaped and gave the backing heat to the fire that practically destroyed Nymboida.

Some of the last remaining refuges of koalas, in particular in the lower Kalang valley in Gladstone State Forest at Sunny Corner are currently being industrially logged by the Forestry Corporation of New South Wales. More than anything I would like to call upon the New South Wales Government to place an immediate moratorium on logging of primary koala habitat, in fact of all koala habitat. If industrial logging is to continue in these areas of known value and known presence of koalas it will simply multiply the negative impacts of these absolutely catastrophic fires.

The CHAIR: You have finished with your opening statement?

Mr GRAHAM: Correct.

The CHAIR: I will kick off with the first question. Could you expand on this for the Committee: You mentioned operational issues in relation to Dorrigo plateau and Forestry Corporation protecting plantations?

Mr GRAHAM: That is correct; Clouds Creek, Ellis, Sheas Nob state forested landscape.

The CHAIR: For the Committee's knowledge, for members' information, how is that information verified?

Mr GRAHAM: At a public meeting held in September a representative of the Forestry Corporation of New South Wales stated publicly that there was an economic value that could be quantified in the plantation estate and there was no value to adjoining old growth areas or private lands or primary koala habitat in the Clouds Creek area and that because of that there would be a priority placed upon the protection of the plantation estate. That resulted in the preparation and lighting up of a 30-kilometre long back-burning operation, which escaped and gave the energy to the fire that raced down off the plateau and destroyed the Nymboida Valley. I think it is now 101 homes that were destroyed from that.

The CHAIR: So crews on the ground were being directed by Forestry Corp, is that what you are saying, to protect the plantations? Just to be clear, there was a massive containment line or back-burning that then occurred through old growth—I am not sure of the vegetation type or the forest—so old-growth forest, rainforest, koala habitat, World Heritage?

Mr GRAHAM: Correct. All of those elements were impacted in a vain attempt to protect the plantation estate. In that area are some of the world's most significant old-growth tall eucalypt forests. There are World Heritage areas at Mount Hyland Nature Reserve. The area is known to support a nationally significant koala population centred upon the Mcleods Creek area and the operations resulted in what appears to be one of the largest ever back-burning operations ever attempted and despite the protestations of local brigade members, community members and concerned citizens that that type of back-burning operation would create significant risk of harm to life and property and nature, the operation was implemented.

The Hon. MARK PEARSON: Could I just ask a question at that point?

The CHAIR: Maybe Committee members could introduce themselves.

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The Hon. MARK PEARSON: Sorry, Mark Pearson, Deputy Chair of the Committee. You said that there was an assessment done by the forestry operation and that assessment showed that if they were to go ahead with the back-burning there would not be significant impact. Can you tell us how they came to that conclusion?

Mr GRAHAM: I do not know how they arrived at their conclusions—

The Hon. MARK PEARSON: Were they asked?

Mr GRAHAM: —but the reality on the ground is that there is such a massive moisture deficit that applying tens of kilometres of new fire line on the ground in such conditions meant that it was simply unable to be contained. That significant new fire front was at the mercy of the winds and escaped in multiple directions and ended up burning out the entirety of the plantation estate as well as most of them—

The Hon. MARK PEARSON: You said that members of the Fire Brigade service also protested and said that this should not go ahead, is that right?

Mr GRAHAM: That is correct. Members of the local brigade, the Tyringham brigade, repeatedly called upon the Forestry Corporation not to undertake such broad back-burning strategies, to implement such broad back-burns, lighting up kilometres of forests and they were absolutely ignored, and the concerns that were flagged about risks to life and property and risks to biodiversity were absolutely ignored and the local concerns completely ridden roughshod over. The Forestry Corporation went right ahead and the evidence is everywhere about the catastrophic outcomes of the bushfire management strategies employed by the Forestry Corporation.

The CHAIR: Mr Graham, I bring you back to koalas. As a result of that—and I am trying to think of it geographically—which areas of core koala habitat have been lost, as far as you are aware?

Mr GRAHAM: In that particular instance the entire Mcleods Creek area, which had a number of hubs and had some of the best koala habitat connectivity because those koala colonies reside in one of the broadest expanses of native forest, of tall eucalypt forest on the great escarpment and the Great Dividing Range and that entire area is now burnt out. There is barely a green leaf left for tens upon tens of kilometres. Hundreds of thousands of hectares have been absolutely fried.

The CHAIR: Thank you. A question from Ms Sharpe.

The Hon. PENNY SHARPE: Thank you. It is very serious what has happened up there. It is a little unclear. Can you tell us what the time frame was for this back-burning? When was that occurring?

Mr GRAHAM: This was all in relation to the original Bees Nest fire, which commenced in the first week in spring, about 7 September. These broad back-burning strategies were first mooted about a week after the initial ignition. Community members, of whom I am one, started looking at some of the operational maps and saying, "That looks like a real worry if that is to be a back-burning operation at that scale". Then in the weeks following that—in the week and a half to two weeks following the initial release of that plan the lighting commenced and by four Fridays ago from now extreme fire weather conditions blew in, big westerlies, 80-kilometre-an-hour westerlies, and an absolute firestorm built across that forested landscape, drawing its energy from those massive back-burns and swept over the plateau edge and down into the Nymboida Valley, as I said with 101 houses, and there has been direct mortality of all sorts of wildlife through there, including koalas.

The Hon. PENNY SHARPE: The decision to back-burn by Forestry Corp is a decision for themselves. What is your understanding of the oversight in relation to these decisions?

Mr GRAHAM: Section 44 bushfire operations are highly opaque and the Forestry Corporation appears to have significant powers to do as it sees fit without any checks and balances.

The Hon. PENNY SHARPE: So they are basically responsible for their lands. That would be similar for National Parks, for example? National Parks can do what they like? I am quite astonished that there is not more coordination in relation to back-burn activities?

Mr GRAHAM: As I said, it is hard to know because there is an opacity there, there is a difficulty in knowing precisely what decisions are being made by whom in these operations. I guess all that I can bring to the attention of the Parliament as evidence is the observations made, the evidence gathered prior to, during and after those major back-burning operations. As to the actual cause of that, the Parliament may wish to seek papers in relation to some of these matters because the consequences of them have been incredibly dire for our koala populations.

The Hon. PENNY SHARPE: As this is ongoing where there has been a lot of discussion about the ability to try to find out what is going on, obviously it is a difficult situation because there are active fires still

CORRECTED

going on, but what is happening in terms of trying to get a handle on the impact on the koala populations through the fires or is it still too early, given that they are still active?

Mr GRAHAM: I think some of the best available data is probably down in the Port Macquarie area, which have been so intensively studied and looked after by the koala hospital and the community so there is some pretty good data there. There has obviously been a lot of intensive work as well done up on the Richmond Lowlands with some of the work led by Dailan Pugh. Elsewhere it is still such a dynamic and evolving fire season—there is fire burning in so many places that are known to be of significance to koalas that the final situation will take some time to understand but we can say with certainty that many of these fires are burning really hot and really fast in that there are extensive ground fires.

The extensive nature of these ground fires is absolutely unprecedented. We have never before seen such broad expanses of forest across the North Coast, which is a global biodiversity hotspot. We have never seen such fires burning so fast and so hot and we know that that is a big problem for our koalas. There are simply no refuges and the risk of direct mortality is great. So we have definitely lost a lot of koalas that we knew. We have lost such a massive swathe of known koala habitat that I think we can say that without any doubt there will be ongoing declines in koala populations from this point forward, given the massive swathes of the landscape that have burnt, the lack of refuges and the ongoing drought, and the fact that there is simply no moisture and no surface water in so many of these landscapes. The availability of some moisture and surface water can help koalas to survive a fire front and can also help the forest to regenerate in a normal or a healthy sense.

The moisture deficits that now exist across the North Coast are absolutely astonishing and there are actually getting worse. As each day of summer goes by, more and more moisture is being sucked out of the landscape, which means that areas that have never been exposed to fire and areas that have been refuges for koalas—some of these really moist, tall, wet eucalypt forests—are now all available to fire. Now the conditions are all such that they will all burn and many of them are burning right now.

The CHAIR: Mark, you said at the beginning about Bongil Bongil in terms of the importance of protecting the habitat that is remaining. Could you expand on that for the Committee?

Mr GRAHAM: Certainly. With the absolute decimation of the Port Macquarie coastal koala colony—and there is significant evidence of that—that then means that the koala colony centred upon Bongil Bongil National Park—the area from the southern flanks of the Coffs Harbour local government area through to Bellingen—now has the largest known coastal koala colony. Thankfully, they have not been any major fires; there are a couple of very small spot fires that were put out three or four weeks ago quite quickly. But that landscape is essentially entirely unburnt and supports such a significant koala population into the hundreds of animals.

I would hope—and I would draw to the Parliament's attention—that this is now one of the last bastions, the last refuges, of our coastal koala populations. I would, I guess, be calling upon the Government to ensure as best we possibly can that fire, if it does propagate within that area, is suppressed as rapidly as possible to give this incredibly important koala colony a chance of survival.

The Hon. MARK PEARSON: The plantation that the forestry body sought to do the back-burning for to protect—is that plantations of timber?

Mr GRAHAM: Softwood plantations, essentially—

The CHAIR: Pine.

Mr GRAHAM: —slash pine and potentially radiata pine. I think it is mostly slash pine.

The Hon. MARK PEARSON: Okay, so the back-burn occurred to protect a softwood plantation but that back-burning actually caused major fires that destroyed a great deal of old-forest timbers and obviously habitat and animals. Is that right?

Mr GRAHAM: That is correct. Burning in a big arc around this plantation estate meant that the adjoining areas of old-growth forest, rainforest, koala habitat and threatened species habitat all burned. It burned hot and it burned hard. Many of the largest trees in the landscape, which koalas prefer—large tallowwoods and the like, their favourite food—completely burned through and collapsed.

The Hon. MARK PEARSON: What does a koala do when a fire is approaching and he or she is up in the habitat in the tree? From your observations as an ecologist with expertise in this area, what do they do to try to survive? We do not have much time left but we are just interested to know what that solitary koala does, maybe with a joey, to try to survive.

Mr GRAHAM: That would depend entirely upon the nature of the fire, its intensity and its rate of spread. In many instances with the type of fast-moving crown fires that we have been experiencing, koalas really

CORRECTED

have no capacity to move fast enough to get away, so there could be direct mortality. If the fire were slower-moving and there was not heaps of smoke, then the koala instinctively would move towards a safer refuge, whether that is a gully or to get down on the ground to try to survive. It is a bit hard to give a definitive answer because fires are such a dynamic process and there is such a spectrum of fire intensity. I think wherever koalas were able and capable to get out of the way of fire, if it was not moving too quickly, and there were pathways available to them, they will take those pathways. But we can say with great certainty that the fires have burnt so hot and so fast that there has been significant mortality of the animals in the trees. But there are such big area now that is still on fire and still burning that we will probably never find the bodies.

The Hon. MARK BUTTIGIEG: Thank you, Mr Graham. I am following up on my colleague the Hon. Penny Sharpe's questioning regarding the coordination. Is there any awareness of what the normal situation here in terms of protocol is, because presumably there is some sort of decision-making process before these back-burnings commence? It sounds like what you are saying is that Forestry Corporation just took it upon itself to start a back-burn but who ultimately makes that decision as to whether or not that can occur?

Mr GRAHAM: Through the chain of command, there would be senior staff within the Forestry Corporation who would have some responsibility for that—a regulatory, statutory-type responsibility. If it did come under, for example, a section 44, then there would be the involvement of an incident management team. Our experience—this is my personal experience as well as that of the community that I am part of in terms of brigade members and the like—has been that no matter what has been said or done to protest against these massive back-burns that the Forestry Corporation takes it upon itself to do what it sees as fit, frankly there appears to be little control of its actions.

The Hon. MARK BUTTIGIEG: So, in a legislative or statutory sense, it ultimately does have the power to do that because obviously it is its asset, I guess. Is that ultimately the situation?

Mr GRAHAM: I think that is a fair appraisal. It is a public land management agency. It is covered by New South Wales legislation regulations and it is given certain powers. But I guess when the actions undertaken within and surrounding the State forest estate create huge impacts upon koalas, people and other biodiversity, serious questions need to be asked about these operations and changes need to be made.

The Hon. MARK BUTTIGIEG: Yes, indeed. Obviously, you have alluded that we do not know the final extent of the damage to the population, given that it is still ongoing, but do you have any sense historically of how bad this is in proportion, in terms of destruction of koala population? Obviously, there have been events in the past where this has happened. Is this the worst or—

Mr GRAHAM: I guess this is by far the worst fire crisis that has ever been experienced and it is growing rapidly. Just over the weekend in the forest neighbouring me in the Upper Bellinger and Upper Kalang valley, there were significant crown fires over the weekend in areas that we know supported a healthy, breeding population of koalas. Now there are proposals to light back-burns in the top of the Kalang and the Bellinger valleys, which, with significant adverse weather now predicted to come in tomorrow and later on, means that there will be more energy in that system, which will create a significant additional risk to life, property, biodiversity and koalas.

The Hon. PENNY SHARPE: Mr Graham, are you suggesting that they should not be doing any back-burning?

Mr GRAHAM: At this point in time there is such a moisture deficit that adding any fire to the landscape means that it is almost entirely uncontrollable. There is simply no moisture that would otherwise normally and historically have prevented fires moving through gullies, rainforests and the like. I have photographs and maps now of fire burning a kilometre to a kilometre and a half through pure Antarctic beech rainforest over the weekend. These are areas that are simply not meant to burn, which previously would have held fires and protected adjoining koala colonies. Basically anything that can burn will now burn. Applying more fire to the landscape is simply adding more energy that when conditions turn adverse in terms of weather conditions and stiff wind give the fire more latent heat. It gives it more energy that then exacerbates the ferocity of the event. We are facing a very real risk of that now through the Bellinger and the Kalang valley.

The CHAIR: On that very depressing note, Mr Graham, we are out of time. Thank you very much for appearing via telephone.

Mr GRAHAM: Just in conclusion, if I may, ever so quickly: We really are calling for a moratorium on the logging of koala habitat. What is going on at Sunny Corner in Gladstone State Forest is absolutely diabolical. That area has such a significant koala colony and it is being industrially logged right now.

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The CHAIR: Thank you, Mr Graham. I do not believe you took any questions on notice. Thank you very much for appearing.

Mr GRAHAM: Thank you.

(The witness withdrew.)

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VIC JURSKIS, ecological historian, sworn and examined

The CHAIR: Would you like to start by making a short opening statement?

Mr JURSKIS: Yes, please. I am one of very few who have studied natural koalas. They live in large home ranges with thousands of trees, so you do not see them. Healthy old trees mostly have poor, hard, dry leaves that cannot sustain koalas. They move long distances to find fresh browse. Explorers did not see them in the valleys because they were not there. John Gould wrote that they could rarely be detected, even with the help of Aborigines. After settlers cleared paddocks, sowed pastures and disrupted Aboriginal burning, koalas erupted because dense young forests with millions of new shoots grew up in the foothills. Paddock trees got sick and started turning over new shoots all the time, so koalas invaded the valleys. The fur industry was a response.

In the Federation drought, trees were not able to keep reshooting, so koalas suffered starvation and chlamydiosis. They died out in the valleys but they survived in the forests. After World War II, timber cutters got chainsaws and tractors. Intensive harvesting created dense young forests and koalas bred up again. Then we stopped burning and grazing and locked up most of the forests. Trees got sick again; now koalas and scrub are erupting through declining forests—both regrowth and old growth. The dense population in the Pilliga crashed again in the millennium drought, whereas low-density populations continued to erupt.

Nearly everything you have read or heard about koalas, including NSW Koala Strategy, is wrong because it is based on denial of history and unwitting studies of unsustainably dense populations. NGOs and national parks service rely on misinformation to support fundraising, political campaigns and land grabs. The Senate inquiry swallowed it whole. When Mr Singh, who is now the member for Coffs Harbour, called it out, AAP FactCheck said his statement was false. They quoted the ridiculous Senate report and World Wildlife Fund report about millions of koalas in 1788.

You have got my ecological history. It was submitted, refereed and accepted as a review—the only reasonably comprehensive review of koalas that has ever been published. After they announced its imminent publication, CSIRO rebadged it as an opinion piece, implying a low standard. When I challenged AAP, they used this to deny the facts. But I am here today to share the facts with you. As I wrote in my submission in July, denial of history leads us to set up reserves of dying trees and scrub for unsustainable populations. Then they face lingering death in droughts or incineration in megafires. You have got five photos of a koala that I saw crossing the highway south of Eden Wednesday before last, where Dr Lunney says they are extinct. I will use them to illustrate the problem with koalas and fires. Thank you.

The CHAIR: Thank you, Mr Jurskis. You are from the South Coast; that is correct? You are suggesting that there are far more koalas on the South Coast than—

Mr JURSKIS: There are far more koalas throughout south-east Australia than there was at the time of European settlement.

The CHAIR: From the South Coast, then—the South Coast of New South Wales—what is your estimate of how many koalas are in that part of New South Wales?

Mr JURSKIS: I have got an old estimate that I did some time ago and I cannot remember. I can give it to you on notice. But the numbers have gone up since I made that estimate. Even the national parks service admits that koalas are increasing in the new koala park that is supposedly a climate refuge north of Bega. They are increasing in dense regrowth forests from 1980s wildfire and clear-felling. That forest has not been burnt in the meantime and it is declining, so you have got that double whammy: You have got dense young growth and in chronic decline of health at the same time, so that there is currently an increasing koala population using that unnaturally rich food resource until the next drought or the next fire, when they will be gone and the resource will be gone again.

The Hon. PENNY SHARPE: You are very critical of the NSW Koala Strategy. What is wrong with it, in your view?

Mr JURSKIS: It aims to stabilise and then increase populations, when there are already too many koalas because of the unhealthy, chronically declining forest. That is the same reason why we are having uncontrollable wildfires: It is because of the structure of the forest. As Victor Steffensen says, it is upside-down country: It is thinning on top and thick underneath. I would like to refer to those photos that you have got. For example, the first photo—if you have a look at the ground you can see it is all litter and dead wood. There is no grass or herbs or anything. That is where all the biodiversity is in a healthy forest: It is in the ground layer and the small animals that rely on that layer. It is not there; it has been choked out by scrub.

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So you have got litter on the ground, and it is continuous with scrub in the middle and it is continuous with the thinning canopy on the top. You get a fire in that, it is uncontrollable because in severe conditions you get fire storms and ember showers that can be tens of kilometres in front of the fire front. That is why fires are uncontrollable. The only thing that is unprecedented about these fires we are having at the moment is the amount of fuel in the bush. It is right through Australia; there is three-dimensionally continuous fuel and declining trees wherever you go because we no longer use mild burning. In fact, in New South Wales it is illegal to manage the bush properly by burning it frequently and mildly. It is against the regulations to do it properly.

The Hon. SHAYNE MALLARD: Thank you for your submission. I am from the Blue Mountains and there are reports of one or two koala sightings up at Blackheath and Lapstone, but just one or two sightings. If your hypothesis is right, would we not be seeing a bounce back of significant numbers of koalas in a habitat that did have thousands and thousands of koalas up until the turn of the last century?

Mr JURSKIS: No, it did not have thousands and thousands of koalas. That is exactly my point.

The Hon. SHAYNE MALLARD: The entire Blue Mountains?

Mr JURSKIS: A natural koala population has a density of about one koala per 100 hectares.

The Hon. SHAYNE MALLARD: There are a few thousand hectares, though.

Mr JURSKIS: Yes. The first eruption of koalas was noted by surveyor Govett, who Govetts Leap is named after. He described them as numerous in the dense stringybark forests on the Hawkesbury and on the Coxs River side of the Blue Mountains. Those were new forests; they grew up when we disrupted Aboriginal burning.

The Hon. SHAYNE MALLARD: But we are not seeing evidence of an erupting koala population in the Blue Mountains.

Mr JURSKIS: We are. If you can see koalas, it means they are erupting. Naturally, you do not see them because you have got one koala per tens of thousands of trees. A natural koala population is invisible. When you can see them—like, for example, that koala in the photo there; that is in an area where koalas are supposed to be extinct. They are actually erupting.

The Hon. MARK PEARSON: When you say the word "erupt", what do you mean?

Mr JURSKIS: Erupt is the opposite to decline—increase rapidly.

The Hon. MARK PEARSON: Are you saying that the reason the number of koalas is increasing rapidly is the balance that has occurred—

Mr JURSKIS: The imbalance.

The Hon. MARK PEARSON: Yes, the imbalance, which you have claimed occurs in natural vegetation. How does this scrub get there that you said you are so concerned about?

Mr JURSKIS: The scrub gets there for two reasons. First, you are not destroying all the woody seedlings like Aboriginal people used to do regularly. More importantly, the main thing that controls seedlings in nature in the natural fire regime in the healthy canopy of the trees. When the trees gets sick they start declining and the canopy gets thin. More light and moisture gets through to the understory and the understory booms. That reinforces the changes in the soil that underpin the problem because if you do not burn it it changes the soil and the roots of the trees get sick. That is why the canopy starts thinning and the physiology changes. They keep recycling young foliage all the time.

That is why anything that takes advantage of trees for nutrition explodes, including koalas, mistletoes and native cherries—which are a parasite on the roots. Anything that can take nutrition from eucalypts explodes when eucalypts get sick and start turning over nutritious sap and leaves all the time.

The CHAIR: I just want to check the evidence you are giving today. You are giving evidence as a retired individual. Is that correct? You are not giving evidence for another organisation?

Mr JURSKIS: No, certainly not.

The CHAIR: But you are a fellow of the Institute of Foresters of Australia?

Mr JURSKIS: I am a fellow of the institute, yes. And I am a member of the Royal Australian Historical Society.

The CHAIR: You are a spokesperson for the Institute of Foresters of Australia?

Mr JURSKIS: No, I am not. I am a fellow.

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The CHAIR: Okay, but last week you spoke publicly about the need for back-burning on behalf of the Institute of Foresters.

Mr JURSKIS: No, I did not.

The CHAIR: It is in *The Sydney Morning Herald.* There is a quote from you in relation to back-burning. I just want to check in terms of the evidence you are giving. You do have a history as a forester.

Mr JURSKIS: I certainly did not represent myself as a spokesman for Institute of Foresters to *The Sydney Morning Herald*. I can assure you of that.

The CHAIR: Was it an open letter?

Mr JURSKIS: I do not know. I have not seen it.

The CHAIR: Are there any other questions? It is good to disclose.

