A/Committee Secretary,
Innovation, Tourism Development and Environment Committee
Parliament House
George St.
Brisbane QLD 4000
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14th March 2019

Submission on the Inquiry into the Environmental Protection (Great Barrier Reef Protection Measures) and other Legislation Amendment Bill 2019

By Mrs. Patricia Julien on behalf of concerned residents of Clairview township, local graziers and Mackay recreational fishers
[redacted]

Dear Committee members,

Case Study to support the need for the Bill[1]

Since late November 2017 chronic high levels of sediments and nutrients have been entering the creeks, estuary and Great Barrier Reef waters from the new 6,000 acre Racecourse Projects Rangeview sugar cane farm in the northern section of the Styx River Basin. The farm would be one of the largest sugar cane farms in the world, and is an order of magnitude bigger than the average size of other Queensland sugar cane farms.

The office of the Great Barrier Reef reported that as of February 2019 there are 336 cane growers (9.3%) (82,695 ha) out of approximately 3,600 growers, and 73 graziers (1%) (over 841,076 ha) out of approximately 7,100 graziers accredited (in Burnett Mary, Dry Tropics and Fitzroy regions) under the BMP programs. This makes the average size of accredited sugar cane farms within the current best Management Practice's program 246 ha compared with the 2,427 ha of the Rangeview sugar cane farm.

Downstream water pollution from Rangeview sugar cane farm occurs every time there is a medium to large rainfall event. There have been around six such events since December 2017. Sediment and nutrients fill he lower portion of Clairview Creek which forms the southern border of the Rangeview property, and Middle and Cattle Creeks which are within the property, adversely impairing their aquatic values.

The creek and estuary waters are opaque during and after such events, and eutrophication has been reported by recreational fishers in Clairview Estuary.

[1] See also the attached full report.

It is a hotspot for high pollutant loads and must be targeted by regulatory reforms in the Bill to prevent further creek, estuary and Great Barrier Reef water pollution. In particular off-site rainfall runoff from this farm should be meeting the end-of-catchment anthropogenic targets for the Reef catchments and the relative priorities for water quality improvement. Before this farm was built the Styx River Basin was well within recommended guidelines. Now it is a high to very high management needs priority catchment and will not meet recommended Great Barrier Reef water quality targets by 2025 unless on-farm management and actions are changed and modernised. The Bill should be designed to achieve such an outcome.

We have informed DAF, DES and DNRM and Isaac Regional Council of the chronic pollution from this farm and provided them with the results of our water quality testing. DNRM told me that there was an Erosion and Sediment Management Plan in place for at least 2,000 acres (809 ha) of this farm for a vegetation clearing permit which expired in 2016, but obviously it is insufficient to prevent high sediment and nutrient loads off-site.

These loads are reaching creeks in and adjacent to the property and flow into the Clairview estuary and then into Great Barrier Reef waters. The sediment plumes wash back and forth at the estuary mouth then travel north along the coast. They appear to be affecting the seagrass beds of the Clairview Dugong Protection Area off Clairview township. I assisted with a seagrass survey on October 6th 2018 following a 200+mm rainfall event September 4-5th and it was very evident a massive sediment deposition event had recently smothered the seagrasses. There were small but widely scattered patches of blue green algae throughout the survey site, a sign of nitrogen pollution. A popular fishing hole that is a kilometre offshore from the mouth of the estuary no longer carries fish since the farm was built according to local recreational fishers.

The aquatic biodiversity values of the affected creeks before broadscale clearing commenced for this farm were high to very high and some of the highest for the Mackay Central Coast Bioregion. That is no longer the situation, as chronic high sediment loads wash off this farm filling the water holes in the creeks that historically served as refugia for aquatic life throughout the dry season. With subsequent high rainfall events that sediment is washed out of the creeks and into the estuary and reef waters. Then sediment-laden runoff from the next large rainfall event again fills the waterholes and the cycle is repeated.

DES informed us that the situation could only be addressed legally under Section 440 ZG of the Queensland *Environmental Protection Act 1994*, as the Styx River Basin was not declared a priority management area in the2012 Great Barrier Reef Water Quality Plan, and thus is not monitored for water quality, nor required to have a Risk Management Plan. Section 440 ZG requires off site water quality pollution which is usually investigated and prosecuted by the relevant local government regional council, in this case Isaac Regional Council.

440ZGDepositing prescribed water contaminants in waters and related matters

A person must not—

(a) unlawfully deposit a prescribed water contaminant—

(i) in waters; or

(ii) in a roadside gutter or stormwater drainage; or

(iii) at another place, and in a way, so that the contaminant could reasonably be expected to wash, blow, fall or otherwise move into waters, a roadside gutter or stormwater drainage; or

Example of a place for subparagraph (iii)—

a building site where soil may be washed into an adjacent roadside gutter

(b) unlawfully release stormwater run-off into waters, a roadside gutter or stormwater drainage that results in the build-up of earth in waters, a roadside gutter or stormwater drainage.

Maximum penalty—

(a) if the deposit or release is done wilfully—1,665 penalty units; or

(b) otherwise—600 penalty units.

Note—

See section 493A (When environmental harm or related acts are unlawful).

Their Health and Environment Officer undertook a site visit and told us that the size of the Rangeview farm was far too large for them to manage with their level of resources and expertise and that the situation required a state level multi-agency approach as there were so many types of adverse downstream impacts best managed at the state level. A multi-agency meeting was planned in Mackay in January this year but has since been cancelled with no further meetings planned as far as we know. So the situation of chronic water quality pollution from this farm continues unaddressed with at least six large rainfall events since November 2017.

Water Quality Monitoring of rainfall runoff from the Rangeview sugar cane farm

We collected water samples in runoff from the farm following a 200+mm rainfall event Sept 4-5 2018 and had them analysed by the Mackay Regional Council's water lab. Full results are attached and results for Total Suspended Solids (TSS) and Dissolved Inorganic Nitrogen are discussed below[2].

Little to no rain fell within the Clairview Creek catchment during the September 4-5th 2018 rainfall event. The rainfall event affected Cattle Creek. This explains the differences in the water quality testing results where Clairview Creek was in compliance with GBR Water Quality Objectives but Cattle Creek and a cane drain in the Cattle Creek catchment were not.

Total Suspended Solids (TSS)

Sediment loads (TSS) were 352 mg/L compared to the Event-based Water Quality Objective of 200 mg/L just upstream from where lower Cattle Creek was crossed by the Bruce Highway before it flowed into the Clairview Estuary. That is 1.76 times the TSS Water Quality objective for the Styx River Basin.

[2] See also the attached lab analysis report.

At the Rangeview sugar cane farm cane drain just upstream from the Bruce Highway where it drained under the highway and through another smaller cane field then into the Clairview Estuary the TSS load was smaller with samples at 38 and 50 mg/L.

