Independent Forestry Panel

TRANSCRIPT OF PROCEEDINGS

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LOCATION:	VIA VIDEOCONFERENCE
DATE:	THURSDAY, 24 OCTOBER 2024

<THE MEETING COMMENCED

PROF MARY O'KANE: Hi David. It's Mary O'Kane here. I'm the one online and thank you again for doing this. You helped me a fair bit at the time of the bushfire inquiry was the last time we spoke, I think.

PROF DAVID LINDENMAYER: Yes.

PROF O'KANE: And Mick Veitch is on the committee with me, a former parliamentarian who knows a lot about this space, having done many parliamentary inquiries. Peter Duncan's an apology. He got called to the airport urgently, so that's probably one of his many federal government committees. And so he'll try and join us in this and as you know, this is being recorded.

We try and be very transparent in this and this inquiry, we're really a post box. It's about reflecting what the various submissions, what people are saying about this issue is what we're doing as opposed to doing an advice to government on what it should do. So we're sort of summarising the positions. Anyway, over to you to what you'd like to tell us. Mick, unless you had anything you wanted to add?

MR MICK VEITCH: All good, Mary. Probably other than to say, David, we did cross paths when I was on the forestry inquiry with the New South Wales parliament and we met at a hearing.

PROF LINDENMAYER: Yes, yes.

MS CLARE MILLER: And sorry, Mary, I'll just introduce the secretariat who are supporting the panel. So Clare Miller and Oliver Cope.

PROF O'KANE: Thanks, Clare. So over to you, David. Yes.

PROF LINDENMAYER: Well, as I said in my submission, there's been one inquiry into this industry every year since the Second World War and I suppose my take on this is that it doesn't matter what inquiry you have, where, from what angle, the industry doesn't work anymore. It just doesn't work. It's not sustainable and it really isn't sustainable and I'm looking at a dataset at the moment which shows the level of bastardry that's now going on in the industry. For example, in New South Wales, there's been quite a concentration of logging efforts in the proposed Great Koala National Park. We can see it.

PROF O'KANE: This is recent, is it?

PROF LINDENMAYER: This is recent. This is happening today and it's been happening since Labor was elected, basically that's led to the industry focusing its logging efforts in places that are proposed for conservation. This is not unusual. The industry has done this repeatedly since – my recollections of this date back to the late 1980s, it happened in northeastern Victoria, it happened in central Victoria, it happened in parts of southeast New South Wales. It's a pretty tried kind of tactic

where you degrade an area pretty heavily through intensive logging and say, "Oh, look, it's so disturbed you shouldn't put it in a national park."

So yes, that's exactly what's happening at the moment and frankly I think it's pretty ordinary when you've got areas identified as high conservation value areas that are degraded [redacted] in this way and I'm hoping that there will be something that will be published pretty soon to expose that. Frankly, the ability of New South Wales Forest Corporation to continue to generate breaches of practices, my consultation with a criminal lawyer indicates that maybe Forestry New South Wales should [redacted] for the number of breaches of prescriptions that they have promulgated over time. And I don't say those things lightly. That's words coming from a leading criminal lawyer in New South Wales.

So if we look at the basic science of this is that the industry has completely over cut the resource for many, many decades. There have been policies of deliberate liquidation of old growth forest dating back to the 1920s. There have been policies since the 1960s in the Eden woodchip concession area which stretches a long way north from where the woodchip mill is, that converts – it was designed to convert old forest with twisted trees into straight growing sawlog trees but the reality is that the mill has taken on as much timber as you can throw it and more if you could and that's really led to the collapse of the sawmill industry.

So there's only a handful of sawmills between Sydney and Eden and most of those are pretty small concerns. And you can see it in the finances. New South Wales Forest Corp is a loss making entity in the hardwood division. It's propped up by the softwood division. John Barilaro at one stage and Dominic Perrottet actually wanted to sell the hardwood division because it was so uneconomic. But the costs are kind of sheltered and hidden because of the way that the finance structure works within New South Wales Forest Corporation. The true money is in the plantation sector, it's not in native forests and it's been that way for a very, very, very long time.

But there are other issues that really drive at the heart of sustainability. We now know that when a forest is logged, it becomes more flammable for prolonged periods of time. Work at the University of Wollongong shows that that period of time can be up to 70 years after logging. We see extensive areas of high severity fire across the logged forest estate and that's what we call disturbance stimulated flammability.

PROF O'KANE: And is that on all forms of forestry?

PROF LINDENMAYER: Yes, thinning and – logging and thinning.

PROF O'KANE: And it's about the same levels or is it worse in one than the other?

PROF LINDENMAYER: It's worse in conventional logging but the signal is also there in thinning.

PROF O'KANE: Right.