The Hon. MARK BUTTIGIEG: I am quite surprised by your evidence, given the evidence we have heard on this today, because it is counter to what we have been hearing, which is that all the studies, mapping and everything else indicate that there is unanimity over the extent of the decline of the koala population and the fact that it is dire and on a trajectory to extinction. You are suggesting otherwise.

Mr JURSKIS: Absolutely.

The Hon. MARK BUTTIGIEG: Can you tell us why everyone else has got it wrong and you have got it right?

Mr JURSKIS: Yes. Most of the studies you refer to ignore the first 100 years of the European history of Australia and a lot of them ignore the first 200 years. The majority of the recent studies about the dire decline of koalas refer to the last 20 or 30 years.

The Hon. PENNY SHARPE: Is that not because the pressures on koala populations have been ramped up?

Mr JURSKIS: Absolutely not. It is because koalas have erupted since the late twentieth century as a result of more reservations of land and loss of burning and grazing. Burning and grazing can both keep forests healthy and they have both been reduced over vast areas and a lot of land has been put into reserves and so forth. It is a mismanagement of land that has driven these eruptions of koalas. If you have eruption inevitably the population is going to crash in a drought or the koalas are going to get incinerated in a fire, as I said in my submission.

The Hon. PENNY SHARPE: So it is your view that grazing and logging assist the population of koalas?

Mr JURSKIS: I did not say logging; I said grazing and burning. But, yes, logging also increases koala populations. That was demonstrated. In 1991 there was a comprehensive survey of arboreal fauna on the North Coast of New South Wales by Kavanagh and others. There were only two animals that were affected by logging. Koalas increased as a result of intensive logging and powerful owls were associated with unlogged forests.

The Hon. MARK PEARSON: Do you agree that a tree is the main habitat home of a koala?

Mr JURSKIS: The thing is that—

The Hon. MARK PEARSON: Sorry, can you just answer the question? Would you agree that a tree is the only and main habitat for a koala?

Mr JURSKIS: I cannot agree to that without qualification. As I said in my opening statement, mature trees are basically not habitat for koalas unless they have a flush of new growth on them. Koalas rely on soft, young leaves and shoots for nutrition.

The Hon. MARK PEARSON: But they do travel.

Mr JURSKIS: They do travel, yes. They have to travel—

The Hon. MARK PEARSON: Can you tell me the logic in an industry removing trees—logging—when you agree that the main habitat that a koala is going to sleep in and survive from is a tree?

Mr JURSKIS: I get the question. Dense young forests have lots of new shoots. Mature trees do not.

The Hon. MARK PEARSON: They are growing, are they not?

Mr JURSKIS: Mature trees?

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The Hon. MARK PEARSON: Yes.

Mr JURSKIS: Basically, once they reach maturity they are growing very, very slowly. But the dense, young forests are producing new shoots all the time and declining mature trees are recycling new shoots all the time. Healthy trees are not.

The CHAIR: Mature trees are also seeding new trees though. That is how a forest works.

Mr JURSKIS: No, it does not. They only way that new trees can develop in a eucalypt forest is if there is an opening in the canopy. In the same way that under a mild burning regime the mature trees control the understory, they also control regeneration. The seeds cannot germinate and develop into seedlings and saplings if they are affected by competition by healthy, mature trees.

The Hon. CATHERINE CUSACK: Mr Jurskis, research conducted by the Australia Koala Foundation suggests that between 1888 and 1927 eight million koalas were killed for the fur trade, and at least four million of those pelts were sent to Britain. Does that not suggest that there were a lot of koalas?

Mr JURSKIS: I get the question. No, it does not at all. That was 100 years after European settlement. What I have already said to you is that all the studies that talk about the millions of koalas ignore at least the first 100 years and in many cases the first 200 years of European history.

The CHAIR: Any other questions?

The Hon. PENNY SHARPE: My final question to you is that given that this inquiry has been established because we are concerned koala populations, is the take home from your evidence today that we do not need to do anything and that koalas are fine?

Mr JURSKIS: Absolutely not. My evidence is that we need to restore a healthy landscape with low but sustainable densities of koalas.

The Hon. PENNY SHARPE: By grazing, burning and logging?

Mr JURSKIS: I do not necessarily advocate for grazing. I am saying that one of the reasons forests are sick is because we reduced grazing. But you cannot maintain a healthy forest without mild burning. That is true right across Australia. We have declining forests and eruptions of all sorts of things, including mega fires, because we are not maintaining a safe and healthy landscape the way it was maintained for 40,000 years.

The Hon. PENNY SHARPE: So you do not support the creation of national parks?

Mr JURSKIS: National parks do not do anything for conservation. What we need is mild fires across the landscape, like we had for 40,000 years under Aboriginal management, which created the biodiversity that greeted European settlers.

The Hon. PENNY SHARPE: Do you believe that fire is the most important thing?

Mr JURSKIS: Absolutely. The only real environmental issue in Australia is the lack of mild fire across the landscape. I do not care what tenure you are talking about. National parks, State forests and private property are all generally in pretty bad shape. That is why we are having mega fires and that is why we are having ups and downs.

The Hon. PENNY SHARPE: You do not accept that drought and lack of moisture is making that almost impossible to do?

Mr JURSKIS: No. We had drought, mid-40 degree temperatures and searing north-westerly gales here in Sydney in December 1792 and the settlers controlled the fires with green branches. There was one hut lost in Sydney and a few gardens and fences. One hut, a stack of wheat sheaves and outbuildings in Parramatta. The reason fires are uncontrollable today has nothing to do with drought. It is all down to three-dimensional continuous fuels across the landscape.

The Hon. PENNY SHARPE: Nothing to do with climate change?

Mr JURSKIS: No.

The CHAIR: That is the end of questions for Mr Jurskis. Thank you very much for appearing.

(The witness withdrew.)

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KELLIE LEIGH, Executive Director, Science for Wildlife, affirmed and examined

DAN LUNNEY, independent koala expert, affirmed and examined

The CHAIR: I welcome our next witnesses, Dr Dan Lunney and Dr Kellie Leigh. Would you like to make a short opening statement?

Dr LEIGH: I would like to draw attention to a really nationally significant population in the Blue Mountains area. I did start working with koalas down in Victoria, where there are quite different management problems. In the Blue Mountains, where there are historical sightings, back in the fur trade days koalas were hunted and they were seen quite frequently around the lower mountains, around Hazelbrook and Springwood, and the other side of the mountains right through to the Megalong Valley. We have been doing assessments based on records from the previous fires back in 2013 when koalas started popping up. People have assumed that because it is largely sandstone country in the big protected area—we are talking about the Greater Blue Mountains world heritage area, so eight national parks and Jenolan Caves Reserve as well—throughout that area the assumption has been that if koalas are there they are low density and they are not significant populations.

What we are finding is large, growing populations. They are not low density. We have found a lot of koalas particularly in south-east Wollemi National Park, which runs right down into the Hawkesbury. They are cross tenure. There are a lot of animals in the protected area on a range of soil types and different habitat types and they are running down into the developed area as well, where they face different threats. On the other side of the mountains in Kanangra we have found a lot of koalas over 1,100 metres, so they are in snow some of the year in winter. They are on low- to low-to-moderate quality soil types, they are breeding and they are chlamydia free. We also did a collaborative genetic study using whole genome technology with the University of Sydney, James Cook University and San Diego Zoo Global and we assessed koala genetic diversity across the whole species range.

We found high diversity in New South Wales and the highest diversity was in this Blue Mountains population. At that stage it was quite a small sample size. From that point of view they are particularly important for species conservation. Obviously in the protected area the key threats—as opposed to land clearing, which is a threat to them because they do go into developed areas, but we have core populations in large numbers within the protected area as well—are fire and disease. At the moment we have chlamydia in one population that we have assessed and there are five that we need to get to, based on sightings. We are only on the second one now. There is chlamydia in the Hawkesbury area, but it does not seem to be stopping population growth. There is no chlamydia at the moment in the Kanangra population at all. Basically we do not know what is out there.

Everywhere we look we find a lot of koalas. This area just has not been surveyed. It is really challenging terrain. We use scat detection dogs and other methods to find the koalas. They appear to be breeding well. The demographics that we are getting are of a young and expanding population, particularly up in Kanangra. Bushfires obviously at the moment—I have supplied a document that shows maps of the fires from a couple of days ago. One has gone through two-thirds of the koala habitat that we have mapped at our first study site and the fires from Kanangra are now coming up through the second study site. The other populations that we have flagged for further survey are all under threat as well. We are finding that there is just no resources or planning in place to be able to deal with this threat for these koalas.

Dr LUNNEY: I think koalas are an excellent animal to study because they are visible, they are distinctive, they are in people's memories, they are in the historical record and then you can use a lot of techniques that are not available for cryptic animals through citizen science. If you can get a lot of people involved in projects, from that point of view, it is great. I think the most important single thing that has caused the loss of koalas is the loss of koala habitat and the fragmentation of what remains. The secondary effects then start to play in. As the habitat shrinks and fragments, then drought, dogs, fires, roadkill, disease and mining play an increasingly important part. I think climate change, especially drought, is a major pervasive threat. Another important thing is koala populations differ markedly across the State and, in fact, across Australia.

A population could be declining, dwindling, going extinct or, in fact, increasing. It is important to understand the differences among the populations. When you are managing them you should have a national policy, a State policy and the local managing plans can be effective. It needs that hierarchy. As a research scientist I think it is utterly crucial to draw on research and then sustain research programs. That could range from population studies, continuing surveys, long-term monitoring, historical studies, examination of the role of private land and integrating koala work with other studies. I have been working with economists and sociologists to look at a broader range.

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The CHAIR: Thank you. Just in relation to the fires that we have heard so much about, they seem to be in some ways impossible to fight and we have always heard about protecting life and property. What more could be done to try and save koala populations, say in the Blue Mountains, Dr Leigh, from this impending fire front?

Dr LEIGH: I think we are getting a lot of lessons out of this. It just shows how unprepared we are, basically. There are no resources and there is no planning in place, right from the basic level. In terms of trying to go in to move koalas, we had a team out yesterday trying to go and shift koalas in front of the fire front, but because the detectability is really low, they are in massive trees, there are no protocols in place. National Parks wanted to do something but it had to knock it back due to safety in the end because we were seen as general public, even though we have scientific licences to work with koalas. There are no procedures or protocols in place to manage doing anything before fire or even after fire. Even wildlife carers do not have protocols for when they can go in after fire, when they can go into the fire ground, what training they need or who they need to go with them.

When you are trying to deal with a situation like this and you are making lots of phone calls to National Parks and Rural Fire Service and they are all busy fighting these fires, you are just helpless and there is nothing that you can do. I think there is a range of things: Starting from scratch and looking at getting standardised protocols for dealing with fires before and after, but then also planning with more prescription burning. There are no resources at the moment and we have over 100 fires across the State. Rightly so, the focus is on property and lives at the moment, but that means there is really little going into wildlife. If we can plan some sort of asset protection that includes koalas, like core refuge areas or something, even if we just protect small pockets, then you end up with a mosaic where potentially animals can recolonise after fire.

The prescribed burning also, although there are some guidelines—I am not an expert; we would need to talk to the Rural Fire Service and National Parks in terms of what is already there—at the moment it is certainly showing us it is not sufficient and there is not enough planning going ahead. Particularly under climate change, these are unprecedented conditions that we have been seeing. The resources are stretched too thin, they are busy trying to put out so many fires and wildlife is just suffering at the moment. And we are expecting to see more frequent and more intense fires under climate change, so this is going to be an ongoing problem.

The CHAIR: So unless the Government moves to protect koalas from the megafires that are happening now, what chance do you think the koala populations in New South Wales have?

Dr LEIGH: I think with what we are seeing at the moment it is pretty minimal, to be honest, because we do have some core populations in the protected areas. There are areas that are not national parks that are burning too. Then we have the fragmented habitats. The koalas that are going to remain are in these high-pressure areas where you have all of these other pressures as well. So in terms of population viability we certainly do not know that in the mountains. It is one of the things we need to do—we need to do more research and find out how many and where they are so we know how to manage them. That is certainly a problem across a lot of areas.

With these fires and the amount that is burning we are looking at a massive proportion of the world heritage area that is going up at the moment, plus you have the fires up in the north and around Port Macquarie wiping out massive amounts of koala habitat as well. It is certainly going to have a devastating impact on populations.

The CHAIR: As a koala expert you are suggesting that what might be needed—unless active intervention is taken to save some of the healthy koala populations now that will potentially be in the fire front within a few days or a week or whatever, you are essentially saying that something needs to change and we need to prioritise protecting koalas and with business as usual in terms of just prioritising life and property that is not good enough for the koala.

Dr LEIGH: Yes—absolutely. We are just helpless at the moment. We are just watching these massive fires. There are two megafires. There is one, the Gospers Mountain fire, that has joined up with three others. It is currently going through the Wollemi National Park down to Bells Line of Road through core koala habitat. We have another fire that has joined up from Kanangra that is moving north as well. They have already hit two-thirds of the northern population we have studied and probably a third of the Kanangra population. One is going north and one is going south and they are going to meet up in the middle—that is probably five of our study sites that will be impacted by these fires. So at the moment with business as usual we have no way to deal with this, no way to manage it and no plans or protocols in place to help do that.

The CHAIR: The Government does have the NSW Koala Strategy. We know that the environment Minister, Matt Kean, is very determined to not let the koala go extinct under his watch. Clearly an active intervention needs to happen to save the State's koala populations from these fires. Do you think community members are there, ready to try to rescue koala populations? Because at the moment it is the fact that there are not enough resources to even fight the fires, but we do—

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The Hon. SHAYNE MALLARD: And regulations.

The CHAIR: And regulations.

The Hon. SHAYNE MALLARD: Safety regulations.

The CHAIR: The safety regulations—you are right. So it needs to be almost like an urgent change to the regulations in terms of letting people in to forests and fire affected areas—is that what you are suggesting?

Dr LEIGH: I am suggesting that to start with—safety procedures and protocols in place—and also more resources so that wildlife can be more of a priority in these fires, because at the moment resources are far too stretched. It needs to be long term too. Because at the moment we could potentially try to go in and do an urgent intervention in Kanangra, where we could potentially find some koalas. At the moment another problem is we have nowhere to put them, so we are not set up with an equivalent of the Port Macquarie Koala Hospital. We have some WIRES carers and wildlife carers around the area. They are already full, pretty much, from the koalas that are coming in. So if we were to grab koalas, we have nowhere to put them at the moment to take care of them.

Also in some of these areas, particularly at our first study site, the trees are massive—up to 40 metres tall. We need specialist climbers. Sometimes we would go out with 20 spotters and take a day and we would find three koalas, so they are not easily detectable. And it is where the fires are really intense because you have massive trees as well. So there also needs to be long-term planning for protection of koalas, trying to manage refuges, potentially, for them across the landscape where under these fires burns are managed and koalas and other wildlife have more chance of persisting rather than these massively intense crown fires going through all of these areas in one hit.

The Hon. SHAYNE MALLARD: I do not know if you heard me say earlier that I live up in the mountains up near Medlow Bath. It is really encouraging to hear you say that there are populations in the remotes of the national park up there. You used terms like "a young and expanding population" at Kanangra and "large, growing populations". That is encouraging in the bigger picture, setting aside the really dramatic impacts of the fire at the moment. Would your prognosis be that once we can get through this current catastrophe that the population will continue to expand and grow in the Blue Mountains?

Dr LEIGH: I think potentially. We cannot ignore the fact that these fires are having a massive impact, so it may be that they are really knocked back and will take a very long time to recover. But certainly we have a good news story in the Blue Mountains and also in Campbelltown and the Southern Highlands there appear to be growing populations as well. So around the Sydney Basin things are looking reasonably hopeful for koalas, which is exciting, compared to a lot of other areas across their range, because they are in dramatic decline and they are under a lot of pressures. There are development pressures in the Sydney Basin as well.

One of the important things about this Greater Blue Mountains World Heritage Area is it is a million hectares of protected area that nobody really thought could support significant populations of koalas, and we are finding them in there. So it is a potential refuge under climate change as well and we have some funding to do more research over time with that to work out what a climate refuge looks like for koalas. Because you have really high altitudes; you have a lot of different microclimates; and they are using different habitats that we did not know they could use. That is partly because they have more choice of habitats than pretty much anywhere else in the country. It is world heritage because of the eucalypt diversity. So they are using tree species and habitats we did not think we would find them on. They are on ridge lines and silvertop ash and different sorts of habitat.

The Hon. SHAYNE MALLARD: You mentioned 1,100 metres, which is where I am in Blackheath. You mentioned that some koalas have been spotted there. I was a bit cynical but you have just given us—or me, anyway—some good news. Have you published any studies yet on this group?

Dr LEIGH: It is very early days. We have published their genetics work and we have a paper in prep from the Hawkesbury population. I only just started assessing the Kanangra population. We have been radio tracking individuals there. The females appear to be breeding every year. When we go out on capture trips we find them just a few hundred metres apart, so they are certainly not low density. But we have not published yet. We are still doing the final surveys of our habitat maps but we will be doing the paper quite soon. We have submitted technical reports to the Office of Environment and Heritage or our Department of Planning, Industry and Environment. They have supported us with funding for a lot of the survey work. So those reports are going back to the land managers.

As a result of that, it is encouraging that, although there is very little they can do in the Hawkesbury at the moment and around the Mountain Lagoon area where these fires are coming through and where we know there are lots of koalas, it has been flagged with National Parks and at the moment they are trying to do a low intensity burn and keep it to a metre high so that there is a chance that those koalas will survive and we will have

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something left. The plan is to try to stop it from crossing Bells Line of Road. If it does not, it is going to go through the Grose Valley and hit the Blue Mountains, so everybody wants that to stop. If they can stop it there, there will be pockets that survive as well.

The Hon. SHAYNE MALLARD: My last question on the area is about the issue of chlamydia. You have identified chlamydia in the Hawkesbury population.

Dr LEIGH: Yes.

The Hon. SHAYNE MALLARD: But not in the Wollemi population.

Dr LEIGH: Sorry, Hawkesbury and Wollemi are together. We did south-east Wollemi down into Kurrajong area—that was our first study site. Our second study site is Kanangra-Boyd National Park into the Megalong Valley and into the upper mountains.

The Hon. SHAYNE MALLARD: Nothing there.

Dr LEIGH: Yes. We have tested 25 samples so far and found no chlamydia whatsoever.

The Hon. SHAYNE MALLARD: Why is that?

Dr LEIGH: That is a very good question. We do not know. There is another chlamydia-free population around the Campbelltown area that has been identified. It may be that because these koalas are mostly in the protected area. There is some evidence that the strains of chlamydia are the same as the strains in cows and sheep and that it may cross from domestic animals into koalas. Perhaps these koalas, because they are not in those fragmented landscapes with domestic livestock, have not encountered it yet. From that point of view it is an important population for long-term monitoring to see if it does get disease and how it reacts to that as well.

The Hon. SHAYNE MALLARD: And the impact of chlamydia is to fertility.

Dr LEIGH: It is to fertility, yes. And it varies a lot across the species range. So some animals, for example, in Victoria will carry two strains of chlamydia and will not be expressing signs of disease; others in Queensland will be hit immediately by it. We have seen a bit of a mix. Generally if they are expressing clinical signs, they will either go blind or sterile and eventually die if they are untreated, but it is the impact of that on the populations. I think Matthew Crowther and others have spoken more about it—they are more disease specialists than I am. It is very variable. But at the moment, although there is prevalence in the Hawkesbury and south-east Wollemi population, the population still appears to be expanding and growing.

The Hon. CATHERINE CUSACK: Just for the benefit of the report, could you explain genetic diversity, the significance of that and why it is important?

Dr LEIGH: Yes. Genetic diversity is what allows a species to persist over time and adapt to selection pressures. So, for example, if you have inbreeding depression and a lack of diversity and a disease goes through, you may have no animals in that population that will resist the disease and you can lose the whole population. If you have a lot of diversity and a disease goes through then you might have a few individuals that will resist it because they have different genes. If those animals then survive they will breed up and then that population will be resistant to that disease and that is how populations evolve over time under various selection pressures.

It is not just disease, it is local adaptations to climate and all that sort of thing. If you look at koalas, the ones in Victoria, the males get up to 14 to 16 kilos. In Queensland the males get up to eight kilos. The fur is quite different. They are totally adapted to different environments. It is really important when you have a declining species you conserve what is left of their genetic diversity because that is what allows them to persist over time. You do not want to be losing highly diverse populations. If they become genetically inbred then they can get into a bit of a spiral where their fecundity rates go down, survivorship goes down and that further contributes to their decline.

The CHAIR: Dr Lunney, were you wanting to comment on that?

Dr LUNNEY: No.

The Hon. CATHERINE CUSACK: What are the conditions that are conducive to maintaining diversity?

Dr LEIGH: Large populations in particular with good mate choice. If you get small and fragmented populations, which happens in a lot of habitats where you have clearing and a lot of pressure on populations, if koalas get cut off with other koalas you can end up with koalas that over time breed with each other and they are more closely related, basically, it is like putting people altogether in one town. You need exchange for healthy

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diversity. You also want to conserve remnant genes. If you have koalas adapted to certain habitats and climates you want to conserve these genes in situ as well.

The Hon. CATHERINE CUSACK: One issue is, as you say, some colonies have chlamydia. We had a couple of chlamydia free colonies. Is it a good thing or a bad thing for those colonies to connect up?

Dr LEIGH: That is a very good question and it is a tricky management question, particularly for the Campbelltown and Southern Highlands area. The Campbelltown population is relatively low in genetic diversity. It is not inbred but it has been a bit isolated; but they are disease free. They are probably going to be encountering other animals towards the Southern Highlands quite soon that have chlamydia. We do not know why they are disease free and again you would probably have to refer to a disease expert on that because I have not studied chlamydia in great depth. But, sometimes populations will be naive to disease so if it goes through it can have a big impact, other times they may be more resistant to it and they might be able to carry it. We do not really know. The impact is unknown.

The Hon. CATHERINE CUSACK: At the moment Office of Environment and Heritage may have a policy to try and keep them separate.

Dr LEIGH: Yes.

The Hon. CATHERINE CUSACK: Is there a consensus amongst koala experts about this really critical issue as to whether we let the corridor connect or not?

Dr LEIGH: It is really difficult. I do not know if there is a consensus because the genetics is relatively recent that we have done and at the moment the focus is just trying to conserve koalas from development. Genetic diversity does take a while generally to have an impact. It is more of a longer term consideration. When you are looking at trying to conserve a species over 100 years or more it is a critical consideration. In terms of persistence of the species we absolutely have to consider it. If you are looking at small populations that get knocked out by development and instant mortality then I think that has to be prioritised. If the population assessments that have been done show that there is better viability in maintaining habitat, which makes perfect sense, then that has to be prioritised, I would say, yes.

