September 2015

SUSTAINABLE VEGETATION MANAGEMENT BY QUEENSLAND PRODUCERS

AGFORCE

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A D V A N C I N G R U R A L Q U E E N S L A N D

1. Introduction

AgForce is the peak lobby group representing the majority of beef, sheep and wool, and grain producers in Queensland. The broadacre beef, sheep and grains industries in Queensland generate around $4.5 billion annually in gross farm-gate value of production. AgForce exists to ensure the long term growth, viability, competitiveness and profitability of these industries. Queensland broadacre producers provide high-quality food and fibre products to Australian and overseas consumers, manage more than 85% of Queensland's grazed native pastures and contribute significantly to the social fabric of rural and remote communities.

Queensland producers use productive, profitable land management practices that sustain the resource base. The challenge of managing this within the constraints of a highly variable climate and the increasing frequency of natural disasters (drought, flood, heat waves) continues to go under-recognised.

Unquestionably, economic development and environmental protection must go together. The Queensland community needs to move these objectives from being at direct loggerheads to a landscape planning approach that allows for sustainable economic and social development, in balance with the environment.

Agricultural businesses need certainty in operating conditions to sensibly and strategically invest. They also need confidence that these conditions will persist into the future to allow for the long lead times required for development and to generate a return

Vegetation management, like all natural resource management policy, needs to be based on evidence.

1.1. The emotion of vegetation management

Vegetation clearing is often portrayed to the community as a chain pulled between two dozers. This is not usually the case. In fact, producers use a number of methods to selectively clear woody vegetation all within the guidelines of the existing *Vegetation Management Act (Qld) 1999* and associated regulations.

Governments and industries are all too aware of the need for a social licence to manage natural resources publicised through recent advocacy campaigns. When these campaigns are based on misconstrued or incorrect information, it diverts the already stretched resources of government and industry into managing the resultant community concerns.

AgForce wants to ensure the existing and future vegetation management legislation aligns with the actual factors affecting native woody vegetation and runoff, whilst maintaining productive and ecologically sustainable regional ecosystems.

This report addresses the critical points central to the current policy debate around vegetation management:

1. **Less than one per cent of Queensland's woody vegetation is cleared annually.**
2. **Clearing for High Value Agriculture produces high value food and, enables production diversity to address climate variability.**
3. **Ground cover, not solely tree cover, determines erosion risk.**

2. The Facts

FACT 1: Less than one per cent of Queensland's woody vegetation is cleared annually.

The Queensland Government regulates, monitors and reports on annual woody vegetation clearing rates through the Statewide Landcover and Trees Study (SLATS)[1]. From this data (presented in Table 1), less than one per cent of Queensland's 117 million hectares[2] of native woody vegetation (forests, woodlands and shrublands) is cleared annually.

Table 1: Annual woody vegetation clearing rates across Queensland.

Year	Woody vegetation cleared per year (includes native and invasive introduced woody weeds)	Percentage of Queensland native woody vegetation cleared	Percentage of total land area of Queensland cleared per year
2012-2013	275,000 ha [3, #]	0.23%	
2011-2012	153,640 ha	0.13%	0.089 % (39 km^2)
2010-2011	91,690 ha	0.08%	0.053 % (30 km^2)
2009-2010	77,590 ha	0.07%	
2008-2009	99,940 ha	0.08%	

Source: Queensland Government SLATS report.
[#] 2012-2013 is preliminary SLATS data, still being validated by government.

Figure 1 presents the annual woody vegetation clearing rates from 1988 to 2012. From Figure 1, the amount of clearing of remnant vegetation (in pink) has remained very low since 2008.

Other clearing (in purple) includes areas previously cleared and woody weed infestations. Above average wet seasons result in high establishment and growth rates of woody vegetation, including woody weeds. Producers need to clear or thin vegetation to restore the tree-grass balance and re-establish productive grazing systems.

In 2011-12, 38 % of woody vegetation clearing (57,650 ha per year) was repeat clearing in areas previously cleared or modified[1, 2]. Figure 2 demonstrates the above average nature of rainfall in 2010 in a national and Queensland context.

