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AGRICULTURE AND ENVIRONMENT COMMITTEE

Members present:

Mr JP Kelly MP (Chair)
Mrs J Gilbert MP
Mr R Katter MP
Mr JE Madden MP
Mr LL Millar MP
Mr PT Weir MP

Staff present:

Mr R Hansen (Committee Secretary)
Ms S Stephen (Assistant Committee Secretary)

PUBLIC HEARING—CONSIDERATION OF THE AUDITOR-GENERAL'S REPORT NO. 16 2015-16: *FLOOD RESILIENCE OF RIVER CATCHMENTS*

TRANSCRIPT OF PROCEEDINGS

WEDNESDAY, 10 MAY 2017

Brisbane

PROOF

WEDNESDAY, 10 MAY 2017

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Committee met at 9.03 am

CHAIR: Welcome, ladies and gentlemen. I declare open the Agriculture and Environment Committee's public hearing. I start by acknowledging the traditional owners of the land on which we are meeting today. I am Joe Kelly, the committee's chair and member for Greenslopes. Other committee members are Mr Pat Weir, the member for Condamine and our deputy chair; Mrs Julieanne Gilbert, the member for Mackay; Mr Robbie Katter, the member for Mount Isa; Mr Jim Madden, the member for Ipswich West; and Mr Lachlan Millar, the member for Gregory.

The purpose of this meeting is to assist the committee in our consideration of the Auditor-General's report No. 16 titled *Flood resilience of river catchments*. I remind those present that these proceedings are similar to parliament and are subject to the Legislative Assembly's standing rules and orders. In this regard, I remind members of the public that under the standing orders the public may not participate in the proceedings and may be admitted to, or excluded from, the briefing at the discretion of the committee. Hansard is making a transcript of the proceedings which we intend to make available on our website. Those here today should note that media might be present, so it is possible that you might be filmed or photographed.

DRYSDALE, Mr Andrew, Chief Executive Officer, Queensland Regional NRM Groups Collective

ROBERTSON, Mr Stephen, Chair, Queensland Regional NRM Groups Collective

CHAIR: I welcome the Queensland Regional NRM Groups Collective. I welcome Chair, Mr Stephen Robertson, and acknowledge you as a former member of parliament, and CEO Mr Andrew Drysdale. I invite you to make a brief opening statement and we will then move to questions.

Mr Drysdale: I will start with an opening statement. The regional groups collective represents the 14 NRM bodies—natural resource management bodies—that cover the state. Each of those NRM bodies is the keeper of what we call regional NRM plans which we think, and our submission shows, are a pretty powerful document. It is more so a process of pulling that together rather than a document. The regional NRM bodies have been around since 2000 or 2001, so we have been in the landscape for quite a while. Our job is to enable land managers—whether they be pastoralists, farmers, local governments, traditional owners and the general community—to better manage their natural resources so we get more sustainable use of our natural resources and in cases we are able to enhance as well as protect those valuable natural resources.

I will pass over to Stephen to give more detail on how these NRM plans work. We have looked around Australia and we see that it is akin that state and federal governments have invested through our natural resource management bodies. It is a bit like having a limousine and a chauffeur parked in the garage and we have forgotten they are there. These NRM bodies and the LNRM plans can play a very big role in building resilience into our catchments to enable our communities to better withstand things such as floods, cyclones and droughts. We believe, as our submission points out, that we play a very valuable role but there is an even more valuable role we can play if governments really acknowledge that role and invest in that role. We believe that our plans should be recognised through some form of statute, but we do not believe we need to be statutory bodies. We believe that if we become statutory bodies, like in other states, we will lose our power to engage our communities. I think it is pretty important that you hear how our NRM plans and even working with statutory plans can really work out in the catchments, and we have some great examples leading in to the last four or five years as a result of the 2011 and 2013 events and then how that stood up after the last Debbie event.

Mr Robertson: Thanks, Andrew. Chair and members, thank you for the opportunity to make brief comments regarding what has changed since the last time this committee received submissions and indeed conducted its hearings. That of course is the impact of Cyclone Debbie and the flooding events here in South-East Queensland that occurred just a little over a month ago. I think it is worth

making the point that the flooding that occurred a couple of months ago is the third major flooding event in South-East Queensland in the last six years. In some respects that is unprecedented and represents a real challenge in terms of how our landscapes can recover over such a short period of time between major events and just underscores the importance of investing in our landscapes to restore the health of not just our waterways and creeks but also our flood plains. As all of you know, the catchments that were most impacted with these flooding events over the last six years have been our farmland in the Lockyer, the Logan and the Bremer catchments. That has had a major social, environmental and economic impact.

It is prescient that this committee should be considering the Auditor-General's report arising out of 2013 because it gives you, in our view, an opportunity to consider what has happened since 2013 in response to getting those catchments back up and running in terms of ecological health but also economic output and of course social cohesion and community health. It also is an opportunity to look at how various investments that have been made have performed with another extreme event such as with the flooding that occurred. I have brought with me some explanatory information about the kinds of investments that were made under the Queensland government and our federal government Healthy Country program which demonstrates that, using good evidence based decision-making and some pretty innovative thinking, we can wisely invest taxpayers' dollars in restoring flood plain health and restoring stream banks in a way that makes them more resilient to subsequent events.

One of the investments that we made, which is unique in Australia, is what is called logjams, which seek to slow the water down to stop it slumping stream banks and mobilising so much of the topsoil that is so valuable to our farmers. I should explain that Healthy Land and Water is an amalgam of the old South-East Queensland Catchments and Healthy Waterways. Healthy Waterways was set up in around about 2000 to deal with the impacts of sediment and nutrient run-off into Moreton Bay. The nutrient issue has largely been solved by significant investment over many years in terms of sewage treatment work upgrades, but the most significant impact now is the amount of soil that is being mobilised from the upper catchments of the Lockyer, Logan, Bremer et cetera that is now impacting significantly out into Moreton Bay, covering the seagrass beds. That of course has an impact on breeding grounds and feeding resources for turtles, dugongs et cetera. The investment that we make in these catchments to restore their health, to stabilise them and to make them more resilient has multiple benefits down the catchments and in fact into Moreton Bay, and the economic benefit of that is multiple.

Chair and members, if it is your wish, we would be very pleased to host a visit to a number of sites in South-East Queensland to demonstrate how our investments work to make catchments more resilient, and hopefully we can open up a discussion about how we, over the long term, reinvest in our landscapes to make them more resilient to deal with the increasing frequency of these kinds of events.

CHAIR: Thank you, Mr Robertson. We will consider that invitation if you want to send that through formally.

Mr Robertson: Sure.

CHAIR: Did you have some document that you wanted to table?

Mr Robertson: Sure.

CHAIR: Is leave granted to table those? Leave is granted. We have a tight time frame today. You mentioned the need for statutory recognition of the roles and functions of your plans and in fact your groups. What is driving these groups at the moment? Is it merely a collective of volunteers or organisations that realise there is a need and a benefit for the establishment of these organisations?