PROF LINDENMAYER: So there's a case that's put by extreme pro industry activists who say that we need to thin the forests to make them more resilient and less flammable. There's actually no data to suggest that that's right. In fact, there's data to show the opposite, that thinned forests – thinning either has limited effect or in some cases it makes it more flammable and that includes not only wet forests but it also includes dry forest types. We've actually looked at this after the 2009 fires in Victoria and the 2019-20 fires across the fire footprint.

PROF O'KANE: Yes, I think I remember talking to you about it.

PROF LINDENMAYER: Yes. So that work is published. That was published in 2002. The work on thinning was published in 2021 and 2020. And it's interesting that in the forestry literature itself, there's a strong signal and indication that thinned forests are actually flammable and they warn against the issue of playing with fire in recently thinned forests because of its extra flammability. So for some old world foresters, that kind of issue is conveniently forgotten.

Now, the other very sinister thing that's happening, very cynical thing is that there are now entities that have been developed around helping Aboriginal people to log their forests to help them quote unquote "heal country." [redacted]

Now, there's no evidence to show that that will make forests less flammable, it'll help any recovery processes. It's just conventional western industrial logging. It's even given a nice new name. It's not logging anymore, it's called forest gardening. Seriously. Which is actually a colonial term that comes from England but it's been adopted by people in this space. So yes, I find that incredibly cynical and there are now First Nations people in Tasmania and Victoria starting to push back, saying this is not something that they want to see done to country because it's so harmful.

Part of the background for wanting to do so called forest gardening is the myths that have been created by populist literature [redacted], that forests were open and parklike at the time of British invasion. [redacted] they're claiming that there are more trees in Australia now than there were at the time of British invasion. Somehow they forgot about the 15 billion trees taken out of the Murray-Darling Basin. That's from Walker et al 1993. Somehow they've forgotten about the big scrub on the north coast of New South Wales that's 99% cleared. They've somehow forgotten about the 14 million hectares of brigalow and other kinds of vegetation that have lost most of their vegetation cover.

So let's rest their case there but looking at the documented evidence, there is no evidence that tall wet forests and foothill forests were actually open and parklike. There's no evidence that many of these areas were subject to regular widespread burning. So I think it's really important that we look at the evidence about the

potential mistreatment of forests through these populist approaches which are actually wrong in many cases because they lack the nuance of how country was managed.

So I've sought a lot of counsel with my First Nations mentors in parts of southeastern Australia including here at ANU and there is not a lot of evidence for widespread burning across vast areas [redacted]. In fact, the opposite will often be the case. Burning was often very localised for particular reasons and most extensive areas of forest were not subject to frequent cultural burning in forests.

PROF O'KANE: What about bushfires, David? What were the frequencies at that point? I mean, I should know but I forget.

PROF LINDENMAYER: I think it's very variable depending on what kind of forest type you're in. So yes, there's no doubt that inland temperate woodlands had areas of reasonably frequent fire, although quite localised and the maintenance of areas of inland grasslands were definitely fire dependent. But for many of the taller wetter forest types including Gondwana rainforests, the frequency of fire is somewhere between 75 and 150 years and maybe even longer in other cases.

And what we do know is that some of those wetter forest types, the older the forest gets, the less flammable it is. Whereas recently burnt or logged areas have a pulse of flammability once they first start to recover from disturbance. And that tells you that those forests were actually unlikely to be regularly burnt given their natural ecologies.

PROF O'KANE: So what's the length of the pulse in time?

PROF LINDENMAYER: Well, length of the pulse that we've documented in Victorian wet forests is about 40 years. A paper by Wilson from University of Wollongong is in the realm of about 70 years.

PROF O'KANE: Right.

PROF LINDENMAYER: And so what's happened with the widespread loss of old growth forest where fire severity tends to be lowest is that we're starting to see more frequent high severity fire that's obviously also pushed by changes in climate with the increase in forest fire danger index days.

So you've got a wicked sort of confluence of additional fire flammability through logging and thinning and in some cases even prescribed burning and that's intersecting with increases in temperature and reductions in rainfall. And so these are one of the reasons why we're seeing massive megafire events like we had in 2019-20. And the background for this is now this is not only an Australian problem, there looks to be a pretty strong forestry footprint in Canada, in Alberta and Ontario, Quebec, southern South America, particularly in the Lenga forest in Patagonia and elsewhere.

So it's not just southern Australia including southwest WA but it's elsewhere as well. Now, I know that foresters hate this work but the data is pretty strong across quite a

number of forest types and in New South Wales the effect of logging on fire severity increases the further north you go. So what we see is that logged forests always burn at higher severity than intact forests and in some cases the effect is so substantial that a logged forest burning under moderate fire weather still burns at higher severity than an intact forest burning under extreme conditions. So the probability difference is really quite marked, particularly as you get into northern New South Wales.

So the reality is that this intensive logging that's taking place in The Great Koala National Park, proposed national park, is going to make that area flammable for the rest of this century as a consequence of that work, those operations. So I think it's really important from a scientific and economic perspective that the exit from the industry is rapid. So I work with Bruce Chapman, who is famous for developing HECS.