The Hon. MARK PEARSON: I am not sure if you would like to answer the question, Dr Lunney. We had evidence from Mr Jurskis about the undergrowth in the forest in the habitat area and the fact that the history of lighting particular types of fires that the Indigenous people used to at certain times of the year helped maintain a balance of moisture and a stronger overhead canopy. That is one main factor as to why we have this problem of the heat level, dryness level and lack of moisture accessibility for these animals. I am grappling with it, as is the Committee. What is your view of that particular view?

Dr LUNNEY: I have not studied that particular issue.

The Hon. MARK PEARSON: Sometimes we can jump to the conclusion the fires are the cause of what is going on at the moment but actually they are a symptom of a whole lot of factors coming together. Would you agree with that as to why the fires are so intense and so destructive now as opposed to what they might have been 50 or 100 years ago?

Dr LUNNEY: No, I do not have a view on that.

The Hon. MARK PEARSON: We have had evidence this morning from Mr Mark Graham, sounding quite emotional and distressed. There is a growing view that we are at a crisis point for these animals and there are organisations and individuals calling for the Government to bring about a moratorium on logging or other adverse impacts on koalas that we know about. What would your position be in relation to a call for a moratorium on logging companies to cease logging areas where there is koala habitat known or possible?

Dr LUNNEY: That puts the focus on State forests and private native forests where there is logging. I think the primary issue for loss of koalas is the loss of habitat on private land. To shift the focus on to what I think of as other than prime habitat, which is in the areas that have not been cleared for agriculture, is an important issue but not as important as the one on private land. I think the focus should be on private land and therefore on anything that controls the private land or the restoration of it. But SEPP 44 is an example of probably the most important instrument for trying to minimise the loss of what remains of the best habitat, which is the land that is nutrient rich, it is moist, and what farmers want to use and where towns grow up.

This is the koala habitat that is lost and fragmented. What we are now looking at in forests that have been logged is habitat that would not have been ranked as the top habitat originally. To shift the focus on to conserving it is only when you have run out of the private land options. That does not quite answer your question. What you need to do is finish the surveys or conduct further surveys of koalas in forests and that has not been what I have

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focused on. I have focused on private land across New South Wales. Calling for a moratorium or the "great koala national park" is an important issue but it has the danger of taking the focus off private land.

The CHAIR: Just before we go on, I do understand that you have provided members with a short statement of facts. Would you like to formally tender these documents to the Committee?

Dr LUNNEY: Yes.

The Hon. PENNY SHARPE: Dr Lunney, you have spent most of your working life looking for koalas and a range of other animals. We have heard some of the evidence, and I take your point of the issue of koalas also liking to live in trees that are good for agriculture, which has brought them into direct conflict in terms of the use of private land. You were here for Mr Jurskis' evidence this morning. It may be covered in this document. There is not an abundance of koalas in New South Wales, is there?

Dr LUNNEY: No.

The Hon. PENNY SHARPE: The populations are essentially declining at a rapid rate that is leading towards extinction?

Dr LUNNEY: They are declining but they are declining at different rates in different locations. The difference in the locations is very marked indeed. A couple of examples: I conducted, with the team I worked with at the time, we looked at the population of Coffs Harbour in 1990 and returned to that a few years ago and we found very little decline, which is surprising. In contrast, in the drought ridden area of Gunnedah the populations are declining and I have been looking at the Warrumbungle National Park population with the Wambelong fire of 2013 that made the headlines when it was in parliamentary inquiries.

The Hon. PENNY SHARPE: I was on that inquiry. That is a good example of what we could be looking at as a result of the fires now. What has been the impact on the koala population in Wambelong as a result of fire a few years ago?

The CHAIR: Could you bring the microphone closer to you?

Dr LUNNEY: I was looking at the Wambalong fire because I was interested in that issue but what I decided to do was to take the history of the park back for more than a century. What is quite clear is that the land was cleared. It was agricultural land. Then the trees began to regrow. It had been thought that the koalas were extinct. They were going to reintroduce koalas but there were in fact some koalas there. By the mid 1990s the koalas were very popular; out of 500 people going to the park, 490 would see koalas. Before the fires but during the Millennium drought, almost all the koalas had disappeared from the record and only about 10 people out of 500 would see a koala.

Then the fire came and now there have not been koalas seen since. The fire was about twice the area of the park, so what you would expect is that the koalas would walk in from private land or if the animals were saved on private land they would walk out onto the farmland but there have been no koalas since. So the fire was a minor impact in terms of numbers but it delivered a coup de grace to a population that was reduced to very low. So I think looking at the historical record was important. I think recognising the fire, which made a coronial inquiry because it was so important, but the major cause of the decline was overwhelmingly the drought.

The Hon. PENNY SHARPE: There is no reason to think that that is not obviously a significant issue across New South Wales?

Dr LUNNEY: A significant issue across New South Wales and the more that climate change makes droughts more intense, more frequent and longer, then the koala populations will suffer, so I think that is the biggest issue. But that can apply to private land, it can apply to national parks and apply to State forests as well. It is not peculiar to any tenure.

The Hon. PENNY SHARPE: Koalas do not know the difference between a national park and a farm?

Dr LUNNEY: They know the difference—

The Hon. PENNY SHARPE: They know their trees?

Dr LUNNEY: They do walk backwards and forwards and they walk across different ethical landscapes in that sense. There are a set of rules and you draw a line. The koala walks on the road, you can run over it and kill it and keep driving but if you got out and hit it over the head that is an offence. The koala does not have to walk very far before it is in a different set of rules as to what you may or may not do with it. The people who look after koalas, the care groups, recognise this problem. I have been looking at the care group records to look at the success or the evaluation or the appreciation of the contribution of the carers.

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When you see an animal coming into care it is because it has been hit by fire, car, disease, dog, so the root causes of that, which are habitat loss and then climate change but manifesting itself as a koala moving into part of the landscape where it is prone to injury becomes the focus rather than the original cause but you need both groups looking at it to say, "I am looking after this koala", so I am working with the koala care groups, but you need to look at the long-term changes across tenure and the landscape.

The Hon. CATHERINE CUSACK: In terms of koala movements, is it true to say that koalas would prefer to move from tree to tree or is it normal for them to want to move on the ground?

Dr LUNNEY: They move across the ground easily. As soon as they move across the ground they are then prone to be run over by a car.

The Hon. CATHERINE CUSACK: Yes.

Dr LUNNEY: That is why fragmentation matters, so you can have a very large area of habitat with a four-lane highway through it and you have got a very high percentage of roadkill. I have been studying roadkill in koalas across New South Wales and wherever you have got a koala population and roads, then you have got koala roadkill. I studied the 1994 fires in Port Stephens. The 1994 fires with the other big set of fires covered about 800,000 hectares. The current fires are double to triple that in area but the 1994 fires were certainly intense and headlines all along the North Coast. I spent three years looking at the fire in Port Stephens and we would radio track them to follow where they were going.

I was working with a care group, looking after the koalas, and to see did the koalas that they spent up to nine months caring for survive? So we looked at that group and another group that was in the nearby patch of forest and the unburnt areas to compare them. The burnt koalas survived. The koalas that had been burnt and rehabilitated survived as well as the natural population, which was wonderful from their point of view, but what was interesting was how far the koalas walked. One koala in fact walked 20 kilometres to relocate itself.

The Hon. CATHERINE CUSACK: On the ground?

Dr LUNNEY: I was studying on the Grahamstown reservoir. Part of it is on the ground because it is a mining area, beach sand mining, and the road is quite wide, which left it wide open for dogs. We thought of fire and roadkill because there is koala roadkill all around Port Stephens. Fires had been raging all through that piece of forest and it was a crown fire but it turns out that the biggest killer was dogs by far. Most of the koalas that were killed after the fire were killed by dogs.

The Hon. CATHERINE CUSACK: Really?

Dr LUNNEY: That was a surprise because if we had not been tracking them we would not have found that was the issue so that changes the management instruction but as soon as they start walking on the ground then they are open to that effect.

The Hon. SHAYNE MALLARD: Wild dogs.

The Hon. CATHERINE CUSACK: I well understand that koalas get injured overwhelmingly when they are on the ground. That is why I am trying to understand would they prefer in the natural landscape to move from tree to tree or is it normal for them to come down onto the ground as much as they do?

Dr LUNNEY: They walk easily across the ground so I do not think it is an issue. They would normally just readily move from tree to tree, and they do. They easily walk across the ground so that is not a problem.

The Hon. CATHERINE CUSACK: Well it is a problem; if they prefer to be going from tree to tree then would not that be wonderful and they would not be on the ground and they would not be injured as much?

Dr LUNNEY: Well, there are certainly no cars and dogs in trees, so yes, from that sense.

The Hon. CATHERINE CUSACK: In terms of answering my question—I am sorry I am being way too leading in the way I am asking it—you are just saying that it is as normal for them to move on the ground as it is from tree to tree?

Dr LUNNEY: It is. They move across the ground easily and they can cover quite long distances and you can see them walking across the ground. But they normally live in trees, they stay in trees, they move from tree to tree. If the tree cover was continuous they would walk through the trees. You would not expect to see them on the ground if there was a continuous forest without roads or fragmented by agricultural landscapes.

The CHAIR: I have another question in relation to the fires. I was speaking with somebody the other day from the Rural Fire Service, who was talking essentially about the movement of the fires over this fire season, what we have seen up north of course and what we are starting to see around Sydney is going to come through

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the summer pretty much down the whole east coast down to the South Coast, burning a hell of a lot of forest. What is your view—and this question is directed to both of you—of what this could do to the koala population of New South Wales? I will go back to the practical question as well of whether there is anything the Committee can recommend in terms of protocols to help the koala populations this summer?

Dr LUNNEY: I can answer that in part. When I was looking at the koala population in the burnt areas in Port Stephens the conclusion I came to was not only the size of the area burnt and the numbers killed but the amount of area left. We found that the burnt forest was re-colonised within a few months and within a year the females had young, so the burning of the forest did not destroy it at all from that point of view. Everyone was actually quite surprised how—

The CHAIR: And that was quite an intense fire in Port Stephens?

Dr LUNNEY: It was a crown fire, yes. It was an intense fire. That was all we focused on. The care groups, as they are doing now, were picking up koalas, and taking them into care. The koalas burn their hands and will not climb. They climb on their fingernails and as soon as they burn their fingernails you have to wait until they regrow. If it had taken out all of the area then the koalas would not have moved back in. The population that was in the unburnt area was the key to the survival so what we do not know—and we can plot it after the fires have gone, look at the boundary of the fire, the boundary of the unburnt area and how large is the population of the unburnt area.

And the other question would be if you are looking at ranked koala habitat, I will conjecture that more of the lower quality koala habitat burnt because it is more fire prone, it is on the ridges whereas the koalas that are surviving prefer the nutrient-rich leaves that grow on the nutrient-rich soils which are in the farmlands near the creeks and in the gullies. One example we studied was in Yengo when the fire went through in 1994 that covered the countryside. It looked black and deadly but the koalas were in the gully below. I think what the fire does is kill the koalas on the spot because they do not fly; they cannot run and they do not go underground, which is a mechanism for escaping fire, so the recovery from the fire depends upon how many koalas are left and that is the question we need to answer to answer your question.

So whilst two million hectares might have burnt, a large proportion of it may not be the best habitat but if there are enough koalas in the best habitat they will recolonise quickly. I do not think it is the overwhelming issue in the long run but it is like any impost, once you have got a pulse like that—and it could be a drought with heatwaves because we estimated that a quarter of the population of Gunnedah died from heatwaves during the drought and they died in a fortnight, so it can be a pulse but it also can be a long-term press. I think the fire is a pulse and it is visible, it looks catastrophic, there are koalas dying and there are koalas injured but in the long term it might not be the issue.

When you looked at your terms of inquiry, fire was not there in the middle of July, it was so cold. It was not possible to contemplate. When the Senate inquiry looked at it, I published an analysis of the Senate inquiry. One of the missing issues was fire. I know fire is an important issue but it was not a pressing issue in 2011. It is an important issue now and we need to look at what is left to be able to answer your question and that is researchable—and that can be researched.

The CHAIR: Dr Leigh, did you also want to comment on that?

Dr LEIGH: Yes, I would. I think we do have a lot of koalas focused on good soils and along the coast. I think that what we are finding—and it relates back to historic koala sightings and records when they talk about two million koalas shot across the eastern States for the fur trade—a period of five years in New South Wales where three million or four million were shot. They used to be really widespread and in high numbers and I think they can exist. We are certainly finding them existing in reasonable numbers in what we thought was really poor habitat for them. These populations that are in these larger, protected areas, which are traditionally not thought to be rich quality soils for koalas, have been intact. They have higher genetic diversity. The populations that are on those good soils are also under threat from development and other pressures.

Some of them are fragmented and have a lower genetic diversity as well. I think we need to be holistic and look at conserving them right across the species range, particularly in these areas. I know that Brad Law has done studies and also found koalas up in northern New South Wales in some of the forests that have not been surveyed because there have been logistical challenges to finding these koalas: The trees are really big, they are very hard to see, we have to use audio callings, scat surveys and that sort of thing. We are finding a lot of koalas and they are important koalas for persistence of the species. Fire is a key threat particularly for those populations. I think we do need to get on top of it. Now we know that they are there, we need to find more of them, map them, find out where they are and how many these habitats we are using, and start allocating resources to protect them.

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I think that goes right from the start of coming in with protocols to manage fire across the landscape in these particular areas that prioritise koalas and other wildlife, that is not just about asset protection because it has to be because of lack of resources. We cannot compete with assets and human lives obviously but they are prioritised because of lack of resources. If we have more resources, we can also prioritise koalas and other wildlife as well. I think we need to look at protocols to get them in place for management of fire in this areas where we know there are key populations of national significance for koalas. We also need to look at those protocols for dealing more immediately around fire of how to access, what to do about the populations when fires are coming, and what to do afterwards.

Also, we are totally under-resourced for care. I know in Port Stephens and Port Macquarie, they do have resources to take koalas in after fire. In this area around the Sydney Basin, we are full already. The numbers that are coming in—even in Port Macquarie, I think they have 30 in care. There are talking about maybe 350 that have been burnt by fire. It is the same in the Blue Mountains where we may have 20 that go into care. We are losing hundreds and hundreds of koalas to these fires. We have to manage around the fire itself. That would take consultation with Rural Fire Service, National Parks, roundtable discussions to come up with plans so that we can actually manage this threat because although we have a lot of other threats—we have diseases and dogs—it has not been the front of my mind because we have been dealing with all these other threats for koalas. When these fires come through at this scale, these other threats are minuscule in comparison to the impact that it is having on a lot of these populations.

The Hon. CATHERINE CUSACK: In terms of the reference you make to a lack of resources and more resources being required, do you have a specific idea about how many resources or what sort of resources?

The CHAIR: Now is your chance.

Dr LEIGH: Yes, a lot of money—we need a lot of money.

The Hon. CATHERINE CUSACK: In terms of how long is a piece of string, I know, but in terms of us and getting an idea of what would make a difference—if you are not aware of anything specific, how would you arrive—

The CHAIR: You can also take questions on notice and get back.

Dr LEIGH: I think it also requires consultation because I do not know what it costs to fight a fire—I am not a fire specialist. I think we need to chat with National Parks and Wildlife Service and Rural Fire Service to find out what the costs are that are involved. Also the fact that we are depending on volunteer firefighters to fight fires of the scale—I think we really need to resource, for example, retained employees within the Rural Fire Service who are there. That comes back not just to the back-burning but the prescribed burning. We have a shorter and shorter season where Rural Fire Service and Parks can carry out prescribed burns to prevent fires of this scale.

A lot of the time the conditions are really limited. If your volunteers are not available to come in and do those fires, they also do not get done. If you have more paid employees out that are managing these fires and doing prescribed burns, then you have this ability to plan properly under climate change to achieve a lot more within those tight time windows.

The Hon. CATHERINE CUSACK: But the resources that you are focusing on in this respect is about managing the fires better.

Dr LEIGH: It is—during the future, for prescribed burning and trying to maintain refuges for koalas, but also when the fires hit, what goes on before and after the fire in terms of wildlife as well. It is very big picture. I do not think even on notice I could come up with a figure for it but I would recommend that workshops or roundtable discussions with all the key stakeholders involved, brought together. I know that Rural Fire Service and Parks are so stretched—they have to do asset and life protection, obviously—so it cannot be a priority for them at this stage. But it needs to be discussed and planned properly. I am sure they could help table what resources they would need to do that in an effective manner.

We certainly need more research done on where these populations are as well—resources to get in and survey these. It makes a difference if we only have two populations of koalas in the mountains and both get burnt, we are in big trouble. If there are seven different colonies and we do not know about them but could protect them—

The Hon. CATHERINE CUSACK: Perhaps you would support a more informed, prioritising koala populations in the prescribed burns planning to make sure that they are getting addressed?

Dr LEIGH: Absolutely. I think there have been discussions in Port Macquarie around this.

The Hon. CATHERINE CUSACK: Because they are not there at the moment, I do not think.

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Dr LEIGH: No. If there is some way to list, for example, core koala populations or high-quality habitats and important populations as assets that then get protected, that would then be a trigger.

The CHAIR: To follow on from that, Dr Lunney, in one of the national parks you said people were flocking there because they were guaranteed to see koalas as well and that treating koalas and significant koala populations as assets for the Government to recognise that in fact it is a big tourism drawcard—we kind of need to see them if we have to put an economic value on koala populations. Is that what we have to do? But you would both argue on, I am assuming, that they are assets.

The Hon. CATHERINE CUSACK: So they could have some standing in the fire management plans.

The CHAIR: Yes.

Dr LUNNEY: I did do an economic study on the value of koala population. I prepared the first Comprehensive Koala Plan of Management, which was Coffs Harbour. One of the issues was: This is going to cost us money so we conducted an economic study and there was an overwhelming value for koalas for Coffs Harbour Shire, particularly for tourism that made the cost of it very minor indeed to protect the koala populations. State Environmental Planning Policy [SEPP] No. 44 is an instrument that controls the planning on private land. It was the south east. We found most of the koalas in the south east of Coffs Harbour. That is where the tourists are.

So, yes, there is a value but there is also another angle—sociological—too, which I have been working on with colleagues at Lismore, Ballina, Byron and Tweed—that is, different components of the local communities that have strikingly different views on how we should be managing koalas, what the issues are and how we should be responding. It is almost an east-west divide, whether you are on the farmland or whether you are in town. There is convergence that koalas are worth conserving but not what the issues are or how important they are. If you do not take that sociological dimension into account, you could be listening to one set of loud voices rather than a diversity of voices as to what the issues are. From an economic point of view, yes, absolutely, they are worth conserving.

As Dr Kellie Leigh has just said, all the populations matter. So when you have something that these fires then what is left matters. That is what we are always looking at with every different threat: fire, drought, climate change and dogs. Where the populations are remaining becomes important and the relative impact of all these threats on different tenures matters a great deal. It is hard to sort out. That is why, as a researcher, I think sustained long-term research on populations in a diversity of locations—and also across the State and across the nation, because the problems in Victoria and South Australia are quite different to Western Queensland and Lismore. We need to take all those into account. As a scientist I think we should be taking a very long-term view.

I was looking at the records of koalas coming into Friends of the Koala. I have been working with that group, which is a care group in Lismore serving the north. Looking at the 5,000 koalas they have had in care over the past 30 years, up until these fires there were 24 koalas who were affected by fires out of the 5,000. So if you had asked the question in July, this would not have been an issue. If you ask the question today, yes, it is the issue. But you can then sit down as the decades pass and there is no fires. These pulses simply disappear and the press of just gradual land clearing for every single development then reappears as the important long-term issue.

The CHAIR: And loss of habitat.

Dr LUNNEY: So I am an advocate of long-term research. Is it costly? Yes, it is millions. You need teams of people out; one person cannot go out in the bush on their own and study a koala. You need a person who can climb a tree; you need a person who can tag them, radio-track and follow them, take health checks, fit in with all the rules. Koalas are quite hard to find. The populations are low density. That is the difficulty of koalas: They are small, grey, hard to see. When you look at them in the tree, a person who is good at seeing koalas can see them, but a person who is not good just could tell you they are not there.

The Hon. SHAYNE MALLARD: We have experienced that.

The Hon. MARK BUTTIGIEG: Dr Lunney, you highlighted a couple of times why you think the focus needs to shift to private tenure land. Can you give us a sense of the proportion of that importance? In other words, why is it so important to focus on that area as opposed to national parks and private forest? The implication is that is where the biggest bang for buck is—that is what you are saying. Could you elaborate on that a bit for us?

Dr LUNNEY: Private forest is private tenure. You mean State forests and national parks?

The Hon. MARK BUTTIGIEG: Correct, yes. Sorry.

Dr LUNNEY: They are in State forests and national parks. They are important. As we increasingly lose the private land, that area—much of which is not the highest quality habitat at all—rises in importance. As we lose the private land, then the other lands become even more important. But because the koalas eat the nutrient-rich

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leaves, which depend upon the nutrient-rich soils near the moist areas, this is the private land. This is where people have farmed. This is where the towns build up and the roads build up with them. That is where the dogs are and the traffic is and all the secondary effects then move in. So the private lands are the rich soils. This is the agricultural lands. That is why we have got such a wicked policy problem: It is because we are looking at development—ordinary things: golf courses, university grounds, housing estates, highway upgrades. Each one of those could be regarded as a habitat downgrade. So it depends upon the language you use. This is where the prime koala habitat is now. When you map koala habitat across the State, you can see that picture emerge, then the conflict.

So what we need is quite different mechanisms. State Environmental Planning Policy [SEPP] No. 44, which I helped write back in '94, was aimed at doing that. From one point of view it has been very successful insofar as Coffs Harbour have still got their SEPP in place. But it has not taken off because of the difficulty of understanding the impact of zoning a piece of land for the environment, whereas someone else might want to leave it open for development, and it is that land which is the best koala habitat which continues to be eroded. You are asking me for a proportion of the population. Also the only issue is not only the numbers of koalas but that the numbers of koalas that succeed in breeding out of the population is sustained and turns over. The best lands have the best breeding populations: More of the females have more young, more often. So you can still have koalas but the breeding rate is lower on the habitat that is ranked from prime land down to marginal.

