WAI 3325 – THE CLIMATE CHANGE PRIORITY INQUIRY

HEARING WEEK 5

HELD AT WAITANGI TRIBUNAL OFFICES, WELLINGTON

MONDAY 24 NOVEMBER 2025 - FRIDAY 28 NOVEMBER 2025

Tribunal:	Judge Stephanie Milroy Prue Kapua Professor David Williams Kevin Prime Basil Morrison
Crown Counsel:	Jeremy Prebble Nixon Fong Grace Seeley Anna McTaggart
Claimant Counsel:	Harriet Morrow Taamorangi Hartley Grant Hewison Tania Te Whenua Michael Sharp Annette Sykes Eve Rongo Katie Paul Luke Evison Hannah Swedlund Darshini Dorn Ms Kudrat Matanuku Mahuika Tamahou Thoms Majka Cherrington Tom Bennion Scott Fletcher Sam Vincent
Witnesses:	**Day 1 - Monday 24 November 2025** Professor Simon Edward Hales Dr Priscilla Mary Wehi Dr George Robert Laking **Day 2 - Tuesday 25 November 2025** Dr Stephen Knight-Lenihan Associate Professor Brendon Dunphy Vernon Winitana Dr Ivo Geoffrey Bertram

Day 3 - Wednesday 26 November 2025
Professor Caroline Emma Foster
Professor Catriona Meredith Olwen Macinnis-Ng
Associate Professor Jonathan Douglas Tonkin

Day 4 - Thursday 27 November 2025
Professor Jane Kelsey
Professor Alexander Mathew Gillespie
Dr Anthony Owen Cole

Day 5 - Friday 28 November 2025
India Logan-Riley
John Stacey Ballingall

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PLEASE NOTE: In recognising that the spelling of names, dialect, and kupu differ across hapū and iwi, we acknowledge that each kupu has a whakapapa that is valid. With respect of these differences, the following transcripts have been specified for continuity in our mahi. The dialectal variations have been transcribed verbatim.

HEARING COMMENCES ON MONDAY 24 NOVEMBER 2025 AT 9.01 AM

KARAKIA TĪMATANGA (KEVIN PRIME)

(09:04) KEVIN PRIME: (MIHI)

Kia ora tātou. Nā reira, e ngā reo, e ngā mana, e ngā waka, koutou katoa kia hono mai runga i te ipurangi i tēnei rā, tēnā rā koutou. Nau mai, haere mai, whakauru mai. Whakauru mai rā ki roto i tēnei noho o tātou i tēnei rā, mō te roanga ake rā hoki o tēnei wiki. Engari mihi kau atu ana ki a koutou.

He mihi anō hoki o tātou aituā maha kua taka atu ki tua rā, i tua i te ārai. Āe rā, e kīia nei te kōrero, kua tangihia rātou, kua mihia, kua poroporoakitia. Ngā mate kua hinga ki waenganui i a koutou, nā koutou i tangi, nā tātou. Pēnā anō hoki ngā wāhi mate kua hinga atu ai i a mātou, nā mātou e tangi, nā tātou katoa. Engari kotahi tonu me te kōrero mō rātou; haere atu koutou, ngā maire, ngā mate. Haere ki te kotahitanga o Rēhua, ki te huihui o ngā rangatira, haere hoki atu ki te iwi, hoki atu ki te kāinga, ki te wāhi tūturu mō tātou. Nā reira, e ngā mate, haere, haere, oti atu. Nā reira, he nui rā tēnei māku i āianei, e tātou mā, heoi anō e whakatau noa nei i a koutou ki roto i tēnei hononga a tātou i te ipurangi i te rā nei. Huri noa, kia ora tātou.

(09:05) JUDGE STEPHANIE MILROY: (MIHI)

Tēnā koe, matua Kevin, mō te karakia tīmatanga i tēnei wiki. Tēnei tāku nei mihi ki a koutou katoa. Ki ngā kaikerēme me ō rātou rōia, ki te Karauna me ōna māngai kōrero. Tēnā koutou katoa.

I will take appearances, and as usual, I will call the names of the lawyers, and if you will just confirm that you are present. So, the first is Dixon & Co Lawyers.

(09:06) MS HARRIET MORROW: (MIHI, APPEARANCE)

Tēnā koe e te Kaiwhakawā. Counsel's names are Ms Morrow and Ms Heartly appearing for Wai 2003, Te Wahapū. Ma'am, Te Wahapū is participating as an interesting party on a watching brief basis, and we seek leave to attend via YouTube link and reappear via Zoom if necessary.

JUDGE MILROY:

Thank you. Tēnā kōrua. Loader Legal.

(09:07) DR GRANT HEWISON: (MIHI, APPEARANCE)

Tēnā koe your Honour. Dr Grant Hewison appearing for Mereana Peka, Wai 2821, role of Māori Wardens in climate emergencies with a particular focus on local government. Tēnā koe.

JUDGE MILROY:

Tēnā koe. Te Whenua Law.

(09:07) MS TANIA TE WHENUA: (MIHI, APPEARANCE)

Āe. Tēnā anō hoki koe Ma'am, koutou ko tō pae rangatira. Tēnei au ka mihi atu ki a koe, matua Kevin. Nāu i whakatuwhera tō tātou hui i roto i te tika me te pono. Huri noa, aku hoa rōia, te Karauna anō hoki, i runga i tēnei o tō tātou hui mā ipurangi. Ko Ms Te Whenua tēnei. Kei konei ahau hei rōia mō Wai 3285, Te Urunga o Kea. Koirā te komiti i runga i tēnei kaupapa mō Te Arawa anō hoki; mō Wai 3286, Ngāti Uepōhatu. Tēnā koutou.

JUDGE MILROY:

Tēnā koe, Ms Te Whenua.

MS TE WHENUA:

Aroha mai Ma'am. Sorry, I also should note in appearance for my junior counsel, Ms Lauren Chand who will, from time to time, appear on our behalf across the duration of the week.

JUDGE MILROY:

Thank you. Tēnā kōrua. Mauao Legal Chambers.

(09:08) MR MICHAEL SHARP: (MIHI, APPEARANCE)

Tēnā koe, e te Kaiwhakawā. Anō hoki tēnā koutou Te Rōpū Whakamana i te Tiriti o Waitangi, tēnā koutou katoa. Michael Sharp, your Honour, appearing for Wai 3340, Tōtaranui Nama Ono Trust with Ms Smith. And I also appear with

Ms Dorn on a number of claimants represented by Woodward Law and Ms Dorn will make appearances for those, your Honour.

JUDGE MILROY:
Thank you, Mr Sharp. Annette Sykes and Co.

(09:09) MS ANNETTE SYKES: (MIHI, APPEARANCE)
Mōrena, e te Taraipiunara, te kaiwhakahaere o tēnei kaupapa, te Kaiwhakawā, koutou mā hoki e noho kanohi mai ki te tautoko te kaupapa o te rā. Tautoko i ngā mihi ki a koe, e te tohunga kua whakatuwhera i tō tātou nei hui. Tātou katoa, me te Karauna hoki, tēnā tātou. Ka huri au ki tērā o ngā reo.

Ma'am, I am appearing today for Ngā Toki Whakarururanga, but I will be seeking leave to remove myself from this interaction to go to livestream and then rejoin on Thursday. I will be taking a watching brief. Mr Scott Fletcher will be here with Mr Sam Vincent. Mr Scott Fletcher is representing Wai 2494, the claim by the Māori Climate commissioner, Donna Awatere, and he will also be undertaking cross-examination for that claim this week.

We are also lucky to have Mr Sam Vincent, who will be here also for the whole week. He will be representing the claims by the esteemed hapū of Ngāti Ruahine, Dr Alice Cole and others. He will be leading witnesses and also seeking leave to cross-examine, which I believe has been granted.

And the final claim that we represent is Wai 3382, it's a claim by Ms Colleen-Skerrett-White and others for Ngāti Pikiao.

MS SYKES ADDRESSES JUDGE MILROY – LEAVE TO BE EXCUSED/GRANTED (09:11:22 – 09:11:33)

JUDGE MILROY:
Oranganui Legal.

(09:11) MS EVE RONGO: (MIHI, APPEARANCE)

Tēnā koe, e te Kaiwhakawā. Ko Eve Rongo tēnei, te rōia mō Ngāti Koata, Wai 3277.

JUDGE MILROY:

Tēnā koe. Phoenix Law. Ms Paul.

MS KATIE PAUL:

Tēnā koe. One moment please, I am just arranging my sound. If I could come back to you, Ma'am, I am just having trouble with my sound button.

JUDGE MILROY:

It's just appearance, so we can hear and see you, so I am going to take your appearance as such.

(09:11) MS KATIE PAUL: (MIHI, APPEARANCE)

Tēnā koe, e te Kaiwhakawā me koutou te Rōpū Whakamana i te Tiriti o Waitangi. Counsel's name is Ms Paul. I appear with counsel Evison of Phoenix Law on behalf of Ms Mason, senior counsel. We appear for 20 claimants from across the motu.

For the record these are:
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Awhirangi Lawrence, Wai 3394.
Louisa Collier, Wai 3392.
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Aorangi Kawiti, Wai 120.
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This week we will introduce our expert witness who is presenting on behalf of our claimants, Professor Al Gillespie, to be heard on Thursday 27th of November 2025. Tēnā koutou katoa.

JUDGE MILROY:
Thank you. Thank you, Ms Paul. Bryce.

(09:13) MS HANNAH SWEDLUND: (MIHI, APPEARANCE)
Tēnā koe, e te Kaiwhakawā, anō hoki ki a koutou ngā mema o Te Rōpū Whakamana i te Tiriti o Waitangi, tēnā koutou. Ko Ms Swedlund tōku ingoa, appearing alongside Ms Sreen for Te Waimate Taiamai ki Kaikohe Claims Alliance, that's Wai 421, Wai 593, Wai 869, Wai 1383 and Wai 1890; for Ngāti Ruapani ki Waikaremoana, so that's Wai 3278; the Ngāti Porou ki Hauraki claimant change claim, Wai 3288; and the Te Ūpokorehe Future Generations climate change claim, Wai 3221. Tēnā koutou.

JUDGE MILROY:
Tēnā koe, Ms Swedlund, tēnā kōrua. Woodward Law.

(09:14) MS DARSHINI DORN: (MIHI, APPEARANCE)
Tēnā koe, e te Kaiwhakawā, otirā tēnā koutou, e Te Rōpū Whakamana i te Tiriti o Waitangi. Ko Ms Dorn tōku ingoa. I appear for the following claims. Mr Tane Cook on behalf of himself and Mataatua District Māori Council, which is Wai 2607; Ms Jennifer Takuta-Moses, on behalf of herself and the Wairoa Māori Committee, which is Wai 3412; Ms Grace Hoet, on behalf of herself and

the New Zealand Māori Council, which is Wai 3413; and then Mr Anthony Olsen on behalf of himself and Matiti Māori committee, which is Wai 3414. Tēnā koe.

JUDGE MILROY:

Tēnā koe Ms Dorn. Bennion Law.

(09:15) MS KUDRAT: (MIHI, APPEARANCE)

E te Kaiwhakawā, otirā koutou, e Te Rōpū Whakamana i te Tiriti o Waitangi. Me mihi ka tika ki a koutou. Ko Ms Kudrat ahau, appearing this week for three claims, Wai 3262, a claim by Climate Justice Taranaki; Wai 2139, a claim by the Muaūpoko Tribal Authority; Wai 507, a claim on behalf of Ngā Ariki Kaipūtahi.

Ma'am, apologies from Mr Bennion. He is in another fixture, but with your leave, will be appearing tomorrow. Kia ora.

JUDGE MILROY:

Kia ora. Thank you, Ms Kudrat. Kahui Legal.

(09:16) MATANUKU MAHUIKA: (MIHI, APPEARANCE)

Tēnā koe Ma'am, otirā tēnā tātou katoa e hui tahi nei i tēnei rangi. Te tautoko awau i ngā mihi kua mihingia ki tērā o ngā rangatira, ki a Kevin, nāna i whakapae i tā tātou hui i te rangi nei, otirā ki a tātou katoa.

Ma'am, Mr Mahuika here. Kei konei māua ko Mr Thoms hei rōia, hei māngai kōrero mō Wai 3287. As with previous weeks, we are largely observing this week, so Mr Thoms will do the majority of the appearances, and Ms Hauraki and I will fill in the gaps. Tēnā koe.

JUDGE MILROY:

Thank you, Mr Mahuika. And Tūkau Law.

(09:16) MS MAJKA CHERRINGTON: (MIHI, APPEARANCE)

Tēnā koe, e te Kaiwhakawā, otirā ki a koutou, Te Rōpū Whakamana i te Tiriti. E tautoko ana ahau i ngā mihi kua mihia ki a koe, e te rangatira, matua Kevin, nāu i para te huarahi ki tō tātou Matua Nui i te rangi. He mihi ka tika ki a koe i tēnei ata.

Ko Ms Cherrington tōku ingoa, nō te tari o Tūkau Law, hei whakakanohi i ngā kerēme e toru: ko Wai 2397, the Ngāti Hine Forestry Trust; Wai 682, Te Runanga o Ngāti Hine; Wai 1464 and Wai 1546, Te Kapotai.

Your Honour, like others, I do not have a speaking role in this hearing week, so I also seek leave to attend via the livestream, noting that will return for the judicial conference and beforehand, should any issues arise that require my attention. Tēnā koe.

JUDGE MILROY:

Yes, thank you. Thank you, Ms Cherrington. And finally, the Crown.

(09:17) MR JEREMY PREBBLE: (MIHI, APPEARANCE)

Tēnā koe te Kaiwhakawā, tēnā koutou. Ko Prebble ahau. Kei konei mātou ko Mr Fong, Ms Seeley, Ms McTaggart mō te Karauna. Just to signal in advance that as with last week although this week looks a bit shorter, we do not expect to have significant questioning for the witnesses and there are at least two witnesses we do not intend to cross-examine, being Dr McCallum and Mr Hales. So, if that changes and there are any further updates, I will obviously provide the Tribunal with those. Thank you.

JUDGE MILROY:

Thank you, Mr Prebble. I should note that we have – I've just been advised, just before we came online, that a memorandum from the Crown has been filed, which obviously we haven't had time to look at but hopefully will have done that by Thursday's judicial conference. So, just noting that judicial conference is set in the timetable to take place after afternoon tea on Thursday 27th of November,

and we will consider what matters have been raised by the claimant and possibly the Crown in your memo at that time.

MR PREBBLE:

Thank you, your Honour. Yes, that memo was for that conference, thank you.

JUDGE MILROY:

All right, thank you. So, welcome all again. Today – this week is the last hearing week scheduled for the main evidence of the claimants, and we are anticipating a week of reply evidence from the claimants in May of 2026, and prior to that, evidence from the Crown in March and April, next year. So we are moving through our inquiry process, our hearing process, well so far. I do note that there have been a number of policy announcements by Ministers of the Crown in relation to climate change. So, the Tribunal is cognisant of the fact that there may need to be some careful consideration of the hearing process, but we will discuss that further in the judicial conference.

So, this morning we are to hear from Simon Hales as our first witness, so I will hand over to counsel.

MS SWEDLUND:

Tēnā koe, e te Kaiwhakawā.

HOUSEKEEPING – TIMEKEEPING (09:20:57)

DR HEWISON:

Aroha mai your Honour. My apologies. Dr Hewison here with Loader Legal. I also just need to include an appearance for Mr Jasper Sontier for the clients represented by Loader Legal. My apologies for not doing that earlier.

JUDGE MILROY:

All right. We will just take that microbreak and come back in five minutes, when Mr Hales will be presenting his evidence.

HEARING ADJOURNS: 9.21 AM

HEARING RESUMES: 9.29 AM

JUDGE DOOGAN:

Ms Swedlund, over to you.

MS SWEDLUND CALLS

PROFESSOR SIMON EDWARD PAUL HALES (SWORN)

Q. Tēnā koe, e te Kaiwhakawā. We will hear the evidence of Simon Hales, which is at appellation #A067. Tēnā koe, Professor Hales. We will check that we can hear you.

A. Kia ora.

Q. Kia ora. Can you please confirm your full name to the Tribunal?

A. Simon Edward Paul Hales.

Q. And do you confirm that your evidence is true and correct to the best of your knowledge?

A. I do.

Q. And you have confirmed previously that you have read the code of conduct for expert witnesses at schedule 4 of the High Court Rules and that you agree to comply with it?

A. Yes.

Q. Great. Thank you, Professor Hales. If you would like to proceed to give your evidence now. Kia ora.

(09:30) PROFESSOR SIMON HALES: (#A067)

I am a medically qualified research professor. I have got degrees in natural sciences and medicine from the University of Cambridge in the UK, and public health and epidemiology from Otago in New Zealand. I have 25 years of research experience, and I've specialised in climate change and health.

Firstly, I want to briefly touch on the future global health impacts of climate change on health. I led a study for the World Health Organisation when I was working for them, which was published in 2014, and the study had the goal of

estimating the future health impacts of climate change at a global scale, which was the second attempt to do a study of that type.

So the assessment was only able to take into account a subset of the possible health impacts, because of technical difficulties with making projections of future impacts, and importantly, we assumed that the world would, in other respects apart from climate change, continue much as it has done in recent decades, with continued economic growth and continued progress in improving health overall.

Even under these really fairly optimistic assumptions, WHO concluded that climate change is likely to cause approximately 250,000 additional deaths per year between 2030 and 2050. So, tens of thousands are due to heat exposure, particularly in elderly people; 48,000 deaths due to diarrhoea, enteric infections, mostly in children; 60,000 due to malaria; and 95,000 due to increased undernutrition, that lack of proper nutrition in children.

So, I should stress that this was quite an optimistic study in as much as we didn't assume any major breakdown in climate or ecosystems or social systems.

So, next, I want to just give you a bit of an overview of some of the impacts of the variability in climate historically within New Zealand, which – in which we were able to observe health impacts and, if you like, understand the relationship between how the climate has changed, even including the weather, the day-to-day changes in temperature and rainfall, and the effects that this has had on human health. Using statistical studies of the observed impacts, both particularly of the short-term impacts – and that that really implies a change in a health outcome within a day or maybe a week or two from the change in the climate – but we're also interested in long-term effects, which is the effects of the climate on years to decades.

So, there are several different sort of causal pathways which I'd like to briefly describe.

Firstly, one relatively well-known and relatively straightforward health impact to assess is the effects of the heat, of the high temperatures, heatwaves, on deaths in adults and also on the hospital admissions in children in New Zealand.

And then another aspect is the effects of outdoor air pollution on both mortality and morbidity, accounting for the effects of temperature. And, of course, air pollution is not directly an effect of climate change, but it is closely related, because many of the greenhouse gases that are emitted that do cause climate change also cause air pollution.

Thirdly, I will just briefly talk about the effects of both temperature and rainfall patterns on enteric diseases. That means infections causing stomach upsets and diarrhoea, typically.

And finally, I will just consider briefly the suitability of the climate – that is, the long-term average temperature and rainfall in New Zealand – for the establishment of vectors of disease, particularly the mosquitoes that carry some diseases like dengue fever, which is a viral illness which has become an increasing problem worldwide, which we don't yet have in New Zealand but we may have – may find that we are having to deal with it in the future.

And just one other point in general is that many of the studies I have just mentioned can also generate the estimated health impacts at quite small geographic scales, and that provides evidence of spatial patterns of both exposure and a different vulnerability of different communities.

So now – so that's just an overview of some of the studies that have been done in New Zealand looking at the health impacts that have been observed, which are largely not related to climate change themselves, but they are related to the – mostly the natural variability of climate.

However, we use these studies to try to estimate the future impacts of climate change, and it's a little bit subtle, but the way we do this is to combine the results

of those observational studies, as I just discussed, with estimates of what will happen or what would happen to the future climate, for example, the changes in temperature. These are based on general – global circulation models, so, models of how the climate system will respond to changes in greenhouse gas emissions. So if we combine our understanding of how climate variability in the past has affected human health, assume that those relationships would stay much the same, and then the climate changes according to the modelling, we can then make projections of the likely health impacts.

Again, we typically have to assume that other things affecting human health, at least in the first instance, are not changed, so things like people's diet and their smoking history or their levels of exercise, we have seen that the – for the – at least for the first purposes, we have seen that those things don't change. That's not that we obviously realise that they will change, but we're making our best estimate of what would happen if other things stayed the same.

So in terms of thinking about the future impacts of climate change in New Zealand, we can make other qualitative or quantitative projections, and some – I'll start by just giving you an overview of some of the types of qualitative projections that we can make, so as temperatures increase, we expect heat-related health impacts, so for example, mortality in relation to heatwaves, we would expect these to worsen, and on the other hand, there may be some effects of cold weather, such as infections like influenza, which might to some extent improve, so it's not only negative impacts we're expecting there.

Secondly, we know that climate change will affect air pollution, and so urban air pollution, particles, and toxic gases such as NO_2. We know that climate change will affect those things, but most importantly, we can affect the emissions of these urban air pollutants at the same time as addressing climate change, and I will come back to that in a moment.

Increasing temperatures will also tend to increase the risks of pathogens caused by bacteria that cause food- and water-borne infections, and this is because typically – not exclusively, but typically, these bacteria tend to thrive in

the environment and in food and water if the temperatures are higher. That said, the other causes of infection, particularly some viruses, have the opposite effect, whereby they are less likely to be transmitted, and the balance of these two things is relatively uncertain, has not been estimated for New Zealand, although it has in global studies.

Another climate change effect which we think will cause an increase in enteric disease caused by some bacterial pathogens is a change in the rainfall patterns, so one thing that has been observed around the world and in New Zealand in recent years has been an increase in severe storms causing floods. This is, again, partly a natural phenomenon, but we know that in many cases these events that we are observing have been made much worse or much more likely by the climate change that has already occurred.

And then, finally, another final sort of qualitative projection is that climate change is likely to make the temperature and rainfall patterns increasingly suitable for some vector species – that is, organisms that transmit disease. So, there are two mosquitoes of the Aedes family which are particularly important in transmitting viral diseases including dengue fever and yellow fever. Now, neither of those species are present in New Zealand, fortunately, and we are doing our best, of course, to keep them out. The climate – one reason it's relatively easy for us to keep them out currently is that the climate isn't – isn't ideal for them yet. It's generally too cold. So climate change will tend to increase the risk of these mosquitoes becoming established, and increasing temperature would also tend to increase the risk that these diseases, and especially dengue fever, which is a major problem globally, could start to affect us in New Zealand.

So now I'll briefly move on to some quantitative projections, and I should stress that this is – well, it's only a subset of the health impacts that we believe will happen. We're not able to quantify even some of the impacts that we know are likely to be very important at present, mainly for technical reasons or for lack of data.

So, in one study which was recently published, we analysed over 600,000 admissions to hospital in New Zealand of children aged under five years old that were born between the year 2000 and 2019, and we looked at the relationship between the daily temperatures prior to their admission to hospital and the risk of them being admitted across over 2,000 administrative areas in New Zealand.

We found that Māori children were somewhat more sensitive to both hot and cold temperatures compared to European children. In other words, you know, for a given degree of temperature change, the risk of hospital admission increased more rapidly among Māori children.

Overall, we estimated that over the five-year period from 2013 to 2019, there were approximately 290 child admissions per year that we could attribute to high temperatures over about 24°C. So these are children that we believe would not have ended up in hospital, had it not been so hot.

And the number of admissions of children attributed to hot temperatures has increased along with the small increases that we've noted in average temperatures in recent years, and I can show you – if I may share my screen, I can show you a map –

HOUSEKEEPING – TECHNICAL (09:44:18)

PROFESSOR SIMON HALES: (CONTINUES)

So if I can just describe this briefly, the warmer colours here are indicating the small areas where there is a greater risk of children being admitted to hospital because of higher temperatures. So these are actually percentages of total admissions, and the red colours would be in the range of 2-3 per cent of the total childhood admissions, and the cooler colours would be in the sort of 0-1 per cent, and I think hopefully you can see that there is some sort of pattern which is related to temperature, given that the east coasts of both islands tend to be warmer than the west coasts and the South Island is, particularly with the nor-west wind, they experience quite high temperatures, so there are some

regions that are showing several per cent of childhood admissions, and the same thing on the – the east coast of the North Island. So perhaps if we zoom in, you can see that there is quite a bit of detail here about the places that are more sensitive, and if you click on this map, which is available online, you can see that, for example, this place in Napier had about a 3 per cent of the hospital admissions in that region were related to high temperature, and this one here would be – so a very low percentage in this other region here.

If I just keep the screen shared for the moment, we were able to use the results of this study to also project what would happen in the future if the temperatures increased by 3° on average, and assuming, again, that other things didn't change. We would then project that about a thousand additional children would be – would end up being admitted to hospital, so although it's quite a small percentage number of admissions, you know, it's clearly – this is potentially quite a substantial effect, unless we either reduce the impact of climate change, reduce the temperatures, or improve the resilience of the community.

The last point I want to make in relation to this is that because heat acts as a risk multiplier, and of course the fact that Māori children were more sensitive to heat than European children, we would expect that the impacts of climate change will tend to exacerbate or worsen existing ethnic health inequalities in relation to child hospital admissions.

And next, if I can move on to talk about urban air pollution. So, I was involved in a study called HAPiNZ 3.0, which examined the health impacts of air pollution, including fine particulate matter, which is usually referred to as PM2.5, and the gas nitrogen dioxide, which is emitted particularly from diesel vehicles, but also petrol vehicles.

So, we looked at the long-term effects of air pollution on mortality and also hospital admissions and asthma in New Zealand, nominally for the year 2016. We found that there were approximately 3,000 deaths annually that were attributable to this urban air pollution, and the social costs associated with it were over 15 billion New Zealand dollars per year in the year 2016, and again,

air pollution acts like heat as a risk multiplier, so this means that because mortality and other health indicators like hospital admission rates are already higher among Māori compared to European ethnicities, the impacts of air pollution also worsen the existing health inequalities.

So – excuse me. I just want to show you another slide, if I can persuade it. So this is – when it comes up, will be a map of the impacts of air pollution on health, which came out from the same study.

HOUSEKEEPING – TECHNICAL (09:50:05)

PROFESSOR SIMON HALES: (CONTINUES)

So, this is a similar type of map to the previous one, but this time, this is showing deaths among adults, so it's people aged 30 and over, and I'll just enlarge this map here.

So, this is mortality rates per hundred thousand people, and we can actually create maps at much finer scale than this, but this is **(inaudible 09:50:58)** is useful as an illustration, so for example, in Christchurch, we estimate that out of 100,000 people, 200 per year are dying as a result of their exposure to these pollutants, and in the North Island, again, there's quite a bit of variation in the – in the risks. Places with less pollution, of course, but also places with – where the population is healthier, so in Wellington, it's only 69 people per hundred thousand.

So I hope that – I mean, these – again, these maps are available online for anyone, so it's possible to zero in on regions of particular interest. The main point I want to make, really, in terms of the effects of air pollution, is that we can reduce air pollution by changing our energy sources, and particularly for heat, electricity and transportation, so if we move to renewable non-fossil sources that don't require burning for all of these things, then it's possible to essentially eliminate these premature deaths.

And then, just finally, in relation to trying to forecast future impacts, there are – studies have looked at the spatial patterns of dengue fever globally, and as I mentioned before, we don't have a problem with dengue fever at the present in New Zealand. We don't have the mosquito vectors that transmit it. But models project that under future climate change scenarios, later this century, that parts of the North Island in particular could become suitable climatically for dengue to be transmitted, and this would certainly be, you know, potentially quite a severe health impact if that were to occur.

In terms of what is being done about this, I was asked to talk to – discuss what's being done by the Crown to prepare or mitigate climate change, so I used the same terminology here as the Intergovernmental Panel on Climate Change, the IPCC, who describe mitigation as the efforts to reduce the extent of climate change by reducing the net emissions of greenhouse gases out in the atmosphere, so reducing their – the degree of climate change, and then adaptation refers to reducing the effects, the harmful effects of – of the changed climate. And these are often, in policy terms, considered separately, but many people, including myself, think that they should be considered together. This is because they are interdependent to an important degree.

In terms of mitigation, the Paris Agreement is a legally binding international treaty on climate change, and it aims to limit global warming, preferably to no more than 1.5°C above preindustrial levels. Those, of course, are levels of average increase in temperature that have briefly been reached in 2024. This doesn't actually mean that the Paris Agreement has failed. For one thing, it's necessary for the increase in temperature globally to occur over many years in a row, not just for one year, so it is still possible to meet that particular target.

And in 2021, the New Zealand government committed to reduce greenhouse gas emissions by 50 per cent below 2005 levels by 2030, and then recently, a further target as a very slightly more ambitious target for 2031 to 2035 of 51-55 per cent reduction in greenhouse gas emissions was announced.

In terms of adaptation, the – a Health National Adaptation Plan has been published. In my view, according to the – the frameworks and protocols which have been developed globally by the United Nations, this adaptation plan should be based on a detailed vulnerability and adaptation assessment. In other words, it's – should – one should look at what the likely health impacts of climate change would be in New Zealand in some detail before attempting to work out how you should adapt. So it's really – the policy is a bit back-to-front in New Zealand at present. Another point is that the study that has been funded is only being funded for half a million dollars, whereas comparable studies overseas have been done using probably at least ten times that amount of funding, so I think it's unfortunate that the study is going to be quite limited in its scope and the amount of detail it can provide.

That leads me on to the question about "What is the gap between what is being done and what needs doing?", which I'm afraid to say is a large gap.

So, the government climate change policies have been described as "highly insufficient", and the second Emissions Reduction Plan that was recently announced has unfortunately, in my view, gone backwards inasmuch as it's removed major policies that were in place which most commentators were likely to be effective in reducing emissions, and instead relies instead on emissions trading, which is not working very well currently, and technological advances, which are themselves quite speculative and well, basically don't exist yet in – at the required scale.

And I would also like to point out that even if those policies were effective, the overarching direction of government policies in energy, transport, agriculture, and in the environment will all tend to lead to increased emissions, and so these are working against the plan to reduce emissions in general, so my feeling is that as a result, New Zealand is unlikely to meet its emission reduction targets, and there's likely to be negative consequences for our environment, for human health, and ultimately, for our wellbeing and our economy.

And a couple of final points. I think this is, I guess, the personal view, but I think rather than simply trying to keep our society working as it is currently, we're trying to maintain a situation which we're used to, or you know, if there's – for example, if there is a – an extreme climate event and it causes a lot of infrastructure damage, then our immediate response is, "Well, we need to, you know, rebuild the roads, rebuild the houses, and put everything back like it was." I think that's a mistake. I think we need to start thinking about supporting communities to rebuild in a way which causes them to be more resilient to future events, so it may require communities to move from some locations which are prone to having severe climate impacts.

The central government policies that increase greenhouse gas emissions put communities in this country and internationally at increased risk from climate change impacts, but the current government does not appear to be making those kind of connections. They're bringing in a range of policies that are likely to increase emissions. The Fast-Track Approvals Bill tends to reduce the amount of protections of the environment applied to new developments.

But potentially, there could be very large public health, social and economic benefits in using our scientific evidence to – basically, to change the way society works to develop mitigation and adaptation policies that work together to respond to climate change.

And in terms of human health, there's a tendency to think about this in a rather biomedical way, thinking about how – how do we make the hospitals more safe from extreme events, how do we make sure that people can get – get to hospital if there's a flood or a cyclone. I think there needs to be more attention paid to the broader determinants of health and greater health input into planning for adapting to climate change. So this means looking at how intersectoral policies are affecting human health, how they are supporting indigenous solutions, and I think current policy is unlikely to achieve effective desired health outcomes, and there's a – quite a big risk that climate change will tend to make inequities in health worse.

I'd like to see the Climate Change Commission engaging more formally and directly with health experts to strengthen the Commission's advice on the effects of climate change, and the policies that would improve this.

There is, I think, a more positive way of looking at this whole issue, which is that the vulnerable communities could be the first to benefit from policies which increase climate resilience, including things like improvements to infrastructure, affordable housing which doesn't cost the Earth to keep cool or to heat, protection of water supplies, energy, transportation systems that support healthy livelihoods and economic security.

Because – because the ability to adapt to climate change effectively – in other words, to reduce adverse health impacts, in this context – depends strongly on the amount of mitigation, or in other words, how – how bad does climate change get, and in this respect, Aotearoa New Zealand should be a world leader in reducing emissions, because on a per-capita basis, New Zealand bears more responsibility than most other countries, and in particular some very vulnerable countries such as the Pacific islands that we have particular relationships with. So although the New Zealand national emissions are small in the global context, we should show the way by decarbonising the economy, especially energy systems, and if that was done well, with a mind to improve health at the same time, that could have very great benefits for both health and health equity.

And finally, I'd just like to say that my view of climate change is it's not just another environmental issue that we can manage away in the same sort of methods that we've used in the past for toxic chemicals or other sort of technological problems. It's – I see climate change as just one symptom of a much wider social ecological crisis, which, if we don't address it, is going to lead to severe impacts, even in this century, and of course beyond, because climate change doesn't stop at the end of this century.

And for me, one of the most frightening things about it is that many of these adverse changes, once set in motion, may be impossible to reverse, at least on the sorts of timescales that we think of as humans.

Thank you. That concludes my evidence.

JUDGE MILROY:

Thank you.

MS SWEDLUND:

Thank you very much, Professor Hales. Sorry, Ma'am.

JUDGE MILROY:

Yes, I was just going to thank him.

HEARING ADJOURNS: 10.04 AM

HEARING RESUMES: 10.11 AM

QUESTIONS FROM CROWN COUNSEL – NIL

(10:12) PROFESSOR DAVID WILLIAMS TO PROFESSOR SIMON HALES:

Q. Tēnā koe, Professor Hales. I am just looking at your University of Otago website, and you have a hard hat on. I am wondering why an environmental epidemiologist needs a hard hat.

A. Well, no, it's – we do tend to attract a certain amount of anger and unhappiness from some sectors of society. The actual reason I was wearing that hat is I was on the flying fox in Rotorua, so that's why I was wearing it.

Q. Right. Okay. So that's not the serious question, but I have got a couple of others. In paragraph 3, you state that the WHO assumed continued economic growth and health progress, but the evidence you've given today seems to me to suggest that assumed economic growth is the opposite to what is needed to achieve the health outcomes that you've been giving evidence about. Is that correct?

WITNESS REFERRED TO #A067, PARA 3

A. Well, I think it's fair to say that health – that human health has historically been gradually improving over recent decades, and part of the reason for that is better public health kind of living conditions, which in turn often is related to economic position, but not to say that it has to be. So I think the conventional assumption is that if the world continues in a favourable direction in coming decades, that that would entail economic growth and that that in turn would lead to improvements in human health. So that's the conventional view, and that was the view at the time of WHO's report, which of course is, you know, over ten years ago.

We did assume that climate change wouldn't have – climate change or any other of the sort of global crises that we're facing, such as biodiversity or depletion of natural resources, forests, freshwater and so on – we assumed that all those things would not lead to a decline in economic growth, which was in those terms an economic assumption, and was supposedly sort of a – supposedly would – would mean that the health impacts would be less.

I think since then it's fair to say that we think climate change would reduce economic growth, perhaps very substantially, if it's allowed to continue as it is currently.

Q. Right, yes, good, thank you. My second question relates to paragraph 29 of your #A067. The decarbonising of the economy will have profound health benefits for health and equity in this country in this country, in Aotearoa New Zealand. So the – there are quite a number of people that make remarks to the effect that New Zealand is such a small country with such a small total emissions, so that doing little or nothing doesn't make much difference because we don't make much difference. But on the other hand, you are saying that from a health equity point of view, there is good reason to meet or even do better than the targets that have been set. Is that what your evidence suggests?

Yes, I think in general, I would agree. Of course, these kind of issues are not something that we can really prove or disprove scientifically. We are talking about what's going to happen in the future. But I think it's fair to say that from a – from the understanding that we have as public health scientists, there are policies which, if followed, would reduce inequalities

in health as they currently exist, and at the same time, address climate change, so that's what we would like to see. Now, that's not what is happening currently, because there isn't a strong focus on equity in the government policies, really, certainly not in terms of energy or transport.

WITNESS REFERRED TO #A067, PARA 29

Q. Right. Right. So thank you. And then my final question or comment relates to the article which is – I'll – for the transcript, I'll just give what I've written down here. So the article, *Daily Temperatures and Child Hospital Admissions*, it's page 130 of our bundle, and it's page 118 of the #A067(a), which is that article, and the abstract says there's greater sensitivity among Māori, Pacific and Asian compared with European children, and this is something that's a bit counterintuitive for me, so I'd like you to help me.

So that – at one point, you talk about – by the way, you're the last-named author and different disciplines have different views as to what first-named author is compared with last named. In your discipline, you are the boss of this show.

A. Yes. Yes, more or less. That's right, yes. I was the – kind of the senior author of that, as we call it.

Q. Yes.

A. So I was – was, yes, particularly supervising the first author and the second author, and sort of helping to direct their activities.

Q. Right.

A. And the interpretation, of course.

Q. Right. And then you've got statistics people and so on that are going to be helpful to – with my –

A. Yes.

Q. – with my question, so my question is that heat-related child hospital admissions in winter, the most affected, the most sensitive are Pacific people, 13.4, then Māori, 11.9, Asian down as 6.1, which is even less than sole European, 7.3. This is all at page 121 of your #A067(a).

And then when it gets to higher temperatures, the Pacific people again are the most sensitive ones, followed by Asian and Māori and European, so the counterintuition to me is that you mention people coming from India

and the Philippines, whose ancestry, at least, would indicate that they are used to heat, or their parents or grandparents were. It just seems odd to me that it's the – it's in the higher-temperature admissions statistics that the Asian people are significantly more affected than sole European. Can you run that one past me?

WITNESS REFERRED TO #A067(A) PAGE 121

A. Yes, I'll try to explain as **(inaudible 10:19:53)** can understand it. I think the – there is an element of our physiology affects our sensitivity to heat, and so if – that's supposing I travel from Wellington to somewhere in the tropics, then I will be less well adapted to the high temperatures there than the local people, physiologically. That's relatively – a relatively unimportant aspect of it. What's much more important is the – if you like, the social adaptation to different climates, so if you think of a – think of a very hot country, I mean, maybe somewhere like Saudi Arabia or Greece, where the houses are painted white, people do not go outside and work in the middle of the day, and these adaptations help to reduce the health impacts of high temperatures, whereas in New Zealand, we don't have those adaptations, so paradoxically, we can actually be – in some respects, we're certainly much more sensitive at much lower temperatures than people would be living in hotter countries. So I guess in a nutshell it's not so much to do with people's genetics and their physiology, but it's more to do with the social norms and the ability of the infrastructure to stay cool as the climate warms.

Q. That's very interesting. Thank you very much. So I in particular appreciate the importance of dealing with climate change issues as a health equity issue as well, so thank you very much for that evidence.

(10:21) PRUE KAPUA TO PROFESSOR SIMON HALES:

Q. Kia ora, Professor Hales. I just had a couple of questions, just for clarification more than anything else. In paragraph 11, when you're – when you are talking as you've spoken about the sensitivity of Māori children to both hot and cold temperatures, can you just give some examples of the kinds of illnesses or diseases that we're talking about?

Obviously, you do talk about asthma, for example, but can you just give an example of the illnesses that you're referring to?

A. Yes. I think it's – to start with, it's probably worth pointing out that the effects of heat and the effects of cold do tend to have somewhat different mechanisms, and they have a somewhat different time course, so the effects of heat tend to be more acute. You would expect to see heat effects on – certainly on the same day as – as the high temperature, and maybe for a day or two following, whereas for cold temperatures, there tends to be a bit more of a delay, so you wouldn't – if it's a very cold day, you wouldn't necessarily see a big increase in hospital admissions on that day, but you might start to see the admissions increasing on following days and even a week or two later.

The reason for that is that one of the main causes of the hospital admissions in relation to cold temperature is respiratory infections, so, colds and flus and – and other things like asthma that would follow on from having those infections.

So in this study, we were particularly interested in heat, of course because of the climate change focus. We actually, in the paper, have a table which shows all of the hospital admissions divided by the main kind of body system which has been affected, so, things like the cardiovascular system, which would be one of the main reasons for admissions, the respiratory system, which of course would include things like asthma, the digestive system, et cetera, et cetera. So we were able to show that certain types of body systems, certain types of disease relating to different components of our bodies' workings, were – were more sensitive to climate or – or not sensitive.

So that – I could refer you to that table for a more detailed answer, but in a nutshell, the types of – the types of illness that led to the hospital admissions relating to heat were more or less those that we would have predicted in advance, so it's things like – cardiovascular and respiratory conditions were particularly important, and some other things, like perhaps, from memory, cancers were less affected.

So I think that – that gave us some confidence that what we were seeing was a real effect of temperature, the fact that we saw these patterns that

related to the kind of – the kind of associations we would have expected to see.

So I'm sorry I don't have that chart right in front of me, but yes, that gives you all the detail that there is.

Q. Thank you. Now, and you're using the methods here – it's on page 22 of the HAPiNZ 3.0 –

A. HAPiNZ.

Q. – and it's page 43 of our documents that we've got here, you have a note there that suggests that "ethnicity could be a factor in the response of some individuals to air pollution. We investigated this in more detail in HAPINZ 3.0 but found no conclusive proof." Can you just – given some of the assumptions and conclusions you've made, can you just enlighten me as to the basis of that? When you are saying there is no conclusive proof, where – what are the bits that are missing?

A. Right. Perhaps if I just go back briefly one step, so, HAPINZ 3.0 is, not surprisingly, the third in a series of studies. The previous one I was also involved with. Essentially, what we were doing was we were looking at the – the risk of people dying prematurely and relating that to the level of air pollution which was estimated around the place where – where each person lived, and we're doing that for the whole New Zealand population. Allowing for other things which could affect the risk of dying – so, smoking would be a prime example – we were able to do that by using information from the census and linking it to the mortality data and the air pollution data.

So in that first study, we didn't have information about the $PM_{2.5}$ air pollution that we think is more – more critical for health, but we had information about PM_{10}, which is a slightly larger size of particle, which is probably not quite so relevant for health impacts, and in that previous study, the association that we found between mortality and exposure was – was higher among Māori than among European ethnicity, but because of the uncertainty around each of those estimates, we weren't able to say that they are statistically different, so – sorry, that's a bit technical, but in a nutshell, there was some indication that Māori were more sensitive, but it wasn't possible to kind of prove it scientifically with those data.

So in the next – in HAPINZ 3.0, that we're now referring to, we were particularly interested to look more closely at that issue, and essentially, what – the simplest way to do this or to think about this is we are making a statistical comparison between mortality and exposure, based on location, but mortality is mortality over a long period; it's over periods of years or decades, and so is the exposure. But if we look at the whole population, then we get a kind of average result, but – the average association between exposure and mortality. We can do the same study again but this time only look at people identifying as a particular ethnicity, so when we do that for a European ethnicity, we find a particular value, and again, with a certain – an uncertainty, the same as in the previous study, and when we did it for people identifying as Māori, we didn't find the previous effect that there – that there was a stronger association. If anything, the overlap between the European and the Māori was greater in this later study.

Now, I can't necessarily explain why that is, and certainly, we were a bit surprised. We were expecting that we might see a larger effect, but that's not what we found. The – of course, the – one of the limitations of looking at an individual ethnic group is that that reduces the power of your study to detect an effect, so the level of uncertainty around the central estimate is greater, simply because there are fewer Māori than there are European. But yes, in a nutshell, we didn't find a – a significant ethnic difference.

Having said that, I would make the point that we do know that among Māori, the underlying level of mortality from all – from all exposures and all causes is substantially greater than it is for Europeans, so given the same level of exposure, because the effect of air pollution is to increase the risk of death by a certain percentage, if it's a certain percentage of a larger number, in the case of Māori, the absolute effect is greater, and the effect on inequality is to increase it.

Q. And just finally, you made a comment in your updating part of your evidence about responding, and talked about our immediate response as reinstatement rather than rebuilding for resilience, I think were the words that you used, and you then said about some communities may need to move. I wonder, do you have any thoughts about what characteristics or

factors in those communities that you see would need to move – what they might be?

A. What I was thinking of in – was sort of extrapolating from some of the major climate events that we've seen in New Zealand in recent years, so I think people living in coastal communities where sea level rise and storm surge would – would start to become a bigger issue, so probably the West Coast of the South Island would spring to mind, some of those communities there that are very exposed, and anywhere where there is likely to be flooding, so, low-lying areas, areas near – sort of towards the end of large hydrological catchments, as happened in Hawke's Bay with Cyclone Gabrielle.

In general, communities that have less economic resources are likely to be more vulnerable. They may well not be insured. They may not be able to afford insurance, and they may not have the – the economic resources to rebuild to the extent that other communities might have.

And then I guess thinking in terms of other exposures, people's lifestyles will be affected by these climate changes, so if you are a farmer and you rely on primary production, if there is an increase in drought as a result of more intermittent rainfall, more extreme – extremes of rainfall, both higher and lower, plus increasing temperatures, meaning that the droughts might be more frequent and more severe, particularly on the east coast, then that could affect the ability to make – for your livelihoods to be able to be sustained. So those people, I mean, I guess they wouldn't necessarily have to move, but you know, if there's no other employment in those rural locations, then that might be the only option.

Q. Thank you, Professor Hales. Thank you for your answers.

HOUSEKEEPING – TECHNICAL (10:34:17)

(10:34) KEVIN PRIME TO PROFESSOR SIMON HALES:

Q. Professor, can I refer you to number 8a of your evidence, please?

WITNESS REFERRED TO #A067, PARA 8(A)

A. Yes, I have that.

Q. Yes. At the end of that paragraph, you say while some cold-related effects may improve. While you were giving your oral presentation, I couldn't catch the example you gave of a cold-related effect that may improve. Can you give it again, please?

A. Yes, of course. I think – I mean, one of the best examples would be influenza, so the – the virus that causes influenza tends to be transmitted more readily under cold, dry conditions. That – I mean, I can go into the reasons for that if necessary, but – so essentially this is one of the reasons why we tend to see winter influenza rather than at other times of the year. It's because the transmission of the disease is more favoured by the climate. There are other reasons as well, such as the fact that of course in the winter we tend to spend more time indoors and with windows and doors closed, so that the transmission indoors is accelerated as well, similarly to COVID.

Q. So is that an improvement?

A. Well, if the – if the climate warms, we would expect to see less cold conditions.

Q. I see.

A. And if there are less cold conditions, then we might see a reduction in influenza. It's not – there is debate about this scientifically. Certainly, I think we're more – we're more certain that increases in heat would cause increases in mortality relating to heat or hospital admissions than we are at the other end.

Q. Thank you. I understand it better now. And the other question I had related to paragraph 30, right at the very end – "likely to be inevitable [*sic*] on human timescales". Does that mean we're doomed, that there's – we're going to wipe ourselves out? What do you mean by that?

A. I don't think it's inevitable. I mean, the word I've got there is "irreversible". Essentially, what I'm saying is that once – once climate change has reached a certain level, which we don't – we don't know what this level is – there are certain things will start to happen which would tend to cause the – the whole system to – to get worse, continually worse.

So, for example, if the ice – if the ice is melting, that causes what was previously a - a white reflective surface to reveal the ground or the sea

underneath, and that ground or sea then absorbs more heat, so there is a positive feedback. Likewise, if we damage the ecosystems which are currently absorbing approximately half of the carbon dioxide that we're emitting – if we cut down the Amazon rainforest would be a topical example, seeing as the conference has just been occurring in Brazil, or if we damage the ecosystems in the sea that would be the base of the food chain in the sea, which is the – the microalgae, then the increases in temperature might cause those things to accelerate, essentially.

So that's one reason to be cautious that we're taking a risk into the unknown every time we release more carbon dioxide or other greenhouse gases into the atmosphere. We are destabilising a natural system, and we don't have full knowledge about how far we can destabilise it before it become completely uncontrollable.

A. Thank you. I understand that better. Thank you very much. Thank you for your evidence.

(10:38) JUDGE MILROY TO PROFESSOR SIMON HALE:

Q. Thank you, Professor Hales. Most of my questions have been asked, but I will just ask if the chart that you referred to in answering Ms Kapua's question, if you could give that to your counsel to send through to us, that would be very good, thank you.

A. I think – I think it's in the paper, which I think you already have.

Q. Good. Okay.

A. But sorry, I don't have a copy of that. I should have brought – I should have had that available, which I don't, but there is a table there which – well, actually, I think it's a figure, and it shows the – shows the curves that relate to the increase in risk of hospital admissions according to which – what diagnosis was given for that admission.

MS SWEDLUND:

Ma'am, I believe that would be page 124 of #A067(a).

JUDGE MILROY:

Thank you. Thank you for that. I can see Ms Kapua is flicking through the paper looking for the figure.

(10:39) JUDGE MILROY TO PROFESSOR SIMON HALE: (CONTINUES)

Q. Just a couple of questions from me, Professor Hales. The first one is in relation to paragraph 15, where you mention that "The total social costs associated with air pollution were estimated at $15.6 billion per year in 2016", which just seemed to me an astonishing figure, and I – when I read it, I had to think: Is that just in New Zealand? So really, it is just a comment from me that there seems to be a lot of benefit that could be gained from reducing air pollution. Did you have anything else that you wanted to say about that?

WITNESS REFERRED TO #A067, PARA 15

A. Well, I think I touched on it briefly, but yes, I'd be happy to expand a little bit. I mean, I think one of the clearest examples would be in relation to transportation, and the – the previous government had various policies which were tending to increase the uptake of electric vehicles. Now, electric vehicles don't release any air pollutants from a tailpipe. They don't burn any fossil fuels in order to run. Admittedly, they do produce a certain amount of particle pollution from the brakes and the tyres, but all vehicles do that. So if we were to remove all of the fossil-fuel-powered vehicles in New Zealand, obviously that would take years to happen, but that – you have to start somewhere. That would greatly reduce the level of mortality estimated by the study. About 2,000 of the over 3,000 deaths were related to nitrogen dioxide pollution, which comes from road traffic, and particularly diesels, and especially large diesel vehicles like buses or trucks. So it is technically feasible to replace all of that sort of obsolete fossil fuel technology, but there are barriers, financial barriers which require the government to intervene to – to encourage uptake, and the present government has unfortunately reversed many of those incentives to – to take up EVs instead of fossil-fuel-powered vehicles, and they've consistently weakened the legislation and proposals to – to try and encourage people to – to use EVs.

So that's just one example.

Q. Thank you for that. My other question, and it relates to my own ignorance to a certain degree – you have referred to both dengue and yellow fever, that the vectors for those diseases may well come to inhabit New Zealand because of the warming climate, and I think there may be questions about how they would arrive in New Zealand, although we have got the – the yellow hornets seem to have arrived in New Zealand without any problems. Did you have any comments about that?

A. The vectors that I'm talking about, there's two particular ones: *Aedes aegypti*, also known as the Asian tiger mosquito, which is a tropical species, and that's less likely to be happy in New Zealand – at least, it could survive here for maybe one month of the year in a warm year, and the other one is *Aedes albopictus*, which is much more adapted to cool temperatures and is already causing small dengue outbreaks to occur in southern Europe, for example.

Now, we don't have either of those *Aedes* species in New Zealand. However, at the border, we regularly intercept them. The biosecurity system, it sort of has traps around airports, and of course any goods that have been brought in will be inspected, and if there are any insects or eggs present, they will be destroyed, if possible, so, so far, that has been successful, but essentially, the mosquitoes are coming here, particularly with air transport of any type but also in ships. The mosquitoes can quite happily live in pools of water for the time it takes a ship to get here.

So, one of the reasons that we're not – we don't have them is that we're trying to keep them out, and we're probably doing a good job. The other reason we don't have them is that quite possibly, particularly for the – the tropical species, *Aedes aegypti*, may well have escaped into New Zealand, but it's not managed to establish a population, because the climate is too cold for it, so as the climate warms, it then becomes easier and easier for the – for this particular species to, if it does get in, to survive and start to build a population, and once it's here, of course, you could try to eradicate it, as we have done in the past with other pests, and one particular mosquito, the southern saltmarsh mosquito, which is a – a vector in Australia of a disease called Ross River virus, so that was – it

did become established in New Zealand, and we were able to eradicate it, but it was an expensive business.

The other – briefly, the other point to make about climate change and dengue is that the mere presence of the mosquito won't guarantee that you end up having a problem with dengue. If the climate is cold enough, the mosquito will not become infectious before it dies, so it requires a particular temperature, typically in the sort of mid- to high 20s region, for the – the infection to be likely to turn into a large outbreak, so it's – you know, there's a continuum. Initially, we – assuming these mosquitoes did get here, initially we might just get very small outbreaks of dengue as someone comes from Australia or from the Pacific islands or from Asia with the disease, the mosquito bites them, becomes infectious and then spreads the disease, but then as – if we allowed climate change to continue, and if New Zealand – if the New Zealand climate became more like, let's say, southern Queensland in Australia, then we certainly would be at risk of having large dengue outbreaks, and yes – and it – it – I mean, it's a serious disease. It's very debilitating, and it does cause deaths as well, particularly in children.

Q. So just in terms of the – so if we lose the 'flu and get dengue instead, what's the comparison between the costs for New Zealand between the two?

A. Yes, I'd like to be able to give you a figure. I mean, I think one could – you could attempt to – to make an assessment of that type. We're not going to lose the 'flu. We're still going to have 'flu, but we might – it might not be – it might not transmit quite so much as it would have otherwise. I think there's too much uncertainty in the modelling and our ability to quantify the health burden relating to these diseases is not sufficiently accurate I could say, you know, "We'd rather have a bit more dengue and a bit less 'flu." It's kind of – it's beyond viability to advise, I'm afraid.

Q. Thank you, Professor Hales. Thank you very much for your evidence this morning. It's been very enlightening and somewhat concerning as well, so thank you again. There are no more questions from the Tribunal, so we will hand you back to your counsel.

A. Thank you very much for the opportunity.

FURTHER QUESTIONS – NIL

HEARING ADJOURNS: 10.48 AM

HEARING RESUMES: 11.24 AM

TECHNICAL DIFFICULTIES – RECORDER STOPPED/RESTARTED

JUDGE MILROY:
(Audio resumes at 11:24:21)… now.

(11:24) DR PRISCILLA MARY WEHI: (MIHI, #A066)
Kia ora. So, he mihi tuatahi, he mihi ki a koutou, e rau rangatira mā, ā, ki a rātou kua hikoi i mua i a tātou. So, ka tipu ake ahau i Te Waipounamu, engari i tīmata tāku haerenga ki te ao Māori i Ruātoki, i Aotea Moana, i te Tai Tokerau, huri noa i te motu. So, ko Waikato-Maniapoto me Ngāpuhi Nui Tonu ngā iwi o tāku hoa rangatira me āku tamariki. Nō Kōtirana ōku ake tipuna. So, he tangata Tiriti ahau.

I have been asked by Te Waimate Taiamai ki Kaikohe Claims Alliance, Wai 3278, Wai 3279, and Wai 3375, to give an opinion on the impacts of climate change within my field of expertise.

I am a conservation biologist, and I currently work full-time as a research professor in the Centre for Sustainability, Ōtākou Whakaihu Waka, The University of Otago, where I specialize in interdisciplinary research with a conservation focus, largely (but not exclusively) at the intersection of te ao Māori and conservation. So, much of this explores socioecological relationships – that is, relationships between humans and other plants and animals – but also species behaviour, morphology and distribution, and how these change through space and time. So, my credentials are listed in full from paragraphs 2 to 5 of my brief of evidence.

For my evidence, I rely on consensus statements from global climate scientists (such as the Intergovernmental Panel on Climate Change), and evidence (including climate modelling) generated specifically for Aotearoa. So, as a conservation expert, my role is to take the evidence from climate scientists and apply and consider how that evidence might apply to biodiversity conservation or the maintenance of biocultural relationships, so, biological and cultural relationships.

So, climate change and the loss of biological diversity (which we call biodiversity), these are interconnected issues, although impacts on biodiversity are often indirect, so, in general, climate change might, for example, lead to the arrival and establishment of invasive species that increase interspecific competition or reduce food availability for native species. Climate change might also lead to changes in abiotic conditions such as increased temperature, changes in water availability that can act to limit survival, alter species' life histories and behaviour, and result in range shifts. It's important to note there are limits to adaptation for biodiversity. So, these may be based on physiological tolerance (for example, related to temperature or water regimes), or they might relate to an inability for species to migrate. So, in these kinds of matters, I accept the evidence of experts who state that pushing towards climate tipping points amplifies threats to species.

There are several potential impacts of climate change on biocultural relationships.

International biodiversity commitments such as the Hawai'i Commitments recognise that Indigenous peoples' knowledge and customary use of biodiversity is essential to biodiversity conservation and that climate change is a particular threat for Indigenous peoples.

So, there is an inextricable link between culture and nature, and cultural, linguistic and biological diversity are deeply intertwined. In Aotearoa New Zealand, the health of te taiao is connected to the health of Māori culture and the health of te reo Māori. So, loss of biological diversity (including but not

limited to climate change effects) is strongly correlated with loss of Indigenous culture and language. So, our work as well as others' shows that as species are lost, so too are practices, and the words that are used to describe both species and practice. So, that is, biodiversity loss affects the reo, practice, and knowledge of hapū.

So, as climate change extirpates local populations and results in ecological shifts, this impacts community social systems. Practices such as gifting and exchange of natural resources, and the maintenance of resources of plants and animals, as an obligation to past and future generations (often called kaitiakitanga), are embedded in cultural thriving. So, cultural health is connected to ecosystem health, and climate change has the potential to threaten these social systems.

So therefore, climate change, through its effects on biodiversity and the diminishing of cultural practice, can challenge cultural wellbeing. So, Māori traditionally rely on the natural world for foods, rongoā, and resources for weaving and other activities. So, these may be native species, from tuna through to kūmarahou, or kuta, or introduced species. In many cases, the same harvesting sites, within tribal boundaries, may have been used for generations and continue to be used by communities today. Where Māori are excluded from traditional lands or access is limited, or when resources become scarce or available at different times of year, as may occur with climate change, that can impact on the provisioning of foods or other resources by the community, and also on the mana of the community. It may also directly affect individuals who rely on those resources for their own wellbeing.

Dr Alexandra McMillan noted in her evidence previously that substantial evidence now points consistently to the benefits to health, equity and hauora Māori from well-designed changes to the food system, so, supporting a shift away from shop-bought meat, highly processed foods – and uphold mahinga kai. Our work in partnership with three Waikato marae showed that accessing traditional foods such as fish is hampered by erosion and other damage to waterways, in the view of local stewards, local kaitiaki. While the causes of

these issues are likely complex, research on the contributions of climate change is urgently required to understand how mitigation can best occur and restoration of healthy foods that upholds local food sovereignty and mana is supported.

Other studies provide stronger evidence of potential climate impacts. So, for example, changes in regional distributions of species can occur because of climate change. So, I collaborated with community experts (so, expert weaver Mrs Te Hemo Ata Henare,) modellers (Dr Barbara Anderson and PhD student Matthew Bond), to explore potential distribution changes for a weaving plant, *Eleocharis sphacelata* (which is also known as kuta), under a range of predicted climate scenarios. Kuta is a wetland sedge and a weaving plant that is especially valued in Te Tai Tokerau, where it is transformed into soft mats, hats, and other items. Kuta therefore has a particular association with Te Tai Tokerau for many, although it also grows in some other areas of Aotearoa. And because 90 per cent of wetlands in Aotearoa have been degraded, every remaining wetland is of importance.

We found that although kuta was predicted to increase in the South Island under future climate scenarios, suitable habitat in Te Tai Tokerau is predicted to decrease. And at sites that are currently renowned for their populations of kuta, in particular Lake Ngātu, habitat suitability was predicted to decrease significantly over time with increasing carbon emissions. There is therefore real possibility for harm. High quality and abundant resources are a source of tribal prestige. Opportunities for kaitiakitanga at harvesting sites that have been treasured for generations, this is challenged, and ceremonial gifting is highly likely to be diminished.

Reduced local access to species is also typically accompanied by loss of biocultural knowledge, and loss of direct ancestral connections to the environment. So ecological changes that occur with climate change are a critical issue that transform resource availability and landscape in ways that affect cultural identity, sense of place, knowledge and social cohesion.

So, this project also highlights that measurement and understanding of the effects of climate change on cultural taonga such as kuta in Aotearoa is a major gap in knowledge that has not been addressed.

So, not all species will be affected by climate change in the same way, as our analysis for kūmarahou showed, but currently data are deficient for almost all species, so it is impossible to plan ahead for future impacts on biocultural relationships.

So, this evidence demonstrates that there are real cultural harms that may result from climate change, should signature food sources for major cultural events become unavailable, or populations of kuta or other species disappear (or move) as predicted with climate change. So, for example, if Te Tai Tokerau were to lose thriving populations of kuta, then years of traditional association between this plant and weavers would be irrevocably damaged. In the food system, if erosion, pollution and other issues that beset Aotearoa New Zealand waterways remain unaddressed, marae will continue to be unable to access healthy, traditional food sources as needed, with a concomitant loss of mana where traditional delicacies are unable to be provided at major events. And to note, it's unclear if councils take adequate account of these biocultural relationships and their future health in council planning.

Not nearly enough work has been undertaken on how climate change might affect culturally important species in Aotearoa (as well as biodiversity in general). Data deficiency has previously been noted as a major problem in quantifying the impacts of climate change on New Zealand's biota, plants and animals. And in my view, understanding biocultural diversity impacts of climate change is an important research gap that needs attention and funding.

The majority of Māori land is no longer in Māori ownership, so many culturally important species populations, that may be affected by climate change, occur on land or in waterways that are not governed or managed by Māori, and at times harvesting will only take place with the permission of the landowner.

Barriers therefore exist for Māori to influence future species management and to manage biocultural relationships and enact kaitiakitanga.

The collective national response to climate change has been inadequate for protecting biodiversity, including highly prized species used by Māori. And assessment of current and predicted future habitat for species using a biocultural relationships lens needs to be undertaken, with an investment into research on biocultural relationships and how they might be affected by climate change.

Reducing the effect of climate change on biocultural relationships that are important for continued cultural health requires well designed mitigation policies, and these should be developed together with Māori experts and communities. Community must be meaningfully and consistently involved in adaptation planning and decision-making for biodiversity to ensure biocultural relationships are enhanced and not diminished.

And finally, the development of protected areas for culturally important species, co-governed with Māori communities, is likely important for the future regional retention of these species.

So, thank you.

MS SWEDLUND:

Thank you, Dr Wehi. If you would just remain for questioning from the Tribunal.

JUDGE MILROY:

Thank you, Dr Wehi. I will just check whether we have questions.

(11:40) BASIL MORRISON TO DR PRISCILLA WEHI:

Q. Kia ora and thank you most sincerely for your submission. Can I just refer you, please, to para 22.

WITNESS REFERRED TO #A066, PARA 22

And you mentioned or talked there about meaningful community consultation and adaptive planning and decision-making. How do you see that actually being carried out? Do you see that being carried out through a local or local government structures, i.e., district or regional councils? How do you see a structure being used?

A. That's a great question. I think that that kind of relationship building and planning has to occur at local scales because, first of all, local councils do have responsibilities, but also local communities tend to know their regions best and are very close observers of change. So, I think that local councils have a really important part to play, but also organisations like the Department of Conservation, because they also have legal responsibilities, for example, for waterways. But I think providing ample opportunity for communities to both convey concerns and also their knowledge and observation of what's going on is also critically important. So yes, I think what happens at a local level is very important.

Q. Okay, thank you. And I see opportunities there that both a governed agency, i.e., the Department of Conservation, and local and regional councils. In many cases now, they have iwi liaison or iwi groups in which they hui and talk about lots of other issues, and in my experience that is growing. So, I would see perhaps – I don't use the term "lead agency", but there is a vehicle there in our democratic process of today in which those issues can be consulted on and arrive at a – either a legally legislated process or a community understanding, i.e., both of them being through district regional plans or community acceptance. So, thank you very much.

(11:43) PROFESSOR DAVID WILLIAMS TO DR PRISCILLA WEHI:

Q. Kia ora, Dr Wehi. David Williams speaking to you now. Thank you for your evidence.

I was struck by your paragraph 9 on loss of biological diversity strongly correlated with the loss of indigenous culture and language. It's sort of an issue that I am really interested in, and I've got a book here, Robert Macfarlane, *Landmarks*. It's all about the loss of English words about nature, as kids grow up in cities and so on. So, these things are

happening all around the world, that there's a loss of biocultural knowledge in even the words we use, so I was very interested in that.

And then I refer you to the article that you wrote with Tom Roa, and at page 235 of the bundle or page 7 of your article which is #A066(a), you refer to Piopio, and I said, "I know all about Piopio, I've had a lot of coffee and lunches at Piopio on the way to New Plymouth", and they you undermine my whole story, because I thought it was the bird, and here you are – the extinct bird, of course – but here you are telling me that Whakaoterangi prepared a particular kind of kūmara, preserves it well if left in certain kinds of frosts for a certain length of time. I thought, "Well, that's a climate change issue".

I mean, but do you actually have any – any further knowledge about that particular form of preparation? So, piopio apparently means "purse the lips", according to some Tainui traditions and understandings. So, I will remember to purse my lips when I pass there each time now in the future. But the substance of this article, you spent a lot of time on the food that's served in poukai, and I just wonder, do you happen to know – I mean, there's not going to be so much frost around. Is this a climate change issue or just people don't do it that way anymore anyway?

WITNESS REFERRED TO HEARING BUNDLE (WITH APPENDICES), PAGE 235

A. I think you would probably need to talk to Tom about the specifics of that kūmara, because I too fall into the disappointed camp. I thought it was also about the extinct bird until I heard him speak about. So, that particular paragraph is a contribution from Tom. I think, though, when – when we talk about specific growing conditions for different kinds of kūmara, though, that absolutely does bring climate change into the picture, because when we do climate – climate modelling for how species might thrive, we do look at things like the coldest temperatures, the average rainfall, the cumulative rainfall, the – the lowest mean temperature per month, so, all of those kinds of biological data are important and will change with climate change. So, how that affects specific, you know, varieties of kūmara I can't tell you exactly, but I'd say that absolutely underscores what I am saying about our lack of data and

our lack of knowledge around how certain really culturally important varieties or species will do in the future with climate change.

Q. Right, good. Thank you. Well, Piopio does seem to have importance in other parts of the country as the extinct bird. Milford Sound is apparently Piopiotahi, so I find out. But – so, the other thing about this article you did with kaumātua Tom Roa, quite a few of the examples are, of course, historic examples. Ngāti Apakura can't get eels anymore because there was a military invasion, there was confiscation of land, the swamps were drained – wetlands, we would call them these days, wouldn't we, but when you want to drain them you call them swamps – and there aren't any eels available, but that's 19th Century stuff, and the examples you gave today in your evidence today related to primary kuta and kūmarahou and so on. Do you have any other modern examples of, you know, where climate change is clearly the most important factor that you need to worry about?

A. I think you are raising a couple of really interesting points here. So, the first is that climate change, biodiversity loss, colonisation, farming practices, habitat fragmentation, all of these things are interrelated, and it can be quite difficult to tease apart exactly what is driving what and that's – you know, that's really challenging, and particularly when we don't have enough data about what's happening with climate and how different species might be affected.

The other thing that you are pointing to is that these relationships are historical. What I would say rather is that a lot of knowledge is intergenerational and because circumstances change doesn't make it any less important. Ngāti Apakura is very well aware that the tuna, that – the health of tuna in their region is no longer what it was. That doesn't make tuna less important to Ngāti Apakura. It means that they feel that loss very keenly, and there's a desire to restore the wetlands so that that species can once again flourish.

I think that people have very important connection with the stories, the pūrākau, the – all of these things have cultural – they are really important, and they are part of cultural identity. There are stories within Ngāti Apakura about their ancestress and her relationship with tuna. These are

not things that once were and no longer exist in the culture. I think they remain living and one of the reasons that kaitiakitanga is so fiercely fought for is because these relationships remain critical to identity, and that's why we call them biocultural relationships. Yes.

And, I mean, I look around the whole country and I see the desire for youth, for people who live out of their regions, to reconnect and to contribute to what we now call kaitiakitanga, the – which is essentially the restoration not only of the ecology of places, the ecosystems, but also the language that accompanies - accompanies that journey.

So, for example, if I no longer harvest the eels of Ngāti Apakura in the wetlands, I lose the words for all of the different phases of the life cycle of those tuna. I lose the – the stories that connect me to those tuna, I lose words for the health of the wetland itself and all of the things that thrive within the land. So, there is this real loss of language and culture if practice cannot be continued. So that's why there's a huge body of evidence now, that shows how language practice, cultural and biology, the species that we live with, how all of these things are interconnected. And I think if we truly would like Māori culture to survive in the future, then we need to ensure that we are doing what we can to ensure our ecosystems are heathy and not impacted by climate change as well as all of the many other threats that they face.

Q. Well, that's excellent. Thank you very much for your elaboration on that, the Ngāti Apakura story in particular, which is a rather important one, because Rangiawhio, apart from anything else, but – so thank you very much.

(11:53) KEVIN PRIME TO DR PRISCILLA WEHI:

Q. Tēnā koe, Ms Wehi. I was interested in your comment in paragraph 14, about kuta, and is kuta just reliant on cold weather, is it?

WITNESS REFERRED TO #A066, PARA 14

A. No. Kuta is really interesting actually. So, this – this is, again, why I say we need to know more, because every plant and every animal has its own set of requirements. So, for kuta, things like the cumulative rainfall each year is really important, and that's partly because it's a wetland plant. But

also, temperature is important, and the seasonality of the rain, so, when during the year that the rain actually falls. So, there's a whole lot of abiotic factors that influence kuta, but in the modelling that we did, it was actually the rainfall that – that popped up as the most important of those factors. But then you've got all the other stuff like pollution, as well, and the way that the lake is used, or – if we're talking about lakes.

Q. Is it likely to affect things like flax, which is sort of in the similar environment?

A. Yes. Flax is a bit different. It's spread right through the country and it's reasonably hearty, and it also grows well at home. I don't know if any of you have flax bushes growing in your kāinga, but it's reasonably adaptable. We don't see that with kuta. At the moment I don't know of any kuta that's growing in captivity or in a domestic situation. It really thrives within those wetlands that we see out in the country, if you like. So, I would say – you know, harakeke is also valued right across the country, but kuta has a particular place, I think, in Northland in particular; also in parts of Te Arawa, as well.

And so this is where I think the nature of the regionality is really important because, if under climate change we have a lot more kuta in the South Island, which is what our predictions showed, that's not actually going to help the weavers in Te Tai Tokerau, the experts that have passed on their knowledge for generations, they are the ones who are not going to be able to get it.

You are not going to be able to see the beautiful kuta whāriki you see around Kaikohe, the mats that you see on some of the marae, for example, those – or the hats that you see weavers up there make. So, there are real regional difference in how climate change will impact culture, I think. Yes.

Q. Thank you very much. Much appreciated.

(11:56) JUDGE MILROY TO DR PRISCILLA WEHI:

Q. Thank you, Dr Wehi. I did have a question about kuta, or at least an example of what might happen. So, it grows in wetlands in Te Tai Tokerau, and you mentioned Te Arawa. And I am just – and then

you – in must talking to matua Kevin, you mentioned that it might – if it was abundant in the South Island, that's not much use to Tai Tokerau weavers. But I was wondering about its – how it would start to grow in the South Island, if it's not there already. So, because as part of your evidence you mention that the wetlands are very degraded and that we only have about 10 per cent of them left, so I am just wondering if it's even possible for kuta to move and grow somewhere else.

A. Yes, you're right that most wetlands are degraded, and that's a huge challenge in itself. We do know of some very small pockets where kuta exists currently in the south. But the main change with climate would be as the rain fall patterns shift. This is what we – what's predicted to happen using these global models. If the rainfall patterns shift, then it would make those very small pockets in the south more likely to be suitable for kuta and it might thrive there and become more abundant. So, you are quite right, a lot of wetlands would still not be suitable habitat for kuta, but there would be places where the rainfall regime would change, and it might do better in those places. And it's – again, it's the changes in the climate that makes a place more suitable or less suitable for a plant to live.

Q. And I am presuming that that's a similar for other plant species. You mentioned kūmarahou in your evidence.

A. Yes, but the challenge is that every plant has slightly different needs, and we really need to understand that those are in order to be able to predict how well they might do under climate change.

Q. Well, thank you very much for that answer. That's been very helpful. I, too, with Professor Williams have noted the – am interested in the linguistic changes that have occurred, as between, for instances, the diaries that my great-great-grandfather wrote and the language used then to modern day Māori, for instance. So, the linguistic shift is happening all the time, but do you expect that it might be exacerbated under climate change?

A. Yes. I think you are right. Language does always change. There is natural evolution in every language as, you know, as circumstances change, as we live in different ways, and so on and so forth. My concern is that – is around the words that will be lost or even the concepts that will

be loss if the relationship with different species change. So, for example, if you can't go out and harvest a plant or an animal, whether it's kuta or whether it's kererū, you start to lose some of the nuance of that language, and particular words just – will fall into disuse because you are no longer practicing. If I was thinking, for example, about tūī, there are many, many different names for tūī that are no longer in common use. So, we know, for example, in Mataatua region, that there are different names for male and female tūī, and if you look really closely, you can actually see the morphological differences, so, the differences in the way that they look. There are different names for tūī depending on the time of the season and what they are feeding on. So, there are very specific ecological knowledge or knowledge of the species that's encoded and embedded in the language itself, in the names that we use for different things. So, all of these things, I think, are both precious for te ao Māori but also very precious for ecologists or conservation biologists like me, because they help us to understand how that ecosystem functions, how it works, and we need to actually have a very good idea of that if we are to keep our ecosystems in good health.

Q. So, just to go back to kuta as the example, even if it does grow in the South Island and somebody, you know, an entrepreneurial Māori or Pākehā person decided that there was a market for kuta in Te Tai Tokerau for the weavers, but nevertheless something is lost, because those weavers are no longer harvesting and process the kuta themselves, so.

A. Yes, absolutely. And even the name for kuta changes as you move through the country, so it might be called pao somewhere else. So, every region has specific words that they use to describe what they see. So yes, absolutely, it would not be the same, it would – it's the relationship that really is important between people and the plants and animals that they interact with.

Q. All right. Thank you very much, Dr Wehi, for your evidence. That's been very interesting to us all. I will hand you back to your counsel now.

A. Thank you.

MS SWEDLUND:

Thank you, Dr Wehi. I have no questions of re-examination and so that concludes your evidence **(inaudible 12:03:09)** today. Thank you.

DR PRISCILLA WEHI:

Kia ora.

TIMETABLING – MICROBREAK (12:03:31 – 12:04:22)

HEARING ADJOURNS: 12.04 PM

HEARING RESUMES: 12.13 PM

JUDGE MILROY:

Kia ora anō, Ms Smith, we will hand over to you.

MS NICOLE SMITH:

Thank you, Ma'am.

MS SMITH CALLS

DR GEORGE ROBERT LAKING (SWORN)

Q. Tēnā koe, Dr Laking. Welcome. Can I just ask you to confirm your full name for the Tribunal?

A. Tēnā tātou. George Robert Laking.

Q. And you appear as an expert witness in relation to claim Wai 3340. It is a claim by Tōtaranui Nama Ono Trust. You prepared a brief of evidence dated 28 April 2025, which has got the label #A075 in these proceedings. You confirm that's a true and correct record of your evidence?

A. Yes, that's true and correct.

Q. And you have read the code of conduct for expert witnesses in schedule 4 of the High Court Rules. Can you confirm that you are complying with code in giving your evidence?

A. Yes, I do.

Q. Just to centre the Tribunal and to note that you are also a claimant in Wai 3395, that's a claim by yourself and others for and on behalf of Ngā Toki Whakarururanga, is that right?

A. Āe, that's true.

Q. Thank you. And the report that you refer to in your expert brief of evidence, that was prepared with one of the other – a trustee, I think, of the Tōtaranui Nama Ono Trust, Mr Manu Caddie, and others.

A. Also true.

Q. Yes. So, can I ask you to present your evidence and then answer any questions the Crown or the Tribunal may have.

(12:14) DR GEORGE ROBERT LAKING: (#A075)

Tēnā tātou. Thank you. So, ka rere te mihi ki a koutou te Tribunal. Nōku te mihi nō tēnei uri o Te Whakatōhea. Hori Laking taku ingoa.

I am a medical oncologist, cancer specialist, by training, and I work for Te Whatu Ora Health New Zealand in Auckland, and I am also an Associate Professor at the University of Auckland, at Te Aka Mātauranga Matepukupuku, the centre for Cancer Research.

I've been professionally interested in the association between climate change and health for more than a decade now. I am an executive board member of Ora Taiao, the New Zealand Climate and Health Council, and the events that led me to prepare the brief of evidence was the cyclone, Cyclone Gabrielle, that made landfall in our country at the start of 2023, and as we all know was extremely disruptive, especially across the northern and eastern part of Te Ika o Māui.

The government was interested in the effects of the cyclone and what needed to be done, and that can be viewed within the context of the government's commitments as part of the United Nations Disaster Risk Reduction Programme.

And so, after the cyclone, the government commissioned a good deal of research to understand the effects in cyclone, what could be done. Most of that was led by MBIE, but the Ministry of Heath also sought people to – from the universities to do research, to understand the health effects of the cyclone and so we at the University of Auckland expressed our interest in that work, and – but it was very important, of course, because we were in Auckland and the research brief specifically focused on Te Tai Rāwhiti and Hawke's Bay, it was very important for us to – to partner strongly with community based organisations.

So, we connected with Te Weu Tairāwhiti Charitable Trust, that Manu Caddie has a leadership role within, and – and we also connected with Sustainable Hawke's Bay in Hawke's Bay, and so, together with the University of Auckland, this was our research consortium.

You might wonder why a medical oncologist in Auckland in a high specialised area of health care might be professionally interested in the effects of a cyclone. I often say in a very simple way, it's very hard to run a health service if you do not have a road so that people can access the health service. So, there's a very fundamental connection to what we do and our ability to do it that depends on also sorts of things that go beyond the simple bricks and mortar of a specialist hospital. But apart from that, I also have a wider interest in health and the determinants of health professionally, as I've mentioned.

So, I took on the role of being the principal investigator for this research project that was officially called a study of the health effects of adverse weather, but we refer to it as *Te Weu me Te Wai*, which referred to the collaboration that we had to Te Weu, Tairāwhiti – weu, of course, being that little fibre or rootlet that is the interface between a plant and the ground – and Te Wai, us at Waipapa Taumata Rau. That's the Māori name for the University of Auckland. So, *Te Weu me Te Wai* was the name that we gave our project.

We were, I think, very well resourced by the Ministry of Health to do this and so we were able to examine the effects on health of the cyclone from two main perspectives.

One was what we could call the quantitative side, in which we drew on data that's collected by the Ministry of Health called the national collections that really is a type of ongoing time-and-motion study of the performance of the health system, and we were able to – to study the performance of health system across the time of the cyclone and the months following, and we had six years of data to work with, so that gave us some comparators for our study of the effects of the cyclone. Much of that time, of course, was the time of the COVID pandemic, but that formed quite natural sort of positive control for the qualitative part of our study of health system performance. The second big part of our project was – beg your pardon, the quantitative part of our healthcare – of health system – of our study.

The second big part of our project was a qualitative study; not working with numbers, working with kōrero, what people had to say. And for this, we were able to go to the affected communities and talk with people about their experience of the cyclone, especially from a health perspective, to try to understand what had been happening, what sort of things went well, what didn't go so well and what might be done to improve the situation.

And that qualitative work was done, as qualitative work is in academia, by focus groups, which is assembling a group of people together with a facilitator to talk about their experience – focus groups were especially used in the Hawke's Bay of the research – and also by one-to-one interviews with affected people, and the one-to-one interviews were especially used in the Tairāwhiti, Gisborne/East Coast part of the research.

And one part of our work that I feel happy about was – it's a point that Manu Caddie was very strong about it, it's – it's very desirable as part of the work to build community capacity to do this type of thing, and so with the help of a qualitative researcher and a professor of Sociology from the University of

Waikato who is based at Gisborne – her name is Professor Holly Thorpe – we trained four wāhine Māori to become qualitative researchers and to talk – to do these interviews in Tairāwhiti especially, to talk with people about their experience, and I think that because the – the researchers in the interviews were members of the affected community, it meant that we were able to open doors, as it were, and yes, local networks, to talk with people up and down the coast.

So, the findings of our research, of course, I have outlined in the brief of evidence. The Minister of Health asked us to put forward some recommendations for how the health system might adapt and modify itself in the context of extreme weather events and the main – there were three main recommendations that we made.

The first recommendation was for much more community empowerment in relation to the self-organisation of communities. The quality of experience during the cyclone, we found, depended very greatly on how well people and their communities were connected with each other.

The second recommendation was for increased presence of our health services in the communities, and that's one that's hit home for me personally as a representative of a highly specialised health service that can often feel a little bit remote from communities it looks after. Health services really should have a greater community presence, and again, we found that the experience of the cyclone in relation to health services depended very much on how well connected those services had been with communities before the cyclone. If you were already known to the health service, your outcome was likely to be a lot better than if they didn't know about you because with the disruption to infrastructure, of course, it would be much harder to identify people if you hadn't already known about them in the first place.

And then the third recommendation was a recommendation to government to think more explicitly about its rules for procurement of equipment with an eye

on – on procuring equipment for resources that would be fit for purpose in the event of another such extreme weather episode as the cyclone.

Naturally, quite a lot of our work, I feel, intersects with the – Te Tiriti o Waitangi, especially bearing in mind that the communities with which we worked in a part of the country that has very strong Māori presence and population, and many of our findings related to the experience of Māori communities with the cyclone, the way that the Māori communities adapt and worked, adapted and worked to get through the cyclone and its aftermath, and we felt that there's a lot that could be learnt from the example of Māori communities. I think that this is a recurring thing around the country, the way in which marae step up as local hubs when disruptive events happen.

I was quite heartened, as I say early on in the brief of evidence, with the New Zealand – at point 14 and 15 of the brief of evidence, the New Zealand National Emergency Management Agency, their midterm report that says: "Te ao Māori and mātauranga Māori are essential in building disaster resilience in Aotearoa New Zealand."

I am very happy to have been invited to prepare and talk about the brief of evidence for the Tribunal today and I would very much hope that the insights and recommendations of our work might resonate with the Tribunal and the Tribunal's interpretations of te Tiriti and what it means for the law of our country.

Thank you for hearing me. I can hear a phone going off somewhere. I do apologise. I think I've stopped that, but I will pause at this point and very happy to respond to any kōrero. Kia ora tātou.

JUDGE MILROY:

Kia ora. Thank you, Dr Laking. We have questions from the Crown, but we are also at the lunch break. So, we will take our lunch break and come back at 1.30. I think we can give ourselves an extra 10 minutes, we will then hand over to the Crown for questions. So, you are allowed lunch, Dr Laking.

HEARING ADJOURNS: 12.29 PM

HEARING RESUMES: 1.30 PM

JUDGE MILROY:

Kia ora anō, welcome back. Now, we left for lunch after Dr Laking had given his evidence in chief, so we are now at the point of handing over to the Crown for their questions.

(13:32) MR PREBBLE TO DR GEORGE LAKING:

Q. Thank you, your Honour. Tēnā koe, Professor Laking. Ko Jeremy Prebble tōku ingoa. Kei konei au mō te Karauna. Thank you, kia ora. Thank you very much for your thoughtful and well researched evidence that you have provided today. Most of the questions I have are clarification ones in nature, but also just to gauge your views a little bit on, I guess, where to next in a bit more detail in terms of the recommendations that you make. And I think, as I have read it at least, your evidence to me has a key focus being on the Hawke's Bay, Te Tai Rāwhiti area and the health impacts of extreme weather events. That's a fair kind of summary of where – where you are going?

A. Āe.

Q. Yes, yes, thank you. Anyway, I have a question, it's possibly a minor one, but just as I read through, paragraph 31 you talk there about: "Secondary analyses were hypothesis-generating and would need further investigation before they could be confirmed." And I guess the question I had really was: What exactly are you meaning in that paragraph? For example, does that mean that the research for the secondary analyses has not yet been undertaken?

WITNESS REFERRED TO #A075, PARA 31

A. So, that statement is a pretty standard type of what you might call a health warning that would go alongside most statistical analyses. When you work with numbers in general, you will set up one analysis as your primary analysis that you feel the most confident about, but you will also try to find out what the data are telling about other things that might be going on.

But those interpretations of the data are always made with a higher level of uncertainty, and I think, thinking back on it, probably the main issue there was that we had relatively small numbers of people to work with because these parts of the country don't have extraordinarily high populations.

There has been some more work done globally to look at the connection between extreme weather events and health. There was a paper published recently that looked globally at association between extreme weather, hurricane, cyclones, typhoons, and then the incidents of acute cardiovascular events following that. So they were able to look at millions of people and that paper found a signal. But of course, we had only some tens of thousands of people to look at, so yes, again, point 31 is a pretty standard type of qualification saying ideally we'd come back and explore that association further over a longer time period with larger numbers of people and a more dedicated study.

Q. No, thank you. That makes a lot of sense. I was wondering if you were suggesting there were other hypotheses that you weren't putting forward, but you are saying that it's just that ideally you would have a greater population size to test some of the key conclusions that you are making in this evidence. Is that what you are saying?

A. Yes, that's what that paragraph is saying. I guess it's always possible to put forward hypotheses and think of other hypotheses but in terms of what that paragraph was saying, it was talking about – yes, like I said, just the small numbers that we had to work with for those associations.

Q. Thank you. I guess 34 onwards you start to talk about your qualitative findings, and at paragraph 39 there, you refer to successful outcomes across extreme weather events being associated with the quality and extent of participant community relationships and prior integration into the public services. And I guess I just had a question about what you mean or what would you say are successful outcomes? How do you define those when you are speaking of them here?

WITNESS REFERRED TO #A075, PARA 39

A. So, I always like to refer to the work of Irihapeti Ramsden who wrote about cultural safety, who was really the inventor of cultural safety. And the

challenge from Irihapeti Ramsden was that the standard for assessing the quality of service is the experience of the recipient of the service. So, very much thinking **(inaudible 13:37:24)** outcomes from the perspective of the people who receive services.

One example of this around the time of the cyclone was how they were able to get medications to people, because with the lapse in communications infrastructure, mobile system was down, data system was down, the usual systems that the pharmacies had for dispensing medicines they couldn't recourse to, so they had to fall back on pen and paper, and they had to fall back on hand delivery of prescriptions out to the community. And really, the ability to set up a work-around like that depended on how well connected the pharmacists were with their communities, that they knew someone who had access to four-wheel drive transport to get into remote areas when the roads were down, that they even knew that there was a person living at a remote address who's medicine supply was expected to run out over the next few days. So that sort of preexisting connection to the health service and links into the communities, those – we identified those things as being predictive of a successful outcome from the perspective of the user of the service who was able to receive their medications.

Q. Thank you. No, that makes a lot of sense. So it is a subjective, if you like, perspective of when something is a good outcome.

A. Indeed, indeed. I think this is probably in the nature of qualitative research, although just speaking as researcher, the further you go into trying to understand events and their outcomes and the determinants of those, you end up having to make some interpretation of what you see happening, and I'm sure there's bound to be a subjective element. I just think that's part of the nature of deliberative reasoning.

Q. Yes. And you go on to note that outcomes were less good, I think you say, involved, I guess, people who were socially marginalised, affected by poor infrastructure, long distances to see a medical professional, et cetera. Presumably, that wasn't much of a surprise to you in undertaking this work.

A. This is true, this is true. It's something that I agonise about a little bit when you go into research. I think it's pretty hard – to go into research in a completely – as it were, in a naïve type of way. Everyone who does research has, what you would call, a prior understanding of the situation and it's on the basis of that prior understanding that a hypothesis is generated and – well, indeed a finding in paragraph 40 about the less good outcomes did line up with a prior hypothesis about this, and not really too much of a surprise, as I, perhaps, sense in your own interpretation of that.

Q. Yes, yes. I take from that essentially you are saying the more isolated you are the more at risk you are medically, whether during a storm event or otherwise, presumably.

A. That's true. And so, I think this led into the thinking from our recommendations, which are all about how we, as a society can work to reduce that isolation, and I think this is – the tension that exists between centres of power and peripheries and that, I think, drove a conclusion that the more that we can empower communities who are close to the periphery, who may be personally related to someone who's socially marginalised or ostracized for whatever reason, then there's potential to remedy those outcomes.

At the top of the brief of evidence – let me see which paragraph it is – I refer to the Meihana Model of health, and it's been influential for my own thinking, and the Meihana Model of health challenges us to think about some of those things that might leave people to be more at risk. It talks about marginalisation, colonisation, racism and migration.

Q. Yes, thank you. That makes sense. I – I – and it leads on to what I was going to ask really, which is your evidence essentially leads to this conclusion: that more control should be provided to local health providers or for the community and their health, and I think – I guess I had a question around this. Firstly, do you consider, to an extent, that that is already happening with health services being devolved? Obviously, we've got Te Whatu Ora but then local health services and providers. Or are you really saying that the current structure of our health service is one

where there's got be greater devolution to local centres? I just want to tease out exactly what you are recommending –

A. Yes, yes, yes. I think it's a bit of both. I am sure that there's ongoing tension between the centre and the periphery. There's all sorts of reasons why it's desirable to have some sort of centre for what happens nationally.

Anyhow, I personally have been encouraged by the reforms that have happened in the health system and one aspect of those being the concept of bringing services closer to people at their home. And of course, one thing I found – I think you might have invited me to say some of my personal opinions, of course it's a bit distressing as a person that works in the public realm when one reform comes in and then its rolled back by the next government. However – actually, I was heartened by the most recent government, the current government, still talking about the desirability of bringing health services closer to people, and it's something I am very glad to be able to be involved in in my own work with reform of cancer services in the northern health region, Auckland and Te Tai Tokerau, where we are quite significantly changing the way that we work. So, instead of being based out of Auckland Hospital and Whangārei Hospital, we are bringing specialist cancer services into community settings, primary healthcare settings, general practices, marae clinics, even to people's own house, where that's possible.

Q. Thank you. That's very helpful too. So, I take it that you do – I think you acknowledge that there is a balance to be struck between – obviously there are reasons, including even just national guidance but consistency too, to have a centralised system, but to also have devolution to an extent. And it is that kind of to what extent you do that is really your interest here with these local communities during the storm events. Is that a fair summary of where you are heading there?

A. I think so. I think we can learn a huge amount from this type of event when we go back. And again, coming to this point about trying to divine what the things where that led to a successful outcome from a point of view of the recipient or at least a good outcome, we can learn so much from that that I would hope would help us in the sense of the

Sendai Framework from the United Nations Office for Disaster and Risk Reduction. They call it building back better.

Q. And your evidence, obviously you are focused here on disaster, therefore, I imagine you would accept that the provision of health services during disasters needs to obviously be worked in closely with our disaster management system as well.

A. That is very true. Health itself – well, and I speak from the perspective of someone who works in the health system, so my perspective is probably going to be one that health permeates everything, health is everywhere. But for health for so many people, is their enduring point of contact with public services, and I think that health has got a role, even beyond the actual nominal service that's provided. I do think it goes bigger than that, because to be able to work effectively in health care, you have to build a relationship of trust. I think I refer to this in my evidence, certainly in the report *Te Weu me Te Wai*. And so you have to build a relationship of trust with the people who provide health care, and what I like to think is that that relationship of trust with someone who really is representative of the state at large, would also help rebuild trust in – and build trust in public institutions as such. If people have a good experience with the health service then they might start to gain or regain faith in what public institutions are able to do, and I guess again that's a reason at a personal level why I feel it is so very important for our health service to be – to adopt and advertise really strong values, and especially the values that's contained in Te Tiriti o Waitangi.

Q. Thank you. Thank you for those answers. That does lead into my last set of questions for you. I also took from your evidence that you are really advocating for greater coordination and perhaps coordination and communication, if you like, as part of what you were talking about there, where you can actually communicate what is required and what is being provided to enable that trust to develop. But is it fair to say you are advocating for greater coordination between central, regional, local authorities and health providers, particularly during these climate-related weather events.

A. Yes. I think it's fair to say that. But I guess that may not – I imagine most people would agree it's desirable for what we do to be joined up. In terms of the nation, coming back to that third recommendation about procurement, we're talking about things like radios or the Skylink internet, so, communications systems that can survive outages due to something like a – like a cyclone. I mean, I've jumped to a fairly specific example, but again that was part of the "build back better" concept, that we should not be shy about fitting out our community providers with the equipment and lines of communication and relationships in advance of the catastrophe.

Q. No, thank you. That practical example is good, because I was going to ask you, do you consider the services actually exist and it's a case of connecting them better and perhaps resourcing them better, or do you think there remain clear gaps in the service of health during emergencies?

A. So, to me, every instance that we've seen where something hasn't worked so well for people, to me that's a gap in some sense and so we aren't there yet.

Just as an aside, I personally am quite interested in the set up that they have at the health service at Te Kaha. That not – it wasn't in our area of study but to me that's an example of a general practice that's in a rural setting that is pretty well set up to be able to coordinate activities inside it.

So, community – so that's out on the – the Whānau-a-Apanui area, where it's not unknown for the highway to be closed off by landslides, for example, and the community has to continue somehow. So, yes, examples around the country, I think, can be learnt from, where these systems work pretty well and I again come back to that point in the midterm report, te ao Māori and mātauranga Māori are essential in building disaster resilience in Aotearoa New Zealand.

Q. Yes, thank you for that. And obviously you were talking just earlier about forms of communication as being something that could be, as I hear you, looked at as a way to, in a practical sense, really assist during emergencies, to ensure that you can reach people. Are there other

practical suggestions like that that you have, that you've really seen from your work?

A. Well, so communication, that's about exchange of signals and you know, if I'm the government, and I send a signal, then the person who receives my signal needs to be ready receive it. So communication is a two-way thing, it's not simply sending something from the centre to a passive recipient.

