



AGRICULTURE AND ENVIRONMENT COMMITTEE

Members present:

Ms JR Howard MP (Chair)
Mr SA Bennett MP
Mrs J Gilbert MP
Mr LP Power MP
Mr R Katter MP
Mr EJ Sorensen MP

Staff present:

Mr R Hansen (Research Director)
Dr M Lilith (Principal Research Officer)

PUBLIC BRIEFING—EXAMINATION OF THE AUDITOR-GENERAL'S REPORT NO. 20, MANAGING WATER QUALITY IN GREAT BARRIER REEF CATCHMENTS

TRANSCRIPT OF PROCEEDINGS

WEDNESDAY, 28 OCTOBER 2015

Brisbane

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Committee met at 11.00 am

HENRY, Ms Nyssa, Program Manager, Monitoring and Reporting, Office of the Great Barrier Reef, Department of Environment and Heritage Protection

NICHOLS, Ms Elisa, Executive Director, Officer of the Great Barrier Reef, Department of Environment and Heritage Protection

CHAIR: Welcome everybody. Before we start can we just make sure that all phones are switched off. I declare this meeting of the Agriculture and Environment Committee open. I would like to acknowledge the traditional custodians of the land on which this meeting is taking place today. My name is Jennifer Howard. I am the member for Ipswich and I am the chair of this committee. The other members with me are Stephen Bennett, the member for Burnett, who is the deputy chair; Julieanne Gilbert, who is the member for Mackay; and we have Ted Sorensen, the member for Hervey Bay also on our committee and I expect him to arrive quite soon. We have an apology from Linus Power, who is the member for Logan.

These proceedings are being transcribed by our parliamentary reporters and are broadcast live on the Parliament of Queensland's website. The purpose of this meeting is to assist the committee in its examination of the Auditor-General's report No. 20, *Managing water quality in Great Barrier Reef catchments*. The report was referred to the committee on 16 July for examination and report.

To assist this work, the committee has requested the briefing today by the Department of Environment and Heritage Protection to assist our understanding of the findings and methodologies for the Great Barrier Reef Report Card 2014. The report card was released by the department last month.

For the benefit of those who are watching the broadcast of this briefing, the PowerPoint slides will be available on our website shortly. I welcome departmental officers. Would you like to start with a brief opening statement?

Ms Nichols: Sure, a very brief opening statement. Thank you very much for inviting us along here to present on the report card. The Great Barrier Reef Report Card is an important event every year in the calendar of information that we are gathering about the reef and the impacts of land based activities on the reef. It is a joint program with the Australian and Queensland governments. So it is actually a joint release of the two governments. I will not say too much. We have quite a detailed presentation to go through today and my colleague Nyssa Henry will take you through that.

Ms Henry: Good morning, committee members. The way I have set the presentation is that it is a 45-minute presentation, but please feel free to stop me to ask questions along the way for clarification. As Elisa said, the Great Barrier Reef Report Card 2014 was released by Minister Miles and Minister Hunt jointly in September. This committee briefing is really to go through the details of the results of this year's report card and I will also explain some of the methodologies along the way.

Just as a bit of context, the Great Barrier Reef Report Card essentially is reporting on the Reef Water Quality Protection Plan—the reef plan known in short. The reef plan is a joint commitment between the Australian and Queensland governments to manage land based threats to the reef, mostly from diffuse agricultural pollution. It is really addressing the water-quality aspects of threats to the reef. As you can see, there are a number of other areas that are dealt with, but for today, just for context, we are looking at the water-quality aspect.

As I am sure you are well aware, committee members, the size of the Great Barrier Reef is quite a challenge for monitoring and reporting. The catchment area is half a million square kilometres. It consists of 35 major catchments all the way from Cape York down to Burnett-Mary, being the most southern catchment and the joining marine adjacent area is also nearly equally as large at 350 square kilometres. We also have the challenge of a highly variable climate, as I am sure you are all well aware, and major flood events.

Public Briefing—Examination of the Auditor-General's report No. 20, Managing water quality in Great Barrier Reef catchments

This is a land use graphic for the Great Barrier Reef catchments. It adds a bit of contextual information. You can see that the dominant land use for the whole of the GBR catchment is grazing—nearly three-quarters of it is grazing—followed by other major land uses such as conservation protected areas, nearly nine per cent, forestry at five per cent and sugar cane, cropping and horticulture make up the remainder of the area. So as you can see, by far and away agriculture is the dominant land use across the GBR catchments.

To determine the priorities for assessment, we undertook a scientific consensus statement update. The original report was done in 2003, updated in 2008 and again in 2013. This sets the management priorities based on the latest synthesis of scientific literature available and it came up with the management priorities identified in this graphic, that is, essentially pesticides and dissolved inorganic nitrogen, which is excess nitrogen from fertiliser in the Wet Tropics from sugarcane areas and also in the lower Burdekin and Mackay sugarcane areas; sediments from grazing, the major grazing catchments being the Burdekin and the Fitzroy as well as the Burnett; and pesticides from the cane areas of Wet Tropics, lower Burdekin, Mackay and also the Burnett. This risk assessment took into account the loads of these pollutants and distance to seagrass and coral as well as a number of other factors to come up with an overall relative risk assessment.

Essentially, the Reef Water Quality Protection Plan, which was initiated in 2003 and updated again in 2009 and 2013, sets out the long-term goal for the health of the reef to ensure that by 2020 the health of the reef suffers no detrimental impact from broadscale land uses in the adjacent catchment and that it does not impact on the health and resilience of the reef. Underpinning that goal is a number of targets for water quality and land and catchment management. This covers land management adoption for key agricultural industries, catchment indicators such as ground cover, riparian and wetland extent as well as the water-quality targets for the key water-quality pollutants. The change from the previous reef plan 2009 to the reef plan 2013 included a revision of the targets to be more focused. So the total nitrogen target was changed to dissolved inorganic nitrogen to really focus on the excess fertiliser issue. The sediment target was expanded to include particulate nutrients that are bound to the sediment. They are also an issue for the reef. The pesticide target was increased from a 50 per cent to 60 per cent reduction required to meet environmental health standards. Things like the ground cover target were also raised to 70 per cent. So essentially, these are the key changes to the targets and this is what this reef report card 2014 assesses progress against.

The way we produce the information to populate the report card is through the Paddock to Reef Integrated Monitoring Modelling and Reporting Program, or Paddock to Reef Program for short. The objective of this program is to assess progress towards the reef plan targets and, ultimately, the long-term goal of the reef plan. It is quite a large program and it involves many players from regional bodies, researchers, the agricultural industry and it is jointly funded fifty-fifty with the Australian and the Queensland governments. It integrates monitoring and modelling from the paddock to the end of catchments and out to the reef. Really, it has quite a strong management-science interaction—being a water-quality scientist I am embedded with the Office of the Great Barrier Reef. So we do the translation of the science into informing policy.

Here is a diagram of the Paddock to Reef Program outlining the key elements. Essentially, the Australian government funds the paddock and marine components of the program and the Queensland government funds the catchment aspects. This includes, from the paddock scale, monitoring and modelling of key agricultural practices to determine their water-quality benefits. This information essentially rolls up into the catchment modelling, which is then validated against long-term catchment monitoring to ensure that the models are predicting correctly. This is also combined with remote sensing by satellite imagery of the key catchment indicators, such as wetland mapping and ground cover and riparian zone mapping. This is information that is joined with information from the Great Barrier Reef Marine Park Authority—GBRMPA. They undertake the Marine Monitoring Program for the inshore region and they assess coral health, seagrass health and inshore water quality. All of this information is really rolled up into the report card. I think the next slide might have a graphic on that.