PROF O'KANE: I do know Bruce.

PROF LINDENMAYER: Yes, interesting guy, good economist.

PROF O'KANE: I knew you were doing things. Bruce has been telling me about it.

PROF LINDENMAYER: Okay. Yes, we've been working on the level of subsidy in the industry and then he's been looking at the level of churn in employment, natural churn but also the crossover in terms of skills in the plantation sector. And Bruce's estimate is that a transition period should be about two years to the end. So that's crucial. There's another reason why I think it's important to end the industry quickly is that not only does it give certainty to workers, they know that they've got two years and in Victoria the transition to other employment has been complete. So people have moved directly into other industries.

We know the plantation sector is screaming out for workers and many of the people in the native forest sector have exactly the kinds of skills that are needed in the plantation sector. But beyond that there's also the key issue that data that's not yet published that's led by some people at University of Cambridge show that plantations are four times less likely to burn than native forests that are logged and regenerated. Now, the reason that that's important is that the frequency of fire in native forests is now so high that the chances of forests remaining undisturbed by fire for the 80 years that it takes to grow a sawlog are less than 20%. So you've got an 80% chance that the forest is going to be burnt before the trees reach a sawlog producing age.

So where do we get our trees from, our wood from to support our wood demands? And the answer is clearly plantations. So good productivity plantations will produce a first thinning after 15 years roughly, 14 to 15 years. Another thinning by 20 years and then a clear fell by 25 with a replant directly after that. So over an 80 year period, with intervening transition from clear fell back to reestablishing the stand, you can get up to nine crops of wood in the time that you get one from a native forest and it's four times less flammable.

So I think it's pretty clear where we need to be getting our wood. We know there's substantial areas of already cleared land to establish plantations. Once we exit native forest logging, the experience in New Zealand was that that stimulated investment in the plantation sector because the native forest sector is so heavily subsidised that it makes it hard for the plantation sector to compete at various stages.

MR VEITCH: David, is that the experience of Victoria? Is that what's happening in Victoria?

PROF LINDENMAYER: That's what's starting to happen in Victoria. What is also happening in Victoria is that there's now a push towards very rapid fibre generation, which is from hemp. Places like Gippsland. The other experience in Victoria has been a very large proportion of the plantation grown eucalypt pulp logs are being exported. So over 90% of Australia's plantation eucalypt pulp logs are being sent overseas, which is just crazy. It's very silly.

Now, we should be retaining a significant proportion of that material in Australia and processing it in Australia for Australian jobs. So there's some structural problems in the industry which are undermining its employment potential but also its potential profitability and in some cases that material is processed overseas after it's shipped overseas and then we buy it back again, which is even crazier. So some of these problems can be resolved with that rapid exit and reform of the forest industry in the state.

MR VEITCH: And David, are there lessons then from Victorians, who I think they pretty much took a rapid transition, are there lessons we should learn?

PROF LINDENMAYER: Yes, there's a few very important lessons. One is that you need to watch out for zombie logging and zombie logging is where you call it something different, like forest gardening [redacted]. And so there's a need to watch out for that. There's also zombie logging in the form of post disturbance salvage logging, which is incredibly damaging, so that's logging after wind storms and after fires. And the third kind of zombie logging in Victoria, which is very serious, is this idea of putting in these massive, massive firebreaks right across the state.

So there are proposals at one stage to put in 6,000 km of firebreaks over 40 metres wide which equates to about 24,000 hectares of logging, which is more logging than was taking place when VicForests was in operation. And that actually leads to greater carbon emissions than there was when VicForests was operating. And there are people that are looking at that as a way for the industry to stay alive until there's a change of government for it to then be brought back. So that's why we call it zombie logging and the timber is being largely used for firewood. So the emissions profile from burning this timber is actually very high, so it's actually higher than the approximately million cars' worth of motor vehicle emissions equivalent than is presently calculated for Victoria. So that's some other work that Andrew Macintosh is leading.

So from any angle that I look at it from, from the economic side, because it's a major loss maker, you don't make money from native forest logging. Nobody's made money from native forest logging in Australia for 20 years. Not in Tasmania, not in Western Australia, not in Victoria, not in New South Wales, not in Queensland.

PROF O'KANE: And that's public and private?

PROF LINDENMAYER: Yes, yes. If you look at the structure of the industry, 90% of all your sawn timber already comes from plantations. That's where the money is, that's where the jobs are. The Frontier report in southeastern New South Wales by Frontier Economics. So this is not a cash for comments kind of consulting company, this is what you pay for is what – they'll tell you what it is. They don't do publicity, they don't – you don't do cash for comments with them. It's Angus Taylor's favoured consulting company because you get what – they'll tell you what it is.

