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TRANSCRIPT OF PROCEEDINGS

O/N H-927214

MR B. WALKER SC, Royal Commissioner

IN THE MATTER OF THE MURRAY-DARLING BASIN ROYAL COMMISSION

ADELAIDE

10.05 AM, THURSDAY, 30 AUGUST 2018

Continued from 29.8.18

DAY 23

MR S. O'FLAHERTY, Junior Counsel Assisting

MR O'FLAHERTY: Commissioner, before I call the next witnesses I will tender tabs 1 through 6 inclusive of the folder relating to Mr Hall and Mr Bucknell from yesterday morning, and I also tender the report entitled 'Hydrologic Modelling for the Northern Basin Review' dated January 2016 which is behind tab 4 of the Northern Basin Review core folder.

THE COMMISSIONER: Thank you.

MR O'FLAHERTY: I call Mr Hugo Hopton and Ms Natalie Stalenberg.

<NATALIE ANN STALENBERG, AFFIRMED [10.06 am]

<HUGO JASON HOPTON, SWORN [10.06 am]

MR O'FLAHERTY: Thank you both. Aside from the first couple of questions which are biographical in nature and which I will direct to each of you in turn, all of my questions and all the Commissioner's questions will be directed at both of you. So feel free to answer one or both of you, preferably one at a time for the purposes of the transcription, of course, and feel free to indicate if you wanted to add to something that has been said as well. I want to try and keep this as beneficial as possible and fluid as possible.

THE COMMISSIONER: He means we're not going to make it an interrogation.

MR O'FLAHERTY: Not intentionally, at least. Mr Hopton, you are the Chief Executive, I understand, of Nature Foundation of South Australia.

MR HOPTON: Correct.

MR O'FLAHERTY: And you have a background in natural resources management; is that correct?

MR HOPTON: I do.

MR O'FLAHERTY: Could you briefly describe what that background is?

MR HOPTON: Yes, I've worked for Nature Foundation in the capacity of Chief Executive since the start of 2016. Prior to that I was the Regional Manager for the Natural Resources Management Board in the South Australian Murray-Darling Basin and also accountable to the Department of Environment, Water and Natural Resources as an Executive. And prior to that I was 12 years in the south-east working, firstly, in establishing the South East Catchment Water Management Board and then, secondly, the South East Water Natural Resources Management Board.

MR O'FLAHERTY: Am I right in thinking that the Natural Resources Management Boards have a key role in the development and administration of Water Allocation Plans in South Australia?

MR HOPTON: They do. That's under the requirements of the Natural Resources Management Act 2004 I think it is, and they are responsible for developing water allocation plans which are subsidiary to the regional Natural Resources Management Plan and they work on the sharing of the water resources and also defining sustainable take on the basis of best available science and then working with communities to come up with an agreed position that the government or the Minister might be willing to sign.

THE COMMISSIONER: Does that work feed into the Water Resource Plans called for under the Basin Plan?

MR HOPTON: Yes, it does. It's my understanding that the Water Allocation Plans, as we call them in this State, are the equivalent of Water Resource Plans when referred to in the Murray-Darling Basin context.

THE COMMISSIONER: And can one or other of you or both tell me more about the Nature Foundation, please?

MR HOPTON: Yes.

MR O'FLAHERTY: I was going to get to that point after I got to the biographical - - -

THE COMMISSIONER: I can't wait so - - -

MR HOPTON: Very good. Would you like me to outline that now?

THE COMMISSIONER: Yes.

MR HOPTON: The Nature Foundation is a South Australian not-for-profit charity. It has been around since about 1981. It was established by four people who wanted to supplement the endeavours of the South Australian Government in protecting the important environment assets of South Australia. So it started off as a foundation raising funds to do that and remained in that way for a while, for a number of years. When the National Reserve System program was established by the Commonwealth, considerable sums of money were made available to acquire – to help reach the target of, I think it's 17 per cent of each IBRA region and thereby geographical regions recognised globally, except there was a provision there that the money could not flow direct to State government so an intermediary was required.

So a partnership with the South Australian Government ensued and so those funds came through Nature Foundation to buy land, much of which went into the national parks system later. Since that time Nature Foundation has been involved in helping

to protect 1.1 million hectares of South Australia and some fabulous areas around the Flinders Ranges National Park and the Gawler Ranges and the like.

THE COMMISSIONER: Does the Foundation have a decision-making role in the environmental management?

MR HOPTON: If I could answer your question a little indirectly. Of that 1.1 million Nature Foundation now owns and manages half a million of that acquired through Commonwealth and State funds in combination and also from industries like the petroleum and gas industry. So, yes, but as an independent not-for-profit it chooses when it gets involved in discussions about or policy around soil and water biodiversity or marine in this State.

THE COMMISSIONER: So does the Foundation itself have in-house expertise in the environmental management of these sites?

MR HOPTON: We do. We employ a conservation programs manager who is – has an ecological background and also of field ecology, in particular. We develop management plans, often in partnership with Department for Environment – the Department for Environment and we also contract in expertise from time to time to help us on the land management side as well as the Water for Nature Program.

THE COMMISSIONER: I saw a reference in general terms to the funding sources. What are the current funding sources, in general terms, for the Foundation?

MR HOPTON: If I can give you two other pieces about the Nature Foundation and then go on to that question.

THE COMMISSIONER: Yes.

MR HOPTON: So the land protection – we say we save, protect and restore the landscape of South Australia. That's our ambition. We have another part of our function which is managing grants to university students and research projects and that came about due to a bequest in the early 2000s, and since that time we have issued nearly $2 million worth of grants to nearly 400 research and student projects. And our hope is that those grants will not only help the best and brightest minds come to nature science and stay with that for a career but it's also to partly fund – and it's on average one-seventh of the total cost of those students going through uni. So there's a whole – there's a big alumni there that are actually – it's an investment in future generations in a way.

And the third part is the Water for Nature Program which no doubt we will talk about more extensively today. So funding sources, back in 1981 started with donations and fundraising events of quite small scale. In 2018 our funding comes – a significant chunk comes from the Commonwealth Environment Water Holder for the Water for Nature Program. We work with - - -

THE COMMISSIONER: That's where you're working on contract - - -

MR HOPTON: Yes.

THE COMMISSIONER: - - - to deliver environmental watering.

MR HOPTON: Yes. Correct. Yes. That's correct.

THE COMMISSIONER: So that's not so much a grant as a - - -

MR HOPTON: No.

THE COMMISSIONER: As a price.

MR HOPTON: I think it in Commonwealth terms has been called a grant and there is some move towards calling tenders for that service due to procurement requirements in the Commonwealth, as we understand it. The other funding sources are donations and we run a whole series of appeals to our membership and supporter base. There's bequests from time to time. It's very unpredictable and so we see that as a bonus and we try and create a capital fund internally but we have received some very big and directed donations of land and money up in – up towards $10 million worth for one particular project from a particular family – which creates a corpus inside Nature Foundation so the earnings from that.

And the final part, really, is helping people with clearance approvals offset their native vegetation obligations under the Native Vegetation Act. That has been a considerable part of our business as well.

THE COMMISSIONER: Again, you make as it were – you charge for that.

MR HOPTON: We do. And that is a statutory obligation that people either pay into the Native Vegetation Fund or work with a third party to meet their native vegetation clearance offset obligations.

MS STALENBERG: Do you just want to clarify in terms of the funding for Water for Nature and the philanthropic?

MR HOPTON: Yes. Thank you, Natalie. And the part I missed is we're also active in applying for grants and quite a wide-ranging family of granting organisations. That has been very helpful to get Water for Nature from quite a small operation to the scale it is today. And we've had two significant grants which have amounted to nearly half a million dollars over three years.

THE COMMISSIONER: Apart from the Commonwealth Environment Water Holder is there any other Commonwealth money made available?

MR HOPTON: Occasionally through grants.

THE COMMISSIONER: Grants in what program?

MR HOPTON: We might apply into natural resources management grants in one of the eight NRM regions in South Australia or directed at the Commonwealth for small Caring for Our Country or national Landcare program grants. But it's very opportunistic. We try and find an intersection between the objectives of those grants and also our highest priority needs.

THE COMMISSIONER: Thank you.

MR O'FLAHERTY: And Ms Stalenberg, you are the Water for Nature Manager in the Nature Foundation?

MS STALENBERG: Yes.

MR O'FLAHERTY: And as I understand it your primary role is the administration of the Water for Nature program?

MS STALENBERG: Yes.

MR O'FLAHERTY: And you've held that position since June 2016.

MS STALENBERG: That's right.

MR O'FLAHERTY: You also have a background in South Australian Government natural resources program?

MS STALENBERG: Yes, I do.

MR O'FLAHERTY: Were you the Senior Policy Officer in respect of the Western Mount Lofty Ranges Water Allocation Plan?

MS STALENBERG: That's right.

MR O'FLAHERTY: You've also worked for the Murray-Darling Basin Authority?

MS STALENBERG: Yes.

MR O'FLAHERTY: What was that role?

MS STALENBERG: I think the title was Assistant Director of Indigenous Engagement.

MR O'FLAHERTY: I understand you took that role after taking a qualification, a Master's in Applied Anthropology.

MS STALENBERG: That's right.

MR O'FLAHERTY: Now, the Nature Foundation has provided a submission to this Commission in respect of issues paper number 2. You should have a nice white folder in front of you both with both your names on it, and that should be behind tab 1.

MR HOPTON: That's correct.

MR O'FLAHERTY: This particular submission, Commissioner, for your reference, is already an exhibit in RCE12 behind tab 15 because it was tendered as part of issues paper 2 submissions.

THE COMMISSIONER: Yes. Am I forgetting something or missing something? It opens by referring to it being a further submission. Was there an earlier one?

MR O'FLAHERTY: I might be missing something as well. I wasn't aware of there being an original submission.

THE COMMISSIONER: I do apologise for not knowing that myself.

MR HOPTON: No, this is our only submission. It could be a typographical error on our part.

MS STALENBERG: Yes.

THE COMMISSIONER: Or just an error.

MR HOPTON: It could be.

THE COMMISSIONER: Don't blame the typewriter. It's all right. Don't worry about that.

MR O'FLAHERTY: There has been lots of inquiries in this area so you may have made submissions to other entities - - -

MR HOPTON: We have.

MR O'FLAHERTY: - - - and got them mixed up. So that's a fairly – yes. The – I wanted to ask you about the Water for Nature Program and primarily – and you will understand that we've got Dr Jensen giving evidence about the specifics of the, or the ecological aspects and the practical aspects of that program, so if I don't ask you questions about that part of the program, don't think I'm disinterested. We will definitely be asking those questions of Dr Jensen. What I wanted to ask you was more akin to the administration and the governance of those arrangements.

THE COMMISSIONER: These are the arrangements for Water for Nature or - - -

MR O'FLAHERTY: Yes. There's a reference to what I think was an agreement in 2012 with the Commonwealth Environmental Water Holder but there's the indication that environmental watering has occurred since 2008. I wonder if you're able to expand upon what those activities were prior to that more formal agreement with the Commonwealth Environmental Water Holder?

MR HOPTON: Yes. The – with the Millennium Drought taking effect, it came to the stage where the South Australian Government had to decide which wetlands or flood runners in South Australia received water and which didn't. And it came down to quite a low number and we understand that there are 1,100 wetlands in South Australia and it was down to probably less than 20. At that time Nature Foundation decided that had it wanted to assist in some way and so mounted an appeal to raise – we were looking for both funds and water to be able to apply water in a small way to some of the most important sites. And as a result a place called Hogwash Bend could be watered and that was the site that was highly valued by community and also ecologically and a nesting place for or a habitat for the Regent parrot which is in small numbers in the area. So that was really our first foray into environmental watering in the - - -

THE COMMISSIONER: How is it physically done, by the way?

MR HOPTON: Natalie can tell you that.

MS STALENBERG: So for most of our sites we require a large water pump by the side of the river and we either pump directly from the river into a wetland or we may use irrigation sprinklers to mimic rainfall.

THE COMMISSIONER: Thank you.

MR O'FLAHERTY: There's some nice pictures in the materials in Dr Jensen's brief. So was that an arrangement with the South Australian Government, was that?

MR HOPTON: The arrangement was access to the site more than anything.

MR O'FLAHERTY: Right.

MR HOPTON: There was no water arrangements with them and the local – what are called Landcare groups were involved in deploying the water and getting the equipment under the water to set up and pump.

THE COMMISSIONER: The water was donated in effect?

MR HOPTON: Yes. We had more luck, more success in gaining funds from people and most people during the drought didn't want to part with their water.

THE COMMISSIONER: How did you obtain the water?

MR HOPTON: I'm not sure how that was done but since that time we've acquired a small parcel of water and we will continue to do so as finances permit.

MR O'FLAHERTY: So the Nature Foundation has an entitlement now under a licence?

MR HOPTON: Yes, 74 megalitres, yes.

MR O'FLAHERTY: All right. Now, then, up to – in 2012 there's an agreement between the Commonwealth Environmental Water Holder and Nature Foundation. Whose idea was it to enter into a formal arrangement like that?

MR HOPTON: It might have come from both directions, from the Commonwealth Environmental Water Holder and also Nature Foundation. But there was a conversation in which our President, Mr Bob Lott, was involved and it seemed like, just going back two steps, into the generation of the Basin Plan there was emergence of a strong theme called localism and it was seen that the Commonwealth Environmental Water Holder inventing – entering an arrangement with a non-government organisation, and a charity at that would actually demonstrate localism. And so it was – we were very happy and enthusiastic to sign pretty much the first such agreement and some of the clauses that you had obviously – we would obviously change right now because there has been – since that time, and having very little experience other than a concept, this might be a good concept, nearly everything that has happened since has had to be developed and it has really been a strong partnership approach between Nature Foundation and the Commonwealth Environmental Water Holder to do that with enabling support from the South Australian Government, so the Department for Environment and Natural Resources.

THE COMMISSIONER: "Enabling support", what do you mean by that?

MR HOPTON: The entitlement goes on the Minister's licence which makes it very straightforward so we don't have to muck around with water transfers and then there's also approvals to deploy water on new sites, because a lot of it is Crown lands and there may also be Aboriginal cultural heritage considerations. Is there anything else?

MS STALENBERG: I think the environmental water allocation actually goes onto our licence but it's transferred through the Minister's licence on its way back if there's anything left over after the watering, yes.

THE COMMISSIONER: And the device of transferring it through the Minister's licence enables what?

MS STALENBERG: I think it's just an administrative requirement if – I think the way that it works is that it gets – in the first instance like at the beginning of this watering season it goes onto our water licence and then if we don't use that full entitlement, we then transfer it back through the Minister's licence.

MR HOPTON: And that, too, has been a work in progress. Under the Water Allocation Plan for the River Murray in South Australia there's unbundling and so there's a whole series of site use permits and transfer approvals.

THE COMMISSIONER: By "unbundling" you mean separating water from land.

MR HOPTON: Yes, and also the – there's different elements or different approval processes within, moving water from one place to another or transferring ownership and we were, at the start of being asked to do that site by site, and some of the sites are very small and our preference is that that's just done once for an agreed watering program in a year and it saved everybody a lot of administrative effort and time.

MR O'FLAHERTY: You mentioned the idea of localism. What would be the main drivers behind that idea? What were the main benefits that were seen about – behind that concept?

MR HOPTON: It's a fundamental philosophy that people – people living locally are affected by natural resources being in good, mediocre, medium or poor condition. They have a hand in – so they experience that however it happens but they can also have a hand in influencing what happens. And so the idea that the philosophy is to engage people early right at the start of a process, tap into very – what amounts to very extensive local knowledge and use that knowledge to come up with the best designed works programs and so to have a local community for environmental watering when often in the media it's represented as a contest between environment and business, our experience in South Australia is that you can't have good business without good environment and if you don't have good environment and good business then you don't have good community.

So we just see the three are fundamentally linked and reliant on each other. So localism starts –it can start at a single wetland on someone's property and then it can actually flow to other properties on a particular part of the floodplain if necessary but it does need support of the people of the River Murray community in the towns and on the landholdings along the way.

MR O'FLAHERTY: I take it that manifests in many ways by – in terms of community engagement directly with landholders and with community organisations and councils.

MR HOPTON: It does indeed and that might be with an individual or it could be with a local Landcare group and Natalie might be able to go into a bit more detail about some of the examples.

MS STALENBERG: Yes. So the Water for Nature Program works very closely with the network of Landcare groups in the Riverland and the Murray lands. So we believe that it's better to utilise existing community networks than trying to go in as an organisation and to recreate those networks. And also there's the local knowledge there as well. So we work – at the moment we work with Berri Barmera Landcare

who hires an irrigation technician for us. We also work with Riverland West Landcare and are utilising their services to engage the community at Cadell where we're also working with the Central Irrigation Trust to hopefully deliver environmental water this season. And then further south we work with Goolwa to Wellington Local Action Planning Association.

MR HOPTON: Could I add two things here? There's another group which is the Aboriginal communities as well which is a really important. One of the fundamental things in natural resources management, in my experience, is engaging with communities early as I've said and that's defining the hopes and also defining the problems and then together with them developing a plan of attack to solve those. That has been done through the Natural Resources Management Boards and it seems to bring a far better result which is accepted by those local communities and done far more quickly and far more cheaply than if it was done from a central agency or in this case done by the Commonwealth Government because the people of the region will see them as being remote or detached from their everyday issues. So the planning side is really important.

The road testing of the plan before it's actually finally adopted through genuine consultations, not superficial ones and then engaging those communities – the very same communities in delivering on that plan. And, in a way, making sure that the – the monitoring occurs really well at site scale, local scale, district scale and regional scale and eventually basin scale, and that there's a really good feedback loop about whether the endeavour is bringing the desired result or not. And that way people, in our experience, become more and more engaged and much more balanced in the way they go about their lives and their businesses.

MR O'FLAHERTY: And it may sound trite, but I imagine that takes time to develop that relationship with those local community groups and the community itself.

MR HOPTON: Yes.

MS STALENBERG: Can I add to that?

MR O'FLAHERTY: Yes.

MS STALENBERG: So another part of Water for Nature – and it's outlined in our strategic plan – is to build a capacity in community groups for them to be able to do their own environmental watering projects in the future. And so we have had a number of successes in terms of that, for example working with the Renmark irrigation trust on Johnson's waterhole where Water for Nature was able to work with that trust to deliver water to a waterhole that was in very dire need of water, and from that the Renmark Irrigation Trust was able to gain confidence in the benefits of environmental watering and has since gone on to develop their own agreement with the Commonwealth.

Another example of that capacity building is with the Ngarrindjeri Regional Authority where we worked with the Raukkan community, and delivered water to Teringie wetland, and now Ngarrindjeri Regional Authority has its own environmental watering agreement with the Commonwealth. And we understand that another NGO that we've worked with at Calperum Station, the Australian Landscape Trust, is also entering into a new agreement and we've worked with ALT for a number of years delivering environmental water to the flood plains at Calperum.

THE COMMISSIONER: In relation to that capacity building, forgive me a legalistic question. The Basin Plan has certain requirements stipulated in section 21 of the Water Act, and the Authority and the Minister both have powers and functions both under the Act and under the Basin Plan which is given force by the Act, and there is compulsory regard required under paragraph 21(4)(c) of the Act to the diversity and variability of the Basin water resources and the need to adapt management approaches to that diversity and variability, and also regard to the social, cultural, indigenous and other public benefit issues. Would they be the two rubrics under which the building of capacity and localism can be seen as being not really desirable but mandatory?

MR HOPTON: That's my understanding of it. And we also understand that the Commonwealth Environmental Water Holder may only use water as empowered to do so. It may not go beyond those scopes, so the water must be used for environmental gain.

THE COMMISSIONER: So when you put all of that together - - -

MR HOPTON: But there are ancillary benefits which we see in our program, where it could be something as simple as bringing a very – a highly degraded Black Box woodland back to life, but it's in such a position that people in the local community actually can see that floodplain coming back to life and that in turn flows on to societal good. There could also be – and we've seen this with a business called the Great River Murray walks where people from right around Australia are paying – it's high in tourism and they're paying significant fees to enjoy a guided walk through the River Murray, but they're going through areas that have been watered so it's not walking through areas of dead Red Gums and dead Black Box. And so the – but the CEWH - - -

THE COMMISSIONER: I've seen some of those places.

MR HOPTON: But the CEWH can't – as we understand it, can't provide water for that purpose, but there are those ancillary benefits.

THE COMMISSIONER: But need not close his or her mind to that being a consequence of doing what - - -

MR HOPTON: And we don't - - -

THE COMMISSIONER: - - - is authorised.

MR HOPTON: We don't see them closing their mind to - - -

THE COMMISSIONER: No .....

MR HOPTON: To those ancillary benefits, but you have to be able to justify to the Parliament, I guess, in Canberra that they're using water for the purpose. Is there anything to add to that?

MS STALENBERG: No. I think – yes, the environment comes first in the CEWHs mind and if there's any additional benefits then that's all the better.

THE COMMISSIONER: And it really only goes to demonstrate, in another way, that it's a false dichotomy to pose the environment against, say, the economy.

MR HOPTON: That's our belief and also our experience.

THE COMMISSIONER: Yes. Thanks.

MR O'FLAHERTY: Now, the 2012 agreement with the CEWH was the first of its kind, I understand; is that right?

MR HOPTON: We understand that to be the case, yes.

MS STALENBERG: With an NGO, yes.

MR O'FLAHERTY: And you anticipated, Ms Stalenberg, one of my questions about what other agreements there might be, and you referred to the Renmark Irrigation Trust. Was it the Ngarrindjeri Regional Authority?

MS STALENBERG: Yes.

MR O'FLAHERTY: And what was the third NGO, at Calperum, you referred to?

MS STALENBERG: I believe the Australian Landscape Trust is entering into an agreement, yes.

MR HOPTON: I believe there's one with Banrock Station as well.

MR O'FLAHERTY: Right. Yes. Because that's a Ramsar listed wetland - - -

MR HOPTON: That's right.

MR O'FLAHERTY: - - - that's privately owned up there, isn't it?

MR HOPTON: Yes. Yes, it is. Yes. Ownership has changed, but the management intent of Banrock has remained the same, because it actually brings a big marketing edge to the wines from - - -

MR O'FLAHERTY: Yes.

MR HOPTON: That come from Banrock Station. And there is another agreement with the South Australian Murray-Darling Basin Natural Resources Management Board.

MR O'FLAHERTY: Yes.

MR HOPTON: And that's delivered by – because of the change in structure on how programs are delivered, delivered by the ..... board, so that's delivered from the Department for Environment and Water, as it's now called, and it's funded partly from the Commonwealth and partly from natural resources management levies raised in the region.

MR O'FLAHERTY: And so as not to sound too parochial, given that all of those examples are in South Australia, are there other examples that you're aware of across the Basin?

MS STALENBERG: The Murray Wetlands Working Group, I think, must have an agreement with the Commonwealth. I'm not sure exactly how, yes.

MR HOPTON: We haven't seen their agreement, and the – but we understand it's undertaking environmental watering in the north-west of New South Wales, and also at a place called Nimmie-Caira.

MS STALENBERG: Nimmie-Caira.

MR HOPTON: Nimmie-Caira, which is quite recent. It's a very large wetland, about 80,000 hectares.

MR O'FLAHERTY: Yes.

MR HOPTON: We also understand that some of the Catchment Management Authorities in Victoria along the river are engaged as well.

MR O'FLAHERTY: Okay.

MR HOPTON: And I do know that the Mallee CMA engages in environmental watering, but that is very strongly funded and supported by the Victorian Government. And this is one of the points of difference that we have is that we don't receive money from the South Australian Government ..... so we're reliant on the Commonwealth Environmental Water Holder funds to do what we do. And another point of difference is that South Australia tends to be an incised river valley so to – to

water, we actually need to lift water three metres out of the pool and deploy that across the flood plain, whereas on the Hay Plain it's usually delivered by channel, gravity feed, very inexpensive.

MR O'FLAHERTY: In terms of the amounts of water we're dealing with, my understanding the agreement you had with the CEWH was up to 10 gigalitres, but you most certainly didn't start or reach 10 gigalitres that during the life of that agreement as I understand it. It ramped up, so to speak.

MS STALENBERG: That's right. So it was for up to 10 gigalitres a year.

MR O'FLAHERTY: Yes.

MS STALENBERG: For a five-year agreement, and the largest volume of water that Water for Nature has delivered was in the 2017/18 year, and that was for just under 5,000 megalitres. But we started off, yes, very small.

MR O'FLAHERTY: So - - -

MR HOPTON: And a little bit of - - -

MR O'FLAHERTY: - - - almost half of what you could have drawn down, and I understand that's capability rather than a desire. You have to work up the capability in order to deliver that much water.

MS STALENBERG: Yes, that's right. There's a lot of logistics involved, and so we don't get the 10 gigalitres as an allocation each year, we have to present to the CEWH a watering proposal which lists the sites that we wish to water and how much water we require.

MR O'FLAHERTY: Yes.

MR HOPTON: And in terms of scale, we're talking about 10 gigalitres a year for the agreement that we've had with the CEWH and South Australia, I understand, receives 1,850 gigalitres a year. So we're talking about a tiny proportion of the flow. And the other proportion, it's worth noting, is that South Australia is about a 7 per cent recipient of water from the Murray-Darling Basin, as I understand it, and so we're talking a small proportion from a small proportion in a way, in the context of the whole of the Commonwealth Environment Water Holder's water allocation. And, on that point, we have a very strong view that the water returned to the environment should be towards the 3,200 gigalitre mark of real water, not other projects.

MR O'FLAHERTY: Sure?

THE COMMISSIONER: Why do you choose 3,200?

MR HOPTON: Because it's 2,750 plus 450.

THE COMMISSIONER: But – I can do the arithmetic, but why that – why those figures?

MR HOPTON: It's heading towards the bands that we think – we believe the scientific basis suggests, whereas - - -

THE COMMISSIONER: What's the science that you understand is justifying 3,200?

MR HOPTON: It comes from the genesis of the Basin Plan and it – we believe that the 2,750 figure is a negotiated figure rather than one heading towards the science, so - - -

THE COMMISSIONER: Quite so. Quite so.

