

TRANSCRIPT

LEGISLATIVE COUNCIL ENVIRONMENT AND PLANNING COMMITTEE

Inquiry into Ecosystem Decline in Victoria

Melbourne—Tuesday, 20 April 2021

MEMBERS

Ms Sonja Terpstra—Chair

Mr Clifford Hayes—Deputy Chair

Dr Matthew Bach

Ms Melina Bath

Dr Catherine Cumming

Mr Stuart Grimley

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Mr Cesar Melhem

Dr Samantha Ratnam

Ms Nina Taylor

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Ms Georgie Crozier

Mr David Davis

Dr Tien Kieu

Mrs Beverley McArthur

Mr Tim Quilty

WITNESS

Dr Matthew Edmunds, Principal Ecologist, Australian Marine Ecology.

The CHAIR: I declare open the Legislative Council Environment and Planning Committee public hearing for the Inquiry into Ecosystem Decline in Victoria. Please ensure that mobile phones have been switched to silent and that background noise is minimised.

I would like to begin this hearing by respectfully acknowledging the traditional custodians of the various lands which each of us are gathered on today and pay my respects to their ancestors, elders and families. I particularly welcome any elders or community members who are here today to impart their knowledge of this issue to the committee or who are watching the broadcast of these proceedings. I would also like to welcome any members of the public who may be watching these proceedings via the live broadcast as well.

At this juncture I will take the opportunity to introduce the committee members to you. My name is Sonja Terpstra; I am the Chair of the Environment and Planning Committee. To my left are Mr Clifford Hayes, who is the Deputy Chair, and, further down the table, Dr Samantha Ratnam. Joining us via Zoom we have Ms Nina Taylor and Dr Matthew Bach, and I am not sure whether Mr Grimley is also with us online—not at this point in time. Mr Grimley may join us momentarily. Up this end of the table we have Mr Andy Meddick, Ms Melina Bath and Mrs Bev McArthur.

All evidence that you will give today will be protected by parliamentary privilege as provided by the *Constitution Act 1975* and further subject to the provisions of the Legislative Council standing orders. Therefore the information you provide during the hearing is protected by law. You are protected against any action for what you say during this hearing, but if you go elsewhere and repeat the same things, those comments may not be protected by this privilege. Any deliberately false evidence or misleading of the committee may be considered a contempt of Parliament. All evidence is being recorded, and you will be provided with a proof version of the transcript following the hearing. Transcripts will ultimately be made public and posted on the committee's website as well.

For the record, if you could please just state your name and the organisation you are appearing on behalf of—just for the moment.

Dr EDMUNDS: My name is Matthew John Edmunds. I work for Australian Marine Ecology.

The CHAIR: Okay, fantastic. With that, I welcome you to give your opening address, but if you could just keep it maybe to a maximum of 5 minutes, that will allow plenty of time for committee members then to ask questions of you. With that, I will hand over to you.

Dr EDMUNDS: Okay. I will keep it very brief.

Visual presentation.

Dr EDMUNDS: Just first to highlight that the marine environment in Victoria is quite special. We have very high diversity here. There are a lot of values that are here that are nowhere else. Southern Australia in general has a lot of very special places, but there are some unique biodiversity hotspots here, including in our sediments, the deep canyons, seagrass beds and seaweed beds and the like. The communities all through the marine environments provide really important ecosystem services to our society, not just in terms of their intrinsic values but in terms of processing nutrients for us, providing habitat and production for fisheries and aquaculture, waterways for shipping and all sorts of other services.

Unfortunately there have been some ecosystem declines all through the state in all of the types of habitats that we know of. And a lot of those, or nearly all of those, are human related and usually a compounding of the pressures that we are putting on them. Quite often there are natural events that kind of kick along or switch these changes over. For example, the millennial drought was a natural event but it kicked over a lot of things that we had put pressure on, so there was there was little resilience against things like the drought. A range of things include pollution, and there are some new types of pollution emerging. For example, the pharmaceuticals that pass through our bodies and cause endocrine problems in the marine life to new forms of toxicants that we are creating with different types of water processing. Diseases and marine pests are a big thing as well.

