Rural and Regional Affairs and Transport References Committee
Answers to questions on notice
Agriculture, Water and the Environment Portfolio

Committee: Rural and Regional Affairs and Transport References Committee

Inquiry: Regulation of farm practices that impact water quality outcomes in the Great Barrier Reef

Question No: 1

Hearing Date: 28 August 2020

Division/Agency: Department of Agriculture, Water and the Environment

Topic: Grant spending and outcomes

Hansard Page: 50

Question Date: 28 August 2020

Question Type: Spoken

Senator Green asked:

Senator GREEN: I have just a couple of questions. I've got a few different topics to cover, and I appreciate that there's a lot to get through. First of all, does the department know how much of the $44 million grant paid to the Great Barrier Reef Foundation has been spent so far?
Mr Oxley: We will have that information. I don't have it in front of me, but Mr Moore may have an up-to-date picture.
Mr Moore: I don't actually have the exact expenditure details. We received the current progress report from the foundation just recently, and we're currently going through the process of reviewing that. What I can point you to is that the foundation recently released their annual work plan for the forthcoming year, which detailed information about how they're going in terms of progress towards committing that. I know that plan did put forward about $96 million, I think it was, for this financial year on top of what they've already committed.
Mr Oxley: We will very happily take it on notice to provide an update on the level of committed funds.
Senator GREEN: Okay. I've got a series of questions on this, so just let me know if you'll have to take anything on notice. Can you tell me how much of that funding has been spent on administrative costs?
Mr Moore: I believe it's in the order of $14 million, which is roughly 10 per cent of the funding that was allocated for that, and if you amortise that over the six years, that's the expected quantum.
Senator GREEN: What outcomes have been achieved to date as a result of the spending?
Mr Moore: As I said, the foundation have so far committed—in the first there was approximately $25 million worth of projects in that first year of operation. I think last year the annual work plan forecast about $58 million worth of expenditure. And, as I said, the current forecast for this financial year is an additional $96 million. That's across the whole suite of projects under that partnership. They range from water quality investments to traditional owner grants to community citizen science grants as well as investments through monitoring and also the Reef Restoration and Adaptation science.
Senator GREEN: Okay, but that's—
Mr Oxley: I was just going to say that that's the money out the door. The question about what outcomes had been achieved for expenditure to date will be a complex answer. There will be some instances where we can give you direct evidence of the output. An example might well be engagement of traditional owners in the management of their country. But it will be more complex when it comes to the outcomes of, for example, investments in water quality. So, we can come back on notice, if you like, with a clearer picture around those things.
Senator GREEN: Yes, it would be good if you could come back on notice and maybe also let

us know what the process is for the department to understand what the outcomes are—what evaluation are you doing to determine whether there is an outcome and whether the outcome is—
Mr Moore: I can probably answer that for you now—
Senator GREEN: We don't have a lot of time, so perhaps you could take that on notice.
Mr Oxley: We'll happily take that on notice.

Answer:

The Reef Trust Partnership is two years into a six-year investment program. Projects are continuing to be developed and initiated in accordance with the Annual Work Plans. Given the nature of these projects the majority of outcomes are not anticipated to be realised or assessed until the end of the Partnership. Outcomes from the Partnership will be measured and assessed against the Monitoring and Evaluation (M&E) Plan, available at https://www.barrierreef.org/uploads/Monitoring%20and%20Evaluation%20Plan%20FINAL.pdf. In addition, water quality outcomes will be reported through the Paddock to Reef program and Reef Water Quality Report Cards.

Examples of initial progress against Partnership outcomes include:

- Three new community programs engaging 183 partners in delivering community Reef protection activities, through 25 funded grant funded projects, supported through 7,451 participant engagements in activities – this is contributing towards the Partnership's outcome that Community action is delivering more effective outcomes for the Reef and community.

- End-of-paddock pollutant load reductions of 134 tonnes of dissolved inorganic nitrogen and 6.3 kilotonnes of sediment – this is contributing towards the Partnership's outcome of helping to secure an enduring reduction in the long-term end-of-catchment pollutant loads.