As samples were taken in late morning some 12 hours after the rainfall began the TSS levels during the first flush of rainfall runoff from the fields would have been much higher.

The TSS from an eroding gully from the sparely vegetated riparian area to the creek at the Cattle Creek site was a massive 817,400 mg/L. This indicates that as in the Burdekin Basin sediment source studies, gully erosion may be the highest source of sediments in the Rangeview sugar farm creeks during rainfall events[3]. Water quality sampling at the time of first flush would show the extent of the differences among the sampling sites.

A wide buffer zone of vegetative cover in good condition is vital for reducing TSS to the Great Barrier reef from gully erosion sources. While there is a riparian buffer zone within the Rangeview property, in places there is little to no vegetation and access points exist along the creeks which have been bulldozed and widened.

There should also be enough detention ponds and end-of-catchment constructed wetlands within the farm site to reduce off-site TSS and DIN loads to minimal levels within the GBR Water Quality Objectives guidelines.

Dissolved Inorganic Nitrogen

DIN from the cane drain site at the time of sampling was 2.64 and 2.66 mg/L compared to the Event-based Water Quality Objective of 0.3 mg/L or 8.8-8.9 times the objective for the Styx River Basin. *That would make the DIN levels some of the highest ever recorded from a sugar cane farm in the Great Barrier Reef catchments*. As biodunder as well as fertiliser was being placed on the fields to provide nutrients as well as water for the sugar cane crop it could have contributed to the extremely high recorded DIN levels in the sampled cane drain.

In the Cattle Creek sampling site near the Bruce Highway DIN levels were 0.96 mg/L some 3.2 times the Water Quality Objective. By comparison DIN levels in Clairview Creek were 0.03 mg/L

Biofuels Feed stock Supply

Our information is that this farm will supply waste materials from the sugar cane crop for a research program to see if those materials meet international requirements as a biofuels feedstock. As this farm is a chronic source of downstream sediment and nutrient pollution it would not meet the RSB

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3 **Grazing impacts on gully dynamics indicate approaches for gully erosion control in northeast Australia** Scott N. Wilkinson and Anne E. Kinsey-Henderson , Aaron A. Hawdon, Peter B. Hairsine, Rebecca Bartley.,Brett Baker First published: 05 January 2018 **https://doi.org/10.1002/esp.4339** *Earth Surface Processes and Landforms* **Volume43, Issue8,** 30 June 2018, Pages 1711-1725

requirements for international sustainability certification for a sugar cane farm operation producing raw materials for biofuels.

As far as we know this farm is not a participant in the voluntary Great Barrier Reef Best Management Practice program designed to reduce sediment and nutrient loads in rainfall runoff from sugar cane farms. Biodunder is being applied generously as a nutrient and water source yet there are apparently no on site detention ponds to capture the first flush of rainfall runoff which usually contains the highest sediment loads. Nor are there constructed wetlands downstream to filter the sediment and nutrient loads to improve water quality. As a consequence eutrophication and a loss of biodiversity in the affected estuary are being reported to us by local residents and recreational fishers.

As a chronic source of downstream sediment and nutrient pollution it also does not appear to meet the requirements for international sustainability RSB certification for a sugar cane farm operation producing raw materials for biofuels[4]. The Queensland government via DES has adopted this certification system but to date it has not apparently required compliance by this farm's operators. The need for appropriate sustainability certification could be required in the Bill.

The proposed Bill amendments must be able to ensure such operations can be in compliance with the objectives of the QLD *Environmental Protection Act*. This is especially so if many more very large scale sugar cane farms to supply a biofuels industry are established within the coastal Great Barrier Reef catchments

Our submission reviewing the Bill is done with this farm in mind. I presented the situation to the Mackay LMAC on the advice of GBRMPA and they are considering a letter of support that can be sent to authorities.

The Bill

The amendment Bill supports strengthened Reef protection regulations and in summary:

- Sets nutrient and sediment pollution load limits for the Reef catchments based on the end-of-catchment water quality targets in the Reef 2050 Water Quality Improvement Plan.
- Improves regulated minimum practice standards for sugarcane and establishes standards for bananas, horticulture, grains and grazing to be staged over one to three years, depending on the commodity, region and risk to water quality.
- Requires advisers (e.g. agronomists and fertiliser sellers) when providing 'tailored advice' about regulated agricultural activities to make sure that it is not false or misleading, and keep, and produce records of the advice provided, upon request.
- Requires farmers and graziers to keep fertiliser, chemical and soil condition records.
- Removes the requirement for Environmental Risk Management Plans for cane growers and graziers, replacing these with regulated minimum standards.
- Recognises growers or graziers who are accredited under a recognised Best Management Practice program (or like program) as compliant with the regulated minimum standards.
- Puts in place measures to ensure no net decline in water quality from new development by:
    - Requiring new cropping activities (cane, bananas, horticulture and grains) to meet higher standards through an environmental authority (permit) based on the water quality risk of the activity.

[4] Guide to RSB Certification www.rsb.org The Roundtable on Sustainable Biomaterials (**RSB**) is a global, multi-stakeholder independent organisation that drives the development of a new world bioeconomy through sustainability solutions, **certification**, and collaborative partnerships.

- Requiring new industrial activities to meet a 'no net decline' in Reef water quality standard for additional nutrient and sediment loads through the design of their operation or provide an offset under the existing point source water quality offsets policy.

The Bill also makes provisions for the Minister to request data from the agricultural sector and to establish a regulated water quality offsets scheme in the future.

Comments on the Bill

Current voluntary programs to reduce sediment and nutrient pollution in rainfall runoff to the Great Barrier Reef from agricultural activities in adjacent river catchments have not been enough to make significant progress to reaching clean water targets. The problems in relying on a voluntary uptake program are demonstrated by the example of the Racecourse Projects Rangeview sugar cane farm.

Despite significant investment and support from a multi-national agricultural company the operators of this farm are not a part of the voluntary programs to protect water quality in the creeks and estuary that flow into adjacent Great Barrier Reef waters.

The Reef Water Quality Science Taskforce said "Transformational change is needed over the next 5-10 years if the targets have any chance of being achieved." The Taskforce recommended new and improved regulations as a key part of these necessary changes.

This farm may be one of the first of many very large scale sugar cane farms of 6,000 acres (2,427 ha)or more within Great Barrier Reef river catchments to supply feedstock to the international biofuels market. As such this lack of participation in the existing voluntary uptake programs to protect Reef water quality demonstrates the urgent need for stronger regulations to protect water quality and other Outstanding Universal Values (OUVs) of the Great Barrier Reef.

Millions of dollars have been spent over the last decade to assist many farmers to voluntarily capture sediments and nutrients in rainfall runoff and recycle and re-use them on-site, thus preventing off site high pollution levels as well as raising crop profitability. But this investment is counter-productive and a waste of taxpayer money if most current and new farmers continue with outdated polluting practices, and do not participate in the voluntary uptake programs. Unfortunately this is the case, hence the need for this Bill.