In terms of legislation strength, we do have—in my opinion from working at the coalface—some quite strong aspects to our existing acts, particularly with the recent changes to the *Marine and Coastal Act* which give it more of a holistic ecosystem point of view. That is a major advantage. And flowing from that into the regulations are things like building our marine knowledge framework that is happening—that is really amazing—and putting in place criteria for assessing the environmental status, which in the regulations is called goodness of environmental status, which actually reflects or brings us up to date with developments in Europe and the US that happened like decades ago.

Things like a recent change to the EPA Act—the general environmental duty is a massive change in our capability to manage the environment. The *Fisheries Act* has always had things in place since the 1990s but they have never actually been enforced or used. Particularly the ecosystem and ecologically sustainable development aspects have never been applied from that Act. One of the biggest problems with the legislation is that it actually has not been put into effect from an ecosystems point of view. And the other key thing is that the information basis to making environmental decisions and management has been decidedly lacking.

For many, many decades we have had a best practice standard of what is called the adaptive management cycle, where we look at what is happening out there, we make improvements to our management and then we implement those changes and then we go out and assess again what happened with those changes, did it improve things, and if it did not, we try something else. This cycle is in every bit of policy, legislation, best practice, it is in international standards and yet in Victoria it has very rarely been actually applied in practice, particularly in terms of outcomes basis. Very rarely is there an assessment of what the actual environmental outcomes were, what was the status of the environment, what do we need to change to improve that or protect that.

The CHAIR: You have 1 minute left.

Dr EDMUNDS: Great. I will skip over this one. Basically, getting back to the core of the situation, there is a three-step dance between decision-making, the information that is going into that decision and getting the information in a proper way. I think that process is broken in Victoria. We are not doing any kind of field-based surveillance anymore of what is going on and how things are changing and cycling over time. We are not getting the information to manage or understand the ecosystems.

In summary, there is a great deal of room for improvement, and we have the capability and the know-how to do that. For some reason I am not getting to the last slide. Yes, that is basically the conclusions. Just reinforcing that, in adapting our information system—in terms of the reference of the inquiry—there is a lot of room for incorporating the social side into the information systems, including citizen science, traditional owner contributions and actual co-management, and that is also reflected in the new *Marine and Coastal Act* in terms of marine spatial planning.

The CHAIR: Great. Thanks very much. We will open it up for questions. Dr Ratnam, I will throw to you first.

Dr RATNAM: Sure. Thank you so much for your presentation and your submission, which was very significant, and we will appreciate that. Overall your submission presents a pretty grim picture of the state of Victoria's marine environment, as you have outlined this morning as well, and even our understanding of what we are losing because of drivers like climate change. My first question is: how is Victoria tracking in terms of protecting marine ecosystems in marine reserves? Is there sufficient area protected, and if not, where else should we be looking for new marine protected areas?

Dr EDMUNDS: In terms of 'Is there sufficient area?', it is not so much about the areas as what is in them and what needs to be protected. In some of these areas, some of these parks, we actually have almost by accident protected some pretty amazing things that are only in them. For example, the deep reefs of Wilsons Promontory—the sponge gardens there are like nowhere else and the diversity is amazing. But we have not surveyed every area in Victoria.

Recently DELWP, the department of environment, have reanalysed old footage where we were able to put that into a modern perspective, and we discovered other areas of biodiversity that are well outside any marine park but perhaps should be in a marine park. Particularly with the deep reefs off Cape Howe and Cape Otway and some of the wall habitats at Cape Bridgewater, these are kind of no-brainers because they are not really

impinging on any fishery or anything like that but they are good to be protected. Some of the existing marine parks were put in with politics in play and not put in with actual biology in play—for example, the Ninety Mile Beach square of sand which avoided all of the major biological or ecological values in that area but was convenient because of the oil and gas and fisheries and that kind of stuff.

So I would say it is not about the area, it is about the qualities of some of these. Some of the parks are exceptionally high quality with what is in them and the area that they cover, like Wilsons Prom and Discovery Bay, but some of them miss the mark completely.