- The establishment of 22 dedicated positions for Traditional Owners across the Partnership's governance structures and three employment positions for Indigenous people within the Partnership – this is contributing towards the Partnership's outcome that Traditional Owner participation in governance arrangements for Reef protection and management is improved.

Rural and Regional Affairs and Transport References Committee
Answers to questions on notice
Agriculture, Water and the Environment Portfolio

Committee:	Rural and Regional Affairs and Transport References Committee
Inquiry:	Regulation of farm practices that impact water quality outcomes in the Great Barrier Reef
Question No:	2
Hearing Date:	28 August 2020
Division/Agency:	Department of Agriculture, Water and the Environment
Topic:	Great Barrier Reef Foundation water quality projects
Hansard Page:	50
Question Date:	28 August 2020
Question Type:	Spoken

Senator Green asked:

Senator GREEN: And how does the Great Barrier Reef Foundation handle water quality? What projects are they doing on water quality at the moment?
Mr Moore: The $201 million that was allocated to water quality is broken up into a number of different components. As I said, there was an initial $19 million, I think it was, that went to projects on ground in the first year. There's $141-odd million of regional water quality investment programs, a number of which are currently out to market for people to apply for those funding rounds. There's an amount of money set aside for ongoing conservation and protection water quality investment, as well as a traditional-owner-specific water quality investment component.
Senator GREEN: With all due respect, Mr Moore, I've seen the shiny documents. I'm actually more interested in what projects they're doing right now, and maybe you can give that to us on notice.
Mr Moore: We can definitely provide that on notice.
Mr Oxley: Yes, we'll take that on notice.

Answer:

Water quality improvement projects the Great Barrier Reef Foundation have invested in are provided in **Attachment A**.

Attachments:

Attachment A – RTP Water Quality Grants Summary

Reef Trust Partnership Water Quality Grants

The table below outlines details of grants under the Water Quality program as listed on the GBRF website as of 11 September 2020, available at www.barrierreef.org/reef-trust-partnership under Water Quality section.

Reef Trust Partnership Water Quality Component: Early Investment Projects				
Project Name	*Organisation funded and lead of the project*	*Summary*	*Other partner organisations*	*Budget*
Project Bluewater	Farmacist Pty Ltd	This project reduces the runoff of pesticides into the Great Barrier Reef lagoon through the adoption of improved sugar cane farming practices. The project will directly engage over 70 growers, managing over 12,000 ha of land, in the catchments of Haughton, Pioneer, O'Connell Rivers, and Plane Creek identified as high priority in the Reef 2050 Water Quality Improvement Plan.	University of Queensland, Queensland Department of Environment and Science, TropWATER, Westwood Environmental, pesticide resellers, contractors, sugarcane growers	$1,243,500
Project Pioneer	Resource Consulting Services Australia	Project Pioneer promotes the adoption of regenerative grazing operations to increase ground cover in grazing lands and reduce sediment in runoff to the Great Barrier Reef. In addition to the improved water quality entering the waters of the Great Barrier Reef, other environmental outcomes include reduction in carbon loss from soils, increased biodiversity on-farm, particularly soil and aquatic life, and increased landscape resilience to the effects of climate change.	Maia Technologies, Stacey Wordsworth, producers, Farm Map Analytics, WWF, graziers	$2,899,500
Innovative Gully Project (Strathalbyn) Phase Three	Greening Australia	This project aims to reduce the amount of sediment discharging to the Great Barrier Reef lagoon by approximately 3,200 tons per annum through remediation of alluvial gullies by using established techniques. In addition, the project will aim to pilot the Reef Credit system and investigate how Reef Credits could be used to fund gully remediation works and ongoing maintenance requirements.	Office of the Great Barrier Reef, Griffith University, Rock-it science, graziers	$2,092,040
Cane to Creek 2.0	Sugar Research Australia	Works on farm with small cane grower groups to address nitrogen and pesticides. The program breaks down the barriers between scientists and growers, maximises peer-to-peer learning opportunities and improves understanding of the drivers of water quality impacts.	Wet Tropics Sugar Industry Partnership, Queensland Department of Agriculture and Fisheries, CANEGROWERS Smartcane BMP program, sugarcane growers	$2,226,806
Project Catalyst	Catchment Solutions Pty Ltd	Supports a network of cane farmers in the Reef catchments to improve farming practices to reduce nutrient run off to the Reef. This is achieved by focusing on soil testing, nutrient management plans and implementation of controlled traffic management systems (reducing soil compaction by confining heavy machinery to permanent traffic lanes).	The Coca Cola Foundation, WWF Australia, Bayer Australia Limited, Coca Cola South Pacific, sugarcane growers	$2,407,751