So Frontier Economics' analysis for southern New South Wales was that the plantation industry for that region was worth about $64 million in profits. The native forest sector was worth about $400,000. So the relativities are massive. PricewaterhouseCoopers did a relative investment for one full-time equivalent job in the native forest logging sector, which is about $5.4 million, whereas in the plantation sector it's about $520,000. So there's a big difference in the investment levels needed for a single FTE in the relative industries.

We know that on average in the plantation sector there's about three times the number of jobs per unit area of forest as there is for a native forest. So the multipliers are much higher because the industry is worth a lot more and there's a lot more processing, a lot more value adding than there is in the native forest sector. So the native forest sector has talked about value adding since I can remember, since 1983 when I first started. There was all this stuff about value adding, there was money shipped from the mainland to Tasmania, the Helsham Inquiry, you name it. Same happened everywhere and in every inquiry, value adding comes in, it'll probably be in yours, you know, we have to work out ways to value the industry. But it just hasn't happened.

90% of it is woodchips, paper pulp, box liners, packaging. It's high volume, low value. 90% of your sawn timber's in plantations already, that's where the real value is. And it doesn't seem to matter how much money you throw at this, however you want to look at this, the industry doesn't work. I spent the first 20 years of my career working on ecologically sustainable forest management, writing textbooks on how to do this stuff. I've got a bunch of them up on the shelf behind me. But the economics doesn't work, the problems with sustained yield mean that it doesn't work either.

So what happens is that a log forest becomes more flammable, it's more likely to burn, so you do a salvage log, so you've got less green forest to focus on, so you cut more of that. Green forest becomes more flammable, it burns, then you keep chasing your tail. It becomes more and more marginal because you have to go to more and more low productivity areas on steeper slopes, which we know that fire is more likely to burn at higher severity on steeper slopes, so that becomes more flammable, so you get larger fires that are more uniform, which leaves less green.

And so the whole process pushes on this way, so it spirals on itself. And then as the industry has focused more and more on woodchips and paper pulp, that can cut younger and younger trees, so you have less sawlogs to support sawmills because they need older trees, so you cut more forest to give you the sustained yield of sawlogs, which drives down the age of the forest, which means there's less sawlogs, which means more overcutting to get those fewer sawlogs to meet your quota. You can see how it doesn't work in the end.

And then there's a whole culture of hairy chestedness that goes in the industry as well, so what tends to happen is that a forest chief operating officer in a district will say something like, "There's 20,000 cubic metres in these compartments" and it goes to head office and they say, "Oh, bullshit, that's not right. We know that there's at least twice that." So that they over allocate how much timber there is, so it gets over cut and so you end up with significant over cutting of the forest. And we've seen this over and over and over again. I documented it in a very grumpy book we just wrote. It's called, "The Forest Wars." I'm happy to send you copies if you want to see it.

PROF O'KANE: No, we can get one, I think.

PROF LINDENMAYER: Yes, but the culture of over cutting means that you fish down the food chain. So in the fishing industry, what happens is you take out the high valued fish first and they're overfished, so then you go to the next one and that's overfished and then you go to the next one and you fish down the food chain.

In the native forest logging industry, you started with red cedar in New South Wales, that was mined out, then you went to sawlogs, that was over cut, then you went to pulp logs and the bottom end of the food chain will be biomass burning, which will be a disaster because when you burn about a ton of logs, you get about a ton of carbon emissions. So if we start doing that, which the industry is pushing for, we can forget our greenhouse gas emissions reduction targets. They just will be impossible.

So I really cannot see any other socially just economically viable way other than a rapid exit of the industry and we haven't even started talking about biodiversity yet because we know that when we log native forests, most of the logging is focused in areas of high conservation value. And the analysis has been done across New South Wales but it's the same in Victoria, the same as in Tasmania. We know that from putting together what's called species distribution models and then we can see where areas are proposed for logging, can see where the threatened species occur and we can see that significant overlap of the two.

So there are significant impacts on biodiversity but there are other impacts. So not only do we lose the big trees that many animals are dependent on but certainly in southern New South Wales, what we see is a big change in the composition of the forest. So we're shifting the forest towards a tree species called silvertop ash, eucalyptus sieberi. Eucalyptus sieberi is inedible for koalas and greater gliders. We've demonstrated that and there's more work showing that.

But the problem with silvertop ash is that it's been selected for since the 1920s and since the 1960s it's become the favoured tree species to put through the chip mill at Eden. And so vast areas of northeast Victoria and southeast New South Wales are now dominated by silvertop ash. So it's terrible for biodiversity, it's great for woodchips but it's terrible for biodiversity. So we have vast areas dominated by this tree species. The problem is that it's highly flammable. So it resprouts and reseeds prolifically, so it dominates more and more of the forest, so the other tree species like mountain grey gum, coastal blackbutts, spotted gum, bloodwoods, coastal stringybarks, they tend to be lost the more of these logging and burning cycles we have.

