22nd March 2018

Garry Reed
[redacted]

[redacted]

Committee Secretary
State Development, Natural Resources
and Agricultural Industry Development Committee
Parliament House George Street Brisbane Qld 4000

Email: sdnraidc@parliament.qld.gov.au

Vegetation Management and Other Legislation Amendment Bill 2018

Dear Committee Secretary, please see my submission to this vital VMOLA Bill inquiry.

I have grown up in the Collinsville area as my father did and have heard of and experienced great degradation of the local environment and further afield.

I remember as a child some of the richness of the biodiversity like the huge worms under the Cluster Fig trees on the bank of Coral Creek near its mouth. The Brigalow scrub and Eucalypt forest behind the fig trees had been ringbarked and cleared by the 1970s with the loss of the billabongs would have contributed to the drying out of the banks and dieback of the fig trees, most of which have now been lost to erosion.

My father was aggrieved about the loss of the wildlife from the lost scrubs – I heard about the goannas, quolls, koalas, scrub turkeys, curlews, native mice and God knows what else was lost. I now learn that the web of life is critically important to ecosystem function and biodiversity is the foundation of the resilience of the ecosystem. We also learn the ecosystem services are vital for our survival and gives us rain, aquifer recharge, soil fertility, waterway and ocean health amongst other things.

I have also learned that the abolition of the Two Chain Law in the early 1970s has had disastrous consequences for waterways, water quality and reliability, and ocean and reef health. (I refer to this in my Invasive Weeds Inquiry Submission 043 – page 12) We are also learning about the critical role of fungi and species variation in the ecosystem – I referred to that in my Sub. 043. I find very recent scientific work from the University of California Santa

Cruz, about biodiversity and fungi (see end notes) – this is critically important work and points to the importance of holistic and transdiciplinery approaches.

The history of the management of the vegetation in Australia has been a major failure and resulted in disastrous loss of ecological and natural capital. The politics of land management has been toxic for most of Australia's modern history and seems to be still so. The politics should be taken out of this issue and methods used that work. There is an obvious need for certainty – the pendulum swings and reactions are resulting in dysfunctional policy making that has given poor protection and unlimited discretion to land-mangers which has caused a moral hazard – giving enough rope to destroy invaluable natural capital and decimate ecosystem services that they themselves depend on. It is heartbreaking to see old deep rooted Mulga trees being pushed for drought (that was likely contributed to by over-clearing) fodder and the water infiltration and aquifer recharge functions of the trees lost. There are references to alarming reports on the loss of water infiltration from the loss of tree canopy in tropical savannas in my sub. 043 – pages 5-6.

There is a great need for education about the value of biodiversity and landscape functionality – the closing of the Tropical Savannas CRC at the end of 2009 was a tragedy given the AIMS report of 2012 that identified the enormous decline of the GBR contributed to greatly by a loss of water quality. There is now a desperate scrambling for funding and research to improve tropical savanna land use. There is also a need to explore ways to effectively preserve and quarantine biologically rich areas and refugia through measures like biodiversity credits – it seems that in conjunction governance integrity protocols and systems are put in place and state and federal ICACs are strengthened.

From my experience, I see a need to make the material from the government more user friendly and clear. A case in point is the DNRM document: *Managing clearing for necessary property infrastructure – a self-assessable vegetation clearing code – 2.12.13*. I presume this code will be superseded but I fear that it has been misinterpreted by many people from my observations and also probably former codes. At *4.3 Soil and watercourse protection - Practice: must not occur within 10 meters of the defining banks, except for crossings.* Clearing is allowed 5m either side of fences but because many fences are on the very edge of the bank many land managers are clearing in a prohibited zone resulting is erosion and loss of bank vegetation – the fences need to be moved 15m back from the banks or left uncleared. There is also a grey area with the 50m waterway bank buffer zone in the Burdekin Catchment – a great deal of clearing and agricultural activity is occurring in this zone.

Another area that is an elephant in the room is mining activity and creek diversions. I have personal experience over the last 7 years of challenging a proposal to divert and mine Coral Creek – I copped a $110k costs order that was not my fault after spending over $250k on lawyers – thankfully we appealed it successfully. This report was broadcast just before the Land Appeal Court hearing: http://www.abc.net.au/news/2014-04-29/farmer-faces-ruin-after-losing-coal-mine-court-fight/5417394

What I learned though this gruelling case was that there is a fundamental *conflict of interest* with the way that mining approvals are given – the mining company pays 100% of the fees of the consultants that write the impact statements and if you are opposing a proposal by a mining company they will not work for you as virtually all consultants consider mining their core business. Also the guidelines for creek diversions are written by the Australian Coal Association Research Program [ACARP] which is fully funded by the mining industry. There have been more than 77 failed creek diversions that could be enormously expensive to rectify and most are being put off – a serious risk in cases of insolvency. In the Coral Creek case the QCoal Sonoma mine was allowed to dig their pit to within 30m of the top bank and have carried out road works and drains right up to the bank edge. There is a desperate need for a statutory authority that commissions consultant reports at arm's length from the companies and the governments.

Thank you for the opportunity to contribute to the inquiry into this critically important bill.

Yours sincerely, Garry Arthur Reed

End notes:

https://news.ucsc.edu/2017/12/species-variation.html

Study finds variation within species is a critical aspect of biodiversity - Researchers compared the ecological consequences of variation within species and among species, and found similar effects in many cases. - December 05, 2017 - By Tim Stephens

Excerpts: Many species play important roles in nature and provide services important to people. For example, many fish species are harvested for food, and many insect species pollinate wild and cultivated plants. The loss of these species may mean the loss of ecosystem services, a major motivation for preventing species extinctions. The new study, published December 4 in *Nature Ecology & Evolution*, found that the ecological effects of within-species variation may be far reaching and often rival those of species themselves…

On average, species tend to have larger effects on ecosystems. Yet over a third of studies examined showed that swapping different variants of the same species had similar ecological effects as removing that species entirely or replacing it with a completely different species.

"Traditionally, ecologists have focused on the ecological importance of biodiversity among species. This paper broadly establishes within-species biodiversity as critical for ecology," said coauthor Eric Palkovacs, associate professor of ecology and evolutionary biology at UC Santa Cruz.

Nearly half of all the studies documented at least one ecological response that was more strongly affected by variation within species than by its presence. In a surprising result, within-species variation was shown to have the largest impacts on organisms that the focal species wasn't directly consuming or evading. In other words, trait variation within species appears most important for indirect effects.

The study suggests that protecting trait variation within species is not only important for the future of evolution, but also potentially critical for the functioning of current and future ecosystems, according to Palkovacs. "This is a sobering thought given that human activity is causing within-species variation to be lost at a far greater rate than the extinction of entire species," he said.

https://news.ucsc.edu/2018/03/zhu-fungi.html?ref=recent

Soil fungi may help determine the resilience of forests to environmental change, according to UC Santa Cruz study - March 16, 2018 - By Jennifer McNulty

Excerpts: Nature is rife with symbiotic relationships, some of which take place out of sight, like the rich underground exchange of nutrients that occurs between trees and soil fungi.

But what happens in the dark may have profound implications above ground, too: A major new study reveals that soil fungi could play a significant role in the ability of forests to adapt to environmental change.

Kai Zhu, assistant professor of environmental studies at UC Santa Cruz, took a unique "big data" approach to investigating the role of symbiotic fungi in tree migration in forests across the eastern United States…

Zhu's study, published in the *Journal of Ecology*, is one of the first to use the U.S. Department of Agriculture's Forest Inventory and Analysis program's large-scale data set to see how climate change is impacting the ecosystem, an approach known as "top down" rather than "bottom up."

As a quantitative environmental scientist, Zhu brings the tools of statistics and data science to the study of global ecology. Rather than measuring fungal traits in the soil and scaling up, Zhu uses existing data—including large-scale datasets generated by satellites—to look at patterns and processes playing out on continental and global scales. "Big data is becoming more and more popular and powerful," he said. "It's different from traditional research in ecology, which takes place in a lab or in the field."

Zhu, whose background is in physics and systems theory, brings tremendous urgency to his work on climate change. His research focuses on four areas: forest ecosystems, grassland, soil, and phenology, which Zhu describes as "nature's calendar."

Zhu is determined to make solid contributions to a field in which much of the evidence is incomplete and unconvincing.

"We know the environment is changing, but how it impacts the Earth and its systems is a big question," he said. "As scientists, we have the responsibility to correctly work out this problem—it's a problem that's important to scientists and the general public."

http://www.savanna.cdu.edu.au/centre/index.html

Welcome to the Website of the former Tropical Savannas CRC, which stands for the Cooperative Research Centre for Tropical Savannas Management—or Tropical Savannas CRC for short.