Mr Robertson: We receive funding from a number of sources—from the federal government under the National Landcare Programme, from the state government under Healthy Country and other sources. For example, my own organisation has a membership base that includes the South-East Queensland Council of Mayors and various utilities such as Queensland Urban Utilities. We also have a much larger membership base which is the old South-East Queensland Catchments membership association, which is made up of your local Landcare, Bushcare, Coastcare groups et cetera. In South-East Queensland that represents about 70,000 individual members, so we balance our commitment to good science and evidence based decision-making with a commitment to ensuring that our community groups are part of the solutions that we bring to the table.

CHAIR: Thank you very much.

Mr WEIR: You were talking about the speed of water coming from my area. Originally it was large, open grassland. It has now been developed so that the water actually drains. Wherever we are in my area or down here, between building, roads and the development of paddocks you are speeding up the flow of water. You are talking about the height of these floods. The water is getting there so much quicker now than it did many years ago. I was interested in hearing you talk about logjams. Do you have any plans to manage that water?

Mr Robertson: I have been spending a fair bit of time over the last few months in the Lockyer and other catchments. Farmers almost unanimously say, 'We live and work on a flood plain. We have been here for generations. It floods; we get that, but what we are seeing now that is different from what we have experienced in the past is the speed of the water—the energy that is behind that.' There are a number of reasons for that. Some of that is vegetation clearing. Some of that is artificial engineering works—making the creeks a bit straighter than they needed to be and removing obstacles in the flow of water. There is a range of reasons for that, but at the end of the day there is so much more energy in the system which is mobilising so much more of the soil into the waterways and into the bay.

This is being replicated throughout the state in catchments into the reef et cetera. If we can find ways to take the energy out of the system—and that is what these logjams do, amongst other fairly simple, cost-effective and we now know robust investments, because it went through the test of it a month or so ago—we can bring to the table solutions that make a real difference. By way of example, one of our members, the Port of Brisbane, spends millions of dollars literally each year dredging the mouth of the Brisbane River to keep it open. By investing further up in the catchments, they are now getting a multiple return for that money by reducing the amount of soil that is coming down into the river which they will have to dredge. It is those kinds of innovative solutions for groundworks but also offering up trading opportunities that allow people or organisations to invest up in the catchments, where the soil is being mobilised, that we believe you get the best bang for your buck.

Mr MADDEN: I see that you call for the establishment of a Queensland catchment council. Can you outline how this will expand NRM groups' capabilities and improve flood resilience?

Mr Drysdale: We feel that we have a pretty integrated approach in the regions, but a whole-of-state approach is very much lacking. We have agencies—as agencies do—acting as silos. We have other organisations doing their bit at a state level, but what we do not have is a very integrated approach across the state. I sat in the response room for the Debbie event, and that was an example of how a group of agencies and people need to operate together. The feedback I got is that they did it excellently. We need that same type of approach to catchment management. It is a hugely complex issue. It involves people. Even if we had everyone pushing in the same direction at the same time, we still have a big job. When they are not pushing in the same direction but are actually pushing against, it makes it 100 times harder. We think it is the logical thing to do. It is done in other states. Victoria does it. In terms of looking at states that do integrated catchment management well, Victoria is probably doing it the best around Australia. That is where our thinking lays.

Mr Robertson: I will make one comment in addition to that. It always befuddled me in my previous roles that we had required regional NRM groups to do their regional NRM plans. They went out and consulted widely with every interest that you could possibly bring to the table. It was completed, ticked off and then promptly put on a shelf rather than having a statutory force behind it that requires everyone who had input into it to reference it in terms of the way they go about their business, whether that be local government, private developers or farmers. It always seemed to me to be a waste of effort. During my time we were able to get the South East Queensland NRM Plan recognised as a statutory plan. That has since changed over the years, but it can be done, it has been done and in our view it should be done.

CHAIR: Thank you very much. We appreciate your input into today's hearing.

MILLER, Professor Suzanne, Queensland Chief Scientist, Office of the Queensland Chief Scientist

CHAIR: Good morning, Professor Miller. Thank you very much for appearing this morning. Would you like to make a very brief opening statement and we will go to questions.

Prof. Miller: The role of the Chief Scientist is to provide independent, evidence based scientific advice to government but also to provide community with access to the capability for understanding scientific information and ensuring that is evidence based.

CHAIR: I have two questions to start with. I have read your submission. You talk about recognising the importance of climate change as a factor influencing flood resilience. There are discussions about how that will impact and change forecasting. Is it the situation that current forecasting is based on a range of parameters that we have a reasonable understanding of and can make a reasonable prediction of what will happen, but because of climate change those parameters are becoming much wider and each of those parameters is becoming less predictable so that future casting is much more complex and challenging?

Prof. Miller: I think that is a very accurate view. We are absolutely clear that climate change is impacting on the frequency of extreme events and that extreme events are becoming more extreme. There is global evidence to support that and we are seeing the results of that here in Queensland. That inherently makes modelling much more complex in terms of forecasting what we might expect. Weather systems themselves are unpredictable, but we have extraordinary capability here within the Queensland government. The Department of Science, IT and Innovation has brought together—in fact, since the submission was made, the Queensland Modelling Network is now fully established. That is able to bring together capability and expertise and ensure that we are bringing together multiple models that will now allow us to forecast with a greater degree of certainty, but that is in contrast to the fact that we are seeing more extreme events and more unpredictability in the system.

CHAIR: You mentioned in the submission that there is a need for a shared vision around what resilience is. How do we reach that shared vision? Is that a scientific, evidence based agreement around what resilience is? Given that we have had what I would consider to be strong evidence around climate change and not necessarily a community acceptance of that, how do we achieve a shared vision?

Prof. Miller: I think a shared vision is around ensuring we have communities that are capable of adapting to change. There is evidence to show that within Queensland we are seeing more extreme events. The public—our communities—are becoming more aware of that, and as we have already heard there is acceptance within community of the fact that these events are happening and they will continue to happen.

Philosophically there are issues around differences of opinion within community about why that is happening, but perhaps we should move away from that so that does not circumvent our desire to ensure that community and government are all more resilient to these extreme events. If we focus on the facts and the evidence before us, we know that these events are happening and we need to respond to them.

Mr WEIR: How big an impact do you think development has had, and do we need to rethink the way we are developing our growth in our major centres? My electorate takes in the edge of Toowoomba, the western side, and there is massive expansion out there. The water is coming out of that area much faster than it ever did. That is obviously going to have a significant impact. Do you think there needs to be more consideration in terms of that development area?

Prof. Miller: I think that is absolutely correct. Although we are seeing more extreme and more frequent weather events, the way in which we are planning, particularly our urban and semi-urban developments, is having an impact. Globally that is well understood. We need to have a completely integrated approach. It is about catchment management. It is about development. We live on multiple flood plains. Flood plains are called flood plains because they flood, and we need to understand how the planning policy across the state impacts on that. It needs a completely integrated approach. It needs to be integrated across catchments because catchments cross local political boundaries. We cannot rely on local political boundaries to resolve the issues that we have. I think that is where an integrated solution fundamentally needs to underlie statewide resilience, because it is not just about a particular community. Something that one community will do upstream will impact downstream. It very much needs a statewide approach.