[1] Queensland Government Statewide Landcover and Trees Study (SLATS). Available online at https://www.qld.gov.au/environment/land/vegetation/mapping/slats-reports/

[2] Scanlan JS. and Turner EJ. 1995. *The production, economic and environmental impacts of tree clearing in Queensland*. Report to the working group of the Ministerial Consultative Committee on Tree Clearing.

[3] Provided from SLATS Report 2012-13 from Queensland Government briefing to AgForce.

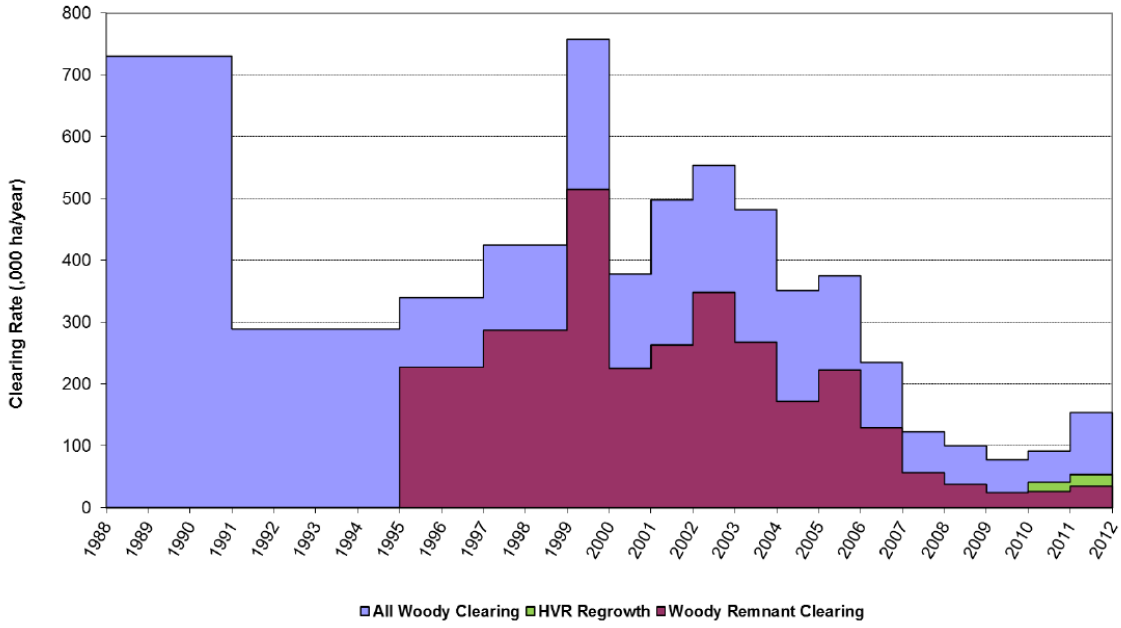

Figure 1: Annual woody vegetation clearing rates from 1988 to 2012.
Source: SLATS, 2012.