So we have fewer animals, more silvertop ash, more fire, fewer animals, more fire, it cycles that way and we could drive to Eden, we could drive to Orbost, we could drive to any number of places and that's all you'll see is silvertop ash. We've been working on how do we put the nutrient landscape back together again for a whole suite of species. It's a lot of work. So just because we close down the native forest industry doesn't mean we won't need a workforce to deal with the problems that are hangovers of what's gone on for the last hundred years.

PROF O'KANE: And what will have to happen with those hangovers?

MS MILLER: Mary, I'm so sorry to interrupt, just for the transcript Peter Duncan's also joined. We just can't see him on the screen. Peter, can you hear us?

MR PETER DUNCAN: I can now.

MS MILLER: There you are, okay. Apologies, Peter.

MR DUNCAN: I've been listening. I'm sorry, I've been driving. So Professor, I'm sorry I was late but I have been listening for about the last five or 10 minutes.

PROF LINDENMAYER: Okay, good. Good. So what's needed in the forest?

PROF O'KANE: Yes.

PROF LINDENMAYER: We've got significant regeneration failure in parts of the forest estate but where we haven't seen good regeneration following logging. So there's going to need to be part of a workforce that puts the forest back together again. We've got substantial problems with feral deer and other herbivores and that's an interaction with fire. So when we have fire or logging, we produce young germinates and regeneration which is very favoured by some of these feral animals like sambar deer, which number in the millions. And so we've got a feral deer problem that we're going to have to deal with.

Now, there are opportunities there because a dressed carcass on a 600 kilo sambar deer is actually worth a lot of money. So there's those aspects. We've got weed problems in some areas and we've got forest composition problems that we talked about, for example, the dominance of silvertop ash. So there's a lot of restoration work to put the forest back. If we're going to get good regeneration, we are going to have to control

the feral deer problem because they often target particular areas of young regrowth post logging and post fire. But it's often quite concentrated, so there are ways to prioritise where you would do those kinds of things.

I think there's a need to measure the carbon stocks. We don't need to trade the carbon but we can record it and we can include it in the state's carbon accounts. Mostly carbon trading has been very – it's been gamed. You know, the human induced regeneration stuff is [redacted]. Soil carbon stuff I think is pretty dodgy but I think there are other opportunities to record and measure carbon that can be reported in the state's accounts, which is important because it will reduce the reliance on other sectors if we do it properly. But it's got to be done properly.

We are also going to need to deal with the issue of increased flammability of forests that's created by a history of logging. And so that means elite firefighters, it means embracing new technologies, those kinds of things because that pulse of flammability is going to be with us for most of the rest of this century.

PROF O'KANE: And are we doing that well anywhere?

PROF LINDENMAYER: No. No. We're not.

PROF O'KANE: Is anybody doing it well anywhere in the world?

PROF LINDENMAYER: The ACT have started to look at it using new drone technology to detect fires quickly and using lightning strike modelling to determine where there are hotspots for lightning strikes and then lightning induced ignitions. And then looking at drone technology with large payloads to be able to drop fire retardant and water directly on ignitions not long after they've happened. So the total cost of doing that we've estimated to be in the realm of about $40 million, which is trivial relative to the potential to save lives and property.

PROF O'KANE: 40 million in the ACT?

PROF LINDENMAYER: 40 million in the ACT but also that's a trialled area for Kosciuszko National Park, which is 690,000 hectares.

PROF O'KANE: Yes. Right. Peter, Mick, have you got –

MR VEITCH: Yes, David, can I just ask – you've raised a lot of issues there around land management, the biodiversity, biosecurity issues. Do you have some suggestions around the stewardship models for this? You know, you're advocating getting out of – sort of a rapid transition out of the native hardwood harvesting. What sort of stewardship models do you think could be looked at?

PROF LINDENMAYER: In what way?

MR VEITCH: So like is it just all handed over to, for instance, national park via the state government or are there other stewardship models that could be considered? You know, joint arrangement with Indigenous groups or the like.

PROF LINDENMAYER: Yes, so I've worked in and thought about stewardship in relation to co-management of national parks. So I've worked with the Wreck Bay community for the last 22 years in the Jervis Bay territory, sort of partly part of the ACT. And that's co-managed between Parks Australia and the Wreck Bay Aboriginal community. I think that's a better model. Sole management is highly problematic for a range of reasons. I think it's much better in partnership. So we've looked at that model and also been thinking of that for particular areas in Victoria as well.

The danger here is the potential for First Nations corporations to be parasitised by corporate forestry that want to log country but just do it under a different name. And I know that the industry is anxious to be able to do that and badge it as caring for country and all that kind of rubbish. We have then in a Victorian case and we've also been asked to look at this for The Great Koala National Park, looking at green bond financing for 10 year periods. So that's involved work with [redacted] and other big investment houses, looking at standard debt finance with the proceeds of the bond, the green bond, looking at the kinds of management activities that will be needed to restore parks or to create infrastructure to bring people to those areas. So you're creating opportunities for economic renewal.