PROOF

Mr MADDEN: Thank you for coming in today. You would have heard me ask the previous presenters about establishing the Queensland catchment council. When I studied agriculture and horticulture in the 1980s, I remember the mantra that our most serious environmental problem in Australia is soil erosion and yet that is a phrase I hardly hear mentioned now. It was discussed by Mr Robertson. Do you think establishing the Queensland catchment council might in some way address that issue of soil erosion and raise the profile of that issue?

Prof. Miller: I think an integrated approach is absolutely critical and a catchment solution is absolutely critical. Raising the profile of that as a very significant part of the solution I think will be really important not just for community but also for the way in which government approaches a solution to this problem. We are simply going to see more flooding issues if we do not address these problems. We may still see more flooding issues, but we need to be able to manage them better. We need to be able to recover from them more quickly to assist our communities to recover more fully.

I think a catchments approach—and we were really clear in our submission—is absolutely critical to this. Soil erosion is one element of that but there are multiple elements. I would also say that a lot of expertise sits within the Queensland government. We have some extraordinary scientists who are world-leading experts in this field, and I think more could be done to draw upon that expertise. At the moment what we do see—and I believe we mentioned this in our submission—is that often because there are local council jurisdictions reliance is placed on consultancies, because it would be impractical and unrealistic to expect local councils to maintain that expertise within each local council. The challenge is that that is not necessarily a coordinated approach. Having a catchment approach together with using and utilising the expertise that already sits within the Queensland government would be a very powerful way to shift our thinking and shift the way in which we are managing our flood resilience.

CHAIR: Professor, on page 4 of the submission there is the following statement—

All Councils had increased focus on raising community awareness for flood response, but not on other aspects, e.g. vegetation management and levee regulatory responsibilities.

Why do you think that is the case?

Prof. Miller: I think it is possibly quite problematic, because in some ways the narrative around vegetation management is easier to explain to a broader community. I think there are issues around levee management, for example, that can be quite contradictory, so understanding the narrative around these other issues can be quite complex. I think that makes a difficult story to tell in many ways, so we have tended to shy away perhaps from trying to tell those stories.

Obviously, levees are a solution or a part of a solution but can also create problems elsewhere. I think being able to articulate the complexity of the situation means that we often shy away from even trying to engage the community in these sorts of discussions and outlining what the solution might be, because they are very complex systems.

CHAIR: You mentioned that levees can instil a false sense of flood security. Is there evidence that that is occurring? How would we counter that?

Prof. Miller: Certainly my experience and in fact the recent experience in Mackay was that having what would appear to the community to be mitigation systems in place, whether it is a levee or a dam, might not resolve your problem. It may delay water flow, and that may assist, but in some circumstances when you have extreme events with massive rainfall levees might not be the solution but can create a false sense of security. We certainly saw that recently. If you have a dam or a reservoir, there is an assumption that that will somehow resolve the problem.

When you have a huge amount of rain falling into a catchment, a levee may not be the solution, particularly if the rainfall happens to be slightly below your levee. We cannot predict nature and where the maximum rain might fall. I think it can create a false sense of security within the community, but it is part of the system. Being able to explain what part of the system it plays and then explain the limitations of that element of the system is part of the story that we need to be telling to the community.

CHAIR: I live in the Norman Creek catchment and we have an active catchment group there. In the 20 years that I have lived there, the number of backyards and other areas that would absorb water has rapidly declined. In fact, we now have whole blocks where you would be struggling to find more than a few square metres of grass. Should we be looking at requiring councils to consider flooding impacts when they are approving developments and looking at allowing for those changes in water absorption capacity?

Prof. Miller: Unequivocally yes.

CHAIR: And is that happening?

Prof. Miller: We have not seen evidence that that is happening but, again, I think it may be that it is patchy across different local jurisdictions, because we do not have a coordinated approach to this at a state level and not even in South-East Queensland. There appear to be very different planning policies in different local authority areas. The ability for us to encourage councils to think much more strategically and not just assume—part of the issue may be that sometimes with flooding the issue can be somewhere where the flooding is not happening; the flooding is happening elsewhere. A holistic approach that does not just look at my literal backyard but at my metaphorical backyard would be really quite critical in addressing that sort of issue in terms of planning.

CHAIR: I know they are doing it where the flooding is happening. We have some developments that we call the 'Venice of Coorparoo'. It is happening.

Mr WEIR: Dr Geoff Garrett's submission talked about virtual flood exercises. Could you explain what that entails?

Prof. Miller: That element of our submission was really in relation to the fact that, clearly, there is an enormous amount of activity that needs to happen, and does happen, immediately following flood events. I certainly have been very impressed with the way in which communities—local and state government—come together in managing the immediate aftermath of these events. The challenge is that we can become complacent or that we become inexperienced. We lose that corporate knowledge, particularly for small local government authorities. Sometimes that knowledge can be lost, because you do not have vast numbers of staff. If people move on, the experience is lost.

The opportunity to scenario plan in quite a practical way will allow us to maintain that expertise so that when these flooding events happen—and it is not 'if' anymore; it is 'when' these flooding events happen—we have full preparedness in all of our communities and really maximise the positive outcomes that can come from these flooding events, which is the building of capability and expertise within the community at every level of the government and at every level of the community. We are really trying to suggest that we do not lose that expertise and capability because we might have a period without flooding in a particular area.

CHAIR: Thank you, Professor Miller, for your presentation today and for your work for the people of Queensland.

Prof. Miller: Thank you very much.

PROOF

DAVIDSON, Mr James, James Davidson Architect

FILET, Dr Piet, Convenor, Flood Community of Practice

McALISTER, Mr Tony, Director, Water Technology

CHAIR: Dr Filet, would you like to start with a brief opening statement and then we will go to questions.

Dr Filet: Thank you, Mr Chairman. The Flood Community of Practice is a collective of professionals that came together after the 2011 events when I think at a professional level we all realised that, in any future events, we had to lift our game in terms of how we might approach it. We have a personal passion to get on the front foot to understand the risks and hazards and the opportunities to be better prepared. In doing that, we are combining all of our experiences and insights and ways to share knowledge. We have tried to find some innovative ways to share knowledge—from running hypotheticals to a major planning charrette that James will talk about in a moment and collaborating with international colleagues. We have a strong Dutch collaboration, where they are sharing some of their insights—not that you can use the solutions here—to help shape the thinking.

In the three years that we have been together we have tried to put on the table many broad and interesting ideas that the various authorities might like to use in getting on the front foot to do with future flooding events. In recent times we have developed a concept called a fluvial transit concept. I am happy to give you some summaries later on.

CHAIR: Would you like to table that?

Dr Filet: We certainly will.

CHAIR: Is leave granted? Thank you.