And so, this makes me think about something like education, for example, a different realm from health, but the importance of what you might civics in our education and the types of things we put in our curriculum, because working in the health area, the more generally informed people are about what we do and why we do it, then I think that gives a real head start for being able to work constructively when we have to go ahead and work rapidly to do something.

I think the COVID pandemic can teach us a lot about this type of thing. The general climate of uncertainty about things like vaccines, for example.

I think a lot of the dialogue that we have inside our community about – inside our country about how things should be done does come back to basic level of education, which we need to be able to work as a society. So again, that means educating people about Te Tiriti o Waitangi, for example, and keeping that in school curriculums.

I might have strayed a bit from the health brief, but as I've said –

Q. Thank you.

A. – health is in everything.

Q. No, thank you very much for those answers. My last question was, do you think your findings from Te Tai Rāwhiti and the Hawke's Bay are ones that could be translated across to the rest of New Zealand, or do you think that they're really highlighting, I guess, risk issues that need to be considered in a more rural setting as opposed to, for example, the pressures that might be faced in our urban areas?

A. One thing that I thought about a disastrous weather even that knocks out infrastructure, such events make us all rural. You know, I live in a city myself, but if I don't have a road and I don't have communications, I might

as well be living 100 kilometres away in a rural setting. So, my view on this is that, yes, the way that people live in rural communities can – we can learn so much from that, about how communities cohere and – neighbours know each other and get together to come through a disaster. Disasters make us all rural.

Q. Thank you. Thank you very much for your evidence. Those are the questions I have for you.

JUDGE MILROY:

I will just check if the Tribunal has any questions.

(13:57) BASIL MORRISON TO DR GEORGE LAKING:

Q. Thank you most sincerely for your comments. Can I ask, Mr Laking, you made the comment about we all live rural in the sense of when the balloon goes up, but it wouldn't it be in – from practical terms, if you are in a city environment, at least you could walk next door and talk to somebody, whereas if you are out in – 10 to 15 kilometres from another house, it makes it a bit more difficult. So, would you see some differences there?

A. Yes, yes, of course that's the case. Yes, the analogy will only go so far. However, I still find it an interesting parallel.

Q. Thank you.

(13:58) PRUE KAPUA TO DR GEORGE LAKING:

Q. Kia ora, Dr Laking. I just one question. You talked about building back better, which was similar to what heard from Professor Hales this morning, about rebuilding for a resilience. In the context of your study, what do you feel that would mean for communities that might have to move? Would there be some health implications, some issues that would need to be addressed in relation to that?

A. Very much so. Very much so. There's very big set of implications for communities that might have to move. Fortunately, to my knowledge, this has not happened on a large scale with the aftermath of the cyclone. However, I guess, if we come back to that concept of the Meihana Model and migration as a strong determinant of health within that, that there are

– removing your community, in health terms, we might describe that as a major life stressor, and – and that requires a careful eye across the health effects.

I was able to tune in for the previous brief of evidence and just talking about when the vegetation where you are changes, then your language changes, because you are not talking about those things anymore. The points of connection into the world change and the implication of that change in environment really must not be underestimated.

There's a couple of words which we used in our work, there's a word called – that – quite like these words – solastalgia, which is a sense of psychic grief from losing the place that you used to know. And there's another – he kupu Māori, matemate-ā-one, which is not identical in meaning to that solastalgia but I think also touches on how people feel when their land and circumstance changes, the points of reference that we have psychically and as a community.

Mental health was a – we found that to be significantly jeopardised with what happened in the cyclone in an ongoing sort of way. Although communities are in the same place, there's another concept, it's called rain anxiety. So for many people who live in the affected areas, the rain starts to fall, that can be quite stressful because there's always that question mark, "Is this all about to happen again?". So, change in environment or change of location has got a lot of big health and implications that need a careful eye across them. Kia ora.

Q. Kia ora. Kia ora, Dr Laking. Just in relation to that, from your research and understanding, is there an effect that might be greater than Māori than perhaps on the general population in relation to the effects of rebuilding with resilience or not reinstating, et cetera. What's your perception of the communities that might be affected, I guess, pretty much from Te Tai Rāwhiti and the Hawke's Bay area that you have referred to, but do you have a view about that?

So, the concept that comes to mind there is tangata whenua, and to me that's a consequence of duration of occupation of land and the stories, the kōrero that's associated with land. You can go outside and you can look at a maunga and there's kōrero that goes with that maunga and if

you don't see that maunga anymore then it becomes a lot harder to access that kōrero and actually that might be quite an important kōrero for our identity as a people and actually as a reference point for a whole set of other values that we have. Often kōrero have some meaning inside them that relates to how we ought to act or behave, for example, and if you don't access that kōrero then we have to find another point of refence for those values. I – so this is especially true for tangata whenua, especially true for Māori, and I think as time goes on – because I'm a big follower of Wai 262 that – that I understand to talk about how people over time ultimately becomes claimed by the land in which they lived. And so Māori experience this strongly, but I think all people who feel that infinity to the land that they inhabit, if that land is changed out of all sight or they are wrenched away from that land, then that has a very big implication for – ultimately for health and wellbeing.

Q. Kia ora. Thank you, Dr Laking, thank you for your answers and your evidence.

(14:05) PROFESSOR DAVID WILLIAMS TO DR GEORGE LAKING:

Q. Tēnā koe, Dr Laking. David Williams talking to you now.

So, I am focused on your paragraph 55, *Community empowerment*, and the last sentence talks about "a devolution of power from central government towards communities", and quite a large part of your answers to questions from the Crown focused on that, and there's a legal principle of subsidiarity, which is that governance and decision-making should be at the lowest possible level, which I think you might be familiar with by the way you are nodding.

So, my question is that I get slightly mixed messages from your excellent long report *Te Weu me Te Wai*, because there's quite a lot of affirmation of high-up stuff from the World Health Organisation, Ottawa Charter, from the Sendai framework, which comes from the United Nations General Assembly Resolution in 1989, and the Ministry of Health 2023 Strategy. So, you sort of – you have this high-flown stuff which is up there being directed down, but almost all of your quotations from the qualitive study is people at the bottom telling the

people at the top that they don't know what they are doing, and of course, you referenced Te Whare Tapawhā and the Meihana Model. So, how do you hold all this stuff together? What's the basic thrust? Is it from the bottom up or from the top down or a bit of both?

WITNESS REFERRED TO #075, PARA 55

A. Kia ora. Well, I feel very honoured that you have put this question to me, and I wish I had the answer to it. To me, I many ways, this is the central question of governance, how to resolve that tension. We need both things.

I think as human beings, it's quite hard for us intellectually to hold two ideas inside our mind at the same time, but both point in the direction of general wellbeing and so we pretend to sort of default to binaries, one thing or the other, and I have to – you know, I have to acknowledge, you have identified the tension in our work. One thing that I would like to suggest is that much of the messaging from these international centralised organisations, is keep devolving power out to communities, keep adopting that subsidiarity. And so I would love to continue trying to understand this point, how do we strike the right balance, but I fear it's not something that I personally can provide the ultimate answer to on my own. I am sorry.

Q. Don't be sorry. Actually, your answer is very helpful to me because, you know, it's always easy, and I suppose especially from a lawyers' framework, to think in binaries and good and bad and so on. So actually, your answer was very helpful. Thank you very much.

QUESTIONS FROM KEVIN PRIME – NIL

(14:09) JUDGE MILROY TO DR GEORGE LAKING:

Q. Dr Laking, I've just got questions about two matters referred to in your evidence, and I will say them both now and then ask you the questions about them. The first was the relationships of trust and the second was the care for the carers. And so, in terms of the relationships of trust, we did see in the COVID situation what can happen, or at least, what we saw was some loss of trust in central government and the messages from

central government, as well as significant support for what was done there, and I suppose this, in a way, ties in with Professor Williams's question, that tension between central and local. But if we just look at the local situation, can you just talk a little bit or describe a little bit about where you saw those relationships of trust happening in Tai Rāwhiti and in the Hawke's Bay area?

A. Yes. So if – I think one of the things that we identified was the importance of preexisting relationships that meant that people were not forgotten about by the health service and during the period of emergency, and so when it came to the emergency, there had to be some preexisting relationship of trust. COVID, I think, has been very harsh for that sort of fabric of trust in society and that leads to the question, "What went wrong? What happened during COVID?", and I am sure there's all sorts of insight that people have, but I would like to mention another part of trust that I would say is very important, and that is to have some sort of empathy and some sort of ability to imagine what it would be like for me to be you and to see things from the other person's perspective and then understand the other person's motivations and then try to build trust from that, and I – since COVID's been mentioned, I think that one of the areas where we went wrong with COVID as a country was to – in our media and our public conversations, I don't think we drew enough attention to the very major jeopardy that this virus posed to anyone who had a preexisting health or disability problem.

As cancer doctors, we were extremely concerned by this. We knew, the first time around with COVID, that anyone who was having treatment with us who contracted that virus would be at a far higher risk of dying from it, and so this made it very clear to all of us as cancer doctors that it was very important that the isolation, exclusion and immunisation measures were adopted. I did not see that type of message getting out into the community at large, and I still don't see it.

I talk with people whose grievance is that they were not able to continue in their work because they declined to be immunised, and I – all I can conclude is that many of these people have missed out on the message about the very major threat to health for people with health conditions or

disabilities, and for me, that was the reason why we did all that stuff, and that was the reason why we had to do all that stuff.

Now, how – what do we have available – what resources and skills and tikanga do we have available as a community to enlarge understanding and empathy in that way? And again, I come back to what exists already in tikanga Māori and mātauranga Māori with things like the hui processes, hui where communities will sit down together and talk through a situation and commit consciously to looking at it from all different directions and then form a point of view as a community. So, that type of tikanga, I think, is essential for the ability to grow empathy, and from that, to have a relationship of trust.

I feel I may not have answered all of your question.

Q. Well, you certainly started on answering it well. Just in terms of that tikanga – you know, hui, community involvement, engagement and so forth – is that something that our health services are actively encouraging now, that the members of the health services, are they encouraged to form those connections with the community or with marae and so on?

A. So, again, I've got to say, the part of the health system that I inhabit is a very specialised realm of the health system and I think it's quite remote from communities. I am sure the situation is different for our colleagues who work in primary health care, where they, you know, are located in communities. But I look at institutions that we have in the country, and I look at things like education, for example, where high schools are very much part of day-to-day community life, and I sometimes think, especially for a service like us that works in the realm of cancer, we sort of feel quite removed sometimes from community life, and I don't think it has to be that way. We have community organisations for cancer, you know, Cancer Society of New Zealand for example, and I think those give us some avenues for even people like me, who work in highly specialised areas, to connect with communities as well.

I do think we can be doing more to integrate some things that historically have been considered quite specialised and quite apart from communities. We could do more to integrate those with community understanding.

Q. Yes. I seem to remember from my childhood, which was a long time ago, you know, the health nurses coming around to the schools and all those kinds of things happening which don't seem to happen anymore. So, anyway, I might have that wrong, that might still be happening, but –

A. May I say, I do think there is a point there, and I do think, just as an observer of how we've set up our institutions, that there's a risk inherent when you reduce the activities of institutions to tasks and widgets, that you can lose sight of some bigger intangibles and simply just being around people, for example, it's hard to reduce that to a widget or a task, but I do believe it does bring value. And again, I see that within tikanga and mātauranga, kanohi-ki-te-kanohi principle, for example. When you look at the fabric of a society and how people do things and how we grow together as a society, there's a very big dimension of it that is a lot more than just widgets or tasks that can be counted up one by one and then you strip away what you can't count. You lose quite a lot when you do that sort of thing.

Q. Well, thank you. Thank you for your answers on that particular area. The second one was about the care of the carers, and I just wondered what systems were in place – I mean, I think we've all seen on television, those women at the marae providing day after day food, care, assistance with temporary accommodation at the marae and so on. And have wondered how they can manage to carry on doing that, but I imagine that that's a similar issue for a lot of the emergency workers. Again, just wondering what might be in place to care for those people.

A. So, one episode that we were quite distressed to find out about was many health workers had to get in their own cars and drive up the country to be present to help people who couldn't come to the central hospital, and I as recall, they were provided with petrol vouchers to do this by their employer, but then after the emergency over, at least some of them were advised that they could expect that the value of those petrol vouchers would be deducted from their subsequent pay, which seemed a bit harsh. Now I am going into the realm of my own thoughts and suspicions, but I think as institutions, we tend to like classifying things, and that includes classifying people, and under headings like "the survivor of a disaster"

and “the provider of help in a disaster”, and in this situation, those two things were the same, but I think our system found it a bit hard to – to acknowledge the dual identity of providers of help in a disaster at the same time as being a survivor of a disaster.

Q. All right. Thank you very much for your answers, Dr Laking. I will hand you back to your counsel, Ms Smith, for any further questions.

QUESTIONS OF RE-EXAMINATON – MS SMITH – NIL

JUDGE MILROY:

Yes, thank you very much, Dr Laking.

DR GEORGE LAKING:

Thank you. Okay, kia ora. Ka kite.

TIMETABLING – MICROBREAK (14:22:18 – 14:23:33)

HEARING ADJOURNS: 2.23 PM

HEARING RESUMES ON TUESDAY 25 NOVEMBER 2025 AT 9.06 AM

KARAKIA TĪMATANGA (KEVIN PRIME)

(09:07) JUDGE STEPHANIE MILROY: (MIHI)

Tēnā koe, Kevin, i paihere i a tātou ki te taha wairua. Mōrena koutou. Welcome to our second day of week 5 of our hearings.

This morning, we are hearing from Dr Hewison, who is online with us, who will be giving some opening submissions, and then we will hear from your witness, Dr Hewison, Stephen Knight-Lenihan, so I will hand over to you. Thank you.

I am sorry Dr Hewison, you are on mute. Thank you.

(09:08) DR HEWISON: (OPENING SUBMISSIONS #3.3.030)

E te mana o te Kōti, tēnā koutou. Tēnā koutou, your Honour. Hopefully that's now coming through.

I am here today on behalf of claimants Mereana Peka and the Turehou Māori Wardens and Thomas Henry, the Ōtāhuhu Māori Wardens. They are calling evidence from a Mr Stephen Knight-Lenihan, focused primarily on local government.

You should have Mr Knight-Lenihan's brief of evidence number #A061 and his speaking notes which he will primarily speak to today, #A061(a), but if I could just take a bit of time to also provide you with some introductory submissions.

The claimants are Mereana Peka, Turehou Māori Wardens, and Thomas Henry, Ōtāhuhu Māori Wardens. Both address the impacts of climate change on Māori at a local level, especially the impacts on their roles as Māori Wardens both in adaptation and especially during climate emergencies.

So, one matter central to their concerns is the Tribunal's Statement of Issues, clause 3.3. And very briefly, that says:

> "With regard to local government, has the Crown provided local authorities with sufficient guidance, direction, and support to mitigate and address the impacts of climate change on Māori (including their physical, spiritual, cultural, social, health, and economic needs and aspirations) at a local level?"

The evidence before the Tribunal across all of the documents that are being provided to you is that the Crown has established and empowered local government or local authorities through a range of statutory instruments, principally the Local Government Act 2002, the Resource Management Act 1991, but also, to some extent, through the Climate Change Response Act, the Local Government Water Services Act 2025, more recently, and in fact, many, many others including the Treaty settlement legislation.

These frameworks are intended to determine how councils engage with Māori, recognise mana whenua, incorporate tikanga Māori and respond to climate related risks and impacts. The question and the question in your Tribunal Statement of Issues, is whether these instruments actually provide enough guidance for local authorities who do carry quite a lot of the burden of addressing these issues, the climate change and the risks and impacts at a local level.

He piki tūranga, he piki kōtuku, The future of local governments strategy and document, which was released back in June 2023, is an example of local government and local authorities asking for a lot more guidance and lot more surety about how they do their work at a local level from central government, so I invite the Tribunal to consider some of the outcomes of that particular document.

But the evidence of Mr Knight-Lenihan and the evidence, really, through the documents, including the Crown evidence, is there is an absence of clear guidance for local authorities in seeking to integrate Māori – their Māori responsiveness into climate change policy, governance and practice. But local

authorities, being what they are and operating locally and having those relationships locally, have attempted, through the lack of guidance, to actually put forward things that they think are important in terms of embedding principles of Te Tiriti o Waitangi and mātauranga Māori at the centre of their climate responses.

There are some stand-out local authorities **(inaudible 09:12:50)** or some that are taking things into their own hands and taking approaches that really intend to bring about those relationships and principles at a local level.

The Taranaki Regional Council has taken that approach. Nelson City has a co-design climate strategy and action plan. The Kāpiti Coast Climate Emergency Action Framework has been established in partnership. Auckland Council again, Te Tiriti – sorry, Te Tāruke-a-Tāwhiri has a Māori-responsive framework embedded within its climate action plan and so on.

We've done a little bit of work in looking across those number of councils and we would be pleased, if you are interested in us sharing some of that through a memorandum or perhaps a further brief of evidence. Unfortunately, we didn't quite have time to bring those documents to you today, but we will be pleased to do so if you wish to see some of those examples of what local authorities are seeking to do locally.

Just turning to the evidence of Mr Knight-Lenihan, I don't want to really steal too much off his thunder. He has an extensive experience in this area and no doubt you are keen to hear from him directly. But he examines whether the Crown does provide that adequate guidance or guidance sufficient for local authorities to reduce climate change impacts on Māori at a local level. He particularly focuses on adaptation rather than mitigation because that's where a lot of the local authority work that takes place is focused on.

His evidence, as does the evidence of many of the claimants, it predates the recent announcements by the government on the changes to climate law, and

to some extent, as we will on Thursday at the judicial conference, need to consider how to bring that information in through the claims as well. He notes, in particular, the Māori communities are disproportionately affected by climate hazards because of historic Crown actions, in particular, displacing many hapū to low-lying vulnerable areas where marae, urupā, wāhi tapu are exposed to flooding erosion and storm surges. And the Crown evidence, it essentially accepts or reaffirms that that is an issue in regard to climate change.

The National Adaptation Plan 2022 promised tools to assess Māori vulnerability and protect cultural assets, but essentially national progress has been slow, and with changing governance, the goal posts also have shifted.

Mr Knight-Lenihan highlights major gaps: unclear allocation of adaptation costs; no differentiation between rural, urban and peri-urban impacts; unresolved liability for legacy land-use decisions; and inadequate recognition of communal Māori asset ownership and issues such as insurance, of a lack of guidance and uncertainty both for local authorities but also for Māori at local levels in terms of how to respond to the impacts of climate change.

He argues that the Government's fragmented, individualised approach risks widening the socio-economic inequities and hinders coordinated adaptation, particularly in terms of managed retreat, compensation, land relocation options, and infrastructure that needs to service marae and other facilities of importance to Māori.

While the – some initiatives like the Māori Climate Platform did provide some support, in Mr Knight-Lenihan view, they are piecemeal, and again, through changing approaches at central government, some have fallen away, despite being established some years ago.

So, overall, Mr Knight-Lenihan's evidence will be that the Crown has not provided local authorities with sufficient guidance, direction, and support to mitigate and address the impacts of climate change. So essentially the answer

to that particular statement, in Mr Knight-Lenihan's view, is that the Crown has failed in that regard.

Just very briefly, I just wanted to also highlight that the changes to climate law that came about through the recent announcement in November and responded to by coordinating council does put us in a difficult position in terms of where those goal posts are going to be going into the future, and just wanted to say, from a local government point of view it reinforces the lack of guidance or the shifting and changes that local authorities find difficult to respond to.

In particular, the way in which we establish local authorities in New Zealand is, of course, through an electoral process that's based locally, and in that regard, having a lack of central government guidance makes it even more difficult for local authorities to respond to particular local electoral needs, but also to be working with Māori in a much more long-term approach than perhaps is possible.

That less prescriptive central government direction or the changing of direction makes it harder, also, for local authorities to justify funding and financing through rates at a local level and in particular, addressing concerns specific to Māori.

So, we will get the opportunity to discuss that with you later in the week, but I just wanted to emphasise, from the claimants point of view, that those changes do make it, in a sense, even worse in terms of there being a lack of guidance than perhaps there has been in the past.

So, before handing over to Mr Knight-Lenihan, I just wanted to conclude that the submissions of the claimants are that the Crown's actions and omissions have resulted in a lack of sufficient guidance, direction, and support for local authorities to mitigate and address the impacts of climate change on Māori at a local level. Thank you, your Honour.

(09:19) JUDGE MILROY TO DR HEWISON:

Q. Thank you, Dr Hewison. Just in relation to the documents you refer to re: the Taranaki Regional Council, Nelson City, Kāpiti Coast and Auckland City Council, it would be helpful to the Tribunal if you could provide those by way of a further brief.

A. Thank you.

Q. Thank you.

A. Certainly.

JUDGE MILROY:

Over to you, Mr Knight-Lenihan.

(09:20) DR STEPHEN KNIGHT-LENIHAN: (#A061, #A061(a))

Kia ora. Ko Stephen Knight-Lenihan tōku ingoa. Thank you very much, Grant. As Grant has pointed out, I am the expert witness for Mereana Peka and Thomas Henry from the Turehou and Ōtāhuhu Māori Wardens.

So, I am an environmental scientist, and I have a bit of a planning doctorate, so I sort of combined the two areas. My area of expertise is in incorporating ecological principles into planning legislation and regulations, and the practices of local government in this regard. And that's included considering community-level climate change adaptation policy and application issues.

As Grant has pointed out, I will be addressing specifically, the section 3.3 of the Tribunal Statement of Issues regarding the – whether the Crown provides local authorities with sufficient guidance, direction, and support to mitigate and address the impacts of climate change on Māori.

I will focus on the impacts of climate changes Grant's outlined, rather than mitigation.

And my brief of evidence was submitted to the Tribunal on 28 April; drew primarily on published assessments by government agencies on climate adaptation, as well as commentary from Northland Regional Council,

Christchurch City Council, Te Rūnanga o Ngāi Tahu, Auckland Council, and Te Arawa Climate Change Working Group.

As Grant has pointed, there's a far wider area of examples in this – it's relevant to this but we haven't gone through all those at this stage.

The oral summary that I am presenting incorporates material from that brief of evidence in April, and I will indicate that during this presentation, I will putting in additional material drawing primarily from the briefs of evidence provided by the Ministries of Environment and Primary Industries, and the Departments of Internal Affairs and Conservation which have been filed with the Tribunal.

So, I will provide a bit of context at first.

The effects of climate change are more likely to be disproportionately impacts on Māori communities as Grant outlined and you will be well aware of those issues. And the government agencies have accepted that. So, the Ministry for the Environment, for example, has noted Māori communities "are more sensitive to natural hazards and climate impacts because of the proximity of housing, infrastructure, marae, urupā, pātaka kai and wāhi tapu to the coast and other at-risk areas."

The Government's National Adaptation Plan of 2022 stated the following intentions:

Action 3.2 - Design and develop risk and resilience and climate adaptation information portals: these portals will make information on social, and equity risks available to the public. They will also help assess the vulnerability to climate change of Māori and other impacted groups.

Action 3.10 - Assess socio-economic and climate vulnerability for Māori: social and climate data will be collected and analysed to determine how to strengthen resilience for Māori communities.

Action 3.27 - Develop a framework for assessing exposure and vulnerability of taonga/cultural assets to climate change.

So, in my original April brief, I noted that while some councils were providing elements of the above, progress at a national level by the government had been modest at best, in my opinion. For example, Manatū Taonga, the Ministry for Culture and Heritage, has responsibility for Action 3.27, which is developing a framework for assessing exposure and vulnerability of taonga, and at the time of commenting in April, the Ministry says that this is an action for the future. So, a lot of this material is still to be realised, and I will come back to that point through the evidence.

Subsequent to my submitting my April brief, an online national flood hazard map has been published by Earth Sciences, showing, among other things, where climate change may increase flood risk over time. This will underpin council adaptation planning, land use and development, infrastructure investment, and emergency responses. The map is currently not refined enough to identify individual properties, but that's likely to come. And certainly, some councils, regional councils, have already got their own versions of these hazard maps which do go into greater detail.

In October 2025, a National Adaptation Framework was released. The Framework and accompanying Cabinet Paper from 22 September '25 contribute to debate over where adaptation costs may fall, and the need for local adaptation plans. Neither directly address Treaty of Waitangi principles nor specific Māori issues addressed as part of this inquiry, and there is no detail as to the processes to be put in place to clarify where costs or liabilities might fall, nor how adaptation plans, so that area of the detail is still to be put in place.

The minister, Climate Change Minister Simon Watts, says that those details will be released in future and includes a response to the – and his comments includes a response to what was known as an Independent Reference Group's July 2025 report on climate adaptation, and I will come back to that a bit later.

My summary from all the above, so that's a combination of the April brief of evidence plus what's happened subsequently, and I will go into this in a bit more detail, but just to summarise:

- Currently New Zealand taxpayers cannot cover the increasing costs of climate related events. So, that came out through the Independent Reference Group's Report.
- Individual property owners will be increasingly expected to be informed of climate related risks, i.e., it will be up to individual property owners to get that information, which will be made available, and then take action. The property owners will then be required to take action to reduce or avoid those risks.
- There is limited guidance currently on where costs will fall in terms of reducing vulnerability to climate change, recovering from natural disasters, and long-term spatial planning.

  Just as an aside, I note there is a rather confusing relationship between what is disaster risk management reduction and climate change. I will come back to that later, but I just put that in here because there – the current debate is that you have to recover from an event and it's up to you to put in place mitigation to reduce the extent of that event. That's rather different from a change in climate change base lines. So, they are not necessarily the same thing, but they have sort of been conflated in the current discussions, I feel.
- There is no guidance on differentiating between rural, peri-urban and urban communities exposed to climate change impacts over different time periods. For example, the concept of beneficiaries paying for reducing individual property vulnerability – which is coming out over the last few months – may clearly attach to land use decisions made today, but arguably such clarity over the beneficiary paying will decline for increasingly older land use practices, such as, for example, farming communities or suburbs.

- This means it is unclear who is responsible for legacy decisions altering land use practices nationally over the past decades. In other words, where does the liability fall?
- As an example, establishing farm communities – sorry, established farming communities increasingly exposed to floods and droughts worsened by climate change may trigger profound and widespread shifts to reduce their vulnerability. In my assessment, currently it is unclear how this will be done, who pays and what the consequences are.
- Increasing the burden on private property owners may increase the likelihood of legal action against regulatory authorities for real or imagined dereliction of duty attached to historical and current resource consents.
- And the final point just in this little summary is that the communal nature of Māori asset ownership is not directly addressed. While joint ownership exists outside Māori assets, there may an additional complexity attached to communal agreements involving adapting or removing Māori assets, or the infrastructure required to service those assets.

Okay, so that's just a little summary, and some of these points I will come back to. I just thought at this stage I'd ask if there are any questions arising from the evidence at this stage, or clarifications?

JUDGE MILROY:

Our usual process, Dr Knight-Lenihan, is that we question after you have completed your presentation. Thank you.

HOUSEKEEPING – TIMEKEEPING (09:30:10)

HEARING ADJOURNS: 9.30 AM

HEARING RESUMES: 9.35 AM

STEVEN KNIGHT-LENIHAN: (#A061) (CONTINUES)

Thank you very much. Just a note: I'm up to point 23 on page 5 of my oral evidence.

So just to pick up on – on that, there was an article in *Newsroom* recently which quoted Minister Watts saying – this is the – the climate change minister – saying that "there had long been an assumption that the government would step in to provide homeowners with the market value of their properties after disasters, but that this was not fiscally sustainable in the long term. A new approach is still being worked on and details won't be finalised until the next term of Parliament, but in the interim, the government is planning to adopt a different tack for the next extreme event." So that's flagging, very much, the individualisation of risk.

The Ministry of Primary Industries' brief of evidence notes that Māori own a large share of primary sector assets, characterised by being in low-versatility land use classes. Lower versatility land is subject to physical limitations that make it vulnerable to erosion and the impacts of climate, drought, excessive rain and so on, and wetness, i.e., moisture levels, high moisture levels, which influences production, sorry, of land. The impacts of climate change on Māori land is projected to increase with a warming climate.

The situation currently is in flux, and the summary above is preliminary and subject to review, obviously, as more details become available, but my observation is that these two things line up very uncomfortably – the individualisation of responsibility for the impacts of what they call essentially events but is being rolled up into the idea of climate change adaptation.

Discussions with Ngāi Tahu and Christchurch City Council representatives underscored progress on tackling adaptation issues locally, so in contrast, there is quite a lot going on locally, and I refer the Tribunal to the Coastal Hazards Adaptation Plan for Whakaraupō Lyttelton Harbour and Koukourarata Port Levy, which was published online in 2025, so that gives you an example of – of what is being done.

An issue arising from such initiatives is coordinating strategies to protect public assets, including transport, power supply, stormwater, sewage and potable water supply, along with recreational areas and coastal access, with Māori assets specifically and private assets more broadly, so in other words, it's the bringing together of "How do you manage access and providing of utilities to these areas which are increasingly subject to the impacts of climate change?".

As with Christchurch, Auckland Council has adaptation plans, which are associated with protecting public assets, through, for example, recently published online maps showing areas susceptible to coastal instability and erosion, known as ASCIE zones, that might be affected by climate change – in other words, worsen. Also published are maps collating data on flood-prone areas, especially those associated with heavy rain.

While providing required information, guidelines on what to do with this information is limited. Private property owners have the ACSCIE zones and flood-prone data now appearing on the Land Information Memoranda, with the implication being that this information should be taken into account or acted on. Meanwhile, those involved in maintaining and protecting Māori assets need to discuss with councils the extent to which critical infrastructure should be maintained to service their assets – these assets, Māori assets – given limited council resources and the tension between maintaining for cultural reasons and maintaining for economic reasons.

There is also a question over how to manage all assets, public or private, in a coordinated way. The independent reference group report for the Ministry for the Environment I referred to earlier emphasized individual responsibility in adapting to climate change – by which they actually mean events; individual events – including that iwi, hapū, Māori should be empowered and resourced to make local adaptation decisions for whenua Māori and Māori assets.

In my opinion, this is – this fragmented individualised approach to climate adaptation will be inefficient, will likely worsen existing socioeconomic gaps,

and will not provide the central government input required to address climate change impacts.

Now, I'll just pick up on this point again from my April '25 brief of evidence. So, what I've just been talking about 'til now is really just an update on what's been happening since April. Returning to my brief of evidence from April, there is a lack of Crown guidance for local authorities on how they should allocate resources to maintain infrastructure to land that has particular spiritual and cultural value to local iwi or hapū but may have limited direct economic value or limited broader community value, so this may skew decisions against maintaining infrastructure to such land or bias towards land that's economically – assessed as being economically valuable.

In addition, some Māori communities are not currently well served with utilities such as safe drinking water, sewage or irrigation. Some of these communities may have to make significant climate change adaptation decisions, creating uncertainty about the extent to which that infrastructure deficit should be addressed in the meantime.

Since my April brief, there has been a range of initiatives that have come to my attention that address this deficit, and I will refer to those a bit later on, so I'll come back to them.

Planning rules may also affect the ability of hapū to implement their own adaptation actions, such as relocating communities or building water storage in land with restrictive zoning provisions, referencing the fact that there are, for various historic reasons, restrictions on what you can do on certain types of land, and that in turn restricts the ability to relocate, for example. There is no transparent compensation system that defines financial responsibilities such as may occur following disasters such as flooding – but that is changing; we're in the process of that – seeing that change – and certainly none that take into account Māori interests. Instead, individuals and communities such as hapū and iwi are being left with compounding risks of financial wellbeing and stress.

As noted, since tabling my April ’25 evidence, the government has released an additional framework which may lead to clarifying the rights and responsibilities for a range of adaptation initiatives, from protecting infrastructure through to some form of managed retreat. However, as the details of how the subjective – or how the objectives of the frameworks are to be realised, the guidance is currently incomplete.

My assessment, from reviewing the Climate Change Commission ’24 – 2024 review of the first national adaptation plan and the local government New Zealand submissions to the Finance and Expenditure Committee in 2024 – Committee’s 2024 cross-party Inquiry into Climate Adaptation, as well as the findings of the inquiry itself, in summary, is that Aotearoa New Zealand lacks a clear and coherent framework for adaptation, planning and implementation, and that the patchwork of legislative and regulatory powers as well as responsibilities makes local decision-making very difficult, let alone local decision-making that prioritises or even takes into account Māori perspectives. It’s unclear to local authorities what they should prioritise in terms of adaptation.

There is no national direction on or clear rights and responsibilities for planned retreat, or clarity on the powers of acquisition for planned retreat. There is no transparent compensation system that defines financial responsibilities such as occurs following disasters, as I’ve mentioned before, and certainly none that take into account Māori interests. Instead, individuals and communities such as hapū and iwi are being left with compounding risks of financial wellbeing and stress, which picks up on my earlier point.

Therefore, I believe that there is a need for strategic long-term planning and joining up of central and local government climate change adaptation decision-making that observes the principles of Te Tiriti o Waitangi. This would include, in my view, spatial planning enabling the integration of local adaptation planning with other land-use and placemaking decisions and plans.

At paragraph 40 in my April briefing of evidence – brief of evidence, I asked a question, as a question for the Crown: What steps are being taken to create a

spatial planning framework coordinating responses to climate change nationally to improve certainty and clarify roles and responsibilities, and how will this support iwi Māori to exercise rangatiratanga?

The previous government's review of the Resource Management Act 1991, the RMA, included creating environmental spatial planning and climate adaptation legislation intended to, at least in part, address coordination and clarification of issues. The current government has indicated it will create a framework designed to address this issue. However, again, there remains uncertainty what this new framework will look like. As a result, in my opinion, many regional and territorial authorities are in something of a policy lacuna, meaning decisions are being delayed and/or are being made in a conservative way which risks contributing to poorer medium-term and long-term outcomes.

The Ministry of Primary Industries' brief of evidence notes that in February 2023, the government initiated a ministerial inquiry into land use, the MLIU, and appointed an independent panel to recommend actions to address the impacts of land use in severe weather events in the Tai Rāwhiti Gisborne and Wairoa regions.

Following Cyclone Gabrielle, Māori partnerships and investments funded whenua – and investment funded Whenua Tira, a Māori cultural extension fund, supported 30 Māori agribusinesses, and according to MPI, this project lifts the capacity and capability of whenua Māori landowners to understand and respond to environmental regulatory reforms. The project ran for two years and ended as of 30th of June 2025. Now, that's an example of where action is being taken, but it's in response to a specific series of events and is not something that applies across the country, so it's helpful here, but not generally.

I'd like – I'd like now to consider one aspect of climate adaptation: relocation.

Following on from the colonial history of New Zealand, in my opinion, one consequence from this history is that where hapū may have to remove communally owned assets, such as marae, urupā and housing, from land they

own, due to the current predicted impact of climate change, there is a question as to whether relocation options should include land previously taken and now developed for other purposes.

At 50 in my April brief, I ask a question for the Crown: is guidance available or being developed to help councils and iwi navigate historic and cultural complexities when addressing climate adaptation challenges and options? I'm unaware of any existing process addressing this question.

Further to the Northland Regional Council's observations, the link between Māori and te taiao means climate change impacts on native flora and fauna will have direct implications for iwi/hapū spiritual connections to taonga and whakapapa, as well as practical issues such as food security and the ability to enjoy customary use of their whenua.

Climate change is likely to threaten the cultural taonga that hapū whakapapa to, as they are frequently located near coasts and rivers at risk of erosion, inundation or flooding.

This includes cultural infrastructure such as marae and urupā, places of cultural significance (such as wāhi tapu and archaeological sites), sites of taonga (such as native flora and fauna) and sites used for cultural practices (such as provision of kaimoana).

The Climate Change Commission's '24 – 2024 review noted that many Māori are more likely to be impacted by climate change hazards, in part because households are at risk of poverty, health disparities, living in poor-quality or crowded housing, and work in industries more exposed to climate-related hazards.

Affordability issues were also highlighted by the LGNZ submission to the Finance and Expenditure Committee's 2024 climate change adaptation inquiry, and Local Government NZ noted, in part:

> There will be affordability issues for councils and low-income communities that cannot meet the costs of adaptation alone, which, when coupled with uncertainty around central government contributions and a lack of clear decision-making processes, can delay long-term investment. In some cases, central government funding support to resource adequate climate adaptation measures for these communities will be necessary and would be consistent with the principle of equalisation.

For Māori, this may be addressed, at least in part, through the Māori Climate Platform.

The first climate resilience pilot project funded through this Platform was announced on the 5th of February this year at Northland's Matihetihe Marae.

The project upgrades the marae's reticulation system to provide safe drinking water to nearby households, the local kura and the marae, all of which had become increasingly vulnerable to adverse and extreme weather that impacted the water treatment plant and compromised drinking water safety.

In May '25, the remaining four pilot projects were also approved to proceed to contract negotiations. They involved the Te Karaka microgrid solar farm, the Matakana Island coastal protection structure, Te Tauihu solar panel and water storage, and Taranaki indigenous biodiversity afforestation. So those are the four projects.

In July 2025, Climate Change Minister Simon Watts approved funding through the Platform that included a focus on marae-based climate adaptation resilience and mitigation, with two investment categories: resilience, infrastructure, and renewable energy and energy efficiency.

While a potentially useful contribution, a brief recent history of efforts to address water services to marae and papakāinga illustrates the fragmented approach to infrastructure management to date. This in turn illustrates the difficulty in

addressing infrastructure gaps while also planning for climate change impacts. In other words, I'll just build on this idea that there are projects in the pipeline, some of which have come to fruition, but they are still rather fragmented and aren't part of an overall strategic spatial plan for New Zealand.

So, picking up on this – so it's not to discredit the individual programmes or projects, but to make a point about the need for a strategic multi-decadal approach.

Now – so as to illustrate this – this, using the brief recent history of efforts to address such things as water services to marae, in 2021, a Rural Supplies Technical Working Group was established by the Department of Internal Affairs. In May 2022, the Working Group released a report that included findings related to rural marae and papakāinga, highlighting the historic inequities in accessing safe, reliable and affordable drinking water and wastewater services experienced by many rural marae and papakāinga. The Working Group strongly recommended the newly established water services entities prioritise the establishment of marae and papakāinga, including how to give effect to Te Mana o te Wai.

In December 2022, the Department of Internal Affairs established the Marae and Papakāinga Rural Water Services Technical Advisory Group. This group would help guide the then-proposed water services entities to fulfil their roles and duties. So this is three years ago. Note that this was done under the previous government's Three Waters proposed reforms. Current proposed Resource Management Act reforms likely mean consent applicants no longer need to demonstrate their proposed activities follow the Te Mana o te Wai hierarchy of obligations as set out in the National Policy Statement for Freshwater Management, so it's an example of things shifting in different sectors, making it rather difficult to plan.

So picking up this at 73, the obligations are – these are the Te Mana o te Wai hierarchy of obligations – first, the health and wellbeing of water bodies and freshwater ecosystems; second, the health needs of people, such as for

drinking water; and third, the ability of people and communities to provide for their social, economic and cultural wellbeing, now and in the future.

In December 2023, the Marae and Papakāinga Technical Advisory Group provided a short statement addressing to the Honourable Simeon Brown, who was then the Minister of Local Government, recommendations regarding water services to marae and papakāinga under Local Water Done Well – so, this is the new programme that the current government has brought in – and that included: commission further research into the current situation of marae and papakāinga relating to water services in order to set baselines and annual targets for councils; require councils and/or their water services entities to establish formal relationships with Māori, iwi, hapū and papakāinga; provide, as a matter of urgency, adequate accessible central government funding to bring marae and papakāinga water services to standard; and finally, provide funding for climate change resilience for marae and papakāinga.

The recommendations made above were received by the government, but, as yet, have not been taken forward. However, in late 2022 – so, under the previous government – the Department of Internal Affairs established a $30 million Rural Drinking Water Programme. The programme installs upgraded drinking water infrastructure for rural marae, kōhanga reo and papakāinga, and other private rural drinking water supplies that are not connected to a town supply. Of the total $30 million available in the programme, $20 million was set aside to upgrade water treatment systems for rural marae, kāinga and kōhanga reo, and $10 million set aside for other private rural drinking water supplies.

As at 31st of March 2025, the programme had installed upgraded drinking water supply – water infrastructure at 67 rural marae, kāinga and kōhanga reo, and 11 other private rural drinking water supplies.

Applications from 50 more marae, kāinga and kōhanga reo sites are in progress for possible installation. The Department of Internal Affairs notes that in

February ’23, the programme closed to further applications from rural marae, kāinga and kōhanga reo, due to funds being fully allocated.

A new $10 million marae drinking water infrastructure fund was set up in 2024 under the current government. The fund will provide marae that are not connected to a town supply with upgraded drinking water infrastructure treatment systems, training and maintenance. Registrations for the fund opened on the 4th of November 2024, closed 6th of December 2024. Provisional decisions were made February 2025, this year. It is expected that approximately 35 marae will receive new or upgraded infrastructure from the funding available, subject to site investigations.

So shall we take a brief pause there? That was just to illustrate various programmes and initiatives that have been put in place, but some of which have now ended and/or overlap and replaced by other initiatives, and again, not a lot of evidence of coordination here, although the individual projects are presumably highly valuable. But do we want to take another break at this point?

JUDGE MILROY:
Yes, thank you, Dr Knight-Lenihan, we will do that.

HEARING ADJOURNS: 9.57 AM

HEARING RESUMES: 10.05 AM

STEPHEN KNIGHT-LENIHAN: (CONTINUES)
Thank you very much. So, I’m just picking up at point 82 in my oral presentation.

In reference to my April brief at point 62 in that April brief, I asked a number of inter-related questions for the Crown, which included: What is the long-term – say, 5-30 year – strategy for identifying areas of Aotearoa New Zealand exposed to varying levels of climate change impacts, identifying responses and putting into place funding mechanisms as part of a broader infrastructure policy,

and how will this account for differing capabilities and capacities of communities, including Māori perspectives and Treaty of Waitangi principles?

The Climate Change Commission, in 2024 – its review of the first National Adaptation Plan makes the point that anticipatory action is being taken, but the danger of being swamped by costly cleanups might overwhelm intentions to reduce vulnerability. Put simply, as we sit down to figure out what to do in the next 5-30 years, there are essentially disasters that keep occurring that then divert resources towards coping with them, so we're constantly being overwhelmed.

Recent actions by the Crown may partially – and which I've referred to – may partially address this lack of preparedness. However, it's still – there's still a lack overall of a broad spatial and long-term approach.

Now, I'm just going to mention briefly the insurance and natural hazards relationship.

The increase in "risk-based insurance pricing", focusing on individual properties, is likely to increase costs for assets exposed to natural hazards, where projected climate change impacts will worsen the scale and/or frequency of events. Where this applies to the likes of marae, the costs of reducing vulnerability may be prohibitive, relocating may be impractical, and eventually, there is a risk of under- or no insurance. Now, while these challenges are shared by property owners generally, an additional component, as concluded by a review by consultants Willis Tower Watson, is that the current mainstream insurance products are not well suited to facilities such as marae.

The Natural Hazards Commission has some appreciation of this, but there remains no government guidance on whether and how to – how insurance for marae – sorry, Māori assets – need to be treated differently.

This overlaps with a lack of guidance over how to incorporate te ao Māori perspectives into natural hazard risk assessment and management, the government's preference not to include such a perspective notwithstanding.

Since my April brief, I've considered this more closely and concluded incorporating a te ao Māori perspective into hazard management plans could alter any phased approach to climate adaptation.

So, for example, building on the Ministry for the Environment's dynamic adaptive planning pathways (DAPP) approach, Christchurch City's 2025 Coastal Hazards Adaptation Plan for Whakaraupō Lyttleton Harbour and Koukourarata Port Levy, which I referred to earlier, outlines the following options – and this is a hierarchy. So, essentially, maintain, keep doing what we're already doing; accommodate, live with the hazard; protect, keep the hazard away as much as you can – and we're talking about natural hazards related to climate change impact; retreat and move away from the hazard; and avoid, which is don't move in the way of a hazard, i.e., don't build your utilities there in the first place.

Applying a te ao Māori approach may alter the acceptance and timing of these different options. For example, applying a nature-based approach to adaptation, such as reconstituting wetlands or restoring ecosystems, may be more readily favoured than under a more mainstream approach, so in other words, it may influence how people look at these – what is becoming an accepted hierarchy. And I will return to this again briefly a bit later.

I'll mention the Rauora framework. The 2022 National Adaptation Plan included reference to this Rauora framework and it bringing together Māori values and principles into an indigenous worldview of climate change – in other words, what I've just been talking about. As of 2024, a Manaaki Whenua Landcare Research webinar noted Māori frameworks for disaster recovery and climate change had not been implemented. While this is broader than the Rauora framework specifically, it suggests that little practical guidance to date had been developed.

Now, a reference to the Crown research institutions' support – so, the CRI support. In 2023, a Manaaki Whenua Landcare Research – a publication from them on climate change risks and adaptation tools for Aotearoa New Zealand cultural heritage points out significant research support has come from CRIs. This can be seen as a form of Crown support. The publication describes cultural heritage climate change adaptation tools and lists strategies, plans and information sheets relating to places of significance for various iwi and hapū around the country. This includes links to adaptation strategies, risks and vulnerability assessments, and adaptation frameworks, raising the question whether and how central government should be involved.

An issue for those working at a regional and community level is keeping up to date with initiatives occurring elsewhere in New Zealand. There is no centralised guidance on evolving best practice, and my own inquiries suggest that there is a significant role for central government in supporting the development of existing networks, iwi and local government, addressing climate change generally and from a Māori viewpoint specifically.

I'll mention some initiatives by the Department of Conservation based on their brief, which you have a copy of. As with the Ministry of Primary Industries, the Department of Conservation focuses on emissions management primarily. However, investment in the likes of indigenous biodiversity has implications for climate change resilience and contributes to conservation efforts with iwi adapting habitat and species to climate change. This overlaps with the observation earlier that te ao Māori approach – a te ao Māori approach may provide support for a nature-based approach. This would also support Minister Watts' July 2025 funding through the Māori Climate Platform supporting marae-based climate adaptation resilience and mitigation, so there's definitely a potential beneficial overlap.

And I've just pulled out some selected examples. I won't run through them in detail, because there is – they're part of the Department of Conservation's brief, but just to mention some examples, Ngā Whenua Rāhui, a contestable

ministerial fund which was established in 1991 and whose kaupapa is to facilitate the voluntary protection of indigenous biodiversity on Māori land while honouring the rights guaranteed to Māori landowners under the Treaty.

Another example, working with Te Nukuroa o Matamata to assess the conservation status of kanakana, the pouched lamprey, in the Taiari catchment as part of Te Mana o Taiari's Ngā Awa river restoration programme. Kanakana were identified as one of the Kā Tohu te Taiao, or climate change indicators, for the Taiari. The data collects helps – data collected helps to assess the status of the population of the pouched lamprey and guide management of critical habitats impacted by climate change.

Another example, Department of Conservation, in partnership with hapū affiliated with Te Rūnaka o Ōtākou and Kāti Huirapa Rūnaka ki Puketeraki – pardon my pronunciation – has developed a comprehensive biodiversity monitoring programme for the – again, the Taiari River, under the Ngā Awa programme, and it uses environmental DNA in that case, so it's a good example of where recent technology has been blended into, I guess, a more traditional approach to managing some of these resources.

And then the – they're also – the Department of Conservation has a climate change adaptation plan referencing at page 12 which is implemented in a way that gives full effect to the principles of the Treaty of Waitangi under section 4 of the Conservation Act. A new plan is being developed and was due to be released around about this time this year, which will focus on and prioritise a set of actions that the Department of Conservation will work on over the next three years to prepare biodiversity assets and cultural heritage for climate change impacts. The Department's brief addresses specific issues raised about climate change impacts on ecological processes, including increasing habitat and species vulnerability.

Finally, the Department of Conservation has a statutory responsibility for the protection of cultural heritage on public conservation land and waters. This cultural heritage includes archaeological sites, wāhi tapu and other places of

intangible cultural heritage value, as well as historic buildings and structures. For example, the Department works with iwi and hapū to support the recovery of taonga and kōiwi following weather events such as Moturua in the Bay of Islands with Ngāti Kuta and Patukeha following Cyclone Gabrielle. So, all this information, as I said, is in the Department of Conservation's brief, and I just bring those up as examples of what is being done but also the potential to feed into a more coordinated approach across the country.

So, in conclusion, finally, my assessment is that the country still lacks a coherent national adaptation strategy balancing disaster response, which is the disaster response management and recovery process, with long-term 30-year anticipatory planning relating to the shift in baseline climate.

Previous and current government initiatives have identified actions required to address this gap, but implementation has been fragmented.

This increases the vulnerability of the country to the impacts of climate change, because of the delays that occur.

Māori communities and associated assets are in many cases disproportionately exposed to this increasing vulnerability, and the Government needs to explain how, in practical terms, it is going to address this heightened vulnerability.

And this is the end of my submission at this point. Thank you very much.

JUDGE MILROY:
Thank you –

MR HEWISON:
Thank you Mr – apologies, your Honour. Thank you, your Honour. I think we are open to questions from claimant counsel?

JUDGE MILROY:
Indeed, and the first question is from Bennion Law.

MR BENNION:

Kia ora. Kia ora, ngā mema o Te Rōpū Whakamana i te Tiriti o Waitangi.

I was not available yesterday, your Honour, but am here now to ask some questions of Mr Lenihan.

(10:18) MR TOM BENNION TO DR STEPHEN KNIGHT-LENIHAN:

Q. First of all, thank you, Mr Lenihan. I've got just ten minutes here. Thank you for your evidence, because it has – even while listening to it, you know, a whole lot more thoughts come about the uncomfortable questions that you are raising about adaptation. Now, I represent, among other claimants, Climate Justice Taranaki, so those are people in the Taranaki south coast feeling some of the effects of climate change.

I just want to cover two areas. One is your – the level of resources required for adaptation, and the second area is priority for Māori in adaptation, if any, right? Which I think is the other thing that comes through in your evidence.

So on the first issue, you are familiar with Professor Tim Naish's research?

A. Not specifically, no. What's that –

Q. Okay. He provided some evidence in this inquiry. I just want to check a couple of things with you. A document, #A025, paragraph 66, you don't need to go to it, but he says that one-in-100-year floods in some parts of the country, some coastal parts, will be on average happening annually by 2040. Do you remember – have you heard of that evidence?

A. I'm aware of that research – not specifically through Tim, but yes, I am.

Q. Okay. You are also aware that there is an outside possibility of a 2-metre sea-level rise by 2100, if warming – particularly if warming reaches 2° globally? Yes?

A. Yes. Yes, I'm aware of that.

Q. Right. Okay. And Professor Naish talked about, I think about $38 billion worth of assets affected in a 1-metre sea-level rise, and I'm thinking about his evidence, just for reference, #A025 paragraph 67 – so you're familiar with figures like that, about $38 billion worth of assets affected in 1 metre?

A. Yes.

Q. Right.

A. Yes. Yes, I am.

Q. Yes. So, I mean, just in general terms, when you're talking about a strategic and multi-decadal approach, the resources that we need to apply specifically to adaptation would need to be in the order of billions and tens of billions right now, would that be fair?

A. That's – yes. I'd probably argue it's probably going to be more than that, but yes, I would definitely – yes, I agree with that.

Q. All right. So, secondly, coming to this issue of priority for Māori in the application of adaptation resources, you are indicating, I take it, that we're going to have to make choices, and hard choices, about where to spend money on adaptation. That's the issue, isn't it?

A. Yes.

Q. And I think you mention that this government is already saying that for individual homeowners, one of the hard choices already facing us may be that individual homeowners are not going to get the same level of support that they might have got in previous, say, flood or cyclone events. I think that's what you indicated?

A. Yes, that's correct, yes.

Q. All right. So would you also say that in terms of the principles that underpin adaptation programmes, when they apply to Māori, need to be explicit and guided by tikanga?

A. I would definitely argue that – that is lacking and that it needs to be taken into account. How that's done, the process is outside my area of expertise, but it definitely needs to be part of the conversation, absolutely.

Q. Right. And I just want to – because hadn't we got the danger that if we don't – that we don't want to have adaptation programmes making unexplored assumptions? For example, an adaptation programme that says marae buildings are the important matter or marae communities are more easily relocated than other communities. We need to avoid unexplored assumptions, don't we?

A. Well, yes. I think part of what I've seen when I've gone through what is currently being proposed is that there is a significant lack of detail about

how you go through that process, because inevitably, if you make assumptions about what can be done, you will get that wrong. Unless you actually talk to the communities involved, Māori or non-Māori, and definitely in terms of marae, definitely in terms of those facilities, yes, absolutely.

Q. All right. And another part of the discussion is – I think you raised this – is when you're looking at adaptation, there's a difference between whether you protect things in situ or whether you relocate. Those are two very different equations, and protection in situ can be quite expensive.

A. Yes, and is usually seen as a transition, so in the way that adaptation is occurring globally – and in New Zealand, but more so in many other countries – is that yes, you should put in facilities to protect a particular resource of value, but you – as you do that, you plan to either partially or entirely relocate, so that you can do something, but you know it's only going to be temporary, and we're not really having that conversation at the moment.

Q. Yes, and I thought I heard you say that the other part of this, as well, is the nature of the Māori assets being protected. There is a difference, isn't there, between the individual marae buildings, whole communities with their infrastructure, versus perhaps farmland, maybe even forest – we haven't had a discussion yet, I take it, about how far – you know, what particular types of Māori assets we're protecting and why they need protection, yes?

A. Yes. So the approach that's being taken at the moment, from the examples I've looked at, is the emphasis is on council, so essentially, local authorities have got to make a decision about which of the public assets that they're responsible for they maintain, going into the next five, ten, thirty years, and part of the equation, given that there's a limited resource, they've got to make a decision about which part of the landscape they've got to protect. What's the priority? And that process, there's not a lot of guidance as to how you do that, and you're quite right, so, different parts of the landscape will have different values. But you've got to be clear about, "What values are you taking into account? Are they economic, cultural, whatever?" And that's – that part of the process is not

very clear, and if you add in to that equation liability, i.e., "What if you get it wrong?", that makes a lot of – and I'm not making – I'm making a generalisation here. There's a lot of councils that are making decisions, but generally speaking, it makes people averse to making decisions now until there's more clarity. The problem with that is it will probably make things worse.

Q. All right. And then, just lastly, the government is considering removing the Treaty reference from the Climate Change Response Act.

A. Yes.

Q. Have you seen any discussions of the implications of that for decisions on adaptation or the approach to adaptation?

A. I've not seen anything directly. My assessment, which I mentioned briefly, is that if you take the te ao Māori approach, that would influence that hierarchy. So in other words, there are the principles, in terms of the Treaty, but at a very practical level, if you apply those principles and the te ao Māori – the worldview, you will end up with a different hierarchy, a different set of priorities, a different way of reacting and responding, and currently, I've not seen a discussion about "What are the implications of removing a reference to the Treaty from the legislation?", how that might influence the decision-making at the local level. I've just not seen that discussion.

Q. All right. Thank you, Mr Lenihan. Those are my questions. Thank you, your Honour.

HEARING ADJOURNS: 10.27 AM

HEARING RESUMES: 11.01 AM

JUDGE MILROY:

Welcome back, everyone. We are now at the point where we have questions from the Crown, so I will hand over to Crown Law.

(11:01) MS MCTAGGART TO DR STEPHEN KNIGHT-LENIHAN:

Q. Tēnā koe. Ko Anna McTaggart tōku ingoa. Thank you for your evidence today. I have some questions for you. Can I just check, do you have a copy of your brief of evidence and your speaking notes?

A. Yes, I do, thank you.

Q. Thank you. My first question is: Have you read the brief of evidence of Katherine Mary Wilson from the Crown?

A. Katherine Mary Wilson, did you say?

Q. Yes – that deals with the government adaptation work.

A. No. No, I have not.

Q. Are you aware that brief of evidence addresses what the government is doing in relation to climate change adaptation, including dealing with some of the issues you identify, such as infrastructure, where costs should fall, support and guidance for local government, and that kind of thing?

A. Not in terms of that evidence that you reference, Kathryn Mary Wilson, no. I've only relied on the material that's available publicly.

Q. Thanks. That – that brief does go into quite some detail about the government's current work programmes around adaptation, so if you would – if it would be helpful to the Tribunal, maybe we could put some questions in writing once you have had a chance to have a look at that?

A. Yes. Yes, indeed.

Q. Thank you. You have discussed, in your speaking notes, the government's new National Adaptation Framework.

A. Yes.

Q. And you say in your speaking notes that details of the objectives of the framework haven't come out yet and it's incomplete –

A. Correct.

Q. – and at 31 of one of your speaking notes, you say that there is no change to your April assessment that New Zealand lacks a clear and coherent framework for adaptation planning.

WITNESS REFERRED TO #A61(A), PARA 31(A)

A. Yes, in the sense that the – what was released, or has been released, doesn't provide details of the delivery, so it does outline an intent.

Q. Would you agree that the framework is a step in the right direction to eventually achieving the kind of clear and coherent framework you discuss?

A. It's – well, it's a mix. It definitely accepts that you need to have a framework, and it certainly talks about the need to clarify things like where costs fall. My concern is that there's a clear preference for an individualisation of risk assessment and therefore costs, and that's the bit that I was concerned about, because I wasn't – I couldn't find enough detail in there to tell me how that might work in practice.

Q. Would you agree in general that the framework is quite a high-level document and that perhaps it might not include that level of detail yet, but as you've noted in your speaking notes, it has been foreshadowed by the Climate Change Minister that further details be released in the future? Would you agree with that?

A. Well, that's what the Minister said, yes, I would agree with that.

Q. I might just take you to the framework itself, if that's okay. It has been filed by the Crown already at – as #3.2.204(a). If I could just ask my colleague Ms Seeley to bring it up.

If you could go to page 4, which is the pillars of the framework. Yes. If you could just make it a little bit bigger. Thank you.

The framework has a list of actions, and some of these actions do pick up on some of the areas you've identified as gaps or areas that need to be addressed. For example, action 6, which talks about establishing a new national direction to support councils in managing risks and natural hazards, and action 7, which discusses identifying areas with hazard risk, and talks about new spatial plans in the reformed resource management system, and there's a number of actions throughout, including talking about giving more guidance to local government, and then, under the investment and risk reduction section, which is on the next page, that does touch on issues such as infrastructure and protecting infrastructure. So would you agree that the framework sets out these actions and picks up on some of the things you have talked about?

WITNESS REFERRED TO #3.2.204(A), PAGE 4

A. Yes, I don't think there's –

Q. **(inaudible 11:07:33)** details are yet to come, it is still making progress in these areas and setting out a bit of a pathway forward?

A. Yes, I think the point I was making in – in – in my evidence was that the – at this high level, yes, these issues have been accepted, and I don't think there's any dispute that people recognise that these things need to be addressed, but that has been something that has been recognised for, let's see, four years, minimum, and part of the problem is that it's taking rather a long time for the details to become apparent to the degree to which decision-makers, i.e., local government, can actually do anything with that information, so yes, I'd agree that they have identified what needs to be done, but the problem is it's taking far too long to get some guidance, and in the meantime, decisions are either being delayed or being made which may compound the existing vulnerability. That's – essentially the concern I was expressing.

Q. The framework is quite recent, though, isn't it, so –

A. Yes, but we've had – I mean, we've had framework – we've had people make these comments – like the Commission, we've had various other agencies saying we need this done, and to be frank, we had the precursors, or we had the – a framework which was put in place when the RMA was reformed under the previous government, only to be removed in order for the current government to replace it with its own set of reforms which seem from my perspective to be approaching what was done under the previous government, and that's the frustration, is that people are going, "Yes, we can see that it's a political process and we understand that that's the nature of democracy, but in the meantime, we definitely – we are desperate for people to give us a steer on how to do things, who's going to pay, and what the implications are."

So yes, I agree. Don't have a problem. You've got a good framework, or there is a framework. But the concern is, yes, and what happens when the next government comes in?

Q. Thanks. I guess my general point is: Would you agree that there is work in progress and some of these areas are going to be clarified and that guidance is in progress and will hopefully clarify these areas that you have set out?

A. Yes, I mean, that would be hopeful. The only other comment I'd make is that a lot of local governments – I'm thinking – we're in Auckland. Auckland, for example, is already putting in place aspects of what central government has indicated it should be doing, and – in other words, things like, "Just be aware you're in a flood zone, just be aware you're an area that's exposed to instability and erosion and you need to take that into account into your decision-making", so it's good. I mean, these things are happening, but in the absence of any clear steer from the government, which is essentially saying, "Well, we've now got a framework", which you've identified these things that need to be done, and people at the leaf government, if you like, at the lower level, are going, yes, but we've been aware of this for quite some time. And Kāpiti Coast went through a lot of this, what, 20-odd years ago.

So a lot of this is not new, and the frustration is, whatever colour of government is in hasn't progressed this beyond the point of saying, "We really need to do something about it." That's it. That's the comment.

Q. Thank you for that. I might take you to the – in 20 of your speaking notes, you refer to the 22nd of September 2025 Cabinet paper which accompanied the NAP **(inaudible 11:11:45)** framework. Can I take it from this that you are broadly familiar with the Cabinet paper?

WITNESS REFERRED TO A061(A), PARA 20

A. Sorry, which –

UNIDENTIFIED SPEAKER: (11:11:52)

Paragraph 20.

MS MCTAGGART TO DR STEPHEN KNIGHT-LENIHAN: (CONTINUES)

A. Paragraph 20, sorry. Yes. Yes. So I – yes, I'm familiar with the Cabinet paper, correct, yes.

Q. Thank you. Could you go to page 5, please? Just the first page of the Cabinet paper. Is – just want to check, is this the Cabinet paper that you refer to in your brief of evidence?

A. Yes.

Q. Thanks. If I could just take you to paragraphs 42-44 of the Cabinet paper, at paragraph 22 of your speaking notes, the last bullet point is – you say that the communal nature of Māori asset ownership is not directly addressed in either the framework or the Cabinet paper, is that correct?

WITNESS REFERRED TO #A061(A), PARA 22

A. Correct.

Q. If I go to paragraph 44 of the Cabinet paper, it says that policy settings relating to the Crown's role in supporting homeowners suffering significant losses after a major event will consider the particular circumstances of Māori landowners, including the unique legal and cultural status of whenua Māori and the collective ownership and decision-making structures. Can you see that?

A. Yes.

Q. Given that the Cabinet paper does seem to address the concept of collective ownership, I was wondering whether the issue you are raising is that collective ownership is mentioned in a specific policy context, which is natural disasters, rather than in relation to adaptation more generally.

A. Yes, it's a – it's a difficult area, because there are two – as I mentioned in my evidence, was that there are two aspects, so there's a natural disaster response mechanism and then there's the climate change baseline shift, and what I was saying is that – I mean, you're correct to point out that the Cabinet paper definitely refers to the unique aspects in terms of Māori ownership. What I'm saying in my evidence is that the additional complexity attached to this isn't really clarified in terms of how that might be addressed, so yes, and I mean this is not – this acceptance of the particular nature of Māori ownership is well accepted in government and in – generally speaking. I guess the point I'm making is that it's not directly addressed in the sense of how you might go about doing this.

In other words, this kind of phrasing appears periodically over many years, but we don't seem to get beyond that. Like, "What might it look like? How would you cope with this?", given, in particular, **(inaudible 11:15:09)** agreements involving adapting or removing Māori assets or infrastructure required to – to service these assets isn't part of what is

being addressed, even in the Cabinet paper, and more particularly, in the framework itself. That was really my point.

Q. Thank you. Would you agree that the acknowledgement of the unique legal and cultural status of whenua Māori and some of the complexities that might go along with that does show the government is aware that there are particular considerations relating to Māori land and land ownership, in the context of adaptation?

A. Yes. Yes, I accept that.

Q. Thank you. Taking you back to paragraph 20 of your speaking notes, **(inaudible 11:15:56)** clarification point.

WITNESS REFERRED TO #A061(A), PARA 20

A. Right.

Q. You say that neither the framework or the Cabinet paper – I'm assuming that's what you are addressing – directly address Treaty of Waitangi principles or specific Māori issues addressed as part of this inquiry. Is that correct?

A. Yes.

Q. At paragraph 42 of the Cabinet paper, it does address the fact that land and other cultural assets **(inaudible 11:16:26)** held by iwi, hapū and Māori are disproportionately located in areas vulnerable to climate change **(inaudible 11:16:34)** natural hazards.

A. Yes.

Q. And it also acknowledges that this is partly due to historical Treaty breaches, and then it addresses that through aspiration, Māori have expressed interest in Treaty-centric approaches to adaptation –

A. Yes.

Q. – and are interested in that. And then at paragraph 45, if you just scroll down a little bit, the paper goes on to say that by requiring adaptation plan in the highest priority location, we increase the likelihood of better outcomes, in particular, for those groups who are more vulnerable to climate impact, which include iwi, hapū and Māori communities. So would it be fair to say that the Treaty impact statement does address some of the issues raised with this inquiry, such as disproportionate vulnerability to climate change?

A. Yes, no, I'd accept that, and it picks up on information that had been – as I say, had been in other documents prior to the framework being released, so yes, no, I'd accept that there's a – a reference to the – excuse me – to the particular issues facing Māori. I accept that in the – in that impact statement, yes, that's correct.

Q. Are there any specific issues which you would have liked to have seen addressed? You refer to specific issues. I was wondering if you had any in mind.

A. Well, what I was thinking was, in terms of taking this the next step is to say the particular issues relating to this include what options might exist for people who are disproportionately affected – in particular, costs where if, for example, things have to be temporarily adapted to – with a view to possibly having to remove facilities, where they might go, what are the options in there, how might that be financed, and in particular – well, not in particular, but and – and including the peculiarities and difficulties in terms of getting insurance coverage for these sorts of events, which are not – in that case, not unique to the – to Māori assets, but definitely are exacerbated because of the historic events, so that was what I was really wanting to see more of, is that sort of next level of discussion, the practicalities of this process.

Q. Thank you. Would it be fair to say that while Treaty principles are not specifically mentioned, the Treaty statement does show that the government is aware of Treaty issues and of Māori aspirations for adaptation, and considering the specific needs Māori communities might have in that, as you discussed earlier, some of that detail could come later through further implementation and development of these ideas?

A. Yes, I accept that, and if it – and if that is the detail that will become apparent, then that will be definitely worthwhile. I mean, that will be the sort of thing – yes, so I accept that, and I accept that it would be an intent.

Q. Thank you, and thank you again for your evidence today. Those were all my questions.

JUDGE MILROY:

Thank you.

HOUSEKEEPING – BACKGROUND NOISE (11:20:19)

(11:20) BASIL MORRISON TO DR STEPHEN KNIGHT-LENIHAN:

Q. Thank you. Thank you most sincerely for your submissions, and Dr Hewison and also Mr Lenihan, can I first of all make a comment and then a question? And the comment is I'm delighted to see both of you use the term "local government" or "local authorities", because these days, they tend to use the term "local bodies", and local bodies disappeared on the 1st of November 1989, so thank you for that – for those comments.

Now, in all seriousness, the question really goes to Mr Lenihan. My understanding is there's currently five unitary councils in the country and a hybrid on the – on the Chathams. Is that still the case?

A. As far as I'm aware, yes.

Q. Okay. Have you done any research in regards to how the unitary councils are dealing with the issues that are in front of us? You have mentioned the Auckland Council, and I was just wondering where – whether or not they, as the biggest unitary, of course – whether the independent Māori statutory board is having an influence on the unitary councils' plans and policies.

A. I haven't – I haven't looked at that specifically in terms of the influence relative to other structures. I know that there's – as far as I'm aware, there's a good relationship and it seems to be having quite an influence in terms of decision-making in Auckland, but I couldn't comment on whether that's better or worse than, say, the classic council district-regional relationship. Is that what you're asking?

Q. Yes, well, I – I'm just wondering, for instance, in 1989, there was only one unitary council, which – which was Gisborne, and I just wondered whether there'd been any research done and how they are managing the issues in regards to the issues in front of us today. I just thought there might have been some research done on how a unitary is operating as in regards to a district, city and/or a regional council. That was really the question.

A. Yes, I think the – I think the issue here is – well, there's at least two separate issues. One is the unitary structure, in theory, should enable – facilitate decision-making. So, the relationship between different –

Q. Yes.

A. But the other issue, though, is resourcing. So Tai Rāwhiti versus Auckland – I mean, Auckland's got more money and more resources and more people, and so they can do things, and especially under Mayor Brown, they can do things which may be a bit more – a bit more direct, I guess, is the nice way of putting it, whereas other unitary authorities which might like to do that possibly are finding it a bit more of a struggle, simply because of resourcing, I suspect.

Q. Okay. Now, I'm particularly interested in Gisborne, being the first, and has had several iterations of political leadership and that sort of thing over time, and I just wondered whether there'd been any research done in regards to how that was working out. Thank you, and once again, Dr Hewison, thank you very much for – I'm sure you know where I'm getting at. Thank you.

MR GRANT HEWISON:

May I just ask, Sir, if you wish to have some more material on that question, I think we could provide some supplementary evidence along those lines, but just to reiterate, Auckland Council being a third of the population, and it has a much more sophisticated relationship with Māori, both in terms of the – the structures that are created there, but also mana whenua as well, than, I think, any other council probably has within the country. But it also has, as Mr Knight-Lenihan said, considerable resources to apply to that. But I think it – I think it probably is also in the same position of not having really sufficient detailed guidance from central government about how to apply these issues at a local, detailed level, yes. But we'd be happy to provide more information if that would be useful.

BASIL MORRISON:

Yes, no, I agree absolutely, what you are saying, Auckland is a – is an exception, and I accept that, and I just wonder, down at – perhaps at a lower

level of population and resourcing, whether the principle that we're looking at is being carried out by the three unitaries at the top of the South, and of course, Gisborne being there from Day 1 and how that was working, so Dr Hewison, if – Mr Lenihan, if a bit of that stuff could be incorporated in your submissions, that would be helpful, and once again, thank you most sincerely, Mr Lenihan, for your briefs of evidence. Thank you.

QUESTIONS FROM TRIBUNAL PANEL – NIL

(11:26) JUDGE MILROY TO DR STEPHEN KNIGHT-LENIHAN:

Q. I have just got one question, and that's in relation to your reference to the approach that Māori might take in terms of the hierarchy of priorities, I guess, is the way to put it, and you have referred to that in your speaking notes. I am just trying to find it. Yes –

A. Yes, I've got – I've got it here.

Q. Yes.

A. 89.

Q. Yes, and I just wondered if you wanted to expand a little bit more on – you made reference to Māori perhaps adopting more nature-based approaches, and my thought, when you referenced it, was that you were referring to possibly the wish of Māori to restore the local environments, which would then strengthen their ability to adapt and be resilient to climate change. So I wondered if you had any further comments you wanted to make about that, and how those – whether that hierarchy that you have got at paragraph 91 might change or a completely different hierarchy be put in place.

A. Yes. Just to expand on it briefly, then, the idea is that – that adaptation in that broader sense involves a range of different methods, so it combines hard engineering, soft engineering, a whole range of different things.

Now, if you include how to value the response, if you look at it purely from "How does it protect assets?", then there's a benefit-cost approach. You go, "How much does it cost to build a sea wall and what are you protecting?".

If you build in other things, so, if you do – if you take into account, say, reconstituting coastal wetlands, for example, "What are the biological, cultural, natural asset benefits that you get from that?", and you include that in your equation, then investing in, say, a bit of hard engineering, but more nature-based responses comes out as having a higher benefit-cost ratio, so that alters your approach to protecting the coastline or whatever it happens to be.

And so the hierarchy – the problem with hierarchies is it gives you the impression that it's an absolute stepwise approach, but it never is. It's always going to be a combination of, "Okay, well, we can keep doing what we're doing, but at the same time, we need to be building sea walls while at the same time trying to reconstitute a wetland", so they're very much in parallel, so it's more like a logframe approach, where you have all these overlapping processes.

So what I'm saying is that the – my sort of interpretation the te ao Māori approach is that it would add another dimension, so, for example, if we come back to the governance framework which we were talking about earlier. If you include that, you – you should get a better outcome, because it will address a whole bunch of benefits, rather than just trying to protect an asset. There's a whole bunch of things that you could be achieving here, which may be more challenging, but over the longer term, will both protect things and enhance, and in different ways, in different dimensions. So that's really my observation, at that point.

Q. Thank you. Thank you for that answer. It is hard, though, to get away from the short-term cost-benefit approach, isn't it, and to have that recognised at all levels, that some things might be worthwhile, even if they cost a bit more in the short term.

A. Well, the only comment I'd make there is that some time – you've got to be – benefit-cost approaches are, you know, contentious, because it depends on a whole bunch of things, like "What's your timeframe?", "What's your discount rate?", a whole bunch of things that you've got to feed into there, and they're all based on assumptions, and sometimes those assumptions can be entirely wrong.

So part of my observation is that yes, in the short term, it might appear to be a better outcome of their investment to do – to build sea walls or to put in canals or widen your stormwater drains or whatever, but what it can do is create something that the government's very hot on, which is the moral hazard, is that if you put these things in place, then it removes an incentive for people to adapt in a more profound way, so part of what we've got to get better at doing is building in those kind of conversations so that we can be sure that yes, you can offset impacts in the short term while preparing for more profound changes in the future, and you've got to be better at doing that.

So it's not one benefit-cost, it's actually several across different timeframes. I don't know, is that – does that help?

Q. Yes, it does. Thank you. That is very helpful. I think I would just like to ask one other question, and that was in reference to your comment that people have tended to conflate the disaster management and events, disastrous events such as Cyclone Gabrielle, with climate change policies and management, and I am just finding it – I mean, one sort of interacts with the other, if I can put it that way, so would you like to just explain that a little bit further?

A. Sure. So, historically, disaster risk reduction, and there are different terms, globally has become its own industry, so people look at "How do you" – so, terminology like "Let's make systems more resilient" often refers to the idea that we should be able to cope with a disaster, a natural event, whether it was a flood or whatever it is, and then recover from that pretty much back to where we were.

Climate change has now said, "Well, the idea of resilience is that you've then got to build in the transition process", so yes, Gabrielle woke us up and said, "Look, these areas – we already knew that they were vulnerable, but this has really made it quite clear", so how do we not just prepare for the next cyclone, but how do we shift land-use patterns in the next 10-20-30 years? Now, that's the climate change baseline shift.

The problem with focusing on disaster risk is that because there's this whole industry that's evolved over several decades, the tools available tend to be a bit limited, and they tend to focus very much on the –

basically, the engineering solution approach; what we've got to do is expand your wastewater – your stormwater systems, put in levees, and all that sort of stuff. And that's seen as a sign of success, because you've made yourself more resilient. But the danger with that is that you can have – you can improve your short-term resilience while decreasing your long-term resilience, i.e., you've actually got to invest in long-term change in land use, and that's what I – you're quite right, they overlap a lot, but it's that people have – globally, have only fairly – you know, in the last couple of decades, gone, "Actually, we now need to overtly include climate change into how we respond to disasters." It's no longer sufficient to go, "Well, when the next one turns up, we'll be better prepared", because you might say, "Well, the next one's going to turn up more frequently, and it might be bigger, so what do you want to do?", and that's the discussion. That's what I mean by making the distinction.

Q. And I guess the other aspect of those engineering solutions is that they all need to be maintained over time, and in your understanding, is that factored into the cost-benefit analysis?

A. Well, one – I did an exercise a few years ago, working, again, with Christchurch, funnily enough. They did a thing called the Waters and – WAMS, asset management system – can't quite remember. But they – anyway, this is back in the late '90s, and what they did was that they put in place – so, they were looking at replacing a whole bunch of stormwater systems which had been put in place – because, as everyone will know, you know, Christchurch is built on a big flood plain, so you know, part – places like Marshlands had basically wooden channels, and they said, "Well, we've got to update all this stuff, we've got to replace it all", and they did an exercise where they said, "Well, what happens if we did" – now, the term "nature-based solutions" wasn't there then, but effectively, that's what they were doing.

"What happens if we reconstituted waterways? What happens if we put back meanders into streams and rivers, you know, Heathcote and places like – what if we did all that?", and what they discovered when they did the modelling is that pipes would still work, but they'd devalue. So, as soon as you put a pipe in, you put in place a devaluation so that you know

that in 50-150 years, you've got to pay for another one or maintain. If you did the nature-based solutions well, they actually improved in value, so you had an improving asset, and what was really interesting – and I mean – is that essentially, the accountants said, "We don't have a model for improving assets. We have a model for depreciating assets. How do we include a model for improving assets? We don't know how to do that." But the Council – and, you know, good on it – said, "Well, that doesn't matter, because if we invest" – and they did a – they said, "How much does it cost per kilometre to nature-based solutions versus engineering?" Not – they were within cooee of each other, same magnitude, okay? But if they did the nature-based properly, it would improve in value, and not only that, it would not just give you stormwater management, but it would give you cultural, recreational, biological benefits in addition to just building a pipe.

So it was a really good example of how, if you do it well at the beginning, the asset actually becomes better at doing what it is that you want it to do. You still have to maintain it, you still have to maintain the – because these systems don't survive on their own; you've still got to look after them. But the good thing is that you don't have to essentially replace it all in 50-150 years. So that was a, it was an interesting exercise.

Q. Very interesting. Well, thank you very much for your evidence, Dr Knight-Lenihan. As I said, it has been very interesting and enlightening, and it is now time to hand you back to your counsel in case there are any further questions he might wish to ask in terms of re-examination.

(11:38) MR HEWISON TO DR STEPHEN KNIGHT-LENIHAN:

Q. Thank you, Ma'am. Probably just in terms of the questions, particularly from the Crown, I think the – what your response was, and perhaps didn't quite go as far, was, "Yes, there are these high-level documents, and a high-level recognition that's been there for decades, really, around the need for adaptation and adaptation to climate change, but they don't provide any kind of detailed specifics", and things like, for example, as we've just been discussing, how do you balance up, say, a nature-based

solution versus a hard-engineering solution, but more specifically, for Māori, what's the priority? What have Māori prioritised in terms of a solution and a hierarchy? So I was just wondering whether that's what your criticism was about, or whether it – yes, whether you wanted to comment further on that.

A. Yes, so, it's the – I agree, it's not that the Crown recognises these issues, as it has done in successive governments, so I'm not disputing that, and I think – and it's great that it's, you know, recognised in the Cabinet minutes, it's great that, you know, that all of that is in the system, but it's just that it's been in the system – it feels like it's been in the system for a while, and we need to take the next stage, and there was reference to, say, Auckland Council, so some councils and iwi who are working together seem to have taken that next stage, and we need to go, "Well, can't we take those lessons and roll it out?". Like, can't we use that somehow? And that's what it's – it feels like we're at the cusp of that, but it just isn't happening, and that's the frustration.

Q. And part of that guidance that's really important, but really hasn't come through the Crown documents, so, the successive periods – is specific Māori values, so by example, you know, the resource management area, we've become very accustomed to incorporating Māori spiritual values in the way that we design, for example, wastewater systems, so we don't – we've had policies in the past of simply putting wastewater into awa, and we had decisions made and real influence over this in the '70s and '80s, to – we need to put this – the waste on land first, as an example of where we've taken that view and prioritised it.

I think my question is, we, in this space, again, in adaptation, we haven't prioritised a Māori worldview or Māori values or Māori principles, in terms of how you might take a decision in terms of adaptation, or Māori assets or facilities or whenua that is of value, incredible value to Māori. Would that be a – do you want to expand, perhaps, on – on that aspect?

A. Yes, I think, from my perspective, is that there are – so, the water example is a really good one, is that as an – so, my background's in ecology, but – background's actually in water ecology, right back, and if you talk to an ecologist, and they said, "What would be the best thing to do?", and they

say, “Well, don’t put it into the water”, don’t put – doesn’t matter how treated it is, you don’t put anything like sewage into water. Yes, you put – you use land, because land’s quite good at doing the, you know, tertiary polishing of wastewater.

If you then apply that thinking – and essentially, my point is, I can’t – I’m not going to pretend that I’ve got any great knowledge of Māori worldview, but I suspect there’s a whole bunch of things that if you brought it into the conversation, would put forward ideas which would be incredibly beneficial in terms of adaptation, and at the moment, it just feels a little bit like the government is trying to remove reference to the need to include that in decision-making, not specific to adaptation, but just generally, and that feels like it’s not a good idea, if for no other reason than we’re going to be missing out on some really good thinking, really good ways of going, “Well, actually, have you thought of doing this? This is driven by, you know, te ao Māori, but it has benefits beyond Māori, it has benefits to the community generally.”

And I think that’s the bit that I’m very, yes, concerned about. I don’t want to see that lost. There’s no need for it to be lost, and I think, from what I have read in reference to the way that the government has included reference to the need for taking the Māori perspective, it’s still there, but I think it’s still seen a little bit as off to one side. It’s sort of almost a separate process, as opposed to being integral into all decision-making, which I think’s a wrong thing to do, because we will miss out on good opportunities to do things better.

Is that kind of what you’re –?

Q. Yes. Yes, and I suppose the next part of that, with the local authorities and local government, is at that level, a lot of these decisions are being made about adaptation, about resilience, and without strong guidance from a central government that prioritises Māori and Māori values in these processes, local authorities will just naturally fall back to a more general approach to decision-making, and I suppose that’s – did you want to expand on that kind of aspect **(inaudible 11:44:55)**?

A. Yes, and I – yes, I think that’s true. I think that if they’re not driven by something else – now, the reason I mention that is because I also happen

to have a wee bit to do with Te Arawa in the Bay of Plenty and Rotorua, and what I notice there is that if you've got a – if you've got a Māori agency that's pretty forceful and well-resourced, it will drive decision-making, and come up with really good ideas. So just as a – almost by the by, but it illustrates the point, is that I've got a niece that is involved in putting together woven mats to control – help control weeds in the Rotorua lakes, and that is very much driven by a particular perspective on how to manage problems. Now, it works really, really well, but what she's done is, she's worked with her connections through Te Arawa, and it's sort of rolled out, so the schools are involved, you've got kids making these mats, it all gets rolled out, and the Council says, "Well, this is great. This is wonderful."

So at that level, you can get quite a lot achieved, but I'd agree that generally speaking, if you don't have a very active component within your local community that's driving that sort of thing, I guess the default – and that's really what I was saying in my evidence, is that there's the sort of lacuna, there's a sort of emptiness there, where people are going, "Well, we'd really like to take more action, but we're not sure what we're allowed to do. We're all a little bit hesitant about: what is our mandate now? What are we legally allowed to do? Should – are we in danger of stepping across some boundary that we don't know exists? So we're just going to be conservative and hold back and wait until there's more clarification."

And that's part of the frustration, is that yes, we've now got a framework, but to be frank, the framework doesn't really give you a lot of assistance in terms of, "What am I – what can I do now?", so we're still waiting for that, and that may not appear until possibly after the next election, and then what?

So I'd agree, I think the default is being very cautious, but on the other hand, if you do get good relationships and good agencies locally, you can get quite a lot achieved, partly because it makes a lot of sense.

Yes, so is that kind of what you're –

Q. Yes, yes, yes.

A. Okay.

Q. Thank you. Well, thank you, Dr Knight-Lenihan, for your evidence. Thank you, your Honour and the Tribunal, for your questions, and claimant counsel and the Crown, and that probably concludes our participation for today.

MR PREBBLE:

Thank you.

JUDGE MILROY:

Thank you. Thank you –

MR PREBBLE:

Your Honour, Mr Prebble here for the Crown. Sorry to jump in. I just had one point that I wanted to check before they do finish their presentation, because as we heard from Ms McTaggart in her questioning, Mr – Dr Lenihan hadn't considered Kathryn Wilson's brief, which is all about adaptation from MfE, and just wondering if it would be beneficial – I think it would be beneficial, but in the Tribunal's hands as to whether it would be beneficial to hear from him, and we could do that by way of some questions just about that brief for him to provide responses to the Tribunal. It sounds like he's coming back to the Tribunal in due course in any event, so just wanted to check that before we close off on this matter.

JUDGE MILROY:

Yes. Yes, I did note Dr Knight-Lenihan's agreement that he would be willing to answer questions in writing, so there is that possibility. We will have to wait until Thursday to see how the rest of the hearing process might fall out, but I think for the purposes of certainty, if I say now that if the Crown would wish to put questions in writing with answers to come from Dr Knight-Lenihan in writing as well, then – then we are sure that the evidence will come in.

MR PREBBLE:

Thank you, your Honour.

UNIDENTIFIED SPEAKER: (11:49:14)

Thank you, your Honour.

UNIDENTIFIED SPEAKER: (11:49:12)

Thank you.

JUDGE MILROY:

All right. Well, thank you again, Dr Hewison, and our particular thanks to Dr Knight-Lenihan for your time this morning, and we can let you go and you can be relieved of the burden of giving evidence for now.

HEARING ADJOURNS: 11.49 AM

HEARING RESUMES: 11.57 AM

MS SWEDLUND CALLS

ASSOCIATE PROFESSOR BRENDON DUNPHY (SWORN)

Q. Tēnā koe, e te Kaiwhakawā. We will hear the evidence of Associate Professor Dunphy, which can be found at appellation #A051(a), and tēnā koe, Dr Dunphy. Can you please confirm your full name for the Tribunal?

A. Kia ora koutou. I'm Brendon John Dunphy.

Q. Kia ora. And do you confirm that your evidence is true and correct to the best of your knowledge?

A. That's correct; to the best of my knowledge, yes.

Q. And you have confirmed previously that you have read the code of conduct for expert witnesses at schedule 4 of the High Court Rules and that you agree to comply with it?

A. That's correct.

Q. Great. Thank you, Associate Professor Dunphy. If you would like to proceed to give your evidence now. Kia ora.

(11:58) ASSOCIATE PROFESSOR BRENDON DUNPHY: (#A051)

Kia ora koutou. I'm just going to share my screen, as I've prepared some slides that I think will illuminate some of my points as well, if that's okay.

Kia ora. My name is Brendon Dunphy. have been asked to give an opinion on the impacts of climate change within my field of expertise. I am an Associate Professor of Biological Sciences at the University of Auckland. My areas of expertise are in ecology, evolution and behavioural science. Simply put, my research looks at the limits to which life can be pushed and perhaps more importantly recover from disturbances from events such as climate change. The remainder of my credentials are set out in paragraphs 3-6 of my brief of evidence.

My evidence will cover the impact of the release of greenhouse gases on ocean ecosystems through atmospheric heating and absorption of gases into the seawater itself. Climate change is having significant impacts across the world's oceans with interconnected effects on marine ecosystems.

In order to understand these impacts, it is first important to understand the key features of the ocean across multiple scales. In this submission, I cover the key features of the world's oceans, before bringing our attention not only closer to home but also closer to shore.

Over 70% of the surface of the earth is seawater. I've provided this figure here just to show a whale's-eye view of what the world looks like, just to show the connectedness among our oceans, which are more geopolitical features, as opposed to biological, and in essence, a whale could swim to any ocean, if it so fancies, because all our oceans are connected. Also what's important on the screen is the red and blue lines, which show warm water sinking over the Arctic Ocean, and then over the course of hundreds to thousands of years, moving along the ocean bottom and coming up in key areas, before this cycle repeats. And so this is a very important feature of the oceans that draws heat out of the world and allows it to be survivable.

From virtue of its size, the ocean has enormous importance to ecosystem functioning across the globe. Given the fluid nature of the ocean environment, there is substantial connectivity between ecosystems. All manner of life dwells in the oceans, ranging from viruses to the blue whale, the largest animal known to have existed. The biological functioning of many of these organisms is tuned to a strict set of environmental conditions, including food content, depth, pH, and water temperature, which must remain within strict limits for these species to thrive.

The ocean itself is subject to huge gradients in physicochemical parameters, with sea-surface temperature, also known as SST, in particular, varying across the globe. So, in this image, we see the temperature gradients operating across the globe, ranging from about 32° in the tropics down to -1.8° in Antarctic waters, and just the position of Aotearoa in amongst these temperature gradients.

Through a strictly economic lens, the ocean, and particularly coastal regions, offer up ecosystem services estimated to be $22.4 trillion per year. Such ecosystem services are goods, such as aquatic resources, fisheries, et cetera; services, which give us economic benefits, habitat protection; and cultural benefits, such as spiritual, cultural beliefs, and heritage values.

Over 30% of the global population lives in coastal areas.

Now we shift our – we shift closer to home. In Aotearoa, coastal areas are generally temperate, with SST ranging between 10-20°C on average. Our marine space comprises of large sandy beaches dropping off to continental shelf areas roughly 250 metres deep. Dotted along the coastline are seaweed-dominated rocky reefs, which hold great diversity of species and potential food sources. These are matched by highly productive harbours and estuaries, where they can be dominated by mangrove forests in the north.

Aotearoa itself sits at the confluence of major ocean currents and within the Roaring Forties band. These strong winds circulate the Antarctic continent and

drive much of our weather. The figure on the right just shows – there's a lot of arrows on it, which just show the currents – major currents around Aotearoa, a key one being this, the East Auckland Current, which brings warm tropical – subtropical waters past our northeastern coast. Warm water is brought to the northeastern coast via the East Auckland Current, and with it, subtropical species that may permanently take up residence as our waters warm. Additionally, several oceanic fronts exist within the waters of Aotearoa, separating large ocean masses, and we see one here, labelled TF, the tropical front, or the Subtropical Front, further south, and then the Subantarctic Front. So these are very important to our waters.

All these factors play a major role in bringing nutrient-rich deep water to the surface, which results in highly productive – and when we talk about highly productive, we're talking about high phytoplankton levels, such as the phytoplankton shown here, and a bloom off the coast of Wairarapa and Cook Strait here. These high phytoplankton levels drive marine food webs. At the base of the food web are phytoplankton, which act as "nature's solar panel", trapping the sun's energy and passing it up the food chain to zooplankton, squid, fish, seabirds and marine mammals. This allows Aotearoa to have the highest diversity of endemic marine mammals and seabirds on the planet.

Such amenable conditions for life attract migratory species, who come here seasonally to exploit the rich resources within Aotearoa's waters. Iconic examples are the tītī, seen here. This – or the sooty shearwater, which migrates across the Pacific Basin annually, leaving Aotearoa, heading over to South America and then up to the north Pacific. It then, over the course of 11 days, will come back to Aotearoa, which is where this big blob of locations from this geoposition tag are under here, just highlighting the – the number of species that migrate back here to breed and take advantage of our highly productive waters that we have.

Equally, other large predators such as sharks, marlin, tuna, and whales undertake seasonal migrations. The key point to be made is that the waters of

Aotearoa are dynamic, productive, and highly sought after by many marine species.

This takes me to the impacts of climate change on the marine environment in Aotearoa.

The ocean acts as a receiving environment for many of the anthropogenic pollutants produced by humanity, whereby plastics, sediments, heavy metals, nutrients, and greenhouse gases, among others, slowly accumulate and have deleterious impacts on the environment.

Accordingly, as the receiving environment, the oceans have slowly absorbed the increase in anthropogenic CO_2 and the associated heat derived from increased emissions. From 1970 to 2021, the earth accumulated 381 zettajoules, which is ten to the power of 21, of excess heat, with 90% of that being absorbed by the ocean. This is equivalent to the ocean absorbing the energy of 25 billion nuclear bomb explosions over the last 50 years.

The SST anomalies shown on this screen here reflect times when sea-surface temperature, or SST, is warmer or colder than normal against this 1971-2000 year average. The other point I would like to make is that this is an American dataset, so they were using degrees Fahrenheit, but the trends remain the same for the Celsius. We can see a significant warming trend from the 1980s onwards, indicating that the buffering capacity of the ocean is being breached. Also, indicators show that between 1982 and 2023, each coastal region in Aotearoa had their warmest years recorded in either 2022 or 2023.

In Aotearoa, predicted climate change impacts are an increase in seawater temperature of 2.5–3°C by 2100. SST has already increased by 0.7°C since pre-industrial times, which, while it may sound insignificant, for the ocean, these are very large increases in temperature.

Looking more locally, this is particularly stressful for intertidal species exposed to air during low tides, and especially so for species on the north-eastern coast

of the North Island, Bay of Plenty to the north, where larger spring low tides occur in the late afternoon, exposing intertidal organisms to prolonged heating. Some species in that area, including pupu, or cat's eye, *Lunella smaragda*, are already nearing their thermal limits, and thus will experience significant mortality if warming continues. For many intertidal species, mortality events are abrupt. Rather than observed decline, whole populations will exhibit abrupt mortality events and disappear from areas, as has been witnessed for kūtai at Ninety Mile Beach following a marine heatwave in early 2020.

Warming waters will become more amenable to migrants. Kaitiaki and fishers will tell you that the oceans are changing. Although anecdotal, this reflects scientific observation. The temperature shifts we are witnessing has already changed the species composition of the coastal waters of Aotearoa, particularly the assemblage of coastal fish in north-eastern areas of the North Island which are adjacent to the EAUC, or the East Auckland Current. Tāmure, or snapper, are increasingly being caught in the Marlborough Sounds now, and then we have records of haku, or kingfish, being caught in Dunedin Harbour.

A particularly concerning example is the long-spined sea urchin, *Centrostephanus rodgersii*, which is now able to expand its numbers within the waters of northern New Zealand. This is a different species to the more common kina, or *Evechinus chloroticus*.

It was previously thought that cool winters kept numbers of this urchin low, but that it has been released from this population check due to the warming over the past decades. The species is now creating "urchin barrens", as it does not seem to be troubled by native predators, being fish or crayfish, that control densities of other urchins such as *E. chloroticus*, or kina. This is concerning as these barrens are deeper than *E. chloroticus.* This species also disrupts longstanding ecosystems as they eat a wider variety of food than kina, or *E. chloroticus*.

Marine heatwaves, or MHW, will be a particularly pernicious feature of future climate change impacts. Broadly, this term means events where SST, or

sea-surface temperature, remains over a certain threshold for a fixed period. This has drastic impacts on species distributions and available prey items. In 2015, a marine heatwave in the north Pacific, arguably one of the best-recorded thus far, resulted in the mortality of over a – one million seabirds from starvation.