The Hon. MARK BUTTIGIEG: Just a quick follow-up on that in respect of the efficacy of SEPP 44: Is it that the content is good but it is not being enforced as a primacy factor over other considerations? In other words, the environment is not being placed at the forefront by using SEPP 44. Is that what you are saying?

Dr LUNNEY: No. Each council—it is a council matter, so they are deciding on land use. A lot of the options are being left open as to how they are going to manage a piece of land. So there is an inherent conflict in recognising koala habitat and then saying, "Conserve that habitat." When we did the plan of management for Coffs Harbour, what we did is we ranked the habitat as primary, secondary and tertiary. So you could have less change in primary, more in secondary and more in tertiary and you tolerate more change. That differs when you do a shire-wide plan from doing what SEPP 44 initially sets out to do, which is every development application has to be considered for potential habitat. If potential habitat is there, then you have got to go and find out whether it is core habitat. If you do not have a plan, then every development application has to go through that process.

Coffs Harbour, which was keen on development, was much more keen on having an overall plan. So when we said, "If you set aside these areas for koalas, even if there are koalas over there you can develop because you have got an overall plan," they liked that idea. It allowed development, so you could walk in, say, "I want to develop. There's the plan. I can avoid this," and a year's red tape is suddenly avoided. But that took 10 years to get through, that plan. I wrote a paper to say, "Why did it take 10 years to do a koala plan of management?" Every known obstacle was in the way, but we got it through and then it went through State Parliament as part of the local environmental plan [LEP] for Coffs Harbour.

So that was a success story and it is still there. But the word "encourage" to do a shire-wide plan, rather than "must"—and I remember discussing with the lawyers at planning at the time. I said, "If you don't have 'must', it will not happen." They said, "We can't have 'must'." We said "should" or "encourage". I am not arguing that should be the case, but as a consequence we have a modest uptake of what I think was essentially a good idea for conserving koalas, which was a land use planning instrument. People are concerned that it does not deal with dogs, cars et cetera, but that is another thing for council. The planning instrument does not deal with that and people are confused as to why it has not saved koalas. But roadkill and these other issues—fire, drought, dogs, mining—unless it is a land use change, are not part of what I think SEPP 44 was originally targeting, which was a land use decision as to how you are going to use that piece of land.

The CHAIR: Thank you, Dr Lunney. That is the end of our time for this session. Thank you both for attending this hearing. There were possibly questions taken on notice around funding. The Committee has resolved that answers to questions taken on notice be returned within 21 days. The secretariat will contact you in relation to those questions. Thank you so much for appearing and for the work you do.

(The witnesses withdrew.)

(Short adjournment)

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VICTOR STEFFENSEN, Tagalaka Descendant from North Queensland and Indigenous fire practitioner, affirmed and examined

OLIVER COSTELLO, Chief Executive Officer, Firesticks Alliance Indigenous Corporation and Deputy Chair, Indigenous Reference Group, Threatened Species Recovery Hub, affirmed and examined

The CHAIR: I welcome our next set of witnesses.

Mr COSTELLO: I would just like to start by paying my respects to country and elders past, present and future.

Mr STEFFENSEN: I also pay my respects to the traditional owners of this country and abroad.

The CHAIR: Thank you. Would either of you like to begin by making a short opening statement?

Mr COSTELLO: I acknowledge country. I am a Bundjalung man from the Northern Rivers of New South Wales. It is really important for me to always pay that respect. That is an important protocol for us. I am here representing the Firesticks Alliance, but I have many other hats and I would like to declare those. I am also the Vice President of the Northern Rivers Fire and Biodiversity Consortium. I am the Chairperson of the Jagun Alliance. In Bundjalung, jagun means country. It is a local country alliance that I chair. I am a visiting fellow at Jumbunna Indigenous House of Learning, which helped establish the Firesticks project. I am the Deputy Chair of the Indigenous Reference Group of the Threatened Species Recovery Hub as part of the National Environmental Science Program. I am Bundjalung jagun custodian.

In response to question about the rights and responsibilities of traditional owners on country, Firesticks has been working for the past 10 years or so to really build recognition and revitalise that knowledge and practice. We have been working across New South Wales to build a community of practice that can help support more country being managed through appropriate fire. Our ancestors managed this landscape for millennia and fire was one of our principle management tools. Through colonialization we have seen a rapid decline in our practices and, equally, a rapid decline in the values associated with this country. Koalas are one example of that, but there are many other culturally significant species and places that are under threat. It is really important that we establish appropriate cultural protocols and practices to be able to manage those values.

For me, koalas—we call them Boorabee or Budabi in our language—are a really important dreaming story for our country. A koala is an important totem for our country. We have many different values. Some communities will not eat koala because it is a totem, while others will eat it. In different parts of the landscape koalas have different values and relationships. It is important for me to say that as well as representing Firesticks, I have spoken to community members across the State about koalas and their values. Those communities all have different language names for those koalas and they all have different stories and values related to those koalas. It is really important that we understand the diversity of the responsibility that people take on and our role to support and protect them. That is all I need to say for now.

The CHAIR: Mr Steffensen, would you like to make an opening statement?

Mr STEFFENSEN: Yes, I have short one. I would like to say that I represent country and traditional knowledge with the educated information that I will be producing and sharing today. Even though I come from north Queensland, I have spent an extensive number of years working with a lot of traditional owners in the southern regions of Australia to look at landscapes practically. I see the indicators of country in a way that does not support the wellbeing of the plants and animals of this country. That is all.

The CHAIR: Thank you. I might kick off with a question to both of you. What is the best practice in terms of ecological fire management from an Indigenous perspective to protect koalas from fire? We know that koalas can remain in forests and be okay when fires go through those forests. Can you explain to the Committee how that works from the perspective of your areas of expertise?

Mr STEFFENSEN: When we look at Indigenous fire practices, they are based on looking after country and managing different ecosystems with different types of fires. It is not a system where we just drop a match into country or a hazard reduction or controlled burning system as they are understood in the present day. It is a practice that is very fine and very layered, with many techniques and many purposes, to support food on landscapes and to support healthy landscapes to survive for not just animals and plants but also people. Fire was practiced in a way where Aboriginal people were a part of the landscape. It was to protect their resources and it was to enhance their resources. It was done in a way that was also spiritually connected. When we look at the state of the landscape

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today, that practice still needs to be applied to country. But today we have different landscapes with different fuels, weeds and problems.

There is an immense amount of problems within the landscape that create sicknesses. It is just like people—there are cancers, lung diseases or whatever other problems they have. In old times the ecosystems were balanced and healthy. Now they all have different problems within them. The Indigenous knowledge has an amazing way of applying that knowledge to a just management system here and there for different situations within the landscape to heal landscape and bring it to a point where it is safe. It has not been properly demonstrated to this day. It is something that is always overlooked and is something that has never been properly supported. People get Indigenous burning mixed up with the current practices that are happening now, which are based on hazard reduction and those types of burning practices. But Indigenous fire is a really careful management practice. It is applied in a way of high knowledge.

Fire is not the only management that we use to look after country. There is also the knowledge of harvesting country and using the plants and invasive natives—as they are called today—for all sorts of uses, such as shelters, windbreaks and so forth. They are also used for medical and food uses. That is beyond anyone's understanding of how country was managed by people in a way that looked after country. It brought a wealth of information and knowledge in understanding the landscape and how we fit in with that. Up until this day I still have not seen a proper program that puts in place the layered approach of applying fire in a way that looks after country and looks after our species and animals, keeping in mind that fire is a healing tool that is used to repair country and heal landscapes. Then even the systems that do not need fire will stay healed. There is country that we do burn and country that we do not burn. That has got to be clear.

Mr COSTELLO: Budabi belong to waybar jagun. Koalas belong to fire country. They eat gum tree. When we talk about cultural fire, cultural fire is the right fire for the culture of that land. As you walk through different landscapes the culture changes because the plants and animals and the kinship of the land shifts. Fire is a critical part of managing koala country. The problem is that we have seen an absence of Aboriginal fire in the landscape and, in response to that, hazard reduction, wildfires and all those sorts of things. What we are not seeing is cultural fire for country and the right fire for country. The right fire for koala country is maintaining the health of the system. That includes protecting the canopy where the koalas live.

Koalas are just one of many culturally significant species that we burn for. We need to make sure the canopy is healthy and safe. The pathways are also important. At home there are stories about the koalas and their song line pathways. They are pathways that we share as well. We burn to keep the pathways open. We manage the ridgelines and we manage the valleys and gullies to keep that country safe and functional so we can move through it. A lot of country out there, you cannot move through it. It is all choked up with scrub. Some of those plants belong in that country somewhere, but maybe not where they are. Fire teaches that kinship law. It actually keeps the animals and the plants in the healthy places where they belong. It maintains that structure in the community, the landscape and the culture of that place.

When you practice it the right way, when wildfires come they are good fires. It is okay because the fire will change its behaviour. It will not burn the canopy, there will not be much fuel on the ground and it will not do a lot of damage. If you burn the right way you will also get the next generations of food, habitat and trees. Fires are a critical part of koala country. Unfortunately, because of a lot of current hazard reduction activities and planning laws, they restrict appropriate cultural fire management.

The Hon. CATHERINE CUSACK: As you say, it is very layered and very specific to landscapes. How much of this knowledge has been lost by local Indigenous communities and what can be done to recover that knowledge?

Mr COSTELLO: There are huge losses in knowledge and practice. That is reflected by the damages to country. When you see whole landscapes that are being logged, cleared and farmed, that is all knowledge that now cannot be practised. Even when people have that knowledge, it is still not in practice anymore. A lot of those old people have gone. The reality is that Firesticks—Mr Steffensen can speak to this—has a demonstrated methodology for reviving knowledge. It is about understanding the values and practices of country and supporting people to understand their own identity, share that and build their knowledge systems. All our knowledge systems were built from country, from the culture of the land and from our observation of that. It is much easier to learn from an uncle, a mentor or an auntie and they can tell you the story and then you can practice it.

Sometimes we have to learn a harder way. We have to learn through observation, we have to spend time on country, we have to connect with country or we have to travel all over the landscape and meet and spend time with other knowledge holders who have that knowledge as well. That is what Firesticks has done, it has built a community of practice that cuts across mainly the east coast of Australia, which means we can connect people to knowledge holders. In the different country types they can share knowledge and share practice. When you affirm

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the practice and it becomes knowledge it is very empowering. There are so many people out there who are really empowered by this process. People would say they do not know, and this is a common experience I had when I first started. People would say the knowledge is gone.

We go and talk to Elders and they say, "We do not know about fire." But then we start talking about, "What are your totems? Where do you camp? What do you eat? What are your important stories?" They are all fire stories. They are all about who we are, where we live in the landscape and we can understand the fire relationships. We can look at how fire affects certain plants or animals. If this place is a Budabi place, we know what the story of this place is and we can use our own knowledge and science to understand what the appropriate management is.

The Hon. CATHERINE CUSACK: When I went to Kakadu—sorry, it is not North Queensland but it is up in the tropics—we think of a wet and a dry season there, but my understanding is that the Aboriginal communities up there have eight seasons. I wondered if you would like to comment, particularly in relation to what you just said about food resources and the role of fire. Our traditional idea of four seasons is not necessarily how it works in the calendar.

Mr STEFFENSEN: That is right. There are a lot more seasons and there are a lot more ecosystems, too, in the way that we see country. The minute one tree changes, the different country, the different soils, the different curing, the different foods and values that come from that. I would also add that knowledge was very fragmented and a lot of knowledge was lost, but it also was not lost. Knowledge is shared through the landscape and the indicators and principles. That is how it works with rebuilding knowledge on country, from country. That is how other communities adopt those methods to rebuild knowledge, with other Indigenous communities helping other Indigenous communities to rebuild our culture. When we look at the way we see country through seasons and through the layers of country, it is all based on our ecosystems, trees and seasons.

We read landscape and landscape has to be read by being on country all of the time. That cannot be done with modern management practices in the sense of just going out and doing a burn over two weeks of the year and having a set date, by making decisions from an office or by looking at maps. Decisions are made by reading the seasons, reading landscapes and being able to make those decisions off the cuff about what the clan needs. But we are in a different situation in the southern areas of Australia than what it is in the far northern areas, not in the sense that the practices, foundations or the values of country are different—they are quite similar on a baseline—but when we look at a lot of places in northern areas, they do not have the amount of sicknesses that the far southern areas have.

I find gum country and other ecosystems that do not have the native vegetation anymore, that are full of leaf litter, full of lantana. Others have other weeds and problems and some even just bare dirt on the ground. When landscapes have those sorts of sicknesses, the way that we apply fire is based on maintaining knowledge and applied through healing landscapes. There is an adjustment of knowledge to revive landscapes and revive country to make it healthy. When we look at sharing knowledge down in the southern areas, and look at all of the problems that they have there, those problems are slowly heading up north, too. I start to see places in the northern areas of Australia just with leaves on the ground and things like that. Understanding how we see country and the values of country through Indigenous eyes is extremely important.

There is no doubt that the broader community and entire nations, even by international standards, will have to reconnect with landscapes, understand the knowledge layers and have a wealth of education, just as Aboriginal people did for thousands of years. I say this: you have no choice but to do that.

The Hon. PENNY SHARPE: Thank you very much for that. I am very interested in how State agencies are interested or engaging and talking to you about this, as we live through the fires now that are catastrophic across the State. Are they reaching out to you? What is your interaction with State forest, National Parks, the Rural Fire Service? Tell us about that.

Mr COSTELLO: I used to work for National Parks. I started as an Aboriginal cadet there. In my job interview I talked about—because I had already started the Firesticks project, which was just a uni thing and a sustainability leadership project at the time—how important that was and I took that into the agency. There are some really great people in parks, RFS, forestry and within the organisations that we work with when we get some good individual support. But I feel that there are big structural gaps in the way that the agencies engage us, because I guess they are always caught up with other priorities; for example, the Enhanced Bushfire Management Program and a whole heap of important work that they are doing. But they fail to see the opportunity in what we are suggesting.

We are suggesting a different way of managing the land based on the way the land actually responds in a healthy way to management. It is very challenging. When I was at parks I helped to develop the cultural burning

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policy, which was largely trying to enable us to practice. Mr Steffensen and I are trying to do all of this work with National Parks, but we are not qualified firefighters so we are not able to be on burns. What about our Elders and our young people, who need to be able to mentor us and to be taught how to burn? That is one of the things that I worked quite hard for. Parks took that on and so I commend it for that. Really, the main issue is resourcing it, because agencies are underfunded and over demand. Priorities come with funding and there is no investment at a program level in any cultural burning.

There are projects. The Environment Trust has been funding some projects more recently, which is amazing. We really value the support. The National Indigenous Fire Workshop that we ran last year at Bundanon had sponsorship from the Rural Fire Services Association, the Rural Fire Service, what was the Office of Environment and Heritage [OEH] through the research hub, the Saving our Species program and Local Land Services. National Parks gave us a marquee. We are getting support and there are good people there but, to be honest, I do not think a lot of these things can be led by government. That is our methodology. It is about Indigenous-led mentorship. We want to work with agencies and landholders to partner with them to show them how we can manage country.

Mr STEFFENSEN: When we look at all those fire agencies and land management agencies in this country, it is going to take all of us. This is one of the biggest challenges environmentally that this nation is going to have in history, apart from clearing our oceans from poisons and plastics. This is an epidemic that is running across Australia at the moment of lack of food for animals, wildfires. When we look at all the agencies involved, it needs to come to a point where everyone is working together. It needs to come to a point where we are supporting the same actions and that we are out on country working together. I can say that over all of the 27 years I have been doing this work the hardest thing is to get agencies working together and this nation working together.

If you would ask me what is the most difficult part of applying Indigenous fire management back on country or any Indigenous management, it has to be people. And it all boils down to different agencies, different mindsets, arguing with each other, not working together. I see it all the time. Forestry will say one thing and The Greens will argue over here and then national parks will say another thing and they are all not working together. It is so hard to get simple management on country and start doing something practically when we have disillusioned mindsets that are not even working together in this nation. It is something that really has to be identified because, if we are not working together, how are we going to deal with this problem of looking after our environment the way it is today?

With the workshops that we implement on country and around the country as well, we have the Rural Fire Service, national parks, pastoralists—everyone—coming to the workshops. And everyone on that ground level can see the value in this and everyone is on board. But the only thing that is not happening is the top level—they are not on board. I can say that there would be representatives from every walk of life in this nation that would have to agree that they want to see action in looking after the landscape. But it is so hard to do when we have everyone so fragmented in their views. That is why it is really important that Indigenous knowledge is understood as being demonstrative and leading with practical examples, bringing everyone along for the ride to work together and to support each other with the solutions.

But agencies seem to get the things like, "Oh, what a wonderful idea—traditional burning, Indigenous knowledge. Let's go. Let's run a cultural burning program." But we need training. And the horse bolts in that direction and the rider is sitting on the horse back-to-front, looking the other way. And the people with knowledge of that country are just standing back and not even getting involved. That has been the way ever since colonisation hit Australia's shores—the people with the knowledge of country have not been included. I applaud the fact that I am sitting here today and finally saying something and being involved in something so important, that has high influence and high importance to Aboriginal knowledge and culture being a contributor. Agencies need to be pulled back.

We need to have the support and the training—and I am talking three to four years' training for people to understand the soils, the trees, the different foods, the medicines, all the problems in our landscape and how we need to heal those problems, the actions we need to do to undertake that. Because the way we apply fire needs to be adjusted—there is not one right way. There are so many layers to everything, as we said before. To understand that, we need to go back a step and we need to apply the training so people can go out there and understand how to manage that land the right way—and not a two-day program and then they can go out and torch it with a driptorch.

The CHAIR: Thank you.

The Hon. MARK BUTTIGIEG: Following up on that, Mr Steffensen, you characterised it quite illustratively when you said you have got buy-in at the ground level where it counts at the practical level because all the various stakeholders can see the value but it is not filtering up to the top. Is that, in your view, as a result

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of a conscious decision to ignore those Indigenous practices at the very top levels or is it just incompetence? What do you think the reason for that is?

Mr STEFFENSEN: I just think that we are not being heard. We run programs and workshops across six States now and thousands of people are influenced and coming to these workshops. There is a network across this country now that is quite huge and ready and on the go to start looking for change. But I cannot tell you why it is not getting to the top levels and why they are not listening, why they are not coming to the workshops, why they are not coming out on country to learn. I cannot answer that question. I do not know why it does not get to the top and why they do not start making actions now to start moving forward and be practical on the ground level that is going to start to spell out the solutions and also start moving this nation forward in understanding a wealth of education it has been deprived of. So I cannot answer that.

The Hon. MARK BUTTIGIEG: Is it a case of their having to have a cosmetic appearance of doing the culturally correct thing looks good but then when it comes to actually implementing it at a higher level across the board they are just ignoring it—is that basically the problem?

Mr STEFFENSEN: Pretty much. It is just like little workshops. We are ready for the next step here and that is large scope—that is putting the training programs right across the State. That is getting thousands of jobs happening. That is getting people out there looking after that country and starting to show the results. I do not understand why it is not happening.

The CHAIR: In relation to the megafires which much of the State is experiencing and will experience over summer, how do you think Aboriginal fire management would help the situation or would have helped the situation? Would the megafires be any different? Explain to the Committee how that would work.

Mr COSTELLO: In a perfect world, if eight or 10 years ago we were able to come down to national parks and say, "We've got this big idea; why don't we start to manage the country differently?" parts of the landscape that are cooked now would not be cooked. There would be canopy intact; there would be species there. Sure, there would probably be a lot of fire in the landscape because there is a drying process and we are dealing with climate change effects and stuff like that, but that is not a new problem for us. Our people managed the landscapes through changing climates for millennia. The knowledge is based on reading country—seasonal indicators and cues and being able to adapt to the change and transition. We are not talking about removing wildfire from the landscape. Wildfire is not a good term for me. A lot of the unplanned fires that happen in a landscape are lightning strikes.

Lightning is our fire lore teacher. It actually teaches us how to manage the country. If we are managing the country the right way, those fires that the lightning creates do not become catastrophic landscape fires. They just trickle around. Sometimes they might have a bit of a negative impact here and there but largely it is not as significant. If we are able to get that—not just a burn here or a burn there but a cultural fire regime, a mosaic across tenure, across the landscape, that actually has successional burning, every year, we are out there for months and months, young and old people out there burning country, walking their pathways, learning their stories, managing that land—when these fires happen, and they are going to keep happening, the behaviour of the fire is different. There is also the technical response as well, being able to respond to a wildfire, knowing how to read that country and burn that country the right way—getting it ready.

The fires are going to come. Our people would have known for years that this season is going to happen. They would already know. We have been saying it for years. This is all bad. We were in Tathra before Tathra went off; Jubullum, we ran a cultural burn there in 2018. That next summer it burnt again. Two megafires have gone around our little demonstration burn. The fire has gone around both of those. Imagine we had spent five or 10 years burning all that landscape, the difference that would have made. We have all the evidence. We can take people and physically show them all that story. There is getting ready for the fires; when the fires come, being able to respond—having successional fuel loads. We know where they are and can say, "We can start burning this country." Instead of linear ignition hazard reductions that cook all the animals, we just do our same patchwork, same cultural framework, same knowledge, apply it across the landscape when the fires come.

Now, post fire when there are negative impacts the first thing we do is we go in and we read the country and, look, there is no canopy here now so these are the problems we might have. We want to go and burn some of the country already because we know that if we do not get in there and burn it when the moisture comes when it is ready to burn that we are going to have 20, 30, 100 years of problems because we did not follow the lore. We understand that responsibility but we are not enabled. We have hardly any access to land, we have no resources. I worked for government for eight years trying to make change only to realise it is not going to happen there and to step out on my own. We need to survive, we need livelihoods on country and there is literally hundreds and thousands of Aboriginal people out there sitting in their community. Many have a job doing something that is not that useful, or maybe they have no job.

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They want to do this stuff. It is powerful work we do. The opportunity is right there. All that country, so much land has been burnt over the last couple of months. It is really devastating. People are calling me and they cannot go on, they have been fighting fires for two months seeing ancestor trees and animals, whole populations of koalas and potoroos are gone, they are not there any more. We are not going to see them again. If we look after it they might come back but otherwise they are going to be gone like all the other places they are gone. That is really hard for us. When we see these negative things it is really quite draining. We can do stuff about it. There is things we want to start doing in the next weeks and months. If we have resources we will be out there doing it. We are already trying to do what we can.