It may be that some farmers lack the funds to make necessary changes and that not enough federal and state funds have been made available via matching grants to assist a higher rate of voluntary uptake. But we note that the new massive Racecourse Projects Rangeview sugar cane farm was very well financed, so the low voluntary uptake rate of modern management practices to prevent or minimize pollution of Reef catchment rivers, estuaries and GBR waters is more than a matter of sufficient financial subsidies.

We also note that this farm was located outside of the priority catchments for management of reef water quality, thus avoiding state requirements for high risk operations in spite of being a huge farm very likely to produce chronic pollution offsite.

Because the very slow rate of uptake of voluntary measures on existing farms and the fact that the scale of new agricultural, mining and urban areas within the GBR catchments is now much greater than in the past, changes to the QLD *Environmental Protection Act* that require mandatory measures in all Great Barrier Reef catchments now appear necessary to prevent off-site pollution.

We strongly support the main elements of the Bill:

- Catchment pollution targets that will give the Reef clean water.
- Ability to regulate all industries, all agriculture sectors and all catchments - the laws should apply to everyone so that progress can be made as rapidly and as equitably as possible.
- Industry standards as an alternative means of compliance so farmers can choose their own pathway to improved practices - but these standards must be genuinely 'best practice' in terms of Reef water quality, rather than minimum standards or business as usual.
- The ability to set minimum standards which will ensure significant cuts to water pollution, including the full Six Easy Steps for cane farming, and all grazing land in C and D class restored to good condition (B class or better).
- The ability to collect essential data that can drive productivity improvements but also ensure full regulatory compliance.
- New developments to not increase pollution, so the investments and efforts made to cut pollution from existing land and water users will not be wasted.

There is a need to define "new" e.g. would the Rangeview sugar cane farm be defined as new as 2018 was the first sugar crop year? How will large "out of compliance" sugar cane farms be regulated under the Bill?

Key gaps in the new laws that must be addressed:

- The Bill does not address activities in high risk areas such as riparian zones, erodible soils, coastal wetlands and 'leaky' cropping land – the Reef water quality targets cannot be reached if these areas' issues are not covered. The state claims that re-invigorated vegetation management laws provide enhanced protection measures for riparian and natural wetlands in all Reef catchments. But in many cases extensive clearing of riparian vegetation occurred in the past and as recently as under the Newman government. Good quality riparian vegetation needs to be restored to within as least a 50m buffer zone to minimise or prevent gully erosion which has been identified as a major source of eroded sediments to streams in the Burdekin River catchment. This gully formation and erosion was evident when we conducted water sampling in Cattle Creek following 200+mm of rainfall September 4-5th 2018 (See also our water quality testing section in this submission on page 4).
- The Bill's **minimum practice standards** will include acceptance of alternative practices for ensuring risks to water quality from sediment loss are managed. This measure is to allow for harvesting and selling of cane trash should it be needed to provide feedstock for a biofuels industry in the GBR catchments. As trash blanketing of cane farms is a major method for reducing high sediment loads in rainfall runoff there needs to be more explanation by the state on exactly what these alternative practices will be and how effective they would be in preventing pollution reduction offsite of these farms.
- It is proposed in the Bill that the current sugar cane minimum practice standards in the ***Environmental Protection Act 1994***, with some minor modifications to the prescribed nutrient application methodology, will apply immediately in the already regulated Wet Tropics, Burdekin and Mackay Whitsunday regions, with additional soil and erosion control requirements. This would exclude the Styx River Basin which is part of the Fitzroy River Basin and is a GBR catchment located directly next to Clairview Estuary which flows into Reef waters. Historically the Styx was not a source of sediment and nutrient pollution from sugar cane farming but now it is and at major concentrations. This basin as a pollution hotspot must be included immediately and required to meet nutrient application methodologies and additional soil and erosion control requirements to stop the current ongoing pollution.
- Ensuring that sea ports are covered by this Bill as they can and do contribute to pollution of GBR waters via surface and groundwater flow paths.

- New agricultural developments classed as high-risk activities (>30ha) will require a land-based water quality risk assessment under the Bill. Rangeview sugar cane farm is certainly high risk being 6,000 acres (2,427 ha) and lacking sufficient measures to prevent rainfall runoff pollution.

  But broad scale vegetation clearing and planting of sugar cane began in December 2017 so is it classed as "new". It currently lacks a risk management plan or viable Sediment and Erosion Management Plan, is not participating in a voluntary Best Management Practice for sugar cane program, and is not classed as an Environmentally Relevant Activity because it is not within a high priority catchment for GBR water quality monitoring, mainly because intensive large scale farming was not the state's intention for the Styx River Basin. The intent was grazing and native forestry which did not produce high pollution levels.

  So this situation is obviously a test case for the ability of this Bill to effectively address the obvious need for a water quality risk assessment and improved water quality regulation for this farm.

  Will an Environmental Authority be required and under what conditions to ensure GBR protection? This farm could provide an ideal site in which to test the ability of the Bill's requirements for this farm to meet current catchment load limits as it is the only farm within the northern Styx River Basin with Middle and Cattle Creek draining through it directly into the GBR waters via Clairview Estuary. Other properties through which Clairview Creek runs are grazing properties which have very low impacts on water quality judging by the creek's high aquatic biodiversity values before the establishment of the Rangeview sugar cane farm.

  So any pollution identified in end of catchment monitoring at the entrances to the Clairview estuary would reflect pollution from the Rangeview sugar cane farm, as well as the impacts of measures to reduce water quality pollution from the farm.
- Rainfall can be very variable within each GBR catchment. There needs to be adequate rainfall monitoring within each catchment including rainfall intensity and duration to inform those monitoring and modeling end of catchment water quality. There is no BOM weather station within the Styx River Basin.
- Requiring that sufficient funding be provided as frequently as needed, to cover necessary water quality monitoring for all GBR catchments, and research funding to be able to trace the pollutants back to their sources other than relying on the records of local and regional fertilizer producers.
- Requiring that sufficient funding is provided for prosecution of polluters when other methods to control pollution have failed.
- Requiring compliance with international environmental sustainability certification standards for each sector producer. (See the information on RSB certification on p. 5 of this submission)
- Fertilizers may be obtained from out of state providers and this may be a way for farmers to fully or partially circumnavigate reporting requirements. How can the Bill handle out of state fertilizer providers?
- Requiring that the amounts, timing and location of biodunder applications on large farms be monitored and reported, in addition to rainfall and rainfall intensity monitoring
- The state now employs satellite monitoring to detect water pollution plumes but this can fail when cloud cover is extensive, as it usually is after major rainfall events. What other methods employing new technologies, such as drones, could be employed to detect major pollution events as they occur or soon after they occur?
- How will irrigation timing, location and water volumes applied to crops be monitored and reported?
- There are many farm operations where farmers spread their economic risk by running cattle feedlots as well as growing sugar cane and/or other crops on their properties. These are

increasing in size and number within the GBR catchments. Large cattle feedlots used to be banned from the GBR catchments. How will the regulations proposed in the Bill deal with cumulative impacts from such integrated operations which can all produce polluted runoff?