The figure on the screen explains the inter-related impacts of a marine heatwave, where we have warm water temperatures off the waters of California. This leads to a change in the quality of plankton, and so that may be the amount of nutrient within them or actually the species composition that allows foraged fish to feed upon them. This reduces the quality and amount of foraged fish – so this is things like sprats, pilchards – which these top predators, such as larger fish, seabirds and whales, rely upon. It also resulted in more harmful algal blooms, and because many of these species are what's known as ectothermic, their metabolic rate relies on the water temperature. If the water temperature increases, their metabolic rate increases, and they burn through more of their fuel, so there is less fuel to go further up the food web. Thus, we see that fish stocks crash, we get a reduced body condition of those fish. We also saw an increase in whale mortality events, and the whales who were capital breeders actually decreased their birth rate, and as I mentioned, large-scale seabird die-offs and breeding failures.

Here in Aotearoa, die-offs of kelp forests, sponges, mussels and top predators have been attributed to marine heatwaves. Mortality is not necessarily brought about by the higher temperature per se, but by a decline in prey quality and abundance and a general weakening of the resilience of the species. Marine heatwaves can also affect the behaviour of species, including changes to spawning patterns, timing of migration, and in tropical areas, coral bleaching. As seen by the figure on screen, in 2022, the majority of the coast experienced a marine heatwave for 60% or more of the year. Marine heatwaves are predicted to increase in frequency, being an increase in the number of times per year; and increase in duration, how many months of that year are experiencing a marine heatwave; and also intensity with climate change, so that is the – the increase in sea-surface temperature.

This will also affect industry. For those aquaculture ventures seeking to raise animals in coastal New Zealand, we are seeing localised but large mortalities of farmed mussels and oysters. Salmon farms are experiencing reduced profitability from warming waters. Industry is being required to recalibrate and to move offshore and grow in deeper, cooler waters. This will take some time to implement as we developed the necessary technology and infrastructure to support this.

On the screen here is a summary of the impacts of climate change on New Zealand marine mammals, and a recent review by Roberts and Hendriks in 2022 assessed the impacts of climate change on Aotearoa's marine mammal fauna. They found that warming oceans will shift distribution of prey and the species themselves as they search for thermally preferential habitats within which to dwell. This may limit the range over which these species can occur, limiting their capacity to breed and increase population sizes. As we can see from this table, where it says – a dash in this is negative. This is where there is little to no information that we currently have or there are positive and negative impacts from these features of climate change. And so what you can immediately see it's very species-specific. And so this, however, will be dependent on species and location where they are found. Moreover, a shift in temperature and other ocean conditions may favour an increase in harmful algal blooms, such as, for an example, *Pseudo-nitzschia* species, the toxins of which have been associated with an increase in deaths of southern right whale calves.

With climate change, sea levels will rise, and depending on the climate scenario modelled, future sea level rise is predicted to be 0.2–0.6 metres by the year 2100, and the pH of sea water to drop 0.14-0.35 pH units, i.e., specifically, that the water will become more acidic.

This increase in sea level rise erodes cliff faces and alters coastal sandbars and harbours, causing increased sedimentation within surrounding waters and associated loss of habitat. The image on the right – sorry, the left – just shows

the impacts and predictions for coastal inundation around the coastline of Aotearoa.

Vital habitats for species like the culturally significant shellfish tuangi and hanikura, among others, are impacted, leading to shifts in coastal food webs – ecosystem services provided within.

For coastal areas, this will also lift water tables, increasing the "bogginess" of coastal fields, and diminish the availability of habitat for intertidal species. And so as we can see from this figure, the eastern areas of the country will be more affected by climate change.

On the right is the Munida Transect, which is a dataset compiled by the University of Otago just off the waters of Otago and starting from 1998 to 2020, as we see here, where they have measured the pH of water through time. Ocean acidification is predicted to increase. As more information comes to light, it – it is harder to make broad generalisations to ocean acidification, as sensitivity is very species-specific and may depend on how old the organism is, what species it is, and where it occurs in the water. What we do know is that there are reports of negative impacts on key marine species. For example, reduced growth and survival of shellfish like pāua, which require calcium carbonate for their shells. And so we're seeing is a trend through time of increasingly acidic waters.

Current modelling suggests an increase in westerly flows over the country as climate change progresses. This will more than likely alter local ocean currents and the upwellings that bring vital nutrients to the surface, with impacts of regional productivity – so that's the phytoplankton blooms, and this will impact areas or coastline around New Zealand. Equally, increased subtropical storm activity is predicted, bringing with it damaging winds, increased wave action, and an increase in record precipitation levels. Increased precipitation can rapidly decrease salinity of harbour waters, increase sediment flows in rivers from landslips, and thereby result in increased sediment deposition within harbours and coastal areas. This can reduce the ability of visual predators to

find food – such as penguins – and equally, increase the stress for bivalves such as cockles, pipis, mussels, that must filter out the silt and sand before they can ingest phytoplankton, the – the food that they're looking for in the waters. Moreover, sediment can coat rock surfaces, preventing the settlement of juveniles onto rocky reefs, and this can impact kina and pāua, threatening the recovery of fish stocks.

It is important to note that the key drivers of climate change do not operate in isolation. Marine heatwaves are often caused by low wind, which also reduces nutrient upwelling, further exacerbating the impact of marine heatwaves as animals struggle to find food. Warmer seawater increases tropical cyclone activity and their intensity. Thus, the combination of warmer sea temperatures followed by a sudden deluge can result in increased mortality of shellfish unable to move away from deleterious conditions. An example of this occurred in 2017 where record water temperatures accompanied by Cyclone Gita rainfall caused up to 90% mortality for mussels grown in the Firth of Thames. Whilst laboratory studies using consistent conditions are useful for understanding these impacts, we do not yet have a good handle on their operation on ecologically relevant scales. There is more work to do to understand how these impacts of climate change will add upon one other to stress ecosystems and the organisms within.

On this slide, I've just summarised typical coastal environment in northeastern New Zealand and listed all the – the impacts of climate change it will be operating within, but also some multi-stressor impacts as well, so just discussing the impact of increased rain, warmer waters, and the impacts on food, sediment levels, ocean acidification, increased storms.

I will now turn to focus on the ecological impacts of climate change on coastal habitats in northeastern Aotearoa.

The northeastern Aotearoa marine environment is a complex mosaic of rocky reef and soft – that being sandy beaches, mudflats – soft-shores habitats. As an example, the Ōhiwa Harbour and surrounds, located in the Bay of Plenty, has a rich variety of habitats shaped by its coastal, river, and estuarine

environments. The varied habitats are essential for local biodiversity but face challenges from coastal development, land use change, tourism, and climate change.

I will go through a summary of climate change impacts that can be expected for each key habitat within the coastal environment of north-eastern Aotearoa, using local and international exemplars.

Firstly, soft shores. Rising sea levels, more frequent and intense storm events, and changes in rainfall patterns cause increased erosion of soft shores and alter tidal inlets. This will disrupt sediment flow and the tidal range of the soft shores. Mudflats are particularly vulnerable to sea-level rise and reduced sediment supply due to coastal flooding, which could transport the sediment landward. As a result, coastlines are retreating, and low-lying areas are facing permanent flooding. This also threatens other low-lying ecosystems like salt marshes. Climate change is, therefore, putting soft shore habitats at risk, reducing the unique spaces where land and sea meet. This threatens the survival of soft shore species specially adapted to these environments, as they may struggle to keep up with rapid changes.

Rocky shores are vulnerable to physical damage from environmental changes such as rising sea levels, stronger storms and extreme thermal events. This results in shrinking habitat that forces species to compete for limited tidal zones, affecting natural zonation and ecological balance and reducing biodiversity. Increased temperatures and marine heatwaves lead to thermal stress, particularly during low tide, harming species like mussels, snails, limpets, and seaweed. It is predicted that as the climate warms, the abundance of primary producers – for example, seaweeds – which are more susceptible to higher temperature, may decrease, whereas sessile invertebrates, such as barnacles, may dominate the rock surface once occupied by the seaweeds. Other species will move as this change occurs as they are not adapted for survival in a barnacle-dominated ecosystem. Also, extreme weather events including marine heatwaves associated with climate change, combined with low tide timing on rocky shores, may impose great thermal stress on intertidal

organisms and cause mass mortality and even localised extinctions, rather than a simple poleward shift in intertidal species distributions.

Climate change is having major effects on seagrass ecosystems by altering their growth, reproduction, and distribution. Rising sea levels mediated by global warming can permanently flood the low-lying seagrass bed. This, in turn, increases water depth and limits light availability, reducing seagrass growth and it – and potentially eliminate some species. Warmer waters, nutrient runoff, and increased sedimentation cause eutrophication, further reducing water quality and threatening seagrass survival. The loss of seagrass beds would dramatically reduce marine biodiversity, as they are critical habitats supporting thousands of species, including fish and crustaceans. Seagrass beds act as nursery grounds for a variety of fish species, especially tāmure, or snapper, which are important for fisheries' resources. This decline would not only disrupt coastal ecological balance, but would also have economic and ecological repercussions, due to the cascading effects on ecosystem services across marine environments.

In summary, climate change poses multiple threats to global coastal habitats, and Aotearoa cannot escape. Climate change-driven impacts on coastal habitats result in habitat degradation, biodiversity loss, weakened natural defences, and the disruption of key ecological functions. The loss of critical habitats like rocky reefs, sandy shores, mangroves, and seagrass beds has cascading effects through food webs, compromising the stability, biodiversity, and resilience of coastal ecosystems. As coastal ecosystems weaken, their capacity to support marine life, protect coastlines, and store carbon diminishes. This heightens the vulnerability of both natural and human systems to climate change, emphasising the urgency of conserving and restoring these vital habitats. In addition to steps to prevent climate change occurring, conservation measures, such as marine protection in all its various forms, habitat restoration, and regulations on harvesting, are crucial for preserving these habitats. Including kaitiaki in planning and implementation for the urgent action that needs to be taken will be crucial in giving these ecosystems the best chance to

survive the effects that climate change is having and will continue to have on the marine biome as a whole.

Kia ora.

MS SWEDLUND:

Thank you, Associate Professor Dunphy. If you would like to remain for questioning from the claimant counsel, Crown and Tribunal, although I do believe, Ma'am, we're coming up on our break.

JUDGE MILROY:

Yes.

HEARING ADJOURNS: 12.26 PM

HEARING RESUMES: 1.22 PM

JUDGE MILROY:

Welcome back everyone. I hope you've had a nourishing lunch. So, we are now at the point of questions for Associate Professor Dunphy, and I believe our first questions are from Bennion Law.

(13:22) MR BENNION TO ASSOC. PROFESSOR BRENDON DUNPHY:

Q. Professor Dunphy, kia ora. My name is Tom Bennion. I am representing a number of claimant groups. One of them is a claimant group on the – with people in the south Taranaki Coast, so quite interested in your research. I've just got four quick items. First to say, thanks for the research and that first diagram showing oceans from a whales' perspective, was very interesting. Can I go to figure 2 first in your #A051(a)? And you show in purple and in dark blue ocean currents, and you talk about the East Auckland current bringing warm waters from the – from the tropics. In terms of the future with climate change, is there anything anticipated that's similar to the AMOC situation – you know, the Atlantic Meridional Overturning Circulation? So the AMOC is expected

to, as you know, weaken, maybe disappear. Is anything of that kind expected with any of these currents in New Zealand with climate change?

WITNESS REFERRED TO #A051(A), PAGE 6, FIGURE 2

A. To be honest, I am not aware of any discussion around that. What I have heard is that the shifting wind patterns will actually impact a lot of our climate – sorry, our current flows around the country. But in terms of currents stopping, per say, I am not aware personally.

Q. Okay. Thank you. And then coming to figure 3 on page 7.

And you've got that sea-surface temperature anomaly graph running from 1818 through to 2020. I was looking online. I was just wondering how far this extends backwards. My question is more like this. Say, in the last 1000 years, is that anomaly that we see on the righthand side of this graph at 2020 an anomaly that someone would not have seen in the last 5000 years, you know, in the same way that sea – air temperatures are rising or – or global warming is affecting things?

WITNESS REFERRED TO #A051(A), PAGE 7, FIGURE 3

A. As far as I know, no. This is quite novel to recent days, and yes, and as we can see, sort of rising sharply since 1980, so...

Q. All right. I guess I am putting this badly, but what I am saying if I was – for a person in New Zealand a thousand years ago, would they have experienced anything of this nature in terms of the sea surface temperature anomaly?

A. No.

Q. All right. And next is around sea level rise. You've got a section, I think, in your report at page – #A051(a), at page 13, you talk about sea level rises, and you've got 0.2 to 0.6 metres by 2100.

WITNESS REFERRED TO #A051(a), PAGE 13

A. Yes.

Q. In Tim Naish's evidence, he also talked about a possibility of a sea-level rise of two metres by 2100, saying that couldn't be ruled out and that's associated with Antarctic ice sheet disintegration. You would agree that that's something that's also potentially in the mix here.

A. Yes, it is, and it really comes down to the climate scenario being modelled and that sort of just highlights the uncertainty that we're dealing with in

making these predictions. But yes, I sort of went for a conservative number there just to sort of – as I feel that would probably be more likely, yes.

Q. Okay. And he says in his – in one of his papers – he says – I'm looking at #A025(a), page 61 – you don't need to go there – we may not need to go there, but he says, around that two metres by 2100 can't be ruled out. Low confidence at the moment, high impact, low likelihood. But then he says in the footnote, that high impact, low likelihood, he says, "becomes increasingly more likely as temperatures rise, and will be close to a certainty should global warming reach 2°C."

I mean, is that a generally – I mean, do you agree with him on that or agree the general point that temperature rise, once we get into the sort of 2° range, these things that seem remote-ish now start to get much more likely. **(inaudible 13:28:12)**

A. In my generation, yes, at 2°, those sorts of things start to become quite likely.

Q. Okay. And then just lastly, on – on the comments you made about seagrass beds, there's been research of the work on things – blue carbon proposals, the idea of sequestration in the sea, and I know that seagrass and other things like that have been talked about in relation to that. Is it – is it generally fair to say that the idea of carbon sequestration in the oceans using biomass in particular gets more complex the more warming we have, more tricky and more difficult, the more warming we have?

A. Yes, and also coastally, because we need to lock it – any carbon within biomass needs to be locked at depth. And so, in the shallower waters, it becomes a bit more difficult to sort of get the impact that we are after.

Q. All right. Thank you, those are my questions.

JUDGE MILROY:

We also have question from Sykes & Co – I believe, Mr Vincent.

(13:29) MR VINCENT TO ASSOC. PROFESSOR BRENDON DUNPHY:

Q. Kia ora, Professor Dunphy. I am one of the lawyers for the claim filed on behalf of two hapū of Ngā Ruahine in South Taranaki, and they've given evidence about what's happening on their coastline.

So, we've heard evidence from them that they are experiencing a large degree of coastal clifftop erosion, with some significant sites along the coast being 80 per cent gone, and that pāua reefs below have lost all of their pāua, and they believe that things are connected. Can you comment on the link that can exist between eroding cliff faces and the depth of shellfish such as pāua on rocky coastlines below?

A. Yes. One thing that could be operating in this situation would be an increase in sediment in the water, which darkens the water. It also smothers rocks where the pāua larvae would settle. It would also smother important coralline algae, which looks like a pink paint on rocks, coastal rocks, which is really linked to settlement of a lot of larvae. And so, because it is a seaweed, if it gets smothered, it can't get light and it actually bleaches and dies. So, if there is any mechanism which is increasing the sediment and then the settlement of that sediment on rocks where pāua would be settling, then that's definitely going to impact the population in stocks.

Q. And I guess, more generally, when it comes to sedimentation causing harm to coastal ecosystems, how significant are the extreme events like extreme rainfalls, storm surges, when you have this kind of thing, compared to the more ongoing, gradual sedimentation that might be occurring?

A. Well, the big pulses of sediment are definitely going to have short-term impacts as long as it can be cleared out, but if they are going to then settle in the coastal area and then become problematic, if they take up, you know, a longer residence time in the coastal areas, then it becomes quite problematic as well.

Equally, as I mentioned in my evidence, the freshwater incursions you get during these high precipitation events can actually add another stress to already stressed organisms, and – and we get mortality occurring from that as well.

Q. Thank you very much, those are my questions.

JUDGE MILROY:

Now, questions from the Crown.

(13:32) MR PREBBLE TO ASSOC. PROFESSOR BRENDON DUNPHY:

Q. Tēnā koe, Professor Dunphy. Ko Jeremy Prebble tōku ingoa. Kei konei mō te Karauna. I am one of the lawyers for the Crown, and I just had some brief questions on your helpful evidence and the attached scientific report, which I understand you have before you.

A. That's correct. Kia ora.

Q. Kia ora. And I noted in response to questions from Mr Bennion, you observed, obviously there is uncertainty with some of this as a scientist that you must deal with in terms of, I guess, the multitude of factors that are giving rise to observable effects. That will be fair?

A. That's fair, yes, that's a fair statement.

Q. And just picking up really on that theme, and I just had a few questions about one particular part of your report. So, at paragraph – sorry, page 9 of that attached report – that's the report that you put together with Martin Cheng.

WITNESS REFERRED TO #A51(A) PAGE 9; HEARING BUNDLE (WITHOUT APPENDICES), PAGE 67

A. Correct.

Q. And you have got a statement there that begins at the bottom, "Due to climate change, the assemblage of coastal fish is changing…", and you go on to talk about, "particularly in north-eastern areas of the North Island" and you also talk about, "Even local species are expanding south", and you talk about snapper being increasingly caught in the Marlborough Sounds, and you have already talked about that, but records of kingfish being caught in Dunedin Harbour. You've obviously got that paragraph before you?

A. That's correct, yes, I do.

Q. And I guess the question I have is, my understanding at least is this is an area that has been the subject of studies to try and detect climate-driven

changes in fish populations around Aotearoa, but it's been difficult to do so conclusively. Is that fair?

A. Yes, that would be fair. What we are – I guess, my point I am trying to make is that we are just seeing more and more incidences and reports coming back of fish are turning up and occurring where we've never really seen them before.

Q. Yes. And I guess the point that I am just exploring is that, obviously, you would agree there are multiple stressors that are being applied to species alongside natural variability in the ocean waters, that's a factor that needs to be taken into account as well, is it?

A. That's correct, yes.

Q. And, at least from the scientists who are giving evidence from the Crown, and that's Sam Dean from NIWA and Richard Ford from MPI, they consider that while fish populations are sensitive to climate change, proving it in the ocean is difficult. Do you agree with that proposition?

A. It is quite involved, yes, that's a fair statement, yes.

Q. And so really just picking up on that paragraph, although you say: "Due to climate change…" I think really what I am getting at is you'd agree it is – climate change is a factor, but it needs to be considered among a number of factors that are obviously influencing the demographic or the variability of fish species.

A. Yes, that would be a fair assessment of the sentence, yes.

Q. Yes. Thank you very much. Those were the only questions I had. Thank you very much for your evidence.

A. Kia ora.

JUDGE MILROY:

And now, turning to questions from the Tribunal, over to you, Professor Williams.

(13:35) PROFESSOR DAVID WILLIAMS TO ASSOC. PROFESSOR BRENDON DUNPHY:

Q. Tēnā koe, Dr Dunphy. David Williams speaking to you, and I've got three questions really, they're all at page 1006 and 1007 in the bundle, which

is pages 6 and 7 of your evidence. And the first one, you say that Aotearoa has the highest diversity of endemic marine mammals and seabirds on the planet. As far as I am aware, Aotearoa New Zealand also has one of the highest extinction rates on the land, in terms of various species, with biodiversity loss. Does that not apply in the marine area? In the marine area, have we not had the extinctions that we've had on the land, for birds particularly?

WITNESS REFERRED TO #A051(A), PAGES 6-7; HEARING BUNDLE, PAGES 1006-1007

A. We're on our way there. 90 per cent of our sea birds are facing some form of threat, and so we're actually particularly worried about seabirds. Yes. It kind of highlights the difficulty we have between what we call tree and sea. So, understanding what's operating on the land verses the ocean, it's a lot harder to observe what's going on under the water. But yes, I mean, in terms of sea birds, we have 90 per cent threatened. We have some of the highest rates of threatened species of anywhere on the planet.

Q. Right. So, we've got the highest diversity, and the highest possibility of loss as well.

A. That's correct.

Q. I see. So, above that statement, in your figure 2b, this East Auckland current, which brings warm water to the northeastern coast, the figure 2 doesn't show exactly where that purple band comes from. It's obviously not from Antarctica, but where – does it swoop down from – well, can you say, where does it start from?

A. That's the coral sea near Queensland. It comes down the coast of Australia. A portion of that will extend down Tasmania and then a portion of it comes actually comes across as this tropical front to us. So, there was a great example last night of a baby turtle being washed up in Northland, and that had come across on this actual current to us here.

Q. East or west?

A. **(inaudible 13:38:23)**

Q. Is the east coast or the –

A. East coast.

Q. Because there's a West Auckland Current as well, I see. How did the turtle get here?

A. But the West Auckland Current is subject to debate. So, the oceanographers, some will agree there's one, others don't.

Q. I see. Well, anyway, that does definitely answer my question.

Q. Now, down to the figure 3 graph. Now, in this inquiry, we're in the fifth week now and I've seen lots of graphs that start going up from around 1980 onwards, as this graph does, but something happened in the early 1940s where you go above that 1971 to 2000 average. So, was there anything that happened in the early 1940s that would change the narrative that we normally have about these climate change scenarios?

WITNESS REFERRED TO #A051(A), PAGE 7; HEARING BUNDLE, PAGE 1007

A. I'll have to be honest, I'm unsure what's driving that peak. I did look at it yesterday and wonder, but I haven't – I'm unaware of what's actually driving that peak in the 1940s. I'm happy to go back and do some research around that and report back if you need me to.

Q. It would be quite good, because I mean, there's used to be quite a few climate change sceptics around and they'd always say, 'But these things have always been going up and down, and it's not man-made, dah deh dah', that sort of scepticism. So, when I spot something like that 1940s thing, is this just part of a cycle that's been going on for thousands of years and it just happens to spike here, and it just happened spike in 2020? It would be useful to find out a wee bit more about it. Is that possible?

A. Yes, I'll do my best.

Q. Can you treat that as a question to be answered, please? Thank you. That's great. Great evidence. Nicely presented too. Thank you very much.

A. Thank you, kia ora.

QUESTIONS FROM KEVIN PRIME – NIL

QUESTIONS FROM JUDGE MILROY – NIL

JUDGE MILROY:

Thank you very much. It was very clear evidence that you've given us. Could I just ask though, there were two slides that you showed us in the PowerPoint which I don't think are in the report that's attached to your evidence, and that was the first one which is the view of the whales, in terms of how they migrated around the oceans, and the second was the lovely one with the – and I must admit I just want this because it looked really nice – the one with the picture of the phytoplankton. I've not actually seen what a phytoplankton looks like, so it would be nice to have that. So, I will just hand you back to your counsel now.

MS SWEDLUND:

Tēnā koe, Ma'am. And just to confirm, we will file the PowerPoint shortly.

QUESTIONS OF RE-EXAMINATION MS SWEDLUND – NIL

JUDGE MILROY:

Thank you, Ms Swedlund, and thank you very much Dr Dunphy for your presentation. Thank you – and for your time given to us, thank you very much.

ASSOC. PROFESSOR BRENDON DUNPHY:

Kia ora tātou.

JUDGE MILROY:

Now, we're running a little early, and I am just wondering if Mr Winitana is available at this time.

MS SREEN:

Tēnā koe, Ma'am. Ms Sreen here on behalf of Mr Lyall. Mr Winitana is in fact on Zoom and is prepared to start if that is suitable for the Tribunal.

JUDGE MILROY:

Yes, I think that will be very suitable, I've just seen him on our computer so I will hand over to you to introduce him.

MS SREEN:

Tēnā koe. I will be leading the evidence for Wai 3278 this afternoon, Ngāti Ruapani ki Waikaremoana Climate Change Claim.

Ma'am, we filed submissions on behalf of the claimants on the 2nd of October. They can be found at appellation #3.3.024, and we ask that it be taken as read and then move straight to the evidence of Mr Winitana.

His brief of evidence can be found at appellation #A143, and for today's presentation he's prepared speaking notes, Ma'am, which I filed yesterday afternoon with a covering memorandum, and I was just wondering if that is before the Tribunal for this afternoon.

JUDGE MILROY:

It will be shortly. They will be here very soon. So, if you would like to begin, we will get those speaking notes in a moment.

MS SREEN CALLS

VERNON WINITANA

Q. Thank you, Ma'am. Mr Winitana, please, can you confirm your full name?

A. Tēnā koutou. Ko Wēni Winitana tōku ingoa, Vernon Winitana.

Q. Thank you, Mr Winitana. I will pass it now to you to present your evidence.

(13:43) VERNON WINITANA: (#A143, #A143(a))

Kia ora. Thank you for this opportunity to read from these speaking notes.

What I am going to speak today of one specific and dramatic weather event in early 2023, Cyclone Gabrielle. The real story of climate change is about the impact of the Crown's role in our rohe pōtae and how over generations there has been a slow creep into a state of almost total dependency by mana whenua on the Crown.

As kaitiaki, Ngāti Ruapani ki Waikaremoana has a sacred obligation to safeguard Lake Waikaremoana and its ecosystems and the surrounding areas from climate induced harm and extractive infrastructure. We have lodged this claim to restore our mana, uphold our tino rangatiratanga and address the ongoing breaches of Te Tiriti o Waitangi by the Crown.

This inquiry is a chance to secure a future where our mokopuna inherit dignity, not deficit. Our participation reasserts that Ngāti Ruapani decision-making flows from tikanga, not Crown frameworks. There's a declaration that climate resilience must be grounded in tikanga and locally led. We would like the solutions and recommendations coming out of this Tribunal to assert mana motuhake over climate policy and planning.

Cyclone Gabrielle devastated Wairoa in February 2023, inundating homes, marae, whenua, displacing whānau, and exposing deep infrastructure in flood protection vulnerabilities. The Wairoa River burst its banks, inundating North Clyde and surrounding areas. Hundreds of homes were damaged and/or destroyed. Many were Māori households. Many of our people reside in Wairoa. The cyclone harmed marae, pātaka kai, whenua, awa, businesses and infrastructure. The Wairoa District Council described the impact as extensive and profound, touching every part of the community.

Cyclone Gabrielle caused record inflows into Lake Waikaremoana, stressing hydroelectric infrastructure and impacting downstream farms along State Highway 38. In the 12 months to June 2023, Lake Waikaremoana received the highest average inflow since records began in 1930, almost double the long-term average.

Many whānau were forced to evacuate, with some homes still uninhabitable months, even years later. Emotional and cultural dislocation compounded the physical loss. I am not here just to talk about the damages the cyclone brought upon the region, I would also like to speak of the aftereffects.

Like many, I am tired of the years of the water boil notices that have existed in the Waikaremoana region, especially when we have a lake pristine of water – of pristine water. Like many, I am tired of the 28 kilometres of unsealed road that gives a two-year life to a new vehicle and the damage to the shores of Lake Waikaremoana due to Genesis Energy raising and lowering lake levels or the flow of the water into Waikaretaheke River, the headwaters of the Wairoa River that flooded downstream the township of Wairoa.

While regional and district councils were not completely at fault, I hold them, together with Crown, accountable for the systemic neglect in their response to Cyclone Gabrielle.

Following Cyclone Gabrielle, both the Wairoa District Council and the Hawke's Bay Regional Council provided emergency support and began long term recovery planning. But their engagement with Māori communities was met with some collaboration and more contention.

The Wairoa District Council activated Civil Defence Centres, coordinated welfare including through trusted marae networks, issued regular recovery updates and helped whānau access financial assistance. Hawke's Bay Regional Council developed the flood mitigation proposal, Option 1C, proposing a major spillway that would impact Māori land and a marae, commissioned independent reviews into river management, and publicly emphasised partnership and community resilience.

Option C proposed of 170-metre-wide spillway which would divert flood waters but required removing 16 homes, one marae and up to six hectares of Māori land. The Government ringfenced $70 million funding for Wairoa, but its release depended on agreement over acceptance of option C. This sparked tension between Crown-appointed managers and mana whenua.

Hui with impacted whānau and a stakeholder group including Māori reps, farmers and local businesses shaped a long list of flood protection options. However, some, including Tātau Tātau o Te Wairoa Trust, a post-settlement

trust entity, felt the process was rushed and lacked proper consent from affected Māori landowners. The proposed flood mitigation would alter land use and potential sever ancestral ties to whenua, raising issues of tino rangatiratanga and intergenerational equity. The Wairoa Locality Plan emphasised not just rebuilding but regenerating the community through collaboration and cultural integrity.

Some affected homeowners supported relocation for safety, while others resisted the loss of ancestral land and called for more transparent, inclusive planning.

National support was provided to the Waikaremoana Region following Cyclone Gabrielle also, though it was part of broader Hawke's Bay and Tai Rāwhiti recovery efforts rather than a distinct, standalone package. There was welfare support and emergency support available, infrastructure and environmental grants, and other types of support.

Genesis Energy could have provided more proactive strategic advice and community-specific planning before Cyclone Gabrielle, especially for vulnerable regions like Wairoa and Waikaremoana. While they operated within consented limits, the event exposed gaps in pre-event communication, local engagement and climate resilience planning.

Marae in the Waikaremoana region played an essential role in coordinating emergency shelter, kai distribution and emotional support, coordinating with Civil Defence and MSD to ensure culturally safe delivery of service and advocating for long term recovery that respects whakapapa, whenua and intergenerational resilience. Their leadership was crucial in maintaining cultural safety and mana-enhancing recovery.

Moving forward, we consider mana whenua should have a greater role in preparing for, responding to, and recovering from dramatic weather events in Wairoa. Hapū and iwi hold generations of environmental mātauranga that could guide planning. Marae are not just physical shelters but spiritual sanctuaries.

Their role in disaster response is unmatched in terms of coordination and manaakitanga. Our values of kaitiakitanga and whanaungatanga offer holistic models for climate resilience that integrate land, people and spirit.

So I ask, how can the Tribunal embed mana whenua leadership in climate resilience? We want to see formalised roles for hapū and iwi in regional climate and infrastructure planning beyond consultation into decision-making. We want to see marae being used as permanent emergency centres with proper funding as well as training and equipment. We want to see hapū being supported to develop their own climate strategies anchored in tikanga. Finally, we want to see laws that require Māori-led climate impact assessments and consent processes for infrastructure.

The summary that I wish to speak about is that the Crown and its agencies speak on priorities, regulations, adaption plans, growth strategies and quick wins. Māori and mana whenua, we speak of wāhi tapu, our narratives of whenua and wai, our role as kaitiaki and principles of mana, tino rangatiratanga, tikanga and kawa. In my opinion, this inquiry is not only about omissions or adaption, it's about whether Māori are being heard, respected and empowered in decision-making **(inaudible 13:55:25)** climate change issues. Your recommendations from this inquiry are essential to encouraging a generational shift in legislation grounded in the upholding of Treaty principles.

And with that, I have finished my kōrero and I want to thank you for your time.

MS SREEN:

Thank you, Mr Winitana. If you can stay online, as the Tribunal and my friends from the Crown might have some questions for you.

HEARING ADJOURNS: 1.56 PM

HEARING RESUMES: 2.00 PM

JUDGE MILROY:

Welcome back. We have questions from the Crown for Mr Winitana.

(14:01) MS GRACE SEELEY TO VERNON WINITANA:

Q. Thank you. Tēnā koe, Mr Winitana. Ko Grace Seeley tēnei. I just have a few questions for you today relating to the Ngāti Ruapani Treaty settlement and how it might interact with your evidence. So, my first question is: have you been involved in negotiating the Ngāti Ruapani Treaty settlement?

A. I've been involved for a number of years, involved in trying to shape that particular settlement. But in the last couple of days, you probably know, there's been a signing, and I've not been involved in that aspect of it.

Q. Understood, thank you. But you are aware that the deed was initialled last week on the 20th of November?

A. Yes.

Q. And so, do you have a copy of your brief of evidence in front of you as well as your speaking notes?

A. I do.

Q. Great. So, at paragraph 5 you say that the claim is filed because the Crown has failed in its obligations to your iwi and hapū, in part, but also failing to act to prevent climate change and failing to fund your iwi to take the steps to act under your own tino rangatiratanga.

WITNESS REFERRED TO #A143, PAGE 1, PARA 5; HEARING BUNDLE (WITHOUT APPENDICES), PAGE 82

A. Yes. This was filed a couple of years ago –

Q. Yes.

A. – and that's correct. It's a little bit of a stretch for me to claim that the Crown can prevent climate change, but I think it tried to represent our feelings at the time. This was just after Cyclone Gabrielle.

Q. Yes, I understand. Just on that point, on that last point there, about the Crown failing to fund your iwi to take steps to act. In your opinion, does the signing of the settlement deed represent a step forward or a possible step forward in the Crown providing Ngāti Ruapani with some means to exercise tino rangatiratanga?

A. There has been, I understand – I understand there has been funding set aside for Ngāti Ruapani, but what participants on this particular inquiry need to understand is that there are a number of groups competing for the right to represent Ngāti Ruapani, and there's significant tension there which doesn't bode well for the future of any final settlement. But the Crown are participants in that particular forum and so are other parties. I'm one of those other parties. My claim is Wai 144, which was lodged in, I don't know, 1986 – some time ago, and after many years we still haven't secured a sound and just settlement.

Q. I understand. Thank you. And then I just have one final question about your paragraph 9. You say there that you have 50 per cent ownership interests in the Patunamu Forest, to the south of Lake Waikaremoana, and you say, "This is to be eventually returned to our iwi through settlement." And is it correct that the settlement deed refers to the return of the Crown's interests in that forest?

A. Yes, it does.

Q. And later in that paragraph you express some concerns about the Crown's focus on forests as the way to mitigate the effects of climate change and that focus placing a burden on Māori forestry owners. You may have, in your previous involvement in the Treaty settlement, or you may be aware of others' input, but are you aware of whether those concerns have been raised with the Crown through the Treaty settlement process?

A. I just recall a question about emissions and in trading, aspects of trading in carbon credits, but I am not aware of any specific points that you have just raised.

Q. Okay. Thank you very much for your evidence. Those are all of my questions today.

JUDGE MILROY:

I will now just check if there are questions from the Tribunal. Over to you.

(14:06) PROFESSOR DAVID WILLIAMS TO VERNON WINITANA:

Q. Tēnā koe, Mr Winitana. I had just one question relating to your paragraph 13 which is the discussion of option 1C, requiring the removal of 16 homes, one marae and six hectares of Māori land. In this inquiry, we have heard from witnesses in Tai Rāwhiti, I think from Tokomaru Bay, of people recognising they have to shift their marae and are indeed in the process of doing so. So – so, two questions really. One, is this marae you refer to a Ngāti Ruapani marae. I presume not, in fact, but is it?

A. No, it's not, but many of our people who live in Wairoa – there's possibly up to 40 families that identify as Ngāti Ruapani who have intermarried and had some connection to that particular marae.

Q. Right. So then my question is, partly because of those whakapapa links and all the rest, in your view, should the Crown or any other agency ever expect Māori to move from their ancestral land and move their marae? Is this something you have to decide for yourselves, rather than be asked through option 1C or 1D or 1F, whatever it is. What's your sort of basic line?

A. Many of our people are already moved, they've moved out of the district. They've been forced to move. They don't have homes. Their whānau structure has disintegrated in some cases and created additional tensions that they can no longer live in Wairoa.

My view is that this inquiry forum has got an ability to achieve some remarkable **(inaudible 14:08:50)** both unassailable, being unassailable in logic and somehow – yet somehow unactionable in politics. So, I am looking for some real courage from this Tribunal and to show that rare brilliance to produce recommendation so strong that the Government of the day will probably – probably must ignore them for fear of being transformed by truth.

What I am really saying is that I am looking for this Tribunal to come down to present recommendations that's really going to show up the challenges that this inquiry and claimants and Māori across the country are faced with.

Coming back to the simple examples that I explained and revealed, I suppose, for us in Wairoa, has been a real challenge, real challenges,

everyday challenges, people trying to repair their own homes, people having no say on the regulations and the legislations that councils are forced to follow. We've got no say in the way things are being done. We are treated as somebody who needs to be rescued and not somebody who can really contribute to the generational change that's required in the way these climate changes strategies are implemented or designed. Little bit of a long-winded answer I think.

Q. Yes. It sounds like you want a pretty strong version of tino rangatiratanga, is that correct?

A. Absolutely, absolutely.

Q. Right –

A. I'm not alone. I think there are people right across the country that want to do that.

Q. Thank you, Mr Winitana. I think we have met, and we know that we share the name Vernon, so kia ora to you. Thank you very much.

A. Kia ora.

(14:11) PRUE KAPUA TO VERNON WINITANA:

Q. Kia ora Mr Winitana. Thank you for your evidence. I just wanted to clarify. Your statement that you filed, that was filed in May of 2023, your original one, so the speaking notes today, would it be fair to say, are an example of a climate change event that you are referring to in your more general evidence. Would that be a fair assumption?

A. That's a fair assumption, yes.

Q. Yes.

A. Yes, definitely.

Q. Just in terms of that, when you are referring to the greater involvement for tangata whenua, mana whenua, in relation to interaction with the councils. You refer to the Tātau Tātau o Te Wairoa Trust obviously being involved, and you talk about the impacted whānau being involved. Was there any other formal grouping of people – or how would you perceive an appropriate representative body to be engaging with council in terms of looking at solutions?

A. Traditionally, there's an acknowledgement that the Wairoa Region comprises of Ngāti Pāhauwera, Rongomaiwahine… Tātau Tātau is a cluster of seven larger hapū groupings and Ngāti Ruapani ki Waikaremoana. The Tūhoe settlement has brought Ngāi Tūhoe into the Wairoa Region, and I think there is a willingness and a intentional opportunity to – to be able to craft together a grouping that can represent all of those tribal interests.

Q. But there isn't one that exists at this stage?

A. There's not one that exist at this point in time, yes.

Q. Kia ora. Thank you, Mr Winitana. Thank you for your evidence.

A. Kia ora.

JUDGE MILROY:

Matua Kevin, do you have any questions for Mr Winitana?

KEVIN PRIME:

Yes, I do, thank you Ma'am.

(14:13) KEVIN PRIME TO VERNON WINITANA:

Q. Tēnā koe, e te rangatira.

A. Tēnā koe.

Q. I just want to refer you to your evidence, the one filed in May 2023, in paragraph 10(a).

WITNESS REFERRED TO #A143, PARA 10(a)

You talk about – you say the Crown work with Ngāti Ruapani ki Waikaremoana to mitigate the disproportionate impacts of climate change on our people. I suppose my question is, what specific actions do you sort of envisage there?

A. The impact of the Crown is wide, has physical, spiritual, cultural, social, health and economic consequences that impact not just our people but everybody in Wairoa. The Crown obligations disadvantage Māori especially landowners, with native forest for example, Māori farmers, people who work in that agricultural industry. We have an opportunity to

have consultation with regional councils and district councils but just to provide advice.

Q. Okay. In the following paragraph, (b), you talk about specific accountability measures. Are you able to give examples of what that would be?

WITNESS REFERRED TO #A143, PARA 10(B)

A. When it comes to deciding on the environments and habitats that impact the awa, the lake, downstream effects, what we would like to be able to – to do is to be able to co-design a process that gives real acknowledgment to our tohunga, our experts, our own experts participating in that framework design and implementation. That doesn't happen at the moment.

Q. Kia ora. Kua mārama.

A. Āe.

Q. Thank you, thank you.

A. Kia ora.

(14:16) JUDGE MILROY TO VERNON WINITANA:

Q. Kia ora anō, Mr Winitana. I just have a question of clarification. At paragraph 13 of your summary – of your speaking notes, you mention option 1C and that the Government ringfenced the $70 million funding for Wairoa dependent on agreement to option 1C. So, was option 1C – has been given effect to? Or has there been agreement signed about that or is it still being discussed, and other options considered?

WITNESS REFERRED TO #A143(A), PARA 13

A. My understanding is that it is still being discussed.

Q. So, the $70 million has not been – is still in a pot somewhere waiting.

A. The answer to that – I don't know the answer to that. I don't know; I am not close to that decision-making process. Probably with the council and which the two PSGE entities and others.

Q. Thank you for that. And then, just at paragraph 17 of your speaking notes, you refer to Genesis Energy as – or could have provided more proactive strategic advice and community-specific planning before Cyclone Gabrielle. And at the moment, of course, there's no requirement

for them to do that. Would you see Genesis Energy being part of the, or being required to be part of the discussions, as basically, the control the catchment?

WITNESS REFERRED TO #A143(A), PARA 17

A. Yes. We've had ongoing discussions with Genesis prior to and subsequent, but their role was really crucial. We don't believe that they gave enough attention to the possible impact that a cyclone could have had on the region, and many felt that it could have been done a lot – attention to it could have been given a lot more priority prior to the cyclone. They should be part of any mitigation, any remediation, any group that's formed to address this, these issues in the future. Definitely.

Q. All right. Thank you very much to your answers to all our questions. Those are all the questions from the Tribunal, so I will hand back to your counsel in case there are any questions by way of re-examination.

QUESTIONS OF RE-EXAMINATION MS SREEN – NIL

MS SREEN:

Thank you, Mr Winitana, for appearing on such short notice this afternoon. That's all from us today.

JUDGE MILROY:

And again, thank you from the Tribunal, Mr Winitana, for your time today and for your flexibility in coming a bit earlier than expected.

VERNON WINITANA:

Kia ora, kia ora. Can I just add one more thing?

JUDGE MILROY:

Sure.

VERNON WINITANA:

These things don't go away. All I can say is, pērā i te tai, ka hoki mai anō, ā, ka hoki mai anō. Kia ora tātou.

JUDGE MILROY:

Kia ora, thank you and you've certainly laid a big wero in front of us, to be courageous with our recommendations, so thank you again.

VERNON WINITANA:

Kia ora.

TIMETABLING (14:21:13 – 14:23:28)

HEARING ADJOURNS: 2.23 PM

HEARING RESUMES: 3.33 PM

HOUSEKEEPING – TIMETABLING (15:33:54)

MR SHARP:

Dr Bertram has filed evidence in support of the claim by the Mataatua District Māori Council. It is Wai 2607. The relevant documents that he has filed, he has filed an affidavit dated 24 August 2024, which is reference number #A005, and he has also filed an updated affidavit dated 28 April 2025, which is #A005(a), and he has, just also, last week, filed some speaking notes dated 18 November 2025, which, I haven't got the reference here, but I presume it's #A005(b).

JUDGE MILROY:

Yes, that is correct.

MR SHARP:

Just a very brief introduction to Dr Bertram and the evidence that he is giving, so, he – Dr Bertram is a senior lecturer in the School of Economics and Finance at Victoria University of Wellington. You can explain that. He has given evidence in this inquiry relating to the government's climate change policies. So, with that and with your Honour's leave, I will call Dr Bertram.

MR SHARP CALLS

IVO GEOFFREY BERTRAM (SWORN)

Q. Dr Bertram, can you hear me?

Q. Yes.

Q. Dr Bertram, you just heard me refer to the documents that you have filed in the Tribunal, so I will just get you to confirm them also. So, firstly, can you please give your full name to the Tribunal.

A. My full name is Ivo Geoffrey Bertram.

Q. And, Dr Bertram, you have filed the following documents in the Tribunal. That's an affidavit dated 28 April 2025?

A. Yes.

Q. And you have also filed an earlier affidavit, 24 August 2024?

A. 26 August 2024, I think.

Q. Thank you. And you have also filed some speaking notes dated 18 November 2025?

A. That's correct, yes.

Q. So, can you just to confirm to the Tribunal that the contents of those documents are to your best knowledge and belief, true and correct?

A. Yes, with one exception, and that is in the case of the August 2024 affidavit on page 39, there was a typo which I have corrected in the more recent affidavit. If you take page 39 of my affidavit from August 2024, there is a typo in the little equation there, which says: "290+305=395", it should read "= 595". With that correction, that affidavit stands.

Q. Thank you for that precise amendment there. Also, I just want to confirm that in your affidavit, you confirm that you have read and agree to comply with the code of conduct for expert witnesses in the High Court Rules, that's correct?

A. Yes.

Q. Thank you. With that Dr Bertram, I will just leave that to you to introduce yourself to the Tribunal and to proceed to speak to your speaking notes, which have been filed.

JUDGE MILROY:

Dr Bertram, if I could just interrupt, just for a moment. I'm not an economist, so, in reading your affidavits I came across the phrase “cap-and-trade system”. So, as you are going through, I would be very much obliged, if you could explain that system to us. Thank you.

IVO GEOFFREY BERTRAM:

I'm happy to do that. At what point would it be most helpful?

JUDGE MILROY:

Well, I see in your speaking notes, you first refer to the global cap-and-trade system at paragraph 4(a), so if it could be done then, that would be very helpful. Thank you.

(15:41) IVO GEOFFREY BERTRAM: (#A005(d))

REFERS TO SPEAKING NOTES #A005(d)

My name is Ivo Geoffrey Bertram. I refer to myself as Geoff.

My ancestors settled here, starting in January 1840 and we were all here by the 1880s. I live in Wellington, Te Whanganui-a-Tara.

I am an academic economist. I hold degrees from Victoria University of Wellington and Oxford University, including a doctorate from Oxford in Economics. I taught Economics at Victoria from 1976 until 2009, then I was in a position in the Institute for Governance and Policy Studies until 2023, and I am currently Visiting Scholar in the School of History, Philosophy, Political Science and International Relations, so I guess I would describe myself as a retired economist, but still academically active.

I have carried out extensive research on the economics of climate change, starting in 1989, so I have been at this for a long time now. In 1989, the Ministry for the Environment commissioned a report on policy options, by which, the global community could deal with the problem of climate change,

and out of that study of that study for the Ministry for the Environment came the 1992 peer-reviewed journal article on the design of a global cap-and-trade system for greenhouse gases.

So, I guess, to explain how a cap-and-trade system works, that article in 1992 was a very pure and very academic, as it turned out, setting out of the ideas. That – the basic idea that is in that report is that the global atmosphere is a commons, that is to say, it is shared by all of humanity. And there's really no way to say that one bit of humanity has a better right to that global commons than any other. Even though some countries, historically, have asserted a greater right, effectively, by polluting the atmosphere with a great deal of carbon, which now has to be stored in this global commons, to the detriment of other countries, which – that didn't contribute historically.

But the cap-and-trade idea, essentially set aside the historical story of how we get to the current state of play with the atmosphere and, looking forward, said: "The right to put more carbon into the atmosphere, that is to degrade the commons, really belongs, equally, to all the human race in so far as it belongs to anybody."

So, the proposal was that the global community should agree that only a certain amount of carbon could be emitted into the atmosphere in every year. That amount would be divided up across the global community in the form of a per-person entitlement, and in order to emit any greenhouse gases, any industry or individual would have to hold a number of permits to pollute equal to the amount of pollution that they did, and in order to get those permits to pollute, they would have to buy them from the holders.

So, the whole global community would have the permits and then the market would reallocate them to the people who really wanted to pollute, and they would have to pay the people who weren't going to pollute for the privilege, and the consequence of that would have been quite a considerable redistribution of global monetary wealth from the rich to the poor, which was, I thought, one of

the great virtues of the scheme, but it was of course, the reason why I describe it as a very academic idea.

The reality of course, was from the word go, that as soon as the global community began to work on building a cap-and-trade regime, which is what the Kyoto Protocol originally, was intended to be, realpolitik asserted itself and the idea of actually having all the members of the human race participating in this and the poor benefitting at the expense of the rich, given that the rich were going to be doing the polluting, was very quickly set aside, and so the Kyoto Protocol was indeed an exercise in reinforcing the global distribution of par and wealth, and to that extent, it was not a realisation of the ideas that I had set out in 1992.

But if you have questions about the operational detail of a cap-and-trade regime, this is a good time to take them, so, you know, I'm happy to follow up.

JUDGE MILROY:

Thank you for that succinct explanation. I think we get the idea, if you would like to continue.

IVO GEOFFREY BERTRAM: (CONTINUES #A005(d))

In 1993, I and some colleagues were commissioned to do a modelling study on general-equilibrium techniques of the possible impact that carbon taxes would have on the New Zealand economy, and in that study, we found that the effects of the carbon tax on gross domestic product could be either positive or negative, depending on the design of the policy and depending on how the revenues from the carbon tax were used. This is a follow-on from the point I was making about global cap-and-trade, that it can be an instrument of wealth and income redistribution at the same time as it's a powerful instrument for decarbonising.

And so, we found, to prevent emission reducing policies from cutting GDP, it's essential to accompany them with equally strong measures that drive positive transition to a low-carbon economy. That remains the case today, and I'll return

to the issue of good policy design later on, when I come to talk about GDP and Māori interests at the very end.

The following introduction of the New Zealand Emissions Trading Scheme, in 2010, I co-authored with Simon Terry. A book, *The Carbon Challenge*, which critically analysed the Emissions Trading Scheme in detail, identified the problems with it and foreshadowed the issues that have since rendered the New Zealand ETS effectively irrelevant and ineffective in its ostensible goal of reducing carbon emissions.

My evidence is that the New Zealand Emissions Trading Scheme, while it has a great public relations function, and it probably produces an environment where people feel happier about reducing carbon emissions, it has no bite from an economic point of view, and that's reflecting, I think, points I'm going to make later about the lack of real ambition.

I've maintained a research interest in the evolution of climate policy and the statistical record of emissions, which is the central topic of my evidence here. I have also carried out research since 1980 on the New Zealand electricity industry. That's another area on which I'll comment later, though it's not mentioned in my evidence-in-chief. It arises in relation to the evidence of Dr Kieran Murray, which I want to comment on later on, but also, when one starts thinking about the alternatives to the actual policies that have been implemented in New Zealand, and I regard the electricity industry as a central component of a genuine attempt to decarbonise the economy, and I see Māori as having a potentially central role in that.

I've provided for this inquiry the two affidavits that we mentioned before, and I have noted the correction that was needed to paragraph 10.1 of my 2024 affidavit regarding the misprint about 395 instead of 595.

My evidence first addresses the question of what the spirit and letter of the Paris Agreement of 2016 require of the New Zealand government. I consider

that (in common with numerous other countries) this country has failed to live up to its promises.

I then review the statistical record of emissions to show how the New Zealand government has used complex accounting procedures to conceal the basic truth that there has to date been no really serious effort to shift the dial on this country's gross carbon emissions.

I will then analyse the various emissions targets and budgets set by the government.

Then I'll reply to the evidence of Dr Kieran Murray which has been provided on behalf of the government. I'll also make reference at various stages to the evidence of Hemi Smiler, Kate Harrison and Helen Plume, also provided on behalf of the government.

At the outset a clear distinction has to be drawn between mitigation and adaptation. Adaptation, which dominates most policy discussions in this country, is a matter of the domestic arrangements that we make to cope with the consequences of climate change and is not the central concern of either the Kyoto Protocol or the Paris Agreement, though it is included in both. Mitigation – that is, reducing each nation's carbon footprint – is the subject of my evidence, and I will really not have much more to say about adaptation.

So, I start with the issue of the degree of ambition and commitment that the New Zealand government has exhibited in the climate change front since the issue came on to the horizon in the late 1980s.

But I focus here on the Paris Agreement of 2016, which requires that each party have a Nationally Determined Contribution that "must reflect its highest possible ambition". Those words, to me, are very clear and quite unambiguous, and I note that advice to the New Zealand government in a Cabinet paper in 2018 translated this, using the words, "each party is contributing to the maximum extent they can". And again, I read this as quite an unqualified commitment to

high ambition, and given the recognised urgency of reducing global emissions, these words imply an unequivocal commitment of resources and policy leverage to the task of mitigating emissions.

And then my evidence sets out, at paragraph 4.5, three tests that I would apply to the genuineness of a policy commitment.

The first one is, are the full resources of the nation engaged, with active direction and leadership from Government? And I cite there an example of the recent case where what I would call a full commitment of the nation's resources occurred, and that's 2020, faced with COVID, when the government locked down the New Zealand economy, and as a result, saved a very large number of lives and preserved the quality of life for the New Zealand population for a full year while elsewhere in the world, there was a great deal of suffering. I would class that as representing genuine ambition, genuine commitment with the full resources of the nation and the full political reputation political capital of the government placed on the line.

The second test is, does the private sector have certainty about policy consistency and sustainability of enforcement over time? And a good example of a policy that is consistent and enforceable, and credible over time is the Reserve Bank's operation of monetary policy. The Reserve Bank has been given independent status and sets the official cash rate on an independent basis. It has a great deal of credibility in doing so, and it has genuine independence, which does endure from one government to the next, even though there's a bit of tweaking on the margins. And so, I mean, if you were thinking about what a comparable exercise would be in relation to carbon policy in New Zealand, you could think of the Climate Change Commission being not just an advisory body – making reports which the government can set outside whenever it chooses. You would think of the Climate Change Commission actually setting the cap on a cap-and-trade system, a real one; or determining the level of a carbon tax, a real one; or directing certain regulatory instruments to limit emissions and to impose sanctions on parties who didn't pursue what the law requires of them.

You could think of it as having some of the powers that the Commerce Commission possess to pursue companies under the Fair Trading Act, for example. None of those powers, of course, lies with the Climate Change Commission as it is currently constituted, but you could imagine, in a genuinely ambitious policy framework, that commission could have a great deal more bite and more teeth than it has been given.

My third test is, is the policy legally binding on the ministers and officials that are responsible for implementing it? Now, I cited the principles of Te Tiriti o Waitangi in my evidence. I'm conscious that those are currently being softened a little, but nevertheless, there are requirements on the government to – to obey those principles, and I would like to see similar requirements that are legally binding under the climate change legislation. I would point out that the Zero Carbon Act of 2019 has a get out of jail clause, 5ZN, which simply says there are no consequences for the minister of failing to achieve the budgets. That, to me, has no place in that legislation. The minister should face genuine consequences if the budgets are not met.

So, my evidence is that this country's climate-change action to date fails on all three of these tests. The government's leadership and direction has been half-hearted at best and absent at worst. The central policy instrument – the Emissions Trading Scheme – has been ineffective, undermined from the start by rent-seeking, special-interest favours, unpredictable changes in the rules, and the absence of a binding cap on emissions. The Zero Carbon legislation, contrary to the claims of its promoters, has been shown in successive court judgments to be aspirational, not binding. The only period when the New Zealand government has entered into any legally binding international obligation to cap its emissions was commitment period 1 of the Kyoto Protocol, from 2008 to 2012. And as I will show later, the commitment that was taken on at that time was met without even drawing a breath. It was set up to succeed without doing anything about gross emissions.

Since the first commitment period, the New Zealand government has steadfastly refused to be legally bound to anything except statistical reporting of its emissions inventory, as described in the evidence of Helen Plume, paragraphs 4 and 16.

New Zealand consistently scores poorly in global rankings of climate policy. Typical verdicts are "highly insufficient" (from the Global Action Tracker), and "low" performing (from Germanwatch), and those judgments pre-date the recent weakening of policy effort by the current Government. They go right back over a whole series of governments preceding that.

I note that the 2024 Germanwatch Climate Change Performance Index (which I have showed in paragraph 5.8 of my affidavit of August 2024) had New Zealand at 34th out of 67 countries. In the 2025 edition, New Zealand was 41 of 67, and I just noticed that the COP in Belem, in Brazil, over this last week, the Germanwatch has published its latest climate change performance index, and New Zealand has dropped to 44. So, we are going steadily, and quite dramatically, down the international ranking on climate change policy.

Mr Hemi Smiler in his evidence at paragraph 39 says, "Determining New Zealand's highest possible ambition is a political judgement in balancing acceptability, feasibility and affordability." I disagree. The central consideration is feasibility: what can this country do if it seriously commits? "Acceptability" is an amorphous, subjective concept that is heavily affected by the quality and strength of political leadership – it is not an objective, exogenous constraint on what can be done, as Mr Smiler appears to suggest. Nor is "affordability". To present "highest ambition" and "maximum contribution" as a balancing exercise is to confuse ambition with compromise, and I think, in the process, we lose the plot.

I turn now to the issue of emissions accounting.

It is common in Government presentations on this country's greenhouse gas emissions for the term "net emissions" to be used in two completely different

ways, generally without clear explanation when shifting from one to the other, and I take, as an example, the evidence of Hemi Smiler, who gives numbers for the internationally standard definitions of gross and net emissions in his paragraphs 15-22, but then in paragraph 34, he introduces – without explanation – New Zealand's emissions-reduction targets as being "net targets" designed to "reduce net emissions cost-effectively".

And from that point on, Mr Smiler's evidence uses the term "net emissions" to refer to a measure that is no longer the same as the one he has described in paragraphs 15-22. On the contrary, the New Zealand government's targets are specified in terms of what I'm calling "target accounted net emissions", which is a bespoke, locally created measure that differs both in magnitude and in its trend from the internationally standard definitions. This juxtaposition of two quite different measures under the same label is the standard practice in our government's official communications and it has the effect of producing a lot of confusion in the public record. As an example, I cite paragraphs 74 and 77 in the evidence of Helen Plume, which uses the term "reduction of net greenhouse gas emissions" to refer to a target which does not in fact involve any reduction in net emissions, as understood internationally, but rather a comparison between a gross emissions starting point and a target-accounted-net-emissions endpoint.

So, in paragraph 6.14 of my evidence, I try to sort of clarify how this works. I have set out a graphical presentation of those three statistical measures of emissions, the actual gross and net emissions under the standard internationally recognised definitions, and the New Zealand government's target accounting measure, which in my evidence is labelled TAN (target accounted net) emissions. In the chart below, I have updated the gross and actual-net numbers to 2023 using the latest Inventory, which came out in April this year. The target-net series, however, is the same as in my evidence of last year, from the Second Emission Reduction Plan tables, based on rather earlier inventory numbers, which is why there is a little bit of the mismatch in the early years.

ADJUSTING ONLINE PRESENTATION (16:02:13 – 16:02:42)

IVO GEOFFREY BERTRAM: (WITNESS REFERS TO POWERPOINT PRESENTATION #A005(c))

For the record, I downloaded this today, so this is hot off the press. This is the climate change performance index from the Germanwatch NGO, which monitors climate policies for all these countries that are listed, and here, you can see New Zealand listed at number 44 out of the 67 countries that they rank. So, this gives you – if you recall that only a year ago, we were up at numbers 36, somewhere around here, so we're dropping rapidly down through the ranks of countries that are rated low in terms of their policy performance, and we are dropping rapidly towards what will be called very low on the Germanwatch ranking, and I'm happy to supply the Tribunal with a copy of that chart if it's of any interest.

Now, these are the three different accounting measures that I've put together in my evidence, and I just thought I'd take you through them one by one so you can see how they relate to each other.

The first one is gross emissions, and gross emissions is all of the carbon being put up into the atmosphere by activities in New Zealand, without any allowance for the things like forestry that are taking carbon out. So, this is the total amount of emissions coming out of the New Zealand economy, going into the atmosphere.

What you can see here is that starting back in 1990, we are currently recording ourselves as having had 68 million tons, roughly, of carbon dioxide equivalent emitting back then, and as of 2023, we are emitting 76.4. So, our gross emissions are substantially up over that period. But you will notice that they actually rise to a peak in 2005 and then ease off, and recently, they have been dropping, and I think this is something that's true across much of the world economy. The private sector of the world economy is now well aware of the threat of climate change. It's well aware of the need to look towards a transition

to a lower-carbon economy, and it's also aware of the fact that renewable technologies are becoming radically cheaper, very fast.

So, both globally and in New Zealand, we are seeing a lot of private adoption of better – more energy efficiency, lower emissions vehicles and appliances; industry making the transition from fossil fuels to non-fossil sources of energy. You can see, I think, in this chart, one of the things that strikes me, if you look at the transition from 2005, the peak, down to about 2009, 2010, you can see that as the first commitment period of the Kyoto Protocol came over the horizon and the government was making loud pronouncements of its commitment to achieve a reduction in emissions, and business was not quite what New Zealand would really do, the possibility was there that the government might get serious – you can see that there's quite a rapid drop in emissions as business got itself ready to be able to face the serious regulatory intervention. Then you can see, they take their foot off the brake as it became apparent that commitment period 1 involved no really serious action, and as the emissions trading scheme was designed, in fact, to allow high-emitting export industries off the hook by giving them free permits. So, that's the first of the three, the gross emissions track.

Here is the second one, this is actual net emissions, and this is often described as what the atmosphere sees. So, this is – we count all the carbon going into the atmosphere from New Zealand economy and then we subtract all the carbon that's being absorbed out of it by, for example, forest growth, wetlands, other sinks of carbon in the economy.

So, you can see that back in 1990, although we were putting 68 million tons a year, up into the atmosphere, we were pulling 43 million tons out again, because we had growing forests in New Zealand sinking carbon back. Similarly, if you look at 2023, while we were putting 76 million tons up, we were pulling 56 million tons out with growing forests, and so you can see, again, there's about 20 million tons a year there; New Zealand forests pretty much soak up that 20 million and hold our net emissions down below our gross

emissions. So that is what we record in our inventory that we report to the UNFCCC every year in the main tables.

And then there's another concept all together, and that's this one. This is target accounted net emissions, and you can see, just looking at this, that according to the current set of target accounts, which the Ministry for the Environment has on its website, in 1990, we were target accounting 70 million tons, and in 2023, we were target accounting 71 million tons. In other words, our emissions over that long period had remained unchanged. There had been a bit of a burst in the early 2000s, followed by a very sharp drop going into the first commitment period of Kyoto, and since then, things have meandered along, a bit of up, a bit of down, a bit of up, a bit of down, but pretty well on the level. Now that is a totally different story from the one in the previous slide where you see both growth and net emissions rising sharply for the first couple of decades, then holding steady for a decade and only beginning to turn down in the last five years or so. The target accounted story is a totally different track, and of course, much more creditable, much more easy to sell to a world with the story that we are holding our emissions in check.

Now, we put the three of those together, and here is the chart that I got in my speaking notes, essentially, and in my evidence. You can see that putting target accounting and emissions on top of the other two, there is a radically different level and a radically different trend. When Mr Smiler, in his evidence, talks about reducing net emissions, or holding net emissions, he was referring to the dotted line. He is not referring to net emissions as the atmosphere sees them.

And so I would be looking in the New Zealand government's official publications for a chart that did this, or even one that took gross emissions out, and sorry I didn't draw one for today. But you can imagine taking gross emissions out and just comparing the two net emissions tracks. One of them that goes up by about 12 million tons a year and another one that goes absolutely flat over the 30 years from all three decades since 1990 when we start doing our calculations.

Now, this matters a great deal. The way that the accounts work is that a very large part of New Zealand's actual carbon removals from the atmosphere, a lot of the forest growth that's been going on, is simply taken out of the target accounts and set aside, and the reason for doing that is apparent as soon as you look at the trend on the two series. By making all of its promises and its statements using the target accounting numbers rather than the net emissions numbers, New Zealand is able to claim that it has achieved reductions that it has not in fact achieved, and I regard this as a misleading use of the detailed rules for carbon accounting.

HOUSEKEEPING – TIMING (16:11:24)

HEARING ADJOURNS: 4.11 PM

HEARING RESUMES: 4.18 PM

IVO GEOFFREY BERTRAM: #A005(c) (CONTINUES)

I took advantage of the break to construct the chart that I thought was missing in that set.

This is a comparison of the actual net emissions that is, gross emissions minus all the forest growth and other absorption, which is the bottom line, and the target accounted net emissions, which is that dotted line up above, just to emphasise the point that they are both at a different level but they have very different trends over the key period, the first 20 years or so of climate change action, when the target accounting procedure gets the most mileage out of its ability to set aside forests planted before 1990, and the consequence of that is this chart, which shows the carbon removals that have been set aside from the target accounts.

Now, this chart, the one that I have now got on the screen, has not to my knowledge, ever appeared in any New Zealand government publication.

But I just wanted to make a qualification here, if you have my evidence of August 2024 to hand, and you turn to page 24 of that evidence and look at the chart which is included in paragraph 6.26, you will find there, a chart which does come from a government source. But what you will notice about that chart is that it has the gross emissions track, which you can compare with what I have on the screen. It has the target net emissions track, which you can compare with what I have on the screen here. But it does not have the actual net emissions track and that is the general pattern for all government publications, is that they do not show you the distinction between the two versions of net emissions that they are working with, and yet that difference turns out to be absolutely critical in evaluating the targets that are set and the compliance with those targets.

So at that point, I will stop sharing the screen and come back to the speaking notes.

WITNESS REFERS TO SPEAKING NOTES #A005(d), PARA 19

So, typically (as in the evidence of Mr Smiler), a chart is presented with actual gross and net emissions, but then the target accounted net emissions are shown separately, which has the effect of taking those target accounted net emissions numbers out of context, and I'm trying here to remedy that.

The New Zealand government's target accounted net calculation produces a series of "net emissions" that differs in both its level and its trend from the actual net emissions that "the atmosphere sees", and this target net emissions track is then what's used for the purpose of claiming compliance with successive New Zealand commitments under the UNFCCC. The difference between the two versions of "net emissions" illustrated in the chart that I was showing you.

If you are comparing 2023 with 1990, gross emissions were 12% higher, net emissions, on the standard international definition, were 30% higher, and target accounted net emissions as calculated by the New Zealand government were less than 2% higher. So what was in fact a large increase in New Zealand's impact on the global atmosphere has been made to disappear from

the statistical picture by what I describe as opportunistic deployment of an accounting device.

As my chart shows, the target accounting net procedure consists of setting aside a large (though diminishing over time) volume of carbon absorption by growing forests, by excluding all the forests that were planted before 1990. I would emphasise that this is allowed under the Kyoto Protocol rules, for the formal process of reporting on compliance with commitments, although it has the effect of misrepresenting "what the atmosphere sees", and it has enabled the New Zealand government to proclaim achievements that were in fact empty of genuine ambition.

Now, just quickly sharing the screen again.

WITNESS REFERS TO POWERPOINT PRESENTATION #A005(c)

This is article 3 of the Kyoto Protocol, and this is the basis for the target accounting device. It's easily sourced. The – the protocol is up there on the web. But this is article 3, which says: "The net changes in greenhouse gas emissions from sources and removals by sinks". So, sources is all the emissions going up into the atmosphere, and sinks in absorption of carbon out of the air by, for example, growing forests, "resulting from direct human-induced land use change and forestry activities, limited", dah dah dah dah dah, as "measured as verifiable changes in stocks in each commitment period" … "used to meet the commitments in this Article of each Party included in Annex I."

So, later on I will refer to the evidence of Helen Plume, and this is the article in the Kyoto Protocol to which she will be referring, so I thought I should just put it on the record at this point, that the article 3 of the Kyoto Protocol is the basic starting point for target accounting net emissions.

WITNESS REFERS TO SPEAKING NOTES #A005(d), PARA 23

Now, all of New Zealand's emission targets to date have been set as so-called gross net targets. In other words, we start from the gross emissions in a base year – that's on the line at the top of my chart – and then target accounted net

emissions in a later period. That's a radical departure from the common practice, under which quite a lot of countries have specified their targets in terms of reusing actual gross emissions or reducing actual net emissions, and for example, the International Panel on Climate Change, when it models the requirements to hold global warning to 1.5° Celsius, does its accounts in terms of net-net; that is, a reduction in the actual net emissions measured in the standard international way. The IPCC doesn't do a gross net accounting of the sort that the New Zealand government does.

So, New Zealand's practice of taking a particular base year gross emissions number and then targeting a lower TAN number has been described by Climate Action Tracker as misleading, and I agree with that description, and I have said that in my evidence at 6.16.

Turning to the evidence of Helen Joan Plume, she has an extensive discussion of the accounting procedures used by New Zealand in both setting and then reporting on its targets under various international agreements. Her paragraphs 118-135 make sweeping statements to the effect that New Zealand has complied with all the technical requirements set out in those agreements, and particularly with the article 3 of the Kyoto Protocol that I just showed you. And throughout her evidence she lays heavy stress on the fact that official reviewers have accepted that the New Zealand government's emission accounts are compliant with the letter of those agreements.

My point here is that compliance with the letter of the law has to be distinguished from compliance with the spirit of the various agreements, and it equally has to be distinguished from genuine ambition to achieve reductions in carbon emissions. Ms Plume's evidence in general I think typically reflects the public stance of the New Zealand government in that superficially impressive general claims, vast amounts of technical detail, and declarations of compliance with specific provisions in the international documents are presented as though this suffices to justify the actual decisions and commitments chosen.

In particular, I take issue with Ms Plume when she says at paragraph 125 "Given that gross-net accounting was mandatory for Parties that had targets under the Kyoto Protocol…" – and here she's referring to article 3 that I just showed you – "…New Zealand had no choice but to apply the gross-net accounting approach to its CP1 target which covered the period 2008 to 2012." Now, in fact, gross-net accounting was not mandatory under the Kyoto Protocol for countries that did not adopt a gross-net targets.

Countries that had a gross-gross target under the Kyoto Protocol and countries that had a net-net target under the protocol, could account in terms of the gross or their net emissions. It was countries that took a gross-net target under the protocol that came under article 3 and so had gross-net accounting prescribed for them, and more importantly, New Zealand – whatever article 3 of the protocol allowed us to do, New Zealand was never bound to adopt gross net target for commitment period 1. We would have been perfectly free to adopt a gross-gross or a net-net target, had we chosen to do so.

Indeed, in early discussions in New Zealand – and I mean, thinking back now to my own experience participating in policy discussions at the time, between 1990 and 1992, when a carbon tax was first being considered and – and indeed, designed, by the then Minister for the Environment, Simon Upton, it was clear in those discussions that we were contemplating reducing gross emissions as the target for policy, and that would be the purpose of a carbon tax. That idea of having a target of reducing our gross emissions was later on, abandoned once the Kyoto Protocol had opened the way to doing things different.

As Ms Plume notes, New Zealand's adoption of gross-net accounting in its UNFCCC target for Kyoto commitment period 2 (CP2) was entirely voluntary. There was nothing that mandated that we had to have a gross-net target for commitment period 2. It wasn't mandatory at all; we chose to do it because it was convenient. Similar comments apply to our Nationally Determined Contribution under the Paris Accord, which is set in terms of a budget for target accounted net emissions.

A key point here is that adoption of a gross-net target did not ever foreclose the option of aiming to meet the target through gross emission reductions, leaving the credits that we could get from forest growth available to be sold internationally for a net gain. In fact, in the late 1990s, as we described in chapter 3 of our 2010 book *The Carbon Challenge*, New Zealand originally promised not to use forestry credits to meet its first commitment period target. That pledge was abandoned once it became apparent that gross emissions would be barely nudged down by the very limited policy initiatives that were actually adopted between 1997 and 2008.

So, in contrast to Ms Plume's rather sanguine account of official acceptance of the New Zealand government's accounting within the UNFCCC and IPCC reviewing procedures, the evidence of Ms Kay Margaret Harrison, which I have read – it's paragraphs 26-34 – describes the public consultation period in 2015 during preparation of New Zealand's first Nationally Determined Contribution, and she notes at paragraph 29 that "[t]he majority of participants thought the proposed targets inadequate and lacking sufficient ambition", and that "[m]any participants … felt the government was not interested in their views". In fact, she describes participants as having been angry.

Now, as one of those attending and speaking at the Wellington meeting that she mentions, I can confirm that this is an accurate account. And that as she indicates in paragraphs 33 and 34, the government made no changes in response to the consultation feedback, and indeed gave every appearance of quite deliberately setting aside the feedback that it was receiving on – during 2015 on where the target should be set. So, as you will gather, I have not been silent on this over the last 30 years, and whether that's a plus or a minus I guess you will have to evaluate for yourselves.

Returning to the chart in paragraph 17 of my speaker's notes that I have been referring to, for the Kyoto first commitment period from 2008 to 2012, New Zealand's commitment was that its target accounted net emissions would be no greater than its gross emissions in 1990, and that was easily achieved without even trying.

HOUSEKEEPING – LOCATING SLIDE (16:31:48)

WITNESS REFERS TO POWERPOINT PRESENTATION #A005(c)

The gross emissions are the grey line. The target accounted net emissions are the dotted line. The first commitment period is here, 2008 to 2012. You can see that the numbers have shifted around a bit in the last couple of inventories, but the fact of the matter is that we sailed through commitment period 1 with our target accounted net emissions no worse than the gross emissions in 1990. Our actual gross emissions were way up, but that did not come into the accounting procedures to claim compliance.

So, returning now to what I – to my speaking notes.

CONTINUES #A005(d), PAGE 8, PARA 29

The target was easily achieved with no need for any policy intervention, even though gross emissions had risen by 20% and actual net emissions had risen by 23% because of the growth of forest planted from 1990 on, combined with the exclusion of all the forests planted before 1990. I should note here that the target accounting procedure that was in fact used, in 2014, '15, to record compliance with our Period 1 commitment was not the same one as the current set of targeted accounting that was within that slide I just showed you. The result was the same. The target was met without any reduction in gross emissions. The accounting procedures have been rejigged from time to time. Again, I would describe that as opportunistic, because it has involved rewriting some of the history of the New Zealand Inventory.

For the second commitment period, 2013-2020, the New Zealand commitment was stated as follows: reduce gross emissions to 5 per cent below 1990 levels over the period 2013 to 2020. There was a subtext there. It said: this is subject applying the Kyoto Protocol framework of rules. It turned out, in practice, to mean no reduction in gross emissions at all. The average annual gross emissions from 2013 to 2020 were 22% higher than 1990, yet the target was stated to have been met, because instead of actually reducing gross emissions, the target was redefined as keeping TAN emissions 5 per cent below 1990. In

my view – and here, I guess I'm doing a bit of semantic interpretation – when we use the words, “reduce gross emissions” to 5 per cent below 1990, that statement, as it stands, is flatly incompatible with adoption of a gross-net target, and the “commitment” was thus laid out in terms that were seriously misleading, and I note that a number of international commentators, looking at the New Zealand target for that second commitment period, mistook the target for meaning a reduction in gross emissions, and there was some initial confusion when the actually higher level of gross emissions was taken into consideration against the New Zealand government’s claim to have met the target.

In the event, the TAN emissions from 2013-2020 turned out higher than the 1990, but we declared the target had been met by using up surplus emissions that we picked up in commitment period 1 through another application of the Kyoto framework of rules. As I describe in section 7 of my evidence – that’s from August 2024 affidavit – that surplus of credits had been achieved by opening the New Zealand market to imports of “hot air” credits from Russia and Ukraine – credits that lacked integrity and were rejected by most other parties to the Kyoto Protocol.

They, in effect, reflected New Zealand taking advantage of a process in Russia and Ukraine that was very dubious indeed. What had happened was that these – the former soviet economies’ industrial base had collapsed following the fall of the Berlin Wall. As a result, emissions had dropped like a stone, and so, when they were given units under the Kyoto Protocol, they had a whole lot leftover, and there was a great deal of malpractice involved in converting those units into tradeable units of the sort that the New Zealand government allowed to be imported by local private sector polluters and then cancelled against their emission obligations under the Emissions Trading Scheme.

For the years since 2020, there are two sets of targets that now apply. The first of these is New Zealand’s Nationally Determined Contribution (NDC) under the Paris Accord. The second is the sequence of five-year emission budgets produced under the Climate Change Response (Zero Carbon) Amendment Act 2019.

The Nationally Determined Contribution target (NDC), was, as usual, stated very obscurely, as I have quoted in paragraph 9.6 of my evidence, but it's most easily envisaged as a promise that we would hold our total target accounted net emissions over 10 years 2021-2030 to 571 million tonnes in total, with no firm prescription about the year-by-year distribution of those emissions. Now, in paragraph 9.11 of my evidence – of the August 2024 affidavit – I have shown the Nationally Determined Contribution budget as a straight line of declining emissions, starting at 69 million tonnes in 2021 and ending at 43 million tonnes in 2030. That's only one way of drawing the – the target, and you will probably see a variety of representations of the NDC target in the evidence of other people appearing before you. When I put that target into my chart of historic and projected emissions, it's clear that under even the most optimistic target accounting net projections, there is no chance whatever of meeting that NDC target, without again relying on imported carbon credits; that is, resorting again to the Kyoto rules, and estimates of the likely extent of the shortfall range between 80 and 114 million tonnes.

As I say in paragraph 7.14 of my evidence, the Treasury has estimated the cost of importing offshore credits on this scale as lying between $3 billion and $24 billion, and those are the same numbers that appear in Mr Smiler's evidence at paragraph 38. They are not – they are contested, I believe, although, the actual cost, if and when we do go out to buy units on the global market, is at this stage totally unknown.

The potential cost of fulfilling the NDC commitment has not to date appeared as a contingent liability in the Crown accounts because, as paragraph 7.15 of my evidence explains, the Nationally Determined Contribution is not legally binding. It can be changed or abandoned at any time by the New Zealand government, and so, although the target looks ambitious, it lacks the teeth to incentivise serious policy on reducing gross emissions. Because the fiscal consequences of failing to meet the NDC target by domestic emission reductions are large enough to make the target itself vulnerable to opportunistic redefinition or abandonment by government, the target itself has lost most of its

credibility as a driver of economic adjustment, and you will see in the media speculation about whether New Zealand will indeed, in due course, walk away from the Paris Accord as the American government has already done, or redefine our Nationally Determined Contribution, which we are free to do under the terms of the Paris Accord, in order to avoid what is otherwise a very heavy fiscal cost of failing to bring emissions down.

Now, turning to the three domestic emission budgets – that's the second set of targets that currently prevail under the 2019 Zero Carbon legislation – these are set out in paragraph 10.1 of my evidence of August 2024. They are specified in terms of total target accounted net emissions for each period, and there are no targets for the actual gross or actual net emissions in any of the periods. The totals are 290 million tonnes 2022-25 – that's a four-year period, by the way, because the targets came into being after 2021, so they have used a four-year target for those years – 305 million tonnes for 2026-30, and 240 million tonnes for 2031-35.

These domestic emission targets, which were set in 2022, are much less ambitious than the Nationally Determined Contribution, and they are subject to slightly greater accountability for the responsible Minister, who has to account to Parliament for failure to meet the targets, though he's not legally bound to actually achieve the targets. That's the get out of jail card, section 5ZN of the legislation that I mentioned earlier on.

In terms of annual average emissions, the NDC target, if you make it a per-year average, the NDC target is 57.1 million tonnes a year. That's in paragraph 9.8 of my evidence, with a correction, 595 is the number, not 395. So, the domestic budgets, in contrast, are for 66.1 million tonnes a year; that is, 9 million tonnes looser per year than the Nationally Determined Contribution target.

In other words, we promised at Paris to quite a tight target limit. We have legislated and regulated in terms of our local legislation for a much looser target. So, we have taken – the contrast is between 66 million tonnes we are allowed to do under the domestic budgets and 57 million tonnes that we are allowed to

do under the Paris Accord. And you can see that at 9 million tonnes a year, the domestic budgets can indeed be met, looking at the projection of target accounted emissions. Forestry growth is going to carry us through to meet those first two domestic budgets. The third one, 2031-2035, is a bit more dodgy. The Climate Change Commission has warned that the government will have to do something more to meet that third target. But nevertheless, those domestic budgets can be met without having to go overseas and buy very expensive amounts of offshore credits.

As the projections in the Second Emissions Reduction Plan show – and I have a chart of those at paragraph 10.11 of my evidence – the dominant means of meeting the three domestic emission budgets is carbon absorption by forests, rather than any reduction of gross emissions. Indeed, if you look out to 2050, gross emissions in 2050 are still projected to be not even 20% lower than they were in 1990, and the zero-carbon goal is to be pursued by means of forestry, and if necessary, imports of offshore carbon credits, not by addressing the task of transitioning the economy off fossil fuels and high-emissions agriculture.

It is true, as Mr Smiler emphasises in his evidence (paragraphs 17 and 18), that since 2021, all emission series have been trending down, and it is quite likely that this reflects, to some extent at least, the impact on private-sector expectations and behaviour of the Zero Carbon Act and the rhetorical commitment of the 2017-2023 Labour-led Government. But that should not be mistaken for actual policy ambition. The projected track of gross emissions is clear evidence of the lack of genuine ambition in the Government's climate policy, even before the recent decision to leave agriculture out of the Emissions Trading Scheme and to cut back on incentives to decarbonize other sectors.

Now, I will turn now to something that's not specifically in my evidence, but it's just to expand on the point that genuine ambition really does potentially involve quite big reductions in gross emissions, and one indication of the degree to which there is low-hanging fruit in the field of gross emission reduction, there's a chart here, in my notes, from the Ministry for the Environment's 2020 report

on marginal abatement cost, which shows the estimated cost per tonne of reducing gross emissions in different industries in the New Zealand economy. As is typical for exercises of this kind, the chart shows substantial scope for emissions to be reduced at negative cost.

If you look at the left-hand side of that chart, you can see the red and the maroon bars way down in negative cost territory representing emissions, that it would be cost effective and indeed profitable to reduce. There's between 10 and 15 million tonnes per year of that win-win abatement in dairying, in heating, in transport, and in industry. In dairy farming, for example, reduced stocking rates and low-nitrogen feed supplements and reduced use of nitrogen fertilizer were estimated to enable a reduction of more than 2 million tonnes of emissions while actually lowering the cost of production. In road transport, electrifying the light and medium vehicle fleet could cut gross emissions by 12 million tonnes while actually reducing the costs to vehicle owners.

And then, if you look to the right in that chart, a further 80 million tonnes a year of abatement is costed at less than the current cost of units in the Emissions Trading Scheme, and I think that's true even after the price crashed this week.

Now, I've got to add a qualifier to this before we rush thinking that this is an immediate available free lunch. I admit that's what it looks like, and in a long run perspective you can see it that way. In a short run perspective, life is never that easy.

So, in so far as these cost estimates are realistic, the theoretical implication is that a carbon price of $50 or more under the NZETS – and remember the government is – in its second emissions reduction plan, is projecting a $50 carbon price. Now, the real price is way below that at the moment. But if we think in terms of a $50 per tonne emissions trading scheme price, that should provide sufficient incentive for private businesses to adopt all those technological changes because doing so is cheaper than purchasing the emission units. But results of this kind have to be treated with caution, because

they typically underestimated the short-run transaction costs and the implementation costs of the model technologies, not to mention the inbuilt resistance of business to do things differently and the fact that they have investment in established technologies, which they don't want to have to write off in a hurry. So, the costs of getting to those low-cost emission opportunities are genuine ones.

Now, what I say is that that points not to ignoring the existence of economically attractive abatement; it points, rather, towards an important role for determined government action, via tools such as subsidies and regulations, to promote and accelerate private action to bring gross emissions down, and, you know, that Ministry for the Environment report goes on top of another one from Vivid Economics, which I mentioned in my evidence last year, showing similar opportunities to bring gross emissions down at negative or very low cost. In other words, it's not that there's nothing we can do, it is that policy makers have opted not to go there.

Mr Smiler, at paragraph 24, says that "New Zealand's gross emissions have increased since 1990, whereas in many other developed countries, emissions are now below 1990 levels", which is what my charts have showed. And then he states that "the difference can be explained by the different emission profiles". I simply disagree with that. In my opinion, the difference is due primarily to the absence of serious emissions-reducing policy in this country compared to many others.

HOUSEKEEPING – TIMING (16:49:18)

(16:49) JUDGE MILROY TO IVO GEOFFREY BERTRAM:

Q. Can I just make a couple of comments? One is just in relation to – at paragraph 21 of your speaking notes, we have just noticed what I think must be a typo, when you say: "But TAN emissions as calculated by the New Zealand government were less than 2% higher (from 89.8 to 70.9...)", and I'm just wondering, is that 69.8 to 70.9?

WITNESS REFERRED TO #A005(d), PARA 21

A. Yes, that's 69.8, you are quite right.

Q. 69? Good.

A. My typing, I'm afraid, is not really as good as it should be, so you are quite right, Ma'am, and thank you for that correction.

Q. All right, so that is good. The other thing is not to do with your evidence. It is to do with a number I gave to all counsel a while back in relation to the memorandum of the Crown, and I said it was #3.2.300, but actually, it's #3.2.230, so that is for the memorandum of the Crown that was filed on the 24th of November.

KARAKIA WHAKAMUTUNGA (KEVIN PRIME)

HEARING ADJOURNS: 4.53 PM

HEARING RESUMES ON WEDNESDAY 26 NOVEMBER 2026 AT 9.01 AM

KARAKIA TĪMATANGA (KEVIN PRIME)

(09:03) JUDGE STEPHANIE MILROY: (MIHI)

Tēnā koe, Kevin. Thank you for our karakia. Now, we're resuming this morning with the evidence from Dr Bertram, and I see he's with us already. So, we left his evidence from his speaking notes at paragraph 43. So, I will hand back over to you, Dr Bertram, to continue your evidence.

HOUSEKEEPING – TIMEKEEPING (09:03:35)

(09:04) IVO GEOFFREY BERTRAM: (CONTINUES #A005(d))

CONTINUES REFERRING TO SPEAKING NOTES #A005(d) FROM PAGE 13, PARA 43

Kia ora, Ma'am. The section which I am now about to talk about is thinking about alternative policies and in particular, I wanted to respond to the evidence of Dr Kieran Murray, which I have read, and I do take issue with two assertions that he makes in his evidence, and I quote: "none of the statements of evidence listed in paragraph 10 above…", he says, "…provide evidence or analysis that climate outcomes for Māori would be better, or access to international markets improved, were the government to take the actions the authors advocate" – that's in his paragraph 38 – and quote: "The experts identified in paragraph 10 pay little attention to the economic costs of the actions that they seek" – that's at his paragraph 43.

As one of the experts he identifies there, I do feel bound to respond to these statements. It may well be true, as Dr Murray argues at his paragraphs 34 and 37, that the stronger action to reduce New Zealand emissions advocated in the evidence of myself and the other experts listed in his paragraph 10 might not materially improve the *climate* outcomes for Māori or anyone else, given that New Zealand is only a marginal contributor to the global climate change outcome going forward and successful climate change mitigation on a global

scale does require collective effort by the nations of the world , of which New Zealand is only a minor part. It is definitely not true, however, that New Zealand – that stronger climate policy in New Zealand must necessarily be detrimental for the Māori economy and for Māori in the economy, as Dr Murray suggests. Those are two entirely separate issues, the global impact of New Zealand action and the impact on the New Zealand economy and particularly of Māori, of New Zealand government policy. Those two entirely separate issues are rolled in Dr Murray's paragraph 37, even though he does recognise that they need to be clearly distinguished.

The impact of New Zealand policy on climate outcomes is inevitably slight. The domestic impact is large. And when turning to the latter, that is, the impact of New Zealand government policies choices on groups within the New Zealand economy, it's unfortunate, I think, that Dr Murray has framed his discussion entirely in terms of the negative impacts of bad policy choices rather than looking for ways in which properly designed climate policy could have positive rather than negative impacts on Māori and other groups within the economy.

And just focusing on the reference to international markets in Dr Murray's paragraph 34, I just draw attention to the fact that in my affidavit of August 2024, I refer to a 2018 study by Vivid Economics which indicated that the costs of reducing gross carbon emissions in the New Zealand economy is likely to be lower than the global climate price under the Paris agreement going out to 2050. I described how, when the New Zealand market for carbon credits was opened to the international market price during the first Kyoto commitment period, 2008 to 2012, the effect was to drive the local carbon price down. That is to say that with an open market the New Zealand price will tend to move to match the global market price. That's a process called arbitrage, in which the opportunity to trade across the border means that the prices settle to parity.

I then – I cited a Climate Change Commission estimate of the global price for carbon removal units of USD 140 per tonne – Sorry, NZD 140 per tonne, roughly three times the NZ ETS price. Now that price may or may not prevail at present. The international prices and carbon markets are fluctuating and

fairly uncertain, and the outcomes from the recent meeting in Belem in Brazil have probably not been encouraging for the short-term movement of prices.

Nevertheless, if you think in terms of a global price of 140 per tonne, about three times the NZ ETS price, that would imply that opening the New Zealand market to the world price at those prices will drive the local carbon price up, not down. In other words, the – an open market for carbon credits at this point would probably now, and very certainly, in my view, in the next 10 years, substantially raise the return on the sale of carbon credits.

And I noted that internationally, there will be strong pressures at work to drive up the price in carbon emissions and carbon absorption credits. So, insulating the domestic New Zealand Emissions Trading Scheme price that's paid to forestry owners from the international market trend will be difficult. Only by barring New Zealand forest owners from participating in the international market for carbon credits will it be possible to prevent the local price from rising to the export value of carbon credits.

So the fact that the international carbon price is now higher than the NZETS price means that the effect of opening up access to international markets today would be not to reduce but to raise the value of emission reductions of the sort provided by forestry operations in New Zealand, including Māori forestry. The current government policy seems to envisage paying the international price for units that are purchased from offshore to cover a shortfall in New Zealand's NDC target but not to reward domestic forestry carbon absorption at that same price.

If you block New Zealand forestry owners, including Māori, from selling their carbon absorption at the world market price, and force them to accept only the capped NZETS price, that would involve expropriation of potential export earnings, which are sums that could be earned by forest owners if their sequestration services were sold to overseas buyers paying world prices. The Government's expectation in Emissions Reduction Plan of an NZETS price

falling to around $50 per tonne and remaining there until 2050 (which I mentioned in paragraph 10.12 of my evidence) implies a widening gap between the NZETS reward for forest owners and the value of their sequestration services on the world market. As paragraph 2.6 of my supplementary affidavit dated 28 April 2025 pointed out, "the idea of a steadily falling domestic carbon price as world carbon markets tighten does not make economic sense". And the implicit expropriation of forest-owners' potential incomes for the benefit of local polluters who are paying only the NZETS price for their emissions can be calculated as the difference between the world price and the NZETS price multiplied by the volume of carbon absorbed by forestry.

A climate-policy package incorporating vigorous action to reduce gross emissions, as advocated in my previous evidence, could easily – and arguably should – include pricing forestry credits at parity with the international price at which the government is able to purchase carbon credits internationally, or else allowing forest owners themselves to trade on the international carbon market. If you look at Mr Ballingall's modelling, which is adopted by Dr Murray at paragraphs 44-45, of scenarios in which the carbon price to foresters is driven down relative to the NZETS price, that predictably produces substantial negative impacts on the Māori economy. The same modelling procedure, applied to a situation where a world price above the current NZETS price is paid for forestry absorption, would naturally produce substantial gains.

Dr Murray, in his paragraph 41, acknowledges my argument against reliance on forestry as the primary means of meeting New Zealand's carbon-abatement targets, and in his paragraph 43 he then accuses me and other experts of paying "little attention to the economic costs of the actions they seek", and specifically of not "consider[ing] how the stronger action they advocate would impact outcomes for Māori."

He then goes on to cite calculations of the cost for Māori: "if NZ ETS settings are changed to exclude or materially reduce exotic forests". It is clear from the context that Dr Murray has assumed that removing exotic forestry from the Emissions Trading Scheme would not open the way to exporting forestry

credits to earn the world market price. That assumption seems extreme and not clearly warranted. Far from "paying little attention to the costs" of actions that I recommend, I focus rather on the forgone export earnings in global carbon markets that are the inevitable consequence of failure by policymakers to tackle the urgent task of bringing local gross emissions down and thereby freeing up forestry carbon credits to be sold offshore.

I find it surprising that Dr Murray has not attempted, in his evidence, to specify a set of rigorous carbon-mitigation policies that could be implemented in Aotearoa New Zealand without the allegedly damaging consequences for Māori that lie at the centre of his argument. Policy design, after all, is a matter of balancing priorities and interests, and a New Zealand government that was committed both to reducing gross carbon emissions and promoting Māori economic development should have no difficulty designing policy to achieve both those ends simultaneously.

In the evidence of Dr Cole, for example, at his paragraph 24, he states that "the Crown has failed to respond to known climate change risks at a time and in a way that evidenced its Treaty/te Tiriti responsibilities to do everything possible to protect the Māori Treaty/te Tiriti partner from harm caused by, firstly, the consequences of climate change and secondly, unwanted socio-economic impacts of a national climate change response". This captures precisely the idea that a national climate-change response can simultaneously pursue the two objectives of mitigating climate change while avoiding harm to Māori, and this would fit into conventional economic analysis of policy using cost-benefit techniques to include the external costs and benefits in pursuit of socially optimal outcomes.

The supposed conflict between ambitious carbon abatement policy and Māori economic interests that Dr Murray presents is entirely constructed by him on the basis of a hypothesised policy mix that (whether deliberately or unintentionally) loads the costs of failure to abate gross emissions onto Māori while large swathes of the corporate, predominantly Pākehā economy are less impacted and indeed insulated from some of the social costs of their emissions.

I therefore strongly disagree that section 3 of Dr Murray's evidence actually captures, as its heading claims, the impact of the "advocated policy shift" put forward by myself and other experts. Dr Murray has constructed a fictional, straw-man policy shift which is designed to produce the negative consequences he then predicts.

This point extends to Dr Murray's criticisms of Dr Every-Palmer's evidence. In his paragraphs 60 and 61, Dr Murray says: "The practical impact of Dr Every-Palmer's proposal to reserve forestry offsets for hard-to-abate emissions would be to lower the economic cost for the owners of hard-to-abate emissions. The cost to owners of these activities would be lower because (under Dr Every-Palmer's proposal) forestry carbon offsets would be reserved for them, rather than available to the highest bidder." He further states that the outcome would involve: "a transfer of wealth and jobs away from sectors disproportionately Māori to the owners of hard-to-abate emissions".

Now, Dr Murray does not explain who he means by "the highest bidder", nor does he develop any explanation of why withholding forestry offsets from easier-to-abate emissions should necessarily – and he used the word "would", so he's saying it necessarily will happen – would lower the return on forestry offsets, nor does he demonstrate any necessity for the proposed policy shift to involve a transfer of wealth and jobs from Māori to polluters.