The way this information is used is we have what they call the wedding cake tiered approach. Tier 1 is essentially the reef report card, which I have handed out to you today and what we will be going through. This is the high-level synthesis of the information. It is quite rolled up. We have the underpinning tier 2, which really provides, for each component of the program, quite detailed results and the summary of the technical methods that sit behind it. This, again, is underpinned by the third tier, which is the full scientific technical reports, which are 200-page documents, or thereabouts. Those are the ones that go through external peer review, internal peer review and go through our Reef Independent Science Panel to ensure that the science is rigorously reviewed and up to date. That is then synthesised into the higher-tier information.

The results for this Reef Report Card 2014, essentially, combines the results from the 2009 baseline up until the 2013-14 financial year. So that is June 2014. It reports on the progress of the area under the land management best practice systems, the modelled reduction in pollutant loads, the changes in riparian and wetland cover extent for all of the GBR catchments, the levels of ground cover across the catchments and also a snapshot of marine conditions for the 2013-14 financial year.

A key area that has changed from previous report cards to this report card is around the change of targets. The land management practice target used to count the number of landholders who had adopted any improved practice. However, from the Reef Plan 2013 onwards, this was changed to area under best practice, which is a more meaningful target that really relates better to water quality and gives a better indication, because that is the information that underpins the modelling. Also, you can have a smaller number of growers but larger properties. It makes it a better benefit to the reef.

Mr BYRNE: I am sorry to interrupt because you are very much on a roll. Can you just clarify for me, we talked about the change in targets from the 2009 to the 2013 reef report card and this was done in June 2014. You alluded earlier to the changed and ambitious targets that you have set. Is that now modelled in what we have in the reef report card?

Ms Henry: Yes. This report card is the first report card to assess progress under the updated reef plan 2013 targets.

Mr BENNETT: But those new targets were only brought in this year, were they not?

Ms Henry: The targets were updated in June 2013 with the release of the reef plan for 2013.

Ms Nichols: I think the member is referring to this government's additional targets over and above the reef plan.

Mr BENNETT: On that page there we talked about the 2018 targets now. That is what—

Ms Nichols: There are two levels of targets. The Reef Water Quality Protection Plan had targets that were set in 2013, which are the ones that Nyssa is referring to. The targets that came in this year are at a higher level than that. So that is the up to 80 per cent of reduction of nutrient and up to 50 per cent reduction of sediment target.

Mr BENNETT: Are all of those next year?

Ms Nichols: Yes. They are targets that were adopted under the Reef 2050 Long-Term Sustainability Plan this year with the Commonwealth. So the two sets of targets are slightly out of step at the moment, but one of the things that will be happening next year is that there is a target review that is built into the Reef Water Quality Protection Plan and it will have to look at what we call ecologically relevant targets, which is setting specific targets for specific catchments and that will take into account the new targets.

Mr BENNETT: Thank you.

Ms Henry: Thank you for the clarification. I mentioned the Paddock to Reef Program elements. I will now step through each element in turn and look at a brief summary of the methods and then the results for the report card for each one of those components.

The first section—which is the next slide—relates to the paddock management practice adoption, reporting on the area of improved practices under best practice systems. This essentially is done against a benchmark for each of the key agricultural industries. We call them water quality risk frameworks essentially. They outline the required management from innovative practice to best practice, code of industry standard to superseded practice. The target is really reported on through a combination of methods using surveys and industry data collection on farming practices and improvements. I think the next slide actually might outline the frameworks. The water quality risk frameworks were developed by the Queensland Department of Agriculture and Fisheries and really there is one for each key agricultural industry. These are available on our Reef Plan website if you want to know further information.

Mr BENNETT: What has your feedback been on the reporting methodology that DAF is responsible for?

Ms Henry: DAF developed these frameworks and then they were reviewed by the Reef Independent Science Panel and they were also put through the Reef Partnership Committee which includes key agricultural representatives from Canegrowers, Queensland Farmers' Federation and AgForce.

Mr BENNETT: Are they comfortable that they are user friendly in the methodology that is presented in a reef report card?

Ms Henry: The way these frameworks are used is not for growers. DAF has an easier, simpler translation which they use for communicating with landholders. This framework is really how we roll up the information on progress across each one of these industries into a reporting framework. Really, it is based on practices from each of the key agricultural industries, so from the industry BMP programs—that is best management practice programs—and it translates it into a rolled-up reporting framework. You can see the graphic at the bottom shows the alignment between the industry BMP programs, such as Smartcane BMP or Grazing BMP. Under the BMP programs industry standard correlates to our yellow category there in the centre, about moderate risk; below industry standard represents high-risk to water quality; and above industry standard, according to those programs, is best practice in our framework.

Mr BENNETT: Most of our feedback is that it is not user friendly and it is quite cumbersome in trying to reach an informed decision I suppose for people who are not engaged in this process on an annual basis. I suppose we could blame DAF for the reporting mechanism, the wheels and the colours and things. Have you had any feedback?

Ms Henry: The way it is presented in the actual report card?

Mr BENNETT: Yes. Do you get any feedback to the negative component; about the way it is actually presented for a user friendly document?

Ms Henry: Only from Growcom. The other industries were fine.

Mr BENNETT: Growcom has raised concerns about the reporting?

Ms Henry: They were just not familiar with the graphics. We are looking at doing a bit of consultation with them this year to see if we can simplify some of the graphics. We have taken their feedback on board. The graphics were actually designed by the University of Maryland in the United States. That is Bill Dennison's area. They developed the South-East Queensland Waterways Health Report Card. They are the international leaders in report cards. They do ones in the US, Europe and Asia. They designed the graphics for our report card. We always welcome any feedback. It is an adaptive management program.

Ms Nichols: It can be quite challenging because we are trying to put an awful lot of information in that gatefold document. You saw with the tiers we are talking about 200-page reports that end up coming up to a short little thing for the community.

Ms Henry: I might move on to the next slide. Apologies for this. The colours are a little bit odd, but members have printed coloured versions in front of them they might want to refer to. It is probably a bit easier to read. The management practice results, this is for the overall GBR scale, for sugarcane on the left, grazing and horticulture, we assessed the progress from very good to very poor on the scale there. You will see for sugarcane overall we break it into pesticide management, nutrient management and soil management. Unfortunately there has been very poor progress towards the nutrient target and poor progress towards the pesticide and soil targets with only 30 and 23 per cent respectively at best practice for those areas. For grazing it is a little bit better with 47 per cent, so nearly half of the area managed at best practice for streambank management. However, for gullies and pasture management it is only about quarter of the industry at best practice across the board.

Mr BENNETT: This is the 2018 targets now. What about the 2013 targets that we were reporting on in the Reef Report Card? To be fair, since 2009 when we started down this progress—do you know where I am going? The 2014 report card I would assume would have been the 2013 benchmarks that we set ourselves, successive governments, but now we are reporting on the 2018 quite ambitious targets that have been set.

Ms Nichols: No. They are the same targets. The targets were set in 2013. The targets are to be met by 2018.

Mr BENNETT: You have answered that twice now, haven't you?

Ms Nichols: That is all right. Ignore the new targets of up to 80 per cent and up to 50 per cent. They are not represented in this document or presentation at all.