Cane Changer project 2.0	Qld Cane Growers Organisation Ltd	This behaviour change program uses co-design principals to elicit improved practises through accreditation in the SmartCane Best Management Program and other forms of commitment towards improved practices. This phase of the project will build on the existing program in the Wet Tropics and initiate new programs in Mackay, Burdekin and Southern Regions.	Evidn, sugarcane growers	$1,413,500
Reefwise Grazing of Burdekin Rangelands	NQ Dry Tropics	This project will produce dedicated and specific education, training, capacity building and incentives that will take 12 grazing landholders on a progressive journey towards techniques that proactively manage stock grazing pressure and minimise potential for declining land condition leading to reduced sediment runoff. The project will also result in a further 50 landholders using increased knowledge and skills to apply management changes to improve the quality of water discharged from their property.	Queensland Department of Agriculture and Fisheries, Contour Environmental and Agricultural Consulting, Soil land Food, Southern Cross University, Forage Labs Australia, RCS, Northern Australia Veterinary Group, Bush Agribusiness, Grazing naturally, Low Stress Stickhandling, Agricultural Information and Monitoring Services, graziers	$659,984
An Evidence Based Approach to Improving Water Quality in the Barratta Catchment	BRIA Irrigators	Farmer (cane) led project which raises awareness and drives practice change through improved fertiliser application, modifying pesticide type and quantity and improving irrigation efficiency.	Queensland Department of Agriculture and Fisheries, Farmacist, Burdekin Productivity Services Ltd, sugarcane growers	$900,520
Gully restoration, grazing	Mary River Catchment Coordinating Committee	Addresses sediment discharge to the Great Barrier Reef lagoon through gully restoration on grazing land. The project will also work with graziers to increase awareness and actively manage lands that are susceptible to erosion through the adoption of best land management practices.	Graziers	$646,500
Early Career Extension Officers	Qld Farmers' Federation	This project will increase the delivery capacity related to agronomic extension by training early career extension officers (agricultural experts) in practices relevant to addressing sediment, nitrogen and pesticide runoff. The project will involve a 12-month placement of up to eight early career extension officers.	Office of the Great Barrier Reef	$1,258,768

Reef Alliance Project, Phase 2	Qld Farmers' Federation	Supports cane farmers and graziers by using one-to-one agricultural experts (extension officers) to move 462 land holders, covering 209,750 ha, towards best practice to reduce sediment, nitrogen and pesticides.	Terrain NRM, Wet Tropics Sugar Industry Partnership, NQ Dry Tropics, Reef Catchments Ltd, Fitzroy Basin Association, Burnett Mary Regional Group, Qld Cane Growers Organisation Ltd, sugar cane growers, graziers	$3,500,000