Dr RATNAM: So connected to what you were saying before about the need for more surveillance—and that was quite alarming to talk about the fact that we do not do enough surveillance to know what we have, what we are losing and what is threatened—is that then connected to ‘We need to do more surveillance to know what is there’ and then needing to protect those areas, rather than just protecting area for area’s sake? I am just trying to paraphrase. Is that kind of the summation there?

Dr EDMUNDS: That is exactly right.

Dr RATNAM: Right.

Dr EDMUNDS: We are actually are still on a discovery phase of determining what values we have. In other areas we know there are major values but we are actually not monitoring—for example, in Corner Inlet. Corner Inlet is a large area of dendritic channels and broadleaf seagrass. It is really valuable for both biodiversity and fisheries and society in many ways. But we are losing that seagrass at an amazing rate, and that does not grow back. It produces a lot of seeds every year, but it only reproduces by spreading its patch. And those patches spread so slowly that it takes hundreds to thousands of years to recolonise. So there are also areas that we are just not keeping eyes on and not managing properly.

The CHAIR: I might ask a question, if I can. In your submission you note that the new *Marine and Coastal Act* and policies have provided a good kickstart, you say, in the right direction, and then you talk about, in your opinion, key challenges in resourcing and keeping the momentum going. Then you talk about opportunities for researchers, managers, stakeholders and planners to work together. If you could wave a magic wand and make that happen, what would that actually look like from your perspective? So you are saying the framework is looking good but everyone needs to work together. How would that look?

Dr EDMUNDS: There are two aspects to that. One is the marine spatial planning aspect, which is happening right now. I do not have to wave a magic wand because that side is happening. That is about bringing the community and stakeholder groups together to work together with minimal pushing of government to come up with solutions that are agreed between them. There are case studies in New Zealand where that has worked to everybody’s benefit, so that is to be fully encouraged, and the ball is rolling on that one. The other one is there just is not the big stick happening in terms of environmental outcomes. There is a lot of motion in terms of proponents actually doing stuff, but there are no learnings and there is no ongoing management. For example, we have had many, many decades, or 100 years, of dredging—maintenance dredging, capital dredging. There has not been a single environmental study to monitor the effects of that dredging that we can learn from for the next dredging and say, ‘Well, you did these impacts; let’s improve it this way to have a better outcome for the environment’.

The CHAIR: It is just that gathering data and information so we can learn from what has happened.

Dr EDMUNDS: Yes, the intelligence to make proper environmental decisions and actually know what is happening out there. We still do not know what happens with the dredging programs.

The CHAIR: Sure, okay. And just one last one, because I know everyone will have a question. You advocate for co-management of marine ecosystems with traditional owners as well. Can you describe examples of where this already happens in operation?

Dr EDMUNDS: Unfortunately, I cannot. I have to admit I am quite naive and ignorant of how that can work. I only know of case studies in New Zealand with Maori involvement and marine spatial planning involvement. I also only know from a scientific perspective of where in northern Australia they have involved traditional owners and traditional natural experts in the field that have worked alongside scientists, and the

information gain has been amazing in terms of understanding patch dynamics and species that were previously unrecognised but have a completely different ecosystem function. There is a wealth of knowledge that we are not appreciating from that perspective.

The CHAIR: So there is opportunity to make that happen.

Dr EDMUNDS: Definitely opportunity, and just the general understanding and care of the land and that kind of contribution.

The CHAIR: Great, thank you. All right. Ms Taylor.

Ms TAYLOR: Thank you for the very interesting presentation. How do you think we can probably—it is a very broad question—prevent further degradation or loss of our marine ecosystems? What would you think are some mechanisms to help support a better outcome? You have already spoken to that, but is there a really key area that is of highest importance in your mind?

Dr EDMUNDS: There are three key areas. One is getting eyes under water and constant monitoring of what the status is. Another one is understanding the ecosystem so that we know if we turn this knob, this will happen over there, or if we adjust this over here, this will do that over there. That is complicated, but society can do complicated. You do not go to a doctor's and say, 'Please don't be complicated'. But for some reason environmental science and ecology has been dumbed down too far in the Victorian marine space.