Ms Henry: These targets are from 2013 to 2018 and essentially represents the entirety of the industry, where they are up to as of this point. It is not necessarily all the progress made in one year, it is just where the industry is currently towards the target which is to get a 90 per cent adoption by 2018. That is an area based target. Another element that we introduced this year was qualitative confidence rankings. This was in response to the Queensland Audit Office report where they would like to see uncertainty rankings added to all report card results. This was done through an expert opinion and multicriteria analysis approach through the Independent Science Panel where they

combined data on methodologies, statistical error and other factors and basically came up with a one to five bar rating which is in the top right hand corner you can see there. So for this component of the report card it is a three out of five bar rating. I think I have another slide which is an example of the regional results that we will go through. That is in the tier 1 reporting. In the tier 2, which is the slightly more detailed reporting, we break down the reporting into the component indicators that are rolled up into that tier 1 report card. So you can see for sugarcane for the pesticide management, nutrient management and sediment management there is a number of contributing indicators that contribute to that assessment. For nutrients the dominant contributing indicator is nitrogen surplus, so how much extra fertiliser is applied in comparison to the yield, so how much the plant takes up.

The width of the outer ring of that coaster represents the weightings for each one of those indicators that roll into the inner circle. You can see for nutrients the most important thing that relates to water quality is the nitrogen surplus. So about 60 per cent of the weighting overall. Timing of your fertiliser application is the second most important indicator. It is about 30 per cent of the water quality contribution. And things like placement—that is, whether or not you put your fertiliser on top of the soil or incorporate it underneath the soil. They call that subsurface application in cane. That is about 10 per cent of the overall water quality rating. You can see that while the industry is doing quite well in some elements such as placement of fertiliser and having green trash blanketing, which was introduced from the eighties onwards, where they cut the cane green and the top of the cane falls to the ground and creates a ground cover. That has done quite a lot to improve sediment loss from the cane industry since that time. You can see the majority of the industry is at best practice for that practice and placement. However, the area for most improvement is that nitrogen surplus element, and also pesticides, about the timing of pesticides, making sure it is far enough away from the wet season so it is not at a high risk of loss. That is about saving the farmers money just as much as it is about helping the reef.

In the next one I have put in an example of one of the regions for sugarcane. You can see it changes for each region. That was the overall result. This one is for the Wet Tropics which is a high-priority area for sugarcane and fertiliser management. You can see they are doing okay in soil management: 45 per cent of the industry at best practice. However, nutrients and pesticide management are areas for improvement with nutrients in particular the greatest area for improvement with only nine per cent of the industry at best practice for nutrient management.

The next slide is for grazing and is the overall graphic for the whole of GBR catchments. You can see, as I mentioned before, nearly half the industry is at best practice for streambank erosion management—that is, things like fencing off along your creeks to prevent cattle access into the streams and that helps prevent streambank erosion. Things such as pasture management and gully management, only about a quarter of the industry is at best practice for those. The target for 2018 of 90 per cent adoption, we have a little while to go in improving those practices at the GBR scale. I think I have put in the Burdekin region result in the next slide. You can see 62 per cent are at best practice for streambank management, 30 per cent at best practice for pasture and 26 per cent at best practice for gully management. Gully management, I am sure you are aware, is areas of the landscape that have concentrated sediment erosion. They form naturally, but they are exacerbated by grazing pressure. Overgrazing leads to cover reduction which builds upon low cover levels naturally from the drought and really can speed up that process of erosion from these gully features. Some of the best practice management for that is really around fencing off some of those gullies, keeping cattle out of them and reducing grazing pressure around those features. You can see the results vary regionally. On the next slide, for horticulture they are probably one of the better performing industries. This is the overall result. Sediment management, we have about 71 per cent of the area under horticulture, reef-wide is managed at best practice. However, there is room for improvement with nutrients at only 23 per cent of the area at best practice. You can see in some areas, such as sediment management, things like having buffer zones and sediment traps and things like that incorporated into the farming system can really help in reducing sediment loss from these areas. I think I have got a regional result here for Burnett next. At the end of the presentation I have a snapshot for each region with all of the results contained within that. We will wait till we come to that.

The next section is about the paddock monitoring. Really the way this works is we have a number of on-farm field trials for each of the key agricultural industries from Wet Tropics down to Fitzroy in the south. We essentially have them on commercial properties so we are working with farmers directly to trial different management practices to see what the water quality benefits are from some of these practices. Really it is about demonstrating the improvement from these practices. It also produces data that helps refine the models over time and also it is really good for local extension and demonstration days. We have quite a number of landholders come through these properties in consultation with, if it is the cane industry, their local productivity boards. They bring a number of

growers, bus tours through, and have a look at some of these trials and results. The photo in the bottom left hand corner there is one of our paddock sites looking at sugarcane management treatments in the Wet Tropics. This is just south of Innisfail at the Silkwood site. We have five experiments across the paddock looking at water quality, with instrumentation at the end of each row and underground as well. We look at water quality running off the paddock and coming through the groundwater as well. Essentially this information is looking at different levels of nitrogen, fertiliser application and some of the new products such as controlled release fertiliser to look at what the benefits are from these improved practices.

On the next slide, this information is fed up into the paddock modelling. The paddock modelling takes the information from these paddock monitoring trials and combines it with the management practice adoption reporting from the Department of Agriculture and essentially works it out. Once we know the area under each improved practice and we know what the water quality benefit of each practice is, it is just like a giant calculator. It combines it for each soil type and each climate type and rolls it up into the catchment models. The purpose of the paddock modelling is to feed the catchment models to break down the practices across the soils and climate zones. I will not go into too much technical detail because your eyes will probably glaze over, but on the next slide I think we go into the catchment indicators. I will work my way to the catchment modelling so you will see how all of these roll up into the catchment modelling. The catchment indicators use the satellite assessments for ground cover. That is done annually. As well as satellite monitoring of the riparian zones. Along each river they map a 100-metre buffer and look at vegetation changes every four years and the same for wetland extent. For all of the 14,000 mapped wetlands in the GBR catchment they look at extent changes over time. We also have introduced a new program which is looking at wetland condition or wetland functions and values health. That was a pilot project carried out this year which we have done a separate case study on. There are no results to date but we have designed a program for assessing wetland health. The next report card will have some results around health changes and key GBR wetlands.

The next slide shows the results. This report card shows that wetland extent, the rate of loss, is actually reduced from the previous reporting period, with an overall 330 hectare loss, which is less than 0.1 per cent. However, the results for riparian extent change has actually changed since the last reporting period, with a 30,980-hectare loss over this four-year period, which represents a 0.4 per cent change. This is the overall GBR results. Of course, once you get into the regional results you will see some variation. The ground cover target was exceeded, although it was reduced since last reporting period. This is the overall average for the GBR catchments. Once you get into the regional results, you will see some quite significant areas of low ground cover, particularly in the drought declared areas within the Fitzroy and Burdekin catchments. Just a reminder: this is results up to June 2014. Obviously, with the progression of the drought, the next report card on ground cover is expected to be lower level results.

This leads us to the water quality monitoring component of the report card.

Apologies, it is a bit off the page there. Essentially, there is a map on the right-hand side showing the distribution of the monitoring sites from paddock, catchment and the reef. The monitoring is really about tracking the long-term progress of water quality entering the lagoon from the high-priority reef catchments. It is quite an intensive sampling program. They do monthly sampling year round and then, in the wet season, whenever there is a rainfall event, they do quite intensive sampling over a rainfall event. That can be about 14 samples per event, so every couple of hours. This information really is about providing long-term information, but as it is affected by climate—variability in rainfall year to year—you will see monitoring data jump around. Really, this data feeds into the modelling as a validation for the modelling.