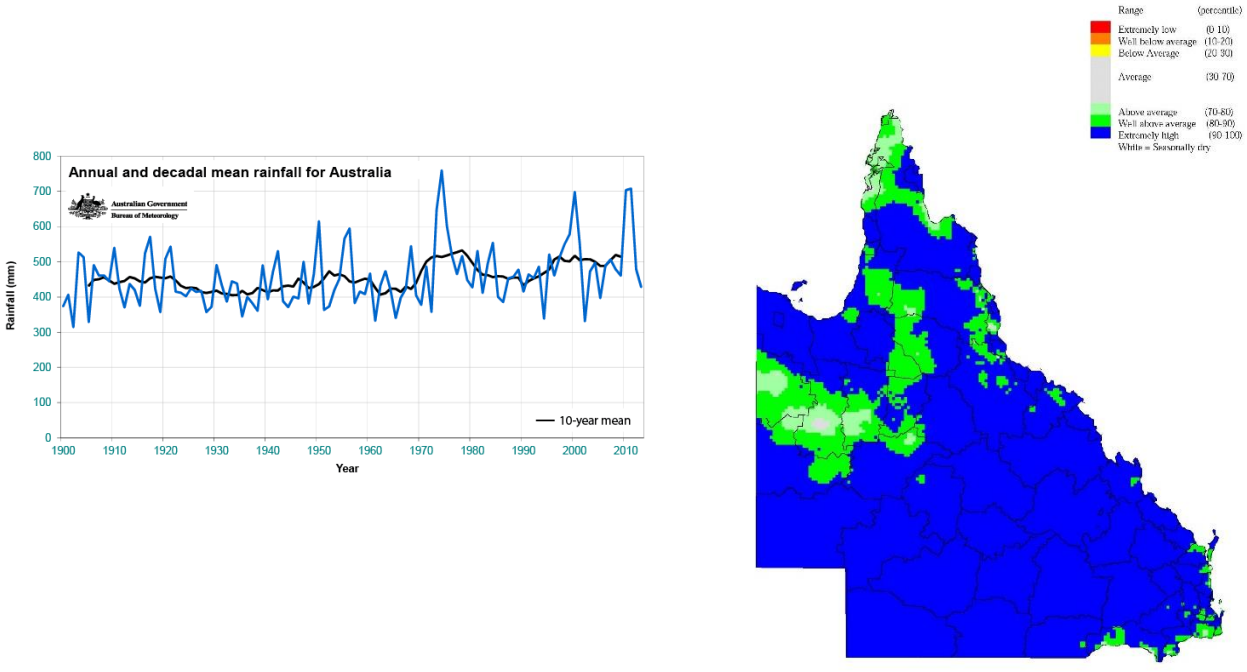

Figure 2: Above-average wet season in context of (a) Australia's annual and decal mean rainfall and (b) Rainfall relative to historical records for Queensland in 2010.
Source: Bureau of Meteorology (online at http://www.bom.gov.au/climate/current/annual/aus/2013/) and Queensland Government (www.LongPaddock.qld.gov.au)

Destructive wind associated with recent (post 2005) tropical cyclones has also contributed to the loss of woody vegetation in some North Queensland coastal regional regions. Natural disaster damage between December 2010 and March 2011 was excluded from the SLATS 2010 to 2011 report[4]. Only this report excluded the path of vegetative destruction incurred by Cyclone Yasi (refer to Figure 3).

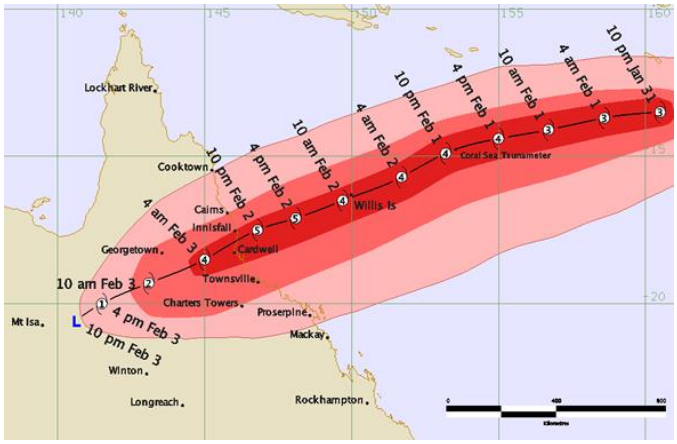

Figure 3: Category 5 Cyclone Yasi (2-3 Feburary 2011)**.**
Source: Bureau of Meteorology. Severe Tropical Cyclone Yasi webpage. Online at http://www.bom.gov.au/cyclone/history/yasi.shtml

Methodology from other annual SLATS reports would infer loss of woody vegetation cover by extreme natural events is included in the annual vegetation clearing rates. Over the last ten years, there has been substantial loss of woody vegetation along the North Queensland coastline due to a number of Category 4 and 5 cyclones since 2005 (refer to Figure 4).

