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TRANSCRIPT OF PROCEEDINGS

O/N H-910733

MR B. WALKER SC, Royal Commissioner

IN THE MATTER OF THE MURRAY-DARLING BASIN ROYAL COMMISSION

ADELAIDE

9.58 AM, WEDNESDAY, 11 JULY 2018

Continued from 10.7.18

DAY 7

**MR R. BEASLEY SC, Senior Counsel Assisting, appears with MR S. O'FLAHERTY,
Junior Counsel Assisting**

<BRUCE THOM, ON FORMER AFFIRMATION

[9.58 am]

<JAMIE PITTOCK, ON FORMER AFFIRMATION

5

<CELINE STEINFELD, ON FORMER AFFIRMATION

10 <PETER AUBREY COSIER, ON FORMER AFFIRMATION

MR BEASLEY: Commissioner, I don't intend to say anything about it at the moment but there was a press release issued by the Honourable David Littleproud, the Minister for Agriculture and Water Resources yesterday which contains a letter sent on 2 July to the Honourable David Speirs, MP, Minister for Environment and Water in South Australia, which attaches what looks to be some form of submission in relation to matters before the Royal Commission. I know that has been brought to your attention.

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THE COMMISSIONER: Thank you. We're in the middle of important evidence that I wish to proceed with immediately so as to benefit to the greatest extent possible from the distinguished witnesses here today. But it is the case that it has been brought to my attention what does have, in some respects at least, the appearance of a submission addressing some of the matters raised in this Royal Commission's issues paper number 2. And according to the document shown to me, it appears to be material emanating from the Commonwealth Department of Agriculture and Water Resources. From its content it would appear, as a matter of inference, that it may also be, or perhaps may only be, matters of argument developed by, and advanced on the part of, the Murray-Darling Basin Authority itself.

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I say that because it is concerned with the historical processes of the Authority. The best source for which, of course, would be the Authority itself. There are two things I want to say at the outset. The first is that this is no way for anyone, least of all, a Commonwealth department and Minister, to communicate with the Royal Commission and it is in particularly a highly irregular and inappropriate way for a submission to be put to a Royal Commission that has published procedures with which many, many other persons and entities have complied.

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The second thing is that there are a number of highly contestable propositions of fact, law and mixed fact and law, contained both in the letter and in the so-called submission. Why it was thought appropriate for the Commonwealth Minister to send this to the State Minister, when the State Minister is neither a Royal Commissioner nor, as I understand it, is the State Minister conducting any inquiry of his own, is a

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matter for someone else to explain but it raises questions which do no credit to those responsible for this publication.

5 In due course, and as soon as may be given the press of other business in receiving
evidence at this hearing, I will have something further to say in considerably more
detail about the contestable propositions to which I have just referred. It need hardly
be said that one of the reasons why this is an irregular and deplorable way for the
Commonwealth Minister to have proceeded is that it prevents the very kind of
10 engagement, confrontation, challenge and refinement of legal and factual positions,
which would be permitted, were submissions to be put and evidence to be tested.
Thank you, Mr Beasley.

MR BEASLEY: Thank you, Commissioner. There are contestable matters in that
document. There are also some straight out inaccuracies that I would be happy to
15 take you through at a convenient time. Overnight, Commissioner, Dr Steinfeld has
provided the Commission with a submission the Wentworth Group made and this
came up in the context of discussing floodplain harvesting, but the submission the
Wentworth Group made in relation to recent proposed amendments to the New South
Wales water legislation, which included issues about compliance and floodplain
20 harvesting, it's a submission from the Wentworth Group to the group director, Water
Renewal Task Force, New South Wales Department of Primary Industries dated 15
April 2018 and I will tender that but otherwise don't need to deal with it further.

25 Last night we were dealing with the document, the publication of the Wentworth
Group behind tab 4, 'Statement on the 2011 draft Murray-Darling Basin Plan'. And
we had come to page 19 which deals with the concerns the group had concerning the
failure of the Basin Plan, at least in relation to determining an ESLT and hence
setting of a sustainable diversion limit to include any projections for climate change,
which, in the document is described as an extraordinary decision, and I assume that
30 that is on the basis that climate change projections, both then and now, are part of
what would be considered the best available science as required under section 21(4)
of the Water Act, would I be right?

ASSOC PROF PITTOCK: Yes, that's correct. So it's concerning for two reasons.
35 One is that the government had available to it adequate and comprehensive advice
from CSIRO as to the nature, the range of likely climate change impacts - - -

MR BEASLEY: That was work published in 2008, I think, about projections of
climate and the Basin Plan.

40 ASSOC PROF PITTOCK: Correct, that was known as the 'CSIRO Sustainable
Yields Project' and that was incredibly detailed projections of potential climate
change impact.

45 MR BEASLEY: Just for the record, that's RC exhibit 13. Sorry go ahead.

ASSOC PROF PITTOCK: And that was at a scale of Murray-Darling Basin tributary catchment by catchment as well as the Basin as a whole. So it's very disappointing that that scientific knowledge wasn't incorporated into the Basin Plan. And the obvious other concern is the scale of those climate change impacts are material to the achievement – objectives of the Water Act and the Basin Plan.

MR BEASLEY: In summary, and I know it's more nuanced than this and they are only projections but in summary, the projections are that it might rain more, for example, in the Northern Basin and there certainly might be more extreme weather events but the likelihood is that the Southern Basin is going to be both hotter and dryer; correct?

ASSOC PROF PITTOCK: Yes. So - - -

MR BEASLEY: And possibly considerably so, and that what appear to be possibly small increases in average temperatures actually have fairly dramatic changes in terms of run-off from rainfall.

ASSOC PROF PITTOCK: Yes, that's correct. So rainfall is considerably reduced through evapotranspiration and that evapotranspiration effect has the potential to be exacerbated in a warming climate.

MR BEASLEY: So less rain and when it does rain because it's hotter, there's no evaporation?

ASSOC PROF PITTOCK: Indeed.

MR BEASLEY: I haven't finished with this topic but can we park it for a moment?

ASSOC PROF PITTOCK: Certainly.

MR BEASLEY: Because in your 2017 review, you've got a report from, I think it's Dr Whetton?

ASSOC PROF PITTOCK: Yes, Dr Penny Whetton provided us further advice. Yes.

MR BEASLEY: And so can we come back to climate change when we get to that document?

ASSOC PROF PITTOCK: Certainly.

PROF THOM: I would like to also make it clear that Professor Whetton's report only includes part of the climate change story. It does not include the sea level rise story in any detail, which I wish to address.

MR BEASLEY: You can feel very confident that when I ask you about why it's important that flow at the Murray Mouth, at some stage I'm going to get to possible sea level rises and whether that should be factored in.

5 PROF THOM: That would be delightful. But I also want to come back to the point that I made with the Commissioner yesterday on the section 22(3)(d), the limitations of the state - - -

MR BEASLEY: You're going to the legislation.

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PROF THOM: I'm going to the legislation.

MR BEASLEY: There's no way you could have worked for the Basin Authority, is there?

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PROF THOM: Yes, well, I love the legislation.

THE COMMISSIONER: Now, now.

20 PROF THOM: But, again, I understand the Commissioner had a ring around this yesterday because I think this is a critical point with the risk issue because when we are dealing with the risk issue and you have it quite clearly there under 3(d) on my page 40 of the Act:

25 *...limitations on the state of knowledge on the basis of which estimates about matters relating to Basin water resources are made.*

To me that's a very clear risk issue that needs to be very carefully assessed and identified at all levels of the Basin, from the top right down to the sea. And it's possible to do that and we haven't seen how they've done that.

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THE COMMISSIONER: Could I just inquire about -and this is directed to all four of you - in the Basin Plan itself, in purported compliance with section 22 of the Act, and in particular items 3 and 5 of the Act's table of mandatory content of the Basin Plan, there is in the Plan, as I read it, it's 402(1), no reference either to rising sea level nor, interestingly, any reference to an increase in inflow from the north. It's to the contrary. It talks about insufficient water available for the environment being a risk. Now, I can understand why, in this country of all countries, there being more water than before is not to be regarded as a risk in the colloquial use of that word, although it would answer the description of a risk in the sense of something about which probabilities can be calculated.

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On the other hand, given the discussion we had yesterday about what are the so-called constraints, it would be fatuous, I think, not to regard flooding as a risk and indeed it's ordinary everyday language to talk about flood-prone land and the risk of flooding as being something that, for example, calls for regulation of those who would insure ordinary householders. So I'm struck by the fact that an aspect of

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climate change that you've told me about, and that I've read about, namely perhaps more water coming down from the north as it dries in the south, doesn't seem to be referred to in the Basin Plan which troubles me, because that suggests the best available science has not been used.

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The second thing is this, for your comment. I can't find in 403, which is a purported compliance with item 5 in section 22, anything in relation to the strategies to be adopted to address climate change which is mandatory to be addressed, at all except as I pointed out yesterday, the rather annoying circularity of saying we address the risk of climate change by finding out more about climate change, which is undoubtedly true, but it would be ludicrous to regard that as a complete answer.

ASSOC PROF PITTOCK: Commissioner, we agree. There is a modest possibility of an increase in rainfall and effective run-off in the Northern Basin, which is material to how water resources are managed. The climate change projections are consistent in advising that more extreme events, both droughts and floods, are likely. And that requires active management. Standard risk management procedures, whether it's workplace health and safety or whether it's managing the environment, a systematic approach involves examining the most catastrophic possible outcomes, in this case at both extremes of less water or more water and considering what an appropriate management response would be and that's not what we're seeing here.

MR BEASLEY: It's a plan, isn't it? It's not meant to be a memo for what we do only for today. It's meant to be a plan that, whilst it can be revised at certain periods, is meant to last more than a short period of time. And that would be one of the reasons, I imagine, why incorporating matters like the best available science to do with climate change is important to incorporate in the Plan.

ASSOC PROF PITTOCK: Indeed and if I might note that it's not only the direct impacts of climate change that are a risk, but poor societal choices about how to manage climate change risk impacting on water resources.

MR BEASLEY: Sorry, did I cut you off? And it's a matter of obviousness, isn't it, that if you incorporate the best available scientific knowledge in relation to climate change projections, it is going to alter the determination of an ESLT and it is going to alter the maximum Basin-wide SDL and even the SDLs for any particular SDL region.

PROF THOM: I find again a contradiction in the Plan and what we're discussing now, particularly with respect to section 22, because the message you get with the Plan is this concept of long-term average. And you get a number associated with that. And then the community in the Basin, including those who really do rely on water supply, then would seem to get an expectation that that is the norm. And that being the norm then gives investors and other users of the Basin some degree of confidence in doing, in investing or making use of the land. But we know not only from the historical story, which we discussed yesterday, the floods and droughts, the

flooding rains, the droughts, the impacts of that over historical time, are well documented by environmental historians.

5 But what Professor Pittock is referring to, specifically as we get more and more knowledge, particularly of the heating of the Basin and that has a huge impact with respect to evaporation and soil moisture loss across the entire Basin, north to south. Plus the difficulties we have in being anywhere near precise with respect to rainfall projections. Much more certain with temperature and the temperature impact. Less certain with rainfall except we have a greater degree of certainty in the projections
10 with the southern compared to the north. But what I'm saying is by pressing this concept of long-term average and giving those figures, sends, to me, a wrong message for users and investors in the Basin without understanding the risks associated with the extremes as well as the transient nature between the extremes, which is the real worry.

15 ASSOC PROF PITTOCK: If I might just give one very brief example about how that consideration may change the way the Basin Plan was prepared. With the risk of, for example, more extreme droughts, a precautionary approach might be to conserve groundwater resources further as a drought reserve, a reserve that's called on to supply water users in times when surface water flows less.
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THE COMMISSIONER: But that comes, I imagine, from a number of factors, including the obvious hydrological consideration that droughts are times of reduced or eliminated recharge.
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ASSOC PROF PITTOCK: Indeed. And so because groundwater is effectively water storage that does not evaporate, it's potentially available in periods in which surface water is less available and that might change the complexion of the measures adopted in the Plan.
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PROF THOM: And this comes back to the need to have in place a long-term measuring regime for a whole range of different environmental and other assets, socio-economic assets, where we can monitor the nature of change and the impact of change and without that, if I may later on - - -
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THE COMMISSIONER: Please.

PROF THOM: - - - Mr Commissioner, speak to that.

40 THE COMMISSIONER: Yes.

PROF THOM: Because we have discussed that in our substantive 2017 report.

45 MR BEASLEY: If I forget just put your hand up and say there's something I would like to say.

PROF THOM: I don't wish to distract from the current - - -

MR BEASLEY: Can I just come back to – and I don't mean this rudely – but to my direct question which is more am I right that if climate change projections are factored in to the determination of an ESLT and an SDL, you're likely to get different figures than what the Basin Authority came up with in 2011 and 2012.

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ASSOC PROF PITTOCK: Yes, you're correct. Certainly in the Southern Basin where a diminution of water availability is more likely, may be more likely than not
- - -

10 MR BEASLEY: You have already given one example in relation to groundwater.

ASSOC PROF PITTOCK: Indeed.

MR BEASLEY: Yes.

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ASSOC PROF PITTOCK: So in the Guide to the Basin Plan, the logic of the Commission was that because the CSIRO sustainable yield project data covered the period 1990 through to 2030 and CSIRO were projecting a median potential loss of water of around 12 per cent - - -

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MR BEASLEY: Yes.

ASSOC PROF PITTOCK: - - - and if I might - - -

25 MR BEASLEY: Worse case 37 per cent, I think.

ASSOC PROF PITTOCK: Worse case 37 per cent. So again we have got this reliance on planning by averages rather than extremes. Leaving that aside - - -

30 MR BEASLEY: When they talked about 2050 they said the worst case of 2030 could be the norm by then.

ASSOC PROF PITTOCK: Indeed. And so in the Guide to the Basin Plan, because the Basin Plan at that time was considered to be only for a 10 year planning period,
35 they took a quarter of the 12 per cent median figure and came up with the three per cent adjustment to account for climate change.

MR BEASLEY: And then they ditched that for policy reasons that they've – or they – I don't want to say that they have explained but they have produced text.
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THE COMMISSIONER: As I understand it, those reasons include the notion of we will see what has happened at the end of the 10 years or so.

ASSOC PROF PITTOCK: Indeed. In the text – I don't have the precise words in
45 front of me – the Commission said that they would use this current - - -

THE COMMISSIONER: The Authority.

ASSOC PROF PITTOCK: The Authority, I'm sorry, that they would use this current Basin Plan period to study the problem further and consider any required adjustment with climate change for the subsequent – the second period of the Basin Plan.

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THE COMMISSIONER: Well, now, if I'm correct in my reading of the material, there has not been any publication from the Authority presaging any effect on the next iteration of the Plan as a result of the study of climate change. They've not released anything. Is that right?

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ASSOC PROF PITTOCK: That's mostly correct. As I mentioned yesterday, Neve and colleagues at the Authority have published an academic paper arguing that the current Basin Plan has within it some characteristics that are adaptive to climate change but there has been no commitment to a process that I've seen from the Authority to define how they would identify adjustments required to the Basin Plan for a second period. The Wentworth Group has requested the government on a number of occasions to consider this matter, to establish a science-based process to work out what should happen but as yet we have had no formal advice that there is a process in place.

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THE COMMISSIONER: One obvious concern that my Terms of Reference raise is that climate change is referred to in the statute as a risk for which there must be a strategy, and both the Act and the Plan have at their very heart the notion of a sustainable diversion limit when diversion means consumptive use for settled humans. And so it raises the question whether a response to climate change is to say, to put it crudely, we will write the bush off so that farming can continue at the same intensity as before the climate change in question. Another response might be both the bush and the farming will have to take a hit because there will be overall less water.

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Or, we could go into variants such as we will run reserves to a more critical extent in order – and no doubt reflecting the touching if irrational human faculty of hope – in order to see whether we can get through this. Those are very, very important social, political, hydrological, agricultural, economic questions, which to the credit of those who wrote the Act are required to be considered. That's what the word "strategy" will involve. And that's why I've been looking in the material and so far I regret to say have not found anything to show that the Basin Authority has a strategy in mind. And that leads me to a view, as an administrative lawyer, just as an administrative lawyer, that the Basin Plan may be defective and can be repaired. It doesn't require legislation, it requires obedience to legislation.

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PROF THOM: Commissioner, you referred to number 5 in that table, the strategies to be adopted to manage or address the risks associated with what was listed in (3). There is a very strong body of literature and knowledge about strategies to identify climate change risk.

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THE COMMISSIONER: Yes.

PROF THOM: I note myself and Professor Pittock have both been involved over several years with the National Climate Change Adaptation Research Facility that, unfortunately, the government has just closed down. But over those years, many studies have been done on the Australian context, picking up the international
5 context as well, as to how to frame strategies that would address over different periods of time how one would cope with various types of climate change and the impacts on society as well as on the environment. Sometimes I like to refer to it as the adaptation pathways approach, so you identify a pathway where there are tipping points and you identify in advance those tipping points where action is then required
10 of a certain nature and you plan for that. You're actually planning, not just - - -

THE COMMISSIONER: Meaning you look ahead and make dispositions now for the possible futures.

15 PROF THOM: Correct. And various countries are doing that in different ways. I'm more familiar with coastal than I am with river systems. But it is certainly undertaken in a very sophisticated way. I would have expected by now, given the state of climate change knowledge that we have in Australia, and we have invested billions in terms of – I stress the word billion – in terms of all the work that has been
20 done by modelling by the CSIRO and the Bureau of Meteorology and the science that has been behind that going right back to 1985 when we really started the climate change research effort in Australia and we have done enormously important work contributing to the world knowledge for the International Panel for Climate Change. That knowledge can be embedded into a strategy here. There's no question it can't
25 be done. It's just requires, if you like, the resources and the will to go ahead and do it. And I would expect the next iteration of the Plan would do that and I hope that this Commission's recommendations will reinforce what I'm saying here.

THE COMMISSIONER: This is pure ignorance on my part, for which I apologise.
30 Has there been any guidelines published by the Authority under 404 of the Plan that address climate change I mean?

ASSOC PROF PITTOCK: Other than the academic paper in which the Authority staff members elaborate on how they think the existing Plan is adaptive, no, there's
35 no formal Authority strategy or plan that sets that out.

THE COMMISSIONER: 404 seems to be a formal requirement. The Authority may publish guidelines and they must be made having regard to a standard.

40 ASSOC PROF PITTOCK: If I may give - - -

THE COMMISSIONER: So that's pretty formal.

45 ASSOC PROF PITTOCK: It's very formal and, no, I'm not aware of that having been undertaken. I would say, however, that former Authority member, Professor Barry Hart from 2016 had been very public in explaining some of the consequences of climate change, changing water availability and the policy options the Authority

faced in terms of who would wear the losses induced by climate change to water availability and he, Professor Hart, has been very good in terms of raising those issues and promoting debate. But I'm not aware of the Authority having made any formal decisions about how to proceed on that matter.

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THE COMMISSIONER: Now, one of the ways in which water management, to use an expression from the Act, would address climate change sort of, as it were, 10 years on, when we've seen something happen, would be to observe a drying effect, a combination of change in precipitation – a reduction in precipitation and increase in temperature.

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PROF THOM: If I may be so bold, Commissioner, Professor Karoly, who is a member of the Wentworth Group, has written papers to argue that the climate change signal is already there. So it's not something going to happen, it's already there.

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THE COMMISSIONER: Quite. No, correction accepted. I didn't mean to suggest that whether anything is going to happen is unknown. I am proceeding on the basis of what I have read in the science which is it has been happening and is happening and will happen. Now, one way to deal with that, one would have thought fairly obviously, is to reduce the sustainable diversion limit.

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ASSOC PROF PITTOCK: Yes, that's correct.

THE COMMISSIONER: It's a fairly obvious response to there being less water overall, that there will be less water lawfully available for consumption.

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ASSOC PROF PITTOCK: Yes.

THE COMMISSIONER: Which raises a social and economic question of the risks of investment, and not just of investment in cold terms of cash, but the social dimension of what I will call the dashing of hopes and the disappointment of ambitions. You start a farm and 10 years later you are told that there will be a permanent step-down reduction in the water available for your irrigation enterprise. Which is, as I understood it, including political statements in Parliament, was one of the reasons why we decided to change the habits of our history and for once to be deliberate, overt and if I can use the overused word, transparent about planning for the management of a resource as socially critical as water, which is one of the reasons why – I'm sorry to be labouring the point – but I'm really struggling to understand what aspects of the Plan address climate change. Associate Professor Pittock, in particular could you elaborate more on what you say the Neve and others paper identifies in that regard?

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ASSOC PROF PITTOCK: Yes, the Neve and others paper sets out how the numerical way in which entitlements are expressed are a function and are adjusted on a year to year basis on the basis that water is available. And so their argument is that if climate change induces less water availability that the water entitlements as a proportion of the share of water available will also fall. And so their argument is that

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there's an inbuilt mechanism for adjustment of water entitlements. From an academic point of view, I have a number of concerns with that approach. And that again comes back to the question of thresholds and tipping points; that a linear reduction in a person's right to enjoy access to their entitlement may not be desirable if, in society's interest, we wanted to, for example, keep a critical mass of hypothetically fruit tree growers in the Goulburn Valley to maintain the production facilities.

Or hypothetically we might want, you know, enough cotton grown in a particular area that keeps some cotton gins economically viable, rather than taking the cheese slicer and removing, you know, a bit of water off everybody equally. Similarly, with the environment, while water entitlements might drop linearly, in terms of the held entitlements, as I mentioned yesterday, the Basin Plan envisages a future in which about 25 per cent of the environmental water are in the form of held entitlements principally by the Commonwealth Environmental Water Office that have the same legal characteristic as water used in the irrigation sector.

But 75 per cent or so of the environmental water would be rules-based water, water left over after other entitlements have been issued. And as we discussed yesterday in relation to the Murrumbidgee River, the rules currently that the State Governments have for allocating water in dry years, overwhelmingly favour held water entitlement holders rather than environment. So, if you like, it's a dumb policy approach that doesn't enable any discrimination, any societal value judgment about where that water would best go under climate-induced drying to get the optimal outcome for society, whether that's for the environment or on a socio-economic basis.

THE COMMISSIONER: I'm a little troubled by the idea that it could be regarded as a strategy to manage climate change, that there will continue to be what I will call current fractionating at maximum allocation by reference to how good the season is. Why I'm a bit troubled is that is as old as the hills, isn't it? It long pre-dates the Basin Plan.

ASSOC PROF PITTOCK: Absolutely and it is one of the things that Australians can be most proud of that we did invent this system of water entitlements as a deliberate rejection of the American system.

THE COMMISSIONER: I'm struggling with the idea that a system that said to a farmer, you have allocation X but given our forecast for the season, you can only have 3X on settlement this year. Every farmer who has made submissions to us or discussed matters with us makes it crystal clear that he or she well understands that as a reality of the regulation, and by the way no one seems to resent it because it has that obvious modicum of social justice and environmental common sense. Well, now, I'm more than a little troubled by the idea that academics have come up with the stunning insight that what we were doing anyhow is a strategy to handle climate change.

Or, to put it another way, that Parliament has been ponderously redundant by saying we want you to identify the risk of climate change and your strategy to change it when, as everybody including Parliament knew we already had the factoring down according to current availability of water of allocated amounts. I can't believe, I
5 have to say, that that could seriously be regarded as a strategy to handle climate change. It was already in existence. And this Act is premised on the basis that what is already in existence was inadequate.

10 ASSOC PROF PITTOCK: Commissioner, I completely agree with you. You will be delighted to know that I and other academics have identified a range of potential climate change adaptation measures that could inform a government policy that go way beyond this fractionation of water entitlements. They include some very basic measures. Things like re-establishing riverside forests to shade and protect surface waters, for example, which, again, are a longstanding good practice in the
15 environment, but climate change adaptation gives us a better reason for doing it at a bigger and a faster scale.