From this year onwards, this is another response to the Queensland Audit Office report. They wanted more transparency of the monitoring data, to see it used directly in the report card. For this year we have included a graphic that basically is water quality monitoring results for the 2013-14 financial year for each of the key pollutants. You can see essentially the Wet Tropics was wetter than average. On the right-hand side of this graphic is a percentage of the long-term average discharge. Essentially that means that the Wet Tropics was about 120 per cent of its long-term average, so it was over, whereas regions such as the Fitzroy and Burnett/Mary on the right-hand side of the graph were about 20 and 30 per cent of their long-term average flows, so much much drier than average, which is why you see much less water quality loads in these years. In wetter years, say 2010-11 when we had some of those extreme wet years, this graph would have looked totally different. The Fitzroy and Burdekin, in particular, would have been well above what the Wet Tropics was for sediment. However, dissolved inorganic nitrogen is generally quite high year around from the Wet Tropics.

Public Briefing—Examination of the Auditor-General's report No. 20, Managing water quality in Great Barrier Reef catchments

This brings us to how all this information is rolled up and underpins into the catchment modelling. As I mentioned before, pollutant loads measured through monitoring are very highly variable year to year, essentially reflecting rainfall differences. This is a bit of a benefit we had of coming after the South-East Queensland report card. They traditionally base their report card grades just on monitoring alone and you will see the grades over time reflecting that variability in rainfall. A wet year, grades go down; a dry year, grades go up. The approach we developed with the University of Maryland in the US was to use modelling to account for that climate variability, so we can pick out what the water quality improvement signal is as a result of our investments in land management change. Really, this is designed to feed back into our reef plan program to determine management priorities going forward. We wanted to know whether the initiatives we are implementing are making a difference.

You can see on this graphic the pre-development essentially is our estimation of natural loads, so these catchments naturally have pollutants such as sediments and nutrients, and not pesticides, of course. The top line is the total load and that shaded area, which looks a bit yellow on this graphic, is the load reduction. We model from 1986 and now up to 2014, and we model the long-term average load reduction. We are not trying to reduce natural loads. We are only trying to reduce the human caused—they call it anthropogenic—loads of each of these key pollutants. For example, a 50 per cent reduction in dissolved inorganic nitrogen, which is the reef plan target, is trying to reduce that human caused load by half, or under the new Queensland targets up to 80 per cent in some key regions.

The modelling really combines all the information for the paddock monitoring and modelling and the catchment monitoring and the remote sensing of the catchment indicators, and combines it up for each catchment. It breaks it down into each subcatchment, looks at its land-use groupings, looks at the current management suite, soil type, climate and many, many other factors. There is a much more complex graphic that I decided not to put in, but in our tier 2 reporting you can see more information on those. Essentially, it models each of the major 35 catchments for sediments, nutrients and pesticides, and looks at the difference between total load and human caused or anthropogenic load, and essentially what the corresponding reduction is each year as estimated by the modelling.

The results in the report card for this year: essentially these results are cumulative, so every year we add the model percentage to the previous year. To date, we have had an estimated 17 per cent reduction in dissolved inorganic nitrogen against the 50 per cent target for 2018. For particulate nitrogen and particulate phosphorous, which are 20 per cent reduction targets, we have had an estimated 11.5 and 14.5 per cent reduction to this year. For sediment, there has been an estimated 12 per cent reduction to date and for pesticides about a 30.5 per cent reduction to date. That pesticide target is now changed to a toxic load reduction. That is different to previous years. In previous years, we just used what they call a mass load target. They just added up the mass of pesticides coming through the system. This year, we have used the same approach, but we take into account the individual toxicity of each one of those pesticides. That is really a more environmentally relevant way of looking at pesticides, because some pesticides are in great mass, such as tebuthiuron. It is used in grazing but is a lower toxicity, so is not as big a threat to the reef, whereas pesticides such as diuron are more toxic, as used in cane. A small reduction in diuron can result in a larger reduction in environmental risk from pesticides. The confidence ranking for this was also a three out of five for this year.

We also graph the long-term progress for these pollutant loads. On the left-hand side of the graph is 2008-09 and you can see where we are up to date under 2013-14. Essentially, we will keep adding to this graph up until 2018. You can see Reef Plan 2009 is the shaded area on the left-hand side and Reef Plan 2013 is where we are currently at on the right-hand side. The lines along represent each of the targets. You can see that particulate phosphorous, nitrogen and sediment is a 20 per cent reduction target; pesticides is that blue line at the top, which is a 60 per cent reduction target; and dissolved inorganic nitrogen is currently the 50 per cent target line. You can see for sediments and particulate nutrients, we are not tracking too badly. However, we have quite a while to go for the dissolved inorganic nitrogen target.

Mr BENNETT: Before you go off that slide, since 2009 we have seen what would seem to be a flattening of issues. Have you done any modelling, obviously regardless of the new targets, where the targets that were set in that period would have put us at 2018, considering that we are see a flatlining and an uptake in best management practices? Has that been modelled?

Ms Henry: Yes. I probably should have mentioned, we did a bunch of scenario modelling in 2013, trying to project forwards. Under the previous water quality risk frameworks, which were developed by the Department of Agriculture, they looked at if we had 100 per cent adoption of what

was best practice in 2013 and we looked at how far we can get towards the ambitious targets, it was estimated that the sediments and pesticide targets were achievable. However, the dissolved inorganic nitrogen target remained challenging with a 34 per cent estimated reduction with full adoption of best practice at that stage. We are going to repeat that scenario modelling earlier next year with the updated agricultural industry frameworks, which are basically a step change up in terms of management. What was essentially a B class in cane nutrient management last time has moved to about a C class on the new framework. With modelling the new standard of best practice as it evolves over time, we hope to get a bit closer towards those targets with the repeated activity. The sediment one, through best practice, looked like it was achievable, the same as the pesticides.

This brings us to the marine results. This is undertaken by the Great Barrier Reef Marine Park Authority and they use satellite remote sensing and in-field monitoring of water quality, as well as in-field monitoring of corals and seagrass health.

Essentially, the remote sensed water quality looks at chlorophyll, which is an indicator of the nutrient status of the water, as well as sediments suspended within the water column, as well as seagrass abundance and reproductive health that is the seagrass seeding and repopulating itself—and the nutrient status of seagrass, as well as coral cover, the change in coral cover, macroalgal cover (which can increase with increased nutrients), and juvenile density which is an indicator of its reproductive health. The confidence rankings for these were two out of five bars for the remote sensed water quality; four out of five bars for seagrass and coral health.

The overall marine results for inshore reef health for 2013-14 is poor condition. Inshore seagrasses showed some signs of regional recovery, in particular in areas where there was reduced impacts. With the low-flow years in the Burdekin, in particular, there has been a reduction in sediment loads coming out. Essentially, the seagrasses had a bit of clear water to do some recovery in. We are seeing some good results in some of the regions, but overall not enough to change the grade.

Mr BENNETT: So even though we are seeing seagrass recovery starting to happen across the whole catchment, we still get a poor rating?

Ms Henry: This is for overall. When I get to the regional results, you will see in the Burdekin it has improved the Burdekin seagrass score.

Mr BENNETT: So overall, there are areas of recovery and some areas that are still—

Ms Henry: Regional recovery, yes, but not enough overall to change the grade. Inshore coral reefs have remained essentially in poor condition, as well.

This is the long-term trend and then I will get into each of the regions. The long-term marine condition: the Independent Science Panel has selected a couple of resilience indicators to look at long-term trends. That was another response to the Queensland Audit Office report, to put a bit more context around the annual snapshot of marine condition and look at how it is travelling over time. You can see that purple line on the screen is the coral cover change from 2007-08 onwards. You can see both coral cover and seagrass abundance had a dip in those extreme wet years and cyclone years from 2010-11 and 2011-12, with a little bit of recovery starting in 2012-13 and 2013-14. However, you can still see overall they are in that orange category there, poor condition. However, they dipped down to red in 2011-12 and 2010-11 for seagrass. Back in 2007-08, it was at the moderate level. Essentially, marine condition jumps around over time. It is quite impacted by floods and cyclones, which is why long-term trends is a more important indicator to look at than just annual snapshots.