Australia's tropical savannas cover almost a quarter of the continent ranging from Townsville on the East Coast across the Gulf, Top End and over to the Kimberley. The CRC carried out research right across this region.

The Tropical Savannas CRC was first established in 1995 by the National CRC Program and renewed in 2001. The Centre closed at the end of 2009.

The CRC's aim was to help ensure that the vast area of the savannas was healthy and managed to provide long-term benefits (economic, aesthetic, social and cultural) to those who use them and to sustain the biodiversity and habitat endemic to them.

https://www.theguardian.com/environment/2018/mar/07/scorched-country-the-destruction-of-australias-native-landscape

Scorched country: the destruction of Australia's native landscape

Michael Slezak - 7 Mar 2018

Less than 50% of Australia’s original wilderness still exists, thanks to the colonialist view that development of land means eliminating native vegetation.

What was lost in the early years

Early clearing was centered around where Europeans colonised. It started around Sydney Cove, on land that is the territory of the Gadigal people of the Eora Nation. It then spread to Victoria, and later to South Australia, Western Australia and Queensland.

With its fertile soil, Victoria was the fastest and hardest hit, and it is now Australia’s most cleared state, with 66% of its native vegetation gone.

Queensland was late to the game, but the clearing occurring there now outweighs the clearing in all other states combined. Rates there are rising, and they currently sit at about 395,000 hectares per year – steadily approaching the peaks the state saw in the 1980s and early 2000s.

All up, since Europeans arrived, Australia has lost more than 40% of its forested area.

A Guardian Australia analysis of national vegetation data, shows less than 50% of Australia's original wilderness still exists, leaving the majority of its original native vegetation cleared or significantly modified.

Compared to many parts of Europe where forests and other native vegetation were almost completely wiped out, some say Australia has a lot left to lose. As a European Kate feels strongly about the land she looks after.

"[In Europe] we don't have anything left and so we have to protect what's there," says Kate. "Maybe we do have more appreciation of the wildlife of Australia than other Australians – if you're born here, you get used to it. But for us, it's so amazing."

http://www.abc.net.au/radionational/programs/scienceshow/effects-of-the-changing-climate-in-south-western-australia/8175170#transcript

Effects of the changing climate in south western Australia - 21 January 2017

Joe Fontaine: This place where we're sitting today, with its banksias, with its jarrah, with its biodiverse understorey, yes, sometimes we just talk about biodiversity but there is a lot of other value associated with these sorts of places. We know that human health outcomes in terms of depression and just general physical health are much better when people live close to nature. We know that places like this are reservoirs for things like clean air and clean water and provide a raft of other ecosystem services. Our flora that we're sitting here enjoying this morning, over half of it has only been described even as a species in the last 25 years. The biomedical potential of these places is largely untapped.

Bill Bunbury: And in that last 25 years, you're reporting I think, aren't you, on the way this is beginning to change.

Joe Fontaine: That's correct. So where we're sitting here, in the southwest of Western Australia, is considered a Mediterranean climate region, which means we have nice wet winters and long, dry summers. But it turns out that this type of place, along with the other parts of the planet that have this type of climate, are the places that are warming *and* drying. So this is almost like a canary in the coalmine sort of place for understanding what climate change impacts may be in the future.

Bill Bunbury: What do we stand to lose in terms of agriculture alone if we lose woodland?

Joe Fontaine: Probably one of the easiest examples is the wheat belt of the southwest of WA, and one of our now-retired faculty here at Murdoch was able to show that the clearing of the wheat belt actually caused a reduction in rainfall. It basically caused storms to move across the landscape faster and drop less rain as they moved. So as we clear these places we're actually increasing the slipperiness, if you will, of the land surface, and we're probably going to get less rain from that as well.

End - VMOLA Bill 2018 -Reed

Inquiry into the impacts of invasive plants (weeds)
and their control in Queensland Submission No. 043

16th January 2017

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Inquiry into the impacts of invasive plants (weeds) and their control in Queensland

Terms of reference for the inquiry

In accordance with s.92(d) of the *Parliament of Queensland Act 2001*, the Agriculture and Environment Committee has resolved to investigate and report to Parliament on the impacts of invasive plants (weeds) and their control in Queensland, particularly whether:

- the responsibilities of local governments in relation to the control of prohibited, restricted and invasive plants imposed under s.48 of the *Biosecurity Act 2014* are reasonable, and local governments are meeting those obligations
- programs for the control of weeds on Crown land administered by the Department of Natural Resources and Mines are effective
- Biosecurity Queensland's weeds programs, including biological controls and new technologies, are adequately funded and effective at controlling weeds
- environmental programs administered by the Department of Environment and Heritage Protection impact favourably on weed control programs administered by the Department of Agriculture and Fisheries and local governments, and
- federal, state and local government weeds programs are coordinated to maximise their achievements and to have a whole of government approach.

Case studies

As it is not possible to examine government programs for all weeds, the committee has resolved to examine the impact of three invasive plant species as case studies for the inquiry:

- prickly acacia
- Giant rat's tail grass, and
- fireweed.

Inquiry into the impacts of invasive plants (weeds) and their control in Queensland Submission No. 043

Dear Research Director, I am very keen to contribute to this inquiry as control of environmental weeds is one of the biggest imposts on my time operating our mixed farm near Collinsville, North Queensland.

My Father was very proactive with weeds and had experience on our property going back to the 1920s. My family often related how the Harrisia Cactus spread from a pot plant that was thrown into the dump on the bank of Coral Creek on Sonoma Station. It is on record that Collinsville was one of three places in Queensland where Harrisia Cactus infestations began.

There was a major Lands Department Harrisia Cactus eradication program in the 1970s that caused serious health problems for the workers as the dioxin contamination and toxicity was little known. The herbicides used today are also very toxic and can contaminate water as far as the Great Barrier Reef (GBR) – minimising herbicide use should be a high priority. Harrisia Cactus (*Eriocereus* sp.) is still spreading around Collinsville despite the introduction of a bio-control bug.

The case studies that this inquiry has restricted itself to three species, only one, Prickly acacia (*Vachellia nilotica*) we have in this area as far as I know yet we have some of Queensland's worst invasive weeds including: Rubber Vine (*Cryptostegia grandiflora*) – Chinee Apple (*Ziziphus mauritiana*) - Parthenium Weed (*Parthenium hysterophorus*) – Parkinsonia (*Parkinsonia aculeata*) - Yellow Oleander (*Cascabela thevetia*) – Lantana (*Lantana camara*) – Mimosa Bush (*Vachellia farnesiana*). My family's observations of the spread and control of weeds is very likely applicable to other weeds and areas.

Restricting this inquiry to just three species may highlight a shortcoming in the approach of this inquiry. I think it is important to consider as broad a range of examples and factors as possible so that historical knowledge is considered and a holistic perspective is gained.

On the main roads into Collinsville there is a weed alert sign with a colour photograph of Parthenium Weed that has been there for years yet domestic and rural landholders often have patches of the weed freely flowering and seeding**. I think there needs to be much more effort and resources put into informing the public about the identification and eradication of the range of environmental weeds we have. A stich in time saves nine!**

My Father and i grew up on this farm and I have built on my Father's knowledge and observations. My Father was alarmed and broken hearted to see the amount of ring barking, over grazing and tree clearing that resulted in huge amounts of topsoil running past our farm in Coral and Pelican Creek, and the spread of invasive weeds. I have learned that we are a hotspot for sediment runoff onto the GBR: The Bowen-Bogie catchment is a hotspot for sediment runoff into the Burdekin River and GBR. **Erosion processes and sources in the Burdekin Dry Tropics catchment - (RP65G) - Synthesis Report - Chemistry Centre, Landscape Sciences - June 2015**
Key Findings **-** *Geochemical sediment tracing showed that the largest contributor of the fine sediments delivered to the GBR Lagoon in 2011/12 was the Bowen-Bogie (38%) -* https://publications.qld.gov.au/dataset/erosion-processes-sources-burdekin

It has become clear to me that a lot of the land management practices are contributing to the problems of land rundown, sediment runoff and invasive weeds – I believe they are interrelated.

I am certain that much of the weed control practices are counterproductive and better methods exist that although more labour intensive, are far more sustainable and have significant benefits. I have witnessed bulldozers used for weed control when basal bark herbicide spraying would be cheaper and result in less soil erosion, loss of biodiversity and use of herbicide. I have used pole chainsaws with carbide blades to access the base of advanced weeds – when dozer blades are used on many weeds the roots shoot and need follow-up herbicide application at levels much greater than a single trunk application.