THE COMMISSIONER: Actually spend money on it.

20 ASSOC PROF PITTOCK: Actually spend money on it. One of the concerns that we have as the Wentworth Group is that in the change from the previous Murray-Darling Basin Agreement and Commission processes to the Water Act and to the Authority is that a number of these linked natural resource management measures, non-volumetric water management measures that aid the resilience of the
25 communities and the environment in the Basin to climate change, have received less attention and funding or actually been completely defunded.

MR BEASLEY: Just so we're accurate about what the Basin Authority's position is and this does pick up the evidence that has just been given by Associate Professor
30 Pittock. In the exhibit RCE9, which is the CSIRO report providing an analysis of the scenarios adopted in the ESLT report, they say under a section dealing with science:

Has scientific information been consistent and defensible –

35 On page 19 and 20 that –

*...the MDBA has modelled the likely impacts of climate change to 2030 and water availability and this modelling is robust. MDBA has not used this information in the determination of SDLs for the proposed Basin Plan but
40 rather has determined SDLs using only the historic climate and inflow sequences. The panel understands this reflects a policy decision by MDBA to the climate change risk sharing amongst users that is represented in current water sharing plans.*

45 Over the page, there's no need for you to go to this:

MDBA has made a policy choice not to directly adduce the projected impacts of future climate change on water availability in the determination of SDLs.

It goes on to say that:

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If climate change impacts do unfold as projected, lower SDLs would be required to maintain the level of environmental protection offered by the currently proposed SDLs. This represents a significant risk in the longer term and a smaller risk in the short term. The panel understands the MDBA's policy approach to climate change to be an extension of an underlying policy position of "Not requiring a change to water users' rights". The Australian Government's policy position of bridging the gap by acquiring entitlements means the Basin Plan will not require a change in entitlement reliability.

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Future climate change is expected to reduce entitlement reliability both for irrigators and the Commonwealth Environment Water Holder. This policy position on climate change has been explained to the panel by the MDBA as "Accepting the climate change risk sharing amongst users, as represented in the current water sharing plans".

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So that really picks up what you were saying, that it's all dealt with by how much allocation you get per year.

ASSOC PROF PITTOCK: Yes.

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MR BEASLEY: And will get through the water sharing plans rather than being a more holistic approach incorporating climate change and SDLs, which would be lower, if you did that.

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THE COMMISSIONER: Well, yes, and another passage from page 19 of that same CSIRO review is that that expedient of simply accepting the operation of current water sharing plans, is one under which planned environmental water is the least secure water share under a drying climate which I understand Associate Professor Pittock to be making as a point this morning.

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ASSOC PROF PITTOCK: Yes.

THE COMMISSIONER: So that as a strategy to address climate change, this is a policy choice, which the CSIRO is opining is the MDBA's position.

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MR BEASLEY: Yes, and that should be made clear, I haven't got anything directly from the MDBA.

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THE COMMISSIONER: It's the CSIRO's opinion about what the MDBA is doing or not doing.

MR BEASLEY: It reads as though what they were told during the preparation of the report. In any event - - -

5 THE COMMISSIONER: Transparency is rarely assisted by putting some barriers between the thing to be looked at and the person trying to see it. The MDBA could, no doubt, contribute to transparency by simply producing material to make good the CSIRO's opinion or not. But assuming that the CSIRO's opinion, as one might expect, has some expertise and understanding involved, then the MDBA appears to have knowingly committed to a strategy whereby the environment will be more
10 compromised than farming by climate change reduction in water available.

PROF THOM: In our submission - - -

15 ASSOC PROF PITTOCK: Yes.

PROF THOM: - - - on page 31 and 32, with references, we make the statement the environment appears to – bears a greater burden of reduced flows in dry periods as water becomes scarcer environmental water is reduced by about four times as much as reductions in surface water extractions by irrigators. And, of course, the historical
20 knowledge of El Niño versus La Niña cycles tells us – and gives good documentation and the graphs are available to show you here – that those El Niño periods last sufficiently long to create stress, but not only of the environment but also the communities and irrigators and then you get La Niña periods where you get abundance of water and advantages are taken of that abundance in terms of various
25 types of agriculture.

So the understanding of those cycles, I don't see being built into the plan in a way that kind of gives the message to those who are in the Basin that the reality is those shifts from one state to another and how then does the Plan meet that in terms of risk
30 assessment.

MR BEASLEY: I'm just flicking through the ESLT report to see if there's anything in there explaining directly from the MDBA as to why the determination of the ESLT didn't incorporate climate change projections. I can't find it. That doesn't
35 mean it's not there. We will check. I'm not also sure, it might be in another publication, but I haven't seen it yet.

THE COMMISSIONER: The CSIRO thought that the MDBA had not taken any approach other than what they call the policy approach of leaving the settings as they
40 are.

MR BEASLEY: Yes. Although, six years have passed so we will run a check whether there has been any - - -

45 THE COMMISSIONER: Yes.

MR BEASLEY: Because this has been caught up in the discussion of best available science, this isn't so much a question but I do want to just make this point clear while we are in this space of talking about best available science and climate change, that the Act itself uses the expression, as we know, "have regard to" on many occasions
5 which will be the subject of what some of the Aboriginal leaders will be giving evidence where the Act says having regard to Indigenous issues. And the words "have regard to" obviously mean something to an administrative lawyer. The Act also uses the term "take into account" on many occasions which means something to an administrative lawyer. I just want to emphasise on this point that in relation to
10 best available science, the direction is 'must act on the basis of best available science'. It is not have regard to. It is not take into account.

THE COMMISSIONER: It is not merely be informed by.

15 MR BEASLEY: And it is not be informed by. It is act on the basis, must act on the basis. That's always worth emphasising when we're talking to scientists about what the best available science is.

PROF THOM: Professor Thom here. I want to say something about that.
20

MR BEASLEY: Go ahead.

MR BEASLEY: And I want to define, in more clearer terms, what is meant by "science", because I have a feeling that a lot of the so-called science that is being
25 invoked in the work here is based on a particular type of science and is not comprehensive. My reason for saying this is science really flows from testing hypotheses, and you use three different interacting ways to do this.

MR BEASLEY: Yes.
30

PROF THOM: One that you see prominently in the Basin Plan is modelling, and modelling is based on certain assumptions and you apply those assumptions in certain ways and particularly with numerical modelling you formulate your models to test the hypothesis, but you link to those consumptions. But there are other
35 models, such as conceptual models, and I'm basically a conceptual modelist, as distinct from a numerical modelist. Why? Because the second type of science, which I've been devoting most of my career to, is observational science. So as a quaternary geologist I go out and drill holes; I test the conceptual model by drilling holes, and I will talk more about that when we get to it.
40

MR BEASLEY: Is that obtaining data?

PROF THOM: For getting data that tests the – test the hypothesis that was set up in my conceptual model. But that's observational, and when we get to talk about the
45 Coorong and Lower Lakes, I will expound on this a little bit more.

MR BEASLEY: We're getting close.

PROF THOM: We will get there.

MR BEASLEY: My strategy was to deal with climate change later, and that strategy went really pear-shaped, but it's not the first time.

5

PROF THOM: But the third component of science, by physical science, is experiments and you conduct experiments again to test. So you bring all these three things together. Now, in the - - -

10 MR BEASLEY: So science for someone else, looking at someone else's science, they have to be able to – they have to know all the data, all the hypotheses, what the modelling inputs are. Correct?

PROF THOM: Correct.

15

MR BEASLEY: They have to be able to - - -

PROF THOM: Know the assumptions.

20 MR BEASLEY: And the assumptions. And they have to be able to test that, and they have to be able to have all the information they need to prove it wrong.

PROF THOM: And you calibrate your model.

25 MR BEASLEY: Correct?

PROF THOM: You calibrate your model - - -

MR BEASLEY: Is that correct, though?

30

PROF THOM: Correct.

MR BEASLEY: Thank you.

35 PROF THOM: And you calibrate your models against the observations.

MR BEASLEY: Yes.

40 PROF THOM: And what I've been saying this morning in relationship to the El Niño/La Niña is they don't see that calibration in a clear way. Maybe Dr Steinfeld, who knows much more about the numerical modelling than me, will correct me on this. We have numerous debates, by the way, Dr Steinfeld and I, on the value of numerical modelling compared with using historical data associated with the nature of the geological and geomorphological evidence. But my point here is that section
45 of the Act that you referred to, act on the basis – “must act on the basis”, we will show later today when you get to me on the Coorong and Lower Lakes, that they did not act on the basis of best available knowledge.

They ignored 30 years of knowledge in relationship to issues, Commissioner, that you raise, such as sea level rise. Now, why? Why did they ignore that knowledge? I don't know. I have yet to find that out. I've searched, and I don't know. So we will maybe talk about that later.

5

MR BEASLEY: Have you asked what you want to ask on climate change? Because I'm really anxious to get to the Murray Mouth and - - -

THE COMMISSIONER: Move on. And if I revert, I revert.

10

MR BEASLEY: I can – I will come back to climate change because, as I said, there's a report attached to a later document.

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THE COMMISSIONER: It's not a topic that's really easy just to package up and put to one side, is it?

MR BEASLEY: It's not. But – so if you want to keep asking questions about it, but there is – I will give you another opportunity, Commissioner.

20

THE COMMISSIONER: I'm obliged.

MR BEASLEY: Thanks.

25

THE COMMISSIONER: You move on and we will see what happens.

30

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MR BEASLEY: All right. Page 22 of this document, believe it or not, talks about the Murray Mouth. One of the things – and there's a discussion at the top of page 22 about – sorry, I'm being asked what document. I've already referred to it 19 times, but just for clarity, 'Statement on the 2011 Draft Murray-Darling Basin Plan', January 2012, behind tab 4, top of page 22, just so my junior can follow what we are doing – which is important, rather than distracting me – Murray Mouth. One of the things we are – can I approach it this way. One of the things we have been told, not necessarily by scientists, going around the Basin is that it's a waste of water to irrigate the southern ocean, and a waste of water to worry about South Australia's Lower Lakes, which are just used for people to run around in their boats. Can you tell us why it's important, both locally to the Coorong and Lower Lakes, but also on a Basin-wide scale, to have sufficient flow out of the Mouth?

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PROF THOM: Thank you, senior counsel, for letting me speak to this matter.

MR BEASLEY: You even called me senior counsel, not special counsel. Keep going.

45

PROF THOM: The situation, as I see it, as a – with a geological background, is that you see the Basin as an interconnected whole. That interconnectedness goes through to the sea. I like the sea – I thought of this the other day, as I was flying over the Basin, that the rivers are like veins draining to a heart. And the heart is the sea. It's

beating up and down. Over geological time this has been critical because, over geological time – and we take you back, Commissioner, to the Oligocene. Now, the Oligocene is a critical period of time for the Basin, about 33, 34 million years ago. And during that time, the sea made one of its big heart beats and moved right inland.
5 It deposited huge amounts of salt.

That salt is locked up in the limestones and the miles of the Oligocene deposits. Subsequent to that, in the Miocene, we had further incursions of the sea and the sea retreated. Pulsed out and then came back again in the Pliocene and in the quaternary,
10 and beat backwards and forwards, each time bringing more marine deposits into the southern half of the Basin, all the way past Mildura, going into New South Wales. The geological mapping of this has been quite clear and identified that these deposits are the source of huge amounts of salt. One could see the salt as a legacy of the geology or a curse to the Basin.

15 THE COMMISSIONER: When you say salt, you mean basically sodium chloride?

PROF THOM: Basic – it's a mixture of different type of salts, but sodium chloride is critical, yes. Now, these salts are available for release. We have – the Basin is a
20 shallow basin. It's what we call a depot centre, it's several – it's - - -

THE COMMISSIONER: It's a what, sorry?

PROF THOM: A depot centre, a couple of hundred metres deep. And so it means
25 that the salt availability to the surface is not too difficult for – to be released. Particularly in the latter part of the period that I'm talking about, the last few million years, you had uplift and along the Basin, as you know, if you go past Renmark, you start seeing cliffs and those cliffs essentially are of some of these deposits that have been uplifted. Now, a lot of the salt has gone over time, a lot of it has gone, but it's
30 still there. And, of course, we have had episodes of – with – particularly with vegetation clearing over the years, in the Mallee and elsewhere, the chances of flushing out those salts.

Now, when I gave my intro yesterday, I said I was Chair of the 2001 State of
35 Environment Report. At that time there was enormous problems associated with salinisation in the southern Murray-Darling Basin. Essentially, there was a wetter period and there was a lot of flushing going on. That's simplistically how to explain it. And with that flushing of the salt, you – we recognise that we had to find different ways to manage the salt problem. And the states and the Commonwealth have
40 developed, over the years, salt interception schemes of the river, to help with that management. But the recognition – and it's recognised in the Act, in fact, it is recognised very clearly in the – in part 2AA of the Act, particularly 86AA – the recognition of the salt problem, and the need to be able to export that salt. Now, the salt - - -

45 MR BEASLEY: Is that the enhanced environmental outcomes? That part of the Act?

PROF THOM: That's correct.

MR BEASLEY: Yes.

5 PROF THOM: Yes.

MR BEASLEY: Yes.

10 PROF THOM: I want to come back to that section - - -

MR BEASLEY: Yes, you can.

15 PROF THOM: - - - in a minute – minute. But the critical part of the story, in answer to the question, is the recognition in the Act and in the plan to export the salt. If we do not allow that export of salt, it will, as we saw in the millennium drought, we start to see its accumulation and we have seen it historically in other places along the Basin. So the - - -

20 MR BEASLEY: So that – sorry, just – I don't mean to – that's schedule 5 of the plan, exporting 2 million tonnes per year of salt from the Murray-Darling as a long-term average.

25 PROF THOM: That's the – that's correct. So that is recognised. So one of the key answers to the question is the importance of exporting salt. But we also in the process – and as other rivers do, export nutrients and nutrients are important for the organisms that live in the sea.

MR BEASLEY: Can you tell us why it's important to export the salt?

30 PROF THOM: Because – why it's important to export salt?

MR BEASLEY: Yes.

35 PROF THOM: Well, if we didn't export the salt it would be trapped in the river system. We would have to have bigger interception schemes, which would take up precious floodplain areas. We would – we would potentially, given Adelaide's water supply is from the river, have further issues with the Adelaide water supply. So the importance - - -

40 MR BEASLEY: Too salty for human consumption?

45 PROF THOM: Becomes – and there are particular limits for crops that are salt sensitive. And the aim, of course, is to keep those – that salt levels down, and it's documented in the plan, and even in the section of the Act, that – what those salt levels should be. And I think - - -

MR BEASLEY: This is exporting salt from the entire system; correct? It's not just exporting salt at Goolwa.

PROF THOM: This is – this for the entire - - -

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MR BEASLEY: Yes.

PROF THOM: The area where the salt is coming out of these – what we call Cenozoic or – I won't use the term, the technical term - - -

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MR BEASLEY: Please do.

PROF THOM: But the – from that part of the geological Basin which is underlain by Oligocene.

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MR BEASLEY: I asked – I knew the answer to that question. I asked it to assist some members of Federal Parliament, in case they're interested, but please keep going.

PROF THOM: And members of Federal Parliament – I have spoken to at least one who has property along the river – are very conscious of the salt problem, extremely conscious, because they have seen over the years their – because of the generations of living along the river, they've seen adverse impacts of salt. So the science is fairly clear about the need to be able to export salt. Now, most of it gets flushed out during the floods. So the flooding events are the big important events to do the flushing.

25

MR BEASLEY: I interrupted you when you were moving on to nutrients.

PROF THOM: Well, nutrients – I mean, along – along rivers – well take elements out of the rocks and out of the sediments and move them in a dissolved way into the sea. And, of course, that's picked up by the various food – picked up by the food chain and ends up, of course, moving up the food chain to the bigger critters. So it's a vital part of any coastal and marine ecosystem to have river, rivers taking nutrients to sea. They also can take toxins, if we are putting pesticides and things like that, that are again adverse to various organisms or to the communities, they canning flushed also to the sea. So a fundamental aspect of this interconnected system from the veins to the heart and the heart is continuing to beat because, to answer a Commissioner's earlier question, the sea level is rising. It's beating, it's coming up again, it's on its way up. And in doing so it's providing part of the very important story about the Mouth.

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MR BEASLEY: Can I ask you a question about sea level rise, given you have raised it. The Commission has received a submission by a person called Professor Nick Harvey, who has – his submission deals with sea level rise and how, unless you factor that into your SDL and the amount of flow you want – you are seeking to have through the Mouth, then natural littoral drift of sand is going to counteract that and you are not going to achieve, for example, anything like the enhanced environmental

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objective in schedule 5 of ensuring the mouth of the River Murray is open without the need for dredging at least 95 per cent of the years, with flows every year through the Murray Mouth barrages.

5 And we contacted him and said, “Do you want to give evidence about this?” And he said, “Yes, I do, but Professor Thom can probably handle it.” So can you tell us about sea level rises and any impact that would have on the objective of keeping the mouth of the Murray open.

10 PROF THOM: First of all, let me tell you - - -

MR BEASLEY: And anything else you want to tell us about sea level rise.

PROF THOM: - - - about Professor Harvey.

15

MR BEASLEY: Okay.

PROF THOM: A colleague of mine and we have published together. Professor Harvey started work on the Murray Mouth and published back in 1983, and more recently right through to 2015. So he knows a lot about the dynamics of the Mouth, and particularly the relationship of the Mouth to the barrages – and I can come back to that story in a moment because that’s critical – but the important thing about Professor Harvey’s work is the way in which he understands the nature of marine processes and how they change the nature of the Mouth over time. Now, this is important in the context of understanding not just contemporary sea level rise but what we call post-glacial sea level rise. And he has documented this, along with others. It’s not just him, but he’s worked with others.

30 The critical thing to note here is that the sands that form the Mouth of the Murray, all the way along the Peninsulas, the Younghusband and the Sir Richard Peninsula have been derived from the sea. They have come on shore as a result of sea level rise over the last, let’s say, 10,000 years, and reached their present position around 6,000 – six and 7,000 years ago. That sweeping of the hard what we call calcarenite shelf has swept the sands into their current position. And form a wedge of sand, goes down to 35 minus 15 metres – approximately minus 15 metres.

Now, that is a big volume of sand there on the – in the below sea level, but in the process of sweeping up the sand there’s also a volume of sand that has been swept up into the dunes to make those Peninsulas. Now, as sea level rises, those sands of the 40 Peninsulas will get – move by what he calls, I think, “littoral drift”.

MR BEASLEY: Yes.

PROF THOM: And moved by littoral drift towards where? Towards the Mouth, because what we have got what we call a bidirectional flow system. Not one way; 45 it’s coming from both directions depending on the weather condition. That sand has one place to go and that’s into the Mouth. Some would say it could go offshore.

However – however, we have a very exciting and very distinctive wave regime that operates offshore. It’s a highly dissipative system with what we call asymmetrical wave orbits which tends to push sand back towards – any sand that’s taken offshore gets pushed back on the shore.

5

MR BEASLEY: Right.

PROF THOM: It’s what we call a sediment sharing system. And this process of sequestering sand into the inlets is well known from a rising sea level situation from a lot of work that has been done on the Dutch coast.

10

MR BEASLEY: Right.

PROF THOM: Several publications I can refer to you with respect to that. The important point here is: why would we continue to have sand coming into that inlet when we have a river? Well, the natural flow, prior to extractions up in the Basin and prior to the barrages, was sufficient with the tidal flows that moved in and out of that inlet to keep it open just about all the time. There’s no historic record of actual closure until 1981.

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MR BEASLEY: Yes.

PROF THOM: Right? Now, what happened with the barrage construction is you changed the tidal prism of particularly Lake Alexandrina.

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THE COMMISSIONER: What do you mean by that?

PROF THOM: Tide – that’s the area where the tides are operating. The surface area where the tides are operating. We call it the tidal prism. It’s a – that area was changed from approximately 100 square kilometres to 10 square kilometres. So we had a 90 per cent reduction in the tidal prism. We also had the intent of the barrages to make the area of Lake Alexandrina, Lake Albert, fresh water, and – for various purposes, water consumption, irrigation, water supply for – for stock. And that intent had a – had a big effect on the Mouth. It meant that that component of the Mouth flow from the land was reduced substantially. And there’s some figures, I’ve gone through a whole range of different statistics, and some of which are summarised in our 2017 report, and I can give further references, but they’re basically all in there.

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THE COMMISSIONER: When you say from the land, you mean the land more or less contiguous to the lakes?

40

PROF THOM: No, from the – from the river. From the river.

THE COMMISSIONER: From the whole Basin?

45

PROF THOM: From the – from the whole Basin. So you have – approximately 40 per cent of the time since about in – since about it the 70s, 40 per cent of the time

there's no river flow. Then there are these big flushes and then there are smaller amounts that are let over the barrages, some controlled measures. There's various data on this which I have at my disposal. It's not all that relevant in terms of the broader concept of the way in which the river is now managed by – at – at those
5 barrages to keep that lake level at a particular level between point 4 and point 75 metres over Australian height datum. That's the critical level.

Now, with that – that means that the tides are the only thing that can keep that Mouth open. But the tides have to compete against the waves and the waves, as I said, are
10 moving sand towards that mouth all the time. Tides get flushed out with a big flood like we had in 2010, like we had a little bit in 2016, but at the same time the waves are going – beating against the coast and pushing that sand back in again. And so you've got this continuous trapping of sand. Now, we were very fortunate. We, the Wentworth Group, was very fortunate a couple of years ago when we started to
15 investigate this in some detail. We had initial concerns that the Basin Plan wasn't addressing this, but we didn't have the – all we had was Professor Harvey's historical data, but we didn't have any real data that I knew the South Australian government had at its disposal.

20 We were very fortunate in contacting the then-Minister, Minister Hunt, and he made available to us materials that dealt with the River Mouth. There are people within the Department of Environment and Water who were extremely useful in supplying us with a whole range of what we might call tipping points. We come back to this concept of tipping points in relationship to flows into the lake and flows into the
25 Coorong system. Those – that information we have summarised in our submission, and in more detail in our 2017 report, particularly pages 37 and 38, and page – I think – 63.

MR BEASLEY: Just stop there, because lawyers like to break things up into really
30 small bits. You mentioned page 63, and you don't need to go to this at the moment, but it's the document behind tab 10. You're talking about the Wentworth Group's review of water reform re Murray-Darling Basin, and you mentioned page 63 where you are talking about an open Murray Mouth, and you suggest that the prospects of having the Mouth open in at least 95 per cent of the years is beyond doubt,
35 reasonable doubt, impossible. One of the reasons you give is the fact that the modelling underpinning the Basin Plan did not incorporate the information relating to marine processes affecting the Murray Mouth. They are the marine processes you have just been describing in your evidence; correct?

40 PROF THOM: Correct.

MR BEASLEY: And what Professor Harvey has told us – and I just want to make sure that we get – whether you agree or don't agree with this, but one of the things he said, the amount of sediment that is moving towards the Mouth is highly likely to
45 increase as sea level rises. That's the first proposition; is that your view?

PROF THOM: That is correct and that's the, again the experience that's happened on the Dutch coast with sea level rise, with movement of sediment into the sea.

5 MR BEASLEY: And he has referred to us to some CSIRO modelling by someone called Webster in 2009, that was prepared for the – he says the Murray-Darling NRM board. I'm not even sure what that is, but anyway, that estimated sediment movement based on an impact of 0.2 to 0.5 sea level rise could be expected to result in 8 million cubic metres of sand moving towards the Murray Mouth and a one metre rise could result in up to 16 million cubic metres of sand.

10 MR COSIER: Peter Cosier. Just to clarify the Murray-Darling NRM board would be the South Australian NRM body that is responsible for that area of the Murray.

