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Innovation, Tourism Development and Environment Committee
Parliament House
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Submission to the Inquiry

Environmental Protection (Great Barrier Reef Protection Measures) and Other Legislation Amendment Bill 2019

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[redacted]

As an engaged grazier in the region, I have had the benefit of viewing the draft grazing minimum standards prior to lodging this submission. My comments take into account having viewed those draft standards and are focussed on an alternative structure.

Draft Grazing Minimum Standards Issues

- The framework based around A,B,C&D land conditions fails to provide a risk based solution.
- In reality almost every property has some land in A,B,C & D condition. It is the proportions of the mix that tends to change from "good" management to "bad" management.
- Under the classification system land in C or "Poor" condition includes any land with obvious signs of past erosion and/or current susceptibility to erosion is high
    - There are very few lots in the Burkekin catchment that have no signs of past erosion.
    - Erosion is a naturally occurring phenomenum and can occur regardless of management practise. It is particularly event driven. Tindall et al 2014
- Any land with a weed infestation will also fall into C.
- There is no provision for allowed %'ges of land in A,B,C or D condition. A grazier might have 95% of his land in A condition through years f excellent management, he would still be captured if he had 5% of his land in C or D condition whilst having proven a history of good or even excellent land management.
- There is no provision for offset of tree cover to grass cover. Tree density competes with grass cover. The increased regulation that occurred under

the VMA amendments, particularly around water courses in the reef catchments were made on the premise that tree cover would mitigate erosion yet this act and its draft regulations fail to mention or incorporate tree cover as mitigation at all.

- The measurement of perennial grass cover may actually be detrimental to native grass populations which, in drier areas of the catchment, often have a naturally lower density than 50%. (Waterhouse et al 2017) *Ground cover can be very patchy in savanna landscapes (Ludwig et al., 2007) and this results in large variability in sediment yields even for hillslopes under the same management regime (Bartley et al., 2006).*
- Large areas of cracking clays (like Mitchell grass country) in the drier regions of the catchment do not naturally support ground cover in excess of 50%, their regenerative capacity relies on their ability to crack and recycle nutrient.
- There are no time provisions or provisions for extenuating circumstance. If a grazier encountered dry years beyond his control or a fire or flood event there are no provisions for a changed score in those years. The regulation is not clear how the area moves into or out of an assessment category
- The regulations do not state how compliance (including ongoing compliance with adopted new remediation methods) will be monitored
- The FORAGE satellite system does not function at greater than 60% tree cover (as stated on the reports) and is somewhat doubtful at even lower levels of tree cover. With over 80% of the catchment classed as remnant vegetation the ability of satellites to monitor ground cover is severely limited.
- The Report Gully mapping and drivers in the grazing lands of the Burdekin catchment, Tindall et al 2014 highlights that there is no current accurate measure for gully erosion other than terrestrial laser scanning. (i.e. on the ground). Therefore measurement of outcomes and classification of land under the ABCD framework is not possible without significant investment in improved measurement capability.
- There is no provision for State owned land to have to undertake the same levels of management intervention. This will lead to increasing tension (as seen in the recent bushfire scenarios) where landholders are being asked to increase investment in land management and adjacent state owned land (roads, national parks, unoccupied state land) is not being managed to an equivalent requested standard.
- The regulations fail to discern between anthropogenic sediments and those occurring naturally, whilst the legislation is proposed to deal with only anthropogenic sediments.
- Of concern is the extent upon which modelling is being relied upon to drive measurement rather than real data. There are only 6 recording stations in the Burdekin catchment with a very limited number of years of data recording on water quality. (Waterhouse et al 2017) *Therefore, our confidence in the model output is hard to measure, and thus confidence in the modelling output is generally lower than for the monitoring data. The 2015 external modelling review (Bosomworth and Cowie, 2016) DNRM, 2015) identified that 'only a few of the many sources of uncertainty can be*

formally quantified' and therefore recommended that qualitative terms be used to describe levels of confidence in results.