CHAIR: Nyssa, in the areas where you have gathered no data and looking at some of the reports, there are some coral that has not been evaluated yet. Are there any moves towards covering that territory or is it not covered for some reason?

Ms Henry: Essentially it is probably more a resourcing constraint within the Great Barrier Reef Marine Park Authority. Cape York has been identified through their Marine Monitoring Program review, which was undertaken last year, as a high priority gap to address. That is why we have not had coral assessment or previously very many seagrass sites. They have added an additional, I think, four seagrass sites this year to Cape York. They have improved that area. Through the Reef Integrated Monitoring Program, which is being developed through the Reef 2050 Long-Term Sustainability Plan, which is being led by GBRMPA in conjunction with EHP, they are going to look at investment priorities to plug some of these key monitoring and reporting gaps across the region. Cape York definitely has been raised as an important area. There is some offshore coral data that the Australian Institute of Marine Science incorporates. Pulling in some of that offshore data in future years is something we want to look at, possibly expanding the reef report card to look at mid and

offshore health over time. At the moment, we are looking at the inshore area, because that is what is affected by the catchment land use side of things. Through the Great Barrier Reef Outlook Report, which they release every five years, they include the full analysis of all that data.

Mr BENNETT: I see this as a really positive graph, that practices are changing, whether we blame climatic conditions. Was anything else taken into consideration, like sewage treatment plant upgrades, urban run-off and other activities that consistently, I assume, were changing during the period of these graphs, so they also would add significant nutrients?

Ms Henry: Urban is about four per cent of the overall nutrient load.

Mr BENNETT: Only four per cent?

Ms Henry: Yes. So sewage treatment plants are actually accounted for in the catchment modelling. Each sewage treatment plant does its monitoring data. Our modellers access that data and use it to account for what is the contribution from sewage and urban areas. Even though it is very locally significant in some areas and it is more a local impact, in the whole of the GBR scale it is estimated to be about four per cent of the overall total nitrogen loading for sewage treatment plants. That is representing the major upgrades and government investment that went into—

Mr BENNETT: I assume a lot of work has been going on over a long period of time.

Ms Henry: Yes. Most of them were upgraded to tertiary treatment through previous programs.

Ms Nichols: So that pie chart at the beginning of the slides had the percentage of land uses.

Mr BENNETT: I understand that is land use, but I suppose the contribution to healthy waterways—I was just curious whether there had been some modelling that indicated practices had been improving across the whole raft, not only cane and grazing.

Ms Henry: Yes. It represents those upgrades to the sewage treatment plants that had been undertaken.

This last set of slides goes through each region with all of the results. For Wet Tropics, you can see that for sugar cane the area of best practice for nutrient management was nine per cent, 22 per cent for pesticides and 45 per cent for soil management. For grazing they were doing a little better than other regions in terms of streambank management, with 82 per cent at best practice. Do not be alarmed at the three per cent for gully management there. Gullies are not a priority for Wet Tropics. That is why there is not very much investment into gully management within Wet Tropics. This really represents the change in industry practice. There is very little change but it is a low priority so we are not terribly concerned. In the actual reef report card you will see on the left-hand side we have included the management priorities for each region so you can see what the focus is. So for Wet Tropics it is really about nutrient management in cane and pesticides as well. In horticulture for Wet Tropics we report on bananas as the dominant horticultural industry in this region. Pretty much half of the industry is at best practice for soil and nutrient management.

In terms of catchment indicators for Wet Tropics, they exceeded the ground cover target, as expected. It is a wet area. It has typically high levels of cover. Wetland loss was less than 0.1 per cent and riparian loss was about 0.2 per cent from the last reporting period—that is a four-year loss—which represents 1,060 hectares.

In terms of catchment loads, there is very good progress towards the sediment and particulate phosphorus targets, with the particulate phosphorus target having actually been met. That was a 20 per cent reduction target and they have exceeded it, at 20.5 per cent. That is really related to the very good progress in the sediment target at 13.5 per cent, because those are bound together—particulate nutrients and sediment. However, unfortunately, dissolved inorganic nitrogen shows very poor progress, at 14.5 per cent, and moderate progress for pesticides, at 28 per cent. Overall, marine condition is still poor, with seagrass and water quality being poor. However, coral is in moderate condition.

For the Burdekin region we actually include grains as another industry for this region, the priorities being sugar cane nutrient and pesticide management, in which there was very poor progress for nutrients. Grazing is the other key priority industry for this region, with sediment management. So you can see in streambank erosion there is moderate progress, at 62 per cent. However, there is poor progress towards the gully management and hillslope erosion, which is pasture management. For horticulture, again, there is moderate progress towards the nutrient targets. However, for grains, this is the one region that actually exceeded its target. Pesticide management exceeded at 91 per cent. That means that 91 per cent of the grains area within the Burdekin is at best practice already for pesticide management. That was one of the stand-out results across the report card.

Riparian and wetland loss continued. However, there was much less wetland loss than previous years, with less than a 0.01 per cent gain, so 61 hectares. Riparian was moderate progress, with a 0.3 per cent loss. The ground cover target of 70 per cent was just exceeded, at 73 per cent. However this is a whole-of-region average. When you get into the tier 3 reports we go down into each subcatchment and you can see some of those western areas of the Burdekin are relatively low cover. About 25 per cent of the area is below the target in some of those western areas of the Burdekin.

Mr BENNETT: Would you be able to give me an example of a wetland gain—how you get more wetlands monitored?

Ms Henry: That is actually through modification of a wetland type.

Mr BENNETT: Change of tenure or something?

Ms Henry: No, it is actually through bunding. Say in grazing, it might be a ponded pasture. It is conversion of an estuarine wetland to a freshwater wetland. They put small earthen berms, little check dams essentially, and that changes it from an estuarine to a freshwater. It ponds the freshwater and allows—

Mr BENNETT: Are you advocating for more dams?

Ms Henry: No, no. These are not dams; they are ponded pastures, essentially. So we are not saying it is a positive; it is just that the area has increased because it has essentially increased the area of freshwater vegetated wetlands. The wetland condition assessment is where you will see some of the impacts to the values and functions of these wetlands from these modification changes. So this is an area, through the revision of the Reef Plan targets, that the Independent Science Panel wants to look at, because they are worried that gains might be misleading as a positive result whereas really it is a qualification.

Mr BENNETT: It must be the same for riparian. Can you give me an example? I mean, we see the devastation of floods and riparian disasters. We are talking about an 8,000-hectare loss or change in the extent of riparian vegetation.

Ms Henry: Riparian is losses. That is what they are reporting on. The only gains you get through riparian is through increased revegetation works, essentially. They account for the natural variation from cyclones and what-not. They are actually looking at the trees. They use the same reporting that they do for the vegetation management clearing. They call that the SLATS report, which is, a robust methodology for accounting for vegetation changes. What our guys do is essentially select a 100-metre buffer each side of the stream—

Mr BENNETT: That is in legislation, isn't it—a 50-metre buffer?

Ms Henry: A 50-metre buffer is in the Vegetation Management Act.

Mr BENNETT: So they go out to 100 for this assessment?

Ms Henry: For this they go out to 100 because from a water quality point of view—they are different management aspects. One is about vegetation management through legislation; this is about water quality. To have enough buffer to slow the water quality movement through the riparian zone and reduce that streambank erosion, the science says you need about a 100-metre buffer.

Mr BENNETT: That makes sense. I knew that the 50 metres was there in legislation, but I was wondering where you marked that.