Mr STEFFENSEN: To add to that, what Mr Costello said is correct. When we have the mega fires and incorrect burning on country that creates the wrong temperatures for soils and ecosystems. They create more flammable plants and they create plants that are going to burn even hotter next time, at the next fires. What happens is you go through different phases. The country used to have the right native vegetation in there and that has evolved over thousands of years to produce the right fire, the right temperatures for the soils. When the big mega fire comes then the invasive wattles, tea-trees and other plants that are totally flammable get up over six-foot high and then become an understorey that thickens so thick that it starts to lose the value and identity of those ecosystems.

When they catch alight then we go through another phase of fire that kills our trees and our parent trees. Soon you will have nothing but dead trees if we just do nothing and allow these phases of wildfires to continue to ravage our landscape. It is crucial to understand that these fires are producing more flammable plants and the right burning is based on getting rid of those flammable plants and putting back the plants that belong in those soils. We need to do that immediately. After wildfires they leave it for another 10 years and do nothing and those flammable plants are way past your head height. When we look at the right fire for that country it is too high for it to reach that plant and to sort it out.

We need recovery teams out there right now after these burns in the next season burning leaf litter to breakdown and kill the young invasive flammable ones and start with the right temperatures to bring up the right plants and the right grasses to come back in that country that is going to be lower, healthy with more food sources and diversity.

The CHAIR: Just to be clear with that, you are saying that the high intensity burn goes through and the acacias and tea-tree love the fire. You are saying instead of doing rehabilitation where you actively go in and reseed, a low frequency fire will get rid of those and generate the plants?

Mr STEFFENSEN: That is right.

The CHAIR: You are not suggesting going in and reseeding, you are saying that the right intensity fire can do that?

Mr STEFFENSEN: That is right. The fire for that country will kill the invasive native when it is at a low level. But if it is allowed to thrive and get above a cool burn threshold, which is usually above six foot, we are not going to be able to do that. It is going to come down to intensive labour of clearing that out, which a lot of communities are doing. We show them. We have to cut it all out first and then apply the fire and then bring up the grasses.

The CHAIR: The fires around northern New South Wales and Dorrigo that we have heard about this morning, I assume there is no post-fire ecosystem recovery plans by the various services we have mentioned but you are urging the Committee to ensure that all of these forests do not burn again so quickly, they need to be in some way rehabilitated by less intensive fires?

Mr COSTELLO: They need a cultural fire plan.

The CHAIR: Urgently?

Mr COSTELLO: Urgently. Now is the time. We have an opportunity. We get told there is too much fuel because it is so long unburnt; "No, you cannot burn in there." Now it has all gone. The kinship has gone in lots of areas. Not all places are going to come back. Depending on the previous management whatever is there we can bring back.

The CHAIR: How soon after a fire has gone through do you need to be to go back and do these burns?

Mr STEFFENSEN: As soon as the next season is ready for that type of country and soil.

Mr COSTELLO: You burn the country the right way the same time all the time.

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The Hon. MARK PEARSON: Can you give us an example of that, burning at the right time, right place in consultation and doing it as a team?

Mr STEFFENSEN: For example, if country has not had catastrophic fires we are out there managing landscapes with the right ecosystem at the right time of year. When it is right for early winter then we go for certain systems like the gum and the boxwood and so forth. What happens is that the curing will only allow for them to burn at that time of year. The problem that we have is now it is full of rubbish and 40 years of leaf litter and all that sort of stuff. Our first burns are going to go across a few ecosystems until we get to the point where we see that healthy layer underneath where we can start to see fires pulling at other ecosystems because the grasses are greener and curing.

The Hon. MARK PEARSON: Are you saying the way we have been doing this is incorrect in many ways because it is reactive rather than proactive and planning, which is what you have been doing for thousands of years?

Mr STEFFENSEN: That is right.

The Hon. MARK PEARSON: Understanding the architecture of the land and thinking ahead all the time?

Mr STEFFENSEN: That is right. It is understanding the land and understanding what is needed for that country. That is why people need to learn that and why it takes years to learn that knowledge. And why our future fire practitioners in this country are going to be walking encyclopaedias.

Mr COSTELLO: Two quick points. One is an example. There is a whole heap of country where the fire has been too hot and the canopy is scorched.

The Hon. PENNY SHARPE: That would be the North Coast.

Mr COSTELLO: Like 40 per cent of the North Coast is probably going to be like that. Whatever did not get consumed that has been burnt, all that leaf is going to end up on the ground. It is going to suppress that country with leaves. As soon as there is moisture back in the soil and when the rains come we will want to come and start to burn like mosaics, reading the country. You go, "We are going to burn this here". It is moving the leaf off so the plants can come up. But not massive areas so you end up with this big homogenous regeneration. Areas where all the fuel and all the leaf is burnt and there is no leaf any more that is going to get full sun and when the rains come you will get mass germinations.

There are all sorts of variables. This is very general. That is when we go, okay, this country here we are not going to burn this country because it needs a couple of years before there is going to be fuel in it before we can burn it. This country here we can burn it. There is country you could burn now but you would not because the soil is too dry but the leaf is there and the problem is going to be there until we do that. That is critical.

The Hon. CATHERINE CUSACK: Just following the question up. Are there case studies of places that show success?

Mr STEFFENSEN: Yes, there is about 130 films on the Vimeo there, not all of them are based on fire but traditional knowledge applications. There is at least 60 or more case studies on fires around the country with communities doing the burns and showing the outcomes.

Mr COSTELLO: We have lots of evidence.

The Hon. CATHERINE CUSACK: Can you talk us through one?

Mr STEFFENSEN: Yes, I have got one.

Mr COSTELLO: The problem is that we do not have the regimes in the landscape. They are like small pilots and burns. We can show you really good evidence but it is not the kind of evidence that we would love to show you, which would make a massive difference to the landscape.

Mr STEFFENSEN: A big scale one. There are so many examples of restoring cleared landscape that was farmed for over 100 years and dealing with invasive weeds. One example is in Kyogle with the Githabul with the dieback and the bell miner birds. That is a project that has been researched by western science for over 40 years now and millions of dollars—I do not know how much money—has gone into that, but we have gone in there with a couple of grand to get me down with the air fares. We have gone into that country with the traditional owners and we have got the solution on the very first day that we get rid of the lantana, we put the fires down—the bellbirds hate the fires—and we start to reclaim all the right vegetation for that country and start to spark the right fires to grow more trees and to spark the seed banks to produce the right smoke for the trees that are remaining to produce better seeds, flowers and germination.

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That process was going so well and there is a video to show evidence of that and it was stopped simply because of Forestry saying they do not want to see us use fire and National Parks saying they do not want us to be doing this. Again it is just legislation and mindsets that again get in the way of progress that could save a lot of money and put jobs out there, and meaningful jobs, as well as educate this nation.

The CHAIR: I ask one last question in relation to climate change and cultural burns. Has that impacted the time frame within which you can do Aboriginal fire management?

Mr STEFFENSEN: Can you repeat that question?

The CHAIR: Climate change and the impact of the time frames within which you can do cultural burns?

Mr COSTELLO: It has an impact but it does not stop the practice because, like I said before, when you are reading country, the windows that we use currently in the prescribed burning space are not the windows that we could be using, and that was my point before. A lot of the hazard reduction work to me is actually causing problems. I have been to lots of prescribed burns from agencies and they are quite proud of the burning until we point out all the things that they have done wrong culturally by the lore, like coming back and after two years seeing more fuel than was there two years ago—one side has not been burnt and the other side there has more fuel there now and the kinship is all wrong.

It is because they have applied the wrong fire. That is why a lot of the fires are so bad, because we have seen a lack of fire in lots of areas and we have seen the wrong fire and when that comes together you get mega fires and they get bigger every year. A lot of these fires are not new; they have just popped up here and there and the country has all gone sick. Now they are connecting up and they are all burning together.

The CHAIR: Thank you. That is the end of our questions, unfortunately. It was a very interesting session. I understand you have a document to table for the Committee, is that correct?

Mr COSTELLO: Yes, I have got two. One is a flyer about our organisation. The other one is we have put our names next to this logging moratorium. I do not want to get involved in the logging debate but clearly from my flight down the other week, seeing how much land has been burnt and understanding the impacts on koalas, any pressure on koala habitats right now that we can make a decision about, if we can do anything we should be doing it because there are things out of our control but there are things in our control, and a moratorium on logging in koala habitats is one thing we can control.

The CHAIR: Thank you very much, Mr Costello and Mr Steffensen, for your excellent evidence. I do not think any questions were taken on notice. Thank you so much for appearing and for your excellent work. We are over time.

Mr COSTELLO: Just one other thing. Thank you for the opportunity. As well, obviously we are quite motivated and there are things we are working on and we have been working on before we were invited to this, so hopefully we might be able to have another opportunity to provide materials, evidence or whatever around what is happening before the Committee convenes.

The CHAIR: Yes. Thank you so much.

Mr STEFFENSEN: And I would have liked to have answered the climate change question too, so next time.

(The witnesses withdrew.)

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CHEYNE FLANAGAN, Clinical Director, Port Macquarie Koala Hospital, sworn and examined

The CHAIR: I welcome our next witness, Cheyne Flanagan. Do you have a short opening statement for the Committee?

Ms FLANAGAN: Yes, just a brief one. Thank you for allowing us to be here today. In 2012 *National Geographic* conducted a worldwide survey. They asked people to name the top five iconic species on the planet. The standard answer was always elephant, lion, panda, whale and the koala. In Australia the koala brings $6 billion annually in tourism dollars. At the koala hospital we host a conservative estimate of 150,000 visitors per year, local, national and international. In the month of November that has just passed during the fire situation it is likely we hosted 50,000 in that month alone, such was the concern of the general public. You are probably already aware of this but our GoFundMe page seeking donations to build wildlife watering stations, which was $25,000 we were asking for, currently now sits at $1.9 million.

This is the biggest GoFundMe campaign in Australia's history such is the power of the koala. We are now going to use this to build two breeding facilities as well. Over the last 10 years, particularly the last five, we have seen an alarming increase in private native forestry in the region, plus the rampant continual clearing of habitat for development is ongoing and disturbing. Even individual trees, which people may not think as of any value, throughout urban areas are continually being removed and they are considered not to be of a significant impact as an individual tree but we refute this as not only is the cumulative loss of these trees major but individual trees have a role behaviourally to multiple koalas occupying overlapping home ranges in urban areas.

Ironically, urban populations of koalas considered to be living on the knife edge from threats such as car impacts and dog attacks are now likely after these current fires to be paramount as a repository of source populations for the future. Population modelling done five years ago using both admission data from the koala hospital from 1973 to 2014, plus the results of a local government area [LGA] wide koala population survey, found that the koalas of our region were declining at a rate of 26 per cent. This did not take into consideration future habitat loss or catastrophic fire events. Currently the amount of koalas lost over the last five weeks due to multiple fires and the strong likelihood of further losses over this coming summer to more fires, to dehydration from the ongoing drought and the lack of available unburnt foliage—this decline could well sit at anywhere up to 85 per cent.

This would then class the koala of the Mid North Coast as critically endangered. Ten years ago we had the biggest coastal population of koalas on the eastern seaboard. The koalas of the Port Macquarie region were considered so genetically diverse that they are of national significance. Today they are a national tragedy. And we repeat: That current legislation allows rampant removal of vegetation and we believe it does not protect the New South Wales koalas and it is pretty evident with the amount of decline. Thank you.

The CHAIR: Thank you, Ms Flanagan, and thank you for all the work you do. I am sure you have been incredibly busy over the last few weeks?

Ms FLANAGAN: Yes.

The CHAIR: You are in Port Macquarie. Can you give your opinion of some of the Government's initiatives, if you like, in facilitating healthy koala populations and ensuring the protection of the koala, specifically State environmental planning policy [SEPP] 44? How do you think that is working?

Ms FLANAGAN: It is a good document but it is not enacted properly. Also, some of the definitions, including what is "core koala habitat" et cetera, need to be addressed. I am not very good with legislation; I have sort of a very poor understanding. If you give me a disease, I talk till the cows come home but I will do what I can in that area.

The CHAIR: What about in terms of the fires now and wildlife rescuers going into forests to save koalas from burnt areas? Have your rescuers faced any barriers or difficulties in terms of accessing koalas that need to be rescued?

Ms FLANAGAN: Not at all. We work very closely with the Rural Fire Service. All our teams are out today. They do a course with Rural Fire Service in fire awareness. They wear full personal protective equipment [PPE]. We do exactly as Rural Fire Service tells us to do. We can get in pretty quickly because we have such a good relationship. So there are no problems at all.

The CHAIR: I understand in the entire State you are the only rescuers in terms of being trained to enter forests after fires and rescue koalas and that there are quite a few wildlife carers around New South Wales who do not have that training and cannot do that. Is that correct?

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Ms FLANAGAN: Yes, there are quite a few that do not but in Newcastle, Hunter koala society has a trained team and it has done plenty of it too. It is something that every wildlife group needs to do. We have been teaching it to try to get through to people that they need to be fully qualified to go on a fireground. Firegrounds are very dangerous places.

The CHAIR: What does the training involved: how many days and what are the costs? Can you talk the Committee through that?

Ms FLANAGAN: The Rural Fire Service does it for nothing but there is an online course as well. It is only half a day but it teaches you fire awareness—what to actually look for: burning embers and burning trees. They fall unbelievably after a fire. They are incredibly dangerous places. We have 20 people, all qualified to go on the fireground. You wear full PPE.

The Hon. CATHERINE CUSACK: How many koalas have they found?

Ms FLANAGAN: For the amount of area that they have covered, not a large amount. We have about 40 koalas that have come through our doors. For the amount of country that they have been on and how many animals we knew were there, that is nothing. Most of them were just incinerated.

The Hon. BEN FRANKLIN: How does that compare with previous fires?

Ms FLANAGAN: One of the main fires, which was the first one that started, we always call that the "90-koala fire", where we would find 30 alive, 30 dead and 30 we would leave out there. This time we have found only about half a dozen and there is just nothing. This is an area that was just so beautiful and so well populated. They are just ash.

The CHAIR: We have also heard from some koala scientists this morning about the urgent need to predict where the fires are going to go if they are going to go through significant koala populations, and whether it is feasible in any way to rescue koalas before fires go through and to try to move koalas from the fire fronts. What are your thoughts on being able to do that?

Ms FLANAGAN: I do not think that—that is an incredibly big task. Koalas, at the best of times, are hard to spot; catching them is not that easy. If they are 40 metres up a tree, that would take weeks and weeks. Where do you put them? Where do you put a whole population of animals? That would be lovely in another world but I do not think that is feasible.

The CHAIR: We also heard about the need to then—because that is not really that feasible—burn to try to protect significant areas of koala habitat. In other words, treat that habitat as an asset as well. What do you think of that option?

Ms FLANAGAN: We put together a document—I sit on a panel with RFS and a few other agencies—where you set aside that are given priority in the event of a fire but unfortunately it all went out the window in these last fires. They were just too big and too horrific and the resources of all those fighting fires—they had to defend property. They did what they could and we understand. You can try to protect an area but embers do incredible things. All you need is some horrible, hot winds and nothing stops. Nothing would have stopped these fires—nothing.

The CHAIR: Can I check with that? Was the protection of core koala habitat—whereabouts was it?

Ms FLANAGAN: There were a number of areas.

The CHAIR: That was contained within the bushfire management plan for that area?

Ms FLANAGAN: Yes, obviously, because one of the major populations is right beside Port Macquarie itself, property and homes take precedence. They did what they can but, as you know, so many homes and lives have been lost in New South Wales that that is their number one goal.

The Hon. CATHERINE CUSACK: I am really interested in your comment that the koalas that have moved into urban areas have benefited, I suppose, from the protection-of-the-life-and-property policies. We have also had evidence that in Coffs Harbour, koalas are successfully thriving back in those developed areas, where that was not—they have taken some measures. I just wondered if you could expand on that a little bit more and, secondly, talk us through how you have such good relationships. It sounds like your organisation has really anticipated that fire is a threat to koalas. You have made some good efforts to prepare for that. I just wondered what that kind of looks like.

Ms FLANAGAN: From an RFS point of view?

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The Hon. CATHERINE CUSACK: Yes, and that relationship that you have and how that worked and how you progressed it? When did it start, for example?

Ms FLANAGAN: The koala hospital experienced its first major fire in 1994 and then the second one at the end of 2001-2002, over that summer period. We used to have the fire awareness courses with National Parks but then it was changed to RFS. I think we are just a very proactive organisation and because we are in an area that is so fire-prone and because these animals are so precious, we just pushed forward and did it. We have been doing it for the past, I do not know, 25 years.

The Hon. CATHERINE CUSACK: Do you have RFS people involved in your organisation?

Ms FLANAGAN: Yes, we do. We do have some but they are pretty busy doing normal stuff.

The Hon. CATHERINE CUSACK: I understand. That would inform your organisation.

Ms FLANAGAN: No, I do not know, we just have a great relationship with RFS. It is so accommodating. It is very helpful. All the other agencies are there as well—Forestry and National Parks. We know them all. Everybody just seems to want to help each other.

The Hon. CATHERINE CUSACK: It is like a community. One of the policies that OEH appears to be advancing at the moment is that koalas need to be separated from urban areas. In particular, they are trying—

Ms FLANAGAN: How are they going to stop that?

The Hon. CATHERINE CUSACK: By cutting the corridors. It seems that is one issue that they are looking at in particular, and fencing the roads so that there can be no more connectivity on the grounds that that area is going to be developed. I just wondered if you would have comments to make on that, given that you live in a community where koalas do live in developed areas?

Ms FLANAGAN: One thing we always joke is that koalas would make great real estate agents because they like to live where people want to live. They want to go for better quality soils and moister soils. Hence, they tend to like the coastal strips in preference. If an urban area is managed properly and you have got good street trees and slow speeds and whatever—koalas can exist if it is in an urban environment if it is planned well. I think the idea of excluding them from some of these places is going to fail. What you do with these animals if they are under such pressure that that they have to radiate into a town because there is not enough habitat where they are? You are going to end up with island populations, inbreeding and all sorts of genetic issues. I think there might be a better way to tackle that.

The Hon. CATHERINE CUSACK: Plus you do end up with a small reserve population after the fire like the one we are experiencing at the moment.

Ms FLANAGAN: Yes. It is interesting that we have been moving out all the juveniles in town in Port Macquarie and repopulating some of the national parks that had very low occupancy. We were putting all these animals down there and these really beautiful populations were really occurring. Now, they have all gone up in smoke, have they not? We tried; we thought we were doing the right thing, but now these ones left in town that are having to run the gauntlet are the survivors.

The Hon. PENNY SHARPE: Thank you. It must be very hard for you and your volunteers and everyone who works there; I just wanted to acknowledge that particularly and thank you for all your work. Obviously the fires are still going. It looks like it is going to be quite a difficult summer. Are there things that government can be doing at this point that are actually about recovery? I know that there is the immediate issue, but from your point of view what are the things that need to be done now that this has happened?

Ms FLANAGAN: We need to put a moratorium on logging. We need to just stop everything until we can take a breath and get independent people to come in and reassess this whole thing, because there is minimal habitat left. Let's hang onto it until we can work out the best way forward. That is what the Government needs to do in the immediate. This is an emergency situation.

The CHAIR: What do you think in terms of the future of koalas under climate change, in terms of increasing fire? What is the Port Macquarie Koala Hospital's view on that?

Ms FLANAGAN: It is not good, because with increasing temperatures—koalas are no different from anybody else. They like preferred temperature ranges. They do not like being hot. If their habitat has been decimated, they have got no cooler areas to go to and they do not cope with heat. That is one thing, and they can die literally from that. But with these hotter, drier conditions, the eucalyptus trees—I do not know whether you are aware, but that is where they get their leaf moisture. So if the leaf moisture in the tree is so low because there is no rainfall, the koalas do not get access to water from the leaf and there is nothing on ground either.

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The Hon. PENNY SHARPE: That is why you are putting water out?

Ms FLANAGAN: Yes, why we are putting these watering stations. We are finding these animals coming in that are not burnt, but they are so dehydrated that they just drink for days. I had one I watched the other day, and she drank for an hour. Even if you give them intravenous fluids, they are still drinking. They are just so dehydrated. Then you have got all these side effects that can happen from that. There is renal failure, of course, and now we are finding ones that are getting blocked bile ducts because they are so dehydrated their bile is becoming quite sluggish. I post-mortemed one the other day and she had this massive blocked bile duct, all courtesy of dehydration. So there are these side issues that happen as well.

The Hon. MARK PEARSON: On a practical level, on the ground when you are out there trying to find the koalas et cetera, what sort of material or equipment do you have to deal with an acute situation? For example, a koala that you probably do not want to handle and take back because it has had so many burns—is there something that can be done to relieve the pain and distress? And if euthanasia is required, how is it done in the field?

Ms FLANAGAN: I have a firearms license, as some of us do. In national parks, unless you have done a course with them, they will not allow you to take a firearm in. But euthanasia on site is obviously the kindest thing to do not only for koalas, but kangaroos. You have got no idea how many animals are out there that are burnt and we cannot get access to with a firearm to humanely euthanise. To actually have to capture that animal and then bring it into a facility to euthanise it is just cruel.

The CHAIR: Yes, I have heard that from wildlife carers.

The Hon. MARK PEARSON: All of your team—at the end of this disaster and all of this grief and sorrow, is there a mechanism in place for people to be able to seek help?

Ms FLANAGAN: We have a psychologist on staff and she is available to talk to anyone. But wildlife carers are tough people. They really are. They are pretty tough.

The Hon. MARK PEARSON: I am sure they are, but still you have got to let it go afterwards.

Ms FLANAGAN: Yes, but we all talk to each other. We have got 150 volunteers and we have been here before.

The CHAIR: Just to follow up on the statement about wildlife carers, what is the regulation in terms of carrying firearms into forest to euthanise very badly injured and traumatised animals?

Ms FLANAGAN: You have to have an animal welfare category on your licence. That is 100 per cent and obviously you have got to be a pretty darn good shot. As I said, National Parks will not allow it unless you do the course, which I am hoping to do next year.

The Hon. CATHERINE CUSACK: Are you a good shot?

Ms FLANAGAN: Most definitely. I shoot competition, so yes.

The CHAIR: Just to continue on that, though, how many of your wildlife rescuers are able to euthanise?

Ms FLANAGAN: None.

The CHAIR: None of them have that?

Ms FLANAGAN: No.

The CHAIR: I did hear very disturbing—not evidence, but information the other day of somebody saying that they were around a burnt area of forest and could hear really disturbing sounds of animals burnt and injured after the fire went through. I am sure you know what that sounds like. At the moment you have teams going in and the only way you can euthanise very severely injured and traumatised animals is by injection?