15 MR BEASLEY: Thanks for that. Then he goes on to say, unless you factor that in – he talks about into management strategies, I suppose that's one way of doing it. You are talking about, in your submission to us, the modelling. Then you are – simply got no hope of achieving that enhanced environmental objective of having the Mouth open 95 per cent of the time unless you have a lot larger flow.

20 PROF THOM: Unless you have a lot larger flow or you dredge

MR BEASLEY: Dredge constantly.

25 PROF THOM: Dredge. So when I – as Professor Harvey did – referred to section 86AA(2)(c), ensuring the mouth of the River Murray is open without the need for dredging at least 95 per cent of the time.

30 MR BEASLEY: Well, that's the point. That's the objective in schedule 5, and that's what in the Act.

PROF THOM: And so that – as in the Act – is wrong and cannot be achieved. And our diagram - - -

35 MR BEASLEY: Well, it may be in the Plan, it may be an aspiration. Lots of things may be aspirations in the Plan.

40 PROF THOM: I do not understand whether that section, that amended section is – I assume it's a non-binding aspirational clause that has been placed into that amended section of the Act.

MR BEASLEY: Well, it says without limiting subsection (1) environmental outcomes can be enhanced in the following ways. Perhaps they can't be.

45 THE COMMISSIONER: Well, this is something I'm going to have to report on as a matter of law, among other things, because I'm required to report to the Governor about the prospects of the plan achieving the objects of the Act. As Mr Beasley has just pointed out, the rather curious wording of 86AA(1), just using the – selecting the

material parts is that the object of these provisions, so the object of the statute, is to enhance environmental outcomes. Shows a touching faith in the effective legislation on the real world. But any how:

5 *The object of the legislation is to enhance environmental outcomes that can be achieved by the Basin Plan.*

I think as a composite phrase that refers to – I will call it observance of these provisions in the Act resulting in provisions of the Basin Plan itself, which then feeds back – I’m sorry to be so complicated but that’s how it works – it feeds back because the Act requires the various players to comply with the Basin Plan. So it’s rather odd
- - -

MR BEASLEY: Then you go to 7.09 of the plan which says:
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The easing of constraints, and the additional 450 gigalitres, and the 2,750 gigalitres allow the enhanced environmental outcomes in schedule 5.

So they’re allowed by that.
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THE COMMISSIONER: If I may say so, that is not much more than a rather awkward paraphrase of aspects of 86AA(2) of the Act, which says:

25 *Environmental outcomes can be enhanced in ways that include ways consistent with the authority’s modelling of increasing the volume of water available for environmental use by 3,200 gigalitres.*

Now, that may have just slipped away in history now, bearing in mind where we are up to in terms of water recovery. But as Mr Beasley points out, another way is consistent with the easing or removing of constraints. And then, oddly, there is a stipulation in subsection (3) that the object of this part – and you’ve got to remember that the object of this part is to enhance the environmental outcomes that can be achieved by the Basin Plan. I don’t know what “enhance the environmental outcomes” means precisely but I think it means results which are thought to be more beneficial or favourable for the environment. I don’t think it means increasing the prospect of achieving a goal. I think it means raising the goal. I think. In any event
- - -

MR BEASLEY: They say – this in a note to 7.09 to the Basin Plan, it says that the outcomes, environmental outcomes in schedule 5 reflect the results of the 3,200 gigalitre year modelling with relaxed constraints scenario.
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THE COMMISSIONER: Yes, well, again, that is of no use to anyone because that’s what the statute said and the Plan hasn’t done anything more than the statute. Then subsection (3) which is what I’m – I would be interested to know what you four think – actually stipulates that the object of these enhanced environmental outcomes is to
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be achieved by – now, I don't know whether what follows is an exhaustive statement, that is, these are the only two ways in which it can be done. It says:

5 *It is to be achieved by attention to constraints and by increasing the volume of water available for environmental use by 450 gicalitres.*

Now, the use of the word “increasing” obviously raises the question, increasing from what? And we know the answer to from what is a reducing number over the last few years by the adjustments in question. But it is still 450 gicalitres. Now, I think we
10 all know that the 450 gicalitres is the subject of intergovernmental agreement that renders it non-mandatory, in the sense that it is conditional upon neutral or beneficial and social and economic effect. That is not yet demonstrated, if I can put it that way.

MR BEASLEY: And people taking a
15

PROF THOM: Can I suggest there is a linkage in some form between that section 3(a) and 86AD(2)(iii) where there is discussion on the purposes of water for the environmental special account.

20 MR BEASLEY: Do you take this Act to bed with you, Professor Thom?

THE COMMISSIONER: Yes.

PROF THOM: That then refers to the use of the account to improve or modify any
25 infrastructure (including bridges or roads) that constraints the delivery of environmental water to environmental assets.

THE COMMISSIONER: Yes.

30 PROF THOM: So it's a very expressive linkage there expressing Parliament's concern that those – there are hindrances, there are these obstacles, if you like, for the way in which water can be best disposed for the purposes of environmental enhancement – I use that word – to – which is consistent with the intent of section 86AA.

35 THE COMMISSIONER: Particularly when you go to 86AA(2)(g), we're talking about the, what I might call the restoration of former floodplains to the status of being floodplains again.

40 PROF THOM: Yes.

THE COMMISSIONER: That's where the constraints for which money may be spent in their removal or protection. So that I, at the moment, am not clear about the status of 86AA in terms of what it compels the Authority to do, requires the
45 Authority to do. And in turn then requires everybody bound by the Plan to do. But I will deal with that as a matter of law later. But I am interested in this discharging of this two million tonnes of salt per year as a long-term average, which is part of this.

That is described, I think, as one of the ways in which environmental outcomes can be enhanced.

5 A contrast that is possible is that between environmental outcomes being
compromised, which is what I might call the minimalist approach taken in the
definition of environmentally sustainable level of take, and environmental outcomes
being enhanced, and this picks up, I think, two key words in the statute: protect and
restore. And picks up the premise of the statute, made explicit in the statute, and
implicit in the legislative history that we all came to this accepting that we were
10 taking too much water, too much in the sense of damage to the environment. Why
two million tonnes? That's obviously a round figure. Is that based upon empirical
observations? This is for Professor Thom in particular.

15 PROF THOM: I would ask – Dr Steinfeld, I think you are probably more familiar
with the question of the salt tonnages and the story behind that.

THE COMMISSIONER: Is two million a figure that will, as it were, have the river
system doing what it has been doing for eons or what?

20 MR COSIER: If I can take a slight step back to Professor Thom's evidence about
the deposition of salt in the Basin, and its particular relevance to South Australia and
obviously to your Royal Commission, Professor Thom mentioned the clearing of the
Mallee in both north-eastern South Australia and western Victoria liberated – so
there's salt going through much of the Basin but in particular relevance to South
25 Australia was the clearing of the Mallee.

THE COMMISSIONER: Could you just explain how it releases?

30 MR COSIER: Because Mallee vegetation is very shallow rooted vegetation. It's in
a desert and it's a very, very dry, arid environment. So when you get rain in the
Mallee, the Mallee grabs that water as soon as it's possible to grab it. When you
remove the vegetation, that water has the ability to filter into the soil and release the
salts and move - - -

35 THE COMMISSIONER: When you say release, you mean it reaches a point where
there is crystallised salt and it dissolves it.

40 MR COSIER: It becomes – this dissolves, it becomes liquid. It enters the
groundwater and then is pushed by gravitational forces into the river system around
Renmark. So the salt diversion schemes that were built in South Australia in
particular grab those depositional points along the river and pulled that very salt-
laden water out.

45 THE COMMISSIONER: Don't take too long on this but how does it do that?

MR COSIER: Without taking too long, the salts enter the river system at particular points through the groundwater. Those points is where most of the salt enters the river system and they just pump that salty water out before - - -

5 THE COMMISSIONER: These are the interception schemes that were pointed out to me when I was up there.

MR COSIER: The interception schemes – before it hits the river itself.

10 THE COMMISSIONER: So it's pumped out.

MR COSIER: It's pumped out.

15 THE COMMISSIONER: And it's in effect brine, is it?

MR COSIER: Put into evaporative basins and evaporates away so you end up with a lot of salt in these evaporation basins. So that's the traditional method and it has been critically successful in making the water quality for the Riverland agricultural and horticulture industries viable since the 1970s. Without that we would not have irrigated horticulture in the Riverland. So that has released the salts. Dr Steinfeld will give you some quantified figures at the moment, but to give you an example of what the two million tonnes means, that's the equivalent of about five thousand tonnes of salt per day. It's the equivalent of 300 semitrailer loads of salt. So if you lined – how many semitrailers, we don't know how many.

25 THE COMMISSIONER: Just a lot.

MR COSIER: If you lined all the semitrailers up, lined the 300 semitrailers up between the Adelaide Oval and South Terrace, that's how much salt we need to export from the river system every single day in order to satisfy the Basin Plan and the Act.

30 THE COMMISSIONER: Well, my question about – Dr Steinfeld, if you can respond to this – my question about the two million - - -

35 DR STEINFELD: Yes.

THE COMMISSIONER: It was something like two million happening in the past.

40 DR STEINFELD: Yes.

THE COMMISSIONER: What's happening now?

45 DR STEINFELD: Yes.

THE COMMISSIONER: Are we likely to reach two million and underlying all of this is two million seems to be an awfully convenient round figure. It is arbitrary and

I've got no problem with it being arbitrary or an estimate but could you explain why it is two million?

5 DR STEINFELD: Yes. So my understanding of how the Authority came up with the kinds of figures is because the Authority modelled the salt export over the period 1975 to 2009 and they estimated that the salt export for that period was about 3.8 million tonnes of salt without development conditions. And that's per year. And then under baseline conditions they did another scenario and found the salt export to be 1.66 million tonnes of salt per year. They also understood the projected increases
10 in salt that Mr Cosier was referring to and they referred to numbers like the salt is projected to increase by 1.91 million tonnes of salt per year under the – well, the 2,400 giga-litre scenario so adding more water would help them to, you know, meet future salt projections and up to 3,200 scenarios they would be able to export two million tonnes of salt per year.

15 THE COMMISSIONER: Now, why is exporting two million tonnes rather than 1.6 an enhanced outcome?

20 PROF THOM: I think it's a good approximation in relationship to the overall understanding of the load of salt in the system. It won't happen every year, as Dr Steinfeld says. But I think it's a good enough figure to work with in a planning sense. This is probably one of the better parts of the plan from my perspective, an appreciation of this as something to export out of the system into the sea.

25 THE COMMISSIONER: I'm so sorry, I'm struggling with some of these concepts. It's exported in the sense that dissolved salt, comes into the water resource from the effect of precipitation in the catchment interacting with these antediluvian deposits, is that correct? That happens in nature.

30 PROF THOM: That's correct.

THE COMMISSIONER: Do we have any concept – and say Professor Thom you as a geologist, are you able to help me here – do you have any concept of whether in nature over the very, very long-term, the conditions are such that the salinity of the
35 water would not, as it happens, be appropriate for irrigation?

PROF THOM: Yes. I will try to work this through. One of the great pieces of more recent geological work done in the Basin has been the discovery of what has happened with respect to groundwater during the last 40,000 years.

40 THE COMMISSIONER: Yes.

PROF THOM: We know this from the very detailed work that has been done around the area where – around Lake Mungo, Lake Keilambete and other parts of the
45 Basin, where the late quaternary – what are called the late quaternary period record has been discovered through geological processes. And what has been discovered there is that we went through a wetter period, around 30 to nearly 40 thousand years

and that's when there was intensive Indigenous occupation of what was effectively freshwater lakes during this period. It's a colder period, less evaporation but it was, in a sense, a very, very productive period for fish and other organisms that Indigenous people lived on.

5

THE COMMISSIONER: So less salinity than we now have?

PROF THOM: Less salinity. Then we had a period of greater dryness and desiccation and a lot of the waters that were available in that area started to dry out, and in the process of drying out, saline crusts were developed. Then, in the last 10,000 years, approximately 10,000 years, things have got wetter again, and it's during this period, as Dr Cosier – I've given him a doctorate today – Mr Cosier has said the Mallee vegetation really started to take over and with the Mallee vegetation taking over, the water table started to drop down. But once the Mallee vegetation was cleared, then the access to those groundwaters became more available, and particularly with extraction for water through irrigation channels and so on.

10
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THE COMMISSIONER: So the transpiration of the Mallee acted so as to reduce what would otherwise be the level of the water table.

PROF THOM: That is correct. And, as a result of that, with that removal of that native vegetation - - -

25

THE COMMISSIONER: The water table rises.

PROF THOM: - - - the water table, seepage takes place, and then you need a flushing mechanism to flush that out and that was what was happening in the 60s and 70s with the wetter period we had, and a lot of that salt got liberated and, as Mr Cosier said, became available and mechanisms such as interception schemes were established to help trap it.

30

THE COMMISSIONER: Because, in nature, that flushing would at least temporarily increase the salinity of the river?

PROF THOM: Under circumstances prior to European clearance of vegetation, the effectiveness of the salt in the system would have been far less than it has been subsequently.

35
40

THE COMMISSIONER: Right.

PROF THOM: So what we have done in our clearance of the Mallee and other vegetation, we have exacerbated the problem, or exacerbated the release of salt to the point that, as Mr Cosier said, there are certain types of crops, I think oranges for example, are very, very sensitive to a small amount of salt. I think it's 600 microsiemens

45

MR COSIER: Commissioner, it's – sorry to interrupt Professor Thom. But the – it comes back to the discussion we were having yesterday and earlier this morning about thresholds. So at the moment we are putting water on the oranges, and they're growing fine, but when you get the wetter periods and you get the flushing, that's
5 when the salt levels in the river rise. And the issue with permanent horticulture is that, if that happens, you lose your crops. Right? After five years it takes to grow an orange tree, to produce oranges, the orange trees will die. So I think the goal for the salinity levels in South Australia, about 800 – what they call ECs, electrical conductivity units, my understanding – well, my recollection is if the ECs rise to
10 something like 1500 ECs, the salt levels in the river, then that starts to kill the orange trees.

THE COMMISSIONER: To go back to something that I think Dr Steinfeld was telling me about, the 2 million is then what might be called a judgment call on the
15 level of export - - -

DR STEINFELD: Yes.

THE COMMISSIONER: - - - out the Mouth, which will have an effect thought to
20 be beneficial on the environment and known to be beneficial to farming. Is that – have I got it right or not?

DR STEINFELD: I don't know the logic of the authority we were thinking about at the time, but it was what they modelled to be able to be achieved under a 3,200
25 gegalitre water recovery scenario.

THE COMMISSIONER: And if it could be achieved it was a good thing in the sense I've described; is that how you understand the thinking?

DR STEINFELD: That's my understanding of the thinking. And there has been some subsequent measurement of the salinity export targets in the Murray-Darling and some of the salinity export targets have been achieved in the period 2010 to 2013. They use a three year rolling average to measure the salinity export targets. That was a period just after the millennium drought had kind of broke in and
35 included quite a wet period of flooding. And the salinity target was well and truly met, 2.9 million tonnes of salt was exported over that three year period each year, but subsequent to that the Basin started to dry out and the next three year period from 2011 to 2014 the salt export targets had not been met, only 1.5 million tonnes of salt was exported in that period. And then - - -
40

THE COMMISSIONER: There's a long-term average.

DR STEINFELD: The – a three year rolling average, and this is actual model figures for that period.
45

THE COMMISSIONER: How do I know it's three years? I go to the plan, or - - -

DR STEINFELD: The Murray-Darling Authority releases a report called the 'Achievement of the Salt Export Targets', and that's where they report against their achievement in the targets in the Basin Plan.

5 MR BEASLEY: I've read something about all of this. I just can't remember where it is at the moment.

THE COMMISSIONER: The long-term average, which is the statutory expression, what's the relevance of three years to that? What is a long-term average in terms of
10 years? Is it a rolling average system?

DR STEINFELD: Yes.

THE COMMISSIONER: So rolling over what period? I realise one rolls
15 indefinitely. I mean what are the periods that make it a long-term average?

DR STEINFELD: So for the authority when they measured the salt export targets, they used the period 1975 to 2009 so that, on average, through that whole period, two million tonnes of salt would be exported per year, but when they do their
20 measurement my understanding is they break it down into three year periods to check whether or not over the past three years that salt export

THE COMMISSIONER: Three years is, as it were, the check that the long-term average is being sufficiently approached.
25

DR STEINFELD: Correct.

THE COMMISSIONER: In other words, you don't fail long-term average by a bad year?
30

DR STEINFELD: Correct.

ASSOC PROF PITTOCK: Commissioner, if I might add, Associate Professor Pittock. This comes to a critical point that if the salt export targets are not being
35 approved – not being met, the way to meet them is to have more water flowing down the river out to sea to take – take more salt out. And the issue with the SDL adjustment projects, that those projects that purport to conserve more biodiversity with less water, is that the paper water bought through those projects is not real water that will flush salt out to sea. And so that disadvantages achievement of those salt
40 export targets.

MR BEASLEY: I will come to that.

THE COMMISSIONER: Historically, the 2 million is attached by MDBA
45 modelling to the increase of the volume of water resources available for environmental use by 3,200 GLs; isn't that right?

MR BEASLEY: Yes, on a reduced constraints scenario.

THE COMMISSIONER: Yes.

5 DR STEINFELD: Correct. Because the scenario for 3,200 is used to model that two million tonnes target.

10 THE COMMISSIONER: That's what I'm trying to struggle with. Has anyone, hydrologically or otherwise, suggested you could get 2 million with 2,200 gigalitre recovery?

MR BEASLEY: No. I think that the CSIRO report makes it pretty clear that the 2,800 plan won't achieve that.

15 THE COMMISSIONER: Well, I just put 2,200 because that's probably closer to where things are.

20 MR BEASLEY: Well, not according to Professor Williams and Professor Grafton. We may not even be anywhere near that.

THE COMMISSIONER: You are quite right.

25 MR BEASLEY: Put the published material, yes, you're quite right. The MDBA asserts that 2,107 has been recovered to date.

THE COMMISSIONER: And has anyone suggested that that could lead to the discharge of two million tonnes of salt per year from the Basin as a long-term average?

30 DR STEINFELD: Well, we know from the Murray-Darling Basin's own modelling that they did in 2012 that 2,400 recovery would only return, well, export 1.91 million tonnes of salt per year. So anything less than that - - -

35 THE COMMISSIONER: Will not be 2 million.

MR BEASLEY: In fairness to the Authority, they are of course asserting that 36 supply measures will result in 605 gigalitre of real water, and the efficiency measures will ultimately result in a further 450 gigalitres of what is called "up water", whatever that means.

40 DR STEINFELD: Can I also bring an interesting point to the supply measures that Jamie mentioned. That will exacerbate the salinity issue for some supply measures; that we have looked at some of the business cases and some of the business cases are proposing the mitigation measure, to use environmental flows as dilution flows to manage the risk of salinity. So not only will the risk increase, but the environmental water that was contributing towards the two thousand and whatever figure could be used to mitigate the risk.

45

MR BEASLEY: I'm going to come to the supply measures and I'm not overly keen on you hijacking when I do that, but I thank you for your answer there.

5 ASSOC PROF PITTOCK: Senior counsel, at risk of diverting you from the Oligocene, can I elaborate on your opening question about the Coorong and Lower Lakes Murray Mouth - - -

MR BEASLEY: Please do.

10 PROF THOM: - - - about the upstream stakeholders – some upstream stakeholders arguing, “Why can't we let the sea into the Lower Lakes?” One of the values of risk.

THE COMMISSIONER: Does this include by just removing the barrages as well?

15 ASSOC PROF PITTOCK: Correct. Professor Thom has outlined the salt export issues, outlined the issues around keeping the Mouth open. He touched on the question of the fisheries values, that the in-shore marine fishery is very significantly enhanced by those outflows. There was a historically a very important fresh water fishery in the river and Lower Lakes that has been significantly degraded as a result
20 of poor management.

MR BEASLEY: Salinity goes up too much, there's that test for that plant which is - - -

25 ASSOC PROF PITTOCK: Yes. Which brings us to the Coorong lakes, Alexandrina and Albert, which are a Ramsar listed site and a matter of national environmental significance under the Environment Protection and Biodiversity Conservation Act.

30 MR BEASLEY: Well, one reason for not doing this would be that it's against the law.

ASSOC PROF PITTOCK: Indeed.

35 MR BEASLEY: Leave that minor thing aside. Now, tell us why it's important environmentally.

ASSOC PROF PITTOCK: So what Australia undertook to do is maintain its ecological character under the Ramsar convention, at the condition that the site was
40 at in 1985 when it was listed. That ecological character is detailed in a beast called a Ramsar information sheet, which is the official document - - -

MR BEASLEY: Is that the aim, to keep it in the condition it was, when it was listed, as a wetland of international significance under the convention?
45

ASSOC PROF PITTOCK: The Australian Government had a choice but, by default, chose the 1985 condition as the base line condition, if you like. And then in that

Ramsar information sheet the Australian Government has spelt out the particular ecological components and the status of those components that we as a nation aspire to maintain that in. That will be - - -

5 THE COMMISSIONER: I think we actually bound ourselves.

ASSOC PROF PITTOCK: We have, yes. Now, there are some circumstances in which that could be adjusted but the Australian Government has not availed itself of those mechanisms at this point in time. Can I also pay my respects to the
10 Ngarrindjeri people who are the traditional owners of the area and their elders, past and present. They have been – among other achievements, they have published a particularly detailed land and sea country management plan for their traditional country and I hope the Commission has been able to avail itself of that document.

15 MR BEASLEY: A representative of the Ngarrindjeri's going to be giving evidence, amongst other Indigenous groups, Aboriginal groups, nations.

ASSOC PROF PITTOCK: I won't attempt to speak for them, but as a western
20 scientist I will point out that a number of the values that they identify in that land and sea country management plan are dependent on particular water qualities and salinities and, to give you just one example, they highlight the importance of nesting colonies of swans as particularly culturally important, and that has been jeopardised by poor management of the Coorong system.

25 THE COMMISSIONER: So if flows aren't increased materially, but the barrage is reduced, the sea continues to rise, those are values which will not simply be compromised but destroyed. Is that - - -

ASSOC PROF PITTOCK: That is a great risk and there's almost certainly going to
30 be a different ecosystem in this area in the future. We think that the Basin Plan, by looking backwards, isn't doing us a great service and the Wentworth Group has argued that we need a whole of community process with stake holders, with the South Australian government, with all the fragmented management of different parts of the system by different South Australian entities and the Federal Government, to
35 try and identify what physical states are possible in the future with water extraction, with climate change, with sea level rise, and try and agree on a new and a practical state that we can manage the system towards. Now, some of that has been set out in a report to the national climate change adaptation research facility, led by my colleague Katherine Gross and published in 2012, which I could make available.

40

MR BEASLEY: Please do, we would like to see that, thank.

ASSOC PROF PITTOCK: Let me finish by saying there are other values in this
45 area that – where there are obligations to conserve. For example, there are a number of threatened species of national environmental significance under the Federal legislation, fresh water dependent fish species, for example, where there needs to be

an articulation about how they would be maintained in the future that we have not seen as yet.

MR BEASLEY: Thank you.

5

PROF THOM: Senior counsel, can I comment further on that point?

MR BEASLEY: Please do.

10 PROF THOM: First of all, just to come back to section 86AA(2)(c), the evidence for our criticism of that particular clause is contained in figure 6 of our submission. So figure 6 of our submission provides you with the basis for that – our, if you like, rejection of that particular clause. And, as I said before, we have obtained that information from the South Australian government. So it does indicate, if you like,
15 that there will be a need for the dredging operations of a scale similar to what we have at the present time, which involves two dredges, operating at around 95 per cent plus at the time.

And that will keep the – particularly the type of drainage into the north Coorong and in context of what Professor Pittock said, maintain at least for the time being those
20 ecological values in the north Coorong. I want to particularly focus on the impact of the millennium drought on Lake Alexandrina and Lake Albert, because I think this ties in with the problem of pathways and adaptation with sea level rise and the future of the barrages. It's something we have touched on in our submission and in our –
25 it's – 2017 report. The critical issue with the millennium drought was the failure to get sufficient water into Lake Alexandrina past Wellington.