Another observation that I find is supported by scientific evidence is the over-clearing of vegetation and loss of tree cover that contributes to weed colonisation and spread – also there are other negative consequences like land and water degradation, biodiversity and ecosystem services loss and desertification. **I made a submission to the Inquiry into the Vegetation Management Act – see Appendix 1 - (Sub 656).**

It is very evident from years of observation through periods of severe and extended drought, heavy rain and storms, fire, overgrazing and grasshopper plagues, that a tree canopy is vital for land health. The tropical savanna land tree species mostly have light canopies that help reduce evaporation and frost & sun burn, and drop leaves, twigs and branches (that prevail when grass fibre has disintegrated) that helps breakup rain drops and holds topsoil and humus.

I have learned of more scientific evidence on the issues of land functionality, biodiversity and carbon sequestration. It is very evident that cleared land is liable to be colonised by environmental weeds because of the loss of the moderation from the natural species and the loss of the gene pool seed bank of the indigenous species. The diversity of native grasses, forbs, herbs and shrubs are often impoverished on grazed land – the introduction of some exotic grasses and fodder species that are very invasive has contributed to this loss of biodiversity and resilience, and vulnerability to invasive weeds. (I understand from DAFF that native grasses are as productive as exotic grasses for cattle grazing.)

A mosaic of vegetation communities was the natural state of most of the savanna lands and has other benefits that are only now becoming evident. Many species are fire-retardant, nitrogen fixers, aquifer rechargers and provide microclimate, the transpiration cycle and habitat for beneficial species like bees, birds, mosquito eating bats and macropods that inoculate the soil with fungi that is critical to soil fertility.

There have been studies of the role Bettongs, Bandicoots and soil foraging species play in soil health and landscape functionality – and the water infiltration and soil erosion benefits of tree and vegetation cover. (See End Notes)

My Father taught me about the importance of leaving logs and branches on the ground to hold back soil and humus from erosion – I have learned that the benefits of that are far reaching like soil carbon, water infiltration, habitat and food for termites, microorganisms etc. and waterway, ocean and GBR health.

Speaking directly to the Terms of Reference:

- The Whitsunday Regional Council Local Government area seems to have a very good approach to weed control but I understand could use much more funding as the extent of the problem is huge.
- The DNRM and Crown Land seems to be inadequately cared for with weed control from my observations and community feedback.
- Biosecurity Queensland should be commended for their work yet much more needs to be done.
- The DEHP administered National Parks seem to be in need of much greater resources dedicated to environmental weed and animal control from my observations and community feedback. The DAFF seem to be working at crossed purposes with the DEHP, NRMs and local Councils from what I hear.
- The question about whether *federal, state and local government weeds programs are coordinated to maximise their achievements and to have a whole of government approach,* is a good one – I suspect that there are significant shortcomings and am not aware of any overarching body responsible for that - from what I can gather the *Weeds CRC* went the same way as the *Tropical Savannas CRC* – I recommend the reinstatement of both of these Corporative Research Centres.

Thank you for the opportunity to contribute to this very important inquiry.

Yours sincerely, Garry Reed

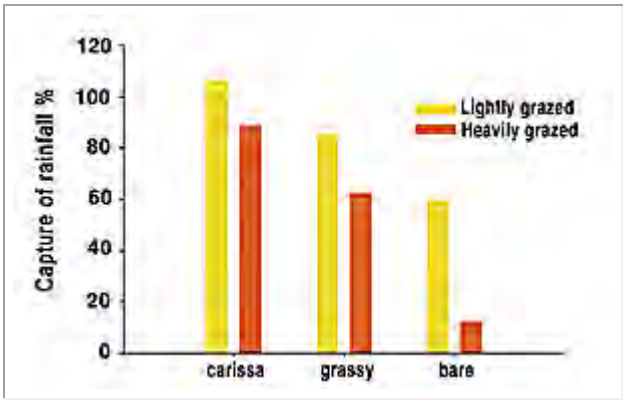
End Notes:

http://www.savanna.org.au/nq/productive_soils_neg.html

Australia's tropical savannas are characterised by low fertility soils, highly variable rainfall and long dry seasons.

The amount of rainfall captured and stored by the soil is the key driver of plant growth, but this can vary considerably across the landscape. If the soils capture the first rains of the wet season effectively, the longest possible growing season for pastures is ensured.

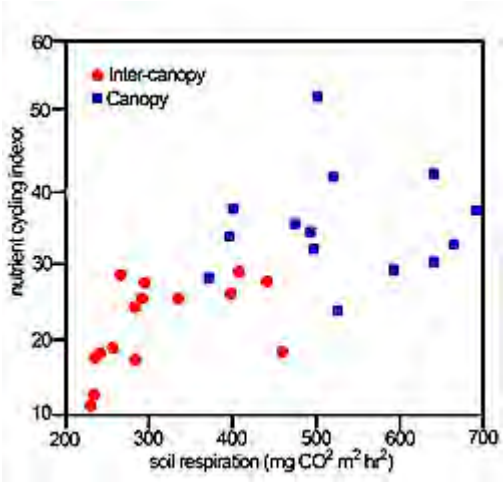
However, landscapes that don't capture this rain effectively will have a longer dry season, which in turn will cause further declines in soil health and productivity. In contrast to southern Australia, high intensity storms account for most of the rainfall in tropical savannas. Therefore we need to maintain high soil infiltration rates to ensure that as much of this water as possible is retained in the landscape.



Above: the percent of rainfall entering the soil within the different vegetation patch types considered in this study. As grazing intensity increases, the percentage of rainfall captured is reduced.

http://www.savanna.org.au/nq/trees_grazing.html

The following article is from *Savanna Links*, Issue 33, 2006. *Savanna Links* is written and produced by the Tropical Savannas CRC.



Relationship between the nutrient cycling index and soil biological activity at Wambiana, across grazing intensities, landform elements and canopy/intercanopy zones. The graph above shows that the zones under trees have higher soil biological activity, therefore more nutrient cycling occurs there. (Also greater water infiltration as reported by Dawes-Gromadzki et al,

Savanna Links Issue No 32). Soil is more stable there than in the intercanopy zones, irrespective of grazing intensity or landscape element.

Landscape condition

Landscape condition was assessed by measuring vegetation and soil crust cover, soil micro-topography and the size and spatial distribution of vegetated and bare soil patches (Tongway & Hindley 2004); these influence the capture and distribution of resources such as water and nutrients.

Results suggested that areas under tree canopies were in better condition than areas outside the canopy in terms of soil stability, infiltration rate, nutrient cycling capacity and soil biological activity. These differences were greater between ungrazed and grazed paddocks than between heavy and light stocking rates. Analysis of nitrogen isotopes in the soil and leaves in the grazed paddocks indicated that more nitrogen ‘leaks’ out of the system in grazed paddocks, possibly due to erosion or grazing and that trees in the grazed paddocks were not as efficient in using nitrogen as those in the ungrazed paddock. Overall, these results emphasise the importance of trees as zones of fertility and highlights the benefits of having a healthy landscape where topsoil, organic matter, water and nutrients are retained and recycled in the system.

References

Tongway, D. J. & Hindley, N. L. 2004, *Landscape Function Analysis: Procedures for monitoring and assessing landscapes, with special reference to minesites and rangelands*, CSIRO SE, Canberra.

Liz Poon is a PhD student with University of Queensland, Dr John Ludwig (CSIRO SE) and Dr Susanne Schmidt (UQ) are Liz’s advisers.

http://www.savanna.org.au/nq/wambiana.html

Variable rainfall in much of the savannas makes sustainable and profitable grazing a challenge. At a working cattle station near Charters Towers, an eight-year research project has been looking at different stocking strategies to deliver the best outcomes for the land, the cattle and the people. By Fran Bancroft and Kate O'Donnell.

Much of past research in the grazing industry has focused on animal production such as supplementary feeding, early weaning and other measures to maximise livestock production. The Wambiana project has shifted that focus on to the land and sustainable management-by attempting a big picture of the whole grazing system's response to how we manage grazing lands in a variable climate.

Dr Peter O'Reagain and John Bushell from Queensland's Department of Primary Industries and Fisheries (QDPI&F) have led the Wambiana grazing trial for the past eight years. The project, is co-funded by QDPI&F and Meat and Livestock Australia, but has also received support from a range of other funding bodies. The project aims to develop a set of best practices and guidelines for graziers and over the life of the project has assessed the ability of different grazing strategies to cope with rainfall variability in terms animal production, economics and resource condition.

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O'Reagain P.J. & Bushell J.J 2003. 'The effects of fire on woodland structure and density in a north Australian tropical savanna', in *Proc. VIIth International Rangelands Congress*, Durban, South Africa, July 2003, pp. 393–395.