- Gully erosion which is being nominated as the highest output from grazing is not well understood at all and therefore model accuracies are inherently low. (Tindall et al 2014)
- To move the dial in terms of outcomes against reef targets is extremely difficult with the level of modelling and data that we currently have. The Wambiana trials illustrated that the biggest influencer of ground cover is in fact rainfall. Variable stocking rates to pasture budgeting and even SOI budgeting both failed to improve ground cover. None of the 5 grazing methods trialled illustrated ground cover at the levels that some scientific reports are suggesting will be needed to move the dial. *To change or reduce run-off at the hillslope scale, average cover needs to be >75% and biomass >2000 kg/ha (Ciesiolka, 1987; Roth, 2004).*

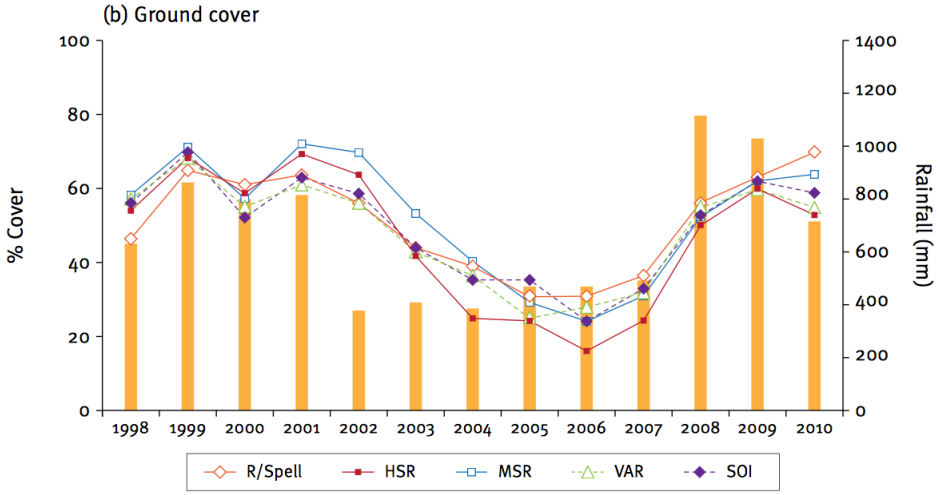
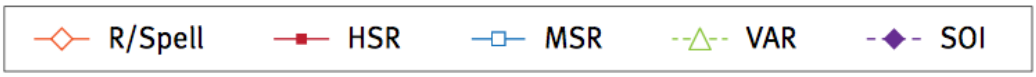


Figure 7: *Change in (a) pasture total standing dry matter (TSDM) and (b) ground cover with rainfall between 1998 and 2010 for different treatments at Wambiana. Both pasture TSDM and ground cover values are averaged over end of wet (May) and end of dry (November) season measurements.*



Source: The Wambiana grazing trial

- The proposed regulations fail to provide for the direct style action that needs to happen in partnership between land holders and Government.
- The legislation may in fact have the opposite effect of undermining the great extension work that has already been undertaken and the trust that has been built throughout the NRM groups.
- The proposed methodology and remedy focuses on reductionist or exclusion style management techniques. (Running less cattle, excluding them from areas etc.) Moves towards regenerative agriculture may be somewhat stifled by this kind of mind-set. It is a key requirement to maintain innovation in land stewardship.

Suggestions for an Alternative

- Rather than an annual land condition score (problematic for reasons listed above) a risk assessment framework is developed to isolate properties that need to do "more" or operate under a management program
- The below frame work is prioritised and based upon the key contaminant sources within the 2017 Scientific Consensus Statement, nutrient, sediment and pesticides.
- The proposed alternate solutions listed below are designed to reduce onerous accreditation or management plan style activities to a small group of landholders with ownership of the highest risk.
- They are equally designed to encourage participation, engagement and proactive recording to illustrate and meet reef targets across each and every landholder in the catchments. A united effort to reach real outcomes rather than just tick boxes.