- Provisions for existing farmers genuinely under financial hardship being able to access funds and other assistance to implement needed mandatory changes e.g. long-term very low interest loans
- Provisions for buying out farmers who are unable to comply with mandatory regulations
- If offsets are to be accepted where is the incentive for agriculture, industry and urban polluters to develop new less polluting technologies or other mechanisms to reduce pollution levels?
- Where water quality including point source water quality offsets are considered the state should demonstrate clearly to the public that they will be viable i.e. bring a net environmental benefit. Offsets should also be located within an affected catchment so that any benefits accrue locally. Reports should periodically be available to the public to prove their viability as an option that will protect the Reef from water pollution.
- Requiring that QGLOBE2 or other state records be reviewed as to compatibility with the GBR Reef Water Quality requirements e.g. 2,000 acres of the Rangeview sugar cane farm is mapped as suitable for irrigated crops yet under the Great Barrier Reef water quality guidelines irrigation is not classified as suitable in the Styx River catchment.
- Require regular reviews of the new regulations to ensure they are meeting the state's expectation that they are "providing the step change required to achieve the steep reductions in pollutant loads needed to improve water quality". Build in flexibility so there can be timely changes to remove regulations that do not work and replace them with regulations or other options that do, and introduce new technologies, processes and support to prevent/minimize pollution.

For the Bill to be effective it will need to be backed up by: regulations which provide the necessary standards and implementation details; and resources to ensure compliance with the law.

We urge the Committee to support this important Bill to help safeguard the future of our Great Barrier Reef and to recommend improvements to ensure the achievement of the 2025 clean water targets.

Sincerely,
Mrs. Patricia Julien

Attachments:

1. Report on chronic water pollution of Great Barrier Reef waters from the Rangeview sugar cane farm.
2. Water quality testing results of runoff from Rangeview sugar cane farm.

Mackay REGIONAL COUNCIL
WATER & WASTE SERVICES

SCIENTIFIC & ANALYTICAL SERVICES
WATER & WASTE LABORATORIES
NATA Accredited Laboratory 17048
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ABN: 56 240 712 069

ANALYTICAL REPORT

Date: 24/09/18

Laboratory Invoice No: Internal Req

Batch & Report No: 18/2293
Revision No.: 01
This report supersedes any previous revisions

Client: Cash Accounts
Attention: Customer Service Supervisor

Client Reference: Compliance Check

Sample Date: 5/09/2018
Sampled By: Patricia Julien
Sampling Method: Grab Sample
Sample Matrix: Aqueous
No. of Samples Received: 6
Date Sample(s) Received: 6/09/18

Report Comments:

1. Analysis performed according to AS, and APHA Standard Methods, and NATA approved in-house methods, except where stated otherwise.
2. cfu/100 mL = colony forming units per 100mL, NA = Not Analysed/Not Required. ^ = Analysis not covered by our scope of NATA accreditation

* = Result is derived from calculation. # = Client supplied data.

3. This report is not to be reproduced except in full.
4. The results below refer only to the sample tested, and not the batches from which they were drawn.
5. Samples submitted for metals have been analysed as soluble metals except where stated otherwise.

Sample received outside the recommended holding times.
Analysis has been continued regardless of sample integrity issues.

Field Observations (if applicable):

Signatories

Kimberly Gyles B.Biomed.Sc.
Laboratory Scientist

NATA
ACCREDITED FOR
TECHNICAL
COMPETENCE

Accredited for compliance with ISO/IEC 17025 - Testing

Internal Req **18/2293**

	Units	Clairview Creek - Causeway	Cattle Creek - Bruce Highway	Canefarm drain	Method
Sampling Date		5/9/18	5/9/18	5/9/18	
Sample Time		11:00	11:30	11:45	
Conductivity	µS/cm	819	379	139	APHA 2510 B
Chemical Oxygen Demand (COD)	mg/L	15	48	76	APHA 5220 D
Total Suspended Solids	mg/L	2	352	38	APHA 2540 D
Total Kjeldahl Nitrogen-N sol	mg/L	0.8	0.7	1.9	In-house MWSAS_C0086
NOx-N	mg/L	[NA]	0.9	2.4	In-house MWSAS_C0082
NOx-N (LR)	mg/L	<0.01	[NA]	[NA]	In-house MWSAS_C0082
Ammonia - N Low Range	mg/L	0.02	0.06	0.24	In-house MWSAS_C0085
Dissolved Inorganic Nitrogen	mg/L	0.03	0.96	2.64	

	Units	DNRME - Cattle Creek - Bruce Highway	DNRME - sediment - Cattle Creek - Bruce Highway	DNRME - Canefarm drain	Method
Sampling Date		5/9/18	5/9/18	5/9/18	
Sample Time		11:30	11:30	11:45	
Conductivity	µS/cm	353	3,200	142	APHA 2510 B
Chemical Oxygen Demand (COD)	mg/L	42	matrix interference	64	APHA 5220 D
Total Suspended Solids	mg/L	340	817,400	50	APHA 2540 D
Total Kjeldahl Nitrogen-N sol	mg/L	0.6	insufficient sample	2.6	In-house MWSAS_C0086
NOx-N	mg/L	0.9	insufficient sample	2.5	In-house MWSAS_C0082
NOx-N (LR)	mg/L	[NA]	[NA]	[NA]	In-house MWSAS_C0082
Ammonia - N Low Range	mg/L	0.02	insufficient sample	0.14	In-house MWSAS_C0085
Dissolved Inorganic Nitrogen	mg/L	0.95	insufficient sample	2.66	

Scientific & Analytical Services
Water & Waste Laboratories, Nebo Rd WTP
Nebo Road, Mackay, Qld 4740

Is growing sugar cane in Broadsound to produce biofuels a viable option if it adversely impacts fishing, tourism and Great Barrier Reef water quality? A case study on Racecourse Projects Sugar Cane Farm west and southwest of Clairview in the northern Styx River Basin showing the urgent need to address and manage adverse impacts.

15th March 2019

Plans for large scale sugar cane farms to produce biofuels in the Great Barrier Reef catchments including Broadsound

The current property land manager for the Rangeview Racecourse Projects 6,000 acres (2,428 ha or 24.28 square km) sugar cane property, the largest in Australia and possibly the world, (Fig. 1) has informed the local community that there are plans for much more broadscale clearing in the Broadsound region to plant sugar cane despite its unsuitability as a crop in this region.

Fig. 1 Part of the broadscale clearing (Nov 2017 to present) to plant sugar cane in the Rangeview Racecourse Projects Farm in the northern Styx River Basin. Clairview estuary is in the background.