The critical level to keep it around about, it's .4 above AHD, it's around about 2
30 gicalitres per day. Anything drops below that, then evaporation – which is operating at around – at the moment 6, 700 gicalitres, per year, but probably will go up with climate change, because of heating projected, maybe to 800 gicalitres per year. Then the lake level starts to drop. And during the millennium drought, the lake level dropped to 1.4 metres below AHD. I think we provided the Commission with
35 photographs that we have taken to illustrate.

MR BEASLEY: You're heading towards acidification.

PROF THOM: I will come to acidification in a moment, but I think the important
40 thing to note is the impact not just on acidification but on the community as a whole, on the stressors placed on the community, on the water supplies, on servicing agricultural activities around – everything was put under huge stress for that – about eight year period. The documentation that we have in our submission on figure 7, page 29, shows how dramatically the lake levels dropped below their standard level. And how salinity rose. So salinity rose by eight to nine times during this period. But
45 it wasn't just the salinity issue. Part of that salinity was due to seepage through the barrages and there were attempts to plug the seepage, and there was some salt from the river as well.

But the critical thing was that with that seepage and Professor Mike Geddes – I don't know if he is giving you a submission, but he's the expert on this – he has demonstrated that with that seepage, you got the larvae of a wonderful entry named tube worm called ficopomatus enigmaticus. It's a lovely name. I will have to spell that out for you later.

MR BEASLEY: Just wondered how the court reporter went with that, but we will be right. Yes.

10 PROF THOM: But this tube worm - - -

MR BEASLEY: pass the remote. Yes.

15 PROF THOM: - - - was growing and grew on turtles, school kids came out to scrape the – now, this is exactly the opposite circumstances from acidification. This is due to the high alkalinity and presence of that larvae that seep through. Now, the larvae is growing all the time on the seaward side of the barrages. You've seen that taken photographs. They take the gates out and scrape it off. So the larvae is sitting there, waiting to come in at a tipping point, and it came in during this period.

20 It started to get these kinds of larvae growing into the tube worms.

MR BEASLEY: I noticed a few seals, I didn't notice the larvae.

25 PROF THOM: Have a close look next time you go. But the critical thing here is that that is the opposite to the acidification issue. Because whilst in certain parts – particularly around Lake Albert and around creek and Currency Creek there was the exposure of the sediments which are rich in sulphide that became acidified, oxygenated and the acids, so you had a PH dropping down to close to 2. So one part of the lake the PH is about 8, 9, the other part is 2. This is an extremely mixed

30 system and obviously not a very advantageous system to have. Now, given what we have said about climate change, increasing heat, problems of water getting down to the lake, is this the scenario that we're heading for? The millennium drought scenario, into the future. Should we - - -

35 MR BEASLEY: As the norm.

PROF THOM: Should it be more, I won't use the word norm. More common under El Niño circumstances under climate change in the future.

40 MR BEASLEY: Sorry. Yes. All right.

MR BEASLEY: And that combination of circumstances then needs to be looked at in a plane. We cannot say that this is a freak event, because all the circumstances that we have talked about here today can repeat itself. And repeat itself more

45 frequently under climate change. So the circumstances in then what is the – what are pathways that are needed to address this into the future? And this then comes back with rising sea levels, so you're going to get that disparity in elevation between the

seaward side of the barrages to the landward side, the landward side dropping under these extremely evaporative dominated events and we know that there needs to be a plan for managing those barrages.

5 Now, one view that is – you’re probably very familiar with by now – is to get rid of the barrages. And there are many, many big consequences to that, particularly if you do not – if you want to retain anything like the ecological character of the lakes and the Coorong that we have had over the last 50 years, you will need a fresh water flow. You will need a fresh water flow to keep that mix so you have a classic
10 estuarine mix and you keep those salinities down to a level to an estuary would wish to have.

MR BEASLEY: Yes.

15 PROF THOM: So, under those circumstances, what can you do? And so this is where the options arise. Professor Harvey was involved in 1991 in an intergovernmental committee here in South Australia, that started looking at these options in 1991, as to what you can do. So there’s a history of looking at this. And we have made our own suggestions, but I think that it’s something that is not
20 included in the Plan and at some stage, given discussions we have had about risks and strategies this morning, one would expect that a plan that is serious and consistent with the Act would take on these issues.

MR BEASLEY: Thank you. Shall we give the witnesses a break, Commissioner?
25

THE COMMISSIONER: Yes.

MR BEASLEY: I’m sure someone has got me an illegal coffee, so others are entitled to. It’s about eight to 12 so when do you want to break till?
30

THE COMMISSIONER: 10 past.

MR BEASLEY: Can I mention a couple of the witnesses have got flights to catch, which requires them to leave at 3. I would rather they kept their flights.
35

THE COMMISSIONER: Yes.

MR BEASLEY: If we get to 3 and we haven’t finished. We might finish but if we get to 3 and haven’t finished what has been offered is to – there wouldn’t be much left to finish the evidence by Skype.
40

THE COMMISSIONER: Yes.

MR BEASLEY: Would that be convenient to you?
45

THE COMMISSIONER: Yes.

MR BEASLEY: Yes. All right.

THE COMMISSIONER: And there may be, as with other witnesses, follow-up correspondence.

5

MR BEASLEY: There may well. I just think it's better that they catch their flights and get home.

THE COMMISSIONER: Yes. Well, give some consideration – perhaps you can discuss with the witnesses – whether you want to abbreviate the lunch break as well. That's fine by me.

10

MR BEASLEY: All right. I will get someone to – thank you. All right. So ten past 12.

15

THE COMMISSIONER: Ten past. Thanks.

MR BEASLEY: Thanks.

20

ADJOURNED **[11.53 am]**

25

RESUMED **[12.08 pm]**

MR BEASLEY: Can I just give you few references from some of the matters we have been discussing. This was referred to by Associate Professor Pittock, exhibit RCE2 is the Technical Background Volume 2 of the 'Guide of the Proposed Basin Plan'. We don't need to go to it, I'm just putting it on the record. Pages 121 and 122 explain how climate change was dealt with in relation to the modelling for the Guide and at the top of 122, the medium climate change scenario estimates – this is based on CSIRO's work – there will be a 10 per cent reduction in surface water availability across the Basin between 1990 and 2030. The CSIRO Murray-Darling Basin Sustainable Yields Project 2008:

30

35

The Basin Plan will apply to water resource planning for the Basin for successive 10 year periods commencing between 2012 and 2019 and the Plan must be reviewed by around 2121.

40

That has, of course, changed.

45

Therefore the MDBA considers it is unnecessary to incorporate the full effect of the 10 per cent predicted decline in average annual water availability under the medium 2030 conditions. In light of the various issues associated with climate change, MDBA has determined that three per cent is an appropriate

allowance to account for the effect of climate change in the proposed Basin Plan.

5 So that is what was said in the Guide. We have checked the ESLT report and it just says nothing about climate change. You were asking about rolling averages for salt. Again, no need to go to this but page 305 of the ‘Technical Volume of the Guide to the Basin Plan’, says – it’s not a very long explanation but it says:

10 *The rivers of the Basin, particularly the Murray, are the conduit for the export of salt into the Southern Ocean. Managing salt accumulation in the rivers and floodplains is best achieved by providing for average salt load exports necessary to balance imports from the landscape and upstream. Salt low target will apply at the barrages on Lake Alexandrina for a salt load in the Southern Ocean. The target is a minimum of two million tonnes per year on a 10 year*
15 *rolling average.*

That is 20 million tonnes in any 10-year period. It says:

20 *This is based on the Basin Salinity Management Strategy target tonnage of 1.8 million tonnes per year with a 10 per cent allowance for salt intrusion between Morgan and the barrages.*

THE COMMISSIONER: Thanks.

25 MR BEASLEY: So that’s that. What else did I have to – so the ESLT report doesn’t mention climate change. In RCE18, which is the ‘Hydrologic Modelling to Inform the Proposed Basin Plan: Methods and Results’ February 2012, the only reference to climate change is on page 7 where the Authority says this:

30 *Modelling of these scenarios –*

And that is 24, 28, 32:

35 *The modelling of these scenarios does not provide a forecast of what might happen under a future climate regime but broadly shows the impacts of various scenarios over the range of historic climate conditions specified. The average impact on water availability due to projected climate change is less than the climate variability to be experienced during the life of the Basin Plan. The additional water for the environment provided by the Basin Plan will provide*
40 *buffering for the ecosystems for any reductions in water availability due to climate change.*

So that’s the only mention of climate change in that. Can I just finish climate change by – on many occasions I think the Wentworth Group in their documents and I in
45 opening, referred to the CSIRO’s 2011 report, RCE9, where they say in summary:

The modelling indicates this is in relation to a 2,800 gigalitre plan. The modelling indicates that the proposed SDLs would be highly unlikely to meet the specified ecological targets even in the absence of future climate change.

5 And the paragraph goes on to say some more about that. What I haven't drawn your attention to, though, Commissioner, which I would like to just for the transcript, page 30 of this report, the very last paragraph outlines a recommendation made by the CSIRO that I haven't drawn to your attention:

10 *With respect to climate change, it is recommended that the MDBA indicate whether, if the drying projections for the Basin come to pass, the MDBA's intention would be to revise the environmental objectives for the Basin Plan, enforce more stringent SDLs to ensure environmental protection or adopt some compromise between the two.*

15 Another paragraph in this report that I haven't drawn your attention to that's on a slightly different topic in relation to – but the topic that I discussed yesterday with the four witnesses concerning whether there's any scientific justification for 2,750 – I think I may have only noticed this for the first time in this report but it says this “The panel” – that is, the CSIRO panel:

20 *The panel understands that other reduction scenarios have been modelled but the panel has not seen modelling results for these other scenarios and thus it is not clear how the 2,800 gigalitre year reduction proposal was arrived at. The panel assumes this proposal was arrived at as a result of socio-economic considerations by the MDBA but a consideration of socio-economic analysis is beyond the terms of reference for this review. As indicated in the logic of figure 1, the feedback following socio-economic considerations require revision of the environmental targets, key environmental assets, key ecosystem functions, in order for the proposed ESLT to be consistent with the stated objectives and targets.*

So that's the CSIRO saying they don't know either.

35 THE COMMISSIONER: I think that amounts to saying that if socio-economic considerations are, as it were, alarming, you lower the ambition of your environmental outcomes.

40 MR BEASLEY: It says that but it also says we don't know what they've done.

THE COMMISSIONER: No, right.

45 MR BEASLEY: Even though we're being asked to peer review what they have done.

THE COMMISSIONER: No, quite.

MR BEASLEY: Now, Mr Cosier, you wanted to finish a comment in relation to salt.

MR COSIER: Thanks, Mr Beasley. I just thought it would be useful to – we just
5 had a fairly complicated complex conversation about salt. It struck me over the
morning tea that in a way we've described the boundaries of sustainable management
of salt in the Basin. So in the wet years the boundary is the increased salt levels and
the risks they pose to permanent crops, particularly in places like the Riverland.
Professor Thoms talked about the drought years where the tipping points are the
10 Lower Lakes and the Coorong as we witnessed in the millennium drought. So
they're your ecological boundaries, if you like, for the management of that one asset,
which is, or one indicator of success of the Basin Plan which is the management of
salt.

15 And the second observation is we've talked about environmental flows as being one
of the solutions to salt, excuse the pun. But in fact there are three that are alive
viable solutions. One is the one that has been implemented since the 1970s, which is
the salt diversion schemes. I'm not an expert in that but I understand there are limits
to the ability of the salt interception schemes to take any more salt out of the system.
20 In my understanding – and it's a quite a historical recollection – they are physical
limits, not economic limits. The second option is, and it's something I know that
South Australia has considered for, on a number of occasions, actually revegetating
the Murray Mallee which would then deal with those pressures.

25 In the future, that might become a more viable option as the pricing of carbon
becomes more viable, so revegetation through the carbon farming initiative, another
Federal government initiative, might make it actually more economically attractive
for landholders in those areas to plant trees rather than grow sheep on very low
quality - - -

30 THE COMMISSIONER: Is it mainly in the sheep or dryland cropping?

MR COSIER: It's mainly – well, there's a combination but in the South Australian
component it's mainly sheep grazing. That's certainly worthy of the opportunity –
35 the point is that an increase in carbon price may make it viable for those landholders
to opt for revegetation in their own economic self-interest which would have a co-
benefit of reducing salt loads into the river system as well. And then the third option
that we've discussed is the enhancement of environmental flows both down the river
and out of the Murray Mouth. So there's three policy tools available and it's a
40 question of the economics and the social judgments that are made in opting for each
of those tools.

MR BEASLEY: Thank you. That's all I wanted to ask about the publication behind
tab 4 that we've been discussing. There are a number of publications following that
45 by the Wentworth Group that I think speak for themselves, that I don't particularly
want to ask any questions about. The next document I want to come to and only very
briefly, is a publication behind tab 9, which is a short publication by the Wentworth

Group called 'Five Actions Necessary to Deliver the Murray-Darling Basin Plan "In Full and on Time" dated 5 June 2017. I don't get to direct what the Wentworth Group publishes but I would encourage them to use the words "in full and on time" again or triple bottom line but anyway - - -

5

THE COMMISSIONER: By the way, can someone explain what I should understand by each of those matters, "in full and on time".

MR COSIER: I'm happy to have a go at that. As I understand it, the expression was first used by Prime Minister Turnbull in a meeting at COAG which occurred after there was some significant controversy from a statement made by the Deputy Prime Minister at the time in Shepparton.

10

MR BEASLEY: What was that comment, though, to give us context?

15

MR COSIER: I'm reluctant to say because I can't recall it properly and I would rather not say it without saying it properly but I'm sure the historical record will show what the former Deputy Prime Minister said about his view of water reform in Australia. A layman's interpretation – which is why we have been keen to use it, hence my wishing to offer a comment – is "in full" must obviously by definition include the delivery of an additional 3,200 gigalitres or equivalent of water into the system. That must be - - -

20

THE COMMISSIONER: So why do you say that?

25

MR COSIER: Well, because the entire objective, the underpinning both under the Water Act and the Basin Plan is to restore over-allocated flows in the Murray-Darling Basin system. So - - -

THE COMMISSIONER: Yes, but why 3,200?

30

MR COSIER: Because the Basin Plan and the 450 gigalitre commitment when added together equal – 2,750 and 450 gigalitres equals 3,200 gigalitres of additional or equivalent river water in the Murray-Darling Basin system.

35

THE COMMISSIONER: But isn't all that subject to (a) the amendments that have happened, which reduces 2,750, and (b) the conditionality of the 450?

MR COSIER: Yes, it does. Yes, of course it does and it is also conditional on all the other caveats that are built within the Plan.

40

MR BEASLEY: But you have also recommended – and we will get to it – that only one of the supply measures, for example, should have been approved. Correct.

MR COSIER: That's correct. So our focus - - -

45

MR BEASLEY: Amongst other suggestions in relation to how supply measures should be dealt with.

MR COSIER: That's correct. So the reason we use the expression is because it's
5 the expression the Prime Minister has used to say – you know, to give a commitment
that he intends to deliver the Plan. We support that commitment. We have said in
many of our submissions that at the moment, as it stands, there is no chance of that
being achieved under the current management of the Murray-Darling Basin Plan and
10 our submissions for the one which you're referring to, for example, goes to great
lengths to give our interpretation of what changes need to be made in order to deliver
those sort of outcomes.

MR BEASLEY: And on time, I take it, means 30 June or 1 July 2019?

15 MR COSIER: Yes.

MR BEASLEY: At least in terms of water resource plans.

MR COSIER: Yes, as an experienced person in public policy, the “on time” is an
20 aspiration, of course, but we are and would like to be on the record to say that we are
delighted the Prime Minister has reinforced that commitment.

MR BEASLEY: It's the same way solicitors are compliant with court orders.
25 Aspiration. I withdraw that.

THE COMMISSIONER: So I'm still unsure, the Basin Plan has the effect given to
it by sections 34 and 35 of the Act which I won't go into now, and it doesn't really
lend itself to evidence, but in very general terms, it's to be observed as a matter of
law. So one goes to the Basin Plan and you see that it has various requirements.
30 Now, those requirements themselves have been devised by reference to the statutory
concept of environmentally sustainable level of take which produces the sustainable
diversion limit which is at the heart of the whole notion of restoring an over-
allocated system. There are two senses that I don't quite understand this delivery in
full, let alone on time. You will have gathered that I am entertaining misgivings
35 about whether the Basin Plan is itself in compliance with the Act. So it has not been
delivered.

MR COSIER: Yes.

40 THE COMMISSIONER: But if it were in accordance with the Act, then it lays
down stipulations that themselves that must be observed. Now, their observance is
all with respect to the achievement of environmental outcomes, so that the impending
review or reviews are opportunities for further adjustment. The obvious possibility –
obvious possibility is that, if you like, experiments don't work and that the
45 sustainable diversion limit has to be reduced. Against that background, I simply
don't understand – I really don't understand what it means to talk about delivery of
the plan in full and on time. Does the time include the notion of these review dates

when these adjustments may occur? In what sense is that delivery of anything on time?

MR COSIER: Yes, Commissioner.

5

THE COMMISSIONER: Because the calendar happens. We can't stop time passing. Nothing is delivered by a date arriving. What will happen on that date that amounts to delivery?

10 MR COSIER: So you've raised two issues.

THE COMMISSIONER: At least two.

MR COSIER: At least two. Let me deal with the first one, the first issue first. So is
15 the Basin Plan consistent with the Water Act? And we have had almost two days of
discussion on that. The Wentworth Group has, as you have reminded us from many
of our submissions, formed the view that the Basin Plan is not consistent with the
Water Act. We are not lawyers but we did seek legal advice at the time and our view
is based on that legal advice. And that is why we, through our submissions in 2011
20 and '12 encouraged the government both in correspondence and in Senate inquiries
and the Parliament not to support the Plan.

But we have also made it clear – and I believe we have made it clear in the
25 submission – that notwithstanding that, the Wentworth Group does accept that the
Basin Plan has now been agreed by a democratic process and that, therefore, we have
taken the view that the immediate focus is to ensure that the Plan delivers on the
outcomes it says it would, because our view is if it does deliver those outcomes, there
will be an improvement in the condition of the river systems of the Murray-Darling
Basin. So that's our position on the first issue.

30

MR BEASLEY: Sure. Understood.

MR COSIER: Commissioner, your point about the second one, of course, is right.
The Plan is not just a simplistic one-off volumetric target. There are a whole lot of
35 complexities built in the Plan. But if – in my response earlier, all those complexities
are caveats to an overriding outcome which is to add water to the river system. That
is the caveat. And so if you look at all of those caveats, the aspiration is 3,200
gigalitres or equivalent of additional water in the river system, subject to, subject to,
subject to. It's the way we deal with the subject to, is whether or not we believe you
40 will achieve the aspiration of the Plan which is a delivery of 3,200 gigalitres or
equivalent.

MR BEASLEY: Does this refresh your memory about what was said by the then
Water Minister, and this from an article in the Sydney Morning Herald by Peter
45 Hannam, 27 July 2017:

Mr Joyce told a gathering in a pub on Wednesday evening in the northern Victorian town of Shepparton that it was important the Nationals had taken control of the Murray-Darling Basin Plan. “We have got 13 billion invested in it”, Mr Joyce said referring to the Plan according to a recording by the ABC.
5 “We have taken water and put it back into agriculture so we can look after you and make sure we don’t have the greenies running the show.”

MR COSIER: That is my recollection of that conversation.

10 MR BEASLEY: Now, in fairness to Mr Joyce, in terms of his reference to greenies, he did qualify that by saying – well, a spokesman for him said that his reference to greenies was directed at:

15 *Those people, including radical greens, who want to throw the Murray-Darling Basin Plan out the door and who want to engage in failed water buybacks.*

Is that your memory?

MR COSIER: That’s my memory.
20

MR BEASLEY: Did I interrupt you?

MR COSIER: No.

25 MR BEASLEY: What I wanted to draw – in this document that I’ve taken you to behind tab 9, your ‘Five Actions Necessary to Deliver a Basin Plan’, I don’t mean to skip over any them but they are set out later in other publications that I will come to but I did want to just ask you about what you mean by part of what you have recommended in relation to number 4:

30 *Build trust with greater transparency.*

And the second bullet point:

35 *Improve accountability with professional water accounting standards and independent auditing against standards accompanied by annual audits of expenditure of public funds and independent annual reviews of the Basin Plan’s progress.*

40 I read that as similar to a recommendation that has been made to the Commissioner by Professor Wheeler and a number of other economists who have made a submission to the Royal Commission. I’m just wondering, is this what you are getting at: that there needs to be proper auditing of efficiency measures. Is that what you’re directing it to?

45 MR COSIER: Yes.

MR BEASLEY: In other words, what money was provided, to who, for what reason? And in relation to water accounting, an audit of what has actually been achieved in terms of real water recovery from those efficiency schemes.

5 MR COSIER: Yes, and I would add the third point is the point we referred to yesterday, and then reinstating the Sustainable Rivers Audit, so you have biophysical monitoring or measure of the success or failure of the Plan itself.

10 MR BEASLEY: What do you mean by independent auditing? By someone other than the Basin Authority?

MR COSIER: Do you want to?

15 ASSOC PROF PITTOCK: Yes. So we're certainly looking for there to be auditing by Federal agencies who might have that as part of their function be that the Auditor-General - - -

THE COMMISSIONER: The Auditor-General and the Productivity Commission?

20 ASSOC PROF PITTOCK: For example, yes.

MR COSIER: So you referred earlier to the CSIRO review. That would be an example of an independent auditing process. In other words - - -

25 MR BEASLEY: Not necessarily, according to one of our witnesses, but go ahead.

MR COSIER: Yes, well, that's - - -

30 MR BEASLEY: Leave that aside.

35 MR COSIER: So referring to Professor Thom's evidence this morning about how science is conducted, people who produce the science, to give you confidence in that science you bring in an external person with expertise to review that science. So the reason for the long-winded answer is it may be the Authority is independent, if they're auditing for example a State Government plan. But if the Authority itself is producing information, then a third party would be an appropriate independent auditor such as CSIRO or another body.

40 MR BEASLEY: Because a lot of these efficiency measures, it's Commonwealth money but the schemes are State-based.

MR COSIER: Yes.

45 MR BEASLEY: So it's not – and I guess part of the audit might be what information is being provided to the Commonwealth to enable them to make a decision we should give this money.

MR COSIER: That's correct. But the bigger picture and the reason for our emphasis in that submission was the overarching lack of transparency in the entire water reform process. Which means that nobody has confidence in the system. Irrigators don't have confidence in the system. Communities don't have confidence
5 in the system. And as you have heard from our evidence and other scientists, scientists cannot even form an opinion on the quality of the information because the information is not there to enable us to form those judgments.

DR STEINFELD: To give you an example of the lack of transparency, when we
10 wrote that 'Five Actions' document in - - -

MR BEASLEY: June '17.

DR STEINFELD: We were looking for a figure of how much of the \$13 billion
15 dollars had been spent on water reform and we could not find any expenditure of the overall volume of money. Subsequent to that we have been provided with updated figures and that's in our more recent report in 2017.

MR BEASLEY: So you would expect something like an audit that shows in relation
20 to each expenditure on any particular efficiency measure that there be the money – the information about what money was spent, what the scheme involved, why it was spent and how much water has actually been said to be recovered using proper standards.

25 MR COSIER: Correct. It is taxpayers' money.

MR BEASLEY: And I take it that part of the reason to suggest that audit also relates to the views of scientists and economists such as Professor Williams and Professor Grafton who have doubts about whether efficiency measures actually do
30 produce river water savings, not entirely but primarily because of their concerns about return flows and no one really knowing what is the exact amount of water that has actually been recovered for the environment, if any has.