Reef Trust Partnership Water Quality Component: Regional Program Projects (Fitzroy, Mackay-Whitsunday, and Mary)				
Regional Program Allocated Budget	Project Name	Organisation/s	Summary	On-ground projects contracted to date (contract values)
Fitzroy (program allocated budget is $19.6m)	The Fitzroy Alliance gully rehabilitation project for Reef water quality	Verterra Ecological Engineering, in partnership with Fitzroy Basin Association and Alluvium	This project is rehabilitating alluvial gullies and streambanks and supporting practice change in surrounding grazing land to deliver sediment savings in both the Fitzroy and Mackenzie catchments. The “Fitzroy Alliance” is collaborating on planning, design and on-ground project delivery for healthy land and water quality benefits in the Fitzroy catchment, and is seen as a more efficient way of achieving an enduring outcome long term.	$5,000,000
	FBA Sediment Reduction in the Fitzroy	Fitzroy Basin Association, in partnership with Alluvium, Verterra Ecological Engineering and Greening Australia and with support from Resources Consulting Service	This project is restoring streambanks, combining works of managing or excluding stock, strategic earthwork, installing infrastructure and revegetation. As part of the "Fitzroy Alliance", FBA will work collaboratively with Alluvium and Verterra on a stream reach/sub-catchment/neighbourhood catchment basis, in which works will be closely coordinated. FBA will also engage Greening Australia to deliver revegetation works and Resources Consulting Services (RCS) to support project delivery and landholder training.	$4,095,520
	Streambank and gully erosion solutions for the Fitzroy Catchment	Catchment Solutions, in partnership with Volunteers Australia, Griffith University, Neilly Group Engineering	Gully and streambank restoration project which includes stock exclusion and fencing, off-stream watering points to restore eroding stream banks and riparian vegetation. The project also aims to establish porous check dams, contour banks, diversion banks and gully and instream structures to achieve the targeted sediment reduction. Key project partners include Conservation Volunteers Australia, Griffith University and Neilly Group Engineering, with support from Grazing Best Practice.	$3,400,000
	Fitzroy Soil Conservation on Cropping Lands	Fitrzoy Basin Association, with support from Precision Cropping Technologies	Activities under this project focus on whole-of-property practice change with customised soil conservation plans developed with farmers engaged in the program. Works include integrated training, extension and on-ground components.	$1,700,000

	Mackenzie water quality program	Greening Australia, in partnership with Woorabinda Aboriginal Shire, Woorabinda Pastoral Company and Fitzroy Basin Association	This project is focused on actions to reduce sediment run-off (and associated nutrients) in the Mackenzie catchment, including improved grazing practices and targeted on-ground interventions to stabilise erosion on select properties. Work will be undertaken with Traditional Owners to build Indigenous capacity. Opportunities to create Reef Credits and additional co-benefits such as carbon storage will also be investigated.	$1,600,000
Mackay-Whitsunday (program allocated budget $22.7m)	Precision agriculture project	Farmacist	Precision agriculture project, a Point of Difference – Refining Farm Nutrient Management Strategies, is providing a pathway and a framework for enhanced economic and environmental sustainability in the sugarcane sector. The objective of the project is to fast track the delivery of essential base data and an extension program designed to have adoption of refined nutrient and chemical management to levels beyond regulations.	$2,700,000
	Project Bluewater	Farmacist	Project Bluewater 2 will build on the early learnings, momentum and success of the pilot Project Bluewater 1 by reducing pesticide loads, and will expand its footprint to cover an additional 21,450 hectares of cane land (about 165 growers) in the Plane Creek and Pioneer River catchments. This expanded proposal includes tailored pesticide management plans, equipment calibration and upgrades, end of field water sampling of blocks and demonstration trial sites, and a cooperative, interactive learning approach. Extension activities will foster reduced pesticide use and selection of lower risk pesticides.	$4,400,000
	Project Catalyst Broader Adoption Program	Catchment Solutions	Project Catalyst is improving nutrient and chemical management and supports the uptake of tested methods and farm management practices with sugarcane growers in the Mackay/Sarina region, who have not previously been active in the innovation or early adoption category. Ongoing agronomic support will also be provided to growers to facilitate continuous improvement.	$1,700,000
	LAND – a Local Area Nutrient Datahub	Liquaforce	Delivering a paradigm shift in the level of actionable insight and accessibility of key agronomic information for growers of all levels of digital maturity, resulting in significant farm productivity gains and water quality outcomes. Growers will have farm, soil, nutrient and performance data at their fingertips via the LAND Grower App, and will receive agronomic support including optimised nutrient management plans, opportunities for industry-leading dissolved inorganic nitrogen reduction and advice on sustainable farm management.	$1,200,000
	Nutrient Management Plans and Agtrix Farming software support	Mackay Area Productivity Services	Nutrient Management and Agtrix Farming support project increasing the number of growers that have adopted improved property-specific nutrient management plans which contribute to reducing dissolved inorganic nitrogen and pesticides loads. This is achieved by providing detailed one-on-one agronomic advice that can be applied and recorded practically with a real focus on improving the regions water quality.	$1,100,000