These crops are to be used as feedstock for a new biofuels industry to be developed along the Queensland coast, provided current research by the company Mercurius shows it can be improved to produce biofuel products for jet fuels and as a diesel replacement. The Queensland government has signed a MOU with the U.S. Navy that states the navy would be interested in purchasing such fuels if navy specifications can be met.

But such an industry will be of little benefit to the state or the commonwealth if there is no will or plan to address its environmental and economic adverse impacts, especially on the Great Barrier Reef.

On November 23rd 2018 we learned there was a recent Parliamentary meeting in Brisbane attended by the current Queensland Labor government officials and staff from relevant government

departments plus GBRMPA. They discussed the ongoing water pollution issue from the Rangeview Racecourse Projects property to the Great Barrier Reef.

They decided against any further actions because of the involvement of the multi-national Cargill company, (a partner with Mackay Sugar in Racecourse Project Pty Ltd), and the investment it brings to the state. But by making this decision it appears they have not considered the economic and environmental costs of adverse impacts and their legal obligations to protect the Great Barrier Reef's water quality.

By deciding to undertake no further actions to prevent pollution of Matters of National Environmental Significance either on land or within the GBR the state also places the commonwealth government in violation of its international agreements to protect the GBR and other matters of international significance. It also raises the question of why is the state doing this when both the commonwealth government and the state are pouring hundreds of millions of dollars to protect GBR Water Quality?

Given good management and planning a biofuels industry in Queensland could be a saviour for the ailing sugar industry but not unless the public is convinced, it can be proven that adverse impacts can be avoided and the industry itself can ensure no off property pollution. That is not the case at present and is a challenge the commonwealth government must own given the potential size of the impacts on the Great Barrier Reef and other matters of national environmental significance.

Case Study: Rangeview Racecourse Projects

Unusual high sediment-laden flow was noticed in Broad Sound Central QLD. In Clairview Creek 20th November 2017 following commencement of broadscale clearing of 2,000 acres of remaining native woodlands using chains between DC6 caterpillar tractors to grow sugar cane in the northern Styx River Basin i.e. Racecourse Projects Rangeview sugar cane farm (outlined in red in Fig. 2).

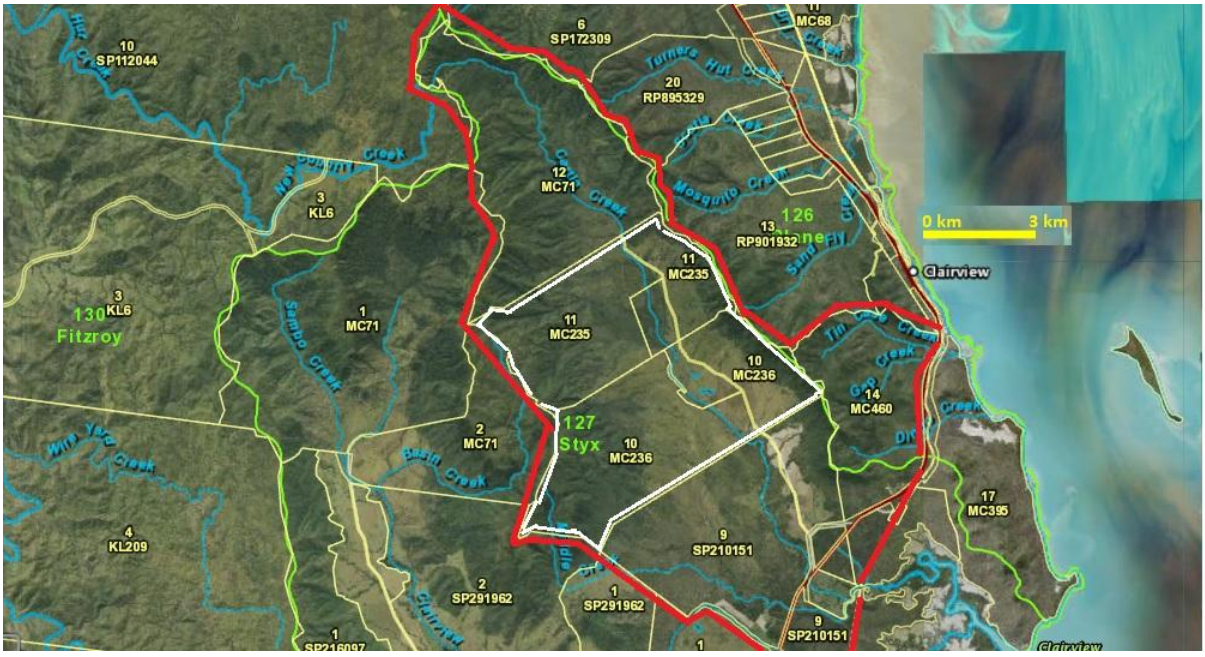

Fig. 2 Rangeview Racecourse Projects property outlined in red near Clairview township.

The area outlined in white included remnant woodlands partially cleared between 2014-2016 under a DNRME operational plan approval.

The land is zoned Rural by Isaac Regional Council. The Queensland government classed it as suitable only for grazing and native woodland forestry.

The Queensland government classed it as suitable only for grazing and native woodland forestry. Former attempts to grow sugar cane had been unsuccessful partly due to growing season rainfall rarely being in the optimum crop yield range (Fig. 3). There have been only 11 years within the optimum rainfall range for a good yield crop in 147 years of records.

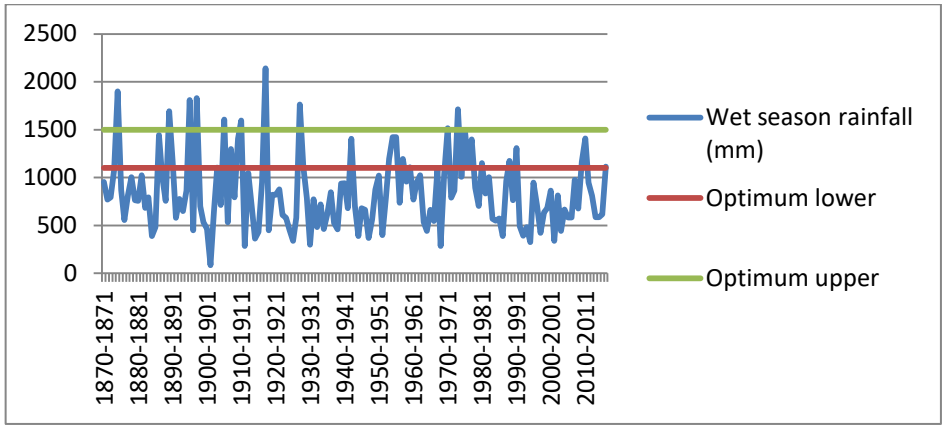

Fig. 3 Optimum rainfall (mm) range for growing sugar cane in the northern Styx River Basin

The property, Rangeview Station, was purchased November 6th 2017 by Racecourse Projects Pty Ltd which is a partnership between Mackay Sugar (12.7%) and Black River (BRI). BRI is a subsidiary of the multi-national agricultural company Cargill.

