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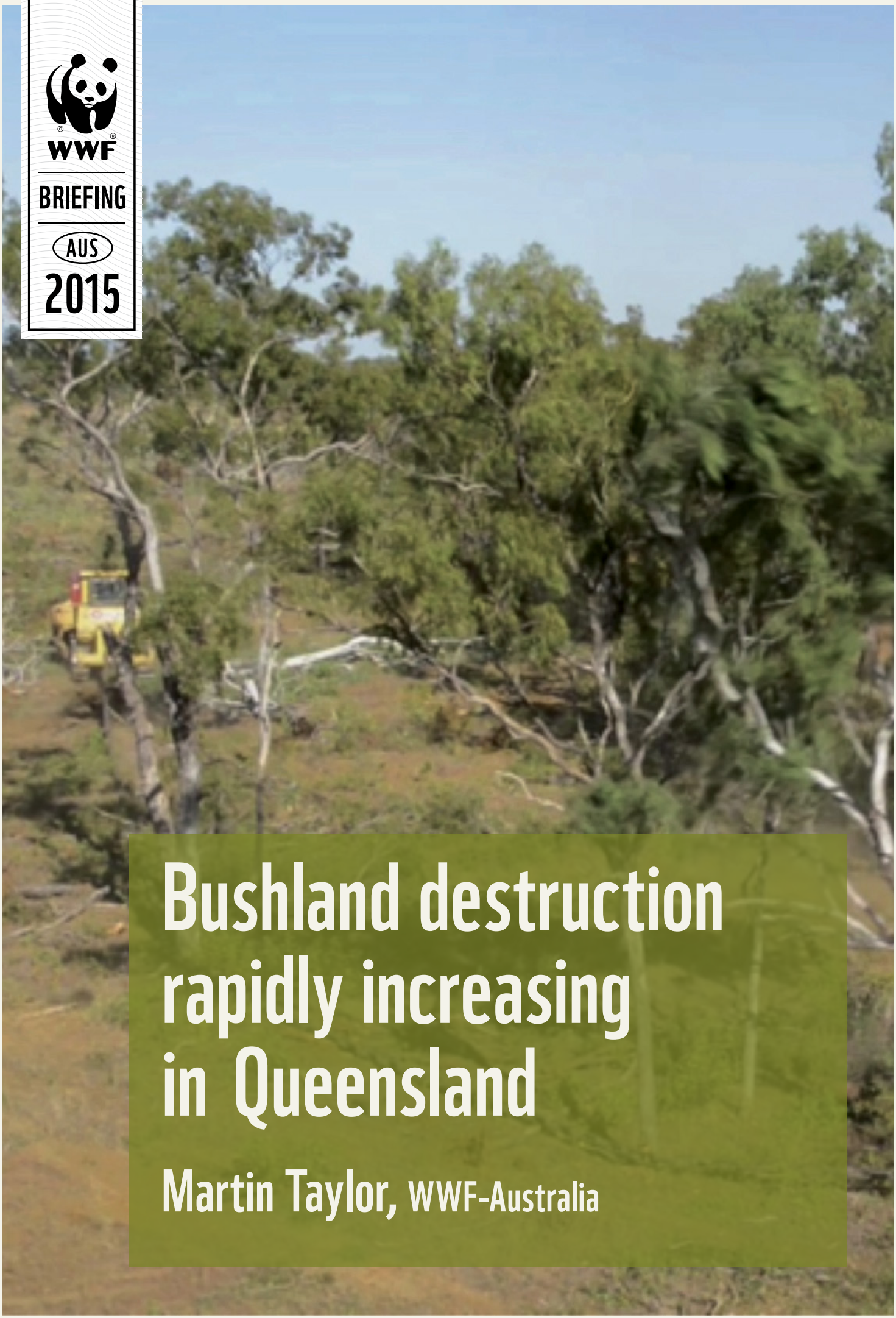
BRIEFING

AUS

2015



Bushland destruction rapidly increasing in Queensland

Martin Taylor, WWF-Australia

"...land cleared in [Great Barrier Reef] catchments increased by 229 %, from 31,000 ha per year in 2008–09 to 102,000 ha per year in 2013–14. This result may lead to an increase in the extent of bare ground which, depending on the occurrence of storms and the amount of ground cover provided by the replacement land use, increases the risk of soil erosion within the catchment. Therefore a rise in land clearing rates can contribute greater sediment runoff."