	Major Grants Project – Grower incentives for the Mackay Whitsunday Water Quality Program	Reef Catchments Ltd	A grower incentives project which supports the administration of a pool of funds to be made available for growers receiving program agronomy advice and support from delivery providers of the Mackay Whitsunday Water Quality Program (MWWQP). This program is expected to accelerate the implementation of the recommendations from the one-on-one extension and the adoption of improved management practices to increase water quality outcomes.	$2,500,000
	Cane to Creek – Mackay Whitsunday	Sugar Research Australia	Building on the early learnings and accelerating the adoption of improved nutrient and pesticide management strategies that contribute to the reduction of dissolved inorganic nitrogen and pesticides.	$2,100,000
	Mackay Irrigation Project	CANEGROWERS Mackay Ltd	Assisting growers to optimise energy consumption and water use efficiency to increase productivity, profitability and to mitigate nutrient and chemical losses with improved irrigation management strategies. This will be achieved with the introduction of real-time data from moisture and soil health probes and crop growth modelling platforms. Irrigation systems will be audited to improve energy and performance efficiencies.	$1,200,000
Mary (program allocated budget $9.4m)	Mary River Recovery project	Burnett Mary Regional Group, in partnership with Mary River Catchment Coordinating Committee and Alluvium Consulting	The Mary River Recovery program includes large scale restoration of eroding riverine areas, lower cost interventions to stabilise erosive areas and revegetation.	$9,000,000

Reef Trust Partnership Water Quality Innovation Program				
Theme	Project Name	Organisation/s	Summary	Project Value
Innovative funding and finance	Prototype to Product: N insurance for sugarcane farmers and GBR protection	CSIRO	Testing a world-first insurance product - prototype nitrogen (N) insurance - to help farmers manage the risk of reduced yields from reduced fertiliser application. The insurance product will allow farmers to mitigate the risk of having a lower return in some years as a result of applying a lesser amount of fertiliser, therefore overcoming a significant barrier to the adoption of more efficient nitrogen rates and substantial improvements in water quality outcomes.	$200,000
	Redefining and reconfiguring Reef catchment land use for better long-term outcomes	Natural Capital Economics	This project will develop a comprehensive understanding of the socio-economic benefits and costs of broad-scale, targeted land use redefinition that simultaneously improves outcomes for the GBR, economic viability of agriculture through enhanced scale and efficiency, and social resilience for communities. It will also assess how such a redefinition process could work in conjunction with other initiatives and emerging environmental product markets to 'crowd in' co-investment from a broader suite of sources.	$230,000