As already noted, it would be perfectly feasible to ensure that forestry offsets are priced at their international value while banning their use to underwrite easier-to-abate emissions, thereby sustaining high returns to forestry sequestration while halting the use of forestry credits to offset easy-to-abate emissions. And if you recall that yesterday I showed you a modelling from Ministry for the Environment indicating that there is a large swath of gross emissions in New Zealand that can be reduced at minimal or negative costs if you take a long-run look at we mean by cost rather than the very short. So, Dr Murray has simply imposed upon Dr Every-Palmer's suggestion an

artificially constructed story of collateral harm from the proposed policy that could readily be avoided by more sensible policy design.

In summary, I consider that Dr Murray entirely fails to demonstrate his conclusion in paragraph 49 that: “the Māori economy would bear a disproportionate share of the economic costs of the more stringent actions advocated by Dr Bertram, Dr Cole, Dr Every-Palmer, and Professor Noy”. Insofar as some sacrifice of GDP in pursuit of climate goals may be required, the costs of that sacrifice ought to be borne by those best able to bear it, not loaded onto Māori. Insofar as more ambitious and sensible climate policy might go together with a gain in gross domestic product, the benefits could flow to all, including Māori.

I turn now to Dr Murray’s criticism of Dr Cole’s evidence.

I have read the evidence of Dr Anthony Cole and agree with him that gross domestic product on its own is an inadequate measure of wellbeing, and that implies that trading-off of GDP against other goals such as emissions reduction can be justifiable. I was therefore surprised that in his section 5 Dr Murray devoted so much of his evidence to an attack on the evidence of Dr Cole, which he claims to be “ill-conceived economically”.

After an extensive recitation of basic facts about gross domestic product, Dr Murray correctly notes that it is “a measurement construct, not a policy tool” and “not a lever government can pull to achieve its desired outcomes”. And from this, he proceeds to claim that “Dr Cole ascribes powers to GDP that do not exist”. Now, I’ve been unable to locate in Dr Cole’s evidence any such attribution of “powers” to GDP. On the contrary, Dr Cole’s critique of standard national accounting simply seems to me to make the well-established points that firstly, many socially-important things are missing from the particular measurement construct GDP, and secondly, that some socially harmful things are accounted for positively rather than negatively. So Dr Murray’s attribution to Dr Cole of the view that GDP is “a lever that Government can pull” seems to me entirely unfounded.

Dr Murray then presents in his paragraphs 100-110 a further lengthy discourse on the partial "decoupling" of gross domestic product from greenhouse gas emissions, which bears no obvious relevance to the issues at stake, and it leaves untouched Dr Cole's point that there is a positive relationship gross domestic product and greenhouse gas emissions. Now, I can find in Dr Cole's evidence no sign that he anywhere denies that the precise parameters of that relationship can change over time – that is the "loosening of the GDP-GHG emissions relationship" referred to in Dr Murray's paragraph 110 – nor does Dr Murray present any evidence that the relationship does not exist.

Dr Murray then turns to what he describes as "the inference by Dr Cole that government policy in relation to climate change and greenhouse gas emissions is dictated by the need to grow GDP", and against this he argues that in fact cost-benefit analysis is a more important guide to policy. This again seems to misrepresent the substance of Dr Cole's evidence, which nowhere says that policy is "dictated" by growing GDP. He argues only that GDP is an inadequate measure of economic success and that other measures are needed, with which I agree. I do note, however, that in his paragraph 126, Dr Murray states as his reading of New Zealand economic history that "economic growth (as measured by an increase in GDP) was at the forefront of government policy aims and directions", and that's a quote from his paragraph 126, which comes pretty close to saying that there's greater emphasis on gross domestic product than cost-benefit analysis. So, in fact, if anybody is representing policy is driven by the need to grow gross domestic product, it's Dr Murray rather than Dr Cole, I would suggest.

Dr Murray, in my view, further misrepresents Dr Cole's evidence in subsequent passages:

a. "Dr Cole argues the market economy within which government decisions are made is fundamentally flawed";
b. "Dr Cole seeks to pit the current economic system, what he calls a mixed market economy, against a system that is focused more on well-being"

and “advocates for a shift away from the ‘mixed market economy’ towards a system focused on societal progress”;

c. Dr Cole claims “that GDP and a market economy are inextricably linked”;

d. Dr Cole “infers that this so-called ‘more market’ approach made GDP growth a priority when it had previously not been”

And in each case, I have given the citations to Dr Murray’s paragraphs and the paragraphs of Dr Cole’s evidence to which he is relating those comments.

I have been unable to match these claimed statements or arguments attributed to Dr Cole to the actual content of the cited paragraphs in Dr Cole’s evidence, and they do appear to me to be figments of Dr Murray’s imagination. In other words, I feel that he has constructed Dr Cole’s evidence from a – from a hostile point of view which doesn’t actually represent its true essence.

Now, I come to a concluding note here, and this is where I do come to the point of alternative policies.

In short, since 1990, New Zealand policymakers have turned away from the option of developing the Kyoto forestry sequestration as an export industry that could supplement our overseas earnings from pastoral agriculture, horticulture, education and tourism, while directly acting to bring gross greenhouse gas emissions down over time at minimal cost to GDP.

So, going back to the 1990s, the policy mix that I and others were envisaging back then was that we would be taking robust action, through a carbon tax or something similar, plus some regulatory and possible subsidy action, to bring our gross submissions down gradually over time so as to minimise the costs and to get private access plenty of opportunity to adjust their conduct, to write off their investment in high-emitting technologies and to move into a low-carbon frame of economic activity. And at that time, we saw the possibility that the sequestration services of New Zealand forestry would have a high value in the long run on international markets, and so we were envisaging simultaneously developing the economy as a low carbon emitting economy in gross emission terms and making a profit on forestry as an export industry.

The New Zealand government, since 1990, has turned in a completely different direction. It's opted to use forestry absorption as a way of covering gross emissions that it has not acted to reduce, and that is the importance of the target accounting net procedure that I took you through yesterday.

So New Zealand governments have instead seized on the chance to "cover" untouched gross emissions with accounting credits that are created by opportunistic exploitation of the Kyoto rules around land use, land-use change and forestry. Forestry has thereby been rendered a captive to the New Zealand Emissions Trading Scheme, diverting its supply of internationally valuable carbon credits to protecting the position of high-emitting rent-seeking corporate interests within the New Zealand economy, whose capture of climate policy has left the economy at large carrying the deadweight burden of their unabated gross emissions.

An alternative policy strategy would assure forest owners of the full international value of their services while forcing gross emitters to bear the international cost of covering their emissions with offshore credits. Such a reversal of the current incentive structure would involve a transfer of wealth and income from emitters to foresters, which arguably would work to the benefit of Māori.

Dr Murray, in his evidence at paragraph 48, notes that "80 per cent of Māori land is classified as Land Use Capability 6, 7 or 8. Hence Māori farmland is mostly used for forestry and sheep and beef farming." And from this he deduces that greenhouse-gas mitigation policies must necessarily reduce the economic return on that land. What's entirely absent from his discussion is the fact that much of this iwi-owned land is in regions, and has topography, suited to the installation of solar arrays and windfarms, which could play a key role in achieving transition of New Zealand electricity supply to fully renewable supply while at the same time providing Māori communities with increased self-sufficiency in energy and opportunities to earn substantial sums from the export of electricity to the national grid.

That sort of large-scale installation of renewable electricity generation in the hands of local businesses and communities and marae and iwi could clearly have a central role in the rapid decarbonisation of the economy of Aotearoa New Zealand, and Māori ought to be encouraged and enabled to play a central role in that development programme, and in the process, to earn a substantial return on quite a bit of the land that they currently own, in – particularly in the Far North but also Bay of Plenty, East Coast; areas which have relatively high solar insulation. If you think about the power of solar generation to operate effectively and look at the latitude of New Zealand compared to the latitude of South Australia and Tasmania, where there's a large chunk of solar power now coming into their electricity grids, the opportunity is quite apparent. So, the future for the Māori economy under ambitious climate policy, in other words, can be bright if the policy is well designed as well as ambitious.

And I will leave it there and happy to pass over to you.

JUDGE MILROY:

Thank you, Dr Bertram.

HEARING ADJOURNS: 9.29 AM

HEARING RESUMES: 9.36 AM

JUDGE MILROY:

Welcome back. We now have questions, and the first questions are from Bennion Law.

(09:36) MR BENNION TO IVO GEOFFREY BERTRAM:

Q. Tēnā koe, Dr Bertram. I am lawyer representing several claimant groups. Some of them have, sort of, concerns about general policy settings for mitigation and adaptation and also, some of them have interests in exotic forests on the East Coast.

So, I just want to clear a couple of background points and then focus in on a couple of things about the forests from your evidence. And thank

you for the evidence. It's intriguing. And thanks also for getting to grips with the Crown's evidence, to help us understand the different views that are there. The first question is just a simple one around your – I think it's your 4.5 in your first paper, #A005, where you set out the three standard tests of the seriousness of a nations policy stance on any issue: Are full resources engaged? Is there certainty? And is policy binding? And I am assuming you are applying that both to climate mitigation efforts, but also to climate adaptation efforts as well.

WITNESS REFERRED TO #A005, PARA 4.5

A. Well, yes, they would apply in both cases, but from a global perspective, as I think I said yesterday, the real global focus is on mitigation. So, when word "ambition" is used in the Paris Accords, for example, that is really focusing on ambition to get emissions down, because that's what matters for the global community. Adaptation is much more a domestic matter, and describing how ambitious our adaptation response ought to be is in fact a matter for domestic policy makers primarily, rather than for the global community. The global community will be upset if New Zealand fails to mitigate, but if New Zealand fails to adapt, the global community will be less concerned. So, there's that distinction between the level at which ambition is prescribed.

Q. All right. Thank you, that's helpful. So, turning to this global ambition around mitigation, and it's a point, I think, you sort of raised generally but also specifically a couple of times – I'm looking at your #A005(b), some of your responses to the Crown. You've got a response to Dr Murray, paragraph 44, you are talking about if we do things – we're a marginal contributor to the global outcome as a small emitter. Can I just take you through some sort of economic/policy points on this? You would accept New Zealand is a small emitter, but if we are talking about physical impact and we're talking about cumulative emissions and tipping points, a small emitter can still be significant in that physical respect, with cumulative emissions and tipping points being part of the problem.

WITNESS REFERRED TO #A005(B), PARA 44

A. Yes, very much so, and depending on what metric you use, it's interesting that you can see New Zealand either as a big or a small force in relation

to climate change. We are always a force. I mean, what New Zealand does will matter, it might be only a percentage point or so of the global impact on ongoing greenhouse gas emissions, but that matters. Every per cent is crucial in trying to bring climate change to a halt.

And if you move from just the total amount of New Zealand emissions as a percentage to total global emissions and look at two other possible ways of measuring New Zealand's impact, you find that you get quite different ideas of how important New Zealand is.

Firstly, if you go on per-capita emissions, that is the extent to which every New Zealand inhabitant impacts on the global environment and atmosphere, we're actually a lot further up the list. Per capita, we are one of the major sources of greenhouse gas emissions.

And then, if you take another step back and ask, "What is the historic responsibility for the current state of the global atmosphere, and hence for the climate change process we see going on?", it's important to remember that New Zealand has a couple of centuries now of deforestation. Māori ancestors and other settlers in this country burned enormous amounts of forestry and that carbon dioxide into the atmosphere which is still there. And so some of the international measures of historic responsibility with climate change have New Zealand at the top of the global ranking per capita. No other country has such a large per-capita historic impact on the carbon dioxide in the atmosphere as New Zealand has. So, at any stage where historical responsibility comes into account, rather than simply what's happened since 1990, New Zealand would be very firmly in the dock.

Q. All right. And in fact, it's – the use of that word "ambition" in the UNFCCC, the fact that that word is used actually suggests that there's more than just the physical impact of small emitters – each nation, but there's some other dynamics going on. Is that a fair comment?

A. Yes, very much so.

Q. Okay.

A. Constructing a global consensus around strong action does require global leadership, and for better or worse, the Kyoto Protocol particularly identified a group of countries, the Annex I countries, to whom the task of

leadership was assigned precisely because they were the wealthy countries, best positioned to take strong action and mostly – and responsible for, at that stage, the bulk of the ongoing emissions. And so, the leadership role was deliberately assigned within the global community to those Annex I countries, of which New Zealand was one. And so, ambition requires leadership. It requires clear statements and commitment, and as one of those countries identified as having common but differentiated responsibilities that put more rather than less onus on us, I think we, along with quite frankly a lot of the rest of the rich world, did fail to step up to the plate.

Q. All right. I just want to come now to the forest sequestration. It's fair to say that forest sequestration has been central to the New Zealand reporting on its targets.

A. Yes.

Q. Yes. And Māori-owned forests have been a significant part of the forest sequestration effort.

A. Yes.

Q. Yes. So, I mean just a simple point, but you would accept that Māori-owned forests have been a significant part of New Zealand emissions reporting, including claims that New Zealand's pulling its weight internationally reducing emissions.

A. Yes.

Q. Okay. Now, you talked about the early development of the policy in New Zealand at the time of Kyoto in 1990. I just got a couple of questions about that. I've seen a cabinet paper – I don't think we need to put it up but we could – that says that in 2002 – you were active in thinking in this area in 2002?

A. Yes.

Q. Yes. The Treaty came up, article 2 concerns came up, around liability for deforestation of existing forests, and there was a five per cent deforestation without liability incorporated early on, actually to allow for those article 2 concerns, do you recall that?

A. I think so, yes. I can't be absolutely certain. This is quite a while ago.

Q. All right. Okay, we can maybe get to that with other Crown witnesses. All right. At that time do you know, just generally, how many did – when everybody was talking forest sequestration, did they discuss how many years or how many planting cycles would be gone through for forests before you think about taking the land back out of forests?

A. Well, that was almost a central concern because – particularly with pine, it was well understood from the start that pine has a relatively short lifecycle, if you like. Pine comes to harvest at 25 to 35 years, somewhere roundabout there, which would me that you would – if you were relying on pine forestation in the long term to hold carbon out of the atmosphere, you had to account for the – the absorption and then the release of carbon as successive harvest cycles going through.

So, I think it was well understood, for example, in the first decade of the 21st Century, 2000 to 2008 particularly, that the very, very large amount of forests that had been planted since 1990 would be coming to harvest in the 2020s. We used to call it the wall of wood. And there was a lot of concern right from the start about how we would account for the coming and going of carbon that would produce a lot of volatility in the land use and forestry – land use, land use change and forestry statistics, as – as big plantings came through as a wall of wood and harvested and then a succession of those harvest cycles would take place. So, I am not sure where your question is leading from here.

Q. Yes, yes, maybe I can put it better. The idea of forest sequestration, as I understood it, was that initially, there would be an interest in putting land into forest because of the high carbon price, to drive carbon emissions down, and that at some stage, emissions would be driven down and then conversion of the land back to another use would become a trivial matter in terms of costs, because nobody would be interested in buying those credits, or the price of carbon would be much lower. I mean, was any thought – was there any discussion about – well, that process might take two or three planting cycles, or were people going, "You know what, if you put land into forest this problem is going to take 100 years to solve"? Was there a theory of a period of 50 years, 60 years or was it just accepted that the land would be in forest forever?

A. I think you would have to distinguish the various levels of debate that were taking place at the time. Within the Ministry for the Environment, I am sure a great deal of – the issues that you are outlining were being considered, but at the level of political decision-making, as I recall at the time, the focus was very much more short term. The policy horizon was generally well within 10 years. Most discussion focused on the first commitment period, and I do not recall any official document from that period that really went through this.

We did review the literature quite extensively in our book in 2010. I'm just trying to – just casting my mind back. We had a whole chapter on the forestry question. But there's nothing there in that chapter that looks beyond the first harvest cycle in the 2020s, because the argument we were making at that time was that planting a large number of pine forests and using them for our first commitment period and the second commitment period to enable us to not do anything about our gross emissions was going to leave us with a real problem in the 2020s as the harvest cycle came around and we would find ourselves having to cover the harvesting of those trees.

So, I would say that insofar as we were probably right out at the edges of that debate in 2008, I don't think anybody, at that stage, was framing the discussion beyond to about 2030. All discussion that I recall was in the single harvest cycle framework.

In the subtext, obviously, was the idea that this would be a permanent carbon sink. Obviously, it would have to be – would have to be replanting after harvest if you – if you weren't to get into strife. But again, in 2000, right at the beginning of this debate, I think all parties involved seriously in the debate did expect us to do something about gross emissions, and so your point that over time the forestry issue should become less and less relevant because our gross emissions would have come right down and so we wouldn't be having to use sequestration to cover them, I do think that was taken for granted.

But as I said in – just a little while ago, several of us did have in mind, even at that stage, the fact that in a global carbon market, there was export potential for forestry absorption as well, but that wasn't at the

forefront of the debate. The debate really did focus within the first harvest cycle and specifically in the period for the first and second Kyoto commitment periods. So, I think short term is the only way to describe the way that this was framed at the time. It was an opportunity and we grabbed it.

Q. All right, thank you. And then I want to come to – this comes naturally on, I think, to this question of the idea that New Zealand might not meet its **(inaudible 09:52:13)** reducing gross emissions. It's got an NDC target that it might have a problem with and might need to purchase credit overseas, and I understand your evidence to say – pity Māori – Māori can't take advantage, or Māori forest owners in the ETS can't take advantage of that New Zealand **(inaudible 09:52:32)** international – for credits, it has to accept that New Zealand price.

In #A005, paragraph 7.14, you say something quite startling. You say that "…Nationally Determined Contribution nor domestic emissions budgets are legally binding… the Treasury did not enter these figures as contingent liabilities on the Crown balance sheet, and there is a real prospect that New Zealand may simply renege on its NDC". I am sure there will be some questions from the Crown on some of that. But to be clear, you are clearly saying that Māori forest owners can't take advantage of what is probably going to be a fast-rising international price of carbon, they are stuck with the ETS price and whatever the New Zealand Government does in a fairly – in the way it works the New Zealand ETS market. Is that the way I should talk about it?

WITNESS REFERRED TO #A005, PARA 7.14

A. Strictly speaking, that's not the case. The – this is a matter that's in the hands of the New Zealand Government. It's a matter of policy design. There is a mechanism under the Paris Accord, article 6.4 of the Paris Agreement, which opens the way to international trading of carbon credits and enables – you know, would enable forest owners in New Zealand to enter into deals with overseas buyers wanting internationally credible forest credits – carbon credits, to sell those offshore. The thing that stands in the way of that is that you – the agreement of your government is required before you can enter into those

trades. So, the Paris trading mechanism was conditional in what they call consent of the host government, and in this case, the New Zealand Government would be the host government for forestry absorption. So, if the New Zealand Government were to decide that it's going to open the market, you know, open the way for New Zealand forests to sell their credits offshores, it's entirely within the discretion of the New Zealand Government to do that under the Paris Accord, as I understand it.

Q. All right.

A. I don't envisage that they will do that, because I think they need these forest credits to cover the gross emissions.

Q. Yes, yes, I understand that. So, and then – so, just lastly on this, you suggest that the government might renege. Just the proposed law change, which I am sure you are aware of, the proposed change where the minister doesn't take the NDC target into account when considering domestic mitigation efforts, is that relevant to this question of how the government is going to meet its NDC commitments?

A. Yes, I think you have to read the record though step-by-step, over – as the years go by. When the original NDC – when the second NDC target was set in 2021, you will recall that there was a first nationally determined contribution target set in 2016 and then another one in 2021. The 2021 was the ambitious one that was going to rely on importing credits unless we did something about gross emissions. As the cost of that has come more and more into view as we get closer to 2030, you can follow government's steady loss of enthusiasm step-by-step. And so the recent changes to delink the NZETS from the NDC is only one step along quite a long process.

I think what's most significant is the Treasury's comments when they were costing the offshore purchases and the reasons the Treasury has given for not allowing them to come into the Crown accounts as a contingent liability. This has been a matter of quite vigorous debate among economists and accountants as to whether those – whether the – the cost of bringing in units under the NDC should be in the Crown accounts as a contingent liability, and Treasury quite firmly says and continues to say that there is no legally binding requirement to meet that target and clearly

they have in mind the possibility of the government simply reneging on the target or redefining the target, which they can do under the Paris Accord, in such a way that we don't have to buy the units.

Now, I would describe redefining the targets so we don't need to import emission units as a reneging, because the whole ambitious framing of the Paris Accord is that you raise your level of ambition over time, not that you cut it back.

But yes, I do consider there is a genuine possibility that the – the New Zealand Government may walk away from Paris, either directly and explicitly as the – you know, as the State Government has just done, or implicitly by lowering its sights and finding ways to avoid honouring the commitment made in 2021.

Q. All right. Those are my questions, thank you and thanks for your report. I have a well-thumbed copy of the Carbon Challenge, your 2010 book, with me. Thank you again.

JUDGE MILROY:

We now have questions from Sykes and Co.

MR SCOTT FLETCHER:

Tēnā koe Ma'am.

(09:58) MR FLETCHER TO IVO GEOFFREY BERTRAM:

Q. Kia ora, Dr Bertram.

A. Kia ora.

Q. Can you hear me okay? I assume you can, after that.

A. Yes.

Q. Fantastic. My name is Scott Fletcher, and I am the lawyer for Donna Awatere-Huata who, among other evidence, is the person who commissioned John Ballingall's evidence, which I think from my friend's questions, you have possibly read **(inaudible 09:58:48)** –

A. Yes.

Q. I really wanted to ask you, much like my friend Mr Bennion, a little bit about forestry, though some different questions about it, and also I

thought we'd have a go a trying to bring down some of the comments around the TAN figures because I am not an economist, and I thought it might be helpful if we could break that down a bit for some slower non-economist types like me. Do you have a copy of your 2024 affidavit to hand?

A. Yes, I do.

Q. Fantastic. Could I take you to paragraph 1.4.4, which is on page 3?

WITNESS REFERRED TO #A005, PAGE 3, PARA 1.4.4

A. Yes. Wait a minute. Page 3?

Q. That's what my version says.

A. Sorry, what was the number again?

Q. Paragraph 1.4.4.

A. Yes, okay, I have that, yes.

Q. Great. So if you've read Mr Ballingall's evidence, you probably know he's discussed these issues around policy commitments and certainty in quite some detail. Do you broadly agree with what he's saying there about the importance of policy certainty and commitments?

A. Yes.

Q. Yes.

A. Certainty has been lacking for forestry since the NZETS was first designed, because there has been a lot of chopping and changing, and clearly, if you want the incentives of the NZETS price to work in the longer run, because forestry investments have quite a long time frame, certainty is really important.

Q. And it's pretty basic economics that if you don't have effective certainty, that undermines investment incentives.

A. Yes. Well, yes, with one qualification. There are some traders in any market who take advantage of volatility, and so some speculative opportunistic trades will occur as people read the opportunity to gain the regulator, if you like, and take advantage of the – of changes from time to time, and in the early days of the NZETS, that did happen with some foresters who saw the opportunity to take very quick gains and bank them and then – and then get out. But in terms of the serious forestry that we're talking about here, yes, certainty is fundamental.

Q. Can we jump down to paragraph 4.8, which is on page 9? Now, you've already talked a little bit about this, but I wondered if you could just expand on that last sentence to do with "the lack of bipartisan political support and rules around forestry and NZETS settings".

WITNESS REFERRED TO #A005, PAGE 9, PARA 4.8

A. Yes. Well, I think the lack of bipartisan political support is increasingly apparent.

The – the rules around forestry and NZETS settings are subject to unpredictable chopping and changing. I – I don't really want to go into a whole lot of detailed discussion of the fine print, but I do think that the record has been one of great uncertainty for foresters. I think – I am not sure whether you have any evidence from forestry operators who have been in the game 2008, but I think they have frequently cheated, bypassed, taken aback by sudden policy announcements that change the rules under which they are operating, both with regard to whether they do or do not have the opportunity to transfer their – or to translate their forestry credits into other types of credits, for example, the Kyoto units that they were originally hoping to get under the first commitment period. I think they have faced, more recently, repeated chopping and changing as to who is and who is not a Kyoto forest and what the recognition as a Kyoto forest involves, and I think that the announcement in the second emission reduction plan that the Government anticipates letting loose a vast wave on forestry on Crown land with the clear intention of holding down the price in the New Zealand Emissions Trading scheme completely cuts across the prediction that the Government was making only a few years previously in its first emission reduction plan of a local carbon price rising to give quite rich rewards to forestry plantings. I mean, simply, that announcement with relation to the price and the Government's actions in capping the price in the NZETS by releasing additional units into the auction do have the effect of massively shifting the expected returns on forestry investments, so – so I think the lack of certainty has been a real problem for foresters, and that includes Māori foresters, obviously, as well.

Q. And it is implicit in what you just said, but my feeling about the way that we look at the policy process is that those costs and that uncertainty aren't really considered or factored into Crown decision-making. Is that your view?

A. That would be my view, yes.

Q. Can I just jump to your speaking notes now –

JUDGE MILROY:

Just before you do that – sorry, Mr Fletcher, just before you do that, we are due for another microbreak.

MR FLECTHER:

Yes, Ma'am.

JUDGE MILROY:

So, we will be back in five minutes.

HEARING ADJOURNS: 10.04 AM

HEARING RESUMES: 10.07 AM

(10:07) MR FLETCHER TO IVO GEOFFREY BERTRAM: (CONTINUES)

Q. Before the break, I was going to take you to your speaking notes, paragraph 48, page 15.

WITNESS REFERRED TO #A005(D), PAGE 15, PARA 48

A. Pardon me, I've set them aside, I'm just having to – having to relocate them.

Q. That's all right. I am not in any rush.

A. Which paragraph was that, again?

Q. 48, page 15.

A. 48. Yes.

Q. Now, this is –

A. Okay.

Q. – quite an important point, so what I propose to do is to sort of break it down into a series of propositions, and you can tell me if you agree with them or not.

So the first proposition, as I understand it, is that prohibiting forestry owners from selling emissions units at international prices, effectively it subsidises polluters. They are paying less to emit greenhouse gases than they would on the international market. Is that a fair point?

A. They're getting less for absorbing greenhouse gases, not emitting them.

Q. Sure, but if you think about it the other way round, forestry owners get less for their planting, because carbon prices are lower, so therefore, polluters are paying less than they would –

A. Yes, yes, that's correct.

Q. – **(inaudible 10:08:55)** market prices, yes.

And you say this is – or you put it as "implicit expropriation of forest-owners' potential incomes".

A. Yes.

Q. I assume you would agree if I said to you forestry owners are disproportionately Māori; it's pretty well known.

A. Well, yes, the – I guess. I wouldn't – wouldn't have the figures at my fingertips, but – but there are certainly substantial areas of forestry that are Māori.

Q. So just to link this to something you say at the end of your speaking notes, as I see your point here, what the Crown is really doing by depressing the domestic price for emissions units is taking value from Māori foresters –

A. Yes.

Q. – and transferring that to polluters, which –

A. Yes.

Q. – is a wealth transfer –

A. Yes.

Q. – quite a significant one.

A. That's correct.

Q. Yes. So I guess that to round that out, your speaking notes end on a positive note that if the Crown was to not do that, that would involve a

wealth transfer from polluters to Māori, which you, I think quite rightly, characterise as a positive thing.

A. Yes.

Q. And the status quo involves transfer from Māori foresters to polluters, which I think we can agree is probably a negative thing.

A. I would certainly think so, yes.

Q. Thank you. That is very helpful. I am now going to have a go at breaking down your very helpful evidence about the – what you call the TAN versus net emissions as an actual concept, so can we jump back to your affidavit at paragraph 6.10, page 17?

WITNESS REFERRED TO #A005, PAGE 17, PARA 6.10

A. Yes, I have that.

Q. Great. So, like I say, I think it is helpful if we just – or at least for me – to break down these points a little bit more. So, as I understand it, the basic difference between the TAN and net emissions, as the concept you use in your evidence, is that TAN excludes certain LULUCF activities.

A. No. TAN excludes a subset of LULUCF activities. In other words, it sets aside all forests that result from actions taken before 1990, so if you have – any forest that dates back before 1990 is not included in the sequestration registry for TAN emissions, but everything since 1990 is included, and it's that exclusion of the pre-1990 forests that gives you the difference between actual net emissions and TAN net emissions.

Q. And just because – it is implicit, but in a practical sense, most – speaking about the whole category, most LULUCF activities are going to be forestry, afforestation or deforestation, in terms of –

A. Yes.

Q. – the difference in emissions. Yes. So if I have got the general point you are making right, obviously, if people chop down a pre-1990 forest, that results in emissions –

A. Yes.

Q. – but that is not counted under the TAN figure.

A. That's a difficult one. Technically, it – technically, it should come into TAN, I think, because it is an increase in gross emissions that comes out of an action taken since 1990. In other words, the deforestation is a

post-1990 event. Just to – just to see how that might work, I defer you – let's have a look. Go back in my speaking notes, I think, is probably easiest, to the diagram on – in paragraph 18 that I had on the screen yesterday.

WITNESS REFERS TO #A005(D), PAGE 5, PARA 18

Q. I have it, yes.

A. And if you have a look there at that very big spike in TAN emissions between 2002 and 2007, you will see that the TAN emissions went up very sharply. Now, that is very large-scale deforestation in the central North Island as a large amount of forestry was converted to dairying between Taupō and Rotorua, and that appears here as a spike in TAN emissions, so that deforestation of forests planted before 1990 does come into the TAN accounts.

Q. Right.

A. It's the absorption of carbon in those forests that is excluded from the TAN accounts, so there's an asymmetry.

Q. I see. Right. That is helpful. So, essentially, then – and please, you know, reframe my attempt to summarise, but there are certain amounts of absorption of carbon which are counted in net emissions but are not counted in TAN emissions. Is that a fair –

A. That's right.

Q. Yes. That is why the net emissions are lower than TAN.

A. That's right, yes.

Q. Can I take you back to your affidavit at 6.11?

WITNESS REFERRED TO #A004, PAGE 17, PARA 6.11

A. Yes.

Q. So, before we get into the various points about the Kyoto Protocol, you have set out here the sort of public Ministry for the Environment justification for the TAN, and I – this is before this inquiry, what I thought the justification was, and it – I guess the question I have, before we even talk about the Kyoto Protocol, is that last paragraph there where the Ministry says, "Target accounting does not count these business-as-usual ups and downs", and I suppose the problem I have is by definition lots of emissions with afforestation will be business as usual, so before we get

into the Kyoto Protocol – and tell me if you can see one, but I cannot see any justification for treating some business-as-usual activity separately from other business-as-usual activity that affects emissions.

A. Well, the justification is provided, I think, best in the evidence of Helen Plume, who does explain that under the Kyoto rules, the opportunity is there to declare a gross net target and – and then accounting for that target, the – article 3 of the Kyoto Protocol sets out this provision that you don't count forests planted before 1990. The – so, I mean, the justification has nothing to do with what the climate sees or what the – what the actual effect on the environment is. The justification is an administrative, legal justification that within the terms of the international agreement, that separation between two different sorts of businesses has been made and so they are treated differently in the accounts.

Q. But as you put it, it is an accounting issue, it is not really that we are selecting certain parts of our economy to count or not count, which I think is the way that particular MfE justification reads, at least to me.

If we get into the Kyoto issue now, as I understand your speaking notes about this, responding to Helen Plume, I think it is fair to say that you characterise her evidence as suggesting that Kyoto creates – my word – a straitjacket as to what the Crown can and cannot do in terms of how it does its accounting.

A. Yes.

Q. And obviously, you do not accept that it does **(inaudible 10:17:34)** –

A. No, I **(inaudible 10:17:34)** accept that.

Q. Yes. Her evidence is a little inconsistent on that point. What I wanted to take you to is paragraph 9.7 of this affidavit.

WITNESS REFERRED TO #A005, PAGE 35, PARA 9.7

A. Which affidavit?

Q. The 2024, same one we are in.

A. Okay. Yes.

Q. So obviously you have pointed out here that when it came to this particular NDC, we picked 2005 as the baseline year, not 1990, and I think most people know 1990 as the baseline Kyoto year, so quite apart

from this particular accounting problem that we are talking about with TAN, clearly, the Crown sometimes feels comfortable departing, as you put it, radically from the Kyoto rules.

A. Yes.

Q. So – and tell me if this is too blunt, but it does seem to me that sometimes the Crown is quite selective as to when it applies those Kyoto Protocol rules as to how it defines and approaches targets.

A. Yes, I consider that correct.

Q. So then, to loop back, and this just is really reinforcing what we established before, clearly, quite apart from what has been said in the evidence in this inquiry, the Crown is not actually treating Kyoto as a straitjacket.

A. Right. No. Kyoto was treated as an opportunity – an opportunity to structure policy in particular ways with cover from an international agreement, but in no sense does Kyoto bind the hands of government as to what it actually does.

Q. Thank you. That is very helpful. Those were all my questions. Thank you, Ma'am.

JUDGE MILROY:

Thank you. We now have questions from the Crown.

(10:19) MS SEELEY TO IVO GEOFFREY BERTRAM:

Q. Tēnā koe, Dr Bertram.

A. Tēnā koe.

Q. My name is Grace Seeley. I am one of the lawyers for the Crown. My questions today will be focused on your 2024 affidavit and your more recent 2025 affidavit, rather than the evidence in reply to the Crown in your recent – recently filed speaking notes, which we will address in the future. So I want to take you first to paragraph 6.1 of the 2024 affidavit.

WITNESS REFERRED TO #A005, PAGE 14, PARA 6.1

A. Yes.

Q. And so there – I am just paraphrasing, but you say that "The United Nations has approved several accounting conventions for the recording

of carbon emission and sequestration", and your evidence is that the New Zealand government has taken full advantage of those conventions.

A. Yes.

Q. Just on that, would you agree that it is legitimate for New Zealand or any other party to the UNCCC to apply one of those approved conventions for accounting purposes?

A. Yes.

Q. And that the gross net approach used by New Zealand is therefore legitimate as an accounting convention?

A. Yes.

Q. But you would also agree that other accounting approaches employed by other parties are also legitimate?

A. Yes.

Q. And therefore there is no singular convention when it comes to nationally determined contribution accounting?

A. That would be correct, yes, there are – there are a variety of ways of accounting that are acceptable under the rules.

Q. And just zooming out, in terms of those variety of ways, would you agree that what is required by all parties is – is to be transparent about what is and is not included, including information on the assumptions made?

A. Yes.

Q. And would you agree that New Zealand is compliant with those requirements in terms of transparency?

A. Personally, I don't believe it is, and I – as I think I've tried to explain, the terms in which New Zealand has expressed some of its commitments have been unnecessarily difficult to interpret, I think. In particular, I referred in my evidence to the second commitment period, "reducing gross emissions", which turned out to mean a gross net target, and I consider that that particular wording in the – in the New Zealand commitment is very difficult to reconcile, shall we say, with the set of rules under which the accounting was taking place. But that's a personal view and it's clear that the – the – those – the auditors and the reviewers who looked at the New Zealand reporting on – under that commitment agreed that it was compliant.

Q. Thank you. Moving to paragraph 6.2, you say there that the effect of the Government's use of the two conventions that that you outline in the – in the sub-paragraph above, sub-paragraphs above, has been to understate the severity of the carbon-mitigation problem facing New Zealand, while providing policymakers with an opportunity to construct accounts.

WITNESS REFERRED TO #A005, PAGE 15, PARA 6.2

A. Yes.

Q. I just wanted to clarify what you meant there by – by "construct", and so, is your evidence that New Zealand has constructed its formal accounts in a manner that did not require – did not follow the required rules?

A. No, I am saying that they constructed accounts which were compliant with the chosen set of rules for the purpose of demonstrating compliance with the – the gross net target, which New Zealand adopted. In other words, there is a package of commitment – recording of emissions during the commitment period and a wash-up retrospective recording of compliance with the commitment, and the construction of accounts takes place in a series of stages. The choice of the way the commitment is expressed, the recording of – the way in which emissions are measured for the purposes of the inventory record, and then the way in which emissions are deployed in the retrospective wash-up, and that is a construction accounting exercise with – with several components to it.

Does that answer your question, or have I missed your point?

Q. No, no, I understand what you are saying there, and that does answer my question, but at the end of that sentence, you say – I will read it in full, and I realise it is in front of you, but you say, "while providing policymakers with the opportunity to construct formal accounts that have concealed the absence of meaningful policy action to reduce actual gross and net emissions".

A. That's correct.

Q. But I wanted to clarify really whether you consider that New Zealand had constructed its accounts in a manner that did not follow the required rules, despite the assertion that you make there at the end of the sentence and I think your answer in response to my question was that New Zealand had, had in fact followed the required rules. Is that correct?

A. That's right, and with respect, I am not saying in this paragraph that New Zealand failed to follow the rules. I am saying that they chose to operate under a particular set of rules which were – in fact gave them the opportunity to conceal the absence of meaningful action on gross and actual net emissions. In other words, I am not accusing the government of failing to meet the letter of the law. As I have said in my comment on Helen Plume's evidence, the letter of the law has clearly been complied with and the relevant authorities have signed off on that.

Q. Yes, yes. I recall your comment from yesterday afternoon about the letter of the law and the spirit of the law.

A. That's right.

Q. So I have one sort of further question on this point, which is about paragraph 6.3, and there, you say your evidence is that the lack of policy action to directly reduce gross emissions of carbon dioxide from New Zealand's industrial, transport, commercial and household sectors has been concealed – again, you use the word "concealed" – behind offsets secured by growing forests and by buying – buying in carbon credits from offshore, and we have just discussed the use of the word "concealed", but could you explain to me what – what you mean by "concealed" in the context of that paragraph?

WITNESS REFERRED TO #A005, PAGE 15, PARA 6.3

I mean that the New Zealand – the New Zealand government operates in a democratic setting, where it is accountable to the electorate in general for its policies, including its policies on climate change, and if you follow the public debates, speeches in Parliament and press statements from ministers, the general presentation of New Zealand government policy through the last two decades, it appears to me that the general public has not been brought fully into the government's confidence in relation to the lack of ambition that in fact is there with regard to reducing gross emissions. The ability of government to declare compliance with international agreements and undertakings provides, in my view, a means of concealing the fact that we have not effectively tackled the task of reducing gross emissions, and the word "concealed" is an active word. It does suggest, and I am intending to suggest that in terms of the public

relations presentation of New Zealand's policy and New Zealand's accomplishments, the use of these accounting techniques has indeed been – been misleading from the point of view of the voting public, to whom the government is ultimately accountable.

I agree, however, as we have already said, that the government has complied with the letter of the law and has been signed off on by the relevant auditors and reviewing authorities.

Q. Thank you. Just two quick further points there, and I assume you will be, but are you familiar with the Greenhouse Gas Inventory published by the New Zealand government?

A. I'm sorry, I didn't hear that. I've got a bus going past outside, and it's – okay, it's gone now.

Q. Moved on now? Gone? I assume you will be, but are you familiar with the Greenhouse Gas Inventory that's published by the New Zealand government?

A. Yes.

Q. And would you agree that that Inventory provides transparency about emissions from industrial sectors, removals by forest sinks, and the use of any international units?

A. Yes.

Q. Thank you.

A. I might add, in respect of that, that the transparency is a relative thing. For people like you and me who know where to go, we can dig the numbers out. I have made the point in previous cases, so, I mean, I will reiterate it here that if you were trying to reconstruct the TAN emissions track that the New Zealand government has used over the years to record compliance, until very recently, it was extraordinarily difficult using the published inventory accounts to do that. Only very recently has there been enough information in those accounts to go back and reconstruct what the target accounting emission track has been, and because the rules for target accounting have changed, and in particular, the introduction of an averaging procedure after, I think, 2021, the degree of transparency in the Inventories prior to 2020 is actually not that great with respect to target accounting emissions. With respect to actual gross and

actual net emissions, the Inventory accounts are very transparent and very useful.

Q. Thank you. Just on that point, in terms of the rationale for why the Inventory, in your view, became more transparent post-2020, do you know what the reason for that was? Was there feedback on the transparency prior to 2020?

A. I think there were two reasons. The – well, there are a number of reasons. I'm speculating here, because I was not a party to the decision to make the changes.

I do believe that the government perceived a need to be more transparent than it – about its target accounting because in 2021, it was facing legal action in the High Court challenging its numbers, and I indeed appeared in that action, and I do recall that the issue of the revelation of the relevant target accounting numbers through the Inventory did arise, and that coincided with an improvement in the transparency of the New Zealand Inventory. I do not want to attribute motive here. I simply note that those two things happened at the same time and I suspect that there was an increasing consciousness of the need for greater transparency.

The second reason why transparency improved was that the government moved from accounting for targeted emissions on a pay-as-you-go basis to moving to an accounting – an averaging procedure that shifted the timing of some harvests and some forest growth back backwards and forwards in time in order to remove some of the volatility that had been there in the target accounted series, and that process of changing the accounting procedure did require, I think, that the public records would show the necessary information, but even so, it's – the actual averaging procedure that is currently used for targeted accounting, I have personally not been able to reconstruct from the Inventory. I'm sure it can be done if you have the necessary information.

A. Thank you. That is helpful.

HOUSEKEEPING – TIMETABLING (10:32:59)

HEARING ADJOURNS: 10.33 AM

HEARING RESUMES: 10.53 AM

(10:53) MS SEELEY TO IVO GEOFFREY BERTRAM: (CONTINUES)

Q. Tēnā anō, Dr Bertram.

A. Could I just take the opportunity to add something to an earlier response I gave you? Because I think in talking about transparency, I was going off the cuff in response to your question as to why the accounts became a bit more transparent, and I think that I was unfair to the government of the day in not saying that I think in the period 2018-2019-'20, there is a very – a much stronger commitment, shall I say, in the government, and particularly in the person of the then Minister for Climate Change, Mr James Shaw, to actually pushing climate policy along, and that would have included a commitment to greater transparency. I do think that the – the government itself was proactive in improving the transparency of the inventory accounts at that time, and I don't want to leave the impression that I'm offering a totally cynical view of what happened at that stage.

Q. Thank you. Thank you for that clarification. I have a few questions now in relation to your evidence on forestry, so, starting at 6.4 of your 2024 affidavit, you say there that forestry must play an important transitional role in limiting New Zealand's – sorry.

A. Yes.

Q. In limiting New Zealand's contribution to climate change, but you note that climate policy should recognise risks associated with forestry, such as fire, disease, and pests.

A. Yes.

Q. And you go on to say that the permanence of forest sinks is less secure than that of carbon dioxide in the atmosphere. I just wanted to query you on those risks and the materiality of those risks, in your view. Would you agree that natural disturbances like wildfire occur at relatively low levels in New Zealand?

A. At present, yes. They will become more frequent with climate change, but at this stage, yes.

Q. And noting that answer, do you consider that risk to be a material risk to the sequestration provided by plantation forestry?

A. Yes, I do, in the long run, and one has to think in the long run with forestry, precisely because we're talking decades of harvest cycles, if you're doing harvest cycles, or decades of forest succession if you plant pines now and they later revert to indigenous forestry; then there are a whole lot of contingencies that can arise over the lifecycle of those trees.

Q. And could you just explain why you consider the risk to be material?

A. Well, for a start, the risk of wildfires, I think, increasingly is material and is increasingly evident internationally. I'm conscious that the wildfire issue has arisen in the North American continent more than it has in New Zealand at this point, but we've also seen in Australia signs of an uptick in the risk of wildfire, and I do envisage that in New Zealand we will face an increasing risk on this front.

Now, I'm not an expert on the relationship between atmospheric temperature and wildfire risk. That's a scientific issue. But in terms of materiality, I'd draw your attention to the damage done in Nelson recently by a substantial fire in forestry land on the Golden Downs. Whether that is attributed to climate change or to other causes remains open, I guess, but it is certainly a material risk.

In relation to pests, I'm conscious that with a monoculture, which is what New Zealand tends to do, where we plant only *Pinus radiata*, the exposure of that to a pest that is particularly selectively damaging to *Pinus radiata* is going to be greater than if you have a diversified portfolio of forest species, of tree species in your forests, and so again I'd regard that as a material risk. But again, we're thinking about decades rather than next year.

Q. Thank you. I just want to take you back to one part of your answer, where you cited Australia and North America. Would you accept that New Zealand generally – well, in large parts of the country – has quite a different climate to those countries?

A. Yes.

Q. Thank you.

A. **(inaudible 10:58:43)** I mean, I'm thinking about that. I should add that if you go up to British Columbia, the western side of Canada is again a temperate climate, like New Zealand, has a very large amount of conifer tree species in its forestry, so I think the risk of wildfire that's arising in – in British Columbia, particularly, and to some extent in Alberta, is probably climatically somewhat more comparable with New Zealand than Australia or the continental United States, but again, I'm outside my area of particular expertise here. I'm not a climatologist, and so –

Q. I understand **(inaudible 10:59:29)**

A. – I'd have to qualify what I'm saying; that this is not – I'm not speaking here as an expert in that particular area.

Q. I understand. Thank you. I wanted to move now to your evidence at 6.16, and there, in that paragraph, you talk about the adoption of averaging over forestry cycles, which is one deliberate voluntary act of the New Zealand government that enables "the construction of emissions accounts that have been described by the Climate Action Tracker as 'misleading'", a judgement with which you concur.

A. Yes.

Q. And you mentioned it briefly earlier to me, I think in your answer on the greenhouse gas inventory, but can you – well, you mentioned that – the adoption of averaging, and that it was a bit opaque to you, I think, but can you explain why you consider the adoption of averaging over forestry cycles to be misleading?

A. I'm sorry, but that's not the reference that I'm referring to here. I'm just having a look at this. The – no, no, you're quite correct. Yes, I've mentioned averaging here.

So, Climate Action Tracker has – and I have sympathy for them. They're one of the international non-government agencies that tries to follow the emissions policies of govts around the world, so it's working on a very wide canvas, reading each country's record and its commitments and trying to interpret those, and I have great sympathy for Climate Action Tracker in the case of New Zealand, because it's clear from their attempts during the second commitment period to reconstruct what New Zealand

was committed to doing that they had found the terms of the New Zealand second commitment period target as very difficult to interpret clearly.

You will recall that the target was stated as a reduction in gross emissions. It was then subject to Kyoto accounting, and Climate Action Tracker, as I recall, initially thought that this was a gross target, and then, I guess, when jogged by – presumably by interaction with New Zealand officials or UNFCCC officials, got a better understanding of it. But they did find it difficult to interpret the New Zealand commitment and the New Zealand accounts, and they described them as misleading on that basis – that to an outside observer not familiar with the findings of New Zealand's particular circumstances and particular inventory, it was not easy to get a clear handle on exactly what was being accounted.

Again, I would emphasise that those accounts are compliant with the letter of the law. It's – this is a comment from outside the official circle about how the accounts appear in the public arena.

Q. Thank you. I'm still a little unclear as to why you think that the adoption of averaging over forestry cycles is misleading. Are you able to **(inaudible 11:02:58)**?

A. That's not what I'm saying here. I'm saying the accounts are misleading from the point of view of outside observers attempting to evaluate New Zealand policy and New Zealand performance. The adoption of averaging is controversial, and I mean, we can go into that if you wish, but for those who have followed the process closely and are familiar with the nature of the calculations, they won't be misled. Insiders in this business are not misled, but in my view, outsiders very readily are, and that is, I think, the issue that has concerned me consistently over the last two decades of a disconnect between the reasonably clearly understood technical work done within the official circle and the way in which the wider public is informed and advised of progress and policy, and that disconnect has always concerned me, and that's what I'm trying to get at here with the word "misleading". I'm not suggesting that the inside officials are misled.

Q. Thank you. So just to summarise so that I can be clear that I have understood what you have said, on the adoption of averaging in particular, is it fair to say that you consider the adoption of averaging across forestry cycles to be legitimate, but you have concerns about the ease in which that is able to be communicated to those outside of the climate policy space or operating within the industry?

A. Yes, it's – I consider it legitimate. I think the most important qualification, though, that I would offer about it is that having adopted target accounting and the gross net approach to setting targets a long time ago, New Zealand did change the rules in its accounts in mid-stream, and the result is if you go back to the period from 2000 to 2019 or '20 and compare the target accounting statistics using the averaging process and the target accounting using the previous methodology, you will find that there's a mismatch between the two, and that means that when you look – as I think I mentioned yesterday, when you look back at the first commitment period using the current version of target accounting, which has the averaging procedure built in, the picture you get of our compliance with commitment period 1 is a bit misleading, because the actual target accounting figures that we used in our true-up accounting in 2014-2015 used a different accounting methodology. It did not have averaging in it. And the result of adopting averaging in mid-stream is actually to change the historical record, which, I mean, is perfectly legitimate, to do that, but you do need to bear in mind that the result is that the historical record changes, and if you compare the various statistical series that have come out over the last two decades, you will find they did – there's a lot of movement around in what we say our accounted emissions have been, and that concerns me, I guess, just because I think history matters, but again, I do not dispute that it's all entirely within the rules.

Q. Thank you. Thank you for that helpful explanation. Moving to paragraph 10.14, so there, you note that –

A. I'm sorry, which number was that?

Q. 10.14, so that's paragraph [*sic*] 44 of the 2024 affidavit.

WITNESS REFERRED TO #A005, PAGE 44, PARA 10.14

A. Yes, okay.

Q. There, you note that forestry is the cheapest option in the short term and refer to the planned afforestation programme under what was then the draft second emissions reduction plan.

A. Yes.

Q. And you go on to analyse why you do not think that forestry remains the cheapest option in the longer term. I just wanted to briefly query you on costs. As a general proposition, would you agree that climate policy inherently involves trade-offs?

A. Yes.

Q. And would you accept that New Zealand also has a unique or quite an individual emissions profile which poses some distinct challenges to a transition to a low-carbon economy?

A. I'm sorry, could you repeat that question?

Q. Would you accept that New Zealand has a unique emissions profile?

A. Only in some respects. Our gross emission profile is very similar to a lot of other developed economies. The difference in the New Zealand profile is to do with the relevance of **(inaudible 11:08:41)** that is the sequestration side of the accounts.

Q. And you don't consider that, for example, the role that both the energy sector in New Zealand and the agricultural sector in New Zealand play in our emissions profile that makes – gives New Zealand a somewhat unique emissions profile?

A. We certainly have a larger methane component in our gross emissions than – than a lot of other countries have, so yes, there's a – it's a matter of the proportions, if you like. The degree to which that enables you to say we are unique, you know, I guess we have to unpack that word "unique". Precisely how unique we are I think –

Q. Yes, **(inaudible 11:09:24)** "unique" maybe is not the right word. Perhaps "somewhat individual" or "we have distinct characteristics".

A. Yes, every country has distinct characteristics, and the Kyoto Protocol explicitly said, you know, countries have different – are in different situations, so yes.

Q. And do you think, in the case of New Zealand, that some of those distinct characteristics pose some challenges to the transition to a low-carbon economy?

A. No, I don't, actually. I think that for the most part, the way lies open for New Zealand to make the transition using techniques that **(audio skips 11:10:05-11:10:34)** so New Zealand is uniquely – faces unique challenges in reducing its gross emissions, I'm not particularly sympathetic to those arguments. I don't believe that to be the case, and it is true that I have had a go myself at estimating the potential extent of substitution into more renewables-based technologies, and I can't provide you with any convincing numbers to say we can take our gross emissions to zero, but I certainly think we can do better by 2050 than the – the rather modest one-fifth reduction in gross emissions that's currently being canvassed in the emissions reduction plan, so I think the argument of our uniqueness and the particular difficulties we face is overplayed, put it that way.

Q. Thank you. I just had one question in response to your response, where you spoke about, in particular in relation to agriculture, I think the examples you gave were reducing stock numbers and reducing the application of fertiliser –

A. Yes.

Q. – to reduce emissions in both cases. Would you accept that those options may have economic costs?

A. Very definitely in the short run, because we have a dairying industry that's very heavily committed to a particular set of technologies and very high stocking rates, and moving from that to an equally economically efficient but different system for dairying obviously has transition costs, and as I mentioned yesterday, in the short term, faced with the costs of writing off one technology and adopting another, there's an understandable reluctance on the part of the farming community. That is where policy would come into play in order to achieve a transition.

Q. Thank you. And would you accept that that cost – that cost, in the short term, as you say, is a relevant factor for decision-makers in coming to decisions on policy?

A. Absolutely, yes. It means policy must confront the reasons why businesses are reluctant to unilaterally make the move and it's up to policymakers to create the environment in which it's easy and pays off.

Q. Thank you. Those are all of my questions today, Dr Bertram. Thank you very much for your helpful evidence.

A. You're welcome, thanks.

JUDGE MILROY:

Thank you, Dr Bertram. We are now due for questions from the panel, so I will just ask…

(11:14) BASIL MORRISON TO IVO GEOFFREY BERTRAM:

Q. Thank you, Dr Bertram, for your submission, and obviously a tremendous amount of work and experience has gone into producing that report and all of the information that you have provided for us. I must admit it's something that I'm going to ponder on for some time, coming from my background.

However, the question to you is: In your considerations, as we know, the numbers of dairy cattle in New Zealand is declining over the last three or four years, and feed stock to dairy cow is changing, as we have a percentage of a farm now that cattle don't stand on, green feed maize and then it's into annual rye, which reduces the effects of the cows having to – my description – scoff green grass and then go into their cud and release methane, as against with green feed maize and/or annual rye that's been baled.

So, have you done any studies at all to look at how that change is impacting on methane emissions?

A. No, I have not. I'm not an agricultural economist, and I've not had the opportunity to do any fieldwork or research in this area, so I'm relying very much on what others have done and said in relation to what is possible, and I don't pretend that I can give you authoritative answers on precisely how the technological changes in agriculture would come through.

In this area, reports such as Vivid Economics, the Ministry for the Environment's abatement comments, the Climate Change Commission's work, are the sort of thing that I have to go on.

Q. Okay. Thank you for that. So the food production side, of producing food for feeding the so-called 40 million people we feed, and the fact that any reduction in the – in particular the dairy cattle in New Zealand will certainly be taken up by the major dairy country – dairy-producing and dairy-cow-owning countries like India and the United States, et cetera, et cetera, so if we had a situation where the dairy industry in New Zealand had moved to a point which I think you're suggesting, maybe over a 30- or 40-year period, that food production would still be a major export earner for the country and the decline of the dairy industry or the reduction of the dairy industry would be taken up by overseas production – how do you see that developing over the next 30 or 40 years?

A. Well, what you're referring to here is one of the very longstanding debates in climate policy. It's called the problem of leakage, and in a world where some countries are acting vigorously and cut their emissions and other countries are not acting vigorously to cut their emissions, yes, indeed, the – those who do not act can free-ride on the efforts of those who do act, and I acknowledge that there has always been the problem at the heart of all the international negotiations from the start. The incentive to free-ride and to defect is strong, and that is why I think you have to take a long-run perspective on these things.

There will be swings and roundabouts in the global response to climate change, and if, indeed, the United States and India take the chance to raid New Zealand's market share in dairying because New Zealand acts and they chose not to, there's a moral failing there, but there's an economic reality, and so I'm not suggesting that you close your eyes and plough straight into this, but I am suggesting that ambition requires quite a lot more serious engagement.

Q. Okay. Thank you most sincerely, and I will certainly re-read, re-read and re-read, because I've found it fascinating. I must say that some of it is way above my head in the intellectual debate, but look, thank you most

sincerely. I appreciate the effort that you've put in to bringing this brief of evidence and your experience, so thank you most sincerely.

A. **(inaudible 11:19:56)**

(11:19) PRUE KAPUA TO IVO GEOFFREY BERTRAM:

Q. Kia ora, Dr Bertram. I don't have any questions. I just wanted to just ask on – in your speaking notes, on page 9, you have a reference there to a footnote that's not complete, and I just wondered if it was to paragraph 6 –

WITNESS REFERRED TO #A005(D), PAGE 9, PARA 30

A. Which paragraph is that?

Q. Is it to the paragraph – I think possibly 6.24 in your evidence?

A. **(inaudible 11:20:29)** in the evidence?

Q. Is that the – is that what you're referring to there?

A. Well, sorry, I'm just trying to – trying to locate the reference you're making. In the speaking notes –

Q. On page 9, there's a footnote 2, which refers to the average annual gross emissions in the –

A. What paragraph is – what paragraph is it?

Q. Paragraph 30, the top –

A. 30.

Q. – in commitment period 2.

A. Yes, I see, there's an empty space there.

Q. Yes.

A. Right.

Q. Is it –

A. What I'm referring to there –

Q. I think it's –

A. – is the reason that there's no footnote is that the reference would have been to the chart of emissions attached to paragraph 18.

Q. 18.

A. And indeed to the relevant numbers, which we had to make a correction to in paragraph 21. As was pointed out, I'd entered 89.8 rather than 69.8 into that, but paragraph 21, I'm just looking at that and trying to – no, it's not in paragraph 21, it's in the chart, and indeed, average gross emissions

2013-2020, 22% higher than the 1990 level, you can do that by eye, looking at the chart in paragraph 18, but I should have provided a note to the relevant inventory table in the Ministry for the Environment website, and my apologies for that, and I can provide the Tribunal with the reference to that number.

Q. Thank you. Thank you, Dr Bertram.

(11:22) PROFESSOR DAVID WILLIAMS TO IVO GEOFFREY BERTRAM:

Q. Good morning, Dr Bertram.

A. Morning.

Q. So you've got David Williams talking to you now. Many, many decades since we met each other in Oxford and –

A. Yes.

Q. – seen you very seldom in the –

A. Oxford, 1970s.

Q. – decades in between, but anyway, I've enjoyed listening to your evidence and spotting what you've been doing over the years, so just first an observation and then three questions, so my observation is that quite a lot of the evidence the Tribunal has received has been focused on backsliding, you might call it, in the last short period of the present government, but in terms of the "highest possible ambition" mantra from the Paris Agreement and other places, what I get is that we've never, with successive govts, ever been anywhere close to highest possible ambition, and we tend to slide back from a weak start, so just to observe that some people want to target the present coalition government and other people might want to target other governments because of political leanings, but the sense I get is that this is a consistent record regardless of which coalition or which major party leads the government. Am I right in that?

A. That's my view, yes. There is a variation in the degree of rhetorical commitment. I regarded the original emissions trading scheme in 2008 as already a failure, and that was a Labour-led initiative. The National government that followed weakened it, but the difference was not, in my view, fundamental. The Ardern government in 2017-2020 had a strong

rhetorical commitment and put in place a target that actually, on the face of it, was quite ambitious, for the nationally determined contribution, but then in practice was unable to move either serious legislation or real effective policy through the coalition process. The current government, in my view, has not so much really seriously backslid as simply taken the veil away from the longer running record. We are stopping to pretend that we are really ambitious and settling for quite a low degree of actual ambition and to the extent that the current government is explicitly acknowledging that, it's a move, in a sense, to greater transparency, I suppose.

I did write a piece for Carbon News a few weeks ago, in which I said I listened to the ministers latest set of policy announcements, not with a sense of outrage and horror, but with a sense of weary resignation that it seemed to me inevitable that policy would move in that direction.

Q. Well, age should not limit us. We don't have to be weary about this, Dr Bertram. I have three more technical questions, just to make sure that my brain is correctly engaged on these issues. So, at paragraph 6.4, which you have already been asked about, of your main affidavit, Crown counsel has already drawn your attention to that; 6.4 on page 15 of your first affidavit, that forest sinks should play only a transitional role in bringing net emissions down, and of course, you'll be aware that a lot of the evidence we have received is on behalf of Māori with interests in forestry.

But the statement that the permanent forest planting is not in unlimited supply, could you make some comment on that, because we have had evidence from foresters who are wanting to do some indigenous planting, rather than replanting pine and things like that, and there is a lot of pastoral land now being planted in pine, but permanent forest planting is not in unlimited supply. I'd like you to sort of elaborate on that, please.

WITNESS REFERRED TO #A005, PAGE 15, PARA 6.4

A. Yes. The – this is something that the Commissioner for the Environment, in particular, has been very strong on, and I agree with his analysis that we have a fixed land area in New Zealand, and of that land area, not all of it will be able to be devoted to forestry, but even if you imagine that we

plant the entire land area of New Zealand in forest, eventually, you hit a limit. The same is true for global plans to use forestry to mitigate carbon – greenhouse gas emissions. You can plant the entire globe in forest. At some point, there is a limit to the amount of forestry you can put in. At that point, if you really, seriously have a zero-carbon target, a zero-carbon target requires that you deal with gross emissions.

And so what I'm suggesting here in paragraph 6.4 is that getting started on gross emissions earlier rather than later is really important, because however – you can't be certain how long the transition will be that forestry gives you, but all that it does give you is a window within which you have to deal with gross emissions. And if, as I suggested at the end of my speaking notes, you actually see the availability of plantable forestry land as an opportunity to actually expand our export earnings, rather than an opportunity simply to keep on having high gross emissions and covering them, it's an important forgone opportunity to get gross emissions down early and as fast as is reasonably practical.

So, yes, I do see forestry as only transitional. I think the pests and wildfires risk is greatest for pine forests and that there are much better opportunities in the long run with indigenous forestry. The problem with indigenous forestry, obviously, is that it takes a lot longer to grow and absorb carbon. When you begin to think about centuries, then it's a far better carbon sink than pine. And so I would anticipate that even in so far as we use pine forests now to transition us through, in the longer run, that will have to transition to indigenous forest.

Now, I'm not sure if that answers your question, but –

Q. No, it clarifies –

A. – just to check exactly what you are looking for.

Q. – my thinking, because what I'm getting from your evidence is that overwhelming importance should be given to the gross emissions, and that's what we are not doing.

A. That's my view, yes.

Q. Yes.

A. That's what we are not doing, yes.

Q. Thank you. So, paragraph 9.7 on page 35 of your first affidavit, you were asked a question about this by Mr Fletcher as well. So, what is clear is that 1990 is the single allowable base year. But does that mean that the New Zealand government could not allow carbon credits to pre-1990 indigenous or exotic forests? What are the policy constraints?

WITNESS REFERRED TO #A005, PAGE 35, PARA 9.7

A. We are referring here to the nationally determined contributions and there are no constraints on what that can contain. Nothing in the Paris Accord binds New Zealand to use a Kyoto accounting framework for its nationally determined contribution. So, that is entirely a unilateral choice by the New Zealand government.

Q. So, I mean, this is not a large scale, but there have been people that have given evidence to us who point out that they have had land which is still virgin native bushes. It's never been pastoral land and it's never been pine, but they get no credit for that whatsoever. I mean, is that the sort of option that could be thought of?

A. Absolutely, yes. If you look internationally, there is a great deal of discussion at the moment about preserving the Amazon Rainforest under what's called the REDD discussion. The idea that established indigenous forest which is serving to hold carbon out of the atmosphere is performing a useful function and should be rewarded for that is internationally running very strongly. It seems to me that in New Zealand, precisely the same case for preserving the legacy of existing forest that we have is before us and certainly, there's room there for the owners of indigenous forestry to make some claim on the general collectivity. They are providing us with a service of avoiding worsening emissions.

Q. That’s very helpful, thank you. Now, my final question, I'm completely at sea on the unit prices. So, it's page 1070 – sorry, my book – page 43, 10.12 in your affidavit. You have some information about the price of carbon emissions –

A. Yes.

Q. – and there's one view there in the draft ERP2 about fluctuations between $75 per tonne to $50 per tonne and so on, and then – then, below that quotation, “This represents a radical change from the December 2023

Ministry for the Environment…", which would have a rise to $230 per tonne by 2050. These figures are just so far apart, I just can't understand it.

WITNESS REFERRED TO #A005, PAGE 43, PARA 10.12

A. Well, it may be helpful, I'm just looking for my share-the-screen function and I'll show you a couple of charts.

Q. Because in your second affidavit, the ERP2 modelling now has a variation between $92 and $52 by 2049.

Yes, I'm just trying to bring up the relevant slide. Okay. Now, this is a World Bank slide, it's from the World Bank website on carbon pricing and it shows you the range of prices that prevail in the current internationally environment, and these are compliance prices for different countries –

Q. We should go to Liechtenstein by the looks of it.

– in terms of US dollars per tonne of carbon. What you can see here – I'm not sure whether your Zoom is blocking out that part of the screen or not, but you can see that the highest price that the World Bank has observed at the moment is USD 160 a tonne – this is the current – this is the 2025 values – and the lowest price that they found is Poland, which has zero. New Zealand is somewhere in the middle. Here we go, here is the New Zealand ETS, there. They have put that in at about USD 30, which I think is grossly overstating the ETS price. I think the ETS price is currently well below that. But the point I would make is that, in the absence of a functioning global market under the Paris Accord, and that's the current situation, different countries have hugely different prices at which they are either trading or taxing carbon emissions, and if you sit with – the international market that is envisaged under article 6.4 of the Paris Accord were to come into being, which it really hasn't yet, arbitrage across these international prices should produce some convergence to a value, but exactly where is anybody's guess. And so given that very wide range of prices internationally, right now, let alone the range of prices that people project between here and 2050, we are in an environment of very great uncertainty.

What I would – my personal view, I guess, is that if the world does get serious about climate change, the price is going to be quite a lot higher

than the current New Zealand emissions trading scheme price. I do not believe that in the long run, a price of 50 NZD per tonne of greenhouse gas emissions would be reflective of the international value of carbon credits. But that market has, let's face it, it's still to emerge, and the recent COP meeting in Belem and Brazil, does not, as far as I know, contain, among the decisions, an actual functioning carbon market. The institutions for that carbon market have been set up under previous COPs, and there are people working very diligently to make that – make it an actuality, but it still has some way to go.

Q. Right, right, so – but that's not under the control of the New Zealand government, or any recommendations –

A. No –

Q. – that we might make for **(inaudible 11:38:45)**.

A. No, New Zealand government has no control over how the international market emerges, except in so far as we participate vigorously in the international discussions. I mean, Minister Watts has clearly been engaging seriously with other parties to move forward the ability to trade internationally, because the New Zealand government is going to need to go international. If indeed it is to meet its nationally determined contribution, it's going to have to be able to import units from somewhere, and they will have to be legitimate verified units.

Q. And not from Ukraine and Russia post –

A. Not from Ukraine – well –

Q. Post-1989 anyway –

A. Modern Ukraine may well produce high quality units, I don't want to diss the present-day governments of either Ukraine or Russia. You have to look at the quality of units on the – as they come to you.

Q. Yes, yes. Look, that is really helpful, Dr Bertram. Thank you very much for your evidence and all the best.

(11:39) KEVIN PRIME TO IVO GEOFFREY BERTRAM:

Q. Good afternoon, Dr Bertram. My main questions have actually been asked by Mr Bennion, but I've got some rather eclectic questions that I hope you can help me with. The first one is, yesterday you said that

New Zealand ranked about 44th in the world and has slowly gone down. What's the highest ranking that New Zealand has achieved since –

A. In the Germanwatch rankings?

Q. Yes.

A. We have never been anywhere near the top 10. I'm sorry, I would have to go back and bring up the earlier Germanwatch rankings, because I've put the – last year's rankings are in my evidence, and I think I referred yesterday to the 2026 rankings. So, New Zealand has moved down from 35th, was it, to 44th, over the last two or three years, so we are falling very rapidly. Before that, we were probably reasonably stable, around 30th. But I would have to go back and recheck with the early Germanwatch publications. They will be archived on the web, but I don't have them to hand here.

Q. That's fine, even not in the top 10 was helpful.

A. No, we've never been in the top 10.

Q. Okay. the other question I had was, what was so magic about 1990? Choosing 1990, what's the rationale? Do you have an opinion?

A. The rationale is that the world became aware of the climate change problem in the late 1980s. International meetings that resulted in setting up the international panel on climate change and the United Nations Framework Convention got under way in '88, '89, '90. By 1992, '93, international agreements were being signed up and the accounting procedures were being worked on, and the work towards the Kyoto Protocol, which came in 1997, '98, was under way. So, if you think of 1990 as a sort of turning point in policy, there's nothing to do with the turning point in the actual atmosphere.

It's simply the point at which, reasonably, you could think government action is relevant to reducing emissions. So, in terms of measuring how effective government policy had been going forward, 1990 is the base year and the accounts try to measure what extra results had been achieved since 1990 as a result of government action to reduce emissions. It's an arbitrary choice and it does produce a couple of – as any arbitrary choice does, it produces a couple of quirks, and one of those

quirks is the gross net accounting procedure that New Zealand has used over the last two decades.

Q. Okay, thank you. And I guess, if 1800 was chosen as the date, New Zealand would be hugely in deficit, wouldn't it?

A. Well, the issue for New Zealand is that we had a great deal of forest growth going on because we had big plantings of forest from the 1970s, 1980s, and that forest was growing rapidly in the 1990s. So, that we had quite a lot of absorption going on, and if you were trying to do the sort of gross net accounting that – that – that we ended up doing under Kyoto, it's a bit of a problem. I guess the easiest way to envisage this is, again, to go back to the chart that I was showing yesterday, where you can see actual gross emissions and actual net emissions tracking along for New Zealand, and in 1990 and today, the difference is about 20 million tonnes a year. In other words, New Zealand forests soak up about 20 million tonnes of the greenhouse gas emissions that the New Zealand economy puts out there.

And so, the argument at the time of Kyoto was that countries like New Zealand that had very large negative land use – land use change in forestry emissions; that is, that were big sequesterers of carbon, would be disadvantaged setting targets going forward, because, for example, if you imagine that New Zealand had set a target to reduce net emissions – that's from the 1990 level, for the first commitment period of Kyoto, that would be a net-net target, and if you look at the chart that I've got, where net emissions in fact went up quite sharply between 1990 and the first commitment period, it would have been really, really tough to get New Zealand net emissions to hold still at the 1990 levels, and that is because we were – we were already soaking up carbon just about as fast as our forest growth could – could manage at 1990, and that made it unrealistic for us – us to take a net-net target under the Kyoto agreement. We could easily, I think, have taken a gross-gross target, and that is what I had hoped that we would do, that we would seriously tackle our gross emissions under this – this commitment period, but as it turned out, the opportunity came up to do a target emissions gross net accounting and we tool that opportunity.

And it has both positive and negative sides. It released New Zealand from what otherwise could have been a very stringent demand to reduce net emissions, given that we were already rowing our forestry flat out. On the other hand, it gave us an opportunity to escape from making a commitment about gross emissions, and we took that opportunity. So, there's swings and roundabouts in this decision.

Q. Ka pai tēnā. Thank you very much. I really appreciated your oral presentation as well. Thank you.

(11:46) JUDGE MILROY TO IVO GEOFFREY BERTRAM:

Q. Kia ora Dr Bertram. I have just been asked by Professor Williams to ask you, what would be the difference if we had chosen 1800 as our date instead of 1990?

A. You would have to account for the fact that we deforested a very large amount of the New Zealand land area, done primarily by Pākehā settlers, much of it on land transferred from Māori by various devices. And so one of the advantages from a Māori point of view is that the blame for that deforestation and the very large load of carbon that it's left in the global atmosphere falls solidly on the settler economy, not on the Māori economy. On the other hand, if you were to run the accounts through, we have an awful lot of ground to make up if we seriously think about repaying our debt to nature in the form of all those carbon emissions that we did during the 19th and early 20th century as we cleared land to run a pastoral and agricultural economy.

The beauty of 1990 as a historical starting point for the modern series of agreements is precisely that you write off – write out history from the story. And as I think I mentioned yesterday, when I was preparing my advice on global cap-and-trade back in 1989, '90, and in the article that I published in 1992, one of the decisions that was made in that was to set the history aside to look forward at ongoing emissions and try to control ongoing emissions without requiring retrospective accounting for historical responsibility.

Now, understandably, that is now quite a hot topic in international negotiations, where countries with a fraction of our historical responsibility

for the global carbon atmosphere are complaining that we are being reluctant to repay our debt to nature and asking them to repay a debt that they haven't actually incurred, and there are quite serious equity concerns there, so there are real advantages to turning away from the history and just trying to cope with what's happening going forward. But you need to acknowledge that there are, you know, quite big ethical concerns in the background of that.

Q. Thank you for that answer. My next question is just to understand properly the mechanism around whether New Zealand – or the reasons why our government might not allow New Zealand carbon credits to be sold globally. You mentioned that there's no global market, but you also mentioned, I think, earlier in your evidence, that it's a choice of the New Zealand government not to allow our carbon credits to be sold overseas.

A. Yes.

Q. So, just as I understand it, is it that if we sold – if foresters in New Zealand were allowed to sell their carbon units overseas, they would not – as compared to in the New Zealand market, they would naturally go to selling overseas, because there are higher prices available, as we saw from that chart that you just showed a little while ago?

A. Yes, once a market opens up, yes. That's – a simple – if you've got a simple choice, over the next 20 years, between selling your forestry credits on the international market and selling them at 15 NZD or less under the emissions trading scheme, it would be a no brainer, if you were allowed to do that. But you do require the agreement of the New Zealand government to that sort of trading, because the New Zealand government, in the international agreement, is called the host government, under the Paris Accord, and the host government has discretion whether or not to allow parties within its country to trade on the international carbon market, and this may be the moment to throw up another chart. I'll just put this up on the screen. Where are we? There we are.

This is the Paris Agreement trading mechanism. This is under article 6.4 of the Paris Agreement, and this is from the website that's listed at the

bottom of the screen there. And the detail that's shown in that chart is laid out in the rules and modalities document which has been issued by the UNFCCC, and again, the web reference is at the bottom of the screen there. And if you follow along here, the trading that's taking place, you can see that in the middle of the screen, there is the requirement for authorisation by the host party.

And so, even once this market mechanism is established as envisaged under the Paris Agreement, national governments have, in each instance, the discretion as to whether trading is or is not going to be permitted. And so, the New Zealand government, under this article 6.4 mechanism, has always the option to allow or disallow the trading of credits under this mechanism. Now – and my guess is that it's unlikely that the New Zealand government will authorise that, so long as they are requiring the use of these carbon forestry credits to cover the New Zealand economy's gross emissions. If we had reduced our gross emissions and had these forests carbon credits available for sale without needing them domestically, then of course, authorisation would be a much more straightforward decision, and we would be looking at export earnings.

Q. And conversely, if they did allow our carbon units to be sold overseas and therefore, our emissions not being covered, it would force players, our polluters, to reduce their gross emissions?

A. Yes, very much so, because the government would then be in the position of having to buy in a large number more credits than it's currently facing at the international price, and assuming the international price over the next couple of decades is reasonably large, that would pose quite a considerable burden for local polluters. Now, the government, again, would have the option of socialising that; in other words, carrying **(inaudible 11:53:57)** tax paying public, or loading it through to the polluters by ceasing to give them free credits, I guess, which is the current mechanism that applies to quite a lot of the big industrial polluters. Agriculture obviously stays outside the pricing mechanism at this stage.

Q. Thank you. Thank you for that answer. Can I just ask you one of those eclectic type of questions that matua Kevin asked. That is, when the previous government provided subsidies for purchase of electric vehicles,

as I understand, Treasury were critical of the use of money for that purpose, because, presumably, it was not an efficient use of money. Did you have any comments about that?

A. Yes, I do have a comment. I'm very strongly supportive of the subsidy programme for electric vehicles, because of the low-hanging fruit in our gross emissions. The light and medium vehicle fleet in New Zealand is the absolute top candidate from my point of view, and that's because of our complete reliance on importing oil products to run that fleet. We save a lot on the balance of payments by electrifying it, provided that we can get the electricity from renewable sources in New Zealand.

As for what Treasury says, Treasury has a sort of split personality on these issues. There is one side of Treasury that is quite rigorous in its imposition of very tough standards on government spending and very reluctant to spend government money on almost anything and applies quite rigorous rules in its cost-benefit analysis. There's another part of Treasury that has produced a thing called the living standards framework over the years, which is very much committed to a wellbeing approach to policy. That was visible in a number of so-called "wellbeing budgets" over recent years. And that side of Treasury would be far more, I think, amenable to subsidising a transition to an electrified vehicle fleet. So you probably have to choose which Treasury document you read before you attribute a particular view to the New Zealand Treasury. But certainly, I would be on the side of being prepared to use quite strong subsidies and regulations to move the vehicle fleet as fast as we can to an all-electric fleet. I believe that's feasible to do over the next decade. I note that a number of European countries have been trying to go down the same track and finding the going quite tough, as you'll probably expect, but making a lot more progress than we have been.

Q. Right. Thank you. That was the last of my questions. Can I thank you again on behalf of the Tribunal for your very clear and cogent presentation of evidence this morning. It has been very valuable. Thank you very much. I will hand you back to your counsel in case there are any questions by way of re-examination.

(11:57) MR SHARP TO IVO GEOFFREY BERTRAM:

Q. Thank you, your Honour. Dr Bertram, just for completion, while we are having this discussion about international carbon markets, I wonder if you could just comment on private carbon markets, such as when Air New Zealand buys offsets for flying or a company like IKEA might buy forest in New Zealand for their carbon offsets. How does that relate as compared to the official international carbon markets that may or may not exist?

The voluntary market is a great deal less satisfactory than the compliance markets. And I just – I downloaded this during the break this morning from a website called CarbonCredits.com, Carbon Prices Today, which does show you the latest prices and the year-to-date prices in various markets, and what you'll notice is the compliance markets, which are the sort of ones that would be relevant under the Paris Agreement 6.4, you can see trading at prices that are quite substantial, there's 82 dollars – 82 Euros, I'm sorry, in the European Union per tonne. UK is trading at 58 USD, 50, Australia at 36 – I guess that's Australian dollars, 36. New Zealand is here recorded as trading at 44 NZD. That, I think, must be today or yesterday's emissions trading scheme price. South Korea and China. So you can see there's a very wide range of prices in the compliance markets. And down at the bottom are the voluntary markets. Now, the aviation industry offset market, for example, is the sort of place where Air New Zealand is getting credits to sell to its customers to offset their flying miles, and what you can see here is that the prices in the voluntary market are minuscule, and the reason for that is that the voluntary market is – it is still nascent. It is loaded up with – with credits that may or may not fit into the compliance market, and it is overhung by a great deal more uncertainty than would be the case with compliance markets, which are back by government policy.

So I think those prices that I showed there, at less than a dollar a tonne in the aviation industry offset market, are probably a little pessimistic. I think there will be other parts of the aviation offset market that will be trading higher. But I just – I reached for some number this morning, because I felt that this question might arise, and what you can see is that

there's a very great disconnect at the moment between the voluntary and the compliance market prices.

Q. Thank you. And what if – what happens, say, if a New Zealand forester provides removal units for the voluntary market. How does it impact on their ability to also provide those units in the compliance market, or the ETS?

A. There is a great deal of difficulty in harmonising the voluntary market with the compliance market in terms of recording each countries emissions. Because obviously, if New Zealand foresters start selling credits offshore, then those credits have to be taken out of the New Zealand inventory for the purposes of recording its emissions internationally, or else you would have double counting. You would have a single forestry credit being given the price on the voluntary market on the one hand, but being used to save New Zealand having to buy in units on the compliance market.

So, there are all sorts of mechanisms and certification procedures being developed to prevent that sort of double counting between the voluntary and the compliance market, and they present real challenges, which I don't think we can pretend have been solved at this point. But it does mean that New Zealand foresters are not in a position to just go and strike deals offshore, without at the same time bringing the New Zealand government into the loop, because their actions have repercussions for the New Zealand emissions trading scheme and for the New Zealand government's carbon accounting, and they have to be allowed for on that basis.

Precisely how that works out in practice I think is still very unclear. People I have spoken to recently about the development of the rules in these two markets continually emphasise that this is a work in progress and we have quite some way to go before it actually emerges into a full-fledged market setting. I think a lot of us were over-optimistic at the time of the Paris Accord in thinking that the article 6.4 mechanisms would come into place reasonably quickly, and I think it's been disappointing that they haven't moved faster.

Q. Thank you, Dr Bertram. So I just want to confirm, more for the Tribunal, that Dr Bertram will be appearing at a later hearing to give evidence on a

number of matters, and it is hopeful that the article 6.4 market mechanisms will be in place by then and – and perhaps Dr Bertram can provide more clarification at that point.

With that, thank you; thank you, Dr Bertram, for your very useful evidence.

A. You're welcome.

HOUSEKEEPING – TIMETABLING (12:02:31)

HEARING ADJOURNS: 12.04 PM

HEARING RESUMES: 12.12 PM

JUDGE MILROY:

Kia ora anō. Mr Sharp, we're in your hands to introduce Dr Foster.

MR SHARP:

Thank you, Ma'am. Now Ma'am, Professor Foster has filed a brief of evidence dated 26 September 2025, which is #A125, and also a bundle of documents, which is #A125(a). Now, the evidence is being combined on behalf of Wai 3340, the Tōtaranui Nama Ono Trust. Professor Foster is giving evidence as an expert on the international environmental law.

And I thought it would be worthwhile just getting a brief explanation of the relevance of this evidence to the issues being dealt with for the Tribunal, so everyone knows where it fits in. So, Professor Foster will be giving evidence on the advisory opinion of the International Court of Justice on obligations of states in respect of climate change delivered this year, and many of us may be familiar with this, which was widely reported in the media as being further to a claim brought by Vanuatu as to failures by countries around the world in the field of climate change.

So, Professor Foster will address – she will discuss what this advisory opinion says about obligations under international law to address climate change which applied to New Zealand. So, Professor Foster, she doesn't comment on

whether New Zealand is complying with these obligations or to the extent that these obligations are enforceable under domestic law in New Zealand, but her evidence is relevant to the issues and claims brought by this Tribunal in as far as claims that the NZ Government is currently in breach of international obligations to deal with climate change. And in that context, Professor Foster's evidence outlines what these obligations are.

So with that, I would like to introduce Professor Foster.

MR SHARP CALLS

PROFESSOR CAROLINE EMMA FOSTER (SWORN)

Q. So, Professor Foster, can you hear us?

A. Yes, I can hear you.

Q. Thank you. Now, Professor Foster you've – can you just provide your full name to the Tribunal?

A. Caroline Emma Foster.

Q. Now, you have filed a brief of evidence dated 26 September 2025 and a bundle of documents. Have you got those documents before you?

A. I certainly have the brief of evidence. I also have a number of documents, including the ICJ Advisory Opinion, with me.

Q. Thank you. And can you confirm that, to the best of your knowledge and belief, the contents of your brief of evidence is true and correct?

A. Yes.

Q. Can you specifically confirm that you have agreed to comply with the code of conduct for expert witnesses under the High Court Rules?

A. Yes.

Q. Thank you, Professor Foster. Can you just proceed to speak to your brief of evidence?

(12:16) PROFESSOR CAROLINE EMMA FOSTER: (#A125, #A125(a))

E rangatira mā, tēnā koutou katoa. My colleague, Professor Williams, good morning. Nō Ōtautahi ahau, tūturu, engari nō Tamaki Makaurau ahau ināianei. My name is Caroline Foster. I have an LLM, First Class LLM and a PhD from

the University of Cambridge which investigated the rules on evidence in scientific cases in international courts and tribunals.

I am a researcher and teacher of international law and international law and also international environmental law, with around 25 years of experience. I have authored or co-authored around 100 publications in international law, international environmental law, international trade law, the law of the sea, the law of Antarctica an international dispute resolution. These include sole-authored books with Cambridge University Press and Oxford University Press. And presently I am Director of the New Zealand Centre for Environmental Law, here at Waipapa Taumata Rau, the University of Auckland.

Before I took up my position here, I was, for around a decade, a policy and legal advisor with the Ministry of Foreign Affairs and Trade, Manatū Aorere, in the 1990s and I also had around 12 months' experience in London in the non-governmental sector with an organisation called International Alert, which was founded by Martin Ennals after he founded Amnesty International.

Most recently I was legal counsel to the International Union for the Conservation of Nature in the ICJ Advisory Opinion on Climate Change, which I will be talking with you about today, and also for the previous advisory opinion, the year before, in 2024, also on climate change, from the International Tribunal for the Law of the Sea.

Can I just check that I am loud enough for you to hear me?

JUDGE MILROY:

Yes, thank you, we can hear you well.

PROFESSOR CAROLINE FOSTER: (CONTINUES #A125, PAGE 4, PARA 7)

Terrific. Wonderful. So, I thought it might be useful to begin by addressing the status of an advisory opinion of an international court or a tribunal. These opinions are requested by authorised organisations to help them with their

work, and the ICJ Advisory Opinion was requested by the UN General Assembly. The ITLOS, International Tribunal for the Law of the Sea, advisory opinion was requested by the Commission of Small Island States on Climate Change and International Law.

Advisory opinions can be important because they authoritatively clarify the law for the international community, so they have similar effects to judgments in this respect, although judgments are binding on the parties to a dispute. Advisory opinions are advisory rather than binding, but this doesn't greatly alter the status of the views that they express on the content of the law.

An advisory opinion status might be enhanced when the judges are unanimous, which was the case with both of these advisory opinions, and it's also worth noting that the level of participation by states and other entities in the proceedings in both these cases was high.

Today, I will mainly talk about the ICJ advisory opinion, which is considerably broader in terms of the law that is applied, and I will refer to relevant paragraphs in my written brief as I go along, in case the Tribunal would like to follow using that document.

I am first going to turn to the questions that were before the ICJ, which is at paragraph 9 of the written brief. That is paragraph 9.

WITNESS REFERS TO #A125, PAGE 4, PARA 9

The ICJ Advisory Opinion was requested by the UN General Assembly in 2023 by Resolution 77/276, and it asked the Court two questions. Firstly, "What are the obligations of States under international law to ensure the protection of the climate system and other parts of the environment from anthropogenic emissions of greenhouse gases?" What are the obligations? And the second question, "What are the legal consequences under these obligations where States, through their acts and omissions, have caused significant harm to the climate system and other parts of the environment, with respect to states, including, small island developing States, which are injured or specially affected

or especially vulnerable…", and also with respect to "Peoples and individuals of the present and future generations"? The future generations aspect is one that I've been publishing on recently, and I will come to that later.

Now, similarly to the written brief, I am going to talk first about the first question and then come to the second question, and I will start by addressing the Court's main findings under the climate treaties and then come to customary international law, and after that, to other relevant treaties, as well as principles of international law.

I will then talk about what the Court said regarding legal consequences where harm has occurred, and before closing, I will aim to summarise the obligations that are on New Zealand and other states as clarified in the ICJ advisory opinion.

So, as Mr Sharp said, I don't propose to address matters concerning whether particular New Zealand policies or laws or proposals are consistent or otherwise with its international legal obligations, and in my view, doing so would require thorough consideration of arguments both ways on fairly complex questions. Those issues will be quite heavily nuanced, given that many of the specific terms we'll be canvasing today used by both tribunals are new to the ears of the world and their application needs to be tested over time and practice in diverse processes around the global.

So, let's start with the first question on states obligations under international law to ensure the protection of the climate system at other parts of the environment, and we can turn initially to the climate treaties at paragraph 17 of the written brief.

WITNESS REFERS TO #A125, PAGE 7, PARA 17

There are three climate treaties, the United Nations Framework Convention on Climate Change or UNFCCC, adopted in 1992 at the Rio Earth Summit, which ended, of course, in 1994 and its ultimate objective was "stabilization of

greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system".

The Kyoto Protocol to the UNFCCC of 1997 and the Paris Agreement of 2015 translated the UNFCCC's basic aims into a set of more specific obligations, and we will turn now to paragraph 30 of the written brief. We will return to customary international law and principles of international law in due course.

WITNESS REFERS TO #A125, PAGE 9, PARA 30

So, I am at paragraph 30 now. What we see in the UNFCCC are "commitments for all parties to generate national and regional greenhouse gas emissions and removals inventories and formulate greenhouse gas mitigation measures. The UNFCCC also required industrialised countries… and countries with economies in transition… to take a lead in climate change mitigation by limiting emissions and enhancing their greenhouse gas sinks and reservoirs".

The term "mitigation" refers to efforts to reduce atmospheric greenhouse gas concentration. Mitigation is the main thrust of much of international climate law, and mitigation is all about reducing emissions and increasing removal of GHGs from the atmosphere, including through carbon sinks such as forests and mangrove swamps, or more artificially, through means of greenhouse gas sequestrations such as underground storage, enhanced rock weathering and so forth. And it is worth noting here that the ICJ emphasised that the precautionary principle should apply. Countries do need to be careful not to risk undue harm when they are seeking to mitigate climate change. Actually, if you are looking for a good reading on carbon dioxide removals, I can send a reference for Neil Craik's piece in the *Research Handbook* on the Paris Agreement.

In any event, my main point is that the international community uses the term "mitigation" to refer to reducing atmospheric greenhouse gas concentration. In contradistinction, "adaptation" is a separate term, and it refers to adapting to a climate changed world where mitigation has only been partly successful. So

examples of adaption include, for instance, building sea walls and the movement of settlements, et cetera.

WITNESS REFERS TO #A125, PAGE 10, PARA 31

So I am at paragraph 31. "The UNFCCC also contained obligations relating to parties' adaptation to climate change", and they included, among other matters, to take an example, international cooperation, including for the protection and rehabilitation of areas, particularly in Africa, affected by drought and desertification.

WITNESS REFERS TO #A125, PAGE 10-11, PARA 33-36

I come now to paragraphs 33 to 36. The Kyoto Protocol to the UNFCCC then concretised certain UNFCCC obligations, including binding emissions reduction targets for developed countries and countries with economies in transition and the EU. And apologies, there seems to be error in paragraph 33. It should refer to developed countries and not developing countries. Those binding targets refer to 2008 to 2012 period, requiring the average reduction of 5 per cent below respective 1990 levels.

So, the Kyoto Protocol still remains in force, but there were no binding targets for the subsequent 2013 to 2020 period, because the parties never reached agreement on those.

The Paris Agreement provided an important new concretisation of the UNFCCC's ultimate climate objective. The Paris Agreement's object and purpose as found in article 2(1)(a) was to "strengthen the global response to the threat of climate change" by:

(a) "Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C, recognizing that this would significantly reduce the risks and impacts of climate change", while also,

(b) "Increasing the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development; and

(c) Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development."

So, very importantly, the Court considered the 1.5°C threshold to be the parties', as they put it, "agreed primary temperature goal" for limiting global average temperature increase. And this creates, endorses a reference point by which the world can gauge how well it is achieving the UNFCCC objective of stabilizing greenhouse gas emissions at a level preventing dangerous anthropogenic interference with the climate system. The Court's reasons for placing the 1.5° temperature goal front and centre included the science and also the 2023 outcome document from the first global stocktake under the Paris Agreement.

WITNESS REFERS TO #A125, PAGE 11, PARA 36

I am at paragraph 36 now. Article 4(1) ties mitigation obligations also to the Paris Agreement's article 2 goal by stating that in order to reach the goal, "Parties aim to reach a global peaking of greenhouse gas emissions as soon as possible . . . and to undertake rapid reductions thereafter", so as to achieve net zero emissions by balancing emissions and removal by the second half of the century."

In practical terms, the Paris Agreement's mitigation scheme operates through the Nationally Determined Contributions, or the NDCs. So, article 4(2) contains the parties' individual mitigation obligations and requires each party to prepare, communicate and maintain successive NDCs that it intends to achieve. Each party must communicate their NDC every five years. Now, these are obligations of result. They require the parties to attain the specified outcomes of preparing, communicating and maintaining their NDC.

Obligations of result can be contrasted with obligations of conduct, and some of the obligations that I will be referring to in due course are obligations of conduct. Obligations of conduct do not require a party to attain a result but rather to conduct itself in a certain way. The usual standard of conduct under preventive obligations in internation law is due diligence. Preventative

obligations in international law include a wide variety of treaty and customary international law obligations aimed at preventing environmental harm and other types of harm. Another example of a preventive obligation would be the obligation to prevent genocide, for example.

WITNESS REFERS TO #A125, PAGE 11-12, PARA 38-43

Returning to NDCs, at paragraph 38 through 43, importantly, the Court goes on to clarify that States don't have an unfettered or an unlimited discretion around the content of NDCs. So, article 4, paragraph 3 prescribes that "Each Party's successive nationally determined contribution will represent a *progression* beyond the Party's then current nationally determined contribution" (or NDC), and will "reflect its *highest possible ambition*" – progression and highest possible ambition – "reflecting its common but differentiated responsibilities and respective capabilities, in the light of different national circumstances".

Okay. "The Court then goes on to clarify that 'progression' means that a party's NDCs 'must become more demanding over time'", and that "The requirement for 'highest possible ambition' meant that the content of a party's NDC must be '*be capable of making an adequate contribution to the achievement of the temperature goal*', taking into account that the parties are to undertake and communicate ambitious efforts 'with the view to achieving the purpose of' the Paris Agreement."

Now, "All parties are bound by these obligations regarding the content of NDCs. However, they are obligations of conduct rather than result, the Court held." They are to be fulfilled to a due diligence standard. Specifically, a standard of stringent due diligence applies to the preparation of NDCs, which the Court says means that each party "has to do its utmost to ensure that the NDC it puts forward represents its highest possible ambition".

WITNESS REFERS TO #A125, PAGE 12, PARA 41

I am at paragraph 41. "Further, the Court held that States are obliged to exercise due diligence such that their NDCs '*when taken together, are capable of achieving the temperature goal*…'" and the UNFCCC goal of "'stabilizing

greenhouse gas emissions at a level preventing dangerous anthropogenic interference with the climate system'".

States may be assisted in this by the requirement that NDCs are to be informed by global stocktake outcomes, and we saw in 2023 global stocktake, the determination by the parties that they "are not yet collectively on track" towards achieving the Paris Agreement's purpose and long-term goals and also the recognition, significantly, from the parties in the global stocktake outcome that limiting global warming to 1.5 "with no or limited overshoot requires *deep, rapid and sustained reductions*" in emissions, and they give figures of 43 per cent by 2030 and 60 per cent by 2035 relative to 2019, as well as reaching net zero by 2050.