MR HOPTON: - - - where the jurisdictions could agree.

THE COMMISSIONER: I'm not aware of science that supports 2,750, but I'm not aware of science that supports 3,200.

MR HOPTON: No.

THE COMMISSIONER: So what is the Foundation's position?

MR HOPTON: We prefer to see more real water in the channel and available to the floodplain than has been - - -

THE COMMISSIONER: Are you uncomfortable about suggesting a figure other than 3,200?

MR HOPTON: No. But once again, we - - -

THE COMMISSIONER: Do you have a view about what the science would require?

MR HOPTON: We hold ourselves as a science based organisation and prefer to have evidence, or well-reasoned processes or models.

THE COMMISSIONER: Sounds reasonable.

MR HOPTON: We understand that the Basin Plan doesn't take into account climate change and there's more confidence in the estimates from – in climate science than there were when the Basin Plan was cast, and that the science that led into the development of what is now the Basin Plan is predated it by some years as well necessarily. So we prefer for, in a precautionary way, that the figure be higher so

that the – the quality and pattern of flows in the channel can be towards acceptable levels and that the Murray Mouth is open and exports the salt on a regular basis.

THE COMMISSIONER: A phrase that I have to work with in the Act refers to "protecting and restoring" and relevantly:

> *Protecting and restoring the ecosystems, natural habitats and species that are reliant on the Basin water resources and to conserve biodiversity.*

That's in section 21. And then the objects of the Act use the phrase slightly differently, where it refers to one of the objects of the Act being:

> *To protect, restore and provide for the ecological values and ecosystem services of the Murray-Darling Basin –*

etcetera, etcetera. It's an interesting order that the words appear, protect and restore, and I'm moving towards a view that what those quite ordinary and, therefore, relatively plain words suggest is that the relevant purpose of the Act is, as it were, first to slow and halt degradation and second to improve the position. That is, to enhance the position, which matches with the Water Act's references to the fact that there has been over allocation and degradation. Does that accord with the approach that the Foundation, as a matter of policy – I'm not asking about law – does that accord with the policy position of the Foundation?

MR HOPTON: It does, and if you think about our three word slogan which is "save, protect, restore".

THE COMMISSIONER: It's very similar, isn't it?

MR HOPTON: Very, very aligned.

THE COMMISSIONER: Well, now that's why the amount of water to be returned to the environment, by which I mean the amount of consumptive take reduction, becomes important because one might say, not very scientifically, every little bit helps. But you couldn't say scientifically that any little bit will either protect or restore. It may be inadequate to protect, and it may be even more inadequate to restore. In other words it's science that will inform you whether you're getting enough first of all to slow and eventually help the degradation and then, next, enough then to turn it around. Does the Foundation have a formal policy position as to whether there is enough water provided under the Plan for those purposes?

MR HOPTON: No, we don't. I would add that - - -

THE COMMISSIONER: I don't wish to embarrass you or the Foundation.

MR HOPTON: No.

THE COMMISSIONER: But is that because it's politically controversial?

MR HOPTON: No. We haven't written it down. We're a very small organisation.

THE COMMISSIONER: It's a clerical reason. Right.

MR HOPTON: Not even typographical. But I would add that there's a lot of talk about the volume to be returned to the environment, but one of the crucial things is the pattern of flow - - -

THE COMMISSIONER: Yes, right.

MR HOPTON: - - - and how that water arrives and the timing of it. So pre-regulation as you know, the river was very – it could be dried out or it could have very significant flood events as well, and we've tended to have – reduce the amplitude of those, and it's only in recent times that with the raising of the trials by the Department for Environment and water for weir pool raising and lowering have we started to experiment with starting to move those levels up and down again.

THE COMMISSIONER: Well, and then there's the reversal of the seasonality upon the river being turned into a conduit for some irrigation water.

MR HOPTON: That's right. Yes.

THE COMMISSIONER: Which seems to be an aspect of the river, but the Act more or less requires us to continue, apparently, in an attenuated or ameliorated form so as to accommodate the environment.

MR HOPTON: Yes, that's correct. And so some of the structures that are built or planned along the River Murray, such as a channel regulator or the Hattah Lakes or ..... river do assist in mimicking to some extent what would have been pre-regulation, if we call it that, pre-engineered structures, but they tend to bring a ponding of water rather than a flow of water across the landscape, as Dr Jensen might explain. They help us, but the – we do need to be able to convey water to sites on the basis of the ecological need, and that's where our program comes in, and we tend to do the difficult sites. So we, I think this year, started with a program of 65 sites for about seven to 8,000.

MS STALENBERG: 7,600.

MR HOPTON: Yes, 7,600 megalitres. Whereas the NRM board has nine sites for 9,000 megalitres, so obviously our program is much more intensive, but it also has the benefit of getting water to sites that are of critical importance, vegetation which is hundreds of years old, and also allows us to engage many people in the community and to build up this understanding and capability that environmental watering does bring a genuine and nearly immediate benefits, and that it becomes part and parcel of

the way the natural resources of the River Murray are managed in South Australia. And also I'm expecting we will move ..... upstream as well.

THE COMMISSIONER: Is volunteer work used by the Foundation in raising funds?

MR HOPTON: Yes, it is. And Natalie can give some examples, I'm sure, for the Water for Nature Program, if that helps.

MS STALENBERG: So quite often the landholders that we work with on their own wetlands provide volunteer time to undertake activities like refuelling the pump, which needs refuelling every day, or moving sprinklers. We've also, in the last 12 months, been utilising the services of the Cadell Training Centre and those participants in that program volunteer to – to move sprinklers and things across the flood plain.

THE COMMISSIONER: Sorry, what is the Cadell Training Program?

MS STALENBERG: So it's a - - -

MR HOPTON: It's a pre-release - - -

MS STALENBERG: - - - low security.

MR HOPTON: - - - detention facility.

MS STALENBERG: Yes. But also through Landcare groups we've been able to access volunteers. Some volunteers go onto our properties where we've been delivering environmental water to a wetland and undertake bird surveys or frog monitoring, those kind of citizen science type activities as well.

MR HOPTON: Men sheds, footy clubs, wherever we can.

THE COMMISSIONER: Thanks.

MR O'FLAHERTY: Now, in terms of the operation of the agreement you have in terms of the environmental watering process, as I understand you have essentially a five-year strategy and then within that five-year strategy you have annual priorities or schedules of watering particular sites in the wetlands that you've identified; is that right?

MS STALENBERG: That's correct. So – and Dr Jensen can talk to that as well, but we worked with Dr Jensen to develop a five-year watering strategy for the program which outlines our methodology about deciding which sites to water in which water season, including taking into account the priorities of the Murray-Darling Basin Authority and the Commonwealth Environmental Water Holder, but also local conditions, and so from that five year strategy we also then have individual

watering plans for some sites and we're progressing with those as we go. And then each year there is an annual watering plan where we refer to our five year strategy and the five-year plan for each of the sites and then consider the conditions of the river as to whether it's going to be a dry year or a wet year and therefore whether it's appropriate to be watering particular sites and also the – the monitoring that Dr Jensen provides on specific sites.

MR O'FLAHERTY: You referred to the Authority because there's a series of what I might call umbrella or core or Basin-wide documents aren't there, that the Authority develops, and the States develop, in terms of an environmental watering strategy and watering plans – long-term watering plans and annual watering priorities, and it would be a requirement for the Foundation to make sure that what you're coming up with feeds in – feeds in and fits in with those broader documents.

MS STALENBERG: Yes, that's correct. And then, of course, there's that double checking point when we go to the CEWH.

MR O'FLAHERTY: Yes.

MS STALENBERG: Yes.

MR O'FLAHERTY: Now, by my calculation, at five years from 2012 is 2017. You mentioned 2017 to 2018. Is there a fresh five-year agreement or is that something that is currently under consideration?

MR HOPTON: We – we would love to have another five-year agreement with the Commonwealth Environmental Water Holder, but amended to reflect what everybody has learnt since 2012.

MR O'FLAHERTY: Yes.

MR HOPTON: We understand that the – the Commonwealth Environment Water Holder is subject to new procurement requirements and – which would have a trigger, I'm not sure what level it is, but a certain amount of expenditure, and so the – we understand the need for transparency and fiscal accountability, but one of the things we think will be difficult is how to write the scoping document for not only delivering water to sites but working out what the prescription for a particular site should be and the community engagement, the accountability processes back into the CEWH, so getting approvals to go, and also gathering the data and processing that.

There's sensitivities, like Aboriginal and cultural heritage, which we've just – you won't know – nobody will know until they get onto a site and so how do you just do that in a dollar per deliverable means? So we actually think it would be good to have a second five-year agreement, or a five plus five if that was – if the Commonwealth could find a way to – to proceed with that within – within their policies for finance.

MR O'FLAHERTY: You mentioned that there's – the CEWH is now subject to more procurement responsibilities.

MR HOPTON: I think they've – I think they've changed with time.

MR O'FLAHERTY: Yes, I was going to ask. I know that 2012 predates your time, but in terms of both your interactions with the Commonwealth Environmental Water Holder up till the end of that first five-year agreement, what was the nature of the interactions in terms of that checking that you described of compliance with the Commonwealth documents and what you had in mind?

MR HOPTON: Well, remembering we – nobody really knew how this might work at the start and that the volumes of water deployed were small initially, it was more a proposal by us about a number of sites to water and a volume and that was pretty much agreed and we would go and work out what needed to be done in an operational sense and then proceed with that and report on it.

MR O'FLAHERTY: Yes.

MR HOPTON: But as time has gone by, and I believe more people have become involved in environmental watering right across the Basin, the processes have become more detailed and more rigorous and they also take more time and scrutiny and analysis than they did in the early days. And so now if we're talking about a proposal, the initial one of around 7,500 megalitres for this new financial year or watering year, there has been a lot of work that – tens of days of work from our little organisation to meet all the requirements, and it seems to be growing.

MR O'FLAHERTY: You've mentioned Dr Jensen and I understand that there's an advisory committee within the foundation that essentially helps or produces the – these five-year strategies and these annual strategies; is that right?

MR HOPTON: The committee is made up of community members in the main and we also have a departmental person on the committee, which is very helpful. That's Department for Environment - - -

MR O'FLAHERTY: Sorry. That's South Australian department?

MR HOPTON: Department for Environment and Water, yes, and it tends to survey the operating environment. And it could be the seasonal outlook, it could be the mood of society or how markets are going in the irrigation sector, and the science – Department of Science and Technology, and that meets every two months or so, and the staff take a proposal there, and it gets pretty heavily tested in the meeting, and so we're pretty satisfied that's a rigorous process from our point of view to have documents ready for consideration by the CEWH.

MR O'FLAHERTY: And I think what you described what you might also describe as a rigorous process now that you're experiencing at the moment with the CEWH in order to satisfy their procurement requirements; is that right?

MR HOPTON: Yes. And there's also a lot of scrutiny with the CEWH. I don't know how many committees I've had to report to in the last 12 months, but I understand it's quite a considerable number, so they're trying to make sure that everything is how it should be and, of course, that brings with it a lot of diligence from within. It would be great if the amount of effort was proportional to the risk or the volume rather than everything having to receive the very significant level of scrutiny. Our smallest site is five megalitres, and that gets the same scrutiny as a site that takes 3,000 megalitres, so it could be - - -

MR O'FLAHERTY: Do you have any suggestions as to how that could be improved or how that level of scrutiny could be proportional to the amount of water and risk?

MR HOPTON: Yes. It happens in most organisations. If you look at the degree of risk of something coming to pass, something unwanted coming to pass, and then the consequence should occur, and then assign a level of attention to that.

MR O'FLAHERTY: In terms of the – your desire for a five-year program, and this might be an ecological question or it might be a governance question, so feel free to defer to Dr Jensen in some aspects if you want, but other than a sort of a – is – what are the – what's the justification for wanting a five-year spanning agreement rather than a – each one year rolling arrangement?

MR HOPTON: There's a number of reasons for that. When we work out the ecological requirements for the wetlands that we see as the highest priority for our attention in South Australia, we work as if we were on a five-year program.

MR O'FLAHERTY: Yes.

MR HOPTON: And we also think longer term than that. So we just make some assumptions, so we can actually get the prescription right. The second thing is that we talked earlier about working with communities and needing to be present and build trust and relationships, and that can't be done with stop start. And the final one, which is a really practical one for us, is that we – we have a standing cost, so we haven't put any water out this year yet because we've only just received the approval this week. But we've had staff and resources waiting, and we don't have a large budget. So they have a five-year plan that would roll, we can just water, so – and this year we need to deliver a 12-month program in nine months now, so having longer-term programs, and many organisations right across Australia in this natural resources sector find that is much more efficient, get much more done for the money, if you can say, "Look, here's a three-year program or a five-year program", and just roll through that at the end of the financial year .....

THE COMMISSIONER: Makes you wonder about three-year parliaments, really, doesn't it?

MR HOPTON: Yes.

MR O'FLAHERTY: It may well be beyond our terms of reference.

THE COMMISSIONER: It could be.

MR O'FLAHERTY: You say you've just received approval this week.

MR HOPTON: Yes.

MR O'FLAHERTY: Now, my understanding of the – what might be called the watering year is the financial year, July to June.

MR HOPTON: Correct.

MR O'FLAHERTY: When – through the life of the five-year agreement and now, when would you submit the annual watering priority that you had for the forthcoming watering year?

MR HOPTON: It – the timing is generally – we start work on that and that's substantially progressed by April each year.

MR O'FLAHERTY: Yes.

MR HOPTON: So we're about two and a half months/three months out. But there are some things to take account of and bring it to finality, and primary amongst those are the – what is being observed in the – in the wetland sites that we wish to water, and do they – they need to have a watering or would it be best to put them into a drying phase for a little while? The second is looking at the seasonal outlook for the – for the Basin, so how much water might be coming down, would there be a natural high river or are storages low. So as we get closer to the end of June, then we have more confidence in the data.

MR O'FLAHERTY: Yes.

MR HOPTON: But we – I mean, this Murray-Darling Basin system is one of the most variable systems in the world, so we're – we're talking of droughts and flooding rains always, so we need to be adaptive.

MR O'FLAHERTY: So you would - - -

MR HOPTON: Have you got anything to add to that, Natalie?

MS STALENBERG: Yes, I think this year the – the process was slowed down a bit in terms of restructuring our costs. And – and also the – the attention to detail to the – the plan that we put forward. So there was a lot of toing and froing since May, really.

MR O'FLAHERTY: So it was about May that you submitted what you had as what you considered to be - - -

MS STALENBERG: Well - - -

MR O'FLAHERTY: - - - relatively final - - -

MS STALENBERG: Yes.

MR O'FLAHERTY: - - - in terms of what you had planned for the July-June year.

MS STALENBERG: No, the list – I think there was some – some discussions. The actual list of sites probably went to the CEWH in June, I think.

MR O'FLAHERTY: Right.

MS STALENBERG: Yes.

MR O'FLAHERTY: Okay.

MR HOPTON: So if we could, we would like the watering program to be approved by mid-June each year.

MR O'FLAHERTY: Yes.

MR HOPTON: So then we could without - - -

MR O'FLAHERTY: Begin the planning for - - -

MR HOPTON: - - - having to go into – or suspend our activities on ground.

MR O'FLAHERTY: Yes.

MR HOPTON: We've used our time well. Been connecting with community, we've been maintaining the gear. We've been - - -

MS STALENBERG: Yes.

MR HOPTON: - - - getting approvals and all that sort of stuff, but it's - - -

MS STALENBERG: And yet - - -

MR HOPTON: It really is a - - -

MR O'FLAHERTY: In anticipation of getting - - -

MR HOPTON: Yes.

MR O'FLAHERTY: - - - that approval, yes.

MS STALENBERG: And the other thing that has happened in the last two years, I think, is that the CEWH has decided that they will no longer allow watering in June, so because of the – the administrative process and the time it takes to transfer water, any remaining water back to the Commonwealth, they want to - - -

MR O'FLAHERTY: Right.

MS STALENBERG:

MS STALENBERG: - - - reduce that risk, and so we need to finish our watering by 1 June, which removes a whole month of when you can actually deliver environmental water and get bigger bang for your buck. If you're going to water that site in Spring, you do what we call priming, and Anne can talk to - - -

MR O'FLAHERTY: Yes.

MS STALENBERG: - - - that further.

THE COMMISSIONER: Is this a result of an accounting period convention or what?

MS STALENBERG: The - - -

THE COMMISSIONER: The Commonwealth –

MS STALENBERG: Financial year.

THE COMMISSIONER: That's what – it's just a financial year figure.

MS STALENBERG: I think – I believe so. I'm not sure where it came from.

MR O'FLAHERTY: You mentioned it was - - -

THE COMMISSIONER: It's not ecological, is it?

MR HOPTON: No, not ecological.

MR O'FLAHERTY: Because you mentioned there's a process, an administrative process by which if there's any left over, you mentioned earlier that for – if there's

any left over in Nature Foundation's accounts, you would have to transfer it to the South Australian Minister, who would then have to transfer it to the Commonwealth Environmental Water Holder. And so is the reasoning for needing – is the reasoning, "We need a month to do that process"?

MS STALENBERG: That's right. That's as I understand it.

MR O'FLAHERTY: I'm sorry, I'm not sure I'm following why that needs – I think we did try to - - -

THE COMMISSIONER: Mr O'Flaherty, it's because bureaucracy is more important than ecology. You can move on, I think.

MR O'FLAHERTY: Fair enough. In terms of the – you said, Mr Hopton, I think, that you would ideally like approvals to be made in June, mid-June.

MR HOPTON: By mid-June latest, yes.

MR O'FLAHERTY: Yes. Was that the experience in the past, that the Foundation got those approvals round that time in the - - -

MR HOPTON: Recognising that Natalie and I joined Nature Foundation in 2016, there's about - - -

MR O'FLAHERTY: Yes, asking in a corporate sense rather than - - -

MR HOPTON: Four years. But I understood it was much more straightforward.

MR O'FLAHERTY: Yes. Yes. Now, I think you mentioned there might have been a bit of pushback. Was that in the approvals process this time round? Could you give an example of – was that where the Foundation said, "We want to water this site", and the Commonwealth Environmental Water Holder said, "No, don't water that site"? Is that the nature of the pushback? Or was there more of a, "You need to justify why you need to water that site"?

MR HOPTON: The – the categories were – there's a couple of categories. So - - -

MR O'FLAHERTY: Yes.

MR HOPTON: Some of the sites and some of our larger sites require to pump from environmental water approval, so it was watering subject to, so there was a group of those. There was a group that's saying, "Yes, really happy with those."

MR O'FLAHERTY: Yes.

MR HOPTON: And then there was another group which attracted some discussion about whether – of the – the merit in the seasonal cycle that we were in, so it's – it's

dry, as everybody knows, in Queensland, New South Wales and Victoria, and whether those sites should be watered. And so - - -

THE COMMISSIONER: That's a technical scientifically informed dispute, is it? Or difference, I should say. Difference.

MR HOPTON: We – we have a view that we need to look at the – each site on its ecological merit on the basis that the river system is a highly modified system. So a number of the sites that we're looking at in an unregulated system would have had very high flows and a fair bit of water going over there since the break of the Millennium Drought, but they haven't. And so we have recommended that they be watered but they, in natural terms, would have a flow around the 50,000 or 80,000 megalitres a day across the border, and so the Commonwealth Environmental Water Holder has taken a different view saying that we're in a dry time, therefore, should only be watering sites that would have been sites that would receive inundation at lower flows across the border.

THE COMMISSIONER: But it's a difference between the views - - -

MR HOPTON: It is.

THE COMMISSIONER: - - - which is a difference about what I'm going to call – I think you've called it the merits, I've called it the technicalities. It is ecological. They're differences about - - -

MR O'FLAHERTY: Were the people expressing these views from the Commonwealth Environmental Holder, were they scientists saying that?

MR HOPTON: No, not that we know of, and it's – we believe the Commonwealth Environmental Water Holder is working to the model, a model - - -

THE COMMISSIONER: Yes.

MR HOPTON: - - - whereas we're looking at the merits site-by-site.

MR O'FLAHERTY: Yes.

THE COMMISSIONER: I understand.

MR HOPTON: And the analogy here is that we can look at population health, but – but you've got to get down to the individual to know whether they're well or need treatment, and - - -

THE COMMISSIONER: Yes.

MR HOPTON: - - - we think the CEWH is working at the population level, not the - - -

THE COMMISSIONER: Epidemiology doesn't deliver therapy.

MR HOPTON: Correct. So it has been a very ..... discussion, in our view, and we put our views and they put their views but, in the end, they're the final arbiter.

MR O'FLAHERTY: Now, I think you mentioned – and correct me if I got this wrong – but you asked for up to six gigalitres this year round, was it?

MS STALENBERG: 7,600.

MR O'FLAHERTY: 7,600, sorry. Did you get that full approval?

MS STALENBERG: No. So as Hugo outlined, we have a – well, there's three lists, essentially, in our watering schedule this year.

MR O'FLAHERTY: Yes.

MS STALENBERG: So there's a table that we can go ahead with as soon as we get the water transferred, and then there's a table where there's provisional approval where we need to work with partners, including the Department for Environment South Australia, to answer some additional questions. And then there's a list of sites where they've essentially said, depending on what happens with the river and whether it continues to be a dry year or whether we get rain - - -

MR O'FLAHERTY: Yes.

MS STALENBERG: - - - as to whether those sites would be watered. So - - -

MR HOPTON: ..... Calperum .....

MS STALENBERG: No. So Calperum is – Calperum is the – one of our larger sites that we've watered before which was taken off because they're developing a new agreement with the Australian Landscape Trust. So the – the first table that we're able to go to is 2184 megalitres, I believe, and then there's another volume of water caught up in amongst those three different lists which is for priming our sites, which I touched on before. So priming is usually done between sort of May, June, and July. So now we have to bring that forward. But that's also – will be under review come sort of February as to – depending on the conditions that we're heading into for the – the 2019/20 year.

MR O'FLAHERTY: So that priming would be May, June, July of next year.

MS STALENBERG: Yes.

MR O'FLAHERTY: And what sort of amounts are we talking about there in terms of water?

MS STALENBERG: Well, in terms of the first list, there's 800 megalitres there.

THE COMMISSIONER: Could I take you to page 2 of your submission to me, please. I'm not sure I sufficiently well understand in the second paragraph on that page, the reference as follows:

> *Since the flood peak of 2016, we have recorded a widening gap between watered and non-watered trees.*

I understand all of that. And then the next phrase:

> *As baseline condition declines due to dry conditions.*

Could you just explain to me what the notion of baseline condition declining means there?

MS STALENBERG: I think Anne might be - - -

THE COMMISSIONER: All right. I will - - -

MR HOPTON: Would that be okay?

MS STALENBERG: Yes.

THE COMMISSIONER: Absolutely. Thank you. I see that - - -

MR HOPTON: I would – I would add too on the monitoring side of things is that there's a Basin-wide monitoring plan and that resources are directed to monitoring at the Basin scale, but it's very, very difficult to find resources to monitor at the local scale, site-by-site scale, and we believe that the Basin scale can't be properly informed unless data comes in at sufficient detail from the top to bottom of the Basin from the local sites.

THE COMMISSIONER: That's an old-fashioned view. You want observations, rather than extrapolations.

MR HOPTON: Correct.

THE COMMISSIONER: Seems fair.

MR O'FLAHERTY: ..... line of inquiry that I had was you've mentioned monitoring in your submission a couple of times. I take it you would see there would be a need for both local monitoring and the Basin-wide. I think you call for the - - -

MR HOPTON: Absolutely.

MR O'FLAHERTY: - - - reinvigoration of the Sustainable Rivers Audit, which is that Basin-wide study, but you say that there's a particular deficiency in local monitoring.

MR HOPTON: So it's very difficult to access funding to do that.

MR O'FLAHERTY: Yes.

MR HOPTON: And that we would apply for somewhere between 30 and 50 grants a year to do things like that, and many granting bodies – the – the grant-making sector has favourites and they – they go for them for a while and they drift away, so monitoring is not a favourite at the moment. So we – we tend to supply those resources from within Nature Foundation because we believe it's vitally important to be able to demonstrate if environmental public water is put onto a site, that we need to know whether it's meeting the objectives of that site or failing to do so or exceeding our expectations.

THE COMMISSIONER: I - - -

MR HOPTON: And we can do that with incredible measurement – incredible measurement.

THE COMMISSIONER: I've had experience in areas other than scientific or ecological areas where it's grants programs, and going back nearly 35 years, I have a distinct recollection of a very explicit move to improve granting by ensuring that no grant was made that did not integrally include a means of knowing whether the purpose for which it was sought had been fulfilled or not. So that in monitoring by a mode of measurement and assessment set in advance and not afterwards, monitoring and, for that matter, reporting are part of what some people call an acquittal process was absolutely essential. This discussion that I recall having around board tables, as I say, a very long time ago, because otherwise you were able to boast of making lots of grants, but if somebody asked, "How did that program go?", you were not able to say except by referring to the next grant application by the same recipient who would say, in breezy terms, "That was a really good experience. We would like to repeat it." And I must say, I had thought from a reading of the Basin Plan and the Water Act and, for that matter state-level programs as well, that surely monitoring is an integral part of understanding environmental watering, otherwise you don't know whether it has worked or not. Isn't that correct?

MR HOPTON: It is correct.

THE COMMISSIONER: It's also basically scientific in the sense of it's empirical, and to mix up terms, as it were, you can start a tithe trading process to get the best bang for your megalitre. Isn't that fundamental, elementary?

MR HOPTON: I – I – I agree. A number of – we received one of the grants I mentioned before – the near half-million dollars worth of grants has allowed us to do

that fine monitoring site-by-site and also to research the – the relevant prescriptions for each of those sites. That comes to an end, and we don't receive money from the Commonwealth Environmental Water Holder to do that – that site-by-site monitoring. Speaking more generically about grants in particular, grant-making bodies might provide a grant but say they won't fund the monitoring but the receiving organisation must find other resources to do that, so – so it's an .....

THE COMMISSIONER: That sounds like a defect in the approach to a grant.