	Farmland to Reef Regeneration Fund	The Nature Conservancy	Underpinned by a long history of successful impact investment Kilter Rural and The Nature Conservancy (TNC) Australia are developing a detailed business case for establishing a globally significant impact investment fund – "The Farmland to Reef Regeneration Fund" for the Great Barrier Reef.	$500,000
	Great Barrier Reefinance	Cultivate Farms	Australian farms have traditionally been passed on to the next family members with family farms forming the cornerstone of the farming community and economy. However, the ability to retain and attract next-generation farmers is getting harder. The project will eliminate the biggest barrier to farm ownership for next generations (access to capital and land) by matching aspiring (next generation) farmers with those looking to retire from the land, whilst brokering improved management practises which will result in improved water quality outcomes as part of the transition arrangements. This process might include vendor financing or progressive transfer of equity.	$170,000
	Eco-Markets Australia's Reef Credit Scheme	NQ NRM Alliance	Transitioning the Reef Credit Scheme architecture from start-up phase to a fully independent governance structure administering the Scheme, Eco-Markets Australia Limited, which will be Australia's first non-government environmental markets administrator. The Reef Credit Scheme is a world-first market-based mechanism that is a tradable unit of pollution reduction that can be sold to a range of buyers such as government, corporate and philanthropic entities.	$400,000
Broad and local scale planning to support future interventions	Extracting River Bank and Gully Erosion Data from the Qld Power Grid	Griffith University	Targeting a major missing data component needed for reducing the fine sediment erosion degrading Queensland rivers and the Reef. A partnership between Griffith University and Fugro is providing unprecedented access to 620 Tb of privately-held data collected for powerline asset management spanning the GBR catchments, equivalent to 71 years of continuous Netflix streaming. Novel techniques in data handling will repurpose this big dataset for landscape analyses to measure and monitor riverbank and gully erosion. Unlocking this information will provide a technological breakthrough to significantly improve our ability to identify, quantify and prioritise erosion sites for Reef-wide water quality management.	$350,000
	Advanced hydrodynamic modelling of pile field bank stabilisation works to inform design guidelines	Alluvium	Exploring improvements to the design of pile field groynes for streambank stabilisation based on empirical data and advanced three-dimensional hydrodynamic modelling approaches. The outputs may result in a more efficient allocation of funding into streambank stabilisation and more cost-effective sediment reduction programs.	$200,000

	Assessing gully and stream bank erosion risk with LiDAR	CSIRO	Using multi-resolution and computationally efficient approaches to map and assess the erosion hazard of individual gully and stream bank features across large LiDAR terrain datasets. The project outputs will provide greater information for agencies and landholders to engage in erosion control. The outcome will be better targeted and more cost-effective water quality improvement projects.	$350,000
	Turning wetland ecological and hydrological data capture into targeted positive wetland and water quality management outcomes	Department of Environment and Science	The Queensland Herbarium is delivering a wetland capture app that will provide access to a service verifying the types of wetlands in landscapes and providing a curated package of wetland and weed species management information tailored to those wetlands.	$100,000
	Electromagnetic Induction Soil Mapping in the Russell River catchment	Jaragun Pty Ltd	Using state-of-the-art electromagnetic induction (EMI) technology combined with conventional soil survey to develop detailed soil maps required by the sugarcane industry to implement precision nutrient management for improved farm productivity and water quality to the Reef. The two-year project is a partnership between Jaragun Ecoservices and the Qld Department of Natural Resources, Mines and Energy's soils team.	$350,000
Technology transformation	INCENTIV8 - A rapid assessment visualisation tool for incentivising irrigation stewardship for Burdekin Canegrowers	James Cook University	Excess runoff due to over-irrigating threatens the health of the iconic Great Barrier Reef. Over-irrigating not only increases water quality pollutants leaving the farm, but it also costs the farmer more in water and electricity. To accelerate widespread practice change in irrigation and induce pathways for innovative ways to finance water quality improvements, a rapid assessment visualisation tool is needed to unlock the complex interactions between irrigation management, farm economics and green finance systems.	$400,000
	Development of a banana yield monitoring system and a refined input management program.	Farmacist	Precision Agriculture (PA) in the banana industry faces a significant challenge due to the inability of growers to successfully identify locations of yield variability within plantations. This project is delivering plantation yield variation maps to growers allowing them to focus on the implementation of PA technologies and practices into their farming operation.	$300,000
	Network of Seaweed Biofilters – Stage 1: Concept Design	Australian Seaweed Institute	The Australian Seaweed Institute and Central Queensland University are collaborating to develop a transformational technology for seaweed to protect the Great Barrier Reef. Through a network of seaweed biofilters between the coast and the reef, nitrogen and carbon dioxide would be captured by the seaweed and then harvested for use in products such as biofertiliser. This circular economy innovation is anticipated to provide a significant opportunity for new jobs and economic development in regional Queensland while improving water quality essential for reef health.	$350,000