– **Queensland Auditor General May 2015.**

"Goal 1: Increase the national extent and connectivity of native vegetation

Goal 2: Maintain and improve the condition and function of native vegetation"

– **Australia's Native Vegetation Framework, Council of Australian Governments 2012.**

Cover: Trees being pulled down by a chain between two bulldozers, under a High Value Agriculture approval granted in Jan 2015 for Olive Vale Station, Cape York © Kerry Trapnell/The Wilderness Society

KOALA STRANDED IN A TREE AFTER LAND CLEARING © ABC

OVERVIEW

In 1999-2003, the Queensland Government phased out and then ended the broad scale deforestation or clearing of mature or intact forest and bushland (termed 'remnant vegetation' in Queensland). Prior to the reforms taking effect, permits to clear a final 500,000 hectares of land were distributed to landholders by ballot, and $150 million in financial structural adjustment assistance was made available to assist landholders and other enterprises affected by the reforms.

The reforms were introduced because healthy native vegetation is a valuable resource which secures clean fresh water and protects topsoil, prevents waterlogging and salt contamination of soil, provides shelter for crops, livestock and dwellings, maintains stable local rainfall and temperature regimes, absorbs greenhouse gases, conserves and prevents extinctions of native wildlife. Native vegetation also protects the Great Barrier Reef by reducing soil loss and consequent water pollution in the rivers which flow into the Reef.

Agricultural production and employment in Queensland actually increased after the reforms, contrary to predictions.[1]

1 Williams B 2009. Loss of jobs from clearing disputed. *Courier Mail* 22/06/2009

In 2009, the Bligh government extended these laws to protect bushland that had been cleared historically but which has been regrowing for more than 20 years in wetland and watercourse buffers, on steep slopes prone to erosion, of endangered ecosystems and in habitats of threatened species (termed 'High Value Regrowth'). Previously, only remnant vegetation was protected and some regrowth on leasehold land.

Agriculture industry representative body Agforce reacted positively to the protection of High Value Regrowth in 2009, saying that '*the new legislation balances productive land management while maintaining biodiversity values.*' [2]

Due to these successive policies, clearing of all native vegetation (remnant and non-remnant) decreased from about 750,000 hectares in 1999-2000 to 78,000 hectares in 2009-10 (Fig 1).

Land clearing emissions in Australia have fallen to just 6% of total emissions, down from 25% in 1990. The *Vegetation Management Act* in Queensland was the main reason Australia was able to meet its emissions reduction target under the Kyoto Protocol of the UN Convention on Climate Change. [3]

NEWMAN GOVERNMENT BREAKS PROMISE ON LAND CLEARING

Prior to the 2012 Queensland election, the Liberal National Party led by Campbell Newman committed to '*retain the current level of statutory vegetation protection*'. After taking office, the Newman government broke this commitment, amending the *Vegetation Management Act* in a way clearly designed to weaken protection. A speech to the Rural Press Club, by then Minister Andrew Cripps detailing the changes, was entitled *'Taking the axe to Queensland's land clearing laws.'* [4] The government also made administrative changes reducing staffing and regulatory resources.

Following these changes, preliminary estimates of clearing of remnant vegetation suggest a near doubling from about 52,000 ha in 2012-13 to about 95,000 ha in 2013-14 (Fig 1).

2 http://www.agforceqld.org.au/file.php?id=211&open=yes
3 http://www.wwf.org.au/?11441/Changing-land-use-to-save-Australian-wildlife
4 http://www.theaustralian.com.au/national-affairs/campbell-newmans-lnp-bulldozing-pre-election-promise/story-fn59niix-1226654740183

PALASZCZUK GOVERNMENT'S PROMISE TO RESTORE PROTECTION

The government of Premier Annastacia Palaszczuk came to office in February 2015 after making an election commitment to reverse the Newman government's 2013 changes to land clearing laws. The Premier recently instructed the responsible Minister to '*reinstate the vegetation protection laws repealed by the previous government.*'[5]

To implement its commitment, the Palaszczuk government must take immediate administrative action to stop further 'panic clearing', and then follow this up with legislative changes to reinstate the land clearing controls undone by the Newman government, thereby ensuring that the *'legislation balances productive land management while maintaining biodiversity values.'*

RECOMMENDATIONS

ADMINISTRATIVE AND REGULATORY CHANGES, NOT REQUIRING AMENDMENTS TO THE ACT

Actions can be taken to significantly advance the government's election commitments without an immediate need to amend the Act itself.

Immediate steps

The government should act immediately to stop 'panic clearing' and tighten some of the loopholes created by the previous government.