Ms Henry: It is consistently done each time, though, back to 100 metres, so it is comparing apples with apples for this report card. Most of the loss is due to management issues.

Mr BENNETT: Wouldn't that be a significant way forward, if we move that buffer out to align with your monitoring?

Ms Nichols: It certainly is something that the water science task force might like to consider in terms of looking at those sorts of issues. Also, the buffers that are in the legislation actually only apply to three catchments in the reef—the Burdekin, Wet Tropics and Mackay-Whitsunday. One of the other things they might want to consider is extending those to Fitzroy, Burnett-Mary and Cape York to cover the whole reef catchment.

Ms Henry: These catchment indicator results help reflect the catchment loads results. You will see that there is very good progress in Burdekin towards the particulate nitrogen, particulate phosphorus and sediment targets. There have been quite a lot of projects focusing on grazing and riparian management within the Burdekin. This is reflective of the sediment savings from streambank erosion. However, unfortunately the dissolved inorganic nitrogen and pesticides, which is the cane management issue in the Lower Burdekin, is at poor progress.

Public Briefing—Examination of the Auditor-General's report No. 20, Managing water quality in Great Barrier Reef catchments

Coming to the marine inshore condition, Burdekin has had the improvement in seagrass. You can see it has gone to green in the outer indicator for nutrient status, and the whole score has come up to moderate. So seagrass has had that regional recovery in the Burdekin. However, overall water quality and coral remain in poor condition. That brings the overall score to moderate.

Mackay-Whitsunday might be of interest to our local member. Just by way of information, we also have a range of regional report cards being rolled out. I am sure you were at the launch last week of the Mackay report card.

Mrs GILBERT: Yes.

Ms Henry: We basically share this information with the Mackay report card and unpack it into more detail. These are the whole-of-region results. Again, it is similar to other regions for cane, with very poor progress on nutrients and poor progress in soil management and pesticide management. There are the same results for grazing, essentially, although grazing is not as high a priority for this region. Essentially, as it is a wetter coastal grazing area you have high levels of ground cover. It is not generally a sediment loss issue for this region from grazing.

In terms of the catchment indicators, we have had the ground cover target exceeded, at 88 per cent. There was also a very small—less than one per cent—wetland gain, which is due to that modification of wetlands from estuarine to freshwater. And riparian loss was at 0.3 per cent. Also for this region, due to the high ground cover and low-priority grazing issues, particulate phosphorus and particulate nitrogen had very good to good progress. There was moderate progress towards dissolved inorganic nitrogen and sediment targets, and pesticides had probably the biggest reduction across the regions—same as Burnett-Mary—with a 41 per cent reduction overall.

Inshore marine condition remains in poor condition, with seagrass still being poor in the Mackay-Whitsunday region. However, coral and water quality are in moderate condition. You can see that in particular coral cover is actually in good condition off Mackay still, which is good news for our tourism folk.

For Fitzroy, the reason we do not report on sugar cane in the Fitzroy is that there is no sugar cane. That is also why we do not report on dissolved inorganic nitrogen for the Fitzroy catchment, because that is associated with cane management. So grazing and grains are really the dominant priorities for management in Fitzroy catchment, with grazing unfortunately having very poor and poor progress for each of its key indicators. However, horticulture was doing a bit better, with 60 per cent at best practice for soil. For grains, this is one region that is also doing quite well for pesticide management, with 70 per cent of the area at best practice for pesticides in grains. Unfortunately, Fitzroy had one of the worst riparian results, with a 0.7 per cent loss, which is 14,777 hectares over this four-year period. As Elisa mentioned, this is one of the regions that is not covered by the riparian protections, so it had poor progress for this target. However, wetland loss and ground cover—ground cover exceeded the target and wetland loss was about 0.1 per cent, so reduced from previous years.

I guess the small changes in management in grazing are really reflected in the catchment modelling. Unfortunately, we have very poor progress towards all of the water quality parameters for the Fitzroy region. It is quite a challenging region. There are about 4,000 graziers there, so there are a lot of people to work with. It is a large area: it is bigger than Tasmania. It is a challenging catchment to work in but, having said that, the water quality results are still, unfortunately, very poor, which I guess is reflected in the marine condition, with poor condition overall and very poor coral health. The coral in this region has really been impacted by significant bleaching events in 2008 plus the major floods, as you will recall, in 2010 and 2011 in the Fitzroy. So this poor region has been battered a little bit in terms of its coral. Likewise, that has also impacted the seagrass. So it has poor results overall.

Mr BENNETT: I remember the Auditor-General being particularly focused on monitoring and data collection. It looks to me that there are only three or four monitoring sites in the whole Fitzroy delta.

Ms Henry: Are you talking about the marine environment or the catchment?

Mr BENNETT: Well, the catchment. You were referring to the size of Tasmania. Is that a significant issue in terms of the accuracy of the data collection or the lack of monitoring?

Ms Henry: Actually, Fitzroy is quite lucky. The way the Fitzroy geography works is that all of those major subcatchment rivers all drain out through the main Fitzroy River mouth. It is a significant river. This is different from places like Mackay and the Wet Tropics, where you have multiple large rivers coming out to the coast. From a monitoring point of view it is actually quite an easy catchment to monitor, because it all comes out essentially the one mouth.

Mr BENNETT: Here you have them out around Emerald as well, though.

Ms Henry: Yes, we have a few subcatchment sites there. We used to have even more subcatchment sites, but the modellers basically go through a process with the monitoring team and look at the skill of the model in predicting. They have had really good match-ups between the monitoring and modelling for the Fitzroy catchment, which is why they have moved some of those subcatchment sites to some more of those end-of-system sites in the Wet Tropics and Mackay, because that is where the model needed further validation. There is inshore monitoring by GBRMPA as well for this region, of coral and seagrass and water quality. Of course, with additional investment—we would always like more monitoring sites.

Mr BENNETT: Yes, absolutely.

Ms Henry: The next slide is the Burnett-Mary, which might be of interest for some of our members here today. In the Burnett-Mary, as you know, the priority is really around sugarcane, grazing and horticulture; they actually have the trifecta in this region. Like the other cane regions, we have seen very poor progress in the nutrient target and moderate to poor progress in the other areas. Grazing is a similar story, with 44 per cent at best practice for stream bank, 46 per cent for pasture management and 30 per cent for gullies. Like the Fitzroy and Burdekin, gullies are high priority in this region. Horticulture is a standout result for this region at 74 per cent. So that is good progress for soil management. This data actually comes from Growcom's farm management system data. They have had a pretty good uptake with the horticulture growers in this region, which is reflected in that result. Wetland loss has continued but at a reduced rate at 0.1 per cent. Ground cover target was exceeded. Unfortunately, Burnett-Mary was one of our regions like Fitzroy that had a poor result for riparian loss, with a 0.7 per cent loss, which is actually a poor result over this last four-year period. Again, this is one of the regions not currently covered by the riparian protections.

The catchment loads is a bit of a mixed result. We have had fairly good progress in dissolved inorganic nitrogen and in particulate phosphorus and pesticides from cane. However, there has been very poor progress, in particular, in nitrogen and sediments. I guess this is a lower priority region overall in terms of risk to reef. Therefore, it has reduced investment level for improved practices in grazing. Not to make excuses, but that is just a bit of contextual information. You can see there has been slower progress in grazing in this region and, therefore, slower progress in the water quality targets for sediment and nitrogen, and this is reflected in the marine condition. However, noting that GBRMPA do not actually assess the coral in this region—the coral monitoring stops at the Fitzroy catchment—that is another gap that has been identified for future investments in monitoring evaluation. So seagrass and water quality health were in poor condition overall. You can see some of the indicators such as total suspended solids have improved, however, the nutrient status is still poor for water quality. The seagrass nutrient status is okay, but the reproduction effort—that is quite an important indicator because it looks at how it can recover in the future—was actually very poor. That is it for the regional results.