[4] Queensland Government. *Land Cover change in Queensland 2010-11*. Available online at https://publications.qld.gov.au/dataset/land-cover-change-qld-2010-11

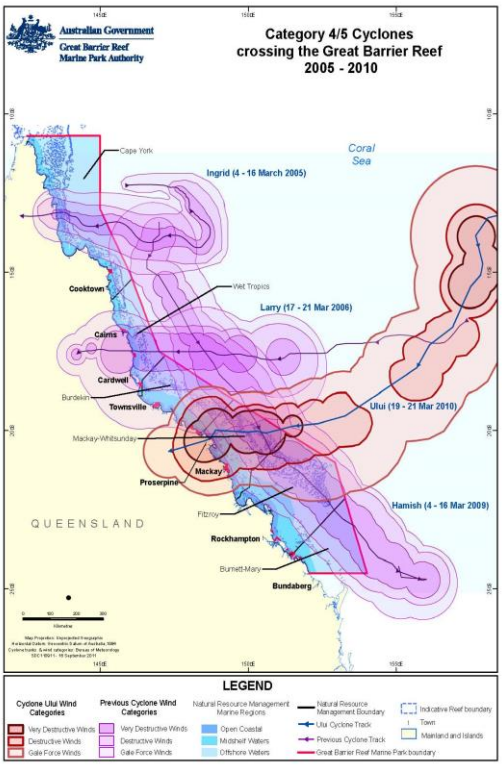

Figure 4: Destructive winds from tropical cyclones 2005-2010 contributing to loss of woody vegetation in some North Queensland coastal regions.
Source: Queensland Government. Disturbance affecting the Great Barrier Reef webpage. Online at http://www.reefplan.qld.gov.au/measuring-success/report-cards/second-report-card/marine/disturbances/#climatechange

FACT 2: Clearing for High Value Agriculture produces high value food and fibre, and enables production diversity to address climate variability.

Clearing for high value agriculture is not broadscale clearing for grazing. It is targeted clearing for high value development – helping Queensland achieve its employment, social opportunity, and food security goals.

In a planned landscape approach, small areas of intensive agricultural will improve business viability and allow more for reinvestment in ecosystem services such as reduced grazing pressure and stock exclusion from riparian zones.

Sustainable clearing for relatively small pockets of high value agriculture enable agricultural production to meet the increasing requirements of international markets and Australia's Free Trade Agreements.

Developing the North

Applied science and national consultation has resulted in the *White Paper for Northern Australian Development*[5]. This is all about building roads, developing water resources and sustainable industries across Northern Australia, a gateway to future trade, investment and business opportunities to sustain rural communities. The Australian Government has committed $500 million towards the National Water Infrastructure Fund to secure water for agricultural purposes[6].

Given that most of the development has occurred in south and central Queensland, it is natural that new agricultural development will focus on the north.

It is imperative that new irrigated agricultural systems are developed across North Queensland such as the Flinders Gilbert Agricultural Zone[7], if the Queensland Government is to achieve its stated goal of doubling the value of agricultural production by 2040. Government is working with private businesses to develop profitable, best practice irrigated cropping and high value agricultural systems in these new zones.

The *Cape York Regional Plan* identifies Priority Agricultural Areas and regional policies to facilitate economic and employment opportunities in the region[8]. The current *Guidelines for clearing new*

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[5] Australian Government. 2015. *White Paper on Developing Northern Australia*. Available online at http://northernaustralia.infrastructure.gov.au/

[6] Australian Government. 2015. *Agricultural Competitiveness White Paper*. Available online at http://agwhitepaper.agriculture.gov.au/white-paper/white-paper-at-a-glance

[7] Queensland Government. 2015. *Flinders Gilbert Agricultural Zone*. https://www.daf.qld.gov.au/business-trade/development/industry-development/flinders-gilbert-agricultural-zone

[8] Queensland Department of State Development, Infrastructure and Planning. *Cape York Regional Plan 2014.* http://www.dilgp.qld.gov.au/resources/plan/cape-york/cape-york-regional-plan.pdf

areas for high value or irrigated high value agriculture require comprehensive reports outlining land and soil suitability, economic viability and site selection[9].

Any changes to the existing guidelines will jeopardise future investment and rural community stability across northern Queensland.