The third one is getting all of the community involved. At the moment a lot of the knowledge is behind closed doors. We do not know anything about the monitoring and environmental management in the oil and gas industry, and yet they are a big force in our marine environment. Even things like what Melbourne Water does in Port Phillip Bay is a blank—there is nothing in the public domain there. So having things in the public domain from the scientific perspective and then integrating community science—there is a massive opportunity for citizen science and rangers and all of that kind of traditional owner space to be integrated into the scientific space and the environmental management space, but at the moment that is totally unlinked. In fact there has been a dropping of scientific monitoring for using citizen science monitoring in Victoria, with citizen science programs. All the scientific reef monitoring program was dropped in 2015, and citizen science was put in its place. That kind of thing should happen side by side and be tightly linked with each other and not replace each other. I think they were the three—yes.

Ms TAYLOR: Thank you very much—very comprehensive.

The CHAIR: Mr Hayes.

Mr HAYES: Thank you, Chair. Yes, thank you very much for your submission and talking to us today. Dr Edmunds, I have read a lot in your submission and was concerned particularly about the EES process. I just wonder if you could point out the deficiencies of the process of evidence giving and if you could suggest—maybe I am leading the witness here—some sort of more independent way of carrying out these assessments.

Dr EDMUNDS: Yes. This comes back to the root of the problem I have been mentioning about—that the scientific processes in Victoria in the marine field have been failing. The standards have been very low, and there is no checking of these standards or review of these standards. In actual fact in the EES process as it stands, a proponent can put in a proposal in the EES documentation, and there is no requirement for that to follow scientific standards. Now, scientific standards are a way of trying to provide factual, reliable evidence that you can make decisions on, as opposed to advocacy, marketing or just straight-up corruption. So there is a role for science, and the only time when that actually comes into play in the EES process is at the submission and hearing phase by people that review what has been put forward. Up to that point anybody can say and do anything. This is a problem with the EESs as they stand now: the scientific thing is not held to account. If you read the panel inquiry hearing for the AGL and indeed the minister's report following from that, from the AGL Western Port project, it fell down on the science. There was no procedure up to then to say, 'No, the science underpinning this is not adequate'. There was nothing to distinguish the EES from advocacy and marketing. The science behind it was not evidence based.

Mr HAYES: Yes. I took a lot of interest in the AGL case, and there was a lot of concern about the EES that was done for it. I want to go to establishing a more independent mechanism, if possible, and also my concerns

about VCAT in the same sort of way—that really the expert witnesses are really pushing a point of view for the proponent and contradictory evidence the same way, where it is really pushing opinions rather than fact.

Dr EDMUNDS: It is a real problem, and in fact having been through this mill many times, including at VCAT recently, it is run by the barristers. The whole evidence and evidence-producing process is actually twisted by this barrister and antagonistic process to the point where solid evidence is downweighted by the fact that that person does not have a PhD or has only had two years experience. But the truth is that 2 plus 2 is 4, regardless of whether it is said by a primary school student or somebody with a PhD, and that gets lost in this process. The barrister is allowed to actually twist things around to an appearance or downweight people's evidence according to some kind of twisting and gameplay in these hearings. There have been many EES processes where it has hung just by a thread, where it has switched to the right way, and in some cases it has never actually switched to the right way. It is wholly reliant on a gameplay between the barristers; the science gets pushed back into the background. This is not a good situation.

The CHAIR: Okay, we are going to have to move along. Dr Bach.

Dr BACH: Thanks very much, Chair, and thank you, Professor Edmunds, for your fascinating presentation.

Dr EDMUNDS: Sorry—Doctor. I am not a professor.

Dr BACH: I am so sorry. I have promoted you. You are that authoritative! Dr Edmunds, I have noted a range of comments that you have made about how we could be doing things differently or better. In your presentation I think I am correct in saying that you remarked that Victoria's system is broken. Now, I confess I did not exactly follow the specific reasons why it was that you felt so strongly. Would you mind elaborating upon that point?