Dr Filet: We have some other little ones. We ran a workshop in August last year. We brought about 170 professionals together over three days to look at the Brisbane River catchment and try to understand how we might better identify some of the fundamental issues in terms of its performance as a water catchment and how you might deal with issues of flooding. That is just one of the outputs that we have been happy to build upon. From that, I think our diversity and the way that we work might be something that the committee is interested to explore, because your issues around how the future of the catchment might operate have been parallel as to how we as a group of interested professionals have been working together.

CHAIR: Thank you very much.

Mr WEIR: We obviously have a lot of mapping of areas that are impacted by flooding, but, on the same theme that I have been talking about of increased building and development, there would be areas that at the moment are not under the flood mapping but do you see other areas that could be impacted if other practices are not put in place?

Dr Filet: I think the estimation of where future flooding could go is open to your imagination and really can be based on trying to understand extreme flood events. I think one of the interesting things that you raise is that water out of control is energy, and how you manage energy is the issue that creates the impact. If you are looking at management options that can buffer or slow—and I think one of the interesting things that we have come across is this whole concept of how you store water before it leaves, so it is delayed and even recharges certain areas—that is part of the way that you have to look. How does this activity function in your local catchment? On a day-to-day basis it might be fine, but you have to ask, 'What happens in some of these extreme events?' That is what we have tried to do.

In this work we have tried to look at it also from a drought perspective, because if we are going to invest in some of these issues it is often the extreme water events that you are trying to deal with. With limited investment and clever investment, maybe we can do both. The team here also has some other views.

Mr McAlister: I would like to emphasise that I think the previous two presentations could almost have come together in the context of South-East Queensland. Stephen talked about the mud and the sediment getting into the bay. Suzanne talked about the need for integrated catchment management. In South-East Queensland we have an almost unique opportunity, where we have dams, we have agriculture and we have cities all linearly connected to each other but managed separately. If we can start managing them holistically, we can really make a difference to the cities, to the agriculture, to the dams and to our region's resilience. That needs an integrated catchment approach and it needs people to start working together and thinking about things consecutively rather

than just in their own little boxes. That is one of the big things that I think we have captured with this concept of the fluvial transit—to look at it as a system rather than just as a flood plain or agriculture or water supply or sewerage or ports or all of those things.

Mr Davidson: The interesting thing about this is that the concepts in it are relevant for every area of Queensland and Australia. I have done a fair bit of work out at Camooweal and I know that there is a lot of flooding out there. I am doing some work up Mackay, Cairns and Townsville way. In terms of the concepts in this, if you took it to the locals and talked like we did here in that we brought international people but also had a lot of local people with a lot of local expertise in the room then we could work it out across Queensland almost. That is the benefit of it. We are about to produce a book as well.

CHAIR: Thank you.

Mrs GILBERT: That is very interesting with what you are reporting on and also including areas like Mackay. Mackay relies on levee banks around the city. I live behind a levee bank and I feel safe. I am feeling a bit nervous now. Have you done any work on the levee banks for the city areas as well as out in the rural areas?

Dr Filet: What we have tried to do collectively as a group is understand the benefits of different measures. Believe it or not, we had some international guests who came to Brisbane a few years ago and the first thing these chaps from the UK asked is, 'Where are your levees here in Brisbane?' As we were driving along Coronation Drive I said, 'We don't have one. There is a bit of a natural thing,' and they said, 'You're very lucky.' That international experience around the challenge of levees is something that we cannot trivialise. They have a role but, in our approach, by looking at the range of measures the whole issue of levees comes nearly as a measure of last resort.

What else can you do before you get there? Essentially, the experience in our group is that the minute you start to play around with where the water can or cannot go you have a new monster on your hands. What is it that you can do well in advance? I think our concept of looking at what you can do in the upper catchments means that, particularly for an urban area like Brisbane, which is totally constricted in what it can do, if you do not maximise all of those opportunities in the upper catchments only then would you really think of the issue of levees in your urban areas,

I think in Mackay and the Pioneer Valley, and I understand it well, it is the role of what can happen in some of those agricultural areas. I suppose we do have a legacy issue with where we are living. Maybe in hindsight, if we had a crystal ball or if we had a clean slate, we might have done it differently. In some cases, if we do have communities established and living in areas where the threat is going to continue and grow, yes. After you have looked at all the upstream ones and if you are finally coming to a view that protection measures are still not adequate, you might need to do that. However, look at what happened in Lismore: they had built a certain level of protection, but the recent event was much more than what that could protect. There is a view in the flood game with every flood that the next flood will be worse than the last one. That is a simplistic view. In building some of these mitigation measures, you have to be very careful.

I am sorry: I am not putting levees in the best light, but they do bring a range of challenges only as a measure of last resort. In his tour of the US a few years ago, James saw the challenges that towns such as New Orleans and those parts of the world have had to face when looking at levee options.

Mr Davidson: I travelled on a Churchill Fellowship. I went to New Orleans, the UK and the Netherlands. They were the people we brought to Brisbane as part of this. There was a lot of experience in the room. Currently I am working with the Maitland City Council in New South Wales. They have a levee that was built in the 1950s. The problem they are facing is that it is a bit of a legacy problem with development. Because they have the levee, it kind of scares people away from developing there. Therefore, we have been called in to help look at ways to design around flood but also look at heritage buildings, because they have a lot of beautiful old heritage buildings that are prone to flooding. The fact is that they have the levee—it is obvious—so that is what they are facing: they want to bring people back because they lost about half their population in those times.

Mr MILLAR: I absolutely agree with you on levees. There is an issue like that in Emerald at the moment with levees. You end up pushing the water so it becomes someone else's problem. I am interested in these charrettes that you mentioned before. First of all, what are they? What are some of the findings? What are you getting out of it?

Mr Davidson: You have to blame me for that word. It is a French word for 'workshop'.

Dr Filet: The students used to do it in their carts as they were finishing off their assignments. They would collectively help to get it to the best bit and then you submit it.

Mr Davidson: We used to do that at university. It sounded better and we would get more people in the room if—

Mr MILLAR: What are they and what are you getting out of them?

Mr Davidson: Basically, it was almost an organic process. I was successful in getting the Churchill Fellowship. When I was travelling the world I met a whole bunch of interesting people who do this kind of thing around the world. They did it for New Orleans and they have recently done it for New York. It is multidisciplinary and interdisciplinary, and you get local people. At ours we had representatives from all of the local councils. I did a lot of work prior to it, to identify problems. I went out to the Lockyer Valley and spoke to Quentin Underwood. I said, 'What are your biggest issues out here that I need focus on when I bring people together?' It took two years to get the funding. The funding came through from UQ and also the Dutch put some money towards it and we had Graeme, who is sitting behind us, from QRA. Basically it is state and local and community.

Dr Filet: It is actually a drawing exercise, believe it or not. We are very good at making technical reports. We bring a group of experts around and, with all of the work that James had done in preparing, we had key maps for different parts of the catchment. Literally, we created a focused conversation and, in our case, it was: how can we deal with floods and droughts, maybe in a combined event, knowing that the future is a little bit fuzzy? Literally over three days we bring all these ideas out and you draw. The Esperanto of ideas is through the drawing. These very skilled operators were able to distil all these ideas. We have myriad drawings of what is happening now and what could be in the future. That is the process.