Eastern Bettong Reintroduction - Returning Ecosystem Engineers
http://www.mfgowoodlandexperiment.org.au/bettong.html

The reintroduction of the Eastern Bettong (*Bettongia gaimardi*) to the Mulligans Flat Woodland Sanctuary is the subject of a major research grant led by the ANU, the ACT Government and CSIRO. This study will examine if the reintroduction of Eastern Bettongs to box-gum grassy woodlands will have cascading effects on the ecosystem. Eastern Bettongs are known to create up to 3000 diggings per ha, this is expected to have profound effects on the soil, water infiltration, seed germination and litter accumulation in the reserve.

http://www.abc.net.au/radionational/programs/latenightlive/the-eco-truffle/7626156

The Eco Truffle - Wednesday 13 July 2016

http://www.abc.net.au/radionational/programs/latenightlive/saving-the-australian-truffle/7652418

Saving the Australian truffle - Friday 22 July 2016

Native Australian truffles don't taste very good, but they're crucial for the health of the environment. Unfortunately, they're under threat. Scientists Todd Elliott and James Trappe give their advice on how Australia can save its truffles.

You might think truffles belong in restaurants, but in Australia they're a vital part of many ecosystems. Truffles are the fruit of fungi that live below the ground, and while Australian truffles aren't actually much good for culinary purposes, small marsupials still enjoy consuming them.

'The below-ground part is the mould growth in the soil,' says Oregon State University mycology master James Trappe. These fungi form a symbiosis with the tree roots, and are vital to the health and survival of trees.

In fact, about 95 per cent of the world's plants depend on these below-ground organisms, says global biodiversity student Todd Elliott. 'It actually ties in with the trees and plants' roots and is exchanging nutrients back and forth,' he says.

'This wood-wide web connects all these plants on the planet and is key for nutrient exchange.' Truffles reproduce through spores, which are transported and dispersed by the small mammals and insects that eat them.

But these animals are now being killed by pest animals like foxes and feral cats, and the ramifications are being felt all the way down the chain to the sub-surface fungi. Foxes and cats consume 75 million native animals each night, and up to 20 billion a year.

Not only do native mammals help distribute the truffle spores, they're also responsible for tilling the soil in search of the food, making it permeable to rain and maintaining nutrient cycles. 'This whole system depends to a large degree on tilling the soil, loosening it up, because so much of Australia's soil [is] very ancient and weathered for two billion years in many cases,' Trappe says.

'Water can't permeate readily into that soil unless it's tilled—little animals dig a hole to get the truffle and they leave a little reservoir there for rainwater. 'These little animals are so important to the health of the soil—the soil is the productivity source for everything we want to grow, be it wood or food, and if the very foundation of these complex interactions is interrupted, then the productivity is going to decline. It has.'

How truffles might save the environment

There's an estimated 2,000 varieties of truffle in Australia—many more than originally thought—and only about 300 of them have been named and described. **Researchers hope that these truffles could play a role in making Australian environments more resilient to drought.**

End – 16.1.17 - Invasive weeds - Qld Inquiry – Garry Reed

29th April 2016

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Submission to Committee on *Vegetation Management (Reinstatement) and Other Legislation Amendment Bill 2016*

Dear Chair and Committee Members, I am writing from the perspective of someone that grew up on an agriculture and grazing property in the Collinsville area, completing an apprenticeship at the local power station - working between Brisbane and North Queensland as an electrician and in agriculture, forestry and landcare.

I sent a letter to the Newman Government leading up to the introduction of the Vegetation Management Act Amendments in 2013 - to report on some alarming waterway clearing activity locally and the history of land degradation and soil erosion that our family has witnessed over the last 90 years.**(See attached** – nb. a spelling mistake, I meant imminent.**)**

An alarming report from a friend travelling to Collinsville from NSW last winter – 2015, who witnessing large scale chain clearing in Queensland, had prompted me to write to the Queensland Government in September because the activity has such far reaching and potentially terminal consequences. The informant had experience as a biologist in Queensland for over 30 years and was horrified to see this occurring again. I pleaded for some sort of mechanism like biodiversity credits or compensation be put in place urgently to fairly and effectively preserve ecosystems for the future of sustainable farming and landuse in Qld and referenced the following: NSW introduced the *Biobanking* system 5 years ago and reviewed it 3 years ago: *http://www.environment.nsw.gov.au/biobanking/*
A review of biodiversity legislation in NSW was released December 2014:
http://www.environment.nsw.gov.au/resources/biodiversity/BiodivLawReview.pdf

What has failed and what has been successful?

I called for a moratorium given the critical importance of biodiversity and the probable extinction of regional remnants and biodiversity especially on high quality land facilitated by the extended clearing permitted by the dysfunctional and politically compromised Newman LNP government. (See End Notes: *Borbidge Sheldon Election Review and Report and Recommendations - QCoal's James Mackay developing environmental policy for Newman Government in Queensland)*

Over my life here I have learned a great deal about some of the systemic problems that are resulting in enormous losses for our state and nation and I have contributed to a number of inquiries to set out my experience. The letter I wrote to the Newman government at the time of the Vegetation Management Act reforms - 22nd May 2013 (attached) has proved to have been very relevant from media reports of major high biodiversity value vegetation loss.

Land clearing soars in Queensland, leaked figures show - By Environment reporter Jake Sturmer and the National Reporting Team's Lisa Main - Updated 16 Jun 2015

In an effort to halt the rise in clearing, Associate Professor Martine Maron, an environmental scientist at the University of Queensland, along with 20 other concerned scientists wrote to the current ALP Government urging them to "consider the irreversible environmental consequences" of clearing.

"Land clearing threatens Australia's national commitments on a number of fronts, including preventing extinctions, reducing emissions and improving reef water quality," Professor Maron said. http://www.abc.net.au/news/2015-06-16/land-clearing-soars-in-queensland-leaked-figures-show/6550622

My father and uncle reported to me that storm rainfall decreased after the clearing of the Brigalow scrubs south of us in the 1970's. Isotopic analysis of rain has confirmed that inland areas receive a large proportion of their rainfall from the transpiration cycle from vegetation. I have heard an anecdotal report that the EPA had documented a rainfall decrease correlating with the Brigalow clearing. The Brigalow ecological communities are now listed as endangered yet continue to be cleared with many remnants also in decline from erosion and weed infestation.

Brigalow is now considered an important species for economic material and biofuel, nitrogen fixing, land rehabilitation, climate engine/water transpiration cycle and carbon sequestration. (See End Notes.)

I recently went on a very encouraging *Innovation in Agriculture Bus Tour* hosted by NQ Dry Tropics, Terrain NRM, Herbert Cane Productivity Services, and Reef Catchments. A major focus of the farms attempting to reduce sediment and fertilizer use and subsequent runoff to improve reef water quality, was soil health and a reduction of tillage.
http://www.nqdrytropics.com.au/innovative-farming-techniques/

About 25 years ago I made inquiries to DPI (Dept of Primary Industries – Qld) about fungi's role in soil fertility – I was informed that no one was working on it. I understand that situation has changed yet I see the issue of habitat for macropods that contribute to ecosystem health is given little consideration. I notice that Currant bush/Conkerberry [Carissa ovata and C. lanceolata) are included in a list of weeds for the Burdekin Dry Tropics although it does state that it is not a declared plant because it is an Australian native plant and you should contact your local government pest management officer. From my experience some local graziers are targeting this species along with the environmental weeds like Chinee Apple and Lantana – leaving little habitat for species like Bettongs that inoculation the soil with fungi. The following project that should be applicable to our Bettongs dates from around 2011:

Eastern Bettong Reintroduction - Returning Ecosystem Engineers
http://www.mfgowoodlandexperiment.org.au/bettong.html

The reintroduction of the Eastern Bettong (*Bettongia gaimardi*) to the Mulligans Flat Woodland Sanctuary is the subject of a major research grant led by the ANU, the ACT Government and CSIRO. This study will examine if the reintroduction of Eastern Bettongs to box-gum grassy woodlands will have cascading effects on the ecosystem. Eastern Bettongs are known to create up to 3000 diggings per ha, this is expected to have profound effects on the soil, water infiltration, seed germination and litter accumulation in the reserve.

I have been deeply disillusioned and disappointed over the years of following the developments in national and international protocols on the preservation of biodiversity, land and water quality – to go on with others to make great sacrifices and put in years of hard landcare work, then to see such gross loss through negligence and poor governance processes. I found the following report that seems to have been forgotten or neglected as I hear next to nothing about it.