A 2018 Wetland Info map from GLOBE2 shows that the burgundy coloured areas within the property are designated for irrigated cropland (Fig. 4). This contradicts the 2012 *Great Barrier Reef Water Quality Objectives for the Styx River Basin* which classes it as a GBR catchment not suited for irrigation[1].

Fig. 4 Irrigated cropland areas in the property not suitable for irrigation under

[1] https://www.ehp.qld.gov.au/wetlandmaps/?bbox=149,-22,149.5,-22.5

GBR Water Quality Objectives for the Styx River Basin

In 2014 DNRME had approved two operational work applications for clearing of over 800ha of remaining remnant vegetation by 2016. Clearing approval conditions included that only sorghum could be grown and there was to be an approved DNRME Erosion and Sediment Management Plan and 50m riparian buffer zones along the creeks in and adjacent to the property (now called Rangeview Racecourse Projects) which is 13km long and up to 7km wide.

That clearing involved pushing over or cutting down trees at trunk height that left in place the roots. That would have reduced any erosion and sediment flow to the creeks. One crop of sorghum was grown by 2016. It could not be mechanically harvested because of the presence of the tree trunks so cattle were brought in to feed on the crop by the former land owner. No more sorghum was grown.

Broadscale clearing commenced in late November 2017 in the section of the Racecourse Projects Property within the Clairview Creek catchment in the northeastern section of the Styx River basin and continued through the Middle Creek and Cattle Creek catchments until finished in August 2018.

Practically all the lowlands save the riparian areas (often less than 50m in width and bare or sparse in patches) were planted to sugar cane. There were no state requirements for an Environmental Impacts Assessment, approved Erosion and Sediment Management Plan, or a Best Management Practice Plan for growing sugar cane. There were no requirements to protect threatened species during the clearing despite the known presence of such species as the koala and likely presence of the greater glider, with both species listed as vulnerable under the EPBC Act. We know that koalas were killed as a result.

There were no sediment detention basins to capture part of any eroded sediments containing fertilizers, pesticides and herbicides nor are there any constructed wetlands at the end of the creek catchments to filter and treat such sediment laden runoff.

During the broadscale clearing (Nov 2017 to present) DC6 caterpillars widened the access tracks across the creeks (Fig. 5) in possibly up to eleven places. The previous width was for that of more narrow land cruiser access. No erosion and sediment controls were put in place in the creeks. Fish barriers were thus created and DAF Compliance is now checking into these. DNRME is consulting with the land manager to make changes to meet Queensland *Water Act* requirements.

Fig. 5 Widened DC6 access tracks across GBR creeks on the property

The widened access tracks and areas along the creeks with little or no riparian vegetation are acting as major sediment sources to the creeks after heavy rainfall events (Fig. 6) e.g. >100mm of which there have been four between Nov 2017 and October 2018.

Fig. 6 Widening of these access points for DC6 Caterpillar tractor access has resulted in higher sediment loads in stormflow runoff to the creeks after rainfall. Bruce Highway and Racecourse property Feb 2018.

A waterhole about 300-500 meters from the Bruce Highway upstream in Cattle Creek has been deepened (Nov 2017) and is being used as a water supply source to irrigate the sugar cane (Fig. 7).

Fig. 7 Deepened waterhole in Cattle Creek

Water authorities in Rockhampton have been contacted and it appears there may be no water permit to excavate the former waterhole and use the water for irrigation. That is being investigated by DNRME Mackay under the *Water Act*. The land manager claims the deepened water hole was pre-existing but our information is that it was not as it was deepened in Nov 2017 after the property was bought by Racecourse Projects. The excavated materials sit on the edge of the waterhole and act as a major source of eroded sediments to Cattle Creek during higher rainfall events.

Rainfall events and sediment flows to the creeks, estuary and the Reef

Images taken before and after the broad scale clearing on the Rangeview Racecourse Projects property show the dramatic changes in sediment-levels in Clairview Creek following similar rainfall runoff amounts (Fig. 8). Flows over the causeway at Clairview Creek, just upstream from the Bruce Highway are clear on 14th April 2008. After broadscale clearing (Nov 2017 to present) and heavy rainfall on the 14th October they are full of sediment. Sediment-laden flows reached Clairview estuary and tides continued to wash it in and out of the estuary through November 20th 2018 before it dissipated.

Fig. 8 Pre and post broad scale vegetation clearing images of Clairview Creek flows. Circled rock shows flows are at the same level reflecting similar rainfall runoff amounts.

There are now large sediment-laden flows from Cattle and Middle Creeks in the property and from Clairview Creek (where it adjoins the property) to Clairview estuary following large rainfall events:

- Nov 20th 2017 in Clairview Creek. Sediment-laden creeks reported. (Fig.9)

Fig.9 Aerial image taken 20th November of sediment laden flow in Clairview Creek downstream and along Lot 9 SP210151 section of Rangeview Racecourse Projects sugar cane farm. Looking west across the Bruce Highway about a kilometre from the estuary along Clairview Creek. This creek usually runs clear. Location: Latitude -22.189142 Longitude 149.5000

- Late Feb 2018 across Cattle, Middle and Clairview Creeks >200mm rainfall event producing high sediment flows to the estuary and the Great Barrier Reef World Heritage Area. Sediment flows from this estuary flow north to the Clairview Dugong Protection Area and Avoid island's Turtle Nesting Sanctuary and the significant sea grass bed feeding grounds for these EPBC-listed species , and south to the Broadsound nationally listed wetland (Figs. 10 (a) (b) (c)).