The Court then turns to domestic mitigation measures under the Paris Agreement and "the Article 4(2) obligation that 'Parties shall pursue domestic mitigation measures, with the aim of achieving of the objectives of' their successive NDCs. This is also an obligation of conduct and not an obligation of result. Therefore, the parties are required to fulfil the obligation to the standard of due diligence." So "Compliance 'is to be assessed on the basis of whether the party exercised due diligence in its efforts and in deploying reasonable means to take domestic mitigation measures'." This, of course, "includes measures controlling private actors", because most of our GHGs are omitted by individuals and by economically productive activities that are undertaken by companies. Parties don't "have to 'guarantee' that their NDCs will be achieved, but they do have to 'make best efforts'" to attain that result. And the Court said, "this 'requires States to be proactive and pursue measures that are reasonably capable of achieving the NDCs'", and that "'these measures may include putting in place a national system, including legislation, administrative procedures and an enforcement mechanism, and exercising adequate vigilance to make such a system function effective, with a view to achieving the objectives in their NDCs.'"

MR SHARP:

Aroha, Professor Foster, we're due to break at 12.30, so I wonder, your Honour, whether that's a convenient place to take the break.

PROFESSOR CAROLINE FOSTER:

Yes, would you like me to complete the final paragraph on the Paris Agreement and then we can come back to customary international law directly after the break?

MR SHARP:

That will be very suitable, thank you.

PROFESSOR CAROLINE FOSTER: (CONTINUES #A125, PAGE 12, PARA 44)

So, just on adaptation to climate change under the Paris Agreement, you will see that the Court sets out relevant provisions from Paris, including article 7 paragraph 9. That is the provision that says that "Each Party shall, as appropriate, engage in adaptation planning processes and the implementation of actions, including the development or enhancement of relevant plans, policies and/or contributions." The due diligence standard again applies and options for fulfilling adaptation obligations are identified, including restoring ecosystems, creating early warning systems, resilience-enhancing infrastructure, regenerative farming, crop diversification, weatherproofing of buildings, land management to prevent wildfire risk, et cetera.

That concludes what I have to say about the climate change treaties from the ICJ Advisory Opinion, and I will be happy to turn to customary international law after lunch.

MR SHARP:

Thank you, Professor Foster.

JUDGE MILROY:

Yes, thank you, Professor.

HEARING ADJOURNS: 12.38 PM

HEARING RESUMES: 1.06 PM

JUDGE MILROY:

Welcome back from lunch, and we will resume the evidence of Professor Foster.

(13:06) PROFESSOR CAROLINE FOSTER: (CONTINUES #A125, PAGE 7, PARA 19)

Kia ora, your Honour. Thank you very much. We were just finished talking about the climate treaties, and I'm now going to need to take you back to paragraph 19 of the written brief. Apologies for the toing and froing. The written brief reflects the way that the advisory opinion is sent out, where the Court determined the different bodies of applicable law and then came back to each of those bodies of law in turn.

So, we move back to paragraph 19 to start talking about customary international law, and as I noted earlier in the written brief, customary international law is clearly listed among the sources of international law in Article 38 of the ICJ statute. So customary international law and treaty law are the two main sources of international law. Both are sources of binding international law, sometimes described as hard law, for example, the UNFCCC, the Paris Agreement and other treaties and conventions addressed in the advisory opinion are hard law, as is the UN Convention on the Law of the Sea.

But in contrast, General Assembly resolutions, and also declarations, such as the Declaration on the Rights of Indigenous Peoples, are not treaties, they are non-binding law, also described as soft law. Now, some of their content could be hard but not by virtue of the status of the instrument in question. So, to qualify as hard law, we'd be looking to see if such content meets the – the usual tests and formulae for customary international law, which would mean it would have to reflect a combination of state practice and opinio juris, which refers to the belief on the part of states that their practice is being conducted consistently

with a rule of international law, and widespread and essentially consistent state practice and opinio juris are required.

Examples of customary international law include the freedom of navigation on the high seas, or diplomatic immunity. As it happens both of those rules of international law are also found in treaties. So, parties to the treaties would be bound both by the treaties and by customary international law, and non-parties to the treaties will be bound just by the customary international law. So, for example, the United States is not party to the UN Convention on the Law of the Sea, UNCLOS, but remains bound by customary international law on matters including the freedom of navigation on the high seas.

I am at paragraph 19 now. Two customary international law duties addressed in the Advisory Opinion called for particular attention. "The first was the duty to prevent significant harm to the environment, building on the 1949 *Corfu Channel* case and international judicial decisions since. The Court confirmed that the duty of prevention applies… to the climate system and other parts of the environment."

The duty to prevent significant harm was an obligation of conduct, requiring States to act with due diligence, to "employ all means reasonably available to them" to prevent harm so far as possible, and as the Court had previously held in other cases, this means that States are obliged to "use all the means at [their] disposal in order to avoid activities which take place in their territory, or in any area under [their] jurisdiction, causing… damage to the environment of another State."

Of course, in tune with the Advisory Opinion's approach to the Paris Agreement, the Court further finds that "'stringent' due diligence is required" under customary international law, as it has already said in respect of obligations of conduct under the Paris Agreement, and that's because of the nature of the problem that we are addressing with climate change.

"The second customary international law duty was the duty to cooperate" to protect the environment, which is linked intrinsically to the duty to prevent harm", and, the Court said, also derives from the principle of good faith in the conservation and management of shared resources based on shared interests.

WITNESS REFERS TO #A125, PAGE 13, PARA 46

We move through to paragraph 46 to continue with customary international law. Paragraph 46.

So, as to the customary international law, particularly the obligation to prevent significant harm to the environment, you might well ask whether New Zealand is too small to make a difference, and at paragraph 46 you will see that the Court explained that the customary international law of duty to prevent serious harm to the environment not only applies, but applies regardless of the fact that the climate change problem is caused by the cumulative effect of conduct in various States, and you will see that the Court says that "individual conduct leading to emissions [can] give rise to the obligation to prevent significant transboundary harm even if such activity is environmentally insignificant in isolation… the risk associated with climate change is a consequence of a combination of activities by different States, and… States need to avert the risk through a coordinated and cooperative response."

The Court also explains a little bit more about the elements that would be relevant in determining what due diligence calls for. You will see a description in paragraph 47 of a State having to "use all the means at its disposal" and putting in place a national system, in which we – there's a formula that we've seen previously, because the Court said the same thing under the Paris Agreement.

I do note at paragraph 48 that other elements of the required conduct included undertaking risk assessments in relation to significant greenhouse gas emitting activities and notifying and consulting other States as appropriate.

And the Court then provided more detail about some of these points, so, States have to "actively pursue the scientific information necessary to assess the probability and seriousness of harm", and also that the due diligence standard isn't fixed. It will become more demanding where there is generally recognised scientific evidence that it is highly probable significant harm will occur, and it can become more demanding in the light of new scientific and technical knowledge about the seriousness of climate change and as the problem worsens.

At paragraph 50 you will see the point I made earlier on, that potential risks could actually come from mitigation or adaptation measures themselves, and I mentioned earlier, I think, underground greenhouse gas sequestration, but here in the brief I also mention ocean fertilisation, for example. So, the Court reminded us that prudence and caution are required where technologies posed risks.

In the meantime, a State's capabilities do remain a key factor for determining the required due diligence, as reflected in the "common but differentiated responsibilities" principle. So it is "understood that the degree of care expected of a State with a well-developed economy and human and material resources and with highly evolved systems and structures of governance is different from States which are not so well placed". And the Court then went on to indicate, as is also mentioned in the section of the brief on principles, that States that are experiencing economic development and increasing capacity over time for climate change mitigation can expect that the due diligence required of them will heighten.

The carrying out of environmental risk assessments in respect of proposed activities that might have a significant impact was both an aspect of the due diligence required by the duty of prevention and also an independently recognised duty under customary international law. The Court said that it might be reasonable for States to conduct their assessments of the risk caused by greenhouse gas emissions by way of general procedures that cover different forms of activities, but additionally, it's important that States carry out the IAs

for particularly significant proposed individual activities contributing to emissions in order to address their possible downstream effects, and commentators have understood this to mean the IAs are called for in regard to decision-making on significant fossil fuel resource extraction and that they would have to take into account that oil extract is ultimately intended to be burnt, probably when exported. So, depending on the activities, States might have to do an EIA about an activity's downstream climate impacts as a matter of customary international law.

The brief also discusses the customary international law duty to cooperate for the protection of the environment, which is – is important to bear in mind. In the interests of time, I will move, though, to – I think I will move to paragraph 55 and the relationship between the climate change Treaty obligations and the customary international law obligations.

WITNESS REFERRED TO #A125, PAGE 15, PARA 55

So, how do treaty and custom relate here? And the Court took the view that at present, compliance in full and in good faith with the climate change treaties, as the Court has interpreted them, suggests that the State substantially complies with the customary international law duties to prevent significant environmental harm and to cooperate.

I presently developing research in another context that I expect will argue that States are also required to engage in cooperation in the international economic sphere, including by developing international economic law to help mitigate climate change. That is a matter that some might say the ICJ tended to overlook, perhaps because it didn't receive great attention in the pleadings. So, that was an interesting and important contribution from the Court.

WITNESS REFERS TO #A125, PAGE 15, PARA 56

But let's come to States obligations under other environmental treaties, and I am at paragraph 56 and following.

So, you will see that States had obligations to ensure the protection of the climate system and other parts – paragraph 57 – other parts of the environment from a range of other environmental treaties. So, the ozone treaty regime complements the climate change treaties. It specifically requires the phase out of certain greenhouse gases that happen to overlap with the category of ozone-depleting substances.

The States party to the Convention on Biological Diversity of 1992 (the CBD) which was also negotiated at the Rio Summit at the same time as the UNFCCC, also contains a range of important obligations and of course, biodiversity is too often overlooked in the context of dealing with climate change. The Kunming-Montréal Global Biodiversity Framework adopted in 2022 is the latest set of targets for the international community on biodiversity and it specifically encourages parties to "[m]inimize the impact of climate change and ocean acidification on biodiversity and increase the resilience of biodiversity through mitigation, adaptation, and disaster risk reduction actions". And we also need to take into account that climate change, mitigation and adaptation measures should not unduly harm biodiversity.

We have the UN Convention to Combat Desertification of 1994, which also contains relevant obligations.

And then we come to the UN Convention on the Law of the Sea.

So, as mentioned earlier, the ICJ's views on State parties' obligations under the UN Convention on the Law of the Sea (UNCLOS) aligned with those of the International Tribunal for the Law of the Sea, ITLOS, which it had expressed in its 2024 Advisory Opinion on climate change.

So, the Law of the Sea Advisory Opinion came first, and you will be aware that climate change related affects in the ocean include – well, sea level rise, but also increasing ocean heat content, marine heat waves, ocean deoxygenation, ocean acidification and we're told that, for instance, a problem with ocean warming is that it doesn't only reduce the amount of oxygen that the ocean can

hold, but it stratifies it. So, less oxygen is transported to the depths where it's needed to support ocean life. I am no great expert, but I gleaned this from the legal materials.

As to ocean acidification, we are told that that is caused by all the CO_2 that the ocean is taking up, which reacts with the water, and it forms carbonic acid, and that puts coral reefs and coral ecosystems at risk because it makes the water more corrosive – and I am quoting the scientists here – more corrosive for marine organisms that build their shells and their structures out of mineral carbonates like coral and shellfish and plankton. So, we are expecting that projected ocean acidification and oxygen loss will affect deep ocean biodiversity and habitats that are linked to provisioning services in the deep ocean, and that large-scale changes to food web structure are occurring in all oceans. Many issues for the Law of the Sea Tribunal.

WITNESS REFERS TO #A125, PAGE 15, PARA 60

In the ICJ Advisory Opinion, it specifically endorsed the various ITLOS findings. At the second bullet point here, the Court endorsed the finding on States parties' obligation to protect and preserve the marine environment under Article 192 on UNCLOS, meaning they must protect it and not degrade it. "The standard in respect of protecting the marine environment from the high risk of serious and reversible harm from climate change was stringent due diligence", and "Parties… were required to take measures 'as far-reaching and effective as possible'". And that, of course, means reducing atmospheric greenhouse gas concentration.

At the fourth bullet point, we had the finding under Article 194(1) of UNCLOS, States' obligations to take all measures necessary to prevent, reduce and control pollution of the marine environment, with the ultimate aim of preventing its occurrence altogether. And you would have read a few bullet points earlier that the Tribunal found that anthropogenic greenhouse gas emissions into the atmosphere constitute marine pollution, because they met the definition of a pollution in UNCLOS because they involve the introduction, directly or

indirectly, of substances or energy into the marine environment which is likely to result in deleterious effects. You have the full formula here.

In addition, there were other obligations, as noted in the brief, including with respect to environmental impact assessment required under Article 206 of UNCLOS.

WITNESS REFERS TO #A125, PAGE 18, PARA 64

And that brings me to Human Rights Obligations, at around paragraph 64, I believe. So, the ICJ held that events such as sea level rise, and drought, desertification and natural disasters may significantly impair the enjoyment of certain human rights. And without attempting to be exhaustive, the Court addressed: the right to life; the right to health; the right to an adequate standard of living; and the right to privacy, family and home, and also observed that climate change may impair the enjoyment of the rights of women, of children, and the rights of indigenous peoples. You will also see that the Court recorded that "the preamble to the Paris Agreement provides that parties should, when taking action to address climate change, respect, promote and consider the rights of indigenous peoples, local communities, migrants, children, persons with disabilities and people in vulnerable situations as well as gender equality."

So, that is the preamble. Preambles to treaties are non-binding text that is regarded as recording the parties' intentions around the purposes of the treaty and may assist in interpreting a treaty's operative provisions.

The Intergovernmental Panel on Climate Change had found that both women and indigenous peoples may be more severely impacted by the effects of climate change, and the Court considered that "the enjoyment of human rights by such groups is at risk of being affected by the adverse effects of climate change".

And overall, the Court confirmed that climate change's adverse effects may impede effective enjoyment of human rights, and that the full enjoyment of human rights couldn't be ensured without protecting the climate system and

other parts of environment, and States were obliged by international human rights law to take the necessary mitigation and adaptation measures.

Additionally, the Court found that a human right to a clean, healthy and sustainable environment was inherent in the enjoyment of other rights. However, I note that although UN General Assembly Resolution 76/300 of 2022 recognised such a right, a number of States, including the UK, the US, New Zealand, Norway, India and Belarus rejected the existence of a customary international law right at the time of the Resolution, and another group of States were also apparently not – not fully supportive.

Let us turn, then, to penultimately the principles of international law that the ICJ discussed. So, we have covered the treaties and the customary international law. Let's come to principles of international law, which is at paragraph 23 of the brief.

WITNESS REFERS TO #A125, PAGE 8, PARA 23

So, I should be clear that in referring to principles of international law or principles of international environmental law, the Court isn't suggesting that these principles have the status of what are termed, in slightly different terminology, general principles of law, which is a third source of binding or hard law identified in the ICJ statute. So, the Court is not intending to suggest that these are binding or hard law. Rather, the Court is talking about these as principles as such, and it's understood that it is talking – that these are soft law, although occasionally you will see some writers who are prepared to accord the precautionary principle the status of customary international law.

So, at paragraph 23, the Court then identified the principles of sustainable development; common but differentiated responsibility and respective capabilities; equity; intergenerational equity; and the precautionary approach or principle. And the Court found that these principles were applicable as guiding principles for the interpretation and application of the most directly relevant international legal rules.

I will just touch on a couple. A sustainable development is a key principle here, and the Court described sustainable development as concerning the need to reconcile economic development with environmental protection.

WITNESS REFERS TO #A125, PAGE 9, PARA 25

And the other principle I will pick up on is principle of intergenerational equity, at paragraph 25, which is recognised in the UNFCCC and the Paris Agreement, and here the ICJ Advisory Opinion on climate change echoed the Court's remarks in its 1996 Advisory Opinion on nuclear weapons, where it said, "the environment is not an abstraction but represents the living space, the quality of life and the very health of human beings, including generations unborn". So, the Court went on to say that intergenerational equity was an expression of the idea that, "present generations are trustees of humanity tasked with preserving dignified living conditions and transmitting them to future generations." And it seems valuable that the Court added that "Due regard for the interests of future generations and the long-term implications of conduct are equitable considerations *that need to be taken into account* where States contemplate, decide on and implement policies and measures in fulfilment of their obligations under the relevant treaties and customary international law."

And as you will read at paragraph 27, "In my view this means arguably that a State acting in accordance with the principle of intergenerational equity might for instance go through a process involving gathering information on, and considering the impact of, its climate change related decision-making on future generations."

WITNESS REFERS TO #A125, PAGE 20, PARA 70

I will go now to the Court's response to the second question that it was asked by the General Assembly, at paragraph 70. So, we are looking here at what the Court had to say on the legal consequences arising from state conduct causing significant harm to the climate system and other parts of the environment.

Under the international law on State responsibility certain legal consequences attach to wrongful conduct. These legal consequences include the duty of cessation, i.e., to stop the wrongful conduct and start complying with international law, and the duty to provide assurances of non-repetition, and the duty to make full reparation. Reparation may take the form of restitution (restoring the situation), compensation (for financially accessible harm) or satisfaction (for example, an apology). The Court confirmed that the law on State responsibility applies in respect of States' climate obligations, including the whole range of legal consequences, so this means that a State that is in breach of its climate obligations may have to make reparation in addition with complying with the continued duty to perform these obligations.

Now, the Court emphasised that for obligations requiring fulfilment to the standard of due diligence, what might constitute a breach was a State's failure to act with the requisite due diligence in – in particular, in regulating and controlling private activity. In other words, States' wrongful conduct would constitute the failure to exercise due diligence, rather than the emission of greenhouse gases per se.

The Court gave some specific examples of possibly internationally wrongful acts, including the failure of a State to take appropriate action to protect the climate system from emissions through fossil fuel production, fossil fuel consumption, the granting of fossil fuel exploration licenses or the provision of fossil fuel subsidies. That's at the Court's paragraph 427.

For obligations of restitution or compensation to apply, the international law on State responsibility requires there to be a "sufficiently direct and certain causal nexus" between the wrongful conduct and the harm caused. But I note that the Court also said that "where the exact extent of damage caused is uncertain" only a proportion of the sum claimed might be payable, as a "global sum".

But the Court, interestingly, does seem to consider that causation might potentially be established at least in general terms, and it seems as though

there's scope for a contentious case arguing that certain State's conduct has caused increases in destructive weather, at least. Very much untested territory.

There is then the issue that it is the conduct of multiple States combined that leads to climate harm. The Court opined that the responsibility of a single State could be invoked without invoking the responsibility of all States that might be responsible. And further, the Court observed that previously, where there had been multiple causes of injury, the Court itself had held that responsibility for part of the injury should be allocated among the relevant actors.

In terms of the form that reparation might take, examples of restitution given by the Court included restoration of ecosystems and reconstruction of damaged infrastructure. Compensation might be required for damage to the environment. That might involve indemnification for impairment or loss of environmental so-called "goods and services", and maybe damage in the form of expenses incurred by States as a consequence. Some examples of satisfaction given by the Court included expressions of regret, formal apologies, public acknowledgement or statements, education of the society about climate change, or a formal judicial declaration.

Now, the Court didn't rule on the question of temporality, and that is the matter, in particular, of when the relevant legal obligations, particularly under customary international law, may have come to apply to conduct causing harm to the climate system and other parts of the environment, for example, in light of when States' knowledge of the climate problem sufficiently matured. That question was outside the scope of the Advisory Opinion.

Finally, I turn to the implications for New Zealand and for all States in terms of international legal obligations. These are set out in the written brief, but I will go through them.

WITNESS REFERS TO #A125, PAGE 21, PARA 78

New Zealand is party to all the relevant treaties addressed by the ICJ, including the United Nations Convention on the Law of the Sea. New Zealand is obliged

to comply with these treaties. New Zealand is obliged to comply with customary international law, as are all States.

- New Zealand has an obligation under the UNFCCC to adopt measures with a view to contributing to the mitigation of emissions and adapting to climate change.
- New Zealand also has additional obligations as a listed developed country under the UNFCCC to take a lead in combating climate change by limiting emissions and enhancing sinks and reservoirs.
- New Zealand has an obligation to co-operate with other parties to the UNFCCC to achieve the UNFCCC's underlying objective, the "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system", and also has obligations of cooperation under the Paris Agreement, including through financial transfers and technology transfer to developing countries.
- Under the Paris Agreement, 1.5°C is the "agreed primary temperature goal". We have that from the Court. As a party to Paris, New Zealand has an obligation to prepare, communicate and maintain successive NDCs that are also progressive.

  It has an obligation to act with due diligence in preparing, communicating and maintaining the successive and progressive NDCs that demonstrate New Zealand's highest possible ambition. According to the ICJ, that means they will need to capable of making an adequate contribution to achieving the Paris Agreement's temperature goal, and when taken together, all parties NDCs must be capable of achieving the temperature goal.

  Under the Paris Agreement, New Zealand also has the obligation to act with due diligence in pursuing domestic measures which are capable of achieving the objectives set out in the successive NDCs.
- New Zealand then has a customary international law duty to prevent significant harm to the environment by acting with due diligence and using all means at its disposal to prevent activities carried out within its jurisdiction or control from causing significant harm;

- And also a customary international law duty to cooperate with other States in good faith to prevent significant harm to the climate system and other parts of the environment, which requires sustained and continuous forms of cooperation.
- New Zealand has obligations under the Vienna Convention for the Protection of the Ozone Layer and the Montreal Protocol on Substances that Deplete the Ozone Layer, the Convention on Biological Diversity, the Desertification Convention, to ensure the protection of the climate system and other parts of the environment from emissions.
- New Zealand has obligations under UNCLOS to adopt measures to protect and preserve the marine environment.
- And finally, New Zealand has obligations under international human rights law to respect and ensure the effective enjoyment of human rights by taking necessary measures to protect the climate system and other parts of the environment.

Kia ora anō. Thank you for your attention, and I will leave that there for now and await questions.

JUDGE MILROY:

Thank you, Professor Foster. We are just going to take a microbreak now for five minutes and then we will come back for questions.

HEARING ADJOURNS: 1.41 PM

HEARING RESUMES: 1.48 PM

JUDGE MILROY:

Welcome back. We're at that point where we have questions from the Crown.

(13:48) MR PREBBLE TO PROFESSOR CAROLINE FOSTER:

Q. Tēnā koe, Professor Foster. Ko Jeremy Prebble tōku ingoa. Kei konei ahau mō te Karauna. Thank you very much, Professor, for your thorough evidence, which is very helpful, and the obviously, the Crown will be

considering that for our legal submissions in this matter. Given its legal nature, I really only have a few minor points of clarification about your brief. Just kind of the overall purpose of it: I think you agreed at the start that the evidence primarily provides an objective overview of the ICJ Advisory Opinion, rather than seeking to apply to New Zealand or to comment on whether New Zealand is in breach of any aspect of the opinion. That's fair, isn't it?

A. Yes, tēnā koe Jeremy, thank you for the question. The brief is intended to provide a primarily objective overview and I sought to make clear places where I am giving, additionally, my own view, which I hope is apparent from the way that the brief reads. In terms of the other part of the question, given the complexity of the issues, perhaps the most that one might be able to say is that certain legal issues could be in play, so the brief and my remarks may help with identifying certain legal issues, I think will be fair to say.

Q. Thank you. That makes sense, thanks very much. I had a question – moving on now to paragraph 33. And I noted that you changed your – or corrected there that 'developed countries…'. That's that particular paragraph, just at the last sentence where it refers to "The Protocol still remains in force even though there were no binding targets for the subsequent 2013-2020 period, as the parties never reached agreement on these." The Crown is giving evidence – when it gives evidence later, I think next year, from Helen Plume, who considered that there was an agreed second commitment period for the Kyoto protocol covering the years 2013 to 2020, and I understand from her that she considers that was finalised at the UN Climate Change meeting in Doha in December 2012, with Doha amendments to the Kyoto protocol establishing a second commitment period. Do you agree with that, or do you take issue with that? Is that a matter that you are familiar with?

WITNESS REFERRED TO #A125, PAGE 10, PARA 33

A. Yes – no, that's correct, Jeremy. There was a second commitment period agreed.

Q. And in terms of, therefore, your statement there, do you stand by that, or do you wish to clarify that at all?

A. Well, I think the two are consistent. A second commitment period was agreed at Doha, yes, for the years that we have here, 2013 to 2020. But what we lack is binding targets for that period.

Q. Right. And so, that's your main point in making that sentence there.

A. Yes.

Q. If I take you now to the end of your brief, or near the end, where you were talking at para 78 about the implication of the Advisory Opinion for New Zealand.

WITNESS REFERRED TO #A125, PAGE 21, PARA 78

A. Mhm.

Q. And in terms of this, I just had a couple of clarifications. At the first bullet point, you were talking about obligations to mitigate greenhouse gas emissions and adapt to climate change, which I take you accept also exist under the Paris Agreement, not just the UNFCCC. It just that you happened to be focused on that at that point. Is that fair?

A. That's correct, yes.

Q. And is the reason that you are just referring to it there simply because you are going into more detail about the Paris Agreement in your later bullet points below or is there reason to focus just on the UNFCCC there?

A. Yes, the structure, I think, you will find tends to mirror that of the dispositif at the end of the ICJ Advisory Opinion, where the Court moves successively through the UNFCCC and so forth, so it addresses the difference sources of law successively, and that's what I've done here as well.

Q. Thank you. No, that makes sense, and I had a similar question, which I assume that the answer will be the same, for the second bullet point again, where you are referring to annexure 1, parties to the UNFCCC, but obviously those parties are now developed countries under the Paris Agreement. That's a fair – the terminology is broadly consistent, but they are changing the use of language over time.

A. So, this structure, again, is built to mirror the Court's approach, and that bullet point, therefore, deals only with the UNFCCC and the relevant content from the UNFCCC, leaving the question of Paris Agreement content in terminology for the sections on Paris.

Q. Yes. And do you think that, just as a general question, the language of the UNFCCC is somewhat succeeded, now, for the Paris Agreement, in terms of these developed, you know, developed countries versus annexure 1 countries?

A. Well, we just take each treaty on its merits. They are both enforced, they both apply. And then we set about interpreting, you know, their particular terms and – and their particular obligations, following rules on interpretation.

Q. Thank you. Just a final comment, I guess I had, and I think it relates, again, just to the nature of this evidence. As I understood you to say just moment ago, that this is really a summary of that Advisory Opinion, rather than an application of it in New Zealand's domestic setting, but I think you would agree that in terms of our international obligations from particularly these international agreements, how they are applied domestically is obviously very important when considering claims in the domestic setting. Is that fair?

A. I am not sure I understand the question, sorry.

Q. By that I mean, obviously when we are dealing with the translation, if you like, of an international agreement into domestic legislation, how we pick up those domestic – those international obligations, is very important when considering what our domestic obligations are. So we don't, for example – as the government puts in place legislation, and human rights is a good example of this – when you look at the New Zealand Bill of Rights Act Act, how it translates, what might be in the ICCPR in – into that bundle of rights that applied domestically, you need to give careful consideration to what Parliament has done in translating those rights, because they are not necessarily one in the same, are they?

A. Terribly complex. I think it's fairly simple, isn't it, in that we – maybe what you are getting at is that we, in New Zealand, we have a dualist system, where the international legal system and the domestic legal system are separate spheres, and then most, you know – the concept of Parliamentary sovereignty is at the root of our constitutional system. Statute is the highest form of law in New Zealand. And at the same time, New Zealand is fully obliged by international law to comply with our

international legal obligations. So, the way that it all tends to work in practice is that Parliament will be aware, we hope, very much of those obligations and legislate accordingly. Domestic bureaucracies will be well aware of our international obligations and help ensure that our various policies are maintained consistently with them. That's how the overall system works, if that helps.

Q. No, that helps, and that answers the question. Thank you very much for your evidence, Professor.

JUDGE MILROY:

We now have questions from the panel, and I will hand over to Professor Williams.

(13:56) PROFESSOR DAVID WILLIAMS TO PROFESSOR CAROLINE FOSTER:

Q. Tēnā koe Professor Foster. Thank you for your evidence. Just for the record to acknowledge, as you have acknowledged at the beginning, that we are former colleagues at the same institution, but had not researched on this area jointly at any stage. So, what I have noticed is the reference to stringent due diligence on several occasions, and you say in paragraph 40 that the standard of due diligence will vary. So I just – so my first question relates to, what precisely does the word "stringent" add to the duty of due diligence? Because I would have thought that if you were being due diligent, you would get it done, whatever – so what does stringent mean? But the second question relates to the several references to the fact that the ICJ Opinion is quite clearly – relates to the obligations of conduct and not an obligation of result. So, we've heard evidence that – that the New Zealand Government has been quite punctilious in reporting, according to the requirements of the Paris Agreement and has set out its national determined contributions and so on, all without having any positive impact on gross emissions or net emissions. So, just to put it bluntly, does the ICJ Opinion help us in any way at all? Because it just says that the government should provide – do the right conduct but it doesn't help the climate crisis.

A. Kia ora, David. Thank you for these important questions.

Perhaps I will start with the second one, if I may; how does the Advisory Opinion advance us? And it's my thinking and that of others I've spoken with who also work in this area that part of the way that it advances us is because it does elaborate on the requirements of the Paris Agreement, that it sets out, although they are not themselves, ultimately, extremely clear to the point of obvious amenability, you know, to direct application with everybody immediately knowing what they mean, it does set out some further understanding of what those requirements around NDCs are. It gives us something further to go on terms of what may be meant by progression and highest possible ambition.

And we can expect to see that the various tests that the Court has identified will now be asserted and tested through a whole range of bureaucratic, judicial and other important processes around the world. So, I know that sounds very incremental, given the pace of the problem we are dealing with, but it is very helpful.

The Advisory Opinion is also extremely worthwhile in terms of the clarifications of customary international law. So, the clarification that customary law and prevention of environmental harm does apply to harm to the climate system is an extremely helpful step forward. The full clarification around the application of the customary international law duty of cooperation is extremely important. People I have spoken to had not necessarily expected or hoped that the Court would identify and speak to that second customary international law obligation as it has done. So I hope that is something of an answer to the first question.

Turning then, if I could, to the matter of due diligence, what due diligence means, what stringent due diligence may mean, and also – also at the end, I would like to come to the idea of just getting it done.

So, due diligence as a standard of conduct attaching to preventive obligations has emerged in maybe the last 10, perhaps 15 years in international cases. And with it – or perhaps it has piggy-backed on this distinction between obligations of result and obligations of conduct, which is familiar to lawyers from various civil law traditions, but I would say not particularly familiar to those of us who are trained in the common law. It

seems to be second nature to them. So, the two have emerged together. Now the concept of due diligence has been explained and articulated in successive decisions by both the ICJ and tribunals operating under the UN Convention on the Law of the Sea, including the ITLOS, but also arbitral tribunals which is another key dispute settlement mechanism under the Law of the Sea Convention. And the – many of the phrases that I've given you from the ICJ Advisory Opinion are actually drawn from that prior jurisprudence that comes from both of those sources over the last 10 or 15 years in environmental cases, and sometimes they are applying, perhaps, a customary international law of prevention obligation but sometimes they are actually applying a treaty provision, perhaps from UNCLOS or a bilateral environmental treaty, and they are saying this provision is an obligation of conduct. The parties are not obliged to achieve the result, but they are obliged to carry out their very best efforts. In the different formulas, the main formulas that we see in respect of due diligence are employ all means reasonably available to them to prevent harm as far as possible, use all the means at their disposal to avoid activities, et cetera, put in place a national system, and the rest of the formula about the national system, including monitoring and vigilance and so forth. So, that's all, if you like, prior jurisprudence which is being brought through in this setting which normally attaches to the concept of due diligence in the customary international law obligation to prevent harm to the environment. Usually, the environmental area is beyond national jurisdiction and the environment of other States.

And that matches the formula that we find in the dispositif, the paragraph 457(3b)(a) at the end of this Advisory Opinion. The Court uses the phrase uses the all means at their disposable to encapsulate the concept of due diligence, and the Court will have thought one aspect carefully about which formulation describing due diligence they actually put in there – dispositif, where they dispose of the questions before them formally in the end in paragraph 457, and they have said, 'use all the means at their disposal' there.

Turning to stringent due diligence, this is a new phrase. Stringency is a new phrase that has come to be applied, firstly in the ITLOS

Advisory Opinion and then adopted by the ICJ in this Advisory Opinion. In this Advisory Opinion – I mean, this is obviously an elevated standard of due diligence, which obviously is supposed to put some accent on the due diligence that's required and also to indicate that due diligence sits on a sliding scale and in this case, it's serious, a serious situation and its stringency that's needed. But what does stringency mean? We read here from the ICJ that it talks about States doing their utmost, but I do note that the phrase "do their utmost" has actually already previously been used in prior jurisprudence case law in relation just to due diligence in general. So, it was used, I think, by the ITLOS in the Advisory Opinion of the Seabed Disputes Chamber on the responsibilities of States sponsoring deep seabed mining a few years back, so the phrase "do their utmost" has previously been associated already with due diligence in general. That means that we aren't left with a great deal to go on in terms of what stringent due diligence would require that due diligence does not already require. It certainly puts an accent on the situation.

You are correct that due diligence varies according to the circumstances, including the level of scientific knowledge, the risk of harm, the urgency. That's at paragraph 246 to 254, and there is also a discussion of seven or eight elements of due diligence at paragraph 280.

Just finally, there may be a distinction to be made between what due diligence demands and getting it done. So a State could comply with a preventive obligation, it could exercise all due diligence, and the situation might turn out for the worst. So a State could, for example, comply with all due diligence, with obligations to prevent genocide and geocide could still take place, and that would also be the situation here in relation to prevention of harm to the climate system. That doesn't mean that everything a State does is actually complying with a due diligence obligation, but it does mean that one can exercise due diligence and still not get it done.

Q. All right. Well, thank you for the answers. I'm mindful that lawyers might have thought that good faith would be good enough, but sometimes we lawyers talk about utmost good faith. So, maybe this is a version of that.

We will have to see how the years roll by and see whether it works. So, thank you very much.

JUDGE MILROY:

Matua Kevin, do you have any questions for Professor Foster?

QUESTIONS FROM KEVIN PRIME – NIL

(14:07) JUDGE MILROY TO PROFESSOR CAROLINE FOSTER:

Q. Professor Foster, I was tempted to ask you about causal nexus because it is a matter that troubles the Tribunal in another inquiry, but from what your evidence, is the issue of causal nexus is still to be fully fleshed out or determined by a further series of – well, possibly a further series of cases. Is that how I am understanding your evidence; is that correct?

A. Yes. Yes, thank you for the question. I think it is worth underlining that what the Court had to say here about causal nexus was quite a considerable advancement in understanding about the possibility that causation could perhaps be established in contentious proceedings around harm for climate change. So many had probably thought that that would be an insuperable challenge. But the Court does appear to indicate that we attribute changes in the climate to – scientifically, to emissions, and we can further calculate scientifically how much of the atmospheric greenhouse gas concentration is attributable to the conduct in different States, and those two things together, at least, provide something of a starting point for potentially establishing causation. So the Court travelled quite a long way down that road.

Q. Thank you for that. And my second question and last question is about the issue of – well, in undertaking efforts to deal with climate change and reduce carbon emissions, that there's also got to be consideration about reducing harm to others and in particular, in my mind, is a photograph I just saw from National Geographic's, 50 best photographs of the year, of a Sámi indigenous person engaging in their traditional way of life, which included hunting – well, looking after reindeer, and at this point it was culling a reindeer for the betterment of the herd. And the question for

them, of course, was that their range of their traditional lands covers a number of different countries but is also possibly containing the rare earths and so on that are used in the kinds of technologies that we're using to reduce our carbon emissions. I didn't really see in your evidence a reference to the right to maintain their way of living, their cultural values, and I am just wondering if that was something that was in or wasn't – if I am reading that wrong, I suppose.

A. Yes, thank you. And I've portrayed really what was in the ICJ Advisory Opinion, but the right to enjoy ones culture has come up in other fora, so I know that it's come up in the *Daniel Billy* case before the Human Rights Committee, for instance, with the Torres Strait Islanders claims there about the effects of flooding on their ways of life, their ceremonies, their graveyard areas, and also the way that would gather food from traditional sources. So, it has come up in other fora, and the UN Human Rights Committee has found it specifically a violation of the right to enjoy culture and right to be free from arbitrary interference with private life, family and home. As I understand, this is sort of what I gleaned. I haven't gone back and actually read that decisions but – at least not recently – but it is there, it has come up in other fora, and Australia was called upon in that case to take further timely and appropriate measures, and also to provide some compensation for harm suffered, to engage – again, as I understand it – to engage in consultations with the communities to address their needs, and so forth. So, the *Daniel Billy* case is certainly, you know, an important one.

Q. All right. Well, thank you very much for your evidence, Professor Foster. Those are all my questions, and I will hand you back to your counsel, in case there any questions by way of re-examination.

MR SHARP:

Thank you, your Honour.

(14:13) MR SHARP TO PROFESSOR CAROLINE FOSTER:

Q. Professor, just – just following on from questions from Judge Milroy, I just want to refer you to the Paris Agreement itself. Within the preamble, if I

can just bring that up, within the preamble on the second page, it states that part of the agreement is that the parties, "when taking action to address climate change, respect, promote and consider their respective obligations on human rights, the right to health", and the rights of indigenous people, and some other groups.

So, within the context of New Zealand's international obligations arising under the Paris Agreement, that would be one of them, would that be the case?

A. I think I found it in preamble paragraph 11, maybe.

Q. In the preamble, in the start of the Paris Agreement.

A. Yes.

Q. On the second page.

A. Yes. "Acknowledging that climate change is a common concern of humankind…" I think it's on the front page of my copy.

Q. Yes.

A. "Parties should, when taking action to address climate change, respect, promote and consider their respective obligations on human rights, the right to health, the rights of indigenous peoples, local communities, migrants, children…" – not to omit the importance of remainder of the paragraph. I think that's the paragraph I refer to earlier, yes, and it is in the preamble to the Paris Agreement.

So, it is telling us, at least in part, the intended – what – what the parties had in mind when they concluded the Paris Agreement. So, it's conditioning the text that follows, if you like, and that is useful information in general, isn't it?

Q. Yes, but I guess the specific question is, is that part of New Zealand's obligation under international law relating to the Paris Agreement?

A. So, strictly speaking, not, but I don't think that detracts from your point, which is that it is drawing attention to certain existing obligations under international law and other human rights instruments. So, for instance, when it refers to right to health, there are binding obligations on the right to health. When it refers to the rights of children, there are binding obligations on the rights of children. So, do you see what I mean? It's calling attention to those obligations, many of which are binding.

Q. Thank you. And also, if we go to Article 7(5). So, this relates to parties' knowledge and adaptation action and has certain relevant considerations they have to take into account, "and should be based on and guided by the best available science and, as appropriate, traditional knowledge, knowledge of indigenous peoples and local knowledge systems…". So would that be – as it is a specific obligation under the Paris Agreement, that would be part of New Zealand's international obligations? I'm just asking whether that is the case.

A. Yes, so let's have a look at it. It says, "the parties acknowledge…", so what this paragraph is doing is acknowledging, and it is acknowledging the adaptation action should do the following. So it is an acknowledgement. It doesn't say, you know, the parties shall ensure, it says parties acknowledge that it should and then it says, "and should be based and guided by the best available science and, as appropriate" – I guess that depends on the country and the situation – "traditional knowledge, knowledge of indigenous peoples", et cetera, and then it gives the purpose of all of that, which is with a view to integrating adaptation into the relevant plans, again, where appropriate. So yes, it is a Treaty provision, but when we read the actual terms of it, it is essentially an acknowledgement of what should be done as appropriate.

Q. Right. So, it is an obligation within a wider context with those certain rights –

A. Well, it doesn't read in terms of, you know, "parties shall" which is the normal terminology when the parties are committing themselves legally in the sense that I think you are meaning, but it is an important provision which sets down an acknowledgement on the part of the parties of what they consider should be done.

Q. Thank you, Professor. Those are all the questions I had, your Honour. So – just leaves me to say thank you, Professor, for your extremely valuable evidence for this Tribunal.

PROFESSOR CAROLINE FOSTER:

You're welcome.

JUDGE MILROY:

Yes, thank you again, Professor Foster, and for gifting us your time this afternoon. We will take a microbreak and then we will begin the evidence from Professor Ng and Jonathan Tonkin.

HEARING ADJOURNS: 2.18 PM

HEARING RESUMES: 2.24 PM

JUDGE MILROY:

Kia ora anō. So, welcome back. We are now about to hear the evidence from Professor Ng and Jonathan Tonkin, and I believe, Mr Vincent, you will be introducing our witnesses.

(13:24) MR SAM VINCENT: (OPENS)

Tēnā koutou, ngā mema o Te Rōpū Whakamana i Te Tiriti o Waitangi. Professor Macinnis-Ng and Dr Tonkin are ecologists with a special interests in the relationship between biodiversity and climate change. Professor Macinnis-Ng's speciality is in plants and forests and in terrestrial ecology. Dr Tonkin's speciality is in freshwater ecology and rivers.

Professor Macinnis-Ng is engaged on behalf of Wai 3281, the claim by Collen Skerrett-White, in addressing – which addresses climate change issues in the rohe of Ngāti Pikiao and which focuses on issues arising from the over-reliance on pine forestry in that rohe, this being, in large part, a consequence of the Crown's climate change policies. Our written opening submissions addressing Professor Macinnis-Ng's evidence are document number #3.3.029, and her affidavit is document number #A069.

Dr Tonkin is engaged on behalf of Wai 3382, the claim filed on behalf of two hapū of Ngāruahine who suffered a significant fish mortality event in their awa, the Waingongoro in South Taranaki in early 2024. Our written opening submissions addressing Dr Tonkin's evidence are document number #3.3.016(a), and his affidavit is document number #A103.

While each of these witnesses has engaged with issues specific to the respective claims, they are also both here to give expert ecological evidence about the impacts of climate change in Aotearoa and how we can address those impacts.

Their combined PowerPoint presentation is document number #A069(c). Professor Macinnis-Ng has prepared to give reply evidence to the Crown today, and that reply evidence is reflected in the final slides of the PowerPoint presentation you will see today. That updated version of the PowerPoint with the reply evidence now included is document number #A069(c), and the version before the addition of the reply evidence is #A069(b). Unless there are any questions for me, I will invite our witnesses to begin.

JUDGE MILROY:

No questions, thank you, Mr Vincent.

MR VINCENT:

Thank you, your Honour.

MR VINCENT CALLS

PROFESSOR CATRIONA MEREDITH OLWEN MACINNIS-NG (AFFIRMED)
ASSOCIATE PROFESSOR JONATHAN DOUGLAS TONKIN (AFFIRMED)

Q. So, I understand you are both here with us. So, Professor Macinnis-Ng and Dr Tonkin, can you both please confirm your full names for the Tribunal.

A. [Professor Cate Macinnis] Yes. My full legal name is Catriona Meredith Olwen Ng, but I am known professionally as Cate Macinnis-Ng.

[Assoc. Professor Jonathan Tonkin] My name is Jonathan Douglas Tonkin.

Q. All right. Professor Macinnis-Ng, do you confirm that the contents of your affidavit remain true and correct to the best of your knowledge and belief?

A. [Professor Macinnis-Ng] Yes, I do.

Q. All right, and Dr Tonkin, do you also confirm that the contents of your affidavit remain true and correct to the best of your knowledge and belief?

A. [Assoc. Professor Jonathan Tonkin] I do.

Q. Thank you.

MR VINCENT ADDRESSES JUDGE MILROY – LEAVE FOR AFFIDAVITS TO BE TAKEN AS READ (14:28:06)

JUDGE MILROY ADDRESSES MR VINCENT – LEAVE GRANTED (14:28:12)

MR VINCENT:

Thank you. All right, well then, Professor Macinnis-Ng and Dr Tonkin, over to you.

(14:28) PROFESSOR CATRIONA MACINNIS-NG: (#A069(c))

Tēnā koutou, ngā mema o Te Rōpū Whakamana i te Tiriti o Waitangi. Ko Cate Macinnis-Ng tōku ingoa. He Ahorangi ahau i Waipapa Taumata Rau, the University of Auckland. He tangata Tiriti ahau. E noho ana ahau i Tāmaki Makaurau. Nō reira, ki ngā mana whenua o Tāmaki Makaurau, Tāmaki herenga waka, tēnā koutou. Ki a Ngāti Pikiao, tēnā koutou, tēnā koutou katoa.

I would also like to acknowledge elders past, present and emerging of the Gayamaygal clan of the Eora nation as the traditional custodians of the unceded lands now known as Sydney, where I grew up and lived until moving to Aotearoa 15 years ago.

In addition to being professor at the School of Biological Sciences at Waipapa Taumata Rau, the University of Auckland, I would like to mention some contributions that are relevant to the evidence I am giving. I am a lead author for the Inter-Governmental panel on climate change for assessment round 7 which begins in Paris next week. In 2023, I was senior science advisor for the

Ministry for Environment *Our Atmosphere and Climate* report, and was a past president for Te Ara Toro, the New Zealand Ecological Society.

My research specialty is plant ecophysiology and the impacts of climate change on biodiversity. In 2015 I was award a Rutherford Discovery Fellowship to study the effects of drought on native forests. I hold a Bachelor of Science in Environmental Biology, and I have First Class Honours and a PhD in Plant Science.

I confirm that I have read the code of conduct for expert witnesses in Schedule 4 of the High Court Rules of 2016, and I restate my agreement to comply with this code. I am grateful for the opportunity to present today. I will hand over now to my colleague, Associate Professor Tonkin, but just before I do I want to mention the first slide has his title incorrect. He was recently promoted to professor, and in my excitement, I've put it on there as "Professor", but in fact it's not official until later next month, so that is my mistake. Over to you, Jono.

(14:30) ASSOCIATE PROFESSOR JONATHAN TONKIN: (#A069(c))

Tēnā koutou, ngā mema o Te Rōpū Whakamana i te Tiriti o Waitangi. E te mana whenua o tēnei rohe, Ngāi Tuahuriri, tēnā koutou. Ko wai au? Nō Ingarangi ōku tupuna, engari i tupu ake au ki Whanganui. Ināianei, e noho ana ahau ki Ōtautahi. He tangata Tiriti ahau. Ko Jonathan Tonkin taku ingoa. He Ahorangi Tuarua ahau i te Whare Wananga o Waitaha. Nō reira, tēnā koutou, tēnā koutou, tēnā rā tātou katoa.

So, I am an associate professor of Ecology and a Rutherford Discovery fellow in the School of Biological Sciences at the University of Canterbury. My research focuses on tackling global challenges at the nexus of biodiversity and climate change, with an emphasis on forecasting and understanding drivers of ecological change in rivers. I'm particularly motivated to understand the connection between changing river flow regimes – so, the sequences of floods and droughts – and freshwater biodiversity.

I confirm that I have read the code of conduct for expert witnesses in Schedule 4 of the High Court Rules 2016, and I restate my agreement to comply with this code. Thank you.

TECHNOLOGY – SETTING UP POWERPOINT PRESENTATION ON SCREEN (14:31:38 – 14:32:25)

PROFESSOR CATE MACINNIS-NG: (CONTINUES #A069(c))

So, what we would like to do in the presentation today is to, first of all, start by giving you a bit of background to the impacts of climate change on biodiversity. So, we are going to start with some general concepts that apply to sort of the global situation and then we will give you lots of examples of what's happening here in Aotearoa. So, that first section is a lot about, you know, "What are the concepts in the background materials?", and then we will move on to some specific details about some particular issues we're being asked to comment on. After that, we will move on to thinking about what the future might look like and how that could be better, and then finally I have some slides on my own responses to some of the Crown evidence.

So, when we're looking at the impacts of climate change on biodiversity there is a whole different range of climate components that can influence what's happening. So, I understand that you have heard from Professor Tim Naish in terms of the real scope of all the different kinds of climate change components that – that are going on. There's lots of different types of changes that are happening, and all of these different processes can be then affecting our biodiversity. So, those different climate components are listed at the top of this slide, and then underneath that we have all of the biodiversity components, and those are shown in blue, and they range from organisms through to populations, species, communities, ecosystems and biomes. Now, we could spend all day going through this slide in detail in terms of what sits at the very bottom of those slides, all those different kinds of impacts can be find, but what I want to emphasise here is the fact is there's all sorts of different things that can be happening to biodiversity, to living things that can exist, you know, within the subcellular layer, for individuals, for interactions between different populations.

There's all sorts of different processes and places in which those impacts can occur.

And capturing and understanding the full range of this is in fact a very tricky thing to do, and it's a problem that exists globally, but it's more problematic when we're not sort of trying to look really hard. So, how can we go about kind of understanding or what might we expect to see in the field? So this is a slide from a paper from 2011 which is just thinking about the – the different kinds of impacts that will expect populations and species to experience.

So, on the very right, we have extinction, and that's what we're often focused on trying to avoid. When extinction happens, then species no longer exist, and obviously that is a bad thing. But there are a whole lot of other things that can happen moving into extinction that happen before that occurs that are also problematic for how biodiversity operates. So, to go through those, first of all, on the left here is toleration, and this is where an individual, an organism is able to remain in that place, but it is in a stressed situation. So, often for plants, for instance, we might see that they are looking quite stunted, or animals might be in a poor condition. So, the toleration is – is having an effect, but they are able to remain in that place.

The next option is habitat shift, and this is where the organism remains in the same kind of geographic location, but it might be having to exist in only particular parts of that. So, for instance, plants might need to exist close to water bodies so that they can get enough water, or animals might need to be close to certain food supplies or other resources.

The next scenario is migration, and this is where the range of the organism changes. So, an example of this that's commonly used is in the northern hemisphere, we are seeing forests advancing northward as it gets warmer moving towards the pole. So, we're seeing the forests moving into spaces that they didn't exist before, because of those warmer conditions. But if none of that works out for the population or the species, then this is when extinction occurs and this often happens when, say for instance, there's not a large land mass,

so not all organisms have the option to move towards the pole, because they are living on kind of confined – in confined spaces. Or maybe there are just really extreme events that occur that lead to a lot of death. So, you can already see there's a lot of complexity that's coming in here.

The next thing I want to talk about is how we actually measure all of this. So, we can take information that's happening real time and look at what's going on, and this is really the observational-type stuff, and I think we often kind of associate climate change impacts with observations. They're easy to understand and reasonably easy to interpret. So, a good example of observations is in the UK. There's a decades long data set of butterfly observation from amateur entomologists who have just been observing butterflies in their gardens, and that data set was collated and they realised that, in fact, certain species were advancing further northward, and they could associate that with a climate change shift. So, that's a real serendipitous or sort of lucky opportunity, that the data set existed and somebody put it all together and saw the patterns. Direct observations are more difficult to kind of put together, because we actually need to be making those observations to see what's going on.

So, other examples of things that we can use are the paleo-ecological records and this is really just the fossil record that can tell us what happened in sort of climates in the past. So, climate change is not something new to now, but what is new is the rate at which the climate is changing. So, in the past, climate change – processes were recently slow, and then we could see changes in populations of biodiversity, and we've had past extinction events associated with that. So, studying the fossil record is helpful to kind of understand what might be going on, but the difference now is two things. First of all that the rate of change is much faster now, and the other thing is that we have multiple additional stressors, things like habitat loss and invasive species impacts that weren't happening in the past, in the fossil records.

So, the fossil records have limited application when kind of thinking about what future climates might look like, which is not to dismiss them all together, but just

to be aware of those limitations. Then, the third item I've got up the top here in this orange box here is the climate envelope models, and these are all about looking at the climate conditions in which a particular species exists in and how that might then change.

So, we can look at, for instance, what are its temperatures, what's its comfort zone for temperature and then as that changes, you know, that population might have to shift into different places. So, we can look at the current, kind of, envelope of where a species exists and then compare that to, kind of, future climate projections to think about how that species' range might change, as an example of that. There's different ways you can apply these models, but they kind of have limitations, because many species don't kind of cover the whole area that they could or there might be other reasons why they're kept out – for instance, predators or invasive species, all kinds of things. So, again, the climate envelope models have some limitations.

Now, down the bottom here are some examples of mechanistic processes or measurements, and the mechanistic ones are all about understanding, why is it happening? What's going on? And the mechanistic ones are really helpful for helping us predict future scenarios, how the future scenarios will impact biodiversity. So, the first example here is a – sorry **(inaudible 14:39:51)** – ecophysiological models and this is kind of thing that I use in my research, and these are process-based models that are closely associated, they are closely simulate what a system will be doing in terms of things like fluxes of carbon in water or – or how the species might interact with each other. And we can create these really good mathematical models. It's a whole lot of, I guess, mathematical equations that are put together, but they simulate what's happening behind the scenes so that we can then confidently run scenarios of future climates to understand what might happen in the future.

The next example here is experimental manipulations, and these could be things like glasshouse experiments, where we, for instance, expose plants or insects or other organisms to, say, warmer temperatures or drought conditions.

So, we're actually exposing the plants to things, or the other organisms, to see what's going on.

And then the final one here is the population models, and these are all about understanding how different groups of organisms might interact with each other. There has actually been some more recent research that's looked a lot more into the ecological interactions, things like food webs and pollination and all sorts of processes that are not covered in this slide. But the main point I want to make here is that there's lots of things that we can measure in terms of thinking about what's happening now and what might happen in the future, and it is pretty complicated and specialised stuff.

So, if we then move now to thinking about bringing it to the local context in Aotearoa. This figure from 2013, from the Ministry for Environment shows the complexity of the different types of climate change in place we expect across the motu. And, as I mentioned, I imagine Professor Naish has gone into this in somewhat detail so I am not going to do that so much here, but why I did want to put this up was to show the fact that we've got lots of different things happening in different parts of the motu. So, for instance, for rainfall, the wetter parts become wetter, the dryer parts become dryer. And then we overlay that with what's going on in terms of the different ecosystems. We have very complex, kind of spatial distributions of the different kinds of ecosystems. It starts to get really tricky to think about, you know, what ecosystems and where they are and what the vulnerabilities might be across different areas.

So, the kind of finding out what's going on is – is actually a really big challenge. But that said, we do actually know a number of examples of direct impacts of climate change on species in Aotearoa. So, the examples of these that I've got here are really kind of straightforward because they're – we've measured them, we know they are happening, and they are quite obvious.

So, the first one I've got here is mast seeding events and this happens in beech forests and tussock grasslands. So, for many plants, they will produce a consistent amount of reproductive material each year. So, this is like flowers,

seeds, cones, all of those sorts of things. But a number of species across the world will have mast events, and this is where there is particular years where there is a big increase in the reproductive output. And around the world this is found to be strongly associated with climate signal, particularly differences between temperature between years. And so, here in Aotearoa, beech forests and tussock grasslands are two systems that have that mast seeding event. Now, it's a direct impact, because it is the changing climate that's changing that, and we are seeing globally under future climates, and it's even happening now, these mast events are happening more frequently.

Now, another example of a direct impact, and I think you might have heard about this from someone else as well, is the tuatara sex ratio. So, tuatara obviously being iconic reptilian species, their eggs are highly sensitive to temperature, and when the eggs are warmer, there will be a larger proportion of males and because the tuatara populations are all quite isolated – they are often on offshore islands to protect them from invasive species – these small populations are really vulnerable to any kind of changes in sex ratio, because as you can imagine, if there's not enough females in the population, then the population size can quickly start to go down.

So, this has been modelled really carefully. We know it's going to happen but to my knowledge it's not yet actually been detected as happening as yet. So, it's something that we know about, that will happen in the future but not yet happening. So, these are two examples, one that we know is happening and one we know will happen, so those are both direct and recently straightforward to explain.

We can also see things that are undocumented, and so these are some photographs of my own from early 2020, just around, you know, examples of plants that were responding to the dry conditions. So, up in the top right corner here I have the plot of the New Zealand Drought Indicator, and that dark brown, the peak in 2020, that is – the dark brown is kind of the extreme drought. And so, you can imagine – remembering this time was when we were all in lockdown – as a drought researcher, to not be able to get my instruments and take

measurements when seeing all these plants in this condition was a very tricky thing to do, but I did manage to get some photographs, and it's something that we really need to follow up on.

So, lots of different plant species showed sensitivity to these drought conditions but we don't know what that means for the populations ongoing, you know, whether the plants actually died or whether they were – like large mortality events – probably not, but what does it mean for those plants longer term? We don't yet know. So, there's something that we're kind of aware of that's not yet fully documented.

Okay, so we could talk about the issues that are indirect or interactive or synergistic, and so these are things that might have through an intermediate in the case of indirect impacts, or perhaps they could be – they're climate change effects that depend on the effect of another factor, or they might be examples, in the case of synergistic, where the combined outcome is greater than the sum of the separate effects. And so, we think that a lot of the impacts here in Aotearoa are not in fact simple and direct. Many of them are much more complicated, indirect, interactive and synergistic type factors. The difference between those three is not so important here, but what I want to do is give you some examples of these more complicated type impacts, so you can get an idea for those.

So, I mentioned earlier the mast seeding events and you may also be aware that mast seeding events also –

TECHNOLOGY – POWERPOINT PRESENTATION ISSUE (14:46:34 – 14:46:40)

PROFESSOR CATE MACINNIS-NG: (CONTINUES #A069(c))

Mast seeding events, when we get that explosion of seed material, that provides a food source for rats and other invasive species. So, rats reproduce really quickly, their populations explode when they suddenly have this great source of food, and then when that food runs out they switch to birds, invertebrates,

and those other species suddenly become targets of the rats. And so this is why we see money being – especially money going into the management programmes when there is a mast event happening in the beech forests. And we know, actually, that yes, this coming year is predicted to be one of the worst that there's ever been. So, it's really important that those invasive species are controlled when these events happen, and they are happening more frequently because of climate change. So, you can see that there's kind of multiple factors coming together. It's the climate change and the invasive species together that are creating the threat to the biodiversity.

Another example of this is alpine squeeze, and this is where we have reduced refugia for alpine birds occurring because of the invasive mammals being able to get higher – into higher elevations. So, in the past, rats and stouts in particular have had their distribution up mountains sort of limited by the fact that it gets too cold when you get up too high. So, the birds have got somewhere to hide in the cold areas, **(inaudible 14:48:05)** the rats and stouts. But with warming temperatures, the rats and stouts are able to go up to the higher elevations and so the refugia, the places where the birds can hide, have been shrunken, and this is known as alpine squeeze. So, again, it is the invasive species together with the climate change that are causing the impact.

Some more examples here. So, vegetation fire feedbacks favour introduced weeds. To explain that a little bit more, the plants that have evolved in Australia and say parts of the US, the really fire-prone parts of the world, they all have adaptations that allow them to recover and regenerate after fire conditions. So, for instance, they have really hard protective seed-cases that then open up, they are stimulated to open under the warming conditions of fire and that releases the seed right after the fire event so then the seed gets into the soil, which is rich in potash, so that the fire feeds a lot of the nutrients back into the soil, and then those plants can start growing really quickly. They germinate. And so it's the release of the seeds and the germination that is stimulated by the fire.

Another example of a fire adaption is the resprouting from epicormic buds below the stem of the tree. So, for instance, if you see a eucalypt forest, it is very flammable, but the plants are actually just really great at just resprouting themselves. So, the trees don't die, what they do is they kind of lose all of their outside leaves, and then they have this resprouting occurring. They kind of look like a – a bottle cleaner or something, they've sort of got brush – brush all over them, leaves, green coming out from all over them. You know, just within weeks of fire, they are able to recover pretty quickly. So, those are great for recovering from fire, but those kinds of adaptations are almost non-existent in the New Zealand flora. Very few species are able to deal with fire, because fire is just not been part of the landscape here. So, when a fire occurs, those invasive species that have those invasive species that have those adaptations are favoured and they come in straight away and start growing.

So, a couple of years after I moved here we were at the Abel Tasman National Park, and I was really confused because the vegetation was really similar to the coastal heath found in Sydney, particularly, there was a whole lot of hakea around, and I was puzzled that – I didn't realise that hakea was here in Aotearoa, but then found out later that there had been a recent fire and so hakea is a fire-loving species, it's an invasive species, and it was just going berserk in the Abel Tasman National Park. And that kind of thing is going to continue to happen throughout Aotearoa.

Another example here is the mudfish, and these photographs sort of help explain that. So, mudfish in Westport forests, they are losing their habitat because of logging of the forest and also because of increased drought. So, what happens is when the large old-growth trees tip over, it makes these tip-up pools. So, the pools are not there all the time, they are just kind of formed – first of all, the tree needs to fall over and then there needs to be a rain event and then the pool forms and then the mudfish can come in and reproduce. I don't actually fully understand this. Pretty amazing story. But what is happening now is that without the large trees falling over to make these pools and without the rain to full up the pools, the mudfish are not able to reproduce, because they need the water to be able to exist. So, when there are no pools

around, they are buried into the mud, and then they can come out when the pools exists, but as you can imagine, with fewer pools around, it's having an effect on the population.

The last example I would like to give here is kind of this phenological overlap. So, this is another really complicated one that was actually only sort of discovered serendipitously. So, Julie Deslippe at Victoria University in Wellington is doing some research in a global experiment to look at warming in alpine areas. So, she's got this experiment where she's warming the system in the alpine zone, and what they have found is that there was a shift in the kind of flowering time of the invasive plants and the native plants, to mean that there was a more of an overlap between the two. So, the invasive and native plants are flowering together, and this increases the competition for pollinators in – in the alpine zone. Then what this means is that not as many of the flowers are pollinated, and so then the future generation will potentially be stunted. Now, for large common species that's not such an issue, but there's lots of really rare and threatened plants in the alpine zone, and so if those aren't getting properly pollinated, then we are not getting the next generation produced properly, and it's a potentially really big threat to the system. So, you can see that these are like, super complicated to think about.

So, in my written affidavit – this is the Table 1 from that. I've provided a number of other examples of species and ecosystems that are impacted by climate change in Aotearoa. These are ones that we know are happening and that are going on. I am not going to go into this line by line, that would take a while, but I just want to kind of highlight the fact that, you know, these are happening – it's happening across a range of different systems. There's lots of examples that we already know about.

And then the next table from my written evidence divides things up according to the climate change factor. And I think this is useful to think about because thinking about the – you know, what are the different kind of climate change processes and how do they impact differently on different types of populations is really useful.

I do want to talk briefly about rising concentration of carbon dioxide, which has been a complicated one to tease apart. So, you may have heard of the concept of greening associated with climate change, because of course, carbon dioxide is an essential part of photosynthesis, so together with sunlight, plants take up carbon dioxide, and then they can produce sugars which then allows them to grow more material, to grow flowers, you know, and to produce plots. So, this process of photosynthesis, it's super essentially for all life on Earth, we all get our energy originally from photosynthesis. So, what people originally thought decades ago was that increase in concentrations of carbon dioxide would act as a fertiliser, that they would enhance photosynthesis because more CO_2 should mean more photosynthesis, and that is true to a certain point, but what happens is that as this goes on in time, we see that other nutrients become limiting. So, nitrogen in particular, the system can only sort of be fertilised enough by the CO_2, then the nitrogen becomes – there's not enough nitrogen to kind of keep it increasing. So, that's part of it.

But the other part of the story is that rising CO2 is not only kind of influencing plant photosynthetic processes, it's also influencing all the other kind of climatic components together with all the other greenhouse gases, to cause the warming temperatures and of course the extreme events. So, extreme events are the things that are most, kind of, problematic for plants and other biodiversity. And so what happens is that any gains that we get from the carbon dioxide enrichment are in fact, then completely lost because of fires, droughts, floods, these extreme events that kind of just keep decimating ecosystems.

So, the kind of net impact of climate change on the systems, while there might be some small gains, the net impact is fact very negative in terms of productivity, in terms of longevity, and – and all sorts of things like that. So, we shouldn't be fooled by the idea that climate change might be a positive.

And even here in Aotearoa, the other one that I wanted to highlight was the heatwaves. We're really behind in thinking about heatwaves compared to the global literature. Part of the reason is because we think the climate is pretty

mild, therefore it is not a worry. But in fact, in mild climates, that's where the organisms can be more vulnerable to heat, because they are just not use to dealing with it. And in fact, kind of hilariously, here in Aotearoa we define a heatwave as 25 degrees, because that is the temperature at which cows become stressed, apparently. So, we need to do a lot more thinking around what is a heat wave mean, what is it mean in different parts of the motu. So, for instance, in the far north, they are very often dealing with temperatures above 25 degrees every summer, whereas in the south they are not. So, the kind of idea of a heatwave needs to be kind of locally defined. And so there's better methods for defining what a heatwave is.

This is another slide I could talk about forever, but let me move on.

HOUSEKEEPING – TIMETABLING (14:56:42)

PROFESSOR CATE MACINNIS-NG: (CONTINUES #A069(c))

So, this slide tries to kind of bring it all together a little bit. This is from a paper in Nature Climate Change, and the text is a little bit small, but I will run you through each of the panels of the slide. So, at the top we've got just, kind of, the long-term variability. So, climate is variable everywhere, and it's always been that way. And the next line in red is the short-term weather variability, and this is really showing the extreme events. So you can see those blips are sort of the extreme events. They might be things like a storm, or, you know, a cyclone, various things like that. So, those are sort of happening together. And then this third panel is the climate change, shown in blue. And so you can see there's gradual increases in what's going on because of the climate change. And then the next panel is putting it all together. So this black line is an amalgamation of those top three ones, and you can see that through time we've – so we've got these survivable extremes and extinction extremes, and as climate change continues we're getting in to more and more of the survivable extremes, and then eventually we are reaching into these extinction extremes.

And so, it's because of the – the combination of those different things that we see declines in populations, so the last panel is just showing what that

population size might look like. But of course, that's just sort of showing extinction. As I've said before, we also need to be thinking about the sublethal kind of things, too. So perhaps if I leave it there, does that make sense?

JUDGE MILROY:

Yes, thank you. Thank you, Professor.

HEARING ADJOURNS: 1.58 PM

HEARING RESUMES: 3.31 PM

JUDGE MILROY:

Welcome back, Professor Ng, or Professor Macinnis-Ng, I should say; apologies for getting your name not quite right at the beginning. I believe you are up to the slide which is headed "Compound events".

(15:31) PROFESSOR CATRIONA MACINNIS-NG: (CONTINUES #A069)

Yes, let me reshare my screen. Does that look right? Lovely. Thanks.

So, I've talked about all the – you know, the different components that come together, but compound events are super damaging for ecological systems, because what happens is we have two events, one after the other, with no time for the system to recover in between, and so, you know, we've felt that, as humans, as an example of this, in the Auckland Anniversary atmospheric river together with Cyclone Gabrielle, so just, you know, massive events that we just couldn't expect happening together.

So now I will pass over to Jono to continue on around that.

DR JONATHAN TONKIN:

Yes, thanks Cate. If you shift on to the next slide, please?

So, yes, and the – the likelihood of compound events is increasing with increasing climate change as well, and we can – the sort of – the key point is

that as events stack up together, the impacts of them can be much larger in magnitude, but also the recovery can take a lot longer, and we can think about compound events in four different ways.

So, first, a pre-conditioned event is where a pre-existing condition amplifies an impact, and that might be that a large rainfall event or an extreme rainfall event in isolation falls on already saturated soils, and so the impact of – the magnitude of that impact can be much more extreme.

Another one might be where multiple hazards occur together, and that might be something like a drought and a heatwave combining together, so the impact of a heatwave will be much larger under a sustained period of drought than without that drought, and that's where you might see things like wildfires start to play out.

Another one would be temporally compounding, and this is the example that Cate gave before about multiple events occurring in sequence, and that might be the same types of events, where you might expect a sequence of heatwaves occurring in synchrony – or in sequence, sorry – or floods that occur back to back, and we saw examples of that in Nelson last year, where multiple events occurred over the space of three weeks. And this can really – if you think about this as hitting vulnerable species when they're down, and if you think about examples from rivers, you might expect the recovery of a river community or a set of populations of species to recover in even as little time in New Zealand as up to three weeks or a little bit more, but during the recovery process, if another event occurs, you're hitting vulnerable stages, when they're in the recovery process, and the larger the extreme event is – so if you have a really large-magnitude extreme event, the recovery process can take a lot longer, and that's because of often the – the recovery process happens via recruitment of nearby species, of nearby colonies that are present in the surrounding catchment, and so the – if you have a really extreme magnitude event, and you have another one even in the space of the following months to a year, that can have really wide-ranging and long-lasting impacts.

And finally, you can have spatially compounding, where you have lots – or events occurring in synchrony across a large region, and it might be flooding events that occur in multiple places across a region, and if you think about that previous example about how species or biodiversity recovers from extreme events, it's often via the recruitment of species from nearby sources, and if they're occurring at really wide scales, then that process is really hampered.

So the impacts of compound extreme events are really much more extreme than extreme events in isolation, and we know that they're increasing in frequency and they will increase with increasing climate change, and that might be simply through the shift in the mean of temperature, for instance, and if that's changing in synchrony with something else like rainfall, then the extremes are happening in the tails of those distributions, and the chance of experiencing compound events is going to increase.

And just by way of example, there's – on the figure, on the photos on the right here, this is an example from New Mexico, where an extreme rainfall event followed an extreme fire event, and the consequences of that for the biodiversity of the river 50 kilometres downstream was enormous, and so it was effectively a really large wildfire event occurred, and after the event, the flood washed a whole range of organic matter into the river, and it stripped all the oxygen out of the river and led to a mass extinction event, or a mass mortality event, excuse me.

So if we go to the next slide, please, Cate?

And so shifting now to the specific examples that I'm bringing around changing freshwater biodiversity or impacts of climate change on freshwater biodiversity in particular, I thought I'd start with talking about river flow regimes in particular, and so river flow regimes are effectively the sequences of floods and droughts that a river experiences through time, and this is really a master variable for organising biodiversity and ecosystems in rivers. It really is one of the main fundamental drivers of how things are organised and how they're shaped.

And we've seen just – just in Europe alone, there's been, over the period of 1960-2010, up to – the timing of flood events have occurred up to 14 days later, 14 days earlier, depending on where you are across the Europe – across the continent, so even in small geographic regions like that, you can have really contrasting impacts of climate change playing out. And that's really important, because of the timing. So, species evolve really strong associations to these rhythms that rivers experience. It's really, like I said, it's the fundamental sort of sorting mechanism of how biodiversity is organised in rivers.

For instance, a tree that releases its seeds in synchrony with a really predictable seasonal snowmelt flood peak, and if you see the timing of that event change up to two weeks earlier or two weeks later, you can lead to a lack of recruitment on that particular year, and if those events continue to stack up year on year, you start to get to local extirpation or extinction of a species. And it might be similar things with – with fish spawning or insects spawning. They need these rhythms to – for these events to play out.

Similar to timing, we've seen magnitude of large floods change quite dramatically in a really regionally specific way across Europe as well, so in the Mediterranean part of Europe, we've seen a up to 24% decline in the peak of these large floods, and across other parts of Europe, increase in the magnitude of large flood events.

So the – river flows are changing, and they're really fundamental to biodiversity, and the same things are occurring in New Zealand, but potentially to a – potentially to a sort of a more muted extent, but the evidence is not as clear.

Next slide.

Just to make a few examples of sort of how river flow regimes – changing river flow regimes are impacting freshwater biodiversity, or how they can, I thought I'd talk about a few examples.

So the first one is altering river geomorphology and habitat conditions. In New Zealand, we're particularly enamoured with a lot of braided rivers. These are really important ecosystems across the country. We're known for a high diversity of ecosystems, and they harbour really unique biodiversity, species that are found only in these places; they're locally endemic, and the exposed gravels are used by important nesting birds and – and things like that.

And as we start to change river flows, we also start to see the geomorphology, or the structure, the physical structure of the river change. This is really important, because the structure is what makes them what they are, and with a braided river, for instance, you might have 20 different channels across the river, and each of these channels have unique characteristics. They're all in recovery at different times in response to a previous flood event. Some of them are disturbed on a really frequent basis. Some of them are very rarely disturbed. And so each of those channels harbours unique species.

And when we start to simplify a river – and this is what's happening with both changing river flow regimes but also encroachment from land use and invasive species, we start to simplify them or we start to lose these habitats. They start to become more vulnerable to climate change and various other stressors, and we can think about that like how an investor in the sharemarket, just by way of a sort of analogy, invests in a diverse portfolio of stocks and shares that actually buffers them from any shocks to the markets, and any shocks to the financial system. The same thing happens with habitats and ecosystems, and with biodiversity and ecosystems, so the more habitats a system has and the more species it has, the more resilient it is to any shocks that it might experience.

Another one is phenological mismatches. So I sort of touched on that before, and this is the idea that there's a mismatch in the timing of species with each other or the timing between species and the environment, so they've evolved really specific associations in time with each other or with the environment, and when things like river flows change in their timing, we start to see really problematic things playing out.

Another thing we know is that changing river flow regimes increase the risk of invasion of non-native species, and the impacts of non-native species on native species. And so in New Zealand, we're seeing non-native fishes like trout interact with our vulnerable galaxid fishes, for instance, in the high country, and this is – changing river flows are also playing a role in making that play out as well.

And when I talk about biophysical feedbacks, I'm talking about – this relates to the point about river morphology before, where what's happening is that not only are river flows changing, but so, too, are invasive weed plants invading into braided rivers, and what that's doing is actually they start to build up islands in the river, and so you start to get these places where weeds are establishing; the sediment is drifting around the river through the air, because they're very windy environments, often; they start to get trapped, and they – they build these islands up, and they become fortified; and every time a flood comes, rather than shifting that gravel around, what it does is it directs its impacts onto the existing channels, and so you get an increasing level of simplification of the channel structure; and the magnitude of the impacts of those floods are more centralised on the existing channels; and so through time, you get this feedback, where changing river flow regimes are facilitating the invasion of weedy species and that's facilitating the simplification of the channel network as well.

And these are really – the open, exposed gravels are really the key biodiversity parts of these systems as well.

And finally, changing river flow regimes are also interacting with other stressors associated with climate change, like increasing temperature and other stressors.

Okay, go to next slide, please, Cate.

So, unfortunately, there's not a huge amount of examples of long-term cases of evidence of biodiversity change in New Zealand's rivers and freshwaters in particular particularly attributable to climate change, but for an example, there's

a study that I was involved in a few years ago, just recently – relatively recently, that we looked at 25 years of river invertebrate data and – across 64 sites across the country, and what we've – what we found is that the communities or the assemblages of populations that occur in these rivers are becoming more similar to each other, so they're homogenising.

So on the right, what we have is a 25-year time series, and the two lines are North and South Island, so the one that you can see that's actually declining is the South Island, and on the y axis, we have what we call taxonomic beta diversity, and that's effectively variation in communities and assemblages across the South Island, so the larger the value, the more different the 20-odd river communities are to each other, and so as we go from 1991 to 2016, they become much more similar to each other, and if we think about that back to the previous point around portfolio effects, that means the similarity, the increasing similarity that there's less resilience, or there's less unique species to respond to the shocks that are on the way.

And a follow-up study to this has also found that changes in river flow and precipitation were indicated as the key environmental variables that were correlated with measures of changes in invertebrate community structure and composition.

Okay, next slide, please, Cate.

So to date, you know, the largest drivers of change of – in freshwater biodiversity have been through other global change drivers than climate change, so that's things like – particularly things like the destruction of habitat conditions, pollution, invasive species, over-exploitation, and flow modification, and these combined stressors make freshwater ecosystems among the most vulnerable to climate change, but they also mask the direct impacts of climate change itself, making detecting the role of climate change quite challenging.

And notably, we've actually seen a lot of recovery in freshwater biodiversity across the world, particularly in Europe, over the past 50 years, but that's

recovery from past impairments other than climate change, so, things like past land use change, pesticide use, point-source pollution, and so on. But those recovery events are starting to slow down. So it's – again, it's sort of a similar thing to what Cate was saying with terrestrial biodiversity. It's a really complex soup of interactions, and so understanding climate change is really challenging in these cases.

But most importantly, what we know is that these stressors amplify the impacts of climate change, and they make systems less resilient to increasing frequency of climate shocks, particularly extreme climatic events.

Okay, next slide, please.

So although climate change research has often focused on shifting average conditions, what we've already sort of pointed to is that one of the primary ways that climate change will impact ecosystems, and particularly freshwater ecosystems, is by amplifying the magnitudes and frequencies of extreme events, particularly floods and droughts in rivers.

So rivers are particularly susceptible to these changes, and so, together with colleagues around the world, I collated the evidence of – that's available in the international literature on the impacts of extreme climatic events on rivers, river biodiversity globally, and while the information is pretty patchy on the impacts, due to the challenges associated with sampling extreme events, which is often associated with not having long-term monitoring datasets in place, monitoring programmes in place, we found the impacts are really wide-ranging. They range from local-scale genetic changes and population-level responses right through to whole-ecosystem disruptions and local extinction of species.

So the key point here is that we know with some certainty that the frequency and magnitude of climate-driven extremes are changing, and they're increasing with climate change, and these impacts will only increase, particularly those associated with compound events that I raised earlier.

And the other key point I want to make around extremes is that just like climate change in general, the underlying stressors that a system's experiencing, like land use change and invasive species, those are really amplifying and exacerbating the impacts of extreme events. For example, if we think about a flood event that occurs in a landscape that's been deforested, the impacts are much more – much more extreme relative to a system that's in forest, and particularly in native forest. The flow's flashier and the recovery takes longer often because there's a lack of diversity of conditions at the regional scale for which species can respond from.

Okay, next slide, please.

So, this is another table taken from the paper that Cate mentioned, the Keegan et al. paper that – that she was the senior author on, and I just – I'm just putting this in here as an example of some of – of the things we know about climate change impacts on freshwater biodiversity in New Zealand.

Many of the impacts we know are based on known mechanisms, so, fundamental species biology in terms of how the – how species respond to temperature events and – and things like that, rather that sort of long-term observations like the study I showed earlier, but there is evidence available, and some of the examples that we can think about are sort of temperature-sensitive native fish being confined to warmer waters and excluded from cooler waters from introduced trout, so that's an – that's a sort of a – an example of an interacting stressor of an invasive species.

We're also seeing thermally restricted invertebrate species that are becoming more vulnerable because their habitat's being reduced, and they – they have limited options for migration into cooler waters.

Migration of glass eels is being – can be inhibited by water temperatures that exceed 22° Celsius.

And shifts to eutrophic states are occurring in shallow lakes, which are causing algal blooms, and these are being exacerbated under increased temperatures.

Okay, next slide, please, Cate.

And so really, beyond the uncertainty over past impacts, there's also obviously really high uncertainty over the future impacts, but how much these impacts are going to play out obviously depends on emissions trajectories, as well as, as we've both highlighted, the underlying and other stressors that are occurring at the same time.

And the key point is that in addition to the challenges associated with attributing climate change on biodiversity, we've not experienced the worst of it yet, so while there has been clear impacts, the – what's to come is going to be – is – is predicted to be a lot worse.

So to date, other stressors have been some of the key drivers of global biodiversity loss, and particularly for terrestrial landscapes globally, land use change has been sort of the key driver of that, but models are suggesting that – that climate change will be overtaking land use change as the key driver of global biodiversity loss in the next few decades.

Okay.

So just to summarise the evidence that Cate and I have already talked about so far, the direct impacts are relatively easy to measure in many cases, particularly when it comes to many of the terrestrial examples that Cate discussed, and whether that's things that have already measured and observed, like increasing frequency of mast seeding events in beech forests and tussock grasslands, or whether it's things that we clearly understand the mechanisms of but we don't yet have well-documented cases showing, such as things like changing sex ratios in tuatara.

We've both highlighted just how important indirect interactive effects can be, but also how challenging they are to – to detect and predict.

And we've also sort of talked about the extreme events and how multiple stressors combine and compound their impacts in both freshwater and terrestrial environments.

And finally, as Cate has demonstrated with tuatara, mudfish and alpine birds, small and fragmented populations are particularly vulnerable to climate change.

So climate change is having sweeping impacts, which are set to continue to rise in importance, but how these play out is impacted by a number of things related to underlying stressors and existing threats to species and ecosystems.

Okay, so what we are going to do now is pivot to talking about some of the specific details that we've been requested to talk about, so I'm going to talk first about the Waingongoro fish die-off event, and Cate will talk about climate-related risks for pine plantations and climate impacts specific to Ngāti Pikiao.

So, in January 2024, a major fish mortality event occurred in the Waingongoro River, as well as the Kaūpokonui River in Taranaki. The low and high temperature – low flow and high temperature conditions resulted in 82 recorded mortalities observed in two rivers from the mouth to approximately 1-2 kilometres upstream. Four different species were impacted: two native species, longfin eel and redfin bully, and two non-native species, brown trout and rainbow trout. These include taonga species for Ruahine iwi and likely missed many mortalities that weren't recorded and were washed out to sea, for instance.

So, I was asked to provide evidence on – my expertise on this event, including the likely connection between environmental factors present at the time and temperatures, including the high temperatures, low flows and oxygen toxicity, and the fish deaths.

So, the regional council's report indicated the causes were not fully certain, but that low river flows and elevated water temperatures were – were involved, and as well as what happened during the event, preceding the event, there were – the river experienced record maximum temperatures leading to supersaturated dissolved oxygen conditions, which are considered toxic to fish, and these conditions were exceeded over a two-week period preceding the event.

So it's clear that this was an extreme event, and parallel with this event was the fact that excessive periphyton, or the plant growth that occurs on river stones – and cyanobacteria growths were recorded during this period.

So it's clear that these conditions were a primary driver of the mortality event; that is, that an extreme event contributed to the adverse conditions experienced by the fish and the river, leading to the mortalities. But it's not possible to attribute exactly how much this event was driven by climate change per se. Obviously, the science of attributing weather events to climate change is highly uncertain, and to attribute climate change to any ecological event is even more uncertain.

In particular, however, while the extreme drought and heatwave might have been a key driver, it overlooks another critical causal mechanism, and that's the – the management of the catchment as a whole. As I've already outlined, the management – the impacts, excuse me, of extreme climatic events of this nature are amplified by underlying stressors, and it's likely in this instance that a wide range of existing stressors, like in the catchment, contributed to the – to the elevated temperatures and excessive periphyton growths.

These include things like excess nutrients from agricultural runoff; water abstractions, of which there are several throughout the catchment; and a lack of riparian buffers, and riparian cover is reported to be patchy throughout the whole catchment, and this increases the exposure of the water to – to sunlight, and therefore increased warming is experienced. So these three stressors will

amplify the direct impacts of climate change and the – of these sorts of extreme events.

So as I've already outlined, extreme events like this are projected to become more common under climate change, both in the Waingongoro River and across Aotearoa in general, and their impacts are amplified by poor land management such as intensive agricultural practices and lack of sufficient riparian corridors. Coupled with reduced flow and increased temperatures, nutrient enrichment from land use runoff can increase the chances of fish mortality due to oxygen depletion.

So, in summary, without proactive measures, events like these experienced in the Waingongoro River in 2024 will very likely occur increasingly frequently in both – in both the Waingongoro River and across the country, particularly in locations impacted by intensive land use practices.

Okay, over to you, Cate.

CATRIONA MACINNIS-NG:

Kia ora, Jono. So now moving on to pine plantations. So of course forestry is an important industry in Aotearoa, contributing the third-largest **(inaudible 15:57:43)** export value to the economy, and so the kind of use of pines as – as a solution to climate change has also come into place, because they take up carbon so quickly.

I wanted to start with this image from the New Zealand Geographic, which shows the changing forest cover prior to – I guess, since European settlement in the middle here, and then what it looks like today, so there's been massive clearing of indigenous forest when the European colonisers arrived, and then what this larger map shows quite nicely is the light green colour is where the pine plantations occur, and then the darker green is the remaining indigenous forest. So about a third of the motu is covered by forests, and 80% of that is indigenous forests, but there are some areas where there is an awful lot of pine

plantation, and in fact, this region in the central North Island is pretty concerning to me, and I'll get into the reasons for that.

So, when we look at, you know, pine plantations, of course, as I've said, the benefits are that it takes carbon up pretty quickly, but there are a lot of risks also associated with it, and this summary slide just lays them out quite clearly.

So the first is that the biodiversity supported in native forests is much higher, and pine plantations have fewer plants, invertebrates and birds in them. The wilding pine risk is much higher for pine plantations, because they're a source of seeds for spread. Pines are far more flammable than most native species, and so the fire risk is increased with pine. We see a vulnerability to wind throw that is much larger in the pine plantations. And we also see the – the threat, or the impact, of the allergies from the pollen, which is growing out of climate change. And then the final one I've got there is the issues around harvesting occurs, which is really exacerbating problems in different catchments.

So what I want to do now is to dive into a number of these. I'm not going to go into the biodiversity one. We'll just leave that as understood. That's when you've got a monoculture, it's just going to have fewer species in it.

So I'll start by talking about the wilding pines. So the – the issue here is that these escaped pines are getting into other ecosystems, and they now cover 1.8 million hectares of Aotearoa. The rate of increase is at about 5% per year, and this is despite the fact that there are control efforts in place. So without further funding or increased efforts, within 20 years, 20% of the whenua will be covered with wilding pines, and this is a real problem, because it has a number of different issues, and the list that I've provided here is in fact not complete, but I ran out of space on the slide, so I had to just stick to what I could fit in.

So there's reduced biodiversity, as I've already mentioned. Pines don't support as much biodiversity, and they can actually kind of smother out other systems.

They modify the water cycle, so, large trees, as a general rule of thumb, use a lot more water than grasses, and so when a system, as you can see in this photograph, is converted from a grassland to more of a forest-type system, a whole lot more water is used by the trees, and it's returned to the atmosphere, and it's not available to become stream flow, so we see, when pines are invading an area, the stream flow will reduce, and so the water in the rivers is depleted, and then this feeds into what Jono's been talking about as a kind of complicating factor.

We also see increased risk of fire, and I'll talk about that more in a moment, but the – pines just being more flammable mean that they're more at risk of spreading fire to large areas.

It also reduces available grazing land.

They can influence the quality of the soil by changing the soil chemistry.

And they can also have a particular impact on rare and threatened ecosystems, which are obviously often quite small areas and not widely distributed, so are easily infiltrated by the pines, which grow very quickly, which they're – you know, they're chosen because of that – that growth rate.

So what we can say is that every pine plantation is a source for spread of pines, and while there is some ongoing research to produce sterile pines, which is really promising, the existing pines in the landscape won't be solved by their sterility, so we've already got all these pines that are spreading everywhere. Any new pines coming in, that's great, but the existing problem still remains. So there needs to be some more work done in this space to address this.

The next issue I'll talk about is fire and pines. So this photograph is from the Grand Canyon Dragon Bravo fire from July this year, and it's given to me by one of my former students who was fighting on this fire. The reason I've put it in is because this system lasted for weeks, and it was so intense that it in fact created its own weather over that – where that fire was burning.

The area was much larger, and the fire was much more intense than anything we've seen to date in Aotearoa, but I don't think it's unreasonable to think that this could be happening in the future, particularly, as I mentioned, that central region of the North Island, where the pines exist.

So, the problem is that pines have evolved in fire-prone systems. They have these adaptations to fire recovery, as I was talking about before. And so being highly flammable actually helps them, because they can kind of get rid of other plants and then they can come back themselves much happier and sort of taking up all the space, as it were.

So, increased fire weather favours shifts to these introduced species, and so pines are one of the species that are part of that. Earlier, I mentioned hakea. There's a lot of species from Australia that are problematic. Eucalypts is another classic one. There's lots of species coming from different parts of the world that have fire adaptations that are an issue.

But *Pinus radiata* is really problematic, because a comparison of 13 different conifer species from that same area showed that *Pinus radiata* was highly flammable in comparison to those other kinds of species that live nearby, so of the fire-prone species, this is one of the most fire-prone, is the way I read that information.

I've mentioned before around serotiny, this idea of sort of cones being really tough and resilient to fire and then they're stimulated to open to release seeds after fire, and we also see the germination of the seeds being stimulated by the fire, so these kinds of adaptations make pine really comfortable in the fire situation. We've also seen evidence in Chile that *Pinus radiata* is heavily invasive after fire, so this could mean, so, for instance, if there's a native forest gets burnt, a nearby pine plantation is like, "Fantastic", you know, "Send all the seeds in" – obviously it doesn't happen quite like that, but there's this opportunity for pines to be taking up the space. No matter what was in that

region before the fire, if pines are nearby, they will be able to – to get in and infiltrate.

So, the kind of idea around the intervals between fire is another important concept. We see in, say, when I was studying my undergrad, we learned that in the Sydney region, fire intervals – fire return intervals of 7 years are optimum for the best biodiversity, and this is because there's many kind of short-lived plants that need that sort of change in the system to be able to come out of the soil. There's a soil seed bank that is only stimulated to grow after the fire situation. So, seven-year revisit time is very short, compared to what we see in the Australian – sorry, the New Zealand flora of sort of centuries to millennia. So there's – just wasn't this frequent revisit time.

They're – *Pinus radiata*, though, is best adapted for kind of 20- to 40-year fire intervals, so this gives them time to get comfortable, to recover, and then to kind of start again, and this is really different to sort of the centuries that the New Zealand flora has adapted to.

So, fire, a really big potential risk.

The next one's vulnerability to wind throw. Now, this is where trees kind of fall over in the forest, I guess, and this is a natural part of forest systems, and it happens when there's high winds, or it can be related to – as trees get older, they just get more vulnerable to – to falling over. But what we're seeing is that this wind throw is increasing globally, because of the higher winds and heavier rainfalls that are caused by climate change, and we're seeing not just individual trees getting thrown over, but we're seeing large-scale wind throw, where kind of large patches of forest are all kind of pushed over at the same time, particularly when we've got really intense storm kind of events, and when you have large-scale windthrow, obviously that means all the carbon from the system goes, because the trees all die, but we also have the landscape exposed to erosion, and this is particularly problematic on the steep slopes where we often see pines.

Now, taller trees are more vulnerable to windthrow. They're just – it's just kind of the physics of it, I guess, that they can sort of catch the wind better and will be thrown over more easily. But as I mentioned, kind of mixed forests, if it's – forest is a mixed age, then the kind of number of trees in the forest that have reached that vulnerable age will be less. It will be sort of patchy, kind of thing. But when we have a single-age plantation, we will see that plantation reaching a vulnerable age kind of all at the same time, and so that whole kind of stand is exposed to the large-scale windthrow.

We also see pines have this fast-growing life history strategy, so they age into that vulnerable stage much faster than this long-growing native species, and future modelling has indicated that increased concentrations of carbon dioxide will actually help pines to grow taller and thinner, and so that tallness and thinness just makes them, you know, more easily – easily tipped over, so large-scale windthrow events are going to become more frequent in these planted areas.

Now, the next one is the allergenic pollen production, and so a single pine tree can produce between half a kilo and 0.75 kilos of pollen per year, which is a lot of stuff, and when you've got heaps of trees all producing that much, it's no wonder we see these pollen clouds that are visible and that can move large distances, which could be up to a hundred kilometres. So, pollen's really small, light grains, really easily dispersed by the wind.

Now, around 20% of New Zealanders have an allergy to the protein found in pollens, so this is – has a broad impact, and I think you've heard from Professor Alex Macmillan about the health burdens associated with climate change, and this is kind of an example of how Māori might be more exposed, because we know things like respiratory illnesses can be more commonly found in Māori whānau, so it's not just the allergy itself, but then of course it's also the potential for secondary infections like bronchitis and pneumonia, and so I've experienced that in my own family and it's really impactful to be having to deal with this on an annual basis and over such – such large areas.

So in terms of the climate change component of that, international studies show that *Pinus radiata* is amongst the species that is expected to increase its pollen production under warm temperatures, and so this just spreads the – the problem further.

We also know that the pollen clouds are likely to disperse further due to the higher wind conditions in future climates, and what we really need is local research to really get a better handle on, you know, "What is going to be the influence of future climate and what are some solutions to protect people against this?".

Right, the next one is harvesting issues, and so most often, pine are harvested using clear-felling, and this is just where the whole kind of stand is taken out, so this really leaves the landscape exposed when a storm event occurs. When a healthy forest is sitting in a system, the roots are really important for binding together the soil, and also the canopy acts as like an umbrella to baffle kind of rainfall as it comes in, so a healthy forest is – is protecting that soil and keeping it well-bound, but when we remove the whole forest holus-bolus, then the erosion – kind of rate of erosion is just massively increased, and so this just means that we lose the really important topsoil, and as Jono mentioned, it ends up fouling rivers, and as we saw in Cyclone Gabrielle, the slash that's left around is in fact hugely damaging to infrastructure, so this is not just a biodiversity threat, it's also an issue for bridges and other things downstream which just get completely wiped out by all of this material coming down the river. So we know that climate change will exacerbate erosion, and it will also exacerbate slash damage.

And so, yes, there's all this fouling of waterways and the nutrient-rich topsoil is going into the – the waterway, influences that waterway as much as it does damaging what's happening on land. So we really need to be more smart about how we're going to harvest pines, if that's something we want to do.

So just coming back to, "Well, what are the benefits? Why are we doing it?", there are a couple. So I'm not going to completely gloss over them. As I've

said, the pines are faster growing, and they do take up carbon faster, and they're also – have cheaper planting costs, okay, so planting native forest is an expensive thing to do, but there are options for kind of passive regeneration type approaches, but those two things, those things aside, I think it's – you hopefully can see pretty clearly that pine plantations are not well suited for long-term carbon storage, because of their vulnerability to fire and windthrow, so even though they grow much faster, they're not really going to be storing that carbon into perpetuity, and we don't – we're not really managing these pine plantations well at all.

So let me then jump into a couple of other issues that –

JUDGE MILROY:
Sorry, Professor Macinnis-Ng.

HOUSEKEEPING – TIME MANAGEMENT (16:12:07)

HEARING ADJOURNS: 4.12 PM

HEARING RESUMES: 4.17 PM

(16:17) PROFESSOR CATRIONA MACINNIS-NG: (CONTINUES #A069)
Kia ora. So these have been outlined in my written documents. We perhaps can just provide them briefly.

The – there's potential that the pollen season might be increasing, and so that's something that we really need to look into more closely, and Ngāti Pikiao also shared with me that they're finding the bush is silent at night, so this is something that would be really difficult to tie to climate change but we'd need to do more research to understand, you know, what's going on with that, but there could definitely be a range of different factors that would be influencing what might be going on, and a starting point would be to kind of set up some monitoring to – to look at that more closely.