- *Announce a time bound process to implement the government's election commitment:* The government should immediately announce a process with clear deadlines for delivering their election commitment to restore stronger controls over land clearing.
- *Halt clearing of areas the government has committed to protecting again:* The government should use the 'declared areas' provisions of the current Act to immediately halt clearing of high conservation value remnant vegetation and High Value Regrowth de-protected by the previous government.
- *Amend codes and processes for High Value Agriculture assessments:* The government should amend the High Value Agriculture codes and processes immediately to ensure that the impact on water, soil, biodiversity and climate change is minimised.
- *Enhance compliance:* The government should appoint more staff and apply other resources to the monitoring, detecting, prosecution and prevention of illegal land clearing, especially clearing under self-assessed codes, such that resources are sufficient to fully enforce the Act.

5 http://www.cabinet.qld.gov.au/ministers/assets/Charter%20Letter_The%20Hon%20Dr%20Anthony%20Lynham%20MP.PDF

Near-term steps

- *Release data*: The government should commit to the public release of spatial data within one month of confirming that clearing has taken place. This ensures timely, public transparency.
- *Update habitat maps*: The Essential Habitat maps should be revised within three months to reflect best available mapping of threatened species habitats.[6]
- *Investigate approvals*: Already approved High Value Agriculture applications should be double-checked to ensure that they satisfy process and integrity requirements.
- *Reform the granting of exemptions through changes to regulatory maps:* 125,000 ha of unexplained exemptions of remnant vegetation were detected by comparing 2012 and 2015 Regulatory Vegetation Maps. These exemptions should be investigated and processes enhanced to ensure all such changes to maps are solely to correct genuine errors and are made only with the concurrence of biodiversity experts in the Queensland Herbarium.

AMENDMENT OF THE VEGETATION MANAGEMENT ACT

Ultimately the government must amend the *Vegetation Management Act* and related legislation[7] to fulfil its election commitment. These amendments should include the following key reforms:

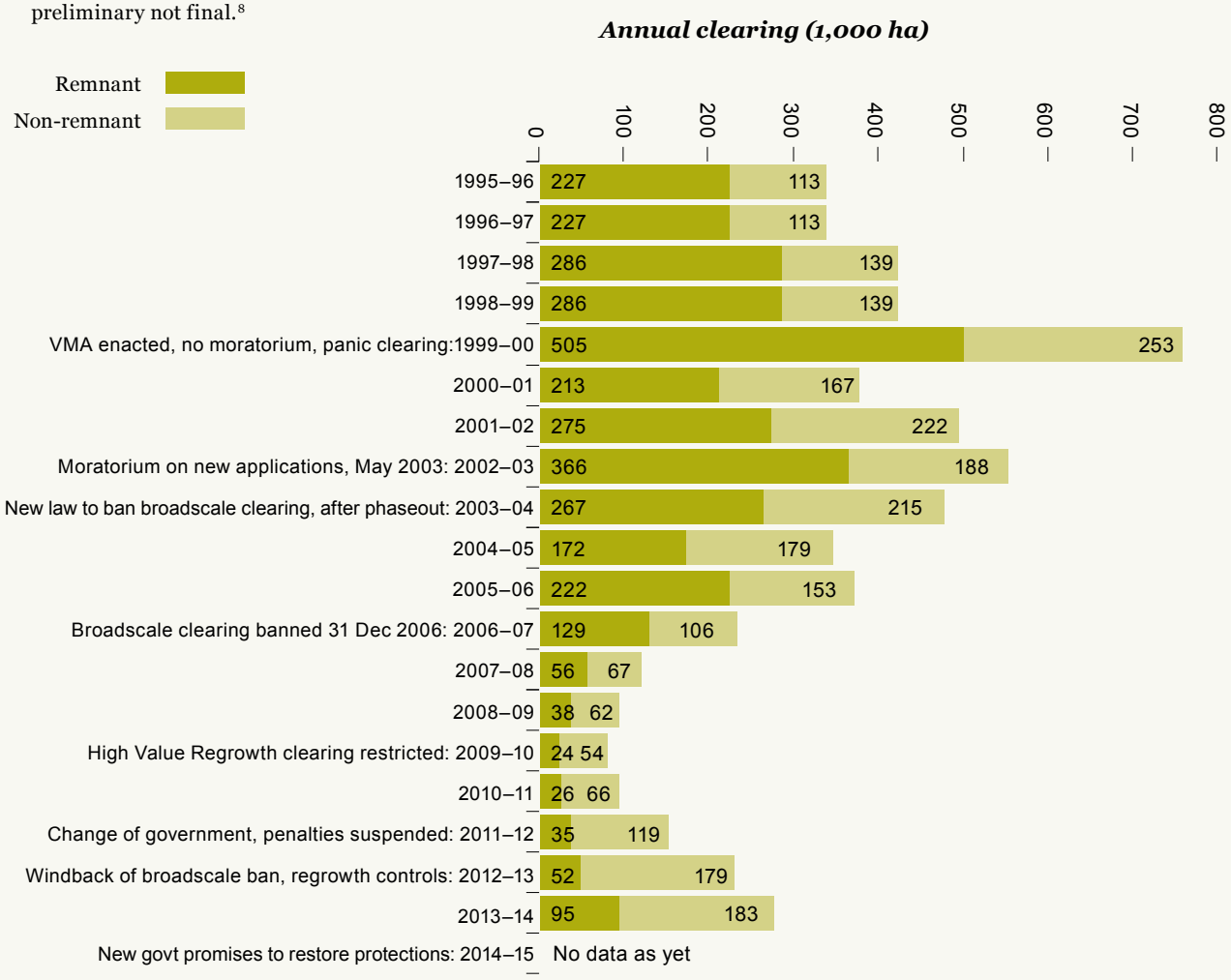
- Restore protection of High Value Regrowth without regard to tenure;
- Extend protection of watercourse and wetland buffer areas across all Great Barrier Reef catchments;
- Restore the ban on broadscale clearing by removing High Value Agriculture as an allowable purpose;
- Restore strong enforcement capability by restoring landowner deemed liability for clearing offences and removing the 'honest mistake of fact' defence;
- Restore riverine protection permits under the *Water Act* for clearing of instream vegetation;
- Review and amend exemptions to ensure they are very small in scale and do not apply to high conservation value areas; and
- Review and amend assessment codes and thresholds for self-assessment to ensure the best possible protection of high conservation value areas. The thinning code in particular is not supported by science, and runs counter to the purposes of the VMA and should be revoked as soon as possible.