Literally, after three days, people walked out of there going, 'Wow. I did not appreciate how my idea fit in with your idea.' We build a consensus, not in a compromising way but in a collective way, that builds on everyone else's experience. You actually come out with a visual picture of what the future might be. That is where the power was. I think these delta doctors who are working around other parts of the world are getting major achievements with working with some of the decision-makers, because you come and present something in front of people who actually see something. We still need all our technical work in the background. The Brisbane River flood studies have just been completed. We are proposing that this sort of work builds on those technical issues and tests them.

CHAIR: Gentlemen, thank you very much for taking the initiative of organising that. It is quite a remarkable achievement. To what degree is the work that you are doing going to change the practice and the behaviour of professions such as architects, engineers and town-planners who work at that very base level when designing one project?

Mr Davidson: That is my aim.

CHAIR: Is that something that would rely on a code of ethics or should we be thinking about guidelines and legislation?

Mr Davidson: It relies on working with Building Codes Queensland, because there are ways that you can build better, more resiliently. You use water-proof products, for starters. That is the reason I did this. I am an architect in practice and I do not want to be dealing with this issue in 20 years time. I want us to work together to solve this problem. That happens all around Queensland.

Mr McAlister: As well as just the building form, there are opportunities of scale here. You touched on Coorparoo and excess run-off. Rainwater tanks on houses can reduce the run-off; they can take the pressure off Wivenhoe Dam. You can have things that are occurring in the local scale that affect the neighbourhood scale that affect the region. It is not just a building thing; there is a realisation about how the whole system operates and how things can add benefit. Rainwater tanks can reduce the run-off, they can reduce the pressure on our streams and they can enable us to maybe keep Wivenhoe Dam a little lower, which gives us more flood capacity. All of those things can work together, but they have to be looked at consecutively.

CHAIR: Thank you very much for your appearance and your presentation here today.

BUNN, Professor Stuart, Director, Australian Rivers Institute, Griffith University

CHAIR: Thank you for appearing, Professor Bunn. You are welcome to make a brief opening statement and then the committee will ask questions.

Prof. Bunn: From the previous presentations and what is clear in the Auditor's report, our catchments are no longer resilient to these sorts of extreme weather events. That problem is not unique to South-East Queensland. The recent flooding in the United Kingdom is another good example of the recognition of that fact. It is fair to say that we understand the causes of that—that our changed land uses affected the relationship between rainfall and run-off, which delivers more water more quickly into the channel network, more stream power is concentrated and channels are more damaged. However, it is also not helped by the fact that most of our channel network, or a large part of it, and riparian lands are in poor condition. If you look at South-East Queensland, about half of the 48,000 kilometres of stream channel are classed as being in poor riparian condition. That means they are highly prone to erosion, so you see a loss of valuable farmland, damage to road and bridge infrastructure and increased costs of water treatment every time we get major rain events. We have heard about the increased costs of dredging and the impacts on the coastal zone. We know, for example, that the sediment plume in Moreton Bay has doubled in extent since 1999, since it has been surveyed.

Many of the problems, we know, are also legacy issues. They are associated with early settlement, but there are ongoing activities that continue to compound the problem. We have heard of things such as channel straightening, removal of vegetation, levees in the upper catchment, sand and gravel extraction from channels and increased urbanisation. The good news on that is that many of those problems can be fixed and it is certainly possible to mitigate the effects of extreme weather events although not to possibly eliminate the effects of the bigger ones. That is going to be increasingly important in the face of this changing climate.

One of the key things is really focusing our effort on the upper catchments, addressing the cause of the problems and not the symptoms, which is something that we tend to do. That is really about slowing water down. I think you have heard that from previous presentations this morning. We know where the problems are much of the time and we have the tools available to optimise investment, to address them and to reduce flood risks, to reduce sediments and nutrients and to maximise the benefits. We get multiple benefits through that targeted investment.

One of the first things we could do is stop making the problem worse. Every time we have an event we see a lot of action, and oftentimes we see that the problem is made worse rather than improved. There is great work being done already. Stephen, I think, mentioned some of the pilot studies in the Warrill Creek and the Laidley, which have withstood the recent flooding. A lot of that work is well intended, but there is quite a bit of it that is not done in the right place to achieve the maximum benefits.

There are two points I would leave with you. My observation is that this is not something that you can leave entirely to the responsibility of individual landowners to deal with, because in many cases an individual landowner can really do nothing more than protect their own property. In doing that, they can increase the height of the levee in front of their property, remove debris in the channels, straighten it up a little bit and they externalise the problem. They pass the problem downstream. We see that time and time again. It really needs a planned and coordinated investment at a catchment scale. Several speakers this morning have already mentioned that.

The final point is that I still believe there are significant institutional barriers to allowing these problems to be addressed at the scale they need to be and to facilitate investment in tackling those. We have a port authority that wants to invest in offsets to reduce the cost of dredging. We have Urban Utilities that wants to reduce its costs of water treatment by reducing nitrogen loading. If we were able to remove some of those impediments, I think we would have a significant opportunity to really tackle the problem at the scale that it needs to be done. In doing that at that scale, there is a significant opportunity to generate several thousand jobs in South-East Queensland alone through on-ground investment.

CHAIR: Thank you, Professor.

Mr MADDEN: Thank you for coming in today, Professor Bunn. There is a question I want to ask that, of the people in the room today, you are probably in the best position to answer. It is to do with farm levees. I know that people have asked you questions about town levees, but farm levees are something of particular interest to me as a former councillor with the Somerset Regional Council. I also have experience with farm levees in the Lockyer Valley Regional Council. Having been in

parliament since 2015, I think I am safe in saying that the local government level and state government level have this in the too-hard basket. Can you advise the committee what other states are doing with regard to regulating farm levees?

Prof. Bunn: That is something I am not that familiar with, in terms of the legislative response to it. The construction of levees or any interference with a watercourse is meant to be approved works under the state department, and in this case it is Natural Resources and Mines. A lot of the construction of these things is meant to be a controlled and approved process, and my understanding is that that is a particular issue.

I think one of the key things is that the reason people continue to do it is that their response to every flood is to immediately raise the height on their side. What we are seeing now in places such as the Lockyer is quite a lot of antagonism against people across the river and the old rivalry: 'You have just shifted the problem to my side of the river and now I am going to have to do the same.' It is almost like a red queen and you just keep accelerating the process. Each time it happens, the floods are propagating at a faster rate with a more erosive pad downstream. Until we tackle the problem upstream of those areas and slow water down to reduce the impact to the areas farmers are trying protect, they will not see the merit of reducing or eliminating those protective devices.

Mr WEIR: Professor, you probably touched on what I was going to ask, because it is as simple as slowing it at the top while trying to get it out at the other end. You look at a map of Brisbane and you think, how do you do that? It is all built in. You said that you do not believe the problem is insurmountable and there are solutions. What are you talking about? Are you talking about detention basins, weirs, levees?