I want to thank the very large number of contributors to this program. We have about 45 different organisations and about 100 different individuals, not all full-time but in terms of contributing effort. These are the major agencies that are involved in the program. I say thanks for their support. I am happy to take any questions.

Mr BENNETT: I am very interested in the best management practice activities and the acknowledgement that we are moving towards accelerating participation in that. In the short time that you guys have had your feet under the desk in the GBR have you seen that the industry has been particularly interested in engaging in how we can take up more of a process of engagement, especially with the smart cane?

Ms Nichols: We actually have had improvement in the last six months. I do not have the latest figures with me here today but there has been—

Mr BENNETT: They were published last week, weren't they? There was a significant percentage of already—

Ms Nichols: There is a big percentage of people who are enrolled in the program. The number of accredited people is slowly growing. Last I looked, which is probably about a month ago, I think we had about 22 accredited growers. It has not been going for very long though. I have to say we have seen an increased interest with the government's announcement that it is re-enlivening a compliance program around the regulations, too. That is great, because one of the purposes of that and the ways that program is being developed is to make sure that it will not target the people who are voluntarily doing the right thing. So the more people who are accredited through the BMP programs, then the more people who will not be targeted through the compliance program.

Mr BENNETT: Does the compliance program have some assistance in education? The numeracy and literacy stuff jumps out to me for some of those things. Is that compliance component of the GBR a part of that as well?

Ms Nichols: Not so much the compliance side of things. We invest quite heavily in extension through Department of Agriculture and Fisheries. We are in close conversation with them about how to make sure the efforts are complementary, particularly in these early stages. We do not actually have boots on the ground in the compliance program yet and we probably will not until early in the new year. What we are talking about is once our compliance officers go out and if they identify programs they will have a referral process to extension advice available to assist growers to either go through the BMP program if that is what they are interested in doing or to meet their regulatory operations. They are actually identical to the BMP program in terms of the nitrogen management and pesticide management. So doing BMP meets your regulatory obligations.

CHAIR: I was just looking at a story on *Queensland Country Hour*. It said that 16 canegrowers in Queensland are accredited at the moment but the goal is to have 80 to 100 growers accredited in the program and by 2018, 380. Does that fit with what you know?

Ms Nichols: As I said, I have not looked in the last month.

CHAIR: That was last month, yes.

Ms Nichols: That is probably about right. I was probably thinking of the grazing BMP numbers; I get them mixed up. I am not a numbers person so I get them mixed up in my head. It is those. There is a little bit of a bottleneck when it comes to accreditation because it has to go through quite a formalised process. We have really high numbers registered and we have a lot of people participating. There is a huge area of land—I cannot remember what it was. Was it over a third or over a half? Anyway, it was a large area of land. I can get those figures for you if you would like some of that information reported back.

CHAIR: I guess with momentum too—it only opened in 2013—and more word of mouth—

Ms Nichols: That is it.

CHAIR:—with more results, they will see the positive result.

Ms Nichols: Canegrowers have a very active program. They had a new project manager come on several months ago now. He is very well respected and has been out and very active in trying to garner support in the regions for that as well.

CHAIR: This might be outside of your area, but I wondered if you are aware of any programs in changing the chemistry of our fertilisers and the pesticides that we use so that we do not get this level of nitrogen.

Ms Nichols: There is a lot of research going on about that. Nyssa might want to jump in here. Particularly around what they call EEFs, enhanced efficiency fertiliser—and there are two aspects to that. One is slow release. So it has a polymer coating. So it is like Osmocote that you use in your garden. It is about testing those for use in North Queensland environments. The tricky thing with fertilisers is making sure that the nutrients are available when the plant needs it, and the research and the science is going on around that. The other area is nitrogen inhibitors which slow down—nitrogen breaks down into different forms over time. A nitrogen inhibitor keeps the nitrogen at the ammonium form which is the preferred form for the plant. It stops it turning into nitrate, which is the form that leaches out. So there is a lot of work going on around that. There are a number of programs that have been invested in under the National Environment Science Programme, or NESP Program. It is an area that we are looking at jointly with the Commonwealth for future Reef Trust investment. It is also an area of extreme interest to our task force. It is really interesting there was a new product released on the market from Incitec Pivot last year called ENTEC which is a nitrogen inhibitor. Some of the trials are getting really good responses in terms of improved yields as well as the water quality run-off. We are hoping that these technological advances will actually get us to the next stage of meeting the targets. As Nyssa outlined earlier, getting everyone to best practice will not actually make it to the water quality targets necessarily. So we need technology to help us. Sugar Research Australia has also been investing in not just fertilisers, but also cane varieties because different varieties of cane will use nitrogen differently.

Mr BENNETT: You also could start to abolish them and use microbes and composting. That would be the ideal thing.

Ms Nichols: Through the Commonwealth Reef Trust—their innovation grants—they have been funding people to trial all sorts of things around those kinds of different—

Mr BENNETT: We have a lot around home. There has been a huge reduction in pesticides and fertilisers.

Ms Nichols: Soil health and conservation is really critical.

Mr BENNETT: This is a comment, not a question. If we are going to use and try to promote the importance of changing practices—and I know this is primarily talking about farming practices—I think more user friendly practices need to be considered, particularly if we think about putting it into schools and starting to have those conversations with other stakeholders who are important. I made that comment earlier. I reiterate that there could be some work done in making this more user friendly and a document that people could actually—who is the reef report card targeted at?

Ms Henry: I probably forgot to mention when I was going through that there is actually a range of communication products. This one is for the key investors within government—ministers, yourselves.

Mr BENNETT: This has been developed for the contributors or the stakeholders?

Mr POWER: Steve is suggesting that I might need a simpler version.

Mr BENNETT: You and me both.

Ms Henry: We actually also did case studies.

Mr BENNETT: So this is for your key investors and stakeholders?

Ms Henry: Yes, we also do simplified case studies. Some of the results turn into a two-pager in layman's or grade 7 English speak, which basically outputs some of the trial results. That is what the Department of Agriculture and regional bodies use in each region when they have their regional field days and workshops with growers and regional stakeholders. They do those. This one is trying to synthesise all of the information into a couple of pages. Some people actually find it easier to read the tier 2 reports because it steps it through in more detail. We are happy to take feedback. Essentially, this is looking at progress towards the target. It is really, 'Here is the target and your coloured line.' So it is the progress towards that target.

Mr BENNETT: I am just thinking about the emotion and the hysteria that sometimes can be promoted around things that are said about different areas. If we are starting to see improvement or challenges it would be nice if that could be tangibly put out into our community in a better way. It is about education, everyone going on the same journey, essentially.

Ms Nichols: Yes, and with this being my first year with the report card, that is something I have really noticed some of the reactions and I have started thinking about how we might address that better in future releases of the report card because there is a lot of info there. I particularly asked Nyssa to put in some of those coasters around regional results that show that actually there is improvement in practice; there are good things going on. However, when it all gets rolled up it gets lost in the noise. We could certainly do much better in our communication not to sugar coat the story, but also to encourage the people who have been investing heavily over the years and working really hard to say, 'Look your results are coming through. We just need to focus more on this area.' We have had a few conversations internally about that and we will keep doing that with a view to looking at how we can improve for next year's release. Every year is a different year and every year is an improvement. We are working on it.

Mrs GILBERT: Can I ask a question about cane farming? In one of your slides—and I was just trying to find which one it was—you said there was less run-off because of the trash and the green tops on the ground. In some areas they are still burning their cane. Are you helping that area to transition into greenstick harvesting so that they are not burning the cane? The science says there is a whole other range of issues with the burning off.