Mosaic irrigation prepares for climate variability and reduces carbon miles for fodder

The CSIRO's report on mosaic irrigation for the northern Australian beef industry[10] recommends Northern Australian producers buffer against climate variability through the use of small-scale irrigated areas to produce livestock forage. Mosaic irrigation has a number of other benefits including reducing the associated carbon emissions for forage production, minimising risk of weed seed spread, and reducing the cost associated with transporting fodder during dry/ drought periods.

Vegetation clearing in the far north contributes less than 1.5 per cent to total clearing in Queensland.

The Cape York and Northern Gulf woodland rangelands have the highest level of wooded vegetation across all of the 14 Natural Resource Management (NRM) Regions in Queensland. Wooded vegetation cover is 92 % and 88 %, respectively (refer Table 2). The areas cleared on an annual basis are very small. In 2011 to 2012, only 2,100 ha (or 0.01 %) in Cape York region and 1,675 ha (0.008 %) in the Northern Gulf region were cleared. These two northern catchments contributed less than 1.5 % to the annual total clearing rate across Queensland.

[9] Queensland Government webpage. Clearing for high-value agriculture. Online at https://www.qld.gov.au/environment/land/vegetation/agriculture/

[10] Grice A.C, Watson I and Stone P. 2013. *Mosaic irrigation for the northern Australian beef industry. An assessment of sustainability and potential.* Synthesis Report. A report prepared for the Office of Northern Australia. CSIRO, Brisbane. Available online at http://regional.gov.au/regional/ona/nabis.aspx

Table 2: Woody vegetation clearing by land cover by Natural Resource Management region (2011-12).

NRM region			Rate of woody vegetation clearing (,000ha/yr)							% wooded vegetation cover 2011[1]	% total clearing in QLD
Name	Ref.	Total area (,000ha)	Pasture	Crops	Forest	Mining	Infra-structure	Settle-ment	Total		
Burnett Mary	1	5595	7.712	0.076	3.637	0.090	0.203	0.076	11.794	69.175	7.671
Cape York[3]	2, 7	13685	0.469	0.000	0.000	1.394	0.250	0.002	2.115	92.219	1.376
Condamine	3	2544	3.656	0.017	0.212	0.225	0.823	0.003	4.935	39.182	3.210
Desert Channels	4	51000	8.631	0.000	0.000	0.010	0.172	0.001	8.814	20.216	5.733
Fitzroy	5	15725	36.595	0.016	0.825	2.862	1.112	0.195	41.605	55.594	27.061
Northern Gulf[2]	6, 7	19410	1.420	0.030	0.000	0.033	0.192	0.000	1.675	88.107	1.090
Burdekin	8	14090	17.684	0.007	0.209	0.361	0.451	0.188	18.900	64.821	12.293
Border Rivers/ Maranoa Balonne[4]	9	10176	25.956	0.147	0.407	0.542	0.501	0.017	27.570	42.550	17.932
Mackay Whitsunday	10	934	0.751	0.051	0.122	0.003	0.019	0.016	0.961	67.706	0.625
South East Queensland	11	2368	1.403	0.000	0.566	0.136	0.189	0.825	3.120	66.740	2.029
South West Queensland	12	18711	28.483	0.000	0.024	0.000	0.541	0.003	29.051	47.334	18.895
Southern Gulf	13	19460	1.547	0.000	0.000	0.181	0.073	0.001	1.801	49.179	1.171
Wet Tropics	14	2224	0.238	0.044	1.108	0.002	0.010	0.003	1.406	84.337	0.914
Torres Strait	15	85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.113	0.000

[1] Based on the wooded extent and FPC index V2.3

[2] Statistics for entire region, including overlap with Northern Gulf region

[3] Statistics for entire region, including overlap with Cape York region

[4] Queensland Murray–Darling Committee manages Border Rivers and Maranoa–Balonne regions

Source: SLATS Report 2011-2012.

FACT 3: Ground cover, not solely tree cover, determines erosion risk.

A balance of ground cover and tree cover determines runoff and erosion risk. This is a well-known soil conservation principle[11] and is outlined in the 2015 *Soil Conservation Guidelines for Queensland*[12].