MR COSIER: Yes, and that example raises the other benefit from transparency, and that is that you do provide the opportunity for other experts such as Professor Grafton and Professor Williams to add value to the decision-making process. So through that process you actually get a better plan through the transparency as well as, you know, the appropriate transparency in the use of taxpayers' money.

40 ASSOC PROF PITTOCK: If I can add some of our concern at the time of writing was driven by the lack of publicly available information on the proposed sustainable diversion limit adjustment projects, where the business cases were not made publicly available for most of those projects prior to decision by Parliament to enable the regulations that support those projects to stand. When we have obtained some
45 information of those business cases we are quite alarmed at the expense of those projects per hectare of wetland conserved and per megalitre of water recovered. They appear to us to exceed by a factor of three, the standard that we believe the

State and Federal Governments had agreed in terms of dollars per megalitre recovered from these projects.

MR BEASLEY: Substantially more expensive than buybacks have been.

5

ASSOC PROF PITTOCK: Substantially more expensive, but also creating a path dependency where they're labouing the taxpayer in funding some very expensive ongoing maintenance. So I mentioned yesterday the Nyah and Vinifera projects in northern Victoria, where the State Government is asking for – and the Authority has endorsed – \$20 million to manage only 850 hectares of floodplain. We don't know how much water would be recovered, supposedly, through that project because Victoria took a view that it would not undertake that modelling for individual projects.

10

15

An operation with maintenance costs of a million dollars per year with no agreement between the State and Federal governments over who pays for that, and a long history of failure of infrastructure built by governments on the floodplain to be maintained in the public interest. And so I think this sort of highlights the importance, purely on financial grounds let alone the desired environmental outcomes, of having greater transparency of – to this level of detail of these Basin Plan and associated programs.

20

MR BEASLEY: All right. Thank you. Can I leave that document and go to document – publication, I'm sorry behind tab 10, which is the substantial review of the Wentworth Group entitled 'Review of Water Reform in the Murray-Darling Basin', November 2017, which also contains a number of annexed reports on various matters. I'm being given a note, distracted again. Page 1 of – in the summary of this document, if I can take you to that, I just want to understand what your view is about that – about this matter in the last paragraph, where you say:

25

30

Since the national water initiative there has also been substantial progress towards the recovery target with two-thirds of the water recovered (2107 gicalitres) and with almost two-thirds of the funding spent.

35

Now, that is the MDBA's position, that 2107 has been recovered. Is that also the Wentworth Group's position? And I'm asking you that because I know Professor Williams has at one stage been a member of the Wentworth Group and Professor Grafton has worked in association with the Wentworth Group, and I'm not sure that reflects their view. That doesn't mean it doesn't have to reflect your view. But do you have confidence that 2107 gicalitre has been recovered for the environment now?

40

ASSOC PROF PITTOCK: Associate Professor Pittock. We don't have confidence that 2107 gicalitres has been recovered. This is an area where we're calling for more auditing and transparency to assure ourselves that that's really the case. We clearly have a tremendous respect for the views of Professors Williams and Grafton on this matter, and we would like to see a fuller response from government.

45

MR BEASLEY: I mean, they're not the only scientists that talk about return flows. It's a well-travelled area both here and internationally. Sorry, I interrupted you.

5 DR STEINFELD: The issue of return flows is critical, as are other issues that could potentially undermine the availability of that 2,100 gigalitres, and we have made recommendations – recommendation number 2.3 is about making sure that water for the – water recovered for the environment is protected in the river and is not being undermined by changes. And we go through very extensively what kinds of changes need to be in place to ensure that that water is real water in the river system and is
10 not being undermined.

MR BEASLEY: Sure. All right. I just wanted to check that. I should just say, Commissioner, I think we are going to sit until 20 past 1, are you comfortable with that?

15 THE COMMISSIONER: Yes.

MR BEASLEY: Everyone else is happy with that?

20 THE COMMISSIONER: That's fine.

MR BEASLEY: I can skip forward in this paper, essentially, to – if I can take us all to page 46 where - - -

25 DR STEINFELD: Excuse me, Beasley.

MR BEASLEY: Yes.

30 DR STEINFELD: Can I just clarify that - - -

MR BEASLEY: You can.

35 DR STEINFELD: - - - the number 2,107 is the amount of entitlements that the Commonwealth and States hold in environmental water and that should yield that long-term average, about 2,000, so it is currently held, but it could be undermined by other processes.

40 MR BEASLEY: Sure. Page 46, where you start the discussion about actions needed to deliver the Basin Plan on time and in full, and number 1 is the topic we discussed about rebuilding, we have already discussed about rebuild trust with greater transparency. But what you mention under that heading, 'Rebuild Trust with Greater Transparency', in the second paragraph:

45 *The first sign that trust has been lost was in the development of the Plan itself which put bureaucrats in charge rather than allowing communities to be at the front and centre of the solution. We saw a centralist, top-down program driven by government and agencies with one arm of government to produce the plan*

while another arm spent billions of dollars without any genuine consultation. The second sign of erosion was when the Basin Authority ignored the best available science for delivering a healthy, working Murray-Darling.

5 And instead:

Manipulated science in an attempt to engineer a predetermined political outcome –

10 you mention the Senate hearings on when the Wentworth Group stated:

There has been no scientific evidence produced by the Authority to suggest that 2,750 or 3,200 would achieve the objectives of the Water Act.

15 And:

The Australian community, in that scenario, would have been misled by Parliament.

20 I take it that is all part of – in terms of transparency, all part of what Professor Thom was talking about earlier today, about this is – this plan must be based on science, and that science has to be capable of being tested, which – which means that the assumptions or the data or the modelling has to be disclosed in entirety so that people can seek to replicate what has been done and test whether it's wrong. And, without
25 that, from the Basin Authority, you don't have the transparency that you suggest is needed.

MR COSIER: That's correct.

30 MR BEASLEY: Page 47, you suggest that metering and compliance needs to be improved. I think you would probably be pushing at an open door there, and I don't intend to ask any questions about it. Page 48, I wanted to ask what was meant at the bottom of page 48 where at section 2.2 of this document, you've got the Commonwealth Government does – quote:

35

The Commonwealth Government does not currently have sufficient measures in place to prevent Basin States from gaming the Basin Plan and ensuring recalcitrant States deliver the necessary action.

40 What do you mean by States gaming the plan?

ASSOC PROF PITTOCK: Associate Professor Pittock. Let me start. I guess the first point is that a number of the key measures that we would regard as being vital to delivering the Basin Plan and associated programs are not incorporated into
45 regulation. So, for example, the constraints relaxation targets that we think are critical for achieving the objectives of the Plan and the Act are not subject to

regulation. A second element is the way in which a number of important projects have been approved.

5 So, for example, with the sustainable diversion limit, adjustment projects, essentially that was undertaken by way of the States approving each other's projects through the Basin officials committee, in which the Authority did not have a veto, and then the authority was put in the invidious position of approving the page of projects as a whole rather than having the capacity to work through the 36 projects and identify those that, in their view, were deficient and should not be approved. We think that
10 there's - - -

MR BEASLEY: I will come to the specifics of that in terms of what you are suggesting there. Yes. Go on.

15 ASSOC PROF PITTOCK: And there are examples of the States doing things like shifting the prerequisite policy measures. So, for example, in New South Wales, Barwon-Darling plan.

MR BEASLEY: Can I assist, you are talking about all the things you are
20 recommending elsewhere in this document and others that should be addressed?

ASSOC PROF PITTOCK: Absolutely, yes.

MR BEASLEY: All right. Good. Thanks. Page 49:
25

Reinstate Basin-wide river health monitoring program.

We have already discussed the abolition of the sustainable rivers audit. Your
30 recommendation is that COAG should reinstate a Basin-wide river health monitoring program. Can you speak in any more detail about particularly what you suggest should be put in place of something like the sustainable rivers audit?

ASSOC PROF PITTOCK: Yes. We believe that experts in the area of river health,
35 who are independent of the Authority, should be commissioned to undertake regular monitoring and review; that such a program should obviously draw on elements of the sustainable rivers audit, but have a particular focus on the specific targets and indicators in the Basin Plan, so that there's a much more harmonised monitoring of the plans implementation.

40 MR BEASLEY: I think we discussed yesterday the recent publication in May by the Basin Authority of the health of various icon sites. I actually don't think the Coorong was in that report.

ASSOC PROF PITTOCK: No.
45

MR BEASLEY: It was only the others. But I'm right in saying that that sort of updates on the environmental health of parts of the icon sites is just not sufficient in terms of measuring the health of the entire Basin.

5 ASSOC PROF PITTOCK: Our view is that that report you're referring to from the Authority, on the status on the icon sites, was just a public relations exercise with no substantial science behind it. It was very ambiguous in that report. The areas of wetlands that had been restored, versus those that had not, it glossed over. For example, the failure of the Living Murray program to effect restoration of the
10 Koondrook–Perricoota living Murray site, where \$80 million was spent on infrastructure in what is an essentially inoperable project.

MR BEASLEY: What was the infrastructure?

15 MR BEASLEY: The infrastructure included tens of kilometres of levee banks and supply canals, and some weirs to manage discharge of water. There are a number of technical failures. The New South Wales government failed to secure the agreement of at least one key landholder whose land could be inundated from time to time and, as a consequence, that has been – that infrastructure has been largely inoperable, to
20 the detriment of the environment.

PROF THOM: Can I just make one - - -

25 MR BEASLEY: Yes. Of course you can.

PROF THOM: Professor Thom here. Make one addition to Professor Pittock's comment about experts being independent. In my view, those – that independence means that those experts are not in any way, shape or form, in receipt of research grants from the Authority. I think that has to be made very clear. They are to be
30 independent.

MR BEASLEY: That's part of what you – how you define an independent expert?

35 PROF THOM: In addition to their professional qualifications, and so on.

MR BEASLEY: Of course. You said part of, yes.

PROF THOM: Part of, but it certainly would be part of in my view.

40 MR COSIER: Peter Cosier also, just referring to Professor Pittock's comments on the monitoring program. Again, we are talking not in theory here, but there are real world examples particularly in Australia of how that's done, and the – you know, world's best practice example is actually here in Australia, in the South-East Queensland healthy waterways monitoring program. So the reason for raising it is
45 again science, if asked, can contribute. We know how to do this and it is not something that is a theory or a theoretical idea. It's not something that is excessively

expensive, given we are spending \$10 billion of taxpayer's money, so it's both feasible and financially viable to do that.

5 PROF THOM: In addition, if I may add to a comment based on section 172 of the Act in relationship to the Authority's functions which outlines in some detail what the Authority can do with respect to collecting information, undertaking research and so on. Under section 1(i), to disseminate information.

10 MR BEASLEY: Hang on, 172.

PROF THOM: 172.

MR BEASLEY: Then?

15 PROF THOM: (i).

MR BEASLEY: Yes.

20 PROF THOM:

To disseminate information about basin water resources and water dependent ecosystems to the extent that the Authority - - -

25 MR BEASLEY: Sorry, you are actually on 172(1)(b)(i).

PROF THOM: (b)(i) – sorry, (h)(i).

30 MR BEASLEY: Yes. This is always a problem with an Act when it's like this, but go on. Yes.

PROF THOM: A lot of brackets here. But my point is - - -

MR BEASLEY: I'm with you.

35 PROF THOM: - - - "to disseminate information to the extent that the Authority considers it desirable to do so". So I think our concern is that phrase "the extent to which the Authority considers it desirable to do so". So all that information may be very, very relevant for issues of testing as we have discussed this morning and of reviewing, but if the Authority does not see it as desirable to do so, then it doesn't
40 have to disclose it.

MR BEASLEY: Thank you for bringing that provision to my attention. All right. Does that complete what everyone wanted to say about monitoring? All right. I don't want to spend any time on page 50 in relation to guaranteed recovery of the full
45 3,200 gigalitres because you do mention the SDL adjustment of 605 gigalitres in the Northern Basin Review. But I will come to that, because you've got – sorry, you've got separate publications in relation to that. Page 51, where you talk about securing

the remaining 1093 gigalitres or equivalent or whatever figure does have to be recovered, and you mention recovering water for infrastructure apparatus between two and seven times more expensive than water purchased. I just wanted to check there – where that – that’s a government publication, is it? Australian Government
5 Water Recovery Strategy for the Murray-Darling Basin. So that extrapolation of two and seven times has come from that publication?

DR STEINFELD: Yes.

10 MR BEASLEY: So that’s from the government figures themselves, has it?

DR STEINFELD: It’s based on expenditure from projects, efficiency measure projects, and we did the classification compared to the water market prices.

15 MR BEASLEY: All right. Thank you. Page 56 and 57 deal with protection of environmental water and I think we’ve already discussed yesterday issues like the Baron Darling water sharing plan and also floodplain harvesting we discussed yesterday. Page 63 we have already dealt with, with Professor Thom earlier today. And I think we dealt with the rest of the matters that I wanted to deal with in this
20 particular document.

THE COMMISSIONER: Can I just - - -

MR BEASLEY: You can.
25

THE COMMISSIONER: - - - return to the question of the business plans you have seen for some of these proposed measures. Have any of you seen, from the Authority, the determination of the amounts of proposed adjustments resulting from those measures, other than the total figure?
30

DR STEINFELD: The Authority modelled for individual supply measures what the likely contribution - - -

THE COMMISSIONER: Would be.
35

DR STEINFELD: - - - would be, but obviously they do interact and so when the Authority made the proposition, it put forward a number, 605, as the – as the whole package.

40 THE COMMISSIONER: That’s a figure that has been reached, on your understanding of the material from the Authority, it has been reached by looking measure by measure and unit by unit to produce what might be called, provisionally an SDL adjustment, and then there is an overall collection, as it were.

45 DR STEINFELD: I think the logic behind individual measures was just to test whether or not the measures were operable within the modelling base. So they just

wanted to make sure that the model was working, but then the final 605 was the cumulative effect of the whole package.

5 THE COMMISSIONER: Is it simply additive or does it allow for what might be called some overlap or concurrency?

DR STEINFELD: Allow for the concurrency and overlap.

10 THE COMMISSIONER: And are you satisfied with the conceptual approach that was taken in that regard?

DR STEINFELD: In terms of the modelling of these projects or in general the SDL adjustment?

15 THE COMMISSIONER: The whole.

DR STEINFELD: The whole lot?

20 THE COMMISSIONER: Yes. All and any aspects that you've looked at.

DR STEINFELD: We are not satisfied that the SDL adjustment supply measures will deliver the equivalent of 605 gigalitres of water.

25 MR BEASLEY: There's a publication by the Wentworth Group behind tab 11, 'Requirements of SDL Adjustment Project to Ensure they are Consistent with the Water Act', etcetera. I was going to come to that in detail in a moment.

THE COMMISSIONER: Thanks.

30 MR BEASLEY: Before we get to that document, though, I wanted to get to a couple of the appendices to the review and appendix 2 is a – that's your work, Dr Steinfeld, 'Progress Towards Environmental Outcomes in the Murray-Darling Basin'?

35 DR STEINFELD: Correct.

MR BEASLEY: And is that work you've done – is that work research entirely by you, or with other people of the Wentworth Group and/or others?

40 DR STEINFELD: That was work predominantly written by myself, but reviewed by key Wentworth Group members.

45 MR BEASLEY: All right. Can I go to page 13 of your report? In summary, you say after ecological outcomes:

After four years of implementing the Basin Plan, and delivery of nearly 9,000 gigs of environmental water across the basis, our assessment of preliminary

outcomes indicates that the Basin's environment was in a better ecological condition than it would have been without the Basin Plan.

5 And then you talk about some positive results from environmental watering. That information has been obtained from – mainly from what sources? From the Environmental Water Holder or from?

10 DR STEINFELD: Yes, correct. Mainly the long-term environmental water monitoring program done by environment water office.

MR BEASLEY: All right. Page – and you have, in this report you've looked at both vegetation, fish, waterbirds, frogs – I said both – all of invertebrates and higher ecological outcomes. Dealing with – at page 14, you start a discussion about native vegetation and commence with this sentence:

15 *There are currently no Basin-wide surveys of native vegetation condition.*

I take it that that is – would be something that you would suggest should be included in the monitoring that you suggest should occur.

20 DR STEINFELD: Yes, correct.

MR BEASLEY: All right. And do I read the second sentence that the Authority is only monitoring the condition of woody vegetation at the icon sites?

25 DR STEINFELD: That was the information that was available at the time.

MR BEASLEY: All right.

30 THE COMMISSIONER: Have things changed since you completed this report?

DR STEINFELD: Since this report was published, the authority produced the 2017 'Evaluation of the Basin Plan.'

35 MR BEASLEY: And, again, in relation to native fish on page 16, first sentence:

40 *Condition of fish has not been recorded, reported across the Basin since the sustainable rivers audit, although the authority is currently undertaking annual Basin-wide monitoring of fish species at 145 sites of the Basin.*

Has that occurred?

DR STEINFELD: I didn't I will just have a look at the reference.

45 MR BEASLEY: Sorry, page 16, native fish:

Condition of fish has not been reported across the Basin since the sustainable rivers audit although the authority is currently undertaking annual Basin-wide monitoring of fish species at 145 sites.

5 DR STEINFELD: That was taken from the Authority's annual report, so I wasn't able to actually find the results of that survey work.

MR BEASLEY: Right. It has got a reference to MDBA 2015.

10 DR STEINFELD: Yes, that's the annual report reference which explains that they are looking at the - - -

MR BEASLEY: I take it since that 2015 though, you haven't come across - - -

15 DR STEINFELD: No. I didn't come across - - -

MR BEASLEY: - - - the publication of the monitoring by the Authority of fish species at 145 sites.

20 DR STEINFELD: I haven't seen

MR BEASLEY: And again, condition of native fish in terms of how they're responding to environmental watering in the Basin Plan is something that you would suggest should be part of the kind of monitoring you were talking about that should
25 replace the sustainable rivers audit monitoring.

DR STEINFELD: Yes.

MR COSIER: Just to clarify, Mr Beasley.

30 MR BEASLEY: Yes.

MR COSIER: If you have a look at the sustainable rivers audit, both 2008 and 2011, it describes the sort of indicators that they use for monitoring condition. And
35 so it has indicators such as fish, waterbirds, native vegetation, etcetera. So that, to us, is an appropriate method as Professor Pittock was saying, for measuring the overall condition of those assets.

MR BEASLEY: All right. And in relation to overall ecological outcomes of the
40 Basin scale, page 30, you've concluded that:

*Since 2012/13 many early environmental outcomes have been observed at specific sites where environmental water was directed, however there are many more sites across the Basin which have not received sufficient environmental
45 flow and remain in a poor and degraded condition.*

I assume that that is a conclusion you reached as a result of reading all of the material that forms part of this report that you've cited?

DR STEINFELD: Yes, that's correct.

5

MR BEASLEY: Yes:

Improvements in the condition of the Basin across large scales have not yet been assessed and reported.

10

Again, this is getting back to sending out reports that only relate to icon sites.

DR STEINFELD: And particular portions of flow that have been delivered, for example, environmental water that was delivered to a certain location.

15

ASSOC PROF PITTOCK: Senior counsel.

MR BEASLEY: Yes.

20

ASSOC PROF PITTOCK: Associate Professor Pittock.

MR BEASLEY: Yes.

25

ASSOC PROF PITTOCK: If I can refer you to figure 12 on page 31, that is one particular indicator that reinforces what – Dr Steinfeld's conclusions, that although there has been some localised improvements in some places, the overall trend in this case relating to flood plain forest vegetation is not looking good.

30

MR BEASLEY: I was coming to that figure. That is based entirely on material published by the Basin Authority; correct?

DR STEINFELD: That figure was based on reports published each year.

35

MR BEASLEY: Yes.

DR STEINFELD: I stitched them together, provided that to staff members at the Authority for their information, and they said that they were happy for me to publish that figure in the current form.

40

THE COMMISSIONER: Could I ask, at page 30 in the first paragraph under the heading 'Ecological Outcomes at the Basin Scale', the very last notation appears to be a footnote 156. Is that a relic of some earlier form of this document? What's it a reference to? I think it is the only footnote. I assume there was an earlier format, was it?

45

DR STEINFELD: Could I check that for you?

THE COMMISSIONER: Could you please. Just take it on notice. I just – because I am interested in – I think I – look, I’m guessing, but I don’t want to guess – those are vaguely familiar or more than vaguely familiar propositions. But could you get me what you intended to convey by that apparent citation?

5

DR STEINFELD: Sure.

MR BEASLEY: I suspect 156 might have been a reference to the hydrological modelling report with removal of constraints that was published by the Basin Authority in 2012.

10

DR STEINFELD: I will check.

MR BEASLEY: Given that you are talking about recovering 3,200 gigalitres in full with eight constraints relaxed.

15

THE COMMISSIONER: Quite so. That’s where I recognised. I just wanted to know what you meant by what I think is an artefact of iterations that is not given. Footnote 156 with about 155 footnotes before then.

20

DR STEINFELD: I will check that.

MR COSIER: The dangers of cut and paste.

25 THE COMMISSIONER: That’s right. Exactly.

MR BEASLEY: I keep talking about constraints being removed. The correct term in the report is as said here, the constraints relaxed – whatever that means. Maybe it’s the same thing as removed, I don’t know. And appendix 4 of this review is the report you had Dr Penny Whetton from the University of Melbourne prepare in relation to climate change in the Murray-Darling Basin. I assume that Dr Whetton is someone that obviously works in this area and has considerable expertise in relation to climate change and climate change projections. Is that right?

30

35 ASSOC PROF PITTOCK: Dr Whetton is the former head of CSIRO’s Climate Impact Group and has had a very distinguished academic career in research on climate change modelling and impacts.

MR BEASLEY: All right. Thank you. Now, the document behind tab 11 is your publication in relation to the supply measures and contains your opinion that only one of the 36 should have been approved. The full title of the document is Wentworth Group of Concerned Scientists ‘Requirements of SDL adjustment projects to ensure that they are consistent with the Water Act 2007, Basin Plan 2012, MDBA policies and intergovernmental agreements’. Before I ask any questions, is this – was this publication the work of any particular person in the Wentworth Group or was it again a joint effort or - - -

40
45

DR STEINFELD: Yes, the report was prepared by me with the support of the Wentworth Group members and in addition, we sought technical and legal advice from a number of consultants.

5 MR BEASLEY: Okay. Just looking at page 2, and this comes back to a question that the Commissioner was asking a short while ago. Under the heading 'Our Assessment of Supply Measure Projects' showed that (2) you say 11 of the projects (representing in the order of 150 to 270 gigalitres water savings) and then in 3:

10 *25 projects representing in the order of 316 to 436 gigalitres.*

Can you tell me where you've gotten those figures of gigalitres from?

15 DR STEINFELD: They were estimates taken from a stocktake report written by Martin and Turner who - - -

MR BEASLEY: Sorry, a stocktake report?

20 DR STEINFELD: A stocktake report.

MR BEASLEY: By Martin and Turner.

DR STEINFELD: Yes.

25 MR BEASLEY: Who are they?

DR STEINFELD: So, they were - - -

30 MR BEASLEY: I see. Someone has just handed me an 'SDL Adjustment Stocktake Report', August 2015 by Warren Martin and Graham Turner. That would be them, would it?

DR STEINFELD: That's correct.

35 MR BEASLEY: All right. Okay.

40 DR STEINFELD: So they were asked to provide an independent review fairly early on in the process to approve these supply measures. And they came up – that was in 2015, in August – and they came up with estimates for particular works that had been put forward at the time and so on the basis of their assessment, we estimated that those ranges were approximate representations of the water savings.