Ms Henry: It is quite a challenge. It is unique to the lower Burdekin area. Most other regions have been using green trash blanketing for many numbers of years. The reason the lower Burdekin does not use it is because they use mostly furrow irrigation. So they have very long cane rows and they need to get the water all the way down to the rows. So they find that the trash blanket blocks that water flow going all the way through. Having said that, there are a couple of innovative growers in that region whom we have worked with who have actually either changed to a trickle irrigation or shortened some of their rows. By changing the farm design and shortening the rows they can get the water for irrigation down to the end of the row, even with the trash blanket, by putting in high pressure valves and things like that. There are ways around it, but it would be quite a significant change for that region. Luckily, the region is relatively very flat. So we do not tend to get massive sediment run-off from cane because it is as flat as a tabletop essentially. Generally, it is a sloping area where you have

higher water velocity where you get that increased erosion. Having said that, you will see in the Burdekin tier 2 coaster results that they actually get a poor result for the trash cover. So to get an overall better score for sediment, they will need to address that over time.

Mr POWER: To turn back to the Wet Tropics results and the spawning of crown-of-thorns starfish, what can we tell from that story about whether that is more or less likely? Obviously there are very complex conditions that see a major spawning of crown-of-thorns starfish.

Ms Henry: From the risk assessment they did synthesising all the available science, the Wet Tropics is identified as a priority region for that crown-of-thorns starfish initiation zone. It just happens to be the geography. There is excess dissolved inorganic nitrogen coming out of the canelands that causes blooms in the food source for the crown-of-thorns starfish. That makes it really important to reduce that dissolved inorganic nitrogen from the Wet Tropics. However, you can see to date there has only been a 14.5 per cent decrease in dissolved inorganic nitrogen, which is a very poor result. That is the focus of the new Queensland government task force with our additional \$100 million: to look at fast-tracking some big changes in nutrient management within the canelands.

Mr POWER: With regard to that red colour in dissolved inorganic nitrogen, does the Wet Tropics continue to have higher water run-off when some of the others had drier years?

Ms Henry: Yes.

Mr POWER: So the other ones may not be reflective of a change of practice; they may be reflective of a drier year. Would that be fair to say?

Ms Henry: Not in the modelling because that is caught in the monitoring. You will see that (monitoring) change around, but in the modelling they are accounting for that climate signal. That dissolved inorganic nitrogen poor result reflects the area within the sugarcane industry at best practice for nutrient management. That is looking at things such as nitrogen surplus, which is really the biggest factor that drives that. You will recall that from the cane one. For the Wet Tropics they had very poor progress in nutrient management—in particular, a nitrogen surplus—so matching your fertiliser applied to your expected yields. Less than 9 per cent of the industry is at best practice for that.

Mr POWER: So, disappointingly, the risk is still there.

Ms Henry: It is a high risk and that is a higher priority management area for us to focus on looking at nutrient management in the Wet Tropics. That is something that the task force is looking at—what can we do to fast-track improved uptake of nutrient practice in this region.

Ms Nichols: There is some recently released science—as recent as this week—by Jon Brodie which has some additional evidence about how we can predict crown-of-thorns outbreaks to do with climactic conditions. It looks like it comes at the end of an El Nino event when we start having high run-off events as La Nina comes in. That will be a really interesting piece of science for us to study and for our task force to have a look at to see whether that can help us predict crown-of-thorns outbreaks and what we might be able to do to help manage those. Every year there is more knowledge being added.

Mr POWER: I imagine there are crown-of-thorns all the time but more when there are these extraordinary events. Is there monitoring in these reports about different zones and what the load is of crown-of-thorns per hectare or whatever it is?

Ms Nichols: A crown-of-thorns load? No, not in this report. It does go in the outlook report every five years but GBRMPA have an active program.

Mr POWER: It is more about understanding the link between dissolved inorganic nitrogen and—

Ms Nichols: It is not that straightforward. They are horrible things. They can have up to 60 million babies a year. They might initiate and the initiation zone is more linked to the land run-off issues, but once they have started they march down and keep spawning and then keep marching down the reef. So that is not necessarily related as closely to the land run-off. It is not straightforward.

Ms Henry: There is ongoing research in this area being done by the Australian Institute of Marine Science through its R and D programs looking at shoring up those links and understanding how the population dynamics change and move and spread down the coast.

Ms Nichols: With the exception of the Wet Tropics, for which we are fairly confident on the science, we could not say that if we saw a big outbreak of crown-of-thorns starfish at Great Keppel Island that that is a land use issue.

Mr POWER: So the science is not clear enough that you could have an indicator that said what the risk of major spawning—

Ms Nichols: No.

Mr BENNETT: To go back to the Auditor-General's report, it talked about the fractured information and competing people, and you just rattled off a number of agencies and departments. Could you give the committee an update on how your new GBR group is coming together to coordinate and facilitate? We all want the investment in all of these programs to be efficient and effective and for there to be less duplication. With all of that and my pet concerns about monitoring and collection of data or lack thereof, are we seeing any potential improvement with the new office that you have been in charge of?

Ms Nichols: I will say yes! This program is a really great example of how much people really do work together in a coordinated fashion, partly because Nyssa is the coordinator and gets it all working. But there is a lot of goodwill there. Inside the Queensland government we have developed an interdepartmental committee and a lot closer relationships working with people. We are developing an investment plan which we are currently consulting on within agencies for the existing \$35 million which is a forward-looking plan for how that is going to be invested rather than a backward-looking one, which is what has been done in the past. I have to say that everyone has been really cooperative in trying to work together to make sure that we are doing that.

It is the same under the Reef 2050 Long-Term Sustainability Plan. All the agencies are together talking about how we are going to implement our responsibilities under that and we will be reporting against how we are going as a government on that. On the investment side, our relationship is really tight with the Commonwealth at the moment and we are looking at how we can align our investment. The Commonwealth has the money that it has announced, which is \$140 million for Reef Trust, but it comes out in regular bursts, unlike ours which is sitting there waiting for the task force to make a decision. We are talking about how they can build around our existing investment in terms of designing programs for the future, because we already have a lot of money invested into BMP in extension.

You will see some of that stuff coming out quite publicly in the next few months. I think things are going really well. It is still early days and it is always challenging. Sometimes working with the Commonwealth is challenging because we have different flavours in government, but at an officer level we are really committed to doing that because what we want is great outcomes for the reef, and we all see that the best way to do that is to work together.

Mr BENNETT: So you will be reporting back on those success stories in due course through the minister, I suppose?

Ms Nichols: Absolutely. Under the Reef 2050 Plan we will be updating our implementation plan which also includes our successes every six months, and there will be a version released at the end of the year so you will see some of the work that has gone on under that.

Mr BENNETT: You mentioned forward thinking as opposed to backward thinking. Is there anything you can allude us to that is particularly exciting for the new office that may be coming up? Did you like that?

Ms Nichols: Exciting for the new office?

Mr BENNETT: Well, forward thinking.

Ms Nichols: For us it is very much about the investment, but we are working with the task force and I guess that is the area where the really exciting things will be coming up next year. The interim task force report will be released in December so you will see some thrilling stuff in that, I am sure. That might be an opportunity for the committee to invite the chair of the task force to give you a brief on the interim report. That might be something you might like.

CHAIR: Thank you, Elisa and Nyssa. We just keep thinking of things to get you back because you just know so much and you are so lovely. Thank you very much. That was really informative. You really broke down that report card for us. I declare the meeting closed.

Committee adjourned at 12.24 pm