Ms FLANAGAN: Yes, you have to bring them into a facility.

The CHAIR: You have to bring them in?

Ms FLANAGAN: Yes, you cannot do a—well, to use and hold Lethabarb, you have to have an authority. It is not for anyone. You also have to do it under the auspices of a veterinary surgeon. It has to be done with authority.

The CHAIR: Are there any recommendations you would make to the Committee in relation to that?

Ms FLANAGAN: The only thing is euthanising with Lethabarb, you cannot leave the animal there. You have to take the animal away, because if you leave an animal with Lethabarb in it and something else comes along

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and eats them, it will kill them. So, yes, they have to be removed. It is probably better to just give them a sedative and move them off-site. It would be kinder, unless you can shoot with a firearm. I did not think I would be talking about this here today.

The CHAIR: It is a pretty dire situation.

The Hon. MARK PEARSON: We have to get our heads around it. Would a person without a licence to shoot just give an oral sedative?

Ms FLANAGAN: No, it is injectable.

The Hon. MARK PEARSON: They can do that into a muscle?

Ms FLANAGAN: It depends who the person is. There are restrictions on drugs, as you well imagine, so this all has to be done under veterinary advice. Probably a good thing is in some places they have a vet go out, but getting a vet who is available to do that is another story. They are busy people.

The Hon. BEN FRANKLIN: Just to pick up on Ms Faehrmann's question, would you advocate for a loosening or lifting of some of the onerous restrictions on allowing people to take firearms in to euthanise koalas in deep distress?

Ms FLANAGAN: What some people may deem deep distress, others may not. To some, they may appear really bad; to others who are well experienced, they may not be. So there is that grey area of people having an understanding of what they are looking at too.

The Hon. BEN FRANKLIN: To me it seems like that is obviously the most humane thing to do—

Ms FLANAGAN: Yes.

The Hon. BEN FRANKLIN: —if a koala is going to die in enormous pain. Your facility is one of the most respected not only in the State but in the country. You said to the Hon. Catherine Cusack that there is no-one in your facility able to do this. That, to me, seems like there should be a recommendation, potentially, around making it easier for people who are doing the work that you do to be able to do this. Is that something you would agree to? And if that is the case, what would you specifically suggest should be done in order to make it easier for people to be able to assist in this way?

Ms FLANAGAN: I think probably one of the best things to do is to do a course through National Parks. There is an accreditation. That would then allow these people to be able to do it. You do not want lots of people, though, on firegrounds with a gun. That is a worry.

The Hon. BEN FRANKLIN: No, I am not suggesting that in any way.

Ms FLANAGAN: And Lethabarb is not an option for a fireground, it really is not, because you have to take the animal out. If you are going into really remote areas, yes, a firearm is 100 per cent a definite. But if your fireground is very close to town, then it is probably just as easy to take the animal in.

The Hon. MARK PEARSON: There has been some development in captive bolt destruction of animals.

Ms FLANAGAN: No, thank you.

The Hon. MARK PEARSON: Has that been looked at with koalas?

Ms FLANAGAN: No, and I really would not like to go—

The Hon. MARK PEARSON: You do not seem to like the idea.

Ms FLANAGAN: Absolutely not. No.

The Hon. CATHERINE CUSACK: Are your firefighters bringing koalas in as well?

Ms FLANAGAN: The RFS and Forestry et cetera? Yes, they have.

The Hon. CATHERINE CUSACK: Do they do a course at all to assist with that?

Ms FLANAGAN: We teach them how to handle koalas. Some of them carry baskets with them and capture bags. But most of the time, they will just ring us and we will meet them on the edge of the fireground. We have got runners—we call them runners, but they drive out there and will meet them if a fire is active.

The Hon. CATHERINE CUSACK: It is very impressive, the way the community is working together.

Ms FLANAGAN: We have been doing it a long time.

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The CHAIR: Can I ask whether there are other recommendations for the Committee? Obviously we are very focused on the current fires at the moment, but this inquiry is looking into all threats in relation to koalas. Are there any other particular recommendation that you would stress to the Committee that you would like to see to ensure healthy koala populations?

Ms FLANAGAN: It is about having the land available—good quality habitat that is not developed and that is looked after. There is no point having a big national park—for example, they are talking about a koala national park—if there are no resources to run the park and look after it. It has to be looked after by the likes of Firesticks. It has to be looked after.

The Hon. BEN FRANKLIN: I have a quick follow up question on that. Did you hear the evidence of the last witness from Firesticks?

Ms FLANAGAN: The last bit of it, yes.

The Hon. BEN FRANKLIN: Do you endorse the work that they are doing?

Ms FLANAGAN: 100 per cent. I can honestly say that forestry in our area are also starting to use Firestick farming. They think it is brilliant.

The Hon. MARK BUTTIGIEG: Ms Flanagan, you mentioned the earlier fires. I think you said that it was referred to as the "90-koala fire", with 30, 30 and 30. What was the experience of the recovery rate after that? Does it happen over time? Do populations recover? I suppose that is a big "if".

Ms FLANAGAN: No, it is a good question. It was about 10 years. But we also repopulated because there were only about 30 animals left on that site. We put some of the ones back that we had rehabbed from burns and we put joeys back in there from town. That was where the recent big fire happened, where we estimated that there were about 350 koalas. We have just lost that whole population.

The Hon. MARK BUTTIGIEG: So your potential for recovery will be proportional to how well we protect the habitat and enhance the habitat going forward?

Ms FLANAGAN: Yes, you have to look after it. I think what happened—

The Hon. MARK BUTTIGIEG: It is almost like you have to overcompensate with what happened with the fire?

Ms FLANAGAN: But we do not have the animals that we had then. There are far fewer.

The CHAIR: Thank you so much for all the incredible work you do and for appearing before today's inquiry. I do not think you took any questions on notice, but if we have any further questions for you will you be happy to receive them?

Ms FLANAGAN: Yes.

The CHAIR: Thank you so much.

(The witness withdrew.)

(Luncheon adjournment)

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MICHELLE DUMAZEL, Executive Director, Policy, Environment, Energy and Science Group, Department of Planning, Industry and Environment, on former oath

ATTICUS FLEMING, Deputy Secretary, National Parks and Wildlife Service, affirmed and examined

NAOMI STEPHENS, Acting Executive Director, Park Operations, National Parks and Wildlife Service, affirmed and examined

The CHAIR: Welcome. Thank you for coming. Would you like to make an opening statement?

Mr FLEMING: I wanted to say that, as I am sure you are all aware, this is an unprecedented fire season. I think the latest stats are roughly 2.7 million hectares has burned, of which about 1.15 million hectares are on national park. It is unprecedented, not just in terms of scale, but in terms of fire behaviour and the continuity and ongoing nature of the season. I wanted to acknowledge all of the firefighters, especially obviously the National Parks and Wildlife Service staff, but also the RFS volunteers and others. There are about 400 parks staff who are out there today and I think we have done over 24,000 days to date. Our performance has been good. It has been praised by Shane Fitzsimmons. I just wanted to mention one stat, which is that 88 per cent of all fires that start on park have been contained on park, which is a bit above the average over the last few years.

The team is doing a really exceptional job in really difficult conditions. The challenge of responding to those fires is ongoing. The immediate priority is saving lives and property. I thank the Committee for its forbearance, if you like. Richard Kingswood cannot be here today because he is on duty. The next challenge, the challenge that you are interested in today, is really what we do after these fires to promote the restoration and recovery of habitats and species populations. I just wanted to say we are already starting that work. It is not the immediate priority, but mapping the key assets, mapping the fire—not just the area, but the intensity—and then working out where the targeted interventions need to be made and what they might be, that work is underway. Obviously, in relation to koalas, the investment in supporting the carers is one of those targeted interventions. Sorry, I hope that helps to set the framework a little.

The CHAIR: This morning the first witness gave evidence on the ground around the Dorrigo Plateau area. He suggested there were instructions from Forestry Corporation for firefighters to defend pine plantations in that area at the expense of forests, of core koala habitat—this is the Mount Hyland Nature Reserve area, which is a world heritage area as well. There is evidence in fact that some of the fireys on the ground were disturbed at what seemed to be burning to protect pine plantations. We were a bit confused in terms of who has what control over each fire in each jurisdiction and how Forestry Corporation can instruct people on the ground to back-burn other areas of forest. Can you shed some light for the Committee on how that works in operational terms?

Mr FLEMING: At a very general level I might just say I am not sure we can comment on the specific example without having seen the evidence, but I might ask Ms Stephens to give you a quick overview of how the Rural Fire Service is in charge of the fires where there is a section 44 in place. I will ask her to give you the overview of how that works.

Ms STEPHENS: I agree, we could not comment individually on that fire because obviously we are not across the detail, but section 44s are declared under the Rural Fires Act and then they come under the control of the commissioner. National Parks and Wildlife Service officers will be firefighters on the ground and we will also serve in key roles in the incident management teams. But the fire is under the control of the commissioner and priorities around activities and strategies like back-burning and which assets are being protected as a priority—people and their assets are always the priority—but in terms of the approach that would be taken to the fire once it is a section 44, that is, decisions made by the Rural Fire Service in consultation with other agencies, but with them as the lead and as the determining authority.

The CHAIR: We have heard evidence of a potentially disturbing number of koalas that may have been, or have been, lost in these fires. What is the plan for National Parks and Wildlife Service to determine the impact of the fires in northern New South Wales on the koala populations there?

Mr FLEMING: In terms of an overview, we need to obviously be mapping the areas that are burnt, but also analysing the intensity of those burns, because obviously more intense has a greater impact, all other things being equal. I think for all wildlife and habitats it is also a matter of overlaying that with what are the highest value assets, what are the refuges, the important habitat features for koalas and so on, and then working out what the targeted interventions are. As I mentioned in the introduction, for koalas one of those interventions is supporting the carers. We have National Parks and Wildlife Service staff on the ground helping to locate injured koalas at the moment. Ms Dumazel might be able to talk in a bit more detail about the koala strategy and how that features in terms of the recovery and restoration efforts.

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Ms DUMAZEL: As part of the koala strategy, we have funding for koala rehabilitators. We are provided funding for those rehabilitators in terms of equipment for purchase. There have been some announcements recently for additional funding and our staff have been working with the rehabilitators to help them access that fund and to find out how to target that fund.

The Hon. PENNY SHARPE: How do they do that?

Ms DUMAZEL: How do they access the funds?

The Hon. PENNY SHARPE: What do they have to do to access the funds?

Ms DUMAZEL: At the moment there is initial emergency funding of up to $135,000 that has been made available. Contact is made, but in terms of the exact application I am not able to provide the precise information on the detail around how—

The Hon. PENNY SHARPE: Who is responsible for dispensing the money?

Ms DUMAZEL: What is happening is that letters have been sent out to rehabilitators.

The Hon. PENNY SHARPE: Through who? The Wildlife Information Rescue and Education Service [WIRES]? Is it done through those who have a license? How do you find people?

Ms STEPHENS: My understanding is that the letters were being sent to organisations and to individuals who hold licences.

The Hon. PENNY SHARPE: So you send a letter saying there is money, but how do they get the money?

Ms DUMAZEL: As well as the letters there has been email contact with those organisations so that they can come forward and let us know what they need right now.

The Hon. PENNY SHARPE: What are they able to ask for?

Ms DUMAZEL: It is in relation to equipment and on-the-ground support to help them in their efforts in the rehabilitation.

The Hon. PENNY SHARPE: I get all of that. What I am getting at is that we have wildlife carers who are completely overrun, on top of the general stress of operating in a fire area. How easy are we making it for them to be able to access the money, or is this really the point that, yes, there is money there—I mean, if you could take on notice how much money has actually physically been dispensed I would really like that.

Ms DUMAZEL: We have the $1.47 million over three years to support and equip the wildlife rehabilitation.

The Hon. PENNY SHARPE: No. That is not what I am talking about. I am talking about right now. You have just come in and you said, "We have got money. We know that wildlife carers are the priority in relation to the koalas with this current arrangement." I am just trying to get a handle on it. Has anyone got one extra dollar in their hand to support the work they are doing as they are literally dealing with dead koalas every day?

Ms DUMAZEL: The Foundation for National Parks and Wildlife is overseeing the funding of the $1.47 million and to support the volunteer wildlife rehabilitation sector. I know our staff are on the ground at the local level in contact with the rehabilitators around what they need, so it is a day by day discussion at the moment because they are trying to work out what they need right now and that is changing as we go along. Certainly what our staff are trying to do is support rehabilitators on the ground right now in terms of what their needs are. We are trying to make it as easy as possible and having the Foundation for National Parks and Wildlife involved in that is really important.

The other thing is I think it is really good that we have got our Koala Habitat Information Base out there because that is a resource that our staff are happy to work with rehabilitators on in terms of refugia that might be available to support our populations as well.

Mr FLEMING: I understand you want information on exactly what has gone out the door, in a sense, and Mr King—

The Hon. PENNY SHARPE: It just seems to me that if you spoke to the WIRES people—we just had Ms Flanagan in—they could tell you on the phone in five minutes what people who are looking after burnt koalas need. It seems to me that there is a very bureaucratic process and I am not at all convinced by your answer that one carer has had one extra bit of money for what they need to be doing what they are doing now.

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Mr FLEMING: I am happy to take that on notice and make sure we get you some more information. Richard Kingswood is actually the guy who is responsible for overseeing that program and he worked last night in one of the incident control teams, which is why is not here.

The Hon. PENNY SHARPE: I accept that.

Mr FLEMING: My apologies.

The Hon. CATHERINE CUSACK: Can you tell us how that $1.4 million was calculated?

The Hon. PENNY SHARPE: It is over three years.

Ms DUMAZEL: It is over three years.

The Hon. CATHERINE CUSACK: But how did you come up with that number?

Ms DUMAZEL: I will have to take that on notice.

The CHAIR: Also what about additional wildlife carers? We have heard from Dr Kellie Leigh this morning in relation to the koalas that are needing to be cared for as a result of some of the fires around the Blue Mountains in the Blue Mountains areas and that the wildlife carers in that part who are able to care for koalas are basically full already. There is not an area like Port Macquarie to care for any more koalas and clearly there will be more burnt and badly injured koalas that will need care. What is the department doing in relation to increasing the number of carers and the capacity for more people to care for animals fleeing?

Ms DUMAZEL: One of the aspects of the Koala Strategy is also to support in terms of vets as well.

The CHAIR: Can I stop you there for a second?

Ms DUMAZEL: Yes.

The CHAIR: You are talking about the Koala Strategy. That is great. We have heard about that. This is a hearing that has been called with a focus on fire because of what has happened in the last two months to try to get more information from parks around what I think I was hoping would be a response that matches where we are in terms of these unprecedented fires. Other than the Koala Strategy, which we have heard about, are there additional carers now? Are you able to put in place additional carers over the next summer, for example? Because you are talking about a strategy that is rolling out over the next three years and this is an emergency now for koalas, you would agree.

Ms DUMAZEL: I will take that on notice. What I just want to say is that the reason I was bringing up the Koala Strategy was around the training in place for local vets. You were asking about the capacity beyond rehabilitators. One of the things that can really help is around upskilling the local vets as well, who have facilities as well that can be used. But I will take the question on notice in terms of what addition work has been on the ground with those local facilities.

The Hon. MARK PEARSON: Has the National Parks and Wildlife Service developed any urgent emergency strategy response to what is actually happening?

Mr FLEMING: Can I take us back a step—

The Hon. MARK PEARSON: Did you meet and talk about what is going on?

Mr FLEMING: Yes. Can I take a step back? As I said, we have 400 staff right now fighting the fires either on the ground or in the incident control teams so the immediate priority—and it is the overriding immediate priority—is lives and property. So we are doing our best, subject to that overriding priority, to develop a strategy looking forward, because we recognise how important that is.

The Hon. MARK PEARSON: What about the wildlife part of National Parks and Wildlife Service?

Mr FLEMING: Yes. And so, for example—

The CHAIR: That is sacrificed, I think.

Mr FLEMING: No, it is definitely not sacrificed. For example, with the mapping of the areas burnt and trying to overlay that with the priority koala areas, there is an initial figure of about 15 per cent of the higher quality koala habitat in national parks that has been affected by fire. So, in a sense, you asked me what the strategy is. The first step is really to work out which areas are affected and how badly they have been affected. That is the basis upon which we can then work out what the targeted interventions are. The sorts of strategies that we will have to roll out are things like—I did not see all the evidence but I think Dr Lunney this morning was talking about the importance of the other threats as well—making sure we are able to target feral animal control, dog

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control and so on around those refugial areas, thinking ahead about whether we need to be looking at translocations to preserve genetic integrity and all of that sort of stuff. All of those things are being factored in. We are just doing the best we can to deal with an unprecedented situation in terms of fire.

The Hon. MARK PEARSON: Is it unprecedented?

Mr FLEMING: It is. I would—

The Hon. MARK PEARSON: In terms of the impact, yes, but really was it that unpredictable? Were there any advisers to the National Parks and Wildlife Service saying, "Look, something is going to happen if we do not manage this differently"?

Mr FLEMING: I would describe it as unprecedented when you take into account the scale of the area that is burnt, the behaviour of fire in some instances and the continuous nature of the season. Ms Stephens can correct me if I am wrong, because she has a lot more experience than I do in New South Wales, but I do not think we have seen anything like that.

The Hon. CATHERINE CUSACK: Can I just clarify, when you say 15 per cent koala habitat, is that 15 per cent of the area affected by fire or 15 per cent of all koala habitat?

Mr FLEMING: It is 15 per cent of high quality koala habitat—

The Hon. CATHERINE CUSACK: In New South Wales?

Mr FLEMING: —in national parks. I am focused on national parks. Obviously there is important work to be done on private land and other public land as well.

The CHAIR: While we are on the issue of that 15 per cent, what is your prediction, then, for the end of the summer fire season, given we are at 9 December? You have said 15 per cent of high quality koala habitat has been lost in national parks so far. All of your people on the—

The Hon. MARK BUTTIGIEG: He said "affected" rather than lost.

Mr FLEMING: Affected—yes.

The CHAIR: Affected or lost?

Mr FLEMING: Affected by fire. It is an important point because you need to examine the intensity of the fire. Again, I am just commenting on the advice I have received. If it is not a high intensity fire, koalas have the capacity to use country that has been burnt within a relatively short period of time. But if it is a higher intensity fire then that can take a lot longer. So you need to look at the intensity of the fire as well.

The CHAIR: You would admit, because a lot of the evidence that we have received today is that they are pretty high intensity fires that have burned through northern New South Wales and the mid North Coast.

Mr FLEMING: Yes. It seems that a lot of it was high intensity fire; not all of it.

The Hon. CATHERINE CUSACK: I think the anxiety is, as you say, there will be surviving koalas and the evidence we are getting is they are very dehydrated and they urgently need help.

Mr FLEMING: Yes.

The Hon. CATHERINE CUSACK: So, is that—

Ms STEPHENS: We are in an operational phase but there are things we are doing every day to help rehabilitators to help the koalas. We are facilitating access of volunteer rescuers into active firegrounds wherever we can, taking into account safety. We are assisting with the search for injured wildlife with both dedicated searchers and also as part of our fire operations. We are facilitating access for innovative search techniques such as using sniffer dogs which have been used in other places to be able to locate fauna in these situations. We are ensuring that there is advice in the incident action plans that go out every day with firefighters.

All the firefighters get an incident action plan and in that plan we have now documented about what they should do if they find injured wildlife, what action they should take. And we have also begun some targeted searches on areas mapped as refuge areas. These are minor things but these are real things we are doing.

The Hon. CATHERINE CUSACK: Where have you done this?

Ms STEPHENS: They are talking here about the use of the sniffer dogs on the Mid North Coast and Richmond River area. It specifically says here that we do not have documented advice on exactly where it is happening but there is no question that this is occurring as national parks staff, as you can imagine, are very focused on anything they can do on a day-to-day basis to help fauna generally and koalas in particular?

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Mr FLEMING: May I provide additional information to your previous question, which is that the $1 million funding that was announced has been available through the foundation via online application forms since 1 December.

The Hon. PENNY SHARPE: Last year?

Mr FLEMING: No, this year.

Ms STEPHENS: For the duration of one year. The intent is to spend the $1 million.

The Hon. MARK BUTTIGIEG: You do not have any figures on how much of that has been dispensed?

The CHAIR: It has only been nine days.

Mr FLEMING: Not since 1 December, no. That is being managed by the foundation.

The Hon. PENNY SHARPE: I wanted to ask about some evidence from Mr Graham this morning. I am not asking for specifics. In the national parks if you want to do hazard reduction burns there is a process you go through and you need to get sign-off from the RFS, is that correct? Can someone take me through the lines of decision-making?

Ms STEPHENS: It depends on whether you are talking about hazard reduction burning or back-burning, which are different.

The Hon. PENNY SHARPE: Yes, they are. I have an interest in both.

Ms STEPHENS: Hazard reduction burning is undertaken by national parks and we use a centralised statewide system. We undertake all our own planning. We do an environmental impact assessment online and then we have an approval within our own hierarchy for that hazard reduction burning as well as sign-off by the incident controller, who is the person who will control the burn on the day. Often the burns are undertaken with both RFS volunteers and national park staff and sometimes RFS may even do a burn on national parks which does not involve national parks staff, particularly in an urban area around Sydney. On occasion we would have the RFS undertake a hazard reduction burn; obviously with our agreement.

The Hon. PENNY SHARPE: The decision in that scenario is entirely one for national parks, is that right?

Ms STEPHENS: It is. The incident controller also has responsibility for the burn on the day but with the planning in the main it would be national parks. Back-burning is an operational tactic that we use to combat the fire during a wildfire. Once again the incident controller in the incident management team signs off on the incident action plan where the strategies and the actual tactical activities for the day are outlined. They have the overarching responsibility for everything that happens on the fireground.

The Hon. PENNY SHARPE: An agency that is wanting to back-burn on their land will seek permission?

Ms STEPHENS: We work together in such a way that we are almost tenure blind. What you will find on a bigger burn is that they will put the national parks staff on the national parks sectors because often the fire trails are suitable for our smaller cat 9 firefighting appliances. You will find the Rural Fire Service volunteers will be maybe in the urban interface and in some instances we will have Fire and Rescue NSW in the bigger vehicles on a more urban area. The whole thing is overseen by one incident management team with one incident action plan and we might be the planning officer and the RFS might be the operations officer and somebody else is the logistics officer. We all work together, one plan, one sign-off by the incident controller for the plan for the day.