45 MR BEASLEY: All right. And then you have – can I just ask a fundamental question first, before I deal with your proposed criteria for whether these measures should have been approved and part of the – used for the recent SDL adjustment for 605 gigalitres. I'm not asking for a legal opinion, I'm asking as a – your view as scientists as a matter of whether this is the best way of doing things in relation to a

plan such as this. And the fundamental issue is this, that what is being done is the Plan is being adjusted now. That is, there's immediately 605 gigalitres less water for the environment, bearing in mind the plan can be – there will be a reconciliation in 2024 – we all know that.

5

But these – the adjustment of the 605 gigalitres is made now. So the plan goes from being a 2,750 plan, if I can call it that, to a 2,750 plan minus 605, whatever that figure is. And the supply measures are not yet implemented. And do not have to be implemented until 2024. And may not work as anticipated. There has to be a risk.

10

And may not achieve the environmental equivalency that they must achieve in relation to which there simply has to be a risk. That's what has been done as distinct from turning it around, what could happen is that the measures are approved but there's no adjustment made until there is some analysis later on to work out whether the system is actually getting 605 gigalitres worth of water or some greater sum, or some significantly less sum. Do you have a comment in relation to that?

15

ASSOC PROF PITTOCK: Clearly the environment will be diminished by not having real water made available as soon as possible. And so to that extent, yes, the environment will be diminished by the 605 gigalitre - - -

20

MR BEASLEY: It takes the risk, doesn't it by doing that way?

ASSOC PROF PITTOCK: It does.

25

MR BEASLEY: The decision is made that consumptive users don't have to take the risk, the environment will take the risk.

ASSOC PROF PITTOCK: Yes.

30

DR STEINFELD: Can I add that communities downstream will also take the risk including communities

ASSOC PROF PITTOCK: In South Australia.

35

MR BEASLEY: Explain further, if you will, what you mean by that.

DR STEINFELD: Sure. Because communities that depend on an additional 605 gigalitres to, for example, flush salts and flush nutrients and maintain water quality will suffer from reduced water quality as a result of 605 - - -

40

MR BEASLEY: When I said the environment takes the risk, the answer you are giving me, well that's only partially correct because real people are also being asked to take the risk depending on where they are in the Basin.

45

ASSOC PROF PITTOCK: Yes, real people - - -

MR BEASLEY: Where they have their business, where they have their homes.

ASSOC PROF PITTOCK: Real people and some examples would be the many tourism businesses along the river that operate houseboats for example, or indeed the Ngarrindjeri community. They are expecting some enhancement of their traditional lands and waters through these environmental flows. They are taking the risk. Part
5 of our concern with this - - -

MR BEASLEY: Well, the risk is being put upon them.

ASSOC PROF PITTOCK: Indeed it is. It is being imposed upon them. We're particularly concerned that the governance process for this exacerbates that risk in that the process for determining these projects means that there's no rigorous scrutiny up until the point in which projects may or may not be subject to environmental impact assessment. And, further, the totality of this SDL adjustment process for the 605 gicalitres, while there is talk of a reconciliation process, that is
10 not guaranteed in law, in our understanding. And so we are not satisfied as to the extent and rigour of that proposed reconciliation process.
15

THE COMMISSIONER: Associate Professor, is that a reference to 711.1 of the Basin Plan, if it appears that the Authority - - -
20

ASSOC PROF PITTOCK: Just refresh my memory as to 711.1.

THE COMMISSIONER: Is that what you by "It's not assured"?

ASSOC PROF PITTOCK: Yes, that's correct. So in the recent discussion in the Australian Parliament, the Wentworth Group asked for legislative change to guarantee a more rigorous reconciliation process and in the agreement between Minister Littleproud and the Shadow Minister, Mr Burke, there was some – an aspiration to undertake a reconciliation process but there's no guarantee of the nature
25 or extent of that process.
30

THE COMMISSIONER: So you, in particular, would be interested in perhaps a revisiting of 711.1 so that the Authority has to look to see whether it appears that a new determination, etcetera.
35

DR STEINFELD: Yes, that's correct.

THE COMMISSIONER: So that's your concern.

ASSOC PROF PITTOCK: Yes.
40

THE COMMISSIONER: As a matter of language that may leave open the possibility that the Authority, as it were has better things to do than to see whether that appearance exists.
45

ASSOC PROF PITTOCK: To give you an example - - -

THE COMMISSIONER: Is that your concern?

ASSOC PROF PITTOCK: Yes, that is our concern because we have seen with the approval of the package as a whole, the Authority was reduced to having to give
5 some generic and arm-waving support for an entire package with many, many flawed individual projects. We know that from Senator Rex Patrick's production of order in the Senate, seeing the Authority's critical comments to individual States about individual projects.

10 MR BEASLEY: Their analysis of each of the projects, yes.

MR BEASLEY: Their analysis of each of the projects. What we are worried about is that this reconciliation process again might be vague and broad and lack specific
15 detail to weed out problem projects.

MR BEASLEY: Slightly off topic but I will forget it otherwise. Can I ask you, and you can answer this, is there a good reason that you can think of as to why, when first of all, why these business cases are not publicly available but, secondly, is there a good reason in science or otherwise why, when the MDBA analyses these projects,
20 that analysis is kept away from the public as well?

ASSOC PROF PITTOCK: In short - - -

MR BEASLEY: And the public includes the members of the public that have
25 scientific expertise?

ASSOC PROF PITTOCK: In short, no and no. The business cases are expending in the order – proposing to spend in the order of a billion dollars of taxpayers' funds. We would - - -
30

MR BEASLEY: Now, there might be part of the business case where there's an estimate of the cost of building something, and that might be something – I hate to use the term commercial-in-confidence, perhaps I won't use that term – but that might be something where you put a black texta through the dollar sign, but outside
35 anything of like that is what I'm talking about.

ASSOC PROF PITTOCK: Yes. I think it's in the public interest for those business cases to be made available so that a whole range of stakeholders, be they irrigators, indigenous communities, scientists, environmental groups, have an opportunity to
40 comment and hopefully enhance what's proposed.

THE COMMISSIONER: There is a possibility, I should point out – I don't need to pursue it in evidence – that, notwithstanding the wording to which you have drawn attention and about which you expressed apprehension, that a proper understanding
45 is that the Authority has an anterior obligation to see whether it appears to have authority that a new determination, etcetera. Because the scheme would otherwise appear to be defective to achieve the objectives. Related to that is another wording

in 727. The Authority may appoint an independent auditor for calculations that we've been talking about. Now, I draw - - -

5 MR COSIER: Commissioner, while they're looking for that answer, can I just add to the previous answer of Professor Pittock. It's not only the community that needs to be satisfied, in this instance Parliament was being asked make a decision, and the Parliament didn't have the information to make an informed decision. We go further than saying there should be a change to require the Authority to make – undertake a review, but that should be a public and transparent inquiry into the review, not just
10 the Authority making a review.

THE COMMISSIONER: To be fair, there are general statutes that regulate public access to government information. And I may be Pollyanna, but it could be that you could read all of this as expecting that under those freedom of information
15 provisions, naturally enough, something as objective and scientific as a 711 reconciliation would be made available. So don't lose sight of that, but I have – yes.

ASSOC PROF PITTOCK: If I might come in on that point, we explicitly wrote to each State Governments and requested submissions that had not been made public
20 and the South Australian government was very good in making that information available. Sadly, other states were not. And while we could have opted to undertake a freedom of information path, the length of time that may have taken would have precluded providing adequate advice to Parliamentarians, for example, in a timely way.

25 THE COMMISSIONER: I very much understand that. Just returning to 727 before we break, here we have got language that raises, for lawyers, a familiar question: when does “may” mean “shall”? To which the modern answer is “not very often”. It says the authority may appoint a person who is independent to audit the calculations.
30 Now, the word calculations is significant. Figures have to emerge. Of course, they're based on projections into the future. They are based on judgments and estimates. But they still have to be calculations. And then that person must produce a report setting out findings, after providing the Authority, the Commonwealth, and each Basin state with an opportunity to comment.

35 Now, again, it would be pretty odd if that could be avoided by the Authority simply, as it were, shrugging and saying, “Well, I see I may appoint one, but I'm not going to.” And so it's possible – there are possibilities where “may” means “shall”. It's all very unsatisfactory in terms of the ambiguities, I agree. But it's right, isn't it, there
40 has never been such a report published?

DR STEINFELD: There has been a report published. It was an independent review of the adjustment determination by

45 THE COMMISSIONER: Right. And you think that's a 727 audit, do you?

DR STEINFELD: I don't know.

MR BEASLEY: That's a report that uses terms like "there's a very high error space here".

THE COMMISSIONER: That may be an audit of calculations, yes.

5

MR BEASLEY: It might be.

THE COMMISSIONER: Thank you, I'm obliged.

10 DR STEINFELD: Can I also - - -

THE COMMISSIONER: Is that a convenient time?

MR BEASLEY: It is.

15

DR STEINFELD: Sorry, can I just add one more reference, which is in 7.24 and – sorry, 7.21 which refers to for the purpose of section 7.11, which we talked about earlier, the Authority may make a determination. So again it refers to - - -

20 THE COMMISSIONER: Yes, I know but that is about a limitation on power, it says you may make a determination only if.

DR STEINFELD: Sure.

25 THE WITNESS: So that's a setting of prerequisites.

DR STEINFELD: Thank you.

THE COMMISSIONER: Thank you.

30

MR BEASLEY: 2 o'clock?

THE COMMISSIONER: Yes.

35

ADJOURNED

[1.23 pm]

RESUMED

[2.00 pm]

40

MR BEASLEY: Before the break, Dr Steinfeld, you referred us to the 'SDL Adjustments Stocktake Report' August 2015, Martin and Turner. I will eventually tender that. That's some kind of assessment of the SDL adjustment that suggests that
45 possibly up to 500 gigalitres could be considered to be the supply contribution for these various supply projects. It expresses the view that there's moderate to high confidence that efficiency measures program can deliver 106 gigalitres but a

considerable risk that the program for 450 gigalitres will be met. Then assesses each supply measure by reference to high, moderate or low confidence in relation to a number of criteria, for example, Menindee Lakes, are environmental outcomes - - -

5 THE COMMISSIONER: Sorry, what page for Menindee Lakes?

MR BEASLEY: Page 14, I didn't realise you had this. I don't want to go through this in detail at the moment but Menindee Lakes – you see it has got low, then it has got moderate in brackets for environmental outcome. Apparently what that means is
10 low prospect of achievement but moderate if you do what we recommend. Hence, you've got something like risk management for Menindee Lakes and it says low, then it has got high. But I will come back to that report later.

THE COMMISSIONER: I should say that on its first page, under the heading
15 'Purpose' there's a history narrated that rather suggests this is not an audit within the meaning of the Basin Plan.

MR BEASLEY: No, it couldn't possibly be and I was just about to come to the Bewsher report that Dr Steinfeld also mentioned, which is a report I have read. It's
20 not in evidence because it might have more relevance to other people but that is a report entitled 'Independent Review of Hydrologic Modell for SDL Adjustments, Final Report', 30 September 2007, Bewsher Consulting Pty Limited. Do you have a copy of that?

25 THE COMMISSIONER: I don't think so.

MR BEASLEY: Well, it doesn't matter. I will just tell you this: this is a review of the SDL adjustments that was commissioned by the Basin Authority by Bewsher - - -

30 THE COMMISSIONER: Sorry, I'm being semaphored the location of this. The tab has been folded in.

MR BEASLEY: It might be tab 4.

35 THE COMMISSIONER: Bewsher, B-e-w-s-h-e-r.

MR BEASLEY: That's it. Yes. Now, if you go - - -

THE COMMISSIONER: I have it but I confess I have not read it.
40

MR BEASLEY: No. But I only need to – you asked the question, maybe it's a 727 audit.

THE COMMISSIONER: I see.
45

MR BEASLEY: I just want to direct your attention to page 5.

THE COMMISSIONER: Yes.

MR BEASLEY:

5 *The scope of this review is limited to how the benchmark conditions and supply
measures are represented in the model through the review of the reports
documenting the representation. It does not include the suitability of the
overall approach for calculating the SDL adjustment that has previously been
reviewed, including 24 river system –*

10 etcetera, etcetera. So given that, it's not a 727.

THE COMMISSIONER: Thanks.

15 MR BEASLEY: Can I also just while I'm on this report if, Commissioner, you go
to page 16, which is where there's an assessment of the modelling. Just so you can
note these important paragraphs. Assessment of the modelling, 4.1, second
paragraph:

20 *Because all hydrological models are only approximations of actual or
proposed behaviour the model representations of the individual SDLA projects
are also approximations. However, through the inclusion of more detailed
information it's always possible to improve the model simulation. As a result
the modeller has to make a subjective assessment of the level of detail to
25 including noting that typically the law of diminished returns applies, ie,
increasingly greater effort is required to improve simulation accuracy.*

Dropping down two paragraphs:

30 *In the vast majority of projects that include physical works these projects have
not been yet designed or constructed. This means that there is also uncertainty
concerning the final characteristics of the projects that will be implemented as
it would be expected that changes will occur as a result of both detailed design
and construction of projects.*

35 There is other similar material in the report.

THE COMMISSIONER: Just so that it's clear, it's something that I have in mind,
in the Basin Plan itself, I apprehend that uncertainties of that kind are what underlie
40 the approach that you see in 7.17(1), which requires the Authority:

45 *to turn its corporate mind to the question of whether the Authority is not
satisfied that a determination of proposed adjustments, etcetera, can be made
that satisfies the criteria below then the Authority may reduce the respective
contributions for any affected unit to a level at which such a determination can
be made.*

MR BEASLEY: Yes.

5 THE COMMISSIONER: It's the usual horrible English but I think it's tolerably plain that it means that degrees of confidence might be enhanced by diminishing the amount by which the environment would be deprived of water in response to these proposed measures. Which gels pretty well with the precautionary principle component of – the principles of ecologically sustainable development. In short, that a precept of prudence is biased so that you step back from doing something that threatens an inappropriate level of harm.

10 MR BEASLEY: Well, I was going to come to this section now, given you have raised it. Where it has got that satisfies a criteria below, the first criteria is the supply contributions to the proposed adjustment to achieve equivalent environmental outcomes compared with a benchmark.

15 THE COMMISSIONER: Yes, and I think you and I both raised this earlier, but for the present four witnesses, it might be useful for you to appreciate that the approach I'm provisionally taking is that there is significance in the fact that that first criteria is not expressed in any tentative terms. It is not may achieve or could on optimistic assumptions achieve. It actually says "the supply contributions achieve". Now, we all know the nature of the exercise involves projection, estimation, degrees of confidence and that can produce ranges. But ultimately, there has to be attention by the Authority to the achievement of those criteria.

20 We know that is for sure because 7.21(b) requires, as a prerequisite the Authority to be satisfied of those criteria being met. Now, it's for those reasons that – that's why I've been asking about what do you know about reports and audits and reviews and why I'm interested in the transparency evidence you've given to me, for which I am much obliged. Because at the moment I am struggling to see in what I will call the public record, the transparently available proceedings of the Authority, whether they were satisfied of these things at all.

25 MR BEASLEY: I think page 19 of the Wentworth Group submission to the Commission has some extracts from various MDBA analysis of certain of the supply measures including Menindee Lakes followed by the sentence:

There can be no trust in governments under such circumstances.

30 THE COMMISSIONER: But the Menindee Lakes one surely is clear. Nobody knows the full extent of the environmental harm that it will carry out, that it will cause. Isn't that right?

ASSOC PROF PITTOCK: Yes, that's correct.

45 THE COMMISSIONER: Which means you couldn't possibly be satisfied of the first criteria. I think – as a lawyer I just think that's really straightforward and if there is anybody out there who says that I've got hold of the wrong end of the stick,

please correct me. I want to be right or as close to right as a human can be. But when it comes to the end of the science it seems to me what we have been told in the business case and in the MDBA's published response to the, or available, I should say, disclosed response to the business case, it is agreed that the environmental impact of the Menindee Lakes proposal is unknown.

ASSOC PROF PITTOCK: That's correct and - - -

MR BEASLEY: Well, what's not – and there's no criticism of this. Page 19 of the Wentworth Group submission contains an extract from the MDBA's analysis that the Menindee Lakes project but prior to even talking about the threat to the Golden Perch nurseries there's a statement we need an EIS.

THE COMMISSIONER: Yes.

DR STEINFELD: And most importantly a strategic assessment of the whole package of projects together and the impacts of the cumulative impacts as well as the individual impacts of each project.

THE COMMISSIONER: With respect, I agree, that simply, at the moment, I – and I need help with this – I don't understand how you could be satisfied of the first of the criteria stipulated where you simultaneously consider that you need an EIS for the Menindee Lakes proposal and there isn't one. That is, I don't understand without what might be called serious cognitive dissonance you could possibly entertain those two ideas at the same time. I am satisfied of equivalent environmental outcome and I do not know the environmental impact of the proposal about which I have formed that state of satisfaction.

MR COSIER: Absolutely.

THE COMMISSIONER: I'm sorry, I think that is not merely unscientific; I think that is anti-scientific.

MR COSIER: I absolutely agree with you. Either you need an EIS or you don't.

THE COMMISSIONER: I don't want to put words into your mouth but I need to know whether you think I'm on the wrong track. I gather you don't.

MR COSIER: No. We – we completely agree with you. And as you can tell from the amount of work that we have had to put into ours the frustration that we get in being to access the most fundamental pieces of information and we drew reluctantly but have no other choice but to draw the conclusion the information is just not there. If that is the case, decisions are being made about projects that have enormous environmental impact or benefit, have enormous social and economic impact or benefit, have enormous costs to the taxpayer and yet the information these decisions seem to be being made without the information that you ordinarily would. I used the expression once, there is more public scrutiny given to the construction of a garage

behind a house in a suburb in Sydney than has been applied to the Murray-Darling Basin Plan implementation.

THE COMMISSIONER: I'm going to regard as understandable hyperbole.

5

MR BEASLEY: I thought you would take it as like Commissioner's notice but - - -

THE COMMISSIONER: In relation to that matter, particularly Mr Cosier's reference to frustration, 7.17 (2)(c) stipulates as a prerequisite, or at least I think it becomes a prerequisite because it's one of the criteria that have to be met, that any processes approved by the Ministerial Council including opportunities for public consultation have been observed. Please forgive my ignorance or my forgetfulness, have there been promulgated processes approved by the Ministerial Council?

10

DR STEINFELD: To my knowledge, the first opportunity that the public and members of the Wentworth Group have had to comment has been quite narrowly focused during the public consultation period in October 2017. And that was four years after the commencement of the phased process. We had no opportunity to comment during that phased process.

20

THE COMMISSIONER: It's just that the language there is – refers to the possibility of processes. It doesn't require them, I don't think. It refers to the possibilities and processes:

25

...for developing initiatives for satisfying these criteria.

Again, it's not English I would commend to anybody, but I think it means a process, not a point. So that – and it refers to opportunities in the plural for public consultation.

30

MR COSIER: So I said - - -

THE COMMISSIONER: And I have read your material and other people's material, to put it bluntly, complaining that insufficient and inscrutable material was made available for too short a period for supposed consultation.

35

MR COSIER: Correct. And in fact I was going to suggest, Commissioner, the emphasis on the word "consultation", that it's not possible to consult and seek an informed opinion without providing information that others can use to make that informed opinion.

40

MR BEASLEY: Can I just pause there. There's assessment guidelines produced by the Authority for assessing these SDL - - -

45

THE COMMISSIONER: I know.

MR BEASLEY: - - - phase 2.

THE COMMISSIONER: But that's not Ministerial Council.

MR BEASLEY: No, I know. But phase 2 assessment guidelines includes:

5 *Business cases need to include an assessment of potential adverse ecological impacts resulting from the operation of the proposed measure.*

It goes on to have detail about that. Business cases will be assessed on the basis that:

10 *It clearly describes the ecological justification.*

And yet you've got the analysis for the MDBA saying, "We need an EIS."

15 THE COMMISSIONER: Yes, quite. In other words, in terms of their own guidelines, the proposal is half-baked.

MR BEASLEY: Well, half might be an exaggeration. You were talking about hyperbole before, but - - -

20 THE COMMISSIONER: Yes. No, but if they say, "We need an EIS." That seems to me to be pretty plain language for "ecological consequences are not sufficiently understood".

25 MR BEASLEY: I take it, reading that document as a whole, that it says that, "There are so many potential risks here that we need something of substance, you need to produce something of substance before this can be properly considered." And yet – I haven't tendered it yet but there's a joint, I think it's a joint MDBA New South Wales Government document but says this is 106 gigalitres of 605.

30 THE COMMISSIONER: Yes, that's one of these attributed – I call them savings – that I was asking about earlier, that results from what would have to be reflected in so-called calculations by the Authority and I've not seen that.

35 MR BEASLEY: Now, I won't bother with it now, despite asking people to get them for me, but the other quotes from page 19 in the Wentworth Group submission, such as the ecological targets for the SDL offsets in the Lower Murray, "are not supported by the evidence" and above natural flow through the system, Lindsay Island:

40 *The potential ecological risks have been underestimated due to a lack of available information.*

Murrumbidgee River, Yanco Creek offtake:

45 *Contains no detail as to when upstream flood runners and tributaries may engage from the increased Yanco weir pool. This represents potential significant unknown third party impacts that represent a significant risk for the project –*

etcetera:

Significant risk to salinity and water quality.

5 We - - -

THE COMMISSIONER: It means – the word - - -

MR BEASLEY: All of - - -

10

THE COMMISSIONER: It means - - -

MR BEASLEY: All of that will be tendered in due course, when there's - - -

15 THE COMMISSIONER: It meant the word “equivalent” could not be satisfied.

MR BEASLEY: Yes. Now, just going back to that and playing devil's advocate, and I'm not suggesting this is possibly a correct interpretation, but it would be consistent with something I have read as to what the MDBA considers to be the correct approach to this Act and this Plan is whether, in relation to 7.17 they can decide they're satisfied at any time. That is, the adjustment occurs, supply measure gets built and then at some stage, five years, 10 years time, without a clock ticking, they can say, “Now we're satisfied, so everything is fine.”

20 THE COMMISSIONER: Like a springing use. A springing state of satisfaction.

MR BEASLEY: Yes. Now, I'm not – that's not my contention as to the proper construction here.

25 THE COMMISSIONER: No.

MR BEASLEY: But it's the only one I can think of at the moment that could possibly lead to someone - - -

30 THE COMMISSIONER: Well, we won't – we won't spend any more time on that now.

MR BEASLEY: Yes.

35 THE COMMISSIONER: We are going to move to - - -

MR BEASLEY: We are moving to page 3 of the document that I was discussing – that I raised before the break behind tab 11, which is the Wentworth Group's suggestion of how the supply measures should be considered.

40

THE COMMISSIONER: Page 3 being table 1.

MR BEASLEY: Yes, table 1. So first criteria:

Condition of approval works based projects must align with Basin Plan.

5 And a reference to the Basin wide environmental strategy. And I've understood that.
Then:

All works based projects must be assessed using a scientifically robust method.

10 Sorry. Dr Steinfeld, you took responsibility for this table?

DR STEINFELD: We all did. This was a collaborative effort.

MR BEASLEY: Who should I address my questions to?

15

DR STEINFELD: I'm happy to field questions.

MR BEASLEY: All right. So you have referred there to section 605, I think it's
schedule 605, is that what we are looking at there?

20

DR STEINFELD: That is correct.

MR BEASLEY: I just want to check that I understand the points you are seeking to
make. So schedule 6 is the default method for calculation of a supply contribution;
correct?

25

DR STEINFELD: Correct.

MR BEASLEY: In the Basin Plan. Section 605 is science – sorry, schedule 605:

30

*(1) Science based, independently reviewed, fit for purpose preference curves.
will be used in the method.*

(2) Science based, independently reviewed, fit for purpose metrics –

35

etcetera. That's what your reference is to a scientifically robust method.

DR STEINFELD: Correct.