Dr EDMUNDS: Yes. It actually comes back to this point that there is no independent process for whistleblowing or proper scientific review. I can run through some examples very quickly: with the desalination plant the monitoring program has sites away from where the impacts are expected to occur. There is no process for blowing the whistle on that. I tried, as the person implemented to do the monitoring, to get the design changed, and I was told that, 'Well, no, it's locked in now by EPA because they have to go through an approvals process. We can't change it, and this is what the experts have said should happen'. With every major development there is a problem. For example, with the SEES process for channel deepening, the deep reef stuff, I did a lot of work there. The proponent did not like the answers to that, so side by side they put forward another environmental impact case so there were two running in the EES process. The independent expert group—the second one that advocates for no impact rather than that there would be impact—went for that. There was no case for review. I had to do a lot of pushing to have my case heard, and it turns out that we have managed to flip that to say, yes, the canyon is a major biodiversity hotspot; it has to be monitored, and it has to be managed. That had to happen from a non-scientific point of view, and again there was no due process where these scientific things could happen.

Now, I could go through every major environmental disturbance case that is happening in Victoria, and there are issues of that magnitude in the public domain. So the system is broken, and now it is well and truly broken because we have no intel on what is happening out there. There is no monitoring, and even if there is an impact out there, there is no process for enforcing people to do something about it, to improve. Where are the adaptive management processes that Melbourne Water has been going through in the last 20 years? What have they been doing to improve the marine environment successively over the years? There is nothing in the public domain there, but I suspect they are not even monitoring in the marine environment.

Dr BACH: All right. Thank you very much, Dr Edmunds. Just quickly, as an additional question from me: I was really interested in the remarks you made about seagrass. Are there any effective programs for the regeneration of seagrass that you are aware of, the details of which you could share with us for our consideration?

Dr EDMUNDS: There have been many attempts, and the best person to talk to about this is Dr Hugh Kirkman, who has spent a lifetime trying to replant. No attempts have ever succeeded in Victoria and indeed New South Wales. The broadleaf seagrass *Posidonia* is the most worrying one. There is no way to replant it. It comes back to the environment that they are in and the ability to spread the patches. The other types of seagrass need the right kind of habitat to regenerate. Some of them will regenerate quite quickly—our *Zostera* has a seed

bank that can generate—but quite often it is that the environment that they were growing in will not let them come back. That is the issue—the environment has changed, so no amount of replanting can change that.

Dr BACH: All right. Thank you very much.

The CHAIR: Ms Bath.

Ms BATH: Thank you. Thank you, Dr Edmunds. This is most interesting. My electorate covers all of Gippsland from the Mornington Peninsula all the way around, so all the best bits of Victoria are my patch.

Mrs McARTHUR: That will be disputed, Chair.

Dr EDMUNDS: It is good though.

Ms BATH: In your submission you talk about the Gippsland Lakes and coastal habitats. But I want to draw and facilitate you to talk about a specific area. We have had shocking bushfires, 2019 and 2020. One of your submissions talks about Wingan Inlet, also Mallacoota, Bemm River—all along that coast was devastated by fires, including and down to the river systems and down to the estuaries. I would like to understand, Australian Marine Ecology, what your position is or what work you would like to see done in terms of the ash and debris falling on those areas, the sediment build-up, the instability of riverbanks or intertidal zones, and the effects of these fires in terms of life cycles. Now, that is a really big topic, but I just think it is an important conversation to be had and to be investigated, particularly because these bushfires are devastating in our region.

Dr EDMUNDS: Yes, and we are only just appreciating how fully linked things like that are linked actually to the marine environment in terms of the nutrient influxes, ash influxes, chemicals from the firefighting, which is a secondary thing. Unfortunately we do not have knowledge to answer that question. The last mapping of the key habitats in that area was in about 1998–99 to 2001. That has never been mapped ever again, but we know since that mapping a lot of key habitats in those lagoons and coastal areas have changed significantly. There used to be very long, lush seagrass that used to live in these lagoons, an estuarine seagrass form. That had practically disappeared by about 2003. We do not have the intel to understand what the bushfires have actually done, and we are not likely to soon unfortunately, but we do know that they are likely to have major impacts.