	On-ground testing and modelling of the effectiveness of Enhanced Efficiency Fertilisers in Wet Tropics catchments of the Great Barrier Reef	Sugar Research Australia and CSIRO	Working with Wet Tropics sugarcane growers to test the effectiveness of Enhanced Efficiency Fertilisers (EEFs). EEFs closely match the nitrogen requirements of growing crops by releasing nitrogen over time. This ability to better match nutrient supply with crop uptake may allow growers to reduce their nitrogen inputs whilst maintaining productivity and potentially improving profitability.	$700,000
	Robust, cost-effective sensor for dissolved inorganic nitrogen	IntelliDesign	IntelliDesign is developing a cost-effective, low-maintenance nitrate sensor to monitor dissolved inorganic nitrogen (DIN) and enable changes in upstream farming management practices resulting in direct improvements in catchment water quality. DIN is associated with crown-of-thorns starfish outbreaks, algal blooms and coral bleaching; a major source of DIN is fertiliser from farms in the catchment area.	$350,000
	Modifying machinery to plant multi-species crops in the sugarcane cropping system for improved soil health and Reef water quality.	Farmacist	Incorporating multi-species crops is cost-effective and can benefit soil health and water quality, however, it is a new concept in sugarcane and limitations need to be overcome to allow adoption into the mainstream. This farmer-driven project is modifying existing equipment cost-effectively to simultaneously plant different seed sizes while undertaking existing paddock operations. This practical, affordable equipment will increase adoption of multi-species cropping and have benefits of improving water quality run-off.	$250,000
	Microwave technology - controlling weeds in sugarcane". A non-chemical and toxin free treatment method	Catchments Solutions	Introducing a non-chemical and toxin-free treatment method for the control of all weed types in the sugarcane cropping system. The project is validating and justifying the use of microwave (thermal) energy for managing weeds and weed seeds in sugarcane production to reduce herbicide use and improve the quality of water flowing to the Great Barrier Reef.	$100,000
	Reducing herbicide usage on sugarcane farms in reef catchment areas with precise robotic weed control	James Cook University	James Cook University is partnering with AutoWeed and Sugar Research Australia to create new smart weed detection and spraying systems for sugarcane growers in the Burdekin. The AutoWeed technology uses deep learning to detect and spray weeds without hitting non-target crops.	$400,000
	Trialling the Use of Drones in Riparian Restoration	Greening Australia	Trialling the use of drones in mapping, weed spraying and seed dispersal in riparian and wetland areas to help reduce the cost and increase the scale of impact for restoration projects working toward better water quality for the Reef. Riparian zones and wetlands are natural landscape buffers, filtering sediment and nutrients from water before it reaches the Great Barrier Reef, and restoring these habitats is a major part of supporting a healthy Reef.	$400,000
	Protection of the Great Barrier Reef from sedimentation run-off	Agersens Pty	In a world-first, Agersens is showing how virtual fencing technology can protect the Great Barrier Reef from damage caused by eroding gullies and streambanks. eShepherd is a new agricultural technology that allows farmers	$335,000

	using eShepherd Virtual Fencing Technology in Sensitive Riparian Areas		to establish virtual fences in challenging terrain typically unsuitable for traditional fencing. The meandering nature of waterways and the impact of floods and fires makes installing and maintaining conventional fencing costly.	
	Understanding nutrient export form remediated gully systems	Greening Australia	This innovative approach is investigating if large scale gully remediation projects that reduce significant amounts of sediment run-off are also reducing nutrient pollution, therefore enabling the greatest cuts to Reef pollution from any investment. On-ground interventions by Greening Australia to repair eroding gullies will measure the outcomes of different treatments for nutrients to help design the most cost-effective polluting cutting projects.	$400,000
	Do innovative regenerative grazing management practices improve land condition, runoff and water quality in grazed rangelands draining to the Great Barrier Reef? (above and beyond traditional Grazing Land Management approaches)	CSIRO	Evaluating if Regenerative Grazing practices improve land, soil, runoff and water quality. If the positive benefits can be quantified, this approach could be used to accelerate an improvement in water quality to the Great Barrier Reef.	$400,000

Rural and Regional Affairs and Transport References Committee
Answers to questions on notice
Agriculture, Water and the Environment Portfolio