National Report by Australia on Measures Taken to Support Implementation of the United Nations Convention to Combat Desertification
Commonwealth Intergovernmental Working Group for the UNCCD, April 2002
http://www.environment.gov.au/resource/australian-actions-combat-desertification-and-land-degradation-10

Australia is one of the twelve most biologically diverse nations in the world, the only developed nation to have this 'megadiverse' status. Australia is also the world's driest continent, excluding Antarctica, and has a high degree of rainfall variability from one year to the next. Very few of Australia's soils are naturally suited to agriculture, with most being shallow, high in salt stores and low in nutrients. Only 6 per cent of the land is arable without irrigation and large areas are naturally affected by salt, sodicity, waterlogging or acidity….

Yet I find International Agencies are still working on initiatives on this convention. (See End Notes.)

It seems incalculable loss has occurred because of a failure to heed warnings and information from those on the ground. My father would be turning is his grave if he could witness what I have recently. From my observations here, practices that have contributed to the Great

Barrier Reef decline have escalated over the 3 years since the AIMS (Australian Institute of Marine Science) report of 2012.

There is an update to the letter to the Newman government. I subsequently learned of the loss of the *Two Chain Law* (protection of 44 yards/40.23 m of vegetation on waterway banks) in the 1960/70s under the Bjelke-Petersen government. I have also found in the recent **Auditor General's Report - *Managing water quality in Great Barrier Reef catchments* -** (https://www.qao.qld.gov.au/report-20:-2014-15) on page 39/40 – Figure 3F that land clearing in reef catchments increased from 31,000ha/yr in 2008-09 to 102,000ha/yr in 2013-14.

Also the study I quoted in that letter - Bartley et al. 2004 that identified hillslopes as the main source of sediment for the Bowen and Burdekin River catchments has been superseded by Wilkinson et al. 2013 which identifies alluvial gullies as the main sediment source – this is a confirmation of the observations made by my father over 40 years and led him to work his guts out to keep cattle off the creek banks, on control erosion and protection of vegetation buffer zones.

The abolition in the early 1970's of the *Two Chain Law* (protection of 40.23m of waterway bank vegetation) has been a major contributor to the collapsing, degrading and eroding creek banks. Waterway bank vegetation is also important for aquifer recharge, water and air pollution reduction, carbon sequestration, fire retardation, micro-climate and wildlife habitat.

The Bowen-Bogie catchment has recently again been identified as a hotspot for sediment runoff into the Burdekin River and GBR. **Erosion processes and sources in the Burdekin Dry Tropics catchment -(RP65G) - Synthesis Report - Chemistry Centre, Landscape Sciences - June 2015**
Key Findings **-** *Geochemical sediment tracing showed that the largest contributor of the fine sediments delivered to the GBR Lagoon in 2011/12 was the Bowen-Bogie (38%)*
See report - page 11- https://publications.qld.gov.au/dataset/erosion-processes-sources-burdekin

Another issue that is coming to light is the loss of waterways from filling for broadscale agriculture and degradation from diversions which do not replicate the hyporheic zone. (The hyporheic zone is located at the interface of aquifers and rivers, and comprises the sediments in which there is exchange and mixing of groundwater and river water. It is an important zone for pollutant, energy and carbon cycling, and may be an important component of the riverine habitat.) The result of this loss is increased soil runoff and reduced water infiltration, aquifer recharge and water quality.

I have learnt a lot about hydrology, geomorphology and ecology since the proposal was made in 2012 to divert and mine Coral Creek that is a primary feed for the water basin our farm draws from. It is over 20 years since I became acquainted with *ecological economics* [holistic

economics] and have become painfully aware of the systemic failures resulting from the lack of accounting for all costs and benefits.

- **The economic system is completely out of date and needs urgent reform. The present *Neoclassical Economics* that considers environmental and social factors externalities is dangerous at this time of environmental crisis. A recommendation from the NSW ICAC if applied in Qld, to apply *Triple Bottom Line* assessment before the issuing of Exploration Leases would have great benefits.** (I have referred to this in my submissions on land use and mining for some time – it should be applied to all decision making.)

Economic policy analysis is not giving enough consideration to environmental and long term consequences. The economy is a subsystem of the ecosystem yet presently environmental and social factors are considered externalities. (I attended the inaugural conference of the Australian & NZ Society for Ecological Economics (ANZSEE) – Coffs Harbour 1995 - http://anzsee.org/ The Commonwealth Government supported the conference and was instituting environmental economic accounting but that seems to have been scuttled by the Howard/Costello Government after 1996. There are a number of initiatives that are aimed at full/true cost – triple bottom line accounting, that need to be urgently put in place. It is criminal to see we are still only talking about this 20 years on.)

The following IQ2 debate is very relevant: http://www.thefifthestate.com.au/spinifex/the-debate-we-nearly-had-on-pricing-nature/75911

The debate we nearly had on pricing nature - Paula Wallace | 27 July 2015

Conservationist Penelope Figgis: *"What I'm talking about are things like TEEB [The Economics of Ecosystems and Biodiversity* - http://www.teebweb.org/areas-of-work/country-studies-home/*] studies… I can't think of anything better to turn this country around," she said, adding that more than 20 countries are now undertaking such studies.*

A country study from TEEB identifies the ecosystem services that are vital to meeting the country's policy priorities and makes recommendations on how these services can be integrated into policies. These recommendations, depending on the country context, can include policies for poverty alleviation, subsidy reform, land use management, protected area management, securing livelihoods, to name a few.

It estimated that the global top 100 environmental externalities (the cost that affects a party who did not choose to incur that cost) are costing the economy worldwide around US$4.7 trillion a year.

Figgis believes having such information available about our ecosystems will enable their value to come into decision-making at all levels and allow business to manage risks better and gain competitive advantage…

It's not unexpected that industry is the greatest contributor to global warming, but it does reinforce economist Pavan Sukhdev's comment: "Corporations determine two-thirds of the economy, and nothing will change unless they change".

He believes that to turn around this "planetary time-bomb" companies need to move from a purely financial understanding of value to a wider understanding that takes externalities into account.

"We cannot manage what we do not measure and we are not measuring either the value of nature's benefits or the costs of their loss. We seem to be navigating the new and unfamiliar waters of ecological scarcities and climate risks with faulty instruments," Sukhdev said….

If Integrated Reporting was mainstream though, it's unlikely that some of the biggest environmental disasters in modern history would have occurred.

The UK based IR (Integrated Reporting) seems to be gaining support also: http://integratedreporting.org/

To sum up my points:

- **Biodiversity is the foundation of the ecosystem resilience. The loss of the remnant biota and refugia at this time of biodiversity loss and ecological crisis is extremely serious.**
- **There has been a history of land-use failures that have resulted in cumulative and ongoing soil erosion and biodiversity loss.**
- **There is a lack of education and awareness about the value of biodiversity and vegetation integrity for ecosystem and landscape functionality.**
- **The environmental weed and soil erosion problems are continuing to accelerate from my experience. Landholders and earthmoving operators should be accredited to an adequate level of competence to improve land use standards.**
- **There is an abundance of more integrated and sustainable agricultural systems yet little transition. eg:** http://www.fao.org/3/a-i4327e.pdf Final Report-International Symposium on Agroecology -18-19.9.14
- **Political conflict of interest is leading to subversion of the assessment and approval process for industry proposals resulting in major decline of land, air and water quality and ecosystem health.**

A case arose during the Newman LNP government that raises serious concern about the separation of powers and good governance. (http://www.abc.net.au/news/2014-05-05/qcoals-james-mackay-developing-environmental-policy-for-lnp/5431008) The case was referred to the CCC (Crime and Corruption Commission) but no breaches of the law were determined. The failure to deal with conflict of interest has been a chronic problem in Queensland and must be dealt with by laws and institutions to save us from the destructive consequences.

- **There is a culture of cover-up and willful blindness in many industries and regional towns that are vulnerable because of dependence on a narrow range of income and employment sources. I have observed and have been informed off the record of many gross failures to maintain environmental and safety standards in the Bowen Basin and the local area.**

I would like to bring your attention to the letter/report I sent to the Newman Government attached. I set out years of experience that is very relevant to our present predicament.

I hope my submission is of benefit for this critically important Parliamentary inquiry.

Yours Sincerely, Garry Reed

End Notes:

Borbidge Sheldon Election Review and Report and Recommendations - 28th May 2015

1.5 The overwhelming election win of 2012 led to hubris and a false sense of security consolidating an energetic and reformist government leadership team but without parliamentary experience. The huge influx of inexperienced new MP's and a leader without parliamentary background contributed to a lack of corporate history in the conduct of parliament and the party room.