40 MR BEASLEY:

*Any adjustment of the sustainable diversion limit must ensure there is no
change in flow indicators.*

45 And you've given a reference to schedule 6.07.

THE COMMISSIONER: What does that mean, no change in flow indicators?

MR BEASLEY: Yes, you might need – I was going to turn your attention to 607 to explain to the Commissioner what you mean by that.

5 DR STEINFELD: Yes. So in applying the equivalence method there needs to be some safeguards to ensure that there is no run away adjustment and one of those safeguards is a limits of change on the indicators of flow at particular locations along the river system. So, the Basin Plan requires no change in the indicator achievement of within channel flow.

10 THE COMMISSIONER: So it's the achievement, it's not the method.

DR STEINFELD: The achievement of indicator.

THE COMMISSIONER: Thank you. Thanks. That's great. Thank you.

15

MR BEASLEY:

(4) Sustainable diversion limit must not change by more than 5 per cent overall.

20

That's just section 7.19 of the Act – Water Act, I think.

DR STEINFELD: Yes.

25 MR BEASLEY: Sorry, section - - -

THE COMMISSIONER: Basin Plan.

MR BEASLEY: Section 7.19 of the Basin Plan, not schedule, yes:

30

Environmental risks must be mitigated to acceptable levels. Phase 1 assessment guidelines.

35 So adjustment folder, I will just turn that up, make sure I have the right reference there. So you've consulted phase 1 assessment guidelines for constraint and supply proposals; correct?

DR STEINFELD: Yes.

40 MR BEASLEY: And you have gone to, if I turn up page 9, Key Elements Overarching Evaluation Criteria. Paragraph 31:

45 *The overarching evaluation criteria based on the high level objectives for phase 1 are set out in schedule 1 to the draft IGA together with a preliminary consideration of risks associated with the proposal. In assessing phase 1 feasibility studies, each proposal should demonstrate that:*

(4) the risks and impacts associated with the proposed measure are manageable and acceptable.

5 DR STEINFELD: Can I stress the importance of this particular criteria?

MR BEASLEY: Yes.

10 DR STEINFELD: It's because the condition of the two – the scientifically robust method that is proposed is the ecological elements method and that method compares the benefits of environmental watering against the benefits of projects like supply measure projects. What it doesn't do is assess whether the risks of environmental watering are comparable to the risks of supplying projects and that is can I also just mention that when I refer to the flow indicators needs to be within the achievement, that I'm referring to the limits of change which are set out clearly in the
15 Basin Plan.

MR BEASLEY: All right. Criteria 6, I didn't quite – I don't understand:

20 *Long-term government arrangements must be secured. Phase 1 assessment guidelines for constraint supply overarching evaluation criteria 3.*

Which is:

25 *The proposed measure is likely to achieve its intended outcomes.*

THE COMMISSIONER: So you're talking about some appropriately indefinite life of the engineering express; is that right?

30 ASSOC PROF PITTOCK: Yes.

THE COMMISSIONER: You want them to remain - - -

ASSOC PROF PITTOCK: Associate Professor Pittock. Yes.

35 THE COMMISSIONER: - - - in fit state and operated.

40 ASSOC PROF PITTOCK: So Federal Government may, via the Department of Agriculture and Water Resources – is going to some sort of State Government entity to construct infrastructure. That structure on the floodplain has to be operated by somebody. Some employee has to come and turn the taps at the right time.

THE COMMISSIONER: Yes.

45 ASSOC PROF PITTOCK: And it's on the floodplain, so it gets flooded and degraded very quickly over time. As the example I gave earlier with the Nyah and Vinifera projects, for \$20 million of project expenditure, the governments face \$1 million a year in maintenance of operation costs and at this point the Commonwealth

and the States have not agreed who owns the infrastructure, who operates the infrastructure, who maintains it, and what the costs are.

5 THE COMMISSIONER: So it's really pointing out the artificiality of making serious decisions about water allocation in light of the estimated environmental benefits of a project without building in doubts about whether the project will remain in operation?

10 ASSOC PROF PITTOCK: Indeed. And we have seen government – State Government entities, regional management entities, defunded, changed considerably over time in the past few decades, and so we do have concern about the adequacy of governments moving forward for these projects that are often managed by catchment management authorities or State Government departments.

15 THE COMMISSIONER: Now, one expedient that occurs to me in that regard is that so long as there has been a component of the SDL adjustment amount attributed to that project, the – a concentration of relevant government minds could be achieved by saying that if the project ceases to operate, then during the whole of the period that that is true, that component of the adjustment will be reversed.

20 ASSOC PROF PITTOCK: Indeed.

THE COMMISSIONER: That would be really - - -

25 ASSOC PROF PITTOCK: Such cross-compliance measures would add a degree of rigour to the Basin Plan implementation.

30 THE COMMISSIONER: And would concentrate the minds of those who might respond to the complaints – the legitimate complaints of, say, irrigators affected economically by the reversal of an SDL adjustment.

ASSOC PROF PITTOCK: Quite.

35 THE COMMISSIONER: And that doesn't sound like it should be too difficult to achieve in the sense that it would be very hard, wouldn't it, to persuade people that there should be an SDL adjustment on the basis of a project, but no requirement for the project to actually continue in operation. That would - - -

40 MR COSIER: Certainly seem reasonable to us, Commissioner.

THE COMMISSIONER: It was just very difficult to understand a public policy justification for why anyone would say, "Let's make an adjustment on the basis of a project," without being concerned that the project continues to operate.

45 ASSOC PROF PITTOCK: Absolutely.

THE COMMISSIONER: It's almost as bad, surely, as saying, "Let's make an adjustment on the basis of a project and we don't care whether it ever happens."

ASSOC PROF PITTOCK: Absolutely.

5

MR COSIER: Yes.

MR BEASLEY: Criteria 8:

10 *Any water savings from the rules based projects will be converted into a water entitlement.*

You say that's a recommendation in the stocktake report that we discussed earlier. Why is that an important criteria?

15

DR STEINFELD: That criteria is important because when projects create water efficiency savings within a river, those savings at the moment, if they're not converted to an entitlement for the environment, those savings will go back into the run of river operations to boost - - -

20

MR BEASLEY: I see.

DR STEINFELD: To boost the reliable need for both – for all consumptive users. So it's really - - -

25

MR BEASLEY: having said entitlement for the environment, I think I understand the point now.

DR STEINFELD: Yes.

30

MR BEASLEY: Yes.

DR STEINFELD: So some projects have proposed the creation of entitlements for savings. And we have advised on the way that that needs to be done, some considerations to that. But broadly, the claimed water savings to ensure that they're real savings in the real world, they need to be put into an entitlement form to the environment.

35

MR BEASLEY: Projects must deliver value for money which comes straight out of the evaluation criteria for the phase 1 assessment guidelines. Projects are cost effective defined to mean an overall average of not more than \$1900 a megalitre. Where does that figure come from?

40

DR STEINFELD: That figure comes from the intergovernmental agreement.

45

MR BEASLEY: Right. And is that – where it says “projects must deliver value for money”, this is the consideration that should be given between a supply measure or

efficiency measure or a constraints measure and, for example, actually buying real water.

5 DR STEINFELD: So this is a pre megalitre figure, so project-like constraints measures may not actually generate a megalitre figure.

MR BEASLEY: Correct, yes.

10 DR STEINFELD: So it's – well, this is an average figure for the package of projects given that they, as a package, are claimed to represent 605 gigalitres.

MR BEASLEY: But it must deliver value for money, what does that actually mean? Is there – I know it says in the overarching evaluation criteria:

15 *The proposed measure is likely to be cost effective, considering the qualitative estimate of the potential supply contribution or likely improved delivery of environmental water.*

20 That's a direct relationship, is it, between the cost of the measure, whether it's building something or whatever it is, and how much water is said to be recovered from it?

ASSOC PROF PITTOCK: Associate Professor Pittock

25 MR BEASLEY: Yes.

ASSOC PROF PITTOCK: It's a somewhat arbitrary figure.

30 MR BEASLEY: Yes.

ASSOC PROF PITTOCK: It's basically expressing our concern that a number of these SDL projects might be being pursued because they are popular.

35 MR BEASLEY: Yes.

40 ASSOC PROF PITTOCK: Rather than a good use of public funds. But there's an opportunity cost in the taxpayers funding these SDL projects, and that at some point we would argue that the cost per megalitre recovered exceeds that that is morally acceptable, and that those moneys would be better off invested in things like purchasing water entitlements.

45 MR BEASLEY: There's another option, isn't there? I'm not making this as a submission but just as an option, another option would be they may neither be popular or unpopular, they may be very expensive, but they may be more politically expedient than a buyback.

ASSOC PROF PITTOCK: Indeed. And certainly political expedience is our concern with a number of these projects in that it is Federal Government money that State Government are expending. There may not be much pressure on the State Governments to spend those funds in a cost effective way.

5

DR STEINFELD: And can I - - -

MR BEASLEY: All right – sorry, yes.

10 DR STEINFELD: Can I add something to what Professor Pittock said is that the figure for \$1900 per megalitre is not our own figure. It's the figure that was in the intergovernmental agreement.

15 MR BEASLEY: Sure. Now, I'm going to go to page 6 of this document now for efficiency measures. Before I do, though, I've got a document here called attachment D, 'Conditions Necessary for Individual Supply Measure Projects Notified for SDL Adjustment' 19 April 2018 which is a document where the Wentworth Group – and tell me if it's not you in the main, Dr Steinfeld – that have gone through each of the 36 measures and given an indication of what, under your
20 criteria, is satisfied, what is required, what isn't applicable, and then some commentary concerning the matters that you say have not been met in terms of your criteria.

25 DR STEINFELD: Correct.

MR BEASLEY: And you – the Wentworth Group, also in relation to that, made a submission to the Basin Authority, which is behind tab 14 of this bundle folder, Wentworth Group of Concerned Scientists Letter to the Murray-Darling Basin Authority, 3 November 2017:

30

Wentworth Group welcomes the opportunity to provide a submission on the SDL adjustment mechanism.

35 And there's a two page letter from Mr Cosier and then, behind that, your submission contains much of the same material that we have just been discussing; correct?

DR STEINFELD: Correct.

40 MR BEASLEY: Yes.

DR STEINFELD: Can I add - - -

MR BEASLEY: You can.

45 DR STEINFELD: Add as well, that - - -

MR BEASLEY: You can add anything you want to say about those documents and the SDL – sorry, the criteria that you suggest for approving a supply measure, please feel free.

5 DR STEINFELD: The key difference between our assessment in November 2017 and what we provided in 2018 in that letter and in our submission, was that the Authority had made available its own assessments of the supply measures.

MR BEASLEY: Yes.

10

DR STEINFELD: So our most recent assessment was informed in much more detail by that information.

MR BEASLEY: Yes, including the identification of risks by the Basin Authority in relation to the matters we discussed that's on page 19 of your submission. Can I ask you this, though, in terms of – and just as a general query – in terms of these 12 criteria, do I understand it that you're suggesting that all of these criteria should be met prior to the Authority proposing an adjustment under section 23A of the Act. Do I have that right?

20

DR STEINFELD: That's correct.

MR BEASLEY: Just to follow that up, though, if the – what's your view in relation to this? If a supply measure analysed by you – sorry, analysed according to your criteria is one that meets all that criteria, but is a project that, for example, has to be built, in other words it's not implemented yet, should there be adjustment to the SDL immediately before the measure is, for example, implemented or should that wait until implementation and analysis of what is actually happening?

30 ASSOC PROF PITTOCK: It's not a matter we've considered in great depth. We are very much persuaded by the Commissioner's issues paper that it's an important question and we are, of course, concerned to see adequate investment and recovery of the environment.

35 MR BEASLEY: Well, the way I would raise that is that, and I suppose this doesn't require comment from you but I think where that came from with the Commissioner, is that the Water Act, even under both before any adjustment is made and also after an SDL adjustment is made, states that even, for example, 23A(3)(b), even when a SDL adjustment is made, the sustainable diversion limit must still reflect an environmentally sustainable level of take. The question is, I suppose, and this applies to the Northern Basin Review in relation to anything that is unimplemented there in terms of the tool kit but also in relation to a proposed supply measure that has not yet been implemented whether, if you adjust the SDL and take – and have less water for the environment during a period which might be six years, prior to the implementation of a supply measure, are you left with an environmentally sustainable level of take or an SDL that reflects an environmentally sustainable level of take? Do you want to say something?

45

ASSOC PROF PITTOCK: I mean, clearly, if there is not water being delivered to the environment in that transition period, then there will be some commensurate diminution of environmental benefits. And that's - - -

5 MR BEASLEY: I mean, – sorry, you finish.

ASSOC PROF PITTOCK: So it would not be sustainable by definition.

10 MR BEASLEY: I mean, it seems as a matter of obviousness, I suppose, say, if we accept that 2,750 does represent an environmentally sustainable level of take, just make that assumption, that means that some figure less than that at some stage will not reflect an environmentally sustainable level of take and if you reduce 2,750 by 605 gicalitres, on the back of measures that (a) are not implemented, some haven't even been built or approved. Some haven't even been designed fully yet. And you
15 are now down to 2,100 gicalitres, and we know what the modelling suggests about 2,400 gicalitres, you certainly can't be left with an environmentally sustainable level of take for at least a period of time until all those supply measures are (a) implemented and (b) working in accordance with whatever modelling was associated with them to give confidence that they represent 605 gicalitres. That almost seems a
20 matter of just basic logic.

ASSOC PROF PITTOCK: Absolutely.

25 THE COMMISSIONER: Can I, in that regard, direct your attention to 720 sub (4) of the Plan. Is that a means by which the adjustment is required not to, as it were, get ahead of itself?

The proposed adjustment must be in the form of a formula as a function of time either varying continuously or changing at specified times –

30 they may not be so different from each other in fact by anyhow –

that reflects the changes up until 30 June 2024 of the relevant efficiency contributions and the operation of the overall adjustments in 719 –

35 which includes supply contributions as well. I'm not suggesting this is as easy to understand as English, but I'm inclined to read that as meaning that those who wrote this understood that there was a period during which things would be happening, actually happening, as a result of the measures. That is, there can't really be an
40 efficiency contribution before the measure responsible for it has commenced, it seems to me. I may be wrong.

45 ASSOC PROF PITTOCK: My understanding is that the intent of the Federal Government in adopting the Basin Plan was to provide for a five-year transition period - - -

THE COMMISSIONER: Yes.

ASSOC PROF PITTOCK: - - - from the accreditation of state water resource plans in the event that those state water resource plans included any changes on the ground to entitlements to provide a sort of five-year grace period to move towards full Plan implementation by 2024.

5

MR BEASLEY: But what you've directed the witnesses to, Commissioner, in 724, the reference to 719 makes it clear that it's a reference to the supply measures because that - - -

10 THE COMMISSIONER: Well, it's contribution as well, isn't it? The net effect of the total supply contribution and the total efficiency contribution. Under 715 to 717, that includes both, doesn't it?

15 MR BEASLEY: It does, but I haven't considered this but one reading of that would be that even when the supply measures are approved, if they're unimplemented, it stays at 2,750 until you know better – sorry, 2,750 until you know better and then you adjust.

20 THE COMMISSIONER: What would be wrong with that, as a matter of water policy?

DR STEINFELD: The key - - -

25 THE COMMISSIONER: Along with what Mr Beasley has just proposed.

DR STEINFELD: Yes. For a matter of, I guess, social acceptance of the Plan, it would mean recovering water from communities up to that, say, 2,750 target.

30 THE COMMISSIONER: Yes.

DR STEINFELD: With associated impacts and benefits and then having to subsequently perhaps reverse or, you know, provide that water back to communities if needed.

35 THE COMMISSIONER: Doesn't the Plan have that built in, in any event, up and down?

40 DR STEINFELD: The next opportunity would be 2026 to have a formal review of the SDLs within the current legislative arrangements.

MR BEASLEY: You're pointing out there pros and cons of doing it either way, if you adjust now.

45 THE COMMISSIONER: No, I understand.

DR STEINFELD: I think another really important point to make is that after 2024, we will hopefully have a much clearer idea of whether the supply measure projects will be successful or not in delivering - - -

5 THE COMMISSIONER: Why do you say that? Well, how long after 2024 do you propose that will be possible? Why do you say that we will know by 2024?

DR STEINFELD: Yes.

10 THE COMMISSIONER: Why?

DR STEINFELD: Because that's the period that the MDBA has to be able to ensure that projects will be implemented - - -

15 THE COMMISSIONER: They only have to be implemented by, what, the 31 December 2023.

MR BEASLEY: 30 June '24, I think, isn't it? Sorry, you're quite right, Commissioner. 712 to – yes.

20

THE COMMISSIONER: They're assessed as at 30 June 2024. They have to be implemented by 31 December 2023. Six months is not a long time in the run of a river, is it?

25 DR STEINFELD: Yes, assuming we have better knowledge – we may not – that if any of the projects are failing, after 2024 there's no clarity on the way forward if projects don't pass whatever tests they need to pass by 2024.

30 MR BEASLEY: Sorry, I think I'm right. I think efficiency measures are 31 December '23 but if you look at 712(3):

A measure may be notified only if (a) it will enter operation by 30 June 2024.

35 So I think that's the supply measure is 30 June 2024.

THE COMMISSIONER: Well, either way - - -

MR BEASLEY: Yes, it doesn't matter.

40 THE COMMISSIONER: This is not a Plan that is going to enable any, what I call experimental protocol to have been worked through. You won't know necessarily whether any measure has succeeded, isn't that right?

45 DR STEINFELD: That's correct. So in that state of uncertainty, what money is there available, for example, going forward to ensure that water can be recovered to achieve the sustainable diversion limit, the ESLT; and, secondly, within the legislative context of the Water Act there's currently a 1,500 gigalitre cap on

buybacks that would perhaps prevent buybacks from even being on the table, if particular projects do fail. So there's uncertainty within the current period up to 2024 over the - - -

5 THE COMMISSIONER: So we are really talking about, as it were, the next Basin Plan, being still a mystery.

DR STEINFELD: It's actually the current Basin Plan.

10 THE COMMISSIONER: I know, I agree but you are looking forward to the implications of the working out of the current Basin Plan for a period where we will need a new Basin Plan – I think.

DR STEINFELD: Well simply to deliver what we are arguing is a 3,200 gigalitres or equivalent outcomes. There's so much uncertainty over the supply measures that if by 2024 some of those are not in operation to acceptable standards – and we have defined what those standards are – that there needs to be money made available to recover water through other measures, say, for example buybacks or efficiency plus potential policy changes and legislative changes to ensure that water markets can be used to recover that water because currently that possibility is not available.

MR BEASLEY: Well, I think what we have to remember in this useful discussion is always that, and some of the released commentary that I've seen from the MDBA emphasises the adaptive nature of this Plan and that things can be done gradually, which is all well and good as a statement. But it doesn't have necessarily any regard to the text of the legislation, the text of the Water Act. The Water Act provides that the long-term average sustainable diversion limit must reflect an ESLT. Now, that would have to commence at the latest at 30 June '19; correct? That's when water resource plans are accredited. That's when the sustainable diversion limit starts.

30 ASSOC PROF PITTOCK: Correct.

MR BEASLEY: So as that's the date – drop dead date, the long-term average SDL must reflect an ESLT. Assuming that the ESLT is 2,750, and you still have all these unimplemented supply measures and you've dropped 2,750 by 605, and in terms of the order that you do this, the Act directs the Authority to take into account the principles of ecologically, not consumptively, but ecologically sustainable development, it would seem a very strange position to say the Act allows 605 to come off 2,750 as at 30 June 2019 on the back of measures that may not be in place for five years.

THE COMMISSIONER: And may never work.

MR BEASLEY: And may never work. That's the ESD point.

45 THE COMMISSIONER: In relation to - - -

MR BEASLEY: Sorry, that was a legal submission - - -

5 THE COMMISSIONER: - - - may never work, could I just direct your attention to 706, please. Unless I'm mistaken, the Authority has published material which at least on the public record, the Authority is to be taken as asserting satisfies 705, is that right, the published draft determinations?

DR STEINFELD: Correct.

10 THE COMMISSIONER: I'm more interested in the stipulation that there has to be an account of how the adjustments were arrived at and the reasons for decisions made in arriving at the draft determination. It's a rather wordy way of putting it. But it means that you couldn't just say that the Authority has determined X. There has to be a description of process, the mental process, and reasons for decisions. That
15 means justifying an outcome. I'm not so sure that what I've seen answers that description. Can you comment on that, please?

DR STEINFELD: The MDBA has provided an account of how they've performed the modelling and the results of that but what we've shown today is the importance
20 of a range of considerations to determine whether these projects meet the requirements of the Basin Plan, including risks. And they were not clearly documented in the draft determination report.

THE COMMISSIONER: So that means that reasons for the mandatory reference to
25 risks, etcetera, that is effect on the environment, the equivalent outcome, you doubt whether those reasons why disclosed in the so-called draft determination upon the basis of which the public, including yourselves were invited to make submissions.

DR STEINFELD: I know that they were not addressed because the subsequent
30 release of the Murray-Darling Basin's own assessment showed some very significant risks that were not discussed in the draft determination.

THE COMMISSIONER: Right. Thank you.

35 MR BEASLEY: I want to – I'm going to ask Associate Professor Pittock to have the final say in a moment because I know he has got to go soon and to raise anything that he wants to in the time available. There is another publication by – before I get to the actual submission, much of which we have covered in any event already - - -

40 THE COMMISSIONER: Yes.

MR BEASLEY: - - - but there is a Wentworth Group publication suggesting rejection of the Northern Basin Review. It's 'Advice on Basin Plan Amendment Instrument 2017 (number 1)'. It's a January 2018 publication behind tab 12.

45 THE COMMISSIONER: Yes.

MR BEASLEY: I don't think there's much need to go through the detail of this.

THE COMMISSIONER: No, I've read that and I don't have anything to ask about it.

5

MR BEASLEY: I had one question about it, not about the matters raised in it because many we have raised, but can any of you – one of the big issues in this is that you raise, is that the toolkit measures are non-statutory? They require states to buy into them. They may not. And the 70 gigalitre adjustment seems to be, in some way, based on the toolkit measures. From the point of view of the issues of science we have discussed, though, in terms of proper scientific justification in being able to understand what data has been used and what the inputs are for modelling and being able to replicate it and test it and prove it is wrong, have any of you seen anywhere published by the MDBA a scientific justification for 390 gigalitres recovery for the environment becoming 320 gigalitres.

15

DR STEINFELD: No.

ASSOC PROF PITTOCK: No, I just find the Northern Basin Review proposals simply offensive for a number of reasons.

20

MR BEASLEY: Go ahead.

ASSOC PROF PITTOCK: One is that, in terms of a number of the water-related measures, they are simply what any professional water manager should do. If there's an environmental flow designated for environmental purpose, any professional water management agency or government should be ensuring that it's monitored and used for the environment.

25

MR BEASLEY: You are talking about one of the toolkit measures that says environmental flows should be protected.

30

ASSOC PROF PITTOCK: Yes, indeed. Then I also find it offensive that incommensurable environmental activities are being traded off one against another. So additional environmental water is being traded off against measures such as providing fish passage on weirs. Any owner of a piece of water infrastructure – this is a topic I've published on – has a moral obligation to modify that infrastructure to minimise environmental impacts to the extent possible, and to trade those synergistic and complementary environmental measures off against one another is – I just think – hard to understand.

35

40

MR BEASLEY: It's hard to understand how that hadn't been part of the 390 gigalitre recovery.

ASSOC PROF PITTOCK: Absolutely. There's no scientific justification for saying 70 gigalitres equals fish passage devices on weirs. They're apples and oranges.

45

MR BEASLEY: Yes.

THE COMMISSIONER: Well, now, the 70 adjustment, if I can call it that, has now been legislated, hasn't it?

5

MR BEASLEY: Amendment, yes.

THE COMMISSIONER: It has been legislated?