MR HOPTON: It can – and a lot grants are a philanthropic grant, so the people who run the funds decide that they do or don't want to fund - - -

THE COMMISSIONER: Sure.

MR HOPTON: And we accept - - -

THE COMMISSIONER: But there are good and bad ways of making funds available.

MR HOPTON: We accept it or reject it on that basis as well, and we're quite prepared to turn down grants if they're not viable.

THE COMMISSIONER: Now, the - - -

MS STALENBERG: Can I – sorry, can I, yes, add, just to clarify, so we do provide what's called an operational – an operational monitoring report, I think it's called, at the – towards the end of the financial year when we've finished our watering.

THE COMMISSIONER: Yes.

MS STALENBERG: So the – the philanthropic funding which has been providing the funding for Anne Jensen to provide monitoring for a number of representative sites, that information goes into that operational report, as well as we also provide some photo points, which is sort of like a basic form of monitoring, to – because most of our watering sites are of – have an objective of improving the condition of native vegetation, so, therefore, we're able to take photos to see the changes in vegetation in response to environmental watering. So that informs that report as well as sort of ad hoc bird surveys and – and frog surveys. So we do provide monitoring to the Commonwealth that supports the successes or otherwise of environmental watering.

THE COMMISSIONER: Because it just occurs to me that under section 114 of the Act, the annual report required to be provided to Parliament and Basin states by the Commonwealth Environmental Water Holder in particular must include particulars of achievements against the objectives of the environmental watering plan, which could scarcely be done - - -

MR HOPTON: Which is - - -

THE COMMISSIONER: - - - without adequate monitoring.

MR HOPTON: And that – we see it as Basin scale, and our observations - - -

THE COMMISSIONER: Sure. But in order to Basic scale, you have to be able to report on every integer of the watering plan, don't you?

MR HOPTON: We would agree with that, and I imagine with limited finances they would – would take a sampling approach at the Basin scale as we are taking a sampling approach with our program.

THE COMMISSIONER: When you talk about limited finances, you mean the limited finances of the Commonwealth?

MR HOPTON: Environmental Water Holder.

THE COMMISSIONER: No, I mean of the Commonwealth. It's a political decision as to whether to fund the Environmental Water Holder to do the job properly, isn't it? Like it's a political decision whether to provide the Air Force with warships.

MR HOPTON: Yes, it's a decision of the government of the day to - - -

THE COMMISSIONER: Yes.

MR HOPTON: Whether it's going to apportion the resources within its care and control.

THE COMMISSIONER: Yes.

MR HOPTON: Yes.

MR O'FLAHERTY: You mentioned the Commonwealth. Do you have any interaction with the MDBA, the Authority in respect of any monitoring activities?

MR HOPTON: No, we don't, but we do try and meet with the Chief Executive or the Chair of the MDBA once a year just to touch base. Have you got anything to add?

MS STALENBERG: Yes. No, and we also work with State Government, I guess, but not so much on the monitoring side of things, although – so part of the monitoring program that Anne has been providing in the past year was also subsidised at one stage through SA Water. There was also complementary sites where there was the salt interception scheme and then our environmental watering sites and so SA Water was part funding the monitoring program up until, I think,

towards the end of last year and then Nature Foundation picked that up for the remainder of the financial year.

MR O'FLAHERTY: We touched upon the organisations that do similar activities in terms of local watering that the Foundation does, and my characterisation of that is that it's certainly not Basin-wide in terms of the scope of those smaller entities undertaking that more local watering of smaller sites. Do I take it – well, would you be recommending that at least the model that the Foundation adopts in terms of its processes can be applicable Basin-wide?

MR HOPTON: We believe it can, on the proviso that it's actually developed with the local community so it's done in the way they think is best for them and also their setting. Just a small example is the lift required to get water from the river to the sites in South Australia, whereas in the Darling system it's a very flat floodplain. Water just rises up and spreads slowly across. It would be different-looking there program there, I would have thought, congruent with the way they manage their landscapes and agricultural enterprises there. So we wouldn't go and say we've got the answer to your community.

MR O'FLAHERTY: No, it's more a - - -

MR HOPTON: We've got a model that might work if you want to have a look at it. Happy to help. And that's what we have done and we love the idea of other people setting up and doing their own thing.

THE COMMISSIONER: Can I ask you about the letter with submissions that you sent on 23 February 2017 to the Chief Executive of the Basin Authority. You will find it in tab 3 of the folder before you. The second page just above the list of dot items there's a paragraph commencing:

Nature Foundation does not support –

Do you see that?

MR HOPTON: Yes.

THE COMMISSIONER: I should read that as opposition to what became the 70 gigalitre reduction in recovery?

MR HOPTON: That's correct.

THE COMMISSIONER: Thank you. And the fifth of the dot items refers to:

The implications of climate change not being taken into account.

MR HOPTON: That's correct.

THE COMMISSIONER: Are you able to describe how climate change should be taken into account for Sustainable Diversion Limits?

MR HOPTON: Yes. It relates to – and this is my understanding of the climate change science and it's not something I spend a huge amount of time on, but we're looking at different rainfall patterns, different intensities, more extreme weather events, so longer droughts and more intense rainfall events. But if it's longer droughts then the capacity for storages to hold water to keep the river channel functional are going to be less likely over time and that means that the take from the river, in our view, needs to be less than it was pre-Basin Plan and it – it affirms our view that we need to head towards a 3,200 or greater gigalitres return from consumptive use to the environmental flow. But it comes down to the modelling showing what Basin yields might be like and it does vary across the Basin given its huge scale.

MR O'FLAHERTY: And the only final question I had was, Mr Hopton, you referred, you used the phrase in your evidence earlier called "genuine consultation". In terms of your experience, could you explain what you mean by that term?

MR HOPTON: Yes, I can. Communities are hold a – are made up of people with a range of views and often bodies conducting a consultation will go out and say what are your views and people say here are my views. They take those on and then try and reconcile it inside the commissioning organisation and really act like Solomon in a way. The most powerful and effective experiences I've had is where you get the people with the divergent views in a room together or a process together and between them they resolve the issue, facilitated by the consulting authority but there has been significant success.

It does take time, particularly when there's some quite entrenched views but in the end often the people from the one community, they're all connected somehow in ways we will never know unless we're part of that community and they will come to a compromise position and I have seen examples where a community has resolved to cut its allocations by 50 per cent for no compensation. There's a great case study at Padthaway in South Australia and no appeals. So done well, it's a great result for that community because they all have the ownership of it and they're very invested in it and a really good result for the natural resources of the area and therefore it sustains that community. They don't have community divisions and also they can expect that the capital value of their properties will be sustained or improved and they have viable private production enterprises in that case.

MR O'FLAHERTY: Now, we certainly have – will have regard to all the materials and all the matters raised in your submissions before you. Was there any other aspects that you wanted to expand upon or clarify or direct the Commissioner's attention to this morning?

MR HOPTON: There's just one and it relates to South Australia, in essence, taking steps to look after its – the health of the river in its jurisdiction and it's just a

suggestion. We note that we have a Commonwealth Environmental Water Holder, there's a Victorian one and a New South Wales one but there doesn't appear to be one in South Australia. From our standpoint – and we're trying to be around in the very long term, we're trying to build a capital fund that will sustain us when we can't get donations or grants that will get us through multiple financial years. And it occurs to me that a healthy working river in South Australia is no different and that it may be in South Australia's interest to have a program of acquisition of permanent right strategically bought so that it could actually over, say, 10, 20, 30 years be a very significant holder of water.

Our suggestion though is that that is done outside of governments so that the holder of that water can be independent of the politics of the day.

THE COMMISSIONER: Legislate for a non-legislated environmental water holder. That's all right. I think I know what you mean.

MR HOPTON: Yes.

THE COMMISSIONER: You would need the force of law to protect the independence but you think the agency, entity or person should be outside government?

MR HOPTON: It's a suggestion.

THE COMMISSIONER: Yes.

MR HOPTON: For examination and it may not work.

THE COMMISSIONER: But I've understood your proposal .....

MR HOPTON: You have, yes.

THE COMMISSIONER: Ms Stalenberg, is there anything you wanted to add?

MS STALENBERG: No, thank you.

THE COMMISSIONER: Can I thank you both very much for the care and engagement you've brought to the matter. It really assists me. Thank you very much.

MR HOPTON: Thank you.

MS STALENBERG: Thank you for the opportunity.

THE COMMISSIONER: Not at all. We will adjourn until a quarter to 12.

MR O'FLAHERTY: Thank you.

<THE WITNESSES WITHDREW [11.28 am]

ADJOURNED [11.28 am]

RESUMED [11.47 am]

MR O'FLAHERTY: Commissioner, before you call Dr Jensen, Ms Beer, who you will recall gave evidence on 28 August last week - - -

THE COMMISSIONER: Yes.

MR O'FLAHERTY: - - - has got in contact with the Commission staff about an aspect of her evidence. You may recall that she was giving figures about the loss of production and the cost of restocking.

THE COMMISSIONER: Yes.

MR O'FLAHERTY: This is at transcript page 2392. I don't need to take to you it, Commissioner, but she used the figures per acre. She has come back and realised that she's so used to using acre, what she meant was per hectare.

THE COMMISSIONER: I remember acres, that's all right. It was hectare, though, was it?

MR O'FLAHERTY: It was. So the reference to 15 to 25,000 dollars to purchase was per hectare and the cost of restocking – re-sowing, rather, was 550 to 600 dollars per hectare.

THE COMMISSIONER: So it has been a very considerable saving. That's good.

MR O'FLAHERTY: Yes.

THE COMMISSIONER: All right. Thanks.

MR O'FLAHERTY: Our next witness is Dr Anne Jensen.

<ANNE ELIZABETH JENSEN, SWORN [11.48 am]

<EXAMINATION-IN-CHIEF BY MR O'FLAHERTY

THE COMMISSIONER: Please sit down, Dr Jensen.

MR O'FLAHERTY: Dr Jensen, it would be fair to describe yourself as a wetland ecologist, is that correct?

DR JENSEN: That's correct.

MR O'FLAHERTY: And you're currently a consultant in your own firm at the moment.

DR JENSEN: Yes, I'm a sole trader so I'm the firm.

THE COMMISSIONER: I know the feeling.

MR O'FLAHERTY: And – but you have a background in natural resource management yourself with the South Australian department; is that right?

DR JENSEN: I do. I've worked for the government in natural resource management, environmental impact assessment, and I was part of the interstate working group that set up the first Murray-Darling Basin Wetland Strategy. But then I left the government and worked with Wetland Care Australia with wetland repair projects on the ground by using Natural Heritage Trust funds. Then I returned to academia and did a PhD with the late, Associate Professor Keith Walker and with Associate Professor David Paton on essentially environmental watering requires for Red Gum and Black Box and Lignum on the Murray floodplains and I've been consulting since 2003 on natural resources management topics.

MR O'FLAHERTY: Yes. And so you, as part of that – part of your current work you – you consult for the Nature Foundation South Australia; is that right?

DR JENSEN: I'm engaged as a part-time wetland ecologist advising on the Water for Nature program.

MR O'FLAHERTY: You've provided the Commission with two submissions, and on the heading of each one there's a heading called 'The Healthy Rivers Ambassadors'. I wonder if you could explain what that is.

DR JENSEN: Yes. The Healthy Rivers Ambassadors is a voluntary group of concerned citizens. We're drawn from across the Murray-Darling Basin. We care about the future health of the Basin and from 2016 we got together to take actions that we believe would support delivery of the Murray-Darling Basin Plan effectively. So we – our very first topic as a group was concern about the lack of flows to the Lower Darling and we believe we caught the politicians' eye because we were people from all up and down the river concerned about a patch that wasn't necessarily our own. So it's a loose grouping but we have lobbied politicians, written letters to politicians, conducted community meetings and the group is continuing as the River Fellows who are doing similar work.

MR O'FLAHERTY: And when did that group form, sorry?

DR JENSEN: It formed in 2016.

MR O'FLAHERTY: Right.

DR JENSEN: It was facilitated by the Australian Conservation Foundation and the Conservation Council of South Australia looking to raise ordinary voices who were informed – first of all to inform us and then to get us to inform other people and to take whatever action we could at the local level.

MR O'FLAHERTY: Yes. You've – as I mentioned you've provided the Commission with two submissions. The first of which, you should have a nice white folder in front of you with some tabs. Behind tab 1 should be your submission dated 29 April 2018.

DR JENSEN: Yes.

MR O'FLAHERTY: I wanted to – now, there – your submission covers a lot of topics so I will be chopping and changing and covering some but not covering others because – not because I don't think they're important but some of the aspects speak for themselves, so to speak. One of the topics I wanted to ask you some questions about is on page 2, under the heading 'Access to Information', you refer to, as your – in your role as Healthy Rivers Ambassador and River Fellow, you've had access to "briefings and documents relating to all these issues", namely, the issues surrounding the Murray-Darling Basin. I wanted to take you to, first, to what I might call briefings. You can correct me what you would describe them. The first of which I understand was in 2016 by – in 16 December 2016 by Goyder Institute scientists. Now, if I could take you to – hopefully it should be behind tab 15.

DR JENSEN: Yes.

MR O'FLAHERTY: This document – do I take it that these are – being with the colourful letterhead of Healthy Rivers Ambassadors, this is your document?

DR JENSEN: I wrote this document for the benefit of the ambassadors, yes, particularly those who were unable to attend.

MR O'FLAHERTY: Do I take it this document replicates or represents your notes of that briefing?

DR JENSEN: It does and it was checked with the Goyder Institute subsequently for accuracy, as far as possible.

MR O'FLAHERTY: What was the purpose of this briefing?

DR JENSEN: The group was concerned about the process of implementation of the Murray-Darling Basin Plan and was seeking some information about the science behind it and the views of the scientists who had done assessments. The Goyder

Institute did many assessments and documents for the State Government assisting in the process of negotiation. So we wanted some facts and figures if we were going to go and lobby politicians.

MR O'FLAHERTY: Sure.

DR JENSEN: We had to be well informed. So that was the purpose.

MR O'FLAHERTY: And under the heading 'Tone of the Meeting', the way I interpret those dot points is that it was a useful meeting?

DR JENSEN: Exceptionally useful.

MR O'FLAHERTY: And there's parts of these notes which are highlighted in blue. Is the purpose for that emphasis of key points?

DR JENSEN: They were key points we thought were appropriate when we went into lobbying meetings.

MR O'FLAHERTY: Yes.

DR JENSEN: If I can just add - - -

MR O'FLAHERTY: Sure.

DR JENSEN: As a professional I have worked inside government and outside government and the process of the Plan when it was signed, I assumed everything was good, it's great. The intention of the Plan as outlined in the Act seemed to me to be the right thing. So I got on with other work. So I was coming back into understanding what was happening with the Plan and feeling very much in the dark and not understanding the processes. So these briefings were absolutely critical.

MR O'FLAHERTY: Over the page on page 2 of these notes under the heading 'Key Points', the first dot point talks about:

> *The ideal environmental requirement of 7,600 gigalitres as shown in the Plan. See diagram below.*

Now - - -

DR JENSEN: That's the diagram on page 7.

MR O'FLAHERTY: That's the diagram of page 7? Yes. Where is that diagram from?

DR JENSEN: That's from the Murray-Darling Basin documents. I believe it's from the Guide.

MR O'FLAHERTY: I was about to say is that from the Guide because that figure sounds more akin to the figures discussed in the Guide - - -

DR JENSEN: Yes.

MR O'FLAHERTY: - - - rather than later documents.

DR JENSEN: Yes.

MR O'FLAHERTY: Yes. There's a reference in that dot point talking about the source of that figure either Keith Walker or Wentworth Group. Who is Keith Walker?

DR JENSEN: The late Associate Professor Keith Walker was at the University of Adelaide, a wetland ecologist and one of my - - -

THE COMMISSIONER: He's a co-author of yours.

DR JENSEN: One of my supervisors, yes.

MR O'FLAHERTY: Right.

DR JENSEN: At that time I knew the number. I just didn't know where it came from and then later I found that diagram which was added to the notes.

MR O'FLAHERTY: Okay. Right. And that, I think you refer to the figures in the Guide in your submission or at least the figures – you refer to that scientific advice being 7,600 gigalitres. Now, that you've been able to look back on the Guide that's that range that the Guide has between 3,900 and 7,600 - - -

DR JENSEN: So the 7,600 is the upper number and I wanted to put it into this context because we were by then talking about 2,750 and I wanted to contrast what the scientists had said was the ideal for complete recovery of the system compared to the numbers we were actually debating.

MR O'FLAHERTY: And the discussion under the heading over the page on 'Goyder Findings on Guide', that's a reference, I think, to some Goyder reports which assessed the modelling.

THE COMMISSIONER: So which page was that?

MR O'FLAHERTY: Sorry, on page 3.

THE COMMISSIONER: Goyder Findings on Guide.

MR O'FLAHERTY: On Guide. That's the assessment that the – is that the assessment that the Goyder Institute conducted on the scenarios in the Guide that would model 3,000, 3,500 and 4,000?

DR JENSEN: Yes. They gave us a long list of different reports they had conducted and my understanding was they were done for the South Australian Government who were assessing the options in the middle of the negotiations.

MR O'FLAHERTY: And in terms of the reports that they gave you, did the – did they give you before that meeting, that December meeting?

DR JENSEN: No. We didn't of the reports. They just gave us the references so we could look them up online if we had time.

THE COMMISSIONER: So which reference is to what?

DR JENSEN: There's a long list of reports that the Goyder Institute - - -

THE COMMISSIONER: The 28 technical reports, the CSIRO, etcetera.

MR O'FLAHERTY: Well, Dr Jensen has identified, I think, what I intended to do just now is – could the witness be shown the Goyder Institute core report folder.

THE COMMISSIONER: Sure. No, I was just asking - - -

MR O'FLAHERTY: Yes.

THE COMMISSIONER: Back on page 2 of these notes under the heading 'Overview' there's a reference to 28 technical reports being referred to by Jim Cox.

MR O'FLAHERTY: Supporting the Plan, yes.

THE COMMISSIONER: Is that what you were just referring to then, Dr Jensen?

DR JENSEN: Yes. Yes, that would be what we were looking at. I have to add that I didn't have time to go and look up all the reports. I was made aware of the key findings from this briefing and I checked some of them, but I - - -

THE COMMISSIONER: You made the mistake of allowing for sleep every day.

DR JENSEN: I wanted to earn money.

THE COMMISSIONER: Sounds reasonable.

MR O'FLAHERTY: The volume that has been given to you, I think, has been produced in response to some correspondence you've had with the Commission staff about what Goyder reports were provided, or at least what Goyder reports were

referred to. They – and it might be easier to refer to them by the table of contents that should be behind tabs 3 through 7. Are those the reports that the Goyder Institute refer to as part of their analysis?

DR JENSEN: Yes. They form part of it. In fact, the key report that I found most informative was that of Matt Gibbs and his co-author.

MR O'FLAHERTY: Okay. So that's the – the South Australian Government department report; is that right? The - - -

DR JENSEN: It's Gibbs et al 2012, I believe it was for - - -

MR O'FLAHERTY: Yes, I think – do we have the South Australian - - -

DR JENSEN: For the MDBA.

MR O'FLAHERTY: - - - department folder? And I'm going to be loading you up with folders, and I apologise.

DR JENSEN: Yes. I'm not sure who was the commissioning body there. I thought it was for the MDBA.

MR O'FLAHERTY: I'm going to put in front of you, I hope behind tab 3 of the folder that has just been given to you - - -

DR JENSEN: Yes.

MR O'FLAHERTY: Is that the one?

DR JENSEN: That's the one. That's the one.

MR O'FLAHERTY: That's exhibit RCE10, that has been referred to earlier.

DR JENSEN: And I - - -

MR O'FLAHERTY: You've found to be – of all the reports you were - - -

DR JENSEN: Yes.

MR O'FLAHERTY: - - - given links to, you found that to be the most helpful.

DR JENSEN: Most helpful and in particular this one table which has got lots of green squares and yellow squares, that's part of that report.

MR O'FLAHERTY: Do you have a page number for that?

DR JENSEN: Page 13, table 2.

MR O'FLAHERTY: Yes.

DR JENSEN: And the summary that we were given is what stuck in my mind because, just for this table, what it's saying is that the volumes that were being considered did not meet the targets all the time for four of the icon sites.

MR O'FLAHERTY: Okay. So here we've got, in the column to the right of Flow Indicator, the target, that's the – what we might call the environmental watering requirement target; is that right? So in terms of the Barmah-Millewa Forest - - -

DR JENSEN: Forest.

MR O'FLAHERTY: - - - we've got 12,500 megalitres for 70 days.

DR JENSEN: Yes.

MR O'FLAHERTY: That needed to be achieved between 70 and 80 per cent of the time.

DR JENSEN: 70 and 80 and per cent of the time. Yes.

THE COMMISSIONER: So what does the label in that column, high to low uncertainty, convey to me?

DR JENSEN: There were – what do you call them – limits of uncertainty set around these targets in the analyses, and I don't have them right in my head at the moment, but - - -

THE COMMISSIONER: So how do I read the 70 to 80 per cent for that first entry in relation to the uncertainty range or the confidence level? What am I – what am I understanding?

DR JENSEN: The colours – the colours. So the green says it's low uncertainty. So high certainty.

THE COMMISSIONER: No, just the column that reads 70 to 80 per cent.

DR JENSEN: Yes.

THE COMMISSIONER: So what does that mean? It's - - -

DR JENSEN: That's the – that's the target. I'm not sure why they've put the certainties there. The certainties are registered through the colours.

THE COMMISSIONER: That's why I'm asking you.

DR JENSEN: Yes.

THE COMMISSIONER: Low uncertainty is a rather awkward way of describing a high degree of confidence, I take it.

DR JENSEN: Yes. It's back to front.

THE COMMISSIONER: I'm not using it technically.

DR JENSEN: No. But yes, for ..... uncertainty.

THE COMMISSIONER: High uncertainty is an expression I've learnt to absolutely hate in this inquiry.

DR JENSEN: Yes.

THE COMMISSIONER: And it really means that you don't think something is going to happen, doesn't it?

DR JENSEN: It does. It does.

THE COMMISSIONER: So that – how do I read that range? And, you know, we all have something like that in our heads when we think about the future. How do I – how do I understand that as relating to these percentage ranges or, worse still, a single percentage such as 30 per cent? How does – what am I meant to be understanding?

DR JENSEN: Without going into the technical detail, and I would have to read the report again to get – to answer all your questions, essentially dark green is good, light green is - - -

THE COMMISSIONER: No, I understand the colours. I - - -

DR JENSEN: Is not so good and yellow means we're not meeting the targets.

THE COMMISSIONER: Yes. Right. So at the moment at least you would encourage me not to ask any further questions.

DR JENSEN: Well - - -

THE COMMISSIONER: The words high to low uncertainty in the third column.

DR JENSEN: Yes. But - - -

THE COMMISSIONER: Now, without development - - -

DR JENSEN: But the frightening message here is - - -

THE COMMISSIONER: I know.

DR JENSEN: - - - that all of the flows they were considering, a very low percentage of them are meeting the targets in icon sites which are already triaged out of the basin as being the sites that we think we can improve.

THE COMMISSIONER: Now, without development is some reconstructed notion of pre-regulation, pre-development.

DR JENSEN: Yes. Pre-settlement, hopefully.

THE COMMISSIONER: Pre-European settlement. Yes. So – and we've got this, I have to say I'm surprised to see a figure as precise as 87 per cent, but anyhow, it says – that means that - - -

MR O'FLAHERTY: Maybe it's low uncertainty.

THE COMMISSIONER: What does the 87 per cent refer to there? Is that a level of - - -

DR JENSEN: I guess it's - - -

THE COMMISSIONER: - - - confidence that you will achieve 12,500 megalitres a day for 70 days?

DR JENSEN: Yes. That – and this is a computer model, so that's why you get figures like that coming out of it, but - - -

THE COMMISSIONER: Baseline is the position - - -

DR JENSEN: Without the Plan.

THE COMMISSIONER: Yes. That we had achieved with our not so flash stewardship of these resources until we decided we should improve. And so that means what though? What does that 50 per cent mean?

DR JENSEN: Under current conditions you would get that – those flows for 50 per cent of the time, which is below the target.

THE COMMISSIONER: It's – you see, that's what's puzzling me. Do you mean - - -

DR JENSEN: 50 per cent of years.

THE COMMISSIONER: So that means there's an equal chance every year of not meeting the 70 day flow indicator?

DR JENSEN: Yes.

THE COMMISSIONER: And so that without development, there was - - -

DR JENSEN: An 87 per cent chance.

THE COMMISSIONER: Only a 13 per cent chance that you wouldn't get it. So they're probabilities, in effect.

DR JENSEN: So an area that was – that would have been flooded nearly every year, that actual number - - -

THE COMMISSIONER: So they're probabilities.

DR JENSEN: That number is the point at which water starts flowing into the Barmah Forest.

THE COMMISSIONER: Right. Now, then we have the Basin Plan with constraints, without constraints, with constraints, without constraints respectively for 2,800 and 3,200 gigalitres recovery; is that right?

DR JENSEN: Yes – yes – yes.

THE COMMISSIONER: And so that first line tells me that there is no appreciable difference in the fairly high probability of each of those four scenarios achieving 12,500 megalitres a day for 70 days in the Barmah-Millewa forest. Have I read that correctly?

DR JENSEN: That's correct.

THE COMMISSIONER: No appreciable difference, because there's 83 and 82.

DR JENSEN: Yes. That's the point of the Barmah Choke. That's where the river channel halves in volume.

THE COMMISSIONER: Yes.

DR JENSEN: It's also the point just before the river spills into the forest. So you actually need the higher one, you need 16,000 at least, to actually start flooding the wetlands.

THE COMMISSIONER: Yes. Sorry, no, I take your point. I think I was aware of that. I'm not so much interested in what I might call the substantive hydrology, ecology of the matter. I'm just trying to make sure I understand how to read this - - -

DR JENSEN: Yes.