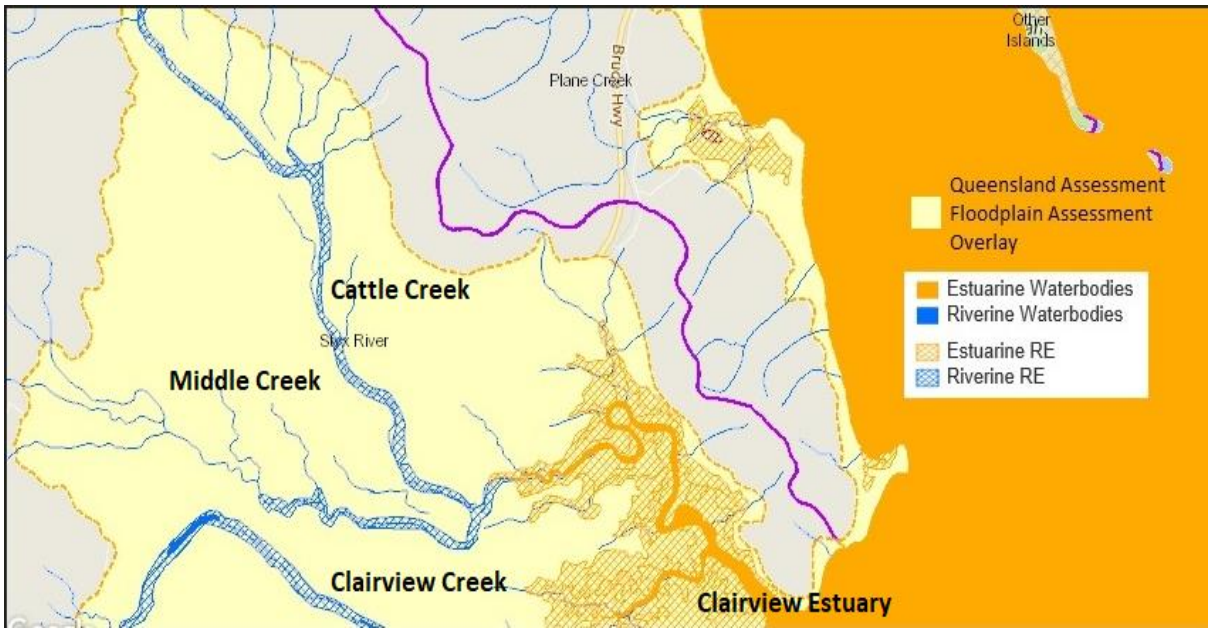

Fig. 10(a) Property's creeks in relation to Clairview estuary and the Great Barrier Reef.

Fig.10(b) Clairview estuary in relation to property's creeks. Note estuary sediments spread north to Clairview township and Dugong Protection Area and south to Saint Lawrence and into Great Barrier Reef waters along the shoreline and beyond.

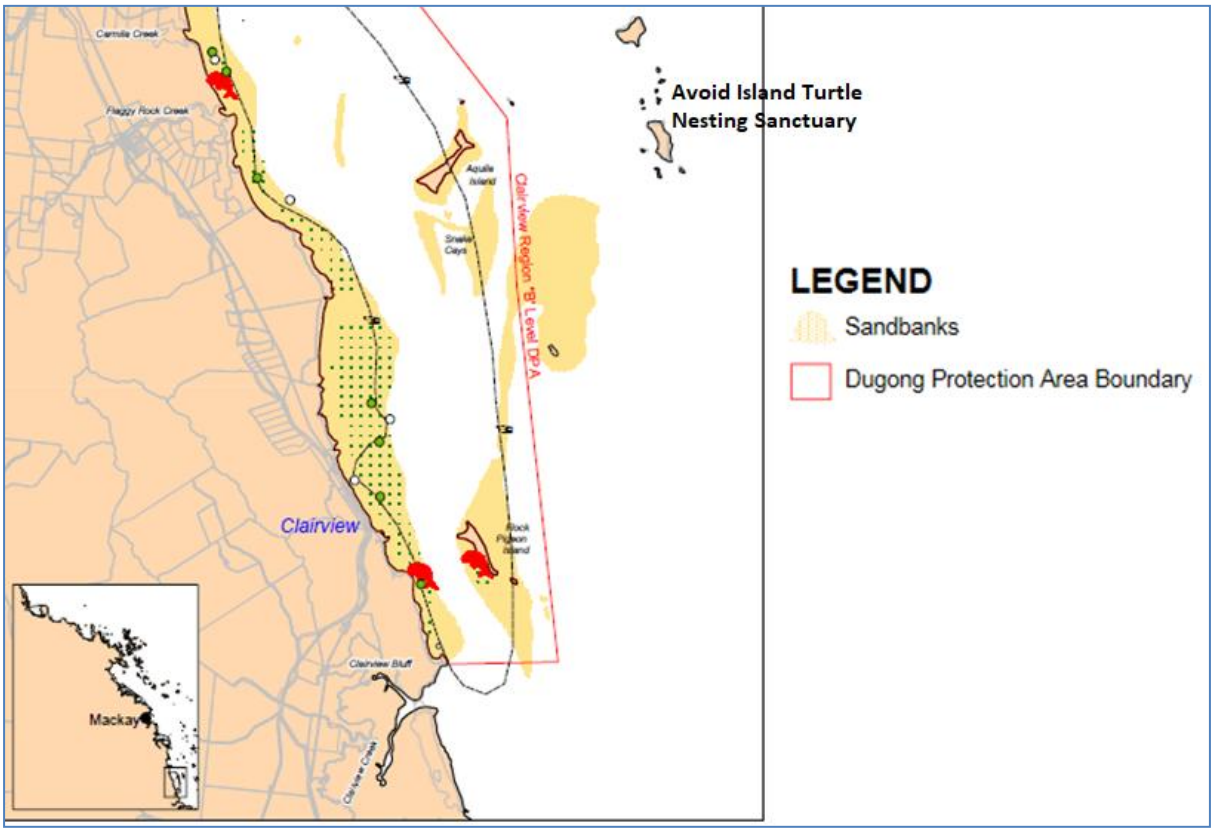

Fig. 10(c) Clairview estuary in relation to Clairview township, Dugong Protection Area and its sea grass beds and Avoid Island Turtle Nesting Sanctuary

- Sept. 4-5th 203mm across Cattle and Middle Creeks. Water quality monitoring showed high TSS and total nitrogen levels in cane drain and creek flow in Cattle Creek. Mackay Regional Council's Water Lab conducted the lab analysis of our grab samples. Total Inorganic Nitrogen (TIN) from the cane drain flowing towards the estuary was nine times the recommended GBR water quality objective for such rainfall events. It was three times the limit within Cattle Creek. These water quality samples were taken six hours

after rainfall had ceased.

Fig. 11(a) Rangeview Racecourse Projects cane drain. Our water quality monitoring site next tothe Bruce Highway. Red lines indicate rainfall sediment runoff directions to Clairview Estuary and Cattle Creek.

Fig. 11(b) Looking towards the cane drain site next to the Bruce Highway above the saturated sugar cane field. Clairview estuary is in the background. Sept 5th 2018.

Fig. 11 (c) Sediment-laden rainfall runoff from cane field into cane drain Sept 5th 2018 six hours after storm. Highest concentrations of COD, Total N, DIN and Ammonia came from the water sampling of this runoff in the sugar cane drain monitored next to the Bruce Highway.

Fig. 11 (d) Eroded cane drain flowing to the clogged underpass under the Bruce Highway (sept 5th 2018). Dissolved Inorganic Nitrogen (DIN) levels 9 times the limit in cane drain runoff.

Fig. 11(e) Cane drain sediment-laden runoff under the Bruce Highway and through the former Lily Creek drainage line to Clairview Estuary (Sept. 5th 2018.

Fig. 11(f) Cattle Creek full of sediment upstream of the Bruce Highway 5th Sept 2018 . DIN three times recommended levels. Sediment levels 1.76 times recommended levels. Sampled five hours after 203mm rain event.