And so the green bond proposal for the wet forests of Victoria, it's an area of about 350,000 hectares, that green bond proposal is $234 million over 10 years, which is less than the cost of the remediation of one level crossing in Melbourne and it's less than the $269 million lost by VicForests in the last year. And the green bonds proceeds include regeneration of forest, where there's been failed regeneration, putting in artificial hollows for cavity dependent animals that have been lost from the system, dealing with feral animals, particularly deer and the cost of doing that, putting in walkways and other infrastructure to bring people into the forest and create other revenue streams for government in that space.

We know that government can borrow money at lower cost than virtually anywhere else and we know from the assessment that's been done by the consultants and by the finance sector that the bond at $234 million would be oversubscribed probably by eight times and completely sold within three days. That's the marketing and we know that people are prepared to take a significant cut on interest to invest in these kinds of things.

So there's been a lot of background work gone into this over the last 18 months with oversight from ASIC as well. So it's an interesting space, looking at these kinds of bonds to provide the kinds of investment flows that are needed to manage these places. Now, the strong advantage of the wet forests in Victoria is that we have a background of 42 years of work there to provide the baseline monitoring against which to compare the management interventions.

But it's possible to do those kinds of things in other areas, for example, in southeast New South Wales or in the case of The Great Koala Park, setting up the right kinds of monitoring to make sure that the bond is real, it's credible, it's verifiable and it's not gamed. And the aim is to provide opportunities for First Nations people to work on country but also people in rural areas to be involved in this process as well as contractors in rural and regional areas to be involved in parts of delivering on the proceeds of the bond and the restoration process. Does that makes sense?

MR VEITCH: It does, it does. Mary, I've just got one clarifying question really.

PROF O'KANE: Sure.

MR VEITCH: David, early on you mentioned 90% of the wood supply in New South Wales is now derived from plantation. That number's quoted in a large number of the submissions that we've received as well. I just want to clarify, is that 90% of the total wood requirements in the state? That's the first thing. Second thing is when it says 90% of – if its' harvested timber, plantation timber, is it all softwood or is it a combination of softwood and hardwood? I'm just trying to get my head around how – because it's mentioned a lot and not many people have actually cited where it comes from.

PROF LINDENMAYER: Yes, it comes from ABARES. It's ABARES' State of the Forests reports and it's in their appendices and tables there.

MR VEITCH: Okay.

PROF LINDENMAYER: So it's 90% of Australia's sawn timber comes from plantations and a lot of that is softwood plantation, remembering that hoop pine in Queensland is a softwood.

MR VEITCH: Yes.

PROF LINDENMAYER: But you also have pretty good hardwood plantations, flooded gum plantations on the north coast of New South Wales as well as other things like slash pine. The flipside of that is approximately 90% of what comes out of native forests in Australia goes into the woodchip, paper pulp, box liner, packaging stream. Again, that's from ABARES but it does vary from state to state. So the proportion is lower in Tasmania, so the numbers there are around about 50% in Tasmania. But still most of the sawn timber is coming from the plantations, even in Tasmania now.

So the total employment in Tasmania, which is often billed as the biggest industry in the country, the total direct employment's 292 people from the last numbers that I saw. So if you were looking at the situation in Tasmania, you wouldn't stuff around with carbon trading and all sorts of other stuff. What you would do is give each person a package and say it's over. That would actually be the least cost for the taxpayer, the most certainty for employees and the best incentive to invest properly in the plantation sector because that's actually what happened in New Zealand.

And there's been some mismanagement of the plantation estate, not by New South Wales Forest Corporation but in other places where they haven't done the right pruning, so the low branch pruning and other stuff, which wipes off some of the value. But once it's a plantation only industry, there's a huge incentive to do that properly. Now, there's other opportunities in this space, so I've worked in the plantation sector since 1994 in the Tumut region and the northern Tumut region up towards the Murrumbidgee River, particularly the Nanangroe plantation and there's been some good aspects to that. The plantation sector also needs good management.

We can't put plantations close to where people live because the flammability issues and we need to manage the weeds and feral animals that are in plantations which are often in much, much higher numbers than they are in native forests. Now, I know there's a lot said about weeds and feral animals in native forests. Let me take you to a plantation and we can spend a couple of days walking through chest high blackberries and see if you've still got the same perception after those two days.

MR VEITCH: I come from Tumut. I used to shear at Nanangroe and I really do know all of those plantations very well and yes, there is a lot of blackberry.

PROF LINDENMAYER: Yes, and it increases over time and it shows that state – New South Wales Forest Corp really needs to do much better as a manager because they're terrible neighbours and there's a lot that needs to be done in this space with the management but it's quite tractable to do if you do it well and there's good science to back up what to do, it's just that they've dropped the ball in that space.