The Review Report and Recommendations
1. Parliamentary party and organisational wing relationship

1.2 The overwhelming election win of 2012 led to a changed dynamic where the leadership team of the parliamentary party in a sense of hubris isolated itself from the organisational wing. The primary consequence of the breakdown was the lack of consultation on policy or political party or campaign matters for the best part of the crucial first two of the government's term.

3. Government decision making
3.1 The government's haste to implement the reform agenda and the 'can do' approach left little room for other views or 'listening to' supporters, voters and even the grass roots of the party. External new ideas or friendly criticism was unwelcome.

3.2 The former government in its reforming zeal and decision making processes alienated almost every key interest group across the state. The good policy work done for many stakeholders was lost by the 'lack of listening' or a dismissive arrogant approach which ultimately resonated at the poll.

4. Policy and Reform Agenda
4.8 Emphasis on the four pillars of tourism, resources, agriculture and the construction industries in 2012 worked well after years of neglect by the previous Labor government. Over the term, however, the view of the government emerged that the new industries, the scientists, the researchers, the innovators and the arts were sidelined or even excluded.

7 Local Campaigns
7.1 The principle that all politics is local was discarded, usurped by a centralised presidential style of campaign, and tightly controlled by the central campaign committee staff with minimal input from local campaign committees. With the exception of one or two well organised campaigns, there were no genuine local policy initiatives other than those approved by the central campaign committee.

Recommendations:

1. *The Borbidge Sheldon review report and recommendations must be released to party units at the same time it is given to the state executive and made public thereafter*.

5. That the LNP *Integrity Paper* should be updated and implemented and all candidates should be required to acknowledge and accept its requirements. That the LNP in government or opposition be required to adhere to the principles which include:

- broken promises will not be tolerated by the public;
- corruption and lack of accountability will not be tolerated;
- the institutions of state must be respected.

39 That the LNP consider the full public funding of election campaigns and the banning of trade union and corporate donations.

QCoal's James Mackay developing environmental policy for Newman Government in Queensland

By the National Reporting Team's Mark Solomons and Mark Willacy - Updated 5 May 2014

The head of corporate affairs for a mining company at the centre of an environmental dispute has been in charge of developing policy on the environment for Queensland's ruling Liberal National Party (LNP) since 2012.
http://www.abc.net.au/news/2014-05-05/qcoal's-james-mackay-developing-environmental-policy-for-lnp/5431008

The case arose during the Newman LNP government that raises serious concern about the separation of powers and good governance. The case was referred to the CCC (Crime and Corruption Commission) but no breaches of the law were determined. The failure to deal with conflict of interest has been a chronic problem in Queensland and must be dealt with by laws and institutions to save us from the destructive consequences.

Centre for Mined Land Rehabilitation - Sustainable Minerals Institute – The University of Queensland - Restoration of Brigalow Plant Communities on Degraded Landscapes
https://www.cmlr.uq.edu.au/restoration-brigalow-plant-communities-degraded-landscapes

One of the most critical challenges in restoration ecology is the rehabilitation of water-limited ecosystems at landscapes of post-open-pit mining, because both soil and plant communities are substantially disturbed (i.e., removed).

The Brigalow Belt Bioregion represents a unique water-limited ecosystem and is therefore highly relevant as an example for the development of successful rehabilitation strategies in Australia as well as any other semi-arid post-mining restoration sites around the world.

P.J. Peeters and D.W. Butler (2014) ***Brigalow: regrowth benefits management guideline.*** Department of Science, Information Technology, Innovation and the Arts, Brisbane.

https://www.qld.gov.au/environment/assets/documents/plants-animals/regrowth/brigalow-management-guideline.pdf

Water loss from brigalow leaves is minimal, and plants do not shed leaves in adverse conditions. As a result, brigalow leaves have the ability to maintain a positive carbon balance over a wide range of environmental conditions, and this species is very productive in a relatively low-rainfall, high-evaporation environment (Tunstall and Connor 1975). Brigalow can also tolerate high salt levels, even though growth under these conditions is reduced

Dry rainforest or brigalow
Brigalow can develop into dry rainforest (semi-evergreen vine thicket or softwood scrub, often with *A. harpophylla* present as an emergent tree) given sufficient moisture, protection from fire, and a suitable seed source (Johnson and Burrows 1994; Nix 1994). If your site will support dry rainforest, it may be preferable to restore this vegetation type rather than 'pure' brigalow, as brigalow with dense dry rainforest is likely to accumulate more carbon and a shady dense tree and shrub layer will be more resistant to grass invasion.

Queensland land-clearing changes threaten trees farmers need - 3 October 2012

https://theconversation.com/queensland-land-clearing-changes-threaten-trees-farmers-need-9714

The trees are nitrogen fixing via a bacteria in their root systems, and they provide calcium to the soil through their leaf foliage. Brigalow trees can withstand high levels of salinity and keep salinity levels in the soils stable. Clearing these trees has led to less crop production as well as less pasture grasses, meaning smaller cattle.

Land clearing encourages exotic and invasive plants, animals and insects to make a new home. These invasive species include weeds like lantana (*Lantana camara*) and the rubber vine (*Cryptostegia grandiflora*), which are a nightmare for farmers.

And brigalow holds the soil together and helps water seep down into the ground. Clearing brigalow has meant more erosion problems for farmers, increased runoff for water, and higher salinity levels in the groundwater.

Whether you're growing crops or pasture for cattle, if you want to have good soil, brigalow is an extremely important tree to have around. Too often, the health of the soil on a property is not valued enough. Farmers have been found to favour clearing these types of vegetation from the most fertile areas on their properties.

Putting at-risk brigalow-dominated ecosystems on the endangered list helps bring attention to this tree, but it isn't enough. There has to be a change in attitudes and land management practices by property owners in this area.

Education is definitely one way. Financial incentives such as the Carbon Farming Initiative may be another way to encourage famers to keep existing brigalow trees on their properties. Until this happens, legislation like the Vegetation Management Act 1999 provide an important way to protect brigalow from being cleared.

Preserving Biodiversity in Brigalow landscapes.

https://www.gpem.uq.edu.au/docs/Brigalow/ConservingBrigalowLandscapesl.pdf

Henry Nix is an Emeritus Professor at Australian National University with over 30 years experience studying Australian landscapes.

In 1960 when I graduated B. Agr. Science from the University of Queensland the prevailing ethos was that unproductive lands should be developed, as a priority. The brigalow lands were at the top of the list.

New methods of clearing using heavy machinery and aerial spraying with potent herbicides gave momentum to the attack. Back then the sheer immensity of the brigalow lands made it difficult to conceive of a time when there would be concern for the remnants of these once distinctive landscapes. But within a few decades less than ten per cent of the original cover remained. Even this pitiful total conceals the true picture. Very few large (>1000 ha.) tracts remain and even fewer are in reserves.

What is more these do not provide a representative sample of the original great diversity of brigalow landscapes. The best developed brigalow vegetation on the most productive sites was targeted early and of this virtually nothing remains.
Much of what is left, along roads and in small paddock remnants, is conservation by default; it was deemed unavailable or unsuitable for productive use. The loss of biodiversity has been incalculable but, as this booklet affirms, not all is lost

Then in the early 1960s I consider myself fortunate to have been a member of the CSIRO teams that conducted land resource surveys that preceded the massive clearing of the Brigalow Lands Development Scheme in the Fitzroy and Belyando catchments. These surveys focused on descriptions of land forms, soils and vegetation and subsequent evaluation of the potential for agricultural, pastoral and forestry production. Conservation was not a focus, but attention was drawn to the need to reserve adequate representative samples of the landscapes described, as well as specific examples of unique, unusual and restricted areas of vegetation.

The Government of the day steadfastly ignored this advice and by the time later Governments took action, it was too little and too late. Active brigalow regrowth has been a scourge for the settler, but it does provide an opportunity as well as a challenge. It can provide a basis for renewal of wildlife habitat, for enhancing connectivity across landscapes and for developing a potentially valuable carbon sink.

World Day to Combat Desertification - 17 June 2016
http://www.un.org/en/events/desertificationday/background.shtml

Desertification - Environmental Degradation

Desertification is a phenomenon that ranks among the greatest environmental challenges of our time. Yet most people haven't heard of it or don't understand it.

Although desertification can include the encroachment of sand dunes on land, it doesn't refer to the advance of deserts. Rather, it is the persistent degradation of dryland ecosystems by human activities — including unsustainable farming, mining, overgrazing and clear-cutting of land — and by climate change

What Causes Desertification

Desertification occurs when:

- the tree and plant cover that binds the soil is removed. It occurs when trees and bushes are stripped away for fuelwood and timber, or to clear land for cultivation.
- animals eat away grasses and erode topsoil with their hooves.
- intensive farming depletes the nutrients in the soil.