There are two examples of other things besides the pine plantations which are causing issues, and these are myrtle rust and the wallaby populations. I understand that there's ongoing management of myrtle rust within the rohe of Ngāti Pikiao, and it's important that that continues, and the wallaby populations are another kind of ongoing issue that also needs to be carefully managed, and this is an example of an invasive species potentially interacting with climate change impacts. The wallabies basically eat all the baby plants, and so then there are no baby plants to kind of replace the adults as they die in the system, so wallabies can quite impactful on different types of vegetation and need to be managed carefully.

So, moving then now to what we might suggest in terms of what a brighter future might look like, this should include both mitigation, which is the reduction of greenhouse gas emissions, and also adaptation, adjusting to future impacts of climate change. So, most of the suggestions that we've provided in our written submissions and also here today are associated more with the – the adaptation-type approaches. So I think when we're thinking about the pine plantations, there's actually been really promising research showing that transitioning from pines to native forest can be quite successful without too much work. So this draws on a lot of the research of Adam Forbes, which has shown across the country a lot of success with revegetation of the radiata pine system, because the pines can act as a nursery for the native forests to come up through that, so as the pine naturally age out, we just let the native plants come in. Assuming there aren't too many other invasive species, there have been examples of really successful revegetation happening that way.

That's a kind of passive approach. It's reasonably cheap. There's also other approaches which are more active, and this could be more investment going into bringing in the plants, and that all depends on the location of the system and whether there's nearby forest and birds to kind of bring in the seeds and that kind of thing.

Another really important thing would be looking at reducing slash damage, so, the way that the pines are harvested needs to be looked at really carefully.

Then, the other specific examples I would mention are ongoing management of wallabies, possums and other pests, and this includes also wasps, weeds and myrtle rust, and making sure that these approaches are done in consultation so that they are appetising and appropriate for Ngāti Pikiao and other iwi who are engaging in this kind of work.

And ongoing monitoring is really important too. So, I haven't mentioned too much the fact that research shows that there will be more invasive weeds coming in that will be able to deal with the warmer conditions, particularly from around the surrounding Pacific islands, and Australia's a huge source of invasive weeds as well, so the monitoring's important to see those new things coming up, so it's not just managing what's already here but making sure we know what's arrived and what could be – continue to be managed.

We had a range of other suggestions that were, I guess, a bit more general but really important to mention around thinking about how the kind of timeframes that we look – think about as scientists are often associated with, you know, grant funding, and you know, maybe associated with political cycles as well, but what we see – what we see Māori doing is, like, thinking, you know, the long-term strategies, thinking about future generations. That kind of thinking is so important. So empowering Māori to be part of climate change solutions cannot be emphasized too much.

There's a range of other things there, but we put those in our written submission, so I suggest that we conclude the slide show here and we're happy to take questions. Kia ora koutou.

JUDGE MILROY:

Thank you, Professor Macinnis-Ng. We have questions from the Crown.

(16:22) MS SEELEY TO PROF. CATRIONA MACINNIS-NG AND ASSOC. PROF. JONATHAN TONKIN:

Q. Thank you, your Honour. Tēnā kōrua. Ko Grace Seeley tōku ingoa. I am one of the lawyers acting for the Crown in this inquiry. I have prepared questions for you individually, just on the basis of the evidence that you have filed, so, Dr Tonkin, I thought I would start with your brief, if that is okay with you. And just checking you have got a copy of your – sorry, not your brief, your affidavit in front of you?

A. [Jonathan Tonkin] I do, yes.

Q. Great. So at paragraph 5, you – and throughout your evidence, you refer to the challenges associated with detecting the impacts of climate change on freshwater biodiversity. I just have a couple of questions there.

Flowing from that, would you agree that it is challenging to predict species' responses when conditions change, including as a consequence of climate change?

WITNESS REFERRED TO #A103, PAGE 3, PARA 5

A. Yes, absolutely it's – it's very challenging, and it's kind of one of my main areas of expertise, and it – obviously, it's a very specific question to the types of modelling that you do, and there's modelling based on long-term observation data, time series data, where you're looking at the states of populations, so things like population size, as a response to something like temperature or climate or river flow or something like that, and you project that forward in time, and as soon as you exit the historical range of variability, your uncertainty propagates, usually, so you start to see your predictions loosen quite strongly, but if you switch to a more mechanistic way of modelling, modelling based on the fundamental properties of species, like demography or fecundity in response to particular conditions, or critical thermal maxima and things like that, then you can start to look outside of the historical range of variability with more confidence, so there's the real trade-off for the types of approaches that you use, but we're certainly – we're certainly moving – we've moved a lot – a long way in the last sort of 20 or 30 years in terms of variability to model what's coming into the future.

Q. Thank you. Moving to paragraph 14, you speak there about braided rivers, and you say that braided rivers support extensive and unique biodiversity and that those rivers require natural and dynamic flow to maintain habitats for that biodiversity. To clarify, is your view that rivers need to be in an entirely natural condition to support biodiversity?

WITNESS REFERRED TO #A103, PAGE 8, PARA 14

A. No, that's – I mean, obviously that's the – that's the ideal scenario, but no, they – there's absolutely ways to manage river systems to support biodiversity, but it – it's obviously a gradient, so the more degraded they are, the less they can support, and – but there are things that we can do in sort of post hoc, after things have already been locked in place, so there's cases where we can't change the – you know, we've built cities on flood plains, for instance. We can't just move a city of 300,000 people out of the way of the river, but we can do things that embed natural variability and natural habitat conditions into an existing condition that isn't as far from natural, and that might be simply just moving the stopbanks back a little bit further aside for the river to give – have more space to move.

A river that has more room to move is also – so it's – it – there's a sort of a win-win in the sense of you create increased volume capacity to cope with large floods that are coming, so you're protecting human infrastructure, but you're also allowing the river to function more naturally and providing more space for biodiversity to inhabit.

Hopefully that answers your question.

Q. No, it does, thank you, and actually, you've taken me to my next question very nicely, where you say at paragraph 21 – you go to the importance there of giving rivers room to move, and you note that we have a number of cities on flood plains in New Zealand, and I was wondering if you were aware of any modelling on the impacts of the shift you propose in terms of the slight widening or the – some degree of widening of rivers on population centres in New Zealand.

WITNESS REFERRED TO #A103, PAGE 12, PARA 21

A. Yes, that's really kind of outside of my area of expertise in terms of the population-, the human-population-level consequences of that, but I know

that there are cases where it's already playing out, so the Hutt River in particular is a place where they're already buying back land along the margins to allow it to flood into and create some sort of resilience in response to the increasing flood risks that this – that the Hutt Valley is experiencing.

Obviously, it's a very complex situation. There's – it's not just an ecological, it's a social-ecological system that we're dealing with there, and there's a lot of competing demands on rivers, and resources along the margins, so yes, it's a really complex situation.

Q. Thank you. That's really helpful. Those are all of my questions for you today, Dr Tonkin.

A. Thank you.

Q. And Professor Macinnis-Ng, my questions for you are only in relation to your evidence on forestry, but thank you for your other evidence you have given today. So, at paragraph 14 of your evidence, you point to a number of problems with – that you have identified with radiata pine plantations, and you have stepped us through a number of those in your presentation, but I just wanted to ask you a few questions about those to clarify a few points.

So, firstly, on the biodiversity value of radiata pine plantations, and I think you addressed this in your presentation, but I just wanted to clarify, the lower biodiversity value that you referred to is as against native forest, is that correct?

WITNESS REFERRED TO #A069, PAGE 10, PARA 14

A. [Catriona Macinnis-Ng] That's correct, yes.

Q. And would you agree that many radiata pine – *Pinus radiata* plantations have in fact replaced pasture?

A. Yes, that is correct, but the pasture replacement is where the hydrology issue comes into place, in that the change from grass to forest really removes a lot of water from the system, so a lot of the – so if we have incoming rainfall coming into a catchment, that rainfall can then – it can either be returned to the atmosphere through evapotranspiration, which is the water that moves through plants, and evaporation from their soil. It can also be river flows, so – so, running down the stream. Or it can

infiltrate into the ground and become groundwater or part of the water table. So those are the three fates of water coming into a system.

So, in a system where we have changed from a pastural grassland into a forest, the amount of transpiration increases substantially, and so a whole lot more water is going back to the atmosphere, and there's far less water to flow down the stream, and so then that exacerbates the issues that Jono was talking about in terms of, you know, the river flows and how much water is available to keep that river healthy, and it also means that there's not enough – there's not as much water available for human use. So, what we don't do a good job of here in Aotearoa is managing our – our different water needs. Prior to coming here, I was a research fellow in the National Centre for Groundwater Research and Training, and we were specifically looking at managing groundwater and river flows with different kinds of vegetation, so, changing from a pasture to a forest is in fact a really – not a great thing to do, particularly under future climates. In the parts of the country that will get drier, that small amount of water that remains for river flow or groundwater is going to decrease, because the trees don't say, "Oh wait, we'd better leave some for the river", the trees just keep using all the water, but we're not quantifying that at all, so it's really actually quite problematic when we see pasture being converted to – to the pine plantations.

Q. Thank you, and I do appreciate I'm asking you a question about something that is holistic rather – holistic in terms of your response, but just specifically on the biodiversity value –

A. Yes.

Q. – when conversion has occurred from pasture to pine, would you agree that from a biodiversity value perspective that plantation forest – plantation pine forest can be a positive, in terms of that shift from pasture?

A. To biodiversity value?

Q. Yes, on biodiversity value.

A. I think we shouldn't think of pasture as having no biodiversity value. It can support a range of different invertebrates and below-ground components, so I'm not aware of any research on that, but I think I would

have to really check on that and get back to you. Is that something I can do to confirm?

Q. Yes, I can put that question to you in writing, certainly. Thank you.

A. Okay. Yes. Sure.

Q. On harvesting, you spoke in your presentation and in your evidence that the clear-felling of radiata pine leaves the landscape exposed to damage if extreme – in particular, if extreme storms occur during that recovery period, which is up to about seven years, as I understand, for *Pinus radiata*. In the case where other types of trees were also clear-felled, would you accept that that risk would occur in that situation as well, for other types of trees?

A. Yes, well, I'd say in general, clear-felling is not really a positive thing to be doing for environmental management, yes, but the – I think – I don't know that we do a lot of clear-felling of other kinds of trees. It's mostly the *Pinus radiata*.

Q. But the issue is not with the choice of tree but with the mechanism of harvesting?

A. Yes, I think that would be fair to say, yes.

Q. And that is probably ultimately an economic choice?

A. The method of harvesting? Yes, but I think the thing is that we're not – when we're taking it as an economic choice, sure, that's the cheapest way to harvest, but we don't factor in the damage done to the river itself or, you know, the – the way that the bridges were knocked out by all the slash. That doesn't come into the equation when we say, you know, this is what we're going to do. So we can say it's an economic choice, but it's not a fully-factored economic choice, and it doesn't actually result in what best economic outcomes would be, and particularly under a changing climate.

Q. Yes, I understand. An economic choice for the landowner, perhaps, but not necessarily taking into account some of those other externalities that you have mentioned.

A. Yes.

Q. Yes. And then my last question is – and this is at paragraph 20 of your evidence – so you say there that native forest is the superior alternative

because it has enhanced biodiversity value, is less prone to disturbance from fire and wind, does not produce allergenic pollens, and if restored in perpetuity, will not have harvesting issues.

And so I just wanted to query that last point. You are proposing there that native forest be restored in perpetuity only and not for harvesting at some future time?

WITNESS REFERRED TO #A069, PAGE 13, PARA 20

A. Well, I think there's a potential there to – to think about forestry, so, I mean, I'm more of an ecologist than a forestry scientist. I'm probably not the right person to talk to. But there is research going on looking at native species as forestry species, so I think there's real potential there to change how we – how we think about forestry, and I would really encourage, you know, plantations of native species as a better alternative to – to pine plantations, and if we are going to harvest them, then that's a conversation to be had, possibly by different people. Does that answer your question?

Q. Yes, it does. I guess I would just put to you that if the trees were restored in perpetuity and not to be harvested, that would have an economic impact on the landowner and the owner of those trees, would it not?

A. If they were doing that instead of using the land for another use, then potentially, but I think we could be thinking about, you know, what's the – what are other kinds of values? How do we think about valuing biodiversity?

So there's been globally some examples of sort of nature-based solutions that authentically looked for ways to, I guess, provide some economic benefit of the biodiversity in ways that we don't do that, so at this point in time, perhaps we don't have those kinds of structures in place here in Aotearoa to – to kind of, I guess, compensate a landowner, but it's something that we should be looking into. It's not something that we should say, "Well, that's just the end of it." There's more conversations to be had around how we manage our landscapes and what that means for the economic outcomes.

Q. Yes, I understand. Those are all of my questions for today. Thank you both very much for your evidence. Tēnā kōrua.

JUDGE MILROY:

Thank you. I am just going to check if there are questions from the panel. No? Matua Kevin, do you have any questions?

(16:36) KEVIN PRIME TO PROF. CATRIONA MACINNIS-NG AND ASSOC. PROF. JONATHAN TONKIN:

Yes, I do have a **(inaudible 16:36:52)**. Thank you. First, to Professor Ng. I can't pronounce it properly **(inaudible 16:37:01)**. In your presentation on the wilding pines, you said that in 20 years, 20% would be covered by wilding pines. Is that of the country? And there's – and – but you said without funding. Did you mean if there's no control?

A. [Catriona Macinnis-Ng] So, there's currently some control events going on, but even with that control, the increased coverage in land is increasing by 5% per year, even with that control, and so if we continue on the same trajectory for the next 20 years, then it will be a 20% coverage of the land with – with – will be having a wilding pine issue.

Q. By "the land", you mean all of New Zealand, or certain areas?

A. That's the entire motu. It'll be 20% covered by wilding pines.

Q. Really?

A. It's a huge, huge problem, because they spread so fast and they grow so quickly. They love it.

Q. Right. And early in your – early in your presentation, you had a picture of a yellowing hangehange. What was – is that from lack of water, lack of rain?

A. Yes, yes. So the 2020 drought was pretty significant in the Auckland region, and so a lot of plants were showing signs of water stress, and one of the most visible ones is when we see leaves wilting like that, so it was a really dry period at that time that was causing a range of different species to respond.

Q. And that's what that result – of the hangehange – was lack of – just lack of water, lack of moisture?

A. Yes. Yes, well, that's what I think. I mean, I was just out taking photographs, and unfortunately, I couldn't get my instruments and do some proper measurements, but water stress seemed like the most likely

one. It could also be heat stress. We've started doing some work on heat stress to try and understand how plants respond to heat, and potentially it was a combination of the two, as we've been saying; the kind of two together. It was reasonably warm as well, but the drought was really the main kind of component.

Q. Okay. Thank you very much. My next question is to Dr Tonkin. In your presentation, you talked about 82 mortalities. Was that the eels, or what were they?

A. [Jonathan Tonkin] Yes, it was a combination of four different species, so it was, from – going back to the details – yes, it was – it was longfin eel and redfin bully, is the two native species, and then it was two non-native species, brown trout and rainbow trout. And those were the ones that were recorded, but it's likely there's – it's not unexpected there would have been more species involved as well.

Q. And what was the cause of the deaths?

A. It was a combination of things, so it was the heatwave combined with low flows, which was exacerbated by the – likely exacerbated by the – the conditions in the catchment, including – which led to sort of excessive growths of algae and periphytons, that are the growths on stones and diatoms and plant matter on stones, and that – during heatwave events, when there's over – excessive amounts of those, you start to get really massive swings in oxygen concentrations throughout the day, so you get these hyper – oxygen situations, and that can be mortality-inducing.

Q. Thank you very much. Those are all my questions. Thank you, your Honour.

A. Thank you.

(16:41) JUDGE MILROY TO PROF. CATRIONA MACINNIS-NG AND ASSOC. PROF. JONATHAN TONKIN:

Q. Thank you. I have got a couple of questions. The first is: you mentioned in your brief of evidence habitat fragmentation, and I just wanted to be sure that I understood what that meant. Is it that some – a particular species – well, actually, you tell me what it means; that might be the better way to go about it.

A. [Catriona Macinnis-Ng] Yes, certainly. Yes, so when we have like a – a really large area covered by, say, a forest, or a – a particular natural kind of ecosystem, it's all really well connected, so it can operate as a whole and there's a lot of interchanging of material, so you know, birds can fly around getting food and there's invertebrates doing their thing and, you know, there's a massive food web, and it can all be quite healthy.

But when we have land being cleared for agricultural activities, for instance, or even by fire, then we start to get that big parcel of that ecosystem broken up, and so it starts to get patchy, and what we see is a range of issues coming about because of that.

We might see a loss of connectivity, so birds are fine, because they might be able to fly between, but we've got other organisms – say, for instance, less mobile organisms or the plants, who are often not as mobile, and so the populations start to get a bit isolated, and that leads to them being more vulnerable to kinds of impacts like climate change.

So the loss of connectivity's important, and we also see an increase of what's known as edge effects, and this is where, you know, if you've got a – a huge area of forest, it's – it's pretty healthy. It can be buffered by things like weeds, but when we have the breakup of the habitat into smaller parts, the edge effects become a larger proportion of that whole ecosystem, because it's exposed around all its sides, so you can imagine an area that's sort of got, I don't know, pasture all around it, is potentially exposed to weeds from all directions, and so we often see a degradation of the quality of that kind of forest, if that's the system that it is, because of those additional edge effects.

So those are the kinds of issues that come about with the – the habitation fragmentation.

Q. Right. Thank you for that answer. My next question is in relation to one of the slides that you have shown, and the slide was about the possibility of pine forests providing habitat for the growth of native species in the understorey, so there was a photo of –

HOUSEKEEPING – LOCATING SLIDE (16:43:54)

(16:44) JUDGE MILROY TO PROF. CATRIONA MACINNIS-NG AND ASSOC. PROF. JONATHAN TONKIN: (CONTINUES)

Q. That's the one, yes, native regeneration under mature pine, and my question was: in that situation, it would, as you mention, be a transition from pine to native, so would it mean that, you know, they would not be harvesting the pine at all while – or yes, how does that work, do you know?

A. [Catriona Macinnis-Ng] These kinds of approaches are where, yes, the – the kind of – the pine is just kind of allowed to live out its life, and it will, I guess, eventually die and then it sort of breaks down and becomes part of the – the **(inaudible 16:45:11)** of the forest floor, so this is not when harvesting is happening, because you can see that the pine is actually – we call it being a nursery crop, because it's providing the protection for those plants to come in and – and start growing.

If we, like, clear-felled and then tried to do the same thing while the – the soil's not well-bound, any kind of rainfall event that comes along, it all just gets washed away, so the pines are actually kind of being helpful in the sense that they will keep the system together, I guess, and sort of protect it from wind and – and rain and other kinds of events, while those plants can get established and start growing up underneath.

And then the pines, yes, they die off, because they don't have a very long life history. The life history strategy of pines is live fast, die young, whereas most of our native trees, they are long-lived and slow-growing, and so it's quite a different kind of approach.

Q. And I see there is a person in that photograph.

A. Yes.

Q. And it looks like they might be pruning. So this is not actually a photograph of a transition situation, is it, or – do you know?

A. I don't – I'm not sure what that person's doing. I'd have to look into it and get back to you. I think they're actually doing some scientific study.

Q. Well, that's all right then. Yes. And just something that has not been altogether clear to me in the evidence is that there is, if I can put it this way, a weighting, I guess, to *Pinus radiata* under New Zealand ETS, because it is faster growing and takes up carbon more quickly, but am I

right or wrong in thinking that a native forest, although it takes up the carbon more slowly, it will take it up over a longer period of time, so that there is more absorption of carbon in a native forest?

A. Yes, and – that's absolutely correct, and we would expect, over a longer time period, native forest becomes more carbon-dense, because the trees are much larger and they're also living for a longer time, so in terms of, like, holding carbon in perpetuity, the native forest does that in a much better way, especially if it's mixed age, because there'll be a natural process of, you know, when those older trees do die, instead of dying like, I don't know, at 100 or 120 years of age, they will die much – you know, it will last for centuries, but when they do eventually die, there will be, in a healthy forest, the next generation ready to go in the understorey, and they can pop up and take that gap in the forest canopy, so the – the kind of – and this is showing globally, that the kind of old-growth forest is so important for storing carbon, because it's just really carbon-dense kind of systems.

And the plantations – there's a number of reasons for it, actually. It's – it's the age that they grow to, but it's also the slow-growing aspect of the native trees means that they have much denser wood, so if you take a piece of wood from a pine and a piece of wood from, say – a piece of kauri, there's far more carbon in the same sized piece of wood in that kauri, because it's much more dense. The biomass is – is more dense and holding more carbon, and so there's a lot of aspects to it that just make the native forest much better at holding carbon for a long time and in much higher concentrations.

Q. Thank you for that. I have just got one last question, and I am just looking at the time to make sure I don't go over time myself.

You mentioned that it's very important to have mātauranga Māori and Māori input into the work that you are doing, and in terms of how we think about our future strategies, and I am just wondering, we have heard from Ngāti Pikiao themselves about what they know and how they are trying to work to help their environment, but I am interested to hear from, you know, the scientists' side, how mātauranga Māori and tikanga Māori

might – how you work with it, yourselves, in terms of working with the people.

A. Yes.

Q. What sort of things happen?

A. That's a really great question. Are you interested in my own experience –

Q. Yes.

A. – or specifically for – yes, okay. So I can talk about a couple of examples. The first one is I've been working with Ngāti Kurī around rātā moehau, which is also known as Bartlett's rātā, but it's the – the rarest rātā, so, closely related to pōhutukawa trees, but the difference is it has white flowers instead of red flowers, and it's confined to the very far north, and in the wild, there's something like only twelve remaining, so a very rare plant which is really vulnerable to climate change, because in the far north, there's huge potential for fires, and also every year they're having dry conditions. Every summer, they have to decide how they're going to use their water, whether they're going to – you know, you know, the water is – is closely monitored every summer, and that's just in a standard year, so they're exposed to drought as well.

So, my research around understanding the physiological responses of different plants to stress events such as water stress can help them think about, okay, so how vulnerable is the species? Where should they be planting it in the landscape to make sure that it can grow well? Do they need to be planting it in places where it's nice and protected, which we'd say they probably would? And then when it's a species which is so significant, do they need to be watching it each summer and thinking about maybe giving the plant some water so that they can get to a well-established stage to grow?

So the project is a – a large collaboration including folk from Auckland Botanic Gardens who are growing up the plants, and then the plants are going north to be planted out into the field, and my contribution is to help think about, you know, where to put those plants and how to – how to take care of them, particularly if there's an extreme event occurring.

So that – that is addressing an aspiration to see this iconic or taonga species cloaking the landscape, and so they have this vision of the – the white flowers being kind of – heralding the – the Christmas time, because instead of being red, there's these beautiful white flowers across the landscape, so that – that's sort of one example of how I've been working with Māori.

I've got, I guess, other projects, but I think one of the things that's – it's – it's as a non-Māori, I have to think carefully about what I can share publicly, because the the mātauranga belongs not to me, so appreciate that as a question, but I'm not sure I can sort of share much else, other than to say what I try to do is build enduring and long-term relationships that will produce mutually beneficial outcomes, but they really need to be directed by the aspirations from Māori, because if I come in as a scientist and say, "We should be doing this, this, this" – as an example, I was talking to a rongoā practitioner and saying, "We've discovered some potential vulnerabilities of kawakawa", so, kawakawa, being an important rongoā species, is actually quite vulnerable to heat stress, preliminary studies are showing, so I thought I should be telling the rongoā practitioners, and I was sort of told, "Well, you know, we'll just – we'll – we'll find other things. We'll adapt. We'll change." And so it was a quite different way of thinking about how we might be thinking about climate change, and it was quite an epiphany for me to think, "Okay, there's different ways of dealing with this".

And so it's so specific to different iwi, different hapū, as to how they want to deal with this, but at the moment, I don't see any – there's very little potential to be doing this really well. We need to, I guess, give Māori that space to be the voice and – and to empower them to get the skills and – and to work with them in ways that matter to them. That's my own kind of positioning on it.

Is that what you were looking for, or something a bit more concrete?

Q. No, I think, as you say, it is very likely to be a matter of each hapū, each iwi deciding what is important to them and how they want to pursue their aspirations in that way, but yes, just interested to see how a Western scientist, if I can put it that way, feels that they can contribute to that.

So that was my final question, so it just leave me to say thank you very much to you both, soon-to-be Professor Tonkin and Professor Macinnis-Ng. Thank you. You are obviously both very passionate about the work that you are doing, which is wonderful to see. So we will just hand you back to your counsel, and they may have some questions by way of re-examination.

A. Kia ora.

(16:54) MR VINCENT TO PROF. MACINNIS-NG AND ASSOC. PROF. JONATHAN TONKIN:

Q. Thank you, your Honour. I just have one question that I want to ask you, Professor Macinnis-Ng. I understand from your answer to the cross-examination questions that clear-felling, regardless of what kind of trees are being clear-felled, is not good, but you have also said that there are discussions occurring about indigenous forest plantations, and so I want to ask you, understanding that you are not a forestry scientist, but from your ecologist perspective, is there a future that you can see of more sustainable forestry than what we have now?

A. [Catriona Macinnis-Ng] Yes, absolutely. I think there's huge potential, particularly because the woods from native species, they grow slowly but they're really high quality, so the amount of money you can get from them is substantial, and there's a lot of demand for them from overseas, so the – swamp kauri, for instance, are, you know, often shipped overseas, and things. If we had a kauri forestry industry, it could be a really economically viable process.

The problem is just the kind of lead-in time to that, and so there's real potential there, but I think the other thing is, too, that kauri can grow reasonably fast under the right conditions, and so it's "Can we provide those best conditions at scale?", is – is another part of the challenge, so there's been a indigenous forestry group at Scion for a number of years, and there's – that's sort of kind of waxed and waned depending on, I don't know, different kinds of focuses, but we could really invest a whole lot more into indigenous forestry as – as a replacement to the pine

plantations. There's huge potential that I think we should really be going for.

Q. Thank you. That – that is all I have to ask you.

A. Kia ora.

Q. So in that case, I think you are free to finish.

JUDGE MILROY:

Yes. Thank you, Mr Vincent, and thank you again, Professor Macinnis-Ng and Professor Tonkin. I will just ask our kaumātua, matua Kevin, if you will close for us, please.

KARAKIA WHAKAMUTUNGA (KEVIN PRIME)

HEARING ADJOURNS: 4.58 PM

HEARING RESUMES ON THURSDAY 27 NOVEMBER 2025 AT 9:00 AM

JUDGE MILROY:

Mōrena tātou. I will just hand over to matua Kevin for our karakia.

KARAKIA TĪMATANGA (KEVIN PRIME)

JUDGE MILROY:

(inaudible 09:01:56) Kevin, mō tō tātou karakia. Thank you.

Mōrena anō. This morning, we are having the cross-examination of Professor Kelsey, so nau mai anō, Professor. So, Ms Sykes, unless there is anything that you would like to submit before we begin the cross?

MS SYKES:

Mōrena, Ma'am. I am actually going to just take Professor Kelsey through the documents so we have document numbers, because I am not clear what the Crown is actually cross-examining on. There are four affidavits, and I – if I could just get her to affirm that those matters and speaking notes are before the Tribunal, so that it will help her orientate herself to any questions that may come from my friends the Crown, so that she knows really clearly which affidavits or which parts of the evidence they are cross-examining on, if that would help.

JUDGE MILROY:

Yes, thank you, that would.

MS SYKES CALLS

(09:02) PROFESSOR JANE KELSEY (EVIDENCE AFFIRMED)

Q. Mōrena, Professor Kelsey. You will confirm that your full name is Elizabeth Jane Kelsey?

A. Correct.

Q. And you are a Professor Emeritus of law?

A. I am.

Q. And you provided – and you are residing at Algies Bay, which is near Auckland, at the moment?

A. That's correct.

Q. And I am just going to just slowly take you through a number of pieces of evidence that's before this Tribunal.

Your first affidavit, which is document number #A014, would you like to affirm that that is true and correct?

A. Correct, yes.

Q. And that you – in preparing that document, you were guided and understood the code of conduct as an expert witness?

A. Yes.

Q. And it was prepared on that basis?

A. Yes.

Q. And appended to that affidavit is a bundle of documents, document #A014(a), is that correct?

A. Yes.

Q. Now, can I move to your second affidavit? That affidavit is document #A029, and it was sworn on the 20th of November 2024, and again, the same questions – you prepared that affidavit and you affirm its contents are true and correct?

A. Yes.

Q. And that you have exhibits that are attached to that affidavit, documents #A029(a)?

A. Yes.

Q. And those were all prepared having regard to the code of conduct for expert witnesses?

A. Yes.

Q. Can I now go, please, to affidavit number 3?

A. Yes.

Q. Affidavit number 3, which was sworn on the 13th of March 2025, and that's document number #A038?

A. #A038, yes.

Q. And you confirm that that was a document that is true and correct and prepared, again, in accordance with the rules regarding to the code of conduct for expert witnesses?

A. Yes.

Q. There's an index to that – to that affidavit?

A. Yes.

Q. And that index is #A038(a)?

A. Yes.

Q. And there are speaking notes also that are on the record of inquiry, which were prepared on the 27th of March 2025, and that's #A038(b)?

A. Yes.

MS SYKES:

And Ma'am, this is where I would like to seek some direction from the Tribunal. We had anticipated cross-examination would be for those three affidavits, but we have also, since we received evidence from the Crown, prepared an affidavit in reply, which is document #A142, but I do not anticipate that being cross-examined upon today, and that may be the subject of further interaction between the Crown expert witnesses and Professor Kelsey before the Crown gives evidence. Can I have some guidance on that, please, from the Tribunal?

JUDGE MILROY:

Yes, my understanding is that that affidavit in reply would be as part of the reply evidence.

MS SYKES:

Thank you. But I just confirm it, for the record, if I might, today?

JUDGE MILROY:

Yes.

(09:06) MS SYKES TO JANE KELSEY:

Q. Professor Kelsey, is document #A142 your most recent affidavit in reply, which was sworn on the 12th of November 2025? Do you confirm that is true and correct?

A. Yes.

Q. And that affidavit, too, was prepared in accordance with the code of conduct for expert witnesses?

A. Yes.

Q. And there are a number of appendices to that affidavit, and I would like to take you to the index of those documents, which is #A142(a). There are three further appendices, #A142(b). They include exhibits A to F. Confirm that is correct?

A. Yes.

Q. And then there is #A142(c), which is appendix C, which is exhibits G to O, and there is #A142(d), which is appendix D, which is exhibit E?

And then the last document, which may be referred to in cross-examination because we haven't had any intimation, is a PowerPoint presentation, #A038(b), and that was prepared by you to facilitate an understanding of some of the matters that you have raised in your earlier affidavits. Is that correct, Professor Kelsey?

A. Correct. That's correct.

Q. On that basis, if you have all those matters before you, I will hand the cross-examination over to my friends.

MS SYKES:

Given that we are all at a distance, it would be really helpful if you could be clear as to which documents you are referring to, if you are going to any of the material for Professor Kelsey, and in particular, if you are going to the appendices, could you give us the page number for those documents which have been exhibited to her affidavit and which now have document numbers. Thank you.

MR PREBBLE:

Tēnā koe. Thank you for that outline. Just – this is Mr Prebble for the Crown. I can indicate that I was going to ask questions on the final affidavit dated 12 November, because I understood that in part, at least, it was really a summary or bringing together of the other affidavits that have been filed, and given the indication from my friend and the Tribunal, I really am in the hands of the Tribunal as to whether you would want me to proceed to ask those questions. I think, to be fair, they are raising issues that I believe are already before the Tribunal through the three affidavits, but I had seen the final one, the fourth one, which draws that together, as being a convenient point to launch into questions, including putting some questions that are matters that are raised by Mr Vangelis in his affidavit from the Ministry of Foreign Affairs and Trade. So that was the focus of the questions.

I am happy to take guidance from the Tribunal as to whether, in the event that these matters should just simply wait for the Crown's evidence to be filed, or that I ask these questions now and if my learned friend does not like the direction of travel, perhaps take objection on them. So, as I say, in the hands of the Tribunal.

JUDGE MILROY:

Ms Sykes, as I understood your submissions this morning, you are not expecting cross-examination on that last affidavit. It –

MS SYKES:

Ma'am, can I just interrupt in this way? If we are going to have cross-examination, we have prepared some speaking notes, so we would like to have those – that material put on the record before the cross-examination commences, so that we can actually have those matters, but our preference is not for that to occur, particularly in light of some of the recent directions around hot-tubbing or an opportunity for expert witnesses to meet together and actually see if there is any positive opportunity for a roadmap forward where they may have agreement on any contested matters.

JUDGE MILROY:

Ms Sykes, just in terms of the hot-tubbing issue, we did have a memorandum from coordinating counsel to the effect that they did not see any – that it would not be productive to have a hot-tubbing session, but from what you are saying, it sounds to me as though in this particular instance there might be some value in that.

MS SYKES:

But when my friends put that joint memorandum, I did say that the exception to our agreement was Professor Kelsey's evidence. We didn't see benefit, for example, from some of our other experts in that kind of process taking up the time of the Tribunal, but we did say that there may be some benefit in both reduction of time and in trying to get some clarity around points of difference through that process, and Professor Kelsey was happy to do that, but if things have moved on, Ma'am, I am really in Professor Kelsey's hands. Been a bit of a few days preparing for the first few affidavits of those exhibits, just to get to this point.

JUDGE MILROY:

Thank you. In this situation – Mr Prebble, losing you from the video thing.

MR PREBBLE:

Sorry, Ma'am.

JUDGE MILROY:

In this situation, I do think it would be valuable if Professor Kelsey and Mr Vangelis in particular were able to engage in that expert conferencing –

MR PREBBLE:

Yes.

JUDGE MILROY:

– prior –

MR PREBBLE:

Yes, I agree with that, actually. I think it may well be beneficial, and to some extent, the questions I had were really just about aspects of the difference between them and drawing out really just some of the thoughts that Professor Kelsey had around that, so I am, as I say, happy to be guided by yourself, and if there is an issue with asking those questions now, perhaps we do have the witnesses from the Crown and Professor Kelsey meet to see if there can be some narrowing of the issues between them. I think that could be a positive step for these particular witnesses.

JUDGE MILROY:

Yes, and I agree, as well. In the circumstances, it may be that the best way to do this is for you to provide those written – those questions in writing so that Professor Kelsey can see the direction of travel and that can help inform the conferencing to take place, hopefully, between herself and Mr Vangelis and so on. So in that situation, I think it would be a better use of the Tribunal's time not to have those questions now, but also just ask counsel to liaise about a suitable time for these witnesses.

MR PREBBLE:

Happy with that, your Honour. Thank you very much.

JUDGE MILROY:

That being the case, you have no other questions for Professor Kelsey this morning?

MR PREBBLE:

No – no, and I can indicate that in terms of the time set aside for witnesses today, we do not expect – I do not expect to have many questions for Dr Gillespie, and so we may well be able to go through the timetable reasonably quickly, but those were – the questions I had were really focused on that final affidavit, so there's no other questions I propose to put to Professor Kelsey this morning, your Honour.

JUDGE MILROY:

All right. Thank you, Mr Prebble. With that indication from the Crown, I think we are looking at bringing the judicial conference forward, so if counsel would be prepared to undertake that judicial conference at some time earlier today than expected.

Our next witness, or again, for Crown questions, is Dayle Takitimu, and I am just wondering if Ms Takitimu is available at this time.

MS SYKES:

Ma'am, is there any opportunity for other witnesses that were going to ask Professor Kelsey to ask questions today? We are just conscious of trying to –

JUDGE MILROY:

Yes.

MS SYKES:

– her time is as valuable as everybody else. Like, my concern is that she is often overseas, and that is one of my biggest concerns about where we are going with the delayed cross-examination by my friend.

JUDGE MILROY:

We did not have any indications from other counsel of questions for Professor Kelsey, but I will just check now, does anyone else have questions for Professor Kelsey?

I think that is a no, Ms Sykes, so yes, we will leave it to you and Mr Prebble to liaise with your witnesses to find a suitable time for that expert conferencing, and if you could come back to the Tribunal to update us when that is organised.

MS SYKES:

Thank you, Ma'am.

HOUSEKEEPING – AVAILABILITY OF NEXT WITNESS (09:16:11)

HEARING ADJOURNS: 9.16 AM

HEARING RESUMES: 9.31 AM

JUDGE MILROY:

Tēnā koe, Ms Takitimu, and tēnā koe, Ms Te Whenua. Again, just before the Crown begins its cross-examination of Ms Takitimu, were there any matters that you wished to mention to the Tribunal?

MS TE WHENUA:

Tēnā koe, Ma'am. Ms Te Whenua speaking. Just to ensure that the Tribunal are aware that the brief of evidence that Ms Takitimu will be cross-examined on today is appellation number #A101, the brief of evidence filed 12th of May, earlier this year. Tēnā koe.

JUDGE MILROY:

Thank you, Ms Te Whenua, and we will hand over to the Crown for questions; and thank you, Ms Takitimu, for being available.

MS TE WHENUA CALLS
DAYLE TAKITIMU (#A101)

(09:32) MS SEELEY TO DAYLE TAKITIMU:

Q. Tēnā koe, Ms Takitimu. Ko Grace Seeley tēnei. He rōia o te Karauna ahau.

A. Kia ora.

Q. Kia ora. Have you had the opportunity to read the joint brief of evidence of Ms Anne Haira and Gina Rangi?

A. Yes, I have had a quick look through it. I haven't gone through it in line-by-line detail, but I've had a quick look through it.

Q. Ka pai. Thank you. Today, I – as well as asking some questions on your evidence, I wanted to put some passages from that joint brief of evidence to you to check whether you agreed with you them or whether you – you had any comments on that evidence.

A. Sure.

Q. And for the benefit of the Tribunal, that joint brief of evidence of Ms Haira and Ms Rangi is at appellation #A118.

So the joint brief, the Crown brief, records that the Ministry for the Environment has worked to build relationships with Māori national groups such as Pou Take Āhuarangi and Te Tai Kaha, and that there are joint work programmes and agreed mutual priorities underway, that officials meet regularly with those groups, and that MfE remains open to feedback to improve that engagement. Are you familiar with that engagement in those relationships, broadly?

A. Broadly, yes.

Q. And would you agree that MfE has worked to build relationships with those national groups, such as the Pou and Te Tai Kaha?

A. I would agree there's been some work towards that. The quality of it we've always probably disagreed on, and we've given the Crown lots and lots and lots of suggestions and feedback over time in terms of how to improve the quality of their engagement, which is very Crown-centred and very Crown-agenda-driven. Doesn't reflect in my mind a genuine Treaty partnership by a long, long stretch.

Te Tai Kaha, for example, is a group that two out of three of its predominant members are actually appointed through Crown mechanisms, so we've criticised that before, that before the joining of FOMA into Te Tai Kaha, that that essentially was a group that the Crown was talking to the Crown, and that – because that involved Te Kāhui Wai Māori, which as you all know is a Crown-appointed and established group. It also includes the New Zealand Māori Council, which is set up by Crown statute, and so while these are mechanisms that Māori have attempted to pursue some representation in, they are light years away from genuine Treaty partnership, which sits at a hapū level, because hapū are the Treaty partners that the Crown committed to in 1840.

And to the same extent, Te Pou Take Āhuarangi, Ihirangi – Ihirangi was always at lengths to point out to the Crown in every contractual engagement we had and throughout the process through the

Māori Climate Platform that we were not the Crown's Treaty partner and that the Crown did not have the unilateral mandate to redefine its Treaty partner or to coopt its Treaty obligations to entities it created. Instead, it needs to take its Treaty partner as it finds it, which is hapū on the ground. We have, for a number of years, been told by the Crown that's administratively inconvenient, but hey, that's the constitutional deal they signed up to in 1840, and inconvenience doesn't in fact render their Treaty obligations null and void or fulfilled by some other side entity that they create.

Hapū, as a contrast, need to engage with the Crown through a whole lot of administrative inconvenience. Some 100-odd Crown departments and entities that we have to engage with on a daily basis. So that sort of does not wash with me.

We've, for a long, long time, from Ihirangi's first engagement with the Crown, impressed upon them that this was not a replacement for their Treaty obligations and that they still needed to pursue how to fulfil their Treaty obligations to their Treaty partners, which exist at the ground level, not through National Iwi Chairs, which is essentially a coalition of PSGEs, again, very tainted by Crown interference through the Treaty settlement process, so there's an issue about the genuineness of the representation when true agency is not present, and the Treaty partner, hapū on the ground, have been excluded from that engagement.

Q. Mārama. Yes, so I understand your evidence on that point, particularly around the – your evidence that Ihirangi – engagement with Ihirangi was never intended to be a substitute, in your view, for engagement with hapū. But I guess my question there was whether, in your view, MfE have engaged with some of those national groups, like Te Tai Kaha and like the Pou Take Āhuarangi.

A. For sure they have. I disagree with the statement at the very end of that brief that there's been extensive engagement. I think that's a huge overstretch, because we've criticised throughout the process the lack of engagement or the inconsistency of engagement, we've criticised that there's not a complete line of sight over the entire work programme and what the Crown are up to, and so there's been this piecemeal sort of

intersecting with Māori groups, really, I would say, having been at this game a number of years now, to create the veneer that there's a lot of engagement going on, but the genuineness underpinning that I'm going to question all day long, because I've sat in the seat and begged for information that would allow us to then communicate with our people more effectively, but it's been – it's been a journey of frustration, as you would have seen from my brief of evidence.

There's been no complete line of sight. In fact, some of the cohesiveness or presented cohesiveness of that entire climate work programme was only made known to me reading some of the briefs, despite the fact I was one of the key players in that, like, in engaging with the Crown for a number of years, because we were never able to see the entire programme or all of its component moving parts. They were sort of drip-fed to us as and when the Crown decided, and so yes, I'd question, one, the frequency and intensity of that engagement, and two, the quality of it. **(inaudible 09:39:32)** –

Q. Kia ora.

A. – that I think they're engaging with the – you know, they're engaging with the – these were entities set up to inform the Crown to – how to do engagement better and how to get their Treaty partnership and their obligations sorted in a better way, not to completely coopt – coopt that obligation of theirs.

Q. Kia ora. Just had a few questions about some passages in your brief now, and just checking you've got a copy of that available to you?

A. Mhm.

Q. So at paragraph 38, you say there that eventually MfE engaged with a group of you who had formed together under the name Ihirangi, and later in that paragraph, you say that a core group of you were affiliated to the Pou Take Āhuarangi – Āhuarangi – of the National Iwi Chairs Forum, and I was just interested, from your recollection, how many within Ihirangi were affiliated to the Pou?

A. Well, I think we would have all considered our kaupapa aligned to the Pou. We were trying to pursue common goals, in terms of the better positioning of our people in regards to climate change and environmental

integrity and those sorts of things, so there was obviously the synergy of kaupapa which we would see as aligned to that. We reported up to the Pou to keep the Pou informed. Mike Smith, of course, was central to that and held really a – a dual role throughout that, throughout some of that time, in terms of comms into the National Iwi Chairs Forum, but I would say we were – we considered ourselves aligned – if not sort of appointed by the National Iwi Chairs, we considered ourselves definitely aligned in terms of the kaupapa we were pursuing, yes.

Q. Ka pai. So there was a strong connection, a strong relationship there.

A. Absolutely.

Q. Thank you. Moving on a little, just after that engagement with MfE started, you make some, I guess, complaints from paragraph 42 of your evidence that you spent the latter half of 2020 and nearly all of 2021 negotiating contract specifications and the scope of work with MfE, and you refer to some, I guess, some barriers and some shifting goalposts, and you say that MfE recast the project time and time again in that early engagement with Ihirangi, and I'd just like to clarify the issues that you refer to in that section of your evidence.

What MfE processes do you consider slowed you down? What goalposts shifted? And how was the project recast?

A. Sorry, what was the – can I just get you to repeat that again? Which processes slowed us down?

Q. Sorry, I'll go one by one. So the first one is what MfE processes do you consider slowed you down?

A. I think there wasn't a great alignment between what the ministers were committing to at a high level.

We had initial engagement really led by Melanie Mark-Shadbolt back in those days as quite a senior operator inside the MfE structure who came to us, and the famous sort of catch-cry was that for a number of years, the Crown had engaged with Māori by requiring Māori to come to them on Crown agenda and to fulfil Crown work programmes and that sort of thing, and she wanted to innovatively shift that and say, "You've already got something up and going and that seems to be working well and in alignment with the kinds of things we'd want to invest in, but instead of

requiring you to reformulate yourselves, we'll come halfway across the bridge to you, and we'll come to you on your terms and we will invest in what you're already doing and the strategy you're already running and sort of put in place."

That was attractive to us, because it was a new way of dealing with the Crown, of course, and we were excited by that. What slowed that down is as it went through the various tiers of bureaucracy and administration within MfE, that message wasn't widely either understood or implemented by Crown officials, and so time and time again, we were required to come back over to the Crown's side of the bridge nearly all the way in terms of the Crown's procurement protocols, which were incredibly clunky and problematic for us because they did require us to reformulate ourselves into a particular way or a particular entity that the Crown would recognise in terms of engaging with us.

They required us to, as we were attempting to make our strategic direction – and what I will sort of say, our indigenous or kind of organic strategic work, while we're attempting to make that visible and get Crown buy-in and investment into that, we were just constantly slammed, I think, is the feeling I've walked away with different pieces of Crown agenda in terms of the very intense work programme the Crown had committed to through the – through the legislation and all the different moving parts that fall out of it, so we, for a period of time there, became increasingly frustrated that we were being absorbed into, again, a Crown agenda in terms – and Crown timing in terms of what they needed to deliver in regards to the NAP, in regards to how different sort of component parts of that infrastructure, policy infrastructure, would be developed, and the iwi-facing work and the indigenous kind of agenda that we were initially excited about being able to progress was in fact left by the wayside as the Crown sort of called the tune, and we, in order to continue engaging with them, felt required to do that.

So, there wasn't great communication through the different levels of Crown officials and through MfE. It felt at times like there was active frustration of the intention that was being committed to at a higher level, and so we just did this sort of dance around where we would try to cut

through that where we could, and when we couldn't, we'd call emergency meetings with Melanie or with the Minister to complain to them about the fact that this – this relationship was not being implemented the way it was originally pitched to us, and we were indeed required to reconstitute ourselves and become this kind of Frankenstein-like entity in order to pull through the iwi-facing work behind us, and I think that, as is clear from my evidence, there never really was a feeling that we got that standing up on two feet in a way that we were servicing the original sort of strategic intent of the Ihirangi group, and yes, instead, the Crown very much was calling the tune in terms of what was in scope, what was out of scope, in terms of the timing of things.

And things were working at incredibly frustrating pace. Sometimes things would slow down to the point where we had to reach out and say, "What is going on?", and then they'd move very, very quickly and we'd be given 24 or 48 hours or a number of days to respond to massive kind of policy proposals, so there was this – we'd sort of refer to it as "tea-bagging", where the Crown would come in and out and basically just tap on our shoulders when they needed something to, again, create that veneer that there'd been genuine engagement going on, but we weren't sitting in a seat feeling like we were being genuinely engaged **(unclear 09:48:43)** with at all.

Q. Thank you. Just want to put a couple of passages from Ms Haira and Ms Rangi's evidence to you to check whether you agree or if it's consistent with your recollection.

So, the joint brief sets out that MfE worked with Ihirangi, and in particular, Mike Smith, through much of 2021 to develop a joint work programme based on four agreed joint priorities, though one came slightly later. That was emissions reduction, climate adaptation, data, and then the latter one was indigenous framework. Would you agree?

A. Yes.

Q. And that was followed by agreement to a joint work programme in February 2022.

A. Yes.

Q. They then say that officials at advisor level were in contact with Ihirangi on a weekly basis to progress the deliverables under those four joint priorities. Is that correct?

A. I would say so. There was an intensity of communications, for sure.

Q. And is it fair to say – I'm drawing this from your evidence – that your concern was not so much with the, I guess, the regularity of that engagement but more with its quality or the changing nature of the officials that you were engaging with.

A. Absolutely.

Q. Is that fair?

A. Absolutely, and I would say – yes, I would say that's fair.

Q. Ka pai. Thank you. I just have a couple of questions specifically on the first Emissions Reduction Plan and the National Adaptation Plan before we get into the Interim Panel and the Māori Climate Platform. It's for the Oho Mauri Trust. But is it correct that MfE officials worked closely with Ihirangi on that *Empowering Māori* chapter in the first Emissions Reduction Plan?

A. Your question is if they engaged with Māori?

Q. If they engaged with Ihirangi; if MfE officials worked closely with Ihirangi on that chapter.

A. I think we – I think we did engage and give some good feedback on that. I don't think I would characterise it as extensive, but we did give feedback into that.

You recall, like, in talking about the period 2021-2022, there was already an element of frustration into the relationship at that point, because, again, these representations we'd had when MfE, through Mel Mark-Shadbolt, had really approached us. We were out in the wild doing our thing. We really weren't engaged with the Crown at that point, and – and would have been doing work in the climate space, and Mike Smith and Hinekaa Mako and co. had been – and various others of us in Ihirangi had been doing work for a number of years in this space, with or without the Crown, and so when they came to us and pitched to us that they would invest in the work we were doing and the trajectory we were going in, that was, as I said, attractive to us, and then this shifting started

occurring where the Crown were kind of calling the tune and – and there was an element of frustration even into those four workstreams that you're talking about that we wānanga'd amongst ourselves, a degree of frustration about feeling squashed into, again, this sort of Crown agenda or Crown work programme, instead of progressing what the original intention was.

It was seen as a way to keep a foot in the door and keep a conversation going, but to say that that felt under duress would be an understatement. We were worried that – as you know, these are six-year cycles in terms of the policy settings, and we – this was the first of those, and we were worried that this would then set the tone in a template manner for everything that then followed, the next six-year cycle, the way it was reviewed, so we didn't want to leave pushback until the next six-year cycle, because we felt like we'd already been pushing up against an existing frame for the NAP that would – wouldn't give us the same amount of influence or leverage as if we helped frame up the first – very first template of it.

So we were scared that if we didn't continue to engage, that we would lose that opportunity, and so we did feel pressured and under duress to shift and to reformulate that relationship in a way that still enabled us to keep some type of influence or some type of voice in it, but the slippage away from that original undertaking by MfE had already embedded itself by then, and just – when I say we wānanga'd it, we had juicy meetings late into the evening on our respective Zooms where some of us, probably me in particular, because I've probably got a shorter fuse for – for being hōhā with these things, was just like, "Let's walk away from it. Like, what – what are we doing here? They are again casting us or requiring us to cast ourselves into a space we didn't ask for, we didn't want. What are the net benefits?"

And again, really, at some point, the excitement and the opportunity shifted for us in those meetings and discussions amongst ourselves into a fear that if we didn't take the very limited opportunities that were being afforded to us, we would lose all opportunity to be at the table, so we agreed to that, but very reluctantly.

Q. Yes, thank you, I do understand your evidence on that point, both from what you have just said and also coming out of your brief.

I also had a question just briefly on the National Adaptation Plan, that first National Adaptation Plan. Ms Haira and Ms Rangi's evidence records that Ihirangi made a submission on the National Adaptation Plan during the public consultation period, which I think was in – between March and May 2022, and that submission emphasized that Māori should be empowered to develop a bespoke independent Māori climate strategy to direct the Māori Climate Platform and to address the unique concerns of Māori communities. Would you agree with that summary of the submission that Ihirangi made?

A. Yes.

Q. And so is – sorry.

A. We were, in some of our advice and discussions with some of the Crown officials that were working closely alongside us and – and had some of that history and knew how far we'd sort of moved from the original intent and tried to, in good faith, kind of do this dance, we were strongly advised inside that space, one, to manage our expectations, but two, we were kind of pitched the idea of the Māori Climate Platform. It wasn't our idea. The Ministry for the Environment had run out of time to really adequately reflect and to create the NAP based on or structured up around an indigenous worldview, which is what we were sort of pitching, and instead, sort of said, "We – we can't do that. We've run out of time. But we need to get the NAP up, because the timeframes are rolling on, so how about we attempt to carve out the space to enable that conversation to be explored further?" And so the idea of the Māori Climate Platform emerged to sort of say, "This will sort of provide the space within the structure to continue that conversation and continue that work."

But again, it was a compromised position from us. We again had discussions about, "What does that mean? What does a platform mean?". This was a shift from a sort of worldview and a framing up of a particular worldview or a bespoke Māori solution or approach to climate change into sort of kicking it for touch, it felt like, into the Māori Climate Platform, to say, "We'll get to that."

We'd always been worried about the sort of main frame of the Crown's climate response being framed up and then Māori things being retrofit to it, and the Climate Platform suggestion sounded like that to us, but again, we were being encouraged to manage our expectations and – and did genuinely feel that there were some Crown officials behind the scenes that were doing a lot of work to convince their colleagues to keep the sort of door open and this Māori climate platform idea emerged as a kind of middle ground where we would park the kind of aspirations into that entity or the creation of that entity and sort of re-stand them up once the NAP was through, but yes, a compromise kind of thing.

We then put a submission in that said we would be – one, that like you're saying, that we did advocate for a bespoke Māori approach to things, and we made, you know, comments in regards to the pursuing of a Māori Climate Platform, but not ideal space for us.

Q. Thank you. That's helpful. I had taken from – from that, through the Crown's evidence, that Ihirangi were broadly supportive of the Māori Climate Platform, but I think – and I am just going to put this to you to make sure that I have understood correctly – that you were supportive of it, but in the context that you were operating in at the time.

A. That's right.

Q. Ka pai. Thank you. My next set of questions are about the Interim Panel and the Māori Climate Platform, but Ma'am, I might just turn to you to see if you want to take a microbreak now.

HEARING ADJOURNS: 9.59 AM

HEARING RESUMES: 10.05 AM

(10:05) MS SEELEY TO DAYLE TAKITIMU: (CONTINUES)

Q. Thank you, Ma'am. Tēnā anō, Ms Takitimu.

A. Kia ora.

Q. So just, I guess, related to the matter we just spoke about, at paragraph 90 and 91 of your brief, you say there that the Minister for Climate Change, I think, would appoint an Interim Ministerial

Panel for Māori Climate Change, and that Interim Panel would be tasked with creating the proposal for the eventual development of that more permanent platform, and then at 91, you say, "To say we did not want this structure would be an understatement." And to me, that's a bit of a departure from the submission that you made on the National Adaptation Plan, and could you just explain the difference between those two perspectives?

A. Yes, sure. Like I said, it was known to the officials we were dealing with and to the Minister we felt under duress at that time. There was light years between what the original intention was and what we thought we would be collaborating on to the various sort of changes and narrowing of that scope into a completely Crown-controlled work programme and agenda to the standing up of this Māori Climate Platform with this Interim Panel.

And so, it is right what you're saying; along the way, we have agreed to certain things to – and as I've said, to keep the door open, and for fear that we would be excluded, because there was nothing within MfE that was giving us any sort of confidence that they understood their Treaty obligations to Māori, and we feared that walking away from these discussions would create a void and a vacuum.

All of the players in Ihirangi have been not just around the climate space, but around the Treaty space in various relationships with the Crown for a number of years, so we know that that's not an idle kind of threat, that's very real. We've seen ourselves and our voices excluded more often than not, to be frank, and so that compromised or duress position became where we're sort of – we were shifting to.

In hindsight, and you probably get this flavour from my evidence, looking back on it, we might have told them to decouple and to walk away from that earlier, if we'd known where the sort of end result was going to be, because we just sort of stayed in, in terms of trying to keep the opportunity live, but we did not ever really want the Māori Climate Platform.

I was involved in the – in some of the reforms that were going on for the Resource Management Act regime at the time, not through Ihirangi but through an iwi representation, and at that time, there was a genuine fear

amongst us that the, I guess, the context of this is that the RMA reforms were moving at pace, the freshwater issue was live, and the climate issues were live, and there was a genuine fear that some of these big kaupapa for Māori were going to be dealt with the way that the Crown dealt with Māori fisheries, by setting up a national body that would then administer Māori rights and interests and essentially keep the Crown arm's length from its own Treaty obligations by coopting them to an entity it established, and so with that in mind, we were fearful of the Māori Climate Platform becoming like a Sealords-type solution, like a Te Ohu Kaimoana-type solution.

There'd already, in that sort of environmental context, been mooted a similar type of structure for freshwater, that there'd be a national entity for freshwater, and a key group of Māori experts to sort of sit on that to resolve tikanga issues, and these all, for us, created a – an environment of extreme caution, and so even with the Māori Climate Platform, we were dubious about how that would be stood up and utilised by the Crown.

A. Kia ora. Thank you, yes, yes, I understand your evidence on that point, and yes, I sense what you are saying about your reluctance to get involved. I am taking that from your evidence. But nevertheless, you did, with the support of the National Iwi Chairs Forum, which you speak about in your evidence, and proceeded, and then, again, moving to about paragraph 111 of your brief, you say that you got stuck in contract negotiations for the Interim Panel with MfE again, I suppose referring to those contract negotiations you had earlier had and the challenges that you alluded to there.

But the point I was interested to ask you about is paragraph 115. You say that every step of the way, MfE pressured you to have an independent legal entity that they could deal with, and you say that this posed issues for you as it risked severing genuine accountability to iwi and Māori and isolated the trust and MfE relationship in a way that you did not think was pono. Can you explain why creating your own trust entity risked severing that accountability to iwi and Māori, in your view?

A. Well, a charitable trust is regulated or governed by its own piece of Crown colonial legislation, and so it becomes an entity within an imposed colonial

framework that is not organically Māori, where the authority stems from the land and from the people who maintain relationships with the land in the way our indigenous populations do, so again, it was inconsistent with MfE's first approach to us that they would take us as they found us, and instead we were required to sort of morph into these different entities that the Crown deemed legitimate or able to deal with inside a Crown framework.

Q. Mārama. Would you accept, though, that public resources do need to be transparently managed and allocated when they are allocated and that there needs to be some framework in place for doing that?

A. Well, there's no issue with transparency and accountability. That's the – that's the point in 115 about being pono. We are governed by our tikanga, which is in a constructed set of rules and regulations. It requires us to be accountable concurrently to our tīpuna and our mokopuna. There's no greater level of accountability and transparency. I don't for one second accept that Crown structures or entities under colonial legislation have the monopoly on accountability and transparency.

Q. Kia ora. Thank you. And then, in August 2023, the Interim Panel met with the Minister of Climate Change and presented the proposals for that second phase of the platform, and that was the proposal – well, it included the proposal to establish the independent Oho Mauri Trust. Is that correct?

A. Correct.

Q. And that was agreed to by Cabinet in October 2023?

A. Mhm.

Q. Followed by two deeds of contribution, and in Gina's evidence, I think says that that's in – sorry, Ms Haira and Ms Rangi's evidence says December 2023, and yours says November 2023, but around the end of 2023, those two deeds of contribution were agreed.

A. Mhm.

Q. And this was just a point that I would like to clarify, because I think there is some discrepancy between your evidence and the evidence of Ms Haira and Ms Rangi, or it requires some clarification.

So, at paragraph 144, you say that you were able to deliver all the milestones required by those deeds, except for the bank account, which was delayed because of the summer break/shutdown and some other related challenges. But Anne and Gina – Ms Haira and Ms Rangi's brief appears to contradict this, and they say that that some of the deliverables under milestone 1 and 2 and 3 either were not met or had some issues. You say at 150 that you "did a little dance, as happens with Crown bureaucracy", about whether the milestones had been met to the satisfaction of all the parties, so I just wanted to confirm, in your view, had all the deliverables under the milestones been achieved, except for the bank account?

MS TE WHENUA:

Excuse me, Ma'am. Ms Te Whenua here. Ms Takitimu has noted that she has perused the joint brief of evidence of Ms Haira and Ms Rangi but not in detail. If Ms Seeley could kindly us to the paragraph that she is referring to to remind Ms Takitimu of the milestones that she refers to?

MS TAKITIMU:

That's okay. I can recall them, because that particular part of that brief of evidence was illuminated to me because of course it does, as you point out, set out the discrepancy or difference of opinion, so I can recall that; that's all right.

(10:16) MS SEELEY TO DAYLE TAKITIMU: (CONTINUES)

A. Their contention is that we didn't meet the milestones and therefore didn't deliver on our contractual obligations.

What I would note and I think have noted in my brief is that it's of important note that there was a general election in the – in that time period, in October 2023. The Crown policy was shifting at pace, as you know. There was a significant change in regime at that time that was ushered in by that election, and to say that some of these milestones were discretionary or required a level of agreement, could we anticipate that that agreement wouldn't be or would be withheld? Yes. We always knew that. We – that the – that there was the scope for the Crown to do as is

set out in the affidavit of Anne Haira and Gina Rangi, present an interpretation that we did not perform our obligations and that we fell short of a Crown measure, but because some of those were discretionary on the Crown in terms of giving or withholding their agreement about that, there was – certainly my perspective is there was an element of deliberate frustration by the Crown in withholding that agreement.

We – there's emails gone backwards and forwards and discussions gone backwards and forwards to say, "Do you agree this milestone's been met? What else do you need in order to be satisfied that this milestone has been met? Can you please confirm your satisfaction that this milestone has been met?", and we were getting inconsistent communications about that. We were getting emails or communications back that would deal with some of our information requests but not the key ones about putting in writing a satisfaction that – that a milestone had been met or a particular deliverable had been achieved.

And so do I think the disagreement was manufactured? Yes, I do, because I can hand on heart say we delivered, and the only thing that was not stood up, through the passage of time and the time of year we were dealing with in early January 2024 and trying to deal with trustees that were geographically dispersed around the country and coming off a summer break, the ability to set up a bank account and go through all the anti-money-laundering hoops and stuff like that proved challenging. Just the – it was challenging in terms of just the time it took us to get signatures and get them to the right place and get the legal advisors we had to set that up, but yes, I just don't agree. I don't agree at all that we didn't fulfil our contractual obligations and meet those milestones.

A. Kia ora. Thank you. I understand your evidence on that point, and that was my last question. E mihi ana ki a koe mō tō kōrero i tēnei ata.

Q. Kia ora.

A. Thank you.

MS TE WHENUA:

Thank you, Ms Takitimu. Tēnā koe anō.

Ma'am, if I may ask some questions of re-examination at this point?

JUDGE MILROY:

Yes, I was just about to ask you if you wished to.

MS TE WHENUA:

Thank you.

(10:20) MS TE WHENUA TO DAYLE TAKITIMU:

Q. Ms Takitimu, my first question pertains to a statement that you made where you said that it was your hope that they would – that the Crown would invest in the work that we were doing as Ihirangi and the trajectory that you were going on. Are you able to comment on what work you were doing and what that trajectory was?

A. Sure. We were working hard, a lot of us, in our sort of private or voluntary capacities, to equip or empower our people at ground level, whether that be hapū or iwi at ground level, whānau, marae, at ground level with what we could see was the impending or looming climate crisis, and we felt that – we had felt for a number of years, way before these engagements, and you can see that by the work record of each of the individual members and particularly Mike Smith and Hinekaa Mako, i.e., a huge investment over a number of years trying to ring the alarm bells for Māoridom to say, "This climate change issue is real and it's significant and it's not off in some fanciful future, it's on our doorsteps right now. Kia mataara tātou. Kia rite."

And some of that comes – we had a impression, being close to the ground, close to our own people, that Māoridom were unprepared for climate change and significant climate disruption, and Māori being, as we have sort of seen, disproportionately affected by the potential impacts of climate change, here in New Zealand in particular, but around the world, that's a similar position for indigenous people, because of the socioeconomic positions they find themselves in as a response to colonisation, but also the land loss, extreme land loss that we've faced historically and the fact that we often occupy rurally isolated and coastal

communities, which will be affected and are being affected right now by climate change.

Some of these things were being spoken about at in international and national level in a way that – I mean, "climate change" itself as a label doesn't endear a lot of excitement for engaging people and sort of saying, "Hey, you know, these things are important and they're going to affect your communities in a disproportionate way."

We had been involved in work to increase awareness about that and education about that amongst our own, and the aspiration, I guess, or the common aspiration between the members of Ihirangi was that in having an obligation to our mokopuna and knowing the state of our communities as they were and are, that climate change and climate disruption was going to give us a hiding, certainly physically in terms of the weather disruption, the rising sea levels, the salination, those sorts of things, the erosion of land, and the extreme weather events, and we obviously were concerned that the state or government response to that would likely not cater well to Māori interests or, again, our experience that Māori – consideration of Māori issues would be retrofit to a otherwise completely colonial schema, and so we were ringing the bell amongst our people, one, to provide education and readiness, and the ability for our people to exercise their own agency, which of course is core to the exercise of self-determination, and we wanted our people to be – still want our people to be self-determining in the face of climate change and to be part of the culture shift required to mitigate climate change and also to be thinking proactively and putting actions and measures in place to adapt.

We knew, for example, in terms of preliminary analysis, in regards to my own people in Te Whānau-a-Apanui, we have a low-lying coastal iwi. We – because we are mokopuna of Tangaroa, occupy the spaces right down by the coastline. We know on preliminary, really rudimentary analysis, that we will likely have to move 12 out of our 14 marae over the next 20 years to move them away from the vulnerability of the coastline and into higher spaces and more sustainable spaces. We know to move a marae within Māoridom takes a massive amount of negotiation and into sort of cultural nuance. We know that, because we've done it before throughout

our history. And so we were worried if Māoridom and some of our coastal communities left those discussions and those deliberations and that planning too late, then nature itself would make those decisions for us, and we knew enough of the broken and dysfunctional Treaty relationship with the Crown that we could not rely on them for help. And we wanted to ready ourselves with our own resources and our own analysis and our own capacity to exercise our self-determination in the face of climate change.

Q. Thank you. Actually, I was going to ask a follow-up question for you to give a specific example of the work that you were doing, community-based, and what – around the trajectory and what communities were seeking, and so am I right in understanding that the Te Whānau-a-Apanui moving of wharenui and marae would be one of those examples?

A. It's a example that would be empowered by that advocacy and that education and of course then the iwi and the various hapū of Te Whānau-a-Apanui would make their own decisions.

We knew it was going – they would be big decisions, because as I said, we're Tangaroa people, and to move ourselves away from the coastline into the domain of Tāne would be – would be difficult, and it would really change – or have an impact on the identity – our identity as a people, and we of course had some issues with being able to move inland, because the government at that time was pimping the Raukūmara for oil exploration, and so we had some issues with where we would then be left to occupy spaces on our traditional homelands, so it could have been one of those things and each of the – that's not necessarily Ihirangi-driven, but Ihirangi would be part of a, I guess, jigsaw puzzle of advisors or information conduits into a process whereby a hapū could exercise their rangatiratanga to make the decisions they needed to make. You know, that international standard of free prior and informed consent, that they would have good-quality information to make good decisions and then be able to execute them and have the capacity to execute them well; to have Māoridom move, fully possessed of their own agency and their own

rangatiratanga, in a space where our existence or our identity as we know it at the moment would be under threat and is under threat.

So there were a number, I guess, of whānau, hapū and iwi that were doing innovative things in this space, including the conversion of some marae to fully sort of self-sustaining. The planting, the – the whole indigenous food sovereignty movement is part of a response to that. Emergency readiness is part of a response to that. And we've seen pockets of that throughout Māoridom, that again, Ihirangi and other people working in these spaces are able to provide a bit of a clearinghouse of analysis to enable good decisions and sharing of ideas and those sorts of things, so it was – we, I guess, were attempting to be a fairly large kind of gun in Māoridom's arsenal to deal with or to rise to the challenge of climate change.

Q. Ka pai. Kia ora. My next question in some ways again touches on your answer to my previous question. It was around your statement that in being – engaging with the Crown as the interim precursor for the Māori Climate Platform, you felt that there was a need for you to – or a message coming from the Crown to manage expectations, but at the same time, earlier, you had mentioned that the Crown need to take its Treaty partner as they find them, so I wondered what, in your mind, blue sky thinking, what the Crown taking the Treaty partner as they find them might look like. What might Treaty-compliant partnership in the Māori climate engagement space look like to you?

A. Well, the Crown need to wrestle with themselves first. The Crown need to understand their own creation and their own installation on this whenua and the rules for engagement which are clearly set out by Te Tiriti o Waitangi and contextualised by te Whakaputanga and further articulated by the United Nations Declaration on the Rights of Indigenous Peoples, and that sets a constitutional framework that the Crown would do well to examine their place within, and that is not the place they currently occupy, and I believe the Crown need to understand the nature and the limits and the extent of their authority or their presence here in Aotearoa and then work from that point, and to do that more genuinely, not to interpret that as has been done for a number of years to suit a

particular Crown interpretation or agenda, but genuinely on the face of the relationship and the history, the acknowledged history; the findings of this Tribunal over a number of years, including notably in Te Paparahi o te Raki, where sovereignty was not ceded; and to ask itself what that means – what that means to be a Crown operating in a space where indigenous sovereignty has not been ceded.

What it means for me is that our rangatiratanga is indisputably still intact and that the Crown must engage with us in that capacity, including the setting of these responses and these frameworks. So you'll see a lot of the – either the Crown evidence or the Crown questioning starts around the area of either the National Risk Assessment or the NAP, but what's already been established is the parent legislation that drives all of those things. That's already been set unilaterally by one Treaty partner, and Māoridom have not been part of the creation of the frameworks for the national response to that, and my understanding of our rangatiratanga still being intact is that we are entitled to be co-designers and set that national agenda and that national response in a way that takes into account our unbroken and inalienable rights.

And so even this idea that's been presented about intensity of engagement or frequency of engagement, those are not metrics for honourable Treaty implementation.

Our ability to affect decision-making on matters that affect us or our land is hardwired into an international human rights framework at this point, and so – and it is carved out in Article 2 of Te Tiriti o Waitangi, and those things, we need a – these – that's why I've sort of said in the initial presentation of my evidence some months ago that these, at their heart, are constitutional issues, because until we have the maturity as a nation to have those constitutional discussions, we are always going to get Māori responding to a unilaterally set or imbalanced Crown response, because we haven't had that wrestling or reconciliation with the constitutional issue that has essentially rendered us powerless in a political way on our own ancestral lands, despite the fact that before the signing of te Tiriti, we knew we were fully possessed of our own rangatiratanga and we were

making governmental-type decisions for the stewardship of our own people.

We were, and I've said in my evidence, we were not incomplete peoples in 1840. We had complete systems, societal systems, that regulated and anticipated what our populations would need, and that has been usurped by the Crown misreading and misunderstanding of their Treaty relationship, and these things in 2025 and in the preceding years around the setting up of the climate panel or the Crown's climate response, are now seen within that context, which is already significantly and problematically imbalanced.

In most places, hapū are the Treaty partner. In some places, that's been amalgamated into waka confederations or in terms of, you know, there'll be nuances for that around the country, in terms of the multiple versions of Te Tiriti o Waitangi that were signed, but certainly, where I come from, there's a hapū-centric view of how we live our lives and our tribal government and our tribal governmental functions, and that is reflected in – in our understanding of our Treaty relationship.

So, again, like I allude to, we get thrown off in that that's administratively inconvenient for the Crown, but it is administratively inconvenient because they have spent 185-odd years now setting up institutions of power and rules and regulations that render it inconvenient, instead of spending a chunk of that 185 years asking themselves how they can properly honour the obligations they committed to in 1840.

Because we find the Crown administratively inconvenient, too, I can tell you that. We have to deal with the Crown in multiple different personalities. Even this evidence that's been put before us in terms of the – the joint brief by Anne Haira and Gina Rangi presents the Ministry for the Environment as speaking with one voice, and I can tell you in our dealings with them that was not the case at all. We would have some people ringing us telling us one thing, another person saying, "Do it this way. You can get it through this way. You can do this." There was a whole ambit of personalities of the Crown that we were dealing with and had to navigate, and I invite the Crown to be courageous enough to look at themselves and the nature and extent of the relationship that was

determined and that they agreed to voluntarily in Te Tiriti o Waitangi, and to really tease out what that means for their exercise of power here.

A. Thank you.

HOUSEKEEPING – TIME MANAGEMENT (10:39:48)

HEARING ADJOURNS: 10.40 AM

HEARING RESUMES: 11.01 AM

JUDGE MILROY:

Kia ora anō, Ms Te Whenua. If you would like to ask your last two questions of Ms Takitimu.

MS TE WHENUA TO DAYLE TAKITIMU: (CONTINUES)

Q. Tēnā koe, Ma'am, and out of respect for yourself and the panel, and our witness in waiting, I will ask just one final question, and it's to – really intended to close the loop on the evidence and the tension, as I understand it, between a Crown-constructed form of engagement and a Māori-led one. So, the question, Ms Takitimu, is how can the Crown, taking its Treaty partner as they find them, through your explanation, this notion of hapū rangatiratanga, at the end of the day, better translate to reducing climate impacts on Māori.

A. Yes, kia ora. I think, just out of respect for the time available, probably the best thing to do would be to say that that analysis is captured within the Rauora model that Ihirangi authored and advanced. That sort of has some of the underpinning analysis, but also, that Rauora model depicts an indigenous world view that centralises interconnection, collectivity, holistic wellbeing and that idea of intergenerational equity within the sort of changing environmental dynamic.

So, there, within Rauora, and if I can refer the Tribunal to some of that analysis as it's set out in the Rauora framework when it introduces what the framework is and what it's based on, it really looks at addressing existing inequity, but the rebalancing of the equation so that hapū and iwi

are able to assert their rights to control, manage their ancestral lands and territories, their waters, and the natural – te ao tūroa that we exist as component parts of, not separate from. And so the shift from the sort of masters of the universe allocation and pushing the limits type model is flipped on its head, essentially, in Rauora, to say we move from a place of optimal performance of ourselves and our – and the environment that we exist within and Rauora is about abundance and an optimal space, and it shifts the thinking in terms of how, in response to climate change, solutions are addressed at place within local communities and in respect to the traditional worldview or mātauranga that exists on the ground. So, the Rauora framework sets out a number of ways to do that and examples of where that's been explored and pockets of application of that throughout Māoridom.

But core to that is the ability to apply an indigenous lens, and not at a generic, national, sort of top-heavy way, but from the ground up, as our tikanga often is. It enables the important application of mātauranga Māori. It really looks at this idea of the return of lands to Māoridom that we have been dispossessed from and now sit outside of our tribal estates, often in DOC or conservation land ownership, and this idea that we will need to reformulate some of the ways that we currently occupy land to take into account climate disruption and the unavailability of large tracts of our ancestral estates from which to do that. Those are outstanding Treaty breaches in – in many cases.

But that recognition and shift of control and decision-making, and the recognition of agency at place for the indigenous populations is vitally important for us to have any chance of adequately managing climate disruption and the wellbeing of our populations. Of course, we have advanced – and we are certainly not the only ones who have advanced that. Without the ability to that, climate change and climate disruption will further re-entrench existing inequities, and that puts Māoridom on a hiding to nothing, and there's – we will be essentially annexed to or retrofit into schema that really don't take into account our worldview or our inherent right to be self-governing and to exercise our own agency in that space.

And again, our lived experience in this space has demonstrated that to us. We have noted that, although not a climate scenario so much, but we noted that with the Rena – the grounding of the Rena in the Bay of Plenty. The isolated Māori communities, including my own in Te Whānau-a-Apanui, were the forgotten mile, and we were left, really to deal with the impacts – catastrophic impacts – of that oil spill by ourselves, while most of the Crown resource was pumped into Tauranga and Papamoa. But our communities and the communities at Maketu and further up the Cape, at Kauaetangohia, Whangaparaoa were left to really scramble around amongst ourselves to combat that.

That's also similar to the experience our Tairāwhiti whānau had in the aftermath of Cyclone Gabrielle. These sorts of experiences are known to us, and in order for our populations to really address our stance and our response and our action to address climate change, that return of the recognition of our agency and our constitutional entitlement to our agency is vitally important.

Q. Tēnā koe, tāku whanaunga. Tēnā koe i whai wā mō tēnei, tō tātou kaupapa i tēnei ata. He mihi nui, tō tohungatanga kua tohatoha mai ki a tātou i tēnei ata. Nā reira, kei te mihi atu au ki a koe. Ana, ka whakahoki atu i te rākau kōrero ki tō tātou Kaiwhakawā ki te tuku i tana mihi ki a koe.

JUDGE MILROY:

Kia ora, thank you, and again, our thanks to you, Ms Takitimu, for being willing to come back to be recalled and for your evidence this morning, so thank you very much.

DAYLE TAKITIMU:

Kia ora. Kia ora rawa atu.

JUDGE MILROY:

So we now welcome Professor Gillespie, who I once worked with many long years ago. Nau mai, haere mai, Al, and I will leave you in the hands of your counsel.

MR EVISON:

Tēnā koe, e te Kaiwhakawā.

I would like to call on behalf of our claimants, our expert witness, Professor Al Gillespie, who will be speaking to the recent evolution of international law in relation to climate change and the rights of indigenous peoples. He will be speaking to his written brief of evidence at appellation Wai 3325, #A126.

MR EVISON CALLS

PROFESSOR ALEXANDER MATHEW GILLESPIE (SWORN)

Q. So, firstly, Professor Gillespie, can you please confirm your full name for the Tribunal?

A. Professor Alexander Mathew Gillespie.

Q. And can you please confirm that you are a professor of law at the University of Waikato?

A. That is correct.

Q. Can you please confirm that you filed a brief of evidence dated the 17th of October 2025?

A. I can confirm that.

Q. And can you please confirm that, to the best of knowledge, the contents of the brief of evidence are true and correct?

A. That's correct, yes.

Q. Further, can you please confirm that in your brief of evidence, you confirm that you have read and agreed to comply with the code of conduct for expert witnesses set out at schedule 4 of the High Court Rules?

A. I have.

Q. So with that, Professor Gillespie, I will leave it to you to introduce yourself to the Tribunal and to proceed to speak to your brief of evidence.

(11:12) PROFESSOR ALEXANDER GILLESPIE: (#A126)

Thanks, Luke. Tēnā koutou katoa, Judge Milroy, Ms Kapua, Mr Prime, Mr Morrison, Professor Williams, it's good to be here, although I must admit it's somewhat strange after working in the area of international environmental law

for, well, nearly four decades now, and as Judge Milroy said, we used to work together, well, not so long ago, let's just say it was a period ago.

I'm going to speak today in a very – I'm going to try and keep it brief. I want to just talk, primarily, about my main points of what we can look for and learn from international experience. My finding in this area is looking at recent court cases between the International Court of Justice, the International Tribunal of the Law of the Sea, the Inter-American Court of Human Rights, the Human Rights Committee of the UN, and the European Court of Human Rights.

WITNESS REFERS TO BRIEF OF EVIDENCE #A126

The way I work in my own area of expertise is often to look to see what other countries are doing and other international bodies are doing, because it makes it easier for us, because we have a tendency as Kiwis, to try to sort things out and assume we are the only ones going through it. So, the way I work at is just like, well, say if someone else is solving it or looking at this problem, why not in our country? And this is a very brief overview. I had a very short amount of time, about 18 hours to write what I could, and so this is just the highlight points that I want to get across from what other bodies have recognised so far.

The first thing to note is that the problem is very serious, and all of the international bodies are accepting this, and this is next to the risk of nuclear war. Climate change is the biggest threat to humanity.

The question that the bodies look at is whether it's an emergency or not, and "emergency" is a difficult word, and there's always a risk here because of the continuity and the time involved before the impacts start to happen, and part of the environmental community has become troubled by the fact that it's a bit like the boy who cries wolf, and like, if you start saying it's an emergency and it doesn't turn up the next day, people become unconcerned, and then when it does happen, they are not prepared.

So, what we can tell you from the international work is that the Inter-American Court of Human Rights considers it an emergency. It is the

word you would most likely want to use. It's a dangerous time, and we use the word “dangerous” from the Framework Convention on Climate Change. We define “dangerous” through the Paris Accord, and so, we can say it is dangerous and it is imminent if you use the wording from Paris and the Convention.

Everyone, all of these bodies that I talk about, all the major international bodies, they accept the Intergovernmental Panel on Climate Change. And so, there is no questioning of the science, and so the IPCC itself explains that climate change is a threat to human wellbeing and planetary health. And so, the reason I'm raising this right at the beginning is, sometimes in all the details, we lose picture of what the concern is, but we are looking at an almost existential crisis coming upon us, and the challenge for us is that it's happening as we are part of the experiment, and that makes it difficult to see and respond. But the evidence is clear, and the international bodies aren’t seeing it.

My second point, protect the messengers, and this is coming through from the Inter-American Court on Human Rights. So, it's not just about the science, it's about protecting those who speak out in defence of the science, and making the point that it's not just saying that those people who are spending their time in laboratories are important, but the environmental advocates are important, and this concern that we are seeing in the Americas is being repeated in other parts of the world, where those who speak out are at risk, and there's an importance of the judicial bodies to protect these people. Sometimes it's journalists, sometimes it's minority groups, sometimes it's indigenous peoples. But we should not underestimate the risk that these people are at for speaking about the foremost concern.

In addition to protecting the messengers, the point that comes through some of these bodies is the importance of protecting science, because we live in an age of misinformation and disinformation and manipulation, and there is a scepticism about basic science in everything from COVID to climate to contrails, and the protection of science and the citizens’ right to science is a basic human right, and so a number of bodies are now saying you have to defend the

science. When I say science, I'm not just talking about Western science, because where the climate change regime is unique is it explicitly recognises traditional and indigenous knowledge, and this comes through from the Paris Accord, and it's in article 7.5, and that states should "be guided by the best available science and as appropriate, traditional knowledge, knowledge of indigenous peoples, and local knowledge systems". So what the law is telling us here is about protecting the science, understanding that response involves indigenous knowledge, and protecting those people who speak out. These are the first concerns to be aware of.

The next thing to note from ICJ, from the International Tribunal of the Law of the Sea, is that this is an idea that – like, I work in international law a lot, and increasingly, what we are seeing is that it's no longer about trying to create new rights or new understandings, or new obligations. It about defending what already exists, because we are at a point in our history where many of the things that we assumed were set in concrete from the 1990s are being eroded.

And so, what the courts are telling us is that substantive obligations already exist. It's not about trying to create new obligations, it's about honouring the existing obligations. And the substantive obligations are first, that no state should do significant harm to the environment, and this is a clear rule. No state should do significant harm to the environment.

That obligation goes up a notch with climate change if you have signed the Framework Convention on Climate Change, which New Zealand has, and it goes up a further notch if you have signed the Paris Agreement, which New Zealand has. And so, it's not about new responsibilities, it's about honouring the existing responsibilities.

There's six points that need to be drawn out in terms of what we need to honour from the existing responsibilities. Adaptation, co-operation, a precautionary approach, environmental impact assessment, financial transfers and good faith. These are – each one is measurable, each one you can show a responsibility

of the state to undertake in terms of not just responding to the international crisis, but also, I would argue, to its domestic adaptability.

The fifth question is about due diligence or enhanced due diligence. Here, international law says that each state must show due diligence to prevent harm to other states, and this is accepted by the International Court of Justice; it's already an obligation. The question is whether you have to have enhanced due diligence, you have to do more, and the international bodies on this point are divided. Some are saying just due diligence, others are saying enhanced due diligence. The difference between standard due diligence and enhanced due diligence depends on how you see the risk and the responsibilities. If you see the risk higher, if you see the impacts higher, then you should do more **(inaudible 11:20:06)** what was deemed reasonable in the settings.

The sixth point, which is coming through clearly in international environmental law and international law now, is this is all connected. You cannot protect the ozone layer without solving climate change. You cannot stop desertification without solving climate change. You cannot work on deforestation unless you address climate change. You cannot – and I would take it a step further, you cannot honour the United Nations Declaration on the Rights of Indigenous People unless you work on climate change.

So, in earlier generations, we were at a point where rights were seen and responsibilities were seen as separate, and each convention was in a little box, and you would focus on one or the other. But now, we are seeing that one theme above all else, which is climate change, will mean that all of the others are at risk of breach unless we concentrate and solve this to begin with.

My seventh point, vulnerability is changing. Vulnerability in international environmental law was often divided. I used to work as the Rapporteur for the World Heritage Convention, and we spent a lot of time on vulnerability for communities and indigenous peoples, and then, I did work at the Convention on Biodiversity and also at the International Whaling Commission,

and in each of these conventions, we understood that the focus on vulnerability was on communities, local bodies, indigenous peoples.

Climate change, for a long time, was different. Because of the politics, they kept these debates about communities and local impacts out of the negotiations. That all changed with Paris. In Paris, it flipped, and the need to recognise that vulnerability also includes local communities, migrants, children, people with disabilities and indigenous peoples became part of the dialogue. And so, in 2015, climate change response changed, and we recognised vulnerability, not just in terms of poor countries, but in terms of at-risk communities, so this has changed the ambit.

My eighth point, human rights and climate change are now interlinked. The body of international human rights law has been in a process of evolution since the end of the Second World War. It starts off as first-generation human rights, and we talk about civil rights and political rights about liberty, equality. Second generation is about economic, social, and cultural rights. And then the third generation is about collective rights, and international humanitarian law is now moving towards the third generation, and in this, we are seeing the interlinkage between human rights and climate change, and the cases are all saying the same thing: that for a long time we used to assume that human rights was in this box and climate change was in this box. But now, to quote the ICJ:

> States have obligations under international human rights law to respect and ensure the effective enjoyment of human rights by taking necessary measures to protect the climate system and other parts of the environment.

And so, you can no longer say that they're separate. If you want to protect the communities, climate change law and human rights law at the international level have completely synchronised.

Point nine, the particular vulnerabilities and the overlapping risks.

Here is a difficult thing to say. Climate change is going to have winners, and climate change is going to have losers. Not – everyone will lose in climate change, but some people will lose more than others. This is important because we can see that in very simply in international terms, those who have got more money are going to adapt quicker than those who have got less, and the chasm between those who have it, and those who have not is going to widen.

And so, what we are seeing is that those who are dispossessed, those who are already at risk, those who are the vulnerable, the women, the children, the minority groups, the indigenous people, climate change will – it is expected will multiply their disadvantages. And the risk here is that, as it multiplies – and it will be worsened for some people, not just because of their economic deprivation and the colonial injustices that happen to them, but also because of their geographical position, and so, certain communities, because of where they are located in the ecosystems, are more at risk than others.

And what the international law is telling us, especially through the separate opinion of Judge Charlesworth in the ICJ is that – and this was not part of the main judgment, but it's an important part of the side judgment to read. Is that the tangible and the intangible impacts on indigenous communities will be manifest and they will be very large. But, as I say to begin with, this is not something which will impact all indigenous communities the same. And so what the law is telling us now is that you have to focus on each individual community. You have got to look specifically, because some are more at risk than others.

Certain – point 10, certain rights are particularly at risks, and these are existing rights. These are rights in international law, which already exist. These are not fanciful, these are not to be created, these are not utopian. These are rights which have existed since 1966 and these are the rights to life, the rights to privacy, and family life, and to minority rights.

And you can go through my – the cases that I have read, and I am happy to answer questions about them, but the point I want to draw out is that the right to life and climate change is not yet strong. And that's because what you need

to prove a breach or someone to become a victim of a state obligation **(inaudible 11:27:03)** the right to life is urgency, and if you are looking at a 10-to-15-year period, the international courts are saying that's not urgent enough. And so, the international courts or the international tribunals are moving away from the right to life and climate change.

But where the international tribunals are making progress is over the right to a private life and family life, and minority rights, and here we are seeing there are breaches that are occurring, often with indigenous communities and the timeframe of 10 to 15 years is not being applied in the same regard. This jurisdictional issue is evolving quickly. The issue of time is important, the issue of adaptation and the governments making a difference between what they apply now and in the future is important, but the specific impact or intensity on a particular group must be shown under international law. It's not enough to just say that because we are a group of elderly women from Switzerland, that we are more at risk of a heat wave stroke. You have to show why that group was, what their impact was, and why the response of the state for that particular group was inadequate.

My final point, international law is beginning to change, and as we move from this holistic approach, whereby human rights law, international environmental law, basic rules of international responsibility are all overlapping, new thinking is starting to evolve and the new thinking that's starting to evolve is about the consideration of future generations. And that is whether our generation has a responsibility to act to defend future generations. In philosophical terms, clearly, we don't know who these people will be, but we do know they will come here and that they will be someone who will benefit, or someone who will pay a price for the acts of this generation.

The view of the International Court of Justice is that intergenerational equity is a manifestation of equity in the general sense, and it shares its legal significance as a guide for the interpretation of applicable rules. Here is the key part: "Due regard for the interest that future generations and the long-term

implications of conduct are equitable considerations that need to be taken into account".

Now, the language of the ICJ is important in this, because they are not saying intergenerational rights, they are saying intergenerational interests and due regard. So, they are not at the point of saying that the future generations have rights that must be taken into account, but they are saying we know that they are coming, and we must take them in part of our decision-making.

Okay, I'm going to stop talking fast at that point because there's enough to think about and hopefully answer some questions.

Panel, Judge Milroy, thank you for listening to me, it's good to see you all again. I'll now be happy to answer anything that people have to ask of me.

JUDGE MILROY:

Thank you, Professor Gillespie. We have questions from the Crown.

(11:31) MR PREBBLE TO PROFESSOR ALEXANDER GILLESPIE:

Q. Thank you, your Honour. Tēnā koe, Professor Gillespie. Ko Jeremy Prebble tōku ingoa. Kei konei ahau mō te Karauna.

A. Kia ora.

Q. Thank you very much for your helpful evidence and the concise summary that you have just provided, highlighting priorities that we face. I had just a few questions on your evidence and the first was really just about the scope and intent of it. I understand, reading your brief, that it's really seeking to helpfully draw out what are the key obligations and principles from a range of different treaties, bodies and jurisdictions for the benefit of the Tribunal and parties. Is that fair, from your perspective?

WITNESS REFERRED TO BRIEF OF EVIDENCE #A126

A. Yes and no. The timing of my presentation didn't work out as I had hoped and so, I had a very small amount of time to – I had 18 hours to write what I could conclude from recent cases. I mean, this is the kind of thing – like, I have written a lot of books, including books about climate change, and I

could write you a book in this area. And so, in the 18 hours I had, I focussed on the recent tribunals, with a view to **(inaudible 11:33:09)**, these are the highlights, and it's not – I'm not trying to say that this is right or wrong, I'm trying to show you that this is the decisions that bodies dealing with comparable issues have come to, and that way – and then, for our case, for the Tribunal, that they may find it helpful, they may not, but in my experience, the comparative knowledge is often useful.

Q. Tēnā koe. That makes sense and well done on your putting together of your evidence in 18 hours, that's very impressive.

A. **(inaudible 11:33:42)**.

Q. I guess the corollary of that is I understand your evidence and I think you'd accept that it's not therefore seeking to demonstrate that the Crown is currently in breach of its international obligations. Those issues remain at large for the parties and the Tribunal. Is that fair?

A. That's correct. I'm not – I mean, I'm happy – if you want me to answer or do research on whether the Crown is in breach, I can do that. This is not that research. This research is just about what other international bodies have concluded on similar questions that we are also looking at. But it's not about whether the Crown is in breach, that's correct.

Q. Kia ora, thank you. And just moving into your actual brief, you refer at paragraph 25 there – this is where you are talking about human rights and climate change, and the failure to comply with international climate related commitments as a potential breach of obligations in those treaties, and also, potential breaches of significant human rights laws, and you have explained that connection now being drawn in your oral presentation. And again, I think you are saying that as a general statement of principle, in that to actually look into this matter requires a degree of focus on a particular number of factors, which I just wanted to take you through. So, for example, in order to determine whether there's a breach will depend on the relevant treaties that are said to be at issue, you'd agree with that?

A. Yes.

Q. And you would also agree that you need to focus on: What are the rights that are at issue in any particular case?

A. Agreed.

Q. Then you would look at the nature and extent of the impact, and I think you referred to that in your oral presentation, that you do need to look at how the particular person or persons are being impacted upon?

A. Correct.

Q. Then you would also look at the action of the state actor and whether or not that state actor is said to be in breach of the particular rights?

A. That's fair.

Q. And whether the claim is international or domestic in focus, as that will obviously require different considerations, depending on how the state has given effect to its international obligations?

A. The focus on the ones I have done is the international response, not the domestic response.

Q. Yes.

A. Although sometimes, with the cases that have come up, their domestic responses have been examined in the international setting.

Q. Yes, no, I fully appreciate that. I was just putting to you that obviously, where the claim is placed will depend on what instruments you are looking at, and if it's domestic in focus, you will be looking at both international and domestic legislation.

A. Yes, yes, that's right.

Q. And if there is a potential breach, there could also be some consideration as to whether there should be discretion for the state as to how it gives effect to its international obligations, and you'll be familiar, obviously, with the concept from the European Court of Human Rights as to the margin of appreciation that a state might have in addressing some of these rights?

A. The margin of appreciation and what is reasonable in the circumstance. Yes, I – I think that's fair comment. But – but that will often – it depends whether you are looking at the domestic setting or the international setting, but yes, that's a fair comment.

Q. Yes. Yes, thank you. And I guess, just looking at that practically, obviously you have talked about cases like *Billy* and *Teitiota,* which you refer to, indicate how important the consideration of the facts are in any

particular case. I think you'd therefore agree that those cases highlight, you really need to look at the rights engaged and how the facts are said to give rise to a potential breach. That's fair, isn't it?

A. It's actually a point I would underline, that – that you can't speak, or you shouldn't speak in generic terms. We know that certain people, certain groups are more vulnerable than others, but just because you are member of that group doesn't mean that you are necessarily going to be impacted. What the international experience is showing us is that you have to look very carefully at each claimant, because some people are going to be feeling the impact much more than others. But it's not just like, you are a member of this group, therefore you are vulnerable. Often you are, and there are general trends, but to prove the right's breaches under the international instrument, it has to be specific, it has to be tight, and it has to be timely.