THE COMMISSIONER: How to read this Plan. Well, now - - -

DR JENSEN: So that – this – the reason for introducing this table is that it's the basis of what I've got in my – in a nutshell, on page 1 of the briefing.

THE COMMISSIONER: Yes. I understand. Yes. Well now, that in a nutshell has excited my interest. It's intended – the word "targets" is intended to describe those expressions of ecological condition or outcome which according to expert opinion, achieved in a kind of consensus approach, will serve to protect and restore the relevant environmental assets; is that correct?

DR JENSEN: It's an indicator measure.

THE COMMISSIONER: Yes.

DR JENSEN: And so part of the difficulty is how do you measure the progress of condition in the Basin? It's a big area and the scientists have gone in, have selected - - -

THE COMMISSIONER: There's a kind of a consensus approach that we see recorded.

DR JENSEN: Yes.

THE COMMISSIONER: There's to and fro, there's peer review, there's critics. I'm not suggesting there's any one correct answer, I don't think anyone can do that. But before the Guide was published the scientists had, with some modellers and statisticians helping them no doubt, they had produced what are called targets which have various measures and require various observations and it's thought – and you put them all together, a tick in the box will contribute to protecting and restoring. A cross in the box means it won't contribute to protecting and restoring. It may even mean things will get worse. Do I understand that correctly?

DR JENSEN: Yes.

THE COMMISSIONER: Now, what's the – I'm finding it hard to track in the record where 3,200 with relaxed constraints meets the targets that had been proposed by the scientific work before the Guide.

DR JENSEN: I can't tell you where it might be. Obviously the scientists who did this particular study, somewhere in their report will be a description of how they've described that.

THE COMMISSIONER: This is Goyder Institute opinion in a nutshell; is that right?

DR JENSEN: No, that's Jensen opinion in a nutshell based on a briefing and interpreting - - -

THE COMMISSIONER: Is it your opinion on the merit or is it your opinion about what they were telling you?

DR JENSEN: It's my summary of what they told us that I thought was relevant.

THE COMMISSIONER: Here you're summarising what Goyder told you at this useful briefing?

DR JENSEN: Yes, because we were trying to understand what are the targets, what's the relative benefits of the different volumes that are being considered and will they deliver what we expected out of the Plan.

MR O'FLAHERTY: And in terms of those 18 targets that are described, one of the questions I think, one of the latter pages of your notes was what is the one target not met at 3,200 gigalitres. If we go back to that, that table on page 13 of the Gibbs report, am I correct in thinking it's the Hattah Lakes target of 85,000 megalitres a day for 30 days because that's the only yellow?

DR JENSEN: Yes. It would be that one.

THE COMMISSIONER: I'm sorry, which one was that?

DR JENSEN: Sorry.

MR O'FLAHERTY: Sorry, that's on page 13 of the Gibbs report.

DR JENSEN: Yes.

MR O'FLAHERTY: Behind tab 3.

DR JENSEN: Yes. So in my notes I – I just asked the question, I would like to know what is the missing target? I then had email exchanges and eventually located Gibbs et al and looked at that, so I actually got the answer but didn't put it back in the notes.

MR O'FLAHERTY: It's not a criticism. For the life of me I was trawling yesterday the MDBA documents and there wasn't a helpful table like this colour-coded.

THE COMMISSIONER: You're going to have to explain it to me. Where do I find the one not met?

MR O'FLAHERTY: Commissioner, if you look at the rightmost column the yellow 15 per cent in the row of - - -

THE COMMISSIONER: This is the 3,200 with the constraints relaxed.

MR O'FLAHERTY: Yes.

DR JENSEN: So one of the targets at Hattah is not met.

MR O'FLAHERTY: Now, there's a number of - - -

THE COMMISSIONER: Just excuse me one second.

MR O'FLAHERTY: Sorry. Yes. That's where the figures we've seen about 17 out of 18 targets being met as opposed to 11 out of 18 I think it was without constraints removed under a 2,800 gigalitre.

THE COMMISSIONER: So for the one that is recorded as a failure in that scenario, the target was a 20 to 30 per cent chance, ranging from low to high uncertainty respectively, of achieving 85,000 megalitres a day for 30 days at Hattah Lakes; is that correct?

MR O'FLAHERTY: Yes.

THE COMMISSIONER: And we find that under each of the scenarios, there's not much difference in the achievement of that because they range 13 per cent to 15 per cent by which I mean that although there has been an improvement in the baseline – from the baseline - - -

MR O'FLAHERTY: Yes.

THE COMMISSIONER: - - - where there's only a 10 per cent chance apparently of achieving that, and the project of protecting and restoring, I suppose, has as an aspirational not impossible ideal of 33 per cent before development, you at best achieve a 15 per cent chance of that occurring, which is considerably less than the low uncertainty 20 per cent; is that right?

DR JENSEN: Yes.

THE COMMISSIONER: In the 20 to 30 per cent, I should read, should I, that achieving that 20 per cent of the time is the low uncertainty limit?

DR JENSEN: Yes.

THE COMMISSIONER: And achieving it 30 per cent of the time is satisfactory albeit - - -

DR JENSEN: For a high - - -

THE COMMISSIONER: Albeit with high uncertainty.

DR JENSEN: Yes.

MR O'FLAHERTY: I'm getting really confused by all the double negatives.

THE COMMISSIONER: I've read that correctly, as you see it?

DR JENSEN: Yes.

THE COMMISSIONER: Can you tell me, what is the point of modelling to produce a high uncertainty chance? If I were and administrator, if I were handing out money, large sums of money, why would I be interested in knowing what you think you can achieve but with high uncertainty?

DR JENSEN: I'm not sure why they've labelled it that way, whether it reflects other language that's used in risk assessment - - -

THE COMMISSIONER: There is an explanation elsewhere about what that phrase means. I won't bore you with it now because I tend to get exasperated but it means you're on the – you're at the point beyond which there's a high probability of it not being achieved.

DR JENSEN: Yes. So - - -

THE COMMISSIONER: It certainly means you're at a point where it's probably not going to happen. Well, I don't know about you, unless I'm at the horse races where I might want long odds in order to get big wins, I'm not quite sure why I would be investing money to achieve something I think won't happen. Have I missed something in terms of public administration here?

DR JENSEN: I think there's obviously some history about how it has been labelled. Ignoring the labels, I took at the table and say there's a really low probability that we're going to meet the targets because even at 3,200 gigalitres with relaxed constraints, only three of the targets are certain to be met.

THE COMMISSIONER: Say that again, sorry. At what?

DR JENSEN: In the final column, only three out of 18 targets are likely to be met because they're dark green. Dark green means they're likely to be met. Light green means there's some uncertainty that they will be met.

THE COMMISSIONER: No, it doesn't, it means there's high uncertainty.

DR JENSEN: High uncertainty they won't be met. And yellow means it absolutely won't be met. So that table to me was like a glaring stop light saying on these icon sites which are getting extra attention and extra water already, the frequency of flows under the different scenarios are not delivering.

THE COMMISSIONER: Well now, the fourth scenario which is 3,200 with relaxed constraints - - -

DR JENSEN: Yes.

THE COMMISSIONER: - - - presently has no prospect of being in existence, does it?

DR JENSEN: No.

THE COMMISSIONER: Because the constraints aren't relaxed and it's not 3,200.

DR JENSEN: Not the way the politics are going, no.

THE COMMISSIONER: I take your point and I don't dispute that.

DR JENSEN: Yes.

THE COMMISSIONER: But just using the word "politics" in the broader more benign sense of describing differences in the community and in the polity about how our money should be spent and how people and land are governed, at the moment I think I'm correct in saying it is certainly not 3,200. It's 1,000 gigalitres less, isn't it, I think?

DR JENSEN: On paper it's 2,107.

THE COMMISSIONER: Quite. And it's not RC, that is relaxed constraints because, at the moment at least, we seem to be at a standstill in relaxing the constraints. That is, among other things, landowner consents don't appear to be forthcoming, and they seem to be treated as a prerequisite. Am I right in all of that?

DR JENSEN: Yes. Yes, the .....

THE COMMISSIONER: So why would – why would anyone trying, as I am trying, to assess the prospects of the Basin Plan – why would we concentrate or even give much time at all to something that, whether modelled or not, is not going to happen? This is not a 3,200 plan and it is not a relaxed constraints plan, not at present.

DR JENSEN: Not at present.

THE COMMISSIONER: And there's no sign it's about to become one, is there?

DR JENSEN: No. But this modelling was done in 2012 or prior to that, where - - -

THE COMMISSIONER: I understand that. But makes it more open to criticism, not less.

DR JENSEN: But the assumption would have been, I guess, that the constraints could be relaxed at that point.

THE COMMISSIONER: Quite so.

DR JENSEN: But it hasn't eventuated.

THE COMMISSIONER: As time goes by and an assumption that something will happen remains only an assumption, because it hasn't happened, the models cogency becomes weaker. I don't say that as a question, that is a statement. That is incontestable. If you build something on an assumption that something will happen, the longer time passes without it happening, the less cogency your model has, I would have thought. Because there has been, hasn't there, ample opportunity for constraints to be relaxed.

DR JENSEN: I'm not aware of the details of the constraints projects, but I do – I'm aware that we need them in place.

THE COMMISSIONER: A lot of time – a lot of time has passed.

DR JENSEN: And my other concern in this whole context is that we're being told, "Wait till 2024 and then we will figure out whether we've done the right thing." So that's another seven years.

THE COMMISSIONER: That cannot be right if you're talking about waiting to see whether 3,200 relaxed constraints is going to happen if it is neither 3,200 nor relaxed constraints that is happening. That would be bordering on the intellectually dishonest to suggest that, "I'm waiting to see whether a scenario will be successful that I'm not attempting to use." And I don't think, to be fair, anybody has actually said, "We are presently experimenting with a 3,200 relaxed constraints scenario", because neither 3,200 nor relaxed constraints. I don't know what we are, but we don't seem to be on this table.

DR JENSEN: No.

THE COMMISSIONER: And so if we are not on this table and the figure, instead of 2,800, is about - - -

MR O'FLAHERTY: 2,100.

THE COMMISSIONER: - - - 2,100 say, and there are no relaxed - - -

DR JENSEN: Or less.

THE COMMISSIONER: - - - constraints – or less – then I don't have to be a modeller, and my maths don't have to be much beyond the middle of secondary school, for me to know that there's going to be more yellow.

DR JENSEN: No.

THE COMMISSIONER: It's all going to be yellow, isn't it?

DR JENSEN: If I may make another point.

THE COMMISSIONER: Is that right?

DR JENSEN: Yes, that is correct. At the point in time when I wrote these notes, I was attempting to learn what was happening in the Basin, and we were presented with this information.

THE COMMISSIONER: Yes. And it was alarming enough then, and we've since moved a long way further down the track. If we had the same briefing again, the numbers would be even more alarming. There are two ways in which one might see the Basin Plan as on a course to be, as is annoyingly said from time to time, delivered in full and on time. One is if the targets are revisited and, to put it crudely, they are weakened. That is, less demanding targets are proposed. And that could occur by what I will call improvement of the science. It's not – it doesn't seem to have happened at all, has it? No one has done that. Said, "Oh my goodness, we've had too ambitious a target, we should change the targets."

DR JENSEN: The question also remains what targets are we talking about?

THE COMMISSIONER: Quite. As to these target though, nobody has come along and said, "These were too ambitious, they are not ecologically justifiable." Nobody has said that, have they?

DR JENSEN: Not that I'm aware of, but I haven't followed closely all the reports.

MR O'FLAHERTY: Just on that, there's – there are some targets in this table which are grey because they are – and the key on the table says that they're not targeted for "active management". Now, I don't know what that means, but my interpretation of that is we're not striving to achieve those targets, even though we have told everyone we will.

THE COMMISSIONER: You will notice, by the way, that they are states of affairs where - - -

MR O'FLAHERTY: The targets are not met.

THE COMMISSIONER: Well - - -

MR O'FLAHERTY: Except for one.

THE COMMISSIONER: Depends what one means. But I'm assuming at the moment that we can just leave grey out of account, not because they're unimportant but because the history of people modelling for success doesn't seem to have been driven by the grey cells. Isn't that right?

MR O'FLAHERTY: Well, the thing is - - -

THE COMMISSIONER: I'm not saying they're unimportant.

MR O'FLAHERTY: - - - those indicators are explicitly mentioned in the ESLT report.

THE COMMISSIONER: Yes.

MR O'FLAHERTY: So that they are hydrological – or, sorry, environmental watering – sorry. Site-specific flow indicators, each of those grey targets are those site-specific flow indicators, but which are not part of the consideration when the success of a relaxed constraints scenario is trumpeted as achieving 17 out of 18. Well, in fact, there are 25 targets in this table, of which only – only 18 of which are met.

THE COMMISSIONER: Yes. But – yes.

DR JENSEN: And if I might make an observation. Of concern is the fact that it's the highest flows that are greyed out - - -

THE COMMISSIONER: Yes.

DR JENSEN: - - - in most cases.

THE COMMISSIONER: Yes.

MR O'FLAHERTY: Save with respect to one, which is the Chowilla, yes.

DR JENSEN: Which is saying, "We're not even trying - - -"

MR O'FLAHERTY: No.

DR JENSEN: "- - - to put water onto the outer floodplains."

THE COMMISSIONER: Or to take the largest of those at Riverland Chowilla, 125 megalitres a day for seven days, it's estimated that without development there was a 17 per cent chance of that. It's estimated that after development, so-called baseline, a four per cent chance of that.

MR O'FLAHERTY: And that has not changed.

THE COMMISSIONER: A target at 10 per cent low uncertainty, 13 per cent high uncertainty and, lo and behold, whichever of these four scenarios is modelled, there's no change from baseline.

DR JENSEN: No. And in other words, the outer part of the floodplain at Chowilla is not going to be watered in future.

MR O'FLAHERTY: And, Commissioner, you might recall the discussion in respect of the ESLT report with the different colour codes of those indicators. That was one of the brown ones which, essentially, needed a massive flood.

THE COMMISSIONER: Yes. Well, now, I'm going to put them to one side at the moment. I just want to come back to asking you about the greens and yellows, or greens and yellow. Another way in which the colour-coding may be redistributed is if the modelling changes. And I think you've made a reference, which I found very sympathetic, at the foot of your page 2, top of page 3 of your submission:

> *My experience has been that the key information is well-hidden and that the reassuring language used by the MDBA and staff disguises the real impact of the details within the implementation process. The message is the Plan is not perfect. It will come out all right in the end at the point at the point of reconciliation in 2024. If it's not all right, there's another process to make good any defaults.*

Now, modelling happens to be an aspect where I must say, personally, I find myself sympathising with what you have written there concerning the implementation process. But what I have not found in the evidence, apart from some well-known generalisations about more robust modelling, whatever that means, that is, I don't know whether "more robust" means anything than "better". If it does, I would like to know because sometimes it might mean cruder. Sometimes "more robust" means more justifiable. Sometimes it means more justifiable. They are opposite meanings. I would like to know. No one has explained it. But I've not seen any expert disclosure, that is, nothing has been published to say, "Good news. The degree of targets not met that you see in table 2 of this report now get to be re-jigged because we've remodelled." Have you seen anything like that?

DR JENSEN: I haven't seen anything like that, but there's a mountain of information, and it could be there.

THE COMMISSIONER: Well, it's the kind of thing which, if it were true, it's difficult to understand why anyone would want to hide it, that is, you would want to point it out and boast of it, wouldn't you?

DR JENSEN: One would – one - - -

THE COMMISSIONER: "Good news. We've done better work, and - - -"

DR JENSEN: One would assume, yes.

THE COMMISSIONER: Well, I'm trying not to be excessively cynical about human nature, but if you have been criticised for the fact that, as the MDBA was criticised for the fact that it was prepared to go with figures that didn't have fulfilment of all the targets, and you have performed either resetting of targets or remodelling or a combination of the two so as to show achievement of all the targets

in a way that you thought would survive another bout of professional scientific scrutiny, and it seems to me that you would disclose it, particularly if you're an organisation, the governing statute of which required best available science. Is there anything wrong in that reasoning of mine, that you – so far as you're concerned?

DR JENSEN: It seems very logical, Commissioner, but in – in support of – well, another piece of evidence in the same direction is the information I tabled on the Coorong data where there was a press release from the Murray-Darling Basin Authority saying that the Coorong had met 10 out of 12 of its targets. That was the headline. And the graph that they provided showed that it had met three out of 12 and partially met seven out of 12, but the words that were put out indicated that the Coorong was – was improving. And I – my immediate reaction was, "Well, that – not where I'm looking." So wondering how they have monitored, what – what parameters they've monitored. And so I tabled that piece of evidence as well.

MR O'FLAHERTY: Yes, and - - -

DR JENSEN: So it might – my – my – my concern is that the way the messages are being – are coming out, there's – there's media spin on them. So you have – you have to go back and read a whole document to get to the – the basis of it.

THE COMMISSIONER: Now - - -

MR O'FLAHERTY: And I will take you, Dr Jensen, to that .....

THE COMMISSIONER: However, in your folder, could I just ask you to go, please, to tab 8? It's your letter to Prime Minister Turnbull of 24 May 2017.

DR JENSEN: Yes.

THE COMMISSIONER: In its second last paragraph, there are two statements that together I don't quite understand. The first is:

> *The Basin plan will require the full 3,200 gigalitre water recovery for river health.*

And the second is:

> *There is already evidence that the 3,200 gigalitre cannot meet all the environmental targets in the plan.*

Now, it's the second of those that is what you've been drawing to my attention in relation to the four scenarios, the greens, the yellow, etcetera; correct?

DR JENSEN: Yes.

THE COMMISSIONER: But I don't understand how it's consistent with the first of those, namely, that it will require the full 3,200. I would have thought what you're telling me is it will require more than 3,200.

DR JENSEN: That was written in the context of where the political discussion stood that – and it was referring to the sustainable developments limits adjustment. We were looking at 605 gigalitres less. That's what that sentence refers to.

THE COMMISSIONER: So - - -

DR JENSEN: The argument that - - -

MR O'FLAHERTY: The SDL adjustment.

THE COMMISSIONER: You mean SDL, Sustainable Diversion Limits?

DR JENSEN: Sorry, yes.

THE COMMISSIONER: Yes. That's all right. Yes.

DR JENSEN: And it's critical to withstand arguments that environmental outcomes can somehow magically be achieved with less water, which was referring to the 605 gigalitres. So I'm urging him to stick with the – the maximum possible under the current negotiations that were going on - - -

THE COMMISSIONER: So you're not - - -

DR JENSEN: - - - on the plan.

THE COMMISSIONER: You're not telling me that you think 3,200 is enough.

DR JENSEN: Absolutely not.

THE COMMISSIONER: In fact, you think it's not enough.

DR JENSEN: Absolutely not.

THE COMMISSIONER: That's right. I just want to get it clear. I'm probably going to find you guilty of excessive politeness to the Prime Minister. That's all. Well now, I'm sorry to keep harping on it, but the 3,200 includes in the arithmetic that originally produced that figure, the so-called 450 gigalitre upwater, didn't it?

DR JENSEN: It did.

THE COMMISSIONER: And you have, both in your correspondence with ministers and in your – the other material including your submission to me, given some attention to what I will call the prospects of achieving that 450 gigalitres.

Taken as a whole, the material rather suggests to me that it will never happen because the prerequisite will never be accepted by the decision-makers as having been achieved, that is, no social or economic detriment. What do you think about that?

DR JENSEN: I think it's a disaster for the Murray-Darling Basin.

THE COMMISSIONER: What do you think about the likelihood of that tentative view of mine being correct, first of all, not justified, not a good thing politically.

DR JENSEN: No.

THE COMMISSIONER: I'm just saying, does that sound plausible to you?

DR JENSEN: Certainly the group that I'm working with now, the River Fellows, we are assuming that there are threats to the 450 gigalitres. We've already seen the 605 gigalitres approved in spite of our lobbying.

THE COMMISSIONER: Hasn't Victoria in effect said at the highest level that it won't happen?

DR JENSEN: The Minister has stated she's not going to support it.

THE COMMISSIONER: Well, the Minister is the highest level.

DR JENSEN: Yes. We're aware of that. What we are trying to do in our group is get more individuals – individual voters informed about what's behind all the decisions so they can let their members of Parliament know that they support as much water as possible to be returned. We end up quoting the current figures under debate while being very concerned that they're not enough and they're declining with every stage that we go through.

THE COMMISSIONER: To be fair, it's clear, isn't it, that there are some people, many people and from different sectors, who think that as much water as possible has already been recovered. That is, to recover more is to push irrigation and other development beyond an acceptable limit. You're aware of that, aren't you?

DR JENSEN: Absolutely aware of that. We have the special drought envoy, the former Water Minister calling for environmental water to be released to drought-affected farmers.

THE COMMISSIONER: I assume that means that a Bill will be introduced into the Commonwealth Parliament because that would require an amendment of the Water Act.

DR JENSEN: Yes, but it's an example of the pressures that are being placed. So already because of the drought effect being felt in the upper part of the Basin there's going to be pressure not to use environmental water.

THE COMMISSIONER: Well, going back to the 450 upwater, if it does not happen then the Plan will remain roughly 2,100 or a bit less plan; is that correct?

DR JENSEN: That's correct, and there's a set of targets associated with that water that would not be met.

THE COMMISSIONER: Now, if it was at that level, should I suppose that's with or without constraints relaxed?

DR JENSEN: That's a separate argument.

THE COMMISSIONER: Isn't it?

DR JENSEN: But we – we need all the water we can get with all the constraints we can get and we still won't meet all the targets in the Plan.

THE COMMISSIONER: So even if that has all the constraints relaxed, what I will call for convenience a 2,100 gigalitre Plan, namely, an amount to be recovered by reduction of the consumptive take, will not achieve probably any of the targets. I'm not asking you to do modelling in your head but if you – if you look at the figures it will be at most a minority of targets that would be achieved by such a Plan.

DR JENSEN: Just for those four sites, yes.

THE COMMISSIONER: Just for, sorry, you're quite right, just for those four sites.

DR JENSEN: Yes.

THE COMMISSIONER: But if it didn't achieve it for those four sites, you can hardly say that you're protecting and restoring - - -

DR JENSEN: And those are icon sites.

THE COMMISSIONER: - - - environmental assets. That's what I mean.

DR JENSEN: If - - -

THE COMMISSIONER: So they would be regarded as key environmental assets, wouldn't they?

DR JENSEN: They – they can be taken as an indicator of where we're going with the - - -

THE COMMISSIONER: My question is not an innocent one, but there were key - - -

MR O'FLAHERTY: A subset of the key.

DR JENSEN: A subset – subset.

THE COMMISSIONER: The word "key" is found in the statute. These would be key environmental assets, wouldn't they?

DR JENSEN: Absolutely.

THE COMMISSIONER: So if you treated them as a canary in the coal mine, if there's a failure of the Plan in relation to them, you don't really need to look much further, do you? The Plan would have failed.

DR JENSEN: No.

THE COMMISSIONER: Do you agree?

DR JENSEN: I agree absolutely. The other target that I find very compelling is the interim targets that state there should be no decline in condition from signing the plan to June of next year. And that includes water birds, for example, and that absolutely has not been met.

THE COMMISSIONER: Yes. I was going to ask you about that in relation to the "wait till 2024 and see" approach. I'm finding it hard to understand how that is consistent with the idea of halting degradation. Can you explain that to me?

DR JENSEN: Well, I don't think it fits at all, because the interim target and then the long-term target are about halting degradation up to 2000 – up to 2019, June 2019, and then improvement beyond that date.

THE COMMISSIONER: First protect and restore.

DR JENSEN: Yes. So that's in the general targets, and they cover several different elements that are supposed to be measured and reported on. If we wait till 2024 before we assess whether we've returned enough water my understanding is there will be no further water recovery since last June, because we already have 2,100 gigalitres on paper.

THE COMMISSIONER: Only recovered in some places.

MR O'FLAHERTY: So the - - -

THE COMMISSIONER: As it's said – as it is said.

DR JENSEN: So the – so no further buybacks, no further attempts to recover water other than via the SDL adjustments projects, the supply projects which - - -

THE COMMISSIONER: None of which have started.

DR JENSEN: None of which have started, and won't be completed until 2024, and therefore the evidence that they are returning environmental outcomes won't be available.

THE COMMISSIONER: Does that not mean that in 2024, making the heroic assumption that there won't be changes to the law, the real possibility exists of very large reductions in consumptive use being required in order to meet environmental targets?

DR JENSEN: Absolutely. And also at that – by that time we should also have seen some consideration given to climate change effect on reducing flows. I understand that's due in 2022.

THE COMMISSIONER: This sounds to me as if what is happening is deferring, almost in full, the assessment of environmental merit in the plan till 2024 or later.

DR JENSEN: Certainly deferring assessment of whether the supply projects can deliver outcomes.

THE COMMISSIONER: But we know – we know that they will not work until they have been implemented. I don't think - - -

DR JENSEN: Absolutely.

THE COMMISSIONER: - - - you need a scientist to tell you that.

DR JENSEN: No.

THE COMMISSIONER: And we know they won't all be implemented in the next six weeks. And we know that - - -

MR O'FLAHERTY: Some of these projects have been constructed though, in the sense that, for example, the Chowilla regulator is currently in operation. It's one of those SDL projects.

DR JENSEN: That's correct, but we don't have the assessment of whether it's delivering appropriate environmental outcomes.

MR O'FLAHERTY: Which belies the point I think that the Commissioner is making that, even when constructed and in operation, there would need to be assessment over a long period of time in order to assess what they are, in fact - - -

THE COMMISSIONER: It supports the point – that supports the point, it doesn't belie it.

MR O'FLAHERTY: Yes.

THE COMMISSIONER: Yes, right. Yes, thank you. Now, doesn't that mean that you've got supply measures, constraints relaxation and the fact that it's neither 2,800, nor 3,200 as being three ways of reaching the same conclusion, namely, today we can say the Plan must fail?

DR JENSEN: Unfortunately, yes.