Wind and water erosion aggravate the damage, carrying away topsoil and leaving behind a highly infertile mix of dust and sand. It is the combination of these factors that transforms degraded land into desert.

Impact of Desertification

Desertification is a global issue, with serious implications worldwide for biodiversity, eco-safety, poverty eradication, socio-economic stability and sustainable development.

Drylands are already fragile. As they become degraded, the impact on people, livestock and environment can be devastating. Some 50 million people may be displaced within the next 10 years as a result of desertification.

The issue of desertification is not new though — it played a significant role in human history, contributing to the collapse of several large empires, and the displacement of local populations. But today, the pace of arable land degradation is estimated at 30 to 35 times the historical rate.

Towards Sustainable Development

Desertification, along with climate change and the loss of biodiversity, were identified as the greatest challenges to sustainable development during the 1992 Rio Earth Summit.

Established in 1994, the United Nations Convention to Combat Desertification (UNCCD) is the sole legally binding international agreement linking environment and development to sustainable land management. Parties to the Convention work together to maintain and restore land and soil productivity, and to mitigate the effects of drought in drylands — the

arid, semi-arid and dry sub-humid areas where some of the most vulnerable ecosystems and peoples can be found.

What can be done?

- Reforestation and tree regeneration
- Water management — saving, reuse of treated water, rainwater harvesting, desalination, or direct use of seawater for salt-loving plants
- Fixating the soil through the use of sand fences, shelter belts, woodlots and windbreaks
- Enrichment and hyper-fertilizing of soil through planting
- Farmer Managed Natural Regeneration (FMNR), enabling native sprouting tree growth through selective pruning of shrub shoots. The residue from pruned tress can be used to provide mulching for fields thus increasing soil water retention and reducing evaporation.

DESERTIFICATION LAND DEGRADATION & DROUGHT (DLDD) - SOME GLOBAL FACTS &FIGURES
http://www.unccd.int/Lists/SiteDocumentLibrary/WDCD/DLDD%20Facts.pdf

Land degradation & Desertification
• 2.6 billion people depend directly on agriculture
• 52% of the land used for agriculture is moderately or severely affected by soil degradation
• Land degradation affects 1,5 billion people globally
• Arable land loss estimated at 30 to 35 times the historical rate.
• Total land degradation affects some 1.9 billion hectares of land worldwide
• 24 billion tons of fertile soil disappear/year, the most significant, non-renewable geo-resource
• Due to drought and desertification each year 12 million ha are lost (23ha/mn!), where 20 million tons of grain could have been grown.
• Six million km2 of drylands bear a legacy of land degradation.
DLDD & Biodiversity
• Land degradation jeopardizes biodiversity. Desertification affects the global loss of biodiversity; 27,000 species are lost each year
DLDD & Climate change
• Current agricultural practices represent over 13% of GHG emissions
• Climate change will depress agricultural yields by up to 15-50% in most countries by 2050, given current agricultural practices and crop varieties
• The percentage of Earth's land area stricken by serious drought has more than doubled from the 1970s to the early 2000s

End - Submission to Committee on *Vegetation Management (Reinstatement) and Other Legislation Amendment Bill 2016* – 29th April 2016 – Garry Arthur Reed

Inquiry into the impacts of invasive plants (weeds)
and their control in Queensland

Submission No. 043

22nd May 2013

EMAIL TRANSMISSION

[redacted]

Dear Premier and Ministers, I am sending this letter adapted from my letter of the 21.9.12 because of the issue of the immanent Vegetation Management Legislation.

I have edited the original letter as it mostly related to the diversion of Coral Creek for a coal mine but there is a lot of material that relates to land management going back decades. I have highlighted text and added photographs that relate to the vegetation management issue.

Our family has had a lot of experience here with almost 90 years on this farm. My father had been very distressed over the last 50 years to see the amount of clearing and over grazing with a great increase in the amount of topsoil washing down our creeks.

My father and I had many disagreements over politics and folklore and there was often resistant to new ideas but our mutual respect for the land and future generations was rock solid. Now many of my father's fears and concerns from years of experience are coming home.

I now learn from a 22 June 2012 affidavit from Dr Andrew Markham for the mining company in the Land Court case EPA1002-11, quoting Bartley et al. (2004) that the *Bowen River Catchment is a hotspot for soil erosion and suspended sediment export. The study estimates that while the Bowen River represents only 7.3% of the catchment area of the Burdekin River, it constitutes 45% of the total sediment load (mostly derived from hillslope erosion), with sediment yields up to 4t/ha/yr for parts of the catchment. The study noted that Pelican Creek was among a number of smaller catchments noted for high sediment contribution, estimated to be 1.3t/ha/yr. Therefore it is clear that the Bowen River Catchment is already a significant contributor of sediment to the Burdekin River (presumed due at least in part to landuse practices and grazing pressure) and that the incremental impact of possible sediment loss from the Coral Creek Diversion on the Coral Sea is likely to be small.*

I would like to draw attention to the Australian Government Caring for our Country Reef Rescue initiative that is improving grazing land use practices and the cumulative increases in sediment run-off from the new Jax Mine and proposed Drake Mine on the bank of the Bowen River.

Also a recent Coral Reef symposium in Cairns reported extremely serious coral cover loss on the Great Barrier Reef with a 50% decrease over the last 50 years with sediment and contamination a contributor.

Subsequent to this report an AIMS report has stated that there has been a 50% loss of Coral over 27 years and another 50% loss is expected over the next 10 years unless major changes are made to improving land use standards.

My father was also distressed about 30 years ago, to see 2 of the 3 big old cluster fig trees (Ficus racemosa) on the bank of Coral Creek washed out in a flood that eroded the bank.
I have been attempting to revegetate the bank to halt the erosion over the last 20 years. So far I have planted over 100 trees and have only ended up with 6 trees surviving, with one 10 year old Black Ironbox (Eucalyptus raveretiana) undermined by a flood 3 years ago and a 15 year old River Sheoak (Casuarina cunninghamiana) having only just died in the last month.
It is now evident why this situation has occurred. It is as a result of the ring barking and clearing of vegetation behind the fig trees and creek banks. The large Gum trees close to the banks were ring barked about 50 years ago and the scrubs running further back were clearing about 40 years ago. Some vegetation has regenerated on the cleared land but is mostly shallow rooted environmental weeds and grasses.

Therefore there has been a major loss of water infiltration, shelter, transpiration and micro-climate that is causing stress and dieback in the remaining vegetation on the creek bank. Also the dead hardwood roots are decomposing further reducing bank stability. Coral Creek has a catchment that runs high into the ranges and can have intense flood flows. Because of the failure to fully rehabilitate this bank erosion there is a serious risk that in a large flood the erosion could spread and cause a catastrophic loss of hundreds of meters of bank in length and breadth and mature trees extending downstream and changing the confluence position of the mouth of Coral Creek effecting the hydrology and water availability for natural vegetation and our farm's water supply.


Coral Creek bank erosion rehabilitation


Creek Coolabah undermined


River Sheoak - possible Dieback diseased

The situation described here is not isolated and is very widespread and also around here the loss of Brigalow (Acacia harpophylla) over the last 60 years has exposed land that continues to erode where no regeneration has occurred because of the nature of the soils and grazing. My Father and Uncle maintained that after the widespread clearing of the Brigalow scrubs in the 1970's, the amount of storm rain declined greatly. It is now known from isotopic analysis of rain water that a large amount of rain comes from the transpiration cycle that depends on deep rooted drought tolerant trees.





Brigalow (Acacia harpophylla) On Pelican Creek near Scottville, Brigalow was harvested for the town suction gas engine powered water pump in the 1920's and also poisoned because of Harrisia Cactus infestation in the 1950's.

We have made many observations and have done some study relating to these issues and gained a lot of experience over the years but as laymen you do not always feel confident in your perspective. It is evident that many bad decisions have been made in the past, with or without regulator approval, that continue to cause significant problems with little rectification occurring.
The following observation relates to mining companies who you would think have an interest in maintaining a high degree of credibility in the community but some of them have been guilty of taking advantage of poor regulation. My concern is that weakening Vegetation Management Regulation will be taken advantage of by some landholders which could result in very significant damage and adverse impacts at this critical time.

At the time of talking to one consultant the Federal Government was discussing green tape reduction and we discussed it. He believed that the problem was not an excess of green tape but a lack of effectiveness and loopholes in that regulation. He thought the reason that some proposals were taking an extended time to get approval was because the mining companies were taking advantage of the process and trying to get approvals for works that should not have been proposed in the first place. (I have also heard similar things from a number of others recently.)