There is generally less ground cover under trees than in cleared areas due to competition for water and nutrient. Grazing management practices, pasture cover and fire regimes, rather than tree clearing, determine runoff and erosion risk. For example, the Queensland Government website for soil erosion management[13] states:-

> *"Trees are often considered to be the universal answer to control soil erosion. Tree roots help prevent landslides on steep slopes and stream bank erosion but they don't stop erosion on moderately sloping hillslopes.*
>
> *In forests, the soil surface is usually protected by a layer of mulch from decaying vegetation as well as a variety of surface growing plants. If the soil is bare under the tree canopy from over grazing, vehicles or pedestrians, soil erosion will still occur.*
>
> *Surface cover is the key to erosion control in grazing lands. It prevents erosion by maintaining the soil so it can absorb rainfall".*

A Focus on Reef Catchments

The Queensland Government has recently considered woody vegetation management as an erosion issue in Great Barrier Reef (Reef) catchments. This was achieved through the inclusion of the Action (EHA20) into the Reef 2050 Long Term Sustainability Plan[14]:

> "*Strengthen the Queensland Government's vegetation management legislation to protect remnant and high value regrowth native vegetation, including in riparian zones*".

The Reef has suddenly became a platform for tighter vegetation management regulations when there is no scientific evidence linking tree cover to runoff and reef water quality. In fact, numerous runoff studies have repeatedly demonstrated that it is the level of ground cover that determines runoff and erosion risk. Table 3 presents some examples of these studies conducted in Reef catchments.

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[11] Scanlan JS and Turner EJ, 1995. *The production, economic and environmental impacts of tree clearing in Queensland*. Report to the Working Group of the Ministerial Consultative Committee on Tree Clearing.

[12] Queensland Government, 2015. *Soil Conservation Guidelines for Queensland*. Available online at http://www.qld.gov.au/environment/land/soil/erosion/guidelines/

[13] Queensland Government webpage – Preventing and managing erosion. Online at http://www.qld.gov.au/environment/land/soil/erosion/management/

[14] The Reef 2050 Plan. Available online at http://www.environment.gov.au/marine/gbr/long-term-sustainability-plan

Table 3: A selection of scientific studies conducted in Reef catchments which demonstrate ground cover, not tree cover, determines runoff and erosion risk.

Reef Catchment	Location	Details	Reference
All Reef catchments	Remote sensing	GIS land condition study. End of dry season ground cover > 70 % reduces erosion risk.	Beutel *et al* 2014[15]
Fitzroy and Burdekin	Bioeconomic modelling	Tree density affects economic viability of land rehabilitation. Compared sediment exports from four grazing land types, four land conditions, cleared versus wooded vegetation.	Star and Donaghy, 2010[16]
Burdekin	Upper Burdekin	Runoff was 50 to 70 % less from cleared country with sown pastures compared to timbered Eucalypt woodland.	McIvor *et al*, 1995[17]
Fitzroy	Nogoa Basin	Study of runoff over seven years from 12 hillslopes and cover ranging from 10 to 80 %. Runoff was 33 mm/yr with ground cover above 50 %.	Silburn *et al*, 2011[18]
Burnett	Tarong	Runoff measured from five levels of ground cover on a 15 degrees slope. Erosion rates minimal (0.5 t/ha) when ground cover was 47 % or greater	Loch, 2000[19]
Fitzroy	Rubyvale & Injune	Runoff increased with rainfall amount and intensity and decreased with increasing ground cover –150 to 11,000kg/ha/yr depending on ground cover.	Silcock *et al*, 2005[20]

Streambank stabilisation is achieved through a combination of both woody vegetation and grass ground cover[21].

[15] Beutel TS, Tindall D, Denham R, Trevithick R, Scarth P, Abbott B and Holloway C. 2014. *Getting ground cover right: thresholds and baselines for a healthier reef*. Report RRRD027 to the Reef Rescue Research and Development Program. Available online at http://www.reefrescueresearch.com.au/research/all-projects/23-final-reports/165-rrrd027-final-report-2.html

[16] Star M and Donaghy P. 2010. *Economic modelling of grazing systems in the Fitzroy and Burdekin catchments*. Report to the Fitzroy Basin Association by the Department of Employment, Economic Development and Innovation. Available online at http://era.daf.qld.gov.au/3109/

[17] McIvor JG, Williams J and Gardener CJ. 1995. Pasture management influences runoff and soil movement in the semi-arid tropics. *Australian Journal of Experimental Agriculture*. 35, pp55-65.