Prof. Bunn: It really comes down to targeted investments. It is identifying the actions you can take. They could be a whole range of things. A lot of slowing down water is increasing roughness—so changing vegetation cover on the hill slopes through different management regimes of the upper forested areas of catchments, building infrastructure on flood plains to impede and pond water, reconnecting flood plain wetlands, putting leaky weirs in channels, replacing and restoring riparian vegetation. If we did that in the upper catchments, upstream where a lot of the intensive development is, then that would go a long way in slowing down water, holding water longer in the landscape, allowing more infiltration. That is really tackling the problem at its source, rather than trying to engineer your way out of it downstream. With a city like Brisbane, by the time the water has got down to the main part of the flood plain there is very little you can do to control it.

Mr WEIR: You are obviously talking a lot of money.

Prof. Bunn: Yes, but, for example, you could make a $500 million investment in South-East Queensland over a 10-year period. That is $30 million to $50 million a year. The organisations that are affected by this—the Port of Brisbane, Queensland Urban Utilities, Seqwater, local governments—are all investing in this at the moment. That amount of money is not something that is out of the ballpark for that kind of scale investment.

An investment of that scale translates to about 4,000 jobs in the region—people involved in planting trees, building fences, doing works; professional people designing approved plans; people in local government doing the approvals. If you look at it on that scale, it is not an insurmountable problem. You could spend a lot more money than that and if it were not targeted you would not have the same effect. I think it has been mentioned before that it really requires very much a catchment based, overall plan where the suite of options is implemented and targeted.

Mrs GILBERT: Professor, you are talking about investment and funding. At the moment councils apply for funding and it is about the best application, not where the highest flooding is. I am interested in this thinking about the whole state, even though the focus of the Auditor-General's report is on the south-east corner. A lot of what has been raised here is about the sediment going out into the bay. In my area, the sediment goes out into the Great Barrier Reef. Do you have any ideas on how the funding for flood resilience could be managed so that we are targeting the problems, not necessarily just rewarding the best applications?

Prof. Bunn: Like I said, there are tools available for us to explore the optimal way in which you spend your money. What actions do you take in what parts of the landscape? We have the ability to provide that advice at the moment. There are certainly projects that people are putting up that you would consider to be no-regrets type of activities—where the problem is obvious and doing work in that place is certainly going to achieve on important outcome—but there may be clever ways to get a better overall outcome. Like I said, you have a port and environmental concerns interested in reducing sediment load. The actions you might take to do that might be slightly different from the actions you might take to reduce nitrogen load.

How do you optimise those investments in the catchment to give you the best combined outcome for the least amount of money? That is really what we are after. Drawing up and having that regional coordination and plan allows you to look at any proposals that come in to say, 'These proposals are consistent with the objectives of that overall plan and would be the ones to do first.' Certainly, as an overall priority, tackling the problems at their source, starting at the top of the catchment, is going to be really important, because by the time you get down to the lower flood plains, with the intensive land usage, you have very limited ability to slow down the water and do something there.

CHAIR: In terms of run-off and water, if you are not tackling issues in relation to floods then you are effectively creating that negative externality for the community. Are there businesses or organisations that we should be looking to to carry some load in terms of funding these sorts of things?

Prof. Bunn: I think you are seeing that now. Tony McAlister might be able to answer this as well. For a lot of the urban development, developers are being asked to set aside areas, make offset payments or, if they cannot achieve it on their own development site, pay local governments to reduce the impact somewhere else. I think those sorts of initiatives are really quite useful.

With the really big investments—at Seqwater, for example—we know what the increased cost of water treatment is to the Mount Crosby Weir every time the water comes down the Lockyer Valley. We know what the costs would be to the loss of storage in Wivenhoe Dam every time sediment comes in. An entity like that should be able to make the scale of investment to reduce the problem, because these are avoided costs that ultimately consumers are going to pay.

CHAIR: I did a tour of the port of Brisbane not long ago and looked at what they are doing there. It is quite impressive.

Prof. Bunn: It is.

CHAIR: There is obviously private sector investment already happening in this area. Is it well coordinated at present?

Prof. Bunn: No. I think the problem we are dealing with at the moment is that we keep tackling the problem in an incremental way. It is all done project by project—'Let's raise a bit of money for the next project,' rather than, 'Here's the coordinated plan and the overall nature of the task force is this amount of money. Where would you spend your first bit of that?' I think the problem at the moment is that a lot of the investment is done in a very piecemeal way. It is uncoordinated. You have the port wanting to reduce sediment, you have Queensland Urban Utilities doing projects to reduce nitrogen, you have councils wanting to improve amenity or whatever other goals they have and overall we are trying to reduce sediment load to the coastal zone.

CHAIR: One submitter suggested a mechanism to try to deal with the fact that you have some councils that are very densely populated and therefore have a large rate base and others that are much more sparsely populated and perhaps across the catchment you spread the load in terms of collecting some sort of tax from all of those people. Is there merit in that sort of approach?

Prof. Bunn: Undoubtedly. You have people living in Brisbane who enjoy the amenity of Moreton Bay and the lower Brisbane River. Most of the problems that are coming down into that and affecting that are coming from the upper catchment, so having a mechanism that allowed for people in the lower parts of the catchments to invest in works that are going to solve the problem I think is a key to that success.

CHAIR: Many submitters have talked about the need for a coordinating body. Some have made some suggestions around government departments and other entities. Does your institute have a view on who would be best placed to coordinate an overall catchment plan?

Prof. Bunn: I do not have a particular view as to whether we need a new entity or whether one of the existing ones may be well equipped to do it. I have been involved for nearly 20 years in Healthy Waterways—Healthy Land and Water, as it is now known. I have been involved in the science and delivery for that organisation for a long time. I think that, under their new merged entity with SEQ catchments, they are in a good position to take a coordinating role across the region. We know that the council of mayors has also had the Resilient Rivers Initiative. There are a number of entities. It may well be that a new one might be a good way to go, but I am not in a position to advise on that.

CHAIR: You are attached to an institute that is attached to a university. Is there anywhere in the world that is doing this well where we can learn some lessons?

Prof. Bunn: South-East Queensland is probably one of the better places.

PROOF

CHAIR: So here?

Prof. Bunn: Quite frankly, I have dined out on the Healthy Waterways story for nearly 20 years. The Chinese ministry of environment has adopted the river health reporting system that we use here in South-East Queensland as part of a national environmental monitoring program. They look to the way in which we coordinate and manage and do that sort of work and hold that up as best practice, so you do not have to look far for good examples.

CHAIR: In effect, what you are saying is that we are at the forefront but there is a long way further that we could move ahead?

Prof. Bunn: We have everything in place. We are not limited by our technical understanding. We have a good understanding of the economics—what are the costs and the benefits of doing that. All of that information shows quite clearly that both the direct benefits and the avoided costs of doing this kind of work stack up on every front. The key question remains, to my mind: why is it not happening at the scale that we need it to happen?

CHAIR: With that, thank you very much for your presentation today.

Prof. Bunn: Thank you.