10 ASSOC PROF PITTOCK: Yes.

MR BEASLEY: Yes. There's an amendment to the Water Act allowing for – the amendment to be proposed again, and it can't be refused by the Senate.

15 THE COMMISSIONER: Without disallowance.

MR BEASLEY: It can't be disallowed by the Senate, I'm sorry. Yes. Sorry, did you - - -

20 THE COMMISSIONER: There was nothing else I wanted to ask about the Northern Basin, except one question. I don't know, is running out. What is the origin of this expression "toolkit measures"?

MR BEASLEY: I think it came from the committee, didn't it?

25

DR STEINFELD: Yes. My understanding - - -

THE COMMISSIONER: What is the – it's no doubt intended to be a homely figure of speech. I'm just trying to understand what it invokes. What do we mean by it?

30

MR BEASLEY: There was a Northern Basin Advisory Committee of which - - -

THE COMMISSIONER: Why are they called toolkit measures?

35 MR BEASLEY: Because they came up with that expression.

THE COMMISSIONER: Toolkit?

MR BEASLEY: Toolkit. Yes.

40

DR STEINFELD: I suppose - - -

THE COMMISSIONER: There's nothing I should understand.

45 DR STEINFELD: No, there's nothing.

MR BEASLEY: I might withdraw that. We're calling several ex-members of that committee to give evidence.

THE COMMISSIONER: That's right, yes.

5

MR BEASLEY: I think in retrospect they may have been suggesting that various things need to be done, not to justify 70 gegalitre reduction but need to be done.

THE COMMISSIONER: Because they're good practice.

10

MR BEASLEY: Because they are good practice and I have a feeling someone from the MDBA might have suggested to them why don't we call this a toolkit. I could be wrong about that but there's a witness that will take us through that. You've got to go. Is there anything further you wanted to raise that we haven't raised? I mean, I know we can come back by Skype with you later but in the three minutes you've got left, is there anything that you think is important to the issues we have been discussing that you want to emphasise?

15

ASSOC PROF PITTOCK: The Wentworth Group very much appreciates the Commission's time and the opportunity to discuss this work. There clearly are major problems with the Basin Plan. We do believe that if governments were of a mind to do so, many of those negative aspects of the Basin Plan can be substantially repaired. There's still sufficient time to make changes. There's \$5 billion left in allocated public funds that could, if directed differently, make a significant difference. I think what's critical and perhaps what you've heard is from a scientific perspective, there's a lot of valuable knowledge that exists from scientists beyond the Wentworth Group who are willing to make that available in the public interest, to achieve better outcomes; that in a number of areas the Basin Plan could be readily strengthened so that it does provide a substantial step forward for the environment, for the people who live in the Basin ahead of the planned revision for 2026.

20

25

30

MR BEASLEY: Thank you.

THE COMMISSIONER: Thank you.

35

MR BEASLEY: Can Associate Professor Pittock be excused?

THE COMMISSIONER: Yes. I hope you won't take it amiss if we feel the need to correspond with you for any further assistance?

40

ASSOC PROF PITTOCK: I would be delighted to provide any further assistance that I can offer.

THE COMMISSIONER: I'm very grateful. I'm much obliged for your help.

45

MR BEASLEY: Thanks for your time. Just feel free to leave while we keep talking.

5 MR BEASLEY: I only have a couple of questions of clarification in relation to the
Wentworth Group submission to the Royal Commission dated 21 May 2018 which is
now exhibit RCE73.

10 THE COMMISSIONER: This is a triviality, on page 6, second last paragraph, third
line under the sub-heading – I don't wish your submission to be misunderstood – you
aren't suggesting that there needed to be a return to environmentally sustainable
levels of allocated water. It was over-allocated resources. I think there's a
typographical error there.

15 DR STEINFELD: Correct. Thank you for pointing that out.

THE COMMISSIONER: It's all about over-allocation because neither this Royal
Commission nor the Water Act nor I think any of you four protest at the allocation,
that is for consumptive use of water. It is a question of how much and when and
where.

20

DR STEINFELD: Yes.

MR COSIER: Yes.

25 MR BEASLEY: Page 3 of the submission, picking up that point from the
Commissioner under the topic, the heading 'Water Reform in the Murray-Darling
Basin,' there's a sentence:

30 *Through past mistakes many rivers have become over-allocated or overused.*

And you've given a footnote. That footnote is actually to the 2004
intergovernmental agreement where that's an agreed part of the preamble to the
agreement that as a matter of fact, there has been over-allocation and hence
something needs to be done about it.

35

PROF THOM: As I mentioned the other day, that issue of over-allocation and
overuse was noted in the 'State of the Environment Report' 2001 as tabled in
Parliament. So it's well-known and well-identified at the time the idea of
developing salinity plans and a whole range of different initiatives that the
40 Commonwealth Government at that time was engaged in.

MR BEASLEY: Well, I think it's almost a legislative fact in the Water Act as well.
I don't think there's any need to discuss constitutional validity.

45 THE COMMISSIONER: Well, there is but not in evidence.

MR BEASLEY: Sorry, not with the current witnesses.

PROF THOM: Again, picking up that point in object 3DI, I think, the recognition of the overuse and over-allocation, I see that recognition in the Act as a clear signal to Australia that we have a major national problem and also an international problem, because having that recognition that we have in various ways abused the water
5 resources – and I might add broader more natural resources – in this particular area, we are not only suffering in terms of our social and economic, we are also suffering in terms of the environment and our capacity to meet international obligations. So I see that as a powerful signal in what we could argue is a well-constructed Act in order to address those issues. And the last thing we in Wentworth Group would want
10 to see is any diminution of those sorts of matters that recognise those issues that I’ve just mentioned.

THE COMMISSIONER: In particular, I think, Professor Thom, you’re referring to the language of paragraph 21(2)(a) of the Act.
15

PROF THOM: Yes.

THE COMMISSIONER: Particularly sub (1).

20 PROF THOM: Sub (1), yes.

THE COMMISSIONER: Thank you. And you will have heard me repeatedly use the expression “protect and restore”. You will find that that is contained within paragraph (b) of subsection (2) of section 21.
25

PROF THOM: 21. Correct.

THE COMMISSIONER: So that the Basin Plan must be prepared having regard to what is a legislated fact – or two facts. And it must promote the steps necessary to
30 protect and restore, etcetera. And I must say, although it’s provisional because I haven’t prepared my report, it’s unlikely, I think, particularly in the absence of anybody arguing this, it’s unlikely that I will see any cause to revisit either in concept or in wording what I regard as rather important basal values that Parliament has legislated. And I haven’t heard argument to the contrary of that. Some of the
35 material I’ve received, it’s fair to say, is less emphatic about the significance of the adverse impacts that Parliament legislated as a fact than others. But nobody seems to say if there has not been over-allocation. So I will almost certainly be proceeding on the basis that those are values that I will use as a standard to judge what has happened rather than something to be questioned in themselves.
40

PROF THOM: If I may, Commissioner – Professor Thom – say that in looking at other forms of impacts with respect to degradation of the Basin’s environmental assets, successive State of the Environment Reports, they have – occur every five years.
45

THE COMMISSIONER: Yes.

PROF THOM: Document the nature of the degradation that is going on. And so it's no – it's – although I was personally involved in 2001, and I have not been involved in subsequent ones, I know from reading the subsequent ones they continue to document that degradation and the impacts of that. So - - -

5

THE COMMISSIONER: Yes.

PROF THOM: That's – I might also add, Commissioner, it's in the objects, number (f), there has been no discussion of this, and I think I understand why, and I would like to – my colleague, Mr Cosier may help me with this.

10

THE COMMISSIONER: Section 3, paragraph (f)?

PROF THOM: the objects (f).

15

THE COMMISSIONER: Yes.

PROF THOM: Under 3:

20 *To ensure the management of the Basin water resources takes into account the broader management of natural resources in the Murray-Darling Basin.*

Now, this brings me to an understanding: at this time when the Act was being drafted, we had the – if you like, a fairly comprehensive national approach to natural resource management through the institution of 53, I think it – 56, I'm corrected, 56 natural resource regions. And these natural resource regions in each State were supported either by statute, as in the case in New South Wales and Victoria, or through administrative arrangements to assist in the management of the natural resources whether they're vegetation, soils, water, in each of these regions. And they came as a result of the funding – initial funding through the Natural Heritage Trust at the beginning of 2000 and so - - -

25

30

THE COMMISSIONER: This is wide enough to include mineral resources as well, isn't it?

35

PROF THOM: No, not mineral resources.

THE COMMISSIONER: Why not?

40 PROF THOM: That was excluded from this. It was – if you like, the resources that underpin the ecosystems, the living resources.

THE COMMISSIONER: The broader management of natural resources.

45 PROF THOM: Yes, the word "natural" in the context of the natural resources, Mr Cosier - - -

MR COSIER: Yes. So the Natural Heritage Trust was the – was a large fund built in 1997 and it sought to do two things. First of all, it sought to fund projects like land care projects and water care projects, but its second motive was to change institutional arrangements in natural resource management across Australia, and that
5 changes as Professor Thom was explaining, as a result of, until recently, the growth in the substance and content of these regional natural resource management bodies. The initial NRM groups’, as we now call them, concept involved in Victoria with the establishment of catchment management authorities that Professor Thom related to and they have always been centred around the management of the living natural
10 resource base whether it be the soil or the rivers or the – the wetlands.

And the reason for doing so is because, as you’ve heard in the last – I’m sure throughout this entire hearing – hearing process – how complex the management of natural resources are and the interaction between nature and human activities. And
15 when you try and manage that process on the scale such as the Murray-Darling Basin, covering a million square kilometres, it gets enormously complicated. And so the purpose – one of the primary purposes of these regional bodies is to harness local expertise as well as scientific expertise in the synthesis across the range of assets as well as the management of individual assets. So the health of catchments, right? Of
20 vegetation in the catchments affects the health of the river, and the health of the river affects the health of the biodiversity throughout the catchment. So that was the purpose of the natural resource management process.

I believe the reason Professor Thom is raising this is we had made significant
25 advances in this country since the 1930s in our understanding of natural resource management processes and one of the unintended consequences of the controversial Murray-Darling has been the sharpening of focus into volumetric outcomes, and rather than how volumetric outcomes can contribute to an impact of the management of these other natural resource base. And again – which is why Professor Thom is
30 raising this – we have always been very supportive of the Water Act because of its sophistication and the understanding of this process and he drew your particular attention to that object for that reason.

PROF THOM: So in that context Commissioner, I see what is in effect through the
35 Basin Plan process, we have siloed the interests of the Act to the water, and the water volume issues, to some extent into matters associated with ecosystems of the water, but we haven’t integrated it in the way that I suggested earlier today to provide that as interconnections between the landscapes, the vegetation, the soils and how they’re used, and the water. And the indication to me in (f) under the objects is that their –
40 those who crafted those words were thinking in these terms, because that was the thinking that was going on very strongly within government at that time. And I think that failure to understand again the implications of that opens up the risk issues that we talked about earlier.

45 THE COMMISSIONER: Yes.

PROF THOM: So I just wanted to draw your attention to that particular provision in the Act that really does reinforce what we would see, through the existence of these entities, none of whom have ever been called upon to represent – be representative on the Authority. And so you’ve got this very strong disconnect between the
5 interests of those who are in the – who have been appointed to these NRM bodies and who are in the staff of these NRM bodies to participate in the, I will use the term holistic understanding and implementation of natural resources within the Murray-Darling Basin.

10 THE COMMISSIONER: Thank you.

MR BEASLEY: The only – I think this may be the last point of clarification I need from the submission, given we’ve really gone over all of it, although I will double-check, but on page 9 under the heading the ‘Adopted Basin Plan Approach,’ fourth
15 paragraph under that heading, there’s a sentence that is in these terms:

The hydrological models to inform the Basin Plan in 2012 were more complex than the models used to inform the Guide.

20 And we have discussed before the – in the flow analysis and the indicator site analysis – please, if you’re not comfortable responding to this because it’s not directly your area of expertise, please say so – but because that sentence is there, I do need to bring to your attention Professor Williams’ view when I asked him about this, because it’s a different view and I’m at page 272 of the transcript. And
25 Professor Williams at 272, line 35, has described end of flow analysis as:

Good hydrology, and that’s where we should have started the sums from.

I then asked:

30

When you say “good hydrology” for end of flow analysis, do you have a clear understanding of what the MDBA means by an indicator site model and (2), do you have a view about it? If so, do you have a view about that sort of modelling compared to an end of flow analysis?

35

Answer from Professor Williams:

Well, the problem with the selecting sites and then trying to assess the impacts on them, it can be done. It can be that they’re not – it’s hard to do the science objectively, because you actually are saying, “Well, if I do this, what do I get?” You know, it’s not quite the same rigour in my view, and I personally think it’s probably possible to do that way, but I would like to be able to see it transparently – the assumptions analysis fundamentals – so you could make a judgment and be sure that you weren’t playing games with yourself.

45

Question:

And as you said –

didn't get the question out, Professor Williams:

5 *And that's not good science. A scientific analysis that doesn't – that keeps you out of the cycle where you can play around with things to fiddle and fiddle around to me, good scientific analysis requires that the input parameters should be as independent as possible from the observations.*

10 And then again at 285, question:

And then in that paragraph below the opinions you expressed, or the assertion is made, I should say, the indicator site method is a much more robust method to determine an ESLP. That's an assertion by the MDBA.

15

Professor Williams:

Well, I would like to see that documented.

20 Which I read, "I would like to see that proven." Now, one interpretation of Professor Williams' evidence there, I think, is that he isn't satisfied that all of the information he needs to make a proper analysis in relation to the indicator site model has been provided to him. Another is that he thinks it involves subjective considerations where you can lead yourself astray. Having said in your submission that the ESLT
25 modelling was more complex than the models for the Guide, do you have any commentary in relation to what I've just read from Professor Williams? Or - - -

MR COSIER: Yes, we do.

30 MR BEASLEY: Yes. Okay, go ahead.

MR COSIER: So in summary – and I will give a slightly more detailed explanation, I don't see any inconsistency between what Dr Williams said and our statement.

35 MR BEASLEY: All right.

MR COSIER: So I draw your attention to our statement on the 2011 draft Murray-Darling Basin Plan, which is dated January 2012.

40 MR BEASLEY: I will just get that.

THE COMMISSIONER: Tab 4, I think.

MR BEASLEY: Yes. Okay, yes.

45

MR COSIER: Of which Dr Williams was a co-author.

MR BEASLEY: Yes. Go on.

MR COSIER: I'm just explaining why I don't believe it's inconsistent.

5 MR BEASLEY: Yes, go ahead please. And page - - -

MR COSIER: Because in hearing what John said, he's – in John's inimitable way – screaming the same words we are, "Some transparency would be nice."

10 MR BEASLEY: Yes.

MR COSIER: So if I take you to page 6 of that report, 'What Water Regime is Required for a Healthy River?' I will read you the first three paragraphs, "The environmental objectives - - -"

15

THE COMMISSIONER: Don't read them out, that's all right. That's fine. We've got them. I confess I hadn't spotted any major shift in the Wentworth Group's position from this 2012 document to your submission.

20 MR COSIER: The first five paragraphs - - -

THE COMMISSIONER: Yes, quite so.

MR COSIER: - - - I would say neatly summarise what John just said.

25

MR BEASLEY: All right. Thank you.

DR STEINFELD: Can I add - - -

30 MR BEASLEY: Yes.

THE COMMISSIONER: And in particular, what – why – you have consistently drawn to attention the CSIRO conclusions.

35 MR COSIER: And the lack of transparency in subsequent processes making it impossible to make an informed - - -

THE COMMISSIONER: Believe me, I have got the message about transparency.

40 DR STEINFELD: The – another really important point to make is the standards by which the Authority applied to the number that they came up with in the Guide versus the Basin Plan. So in the executive summary to the Guide the Authority made the statement:

45 *The Authority is confident that the surface and groundwater systems additional water within these ranges –*

and they gave the ranges we discussed earlier –

will achieve the environmental water requirements of the Basin.

5 Contrast that with what was provided in the ESLT report which was the
identification of the 122 indicator sites, the – there was no estimate published of how
many of those 122 sites were achieved. There was, further, the reduction of the
uncertainty ranges from the low uncertainty achievement to the high uncertainty, and
there was a second layer of uncertainty applied. So another 10 per cent on top of that
10 high uncertainty target. And for the Authority that was the new standard for the
satisfaction of the number. So the Authority – if they were to do modelling using
this improved hydrological site method with the same standards that the Authority
applied in setting the numbers for the Guide, they would have come up with a
number that is vastly different, much closer to at least the high uncertainty range of
15 the Guide.

MR BEASLEY: Thank you for that. I didn't have any further clarification that I
needed from the submission.

20 THE COMMISSIONER: No. All right.

MR BEASLEY: Do any of you wish to add something that you feel has been
missed that's particularly important?

25 PROF THOM: I think Mr Cosier has one general one then I have a general one and
a couple of specific ones, if that's okay.

MR BEASLEY: Very good. Yes.

30 MR COSIER: We will be very brief. Thank you. So again could I also, with
Professor Pittock, thank the Commission for hearing our testimony and giving us the
opportunity to make the comments that we have. We very much appreciate the
Royal Commission shining a torch on what is unquestionably a very complex field of
public policy. I would just like to add as a concluding comment that much criticism
35 of the Basin Plan from us and other experts is occurring quite understandably from
this Royal Commission process. I want to make two points on that.

First of all, it wasn't always that way. And it is our view, as Professor Pittock said,
that it is still possible to get the water reform back on track. As Jamie said we have
40 \$5 billion available to deliver a Basin Plan. For all its faults it is also important, I
believe, to recognise the great progress that we have actually made in water reform in
Australia in recent decades. We are only the second nation on earth that has put
large volumes of water back into a river system.

45 THE COMMISSIONER: What was the other one?

MR COSIER: China. And they did it before us.

PROF THOM: And they're still doing it.

MR COSIER: And they're still doing it. And unfortunately the person who can give you a detailed explanation of that is Professor Pittock.

5

MR BEASLEY: Did the Chinese disclose their modelling?

THE COMMISSIONER: I hereby prohibit going into China because I will never finish if I do that. So I should not have asked the question.

10

MR BEASLEY: I've just been handed a volume of reports, Chinese hydrologic modelling.

THE COMMISSIONER: I'm so sorry. Forget China.

15

MR BEASLEY: Carry on.

MR COSIER: It is such a telling point. Water is a scarce resource. As we enter this century we are trying to provide food and water for seven to nine billion people.

20

You know the international literature about India and other places running out of groundwater. It is the great constraining resource into human development. And that is a great positive Australia has taken the steps it has and that's why we are so supportive, as Professor Thom said, about the Water Act, for example. The second point we would like to conclude on is that our nation's understanding on how we manage water resources has also changed markedly.

25

We referred earlier to Alan Jones in the formation of the Wentworth Group. Fast forward 15 years, Australia now sees the folly of trying to drought-proof Australia by turning coast rivers inland. Until then we had, almost every generation, great new ideas to divert coastal rivers inland. We now know that's a folly. We know the Water Act is a remarkable piece of legislation because it does recognise we have an over-allocated river system. And it sets out what we believe is a scientifically credible path to address that over-allocation. We also realise that water flowing to the sea is not wasted. It is vital to flushing out the salts and other pollutants that Professor Thom spoke to today.

30

35

And through these reforms our scientific understanding has improved markedly giving us a far better understanding of how to both have a healthy environment and a productive economy in a land where we live in a land of droughts and flooding rains. So they're just some of the extraordinary advances that we have witnessed in one lifetime in Australia. So we obviously are very frustrated and disappointed with the progress of the Basin Plan and how it is being implemented but I think it is also important to reflect on just what progress we have made on that pathway. Thank you very much for the opportunity.

40

45

MR BEASLEY: Thank you.

PROF THOM: Just in adding to Mr Cosier's comments, just to remind the Commission that basically the Wentworth Group philosophy involving science and public policy embraces a healthy environment and a productive economy. In our 2014 blueprint, which we I don't think was tabled here, we set out the five areas in
5 which we need to intersect that – in policy terms intersect with science, a healthy environment and a productive economy to meet the environmental, economic and social challenges that the nation is facing. And we do not want to be just seen from the point of view of complaining and looking at things in a negative sense.

10 And I think we have tried desperately as the Wentworth Group right since we founded it in 2002 to find solutions, to offer public policy solutions, some of which have been taken up and we are delighted over the years that we have existed that some of them have been taken up. One of them in the context of implementing the Basin Plan into the future is one that we haven't dwelt on. It's in our 2017 report
15 under section 5.3 Invest in Knowledge and Capacity. That investment in knowledge and capacity we have touched on in the context of the problems of auditing, of monitoring, of measuring, of independence and transparency and we have indicated in that particular section that there are mechanisms by which communities can be far better engaged with those in science and those in administrative roles in the
20 undertaking of the greatly – meeting these great challenges.

In this context we have also expressed concern, not so much in writing but I will express it today, in the composition of the Authority as listed in section 178(3). In that section, you've got seven different areas of appointment, potential appointment
25 to the Authority. It is our view that the government has not made use of the full range of specialisations as embraced by those seven different functions. And if one might add, there may be tendency to have more than could be required under (e), irrigated agriculture, as represented on the Authority.

30 This, I think, is an important aspect in terms of thinking through the future and one would anticipate perhaps an amendment to that particular section by having no more than two from one particular function. No more than two from one particular function. And even in the (1)(f) Public Sector Governance one might expect perhaps a lawyer could be included in that particular area for consideration on the Authority,
35 I dare say.

MR BEASLEY: The Authority, yes.

PROF THOM: But having said that, a final comment, just that we learnt at lunch
40 time for the Commissioner's benefit, Commissioner, you seemed so intrigued about salt, we made some contacts and we found that five billion tonnes of salt are to be found in the groundwater within five kilometres of the Murray River in South Australia. Five billion tonnes. So that's stored there, sitting in the groundwater. So you see the magnitude of that problem, unless there is consideration of the ways of
45 managing it.

THE COMMISSIONER: Thank you.

PROF THOM: So I just wanted to mention that as a passing comment and thank you all. Like Mr Cosier, thanking you very much for listening to us and I apologise for my pronunciation of the tube worm for the record.

5 MR BEASLEY: No need to do that at all.

THE COMMISSIONER: I'm interested by your suggestions about subsection 178(3). It just occurs to me, socio-economic impact is a very important part of the Act and understandably so. And I am sure I will not be reporting that the South
10 Australian government should differ from that; far from it. But wouldn't you need someone like a sociologist?

PROF THOM: Commissioner, as I probably alluded to - - -

15 THE COMMISSIONER: You can retain those people.

PROF THOM: I have been involved in the drafting of the New South Wales Coastal Management Act. We did include seven areas and we did include sociology and economics in our list. So it is certainly, when we consider the importance of
20 inclusion on the Coastal Council of that level of expertise, we have appointed somebody.

THE COMMISSIONER: Thank you. Thank you all very much. I realise it's quite a demanding format that we adopted. I have to say I feel completely vindicated in
25 Mr Beasley having devised and managed it so well. Again, I am sorry it was demanding for you but it has been very useful for me.

MR COSIER: We found it a privilege. Thank you, Commissioner.

30 DR STEINFELD: Thank you very much.

PROF THOM: Thank you.

MR BEASLEY: Thank you. Commissioner, can I suggest despite relative levels of
35 agitation this morning that we deal with the press release by the Minister tomorrow morning rather than now.

THE COMMISSIONER: It won't be now. It may or may not be tomorrow morning but it won't be now.

40

MR BEASLEY: My levels of agitation have just gone up. But anyway, it's up to you.

THE COMMISSIONER: Thank you. We will adjourn until 10 tomorrow here.
45 Thank you.

<THE WITNESSES WITHDREW

[3.30 pm]

MATTER ADJOURNED at 3.30 pm UNTIL THURSDAY, 12 JULY 2018

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