Q. Thank you. And really just a last set of questions that are at a slightly more detailed level. You referred, in your evidence at para 40 and in your oral presentation this morning, to the right to privacy and family life, which, as you'll be aware, that was a key right in the *Urgenda* case. Correct?

A. Yes.

Q. And along with the right to life in that case?

A. Yes.

Q. You also outline that it was a significant right in the *Billy* case as well?

A. Yes.

Q. And I think the other really key right in the *Billy* case was the right to practice minority rights.

A. Yes.

Q. That's fair as well?

A. Yes.

Q. And yet you would be aware that New Zealand doesn't have an equivalent of the right to privacy and family life in our New Zealand Bill of Rights Act?

A. I'm aware of that, but the right that's quoted in the cases is the one that comes from the International and Civil Covenant.

Q. Yes, absolutely, and so, this – this, again, just underscores, and I guess, the point I was making, underscores really, when we are considering these rights, obviously with a dualistic constitution, as – as we heard from Professor Foster yesterday, we do need to consider carefully, how the state has implemented and given effect to its rights from international law?

A. Yes, that's a fair comment.

Q. Thank you, those were my questions –

A. But I would add, though, that we are also at a point where the trajectory is starting to really take off in international human rights law and climate change, and we are only just beginning to feel our way through the appropriate state responses. And so, the only certainty I have is that much more information is coming and is going to expand rapidly. I mean, the next one we are going to come out from is the International Court from Africa. That will be dealing with the same issues, and there is a growing consensus that the crisis is very serious and human rights and climate change are now very intertwined, but how that looks is going to take time to play out.

Q. Thank you, that's very helpful and interesting. Thank you very much for your evidence this morning.

JUDGE MILROY:

I will now just check if the panel members have questions for you.

BASIL MORRISON:

Thank you, Professor Gillespie. Having, of course, pre-read your brief of evidence, and then hearing the way in which you have spoken to it and presented it, I must congratulate you. I found it, not coming from an academic background, I found it very easy to appreciate and understand it, and I will relate to this in many a forum in which I engage in. So, congratulations and thank you for the way you have presented. Thank you.

(11:41) PROFESSOR DAVID WILLIAMS TO PROFESSOR ALEXANDER GILLESPIE:

Q. Tēnā koe, Professor Gillespie. David Williams talking to you now. Thank you for your greetings earlier on.

I have got two questions really. One is about the habit of international law instruments and decisions to use modifiers. So, the Inter-American Court of Human Rights talks, not just about a duty of protection, but a special duty of protection. The Paris Agreement talks not just about the ambition of state parties, but highest possible ambition. And my question is going to relate to the Inter-American Court of Human Rights, not just about due diligence, but enhanced due diligence, and you spoke about that in your initial presentation today.

So, my question is, how does this relate to the sort of evidence that this Tribunal has received? We have heard evidence that – that the Crown does comply with due diligence, in that, the government reports on compliance with the Paris Agreement meet the requirements of the auditors and the people that assess those reports from each government under the Paris Agreement, even though gross emissions and net emissions continue to go in the wrong direction so that the climate change, and to the real – for what the planet is telling the world, so to speak, is not improved by due diligence by the New Zealand government. So, does enhanced due diligence make any difference? What's the word "enhanced" mean and how might it apply to the sort of issues that we have to deal with in this inquiry?

Tēnā koe, Professor Williams. The way it would work, it's become kind of a semantic issue with the international bodies over whether – the highest body, the ICJ is "due diligence". But the other bodies are saying, potentially, "enhanced due diligence". The question is what is reasonable in the term, in the time that you have to respond, and reasonableness is set about or understood with regards to the seriousness and the impacts of the problem. And so, if you see or believe that the problem is serious, or the impacts upon in particular groups are disproportionate to other groups, then you should be doing more, not less. And so, that would mean, in terms of more help with adaptation, more environmental impact

assessments, more good faith consultation. It's not just about doing the standard things of ticking off boxes, it's about more, and particularly more for the communities which are most at risk.

Q. Can I just get clarification, your paragraph 18 talks about the ICJ obligation to act with due diligence. But the evidence we had from Professor – who did we have yesterday? – Professor Foster. The evidence we had from Professor Foster yesterday was that the ICJ recent Advisory Opinion talked about stringent due diligence. I'm sure that's right, so is – do you need to reframe what you say in paragraph 18? Because you seem to be saying the international – Inter-American Court –

WITNESS REFERRED TO #A126, PARA 18

A. Is higher –

Q. – has a higher standard of due diligence than the ICJ.

A. Yes. Yes, I read it as – I did see the Inter-American Court as a higher standard, so I did. But I'm happy to go back and check that point.

Q. Whether "enhanced" is stronger than "stringent", I don't know. There we are. So, my second question relates to the case before the United Nations Human Rights Committee, *Billy v Australia* – has been referred to this Tribunal in these hearings a couple of times, and I'm just wondering quite how relevant that might be to our inquiry?

So, one way of putting the question to you is, in the case of the Torres Strait Islanders that Billy was a member of, it seems that there has to be quite a high standard of proof of actual existing damage to their way of life on those Torres Strait Islands, so does that mean that that Human Rights Committee decision would not be relevant to Māori in general, but would, perhaps, only be relevant to those who have already suffered, for example, in the way the hapū of Tokomaru Bay suffered from Cyclone Gabrielle? As in, only people who can already show that the climate change is affecting them – is that what that committee says?

A. Well, what I read from that – so from that body of work I put together, there is the right to life, there's the right to privacy and family, there's minority rights. The right to life is harder to show breach with, unless it's imminent and direct. With the issue of privacy, family life and minority

rights, breaches are possible, but it must still be specific. You must show that that community is feeling more impact, and the governmental adaptation is not significant, or not enough for the response at this point. But you can't – so, your example about the communities which have already been impacted on –

Q. Yes.

A. – that would be – to me, that would show breach for the rights of privacy and family and minority rights, that's correct.

But that's just my assumption. I mean, it would have to be tested in the court, or in the human rights bodies, but it wouldn't be a breach of the right to life, but it would be a breach of the other ones, and that's what I get from that case. But I expect that this law will evolve quickly over the coming years and as each of these rights will become refined, we will get better benchmarks when a breach does occur.

Q. Right, right. Okay, good, thank you very much, those are my two questions. Thank you for your evidence.

QUESTIONS FROM KEVIN PRIME – NIL

(11:48) JUDGE MILROY TO PROFESSOR ALEXANDER GILLESPIE:

Q. Professor Williams stole my question about *Billy.* I did have one question though, about the right to life aspect of it and that 10 to 15 years' anticipating that there might be danger to life or loss of life was seen by the Tribunal as not – sorry, that court is not being sufficiently proximate. But I'm just wondering how that, as you say, how it might develop in future, because we have had evidence from Professor Naish to the effect that the one-in-100 year storm, by 2040? – a date like that, 2040, sometime like that – would be annual, and as we have seen with Cyclone Gabrielle, and wild fires in the United States, and even elsewhere, that people are dying now, and you know, everyone is attributing the violence of those events to climate change, and I think there is sufficient science to support that. So, did you have any comments to make about the development –

A. So, with the cases that were heard around the – well, we can call the 10-to-15-year period, they were talking about loss of habitat. And so it was as that the coastal areas were lost and as the water became polluted, and the thinking was that within 10 to 15 years, a state could intervene and fix that problem. But you are completely correct, your Honour, and I think you are one step away from the right to life being violated when we start to get deaths in violent storms that you can attribute to climate change. And so – but the previous cases were looking more about the impact on low-lying states, and so we haven't yet tested that question about the turbulent weather and those changes, but I think – I expect that will be where the right to life is violated, and I think that's just around the corner.

Q. Thank you very much for that. I think you are referring to the Swiss grannies' case, because I'm not sure how to pronounce the name of that case –

A. Yes.

Q. – when you refer to the fact that you are a member of a disadvantaged group, or a vulnerable group, that you still have to show specifically that –

A. Yes.

Q. – your situation is such that your rights would be breached?

A. Yes, and I think that that's the trend of all of the cases is that it's not enough just to be a vulnerable group. You have to show how you, in particular, have been impacted on, and that enhances the responsibility of the state to respond.

Q. I'm just wondering how that goes together, or how that is taken into account when we are thinking about future generations, because, well, I think it's quite difficult to think about that sort of thing, you know, in terms of Māori values, and I'm trying to think about it now, I'm finding it quite difficult to express the issue. So, as you will be aware, Māori take into account, not only their ancestors, but future generations. That's part of our tikanga, part of our culture, and I'm just wondering, are the international forums talking about the loss of culture, or the loss of connections, and so, those more intangible aspects that

Judge Charlesworth referred to, are they taking that into consideration, in terms of the breach of rights and so on?

With the international focus on future generations, some treaties talk about the interests of future generations, and the clear point here is that the International Court of Justice does not recognise the right to future generations, but it does recognise the interests of future generations. And the importance here is that once you say that someone has rights in the future, you have to try to define what those rights are, and you have to sort of like say, well, this means X, and you cannot do that. And that's where it becomes very difficult, because we don't know what's in the future. But to take a lesser standard where we just say, well we accept that the future generations are coming, and we should give due regard to their interests means an awareness without specificity of what we should do. Because I think, to be fair, I think we are all struggling with what this means for the future. But what the courts are saying is that they have interests, but we are not saying that they have rights.

Q. Yes, I suppose I'm having a difficulty in understanding what the difference is between interests and rights.

A. I think specificity.

Q. Right.

A. I mean, I'm just thinking about this as I'm speaking, I think if you had to say, the obligation that we have to the future, right now, would be in terms of what we have already committed to, which is the Paris Accord. And that's where you would get the obligations of how we should respond to the future because we have already made that commitment. Rather than trying to work out what the future may or may not hold, if we can accept what we have already agreed to and honour that, it might be a way of going forward.

Q. And I guess the other part of the question that I'm asking is in terms of our commitment to future generations, is that only taking into account the physical, you know, the maintenance of habitat and so on and so on, or – because I would say that Māori had a right now, in terms of future generations, to be able to transmit culture and to have future generations. So, yes, I'm just wondering how all that sort of interacts together.

It's a very difficult question, but the recognition of tangible heritage and intangible heritage is a division in our country. In terms of like, there's international conventions on the protection of intangible heritage, which New Zealand has not agreed to, but we have agreed to the ones that – so, we have agreed to the World Heritage Convention, but not the Intangible convention. And so, even in our own thinking, we have a dualism of what we think is worth protecting, and when you go into the future, trying to protect intangible heritage and cultural traditions is a different process to protecting the physical, but our own country isn't even clear what international obligations that we share. Other countries, it's easier, because they say we protect tangible and intangible.

But in none of the work that I was looking at, none of the cases did they particularly focus on the protection of intangible, although it was mentioned in evidence in a few of them. And so, again, this is an area which I think will evolve in the future, because it's not just enough to protect the tangible culture of a community. You have got to protect the intangible glue that holds it together, otherwise they are just buildings.

Q. Yes, thank you for that, and it's actually a question that I think this Tribunal has to grapple with, itself, which is why I asked you. Those are all my questions and thank you very much for your evidence this morning. I will hand you back to your counsel in case he has any questions by way of re-examination.

MR EVISON:

Thank you very much for your evidence, Professor Gillespie, and no, we do not have any further questions in re-examination.

JUDGE MILROY:

So thank you again, Professor Gillespie, and also thank you for being flexible in terms of when you were available to present, so it is good to see you again, and thank you.

HOUSEKEEPING – TIMING (11:57:05)

HEARING ADJOURNS: 11.57 AM

JUDICIAL CONFERENCE 12.06-12.24, RECORDED IN SEPARATE TRANSCRIPT

HEARING RESUMES: 1.19 PM

JUDGE MILROY:

Welcome back, kia ora anō, and welcome, Dr Cole, to our Tribunal inquiry. Now I will hand you over to your counsel to introduce you.

MS DARSHINI DORN CALLS

DR ANTHONY OWEN COLE (AFFIRMED)

Q. Tēnā koe, e te Kaiwhakawā. I will call the witness Dr Anthony Cole. Dr Cole's evidence can be found at appellation #A084, dated 6th of May 2025, and his speaking notes are appellation #A084(b), dated 18th November 2025. Dr Cole is giving evidence as a tangata whenua expert witness on behalf of the following claims: Wai 2607, Wai 3412, Wai 3413, and Wai 3414.

His expertise sits across indigenous transdisciplinarity, and he holds a PhD in theoretical ecology and mathematical modelling. He is the founding director of Te Toi Ōhanga, the New Zealand Institute of Māori Economic Development and Innovation, and has significantly contributed to the development of a Māori cultural accounting system known as Toi Oranga.

His evidence brings an important contribution to this inquiry as a cultural assessment of the Crown's climate change responses grounded in his expertise and experience across a wide range of disciplines.

I will just check, Dr Cole, that you are able to hear us and see us.

A. Yes, I can.

Q. And do you have your brief of evidence in front of you?

A. I do.

Q. And can you confirm that to the best of your knowledge, the contents of those documents are true and correct?

A. I can confirm.

Q. Thank you. And can you also confirm that you have read the code of conduct for expert witnesses at Schedule 4 of the High Court Rules and agree to comply with it.

A. Yes, I have read, and I do agree to comply.

Q. Thank you, Dr Cole. Now, I will hand over to you to introduce yourself and present your evidence to the Tribunal.

A. Thank you.

(13:22) DR ANTHONY COLE: (#A084, #A084(b))

Tēnā koutou katoa. E kore au e ngaro, he kākano i ruia mai i Rangiātea. Ko Tainui te waka, ko Tararua te maunga, ko Ōtaki te awa, ko Ngāti Korokī te hapū, ko Ngāti Raukawa ki te Tonga te iwi, ko Rikihana te whānau, ko Raukawa te marae. Ko Anthony tōku ingoa. E te Kaiwhakawā, tēnā koe.

My name is Anthony Owen Cole. I currently reside in Waipawa, Central Hawke's Bay, Te Matau-a-Māui. I am the founding director of Te Toi Ōhanga, the New Zealand Institute of Māori Economic Development and Innovation.

I have prepared a written evidence brief for the New Zealand Māori Council and Te Taumata o Pūtiki Wharanui.

These speaking notes outline essential findings and supporting evidence for my more detailed 104-page-long evidence brief that was submitted to the Tribunal on the 6th of May 2025.

This oral presentation has four parts. First, I comment on preparation of this evidence brief, and this includes a response to the submission of Dr Keiran Murray. Second, I provide an evidence roadmap for each of the five submissions outlined in my more detailed written evidence brief. Third, I provide a brief supporting discussion. Finally, I close with a written elaboration that explains how I have attempted to align recommendations with the concerns documented in my written evidence brief.

Climate change is a serious, rapid-onset, existential crisis which I consider to be the defining issue of our time. While we currently have a range of technologies, innovative capacities and solutions that can be used to address climate change, in responding, the Crown has made very slow progress against a barrage of strong lobby-group and media-fuelled public opposition. As a result, New Zealand is not a climate change leader. In fact, we have developed an international reputation as a "climate change laggard". This rating is mana-diminishing and does not accurately reflect the interests, values, cultural identity or aspirations of the Māori Treaty/te Tiriti partner. Instead, this reputation publicly evidences a failure on the part of the Crown to create a climate change response that actively protects the interests and mana of the Māori Treaty/Tiriti partner. My evidence brief attempts to provide a more detailed outline of these concerns and includes suggested remedies.

Section 2. The preparation of my evidence brief.

My written evidence brief was prepared in accordance with the cultural assessment and aspirations reporting method that is explained in sub-section 1.3 of my evidence brief. My use of CAAR, or cultural assessment and aspirations reporting, explains the reason for the close attention I have paid to court rulings and Waitangi Tribunal recommendations relating to the Treaty/te Tiriti principles.

One of the reasons members of the New Zealand Māori Council executive approached me about preparing this evidence brief is because my career pathway is grounded in both Western science and Māori community knowing. My PhD is anchored in theoretical ecology and mathematical modelling. The early part of my science career was spent building economy-environment futures models at regional scale and included early attempts at sector-based greenhouse gas accounting. With very few exceptions, I have spent most of the last 20-years working on the ground in differing Māori community contexts. The primary focus of this work has been the development of a Māori community alternative to New Zealand's current System of National Accounting (SNA), a project that was initiated by the New Zealand Māori Party in 2005-2006 as part

of attempts to find an alternative to the GDP indicator. As part of this 20-year-long wayfinding journey, I have been given privileged and trusted access to Māori community knowing, concerns and aspirations that helped to guide the preparation of this evidence brief.

My evidence brief is based on mandates from the New Zealand Māori Council executive, the claimants, and Pūtiki Wharanui, the taumata that represents the claimants of Wai 262 within the rohe of Ngāti Kahungunu, and is presented on behalf of the claimants listed above. Cultural safety has been provided by Te Taumata o Pūtiki Wharanui, members of the New Zealand Māori Council executive, and more generally, Te Kaihautū o Te Taiwhenua o Heretaunga, Mr Marei Apatu, and Te Rūnanganui o Heretaunga, which is composed of representatives from all 14 marae in Heretaunga.

An important point to note at the outset is that my evidence brief focuses on Treaty principles and the adequacy of a legislative/policy climate change response, rather than specific climate change impacts. That being the case, it follows that I assume that the climate change response needs of local Māori communities will be met, if they are provided access to the tino rangatiratanga, partnership, protection and redress provisions guaranteed in the Treaty/te Tiriti.

The five submissions outlined in my evidence brief were an attempt to assemble a collection of what could be described as key access indicators that assess how effectively the Crown's climate change response gave expression to relevant Treaty/te Tiriti principles.

To explore these inquiry questions, I drew on what records, data, reports and published materials the Crown, journalists and New Zealand scholars have made publicly available. It is important to acknowledge that in places this is an incomplete record. This assessment process is also limited by inferences being drawn from written records and historical accounts without complete access to background context that would have shed clearer light on decision-making rationale and priorities.

Regarding submission 2 of my evidence brief and the written articulation of a Māori cultural philosophy on climate change, this mātauranga was based on direct quotes from *Ko Aotearoa Tēnei* in order to ensure that it was evidential and based on findings already endorsed by the Waitangi Tribunal.

Section 2.1. Submission 5 – Response to Dr Kieran Murray.

Regarding submission 5, I would like to comment on the public critique of my evidence brief by Dr Kieran Murray. I agree with Dr Geoff Bertram that Dr Murray's "critique" has misrepresented what I have said. What I was seeking to communicate to the Tribunal was the inadequacy of GDP as the sole yardstick for assessing progress. Furthermore, it's not just me voicing concerns of this kind.

On the 1st of October 2025, UN Secretary-General António Guterres announced that he has put together a high-level group of specialists to propose new indicators for human and planetary prosperity that go "Beyond GDP". This change has been described as – I quote – "the biggest shift in how economies are measured since nations first started using GDP in 1953, almost 70 years ago". This announcement was published in the highly prestigious international journal of Nature, and in the same article, the explanation given for this dramatic shift reads as follows, and I quote:

> Over its 70-year lifespan, GDP growth has become the benchmark for national economic competence. Every country's leader and their finance teams do what they can to ensure that GDP data only ever point upwards.
>
> And yet, for decades, researchers have been pointing out that this approach creates perverse incentives and could be creating as many problems as it solves — particularly when growth in GDP undermines other aspirations encapsulated in the SDGs [or sustainable development goals]. GDP fetishism, as economist Joseph Stiglitz, of Columbia University in New York City, calls it, is

> one reason why the [sustainable development goals] are a long way from being achieved before their 2030 target deadline.

I would like to draw attention to the statement "GDP undermines other aspirations encapsulated in the [sustainable development goals]". This statement draws a causal relationship between GDP and the achievement of desired wellbeing aspirations. Furthermore, many of the sustainable development aspirations being referred to in this statement are, in my experience, aspirations held by our vulnerable Māori communities. For example:

- Ending poverty,
- Zero hunger,
- Good health and well-being,
- Quality education,
- Gender equality,
- Clean water and sanitation,
- Affordable and clean energy,
- Decent work and economic growth,
- Industry, innovation and infrastructure,
- Reduced inequality,
- Sustainable cities and communities,
- Responsible consumption and production,
- Climate action,
- Life below water,
- Life on land,
- Peace, justice and strong institutions.

The reasons outlined in this announcement by the United Nations for why we need to move beyond GDP apply to New Zealand's current economic status and the international reputation associated with our climate change response. An open letter of concern submitted to the Minister of Finance on the 2nd of October 2025 clearly evidences alignment between sustainable development goals 1–16 that I have just read and New Zealand's current

economic status. I note that this letter is signed by 13 of New Zealand's leading economists. As Dr Bertram has explained, this state of things need not exist, and I quote:

> Policy design, after all, is a matter of balancing priorities and interests, and a New Zealand government that was committed both to reducing gross carbon emissions and promoting Māori economic development should have no difficulty in designing policy to achieve both ends simultaneously.

This quote encapsulates the essential message of submission 4 of my evidence brief.

Finally, one of the ways Dr Murray could have strengthened his submission was to include an explanation of how it gave expression to the Treaty/te Tiriti principles of partnership and protection that are the focus of concern in my evidence brief. I offer this suggestion because as a reader, I struggled to see how these two things are connected and was left wondering how Dr Murray's submission expressed active protection (submission number 1), evidence of valuing the knowing of Māori communities (submission number 2), evidenced mindfulness of the need for interest-relevant engagement modalities (submission number 3), evidenced a willingness to support Māori community aspirations and concerns (submission number 4), and the need for a commitment to growing a strong Treaty relationship as a basis for shared understanding and decision-making (submission number 5).

I will now move on to section 2.2, some concluding comments to the preparation of this evidence brief. While there are gaps in the completeness of the records, data, reports and published materials used to provide historical accounts for this inquiry, this cultural assessment is not wholly dependent on analysis of this kind. In some cases, it was possible to draw on the findings of other independent studies.

Overall, what the results of this cultural assessment indicate is that it is currently difficult to find publicly available evidence that shows that the Crown:

1. Clearly understood and gave effect to its Treaty/te Tiriti obligations in relation to climate change,
2. Recognised the far-reaching implications of emerging court rulings and Waitangi tribunal recommendations in relation to how Treaty/te Tiriti principles should be applied in a high-stakes, high-risk problem context of this kind,
3. Had a clearly developed plan for building capability and capacity within government to appropriately engage with Māori in a way that gave effect to its Treaty/te Tiriti obligations,
4. Had a clearly developed plan for building the governance institutions that would be needed to balance and appropriately treat the mana of respective expressions of tino rangatiratanga and kāwanatanga in a culturally safe, representative manner, and
5. Was able to rise above the headwinds created by lobby groups who repeatedly opposed and effectively paralysed a legislative and policy climate change response.

Section 3. The key findings of my evidence brief.

In this section, I provide a summary roadmap of evidence that supports each of the five submissions in my evidence brief. These five submissions provide an insight into what New Zealand has managed to achieve in terms of a climate change response over the last 30 years. If we do manage to get to carbon zero by 2050, it is currently hard to see how this will be achieved in a way that gives effective expression to the deeper intent of our Treaty/te Tiriti principles.

Section 3.1, submission 1.

Submission 1 focuses on the following Treaty/te Tiriti protection concerns:

1. First, the status of New Zealand as an international “climate change laggard” is mana-diminishing and inconsistent with the values, identity and aspirations of the Māori Treaty partner. This reputation evidences a failure to actively protect the interests of the Māori Treaty partner.

2. The Crown had 60 years to guide the New Zealand economy towards carbon net zero. The last 35 years could have been used to build a unifying national conversation and design and implement a just transition. What could have been done in 60 years now needs to be accomplished in 25 years – a time horizon that involves a heightened risk of transition harm to the Māori Treaty/te Tiriti partner and New Zealand communities.
3. It is difficult to find evidence of how the Crown has expressed the key attributes of the Treaty/te Tiriti principle of protection in its climate change response and the deeper intent associated with Crown's obligations to Māori that are "essential, or highly conducive, to their own comfort, safety or subsistence" – and that was a direct quote.
4. New Zealand's climate change response does not evidence responsiveness to our national origin narrative or the acknowledged failure of the Crown to be an honourable Treaty/te Tiriti partner. Our origin narrative reminds us that as a young nation, we do not yet have an established track record of success in meeting our Treaty/te Tiriti obligations, and therefore, just grounds exist for extra care, additional diligence, deeper inquiry into the causes of our past failures and determined effort to right past wrongs.
5. While there may be reasons why adoption of a climate change response is considered unpopular and costly, the Waitangi Tribunal has clearly stated that if the Crown is ever – sorry, and I – and I quote, "if the Crown is to be justified in exercising its power to govern in a manner which is inconsistent with and overrides the fundamental rights guaranteed to Māori in article 2 it should be only in exceptional circumstances and as a last resort in the national interest".

Submission 1 conclusions.

The Crown has failed to respond to known climate change risks in a timely way that evidences its Treaty/te Tiriti responsibilities to do everything possible to protect the Māori Treaty/te Tiriti partner from harm caused by, firstly, the consequences of climate change, and secondly, the unwanted socio-economic

impacts of a national climate change response. This is a breach of the protection principle of the Treaty/te Tiriti.

I now move on to Submission 2.

Submission 2 focuses on the following Treaty/te Tiriti protection concerns:

(i) New Zealand has not one but two founding cultures with unique worldviews, languages and differing narratives on climate change.

(ii) Based on the evidence outlined, it is apparent that a Māori cultural philosophy (which is outlined in Schedule 2) and narrative on climate change is currently not present in the Crown's legislative and policy response to climate change.

(iii) As an extension of the conclusion drawn in paragraph 24, items i and ii above, that I have just read, the Crown has had 35 years in which to engage with the Māori Treaty partner to honour the Māori Treaty partner's philosophy and narrative on climate change.

(iv) A Māori-cultural narrative on climate change involves a 1,000-year time horizon to assess the mauri-disrupting, unbalancing causes of climate change and the appropriate kawa, kaupapa and tikanga needed to correct these imbalances. This time horizon is currently missing from the Crown's climate change response.

(v) In the years following 1840, the burning of indigenous forests and the draining and destruction of wetlands, scrub and grasslands led to the release of an estimated 280-470 million tonnes of sequestered carbon. This increased global atmospheric CO_2 and made a contribution to human-induced climate change. Yet the amount of stored CO_2 that was released by the burning of forests and draining of wetlands is relatively small compared with the ongoing impact of the agricultural sector of our economy. By the end of 2025, the agricultural sector is on track to release a further 39.6 million tonnes of CO_2 equivalent greenhouse gas emissions. At this annual rate of CO_2 equivalent emissions released, between 1990 and 2025 (approximately 35 years), the agricultural sector will have released

an estimated 1.4 billion tonnes of CO_2 equivalent greenhouse gas emissions.

(vi) From a Māori cultural perspective, the true cost of New Zealand's transition to an agricultural and horticulture economy can only be understood in terms of its dramatic impact on Māori culture, and in particular, the disruption of mauri; the unbalancing of environmental life-support systems; relational disconnection from whānau and place; loss of access to resources, customary harvest and practices; and the ongoing extinguishment of ngā mea katoa, ngā tikanga katoa and ngā taonga katoa.

(vii) Our tīpuna did not cause climate change. Ao Māori was and still is an essential part of protecting the world against climate change. Te ao Māori, te reo Māori, mātauranga Māori, whanaungatanga, whakapapa and kaitiakitanga are all safeguards against climate change and against human activities that unbalance, destroy and compromise the energetic, perceptual-sensory, biological and sacred life-support systems of te iho matua, te aho matua whānau o Rangi rāua ko Papatūānuku.

(viii) Whanaungatanga, whakapapa and kaitiakitanga are safeguards against climate change, against human activities that unbalance, destroy and compromise the energetic, perceptual-sensory, biological and sacred life-support systems of the family of Rangi and Papa. This conclusion is consistent with the climate change response scope and priorities of the planetary boundaries framework.

(ix) The transformation of Aotearoa from an evolutionary lifeboat to an agricultural and horticultural economy involved disruption of mauri and an unbalancing of essential life-support systems. The kinship obligations associated with kaitiakitanga requires an urgent re-balancing of these life-support systems and halting of the decline and extinguishment of our taonga species. This is missing from the Crown's climate change response.

(x) Māori culture "is a creation of its environment". This aspect of our cultural evolution, survival and identity is currently missing from the Crown's climate change response narrative.

(xi) Consistent with the Crown's legislative and policy response to climate change, 185-years after the signing of the Treaty/te Tiriti, the New Zealand economy still does not reflect the life-supporting and life-centring identity of Māori culture. Our economy is not yet what author Carol Anne Hilton has described as an Indigenomic economy. This is also missing from, and essential to, the Crown's climate change response.

Submission 2 conclusions.

The Crown's legislative and policy climate change response has been based on Western scientific theory and evidence that fails to acknowledge the existence of our origin narrative – sorry, the existence of our national origin narrative and its relationship to climate change, and secondly, the knowing, language, worldview and legitimate aspirations of the Māori Treaty partner relating to what Western scientists refer to as climate change. This is a breach of the protection principle of the Treaty/te Tiriti.

I will now move on to a summary of submissions number 3 and 4.

Submissions 3 and 4 focus on the following Treaty/te Tiriti protection and partnership concerns:

(i) Firstly, the Crown's climate change engagement with the Māori Treaty/te Tiriti has contained some highlights, most notably the moemoeā associated with creation of Te Arawhiti. However, overall, this cultural assessment has identified the existence of inadequate to adequate engagement that was, at times rushed, superficial, poorly supported by Māori, culturally unsafe (that is, not representative), and misaligned with the moemoeā for Te Arawhiti, and I quote, "The Crown needs to grow its understanding and ability to feel comfortable working with Māori as a true Tiriti/Treaty partner".

(ii) While the Crown's commitment to consultation is acknowledged, I would not go as far as to say that this is evidence of honourable behaviour (i.e.,

deserving of our respect and esteem), and this honourable behaviour has been called for the Waitangi Tribunal and Court of Appeal.

(iii) If paragraph 26 item i is a correct assessment of Crown-Māori Treaty/te Tiriti partnership arrangements, then this is deeply concerning because no other benefit or promise can be derived from the terms, or principles of the Treaty/te Tiriti without partnership.

(iv) This cultural assessment has failed to find evidence that the Crown recognises the status of partnership and protection principles from a customary protocol perspective.

(v) While there is much written in court rulings and Tribunal reports on the reciprocal nature of the Crown-Māori partnership, the deeper practical significance of reciprocity to Māori culture has been missed. This point, while arguably central to everything that Māori culture stands for, is nowhere evident in the Crown's climate change engagement response.

(vi) The Crown/Māori engagement framework of Te Arawhiti is an important contribution that clarifies how engagement modalities respond to differing interests on the part of the Māori Treaty/te Tiriti partner. This framework should be used as a guide for future Crown-Māori engagement.

(vii) There is ambiguity in a public statement that Māori have been consulted, when very few Māori were involved in the consultation process being referred to. If it is not possible to operationalise a robust, representative consultation engagement, then elevation to a higher level of engagement modality may be called for.

(viii) This cultural assessment has not found evidence that the Crown's climate change response recognises the Māori Treaty/te Tiriti partner as essential to the success of this project. There also seems to be confusion about the Treaty/te Tiriti verses stakeholder status of Māori on the Crown's zerocarbonact.nz website. The deeper significance of reciprocity has been missed by the Crown in its climate change response, which is characteristically transactional in nature.

(ix) The Crown's climate change response focuses much attention on managing the risks to our nation's agricultural sector, without equal concern for: the urgent needs and aspirations of the Māori Treaty/te Tiriti

partner; co-creation of mutual understanding on fairness; and evidence of trust and faith in Māori Treaty/te Tiriti partner perceptions of risk. Climate change-related concerns and aspirations of the Māori Treaty/te Tiriti partner include:

(a) Firstly, addressing the causes of climate change associated with the disruption of mauri; the unbalancing of life-support systems; relational disconnection; loss of access; ongoing cultural extinguishment; and decline in the wellbeing of freshwater ecosystems, coastal fisheries, indigenous fish species and the availability of fresh water.

(b) And secondly, understanding the extent to which a climate change response can leverage mutual benefits associated with a legacy of 185 years of colonisation that now manifests in intergenerational trauma and extremes of social deprivation.

(x) In assessing Treaty/te Tiriti obligations relating to the Crown's choice of climate change engagement modality, successive New Zealand governments have failed to provide co-design engagement opportunities. Instead, the status of the Māori Treaty/te Tiriti partner was associated with the role of a stakeholder, which explains an over-reliance on consultation.

(xi) This cultural assessment has raised concerns about Crown capability and capacity, the adequacy of operational resources, and awareness of partnership obligations.

(xii) A recurring theme that has emerged in this cultural assessment has been the question of adequate Māori representation and just how a co-design modality would be operationalised in practical terms.

(xiii) The Crown's choice of a climate change response mode occurred in isolation from a co-design engagement modality. The Crown's climate change response modality is poorly aligned to: firstly, the Crown's obligations associated with our origin narrative, secondly, a Māori philosophy on climate change, thirdly, the needs, concerns and aspirations of Māori, fourthly, the need for partners to contribute towards mutual benefits, and finally, the mutually beneficial goal of a just transition.

(xiv) Finally, an urgent need exists to elevate the expression of Treaty/te Tiriti partnership to a higher level that assists in realising the long-awaited fulfilment of promises made to our tīpuna when they signed the Treaty/te Tiriti.

Submissions 3 and 4 conclusions.

The Crown has failed to adequately engage with the Māori Treaty/te Tiriti partner and include the Māori Treaty/te Tiriti partner in a process of co-creating a mutually agreeable and beneficial national climate change response that respects the knowing, urgent needs and legitimate aspirations of the Māori Treaty/te Tiriti partner. This is a breach of the partnership principle of the Treaty/te Tiriti.

And I will now move on to the last submission, submission number 5.

Submission 5 focuses on the following Treaty/te Tiriti protection concerns:

(i) First, the national accounting system used by economists to measure and evidence the success of the New Zealand economy obscures and hides unsustainable, harmful behaviour that is inconsistent with the organising principles of ao Māori – whanaungatanga, whakapapa, kaitiakitanga and mauri.

(ii) Second, climate scientists who have developed the planetary boundaries framework argue that a legislative and policy focus on reducing greenhouse gas emissions is not enough to prevent us from exceeding 1.5° Centigrade. Our GDP accounting system is no longer fit for purpose as the sole yardstick for assessing progress. We need a system of accounting that makes visible the causal relationship between economic activity and social, cultural and environment harm.

(iii) GPI accounting for New Zealand also provides empirical evidence of a causal relationship between radical economic reform and harm to Māori communities that is in breach of the Crown's Treaty/te Tiriti protection obligations and responsibilities towards the Māori Treaty partner.

(iv) Finally, GPI accounting is not able to measure the impact of economic activity on Māori culture. This assessment task is the sole domain of Māori Genuine Progress Indicator (mGPI) accounting (now called Toi Oranga). There is no valid reason why a national accounting system that is an expression of ao Māori is not possible. This would assist in supporting a Māori-led climate change response for this country.

Submission 5 conclusions.

The Crown's use of economic measurement system is misaligned with its climate change responsibilities. In the creation of the GDP indicator for New Zealand, the system of national accounting includes harmful greenhouse gas emissions as a legitimate contribution to total economic output. This effectively counts harm to ngā mea katoa and ao Māori as legitimate evidence of economic progress. This is a breach of the protection principle of the Treaty/te Tiriti.

Section 4. Discussion.

The five submissions that make up my evidence brief focus attention on what the Crown has not done. This raises a question about expectations concerning what the Crown could have done, or perhaps should have done. Before commencing such an assessment, I provide some contextual comments.

As a nation state, Aotearoa New Zealand cannot respond appropriately to climate change without a high level of commitment to the guiding principles of the Treaty/te Tiriti and more recent guarantees recorded in treaty settlement claims Acts.

Our national origin narrative reminds us that as a young nation, we do not yet have an established track record of success in meeting our Treaty/te Tiriti obligations and therefore, just grounds exist for extra care, additional diligence, deeper inquiry into the causes of our past failures and determined effort to right past wrongs.

The development of a track record of success in meeting our Treaty/te Tiriti obligations is partly dependent on a sustained commitment to capability and capacity building across the executive, administrative and judicial branches of government. This point was recognised by the Ardern-led Labour coalition government in the setting up of Te Arawhiti.

Beyond the need for capability and capacity-building, what Treaty/te Tiriti principles are engaged as part of a given climate change response and how they should be applied is a legal question. It is for the Crown to accurately determine and apply these principles, guided by governing statutes and New Zealand's constitutional framework. What my inquiry into court rulings and Waitangi Tribunal recommendations has revealed is that the duties, obligations and responsibilities associated with the expression of Treaty/te Tiriti principles are far-reaching. Translating emerging court rulings and Waitangi Tribunal recommendations into effective practice would require a high level of skilful, sustained commitment to Treaty/te Tiriti partnership on the part of the Crown.

In my evidence brief, I focus on two Treaty/te Tiriti principles. This was not intended to diminish the importance of other relevant Treaty/te Tiriti principles, and in particular, the expression of tino rangatiratanga. The guarantees of protection in article 2 are linked to the expression of tino rangatiratanga. In consideration of what the Crown could or perhaps should have done, it is helpful to pay closer attention to role of tino rangatiratanga in a national climate change response.

The Crown cannot honour tino rangatiratanga or act consistently with other Treaty principles by assuming that its own approval is all that is needed to legitimise a climate change response. Kāwanatanga – sorry, and I quote – now, this is from a recent brief of evidence prepared by lawyers as a part of a separate resource management inquiry –

> Kāwanatanga: which granted the Crown the authority to make laws and manage affairs within its sphere of influence but was *not* to be understood as "an overarching power to govern, make and enforce

law". It is less than absolute sovereignty and must be exercised in partnership with rangatiratanga authorities.

Effective governance institutions are needed to provide the means for each Treaty/te Tiriti partner to recognise the authority of the other and exercise their influence in important matters of shared interest.

Thus, a climate change response aligned with tino rangatiratanga requires that the Crown hears the concerns raised by the Māori Treaty partner and enables genuine authority and decision-making in relation to affected taonga.

As a contribution to shared interest, the Crown must also seek to understand what expressions of tino rangatiratanga have occurred in response to climate change and whether the expression of tino rangatiratanga would be undermined by Crown climate change response measures.

Māori rights associated with the expression of tino rangatiratanga are enduring. The Waitangi Tribunal has stated that – again, I quote – "If the Crown is ever to be justified in exercising its power to govern in a manner which is inconsistent with and overrides the fundamental rights guaranteed to Māori in article 2, it should be only in exceptional circumstances and as a last resort in the national interest".

In summary, what the Crown could have done over the last 30 years in support of a climate change response was to sustain a commitment to capability and capacity-building across all branches of government. The Crown could have worked with the Māori Treaty partner to build national institutions that assist in balancing expressions of rangatiratanga and kāwanatanga. The Crown could have taken extra care, exercised additional diligence, focused on deeper inquiry into the causes of our past failures and manifest determined effort to right past wrongs with the goal of ensuring that it heeded the injunction of Justice Williams to value Māori-cultural identity and welcome Māori culture into the very centre of the way we do things.

This brings me now to the last section of my speaking notes, but I'm just going to comment now – provide some closing comments on the recommendations in my main brief of evidence.

The recommendations outlined in my evidence brief respond to repeated calls from the Tribunal for remedies that can be put forward as recommendations to the Crown. The recommendations outlined in my evidence brief were prepared with guidance from legal counsel, aim to strengthen Treaty/te Tiriti partnership, address perceived gaps in protection, build capability and capacity in central government and strengthen the expression of tino rangatiratanga by providing for the creation of supporting governance institutions.

Finally, given the seriousness of climate change developments and the inadequacy of a Crown climate change response, we have requested that a higher level of constitutional protection be provided for the family of Ranginui and Papatūānuku and the essential organising principles of ao Māori, whanaungatanga, kaitiakitanga and utu, in our constitutional framework. In our first recommendation, we have asked that the concerns outlined in this cultural assessment and aspirations reporting evidence brief are remedied under urgency. This request reflects rapidly emerging awareness of the dire consequences now associated with business as usual.

And that brings me to the end of my evidence brief.

HOUSEKEEPING – TIMING (14:06:39)

HEARING ADJOURNS: 2.06 PM

HEARING RESUMES: 2.13 PM

(14:13) MR PREBBLE TO DR ANTHONY COLE:

Q. Tēnā koe, Dr Cole. Ko Jeremy Prebble tāku ingoa. Kei konei ahau mō te Karauna.

A. Tēnā koe, Jeremy.

Q. Thank you very much for your clear and very thoughtful evidence which you have stepped through and the various submissions you are making in those. I thought I would really just focus on your outline that you provided today and the submission 1 that you have taken us through, and that submission, which really is at pages 9 to 10 of your speaking notes. And you state there, in responding to climate change, effectively you reached the conclusion that the Crown is failing to do everything possible to protect Māori, thereby breaching Article 2 of the Treaty of Waitangi, and in doing that, you make a number of statements under that paragraph 22, and the first one I just wanted to ask some questions of is that New Zealand is lagging internationally in your view. And we have obviously heard evidence from the Climate Tracker and the fact that that seems to be a perception that New Zealand is in that state, but when you state that, have you considered, or to what extent did you consider the problems New Zealand face from its unique emissions profile?

WITNESS REFERRED TO SPEAKING NOTES #A084(b), PAGE 9-10

A. Just – just firstly, I am aware also, in the evidence that's been presented this week, that there has been some updates made to the most recent – to the assessment of New Zealand's performance, and not in a favourable direction.

Q. Yes.

A. So, it's helpful just to make that point as well.

Look, I would like to say that I'm very, very aware of the enormous challenges that what I'm presenting in this evidence brief present to New Zealand as a nation, and I am also very, very aware of the – the structure of the New Zealand economy and the emissions profile that is associated with the structure of our economy, the efforts that have been made in the past to change that. But I guess the key point for me is that while I am aware of those things, I am also very aware of the fact that we are staring at a rapidly onsetting existential crisis –

Q. Yes.

A. – which requires that we address it.

Q. Yes, no, that is understood, and obviously, the gravity of the issue is understood as you describe the challenges we face from our – I guess

our emissions profile. In terms of that, you therefore, obviously, it sounds like you are very aware and knowledgeable in the fact that we do have a reasonably significant part of our energy profile coming already from renewable energy, so the likes of hydro and geothermal generation.

A. Yes, understood.

Q. And that the real or one of the real challenges we face, and then I think that's what you are really acknowledging there, is that our greenhouse gas emissions, a significant portion of that is from agriculture, which is a hard-to-abate, hard-to-mitigate industry that we are reliant on?

A. Understood.

Q. In terms of your – your second point under 22, you were talking there about the 60 years that the Crown has to guide New Zealand, and I just wanted to ask a bit more about your understanding as to the significance of 60 years first.

A. Yes, so, taking us out to our net carbon zero target in 2050, and then coming back to 1990, yes.

Q. Okay, that's on me, I failed to appreciate that you were working forward to 2050. I thought you were saying 60 years to now, so I was working backwards thinking: What was the date 60 years earlier that was so significant? That makes a lot more sense. In terms of the comment there, around the 35 years, you are really, I assume, going back to the signing at the UNFCCC and the fact that that's a turning point, if you like, from –

A. Yes.

Q. – the development of international treaties around climate change?

A. Yes, correct.

Q. And in terms of those statements about the Crown having this period of time, including the last 35 years, to what extent have you considered or factored in how – and I guess it's this concept that I will come back to, but the way and the rate that New Zealand moves – have you considered how we are to move if that were to have put us out of step with the rest of the international community?

A. I hadn't given consideration to that, although, that question certainly emerges, I think, around submission 5, where, you know, the submission is put forward that it would be very helpful to have additional measures

that we can use to better understand the progress that we are making. Now, one of the reasons that nation-state governments are very reticent to make any changes to their systems of national accounting is because those are largely dictated by the system of national accounting standards that are created by the United Nations. And so I can understand there is a reluctance and unwillingness to want to step outside of that.

I don't think that the question of stepping outside of what other nations is doing is so much central to my submission. I think more what I was concerned about is posing the question of whether or not what the Crown has done – and there is certainly an assessment of progress associated with that, or its climate change response – what the Crown has done, the extent to which that reflects on its obligations, duties and responsibilities as a Treaty partner.

And then I think I made the point at the beginning of my speaking notes that I'm working from the assumption if you like that it's really helpful to focus on that foundation, because if that foundation is not correct and appropriate and operational, then it's very difficult for the Māori Treaty partner to achieve much else.

Q. Thank you –

A. That, I think, is the real concern for me.

Q. That makes sense, thank you. I guess I was picking up on something that I thought came through from Professor Bertram's evidence, which is not the elephant in the room, but the gaining of traction, I guess, to nations, and the fact that it's difficult when it really requires a concerted effort. So, obviously, if you go too fast, too far ahead of other nations it could stand to economically and detrimentally affect you if it's not in step with other nations. That was really the point I was getting to and to what extent you had factored that into your thinking.

Yes, no, I hadn't, although I think there is one other point that I could perhaps make in response to this, and it is that there is no reason why New Zealand could not become a leader in climate change response. And I'm not sure if you are aware but if we go back to the interests of the New Zealand Māori Party in 2005 and 6 around an alternative to the system of national accounting and the use of the GDP indicator, at that

time, they brought Dr Ron Coleman out from Canada to assist with promoting the GPI accounting framework here in New Zealand, as an alternative, a viable alternative. And after Dr Coleman left here, he went to Bhutan and began a process of building a relationship with the Bhutanese government and assisting them in the development of their Gross National Happiness accounting framework.

Now, I make that point because Bhutan, as a nation, was not afraid to be seen internationally as a leader, not only in its climate change response, because, to the best of my understanding it is one of the only nation states at the moment which is actually carbon negative in its greenhouse gas accounting, but that it has managed to achieve that through its own distinctive system of national accounting, which is the Gross National Happiness accounting system.

So I am less concerned, I guess, about New Zealand being seen to be different from the rest of the world, and actually, on a more positive note, which refers to other parts of my main evidence brief, actually, what I would say is that I think the government, in its failure to be an honourable Treaty partner in its climate change response has greatly limited the wonderful creative potential that exists in our Māori communities, creative potential that could have really enhanced our national climate change response in a way that potentially could have shifted us from the position of being a climate laggard to actually becoming a climate leader. Now, I think that potential still exists, but what the realisation of that potential is very sensitive to, now, is us as a nation confronting our Treaty partnership and relationships. And I think, as a nation, to date, we have failed to do that.

Q. Kia ora, thank you for that, and I think, picking up on your earlier comments, it also requires us, doesn't it, to confront how our economy is currently configured and –

A. Yes.

Q. – work out how to tackle some of these harder-to-abate industries in a way that doesn't lead to further injustice.

A. Yes, understood.

Q. At 22 (v), you refer there to the *Turanga Township Report* (1995), from the Waitangi Tribunal, in stating that "if the Crown is ever to be justified in exercising its power to govern in a manner which is inconsistent with and overrides the fundamental rights… in article 2 it should be only in exceptional circumstances and as a last resort in the national interest", and I just had some questions for you about that.

I assume, firstly, it's pretty obvious that climate change and climate change in New Zealand has the potential and is going to and is already impacting on all aspects of society in New Zealand?

A. Yes, correct.

Q. And it does, as I think you are saying, significantly – potentially significantly affect Māori who are vulnerable in a number of ways to climate change?

A. Correct.

Q. And in terms of those effects, we have heard a lot of evidence throughout this inquiry, but that includes significant coastal communities in having significant cultural sites in, effectively, areas that are at risk from either inundation or storm flood events. You agree with that?

A. I agree.

Q. And do you also accept that with those distinct risks to Māori in mind, that it also is a polycentric issue that has the potential to impact on, therefore, all sectors and aspects of life in New Zealand society?

A. I do.

Q. And in terms of Māori and how they are impacted upon by climate change, I guess, interested in your views about, you know, often that term embodies a significantly wide, diverse range of views when it comes to how we respond to climate change. Do you agree with that?

A. Sorry, if you wouldn't mind, just a little further explanation –

Q. So, in terms of, when you are talking about Māori, obviously Māori stand to be significantly affected by climate change. But when we are talking about Māori, potentially, there's quite a diverse range of views within Māoridom as to how we should respond to climate change.

A. Yes, sorry, was that a question or a statement?

Q. Yes, do you accept that, as a proposition, was my question?

A. Yes, I do, although I'm also interested to know, perhaps, why you are asking that question.

Q. Yes, absolutely. So, for example, I guess what I'm wanting to explore is the fact that really it comes to this, if I go straight to the proposition, or the concept I'm wanting to put to you, it's about the way and the rate, if you like, that the Crown deals and responds with the issue of climate change, and that, in responding to climate change, there are going to be different perspectives about how fast and in what way the Crown should respond, including within Māoridom, but also outside of Māoridom, is really what I wanted to put to you.

And part of the reason for that is, we have obviously heard quite a lot of evidence about how Māori are heavily invested in primary industry and the forestry sector and the dairy industry, so, there needs to be some accounting for the fact that if we were simply to move fast away from some of those key industries, there stands to be significant economic downsides for Māori as well.

A. Yes, I mean, you are drawing attention now to a, I think, part of a conversation with Dr Bertram, the other day, really around just how it would be appropriate for a policy response in New Zealand to work, and I think the key point that Dr Bertram was making, and I agree with this, and concur with it, is that – and I should just explain too that, you know, in this connection, one of the papers that I had the privilege of teaching at university was policy analysis, so I think I'm well aware of the challenges of forming good policy. But I would like to say that I agree with Dr Bertram, that there is no reason why policy makers in this country could not form policy that helps to guide our economy towards an effective climate change response and provides for the needs of Māori communities and other communities in New Zealand at the same time.

Now, I think that is very challenging, now that we are 35 years down the track, and we are now here in the Waitangi Tribunal having a conversation over a failure to have done that, and that is my key point. If the Crown had started this journey 35 years ago and had picked up that responsibility toward the Māori Treaty partner, we would be in a very

different position today, and I think there needs to be some accountability for that.

Q. Understand your perspective. Thank you for those answers, and I guess, what I take from that is obviously there's the approach the Crown has taken over the last 35 years, but you do agree, I think, with the broader proposition that there's a challenging way forward, but it needs to grapple with these various competing interests in a way, therefore, that addresses climate change but doesn't do so without entrenching further inequities or damaging, for example, Māori interests.

A. Yes, most definitely, because otherwise, you know, in my mind, at least at the moment, the climate change response trajectory that we are on at the moment just has the potential to generate decades of Waitangi Tribunal grievances. So, we are going to be back here dealing with these issues if we don't get a really sound position on this now. That is my main concern.

Q. Yes, and I guess, just, I was picking up also, on your discussion around the Treaty itself and what the Crown should do when you refer to "everything possible" under article 2, and to some extent, we are touching on this through the needs of the Crown to balance other interests when governing, and I'm interested in your perspective on this because you talked about partnership, but the proposition, I guess is that under the Treaty the Crown has an obligation to protect Māori interests, but it also has to think about how best to govern for New Zealanders. I'd assume you'd agree with that.

A. Understood.

Q. And that really is a fundamental issue, which this Tribunal will be grappling with, about the interplay between articles 1 and 2 of the Treaty.

A. Yes, so –

Q. And – you go.

A. – sorry, continue –

Q. No, I was just going to say, so, in a way I'm exploring or like to explore the limits in the sense that the Crown can obviously take into account those other public interests, but there is a point at which there is an intersection with Māori interests, and that needs to be done in a way that

is protecting Māori interests, but also, I guess, balancing and trying to ensure the needs of all the communities are provided for.

A. Yes. Yes, thank you. Thank you for that. So, just to come back, I think to the first part of your question, concerning article 2 of the Treaty, it's probably helpful to draw your attention to my main evidence brief and to schedules one and two in my main evidence brief, where I have provided an outline of case law, Waitangi Tribunal recommendations, and to a certain extent, drawing on some of our experience in the RMA space and the cultural protocols that have guided our RMA response activities, and lessons that we have learnt from that. So, I would say, concerning those duties, obligations and responsibilities on the part of the Crown, that schedule one and two was an attempt to bring together kind of like an overview of what all of those, you know, duties, obligations and responsibilities could look like. Not just – I'm not a lawyer, which is not to say that they are comprehensive, but I think that's a helpful starting place.

Q. It has been very helpful and helpful, certainly interesting reading and helpful for, I think, the Crown and how we approach the submissions on this matter. I thought it would be helpful also – I see from your evidence and your summary that you are obviously very familiar with the Wai 262 report, as one of the many authorities that you have considered.

A. I have.

Q. And I just – I thought it might be useful to take some of those – a couple of paragraphs from that, to just test your views around it. Because I think, of the Tribunal reports, it's obviously one that shares some overlap with this being, if you like, possibly broader in scope, given it had such an environmental focus, but there are overlapping themes, or issues, I think, with what the Tribunal is now grappling with here, which is climate change. But climate change is often very interconnected with te ao Māori, the environment, and the considerations, therefore, might be helpful to draw on. So, I did want to just put a couple of paragraphs from that report to you and test your – whether you agree –

A. Just before we do that, if I could possibly just respond to the second part of your earlier question.

Q. Yes, go for it.

A. Which was just around that question of balancing, yes, and the challenges for government, not just to provide for the needs of our Māori communities, but all other communities and of course business in New Zealand as well. A point that I made earlier, I think, is very helpful in this connection and perhaps, if you don't mind, you'll allow me, I'll just draw on some of our experience in the RMA space to illustrate this point. And it is that I'm concerned that the government, in its perception of its Treaty obligations, has greatly underestimated the potential for creativity that exists in our Māori communities and the potential for that creativity to contribute towards a national climate change response in a way that could really enhance and lift our performance as a nation and our reputation internationally.

Now, if I can draw on an example of this, here, within Heretaunga, where I'm a resident, we have a wastewater treatment plant at Clive, and that wastewater treatment plant has an interesting story behind it. Many years ago, the – before this plant was created, the government had certain provisions for wastewater treatment that had been called into question, and there was a need to upgrade the waste treatment plant, and my understanding is – I'd have to check the figure on this, but my understanding was that local government, our district council was looking at a bill to the order of about $90 million to come up with a satisfactory solution, technological solution, from its perspective and I think this was based on milliscreening and then discharge out to sea.

This was – an objection was put forward to this by our Māori communities here, and they objected on the grounds that it was inconsistent with ao Māori, and the Crown initially dismissed that objection, and so the grievance had to be taken to the Privy Council in England, and the Privy Council ruled that it was very helpful for the district council to sit down and have a conversation with their Treaty partner about this, so that's what they did. And in this conversation, there was an openness that emerged on the part of the district council, then, to consider a different way of doing this.

And what this created for – was a space where our community leaders at that time, very, very far-sighted I must say, sat down and engage with our communities and had a conversation about this, and began to develop a Māori cultural foundation, if you like, for the treatment of wastewater. They then worked together with the engineers in the district council to co-design a wastewater treatment plant, and that included some trips overseas to visit different facilities overseas, to look at some different innovation possibilities.

Now, that led to the initial establishment of a prototype waste treatment plant that worked and met all of the regulatory requirements. That then was scaled up to produce the Clive wastewater treatment plant, which, today, I think is a wonderful example of what is possible when permission is given for the Māori Treaty partner to sit at the table with the Crown in a process of wonderful creativity in which, both are recognised as having equal status, Māori are recognised as being essential towards the solution of the problem at hand, and a space has opened up for creativity. Now, not only is that plant now an internationally recognised contribution that's won awards, international awards, but the cost of building that plant came in below the initial estimate of $90 million. So, it was not only good for Māori, but actually, this plant had tangible benefits for our communities here in Heretaunga.

Now, I share that story with you just to make the point that my concern is that central government seems to be very aware of the problems of engaging with Māori, and I'm concerned that, in that perception of those problems they have lost sight of the wonderful potential that exists to actually work together with the Māori partner in a way that produces some pretty amazing outcomes. And to me, that's the message that I really want to present today. Thank you, that was my answer to the second part of your question.

Q. No, thank you, I really appreciate that kōrero.

HOUSEKEEPING – TIMING (14:40:00)

HEARING ADJOURNS: 2.40 PM

HEARING RESUMES: 2.45 PM

MR PREBBLE TO DR ANTHONY COLE: (CONTINUES)

Q. Just looking at the paragraphs, there's really just one that I was going to read out, if you like, and then engage whether or not you agreed with it, and this is at page 239 of, as I say, the Wai 262 report, and in that, Justice Williams says:

> Finally, we think that, as in other situations discussed in this report, the degree of priority to be accorded the Māori interest depends on the scale of its importance to Māori and the nature and extent of likely impacts on it. ultimately, this has to be ascertained by a properly informed Crown and then balanced against any valid interests of other New Zealanders and of the nation as a whole, if those interests are in tension.

And then it said:

> As we have said elsewhere, conflict between Māori and New Zealand interests is not to be assumed.

And I just was interested in, because it sums up a little bit of the discussion we have been having, but whether or not you see your views are aligned with that, or whether you have any different perspectives?

A. I don't think so. I don't have that quote before me, so it's a little bit hard to look more closely at the text –

Q. No, that's fair.

A. – from what I'm hearing, no, that sounds consistent, yes.

Q. Thank you, and those were the questions I had for you, so thank you very much for your very helpful evidence.

A. Thank you.

(14:47) PRUE KAPUA TO DR ANTHONY COLE:

Q. Kia ora, Dr Cole. I just had just a couple of questions, really of clarification. I just wondered, have you read the evidence of Dale Takitimu?

A. I have.

Q. And in that, I guess it would be fair to say, she appears to have been concerned – well, she's concerned about the engagement, but she's concerned about the quality of engagement in relation to climate change response. Is it your view that it is the quality or is it your view that there wasn't engagement?

A. I think my view is that the tension that Dale was drawing attention to exists at multiple levels. If I can respectfully say so, I have a concern, and it is just a concern that I have gleaned from my reading of the literature and experience, that there is, in general, if I can respectfully describe it, a lack of awareness of the real obligations associated with our Treaty partnership, especially on the part of government, so that's at the deeper level. If you don't have an awareness of what your duties and obligations are, you are certainly not going to express them, no matter what organisation or operation, or provisions are put in place, or how much budget you have got, for that matter.

A further problem, I think, is that there's not only an awareness problem, but there's a capability and capacity issue of concern there as well, and I think the Ardern-led coalition government, in its engagement with Te Arawhiti, as much as I can make out from what I've read, seemed to be aware of that capability and capacity concern, and was beginning to make provisions to address it, and I just want to acknowledge I think that was a very, very helpful response, which unfortunately has not been continued by the current government, at least in its initial form, which seemed to be working very well.

So, if there's not an understanding there, and there isn't the capability and capacity, there is a third strand to this level, and the third level, I think, is connected with our – what I've described in my evidence brief as our origin narrative as a nation. Now, by the origin narrative, I'm referring, I think, to a number of different things, but in particular, I would – a tangible example of this would be what is recorded in our Treaty claims settlement Acts, where there is a written acknowledgement on the part of the Crown of its failure to be an honourable Treaty partner in the past.

Now, of course, behind those acknowledgements, there are years of research and published reports and papers that provide a deeper

elaboration of this, and it would be great, actually, for local government to have access to that, but at least that they have read, and they understand the significance of those acknowledgements.

Now why is that important? It's important because I'm concerned that the government, in its aspirations and efforts, and especially at local government, is attempting to plan and make policies and responses in isolation from an understanding of context, and that context is provided by our origin narrative.

Now, in my experience, it is the exception, rather than the rule, to find somebody in local government who actually understands the historical context of our district and therefore, is qualified, in my mind, to be in a position of making decisions that guides how our district is actually moving and moving forward in terms of policy and planned provisions, if they don't understand the context into which they are engaging.

So, capability and capacity, lack of understanding and disconnection from our origin narrative, all of those things, in my mind, compound together through the final layer to this, which I think is the fact that we have an ongoing round of different governments in this country through a very short election cycle, so, we have, you know, a new team coming in, bringing a new perspective and new policy direction that only then adds another layer of complication on top of all of this.

Q. Okay, so, the capability and capacity you are talking about is of government, whether it's at central or local government level?

A. Correct.

Q. The other part, I guess, of that, is where obviously in the process there were bodies involved – Ihirangi, who you have talked about, Ohomauri, and so on – and in your main brief, you talk about, or you question how a panel of eight whānau were going to develop a framework for te ao Māori responses. That's in paragraph 85.

WITNESS REFERRED TO BRIEF OF EVIDENCE #A084

Is that your reference to the Ministerial Advisory Group that was announced?

A. It is.

Q. That went sort of, from seven to ten, or whatever, during that process?

A. Yes.

Q. So, in your view, is there an issue about who comprises those who are involved or consulted or who participate in the climate change response from a te ao Māori perspective?

A. Yes, I think that in my mind, in answering your question, in my experience, the first thing I always come to is the question of cultural safety, and the question of cultural safety is about mandate and representation; about duties, obligations, and responsibilities to communicate back to those who have mandated you and given you the responsibility to undertake a certain task. So, you know, in a Māori community context, that's a safety area, if you like, in which we don't want to move outside of. If we do, we run the risk of getting ourselves into strife and difficulties.

So, the question that I always have, when you scale this up to a national level of scale is, what does the conversation around cultural safety actually look like at that level of scale?

And so, then the first question is, well, we have a team of eight whānau. How are they connected through mandates and through, you know, responsibilities back to the mandated communities, to speak on behalf of those communities? And the answer to that question is a rhetorical question, sorry – the answer to that question is that of course they can't. They can only represent the communities that they whakapapa to, which means that we have a very significant representation problem when the government puts together a committee of this kind.

And that's a concern for me because it's very convenient for the Crown, because they have someone they can ask a question of and get an answer and they have effectively ticked a box or met a, you know, a KPI of some kind, so, it's helpful from that perspective, but it places whānau who step into those positions, in a position that is culturally unsafe, and we shouldn't be doing that.

So, in our recommendations, I spent some time with my legal team talking about provisions that could be made for a governance entity or arrangement of some kind at a national level of scale that would meet the specifications of cultural safety and provide for representation, you know, mandate, and those lines of communication that are so essential to it.

Q. So, in its broadest terms then, perhaps, an appointment by government is always going to raise issues about mandate obligations and responsibilities. Is that right?

A. Correct.

Q. Thank you. Thank you for your evidence.

A. Thank you.

(14:56) PROFESSOR DAVID WILLIAMS TO DR ANTHONY COLE:

Q. Tēnā koe, Dr Cole. You now have David Williams asking you a couple of questions; three, I think.

A. Tēnā koe, David.

Q. So, Crown counsel has already referred you to paragraph 37(ii), which is at page 18 of your brief of evidence, in getting clarification about the 60 years and 35.

WITNESS REFERRED TO BRIEF OF EVIDENCE #A084, PAGE 18, PARA 37(ii)

A. Yes.

Q. I just want to ask you a question about the last sentence of that subparagraph: "What could have been done in 60 years now needs to be accomplished in 25 years – a time horizon that involves a heightened risk of transition harm to the Māori Treaty/te Tiriti partner and indeed all New Zealand communities."

Now, this Tribunal's jurisdiction concerns specific prejudice to Māori, so if all New Zealand communities are suffering exactly the same thing, then we probably got nothing much to say, so, in answers to your questions from Crown counsel, you identified quite a number of ways in which Māori would be more significantly disadvantaged. Can I invite you to sort of clarify that that statement there doesn't mean that all New Zealand communities are likely to suffer in the same way from this issue of we only have 25 years left.

A. Yes, your assessment of that is correct and I concur with it. I think that that is an interesting construction that I put there, at the end of that sentence. I think it probably reflects a deeper, if I can describe it, kind of philosophical orientation of inclusion and not wanting to leave other

New Zealand communities out of the picture, which is not to say that all New Zealand communities are in the same position as Māori, but some of them most definitely are.

Q. Certainly, right. But they don't have a chance to come to the Waitangi Tribunal, whereas Māori do.

A. Don't, unfortunately.

Q. Secondly, paragraph 30, which is – not paragraph 30, paragraph 61, sorry. Paragraph 61, at page 30 of your brief. You mention there something which was actually discussed yesterday about the burning of indigenous forests in the 19th century, post 1844. Now, I don't know whether you are in Waipaoa at the moment – are you in Waipaoa?

WITNESS REFERRED TO BRIEF OF EVIDENCE #A084, PAGE 30, PARA 61

A. I am in Waipaoa.

Q. Well just south of there is the Seventy Mile Bush, or the Ninety Mile Bush territory, where my grandfather helped to burn down a whole lot of that bush – and other people like him, and I have never seen before, an estimate of the millions of tons of sequestered carbon that might have been released by that. I mean, to be honest, to me, it looks rather low compared with an annual rate of, well, coming to 1.4 billion tons just in the years from 1990 to 2025, but in any case, I can't see any citation for any of those figures, so do you have them somewhere?

A. Yes, so, they're drawn from a couple of different sources. Firstly, the area estimates are drawn from the pre-1840 potential natural vegetation of New Zealand map layers that were produced by Manaaki Whenua, so those give us the estimates of area of the different types of – from a scientific perspective, the different types of vegetation cover. And then the – translating from standing forests to sequestered carbon is based on well-established emission factors that are drawn from the published literature. I put a range there, because obviously there is some question around this, and my intention of putting those figures there was not to say that they are definitive, but much rather, just to draw attention to the orders of magnitude that you have recognised.

Q. Yes, well I'm interested in the orders of magnitude. So, through your lawyer, could you supply the references that you have just mentioned please?

A. Yes, I will.

Q. That would be very good. Finally, question three, it relates to the GDP versus the Māori version of – GPI, the genuine progress indicator. Now, you indicated that you did some work on this for the Māori Party, as it then was called, when Professor Whatarangi Winiata was its president, and I'm particularly interested in what you have come up with at page 63, paragraph 131, which is – that can't be right – so, Figure 2 there, you compare GDP per capita and GPI per capita for 17 nations. And then you have a Figure 3, further on, at page 65, which also shows significant difference between using GDP calculations and GPI calculations. So, some of this initial work was done inspired by that work with the Māori party back in 2005 and 2006. So my question is, has this sort of data been put by you or anyone else that you know of to Crown agencies or the government? If so, what was their response.

WITNESS REFERRED TO BRIEF OF EVIDENCE #A084, PAGES 63 & 65, FIGURES 2 & 3

A. Yes, thank you for that question. Just firstly, to acknowledge the graph that you see in figure 3 is not based on data that I was involved in producing. It was in an analysis that was undertaken by some of our scholars at Massey University and was published in a Massey University report, so that is available. I'm just drawing on it here to show that work of this kind has been done for New Zealand and to comment a little bit on the significance of it.

Now, sorry, just – I have lost my train of thought. What was the second part of your question?

Q. Well, comparing GDP to GPI data –

A. Yes.

Q. – do you know of that being put directly to government or government agencies, and if so, what was their response?

A. Yes, that has been, I think, attempted on a number of different occasions that I'm familiar with. One of them was by the – the team that produced

this analysis, who, and I stand to be corrected on this, but I understand that they gave a presentation to Treasury on this. And then, probably, the next big connection point was at the time the Ardern-led Labour coalition government announced that they were about to embark on their living standards – or development of the living standards framework. Now, at that time, I wrote to our Minister of Finance at the time, Grant Robertson, and drew his attention to the work that we had been doing in this space in an attempt to invite a conversation, and he wrote back to me, and I have a copy of the letter, and said that he was very interested in this work and had referred it on to the Treasury, and I have heard nothing more since.

Q. Right, well, okay, so you tried. Thank you very much.

A. Thank you.

Q. And thank you for your evidence and your ongoing work.

A. Thank you.

QUESTIONS FROM KEVIN PRIME – NIL

(15:05) JUDGE MILROY TO DR ANTHONY COLE:

Q. I just have one question, Dr Cole, and that is in relation to the open letter, which is appendix – which has a letter A on it but is actually our document number #A084(c), and that was the open letter to the Prime Minister and Minister of Finance signed by a number of eminent people. I see that it was delivered by hand on the 2nd of October 2025, and I wonder, has there been any response?

A. Not that I'm aware of.

Q. All right. That was my only question. I will hand you back to your counsel in case there are any questions by way of re-examination.

A. Thank you.

MS DORN:

Thank you, your Honour. I have no further questions of re-examination, and just to confirm that we will file those citations that Professor Williams requested,

and just to thank Dr Anthony Cole for his presentation today, thank you very much. Enjoy the rest of your afternoon.

JUDGE MILROY:

If I can also thank you on behalf of the Tribunal for the time that you have taken with us today, and in particular, have been willing to bring your day of giving evidence forward, so your flexibility there has been of great assistance to the Tribunal, and also, your evidence, of course. So, thank you very much and as your counsel said, we wish you the best for the rest of the day.

HOUSEKEEPING – TIMETABLING (15:07:29)

KARAKIA WHAKAMUTUNGA (KEVIN PRIME)

HEARING ADJOURNS: 3.08 PM

HEARING RESUMES ON FRIDAY 28 NOVEMBER 2025 AT 9:00 AM

KARAKIA TĪMATANGA (KEVIN PRIME)

JUDGE MILROY:

Tēnā koe, Kevin. Thank you for opening for us. So, this morning, we are beginning with evidence from India Miro Logan-Riley. Tēnā koe. And Mr Vincent, I believe you will be presenting your witness, so over to you.

HOUSEKEEPING – TIMETABLING (09:03:37)

MR VINCENT:

Thank you, your Honour. Tēnā koutou, ngā mema o Te Rōpū Whakamana i te Tiriti o Waitangi. I will introduce India Logan-Riley. Before I go further, can I confirm with you, India – my understanding, you prefer to be referred to as India, rather than with a title and your last name?

INDIA LOGAN-RILEY:

I am non-binary, so we don't need gendered titles. I won't be offended.

(09:03) MR VINCENT: (OPENS)

All right. India is giving evidence on behalf of Wai 3395, the claim by Ngā Toki Whakarururanga. India is a climate justice campaigner and has been for many years. They currently hold this role with the Pacific Network on Globalisation.

They understand intimately the climate change conferences of the parties under the UNFCCC, having attended many times, and that is one of the main topics they are here to speak to.

For many years, in different ways but consistently, India has been engaging with Crown climate policy from an Indigenous lens and through the lens of te Tiriti. India is a Kaihautū for Ngā Toki Whakarururanga, drawing on their experience in the international sphere, and they have a research interest in

global carbon markets and how they are experienced by Indigenous Peoples. This is another of the topics India is here to speak to.

India's affidavit is document number #A024, and their research paper *Blue Herrings: Carbon Markets and the Empty Promises of Blue Carbon* is within document number #A024(a), which comprises the exhibits to India's affidavit.

The written opening submissions filed before hearing 1 for Ngā Toki Whakarururanga address India's evidence, and they are document number #3.3.001.

Unless there are any questions for me, your Honour, I will proceed to the questions and answers for India.

JUDGE MILROY:

No, we have no questions, thank you, Mr Vincent.

MR VINCENT:

All right. Thank you.

MR VINCENT CALLS

(09:06) INDIA LOGAN-RILEY: (#A024, #A024(a))

Q. India, can you please confirm your full name for the Tribunal?

A. Āe. My full name is India Miro Logan-Riley.

Q. And do you confirm that the contents of your affidavit remain true and correct, to the best of your knowledge?

A. **(inaudible 09:06:55)**

Q. Right.

MR VINCENT ADDRESSES JUDGE MILROY – PERMISSION FOR AFFIDAVIT TO BE TAKEN AS READ (09:07:08)

(09:07) MR VINCENT TO INDIA LOGAN-RILEY: (CONTINUES)

Q. All right, India, would you like to introduce yourself to the Tribunal?

A. Āe. Tēnā koutou. Mōrena koutou. He uri ahau nō Ngāti Kahungunu, Rangitāne ki Wairarapa, Rongomaiwahine. Ko India Miro Logan-Riley ahau. My whakapapa, through a series of arranged marriages, connects me along the coast of Te Matau-a-Māui and down the East Coast to the Wairarapa, and so I whakapapa to many of the marae through this area. However, my whānau are buried at Te Tapairu Marae near Waipawa awa. Āe, I'm currently the Climate Justice Campaigner at the Pacific Network on Globalisation. The bulk of my work has been involved in international negotiations and local activism, particularly with rangatahi Māori and Pasifika, but primarily concerned with the impacts that climate change is having on Māori and the ways in which Te Tiriti o Waitangi and upholding Te Tiriti o Waitangi can facilitate a safer climate future for everyone in Aotearoa, and I will leave it there.

Q. All right. And so can I clarify which was the first climate change COP that you have attended?

A. My first COP was COP21, I believe, now. I forget the numbers, but it was the Paris COP in 2015 where the Paris Agreement was completed.

Q. Right. Right. And that – that was COP21. And subsequent to that, which of the other COPs have you attended?

A. Yes, so since then, or after the Paris one, I attended all of them up until and including the Glasgow COP in 2021, so, Morocco, Bonn, Poland, and then Glasgow – Madrid and Glasgow. Sorry, there's six of them. I forget the locations sometimes.

Q. All right. And now you have filed with your affidavit a research paper that I understand you did for the Pacific Network on Globalisation, *Blue Herrings: Carbon Markets and the Empty Promises of Blue Carbon*. I just want to confirm, or if you can explain for the Tribunal some of the research work that you have done on carbon markets.

A. Yes, so I think it's helpful for context to understand that the Pacific Network on Globalisation or PANG, as it's known, for a shorter name, was created in 2000 as a watchdog NGO mandated by regional Pacific NGOs to track economic development and economic policy in Pacific countries,

particularly after the structural adjustment schemes, and to advocate for an independent Pacific economic pathway in a way that respected and upheld Indigenous economics and Indigenous sovereignty in the Islands. Since then, the work has been a bit more fleshed out, so we have teams working with communities and movements on the ground in West Papua and Kanaky New Caledonia, Maohi Nui French Polynesia, as well as campaigners working on deep sea mining, legacy nuclear issues and the Fukushima waste dumping, and then, myself, I sit in the trade and climate team, so particularly focused on the relationships between climate finance, climate action, Indigenous sovereignty and Indigenous economics.

And so what PANG primarily tends to focus on is frontier issues that other organisations may not have the capacity to track and investigate, and carbon markets have been in the mix of things that needed to be researched since the late '90s, however, there hadn't been a comprehensive piece of work done looking at the impacts of carbon markets on Indigenous communities, particularly in the Pacific, and then what that means for development banks and global north countries who are advocating for the expansion of carbon markets, particularly in Pacific ecosystems.

And so that's what the work was focused on, is: What has been the Pacific experience of carbon markets so far? And then: What can we learn from that, in terms of the expansion of carbon markets into marine ecosystems and marine carbon credit commodities? And then to start to flesh out what that would mean compared against Pacific Indigenous economic values and principles. Yes.

Q. All right. Well, we will come back those topics. As a starting point, could you tell us about how you see a Māori governance response to climate change, what that could have looked like or could still look like in the absence of colonial structures?

A. I mean, I don't have all day to speak to the whakapapa of tikanga Māori, but I'm going to trust that the other expert witnesses who have come before you have covered that. Insofar as I was raised and I was taught, first and foremost is that we, as being from the Coast, are from the ocean,

and that is the ancestor that we are just as accountable to as we are to – to the land here on the East Coast in Te Matau-a-Māui, and because of that, we always **(unclear 09:13:00)** talked about Matike Mai as the whakapapa ethic that underpins tikanga Māori. Māori economics is concerned with the maintenance of that balance and that – it's the continuation of the whakapapa ethic for future generations. The best way I can kind of explain that is that I am here because the ocean and the waters and the lands of Te Matau-a-Māui have nourished and loved and cared for my ancestors so that they could love and nourish those ecosystems in return, which then allowed me to be here, and so that creates an obligation for me to love and nourish and care for those ecosystems so that future generations may be able to experience that love and nourishment in return. It's an ongoing balancing of many different dynamics between whare atua as they express themselves in our ecosystem and us as being Kahungunu, Rangitāne, Rongomaiwahine.

And so, for me, Māori economics is primarily derived and intended towards maintaining that balance, and I think, you know, Moana Jackson actually talked about this really astutely where he said that there – the development of Māori legal principles and approaches is concerned with the maintenance of the health of the collective, and that's not just people, that's everything around us that we have that whakapapa relationship to, whereas Pākehā and colonial law is primarily concerned with the protection of property, and those are two quite distinct treatments of our ways of doing things like resource redistribution and taking care of each other, and the way I like to think about it is that, you know, before colonisation, our rivers were clean enough to swim in and gather kai from, we had enough food for ourselves and anyone who came to our table, and we knew that if we gave, we could receive that in return, and that was a robust social and legal and economic obligation so that no one was left behind.

I think that's really important to bear in mind when we're thinking about economic or political pathways when it comes to addressing climate change.

Q. All right. Turning to the conference that – the Conferences of the Parties under the UNFCCC, can you describe for us at a basic level what actually happens at COPs?

A. Basically? Well, okay. So – so, go back to the early '90s, when countries who were members of the UN decided that there were a bunch of issues that needed international cooperation on; biodiversity loss, desertification, wetland loss and climate change.

And so, the Conference of the Parties under the United Nations Framework Convention on Climate Change met yearly to pursue international cooperation on reducing emissions, particularly under the Paris Agreement, to keep warming to 2°, with an aspiration to keep it to 1.5°.

And so, they met yearly, but also, they will have intersessionals, where they try to progress different negotiation or agreement components in the middle of the year, typically in June, at the headquarters in Bonn.

And so, the Conference of the Parties will meet and come up with agreements, but they don't just create agreements like the Kyoto Protocol or the Paris Agreement. There will be other initiatives and activities that kind of get included in it, so it's quite the multifaceted beast now. There's all sorts of initiatives and programmes and coalitions and commitments that have fallen under the work programme of the COP and the UNFCCC but don't necessarily sit within the explicit language of the Paris Agreement, so, things like the Koronivia Dialogue on agriculture, for instance, or the forest protection pledge that came out of the COP in Katowice, and so there are initiatives that can kind of be created along the way that don't fall within that agreement. Yes.

A. And you have also said that you have multiple – in your affidavit, that you have multiple negotiating strands going on at one time. Can you explain that?

Q. Yes, so I think, going back to Paris, we've got the Paris Agreement. The Paris Agreement is made up of articles. So, typically, those articles would be negotiated concurrently, so article 1 would be negotiated at the same time as article 2, article 3, article 4, so it's really big and there's a lot going on and it's quite complex to track.

And then what came after Paris Agreement was the need to negotiate the Paris Rulebook, so you can think of the Paris Agreement as the house and the Paris Rulebook as the furniture that makes the house function, so it's the rules of how the Paris Agreement is implemented, and that then had to be negotiated, and there are components of that that are still not complete, but the Paris Rulebook largely is complete.

And then there are also decisions that come of the COP each year, so the COP itself will have the decision text, and that's where you will see some of those extra initiatives added or extra things to note or affirm or to recognise, and so those are separate decisions, too, that will also need to be negotiated at each round.

Q. What can you say about the role that you have seen New Zealand play at the COPs, the climate COPs?

A. Yes, I mean, so, New Zealand, MFAT, positions itself as a bridge-builder that helps to find landing zones of commonality amongst the countries, sort of like a somewhat Switzerland approach to the negotiations, "We're all trying to just be neutral and get everyone to agree" is the face of how it's conveyed, and that was key terms and language that was communicated to us in civil society throughout the years that I attended. However, at the COP, what typically happens is that countries will form negotiation blocs to be able to grow influence within the negotiations, so there are a range of blocs, and a country can be a member of several blocs at the same time, and so you will have the likes of G77 New Zealand plus China; small island developing states; Like-Minded Countries, LMCs; AILAC, which is Latin America and the Caribbean and India and I can't remember the last one; there are lots of acronyms, and so New Zealand is a member of the Umbrella Group, which includes the UK, Canada, Australia, and the US, and I believe, Iceland and Japan.

And so that then creates an influence over how New Zealand positions itself in the negotiations in terms of tending to side with developed countries and wealthier countries' positions within the negotiations, so typically, the impact of the bridge-builder approach ends up being one of cooperation with wealthier, bigger polluting countries, rather than what

might be expected through a whakapapa lens, which would be to support our Pacific relations and those governments.

Q. I will quote from you from your affidavit at paragraph 18.

WITNESS REFERRED TO #A024, PAGE 4, PARA 18

"Indigenous Peoples have been active participants in the COPs as an expression of our sovereignty and commitment to our obligations to the places we come from." Can you explain the intention you had, perhaps collectively with others, in participating in the COPs and what you wanted to achieve.

A. Yes. There's really clear understanding that climate change is an outcome of colonisation, in that the expansion of extractive colonial economies and governments opened territories for extractive relationships and the extraction of oil and coal and the like. So, even up at Waipiro Bay near here, the land was confiscated for the extraction of oil. There is a high correlation between land being take and then that land being used for extractive industry that's got us in the situation today. But that isn't just land taken, it's tino rangatiratanga oppressed and dismantled and criminalised, and that is a shared experience across indigenous communities around the world. And so, we come together under a constituency. Under the UNFCCC, they are a recognised constituency, so we're like-minded groups and individuals who will come together to try to grow our advocacy in the negotiations, so you have YOUNGO, which is the youth NGOs; ENGO, the environmental NGOs; RINGO, research and independent NGOs, which is, like, universities; BINGO, business and industry, which is fossil fuel companies; farmers; women and gender; and then IPO, Indigenous Peoples' Organisations. So we're an officially recognised constituency. That means we get support from the secretariat and we get some speaking slots, but we're all there to do our best within the constraints of that system to try and protect our communities and the places that we come from in recognition of that deep knowledge of how we got here.

And so you're often – alongside, you know, some of the Pacific Island countries, you'll find the Indigenous Peoples, some of the youth organisations and environmental NGOs act as the moral reminder within

those negotiations, but also to ensure that our solutions that we hold, that our governance that can facilitate those solutions, are protected.

And so kind of when I first went to the climate negotiations in Paris and spent time with Indigenous communities from around the world, I became really familiar with the ways in which climate change is being used as a motivator to expand land theft and to expand what's being referred to as kind of maladaptation, adaptation done incorrectly that leaves people behind – also can be referred to as green colonialism, in – where in situations such as some of my peers in northern Scandinavia are having their reindeer herding territories taken to build windmills on and being told that they're being selfish because they're not allowing the green development on their land, when actually that's their subsistence space that is where they come from, and it is their leadership that can provide a pathway to addressing climate change.

And so we have to be there in order to try to mitigate that harm by the colonial countries. It's similar even for, you know, communities in West Papua, who are currently colonised by Indonesia, and so we can learn a lot from each other in that process, learn what to watch out for, what features of the existing colonial capitalist system may be doing in other countries that then we have to watch out for in Aotearoa and try to build up safeguards against.

And so, a core part of the work at the COP is to ensure Indigenous rights language is within the text, because that adds to a body of international accountability that can be used to try and protect us, or at least to assert grievance should the harm take place.

Q. For Māori who want to participate on behalf of their communities in COP, can you explain the different ways that that participation can happen?

Yes. So, I went – so, different categories of badges, really technical, and they have colours so it can be easily recognised which category you fall into, and that assigns you kind of a level of access within the negotiations, so you've got party badges. That's governance. They're pink. And so that's all-round access and also a right to sit at the table and negotiate. There's media, so you can go as a media person. That's a red badge. You can go as civil society, which is the yellow badge, and typically, you'd

fall into one of those constituencies that I listed. And then you might be UNFCCC staff, which is the blue badge. And so, typically, Māori have fallen into two categories. So they're on a party badge, a pink badge, and that might be party or party overflow, and – or a civil society badge. I can't recall an instance in which Māori have attended on a media badge, but that has different responsibilities and obligations. That may have been the case, I just haven't met them in the negotiations, because there's anywhere between 30 and 80,000 people there, so it's a pretty big hui.

So, the – a way that I think Māori come in on a party badge is one or two or three slots will be offered to representatives of the Iwi Chairs Forum, and that way, they come on the New Zealand government delegation, but that doesn't necessarily mean that they are fully woven into the negotiation team, and I hope that makes sense, and I can elaborate on that further later.

But typically, that also then requires the signing of a gag order, or an NDA, and that's the same for civil society reps that will be invited onto the – to be pink-badged by the New Zealand government. So in some instances in the past, New Zealand Climate Action Network has had a slot on the – with a pink badge, but they've also had to sign a gag order that means that – can't speak to media without approval by the head negotiator, they can't hand out brochures or pamphlets that may have a particular perspective on the negotiations. They can't represent the New Zealand government as a negotiator either.

And then how I've attended in the past and how I've seen most Māori attend in the past is on a civil society badge, so under the UNFCCC, you have to be an accredited organisation to be able to apply for badges, so that means typically you have to have been around for at least 18 months, you have to be a legally recognised entity within the country that you reside in, and then you go through an accreditation process that can – that currently is taking about two years to process the paperwork of, so you're looking at about three and a half years from start to finish to even try and get accreditation to be allowed to apply for a badge, and then to get a badge, you typically have to apply anywhere between eight months

and twelve months ahead of the negotiations in order to be allocated some.

And you can apply for, you know, 20 badges, but you'll typically only be given maybe, like, five or six, so however big your team is, you can't take that big a team. That's for civil society. Countries can take as big a team as they want.

And so, that way, for me, there's a lot more freedom in being able to speak up publicly and being to create the soft and kind of advocacy political pressure on governments to be able to achieve the outcomes in the text that Indigenous communities need.

Q. I just – in terms of the role played by Māori who are on the official New Zealand allocation, could you expand on that? Is there anything further you can add about the role that you have seen them play in the COPs?

A. Yes. It's a difficult one, because of that gag order, because of the nature in which Māori advocacy is restrained by being on the pink badge, there's only so much that can be done, particularly – you know, because the New Zealand negotiating mandate is decided a couple of months before the team even goes, and there can be no departure from that mandate, so even if there's an Iwi Chairs rep on the negotiating team, if they say, "Hey, well, your negotiating mandate is contradictory to this or breaches Te Tiriti o Waitangi in this way", MFAT won't change, because they won't stray from the mandate, unless they call back to capital and get that changed, which doesn't happen. And so, at least from what I've seen, is that **(inaudible 09:31:11)** is that the Māori representative on the MFAT team is – is heavily managed and restricted, to the point where people who – Māori who are on party badge have been asked to leave negotiation rooms and – and that kind of thing, just at the – at the behest of the lead negotiator, determined on their own terms.

So I think that's primarily why I would never go on a pink badge, because to me, that doesn't necessarily help, although there can be coordination between the person on the party badge and the person on civil society badges, but it is still not a reflection of tino rangatiratanga to be on that delegation, and it just – I guess it just depends on your theory of change

and the techniques and strategies a Māori would use to be able to try and get influence in those negotiations, but there's only so much wiggle room, because the mandate is preset.

HOUSEKEEPING – TIMETABLING (09:32:17)

HEARING ADJOURNS: 9.32 AM

HEARING RESUMES: 9.37 AM

(09:37) MR VINCENT TO INDIA LOGAN-RILEY: (CONTINUES)

Q. As – so, India, as a Māori civil society participant at the climate COPs, to what extent could you influence the New Zealand delegation?

A. Yes, I mean, as I said, the mandate is preset and sometimes we would submit, like, with a group of other young Māori or other young climate activists who would submit on the mandate, but that wouldn't necessarily translate, and so, in terms of influencing MFAT, it would often fall down to the daily stakeholder briefing, and that isn't just a – a conversation with the Māori who are there at COP and the MFAT team, that's all the people who are interested in talking with the New Zealand government. Primarily, those who are from Aotearoa or who have connection to Aotearoa would be in those meetings. And those could be anywhere between 15 minutes and an hour long, depending on the availability of the MFAT negotiators, and they also may be cancelled last minute. They don't necessarily happen every day, especially towards the end of the second week of the negotiations, sometimes, as – as the pressure and the expectations ramped up on everyone in the space.

Sometimes, we would be able to get kind of bilateral meetings with specific negotiators on particular matters that we were tracking and advocating in the negotiations, but again, that would be based on their availability, and typically, in those instances, we'd kind of ask for a bit of insight of what was happening in the negotiation rooms, particularly because although there is a principle of open negotiations, right, that the people should have access to the negotiations and to bear witness to

them, they would move faster if people who weren't government weren't in the room, because countries weren't watching what they said as much, and the political horse-trading that would happen to be able to get specific language in the text would speed up as well.

And so, sometimes we would be trying to get information of what was happening in those closed negotiation rooms, and we would be trying to figure out which countries we needed to lobby, and so sometimes, we would be asking about that from the MFAT negotiators. Sometimes, we would propose language to go into the text and ask New Zealand to advocate for that language to be in the text, or we would reaffirm positions. Maybe, you know, if we had gotten some language into the text that we were happy with, that we would ask for New Zealand to speak up in protection of that, if it was threatened.

And so, it was quite informal. It's on a case-by-case basis at the availability and the determination of the MFAT team, and so although, you know, Indigenous Peoples around the world are sovereign, that wouldn't – that wasn't necessarily the treatment of the relationship, whether we were speaking as Māori in those meetings or as representatives of the Indigenous constituency, because within the Indigenous constituency, we would strategise, so we'd be, as a collective global group, we would identify which countries needed to be talked to and then decide which people present in the room would have the relationship to be able to take that forward, and so very strategic, very smart, but heavily restricted based on the availability of MFAT and their willingness to listen, and if our position contradicted the mandate, then they wouldn't take it on board.

Q. How does that power dynamic sit, in your view, with tino rangatiratanga?

A. Well, seeing as Māori didn't cede sovereignty, we deserve a negotiating seat at the table, equal to states. The current UN structure denies that tino rangatiratanga, not only for Māori but for many other Indigenous communities – Indigenous Peoples around the world.

Because it's just the Crown at the table right now, they can make decisions about our commitments to climate action, they can determine what level of accountability they are going to put onto historic polluters, as well, the larger polluters in the wealthier countries, in a way that's

determined by them entirely. You know, we might be consulted with, but that – there's no power structure accountability to make sure that what we're saying will translate to the negotiation table. There's not even a veto power right now.

And I consider it an extreme breach of tino rangatiratanga, an oppression of tino rangatiratanga, for the New Zealand government and for the Crown to be negotiating on behalf of us, based on their terms and what they want. It's a very paternalistic relationship, where Māori are the – are the infantile Indigenous community to be cared for in interests of, rather than as meaningful Treaty partners who have sovereignty and tino rangatiratanga, and so even though we might say, "Hey, that particular part of the decision text actually contradicts, say, the aspirations of Indigenous Peoples, or doesn't protect Indigenous rights", MFAT can just choose to ignore that. There's no – there's no veto power, let alone for us to be able to contribute to the global climate conversation and to contribute to that ambition to lift the game within the negotiations, because that's the important part of the COP, is that it's all these countries coming together to, ideally, lift the bar collectively, and so it matters if the Crown or if any other country in that space is not helping lift the bar, and in fact is diminishing ambition or diminishing climate finance goals or climate action, because that has ripple effects for the nature of the negotiations and the spirit of the negotiations but also the decisions that come out of it, and then that impacts climate change, which then disproportionately impacts Indigenous Peoples as well as women and children and queer people and disabled people and future generations, and so that's part of what we try to bring as Indigenous Peoples and as Māori to that space, is a spirit of ambition and the good-faith nature of that convention.

Q. Now, the – the Crown witnesses, Kay Harrison and Victoria Hallum, have filed evidence about the Crown engaging in consultation, including with Māori, in order to set Cabinet's mandate before – before the climate COPs, and you have also referred at paragraph 49 of your affidavit about pre-COP consultation taking place. Can you add to this discussion about pre-COP consultation, from your own personal experience?

A. Yes. So I think there's, like, the NDC consultations, which are part of the obligations under the Paris agreement, the nationally determined contributions, our emissions reduction target, and then there's the mandate that's consulted on, so, the particular positions that the Crown will take within those negotiations, year on year.

HOUSEKEEPING – CONNECTION PROBLEM (09:45:24)

MR VINCENT TO INDIA LOGAN-RILEY: (CONTINUES)

A. So, yes, so, there's the written consultation period, typically. Sometimes NDC is in-person consultation, as in the lead-up to the Paris Agreement, the first NDC, or the INDC, the indicative nationally determined contribution. And then there's the briefings, the pre-briefings, in which we kind of get to hear what the New Zealand government is forecasting for that negotiation and what those of us who are going to be on the ground can expect in terms of, like, stakeholder briefings and that kind of thing. I think, to be really clear, like, consultation isn't tino rangatiratanga. Again, the Crown has the power and the resource and the, I guess, systemic power to just ignore what Māori say, and that is just what it is. Like, there's no amount of consultation that can render the te Tiriti relationship upheld. Instead, it has to be more about actually that we can come to things together, if we are going to have a shared negotiation position, if we are going to share our negotiation team. So whatever position MFAT takes, if they decide that that is the best position, even if it's contradictory to Māori governance or values or relationships, there's ultimately no accountability with teeth that can ensure MFAT at least, at the bare minimum, doesn't advance a position that is contradictory, right? There's like, you know, three different ways that they could take it. They can advance a position, they can stay quiet, or they can just actively dismantle a position vocally, and so even to get MFAT to stay quiet on a position that we would consider contradictory to tino rangatiratanga and all of those beautiful things that need to be protected under te Tiriti, that – the accountability just doesn't exist.

And it's hard, as well, because, you know, there's such an atmosphere of secrecy around MFAT when it comes to trade agreements, when it comes to the Paris negotiations, all of those, right? And so there – they may be negotiating something, but we don't even have access to a draft text to input, let alone, you know, influencing their negotiation position in its space, and that secrecy often becomes a way to lock Māori out from being involved, because we just don't have access to that information.

And then the other important thing here is that Māori are bulked into a broader category of stakeholders, and so we're the same as industry, as farmers, as young people, as environmental NGOs, whereas actually, fundamentally, we have a constitutionally different relationship with the Crown that is not reflected in the day-to-day treatment or in the consultations, right, that Māori are any other stakeholder, and we'll often be referred to as "stakeholders" in the room, and so because of that treatment and that miscategorisation and the kind of – the misalignment and mischaracterisation of the nature of the te Tiriti relationship, that's an additional reason that the Crown can just leverage to ignore Māori – just another stakeholder.