Ms BATH: There is that huge knowledge gap, is what you are identifying. What needs to happen from a broad range, whether it is universities directing some of their attention and support for research in that area, whether it is—the answer to everything is government funding. But also, where and how and what would that look like? There is a gap you are identifying. What would you do if you had that magic wand to fix some of that gap? I am speaking specifically I guess around research about fire and the repercussions on the environment from fire.

Dr EDMUNDS: So the first things are understanding what is there, how it is changing, and from a—

Ms BATH: Baseline.

Dr EDMUNDS: decent effort we can actually understand how things are changing differently in different places to different pressures. We can kind of understand the processes for why things are changing in some areas and other areas, and then we can say, ‘Okay, this is changing probably because of potassium coming in in the ash’ and so forth.

In terms of kickstarting that, one of the problems we have had now is that it is easy to pour the marine research funding into universities because it does not have to go to tender, there are no responsibilities for outcomes. They just pump to, ‘Oh, that’s a university. They’re the experts. They’re doing it’. This has been a problem in Victoria because we have seen large aliquots of money that could have been used for ecosystem-level research getting carved up into honours or small student projects, and you cannot study an ecosystem in little atomised compartments of that. An ecosystem is more than the sum of the parts, so you need a decent kind of aliquot to actually understand that. You need to have the spatial coverage, you need the repeated temporal stuff, which universities are not geared for because it is all about getting student projects up and running, because that is where they get to leverage their money. And we have seen that.

Again I come back to the deep reef case where in the channel deepening EES we had this understanding that we have got the pressures on the canyon and we know very little about that biology. The minister said, ‘Okay,

because we have this level of understanding, we'll spend \$2.6 million of offset research on the deep reefs to understand how to manage it'. It is a really important thing that controls the whole bay's ecosystems and indeed Melbourne society. That funding got sent to the universities, and it got split up into small packages for shallow reefs in the north of Port Phillip Bay, so we still do not know anything of the deep reefs in the south. That funding also got split up into such small packages we could not use it to understand the shallow reefs in northern Port Phillip Bay, and that whole research program was a dead-end.

I can go through many examples where this has been split up, including the understanding Western Port program. Again, there are these aliquots of money that are just parcelled into small pieces and split off into pet university research projects when we know—it has been said, 'We need to know this to understand Western Port'—that we still do not understand these major things we need to know to know how to manage Western Port. We all know what we need to know, but the funding keeps going elsewhere.

The CHAIR: Mr Meddick.

Mr MEDDICK: Thank you, Chair, and thank you, Dr Edmunds. I too am interested in what you are saying about the seagrasses because I understand from some advocacy I have done in the past what overfishing, for instance, of certain species can do, in fact causing a trophic cascade that creates that environment that you are talking about that then ends up creating a marine dead zone, and there is no coming back. It is not so much that the grasses cannot regenerate, but it is that the environment that they are in will not allow that to happen. Is overfishing of specific species a problem in Victorian marine environments that are under the control of the state government—so, in other words, not the areas that are under federal parks or federal areas, such as the small pelagic fishery, for instance, but other spots? Is that a problem, and if it is, how much of a threat is it and how extensive is it, and is there data around that? And just related to that question, your question about funding: who do we fund? Who should get the money?

Dr EDMUNDS: Okay. I will go to the first part first. In terms of fisheries, there are well-known cases where we have overfished, and the fishermen will be the first to admit that we have taken it across the line. An example is abalone fishing in eastern Gippsland, and it has changed the ecosystem to the point where it went to a sea urchin barren state. There are other cases where we have absolutely no idea. The recreational fishing for snapper in Port Phillip Bay—it is just going gangbusters with the increasing population. As far as I am aware, there is no traction on 'Is it too much? How much is too much?'. That is a complete unknown in terms of the recreational space. And we are all the poorer for abandoning the co-management arrangements that were previously in place earlier in this century. I think there were a lot of benefits there and checks and balances. Conservation to fishers to managers were working together. I thought that was a really good model, and there were issues coming out to work together. We do not have that anymore.

In terms of fisheries, if you look at the fisheries website, Fisheries Victoria, the actual available knowledge is contracting and the openness of it is contracting. They have withdrawn all of their technical reports. To get information now is really difficult. To understand how the fisheries are going is a lot more difficult than it ever was. So there is a knowledge issue there.