Risk	Actions Required	Source / Comments
Nutrient	• Landholders utilising **inorganic** fertiliser must do so under an accredited management program (like BMP or others) • Fertiliser sales are recorded by lot and records kept.	Of the different nutrient constituents, dissolved inorganic nitrogen is thought to pose the largest risk to the Great Barrier Reef ecosystems (Brodie et al., 2015)
Pesticides and Other Pollutants	- Herbicides or Pesticides applied at a broadscale level (rather than targeted individual treatment of weeds for instance) must be undertaken under an accredited management plan	
Sediment	• Lots are classified as	• Burdekin erosion

	containing very high, high, medium or low risk of gully erosion via the methodology outlined in Tindall et all 2014. • On lots classified as Very High to High risk, the department commits to a yearly gully monitoring system based mainly around field based terrestrial laser scanning. • Lots that are identified through this process with growing gullying are required to develop a management plan for the gullies. • Management plans may be developed in a cluster where efforts are best concentrated upstream. • Activities to be undertaken are jointly developed with the department field / extension staff. • Those activities focus on active management (processes like slowing down water, leaky weirs, mechanical intervention, controlled grazing) rather than exclusion or reductionist theories. •	processes of fine sediments delivered to the GBR: 10% from erosion of surface soils, 90% from erosion of subsurface soils (rills, scalds, gullies and riverbanks) Burton et al 2014 • Key recommendation of Tindall et all 2014 report. • In a summary of the scientific evidence, the 2013 Scientific Consensus Statement (Brodie et al., 2013) has identified gullies as a dominant contributor to the sediment load in the GBR receiving waters. This is particularly relevant in the Burdekin and Fitzroy catchments, the largest contributor of sediment to the GBR of all reef catchments. There is a clear need for consistent mapping of landscapes susceptible to gully erosion and mapping of past and present gully extent and volume. These data should be at a range of scales and in formats that are suitable for prioritisation of prevention, rehabilitation, and investment and extension activities and for use in catchment-scale water quality models. • Present knowledge of gully locations, processes and contribution to the sediment budget in the Burdekin catchment is limited. In a review of sediment sources in the Burdekin catchment, Bartley (2011) highlighted that there is a large

		disparity between studies (e.g. Prosser et al. 2001; Kinsey-Henderson et al. 2005) about the scale of gully erosion in the catchment. This is mainly attributed to the poor quality gully data used in models and uncertainty in predictive methods. Further, a range of findings have been reported in the literature regarding where sediment is originating within the catchment, which sediment fractions pose the greatest risk to the Great Barrier Reef (GBR), and which erosion processes and land management types can be attributed to the source of the sediment (e.g. Lewis et al., 2006; Bartley et al., 2007; Bainbridge et al., 2008).
Activity List	- Every year all producers fill out an activity return where they identify any practises that they undertook on farm that have the potential to improve water quality in the reef and reduce sediment loss. - Activities might include, planting of legumes or palatable perennials, fencing and water infrastructure that improve grazing	- There is a very large amount of changed practise and activity occurring on farms across the catchment that is not captured by extension officers, BMP or Govt funded activities. - These activities may assist in Govt meeting targets in the Reef 2050 plan, they are not currently accounted for. - Producers have historically illustrated a great propensity for change for positive

	spread, planting of water grasses around a dam edge, rehabilitating an erosion site, earthworks like whoa-boys aimed at slowing water, installation of leaky weirs in gully formations, a change to grazing management practise…. Etc. - This shouldn't be seen as an opportunity to create a long list or survey, it should be just one simple question. It has the potential to increase positive engagement with all producers.	environmental outcomes (examples include the almost complete change to no-till farming across broad acre cropping, the move to green trash in cane growing rather than burning, the adoption of increased spelling regimes of grazing paddocks, the incorporation of legumes into pastures, the increase in fencing and water points to spread grazing pressure). - As an example our own company has invested around $500,000 per annum in spreading of grazing pressure and increased spelling regimes. None of that has been under a BMP or Govt funded activity and as such that investment has not been recognised as having a positive effect on water quality.
Monitoring	- Every producer in the region commit to one monitoring activity on an annual basis. - The individual monitoring activity can be selected by the producer to add to the pool of data available but also to be of value to their business. Examples might include, monitoring trends in soil water infiltration rates, monitoring soil nutrient levels, monitoring a gully site, monitoring water quality. - Monitoring at a range	The high variability of run-off and sediment yield in many of the Great Barrier Reef catchments will make it difficult to link changes in catchment management to end-of-catchment sediment yields. Statistical modelling suggests that with current monitoring programs it will take at least 50 years to detect an average 20% reduction in suspended sediment loads with reasonable (80%) confidence (Darnell et al., 2012). The role of sediment storage in large catchments can also make linking land management changes and sediment response challenging (Walling et al., 2011). For example, the Coon Creek (USA) work by Trimble (1981; 1983)