And so we get – and so the Crown listens and then proceeds as it wants, unless we can build some kind of political pressure and soft power to persuade it in a different direction, but that's just politics, that's not a constitutional arrangement.

Q. Can you imagine, and perhaps this does not – perhaps this is not tino rangatiratanga, but can you imagine a better way of the Crown and Māori coming – having a shared negotiation mandate or having one in the first place, rather?

A. Yes, having a shared negotiation mandate, I mean, yes, that is tricky. I am reluctant to articulate solutions that are any less than tino rangatiratanga, because the Crown has a history of using that to claim best practice rather than a step in the right direction, and to slow down progress, as well, right? "Oh, but we've done this little thing over here, so, like, be happy." But that's still not a te Tiriti relationship.

So, for me, I think to start with is, at the bare minimum, a veto power for certain positions; that the Crown cannot progress positions in that space

if it's contradictory or if it's in contradiction to what Māori spheres of governance have asserted as a pathway forward or the position to take in the negotiations.

But what is really hard is that the negotiations move really fast, and by the end of the negotiations, we're all awake 23 hours a day, you know, and no sleep, they're moving fast, there's a lot of back-room meetings that not even other countries can get into to try and come to an agreement, because it's negotiation by consensus, so everyone has to agree in order for it to be gabbled through at the end, and so there may be a mandate that is shared between the Crown and Māori going into that space, but also, then, what is the accountability mechanism within the negotiating team as we move very fast through the political dynamics of the negotiations themselves? And so, Māori have to be resourced to be able to be there to see the negotiations ourselves and to be able to have that be a maintained, consistent and meaningful relationship right through the negotiations, not just into the mandate.

But as I said, those are all nods towards a potential tino rangatiratanga, but it's not tino rangatiratanga in and of itself, but we would have to be at the table ourselves for that to be the fullest expression.

Q. I want to turn to carbon markets, and I want to draw on your research –

HOUSEKEEPING – TIMETABLING (09:52:33)

MR VINCENT TO INDIA LOGAN-RILEY: (CONTINUES)

Q. All right. Now, India, you have explained for us what you see a Māori governance response to climate change looking like. If we can pick up again from that kōrero, from a tikanga Māori perspective, how do you assess carbon trading in the New Zealand ETS?

A. Yes, so, this is – thank you for coming back to that, because I did just want to say I went on an explanation of Māori economics, but the governance response, in my mind, had colonisation not occurred, would have been rapid and very participatory. I think that's, you know, we see the likes of things like rāhui and that kind of thing; if a species is suffering, we respond, and we make sure that we're able to take care of each other

if someone's impacted by, you know, not being able to harvest that particular kaimoana or that kind of thing, and so for me, the same is with the – with the pollution. If an imbalance is being created, we respond, but also that our governance and our resource redistribution mechanisms were such that the people were able to participate and had the time to participate in seasonal governance as well, so yes, I think we can draw on the likes of Matariki, when our people would gather for a month at a time, or weeks at a time, to deliberate the planning for the following year, to allocate roles and responsibilities, look at what worked, what didn't work and "What can we do collectively to be able to, you know, address harms that may be occurring – which then creates harm back in on our own communities?".

And so I think that's something to bear in mind when it comes to carbon markets, where in the ETS – we've had forms of carbon markets in the ETS for a really long time, and emissions haven't come down in a concrete and meaningful way, and so, for me, a Māori governance response would be, "Okay, well, that's not working. Let's just reduce emissions at the source." And that's the same as what the IPCC says, the Intergovernmental Panel on Climate Change, is that the most meaningful way to reduce emissions is to reduce it at the source.

What carbon trading does is it creates an – it turns nature into an equation where harm over here can somehow be magicked away by some good stuff over here, and that is an approach to handling environmental pollution that was started, kind of imagined and theorised by physicists and economists in the US back in the '60s and then into the '80s, and even those who were involved in the very first carbon projects were really clear that it should only ever be a stopgap to start getting businesses to think about their emissions profile. It should never have taken up the policy space that it does now. It should never have lasted this long. And so even the original imaginers of offsetting and environmental pollution offsetting were, like, "This is – can only get us so far before the real policy and action pathways can catch up." And so, for me, that's really indicative, right? The whakapapa is something that is very revealing about what it can achieve or what expressions it will take into the future.

And so, for me, ultimately, something like the ETS is like, well, that's not reducing emissions at the source, and that would be an appropriate response, and that's affirmed by the best of the science and the best of the Indigenous knowledge around the world. No matter how good we get an ETS, it will never be enough, because it's inherently about trading commodities, and so the ETS also cannot fulfil all the other obligations that are part of an emissions reduction pathway, which is, you know, how do we retrain people? How do we plan our economy into the future? How do we transition everyone? How do we relocate marae? And because the ETS has been the primary emissions reduction tool for the Crown, we can see as an outcome of that a narrowness of imagination in being able to actually tackle climate change and the emissions that come from Aotearoa.

And then, not only that, is because, you know, there's some Māori who are selling carbon credits on – in the ETS and in other voluntary carbon market spaces around the world, we have a coercion of Māori into an expansion of private property systems and commodities that is inherently colonial, right? And I talked about earlier is we're in relationship with the land, we're – it's not private commodities or private property for the pursuit of profit, and that's very much an explicit intention by the likes of the World Bank and the global North, who are seeking to do what's called formalising land tenure in Indigenous communities, which means altering traditional tenure into private property systems so that they're more easily commodified, right? And so because of that, what we have in the policy space is what's called or referred to as an expansion of the near-term carbon budget, so it gives an impression that we can keep emitting because there's a way to kind of buy a way out of having to reduce that, and so that's having impact on government policy around the world, because they can just buy their way out, and it's the New Zealand government, the Crown, is budgeting over a billion dollars a year to be able to buy credits to meet its emissions reduction targets under the Paris Agreement, rather than reducing at the source, which would be, to me, a kaitiaki response to these emissions.

In fact, the emissions wouldn't even have got this bad if it hadn't been for displacement and extractive relations being violently imposed on the ecosystems of Aotearoa.

Yes, I hope that covered it, Sam. I was trying to cover a lot of things there so you don't have to ask much more, because we're on a time crunch.

Q. I will ask you one further question, India. You referred, of course, to Māori selling carbon credits, and of course, there is the New Zealand ETS and the Māori role in forestry. What do you think the – the drivers are, or what do you think the needs are that are leading to this, and how could they be met otherwise?

A. Yes, so, in my experiences with Māori in the climate space, as well as my experiences in other Pacific communities who are considering carbon projects, is they're quite honest that carbon trading doesn't reduce emissions, but they need finance, and so until better finance options come to the table, they're going to do carbon projects, even though it doesn't do anything, right? And they're quite honest about that, like, the Indigenous knowledge is quite clear on that. You can't just offset harm, magic it away somehow through the transfer of commodities, and so that's the key thing, is because the Treaty settlements have not been adequate to replace the resource base and the subsistence base and the relationships and the network of interconnectedness with our atua that sustained us, there is an ongoing coercion for Māori to participate in market-based mechanisms and the free market, because we don't really have the choice, because everything's been taken away, and so, you know, to say to a community, "Hey, we could have some funding to be able to feed and house our people", then it may be chosen, but we can't see that as a free and autonomous choice out of the context of what has occurred in the history of this country, and the same for other Pacific Island countries, right? The amount of wealth that was stolen then creates circumstances in which communities are seeking streams of finance.

But best practice finance is additional, so it's not just shuffled around pots of money, there – it's more. It's predictable, so we know when it's coming. It's consistent, so it regularly comes. And it is grant-based, right, so given

as a grant. In carbon markets, you're giving something in exchange for it, and that may require the alteration of your land tenure, it may require the locking up of the development of your land, it also then – because of a whole bunch of environmental science, it may not even be sequestering what is being said it's sequestering, and so it may then also be contributing to the growth of emissions, and that's what happened under the Clean Development Mechanism under the Kyoto Protocol, is that most of the credits were – had been destroyed by climate disasters, right, those forests, those mangroves are gone, or they're found to be fraudulent because they're not an additional sequestration on top of what the ecosystem is already doing, and so because carbon markets were originally designed to be – enable the expansion or the escalation of the use of coal whilst providing some environmental damage compensation, that's directly what they're designed to do, right? And so even though we'd be selling credits and sequestering carbon, that doesn't necessarily result in the draw-down of climate impacts, which then disproportionately impacts Indigenous communities.

I hope all of that made sense – a kind of deep dive into carbon markets. But yes, that's primarily the conundrum that we're at, because the global North, of which New Zealand is one, is not coming through with the climate finance that is necessary and the key targets that are to be met, and not enacting legislation that makes polluters directly pay for the harm that they have caused and continue to cause.

Q. Thank you, India. Those are my questions for you.

HOUSEKEEPING – TIMETABLING (10:04:08)

(10:04) MR BENNION TO INDIA LOGAN-RILEY:

Q. Tēnā koe, Ngāti Kahungunu, India. Just a couple of quick questions. Just on Paris, you were at the Paris COP, you said, and you talked about, in some of your answers, or some of your presentation, about your engagement with government officials at COPs, and you lobby government, et cetera, about language they might use, how to engage. I

assume all of that sort of activity is undertaken by Māori groups at the Paris COP?

A. Yes, so I went on my own with a youth delegation that year, but I was involved alongside Te Tui Shortland, who I believe has given evidence, and Teanau Tuiono, prior to him entering Parliament, and Sina Brown-Davis, who are other Māori in that space within the Indigenous Peoples' Organisation, and so of course, you know, Te Tui was there representing Ngāti Hine, and so there were some of us representatives on the ground, but we then worked more broadly with the Pacific team of the Indigenous Peoples constituency.

Q. All right. Thanks. And also, were there groups representing Māori forest owners there? Do they turn up at COPs, as well, those interests?

A. I wouldn't say it's that specific, but I believe, because Te Tui is a share-owner within a forestry trust, right, that, you know, that representation is there. But also, in the government delegation, there's, you know, Federated Farmers, there's other organisations that I can't quite remember – it's a moving feast each year, who went, but there was industry representation as well as maybe one or two civil society on the New Zealand government delegation.

Q. All right. Thanks. And in terms of the groups that were there at Paris, do we assume that the Māori groups were generally supportive of the Paris – being ambitious about – well, being as ambitious as it was about targets, processes, the idea of countries being required to, or putting in their nationally determined contributions, that those are – those are steps that the Māori groups were aware of, were – participated in discussions about those sort of approaches, understood them and generally thought they were stepping in the right direction?

A. Yes and no, because there's so many components to the Paris Agreement. Some things were a success and some things were a loss, so we didn't get a decision on loss and damage compensation, for example, right? The things – the impacts of climate change that can't be adapted to, both cultural and economic, and so we lost on loss and damage, but we got 1.5 in the preamble, and that is also quite often done in coordination with some of the Pacific Island governments, for whom

they are trying to figure out, "Which horse do I keep in the horse-trading that will guarantee more of a future or potential future for my community?" And in that sense, we are – Māori communities are aligned with the aspirations of Pacific Island countries, and I think that's a key thing.

You know, we wanted Indigenous rights protection language in the text, but we got it in the preamble instead, and the preamble is – has less teeth, and so that's a key thing, is where it goes and how it goes in there and the types of language is really important, so although we got it in the preamble, it would have been better to have it in an actual article, because the – the – the teethiness of it and the accountability measuriness of that would have been stronger, although it's not legally binding, so there can still be some evasion, so that's part of the trickiness, is that, you know, Pā Moana Jackson would talk about, like, you know, if we don't go to these spaces, we'll be forgotten, but if we do go to these spaces, we'll only be marginalised, because of the nature in which the Indigenous Peoples are treated and are not recognised as sovereign in those negotiations, and so we're there, but insofar as the current power structure is, insofar as the current MFAT relationship is, the progress can only be so far.

Q. And just – just lastly, a – a question about the – the Fijiian, I suppose, Pacific – the Talanoa Dialogue Platform. I think that is COP23 in Bonn. Any brief reflection on – on that and – and that – that effort, which I understand was endorsed by the – the UNFCCC process put that up? Any reflections on how useful that was or whether that was a reasonable step?

A. Yes, I mean, I think for me it was reflective of Indigenous processes of discussion, right? Our equivalent is wānanga. We get in a room and we talk about it and we hold each other in good faith, whereas the – the formal and the formal informal and the informal informal ways of negotiating can be too strict and – and not as productive, and so a lot of countries and a lot of civil society were really impressed by the talanoa approach because it helped break down some of that, like, defensiveness and that tension that happens within the negotiations, because you've got 195 different countries trying to get all on the same page, so – but it's

hard to measure, right? Like, the soft impact of that is hard to kind of quantify, in a way, in terms of hard outputs, and unless that became the default way of negotiating, the impacts of the talanoa approach would be quite limited, but it was enjoyed by states as a – an easier way to negotiate or a less stressful way to negotiate, which can help move kind of where some of the blocks are and pieces of the negotiations.

Q. All right. No, thank you. Those are my questions. Ngā mihi.

A. Kia ora.

Q. Ngā mihi ki a koe.

HOUSEKEEPING – TIMETABLING (10:11:13)

JUDGE MILROY:

We are now at the point of having the Crown questions.

(10:11) MR PREBBLE TO INDIA LOGAN-RILEY:

Q. Thank you, your Honour. Tēnā koe, India. Ko Jeremy Prebble tōku ingoa. Kei konei ahau mō te Karauna. Thank you very much for your evidence this morning and the significant work that you do. First, I just had some minor clarification questions. Checking that you do have your October 2024 brief of evidence in front of you?

A. Yes.

Q. And it's really just a minor point, but at 24, paragraph 24, you are referring there to state overflow or party overflow badges, and I assume where you talk about the MFAT delegation, that's the New Zealand delegation, which is negotiators from MfE – includes MfE, MPI, **(inaudible 10:12:08)** MPs and representatives of the Iwi Chairs and the government of Tokelau, is that right?

WITNESS REFERRED TO #A024, PAGE 6, PARA 24

A. Yes. Yes.

Q. Thank you. And then, just going down in your brief, really from paragraphs 26 to 32, you were talking there, including about the – the MFAT funding, if you like, for the Iwi Chairs, and – and obviously, I take from your evidence that you consider the funding is deficient, and I was

not looking to contest your perspective on that, just check your understanding of what is provided. Are you aware that MFAT makes, at the moment, an annual grant of $10,000 for funding Iwi Chairs for providing a badge or badges to them?

WITNESS REFERRED TO #A024, PAGE 6-8, PARA 26-32

A. I wasn't aware of the exact figure. I just note, you know, it's flights and accommodation and that, so it doesn't actually compensate them for their time as a –

Q. Yes.

A. – professional.

Q. Yes. Okay. And you may not be aware, but that funding is baseline funding that comes out of the climate, Antarctic and environment division budget and has been in place for two to three years. Is that something you are familiar with?

A. I wasn't sure about the exact time. I know that an Iwi Chairs representative has been attending since 2017, so that goes further back than the timeline that you have indicated, and I wouldn't know where the previous funding would have come from to be able to – from 2017 onwards.

Q. Yes. Yes. And I can't answer you on that, either. The MFAT witnesses may well be able to. Are you also aware that MFAT has a practice of allowing a room for the Iwi Chairs rep in the MFAT block booking?

A. Sorry, can you repeat that?

Q. My understanding is that the Ministry of Foreign Affairs and Trade has a practice of allowing a room specifically for the Iwi Chairs representatives in the MFAT block booking. Is that something that you are familiar with?

A. I am not across the ins and outs of that, but I will just make the point of that's at MFAT's discretion, and I am aware that in the past, that has been indicated that it's not necessarily guaranteed until quite up – like, close to when COP was going to be happening.

Q. Okay. Thank you. With respect to numbers, while there has been multiple iwi reps on the official delegation in the past, since MFAT opened up the party overflow participation – that's three years ago – they've also

enabled other Iwi Chair reps to participate as party overflow. Is that something you're familiar with?

A. I stopped attending in 2021, so that's not something that I am across. At the same time, like, participation doesn't equal tino rangatiratanga, so that would be my only critique on that.

Q. Yes. I totally understand your perspective on that. It was more just that another avenue for providing more Iwi Chair reps to go in addition to on the official delegation, really. But something you are not currently familiar with.

A. No. No.

Q. And on the party overflow badges, are you aware that numbers are not capped by the Ministry of Foreign Affairs and Trade or by the UN system, unlike for observer organisations?

A. That is correct. I will say that that is a new kind of innovation in response to ongoing critique from civil society and Māori, yes.

Q. Thank you. I just want to now turn to the conclusions you reach, which are at paragraph 53, and that's page 15 of your brief of evidence, and you believe the Crown has breached the Treaty in several ways, and broadly, I am just going to summarise those. The first is you are setting out the exclusion from being an equal participant in international treaty-making, which goes to the rangatiratanga point that you are making. The second is the requirement to enter into non-disclosure agreements, and you have referred to them as "gag orders" previously today. And then the more substantive criticism of the Crown and its negotiation approach, which you say is lacking in ambition. Those are the – the three core conclusions you reach there, that – that's fair, isn't it?

WITNESS REFERRED TO #A024, PAGE 15, PARA 53

A. Yes.

Q. And I would just like to focus, really, on that first conclusion that you reached, being the exclusion and – from the right of exercising rangatiratanga as equal participants. You may not have, but have you had the opportunity to read Victoria Hallum's brief of evidence filed from the Crown?

A. I have skimmed it, yes.

Q. And she – she holds the position of Deputy Secretary at MFAT and has a Masters in the international law. She notes that under international law, sovereign states are the principal subjects and hold exclusive right to negotiate and conclude treaties that are binding. Is that something that you are aware of?

A. **(inaudible 10:17:16)**

Q. And I just take it from your evidence this morning that while you are aware of it, you take issue with it, if you like?

A. Yes, Māori are sovereign, and so we should be at that table.

Q. Thank you. She also then sets out that when dealing with multilateral meetings, such as COP, the rules and procedures are agreed to by all the member states and are expected to be complied with. Do you agree with that?

A. It's negotiated by consensus, yes.

Q. And so, any changes to the rules in terms of how they are conducted, that also then requires a prescribed process. Putting it another way, no one state can make unilateral changes. Do you agree with that?

A. Correct.

Q. Now, obviously there is an important legal issue, which I think you were touching on, around what the Treaty provides or provided the Crown when it comes to international treaty-making, and that includes what the Tribunal has found in the past reports about the Crown's prerogative at international law to negotiate treaties. I did not intend to get into that particular question with you. It is an ongoing debate, and as you are aware, it is also before the Tribunal as part of the Constitutional inquiry. Is that something you are familiar with?

A. Yes.

Q. But I did want to ask perhaps some more practical questions, because I know you were a little bit reluctant this morning to – to get into "Well, what practically could be done?", but I just did want to ask you some further questions in relation to that, if that is okay.

So we heard evidence in the last hearing week, which was the fourth hearing week, from Professor Claire Charters, for the claimants, and she was giving evidence on COP, or she in part gave evidence on COP rules

and representation at her para 112, and that – she said there that Māori should be recognised alongside and equivalent to the government at COP, which I take is broadly consistent with what you have outlined this morning.

A. **(inaudible 10:19:13)**

Q. And I asked her similar practical questions, and I just wanted to put them to you as well. The first is that I understand that the COP rules only recognise states as parties that have credentials and speaking rights, so you need to have those in order to be a party at COP. Is that something you are familiar with?

A. Mhm.

Q. And it is really touching on the point that Victoria Hallum is stating in her evidence, where she notes that under the climate – the terms of the climate treaties, as with all international treaties, New Zealand is a single party, and – so that it must speak with one voice internationally. Do you agree with that?

A. **(inaudible 10:19:49)** the Crown is a single voice, but I wouldn't consider Māori as part of that conceptualisation of New Zealand, and the single voice thing is a – is a Crown position. It's not a Māori position, and it certainly isn't a consensual Māori position, either.

Q. No, but I think – I think we have established that you agree that in terms of the current international law and the rules of COP, for example, you have states who have speaking rights, and so there is a state that has a speaking right. There isn't multiple states within one state, if you know what I mean.

A. That is correct, but I think that's kind of by the by in terms of the Crown's Treaty relationship.

Q. Sure, yes, and that goes to your underlying broader concern around tino rangatiratanga, but just – I guess just following this line of logic, consistent with the rules of COP, as I understand it, there has been no precedent of an international group speaking in negotiations or voting independently of a state's mandate. Is that your understanding?

A. That is correct, yes.

Q. And I guess, given this current – whatever you might say about it, but given the one-voice requirement at COP, do you consider that there are practical options that could be considered within that paradigm to provide greater access for Māori?

A. I think it depends on your definition of "practical", right. Like, the advancement of Māori as a state, right, entering into the General Assembly, and that process, as has been done for other countries that have achieved independence, is a pathway that can be taken. Whether the Crown wants to allow for that or not, it's – let's not just constrain it just to COP. And so, while the one-voice thing might be the situation currently, there has been no indication or no ambition from the Crown to change that, the nature of that one voice, or that it be more than one voice and that one voice being the Crown.

Q. Okay, no, understand your answer there. I guess just for a moment, working with the one-voice current situation that we have, I took from your answers earlier, and – and correct me if this isn't what you were saying, but that within the current arrangements, you would still advocate for a pre-COP partnership process to develop or co-develop a mandate. Is that fair, from what you were saying?

A. I think there's two components to it, right? There's whatever the negotiation position is, which can be captured in the mandate, and then there's the functioning of the relationship itself through time, and that's both in regards to COP and the broader relationship with MFAT, one which is fraught and very difficult at the moment and not te Tiriti-based at all, and so sure, develop a mandate together, but what are the accountability mechanisms? What is the veto power, essentially? How much is the Crown willing to advocate for Māori negotiation positions rather than just look to advance their own? I think there's things to be teased out there, and that's ultimately for the tino rangatiratanga sphere of Māori to figure out, so I wouldn't want to colour that in too much. I think that is a wānanga process in itself amongst Māori, so I don't want to preset that and give the Crown too many ideas to go running away with that not all Māori have agreed to, but there's – it's the nature of the

ongoing relationship as well as the negotiation position. Those two are equally important.

Q. **(inaudible 10:23:32)** and I thank you for those answers, and – and I think you would agree, from that answer, that at least some of that discussion, some of that – those ideas could be picked up if there was a development, a co-partnering, if you like, development of a mandate, because some of the concepts could be put in potentially to that mandate, like, I think you were really talking about one of the concerns you raised was, for example, you know, what is the role within the negotiations? So there's the mandate that leads you up to how you undertake the negotiation, and as you have described, there is a reasonable amount of restriction once you have got that mandate in place for then the conduct of the negotiation, but they are two separate things, however, there is scope when developing the mandate to take account of some of your concerns here, is there not, if it was designed in a co-design way?

A. Potentially, but that doesn't change the structure of the MFAT negotiation relationship with Māori broadly, as it relates to COP, because there's mandate, but there's all the other activities that take place under COP, the NDC, the action plans, the adaptation plans, all of these things. It's quite the beast. So I would broaden it to the whole piece of work, and for me, I would be hesitant to say, "Yes, co-development is the way to go", if there's not equitable access to the power of influencing that, of resource, of staff input and staff hours, as well as the time and capacity to be able to seek the input and the consensus of our people within te ao Māori as well, and that's an ongoing and quite an intensive process to do, because we take it so seriously.

Q. No, thank you, and so in some ways, one of the things you are highlighting there is, aside from just the mandate, you would, I think, practically want to see resource applied to the actual negotiation to ensure that whatever you agreed in the mandate could be given proper effect to during the negotiations. Is that fair?

A. As well as the development of the mandate, as well as any other activities undertaken in relation to the negotiations and the activities that come from those.

Q. Thank you. And look, just a last set of questions. Obviously, we have been talking about the mandate and you noted that, you know, the mandate is determined – and then I understand this to be the case: the mandate is determined at a point in time before, obviously, the negotiation occurs. You need that to then know your position, if you like, in the negotiation itself, and I understand that really is because the mandate really is what is set in place as determined by the Executive, who, at least currently, and again, putting to one side concerns around what is the conception of the state, but the Executive holds the power to negotiate internationally, as a matter of law. Is that something you are – agree with, or **(inaudible 10:26:31)**?

A. As a – as a matter of Crown law and as the current UNFCCC is structured, yes, but as a matter of Māori law, no.

Q. And just on the mandate then being determined in terms of it currently being determined by the Executive, that's obviously a decision for Cabinet in advance of the negotiation. You understand that's the current practice?

A. Yes.

Q. And that would – you can imagine that would take some time and effort to be carefully considered in advance of any significant negotiations such as COP?

A. Mhm.

Q. And so any changes you would want would, you would expect, need a very thorough consideration, too, which may not – I am just really talking about the practicalities now – may not be possible to simply convene Cabinet, again, make a significant change to what has been a, you know, a very lengthy process of getting Cabinet agreement in the lead-up to a negotiation like that?

A. Well, to me, that's a Crown issue, within its own governance practices. Good governance would mean taking the time. Especially something as serious as climate change needs to be taken very seriously with a lot of thoroughness, and again, as I talked about with, you know, how we would wānanga decision-making for Matariki and that kind of thing, that is Māori governance in practice, to take that time, and I would want to know why it's considered impractical and what those barriers are for the Crown to

engage in the appropriate manner of the relationship in the development of that mandate.

Q. Thank you. And look, thank you very much for your evidence this morning. It is very helpful.

A. Kia ora.

JUDGE MILROY:

Thank you. So now we will pass to questions by the Tribunal.

(10:28) PRUE KAPUA TO INDIA LOGAN-RILEY:

Q. Kia ora, India. Just, I guess, following on from the Crown's questions and I guess the issues around mandate. You would agree, wouldn't you, that probably in terms of most of the UN forums, this issue of a Māori voice is endemic across the whole – across all fora in the UN?

A. Yes.

Q. Are you aware of any Māori organisations – I think you answered in a question saying nobody has observer status in terms of UNFCCC. Are you aware of whether any Māori organisations of any description have applied for observer status?

A. Yes, there's one organisation, Te Arawhata, a Māori youth climate organisation, that has observer status, but currently in the process of winding that down, actually, so again, that will take the number to zero, and I believe that we are one of very few Indigenous youth organisations that have accreditation from around the world. I'm not aware of any that have applied. I believe that may be about to change, but because of the fiscal crisis that the UN is in, it's going to take about two years to process.

Q. Right.

A. Yes.

Q. The issue about the Crown or the Crown delegation involving Iwi Chairs, for example, do you – are you aware of why in particular Iwi Chairs was identified as the group to represent Māori – a Māori view within this forum?

A. It's my understanding that Iwi Chairs is the default Treaty relationship holder for most of the Crown's activities across the ministries, and that's

because of the nature of the PSGE settlement and creation process. I do want to draw it back to Te Tiriti o Waitangi and understand that it's rangatiratanga of hapū that is the primary governance model, and so in my mind, that is something that is worthy of more consideration when it comes to Crown-te Tiriti constitutional relationships, and that's something that we as Māori need to iron out, as well.

Q. So if you were looking at the issue of, for example, having a Māori mandate in terms of the position that Māori may take across the board, how would you envisage that that would be carried through in terms of recognising the rangatiratanga o ngā hapū and the Māori organisations that particularly focus on climate change? Issues like the PSGEs and so on, how would you envisage having a Māori position that would be taken into an international forum?

A. Yes, that's a big question. I don't want to speak for all hapū. That would be a big mistake on my part. But what I will say is that I would consider appropriate, because of our intergenerational governance obligations, that we would make longer-term plans that then we can draw the negotiation positions from. I think in terms of the accountability within the negotiations, as they move rapidly, we would need to have some kind of collective that could either be there or be checked in with, but that's, I think, for hapū to negotiate amongst ourselves, but for me, it is highly beneficial to have a longer-term thing so we don't have to rehash all the different components all the time, but then, if there's key things that are coming up within those negotiations, because there tends to be a theme or a key focus area, key outcome, or a batch of key outcomes from each negotiation, and so I would highlight those and wānanga those around the country, as led by hapū.

Q. Thank you. And just finally, the issue of – I think Mr Prebble referred to the baseline funding for Iwi Chairs for the last couple of years. Are you aware of any formal agreement between any aspect of the Crown and Iwi Chairs in relation to involvement or attendance within this forum?

A. I'm not sure about the nature of the relationship now, but when I was there, it was on kind of a yearly-by-yearly basis, it wasn't guaranteed. The badge wasn't guaranteed, the funding wasn't guaranteed, and so it was

kind of up to the decision of MFAT and the political will of the expression of the Crown or the government at the time.

Q. Kia ora. Thank you for your evidence, India.

A. Kia ora.

(10:34) PROFESSOR DAVID WILLIAMS TO INDIA LOGAN-RILEY:

Q. Ata mārie, India. David Williams speaking to you now. So, a couple of questions. The vast majority of colonised Indigenous Peoples have achieved self-determination in political independence, at least, over the recent decades, so it's how you use the word "Indigenous Peoples" that I'm just asking you about, so – the UNDRIP doesn't define Indigenous Peoples. My assumption is you refer to colonised Indigenous Peoples who have been rendered a minority within their own lands and have got no recognition as state parties anywhere in the national law system, is it – is that how you use the term?

A. I guess it's how I've used it in relation to this specific issue, but I think in the UN system more broadly, or even just socially more broadly, it's a little bit different from that. It's a little bit more expansive. And I believe that the current UN standard is Indigenous is self-identified. But also, you know, there are countries who would consider themselves Indigenous who are their own nation-states. Many of the Pacific Island countries would consider themselves in that category, but they have their own state, so they negotiate as a state, so that may not be how they articulate themselves within that particular UNFCCC framework, because they have access to that additional category, and yes, I'm not quite sure on what – in terms of what you referred to in terms of, like, the numbers of those who are currently still colonised, particularly because colonial countries deny Indigenous status from Indigenous communities because it's inconvenient to have Indigenous Peoples. That challenges the power of that colonial state.

Q. Can you just help me in terms of the chapter I'm writing at the moment? You always use upper-case I –

A. Yes.

Q. – and upper-case N and upper-case P? Indigenous Peoples, Indigenous Nations? And that's –

A. Yes, so if you are referring to Indigenous peoples, that typically refers to the – the kind of sovereign Indigenous collective. You can sometimes use a little p, or just Indigenous people, if you are referring to – to communities or specific communities within those Indigenous Peoples capital P, if that makes sense.

Q. Okay, so on to your blue carbon market, because I looked at your appendix C and a very convincing argument you put forward that blue carbon market does not do anything to reduce the emissions as it promised. So my question is, it almost proves too much, in some ways – you might say that the whole UNFCCC, the Paris Agreement, all the COPs you've gone to, they are all part of structures none of which have achieved a reduction in emissions, so is the blue carbon market any worse than anything else?

A. I mean, it's an interesting – I wānanga that with myself all the time in terms of the efficacy of the COP and that kind of thing, but I will note that there are incredible countries doing incredible – you know, I mean, Pacific Island governments have committed to the Fossil Fuel Non-Proliferation Treaty, and those kinds of initiatives which are going to have an impact. It's really the will of the historic polluters and the allies of those historic polluters that tends to get in the way of that. So I don't want to do a writ large across all countries.

Yes, when it comes to carbon markets, we just have to be honest about it, but because there is a profit incentive, because you can buy a credit and trade it as a commodity on the markets and that kind of thing, that continues to push it, and there is a profit advantage to altering Indigenous land tenure into forms of private property, and so – and I think that's the hard thing, is like – and that's, like, fossil fuel companies have their own carbon projects, because they want to be able to offset and not have to reduce their extraction, so primarily, you know, the profit interests of high polluters are highly influential and, you know, many of them come to COP, and part of the reason why the US pulled out of the Copenhagen Accord was because of fossil fuel lobbying, and so there are some very bad-faith

actors in the mix that have too much power and influence, and that's why there's often a push for, you know, to ban fossil fuel lobbyists from the negotiations, because they're not having a good influence, and that could be a position that MFAT could carry forward in the interests of preventing that mess, right? And because we know ExxonMobil knew about climate change but they hid the science for a long time because they knew it would mean they'd have to reduce extraction, and so there's just really awful legacies of those fossil fuel companies and high-emitting industries that have had wide-reaching consequences.

And I do believe that there are things we can do to reduce emissions. Just have to stop chasing after fancy-sounding silver-bullet approaches like carbon markets and be very frank about what they can and can't do and just ultimately commit to keeping them in the ground and transitioning our communities and really protecting and upholding Indigenous governance and Indigenous knowledge.

Q. Thank you very much. And so, are you a half-full or a half-empty person? I mean, you are younger than me. How are you – how are you going?

A. It's – I'm angry, is what it is, and that's – that's what keeps me going, but I'm so angry, because I have been loved so much and I love so much and I care so much about my community, and I think that's something – you know, I come from the East Coast. I come from a community that had 12 people killed by a climate disaster in Cyclone Gabrielle, and we still have one person missing, Joseph Ahuriri, but these kinds of things are great injustices that I cannot just be okay in the face of.

And you know, I spend a lot of time with young people, and I went and spoke to my old high school after Cyclone Gabrielle and I asked them how many of them knew about climate change and they all raised their hand, and I asked them, you know, how do they feel? Do they feel good about the future? And none of them raised their hand, and I think that's part of the big injustice here, and that's part of the big work here, is that the hope of a generation has been stolen, and it has to be restored, and it has to be restored by good governance, and that's where I think te Tiriti and honouring te Tiriti offers us a framework to be able to provide that hope, not just for Māori, but for everyone in Aotearoa, because we have

to commit to this work, and as much as we don't like the idea of – some sectors don't like the idea of not polluting, that – in a Māori governance approach, that has to be reduced anyway, because everyone is suffering because of that, and our coast is suffering because of that, and our communities have lost members because of that, and so that, to me, is the reason, is that mauri protection, it's that wairua protection, it's that whakapapa ethic that I was raised in, and that's ultimately the core, the core of it all. It's what it means to be alive and to serve and to give as a member of my community.

Q. Ngā mihi ki a koe.

A. Kia ora.

JUDGE MILROY:

Matua Kevin, do you have any questions for India?

(10:41) KEVIN PRIME TO INDIA LOGAN-RILEY:

Q. Yes. Tēnā koe. Thank you, Ma'am. Tēnā koe, e kō. Most of my questions have been asked, but I will just cherry-pick what's remaining. First one is a – in paragraph 47, you refer to "seven Indigenous bioregions", which you don't elaborate. Where do Māori fit in in this?

WITNESS REFERRED TO #A024, PAGE 11, PARA 47

A. We're in the Pacific region, yes.

Q. Yes, so that is just the Pacific alone, is it? The seven…

A. Yes – yes, just Pacific.

Q. Good. Thank you. Next one was the – further up in paragraph 45, there. When was the last meeting of that group that you refer to, the Local Communities and Indigenous Peoples forum? When was their last meeting?

WITNESS REFERRED TO #A024, PAGE 11, PARA 45

A. They meet at every COP to advance the work programme, and I believe it's every two years they create a new work plan, and there's representatives from each of those seven bioregions as well as representatives from states, so it's still co-governed with states, it's not just Indigenous Peoples.

Q. So when was that? Was that a week ago, was it?

A. Yes. Yes, a week ago.

Q. Just last week, so that interview in Te Karere last night was about that. Okay. Thank you. And I had one more. Yes, I suppose I was thinking about, you know, many of the iwi, especially in – down that East Coast region, they have – all their land, and you might have 5,000 hectares and it's all indigenous forest, and yet they cannot benefit in any way from this ETS. Can you explain why they can't?

A. I mean, I don't know the technical ins and outs of that, unfortunately. I have – I know the top-level bits about the ETS, not the ins and outs about why native forest isn't allowed. I think the tricky thing there is that there are multiple ways that you can transfer finance to a community for doing good work, and the ETS is just one way of doing that, and it's quite an unstable way of doing that, because the price can fluctuate and demand can fluctuate, and that's like what happened under the Clean Development Mechanism in the Kyoto Protocol, is that a bunch of communities who'd relied on carbon trading for an income lost that income, because developed countries stopped buying credits during the Global Financial Crisis.

And so, you know, I even think about, like, the Jobs For Nature programme as a really good example of ways in which we could start to have a stable workforce that is empowered and paid to do the good work, and I think of many of my peers, many of my Māori peers who are in the climate space, took up that wero and are now working for their iwi or are working for DOC in this kind of space, and so I think it's such a loss that that programme has come to an end, because I think that starts to get at the ways in which we can commit that stable, consistent, additional finance that is going to be required to lower emissions, yes.

Q. Okay. No, that's all. Thank you very much. Much appreciated.

A. Kia ora. Kia ora, matua.

(10:46) JUDGE MILROY TO INDIA LOGAN-RILEY:

Q. Thank you. Matua Kevin has asked my questions, but I did just want to thank you for explaining about – you were referring to the Sámi people

and the pressure on them to allow windmills, and I think I misled people earlier in the week when I thought it was – I knew that they were under pressure in relation to clean energy technology, and I think I referred to rare earths as one of the things, so thank you very much for correcting that.

I only have one question of clarification to ask, and that was in relation to – no, I have got two. I just wanted to ask a little bit further about the Local Communities and Indigenous Peoples forum, and wondered, first of all, the funding for that, and I presume it comes from state parties, and then second of all, whether that funding is sufficient to allow that grouping to meet outside COP and strategise and plan so that – I mean, it seems a very pressured situation within the COP week, to try and come up with things and have input and influence and so on, so yes, if you could just let us know a little bit more about how that forum works.

A. Yes, so, the LCIPP, the Local Communities and Indigenous Peoples Platform, was created to be able to share Indigenous knowledge. So, other than that, it doesn't actually input into the negotiations per se, unless they kind of – which they probably can – **(inaudible 10:47:21)** outside their mandate and, you know, issue a letter or something like that, but the LCIPP is co-governed with states, so – and there are – I think there's representatives from the five UN regions, and then there's another couple, I think there's a SIDS representative and something else. I can't quite remember the details. And so those state parties would have to agree to whatever the LCIPP comes up with as well, because it's co-governed, so it's not just Indigenous Peoples doing Indigenous Peoples' things, and it is largely related to the sharing of knowledge. It hasn't been expanded to also include, well, actually, this is what a just transition plan would look like for us, this is how we'd develop urban spaces or public transport to respond to those emissions reduction needs and that kind of thing, so it's quite narrow. The ambition was for it to have much more input into the negotiations, but that narrowed over the time of the negotiation of the shape and the nature and the mandate of the Platform.

I believe they have met in the past outside of the COP. I do believe they meet at the intersessional as well, which is much more pressure, but it is only a couple of days, and typically, what's expected out of that is, you know, some panel events and stuff like that. I wouldn't necessarily say that all of it is very meaty discussion, although the discussion is deeply meaningful and I don't want to undermine the mana of the kōrero that is shared in that space. It is deeply valuable, highly meaningful, and really uplifting and inspiring. But it – yes, it doesn't have an input stream into what the negotiations are discussing, and usually, they happen – the meeting then happens before the negotiations, for a couple of days before or in the middle couple of days of the negotiations, but the agenda doesn't cover, say, what the article 6 carbon market rule is going to be, or what is going to be in the fossil-fuel phase-down plan, and that kind of thing, those other components of the negotiations, yes.

Q. It seems a pity that that's not the case.

And my other question is you refer in paragraph 36 – I think you answered it in your examination-in-chief – in paragraph 36, you refer to the ability to interact with the MFAT negotiators during COP, and that it was always just subject to "obfuscation" by MFAT, the MFAT officials, and I am presuming that is all about the secrecy surrounding the negotiations and so on.

WITNESS REFERRED TO #A024, PAGE 9, PARA 36

A. Yes, sometimes it would be that. Sometimes it would be that they could set the topics of what was discussed at the stakeholder briefings by only having certain negotiators available there, so if we wanted to talk about something else, if there wasn't the negotiator there that was negotiating on that, we – they wouldn't discuss it, and we would have to try and seek a bilateral meeting instead. And sometimes they would set certain themes, and it would become more of an education session for those other stakeholders for whom it's their first COP or they're learning about a subject – typically, like, researchers or university students, like postgrad students would have a lot of questions, and so the time would instead be given to that, because when we're in the pot of stakeholders, we don't have our own Māori stakeholder briefing. Instead, that's kind of

dependent on the Iwi Chairs rep being able to get meetings secured, or, you know, being able to have a chat over a coffee in the morning would often be the way, or being able to secure those bilaterals with the other Māori who were there on different badges, yes.

Q. Right. And just one last question, following on from Professor Williams' questions. I wondered what the reason was – why you no longer went to COP, and wondered if it related to that question about "How useful is it anymore?", and if that was the case, whether you found it more useful to be working at the local level in terms of information, communications and encouraging initiatives at the local level.

A. Yes, I mean, it's all part of a big web. There's the local, there's the hapū, there's the whānau, there's the city council, there's the regional council, there's the national, and then there's the international space, and so, like, COP isn't the only space in which climate is now negotiated. Because it's now the hot new topic, it's also negotiated in free-trade agreements, at the Pacific Island leaders' forum, at WTO, and World Bank, and all sorts of other initiatives.

And so, for me, I – if I am just honest, I stopped going because I ran out of the energy to do it. It takes a lot to be in that space. It is the single most soul-destroying and inspirational space you can be in at the same time, and that's what makes it exhausting, is navigating those two emotional states concurrently, battling with our – with the Crown, battling with other countries, battling with the polluters, but then the heart and soul is being alongside other Indigenous Peoples, and that's the thing, is I wouldn't be where I am today if I hadn't gone. I wouldn't be where I am today and be able to serve my community in the ways that I do if I hadn't built those relationships with other Indigenous communities.

So to me, it's all part of a bigger strategy. You engage in that space, but you don't forget the national, and that's something that the first youth delegation from Aotearoa, not rangatahi Māori but any rangatahi, that went to COP, they went to the Copenhagen negotiations, which would be one hell of a negotiation to have gone to. It was really soul-destroying, that one. And what they learned from that is that things don't shift at the international if they don't shift at the national level, so there's just as much

of a responsibility to come back and move the Crown here as it is to show up in that international space so that there can be a more ambitious voice coming from Aotearoa in that particular forum, and so, for me, that's the work, is trying to bring life to that te Tiriti relationship here, because that will move mountains and have ripple effects in the international negotiations as well, and it means a lot to other Indigenous communities, who are also doing the work to reduce emissions, to know that we're fighting in their corner as much as we're fighting in our own and that our wellbeing is equally tied to the ways in which we commit to the taking care of each other internationally as well, and so yes, I loved that space, I was – I had skills for that space, but I also have skills for back home, and I think particularly post-Gabrielle, there is a lot of political work to be done here to ensure something like that never happens ever again and that people don't have to lose community members because of that ever again.

So that's where I commit myself to the work now, but there are many young Māori in that space still, and I wish them all the best. They are the bravest and they are so strong for choosing to engage in that space.

Q. Well, thank you. Tēnā koe. Aku mihi ki a koe. I will now hand you back to your counsel for any questions by way of re-examination.

A. Kia ora, whaea.

QUESTIONS OF RE-EXAMINATION – NIL

HEARING ADJOURNS: 10.55 AM

HEARING RESUMES: 11.10 AM

HOUSEKEEPING – TECHNICAL (11:10:07)

JUDGE MILROY:

Welcome, Mr Ballingall, to this Tribunal inquiry, and I will hand you over to your counsel to introduce your evidence.

HOUSEKEEPING – TECHNICAL (11:10:24)

MR FLETCHER:

I will do very little before handing over to Mr Ballingall, but I will just briefly make sure that we have the various documents. Mr Ballingall's brief is #A108. He has prepared a PowerPoint which is #A108(b), and that is what he will be speaking to today, and just in case there's any references to them, the appendices are together at #A108(a).

MR FLETCHER CALLS

JOHN STACEY BALLINGALL (SWORN)

Q. I will just get Mr Ballingall to confirm that his evidence is true and correct to the best of your knowledge and ability?

A. It is, yes.

Q. And I will just get you to confirm that you have read the code of conduct for expert witnesses and agree to **(inaudible 11:11:10)**.

A. I know that code, yes.

Q. Fantastic.

MR FLETCHER:

So, Ma'am, before I hand over to Mr Ballingall and his PowerPoint – and I assume we will be able to share that screen as other witnesses have done – I will just note that I do have some brief examination-in-chief questions after that PowerPoint is done, and then I will hand over to my friends for cross-examination and for Tribunal questions.

HOUSEKEEPING – TECHNICAL (11:11:37)

(11:11) JOHN BALLINGALL: (#A108, #A108(b))

Okay, well, many thanks for the invitation to – to appear here this morning. I should set out that I am, you know, appearing as an economic expert. I'm not a – a forestry scientist or – not a te Tiriti expert. So I'll be coming at this issue primarily through an economic lens.

So, this slide just highlights the key points from my evidence that I'll be referring to today. Throughout the entire discussion today, I think it's really important that we emphasize that New Zealand has the net emissions target for all gases aside from biogenic methane. I will keep coming back to that, because a lot of the debate that we've seen in the last few years has been around how much gross emissions should be reduced. I think it's really important to remember that we always have a net target, therefore we always have to think about forestry removals and gross emissions.

The importance of forestry removals is that they are a relatively low-cost way of abating emissions. The alternatives for emitters in terms of reducing their emissions often involve cutting output or investing in machinery or technology to reduce the emissions intensity of output. Those can be expensive options. Right now, under current technological conditions, forestry remains a relatively low-cost way of abating emissions. That has implications for the costs of getting to any domestic net-zero target.

The proposals we saw in 2023 in the Ministry for the Environment consultation document, they had the effect of devaluing forestry removals, trying to say that they were perhaps less valuable than reducing gross emissions, and that had some fairly important consequences when we modelled it for the economy as a whole and for Māori in particular in terms of how hard it is to get to net zero, and from my perspective, the process that was followed in the consultation paper didn't really meet good regulatory practice standards.

So – I've mentioned this already, so I won't belabour the point. We can get to our net zero target for all gases apart from biogenic methane in two ways: we can reduce gross emissions or we can increase forestry removals. They are two sides of the net-zero coin and they always need to be considered together. As long as we have a net target, we always need to be thinking about the relative cost of reducing gross emissions and using forestry removals. From my perspective, as long as you have a net target, it's very challenging to try and separate those two things out.

So this slide probably explains some things that may already have been covered in the hearing around the Emissions Trading Scheme, so apologies for any repetition, but the Emissions Trading Scheme is at the very core of New Zealand's efforts to try to get to net zero, and importantly, tries to encourage getting to net zero, to incentivise that transition to a lower emissions future in a cost-efficient way. As an economist, I'm always going to say that's an important thing. It's not the only thing, but it is important for us to try to get to net zero in a way which doesn't impose enormous costs on society, and in particular, those who are least able to afford it.

So the way the Emissions Trading Scheme works is the government issues a certain number of units every quarter to be auctioned off. Emitters – so, factories, polluters – they have to purchase enough units to cover off their own emissions, and forestry obviously generates units which can be used to offset those emissions, and the important thing about an Emissions Trading Scheme, the very point of it is to try and help emitters and society as a whole move towards net zero in a way which is least cost.

Central, again, to the Emissions Trading Scheme is the fact that the price of New Zealand Units acts as a way to incentivise behaviour choice – behavioural change by both emitters and foresters, so if the carbon price or the New Zealand Unit price is very, very high, then it may make sense for emitters to invest in new technology to try and reduce their emissions, rather than purchasing emissions units from forestry. Similarly, if the NZU price is really high, that's a signal to forestry owners that there's a great demand for emissions removals, and that can incentivise additional afforestation.

So while the Emissions Trading Scheme is primarily a market-driven – a market-driven system where prices have a key role, that isn't to say it's completely free market, hands-off, let market forces dominate only. The government plays a key role in the Emissions Trading Scheme, and that's through two key ways. First of all, it determines how many units are released each quarter to be auctioned off, so it has a degree of control over the number of units that are out there. In addition, it also sets the rules of the game, so it

introduces a price floor and a price ceiling, for example, in these auctions, to try and make sure that the NZU price doesn't go too high or too low, either of which can have some interesting consequences for the economy.

Therefore, because the government plays a key role in the Emissions Trading Scheme, any changes in the rules of the game can have a significant implication on the NZU price. As I've said, it's the price that drives behaviour, and for forestry in particular, changes to the NZU price driven by changes in regulations can have an impact on the value of our assets, because the value of an asset is simply the discounted future stream of revenue that is generated from it, and for forestry, that is largely driven by the NZU price.

So the key message there is that the government can play a very important role in our transition and it has an important role in shaping the Emissions Trading Scheme. That, in turn, can influence the price, which can influence the behaviour of foresters and the value of their assets.

Given how important government actions are to the workings of the Emissions Trading Scheme in achieving a transition to net zero at a reasonable cost, and also because of the implications of government actions on asset values such as forestry, it's really important that any suggested changes to the Emissions Trading Scheme are very carefully considered. What I've presented here is a fairly generic overview of what good regulatory principles might look like, and this is taken from documents released by the OECD and the New Zealand Treasury, so they're fairly generic, but you know, there are some common things across them.

Good regulatory analysis needs to start off first and foremost by defining the problem accurately. We have to know why there is a need to actually change the regulations, how big the problem is, who it might affect.

Then you move on to start looking at, "Okay, well, if we've identified a problem and we've agreed it's big enough that regulatory change might be required, what are the different ways of trying to address the problem?"

The next step, and this is often a more difficult one, is to try and look at the costs and benefits of the various options, to try and put some numbers around the options. Which one is most or least net beneficial or net costly to the economy and to society?

Then you would go on and identify a preferred option and think about information – implementation of that option.

What's really important throughout this regulatory process is that it cannot occur in a vacuum. It has to engage with stakeholders involved in those regulations who might be most affected. That's a really consistent theme of any set of good regulatory principles.

In my view, the consultation paper that the Ministry for the Environment put out in 2023 which looked at options to try and increase the pace of gross emissions reduction and to, you know, potentially reduce the role of forestry in getting to a net-zero target, in my opinion, that regulatory process did not meet these standards.

My slide there outlines the key concerns that I wrote about in my evidence. First and foremost, it did not do a great job of identifying and quantifying the problem. It started from a – the premise that we need to do more on gross emissions. We're relying far too much on forestry. And as I said before, we – we have a net target. We have to think about gross and forestry removals together. So I don't really buy the premise that reducing gross emissions should be the first priority, not when we have a net target.

Secondly, the consultation paper assumed that there would be an oversupply of forestry units in the long term, and while that may be true in the short term, that way of thinking seemed to suggest that foresters don't understand how prices works – prices work. If there is an oversupply of forestry units, the price of NZUs will come down. That provides a signal to change behaviour, and for

foresters, that would be to reduce the amount of afforestation. That wasn't really taken into account by officials in their analysis.

So despite not having really defined the problem particularly well, it then – the consultation paper then jumped to a series of options which weren't very well defined, all of which aimed to reduce the role of forestry in meeting our net-zero targets and increase the imposition on the rest of the economy to reduce gross emissions, and there was absolutely no financial or economic analysis of what that might mean. There were some high-level comments about, you know, this could affect certain parts of society more than others, including Māori, but there were no numbers put on it whatsoever, and I found that pretty surprising, given the magnitude of the proposed changes put forward in that consultation paper.

So, in lieu of any analysis in the consultation paper, we were commissioned to do some analysis around "What might the proposed changes to reduce the role of forestry in meeting our net-zero targets – what might that mean for the economy? What might that mean for regions? What might that mean for industry? And how might it affect Māori?"

And, you know, we showed that, based on some scenarios which we had to design because there wasn't a lot of detail around them, if you reduce the role of forestry, then getting to any net-zero target becomes much more costly for society. You are effectively pushing emitters to explore higher-cost abatement options, rather than using forestry units, and that has a consequence of – yes, making it three to four times as expensive as the status quo to meet our net-zero target. That's – and you can see on the slide there that those are pretty big numbers.

We also looked at how this might influence the Māori economy, noting that, you know, that the data around the Māori economy isn't great, but we used the best information we had and we were able to show that lower-income households which Māori are over-represented in, they would face the largest proportional cost increases if you took forestry, reduced the role of forestry in the Emissions Trading Scheme. That's because the NZU price would go up

substantially, which flows through to things like petrol prices, energy prices, all of the things you can't really avoid as a household. That would have materially negative impacts on Māori and larger proportional impacts on Māori than non-Māori.

So yes, these – it's important to recognise that these aren't forecasted, what will happen; it's scenario analysis, "What if?" analysis. There wasn't enough detail in the consultation paper to get highly detailed specified scenarios. But we felt like it was a reasonable approximation of the intent of the consultation paper, and we showed that it would have significant costs, both to the economy and to Māori.

So, just wrapping up here, pulling together the key things, I won't go through them all and you can read them yourselves, but I would just move to the right-hand side of that slide and just highlight that everyone wants a transition to net zero which is just and reasonable and incentivises certain behaviours. As an economist, I would say that getting to net zero at a, you know, a relatively low cost is important. We've already seen in the past what happens when the New Zealand Unit or ETS price goes up sharply. That hits things like petrol prices, and it wasn't long ago that petrol prices were way up above $3 and voters were very unhappy, and as a consequence, policy changes were made to reduce those price rises, so it is an ongoing challenge. We all want to get to net zero at a reasonable cost, but any time that cost gets too high, it becomes very politically challenging, and the last thing you want is a massive backlash against climate policy if we're to achieve our net-zero targets.

So, in summary, it's fine to explore different ways of getting to net zero. I think that's a healthy thing to explore. But if we're to make significant changes to the Emissions Trading Scheme around forestry, I think it's really important that the homework is done first, that good regulatory practice is followed, and that these things are not rushed through without due care.

But I'll – I'll finish there and hand over to counsel.

(11:30) MR FLETCHER TO JOHN BALLINGALL:

Q. Thank you. Could I get you to jump back to slide – actually, we don't need to use the slides. I will just –

A. Okay.

Q. – talk about slide 5, in the bottom there. You talked about the idea that potential changes in government policy can lead to changes in asset values. I wonder if you could talk a little bit more with us about that.

WITNESS REFERRED TO #A108(B), SLIDE 5

A. Certainly. So, if we're just focused on forestry for now, in general, the value of any asset, be it housing or be it shares or be it forestry, the way you value that in a financial sense is that you look at the stream of expected revenue that you get from the asset over time, and then you discount that back to present-day dollars using a discount rate. That gives you the overall value of the asset. It just tells you how much income you expect to receive from it over time. That's its value to you.

For forestry, that's going to be heavily driven by the NZU price, because that's essentially how you generate revenue from most types of forestry, so to the extent that regulatory change pushes down the NZU price, that will reduce the value of the expected stream of revenue from forestry, which in turn reduces its asset value.

Q. And I guess the more regulatory change there is, the greater the market will price in possible regulatory change, because it happens more frequently? Or do you think it is more nuanced than that?

A. Sorry, I'll get you to repeat the question.

Q. I guess what I am getting at is, looking at that green model, how is the market price in not just actual regulatory change but the prospect of regulatory change?

A. Yes, well, asset values will also incorporate a risk premium, in a way, and that risk premium is going to be affected by regulatory uncertainty, so you know, if there's great expectations of regulatory change in one way or another, that can move your asset value up or down, so it's not just actual regulatory change that can affect an asset value, it's also expectations or uncertainty around the future direction of regulations.

Q. Can I get you to jump to paragraph 56 of your brief? You have got it in front of you, but I will just give her Honour a moment to grab it if she needs…

WITNESS REFERRED TO #A108, PAGE 14, PARA 56

A. Yes.

Q. So you talked here a bit about stranded assets, and forestry being at risk of becoming a stranded asset. Do you want to talk about that now?

A. Yes, I'd be very happy to. So, what we're getting at there in terms of stranded assets is that investments have been made by forest owners on the expectation that we will continue to have a net-zero target, that the Emissions Trading Scheme will be at the centre of achieving that net-zero target, and that then informs their expectations around revenue stream and therefore the value of their asset.

If significant changes to the Emissions Trading Scheme are made that weren't expected or weren't reasonable to expect, back when they were making that investment decision, there is a possibility now that the value of their asset goes down significantly and, you know, it stops being a, you know, a major generating source and it just sits there, potentially making a loss.

So that's what we – I'm referring to there in terms of stranded assets.

Q. And how great would you consider that risk for forestry under current ETS settings, if you feel comfortable putting an adjective there?

A. As an economist, I'm – I'm loath to get too much into adjectives. I prefer numbers. But yes, it is true that the revenue stream from forestry is going to be heavily affected by expectations around the NZU price and there has been ongoing tinkering with the Emissions Trading Scheme over the last decade to tighten it, to loosen it, within the context of broader climate policy. All this sort of regulatory uncertainty is going to make it harder for foresters to invest with confidence, and that, in turn, could make it more expensive for New Zealand to get to any net-zero target.

Q. If you can just bring up on your own screen slide 6 now –

A. Yes.

Q. – I wonder if you could just talk through that for us, reflecting that you prefer numbers rather than adjectives, why you think it's important to ideally quantify costs and benefits wherever you – where you can.

WITNESS REFERRED TO #A108(B), SLIDE 6

A. The reason why I believe in trying to quantify costs and benefits is that although it can be challenging to do and not everything can be monetised, when we're dealing with an economic policy question or a, you know, a climate policy question that has implications for the economy, we need some way of choosing between the various options that are being put forward to address a certain problem.

Now, you may have a different preference to me as to the preferred option. I may have a different one. The panel could have a different view. The value of putting dollars and cents on these options is that we can then start comparing them and saying, "Okay, well, this one is going to be the most expensive for the economy, but it could save a bunch more emissions", so by quantifying the costs and benefits, you can start identifying the trade-offs inherent in any regulatory change, and I think if you're to have a really evidence-based discussion, then putting some numbers around things can be helpful.

But I'm humble enough to know that that's not the only thing. Not everything can be quantified. But even when you can't quantify something, you can try and discuss it qualitatively on top of any numbers that you provide and again try and make a fairly rational comparison between the options, particularly when they are major regulatory changes.

Q. If we can jump to paragraph 47 of your brief, you have said there that poor regulation often occurs because things have gone wrong at the problem-definition stage. I guess, linking that to what you have just said about quantifying costs and benefits, is that why you often think the problem definition goes wrong, if people have not analysed the costs and benefits initially?

WITNESS REFERRED TO #A108, PAGE 12, PARA 47

A. I think that's a good summary. So, what we're trying to do in any form of cost-benefit analysis is compare the status quo, what we've got now, with

some desired future scenario. If you haven't adequately explained what the status quo looks like and its costs and benefits, then it's very hard to compare any alternative against it. You – you've got nothing to tie it back against, you've got no anchor with – to compare it to. So I – it's absolutely essential to try and get the problem definition right, because that flows into – that provides the baseline from which your costs and benefits can be compared.

Q. And recognising, ultimately, that you are here to talk about the ETS, which is an economic policy, would you feel comfortable – you can comment, really – do you think it's more important to do that with something that's ultimately using a market mechanism or an economic policy?

A. I don't think that would be the – that would necessarily be the delineation I would make.

What I would say is the Emissions Trading Scheme covers the entire economy.

It affects everyone in the economy. It affects all businesses. Even the agricultural sector, that operates outside the Emissions Trading Scheme, is affected by the Emissions Trading Scheme through paying higher prices for fuel or whatever else.

The Emissions Trading Scheme is a really big part of the New Zealand economy and for societal aspirations to move towards net zero. Something that important and something which also generates a lot of costs and benefits that can be quantified, because it is a market mechanism that deals with prices, those things should be quantified as much as humanly possible, and I would have thought the Emissions Trading Scheme, given it's dealing with a set amount of quantities and a certain amount of prices, that inherently lends itself towards quantification of costs and benefits **(inaudible 11:40:58)**.

Q. I'm going to leave your brief now and just talk a little bit about the evidence of Kieran Murray, which my friends for the Crown have prepared. You have had a chance to read that, haven't you?

A. I have indeed.

Q. Just starting off with a simple question, Mr Murray has said there are limitations in the data on the economic impacts of climate change on Māori. Do you have any comment on that?

A. Yes, I agree entirely, especially on the economic side.

Q. And what he goes on to say is that that uncertainty and those limits in the data mean that the impacts on Māori have to be assumed, taken at face value. How do you design or assess policy if data is limited, and can you even do that?

A. Again, I'm very reluctant to be – to consider binary scenarios, because yes, in an ideal world, we'd have fabulous data on the Māori economy, Māori climate exposure, all of those things. We operate in a world of uncertainty. We never have all the information we want in order to be able to inform decision-making. Economics can play a part in that, but not everything.

When there isn't data, as I said in my evidence, I think it's absolutely crucial that you engage with stakeholders, make sure you get their information; quite often, industry information is going to be more valuable than any official data around the Māori economy. So I think, as officials, in particular, it's important to make sure you draw on every available source of information to try and fill any data gaps when it comes to the Māori economy.

I don't think it's an excuse to do nothing. Again, I don't want to be painted into saying the data's not great so we shouldn't do anything. That's not the case. I'd also think if we're considering significant changes to a piece of regulation that has material implications for Māori, it's really important to speak to Māori about how that might play out, and my understanding around this consultation paper is that perhaps that wasn't quite as robust as it might have been.

Q. You have sort of already answered the question I was going to ask, but I will answer [*sic*] it anyway. At least as I understand Mr Murray's alternative approach, he supports delaying making policy decisions until more data is available. You just talked about being painted into that, but do you want to talk about that?

A. Yes, so I think the point that Mr Murray was making, and one which I agree with, is that there can be benefits to delaying significant changes in regulations, and particularly in the case of climate policy.

I'm a firm believer that over time, technological solutions will be really, really important for helping us get to net zero. As every year goes by, emissions-reducing technology, if we think about wind and solar, for example, that's getting cheaper and easier to install. There will no doubt be more, yes, things like methane inhibitors. Those are becoming better and better and lower and lower in cost. So as time moves on, technology improves rapidly and sometimes exponentially. Under those circumstances, it can make sense to hold fire a little bit on major regulatory change and wait for some technological solutions, so again, it's not one or the other, but it is true that in an area where technology is going to play a really important role in meeting our emissions targets, there can be benefits from waiting.

Q. And just to pick out, really, two points from that answer, as you sort of said, it is not as simple as do something or do nothing. It is not a binary. The last thing I really wanted to ask you about is specifically about the data debate and that evidence, and you have worked with data of this kind a lot. Do you think the data on economic impacts, particularly on Māori, from climate change, but generally, will improve over that timeframe, or you are not sure?

A. I like to be optimistic on this, despite being a member of the dismal science.

I think there have been enough calls over, you know, more than a decade now, to improve our understanding of the Māori economy. These calls have come from within government, from external advisors… The best piece of work that's been done on the size and the nature of the Māori economy was done by Business and Economics Research Limited, BERL, a couple of years ago, and it's a really solid piece of work, but it too acknowledges that there are massive data gaps, so there were really strong pushes for our official statistics agency, Statistics New Zealand, or Stats NZ, as it's now rebranded, to improve the quality of its Māori

statistics. I've come across this in the climate change context, I've come across it in the trade policy context, exactly the same problem.

So I think those messages are getting through to officials in statistical agencies, but it takes some time.

I would say, in hopefully five to ten years, I think we'll have a much better understanding of the Māori economy, and in turn, how the Māori economy is both exposed to the physical impacts of climate change, can potentially benefit from emissions reductions policies, and how it might bear some of the costs as well.

So that was a long-winded answer to a short question, but yes, I think it will get better.

MR FLETCHER:

Well, that is all the questions of examination-in-chief I had, Ma'am.

HEARING ADJOURNS: 11.48 AM

HEARING RESUMES: 11.53 AM

QUESTIONS FROM MR BENNION – NIL

(11:54) MR FONG TO JOHN BALLINGALL:

Q. Tēnā koe, Mr Ballingall. Thank you for your evidence. I have the pleasure of asking you a few questions about your evidence. Just before I begin, can I just start with some housekeeping? I will be referring to three documents in my lines of questioning, and I just want to check you have those documents before you, and the first is your brief of evidence dated the 13th of May 2025.

A. Yes.

Q. The second is the report you prepared back in August 2023, which underlines much of your evidence, the analysis of MfE ETS forestry options paper.

A. Yes.

Q. And finally, it is the Parliamentary Commissioner for the Environment's report, *Alt-F Reset: Examining the Drivers of Forestry in New Zealand*.

A. Yes, I have that.

Q. And as discussed with your counsel, I will just be focusing on three pages of that report, rather **(inaudible 11:55:17)** the entirety of the two-hundred-page report.

A. Thank you.

Q. Now, Mr Ballingall, in both your evidence and your 2023 report, particularly at paragraph 68 of your brief, you made the comment that so long as New Zealand has a net-zero emissions target, the idea that forestry removals can be delinked from ETS **(inaudible 11:55:49)** is fallacious, and my question is this. As you might know, in the Parliamentary Commissioner's report, a key recommendation is to phase out forestry offsets for fossil fuel emissions, and so just sort of marrying up your evidence with that recommendation, I just wonder whether you would consider the Commissioner's recommendation as flawed in that respect.

WITNESS REFERRED TO #A108, PAGE 16, PARA 68

A. So, the – the idea that you might have a separate market for methane being offset by forestry removals, which is, as I understand, the core of the PCE's recommendation that you're referring to, you know, I can understand the logic presented in the paper, but what's lacking at the moment is any real discussion of the potential costs and benefits of that move, at least in a quantitative sense, so from my perspective, if you were to only allow forestry to be used to offset methane emissions, that's going to make the cost of getting to net zero, I would imagine, substantially more expensive.

Q. And so would it be fair to say **(inaudible 11:57:31)** from an economic perspective, you are not sort of supportive of the Commissioner's recommendation?

A. I would like to see the economic modelling that explores the trade-offs involved in that approach, because as I, you know, mentioned in my evidence and my presentation, we do have a net target for everything other than methane. At the moment, forestry removals represent a

relatively low-cost way of meeting our net-zero targets. If you suddenly remove those forestry – if you take those forestry removals out as an abatement option for industries, for emitters, they will be forced towards higher-cost abatement options, and that will have potentially significant costs for the economy and for Māori, and the reason I say "potentially" is that I haven't seen any economic modelling to delve into those issues, so that's why I – I'm loath to say one way or another I'm for it or against it. I would like to see more empirical evidence to explore it.

Q. And just from your review of those three pages, you don't understand that there were economic modelling carried out as part of the report?

A. To look at the economy-wide impacts?

Q. Yes.

A. What were the impacts on GDP of the two options? Because I don't recall seeing that.

Q. No, no, that was my question, that you are not aware that the report itself has undertaken any economic modelling of this recommendation, is that correct?

A. So I did look through the report to look for some economy-wide modelling. My understanding was that that – that wasn't in the PCE's report.

Thank you for that. And I think that you quite fairly said that some of those consequences are potential consequences, because you haven't seen sort of actual modelling carried out, but if they were to eventuate, so, based on kind of the trajectory of your evidence that, you know, for example, reducing the role of forestry in the ETS might sort of, as you explained in your presentation, might push up petrol prices, it might affect GDP, it might affect employment issues, you have described those effects as being regressive in nature in both your report and in your evidence. Would you say if the Commissioner's recommendation were to be implemented, a consequence would be that that might pose a threat or present a challenge to achieving just transition to net zero?

A. I am – yes, just transition is an interesting concept. It depends who you think it should be just to or fair to. I am – yes, I was quite taken by the statement of Mr Murray in his evidence, where he outlines that only allowing forestry to be used for methane offsets would effectively end up

resulting in a transfer of wealth away from forestry towards farmers, and there's questions around how just that might be, as well, so –

HOUSEKEEPING – TIMEKEEPING (12:01:53)

(11:54) MR FONG TO JOHN BALLINGALL: (CONTINUES)

A. – I guess, more generally, I would like to see how that proposal would affect the costs of getting to net zero, because it would necessarily force gross emissions to come down much faster, and it would be at a more – at a higher end of your abatement cost scale, so I don't think we can assume away those costs, and I would like to, yes, have a better understanding of what that might look like, because it could potentially be worse for the economy. It could push up petrol prices further and that potentially could have significant distributional impacts on Māori households.

Q. Thank you. And just staying with the Commissioner's recommendation, I think the Commissioner quite fairly acknowledged that its recommendation, if adopted, would result in a higher carbon price, but it goes on to argue that this could generate increased income, which would then be used to fund **(inaudible 12:03:14)** afforestation initiatives in areas that need it the most and that Māori could have priority in getting that targeted funding, and I'm just wanting to see if you – get your views on whether that caveat would change your mind in terms of the economic merits of delinking forestry removals from the ETS.

MR PREBBLE ADDRESSES JUDGE MILROY – COUNSEL HAD PREVIOUSLY AGREED UPON WHICH PARTS OF THE REPORT WOULD BE PUT TO THE WITNESS (12:03:43)

MR FONG TO JOHN BALLINGALL: (CONTINUES)

A. So, picking up on your question there, I think we need to be really cautious around how many policy objectives we think the Emissions Trading Scheme should try to achieve, so the Parliamentary Commissioner's report spends a lot of time talking about biodiversity

outcomes, around soil erosion, and you've mentioned another one there around potentially giving revenue from NZUs to Māori to encourage planting of certain types of forestry, which I presume means native forestry.

My view would be if you are – if you want to encourage specific environmental outcomes, you can target those directly. I don't think it's necessary to use the Emissions Trading Scheme to try and solve every single environmental and social problem we have. It is designed to get us to net zero at a relatively cost-efficient – you know, relatively cost-efficient way. That doesn't mean it can solve everything. If, you know, if there is a strong desire to promote native forestry for reasons around biodiversity or, you know, supporting the Māori economy, then, you know, that could be considered separately through separate tools.

Q. Thank you. Now, in your evidence, you refer to the concept of stranded assets, and your counsel has led further evidence from you in chief. I just want to clarify that the Commissioner sort of made it quite express that in terms of this recommendation, that forests that are already registered in the ETS could be exempted from the recommendation that I put to you earlier, but no further additional forests should be registered, and I just am interested in your view whether that – that's sufficient to sort of prevent stranding forestry assets in that regard.

A. I think it would mitigate some of those effects.

Q. But it wouldn't entirely eliminate those effects?

A. Well, to the extent that, like, it depends on what happens to the carbon price. It depends how much regulatory uncertainty affects the carbon price. Like, I can't say it would take it away.

It's certainly a – it would certainly be a better outcome, if you want to go down that path, and again, I'm not supporting it or not supporting it. If you wanted to go down that path, then grandfathering existing forests would be a way of reducing the risks of stranded assets, compared to saying that no forestry units at all to be used **(unclear 12:08:42)**.

Q. Now, just changing the topic slightly, and my next question will be prefaced by a slightly longer observation, so just bear with me.

In climate policy sort of debates, one reason that is often put forward for taking more urgent actions now is that unless we do more now, the cost of reducing climate emissions in the future will sort of – well, will fall inequitably on future generations, so an example would be sort of urgent action now is to go harder in terms of reducing those emissions today and rely less on forestry removals. So that's one side of the debate.

And I'm interested to read from your 2023 report, and I don't need to bring it up, but just for the record, at page v, you make the point that if forestry removals were to play a smaller role in meeting our emissions target, you say New Zealand's tax revenue would decline markedly and this would mean a **(inaudible 12:10:01)** required, and that in turn would increase the tax burden on future generations for meeting our net-zero targets as additional debt needs to be serviced.

And so I guess in my mind, I feel like I'm in a dilemma, because if we do not **(unclear 12:10:21)** go hard on gross emissions now, this will increase the cost for future generations, but if we go hard on gross emissions now, this would increase the tax burden on future generations, and so I see those forces could potentially work inequitably, and so I guess, as an economist, how would you go about balancing or recognising, you know, **(inaudible 12:10:51)** it seems like whether we go hard on gross emissions today or in the future, there is a sense in which there is some burden falling upon future generations, so I'm interested in your **(inaudible 12:11:05)** comments, how does one go about deciding what to do today in terms of, you know, gross emissions vis-à-vis forestry removals?

WITNESS REFERRED TO #3.3.11(a), PAGE v

A. Yes, life is full of trade-offs. Policy is full of trade-offs. This is my life as an economist.

Look, in terms of the tax burden, I think that's – you know, we've shown that empirically, if you make the economy smaller through forcing up the carbon price, which is what we showed, that will result in less tax being paid, so yes, that will impose a burden on future generations. For me, that's relatively uncontroversial. I think it makes sense logically and our modelling suggests that.

Your first point, around “But if we don’t go hard on gross emissions now, it will be harder to reduce them later”, I would go back to my comment I made before around technology. Technology is changing rapidly. It will, in my view, deliver solutions to help reduce our gross emissions at a lower cost. I don’t think it necessarily follows that delaying gross emissions, especially when we have a net emissions target, is necessarily going to be bad for society, especially when the physical effects of climate change are not going to be determined by New Zealand’s actions alone. We could go really hard on gross emissions right now and still experience exactly the same physical impacts of climate change. So I think we need to be really cautious around the pace with which we try and reduce our gross emissions relative to the rest of the world, relative to the net emissions target.

Q. Thank you for that insight, Mr Ballingall. Can I just ask a follow-up question about that, just given your expertise around this area, just in terms of the technological possibilities going forward. I know sometimes when the government makes that type of bargain, the government is accused of sort of relying on speculations, speculative reliance upon technology that might not be sort of immediately forthcoming, and so I am interested in your experience or your knowledge around, you know, how likely the technological advances that you refer to are likely to bear fruit, to the extent that you can answer that question.

A. As I say, I’m a technology optimist. Climate change is real, climate change is a global problem. Countries all round the world are putting vast amounts of public and private sector funding into finding solutions to reduce the emissions intensity of industries, to deliver things like renewable energy at low cost. They’re investing a lot in carbon capture and storage-type technologies. All of these things are receiving enormous funding and attention, and that is because they eventually will help us meet our global climate ambitions, or at least help us along the way. You know, if we think about something that most people are familiar with, electric vehicles, even 15 years ago, I don’t think people would have expected the degree of change in terms of the – the viability of owning an

electric vehicle and how much that can do for one's emissions profile. So these things change rapidly.

New Zealand isn't going to create all of the technology itself, although we are, you know, doing some really good work around methane vaccines and trying to reduce the emissions profile of our agricultural sector.

So look, I'm – as I say, I'm optimistic. I think that technology will play a big, big role in helping New Zealand and the global economy meet its emissions targets.

Q. Thank you. And just a final two questions. The first is – excuse me – in an earlier hearing, sort of a fellow economist gave evidence – I put a question to a fellow economist, Professor Ian Roy **(unclear 12:16:27)**, that – you know, that taking aggressive climate actions, for example, driving up the price of the NZU, for example, might impact sort of disproportionately on vulnerable groups like Māori, so, something that you have mentioned in your evidence, and his response to me is, "Well, actually, that's quite a one-dimensional view of things. You can actually have both. You can actually – you can actually achieve both things, by both taking aggressive actions but also ameliorate those outcomes by giving targeted subsidy to vulnerable groups." And I just want to invite your response or comments on that idea that you can have the best of both worlds, both doing aggressive climate mitigation now but also subsidising vulnerable groups. What is your take on that?

A. As always, there is a balance to be struck, but I think there need to be – we need to be careful not to think that we can have it all.

So, the whole point of getting to net zero is to drive behavioural change, to make people – to help people, including businesses, households, Māori, to make economic decisions that are in support of our transition to a lower-emissions future. Yes, you could potentially impose, you know, really tough climate policy that pushes up the carbon price, and then say, "But we don't want anyone to feel bad about that and not be able to do things like drive a car, so let's give them a load of money instead" – I presume that's what he's talking about, social support to those most affected. Yes, you could do that, but that has an opportunity cost as well.

So, you know, the example that I can think about was we did some economic modelling around a biofuels obligation. We've done this twice. It comes up and then goes away every five to ten years or so. And we were asked to model the impacts of a biofuels obligation, and what this does is it's – it's designed to increase the share of biofuels in fuel mix across New Zealand, but biofuels are much more expensive than conventional fossil fuels, so what that does is push up the price of, say, driving anywhere or flying anywhere, if you use sustainable aviation fuel. That in turn does reduce emissions, but it also makes the economy smaller. We're making the transition harder and making everyday living more complicated. So the suggestion was made, "Okay, well, let's just subsidise – subsidise people to make sure the price of fuel doesn't go up, and that way, they won't be disadvantaged", and we said, "Well, if you do that, people are just going to drive more. Aren't we trying to reduce emissions?"

So there can be some fairly complex interplay between pushing up the price of carbon and providing additional assistance to households, so it's not that you can't do both. You can, but it's not free, and getting to net zero is designed to change behaviour, and it is going to cost some industries. It is going to cost some households. But that's the point. You're supposed to drive behaviour through using prices to get people to do things differently, and that does have distributional impacts.

Q. Thank you.

A. But I don't agree that you can just ramp up the carbon price and think that everything's going to be okay in terms of the economy, because it just won't be, right now, and I think if people are going to make those claims, they should show us what it means in an economic modelling sense, particularly those advocating fairly strong positions around aggressive action to meet a target. In my mind, those people should be showing some economic modelling that – that illustrates how that affects the economy and how that affects households.

Q. That last question, Mr Ballingall, I know economists are not famous for agreeing with each other, but there is a common theme among economists in this inquiry which is that the data, the limited nature of the

data as it relates to the economic impact on Māori arising from climate change policies, but obviously, in this inquiry, we are interested in recommendations for the Crown in terms of going forward, in terms of how to do better in developing climate change policies, and I think, as you quite wisely said, you know, it's not a case of limited data therefore do nothing, and so a final question from me is, you know, if you were, say, advising the Tribunal in terms of how do you – how can you carefully move forward with any recommendations in the face of limited data, what would be some of your suggestions or recommendations?

A. I don't think I want to go into specifics, because I'm not convinced the existing system isn't working. What I would say is that if you're going to move away from it and you don't have a particularly strong evidential base, I'd have thought incrementalism was more sensible than overhaul. But it comes back to what I said in my presentation earlier. Those seeking to change a major pillar, regulatory pillar of our climate policy, those seeking major change should be the ones demonstrating that it makes sense from an economic and social perspective, and that should be done, in my view, using quantitative analysis wherever you can and detailed qualitative information where you don't have it, and in my view, the Crown did neither in that consultation paper.

Q. Thank you, Mr Ballingall. I have no further questions, your Honour. Thank you for your time.

JUDGE MILROY:

Thank you. I should just explain, the Tribunal did have a chuckle and thought that, if everyone is thinking the same as me, that your answer just to Mr Fong's last question was a very wise one.

So, we will now pass to Tribunal questions, and the first is from Professor Williams.

(12:23) PROFESSOR DAVID WILLIAMS TO JOHN BALLINGALL:

Q. Yes, good afternoon, Mr Ballingall. I've just got – I'm just focused on one thing, which is the price of these units. You said earlier that expectations

around the NZU price is very important, and that would be especially so for foresters, many of whom, of course, are Māori. So I'm looking at paragraphs 32 and 33 of your A108 brief, and so you're an economist talking to a person who's not an economist, and I – my experience of auctions is going with my dad to the Dannevirke saleyards, and "reserve price" there means that's the price when the sheep or the cattle are on the market, so it's got to be – you've got to get above the reserve price before it's – before the cattle or sheep are sold, and I'm looking at this reserve price here, and it's a cost-containment reserve, and so this is a high number which shouldn't be breached, as I understand it. Is that correct?

WITNESS REFERRED TO A108, PAGES 9-10, PARA 32-33

A. Yes.

Q. Yes. Yes. So that's 193 and 242, Tier 1 and Tier 2. I don't know what Tier 1 and Tier 2 are, but I don't think it matters. This reserve was triggered in '21 and '22, but it hasn't been triggered since because the ETS price has been low. So I don't know whether you've looked at the – any of the evidence from Dr Geoffrey Bertram. Have you looked at that at all?

A. I did read it at the time, but it has been a while.

Q. Right. So that included information about the modelling, the price modelling, for NZU over the period up to 2050, and what I can't understand is that the – MfE, the Ministry for the Environment, in December 2023, which is after this period that you are talking about here in paragraph 33, their modelling assumed a price of $230 per tonnes of emissions by 2050. However, the ERP2 modelling, which the government has adopted, has a peak price of 92 tonnes of emissions around 2030, and coming down to $52 per tonne of emissions by 2049, so $52 per tonne of emissions is a long, long way from $230 per tonne of emissions, so there are some economists advising various different parts of the government and coming up with extremely different answers. Can you talk to that at all, please?

A. Certainly can try. I don't – I would have to go back to the documents you refer to, the ERP2 documents, et cetera. It would be worth checking, and

I can do this later today if helpful, whether or not those are real or nominal numbers, so, whether or not they are inflation-adjusted numbers or not.

Q. Yes.

A. I can't recall, off the top of my head, but you know, I think it is true that projections around the carbon price do vary considerably, and a lot of that is dependent on how fast you think technological change will occur, what's assumed there, what's assumed with – what assumptions you make around things like New Zealand Steel or Golden Bay Cement, whatever you assume in your economic model about the certain types of industries that are emitting in the economy, that will determine the overall demand for emissions units and therefore the price, and what I would say – and I know this from having reviewed the Climate Change Commission's earlier work – is that the way they model the economy is quite different to how other people model the economy, including myself. They make some quite strong assumptions about which industries will be continuing and which ones won't. They hold quite a lot of industry output steady, rather than letting it grow at all. All of those things have a depressing impact on the demand for emissions permits. Less economic activity, less demand for permits, lower price. So that may explain some of it.

Yes. The different economic models produce different projections for the economy and the makeup of emissions. That then influences the prices normally.

Q. Right, yes. Well, were you offering to do anything more on that? You – I mean, the **(inaudible 12:29:46)** –

A. I – if it would help the Tribunal, I'm happy to look into the – revisit Mr Betram's evidence and see what he's getting into there.

Q. So it's paragraph 10.12 of Dr Bertram's evidence.

A. Okay.

Q. It's where the MfE figure and the ERP2 figure is in his supplementary brief. At paragraph 10.12, he – there's a reference to the draft ERP2 price, which was going from 75 to – down to 50 by 2035, so there's those two sets of information.

MR FLETCHER:

Sorry, if I could just briefly ask you a question, Professor Williams. Are you referring to Dr Betram's original affidavit or his supplementary brief, just so I can make sure I can make sure I –

PROFESSOR DAVID WILLIAMS:

10.12 is the – in the original one, and it's at 2.6 in his second affidavit.

MR FLETCHER:

Okay, thank you.

(12:30) PROFESSOR DAVID WILLIAMS TO JOHN BALLINGALL: (CONTINUES)

WITNESS REFERRED TO #A005, PAGE 43, PARA 10.12 AND #A005(a), PAGE 4, PARA 2.6

A. I'm happy to have a look at that and provide my counsel some thoughts on that if it would be helpful.

Q. We can just see if Mr Fong is right about economists being able to agree with each other.

A. Yes, I wouldn't bank on it, let's be honest.

Q. Those are my questions. Thank you for your evidence.

(12:31) KEVIN PRIME TO JOHN BALLINGALL:

Q. My first question is, is setting the price of units like the – is that the same as printing money?

A. Is it the same as printing money? Not really, no, because in general, printing money is all about just expanding the money supply, and that pushes prices down –

Q. Yes.

A. – sorry, can push prices up. What we're talking in terms of NZU prices or carbon prices is how they respond to a certain level of demand in the economy, so at any one period, the amount of NZUs in the market is broadly fixed. If demand goes up or down, then that's going to affect the price, so no, I wouldn't equate it to money-printing.

Q. Thank you. That's very helpful, to me, anyway. The other question I had, and I think you partially answered it when responding to Mr Fong: In your opinion, is the ETS working how it's supposed to work?

A. It could do. It – I think it's broadly working, if I can say that. It is sending signals around the direction of travel, in terms of our pathway to a net-zero target. That's not to say there aren't some challenges with it, particularly to do with some of the rules around stockpiles and other factors, but to my mind, it is setting us on the right pathway towards net zero, and for me, the biggest risk to whether or not it succeeds is the extent of tinkering that goes on with it. There is always a temptation to tinker with things that are in place, based on preferences around what you, perhaps as a politician, you think should be the right outcome, and we've seen that a lot with climate policy over the years. To my mind, the Emissions Trading Scheme has a purpose. Let it do its job. Don't try and introduce a whole bunch of other objectives for the Emissions Trading Scheme that it's not particularly well designed to do. Keep it relatively simple and let it do its job.

Q. Thank you, that's very helpful. Thank you, your Honour.

(12:34) JUDGE MILROY TO JOHN BALLINGALL:

Q. Thank you, Mr Ballingall. I had an almost similar question to matua Kevin in terms of the ETS. In your paper, when you were talking about forestry units and the removal of forestry units, these are the actual units – you know, there is a forest somewhere, it is sequestering so many tonnes of carbon per hectare, and that means so many units are credited to that particular forest, and so that is the removal that is being talked about in the –?

A. Yes, that is correct, and yes, apologies for the jargon. In this space, it is – yes, nature of the beast, but yes, that's exactly what I'm referring to. The units that foresters are credited with by leaving trees in the ground.

Q. Right. So the units that the government gives to certain industries are free, and the units that are in the government's auctions, what do they represent?

A. One tonne of carbon dioxide –

Q. No, what I mean is, where is the one tonne of carbon coming from that those units are attached to?

A. Sorry, I don't – could you perhaps ask that again?

Q. Yes. So the foresters have a forest, and you know, that is where their carbon units are coming from.

A. Yes.

Q. Where are the government's units that they are giving freely out, where do they come from?

A. Well, they – to an extent, they don't exist, but the idea is that anyone buying one has to pay the going carbon price.

Q. Right. I think that –

A. **(inaudible 12:36:54)**

Q. – that might be what matua Kevin was referring to as "printing money".

A. Right **(inaudible 12:37:00)**

Q. It is creating something from – that does not have a physical world reference.

A. Yes, no, okay. That makes a more – gives me a bit more clarity. Yes, technically, the government is in – can make decisions about how many units it wants to sell, but if it tries to sell far too many, it's likely to crash the price. That might not be very helpful. Also, there's an emissions cap in place, so there's only so many units available in the market at any – in any one period, so there are constraints on government in terms of how many units it can release, and what we've seen in recent quarters is that the government has released units and they just haven't been – they haven't been **(inaudible 12:37:56)**, so I don't believe it's a money-printing exercise, because there are constraints on the quantity and there are constraints on the price as well.

Q. Right. Thank you for that explanation. And my second question and last question is: The issue of vested interest and they're vested in the status quo, and so – and they may well be waiting for new technologies to come along, but there is a cost in the transition for them to those new technologies, so it's that old question of "Is the signal being given by the ETS strong enough to make the vested interests consider moving their technologies, or does it mean, as we have seen with lots of different

industries over time, that they are going to become obsolete and new industries will take their place?"

A. That is the beauty of a trading scheme that relies on prices, which is it allows emitters to make a choice about how best to account for their emissions. They can make those choices to invest now if they think that makes economic sense. They can wait and continue to, yes, wait for technological change, and in the interim, purchase units, either through the auction or on the secondary market. So I –

Q. I guess what I am asking is –

A. Yes.

Q. – do you think the current settings of the signal is sufficient to keep us moving in a direction towards zero net emissions?

A. I think currently. I think it's appropriate. The cap exists, so we have to get to net zero. It's – we will get there, because it's legislated and the legislation affects how many units can be out there. Whether or not we get there, you know, prior to 2050 or – or not, we will get there, in terms of carbon, anyway. So the – yes.

Q. Yes, that is another matter that Dr Bertram raised in his evidence, was that we did not have a proper cap and trade market, and that is one of the problems, and I guess the other is the tinkering that you referred to.

A. Yes, I would agree, it's not a pure cap and trade. There are various wrinkles around it. But I – you know, finding a pure cap and trade is a nice thing in economics that is rarely seen in the real world, and tinkering is always going to be a factor, so I guess the question becomes, "Is New Zealand on the pathway to becoming a lower-emissions economy?", and in my view, yes, we see that emissions are going down while the economy is growing. That means the emissions per unit of GDP created is going down. Part of that is due to technology, but part of that is due to, in my view, the Emissions Trading Scheme doing exactly what it's supposed to do, so yes, reasonable people can disagree about how fast we should get there and what the costs and benefits are of those choices, but in my mind, we are on the right path.

Q. All right. Thank you very much for your evidence. That was the last of my questions, and I will hand you back to your counsel to see if there are any questions by way of re-examination.

MR FLETCHER:

Tēnā koe, Ma'am. Just conscious of the lunchbreak, slash the end of the week, so I have got two very brief questions of re-examination. First – and please do intervene if I am being too leading here, but I think your Honour and matua Kevin were possibly talking past Mr Ballingall.

(12:42) MR FLETCHER TO JOHN BALLINGALL:

Q. John, you were asked by her Honour, we have an emissions unit. It is linked to a hectare of forestry. That has got something attached to it. But when you have an emissions unit that is allocated to a particular polluter, that does or does not have something attached to it in the physical world?

A. No, it has a unit of emissions attached to it.

Q. **(inaudible 12:43:14)** At least as I understand it, the purpose of the free unit allocation to some polluters, to use a direct economic term **(inaudible 12:43:26)** a subsidy –

A. Yes.

Q. Yes, it is a subsidy. I think that is what matua Kevin and her Honour were asking you about. So by allocating a free unit, that does not of itself necessarily mean there has been a tonne of carbon emissions sequestered, for example, or offset?

A. No, that – sorry, yes, in the context of industrial allocation or free allocation, as it was previously known, the idea of that is to shield emissions-intensive internationally exposed emitters – excuse me – from having to shut down because the carbon costs get too high compared to competitors overseas, so you know, they are given credits which they can use to offset against their emissions bills. So yes, it's absolutely a subsidy, yes.

Q. And the second question really draws on the theme that you were asked by my friend at the end of his cross-examination and also by both matua Kevin and her Honour. I just wanted to pick up on this idea of tinkering

with the ETS. So, if we were to frame the question as not major changes in abolishing the ETS but tinkering with small policy changes in terms of how the market works, like the 2023 proposals from MfE, what are your thoughts on that?

A. Yes, that – to my mind, what was proposed in 2023 was more than tinkering, it was quite structural. I think it's really important that legislation and – and regulation is able to adapt over time. We can't possibly know everything when we introduce a piece of legislation or regulation, and I think that's particularly true in a world where technology is changing very, very rapidly, so I'm certainly not arguing that the ETS should never change. I think as real problems that are evidenced by real analysis come to light and they are material, then absolutely, you know, make adjustments to policies or regulations. But at the same time, unless they are, you know, **(inaudible 12:45:47)** changes, then there should be a strong evidence base behind them. Otherwise, you're just making big changes that can potentially affect people's livelihoods or their cost of living, and you're doing it based on well-informed reckons which perhaps haven't been tested empirically, and yes, I'm empirically biased, I get that, but I think it's an important part of our regulatory process, is that we try to put numbers on things when they can potentially have significant costs and benefits and distributional impacts on certain parts of society.

MR FLETCHER:

That is all I had, Ma'am, so unless there is anything further, I will leave that there.

JUDGE MILROY:

Thank you, Mr Fletcher, and also thank you for clarifying the point that matua Kevin and I were attempting to put across. So that completes our evidence for the week, and so I must thank you, Mr Ballingall, for giving us your time and also being willing to come on earlier than expected to be here with us, and it is very interesting hearing economists' evidence indeed, even though **(inaudible 12:47:13)**

JOHN BALLINGALL:

You're very polite. Thank you.

JUDGE MILROY:

I was thinking that we need another MONIAC machine that includes climate change and ETS as part of it, so that we could see all the different things that happen, but –

JOHN BALLINGALL:

Correct.

JUDGE MILROY:

Yes, so again, I thank you for your evidence.

HOUSEKEEPING – DOCUMENTS TO BE FILED (12:47:36)

KARAKIA WHAKAMUTUNGA (KEVIN PRIME)

HEARING CONCLUDES: 12.50 PM

MINISTRY OF JUSTICE
Tāhū o te Ture

Notes of Evidence Legend

National Transcription Service

Indicator	Explanation
Long dash –	Indicates interruption: Q. I think you were – (*Interrupted by A.*) A. I was – (*Interrupted by Q.*) Q. – just saying that – (*First dash indicates continuation of counsel's question.*) A. – about to say (*First dash indicates continuation of witness' answer.*) This format could also indicate talking over by one or both parties.
Long dash (within text)	Long dash within text indicates a change of direction, either in Q or A: Q. Did you use the same tools – well first, did you see him in the car? A. I saw him through – I went over to the window and noticed him.
Long dash (part spoken word)	Long dash can indicate a part spoken word by witness: A. Yes I definitely saw a blu – red car go past.
Ellipses … (in evidence)	Indicates speaker has trailed off: A. I suppose I was just… *(Generally witness has trailed off during the sentence and does not finish.)* Q. Okay well let's go back to the 11th.
Ellipses … (in reading of briefs)	Indicates the witness has been asked to pause in the reading of the brief: A. "…went back home." The resumption of reading is noted by the next three words, with the ellipses repeated to signify reading continues until the end of the brief when the last three words are noted. A. "At the time…called me over."
Bold text (in evidence)	If an interpreter is present and answering for a witness, text in bold refers on all occasions to the interpreter speaking: Q. How many were in the car? A. **There were six.** Q. So six altogether? A. **Yes six** – no only five – **sorry, only five.** *(**Interpreter speaking** – witness speaking – **interpreter speaking**.)*
Bold text in square brackets (in evidence)	If an interpreter is present and answering for a witness, to distinguish between the interpreter's translation and the interpreter's "aside" comments, bold text is contained within square brackets: Q. So you say you were having an argument? A. Not argue, I think it is negotiation, ah, re – sorry. **Negotiation, bartering. [I think that's what he meant]** Yeah not argue.