Committee: Rural and Regional Affairs and Transport References Committee

Inquiry: Regulation of farm practices that impact water quality outcomes in the Great Barrier Reef

Question No: 3

Hearing Date: 28 August 2020

Division/Agency: Department of Agriculture, Water and the Environment

Topic: Research programs looking at water quality

Hansard Page: 51

Question Date: 28 August 2020

Question Type: Spoken

Senator Green asked:

Senator GREEN: So it's a re-announcement of old money. That's what I was trying to understand. Can you also explain to me if the $100 million from the foundation is going to projects or going to a feasibility study itself.
Mr Oxley: No, the first phase was a feasibility study. That was led by a consortium under the lead of the Australian Institute of Marine Science. It developed a business case for a reef restoration and adaptation program. The government accepted that business case. So the $100 million is actually a contribution towards a spectrum of research programs which are focused on reef resilience and recovery.
Senator GREEN: And do any of those programs look at water quality?
Mr Oxley: I will take that on notice. The principal focus is on coral reef resilience and adaptation. I don't, off the top of my head, know whether there is a stream that focuses on water quality issues. If there is, it will not be a significant component of that work.

Answer:

The focus of the Reef Restoration and Adaptation Program (RRAP) is to help the Great Barrier Reef resist, adapt to, and recover from the impacts of climate change. There is no specific investment in water quality improvement programs within RRAP. Ecological research, monitoring and modelling activities may consider water quality factors in the context of coral reef resilience.

Rural and Regional Affairs and Transport References Committee
Answers to questions on notice
Agriculture, Water and the Environment Portfolio

Committee:	Rural and Regional Affairs and Transport References Committee
Inquiry:	Regulation of farm practices that impact water quality outcomes in the Great Barrier Reef
Question No:	4
Hearing Date:	28 August 2020
Division/Agency:	Department of Agriculture, Water and the Environment
Topic:	List of research projects on the resilience of coral reefs to climate change
Hansard Page:	51
Question Date:	28 August 2020
Question Type:	Spoken

Senator Green asked:

Senator GREEN: Sure. So most of that $100 million is going to concentrate on coral resilience?
Mr Oxley: Yes. It's a Reef Restoration and Adaptation Program. It's focused on coral reefs, not on other values of the Great Barrier Reef Marine Park.
Senator GREEN: Is that resilience in relation to bleaching events or just resilience in general? How much of that $100 million is going towards fighting climate change on the reef, so to speak?
Mr Oxley: The research program that has been developed as part of the feasibility study examined well north of 100 different types of interventions that could potentially be undertaken in order to improve the resilience of coral reefs, or to aid their adaptation, to climate change. Then they had quite a comprehensive process by which the participating agencies have worked out what their priorities for investment should be, and the resources that are available are being applied according to those priorities across a whole spectrum of different lines of study, from looking at the potential to develop more-heat-resistant corals through to looking at things such as being able to apply films to the water that sort of radiate back the heat that's coming from the sun so it doesn't actually get into the water column. There are a whole range of different lines of investigation going on in between those two things.
Senator GREEN: Okay. On notice, could we get a list of those projects?
Mr Oxley: Yes. It would probably be easiest—but I'm happy to take it on notice—to point you to all the publicly available information for the project. We'll find the right medium there.

Answer:

In April 2020, the findings of the Reef Research and Adaptation Program (RRAP) concept feasibility study were publicly released, including the investment case, six recommendation reports and 13 detailed technical reports that are all available on the RRAP website (refer https://www.gbrrestoration.org/home).

The two-year RRAP feasibility study identified 43 concepts suitable for further research and development which include:

- Examining ways to collect and freeze coral larvae for use in year-round coral seeding

- seeding reefs with corals that are more resilient to heat to help coral reefs to evolve and adapt to the changing environment
- developing technologies that increase the survival rate of coral larvae and that can produce and deploy large quantities of more resilient coral larvae
- investigating methods to physically stabilise damaged reefs, after cyclone and bleaching events, to facilitate faster recovery.