[18] Silburn DM, Carroll C, Ciesiolka CAA, de Voil RC and Burger P. 2011. Hillslope runoff and erosion on duplex soils in grazing lands in semi-arid central Queensland. Influences of cover, slope and soil. *Soil Research*. 49, pp105-117.

[19] Loch RJ. 2000. Effects of vegetation cover on runoff and erosion under simulated rain and overland flow on a rehabilitated site on the Meandu Mine, Tarong, Queensland. *Australian Journal of Soil Research*. 38, pp 299-312.

[20] Silcock RJ, Jones P, Hall TJ and Water DK. 2005. *Enhancing pasture stability and profitability for producers in Poplar Box and Silver Leaved Ironbark woodlands*. Report to Meat and Livestock Australia. No NAP3.208.

[21] Simon A and Collison AJC. 2002. Quantifying the mechanical and hydrologic effects of riparian vegetation on streambank stability. *Earth Surface Processes and Landforms*. 27(5). pp527-546.

Current and future management actions to protect the outstanding universal values of our Reef should not be distracted by other agendas.

Tree thickening can increase runoff

Woodland thickening has occurred over certain parts of Queensland since the mid-1800s. This has been proven through carbon dating[22] and analysis of time-series photography. Areas of high value regrowth differ in botanical structure and species composition when compared to the original regional ecosystem (Bill Burrows*, pers.comm*.). Restricting subsequent clearing on these areas is not likely to restore the original ecosystem.

Thickened tree cover can increase runoff, adversely affect regional ecosystem functioning, and reduce biodiversity. Thinning and follow up management, as outlined in Self Assessable Codes[23], can restore landscape to a functioning regional ecosystem.

For example, thickened white cypress country, near Roma and Dirranbandi, has decreased ground cover and made it more prone to erosion[24] (refer Figure 5). Selective thinning by a chopper roller to reduce tree density from 2,000 to 500 stems per hectare resulted in better ecological outcomes, reduced erosion risk and opportunity for hardwood timber production[25].

[22] Bray SG, Krull ES, Harms BP, Baxter N, Rutherford M, Yee M and Cogle L. 2006. *Assessment of vegetation change in the Burdekin catchment of Queensland*. Project Report. Report by the Queensland Department of Primary Industries and Fisheries. QI06091.

[23] Queensland Department of Natural Resources, 2014. Managing thickened vegetation in South East Queensland and the New England Tableland bioregions – Self-assessable vegetation clearing code. Available online at https://publications.qld.gov.au/storage/f/2014-09-30T03%3A46%3A50.736Z/managing-thickened-vegetation-in-south-east-queensland-and-the-new-england-tableland-bioregions.pdf

[24] AgForests Queensland. 2009. *Evaluation of using a chopper roller for silvicultural thinning of white cypress*.

[25] Scanlan JS and Turner EJ. 1995. *The production, economic and environmental impacts of tree clearing in Queensland*. Report to the working group of the Ministerial Consultative Committee on Tree Clearing.

Figure 5: Photo of bare ground, prone to erosion, under thickened white cypress near Dirranbandi.

Sink versus emitter

The contribution of tree clearing to the National Greenhouse Gas Inventory (http://ageis.climatechange.gov.au/) is over-estimated as the calculation method does not consider tree thickening or shrub invasion in grazed woodlands[26].

3. Conclusion

Agriculture and environmental imperatives need certainty that future decisions about vegetation management legislation will be based on science and evidence. AgForce, in representing the interests of broadacre agricultural industries, places trust in the Queensland Government to ensure existing and future vegetation management legislation aligns with the actual factors affecting native woody vegetation and runoff, whilst maintaining productive and ecologically sustainable regional ecosystems.

[26] Scanlan JS and Turner EJ, 1995. *The production, economic and environmental impacts of tree clearing in Queensland*. Report to the working group of the Ministerial Consultative Committee on Tree Clearing.