MR VEITCH: So that's me finished, Mary. I think Peter's probably got a couple.

PROF O'KANE: Yes, Peter.

MR DUNCAN: Yes, look, thanks. I just had a couple of questions. One was about the – I came in at the end of the restoration of the forests process and David, from what you were saying, it's mostly the southeast forests you're talking about with the silvertop ash. But I'd imagine that process, it would not be fast, it would take some time and I think you said that, there's many years of work to do there.

PROF LINDENMAYER: Yes.

MR DUNCAN: And I guess what's going through my mind is can that occur with the designation of a national park or are there other transitional designations, land management designations we'd need to allow that to happen? And the reason why I ask this is not so much taking the time but with others that we've talked to, I've heard before about climate change and the way we do actually need to act – will need to manage our forests more actively in the future. Have you got any views about that?

PROF LINDENMAYER: Yes, sometimes the concept of active management is used as an excuse to go in and do lots of thinning.

MR DUNCAN: Well, I'm not using it for that concept, but I'm using it for this issue of our environment's changing and in that case it has changed, you've mentioned that example. Maybe talk us through that – if you look at it for the right reasons rather than the wrong reasons, put it that way.

PROF LINDENMAYER: Yes, yes, no, that's a good question. So there's been a lot of discussion about the term "active management." There's been a couple of papers written on it, largely by forestry as a way to keep thinning forests. But I see thinning as a different – and that's supposed to – the thinning is supposed to make the forest more resilient to climate change. And in fact thinning does several things that we need to be aware of.

One is that it opens up the forest understory so it's hotter, it's drier and it's more windy or windier. The other thing is that you remove the understory component and the understory is actually really important for fixing nutrients for the growth of the overstory trees. That's what wattles do, they're nitrogen fixers. The third thing is that the understory is also part of the habitat of a very large proportion of forest biodiversity and there's whole ecological principles associated with that, with the vertical structure and complexity of a forest, giving you more species, more niches.

So let's park that to one side because I think widespread thinning of forests is a real problem because it will generate significant carbon emissions, it will make forests in many cases more flammable and of course what tends to happen is that people say, "Gosh, look at all this timber left over, ooh ah, ooh ah, we should do something with this. Let's put it through a sawmill or a pulp mill." So I think it's important to be aware of what can happen when these things get distorted. In the case of the silvertop ash problem, we have looked at this through a number of experiments in northeastern Victoria but the similar kind of situation exists in southeastern New South Wales.

So after major fire events, you have a massive seeding and germination of silvertop ash. It's the dominant component. So we've been working with First Nations nurseries and others to first of all remove the silvertop ash seedlings and then replant the system with other tree species to drive the system back towards what we think is probably a natural reference or benchmark composition. So that is a lot of work to do but it's engaged a lot of local people, including First Nations nurseries but also other rural groups and the restoration process has been pretty successful. It's small scale, so the challenge will be to think about it at larger scales.

And that's where we started to think about green bonds because we know that iconic national parks have a very large constituency of supporters and so we know that there are people that are prepared – would be prepared to invest through this green bonds structure in national parks and some of the activities that would be involved in those kinds of restorations. So that's been the broader financial thinking about restoration and what needs to be put back into the system, particularly around iconic animals like koalas and greater gliders, as some of your flagship species in this space.

MR DUNCAN: So the green bonds concept and that change that you're talking about, using caring for country type principles, what you're saying is with the level of

support for national parks, even if there was a change in regulations, you feel that would be possible?

PROF LINDENMAYER: If you were to promulgate the case to say this is what it looks like now, this is what needs to happen to change it to something that koalas could live in, that greater gliders could live in, that wasn't overrun by deer, those kinds of things. So we do have to engage in some of the hard arguments. There are too many deer. Kosciuszko has too many horses. I know that there are people that don't like to hear that but that is a fundamentally important part of the management when we're overrun with some of these herbivores that do such enormous damage.

And by and large, except for a small rump of very vocal people around Rocky Plain and Jindabyne and Kosciuszko, there's very strong support, including from First Nations people about removing a significant proportion of the horse population every year and the same will be with deer. And if we can do this in creative ways to create industries that don't perpetuate populations of deer but actually drive them down, then I think we can build constituencies for the kind of parks management and forest management that we need.

MR DUNCAN: Okay. The other question I've got, if you look at say the Mid North Coast of New South Wales and the northeast forests, what's the silvertop ash and the deer issue there? What would you say the equivalent problem is there from a forest management point of view?

PROF LINDENMAYER: I'd have to take that as a question on notice because I don't know the northern forests as well as the southern forests and I would just be making up stuff and I'm not good at that. I'd rather not do that.