THE COMMISSIONER: It's no doubt unfortunate, but I'm finding it extremely difficult – given the way you've explained matters in your material in particular, I'm finding it extremely difficult to understand why one would resist that as the conclusion today. I don't understand why you have to wait and see. It is called a plan, after all, meaning a set of stipulations to govern future conduct, and it necessarily means that if you're asking, as I'm required to answer, what are the prospects of the plan succeeding, you look at what you can forecast by acceptable methods, which include the science, the modelling, etcetera, the consensus approach, you look at what the target describes as successful outcome, I think you use the targeting approach from environmental watering requirements and the like, as I've indicated, and it all comes up with one answer only, doesn't it? You don't have to wait and see. You can see now that if you follow through the plan as it is now, it will fail, meaning that in 2024 you will be left asking, "What do we do now?"

DR JENSEN: From – from my - - -

THE COMMISSIONER: Is there anything wrong in that sequence of reasoning?

DR JENSEN: I would absolutely support that I see environmental decline continuing in – in terms of the targets in the plan.

THE COMMISSIONER: Well, that's a failure, isn't it, of the plan?

DR JENSEN: Potential failure, absolutely. Without - - -

THE COMMISSIONER: Well - - -

DR JENSEN: Without intervention, without change.

THE COMMISSIONER: There's no jack-in-the-box of the system. I mean, if you go by that Plan on what we can model now, it will – not may – it will fail. Isn't that right?

DR JENSEN: I believe so.

THE COMMISSIONER: Well, it's like having a business plan for a commercial enterprise where all your information and your best modelling shows that you will continue to make a loss for the next five years, what some people call a burn rate. If your target is to make a profit by the end of the fifth year, you know in advance that you will fail. Now, I'm not saying you can predict the future. I'm just saying because you are predicting the future, accepting that your tools are models, a business plan, a model that shows that you will make a loss in each of the next five years will tell you, without too much agonising, that you do not have a plan to achieve a profit by the end of the fifth year. At which point, depending on how rich you are and what the enterprise is, the bank either does or does not fund you. Why is it different for the Basin Plan?

DR JENSEN: I can't answer why it's different. All I can say is that from my point of view, we are not providing sufficient resilience to the ecosystems for them to survive a further dry period and continued extraction at current rates.

THE COMMISSIONER: In other words, there's a very large difference morally and politically between a burn rate that a private capitalist might be prepared to undertake with the support of a bank and the further degradation of the ecosystems that the Water Act is designed to protect and restore. One is an acceptable risk and the other seems to be illegal, doesn't it? There has to be a Basin Plan that has to set out to protect and restore, etcetera.

DR JENSEN: Yes. I – I think if – if we were going to make a comment about the Basin Plan, the issue is that the Plan has not set out the minimum requirement for environmental health. What it has attempted to do is to undertake the compromises with social and economic factors.

THE COMMISSIONER: What compromises would they be?

DR JENSEN: Compromises, the – the judgment that was made from – from the guide which stated that the ideal return was 7,600 gigalitres, then the discussion points were around three thousand three – 3,500 and 4,000 gigalitres as the starting point for discussions. So the – the highest number being discussed was 4,000 gigalitres. So about half of what the ideal was for recovery, for full recovery of the system, and we've gradually whittled that down now to 2,000. So the compromises that have occurred through the implementation of the Plan have - - -

THE COMMISSIONER: You mean the making of the Plan.

DR JENSEN: Yes, through the process that has been undertaken.

THE COMMISSIONER: Reaching its ESLT.

DR JENSEN: Yes. And so, as you have pointed out, the ecological sustainable level of take should be around a minimum of nearly 4,000 gigalitres, is currently

sitting at 2,100 gigalitres as a result of the processes, and as an ecologist I can say unequivocally that that's not ecologically sustainable.

THE COMMISSIONER: No. And it in particular won't lead to sustainable use of the water resources to protect and restore the ecosystems, natural habitats, and species that are reliant on the resources, and to conserve biodiversity.

DR JENSEN: No.

THE COMMISSIONER: That's a real mouthful, but that comes from the statute.

DR JENSEN: No. And you need to throw into that mix the impacts of the Millennium Drought that we're still seeing, so we're talking about a stressed system still trying to recover from that drought which would need even more than the minimum volume of water that was identified.

THE COMMISSIONER: Yes.

MR O'FLAHERTY: I wanted to – the other – the only other aspect I wanted to take to you in respect to that 2016 briefing was – and that's in your folder behind tab 15. This is on page 5 of your notes there, Dr Jensen. You make a point in your submission about the supply measures.

DR JENSEN: Yes.

MR O'FLAHERTY: And your – and to summarise, if I can, you make the point about – you make a distinction between environmental outcomes, achieving environmental outcomes as opposed to equivalent environmental outcomes.

THE COMMISSIONER: So – sorry, what page?

MR O'FLAHERTY: Sorry. Page 5 of the note behind tab 15, under the heading Chowilla Regulator.

THE COMMISSIONER: Now again, these are your notes of what Goyder told you or they're your notes of your thoughts?

DR JENSEN: A combination.

THE COMMISSIONER: That's all right.

DR JENSEN: It was a point raised in the Goyder briefing.

MR O'FLAHERTY: Yes. And so the blue highlighted dot point which says:

> *Regular don't equivalent – deliver equivalent environmental outcomes compared to natural floods.*

This is the same point you're making in your submission, isn't it? That – now, do I understand one of the – and it may be – there may be more, and you can correct me or expand upon it, is that where – if a environmental target is to deliver water at a particular site or to a particular point in a wetland, and infrastructure is constructed in order to direct water towards that point, there may not be equivalency in the sense of other aspects of that wetland not getting the natural overflows that would have otherwise reached that point under natural conditions? Is that one of the points that you're making?

DR JENSEN: The primary point is loss of connectivity in that a natural - - -

MR O'FLAHERTY: Yes.

DR JENSEN: - - - flood would flow over the banks across the floodplain to reach the wetland and - - -

MR O'FLAHERTY: Yes.

DR JENSEN: - - - the water would return from the wetland to the river post-flood. That - - -

MR O'FLAHERTY: That's that lateral connectivity that is - - -

DR JENSEN: That – that doesn't happen if it's a pipe to a – a wetland.

MR O'FLAHERTY: No, or even - - -

DR JENSEN: Or – or if the - - -

MR O'FLAHERTY: - - - a regulator which is a weir.

DR JENSEN: If a regulator has used – the – the biggest problem with regulators is it's blocking fish passage so the fish - - -

MR O'FLAHERTY: Yes.

DR JENSEN: - - - can't move naturally through the creeks into the wetland and back out again.

THE COMMISSIONER: Can I ask about your fifth dot point there. Those aren't native species being fish or plants?

DR JENSEN: The fifth dot point about - - -

THE COMMISSIONER: Native species of what? Fish, is it?

DR JENSEN: Primarily, fish.

THE COMMISSIONER: Okay.

DR JENSEN: But also macro-invertebrates.

THE COMMISSIONER: Thanks. Thanks.

DR JENSEN: The whole food chain relies on that connection from the river to the floodplain and back again.

THE COMMISSIONER: The fourth dot point favours carp. Would you mind explaining to me, bearing in mind I'm a layman – could you explain to me how that favours carp relative to what I will call natural flooding?

DR JENSEN: With the regulator, my understanding is that at the Chowilla regulator in particular they – they did a controlled flood, and they're able to put water onto the flood plain when there's not a high flow in the river.

THE COMMISSIONER: That's right.

DR JENSEN: So it's quite valuable.

THE COMMISSIONER: Yes.

DR JENSEN: But the timing is very important.

THE COMMISSIONER: Yes.

DR JENSEN: And apparently the – the timing was such that there were carp in the water, got into the wetland and spawned, and some very high numbers of carp bred up in that event.

THE COMMISSIONER: Does the wetland differentially favour carp over native species for spawning?

DR JENSEN: It's – it's more about the barriers to movement, and I'm not sure the details of how the carp got there preferentially in that particular case.

THE COMMISSIONER: I'm just wondering about this expression "favours carp over native species". That suggests that there's a differential.

DR JENSEN: There is. I don't know what the detail is, but I do know that there are data available from the floods.

THE COMMISSIONER: Yes. No, I'm aware of that. I just – I wondered how it happens that carp do - - -

DR JENSEN: Part of it - - -

THE COMMISSIONER: - - - better than others.

DR JENSEN: Part of it is timing.

THE COMMISSIONER: Yes.

DR JENSEN: The other thing would be the – for the adults to be able to get to the wetland and lay their eggs. So it's – it's about whether or not the native fish can actually migrate to that wetland or not.

THE COMMISSIONER: Yes, thanks.

DR JENSEN: But I can't tell you exactly - - -

THE COMMISSIONER: That's all right.

DR JENSEN: - - - what caused it.

MR O'FLAHERTY: And, Commissioner, you will recall that - - -

THE COMMISSIONER: And if you could, I probably couldn't understand.

MR O'FLAHERTY: And, Commissioner, you may recall Professor Mallen-Cooper - - -

THE COMMISSIONER: Yes.

MR O'FLAHERTY: - - - discussed that aspect as well.

THE COMMISSIONER: Yes.

DR JENSEN: Yes.

THE COMMISSIONER: I'm aware of the fact. It's just that I'm interested – but I'm no longer. I've been put off.

DR JENSEN: Yes.

MR O'FLAHERTY: I think there was reference to being plenty of reports about that - - -

THE COMMISSIONER: Yes.

MR O'FLAHERTY: - - - but which we may not have time to completely read.

THE COMMISSIONER: Yes .....

DR JENSEN: We do know that we have to be careful watering shallow grassy areas in October near the full moon.

THE COMMISSIONER: That's so?

DR JENSEN: That favours carp.

THE COMMISSIONER: I thought you were about to - - -

DR JENSEN: .....

THE COMMISSIONER: - - - break into biodynamic fish breeding.

DR JENSEN: No.

THE COMMISSIONER: But, yes. All right. That's all right.

DR JENSEN: No. That's one of the things that we are aware of - - -

THE COMMISSIONER: Yes.

DR JENSEN: - - - and why a number of wetlands have screens on them - - -

THE COMMISSIONER: Right.

DR JENSEN: - - - which are kind to keep adult carp out but allow smaller fish through, including smaller carp. But trying to prevent breeding of carp, impossible.

MR O'FLAHERTY: Yes.

THE COMMISSIONER: Splendid idea.

DR JENSEN: Returning environmental water is very tricky.

THE COMMISSIONER: Yes.

MR O'FLAHERTY: I was about to move on to another briefing.

THE COMMISSIONER: Righto.

MR O'FLAHERTY: That might be a convenient time.

THE COMMISSIONER: Could we adjourn till – now, do you want to make it 2 o'clock or 1.45? How much time do you need?

MR O'FLAHERTY: Look, I am flexible.

THE COMMISSIONER: I'm - - -

MR O'FLAHERTY: I've got quite a fair bit to go through, I think, so - - -

THE COMMISSIONER: I want to make sure that Dr Jensen has all the time she needs to give her evidence. That's all.

MR O'FLAHERTY: Yes. Yes. So I'm amenable to an earlier start if the witness and our transcribers are.

THE COMMISSIONER: Is that okay? You're very kind. Thank you. We will make it one – we will adjourn till quarter to 2, 1.45.

MR O'FLAHERTY: Thank you.

ADJOURNED **[12.57 pm]**

RESUMED **[1.47 pm]**

MR O'FLAHERTY: Thank you, Commissioner. Dr Jensen, I wanted to take you to another one of the specific briefings that has formed part of these materials, and you should have a document relating to one of those behind tab 20 of the folder in front of you. That should be a document entitled MDBA Briefing for SA Conservation Groups.

DR JENSEN: That's correct, yes.

MR O'FLAHERTY: That's dated 23 August 2017. Do I take it as with the other document these are your notes?

DR JENSEN: Yes, they're my personal notes and haven't been circulated.

MR O'FLAHERTY: Right. Okay. So unlike – I think you showed the people from the Goyder Institute the notes that we took to you previously.

DR JENSEN: Yes.

MR O'FLAHERTY: These are not the notes that you've done the same with MDBA.

DR JENSEN: No, and I haven't sent them to the Healthy Rivers Ambassadors either.

MR O'FLAHERTY: Right. Okay. So you were there. Who made up the South Australian conservation groups that attend this meeting?

DR JENSEN: I have to rely on memory. Rosa Hillam, Fiona Paton and Matt Turner from Nature Foundation was invited. It was open to anyone in a conservation group that was part of the briefing roadshow that went round the Basin. And I can't remember if other River Fellows were there.

MR O'FLAHERTY: Sure.

DR JENSEN: Ben Bruce opened it, welcomed people to the briefing. I believe you have the program as well, but I would have to go back to my notes to find who else was there.

MR O'FLAHERTY: That's fine. Sorry, I didn't intend it to be a memory test. What was the purpose of this meeting?

DR JENSEN: The purpose was for officials from the Murray-Darling Basin Authority to describe the process around the Sustainable Diversion Limits and the adjustment process.

MR O'FLAHERTY: Right.

DR JENSEN: And it was leading up to the period of public consultation in October of that same year. So it was providing background information.

MR O'FLAHERTY: So specifically in relation to the SDL adjustment mechanism, was it?

DR JENSEN: That's my understanding. I'm not sure if I've got the program now, I think that said what it was for.

MR O'FLAHERTY: Right.

DR JENSEN: Here we go. Just simply the 'SDL Adjustment Mechanism', was the title.

MR O'FLAHERTY: Right. Because it certainly – the majority of the – your notes appear to be on that but there's obviously other aspects that were discussed in relation to the Barwon-Darling, the Northern Basin Review and more broader topics and sorry, just, and also just to – there's a reference to CCSA, the Joinery in the subheading. Do I take it CCSA stands for the Conservation Council of South Australia?

DR JENSEN: That's correct, and the Joinery is their building and meeting space.

MR O'FLAHERTY: That's where it was held.

DR JENSEN: That's where it was held, yes.

MR O'FLAHERTY: Just going down these topics, the first topic being the Barwon-Darling, what's the reference in that first dot point, the 1,500 gigalitres for recovery, that the – sorry, what is that reference to?

DR JENSEN: I can't tell you exactly. That's just simply I made the note.

MR O'FLAHERTY: Yes.

DR JENSEN: Someone in the presentation must have said that, possibly Peta Durham. There was a confusion also about the starting time so I actually missed the beginning of this. They advertised it as 10 o'clock and they meant 10 o'clock eastern.

MR O'FLAHERTY: That's helpful if it's held in South Australia.

DR JENSEN: It wasn't helpful. So I actually missed Ben's comments and the start of Peta's presentation.

MR O'FLAHERTY: All right. So was it the MDBA officers that were there – sorry, and perhaps I should have asked this: you mentioned Ben Dyer and Peta Durham.

DR JENSEN: Durham.

MR O'FLAHERTY: Who's one of the modellers. Was there anybody else from the MDBA there?

DR JENSEN: Not that I recall.

MR O'FLAHERTY: And they were physically present.

DR JENSEN: They were physically present, yes. So they were doing this presentation multiple places around the Basin.

MR O'FLAHERTY: Yes. There's in the third dot point there is a reference to the toolkit measures. Was there much discussion – what was the – sorry, first of all, were you there for the discussion? Was that one of the matters you might not have been there for?

DR JENSEN: I think I caught the tail end of that discussion and I'm just recording what they were telling us. There was – there wasn't a discussion. It was a – they're telling us this is what's happening, these are the details for your information, basically.

MR O'FLAHERTY: Do I take it from that it was a bit more of a briefing rather than a consultative discussion?

DR JENSEN: Absolutely. It was intended as a briefing.

MR O'FLAHERTY: Yes.

DR JENSEN: So they were saying this is how the process works, here's where all the reports are.

MR O'FLAHERTY: Right.

DR JENSEN: Here are the key numbers.

MR O'FLAHERTY: Yes.

DR JENSEN: That type of thing.

MR O'FLAHERTY: Now, you described the tone of the Goyder Institute briefing or meeting held in December 2016, how would you describe the tone of this meeting?

DR JENSEN: It was – it was helpful. They answered questions readily, I thought, but it was very technical and complicated information. And I guess the lasting impression I have is looking back, now I realise what they were actually saying.

MR O'FLAHERTY: Right.

DR JENSEN: At the time, I thought they were telling us that we – this was still negotiable but, in fact, what they were telling us was they had already decided the 605 gigalitres of projects would be accepted. They were already recommending that. Because if you look at the later timelines, that must have been the case and then the consultation in October which was supposed to be about the process, in the end they were – they gave us a month to comment on the process in a very constricted way on – on an online controlled submission, and no one was going to change the process at that point. So the consultation was about something they were – would never change.

MR O'FLAHERTY: Yes. So there's some dot points in relation to the SDL under the heading 'SDLs Recovery Volume' which talks about the total package being 650 gigalitres, supply measures. There's reference to advice received by MDBA, second dot point, in June 2016. What's that a reference to?

DR JENSEN: I didn't understand it fully at the time.

MR O'FLAHERTY: Yes.

DR JENSEN: I know that Rosa questioned that and didn't really get a satisfactory answer, but in hindsight what they were saying was that if more than 600 gigalitres of the supply measures were approved there would be no more need for water recovery past – I've got June 2016 there, I suspect it should have been '17.

MR O'FLAHERTY: Okay.

DR JENSEN: Because that's what has come out now. No further recovery since June 2017 is what I'm seeing in other documents so I may have mis-recorded that. But at the time I remember we saw this slide and we didn't get it, we didn't understand what it was they were telling us, but with hindsight we believe they were telling us we already worked out that if more than 600 gigalitres is approved in the supply package then we don't need to recover any more water.

MR O'FLAHERTY: When it says:

Advice received by MDBA.

This was a briefing by the MDBA. So were they referring to their own advice or were they referring to advice by a third party, do you recall?

DR JENSEN: The implication was it was a third party. I didn't find out who at the time. As I say, I was still struggling with what was the 600 about, let alone where the advice came from.

MR O'FLAHERTY: Sure. Did you get it, and feel free to – sorry, did you get the impression that the aim of these projects was to ensure that no more water recovery was required?

DR JENSEN: No. I think that was – that was the ultimate outcome but - - -

MR O'FLAHERTY: A happy coincidence.

DR JENSEN: Well, not a happy coincidence, I believed that there was a – as part of the negotiations, as I now understand - - -

MR O'FLAHERTY: Sure.

DR JENSEN: - - - these negotiations took part before the Basin Plan was signed, when that was Minister Burke, and that they apparently were necessary to even get people to sign up to the Plan.

MR O'FLAHERTY: Yes.

DR JENSEN: And the aim of the supply measures was to reduce the amount of water that needed to be recovered through this notion that they put forward of environmental equivalence.

MR O'FLAHERTY: Yes.

DR JENSEN: And I have not been able to find where that was accepted. As a scientist, I can't understand anyone accepting it.

MR O'FLAHERTY: No.

THE COMMISSIONER: What is it that you find unacceptable?

DR JENSEN: The notion that you can produce the same environmental outcomes, that's what I understand by "equivalence".

MR O'FLAHERTY: Yes.

DR JENSEN: The same environmental outcomes by delivering water artificially compared to delivering water naturally. That's what I assumed the comparison was. I believe this – if you look closely at the definitions in the Plan perhaps there's different interpretations of "equivalence" and I know that the modelling that was done to sustain the argument was done in such a way that it was done at a river reach scale and it only compared two very limited flow volumes, and then found there was no significant difference between those two. So therefore they were equivalent.

And I don't agree with that application of the principles adopted in science about the notion of what's a significant difference and how you measure your environmental outcomes. And it seemed to me that the way that was done, as I understood from these briefings, that that is not the way the science would be conducted, for example, at a university. But I qualify that by saying I have not read all of the documents and I'm not a modeller and I don't understand all of it, but just trying to understand from the outside what is meant by "equivalence" and how it has been supposedly proved as part of this process, I don't believe it stands up to scientific scrutiny.

MR O'FLAHERTY: All right. The – and just on that, there's a – the middle of those dot points, there's reference to a test limit of change of five per cent. Was there much detail given as to that limit of change discussion?

DR JENSEN: No. It was just stated that that was a condition that had to be met.

MR O'FLAHERTY: Right.

DR JENSEN: And therefore what – the results that were being presented presumably meant that. I've heard it applied in terms of the – with the SDL adjustments, for example.

MR O'FLAHERTY: Yes.

DR JENSEN: With the 605 gigalitres being accepted, if you apply the five per cent limit of change to the 2,750 gigalitres then they will have to find 54 gigalitres more water to bring it to - - -

MR O'FLAHERTY: I see.

DR JENSEN: - - - to meet those criteria.

MR O'FLAHERTY: Is that a – sorry, just to clarify, and I don't mean this by any stretch of the imagination as a criticism, in a – in the method there's a limit of change prescribed in - - -

THE COMMISSIONER: 719.

MR O'FLAHERTY: - - - schedule 6.07 and in chapter 7 which is a 10 per cent - - -

THE COMMISSIONER: No.

MR O'FLAHERTY: - - - threshold.

THE COMMISSIONER: 719 is five per cent, isn't it?

MR O'FLAHERTY: And then there is - - -

DR JENSEN: There's plus or minus 10 per cent in - - -

MR O'FLAHERTY: - - - the - - -

DR JENSEN: - - - the – what they call the specific, the site specific flow indicators but there's - - -

MR O'FLAHERTY: An overall - - -

DR JENSEN: I believe the five per cent is applied to the overall volume.

MR O'FLAHERTY: Yes. Sorry. And – just – there's an overall limitation of a size of adjustment amounts which is the five per cent.

THE COMMISSIONER: Yes.

MR O'FLAHERTY: And then there is, in terms of how the environmental equivalency is determined, that's by reference of limits of change and that's where one – for each reach, as you're saying, they compared scores within reaches and then there is a variance to the threshold of 10 per cent, so that's where we get some difference in terminology. Yes.

DR JENSEN: And there's another example of how complicated this all is in trying to understand it.

MR O'FLAHERTY: Yes. I will heartily endorse that assessment. The - - -

THE COMMISSIONER: Was there a discussion at this meeting about the notion of equivalent environmental outcome?

DR JENSEN: There was reference to it, but it was really about giving us information and trying to get our heads around what was happening in these processes. Most of the discussion, I think, was around the 12 biological elements. And at that point I remember being very reassured and impressed that there was solid science behind what they were promoting, and that diagram summarised all the targets very neatly. The 12 biological elements.

MR O'FLAHERTY: Is that the diagram that's behind tab 21 of this folder? Is that the - - -

DR JENSEN: I will just check. Yes, that's the one.

MR O'FLAHERTY: I think - - -

DR JENSEN: And I subsequently used that multiple times.

MR O'FLAHERTY: Yes.

DR JENSEN: Because I think that's a very neat summary of what the plan is trying to achieve where you can see all the different groups of species that we're targeting and then the frequency of watering that they require, and I would see that – I assumed at the time that this was the template for setting targets and for measuring the outcomes.

MR O'FLAHERTY: Yes.

DR JENSEN: And we have, in fact, included that fact in the Water for Nature five year plan because we believe we're trying to hit the same targets.

MR O'FLAHERTY: Yes.

DR JENSEN: At a smaller scale. So most of the focus probably was more on that than some of the other detail.

MR O'FLAHERTY: Sure.

DR JENSEN: It was only, I think, an hour and a half briefing session.

MR O'FLAHERTY: I was going to ask you that. It was an hour and a half, was it?

DR JENSEN: Yes.

MR O'FLAHERTY: Now, there's reference to 37 nominated projects, and then there's – under the heading 'Presentation by Ben Dyer' there's dot point – first dot point refers to:

Supply projects include major floodplain works and operational rule changes.

Was there a breakdown of each of those 37 projects?

DR JENSEN: No. No, there was – it was very much a summary.

MR O'FLAHERTY: Right.

DR JENSEN: Just to say there were all these projects, and a few examples were given. I believe they talked about Hattah Lakes and Chowilla, because they're easy to talk about and they're also deceptively - - -

MR O'FLAHERTY: Because they're more built than others.

DR JENSEN: - - - able to demonstrate some form of equivalence. I've certainly heard politicians absolutely convinced by the Hattah Lakes example that all of the 37 projects must be good.

MR O'FLAHERTY: By reference to Hattah Lakes and Chowilla; right.

DR JENSEN: Yes. So I'm not sure by the operational rule changes, what they would be, so we're still awaiting the details of the 37 projects.

MR O'FLAHERTY: And I take it you weren't given anything that would resemble business cases or - - -

DR JENSEN: No.

MR O'FLAHERTY: - - - detail of these?

DR JENSEN: I don't think there was even the table that summarises them just by title.

THE COMMISSIONER: Can I ask Dr Jensen to be shown the Basin Plan, please. Would you mind turning to page 219 of that document? Now, this is part of schedule 6, which prescribes the default method for the calculation of supply contribution, which you may take it from me means the method that is to be applied. You will see that in – on the page 218 there's a specification of a particular benchmark model run. I don't need to ask you about that at the moment. You will see there's a stipulation then for the indicator sites and regions that are to be used in S6.03 and there you find references to the reaches. Can you see that on page 219, S6.03?

DR JENSEN: Yes.

THE COMMISSIONER: And then in S6.04 on that and the next page you will see that there are various stipulations as to how scores are to be generated. On page 220 in S6.05 you see a stipulation with some details of science-based, independently reviewed, fit-for-purpose preference curves, which are required to be applied for weighting environmental significance of the flood dependent area. Do you see that expression there?

DR JENSEN: So which clause is that?

THE COMMISSIONER: S6.05(2).

DR JENSEN: Yes.

THE COMMISSIONER: Is that – are those – is that language – are those concepts with which you're familiar as a scientist?

DR JENSEN: I'm familiar with them, but in this context and in the modelling context I would need a lot more time to absorb exactly how they're applied.

THE COMMISSIONER: Then in S6.06 there's a stipulation which I think you can take it is intended to be the method by which environmental equivalency is ascertained. So the achievement of the same overall environmental scores, and then they go on to stipulate how that's to be done. In S6.07 come the limited change that Mr O'Flaherty was asking you about earlier, and limits of change is an expression designed to indicate, I think, approximate equivalence. Is that how you read it? There can be a variance up to a limit and there will be treated environmental equivalent.