The Hon. PENNY SHARPE: What if there is disagreement, who is the final arbiter?

Ms STEPHENS: There will often be some lively debate in the incident management team around proposed strategies and often Rural Fire Service volunteers will be consulted around what has happened in the past with fires like this. There are often situations where a similar fire has occurred before and people know a lot about it. Parks people will always be consulted around what are the values in the park.

The Hon. PENNY SHARPE: I am trying to get at the end of the day who has final sign-off on it if there is disagreement?

Ms STEPHENS: It is the RFS. The incident controller will almost always be the RFS and the commissioner. The commissioner has control of the fire and all the resources are working for the commissioner.

The Hon. PENNY SHARPE: We had some very interesting evidence this morning from the Firesticks Alliance and the use of Aboriginal knowledge when it comes to managing landscapes. They emphasised that it

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was about managing landscapes, not individual fires. Can you tell us the work, if any, that National Parks and Wildlife Service is doing with Indigenous fire specialists?

Ms STEPHENS: I would like to acknowledge the contribution that indigenous fire specialists have to make in talking about fire management and about fire in the landscape across New South Wales. For national parks we have a fire management manual and it determines the way we approach everything in relation to fire on New South Wales national parks. A strong underlying principle in that manual is that we consult with Aboriginal communities in undertaking thinking and planning around fire management in our reserves. We have in the last two to three years reviewed that part of the manual and reinforced that message. We always reinforce it to our staff that Aboriginal communities are not just stakeholders they are our partners in managing our reserve system whether it is a co-managed park or not. As well as that we also have policy and procedures in place that provide a practical framework for implementing cultural burns on national park estate.

The Hon. PENNY SHARPE: There is a framework; where is it happening?

Ms STEPHENS: What I would say is that national parks does not develop proposals for cultural burns.

The Hon. PENNY SHARPE: Who does?

Ms STEPHENS: The community do. We have numbers of burns that we are currently working on with communities to bring them to fruition so they can occur. Working with Aboriginal people is complex and it often takes a number of years of us working together with them talking about their ideas and what it is they want to do and then having the appropriate people and the appropriate—I do not say approvals—understanding of the culture and knowledge that goes around the burn. Then we do the planning. We are undertaking cultural burning on park. I would not say we have done any landscape burning but I would say that we are definitely working with Aboriginal people and we have a framework to make it happen which we did not previously.

The Hon. PENNY SHARPE: Are there any resources to assist them in this work?

Ms STEPHENS: It is core work for our rangers in our national parks. The other thing we are doing is we have a bushfire research hub and it has the six pieces of work being done by the research hub and one of them focuses on cultural burning and it is all about collecting data and working with communities to understand and document the value of cultural burning in terms of managing our reserve system and the wider landscape.

The Hon. PENNY SHARPE: Do you think there is a role for wider management and indigenous involvement given the nature of the fires we have seen recently?

Mr FLEMING: I think irrespective of the season—as someone relatively new in this role—yes, I would like to see a greater contribution over time, definitely.

The Hon. PENNY SHARPE: The research is looking into this and looking at the outcomes as a result of cultural burning as opposed to current practices?

Ms STEPHENS: My understanding is that it is looking at the outcomes of cultural burning. Interestingly, I think it is looking very strongly at the social benefits for Aboriginal people of undertaking and being involved in cultural burning. Definitely we are putting together a monitoring, evaluation, reporting and improvement framework. We are putting together a framework that will look at all aspects of cultural burning in order to be able to speak based on evidence about the benefits of cultural burning in all facets.

The Hon. PENNY SHARPE: Just to be clear, there is no actual money that is going to organisations like the Firesticks Alliance to assist in them getting their plans up to work with the framework that you are developing?

Ms STEPHENS: Cultural burning is a cross-tenure activity and I am sure you heard earlier from the people who spoke to about it that the Rural Fire Service, Local Land Services [LLS] and the National Parks and Wildlife Service are all involved in working with Aboriginal people. The research project is about work that is happening on other tenure as well as national parks so I think you would say the State generally is putting resources into promoting but also learning more—

The Hon. PENNY SHARPE: Is it providing resources to Indigenous people is the question that I am asking, not so much what you are doing internally. You are asking a lot of Aboriginal people to be involved in this, and they want to be involved in it, but they are not resourced to do that, so my question is: Is there money going to any of those organisations to assist them to work with you to get this to happen, given you are saying you want it to be done?

CORRECTED

Ms STEPHENS: I can only speak from the National Parks perspective and I would say in our organisation the funding currently is with the organisation to work with the Aboriginal community to plan and then undertake the burns.

The Hon. MARK BUTTIGIEG: Because the evidence we heard this morning was that there is an acceptance at the coalface as to people on the ground appreciating the benefits not just culturally for Indigenous people but the actual benefits of using those practices to stop this sort of thing happening in the future but it is not filtering up to the top levels of decision-making; in other words, there is no integrated macro-approach to this. That is the evidence we heard this morning.

Ms STEPHENS: I am aware that there are rangers who are working with Aboriginal communities—and I know there is a lot of enthusiasm—and there are specific ecological issues that are being looked at around grasslands and various other ecological communities and that work is occurring.

The Hon. BEN FRANKLIN: I ask a couple of follow-up questions on this. Have you worked with the Firesticks Alliance in any capacity?

Ms STEPHENS: We have quite a bit to do with the Firesticks Alliance, yes. We have had numbers of our staff attend their workshops over many years. We have had people travel to northern Queensland to attend the workshops up there and in recent times we have had quite a few of our staff attend the workshops that are now being held in New South Wales and we are very aware of their work. Certainly on an individual basis they are working with some of our officers on the South Coast on some of the proposals that are coming out of Aboriginal communities down there.

The Hon. BEN FRANKLIN: Great. You believe that they are a credible, valuable and worthwhile organisation in this space?

Ms STEPHENS: Yes, I do.

The Hon. BEN FRANKLIN: Fantastic. I hear what you are saying and you are clearly involved and active in this space, which is great. My only concern was that the response that was given to a question before about interacting with Indigenous people was that it takes an enormous amount of time. I understand getting a number of the key players on the same page can be a challenge sometimes but the evidence that we heard, to pick up from Mr Buttigieg's point, from the Firesticks Alliance this morning was that there are things that can be done very quickly and very simply in terms of management that can really protect the landscape and get the lower intensity grasslands and so forth being grown rather than higher-intensity flame-inducing plants and so forth.

I am looking for some sort of comfort that you are doing—and I understand it is whole-of-government and it is obviously the RFS, the LLS and so on—everything you can to work in this space because to me it seems like there are a whole set of resources here and a knowledge base which is really important and I would like some comfort that we are doing everything as a Government that we can to utilise the knowledge and the experience of thousands of years in this space.

Mr FLEMING: Can I just add; I have just received a message saying that I think the Environment Trust has funded the Firesticks Alliance in the past, although I do not have the details but to your broader point, National Parks does around 75 per cent of all prescribed burning in the State so clearly we are a natural partner for organisations like that. Going forward we are going to need to try to develop those partnerships and strengthen them. Some of the questions you are raising are about how, as whole of government, we do that.

The Hon. BEN FRANKLIN: And I understand that.

Mr FLEMING: So I am not, on the spot, able to address that, other than to say we will work within government to try and see that happen. The commitment is certainly there from the organisation.

The CHAIR: One of the examples we heard from Firesticks today in terms of on-the-ground, practical examples that could be of enormous benefit to national parks in New South Wales was the need, because when mega fires go through, they will burn at an intensity, particularly in areas that are not adapted to fire, meaning that other species will then grow that are adapted to fire and it will change the landscape. But we heard evidence that in fact cultural burns, mosaic burns, different low-intensity fires could go through areas that had been burned to get rid of the acacias and other species that come up and species that like low-intensity burns will regenerate, essentially helping to restore the national park that has been lost and try and prevent that ecosystem changing to one that will be more likely to burn and more likely to burn—this vicious cycle if you like?

Mr FLEMING: Yes.

The CHAIR: Will National Parks be doing that anyway?

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The Hon. BEN FRANKLIN: Because their point was that it needs to happen quickly after the burn?

The CHAIR: Exactly.

Mr FLEMING: I think the point is, if I am following you, that fire management from here on in, in the areas that have burnt, is critical. That is absolutely right. That will be part of our strategy for restoration and recovering these areas.

The Hon. CATHERINE CUSACK: But not the use of consultation; he was talking for the next 12 months?

Mr FLEMING: Of course.

The Hon. CATHERINE CUSACK: It is just you have given the impression that we are looking at years of discussion because it was difficult?

Mr FLEMING: Okay. If that is the impression that was given, that is not right.

The CHAIR: I suppose the Committee needs assurances in some ways—and again we want to know whether anything has changed as a result of these mega fires and realising, "Oh, my goodness, a lot of core koala habitat has been lost. These fires are going into areas that they shouldn't have gone in. The whole face and make-up of existing national parks may change unless we have a very proactive strategy this summer to address that."

Mr FLEMING: Yes.

The CHAIR: Including low-intensity burns through national parks that have had high-intensity fires?

Mr FLEMING: Yes. So I just have to come back to the fact that our resources are overwhelmingly dedicated to fighting the fires right now. That is not to say we are not absolutely aware of the need for a strategy that is all about recovery and restoration of these areas and that part of that is by fire management strategies into the future and how we deliver them, including through cultural burning. We are overwhelmingly focused right now on fighting the fires but the assurance you are seeking, I think, is one that we can give. I am not sure if there is something I am not saying that you want me to say.

Ms STEPHENS: I could add something there. I would say that low-intensity burning is a strategy that National Parks already uses.

The CHAIR: Following fire, yes?

Ms STEPHENS: With cultural knowledge and it is something that we would want to be talking to the Aboriginal communities about as part of our recovery program. It is certainly something that is not hard for us to do once a decision is made that that is a priority in terms of the ecological or the cultural health of the landscape, so I think that probably addresses your concerns about time frame.

The CHAIR: Ms Sharpe.

The Hon. PENNY SHARPE: I will be brief. The question really goes to the role of National Parks now within the larger cluster given the disaster that has occurred as a result of the koala. I think there have been some media reports this morning suggesting we have lost over 2,000 koalas. There are arguments around the population, but around 20,000 seems to be the number that we think we could only have in New South Wales. What is going to change as a result of these fires in relation to the role of National Parks within the entire cluster to work across the various land teams, whether it is Forestry, whether it is yourselves, and the work that is happening in private native forestry to actually say, "Hey, we have just had a catastrophic event in relation to saving koalas who are already in a very devastated state and on track to extinction. Do you have a role there? Do you need to have a role there? Who is going to step back once the fires have stopped and say, "Hey, we have just had a catastrophic event. We need to save koalas." Who is responsible for that?

Mr FLEMING: So I think in the end, again, when we get through this intense period of fighting fires, everyone involved—Ministers, the RFS Commissioner—has said that we need to review where we are at and what we need to do differently, what are the lessons.

The Hon. PENNY SHARPE: Yes, but their focus of course is going to be on life and property, as is appropriate.

Mr FLEMING: Sure. What I was going to say is that we will be a critical part of that because we are a critical part of all fire management in the State—as I said, 75 per cent of all prescribed burning. We will be a critical part of that. You should expect us to take a leadership role in that review and in ensuring that there is a focus on conservation as part of that.

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The Hon. CATHERINE CUSACK: I will talk about the Biodiversity Conservation Trust [BCT]. I thought the old conservation trust was working really well. It was turning over land and making money, and it was all able to be self-sustaining and reinvesting. In terms of the performance of the new one, the Government refers to 250 hectares of koala habitat being conserved through private conservation agreements. It just does not seem like very much. Secondly, the 81 hectares that are covered in the Lismore-Ballina area have cost $1.6 million, which may account to be nearly $20,000 per hectare. This private land conservation of habitat is critical. I am trying to understand how the performance of this fund is being monitored. We have had suggestions from community that habitat being purchased, particularly in the Macarthur area, is not necessarily, in their opinion, good habitat.

Mr FLEMING: I am not sure, wearing a National Parks and Wildlife Service hat, I can respond to that. I am not sure if you have BCT representatives as witnesses to whom you could direct that. Otherwise, we can take that on notice for you.

Ms DUMAZEL: We will take that on notice.

The Hon. CATHERINE CUSACK: My understanding was that it was part of the koala management plan and that you were oversighting that. Maybe take it on notice but what are the accountability measures for the performance of that trust?

Ms DUMAZEL: The Biodiversity Conservation Trust had made some purchases relating to core koala habitat. In terms of their performance, we will take that on notice for those particular ones but it is a critical part in terms of they are the first few purchasers with core koala habitat but with the $350 million over the five-year period, we would expect further koala habitat to be protected through that process.

The Hon. CATHERINE CUSACK: In terms of the other key strategy, which is koala management plans at local government level, the councils we have spoken to—first of all, it sounds like there are hardly any that have been approved. We just could not quite get a specific number but anecdotally, it sounds like a small number. I think in Wollondilly—was it?—they were unable to get theirs approved at all. Tweed, I think, said they tried for 10 years before they could get theirs approved. Given it is listed as one of the critical strategies, what is going wrong with these plans? Why is it so difficult and expensive for councils to get the Government to sign off on them?

The Hon. BEN FRANKLIN: Campbelltown, too.

The CHAIR: Yes, Campbelltown, too.

Ms DUMAZEL: Yes. There are six plans of management in place and there are a further eight that are in the pipelines. The planning Minister has undertaken further review of SEPP 44 in terms of koalas. We have been supporting our Planning colleagues in that process.

The Hon. CATHERINE CUSACK: Is it the planning Minister who needs to prove them?

Ms DUMAZEL: What happens is that you have the SEPP 44—

The Hon. CATHERINE CUSACK: Review.

Ms DUMAZEL: —which is under the planning system and then what happens is, what we have been doing from an Environment, Energy and Science base is that we provided—we have got our Koala Habitat Information Base, which is informing the SEPP review. What will happen is that that will be the process depending on the changes that might occur with that, which will support councils to complete their plans of management.

The Hon. CATHERINE CUSACK: Am I understanding this correctly that the eight plans that you have got at the moment are just on ice at the moment until this SEPP review is being done?

Ms DUMAZEL: The changes through the SEPP will support councils in terms of having those plans of management finalised but the detail of that is a responsibility for my Planning colleagues.

The Hon. CATHERINE CUSACK: When you say that it supports councils, the only support councils want is for the Government to approve their plans, or if they are not being approved, just tell them what they need to do to approve the plans. They have gone through all of the processes and it is really important so that they can at their council level tell developers what is in the koala management plan and "please, comply with that", because the plans do not have any effect because the Government is not approving them. This is a very frustrating issue for these local communities. I read the strategy and I see this as just a really fantastic initiative that the Government is hanging its hat on, but it has all its plans on ice and it is not being approved.

Ms DUMAZEL: We have been supporting our Planning colleagues in the finalisation of that review. One of the key things that will help the councils is in relation to our Koala Habitat Information Base that supports

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the finalisation of those plans of management. That is due for finalisation and we are supporting that because that is one of the key features that we had identified.

The Hon. CATHERINE CUSACK: When will it be finalised?

Ms DUMAZEL: That is a matter for the planning Minister.

The Hon. CATHERINE CUSACK: Wollondilly have had their plan with you for, I think, seven years or eight years. It was well before this review of the SEPP anyway. What is wrong with their plan? That is a growth area. That is so critical that that plan be determined.

Ms DUMAZEL: I would have to take the details of that particular issue on notice.

The Hon. SHAYNE MALLARD: I also acknowledge the role of the national parks and wildlife fire service. I have had the privilege of being with them and training during the State election and announcing new equipment and a new helicopter, which was very fortuitous. I met the guys. They were predominantly men who rappel down into a lightning strike and take on those fires in national parks. I really take my hat off to them. I know you are working hard at the moment. I am sure the whole Committee agrees with that. That brings me to the segue to the issue of management of fires in the national parks system.

In regard to prescribed burns or hazard reduction fires, the current Minister and I did see one that had occurred in the Grose Valley, which proved quite helpful now in terms of the fire problems we have got over that side. Is koala habitat and known koala colonies—we heard about the Wollemi area having koalas in it today. Is that ranked a priority in terms of where you went to do a prescribed fire in the national parks?

Mr FLEMING: Conservation values are factored into the planning for prescribed burns. Ms Stephens can give you the detail about the framework.

The Hon. SHAYNE MALLARD: That is in the mapping of where this fire is likely to go and what you are trying to achieve in terms of a blockage for a future fire.

Mr FLEMING: I might ask Ms Stephens to give you the detail but there is also quite a bit of research going into how we are better able to do that, in particular with koalas.

Ms STEPHENS: In areas where there is a small reserve where we know there is koala habitat or koala population, we will undertake strategic fire advantage zone implementation around that area as a break to stop fires coming into the colony. You might see that somewhere like Port Stephens in areas where there are large reserves. We tend to undertake our burning on a mosaic pattern.

The principles of the mosaic pattern are actually quite similar to cultural burning in that it helps stop the run of the fire, but it also provides area at different growth stages and ecological stages that enables refugia for the animals to move out of the path of the burn into the unburnt areas and then for different parts of the park to be at different stages and be providing appropriate habitat for different species, including koalas, along the way. That is certainly the underlying principles of the work that we do.

The Hon. SHAYNE MALLARD: Like many members of Parliament, I am quite involved with the RFS. I am in the Community Fire Units myself. The RFS are a little bit critical of the management—no news to you guys—of National Parks of the fires and have a different approach in terms of hazard reduction. The Wollemi fire was going for some period of time before this fire crisis occurred and sort of broke out of there. Was it the intention to allow that to naturally burn through areas of national park as a healthy approach, as a cold fire in there? You can dispute those facts; I am just putting to you what I have been told.

Mr FLEMING: I have to say that the time I have spent with RFS, they have actually been very supportive of—

The Hon. SHAYNE MALLARD: I am just talking about guys on the ground.

Mr FLEMING: Sure. I would say that at an organisational level, they are very supportive. Certainly Shane Fitzsimmons, when I have spoken to him, has praised the efforts of National Parks. Ms Stephens might add some detail if she knows it, but I think at Wollemi part of the problem or issue, if you like, was that there were prescribed burns and there were actually previous wildfire scars that that fire has burned through. Getting back to my comment about the unprecedented nature of the season, in other seasons we may have expected that fire to pull up or be able to be contained on those prescribed burns or previous wildfire scars. But that has not been the case this year.

The Hon. SHAYNE MALLARD: As we got that catastrophic fire day, it moved out of there—or even the week before that.

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Mr FLEMING: Yes, I mean, just generally the fact that things are so dry. It is, what, the worst drought in a century so things are so dry. You combine that with long periods of hot weather and bad winds, plus the occasional catastrophic fire day, and we are seeing behaviour that is different to what we have seen in previous years. Your comments in your introduction about the Remote Area Firefighting Team, I think we call them—the guys who are dropped in by helicopter to look at remote fires. For every example that we are looking at now—and we are talking about the Woolamai fire that is obviously very large. There was another day where there were a lot of lightning strikes, you might remember, and those teams went in and put out a large number of fires that could have been very threatening. So there is a lot this year that is working very well, but the conditions are unprecedented.

The Hon. SHAYNE MALLARD: I acknowledge that there was a team that died that was dropped into a fire a few years ago, because I unveiled the memorial. I expect this question is for you, Ms Dumazel: We just heard about national parks and dealing with hazard reduction in regards to taking into account koala populations. Outside of national parks, the RFS is doing a hazard reduction in not national park area. Is there an overlay, then, on koala habitat and known koala colonies to make sure that they take that into account? Because they are outside of national parks.

Ms STEPHENS: I will probably take that. National Parks is part of the statewide Bush Fire Coordinating Committee, and the coordinating committee sets policy for all fire management across the entire State. There are policies under the committee around protection of ecological values. In fact, we are working at the moment with the Rural Fire Service on a revamp of its risk management systems for bushfire in New South Wales, and Parks specifically is working on developing the ecological and Aboriginal cultural database. So there will be a layer—there is now, but it will be even better layer in the future where people will be able to bring up those values in the parks as part of the planning process for hazard reduction. But that definitely occurs now. Those values are recognised as part of the bushfire risk management planning that goes on, which is the process by which hazard reduction burning is planned on a cross-tenure basis local government area wide.

The CHAIR: Mr Fleming, you said that the fires this season are unprecedented and burnt through previous wildfire scars. What is the department doing, then, in terms of climate change and fire and how this will impact on koalas? Also a question in terms of the koala strategy, Ms Dumazel, in terms of how it addresses the challenge of climate change for koalas. What is it going to mean for koalas in New South Wales if we continue to have these unprecedented fires driven by climate change?

Mr FLEMING: Going back to the initial part of your question, I think climate change is both factored into the fire management strategies and the overarching framework and it is a feature of the science, if you like—the research that National Parks and Environment, Energy and Science more generally is investing in. As I said, I think what will happen is when we get through this immediate period of having to fight the fires and review what the lessons are that we learnt, then that will also be a feature of that lessons learnt, in a sense. I think you put all that together. The fire management strategy that National Parks employs has been factoring climate change in, but it is going to have to continue to do that, clearly.

Ms DUMAZEL: Certainly the research component that we have—the building our knowledge component of the koala strategy—there is a strong focus in terms of climate change and drought: for example, drought conditions for koalas as well as what we can do working with the local communities in terms of drinking stations in certain areas. One of the things that I have done is we have an independent panel of experts for our koala strategy. The strategy is a three-year strategy, but each year that independent panel reviews the work that we have been doing the previous year and give us suggestions for the following year. They normally do that before our annual review in May, and so what I have asked is that we meet in January in terms of just having another look at the actions that we have got in place for the coming year and just seeing whether we need to think a bit further about our research strategies in relation to climate change.

The CHAIR: Just picturing on the ground at the moment in terms of the way that the law operates in terms of protecting natural assets versus protecting life and property. At the moment you are doing mosaic burning—ecological fire management, if you like. You are practising that on the ground, trying to identify core koala habitat and protecting that through hazard reduction burns. But when it gets to a situation where your 400 park staff are on the ground now working to protect life and property and they know that in a national park that they are fighting a fire, there is a last remaining significant koala population—200 koalas in that stand—they have to protect property and life when that is under threat. There is nothing that says that last remaining koala population also has to be protected. Is that right?

Mr FLEMING: Let me make sure I understand the question.

The CHAIR: How does it operate in an emergency when firies from National Parks and Wildlife are on the ground? They have to protect life and property—say property. Say a farm is under threat.