	of spatial scales (plot, sub-catchment and basin level) is necessary to detect potential water quality improvements. End of catchment reporting is unlikely to deliver the results needed to comply with the reef scorecard. Encouraging the collection of data at a - A framework for the monitoring will be agreed between an extension officer and the producer. The mandatory level however should not exceed one sample per year, producers may voluntarily commit to more. - The Govt through reef funding programs commit to reimbursing any laboratory / analysis costs in a cost sharing arrangement where collection costs are born by the producer. - This one activity will build data to improve modelling across the reef catchments but will also increase engagement between all producers and the extension officers in the regions.	suggests that even after the implementation of soil conservation measures in the 1930s, which reduced gross erosion by ~25%, the sediment yield at the basin outlet changed very little. This was due to increased efficiency of sediment transfer through the channel system (via reduced deposition) and the remobilisation of sediment that had accumulated in the valley during the preceding period of accelerated erosion. In summary, due to the costs and challenges with long-term monitoring, there are very few studies anywhere in the world that have demonstrated a reduction in run-off and fine sediment delivery to marine ecosystems following improved land management (Kroon et al., 2014). For restoration to be effective, and reduce the delivery of the ecologically threatening sediment, it must target the primary erosion process, and associated monitoring needs to be conducted at a range of spatial scales (plot, sub-catchment, basin) to allow detection of potential water quality improvements in response to the restoration. It is likely that increasing cover levels across the whole catchment will help reduce run-off and prevent or reduce further hillslope and channel erosion. However, once gullies are well established, specific remediation measures will be required. Depending on the scale and effectiveness of restoration measures, detecting reductions in end-of-river sediment loads may take years to decades using current monitoring programs

		(Darnell et al., 2012).

Other General Comments

- *It is also worth noting, in general terms, that the idea of 'best' or 'recommended' farming practices for productivity or environmental improvement has come under some criticism due to its often prescriptive nature that ignores the diversity of farming systems and farmers' individual contexts (described further below). The practice or suite of management changes being promoted may also contrast significantly with previously trusted advice from the same sources (such as government extension officers) or fail to build on recent changes made to farm management by the producer (Vanclay, 2004; Stanley et al., 2006). Some studies in the international literature suggest the need, instead, to seek a best-fit outcome between desired or promoted practices and those individual contexts. This thinking is also extending to the broader design and operation of extension advisory services (see for instance Birner et al., 2009).* Waterhouse Et al 2017.

I believe it is also important to note that the legislation, whilst appearing to wield a big stick to grazing, still does little about management of state owned land like existing roads and national parks and also little about the continued practise of mine de-watering in every significant rainfall event. Graziers are somewhat disenfranchised to be under more and more cost and imposition to watch the coal mine beside them pumping pit water down our rivers every time it rains. I do not believe that an offset policy is appropriate, testing and treatment of all water leaving a mine site must be a minimum requirement.

Event mean concentration data derived from water quality measurements taken in the Great Barrier Reef catchments as well as other parts of Australia suggest that the highest median TSS concentrations are generally from mining (~50,000 mg/L), horticulture (~3000 mg/L), dryland cropping (~2000 mg/L), cotton (~600 mg/L) and grazing on native pastures (~300 mg/L) (Bartley et al., 2012).

A study of erosion from unsealed roads in Cape York (Gleeson, 2012) indicated that the average event mean concentration from unsealed roads was around 1800 mg/L, and that unsealed roads and other linear disturbance features were the largest intensive land use in the Cape (Spencer et al., 2016), being double the area of all other intensive land uses combined. Waterhouse et al 2017.

Urban planning also continues to fall behind in allocation of green space to reduce impacts from urban use. There appears to be a reluctance to set real urban targets for improvement.

References:

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