DR JENSEN: I don't believe it's equivalence. It's allowing variation.

THE COMMISSIONER: Well, I know, but - - -

DR JENSEN: But it's – I don't know - - -

THE COMMISSIONER: You just have to take it from me as a matter of law they seem to have – whether they're right or not, they seem to have proceeded on the basis that environmental equivalence is to be assessed by a stipulated method which happens to have within it these limits of change. It's a curious expression, 'limits of change', it means a permitted variance, but to reach the legal notion of equivalence.

DR JENSEN: Yes.

THE COMMISSIONER: So you see that's spelled out in S6.07B, for example. 10 per cent notion.

DR JENSEN: Yes.

THE COMMISSIONER: I wanted to draw to your attention the words in S6.07A 'no reduction in scores' and then the phrase I'm interested in is:

> *Although some reduction in individual elements may be permitted if they are offset by increases in other elements.*

Do you see that?

DR JENSEN: Yes.

THE COMMISSIONER: Now, I'm not quite sure what exactly an element is, but I assume that it's the kind of thing that you see referred to in S6.04 and S6.05.

DR JENSEN: Well, I would take the elements to be those in this table that are labelled as ecological elements or biological elements. So it can be the frequency of the flows or the target species, groups of species.

THE COMMISSIONER: Yes.

DR JENSEN: So you might get – an increase in fish potentially could be offset by a decline in water birds.

THE COMMISSIONER: How does that – I'm finding it very difficult.

DR JENSEN: That's – that's my interpretation.

THE COMMISSIONER: What does that mean?

DR JENSEN: I believe that - - -

THE COMMISSIONER: How do I offset fish with birds or vice versa?

DR JENSEN: This is a highly variable ecosystem; you don't get the same results every year, and one year might be better for the fish than the birds.

THE COMMISSIONER: What does it mean to say they're offset?

DR JENSEN: Offset. You might have a decrease in bird numbers and an increase in fish numbers for the same – for the same flow.

THE COMMISSIONER: Why are they an – why are they an offset?

MR O'FLAHERTY: From an ecological perspective.

THE COMMISSIONER: From any, just using the - - -

DR JENSEN: They're not.

THE COMMISSIONER: Just using the words as English.

DR JENSEN: You're talking to an ecologist trying to interpret legal terms. I suspect that someone was trying to account for the variability in the system and the facts that you don't get the same results for the same volume at the same location.

THE COMMISSIONER: This seems to require a judgment.

DR JENSEN: Yes, it does.

THE COMMISSIONER: May be permitted if they are offset by increases in other elements.

DR JENSEN: It does imply a judgment.

THE COMMISSIONER: It doesn't say that there is an offset whenever you observe disparate outcomes for disparate elements. There's apparently a judgment as to whether they are offset. Now, I presume that means made up for or compensated or - - -

DR JENSEN: Or if there was a visible reason why you might get a – a different outcome. Now, in modelling, I'm not sure how they account for that. But if for - - -

THE COMMISSIONER: Modellers can't determine the ecological matter.

DR JENSEN: No.

THE COMMISSIONER: No.

DR JENSEN: But I have to sympathise with the people trying to model the Basin given the huge variability in the ecosystems, and how do you predict that, and what may happen is that if there's a flood in another part of the country the water birds might have all gone there.

THE COMMISSIONER: The next page, 222 in S6.07D – I'm sorry, not in D – at the end of S6.07 there is a note. Now, leave aside the question whether it's legally accurate, it says:

> *These limits of change are for the purpose of modelling sustainable diversion limit adjustment and do not necessarily represent environmental watering or management targets.*

How do you understand that? What do you think that is saying?

DR JENSEN: Well, I understand in trying to compile their model and put in useful information, they've had to make some judgments about what – what is allowable in the variation, and results which perhaps doesn't reflect what you would see in the field, but they're trying to model a situation that gives you at least some predictions and I believe that modellers have to make those sorts of judgments all the way through their models. So that's a note just letting you know that this has been constructed for the purpose of this model and it may not apply in other situations.

THE COMMISSIONER: Just as a matter of ordinary English, why would it be an equivalent environmental outcome if you don't know whether you are equivalently achieving a target?

DR JENSEN: That's hard to answer. My argument about the equivalence in this instance, I can see that the way, now I've seen all this detail and I wasn't aware of all of this detail before, but as I said to you before, I believe that was a very narrow comparison that was done at river reach level. So if you run a certain volume down the river, and then you run 20 per cent less water down the river, it's quite likely that there won't be much difference at a reach scale because you're not talking about frequency of flooding over the banks, you're not talking about - - -

MR O'FLAHERTY: Looking at the detail of the - - -

DR JENSEN: The seasonality, the sorts of things that I would regard as environmental outcomes. I think that the basis of the modelling was narrowed down to the point where it meant something in modelling terms, but perhaps doesn't apply in the environmental word.

THE COMMISSIONER: Yes. I'm left with the impression that it has been devised knowing that it won't actually indicate environmental equivalency.

DR JENSEN: I think I would be more generous than that. I have a lot of sympathy for the scientists who have grappled with this for the five years leading up to the Plan, and just how do you compartmentalise something like the Australian ecosystem?

THE COMMISSIONER: It may not be that scientists had anything to do with this. Scientists weren't responsible for the notion of an SDL adjustment.

DR JENSEN: They – I'm assuming that they advised on the progression of the Plan and the detail that is went into the Plan, and certainly a lot of scientific work went into the Guide. So I know colleagues of mine have worked for years and years trying to somehow describe on paper what happens in the real world and struggled with that every step of the way.

THE COMMISSIONER: The Guide doesn't propose SDL adjustments so as to reduce necessary recovery, say, to 2,100 gigalitres.

DR JENSEN: No. And I have no idea where that idea first came in or what arguments were put forward to accept it.

THE COMMISSIONER: Yes. I think you can take it they're not scientific.

DR JENSEN: I don't believe they would have been.

THE COMMISSIONER: No.

DR JENSEN: But there may have been a call for scientific evidence then, if – once that agreement was reached at a political level that, yes, there will be adjustments and then scientists would have been involved in, "So how do we calculate that, how do we advise on management to achieve that?"

THE COMMISSIONER: Why would a scientist lend himself or herself to an exercise, ex post, to justify a non-scientific conclusion?

DR JENSEN: From what I've seen of the reports the work has been compartmentalised so that there have been scientific tasks that people have reported faithfully against and then the results - - -

THE COMMISSIONER: Yes. But they didn't produce anything like 2,100 gigalitres as necessary recovery. They produced much larger figures.

DR JENSEN: Initially, yes. And I don't think any scientists have been asked to review that volume at all since. I think all of the revisions have come out of the administrative processes and the political arguments that have been made.

THE COMMISSIONER: Yes. Thanks.

MR O'FLAHERTY: Just briefly going back to the – your notes of the briefing behind tab 20, the – just to cover upon the discussions about offsets that you had with the Commissioner, the third dot point under the heading 'Presentation by Ben Dyer,' where it talks about trade-offs, is that the same thing?

THE COMMISSIONER: Who's Ben Dyer?

DR JENSEN: He works in the Authority. He has been there for a very long time.

THE COMMISSIONER: Is he a scientist?

DR JENSEN: I believe he's an engineer. I will have to double check that.

THE COMMISSIONER: They're scientists. So - - -

DR JENSEN: My initial contact with Ben he came to me as an engineer and said, "Okay, we understand the environment needs water. So tell us how much the

environment needs." And he organised a very useful workshop to try and answer that question – to start answering that question.

THE COMMISSIONER: Sounds like an important prior question.

DR JENSEN: Yes. So I know he has a long history with the Authority and, I mean, I came away from this briefing reassured because I thought I was being told that there was a substantial scientific process in place.

THE COMMISSIONER: Being based, as you pointed out earlier, on the 12 biological elements that the CSIRO had suggested.

DR JENSEN: Yes. And just looking at that diagram, if we can achieve those sorts of frequencies of flooding for those different levels on the floodplain, I believe that we would have a working – a good working Plan.

THE COMMISSIONER: Yes.

MR O'FLAHERTY: When you say you came out of this briefing reassured, is that now – in August 2018, is that what you might describe in – as you've described in your submission as one of the experiences where you had reassuring language used by the MDBA?

DR JENSEN: Yes.

MR O'FLAHERTY: And disguising the real impact of the details within the implementation process?

DR JENSEN: Yes, because if they had already recommended approval of the SDL projects this was way past any influence that we might have had as a group, because we were – we thought we were gathering information to lobby for continued modification and change in the way the Basin Plan was being implemented.

MR O'FLAHERTY: But instead you were being told what had already been decided.

DR JENSEN: Yes.

THE COMMISSIONER: Can I just ask, over the page under the heading 'Sustainable Development and its Adjustment Process', the sixth dot point has – I suppose it's Mr Dyer, is it, relaying that the reliability must not reduce. See that?

DR JENSEN: Yes. Yes, that would be a summary of what he was saying, yes.

THE COMMISSIONER: And the next one is mitigate third party risks.

DR JENSEN: Yes.

THE COMMISSIONER: What did you understand, at the time, the reference to third party risks was?

DR JENSEN: I don't think I wrote anything more than that in my notebook and I'm assuming that it was about social and economic impacts.

THE COMMISSIONER: Of what? Of the supply projects?

DR JENSEN: Possibly, in that context.

THE COMMISSIONER: And reliability is of water rates?

DR JENSEN: It – it could also have been risks associated with operating regulators or things like that or – or could even - - -

MR O'FLAHERTY: Some of these are constraints measures as well as - - -

DR JENSEN: Yes.

MR O'FLAHERTY: - - - supply measures.

DR JENSEN: If it was operational rules, things like the Wentworth Caravan Park being able to block an environmental flow because they didn't want to be flooded.

THE COMMISSIONER: Now, I can't resist from asking you this now. I'm sorry, Mr O'Flaherty, but towards the ends of that passage - - -

MR O'FLAHERTY: I think I was going to ask the same question if - - -

THE COMMISSIONER: You will see this intriguing series of figures that starts with 13,632 gigalitres per year baseline diversion limit; right?

DR JENSEN: Yes.

THE COMMISSIONER: The next one is:

> *Revised sustainable diversion limit must be 10,873 plus or minus 544 gigalitres.*

What does – what do you understand that to be a reference to?

DR JENSEN: That's the 2,750 plus or minus five per cent limits of change. So the 13,632 minus 2,750 - - -

MR O'FLAHERTY: That's sometimes referred to as 543, I think.

DR JENSEN: I – I mean - - -

THE COMMISSIONER: Yes.

DR JENSEN: Those are the numbers I've scribbled down, whether I got them right, but the principle was that there was the benchmark recovery volume we were talking about plus or minus five per cent.

THE COMMISSIONER: Do you remember what it was told to you that you noted as that revised SDL must be? I'm emphasising the words "must be" that figure. Was there an explanation as to in what sense it had to be that?

DR JENSEN: The – the – around the argument of the 650 it could – the – the final outcome could not be – could not take more than 2,750 minus 544, which was the five per cent change.

THE COMMISSIONER: So - - -

DR JENSEN: But it could also increase - - -

THE COMMISSIONER: Yes.

DR JENSEN: - - - in theory.

THE COMMISSIONER: Well, I'm not so sure, but anyhow. Then it says:

2,083 gigalitres a year already recovered.

DR JENSEN: That's what they were reporting at that time, yes.

THE COMMISSIONER: Yes. So what about the next one:

650 gigalitres not acceptable.

What does that mean? Sorry, what did you understand that to mean?

DR JENSEN: I'm not sure. I can't tell you. It's either that they were saying that the full 650 gigalitres wouldn't be approved, that it would be a less – a lower number or whether I wrote myself a note saying it wasn't acceptable.

THE COMMISSIONER: What about:

450 gigalitres to bring it back.

What did you understand that to be meaning?

DR JENSEN: That – I suspect that's – I'm not sure whether that was a comment from a presenter or whether it came out of questions being asked, but it was saying

450 gigalitres was essential to bring the target back to closer to where we needed it to be.

THE COMMISSIONER: For what purpose?

DR JENSEN: Well, the 450 gigalitres is about maintaining flows right through the system to the end of the system, and it's about keeping the Mouth open, and it's about supplying the Coorong. So I'm not sure whether a presenter said that or I said it to myself.

THE COMMISSIONER: That's all right. Drop down to the foot of that page, under the heading 'Consultation' the third dot item - - -

DR JENSEN: Yes.

THE COMMISSIONER: - - - has a benchmark versus adjusted for modelling reports. See that?

DR JENSEN: Yes.

THE COMMISSIONER: What does "adjusted" refer to?

DR JENSEN: "Adjusted" would be the lower volume, I'm assuming. The benchmark was 2,750.

THE COMMISSIONER: Thanks. Thank you.

DR JENSEN: And the adjustment would have been minus the 650 or some variation of that.

THE COMMISSIONER: So you weren't told about any alteration to the modelling from the initial setting of the ESLT?

DR JENSEN: No, I didn't have any idea ..... the amount of detail that's in the Act just stunned me when I finally looked at it and realised how much it covered and how much detail was put in in 2012, which implies a lot of work prior to that.

THE COMMISSIONER: When you say "the Act", I take it you mean the Plan as well?

DR JENSEN: Yes, it's the Act and the Plan.

THE COMMISSIONER: Plan, yes.

DR JENSEN: And, well, when I looked it up, that was the first time I realised that the Plan is an Act.

THE COMMISSIONER: Well, not really, but don't worry about that.

DR JENSEN: Okay. But I had been outside government for that period working in projects on the ground, not in contact with people who were involved in the negotiations, so – and it's only through the last three years that I've actually come to understand how much negotiation went on prior to signing the Plan and then the detail that went into the Plan that all indicates that this has been going on since 2007/2008.

THE COMMISSIONER: Now, when you say 'negotiation', do you mean scientific debate and open-minded questioning, or do you mean - - -

DR JENSEN: No, I mean the – the negotiations at the political level of people - - -

MR O'FLAHERTY: Between governments.

DR JENSEN: - - - winning concessions before they're willing to sign the Plan.

THE COMMISSIONER: Is it possible to conduct the best available science on the basis of a political compromise?

DR JENSEN: No. No, it's not. So what I've seen is the best available science went in at the beginning of the process, but since then the Commission science has been targeted, controlled, directed in certain directions, compartmentalised. One of my concerns is even now, following my preliminary discussions with your officers, I've been looking for more information about the monitoring being conducted and I've found very large reports, which I only just turned over to you, where so many people have done a huge amount of work at the Basin scale in selected science. They – we're talking large numbers of people, very long periods of time and – and resources used, and at the end of the – for example, the monitoring report on vegetation in 2015/16, the conclusion is that the environmental watering is likely to have increased species' biomass and richness.

THE COMMISSIONER: By what, sorry?

DR JENSEN: Environmental watering is likely to have increased species' biomass and richness in the vegetation that was monitored.

THE COMMISSIONER: Which you think as a rather underwhelming outcome for all that work, do you?

DR JENSEN: Absolutely underwhelming, and it – it doesn't really provide any direction as to where to go next in terms of - - -

THE COMMISSIONER: Nor detail, yes.

DR JENSEN: Of what – what's the best way to use this water? I'm at the absolute other end of the scale with – with peanuts for monitoring, and I can produce much more definitive maps. And you were asking about my graph earlier, and that graph is showing that the condition of trees that we're not watering in the background, the – the condition is declining every time we have a dry year. So the – the target, the interim target of no further decline is not being met on the patches that I'm monitoring, and yet at the Basin scale the report says more than 60 per cent of the Red Gum and Black Box is either in good condition or moderate condition. So that, to me, does not reflect the detail that we need to be able to measure what's happening on the ground.

THE COMMISSIONER: Thank you.

MR O'FLAHERTY: Just last thing on this document, under the heading 'Northern Basin' in your notes, there's a third dot point:

Senate vote is very important.

Is that something that Mr Dyer said?

DR JENSEN: I suspect that that would have come out of the discussion with the conservation representatives there - - -

MR O'FLAHERTY: Right.

DR JENSEN: - - - because the – the purpose of the meeting for us - - -

MR O'FLAHERTY: Yes.

DR JENSEN: - - - was to gather information and then to lobby for appropriate action, and the facilitation that we received from the Australian Conservation Foundation and from the Conservation Council was to alert us to key decision points, at which point it would be valuable for us to spend our time lobbying particular politicians, and so the – the Senate votes around the disallowance, the two – the Northern Basin and then the SDL adjustment, both of those were targets for us, and I believe that those notes would have been about what we could say.

MR O'FLAHERTY: Yes, because – was it important in the sense that – well, I take it, and I don't want to put words in your mouth – but do I take it that from your point of view, a 70-gigalitre reduction would not be supported by groups such as The Healthy Rivers Ambassadors.

DR JENSEN: It absolutely was not supported by the – the group, and I put in a personal submission as well.

MR O'FLAHERTY: Yes.

DR JENSEN: And I'm aware of other ecologists who did because we believed, in fact, what was needed was an increase - - -

MR O'FLAHERTY: Indeed.

DR JENSEN: - - - in the recovery targets because the two – the two volumes that were considered, again a narrow comparison, neither of them delivered more than 22 out of 43 targets.

MR O'FLAHERTY: The last dot point under the heading 'Northern Basin' – states:

Purchase of Tandou reduce requirements downstream of Menindee Lakes.

Again, was that something that was raised by Mr Dyer, or was that by someone who – someone else in the – at the briefing?

DR JENSEN: I cannot say that that is anything that Ben spoke about, and I can't – looking at it again myself - - -

MR O'FLAHERTY: Yes.

DR JENSEN: - - - I wish I had put more detail because I'm not – not fully – I can't fully - - -

MR O'FLAHERTY: No, that's okay.

DR JENSEN: Recollect – recollect how he used that. So in terms of what Ben said essentially stops at the bottom of the first page there.

MR O'FLAHERTY: Right.

DR JENSEN: And after that, I haven't attributed the comments.

MR O'FLAHERTY: No. All right. Thank you. Commissioner, I am informed that Mr Dyer, in fact, has a PhD in hydrology and water resources science.

THE COMMISSIONER: He's Director of the Environmental Works and Measures.

MR O'FLAHERTY: Yes, you may have got the same note as I did.

The next bit I wanted just to clarify, whilst you have the Basin Plan ready and raring in front of you, Dr Jensen, if I could take you to, first of all, your submission under tab 1 of the folder to your left – yes. If I could take you to – now, I've scribbled over mine, I've scribbled over the page number – page 6. Now, there's a number of dot points where you have – I take it you've done a forensic analysis of the Basin Plan to some extent to try and find these targets and objectives. And I just wanted to make sure that we were on the same page, so to speak, as to where you found these.

Because there's no cross-references there and I don't mean that as a criticism. You shouldn't have to go looking for these things interspersed in a document like this. So if I can first take you to section 5.03 of the Basin Plan which should be page 24 of the Basin Plan document you've got.

DR JENSEN: If I can just set the context.

MR O'FLAHERTY: Yes.

DR JENSEN: I was asked to give a presentation on whether the Basin Plan was meeting its environmental targets so my first task was to say "what are the targets"?

MR O'FLAHERTY: Yes. Who were you asked to do that for?

DR JENSEN: It was through the River Fellows group. We did two presentations here in Adelaide, one to the Hydrological Society and the other based at the Conservation Council, again, with the aim of spreading information to interested people and trying to get them to understand the Plan.

MR O'FLAHERTY: All right. So the first dot point "four over-arching objectives", that I took to be a reference to section 5.03.

DR JENSEN: That's correct.

MR O'FLAHERTY: And then the two objectives for water quality and salinity is a reference to 5.04.

DR JENSEN: Yes.

MR O'FLAHERTY: And the seventh – sorry, the two major objectives for SDLs with seven subsets is 5.05.

DR JENSEN: Yes.

MR O'FLAHERTY: Then the seven intermediate targets and the seven long-term targets, I think I found those in schedule 7, which should be page 229 of the Basin Plan.

THE COMMISSIONER: It's a friendly document, isn't it?

MR O'FLAHERTY: Maybe it's to stop people from just reading the beginning and then skipping to the end to see how it went.

DR JENSEN: 223.

MR O'FLAHERTY: 229, sorry.

DR JENSEN: 223 in mine.

MR O'FLAHERTY: Is that the schedule 7, targets to - - -

DR JENSEN: Yes.

MR O'FLAHERTY: That's good enough. That's the intermediate targets under sub (1) and longer term sub (2). I think you make a point in the dot points below the discussion or the targets that in your assessment those intermediate targets which require no loss of or degradation in those relevant targets are already failing.

DR JENSEN: Yes.

THE COMMISSIONER: Can I just ask you about this. As I read these, the two classes, namely, intermediate and longer term reflect the language of the Act which has as its object to recover and restore the environmental assets.

MR O'FLAHERTY: Protect and restore.

THE COMMISSIONER: Protect I should say, thank you, protect and restore. And so the intermediate target which I understand to be serving the protected function is that there won't be loss of or degradation in, it won't get worse.

DR JENSEN: Yes.

THE COMMISSIONER: And then the idea is that it will get better, hence improvements. That's what restore is.

DR JENSEN: Yes. That's my reading of it, yes.

THE COMMISSIONER: And so it makes sense then, doesn't it, that items A to F of the first class is more or less reproduced in items A to F of the second class.

DR JENSEN: Yes.

THE COMMISSIONER: First make sure it doesn't go bad, get worse and then make it better.

DR JENSEN: Yes.

THE COMMISSIONER: Sort of a Hippocratic Oath for the Basin.

DR JENSEN: And the second class has one additional one.

THE COMMISSIONER: I'm about to come to that.

DR JENSEN: Yes.

THE COMMISSIONER: I didn't quite understand that, I'm so sorry. It may be that it's too many abstract words for me:

The community structure of water dependent ecosystems.

What does that mean?

DR JENSEN: To me that would mean that the ecosystem functions are restored for the floodplains, the wetlands and the rivers in all the different community groups in the 12 ecological elements.

THE COMMISSIONER: So the word 'community' is a term of art, is it, or the expression 'community structure'?

DR JENSEN: Community as in – vegetation communities have different groups within them, different types of habitats.

THE COMMISSIONER: The interdependence and mutual effects of different elements of the ecosystem.

DR JENSEN: And the complexity. So all the different elements are there that should be in a certain location. So, for example, in the vegetation you have the major trees, the larger shrubs, the smaller shrubs, the ground covers, that they're all present and surviving and getting sufficient water.

THE COMMISSIONER: Now, I may be wrong but it does seem, to divide these two classes, the first up to 30 June 2019 and the second from 1 July 2019, seems to stipulate that there will be, as it were, a turning point in the middle of next year.

DR JENSEN: I had assumed that that's because that's when the water allocation plans are meant to be completed.

THE COMMISSIONER: The Water Resource Plans.

DR JENSEN: The Water Resource Plans.

THE COMMISSIONER: That's right.

DR JENSEN: And that was the point at which Victoria was supposed to join the band. I had assumed that divide was political.

THE COMMISSIONER: So that if by 30 June 2019 one could observe loss of or degradation in one or more of A to F, the intermediate targets, then in terms of measuring progress towards the overall environmental objectives you would say that there was a relative failure?

DR JENSEN: A relative failure and a need for action.

THE COMMISSIONER: Sometimes that's a systemic response to failure, sometimes not. That is, the system might just give up, of course.

DR JENSEN: Well, I would hope that the system would respond by acting.

THE COMMISSIONER: Yes. I don't know what the prospect for that would be though. Now, as to the second one, targets from 1 July 2019, it's not quite so easy or straightforward, is it, to postulate when, as it were, it would be fair to ask how we're going. You don't ask on 1 July, I take it? That's when that - - -

DR JENSEN: No, you would be asking are there proposed actions in place.

THE COMMISSIONER: Yes, you would look to things like environmental watering plans.

DR JENSEN: Yes.

THE COMMISSIONER: To see whether they are, according to expert assessment, calculated to achieve these targets. And I'm guessing at the moment that 2024 might be – might have some significance in terms of the point of asking how is progress going. In other words, you wouldn't say 2054, even though we are interested very much in what will be the case in 2054 but in terms of measuring progress which is what this is all about, perhaps it means that if by 2024 you can't see improvements in these things then it will again have been a relative failure.

DR JENSEN: If I can refer to what Mr Hopton was talking about, this is the reason why we would prefer to have at least five year rolling plans for watering - - -

THE COMMISSIONER: I understand.

DR JENSEN: - - - because it takes that sort of period of time to see results.

THE COMMISSIONER: No, I do understand. It would seem to me as well that unless you were observing, collating, publishing, that is making it available to the community, including the scholarly and scientific community, more or less continuously, more or less in real time, in fact, then you would be missing the scientifically-based opportunities to improve what you were doing. What - - -

DR JENSEN: Yes.

THE COMMISSIONER: - - - in the slightly different context is called adaptive management.

DR JENSEN: Yes. Yes.

THE COMMISSIONER: So you agree with that.

THE COMMISSIONER: Absolutely. And I did say in my submission that we sorely missed the Sustainable Rivers Audit - - -

THE COMMISSIONER: No, I see your point.

DR JENSEN: Which was giving us a score card in the 23 Basin valleys every three years.

THE COMMISSIONER: Now, have you heard any explanation as to why there isn't an unrestricted collection, dissemination, collation, publication of data to assess how it's all going?

DR JENSEN: The Sustainable Rivers Audit was on track to deliver that. I've only heard what you might call gossip but it was attributed to the withdrawal of funding by New South Wales, that the argument was put in New South Wales they can better spend their money on their own scientists doing work in New South Wales than contributing to the Murray-Darling Basin pot. And when that funding was withdrawn, then the Sustainable Rivers Audit was one of the first casualties and it went out just when we were monitoring the recovery from the floods in 2010 to '12. So a valuable learning opportunity missed.

THE COMMISSIONER: Thanks.

MR O'FLAHERTY: Are you aware of any published work done by New South Wales Government scientists that could possibly be said to have been that equivalent work that they've described?

DR JENSEN: I'm not aware of it but I don't have time to trawl for all of those reports.