PROOF

MILLIGAN, Mr Graeme, Executive Director, Queensland Reconstruction Authority

CHAIR: Thank you, Mr Milligan, for appearing before the committee. Would you like to make a brief opening statement before we move to questions?

Mr Milligan: Thank you, yes. Mr Moon, our chief executive, is an apology today. He is working with councils across the state in North Queensland following the impact of Tropical Cyclone Debbie. He has asked me to provide this additional information to the committee.

CHAIR: Thank you.

Mr Milligan: I am able to provide an update on points that have been covered, or information that has become available since, in the submissions and hearings and even some of the issues raised today. Just to give you a flavour, I will be covering the budget for the Brisbane River flood studies work, which was a point of consideration previously; the release of the Brisbane River catchment flood study; progress with the development of the strategic flood plain management plan for the Brisbane River—that includes some of our integrated catchment management approach; and our work on the flood warning gauge network project across the state and the links with the Brisbane River catchment. There were some issues raised with that earlier. The development of a disaster management tool for the Brisbane River has been raised as well, but no response had been made. I will cover off on those topics and we can go from there.

In relation to the available budget, the Queensland state government and the four councils directly involved in the Brisbane River catchment flood studies—Brisbane, Ipswich, Lockyer and Somerset—have collectively provided $5 million under a cost-sharing arrangement. That was information that we had previously provided. In November last year the Queensland Reconstruction Authority was successful in receiving a Natural Disaster Resilience Program grant of some $750,003 on behalf of the project partners to contribute to the development of the Brisbane River strategic flood plain management plan, so our budget position is much better than the last time we spoke with the committee. I should say that that program is jointly funded by the Australian and Queensland governments.

The final cost from these funds for delivering the Brisbane River catchment flood study itself was some $3,516,360. The remaining $2,233,644 is for completing the strategic flood plain management plan. Any funds not used for this will be available for the development of the more detailed flood plain management plans that will be developed by local councils. The committee also ought to note that the study partners have contributed and are continuing to contribute significant in-kind resources for the completion of the flood study and to complete the strategic flood plain management plan.

The flood study itself—the modelling and the mapping work—was released to the public last Friday, on 5 May, by the Deputy Premier, supported by the mayors from Brisbane, Ipswich, Lockyer Valley and Somerset regional councils. The purpose of that study was to provide an up-to-date, consistent, robust and agreed set of hydraulic and hydrologic models and flood behaviour information—rate of rise and speed of water, as mentioned before—for the Brisbane River catchment. That was completed as the Queensland government's response to the recommendations from the Queensland Floods Commission of Inquiry.

This flood study then provides the technical data about flood flow behaviour and characteristics from various sections of the catchment and for flood levels in the lower Brisbane River and tributaries. It is a critical first step towards developing the strategic flood plain management plan for the region. I should say for the benefit of the committee that there is significant communication material available on the web in regard to the flood study itself.

That moves on then to the development of the strategic flood plain management plan. This is where we will be providing some guidance for further work. A number of specialist contractors have been engaged since January this year to develop various components contributing to this body of work. That includes the identification of building footprints and floor levels; a discussion paper on building controls; a primary contract for bringing together the overall flood risk assessment work based on the flood behaviour details in the flood study—and that includes the consideration of climate change, which was raised before as well; the identification and assessment of potential structural options; and a common and consistent approach for land use planning, emergency management and community resilience. They are starting to touch on a lot of topics that we were talking about earlier.

We have also engaged two interstate and nationally recognised experts to provide independent advice and guidance on the work that we are doing. The first milestone report was delivered on schedule at a stakeholder workshop on 28 April. A key feature of the strategic flood plain management plan will be the consideration of catchment and management scenarios as part of the assessment of

structural options. Our intention is to understand the changes in flood behaviour within the study area from both currently planned landscape restoration works and a more holistic and larger scale revegetation of catchment headwaters, riparian areas and flood plains. In addition, the analysis of these structural options will also include consideration of natural resource management elements including water quality and ecosystem health and recognition of the cause-and-effect relationships across the catchment.

In terms of the flood warning gauge network projects, while the Bureau of Meteorology is responsible for the issue of weather and flood warnings in the forecast, the Queensland Reconstruction Authority has policy oversight of the rainfall and stream-flow gauge networks across the state upon which the bureau relies. Across the state, the bureau uses data from in excess of 3,500 gauges of stream flow and rainfall. These are owned and operated by some 54 different entities. In most cases, flood warning is not the primary purpose of those owners. It might be that Natural Resources and Mines uses gauges for water assessment purposes, but that information is available to the bureau.

We at the Queensland Reconstruction Authority have no statutory responsibility and we undertake our role through very much a facilitative and collaborative approach. Our aim is to make sure the people of Queensland in flood-prone communities have appropriate flood warnings of flood events. Part of our work then is to ensure that any improvements in the flood warning gauge network are to a standard approved by the bureau, that the transmission of data from whoever is putting them in is suitable for use by the bureau—they can actually receive and consume that data—and, importantly, there is real-time or near real-time visibility of that data to the relevant local council, the State Disaster Coordination Centre at Kedron and the Bureau of Meteorology.

We did an initial statewide risk based assessment work in 2015 and we did more work last year with 45 identified priority local councils to review their flood warning infrastructure networks, with 37 reports either finalised or in draft to be completed by June this year. The balance of the councils across the state—of those ones—do not require reports, and this has been a collaborative approach involving the councils, the bureau, Queensland Fire and Emergency Services along with other gauge owners including the Department of Transport and Main Roads and the Department of Natural Resources and Mines, as I said before. The rest of the councils will be engaged this year to complete the follow-up from all councils. We are also exploring catchment based options with gauge owners for improved operational efficiencies and effectiveness of this network relied upon by the bureau.

Within the Brisbane River catchment, the Queensland Reconstruction Authority has worked with 10 gauge owners and identified that there are 390 rainfall and stream-flow gauges owned and operated by these 10 entities. That includes Seqwater, Natural Resources and Mines, local councils and the Bureau of Meteorology. Through the collaborative approach that we have applied, we have identified the potential for an additional 40 gauges to be included in the supply of data to the bureau. The bureau continues to be well serviced with the supply of data to inform its flood warnings and forecast for the Brisbane River catchment.

Lastly, with regard to the disaster management tool which came up in previous discussions with the committee, a disaster management tool was produced in 2014 using the initial inputs and results from the Brisbane River flood study itself, and this was to ensure that councils were well placed to get the best understanding of floods for responding to flood events downstream of Wivenhoe, commencing with the 2014-15 wet season. As such, it has been available for three seasons. Thank you, Chair. I am happy to answer any questions or provide clarification on those updates.

CHAIR: We appreciate that.

Mr WEIR: You have already talked quite extensively about river gauges, but I am curious about that. They obviously indicate the flow of water, but do they also determine the differences in velocity of that water and how quickly those streams are rising and falling as compared to years gone by?