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Mr FLEMING: I would say key points: First of all, the RFS is ultimately in charge of the critical strategic decisions with these fires. That is the first point. They make the critical decision. Within that framework that Ms Stephens spoke about earlier—and I have seen this visiting the incident control teams—there is a lot of interaction. So it is not that people are thinking exclusively about lives and property; they are thinking about natural assets as well. But what you are putting forward is a scenario where you have to choose between saving lives and saving koalas. I mean, if it is as black and white as that, my expectation is that the RFS will say, "We need to save human lives first."

The CHAIR: Is it your expectation, though, in terms of the experience that maybe Ms Stephens as well has had, that that factors in during, say, these megafires right now—that koala habitat is a factor in terms of the firefighting that is happening on the ground now? Hazard reduction is one thing, but right now all you are talking about is "We just have to get through these fires." Fifteen per cent of national parks—

Mr FLEMING: I think it is fair to say—and Ms Stephens can correct me or elaborate—that conservation is a consideration in these incident control teams.

Ms STEPHENS: At the moment they are putting in—or planning to put in—a southern containment line on the southern side of the Gospers Mountain fire in order for it not to cross into the Grose Valley. One of the things that they are considering is the ecological values of the park along that line—where it should go and how they should implement the burn in order to minimise impacts on the ecological values. They can obviously do that because it is a planned situation. We had fires that ran 45 kilometres in an afternoon in north-eastern New South Wales during the early parts of the fire season. Under those situations I think it is fair to say that life and property are probably the only things that anyone is able to consider.

It really does depend on the circumstances. But there is no doubt that within the incident management team, while the Rural Fire Service is the incident controller, any opportunity to look at the values of the park, or any other community values and assets, will be taken into account in the planning.

The CHAIR: Thank you. We are out of time.

Mr FLEMING: I will just add one very quick comment to an earlier question about the future of koalas. I just wanted to add that one of the outcomes of a fire season like this is that the refugial stuff becomes particularly important. A lot of that, whether we are talking about koalas or other species, will take place in national parks. Clearly national parks will play a very critical role in the recovery of biodiversity generally. We are well aware of that and that is a priority in our planning. I just wanted to close with that.

The CHAIR: Thank you for that and thank you all for attending. The Committee has resolved that answers to questions taken on notice should be returned within 21 days. There may be supplementary questions as well. The secretariat will contact you in relation to the questions you have taken on notice. Thank you very much.

(The witnesses withdrew.)

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DAILAN PUGH, President, North East Forest Alliance, before the Committee via teleconference, on former oath

The CHAIR: I welcome our final witness, who is joining us by teleconference from the New South Wales North Coast. Would you like to make a short opening statement?

Mr PUGH: Yes, certainly. I would like to table a document that I finished preparing only this morning called *The effects of bushfires on North Coast Koalas*. I have been looking at the data in as many ways as I can to try to work out what has been going on. I have also spent quite a considerable amount of time in the forest itself. In particular, I have been trying to work out what is happening with the Banyabba population. To summarise my findings from the data, I combined the various fauna models and compared that to the fire history records from the Rural Fire Service website. I identified that about 24 per cent of koala habitat north of the Hunter River in north-east New South Wales—looking at the bioregional level—has been lost. There are about 1.6 million hectares currently been burned, and that is increasing day by day.

That represents about 28 per cent of that north-east bioregion. About 39 per cent of native vegetation in that bioregion has been burned. I have also looked at the situation from the broader level, including the New England and Tablelands area. It worked out that about 1.9 million hectares—if you include those areas—has been burnt. What comes out of that 24 per cent of koala habitat is that the burning is concentrated in a number of populations. There are 29 koala populations identified in the North Coast by the OEH—they are called areas of regional koala significance. They are distinct populations of koalas. There is some integration between them but, generally speaking, they are the distinct management units. Of those 29 populations, eight have had somewhere between 73 per cent and 90 per cent of the modelled koala habitat within them burnt.

That has a very significant impact. Overall, we are talking about an average of 24 per cent, but eight of those 29 populations have had a much more significant impact than that and are facing a very visible impact at this point in time. Mind you, the drought is compounding those impacts as well. The population of koalas on the North Coast, if you go by the 2012 assessment—which is the one that the Chief Scientist relied upon—includes approximately 8,400 koalas. If we lose 24 per cent of that population—or the habitat for them at least—we are talking about a minimum of 2,000 koalas who have lost their habitat and probably their lives. In the areas I have been assessing there is not much habitat left for them to survive in. I have watched them declining. That is hugely significant, particularly when you look at the individual populations that have lost so much in such a short amount of time.

We have had a 50 per cent decline in the past 20 years and here we have lost at least 25 per cent of that remaining 50 per cent. That is a huge impact in such a short amount of time. I have been looking at the Banyabba population, which is south of Casino. Earlier this year in Gibberagee State Forest we identified a logging proposal in what we had proven was a significant koala habitat. The logging went ahead and since then it has been burnt twice. We also identified Braemar State Forest earlier this year and were hoping to protect it. We identified a really important core koala habitat there but it has since been burned. Areas we identified earlier in 2012, which the EPA determined were home to distinct koala populations, were burnt as well.

Across the Banyabba fireground, which is the Busbys Flat and Myall Creek fires, there has been about 59,000 hectares of potential koala habitat forest burnt. That represents about 81 per cent of the potential koala habitat within that Banyabba population, within that area of regional koala significance (ARKS). That is huge. I have watched and testified. I made appeals to you last time I gave evidence and nothing seems to have happened. I have been out there quite a number of times. I have watched the koalas continue to decline, their food trees to decline, to lose their leaves. There is just no recovery of eucalypt feed trees. The koala numbers have gone down. There are still some there. I have been putting out some water to try to maintain them, but in a very small and limited manner.

Forestry has put out some water containers, but they are not maintaining them. They have not been refilled for weeks. I just despair at the neglect. I despair at the neglect, not only of the koalas, but in trying to assess what is happening to them. I do not know. I count the koala scats and I find them for a while and then I stop finding koala scats, so the koalas have left that area. Where have they gone? Have they died? Have they gone somewhere else? I mean, we are talking about a huge fireground. There are not many places for them to go. I despair at the lack of understanding about what is going on with those populations and that no-one is in there trying to care for them months after the fire went through. Anyway, that is my initial presentation. Thank you.

The CHAIR: I have a question in relation to 73 per cent to 90 per cent of the koala habitat that has burned in some places. When you say koala habitat has burned, we just had National Parks and Wildlife Service talking about 15 per cent of koala habitat in national parks by their assessment has been affected. I have a question in relation to the extent of what affected means in terms of how much has burned. With your experience,

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particularly in those northern forests, when you say burned, is that pretty much the potential of that being koala habitat now or in the near future is gone as well? Is that right, or when you say burned what level of intensity is the fire?

Mr PUGH: I do not have a good data handle on that. By the way, my figure from the combined habitat map that I have prepared is that 33 per cent of koala habitat on national park north of the Hunter River in the north-east bio-region has been burnt, so I have a much higher figure than they do. As to what burned means, I have been assessing Banyabba, I have spent a lot of time on the ground there, and I am finding that most of the burn area as shown by RFS has been affected. By affected, I mean that there was not much canopy fire when the fire went through, but it was intense understorey fire and because the trees are mostly regrowth they are not that tall. Therefore they were heavily heat affected by the understorey burning because the understorey was so dry and quite hot, and then most of those trees lost their leaves.

What I am finding over time, though, is even though some trees survive and some small patches within that burnt area survive, the koala populations in those areas are still declining. I am hoping that by putting water out I am alleviating some of that decline, but I am still seeing that decline despite that. When I say burnt, from my limited experience with Banyabba, most of that burnt area has lost its koala carrying capacity. Now months after the fire, there is still no regeneration of the eucalypt site. I had hoped within a couple of weeks we would start getting some buds back and the eucalypts would start recovering and therefore there could be food for the koalas, but that has not happened as yet. Sorry, that is what I mean by burnt. I have not been across all the firegrounds. A lot of them have had canopy fires through them, so a lot of them would be more intensely burnt.

What concerns me is what the recovery of those eucalypts is going to be. Initially with Banyabba I thought there would be 100 per cent recovery, or most of them anyway. I am worried now that the drought is compounding the impacts of the fire. I have seen trees dying from drought elsewhere in the landscape. I am just wondering what the recovery will be like over time.

The CHAIR: Just to follow up from the Ballina hearing, at that time Dr Steve Phillips mentioned that, through experience and scientific knowledge, roughly 30 per cent of koalas after a fire has gone through potentially survive that fire. What is your own experience up there, and talking with carers up there, after that day? Has that changed? Do you think that is less as a result of these fires in terms of the survival rate of koalas in forests?

Mr PUGH: To be honest I do not have the data to make an assessment of the survival of the koalas. I was in there doing surveying of koalas in a number of State forests for the Banyabba population before the fires, so I have done quite a lot of work beforehand to identify numerous, what they call, koala high use areas where we were getting lots of koala scats and lots of use. Most of those areas are now empty or have few koalas in them. As I said, even where some trees have survived koalas still seem to be declining over time. I am assuming it is because there is no new growth for them and the trees that have survived are still water stressed. That is a nutrient problem for the surviving koalas.

In the areas I have assessed, and I can only go by my own experience, I would think the survival within the fireground is a lot less than 30 per cent. I would think the areas that I have assessed would be limited to more like 10 per cent. I am hoping that some of those koalas have found other areas to move to and will come back over time, but I have nothing to substantiate that and I do not think anyone has done any work to try to work that out.

The Hon. MARK PEARSON: Having observed some of the consequences or outcomes of the recent fires, and with your experience of having looked at the consequences of fires in the past, what is coming through to you as being the major difference with these types of fires that we are seeing now? Is there something that you think is significantly different that you have not seen before that we need to take note of?

Mr PUGH: Yes, because we are in an unprecedented drought the leaf litter, the ground and the vegetation is extremely dry. So, whereas in the past you could think that if a fire got to a wet gully line or a patch of rainforest that the fire would basically go out—they were our fire control lines across the landscape, just natural fire control—they are not working anymore. A large stand of rainforest still has reasonable prospects, but I have seen, for example, at Terania Creek where I have been, fires going 100 metres or 200 metres into the rainforest there. If you only have a narrow band of rainforest, the fire will go through it and keep on going over the other side. It will do some damage on the way but maybe leave the canopy intact and slow down and so on, but it is still going through those barriers that we relied upon in the past.

I think because the fuel is so dry in the eucalypt forest it is getting total incineration of all of the understorey, the understorey plants, the leaf litter, the whole lot is just all burning to ash. You are not getting patches surviving where the fire is going through. I think probably the most alarming thing is the way the fire is moving across the landscape. We had the Busbys Flat fire to start with go through and burn out this koala area

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and then it was virtually out. Then at one edge of that the Myall Creek fire started up. You are getting most of the landscape in these areas—over hundreds of thousands of hectares—being burnt and you have the same issue up at Carrai, up around Washpool, Yuraygir.

We have these megafires that are covering huge areas and they are just moving across the whole landscape. Probably the biggest difference is that we are not getting as much of the landscape left unburnt and we are not getting those fauna refuges that the fauna really rely upon to maintain themselves in such adverse conditions. When I have gone back out to the firegrounds there is not much wildlife there now. Initially after a fire I would notice there was quite a few koalas in some areas—they have declined. There were grey kangaroos—they have all virtually declined. And I am hardly seeing any smaller animals like reptiles and so on. It really is a comprehensive degradation of the environment.

The Hon. MARK PEARSON: Mr Pugh, we heard evidence from two Indigenous organisations who basically said, "Well, look, this isn't such a big surprise to us. We've been managing this over time and we believe that if we had been included in the management programs to use traditional methods of managing the land when facing these various factors, including climate change, that the ferocity of these fires could have been very much abated if the Indigenous practices were allowed to be in place for some time and adopted by, say, National Parks and Wildlife Service and maybe the Rural Fire Service and so on." What do you say to that?

Mr PUGH: I do not think the evidence supports that in forest environments—and I emphasise the forests here—that they were regularly burnt by Aboriginal people. I have been going through the charcoal record and, for example, at Terania Creek the assessment there shows the fire frequency in blackbutt forest was about 280 years. I think in brush box it was up to 320, roughly speaking. It is that sort of time frame that the assessment done by forestry back in, I think, 1980 showed. And for fire in the rainforest it was 1,100 years ago. And there have been other studies done throughout the North Coast which I have been compiling—charcoal studies.

They all basically show the same thing: that fire was not frequently used in forests. When you burn too frequently in forests you lose a lot of your obligate seeding plants that require seeding to reproduce. A lot of them will take five, eight, 10 or 15 years before they mature enough to develop new seed. If you burn before they have had a chance to mature and seed then you wipe out the current stock. You will get seedling regrowth. But if you burn again then you can lose those species from the landscape. I think the fact they are still there shows that the forests were not burnt so regularly as what some people talk about.

The other issue is that if you do a fuel reduction burn it only has effect for somewhere between two, four or maybe up to six years in terms of reducing the fuel loads. But then in extreme weather, like we have had now, even those areas will still burn. I have been out to Terania Creek and areas the fire went through underneath the rainforest. They killed a lot of the leaves, they dropped to the ground and then some big burning trees fell over and two weeks later the rainforest burnt again. It is an extreme example but I have also been through, as part of my assessment of the current fires, a lot of those areas that were burnt. Roughly speaking, off the top of my head, about 150,000 hectares of what has been burnt when I did an assessment a couple of weeks ago had been burnt within the last three years either in wildfires or in controlled burns.

Again, off the top of head it is around 70,000-odd hectares that have been burnt in the last 12 months. So I think this needs rigorous evaluation. There is lots of scientific evidence about the pros and cons of controlled burning or prescribed burning. I think that needs to be considered. I would hope that that will be part of what will come out of the process of some investigation into these fires, to really try to tease out this issue a bit further. As I said, there is a lot of scientific information available on it already, but I would like to see that critically considered and evaluated before we go down this path of trying to stop burning by burning more frequently, because I think that has significant environmental implications and is of limited value.

As some experts have said, it really needs to be strategic and around our assets. We need to work out what we want to protect and that is where we allow or encourage this sort of frequent burning regime. But out in the bush I think it is a different matter altogether and we need to make sure that we are maintaining the environmental values and not degrading those through some misplaced idealism.

The Hon. MARK BUTTIGIEG: Just to follow up on that, is it possible that the lack of evidence over a broad area is due to obviously the population densities of those Indigenous communities was a lot lower than we have today? In other words, is it possible that they experienced a degree of success in proportion to the isolated pockets where that burning would have occurred and therefore there may be some value in extrapolating that practice over a larger area, if it is done properly?

Mr PUGH: I have come across some evidence that in the areas that they preferentially used—that is the more open grassy areas and around wetlands, and certainly in arid areas there is evidence of frequent burning. In forest areas there is not such evidence. As I say, some of the evidence is of quite long fire regime times between

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fire. We are dealing with a totally different scenario at this point in time. We are dealing with different priorities. Our priorities are obviously to protect permanent assets rather than to move around the landscape. We have a need to protect assets. We are putting assets into forest areas where probably they did not exist before that we need to protect. So our priorities are different to what Aboriginal priorities were. We need to consider that difference and then we also need to consider the fact that the climate is changing, we are having unprecedented droughts and we have a lot more ignition points of fires these days—a lot more people willing to go and light one up for their own thrill. I know there are some legitimate reasons for doing it for some people, but we do have these people in the community who are setting fires just for the fun of it or for the thrill of it. So maybe they did not exist previously.

So it is going from using this kind of management with a low density population in the past where they were doing it strategically for their own purposes, which were probably food—and you would not burn too much for that—increasing grain, for helping in hunting. They all require smaller scale burning. There were occasionally huge fires across the landscapes but they had been occurring before the Aborigines arrived here as well. Lightning is an initiator of fires, as we know. The evidence from all the charcoal studies I have done so far is that climate is the main driver of fire regimes in Australia and has been for hundreds of thousands of years. And Aborigines obviously had some effect on that and had some effect for their purposes on those fire regimes, but that does not apply to our current day and age.

The Hon. MARK BUTTIGIEG: Thank you. That was a very thorough answer to the question I asked, and specific too, so thank you for that. Is there a known causal or scientific link between what seems to be increased intensity and incidence of large scale bushfires and climate change?

Mr PUGH: I think there is. People argue all the time about what are the drivers of this and does climate change play a part, and I think of course it does. We know that temperatures have risen by roughly a degree over the last 100 years, so we know that temperatures are going up. We know that rainfall is becoming more erratic, particularly in southern areas but even up here in northern New South Wales as well. So rainfall is becoming more erratic. We are getting increased dry periods and all the modelling predictions are that we are going to get increased severe fire weather across Australia, particularly in southern Australia, but to a extent as well in eastern Australia. I do not think there is any doubt that climate change is playing a significant part in the increase in severe fire weather.

I do not see any doubt at all—heatwaves, huge rainfall deficits—I do not think the jury is out on that one any more, I think it is well and truly proven. What concerns me is what does the future hold? Is it going to get worse than what the models show? That seems to be the trajectory so far. A lot of our predictions are too conservative and things are worse than what we predicted. I am really worried about that and what the future is for our forests and fires.

The CHAIR: In relation to that, we have heard from a number of witnesses today basically that the RFS essentially has to protect life and property. At the moment that is how things stand. When it comes down to fighting fires on the ground at emergency levels, protecting natural assets and key high conservation value assets do not get prioritised as much as life and property. Going forward, what is your view on this and whether there should be a reassessment of the way in which fire is managed as a result of those catastrophic fires and what they are doing to koala populations?

Mr PUGH: I think if you want to give our wildlife a future it is essential that there is a re-evaluation. I think our current policies, in effect, do nothing. The Port Macquarie Koala Hospital has done a great job for that relatively small area around Lake Innes where they have been going in and rescuing some koalas. I am sure Ms Flanagan gave you some numbers. The odd koala out of population of over 300. That is great but that is one small part of the area burnt this year. In the Braemar area there is 6,000 to 9,000 hectares. No-one, as far as I am aware has been in there looking to find koalas. We are talking about months after the event. I appreciate that Government agencies are stretched beyond their limits at the moment.

They are having trouble coping with the ongoing fires. There is no rest for them at all. They go from one fire to another, from one emergency to another and we have our National Parks and Wildlife Service basically tasked with protecting property rather than the environment. I think we need to change that to an extent. I fully appreciate the emphasis on saving people's homes and I applaud it but we need some people tasked with protecting our environment and working out better ways of doing it. I despair that nothing has been done for Braemar koalas in all this time since the fires. I think there is stuff we could do like putting out water more uniformly and more extensively than I have may help. I do not really know. We need to suck it and see whether it helps to mitigate the impact or not. There is much that needs to be done. Part of it is that people are not allowed on the fireground.

I think the Braemar fireground is still closed to the general public, including myself. I cannot take other people in there. I go in by myself now. For a while I had people in to help me but I realised I could not go on doing that. I am just doing what I can without encouraging other people to, in effect, break the law. I know if I ask

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I will not be allowed in there. I would rather the government did it. I would rather there was an urgent response where some people would go in and assess the situation and have a strategy for how to mitigate the impacts. It may require some extra resources be given back to the National Parks and Wildlife Service, they have been cut so badly. Maybe they need to have extra resources. They need to have some people tasked with trying to mitigate the environmental impact. We do need ongoing assessment and research to work out how best to do that and I do not see that happening either.

The CHAIR: One last question from me. This morning we heard from Mr Mark Graham, an ecologist, who was talking about some of the actions on the ground around the Dorrigo plateau in relation to Forestry Corporation workers who were saying that the only thing of value to protect in a particular area was pine plantations and that there was a huge back-burning effort, I do not know the number of kilometres, that essentially wiped out a vast area of forest, rainforest, old growth forest, world heritage area and the Nymboida valley. I want to ask whether you have heard anything like that on the ground in your part of the world or whether there are any concerns in relation to any of the back-burning that is going on there?

Mr PUGH: I have some concerns. I am concerned that forestry extended some of the fires. I do not know whether that is true. All I can say is that the two dead koalas I found after the fires were adjacent to a pine plantation. As to why they would be affected I do not know. Most of the pine plantations ended up being burnt anyway. If it was back-burning it did not help. I would hope, maybe it is a forlorn hope, that would not be one of the things said. I think there needs to be a full evaluation of these fires and what works and does not work. Back- burning has its part in dealing with fires. It is the only thing to stop some of these fires or slow them down at least, but a lot of times it fails and in some cases it does more damage than good.

There needs to be a good strategic evaluation of how best to use back-burning in the landscape and to evaluate the positives and negatives of back-burning this time around. I think that is essential. We need an evidence based approach to these fires rather than an ad hoc approach.

The CHAIR: In relation to that, have you seen evidence to the contrary in your area in relation to these particular fires of containment lines being built around natural assets by RFS or national parks or other volunteers to stop them being burnt?

Mr PUGH: I am aware of instances where park service people have put in fire control lines specifically to protect valuable natural areas. I do not know how much that occurs. I know there is some effort towards that. That is what I would expect of the park service. There was a lot of concern about irreplaceable assets like species that are in known localities and so on. I am assuming they put extra effort into trying to secure them. I am sure there is some effort that goes on that front. Again, that is something you would need to evaluate with a proper review. I would be concerned, if the RFS are calling all the shots as it were, then maybe that would be the lesser priority and I am sure that when properties are threatened it would be a lot less a priority. Again, we need some evaluation and future strategy to deal with those issues.

The CHAIR: Judging from your evidence, core koala habitat does not seem to be one of those high conservation value areas that do have containment lines built around them.

Mr PUGH: Certainly nothing like that happened that I am aware of. Even populations like in Royal Camp and Carwong, which were known to be really important, I do not know the decisions that went on there but I do know that those forests were not spared and I doubt there were efforts—I think around Carwong, for example, there are a lot of pine plantations. I am sure they exacerbated the problems for the Carwong koalas rather than helped mitigate them.

The CHAIR: Thank you very much. I am looking around to Committee members now. Everybody has very glum expressions on their faces after hearing the evidence we have heard all day.

Mr PUGH: I am sorry.

The Hon. MARK PEARSON: It is not just your fault; it is no-one's fault.

The CHAIR: Thank you very much for your evidence today via teleconference. I do not believe you took any questions on notice. Thanks for all the work you continue to do.

Mr PUGH: Thank you and thank you for giving me a fair hearing.

The CHAIR: Thank you.

The Hon. MARK PEARSON: Thank you very much.

(The witness withdrew.)

The Committee adjourned at 15:25.