MR O'FLAHERTY: That's fair enough. Last in those – well, second to last in those targets in your submission are seven targets for 450 gigalitres. And they should be found in schedule 5 of the Basin Plan and on my version at least that's page 216 but it may well be different in yours.

DR JENSEN: Yes. 14/15, yes.

MR O'FLAHERTY: Yes, and so those are the seven targets that you refer to there.

DR JENSEN: Yes, so, and my concern is that if the 450 gigalitres is not delivered then how do we achieve those particular targets?

THE COMMISSIONER: Could I ask you to look at the note that you find at the foot of that list? Do you see that?

DR JENSEN: Yes.

THE COMMISSIONER: It says:

> *The outcomes in this schedule reflect the results of the 3,200 gigalitres per year modelling with the relaxed constraints scenario.*

That's the one that we were talking about before the luncheon adjournment.

DR JENSEN: Yes.

THE COMMISSIONER: Why shouldn't I read that as indicating that if you reduce from 3,200 and if you don't relax constraints and if your SDL supply measure adjustment do not succeed as to 100 per cent of their ambition, it is certain – not doubtful – but certain as a prediction that these environmental outcomes will not be achieved?

DR JENSEN: I would agree with that, sadly.

THE COMMISSIONER: Or even scandalously. Thanks.

MR O'FLAHERTY: The 16 flow and biodiversity outcomes, I could not find in the Basin Plan itself but I understand that you've drawn those from the website of the Commonwealth Environmental Water Holder; is that right?

DR JENSEN: Either from there or from the Authority's website.

MR O'FLAHERTY: Right.

DR JENSEN: I'm trying to remember. The Authority's website, I went back and double-checked and I sent that to you last week.

MR O'FLAHERTY: Yes, I think - - -

DR JENSEN: So it's in particular there's a table that has the river flows and connectivity, vegetation, water birds and fish in four columns.

MR O'FLAHERTY: That might – just so that we're all on the same document, behind tab 10, I think, Commissioner. That should be some correspondence with yourself and Mr Kwong of the Commission and then there's a - - -

THE COMMISSIONER: Which one am I looking at?

MR O'FLAHERTY: The table.

DR JENSEN: Page 2.

MR O'FLAHERTY: Four pages in, labelled page 2 with the heading 'River Flows and Connectivity, Vegetation, Water Birds and Fish'. Is that the table you're referring to?

THE COMMISSIONER: I've got it.

DR JENSEN: You've got that.

THE COMMISSIONER: Yes.

DR JENSEN: Unfortunately I can't find precisely where I found the 16 targets that are derived from that because there's more than 16 listed there.

MR O'FLAHERTY: Yes, I started counting.

DR JENSEN: Yes. So I believe that is on the Commonwealth Environmental Water Holder website somewhere.

THE COMMISSIONER: Can I just – I want to get my terms right here – you see the opening lines of that table refer to:

Additional water available through environmental watering.

Do you see that?

DR JENSEN: Yes.

THE COMMISSIONER: Should I just understand 'additional water' as meaning the so-called recovery that comes about by cutting back consumption to a sustainable diversion limit? Is that what we mean by 'additional'?

DR JENSEN: I – I – I had assumed they meant the 2,107 that's currently on the books, but whatever water is recovered - - -

THE COMMISSIONER: It's not the 450.

DR JENSEN: I don't believe so, but I'm not sure. That has come straight off the Authority's website.

THE COMMISSIONER: Right. I'm not sure that that means it's more or less easy to understand.

MR O'FLAHERTY: Now, you – as I said before, you have pointed out that the intermediate targets that we took you to are already failing. Is that on the basis of your own work, or is that on the basis of your work and others?

DR JENSEN: It's on the basis of both mine and others.

MR O'FLAHERTY: Yes.

DR JENSEN: And – and – and again, going back to the presentation, I was making we ..... targets. First, what are the targets? And then what is the evidence? Without looking at monitoring that had been commissioned by the Authority, just looking for other evidence in the Basin, Richard Kingsford's waterbird surveys are - - -

MR O'FLAHERTY: Yes.

DR JENSEN: - - - are legendary, and I include them in my presentations all the time, and – and what he's reporting is very disturbing, and he only goes – he only visits once a year and he doesn't get any wetland but it's – it's a consistent methodology. Similarly, with David Paton's work, he only does a survey once a year and – and in both cases they can miss birds because birds move around, but it's the same time of the year in the same place, the same methodology, and the trend is down.

MR O'FLAHERTY: Yes.

DR JENSEN: So if we're going to talk about targets for improving the health of the Coorong Lower Lakes Ramsar site, it seems to me that that's – that's a key indicator that is going downwards, and yet the – the Authority puts out a press release saying that the Coorong and Lower Lakes are meeting 10 out of 12 targets.

THE COMMISSIONER: Has there been, to your knowledge, published protest at that discrepancy?

DR JENSEN: I haven't seen it, no. And what concerns me is that a lot of the scientists who are involved in these fields are very dependent on funding from government sources and, in fact, over the past two decades we've seen a real push for less government funding going into research and therefore, all of these institutions have to find their funding and they – and they – their staff are working project-to-project. So - - -

THE COMMISSIONER: How is most of that funding? Is it ARC?

DR JENSEN: It's a whole mix. It can be government programs, it can be state government, it can be ARC, and it's highly competitive. When I was at the university, the success rate for ARC grants I think was 16 per cent, and it takes three months to write an application. It's – and similarly for Nature Foundation, so much energy spent writing grant applications for relatively low success rates. My concern is that we're simply not investing enough money nationally. When you spoke about the national budget before, we do not invest in the health of our own country. In the – in the natural resources that support our economy and our communities, we do not invest. It's done through grants. The – the rules change all the time. The people who are seeking grants have to jump through so many hoops. I characterise it that the environment has been made to jump through all these bureaucratic hoops to get a

bit of water back, but the people who took the water away didn't have to jump through any hoops.

THE COMMISSIONER: Going back to your question about grants and the funding of the science, in your experience, does the relative short-term plus the uncertainty of funding affect the recruitment on a career basis of young scientists?

DR JENSEN: It certainly affects the recruitment of project officers in the field, in natural resources management. We see that constantly. Young graduates come out and they either burn out or they have to leave because of the uncertainty to find another job. Projects stop and start, so the community becomes disaffected. For young scientists, they need to go where the opportunities are, so they – there's a tendency for them to chop and change between universities quite a lot. So I'm not sure, but I suspect we're heading towards a situation where we won't have the long-term data records such as those we get from someone like David Paton and Keith Walker when he was alive, and those sorts of scientists then attract a core group around them, I have a really good example. Bronwyn Gillanders working in marine science, and she is – is attracting young scientists and building a corporate which will go ahead. Hugh Possingham is the same with his work. But I think less and less will have the – sort of the – the central pillars of the scientific research staying in one place and building that experience, and they will – they're going to tend to move.

THE COMMISSIONER: Do you think that should be mainly or at all in-house with the MDBA? That's - - -

DR JENSEN: The science?

THE COMMISSIONER: The science.

DR JENSEN: In an ideal world, I would say yes.

THE COMMISSIONER: In-house, or not at all?

DR JENSEN: In house would be – would be good if the Murray-Darling Basin Authority was independent.

THE COMMISSIONER: Yes, and if it was in - - -

DR JENSEN: If they're not independent, then – then the science should be outside in another independent organisation.

THE COMMISSIONER: Yes, well, of course. But if they're not independent, the difficulty then is the commissioning of the science.

DR JENSEN: Yes. Yes.

THE COMMISSIONER: So you've corrected me, with respect. You first need to posit administration with the integrity that comes from independence. You second have to posit obedience to the statutory requirement to use boast available science, yes. And then one sets about devising, presumably by reference to the kind of science in question or the exigencies of the time, as to how you mix and match in-house permanent staff, consultants, commissioned academics, independent scientists, etcetera.

DR JENSEN: And - - -

THE COMMISSIONER: But something in the nature of peer review or second look, that should routinely be part of the best available science, should it?

DR JENSEN: I believe it has been. It comes back to the question of what is being reviewed, whether it's a limited scope.

THE COMMISSIONER: Yes.

DR JENSEN: The questions – looking from the outside, my big question is if you have targets in the plan, where are the scorecards showing progress against those targets? And I – I haven't seen them.

THE COMMISSIONER: No, neither have I.

DR JENSEN: I know that there's a really good system that Stuart Bunn has been part of around the Moreton Bay catchments. There's a healthy rivers scorecard or – I think that's the right term, where that information is going back to local governments and the communities and – and – and people are engaged. So - - -

THE COMMISSIONER: Is there any reason why it just shouldn't be publicly available always?

DR JENSEN: Not that I'm aware of.

THE COMMISSIONER: Right. I mean, I'm just thinking of all the massive, utterly useless information that is always available publicly. I'm just wondering why something useful like this just wouldn't be, because it doesn't cost much money to make it publicly available, does it?

DR JENSEN: It's – it's commitment and it's the choice of how the money is spent.

THE COMMISSIONER: But it doesn't cost much to - - -

DR JENSEN: Yes.

THE COMMISSIONER: If you've gathered the information - - -

MR O'FLAHERTY: Uploading it on a website.

THE COMMISSIONER: - - - and it's in tangible form, it doesn't cost much to make it available, does it?

DR JENSEN: No. What - - -

THE COMMISSIONER: You don't have to mail out to every member of the - - -

DR JENSEN: No.

THE COMMISSIONER: - - - Australian community. You just put it on the web.

DR JENSEN: What I've found in terms of transparency of information, going back as a mature student to the university, the first day I was there I went to talk to someone and ask them a question and they said, "Look on the website."

THE COMMISSIONER: Yes.

DR JENSEN: I'm going, "I'm talking to you. Why can't you answer the question?"

THE COMMISSIONER: Yes.

DR JENSEN: And there – I've been very aware that, particularly from Canberra departments, they believe they've communicated if they've put a report on a website.

THE COMMISSIONER: But it is a way of publishing, isn't it?

DR JENSEN: It's a way of publishing, but the onus is then on the individual to go and find that - - -

THE COMMISSIONER: That's so. I take the point.

DR JENSEN: - - - download it, possibly print it - - -

THE COMMISSIONER: I take the point.

DR JENSEN: - - - read it, and then – in isolation. So communication is – is highly intensive, highly expensive. And the Authority, when the draft Plan came out, I understand they refused to take professional advice on how to communicate, said, "No, no, we can do it", and we ended up with burnt Plans and – and – and the legacy of resistance to the Plan that is fundamental because it's additional skill. Social science is an additional skill helping people to change. They need assistance, they need support. And you will be aware of the economic work that has been done that said that we would be better off buying the water back with half the money and spending the other half on social support.

THE COMMISSIONER: Yes.

DR JENSEN: And we would get a better outcome. But there has never been any commitment to the social support side of the package.

THE COMMISSIONER: No.

DR JENSEN: Which has nothing to do with being an environmentalist but it's about how you take the environmental information - - -

THE COMMISSIONER: It probably actually is quite a deal to do with being an environmental, that is - - -

DR JENSEN: You would need to bring the humans into the equation.

THE COMMISSIONER: We are part of the pool. You've written about that in your submission to me.

DR JENSEN: Yes.

THE COMMISSIONER: Yes. Thank you.

MR O'FLAHERTY: You mentioned the assessment of the Coorong, Lower Lakes, the Murray Mouth in a press release. I think you described it as – and a graph that was part of that. Could the witness be shown the report entitled Icon Site Condition: The Living Murray? Dr Jensen, if I can take you to page 10 of that document. This isn't the media release or the news article to which you refer but I think this is the source document from which that graph was taken. So on page 10, that's the reference I think you made earlier in evidence to, I think, three targets met and seven targets partially met - - -

DR JENSEN: Yes.

MR O'FLAHERTY: - - - in 2016, 2017.

DR JENSEN: Yes.

MR O'FLAHERTY: And I think – I don't think – well, correct me if I'm mischaracterising your evidence, is that that doesn't accord with your observations and those observations of your colleagues.

DR JENSEN: That's correct.

MR O'FLAHERTY: That amount of targets had been met.

DR JENSEN: When I looked at that my first question is "what are the targets"?

MR O'FLAHERTY: Yes, and to perhaps partially answer that, if I take you to the appendix in this document, particularly if I take you to page 17 by way of example. This is an appendix entitled Performance Across Icon Sites from '06/07 to '16/17 by ecological theme. This particular table which starts on 16 and goes over the page to page 17, the ecological theme here is vegetation objectives. Do you see that on the top of that? Sorry, on page 16 there should be a heading of that table, 'Vegetation Objectives'.

DR JENSEN: Got that.

MR O'FLAHERTY: And if you go over the page to 17 there is LLCMM which I'm going to suggest is the Lower Lakes, Coorong and Murray Mouth.

DR JENSEN: Yes.

MR O'FLAHERTY: And you will see there two objectives for – yes, two objectives:

> *maintain or improve Ruppia tuberosa colonisation, reproduction, maintain or improve aquatic littoral vegetation in the Lower Lakes –*

and those are two of which are being indicated partial.

DR JENSEN: Yes.

MR O'FLAHERTY: I take it you weren't aware of these until very – fairly recently, these objectives?

DR JENSEN: Well, I haven't been involved in - - -

MR O'FLAHERTY: No.

DR JENSEN: At that level of detail. My response was to the press release that I was sort of saying that - - -

MR O'FLAHERTY: Yes.

DR JENSEN: And 10 out of 12 of the Basin Plan targets had been met.

MR O'FLAHERTY: Yes. Now, I just - - -

THE COMMISSIONER: That 10 out of 12 - - -

MR O'FLAHERTY: Yes.

THE COMMISSIONER: I'm sorry, where do I – this table, this appendix B doesn't help me with 12, does it?

MR O'FLAHERTY: No, so the - - -

DR JENSEN: There's a graph – graph on page 10.

MR O'FLAHERTY: If we go to, on page 10, Commissioner, there's these graphs, there's – it's - - -

THE COMMISSIONER: The bar chart.

MR O'FLAHERTY: Yes, that bar chart. There's no easy way of doing it unless you do it manually, but those objectives, number of ecological objectives, namely being 12, I take to mean those 12 objectives are to be found in that appendix depending on the ecological theme, two of which are vegetation objectives.

THE COMMISSIONER: It's as clear as mud. Sorry. If I look at the bar chart - - -

MR O'FLAHERTY: Yes.

THE COMMISSIONER: First of all, is there any explanation in the text as to what 'partial' means? I know what the word means, I'm just wondering what are the members of that class dubbed partial?

MR O'FLAHERTY: There's – in - - -

THE COMMISSIONER: Is it a plus or minus 10 per cent or what?

MR O'FLAHERTY: Yes and no, in the sense of – if I take you back, Commissioner, to page 70.

THE COMMISSIONER: Yes. Hang on.

MR O'FLAHERTY: There's a theme .....

THE COMMISSIONER: Hang on, on 17, yes.

MR O'FLAHERTY: 17. These two vegetation objectives are listed as partial and if you squint you can see that there's footnotes 13 and 14.

THE COMMISSIONER: No, not even if I squint but I will take your word for it.

MR O'FLAHERTY: I might have younger eyes, I can see them.

THE COMMISSIONER: So 25 per cent of targets.

MR O'FLAHERTY: And 25 per cent for aquatic zone.

THE COMMISSIONER: Did you say it's footnotes 9 and 10, is that right?

MR O'FLAHERTY: No, 13 and 14, the last two footnotes relate to - - -

THE COMMISSIONER: To which ones?

MR O'FLAHERTY: - - - the two vegetation - - -

THE COMMISSIONER: The bottom cells?

MR O'FLAHERTY: The bottom one, yes.

THE COMMISSIONER: Hang on. I don't understand footnote 14 at all:

> *Three of four targets met at regional scale. At local scale two of five targets met.*

That's double Dutch to me. What does it mean?

MR O'FLAHERTY: I suspect we may be able to ask Professor Paton what he might be able to - - -

THE COMMISSIONER: Right.

MR O'FLAHERTY: - - - whether he can make head or tail of that.

THE COMMISSIONER: In relation to 13, 25 per cent of targets met for each of the littoral and aquatic zones.

MR O'FLAHERTY: That to me is a 75 per cent failure.

THE COMMISSIONER: I'm just wondering what not met means if 25 per cent is partial. Is not met zero, is it?

DR JENSEN: Commissioner, on page 6 the report, it says "partial is one or more of the targets have been met".

MR O'FLAHERTY: There we go.

THE COMMISSIONER: So unless it's total failure, it's partial.

DR JENSEN: It's partial, yes.

THE COMMISSIONER: Thank you.

DR JENSEN: So not met, there's none. Partial is one or more, and met is all of them and there's a varying number.

THE COMMISSIONER: That means it's fairly, if I may say so, in terms of the pictorial display of quantitative information this is a really rotten table - - -

DR JENSEN: The problem is - - -

THE COMMISSIONER: - - - because all the interest lies in the detail in the footnotes.

DR JENSEN: It would have been much more helpful to have it by site rather than by the – a parameter being measured because you have to look at five different parts of the table.

THE COMMISSIONER: It would be much nicer to have more than one colour for the partial class which is most of the population.

MR O'FLAHERTY: And also slightly bigger fonts.

THE COMMISSIONER: Well, yes - - -

DR JENSEN: The message for me is that the target that was not met the previous year and was partially met this year by only 25 per cent that relates to Ruppia tuberosa which is the key food source for water birds in the Coorong.

THE COMMISSIONER: Even I know that now.

DR JENSEN: Yes.

THE COMMISSIONER: Well now, how – and I'm sorry - - -

MR O'FLAHERTY: Surprisingly then, maintain or improve water bird populations relations is not met.

DR JENSEN: That's what I would say.

MR O'FLAHERTY: Well, they've said it as well.

THE COMMISSIONER: Sorry. Can you explain the bar chart at page 10 again. What are the figures of gigalitres in the bottom line of the legend mean?

DR JENSEN: That's the amount of environmental water delivered.

THE COMMISSIONER: In the year.

DR JENSEN: In that year.

THE COMMISSIONER: It doesn't tell you anything about any consistency of application, of mode of application, just an annual volume.

DR JENSEN: It's an annual volume passing the barrages and its targets could be keeping the Mouth open. They could be providing suitable habitat for waders. It could be to support the Ruppia tuberosa. There would be a number of elements in that.

THE COMMISSIONER: These are ecological objectives this figure records.

DR JENSEN: Yes.

THE COMMISSIONER: And they are 12 in number.

DR JENSEN: Yes, 12 in number spread across that table.

THE COMMISSIONER: So which one – are they the schedule 5 ones, are they? What are the 12 ecological objectives? They're specifically stipulated for each of the sites, isn't that right?

DR JENSEN: Yes.

MR O'FLAHERTY: Yes.

DR JENSEN: So, for example, for the water bird objectives for the Coorong and Lower Lakes, maintain or improve water bird populations.

THE COMMISSIONER: Yes.

DR JENSEN: And those two are not met.

THE COMMISSIONER: Is that not met or partial?

MR O'FLAHERTY: No, they're - - -

DR JENSEN: It's not met.

MR O'FLAHERTY: Zero.

DR JENSEN: So they're part – they're part of the two that are not met. But you have to go through five pages to work out which ones are not met. The other one not met - - -

THE COMMISSIONER: You're way ahead of me. Which page do I go to to work out what you just worked out for me?

MR O'FLAHERTY: That is page 18.

THE COMMISSIONER: 16, is it? 18?

MR O'FLAHERTY: 18.

THE COMMISSIONER: It really is a horrible document.

DR JENSEN: The bottom line of that table on page 18.

MR O'FLAHERTY: I don't think you're meant to drill down to this level of detail in these documents. I think that's why - - -

THE COMMISSIONER: You mean not meant to read them?

MR O'FLAHERTY: Yes, no.

THE COMMISSIONER: Right. So go on, on that bottom line.

DR JENSEN: So this is water bird objectives for the Lower Lakes, Coorong and Murray Mouth: maintain or improve water bird populations, and that's not met for the last two years.

THE COMMISSIONER: Yes.

DR JENSEN: And the - - -

MR O'FLAHERTY: Only in the wet years, basically.

DR JENSEN: The other one that's not met is to restore resilient populations of Black Bream and Greenback Flounder in the Coorong.

MR O'FLAHERTY: That's page 19.

DR JENSEN: So those are the two that are not met in 2016/17.

THE COMMISSIONER: Well, this might just be a case of PR people - - -

DR JENSEN: Yes.

THE COMMISSIONER: - - - getting out ahead of decent scientists, might it not?

DR JENSEN: Well, certainly this press release that caught my eye and made me look at all of this that said 10 out of 12 Basin Plan targets had been met, and I look at the graph and go, "No, three out of 12 are met. Seven are partially met." Which means there could be only one out of several.

THE COMMISSIONER: Well, I don't want to spend too much time. I'm – you can take it that I'm - - -

DR JENSEN: But the spin is - - -

THE COMMISSIONER: You anticipate me.

DR JENSEN: Yes.

THE COMMISSIONER: You can take it that spin is to be deprecated, but life is too short for to us chase down every discrepancy between spin and science.

DR JENSEN: Except that we're talking about one of the targets under the interim of no decline.

THE COMMISSIONER: I understand. Your point is well made and will probably find reflection in my report.

MR O'FLAHERTY: I wanted to move on then to your work with the Water for Nature Program.

DR JENSEN: Yes.

MR O'FLAHERTY: And I wanted to start with what I took to be a – essentially an assessment report on the watering projects between 2013 and 2016. That report should be found behind tab 14 of your volume. Just to go first to page 4 of the executive summary.

DR JENSEN: Yes. Now, we've heard this morning about the identification of 1,100 wetlands in South Australia. That's South Australia alone, isn't it?

DR JENSEN: Yes. In 250 complexes.

MR O'FLAHERTY: Yes.

DR JENSEN: So it's 1,100 individual wetlands have been identified in the Bob Pressey report, 1986, for the River Murray Commission, as it then was.

MR O'FLAHERTY: I was going to ask you that. That was an '86 report, was it? That – and that's well accepted and nothing has changed in respect to those estimates?

DR JENSEN: No. They haven't disappeared. And the 250 complexes is from a report by Mark Thompson in the same year, who was looking at the South Australian part of the valley. So they don't exist in isolation.

MR O'FLAHERTY: No.

DR JENSEN: They're quite often clustered into hydraulic units.

MR O'FLAHERTY: Yes.

DR JENSEN: So – and we're keen to manage them all together where it's possible.

MR O'FLAHERTY: Yes. And of those 1,100 wetlands that would include the – what I might call the famous ones, the Chowilla wetlands and Banrock Station.

DR JENSEN: That – yes.

MR O'FLAHERTY: The Ramsar listed wetlands as well.

DR JENSEN: Yes. So each of those would have a number of wetlands in the cluster.

MR O'FLAHERTY: Okay. I see. And they would be one of the - - -

DR JENSEN: That would be a complex. So - - -

MR O'FLAHERTY: 250 complexes.

DR JENSEN: Yes. Okay.

MR O'FLAHERTY: Okay. Excellent. Then two paragraphs down from that discussion in about the middle of the page with the paragraph starting, 'Following the floods'. Do you have that?

DR JENSEN: Yes.

MR O'FLAHERTY: That paragraph describes what I think I referred to this morning as the ramping up of the watering where originally there was 12 sites and five complexes all the way up to 35 sites and 20 complexes, and then up to the – is that, in the final year, 40 sites?

DR JENSEN: Yes.

MR O'FLAHERTY: And do I – and sorry, I will – in terms of the number of sites, is that – I take that that's not necessarily the same sites that are watered each year.

DR JENSEN: No.

MR O'FLAHERTY: That is essentially a selection of sites depending on need and life cycle of the trees; is that - - -

DR JENSEN: It is.

MR O'FLAHERTY: That right?

DR JENSEN: Within any given location that we go to there can be a number of different habitat types, number of different needs in terms of water. Sometimes we

have defined creeks, so what we call flood runners, which is where the water will come first when we get a flood. Then we have higher elevation on the floodplain, so that's the area where we're more likely to find Black Box, and each has different watering needs and different past histories. Now that we've got to the point of having a five year plan and annual watering schedule we have become much more documented in terms of identifying all of the sub-sites.

MR O'FLAHERTY: Yes.

DR JENSEN: Giving them all numbers, giving them all descriptions. So originally, if we said we're watering at Clarks Floodplain – and we did that over a number of years – we actually were watering different locations within that, but that wasn't coming through in the documentation that we had. And as we've got a bigger program, and more people able to attend to the documentation, and now we've got a fully documented process, so if I walk out the door tomorrow someone else can step in and hopefully pick it up.

MR O'FLAHERTY: Yes.

DR JENSEN: And so, for example, Clarks Floodplain has 14 different locations with different needs so if we say we're watering at Clarks Floodplain every year for the next 10 years, it's not going to be the same place each time.

MR O'FLAHERTY: No.

DR JENSEN: It's going to be different locations requiring water.

MR O'FLAHERTY: Yes. And on page 9 of this report, that's where what you've just described to me is – described in part, at least, where several factors are taken into account in deciding when – which years and which areas particular sites will be watered, and that includes the level of stress or damage of a particular site, the overall health of the trees, and what is described as the stage of the phenological cycle, namely when it's flowering and when it isn't. That's - - -

DR JENSEN: Yes.

MR O'FLAHERTY: Are those the three main things that one looks at, or are there others?

DR JENSEN: We have – we actually have a process that we go through.

MR O'FLAHERTY: Yes.

DR JENSEN: And there's a scoring process to take into account a number of different factors. Those are probably the first ones that we look at. We also need to look at the feasibility of actually getting water to the site physically - - -

MR O'FLAHERTY: Yes, practicals.

DR JENSEN: - - - because we talked about needing to lift.

MR O'FLAHERTY: Practicalities.

DR JENSEN: How to – how can we lift the water out of the main channel onto the floodplain if we don't have a flood? Which requires a source of power, so that's either diesel or electricity. We need the permission of the landholder, or we need to have volunteers available to be able to do it. With 1,100 wetlands to choose from, all of which would benefit from watering, then we come down to the practical factors.

MR O'FLAHERTY: Yes.