The following reports also apply to Land and Vegetation Management.
I studied the EIS for the Drake Mine extension to the Sonoma Mine and found this prediction of climate changes for the local area. When you consider the damage that has been done to the land and creeks here already, the scenario of a significant increase in drought and severe cyclones is extremely worrying in light of our compromised country here.

From Drake Coal Project EIS June 2012

4.4 Climate Change

As well as a decrease in annual rainfall, an increase in daily precipitation intensity (rain per rain-day) and the number of dry days is predicted. The future precipitation regime will have longer dry spells interrupted by heavier precipitation events. Changes to extreme events would have the potential to increase erosion rates and flood frequency, with implications for river flow, water quality, and the design standards of infrastructure.

Drought occurrence is projected to increase over most of Australia (CSIRO, 2007). (CSIRO (2007). Climate Change in Australia, Technical Report, developed by Commonwealth Scientific and Industrial Research Organisation and the Bureau of Meteorology in partnership with the Australian Greenhouse Office, Canberra.)

Models have predicted a range in rainfall changes from an annual increase of 17% to a decrease of 35% by 2070. The 'best estimate' of projected rainfall change shows a decrease under all emissions scenarios (DCC, 2009). (Department of Climate Change (2009). Climate Change Risks to Australia's Coast, Commonwealth of Australia, Canberra.)

4.4.5 Cyclones

Under three different studies the number of severe tropical cyclones is projected to increase by 56% by 2050 (Walsh et al., 2004) (Walsh KJE, Nguyen KC and McGregor JL (2004). Finer resolution regional climate model simulations of the impact of climate change on tropical cyclones near Australia, Climate Dynamic, 22:1,www.springerlink.com/contect/brmpmturdqvxh3vv.), 22% by 2050 (Leslie et al., 2007) (Leslie LM, Karoly DJ, Leplastrier M and Buckley BW (2007). Variability of Tropical Cyclones over the Southwest Pacific Ocean using High Resolution Climate Model, Meteorology and Physic 97 (Special Issue on Tropical Cyclones), ftp.gfdl.noaa.gov.au/qld-regional-profiles.) and 140% by 2070 (Abbs et al., 2006).(Abbs D, Aryal S, Campbell E, McGregor J, Nguyen K, Palmer M, Rafter A, Watterson I and Bates B (2006). Projections of Extreme Rainfall and Cyclones: Final Report to the Australia Greenhouse Office, CSIRO Marine and Atmospheric Research, Canberra, www.cmar.csiro.au/eprint/ open/abbsdj_2006b.pdf.)

These comments relate to vegetation management also and the past loss of critically important vegetation communities is likely to have resulted in the loss of the local variation in species which is considered to be as important as the loss of a entire species.

The fragmentation and reduction in community size of remnant populations can make them vulnerable to genetic weakness, weed infestation and disease.
I have made observations here that defy prevalent folklore about trees and grass. Corridors of trees have been planting on our property and grazed yet the grass under the trees is lusher than in the open and after frost or hot dry weather, is green rather than dry. I have spoken to old time graziers and they tell me that trees get their moisture from a different place than grass.
The implications for soil erosion is critically important as leaf, twig and branch fall from trees prevail while grass disintegrates quickly in drought. The other critical issue is loss of tree cover results in a reduction of rainwater infiltration and ground water recharge. Isotopic analysis show that the transpiration cycles is a significant source of rain and dew especially in inland areas.


Grass green under savannah trees


Leichardt Bean (Cassia brewsteri) dozed by a contractor on a neighbour's land

I have observed some very troubling activity on neighbouring properties over the years. Recently a contractor dozed a track beside the fences and in the process pushed mature healthy trees like Brigalow and Leichardt Bean which are nitrogen fixers, are fire retardant and are very drought tolerant and were away from the fence lines.

Also in the process large trees in a major creek were dozed including the Nationally listed Eucalyptus raveretiana. Large Paperbarks and Sheoaks were also dozed into the running water. I contacted the landholder to get the phone number of the contractor to alert them to the breach of the law that had inadvertently happened. Unfortunately my approach was not greeted with cooperation despite the activity being upstream of my water pump and farm.

Land use and vegetation issues are of critical importance and I believe strong education and regulation are imperative as failure can have very serious and long term consequences. Also there are a lot of inexperienced landholders and operators that can make serious mistakes.


The landholder that contracted the dozer operator to carry out this work was justifying this loss of creek vegetation & soil and water contamination because of rubber vine that I could have controlled with a hand saw and herbicide.

There is little doubt that biodiversity is the foundation of the resilience of the ecosystem and our economy is a subsystem of the ecosystem. Policy decisions do not always take this into account and is leading to diminishing natural capital and environmental health for future generations.

I wrote the following about the mining industry which could also be applied to the grazing industry.

The short term financial gain from the high risk components of the coal mining occurring in this area will be at the expense of our long term primary production and economic viability.

Thankfully most graziers have a respect and love of the country and they are not of a fly in-fly out nature and have a long term perspective yet mistakes can be made despite good intentions.

Another issue that relates to land clearing and again is of the utmost concern to me as it was to my father, is environmental weeds. From my observation the problem seems to be escalating and the loss of native vegetation and increased clearing and earthworks exacerbates colonisation because of reduced competition and the increase in vectors.

I have noticed that some landholders use heavy machinery to clear species like Lantana, Chinee Apple and Rubber Vine when a small amount of herbicide on the basal trunk or cut stump is all that is required. The downside of using dozers to clear weeds is obviously soil erosion but also from observation the weeds comes back from seeds and roots and grow more vigorously because of the reduction of moderation from native vegetation. The weed problem is often exacerbated and many areas that have been cleared over the last 50 years are often now completely weed infested.


Peter Delamothe Road 5 km east of Collinsville


Fire break on grazed land – Grader grass infestation

http://www.daff.qld.gov.au/4790_7293.htm

The Queensland Government Biosecurity website states: *Grader grass* (*Themeda quadrivalvis) The best form of weed control is prevention. Treat weed infestations when they are small - do not allow weeds to establish.*

This recent report makes some very important points: http://www.abc.net.au/news/2013-05-17/predictions-australia-will-be-hardest-hit-by-climate-change/4695718

Ian Dunlop is a former senior Executive of Royal Dutch Shell and a former chair of the Australian Coal Association.

"We're one of the driest continents on the earth and the effects on Australia will be more severe than elsewhere."

Mr Dunlop says climate change will also have a negative impact on Australia's agricultural industry.

"The much longer term problems of the sustainability of things like agriculture because if we keep on going where we're going large parts of the country are either going to be moving back into deserts or alternatively they'll end up subject to extreme flooding and conditions that aren't particularly conducive to agriculture anyway," he said.

As I have been working on this letter I hear that the vegetation management legislation changes have been passed in Parliament. I regret not working on this before now because I am very concerned that a lot of irreplaceable natural capital will be lost with very serious consequences. There are presently many land use problems, unsustainable practices and inefficiencies that should be rectified before more land is made vulnerable to further damage.

I heard this report yesterday on Bush Telegraph and I am very concerned that you have jumped the gun to pass this legislation without all of the information relating to its consequences.
http://www.abc.net.au/rural/telegraph/content/2013/s3762955.htm
To quote; If the changes are approved in parliament this week, farmers will be allowed to clear their land if it is deemed to be of "high-value agriculture". It occurs to me that this is a very dangerous development because areas of high value for agriculture are also likely to be of high value for biodiversity which is of critical importance for ecosystem services. And as our economy is a subsystem of the ecosystem, the challenge of balancing our short term use with the long term viability for future generations could be a terminal failure.

I have immense faith in our farmers and graziers and know their love of the land but I also know how stubborn and how many views there are about the way things work.

Unfortunately not everyone does understand exactly how the complexity of the ecosystem works and scientific knowledge is constantly being updated and analysis refined.

I have come to meet many scientists and environmentalists over the years and I find that they are not immune to cherry picking information and engaging in motivated reasoning and wishful thinking, but they are usually open to scrutiny and new evidence and knowledge.

One very experienced fellow said to me some time back that the problem with the environmental crisis is that it is slow moving and people pass away with the knowledge of what we have lost and that our environment is dying by a thousand cuts and as it gets weaker it will be more vulnerable to what could become the final cuts. I hope for the sake of future generations that we are not committing slow motion huri-kuri.

It is admirable to show trust but foolish to fail to verify. Management of impacts on our common environment is a Government responsibility. Failure can have extremely serious consequences.

Please contact me if I can help further with these critical issues for our area, state and nation.

Thank you for your attention to our concerns.

Yours Sincerely, Garry Reed


Pelican & Coral Creeks, Scottville via Collinsville


Pelican Creek 19.2.13 Governance Failure