Mr Milligan: As they are gauges they do not give us real-time velocity of the water, but we do have to varying degrees—and this is an issue dealing with 54 different owners across the state—information on their rating curves. As you can understand, in a cross-section across the river the water flows through. If you know that cross-section and you can work out the volume, the velocity can be developed and that is part of the equations and modelling that are used to determine how water comes down through the catchment system and how the modelling of the bureau operates.

Mr WEIR: With regard to that modelling, you mentioned real-time readings.

Mr Milligan: The real-time readings we get are on rainfall if it is in a rainfall gauge or on the height of the gauge at that particular time. All of the other information is prearranged in the computer models that the bureau might use.

Mr WEIR: We are increasingly seeing during these flood events whole houses washed away and erosion on grand scales and it is obviously the velocity of the water that is causing that. I was just wondering about the preparedness for that downstream to be ready for those events.

Mr Milligan: That goes to the recalibration of models that are developed for these catchments, and that is no small task either.

Mr MADDEN: Thanks very much for coming in today. I have a question with regard to resilience funding. I am aware there was a change with the Queensland Reconstruction Authority moving from funding like for like to funding more resilient structures. Since that change was made we have had Cyclone Debbie. Can you inform the committee of any examples of benefits you have seen with regard to resilience funding as opposed to like-for-like funding?

Mr Milligan: There are a couple of points, and I can give you a bit of context for that as well. The Queensland Reconstruction Authority now leads resilience and recovery work across the state and we have a division focused on the resilience activities. We work with councils to understand their risk and use a catchment based approach as well. We have managed successful resilience and restoration programs—that is, the Betterment program—and there was $80 million from 2013 and $20 million from 2015 and we know that they have withstood subsequent events, including Tropical Cyclone Debbie. I do not have any specific examples of roads or bridges, but we know that that has been the case. I have asked questions of our colleagues at the South-East Queensland Healthy Land and Water and some of the restoration work for the riparian restoration that was done has withstood the effect of these more recent events as well.

Mr MADDEN: There was some mention in the media yesterday about bridges in Rockhampton being raised and allowing better access when the floods were on in Rocky. Is that an example of Betterment funding?

Mr Milligan: I am not familiar with that particular issue, but in terms of looking at essential public infrastructure we are providing funds to make them more resilient and more immune to future flood events as part of the consideration.

Mr MADDEN: Do you think we have adequate funding for Betterment funding?

Mr Milligan: It is probably not for me to answer that one.

Mr MADDEN: Thank you.

CHAIR: It seems to me like you probably need a new name. It seems like you have moved beyond just reconstructing into the preventive space, which is a good thing. In terms of the rain gauges, I think you said there are 3,500 around the state owned by 54 different entities, with 390 in Brisbane owned by 10 different entities. Are the entities that are placing those rain gauges doing that out of the goodness of their hearts? Is there some commercial reason they are doing that? What is the driving force behind those entities putting those rain gauges in?

Mr Milligan: I may have mentioned before that most of those gauges for all of those 10 and 54 entities across the state are for their own purposes and so it is not primarily for flood warning, but the bureau will use that information to help bolster the details they have to inform their flood warnings. We know that we are getting information from some mining companies. We know that they have the information and they have been happy enough to provide us with feeds on the information from their rainfall and stream-flow gauges. That is one example, and this is part of the challenge in that we have a lot of gauges out there to various standards. If they were all to a flood warning network stage, they would need to be able to operate if the power goes out. They all need to be ideally linked with radio repeaters across the state which, in a state the size of Queensland, makes that very difficult.

At the moment, a lot of our gauges are read manually still from the bureau gauges. We get the information after they go back and key it in on a six-hourly basis or whatever frequency the bureau would require through the internet or through telephone connections, or there are mobile phone connections and satellite phone connections.

They are some of the issues from a flood warning perspective. Some of those technologies are the first ones to go out if you lose power, so this is why we are looking at it and making sure we have the right mix and match of bureau and council gauges that are deliberately set in for flood warning and they are complemented with gauges from other sources—other owners—to make sure we get the information in, so it is quite complex.

CHAIR: Given the diversity of ownership of these, do you simply accept the data that those organisations are choosing to collect or do you have some capacity to influence the type of data and the way they collect it and present it?

Mr Milligan: Yes. As I mentioned before, we wanted to make sure that the way the data is transmitted is consumable by the bureau. We work with these gauge owners, and if they can package up the data in a different way to suit not only their own needs but also to suit the bureau's needs we get those outcomes. We do that by just simply going out and meeting with councils and we are doing that more now on a catchment basis for the selection identification and then even the ongoing operation and maintenance of gauges trying to get councils and other gauge owners to work together. We have done a little bit of work out in Western Queensland, but that is where we are going to get the best capture of information and supply to make sure the bureau gets it as best it can.

CHAIR: But there is no compulsion on them, is there?

Mr Milligan: No. As I said before, we have no statutory provisions. We do our work through facilitation and collaboration as one of our strengths.

CHAIR: So you see that as a strength?

Mr Milligan: Absolutely. We have been able to deliver significant outcomes through just being able to get people to at least sit down and talk with each other. I have numerous examples where we have been able to get people together from the Bureau of Meteorology, local councils, Queensland Fire and Emergency Services and Main Roads to just sit around the table and put on the table what information they have and then everyone just agrees to share the information.

CHAIR: Many submitters have talked about the need for some body to be identified to drive the overall catchment management and the catchment management plans. Does your organisation have a view on that and perhaps who or what that body should be?

Mr Milligan: It is probably one of those policy questions that I am unable to answer. It is not within our remit at the moment.

Mr WEIR: With regard to the flood study work that you released, have you had much feedback on the actual plan?

Mr Milligan: It is a study. As you can see from the material, it provides information on flood behaviour—the extent, depth, velocity—within a study area downstream of Wivenhoe Dam. From the release on Friday we can say that there has been significant media coverage and to date there has been what I would call no real negative media or responses.

Mr WEIR: Was there much interaction with the public and those affected?

Mr Milligan: Not at this stage of the project. This was purely a technical body of work that would not have been improved as such through a traditional community consultation process. This runs the hydrology and the hydraulics using just the data that is available. The next step is doing the strategic flood plain management plan, which will be a common and consistent approach across the four council areas, and then the councils will do their more detailed work. There will be appropriate levels of community consultation through those processes.

Mr WEIR: I just know that in my region when the flood mapping was released it caused a bit of ruckus with people whose households were in flood zones and insurance issues.

Mr Milligan: Yes. I probably was involved in putting together that information, but with the Brisbane River study and other work we have done through our Queensland flood mapping program we have updated that information in most areas across the state. The quick story there is that we have produced more than 12,000 flood mapping products for 172 flood-prone communities across 53 councils across the state in 2½ years using $4½ million. We have left quite a significant legacy to build on where it needed to be built on in terms of information on people's exposure to floods, because people really need to know what their exposures are.

Mr WEIR: Yes, that is right.

CHAIR: Mr Milligan, thank you very much for your presentation today. That concludes our public hearing. Thank you very much to all those people who presented today. I now declare this hearing closed.

Committee adjourned at 10.30