DR JENSEN: So we start with the ecological and then we move to the practical, and one of the others that we consider is the visibility of the site to show other people what we're doing, so in order to be able to build support in the community, perhaps encourage others.

MR O'FLAHERTY: It's a bit of PR, in one sense.

DR JENSEN: It's important to be able to get the community on board to understand what we're doing, why we're doing it.

MR O'FLAHERTY: Sure.

DR JENSEN: That this is beneficial to everybody.

MR O'FLAHERTY: Yes.

DR JENSEN: So certainly the PR, as you call it, is an important element.

MR O'FLAHERTY: Which is why wildlife foundations always refer to the cute furry animals when they're talking about what they are saving from the environment.

THE COMMISSIONER: That's really unfair.

DR JENSEN: Our story is the Black Box that - - -

MR O'FLAHERTY: Indeed. No, no.

THE COMMISSIONER: Exactly. Which is neither cute nor furry.

MR O'FLAHERTY: And I don't mean that by criticism; that's a great tactic.

DR JENSEN: They're neither cute nor furry, but they're very, very important, because we have no Black Box regeneration since 1956.

THE COMMISSIONER: I was reading that at the top of page - - -

MR O'FLAHERTY: 5.

THE COMMISSIONER: 5. Yes.

MR O'FLAHERTY: Yes.

THE COMMISSIONER: What – does that mean that the 89, 93 regeneration event hasn't yet produced mature?

DR JENSEN: It means that there's only small pockets surviving.

THE COMMISSIONER: Right.

DR JENSEN: Places that we know they came up they did not survive, for example at Chowilla. We do have some at Clarks Floodplain that I mentioned, which is near – between Berri and Loxton.

THE COMMISSIONER: So they start, in great eagerness, a mass of saplings. And then they run into dry years.

DR JENSEN: Yes. And there's two places on my monitored sites where we have them and in one case it's because the landholder, many years ago, contour ploughed the land to encourage – he was growing crops at the time, and so we're left with these furrows which hold the water longer and that's where the 1990s black box have survived. So we have – we have a patch of them.

MR O'FLAHERTY: So what was good for the crops was also good for the Black Box. What was – what would have been good for the crops was also good for the Black Box

DR JENSEN: It was. But the subsequent landholder stopped cropping, but then we had – well, they must have survived the previous landholder as well, at some point. So I'm not sure about the timing, but anyway that was modification of the floodplain which created conditions that allowed them to survive, but elsewhere they haven't.

MR O'FLAHERTY: And I take it a lot of this work is addressing that particular point the Commissioner made was where there is some element of regeneration of these – this biota, but – as a result of the larger floods but it's without the more moderate or minor watering events, they don't subsist, and so this project is essentially trying to have maintenance watering, so to speak.

DR JENSEN: Yes. That's the point we started from.

MR O'FLAHERTY: Yes.

DR JENSEN: In 2013 we didn't know what was coming and there is a graph, is it – in one of these papers that shows the gap between the two lots of flooding we've had.

MR O'FLAHERTY: Yes, I'm going to come to that. Yes.

DR JENSEN: And so – you know, looking ahead, the first thought was to get them through the first summer and then we continued to water. I have to add that there's a lot of the natural regeneration still surviving, but it's much smaller and not nearly as vigorous, and could well disappear if we have an extended drought.

MR O'FLAHERTY: As far as the practicalities that's, I think, described in pages 11 and 12 of this report where you physically pump the water from the river channel and – well, one of the methods is pumping the water from the river channel up onto the relevant area and watering it by use of sprinklers.

DR JENSEN: Yes. We use sprinklers to simulate rainfall where we've got an established field of seedlings because we don't want to run machinery over them and it's pretty hard to spread the water far enough, but a high throw sprinkler will get water over a pretty broad area and it's like adding rainfall to the mix.

MR O'FLAHERTY: That sounds like a relatively labour intensive process. Are there – given all the funding in the world and all the forward planning in the world, can you envisage improvements to that process or is that still the best way to address the watering requirements of these areas?

DR JENSEN: In some sites it probably will be the only option we have, but we're at the moment pursuing – Nature Foundation is pursuing a partnership with Central Irrigation Trust and any partnerships with the Irrigation Trust, what we have the ability to do is to tap into their infrastructure and their water is sitting above the floodplain. So there's the ability to gravity feed from their systems, or possibly with a pump.

THE COMMISSIONER: That will reduce your pumping. That would reduce your - - -

DR JENSEN: It reduces our pumping, plus we have to pay a fee to them because they've pumped.

THE COMMISSIONER: Yes.

DR JENSEN: But – it's a different way of doing business.

THE COMMISSIONER: Yes.

DR JENSEN: But it gives us more flexibility in that that water can be available in a dry time and targeted to a particular wetland. That's another way. I mean, we would

love to discover that there was a solar pump that had enough power to do this, but they just don't have the capacity to - - -

THE COMMISSIONER: Sure.

DR JENSEN: - - - move the water that we need to move. So we're still stuck with conventional options, and Natalie Stalenberg looks at all the different possibilities including hiring a ferry and putting it on the river and putting the pump on that. So far we haven't come up with any innovation.

MR O'FLAHERTY: Lot of lateral thinking. Yes. And in terms of the benefits – and there is a number of graphs that I think you want to take us to, but is one of them on page 19? Is that the comparison you were just talking about?

DR JENSEN: On page 19. No, there's another one.

MR O'FLAHERTY: I think it might be - - -

DR JENSEN: The one with the red circle on it.

MR O'FLAHERTY: Yes.

DR JENSEN: That's back at the beginning, I think.

THE COMMISSIONER: That's all right. I've got several copies of it.

MR O'FLAHERTY: Tab 2A.

THE COMMISSIONER: Environmental watering makes a difference.

MR O'FLAHERTY: Yes.

DR JENSEN: That's the one.

THE COMMISSIONER: I've seen it. We don't need to explore it. It very fully speaks for itself.

MR O'FLAHERTY: Yes.

DR JENSEN: Just to draw to your attention, the blue bars on that are measuring the areas not watered and showing you that the condition declines when we have dry seasons.

THE COMMISSIONER: Yes. Quite.

MR O'FLAHERTY: All right. Then – so that was the results that you saw in the past – the past watering program.

DR JENSEN: Yes.

MR O'FLAHERTY: I wanted to then take you to the strategy that is envisaged, at least for the 2017-2022 timeframe. That should be behind tab 13. And the first of which, if I could take to you, I think, page 8 of that document.

THE COMMISSIONER: I'm sorry, just out of curiosity on my part, when does seed fall .....

DR JENSEN: Most of them in summer, sometime between December and March but some of them are winter. Some of them have an alternative strategy and they flower in winter. So seed fall is 12 months after flowering. So if we know when they flower, then we know when there's going to be seed on those particular trees.

THE COMMISSIONER: Then try and time some watering for that.

DR JENSEN: So we can time the watering for that. But the other finding that we have now is that watering at any time supports the crop so if there's – for any reason we can't get to the absolute prime timing through practical difficulties then watering at any time maintains condition, supports the crop, makes sure they don't drop too many of their fruit before seed is ready so - - -

MR O'FLAHERTY: Yes, I forgot to ask I think in terms of the optimum time for watering for the sites that you've selected you've just made the point that any time will be of benefit.

DR JENSEN: Yes.

MR O'FLAHERTY: But am I right in thinking that spring through to early summer is the one where you get the most benefits from?

DR JENSEN: For this part of the river, late spring to early summer would be the natural peak flow and I know that the Commonwealth Environmental Water Holder sort of looks at what are the natural cues and triggers and how do we mimic that. But what I'm starting to find is we're operating in a very changed environment, very changed water regime. We're looking at further changes into the future and, in fact, we maybe need to be thinking about adapting what we do. First of all we're not going to be able to water the outer edges of the floodplain, the higher elevations, we can't get water out there. We're not likely to get floods as frequently as in the past and so what we're starting to think about, Natalie spoke about priming. We've realised that if we put water in in May/June and then water again in October, November we actually get a much better result.

So we would like to water in May/June or July/August at the latest, and then come back in the following season. But if we've got restrictions imposed by CEWH, you can't water in June - - -

MR O'FLAHERTY: Yes. I was about to ask that, yes.

DR JENSEN: - - - and we now haven't been approved to water in July and August this year, and suddenly we're using the windows - - -

MR O'FLAHERTY: For priming.

DR JENSEN: - - - that match the ecological requirements. And the other thing that's happening is if we look at trying to mimic the natural frequencies we would never water some of the higher parts of the floodplain. And our argument is, for example, these Black Box they're at middle elevations. To keep them going we need to water – for example, some sites we need to water now, but that wouldn't be a natural frequency. And so what we're starting to see, we need to modify taking the natural historic regime as our guide and say, no, we need to modify to what we've got now and what we've got coming in the future.

And one of the big lessons we've learnt is looking backwards for the hydrological data didn't predict the Millennium Drought and we actually can't rely so much on history and what we think happened. And Martin Mallen-Cooper and Brenton Zampatti have just come out with a paper saying the river didn't dry down to pools in drought. It naturally still had a flow in droughts and the fish were able to survive in connected pools, not isolated pools and all the pictures we have of Harold East standing astride the river because it was in drought that was because already the irrigation extraction was quite high and high enough to reduce the river to pools.

So there's lots of – we're still learning a lot about the ecosystem. We're still learning that the Lower Darling is absolute critical for all Basin fish so if the Lower Darling doesn't have flows, we're talking about impacts right across the Basin, not just the Lower Darling communities. That has only just – that came out in a conference last September from John Koehn, gathering up all the fish biology over a really extensive program with EWKR – I can't remember – environmental flows, environmental water, knowledge and research, I think it was called. They're trying to gather the information from all the different ecologists and that breakthrough knowledge, saying the Lower Darling is absolutely critical, that only came to light last year so we're still learning - - -

THE COMMISSIONER: Just in time to improve the design of the Menindee project.

DR JENSEN: Do you want to talk about the Menindee project? That was one of my queries about the supply projects.

THE COMMISSIONER: It's one of my queries too.

DR JENSEN: Good.

MR O'FLAHERTY: Just on the 2017-2022 strategy, it's envisaged in that document to increase the number of sites, rather, to 82 sites. This is on page 8.

DR JENSEN: Yes. And again we're talking about individual sites so Clarks accounts for 14 of those.

MR O'FLAHERTY: Yes, so it's a - - -

DR JENSEN: So they can be grouped. I think it was 82 in 16 complexes. Does it say that somewhere?

MR O'FLAHERTY: Yes, 82.

DR JENSEN: 13 complexes.

MR O'FLAHERTY: This is the third paragraph.

DR JENSEN: Yes.

MR O'FLAHERTY: No, second paragraph, 82 sites, 64 sites across 13 wetland complexes and 18 single locations.

DR JENSEN: Yes. So as we go along we become aware of new possibilities.

MR O'FLAHERTY: Yes.

DR JENSEN: And that goes through the process where we check what's the value, is it practical, you know, how do we do this, where does it fit in the scheme of things, what's the ecological need and then they get added to the list.

MR O'FLAHERTY: And over the page on page 10, these are the different scenarios, as I understand it, as to what may inform an annual watering schedule or strategy, namely if it's a dry year you will water some sites but not others through to a wet year where you're able to water nearly all of your sites or at least a greater proportion.

DR JENSEN: Or you can't get to them.

MR O'FLAHERTY: Or you can't get to them because they're gloriously under water.

DR JENSEN: Yes. So this is an adaptation. There's a set of flow scenarios with CEWH and in the Murray-Darling Basin watering strategy.

MR O'FLAHERTY: Yes.

DR JENSEN: And we've adapted and we actually added one because we're in the very regulated lower end of the river and because we've got this difficulty of being able to lift the water.

MR O'FLAHERTY: Right.

DR JENSEN: So that – what I do is I check what are the forecasts in April and I have to say in April the Murray-Darling Basin Authority were saying it was a wet year and I'm going, I don't know who you're talking to but I don't think so. And I advised that we should be looking at our in-channel and dry scenarios so strategy 4, strategy 5.

MR O'FLAHERTY: So this would be the scenarios that you would apply for the 2018/19 watering year.

DR JENSEN: Yes.

MR O'FLAHERTY: You were saying in around April we need to be at strategy 4 or 5 for that particular year, yes.

DR JENSEN: So then I would go to the table of sites and said what have I said we should do under those flow scenarios.

MR O'FLAHERTY: And that table, just so I understand this, is, for example - - -

DR JENSEN: This the end of - - -

MR O'FLAHERTY: 16.

DR JENSEN: It's the end of the report.

MR O'FLAHERTY: Yes.

DR JENSEN: So lots of pages because there's lots of sites so appendix 2.

MR O'FLAHERTY: So appendix 2. So the first page is page 16. And so then you've got for each watering site the last - - -

DR JENSEN: The last six columns.

MR O'FLAHERTY: The last six columns are your scenarios and that will indicate to you if we're in scenario in-channel, for example, that first one, it's saying fill from CIT.

DR JENSEN: Central Irrigation Trust.

MR O'FLAHERTY: If required in five year plan.

DR JENSEN: Yes. So I would take out those two columns and start a new table with those two columns.

MR O'FLAHERTY: Yes.

DR JENSEN: And then I pull up our five year plan to see what are we saying for this site, where are we up to because, for example, if we're starting with a dry site I would probably recommend watering two years in a row and then reassess in the third year whether we have a dry cycle or whether we need more water because two years in a row gives us better results and I would possibly even throw in priming as well. So taking into account what's needed, when is the last time it was watered, what is the condition, how urgent is it, because when it goes to the Commonwealth Environmental Water Holder we have to give it an urgency rating, how important is it to water in this year.

MR O'FLAHERTY: Yes, so it gives the – one of these columns is entitled Watering History so that gives you an idea of how often it has been watered in recent times - - -

DR JENSEN: Yes.

MR O'FLAHERTY: - - - which will then inform what needs to be done in one of those scenarios.

DR JENSEN: Yes.

MR O'FLAHERTY: Going back then to page 11 of this document where under the heading 'Priorities for Environmental Outcomes'.

DR JENSEN: Yes.

MR O'FLAHERTY: I take it these aren't hierarchical. These are priorities that are aimed to be met, each of them?

DR JENSEN: These are in the table we looked at before from the Basin watering strategy.

MR O'FLAHERTY: Right. Yes.

DR JENSEN: The one with the orange headings.

MR O'FLAHERTY: Yes.

DR JENSEN: So they had those different priorities and then each year they come out and they give us a series of areas they're interested in. So building resilience, flows and connectivity, natural cues, native vegetation, water birds so it's a

combination of sources but we update each year what are they saying at a Basin scale and then checking it with our own local priorities as well.

MR O'FLAHERTY: Translate it into your own specific.

DR JENSEN: So you've got fish and frogs over the page as well.

MR O'FLAHERTY: Yes.

DR JENSEN: So for us, with the scale of our operations, we're really restricted to patches of the floodplain, small water bodies, creeks and so on, we don't have the ability to flood large areas but we look at what can we deliver within these priorities.

MR O'FLAHERTY: Yes.

DR JENSEN: That also complements what the state governments, the agencies are doing at a larger scale.

MR O'FLAHERTY: That's all the questions I had on that. The other topic I wanted just to raise with you briefly was the idea of – that has been mooted in some submissions made to us is the – in respect of the connectivity or the inclusion or not of the south-east area of South Australia round the farming communities, south-east of the border of the Coorong and the Murray-Darling Basin. It has been suggested, I think, in some submissions and in evidence as perhaps more in way of a query as to why that's not part of the Basin, the idea or the point that may well be made in respect of that is that there's an indication at least some flows, either ground or surface or very – just under the surface of the water from that area flowed into the Coorong in a natural system.

THE COMMISSIONER: This is the idea of increasing the ingress of fresh water into the Lower Coorong; is that right?

MR O'FLAHERTY: So this is the idea I think and, again, Dr Jensen is going to be far more on top of this than I am I think in respect of the drainage schemes in the south-east, the argument being that they are otherwise diverting water that flowed into the Coorong.

THE COMMISSIONER: That's right.

MR O'FLAHERTY: Fresh water, that is, into the Coorong. That's being diverted out to the Southern Ocean. You've referred ..... Dr Jensen this should be behind tab 11 of the folder, to a - - -

THE COMMISSIONER: This is the Cardwell Buckingham recommendations document.

DR JENSEN: Yes.

MR O'FLAHERTY: Indeed. A report conducted in the eighties and my reading of that report – and I say that in the sense, to the extent I can understand the science, is that – am I getting it right that the assessment at that – in that report was that whilst there were some flows into the Coorong, they were of such intermittent nature there isn't really a connectivity from an ecological perspective. Have I got that at least partially right?

DR JENSEN: Yes, yes. So if I can just summarise it for you.

MR O'FLAHERTY: Yes. If – yes, if you could expand on that, it would be much more eloquently than I can.

DR JENSEN: The context at the time was concern in the south-east there had been too much drainage, water levels were falling, and there was a push for drainage to be reversed if possible.

MR O'FLAHERTY: Right.

DR JENSEN: There was an environmental impact statement which then led to a number of other studies being done, including the south-east wetlands investigation, how to share the water amongst the few remaining wetlands in the area, and I Chaired a Committee that looked at the impact of drainage on groundwater levels in counties Cardwell and Buckingham, which includes the Keith area, and on the Coorong. And I was the junior on that committee and the gentlemen who joined me had 30 and 40 years' experience in the south-east, Max Till, Greg Shepherd, Milton ..... brought an enormous amount of experience, and Peter Hoey was also a member, and our conclusion from all the evidence that we could gather was that it would take two wet years of saturation in the south-east to produce a volume that could reach the Coorong naturally.

The natural flow path is from Tilley Swamp, around behind Salt Creek, through the sand dunes, through a natural creek cut, and eventually into Salt Creek. In 1864 the drainage board actually cut through the range behind Salt Creek. They cut a 12 foot deep cut, which meant the water could go straight from Tilley Swamp to Salt Creek much more easily, and a series of cuts all through the Bakers Range watercourse, all the other watercourses that lead into - - -

THE COMMISSIONER: So this was to – with a view to changing the productive land use.

DR JENSEN: To – yes, to drain the land. So essentially the south-east is a series of water courses that pool and occasionally cut through the range and then it's a very slow flowing set of watercourses. It's not the normal river at all. And the surface water travels north-west and eventually ends up in the Coorong, if there's enough of it. The groundwater travels direct to the ocean, so it's travelling in a south-easterly direction, so it's primarily the surface water that would have arrived at the Coorong,

with some – there might have been some groundwater coming from it directly north-east of the lagoons, but there's not a big catchment there.

So it's primarily surface water we're talking about. The drainage board kept meticulous records back then and after the cuts were made in 1864, and up till 1917, there was six times that Salt Creek flowed in 52 years, with the enhanced flows with those drains in place. So approximately one in 10 years, and our estimate was that naturally there would be about one in 20 years. And after 1917 then the drains started to be directed out to sea further south, so that the water was not reaching the Coorong anymore, and our assessment was we're probably back to pretty much the same sorts of inputs that had occurred before settlement.

So the ultimate conclusion is the south-east is not a source of water for the Coorong except in exceptional times and that the primary water source was the Murray, particularly in flood. So that was the evidence contained in that report. I apologise, I didn't have a clean copy to provide. I'm still trying to find one.

THE COMMISSIONER: No. That's all right. I haven't noticed anything wrong with the one I've seen.

MR O'FLAHERTY: I think there's some highlights.

DR JENSEN: Someone had highlighted it, so it has kind of redacted some of the keywords out of it.

THE COMMISSIONER: I didn't notice that.

MR O'FLAHERTY: And Dr Jensen has helpfully provides us with a - - -

THE COMMISSIONER: I see, right.

MR O'FLAHERTY: - - - replication of the key recommendations.

THE COMMISSIONER: Thanks.

DR JENSEN: I just note that recommendation 1 is not there because it refers to groundwater in counties Cardwell and Buckingham.

MR O'FLAHERTY: Right.

DR JENSEN: That's why I didn't bother to put it in.

MR O'FLAHERTY: Yes.

DR JENSEN: But my concern was when I saw on the list of supply projects that some south-east flows - - -

MR O'FLAHERTY: Something called a south-east flows restoration.

DR JENSEN: - - - supposedly saving the Coorong from itself. It doesn't fit ecologically. There's a salinity gradient from the Mouth to the end of the south lagoon. If you put the fresh water into the south lagoon, you're putting it in at the high end of the salinity gradient. My understanding from Associate Professor Paton is that rules that he and I discussed some time ago in the in the course of the upper south-east salinity and drainage project, we tried to set a boundary on how much water went in at any one time, because the southern lagoon needs to be maintained as a hypersaline environment. That's what makes it special, that's what supports the appropriate species, and my understanding is that water is being put in as soon as the lowest end of the target is reached, not waiting until the salinity is going above that.

If you put it in at 60 milligrams per litre you're keeping it out of the hypersaline range, so there's a concern that the environment in the Coorong as listed with Ramsar involved a hypersaline lagoon, the south lagoon and a marine lagoon, the north lagoon, and then the fresher water from the river, and it's that mix of environments that's important.

THE COMMISSIONER: In Ramsar terms, that's the characteristic.

DR JENSEN: That the characteristics that were listed.

THE COMMISSIONER: Yes.

DR JENSEN: Now, there has been argument whether that – were natural or not, it should be like that. And - - -

THE COMMISSIONER: I take it – I've never thought about this – can one – can a listing nation unilaterally change the description of characteristics for Ramsar?

DR JENSEN: No. No, they're required to maintain the characteristics as listed.

THE COMMISSIONER: Quite. So that needs to be a consensual change.

DR JENSEN: Yes. And I understand there has been correspondence around that for some time.

THE COMMISSIONER: Thanks.

MR O'FLAHERTY: There's a system of notifications in the Ramsar ..... think, when it's departing from that description.

DR JENSEN: Yes.

MR O'FLAHERTY: So you would say that the description of that SDL adjustment project being a south-east flows restoration is a bit of an ecological misnomer; it's not actually restoring anything that's natural.

DR JENSEN: No. My concern was there was no way it was equivalent.

MR O'FLAHERTY: Yes.

DR JENSEN: It was put forward as being equivalent environmental outcomes.

THE COMMISSIONER: Equivalent to what, by the way?

DR JENSEN: Well, I would – from my point of view I assume it should be equivalent to a hypersaline lagoon.

THE COMMISSIONER: I see.

DR JENSEN: And the concern that Associate Professor Paton has been raising is that we're getting algal blooms in that lagoon, which is smothering the Ruppia, which is therefore killing off the food source. I know there's some argument about what the cause is. My position is we need to figure out what's causing those algal blooms and manage them, because at the moment they are destroying the character and preventing the ecosystem from functioning.

MR O'FLAHERTY: And I can indicate to you, Dr Jensen, we're actually hearing from Professor Paton, next week I think.

DR JENSEN: Yes, I understand that.

MR O'FLAHERTY: So no doubt we will hear more on that topic.

DR JENSEN: I'm sure you will.

MR O'FLAHERTY: That covered the questions that I had. You can rest assured that we have, or we will be, reading through all the very considered materials that you do have. Was there anything that you wanted to raise with the Commissioner this afternoon for particular amplification or direction?

DR JENSEN: I had a number of points I've been making while we've been talking, and I will try to condense them as much as possible. I absolutely support your position that the level of take is not ecologically sustainable and I believe if you can – able to make recommendations that can prevent any further erosion of the recovery targets and in some way can look to build them in the future that would be absolutely helpful. The prediction under climate change is that flows will decline and that has not been factored in yet. My understanding it will be factored in in 2022, but I've seen predictions of 30 to 50 per cent decline.

And one of the big concerns is that with reducing rainfall for every one per cent reduction there is three per cent reduction in run-off, which means less water going into any existing dams are making any additional dams not helpful. Around environmental watering, I'm finding that the management is far too bureaucratic. It's limiting the effectiveness of what we are able to do and we need a less – a less micromanaged system, but we also need to take account that the way it has been set up, it was set up by people used to managing irrigation water, and we've made the point about the financial year cycle that means we have periods we can't water for administration reasons.

That needs to disappear. We need to be able to reproduce highly variable flows on a 10 year rolling plan that will give us much better environmental outcomes for the water we've got available. There needs to be a change in the approach, and coupled to that we need to separate the water and the agriculture portfolios. At the moment the plan is being administered in the Department of Agriculture and that – we see the influence of that repeatedly, we're getting pushback on proposals to start watering new sites this year, that I say need water and need water for two years in a row. The pushback is, "We might not have water next year so we shouldn't start watering this year." To my way of thinking the reverse is true: if we can't water next year, we doubly need to water this year. I've made the point about the Lower Darling flows being absolutely critical. I know that a lot of those management decisions are within New South Wales. That needs to change. It's part of the Basin.

THE COMMISSIONER: Changed to the Commonwealth.

DR JENSEN: If – it needs to be at a Basin scale, independent management level that takes it out of the state hands, because what we've got is the state discriminating against two groups of people, favouring one group of people over another group of people in their own jurisdiction, but with consequences for all of us in the Basin. So – and my final point is I don't want this Plan to fail. I'm very worried about any findings that might cause it to be disbanded. What I want to see is have it improved and make it more effective.

THE COMMISSIONER: Thank you very much. I suspect I will appreciate this even more after I've thought about a lot of this, but I found that extremely helpful and I'm very grateful for your care and skill. Thank you.

DR JENSEN: Thank you for listening and I'm happy to provide any extra information if it's required.

THE COMMISSIONER: If we need to be in touch with you, we will be.

MR O'FLAHERTY: Thank you.

THE COMMISSIONER: And thank you for that offer. That's kind. We adjourn to Tuesday, 4 September.

MR O'FLAHERTY: Yes.

THE COMMISSIONER: At?

MR O'FLAHERTY: That would be.

THE COMMISSIONER: At the Commission offices at 50 Grenfell Street.

MR O'FLAHERTY: Indeed.

THE COMMISSIONER: Very well. Thank you.

<THE WITNESS WITHDREW [3.47 pm]

MATTER ADJOURNED at 3.47 pm UNTIL TUESDAY, 4 SEPTEMBER 2018

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