MR DUNCAN: And look, I would be too but my guess is they've probably perpetuated more of the popular and more local native species like blackbutt and things like that because that's been their bread and butter, I guess, in those forests. Yes, so if anything, there's more of those rather than the silvertop ash.

PROF LINDENMAYER: That's right. My understanding is that there has been a big switch towards coastal blackbutt, eucalyptus pilularis, to the detriment of other species and areas of flooded gum in some places as well as sort of a plantation tree and some areas. I don't know the full details of it other than if you have areas of solid blackbutt, there's not enough variation in leaf nutrients to support animals like greater gliders and koalas. But that's work led by other people in my group like Kara Youngentob and Karen Marsh.

MR DUNCAN: Okay. Look, and just quickly then, I know that time's short but you seem to be supportive of a plantation sector of some sort and put the softwoods to one side and then maybe again in that sort of Mid North Coast to; northeast area, you see that there could be successful hardwood plantations there? I'm not talking about in forests, I'm –

PROF LINDENMAYER: Yes, absolutely.

MR DUNCAN: Yes. And maybe the blackbutt and other species, colonial species could be used. Do you have any issues with that?

PROF LINDENMAYER: No. No, as long as it's not used as a conversion process where we convert native forests to plantations.

MR DUNCAN: No, I understand that. And I'm not talking about that, I'm talking about cleared land or farmland or other agricultural pursuits.

PROF LINDENMAYER: I'd also like to see though a range of approaches to do that. So there's been an industrialisation of plantations in many cases. I understand that and I also think there's opportunities to fragment the plantation sector so it's less fire prone. That's important as part of fire management. We've written quite a lot on that.

But also I think there's opportunities to do farm forestry much, much better than has happened before, to be able to help create a diversity of natural assets on peoples' farms to therefore be able to create a greater diversity of income streams. And so we know that land capability mapping shows that there's vast areas of reasonably productive Australia that could be put under plantations but it doesn't necessarily mean that we have to have tens of thousands of hectares of this because that also has a social impact in terms of depopulating rural landscapes. So I think we can do it better than what we've done previously.

MR DUNCAN: Okay. Do you know of a good example of – and I'm talking about a model plantation here, something that's well managed and whether it's hardwood or softwood in New South Wales or Australia, for that matter?

PROF LINDENMAYER: Yes, I think parts of the Tumut plantation are really well done.

MR DUNCAN: Okay.

PROF LINDENMAYER: As Mick was saying before, there are issues with weeds and feral animals, they're management issues. There are other models for doing this, the Swedes do it quite well in southern part of Sweden. So I think we can look further afield than where we're at now. There are examples where it's done very poorly but I think we can learn from those mistakes if we do it well.

MR DUNCAN: Are you aware of Professor Bauhus' work in Germany?

PROF LINDENMAYER: I am. I've published papers with Jurgen.

MR DUNCAN: Yes. And what do you think of his ideas? And I'll just briefly summarise, the idea is more positive environmental management almost approaches to forest rather than the sort of negativity going in to fix it up after its broken sort of

thing. I've been talking to him – I went overseas recently and just got some of his material, I was just interested in your views?

PROF LINDENMAYER: Yes, I think the reality here is that the true economics and the money and the jobs are in plantations.

MR DUNCAN: Okay.

PROF LINDENMAYER: But there are ways to manage plantations well to ensure that they're good investments, we deal with the weed problems, we deal with the fire problems, we deal with the feral animal problems. But we can have a diversity of plantation types. It needs to be well managed but it also needs the extension services to help landowners do the right kinds of things, when to prune them, when to thin them, when it's appropriate to take things to market, what sorts of trees to plant where and why.

Those kinds of things that we used to have with ag extension that don't exist well anymore, we need to put that back in place to help this, at least for the next five to 10 to 15 years while we really help this transition to grow the plantation sector. But we also need to retain some of that material, that plantation material, in Australia and process it here. It's madness to keep exporting so much of it overseas. It's silly.

MR DUNCAN: Well, also importing timber from unknown heritage as well, which is not great.

PROF LINDENMAYER: Exactly.

MR DUNCAN: Look, I'd better pass back to Mary. Apologies too that I was late, I had something to do for my family but I got most of it I think and we've got notes being taken anyway. So Mary, is there anything?

PROF O'KANE: No, could talk on for a long time, David, but thank you very much and we'll wrap up and can I just say to the team, we've got another meeting in a minute, so –

MR DUNCAN: That's right.

PROF O'KANE: Anyway, thanks, David, and for the submission as well.

PROF LINDENMAYER: So if anybody wants to follow up other things, fire and plantations or weed issues or timber yields or whatever, please just reach out and I'm happy to send you material.

PROF O'KANE: Thank you. And anything you want to send out of this would be appreciated too.

MR VEITCH: Thank you.

PROF LINDENMAYER: Thanks for your time. Cheers. Bye.

PROF O'KANE: Bye.

>THE MEETING CONCLUDED