And the funding—who do we fund? I think this also gets back to the independent body and the oversight in understanding, 'Okay, what we need to know?' and, 'This is the major knowledge gap'. For example, in Western Port we need to know what are the main primary producers and where is it coming from and feeding to. It seems most of the energy is coming from the intertidal mudflats and going to the subtidal fish and seagrass communities. That is an unknown, but it is something we need to clear up. There needs to be somebody to say, 'Right, this is the knowledge gap. We need to fill that. Why are you going monitoring fish over there that have nothing to do with this, with that money?'. We do not have a mechanism for that. At the moment we rely on scientific good faith, but that is where the fall-down is. Mostly in this, for scientists, we have a key scientist providing the advice to further their own research nest essentially—that seems to me what is happening.

Mr MEDDICK: The only reason I ask that is because I am very conscious of your comments about this money is going to universities, and I am curious as to is that happening just because there is a dearth in the market, if you like, a space where there is no-one that government can go to, so they go to who is there, who they think that they can trust because, you know, universities are full of scientists et cetera.

Dr EDMUNDS: Yes.

Mr MEDDICK: But for our purposes, in terms of when the report comes to be written, is there somewhere or groups? Is it private enterprise? Who is it that would be a better beneficiary to give us the answers that we are looking for?

Dr EDMUNDS: So in terms of the science space, it is all private industry, effectively. It is all industry now. I am a private consultant. I work ethically as an independent scientist. It just so happens that I am a business. Universities are a business—they are working to a business model. Their model is to get funding that then they can leverage to get commonwealth funding. Their model is totally driven to get papers published. The scientists are driven. The need for them is to publish a paper to keep their job. To do that, they tender, they get money wherever they can, they then leverage money from the federal government for a fee per student and that kind of stuff. It is a business.

CSIRO is another major body. They are a bit of a mix. They fulfil a major role in the massive programs that need to be done at a national kind of level. And there is another body that kind of straddles them and universities in terms of national significant studies, and that is the IMOS and NESP kind of programs—sorry about the acronyms—but there are other bodies.

There are state government bodies as well. There used to be a thing called the Marine and Freshwater Resources Institute. That is kind of defunct now. Those kind of bodies—well, the best example now is the Arthur Rylah institute, which does direct government work as well as commissioned work from government agencies and elsewhere as well. Then there are NGOs that are kind of funding research off their own bat from Ma and Pa kind of donations as well, of which some has flowed to me, like the WLVF, the Australian Conservation Foundation, VNPA—those kind of bodies. All of them are in this competitive space. It is all completely industry-competitive science.

Mr MEDDICK: Thank you.

The CHAIR: A very quick question, Mrs McArthur.

Mrs McARTHUR: It seems to me that you are suggesting that politics is getting in the way of the environment: (a) we are giving the money to the wrong people; (b) we are locking up places and throwing away the key without looking after them. In particular, how can we overcome this? How can we put the environment ahead of politics and look after it better?

Dr EDMUNDS: Okay. So the first thing is going to the major proponents of activities that are impacting the environment like Melbourne Water, wastewater dischargers, dredging programs, desalination. They should have a monitoring program to assess their impacts. They should be openly reporting that and improving their processes through time. That is not happening. That is the first step. We have got to understand what are the impacts and how are they being managed and improved.

The other one is where we see major knowledge gaps and we give that money to, say, universities, it needs to come with a stipulation that, 'Hey, you cannot split this money up into small little aliquots of a species here and a species there. It's got to be to understand an ecosystem. We need this type of information to do our management. If you don't give us this type of information, there's got to be consequences'. At the moment there are no consequences.

Mrs McARTHUR: So you need an outcome KPI?

Dr EDMUNDS: Yes. So you give somebody money, you are buying information, you should be entitled to get that information back, and that is not happening at this stage.

The CHAIR: And I am sorry. We are out of time, unfortunately. Look, thank you very much, Dr Edmunds, for your presentation and your evidence today.

Witness withdrew.