- Oct. 13-14th Thunderstorm with over 100mm rainfall. Again massive sediment-laden runoff to creeks and the Clairview estuary and inshore GBR. It was mid-November before the tides again ran clear of sediment. There was evidence of eutrophication from high nitrogen levels in the estuary. Water clarity was nil and no fish were caught by local fishers either in the estuary of at a favourite fishing hole about one kilometre offshore from the mouth of the estuary.

The fact that high sediment loads are still coming down from the property after months of engagement of the land manager with DNRME officers to undertake erosion control measures on the property indicates that much more needs to be done to prevent continuing chronic pollution of matters of national environmental significance in the Great Barrier Reef.

Prior to this broadscale clearing Clairview, Middle and cattle Creeks were classed as having among the highest environmental values within the Mackay Central Coast Bioregion and local residents of Clairview and surrounds want those values reinstated and protected as it also affects their quality of life if local fishing values are destroyed.

Great Barrier Reef Impacts

Clairview estuary is a part of Broad Sound Fish Habitat Area and the GBR World Heritage Area. There is the Clairview dugong protection area just north of the estuary mouth where there are extensive seagrass beds. On Oct 6th these seagrass beds were monitored by Sea Grass Watch in partnership with Reef Catchments NRM. Thousands of tonnes of fine clay silty grey sediments of the same texture and colour found on the Rangeview Racecourse Projects property was found interspersed with fine sand offshore from Clairview township in the seagrass beds out at least 500m offshore. Some algae was scattered throughout the seagrass beds indicating elevated levels of nitrogen which has also been associated with Crown of Thorn outbreaks.

Earlier and continuing sea grass monitoring results could be compared with large rainfall events affecting Rangeview Racecourse Projects property to look for correlations between this massive sediment and nitrogen pollution source and adverse impacts on these sea grass beds important feeding grounds for both dugongs and turtles in thus area.

Concerned fishers and Clairview residents have had ongoing contacts with DNRME, DAF, and DES since Nov 2017 to address this ongoing pollution. DES referred us to Isaac Regional Council to get ongoing water quality problems addressed. In October Mark O'Dwyer the health and environment officer for this Council began an investigation under the Queensland *Environmental Protection Act*.

We believe this is also a state and federal level responsibility as Isaac Regional Council does not have the resources or full authority to address all the adverse impacts from this farming operation.

The Styx is a Great Barrier Reef catchment but it has not been listed as a priority catchment for water quality monitoring. This listing was in 2012 well before Racecourse Projects commenced clearing in Nov 2017. In 2012 the uses for the property were native forestry and grazing and the Clairview estuary was classified as only mildly modified. The situation is now vastly different and the increased erosion and sediment and fertiliser volumes need to be reduced and managed if this catchment is not to become a GBR hotspot for poor water quality to the Reef. It now should be a priority catchment because of this change in land use. Not even Sugar Cane Best Management Practice is happening at this time and there are no known timelines for actions to ensure prevention of future polluted runoff events. Biodunder continues to be carted from the mills and spread over the sugar cane fields of this property ensuring sky high DIN levels in future runoff to the GBR if it is applied before large rainfall events.

Note this basin has no Water Resource Management Plan so is somewhat of an orphan with regard to monitoring oversight, but this has to change if ongoing pollution of Great Barrier Reef waters is to be prevented and its Outstanding Universal Values, worth billions to the state's economy, are to be protected.

Forward planning is urgently needed if Broadsound is to avoid ongoing GBR pollution management problems and the loss of its tourism and fishing resources as well as MNES if the region is converted to massive sugar cane farms to supply a biofuels industry. These farms may also get on-site biofuels processing plants on-site if this industry proceeds. The effects of such plants need to be identified and managed. Yet Isaac Regional Council has no mention of this in their current draft planning scheme and there are no state or federal plans or even legislation to address this now urgent need.

So we come to the question of how ongoing sediment, fertiliser, herbicide and pesticide pollution of the GBR catchment, estuary and Reef of such an industry can be monitored and prevented, and by which agency or agencies given the relevant state agencies and GBRMPA do not even want to address these issues for the Rangeview Racecourse Projects farm?

Thanks for your interest and concern.

Contact:
[redacted]

Appendix I
Analysis of water quality results: Community monitoring
Samples analysed by Mackay Regional Council's Water Lab

Summary

- The test results for the two key Reef pollutants, sediment (TSS) and fertiliser run-off (DIN), exceed the Water Quality Objectives for the region, in some cases significantly.
- The samples likely show conservative pollution levels as they were taken after the rainfall event.
- For fertiliser run-off (Dissolved Inorganic nitrogen – DIN):
  - Cattle Creek, which a number of cane properties drain to, has levels three times those recommended during rainfall events.
  - The water draining from the cane farm to Lily Creek has level almost 9 times in exceedance of recommended levels.
- For soil run-off (Total Suspended Sediment – TSS)
  - the levels of pollution is in exceedance in the creeks surrounding the properties and in some cases at extreme levels.
  - the lower results for cane drain water indicate that most loose soil has already washed off.

Water Quality Objectives

The Mackay Whitsunday Water Quality Improvement Plan sets out Water Quality Objectives for high flow events for the protection of aquatic environmental values.

Table 29 TSS and nutrient concentration event-based WQOs.

Indicator	Event-based WQO
DIN (µg N/L)	300
PN (µg N/L)	340
FRP (µg P/L)	30
PP (µg P/L)	70
TSS (mg/L)	200

Equals 0.3 mg / l

Water Quality Monitoring Results: TSS and DIN

	Units	Clairview Creek - Causeway	Cattle Creek - Bruce Highway	Canefarm drain	Method
Sampling Date		5/9/18	5/9/18	5/9/18	
Sample Time		11:00	11:30	11:45	
Total Suspended Solids	mg/L	2	352	38	APHA 2540 D
Dissolved Inorganic Nitrogen	mg/L	0.03	0.96	2.64	

	Units	DNRME - Cattle Creek - Bruce Highway	DNRME - sediment - Cattle Creek - Bruce Highway	DNRME - Canefarm drain	Method
Sampling Date		5/9/18	5/9/18	5/9/18	

	Units	DNRME - Cattle Creek - Bruce Highway	DNRME - sediment - Cattle Creek - Bruce Highway	DNRME - Canefarm drain	Method
Sampling Date		5/9/18	5/9/18	5/9/18	
Sample Time		11:30	11:30	11:45	
Total Suspended Solids	mg/L	340	817,400	50	APHA 2540 D
Dissolved Inorganic Nitrogen	mg/L	0.95	insufficient sample	2.66	

Sample Time		11:30	11:30	11:45	
Total Suspended Solids	mg/L	340	817,400	50	APHA 2540 D
Dissolved Inorganic Nitrogen	mg/L	0.95	insufficient sample	2.66	