6 Protected Plants Trigger Map is used to trigger threatened plant surveys under the *Nature Conservation* and *Environment Protection Acts*. Essential Habitat maps constrain clearing under self- and development assessment codes.

7 The *Water Act* and *Sustainable Planning Act*.

FIGURE 1

Annual clearing rates of remnant and non-remnant vegetation in Queensland 1995 to 2014 and significant events in the regulation of land clearing.
Data for 2012-14 are preliminary not final.[8]



8 Data up to 2012 are from the SLATS report 2011-12 and preliminary data for 2012-14 from the preliminary SLATS report.

STATISTICAL SUMMARY

Environmentally-destructive land clearing is rapidly increasing in Queensland since the Newman government's 2013 amendments to the *Vegetation Management Act* which:

- removed the 2006 ban on broadscale land clearing for High Value Agriculture, which in turn was poorly defined and therefore open to abuse;
- removed the 2009 protections for High Value Regrowth, except on leasehold land;
- increased the burden of proof on government in cases of illegal land clearing; and
- allowed almost all clearing previously requiring a permit to occur under self-assessable codes.

In recent years:

- Total areas of native vegetation cleared annually have more than tripled from about 78,000 hectares in 2009-10 to about 278,000 hectares in 2013-14 (Fig 1).
- Clearing of non-remnant native vegetation rose from about 54,000 hectares in 2009-2010 to about 183,000 hectares in 2013-14 (Fig 1).
- Clearing of remnant vegetation nearly doubled from about 52,000 hectares in 2012-13 to about 95,000 hectares in 2013-14, and has nearly quadrupled since 2009-10 (Fig 1).
- In Great Barrier Reef catchments, clearing more than tripled from about 31,000 hectares in 2008-09 to 102,000 hectares in 2013-14, representing a significant threat to the Reef as a result of soil and chemicals being washed into watercourses and then into the Reef lagoon.
- About 112,403 hectares of remnant vegetation has been approved for clearing for High Value Agriculture of which about 11,000 hectares have so far been cleared to date.
- High Value Agriculture approvals have been issued which may not meet the criteria, because they extend beyond areas mapped as suitable for crops, which include high value habitat for threatened species.
- Clearing of known High Value Agriculture approvals will produce CO_2 emissions of at least 11.7 million tonnes, which is equivalent to 40% of the 28 million tonnes of carbon farming abatement recently purchased by the Commonwealth's Emissions Reduction Fund.

- About 700,000 hectares of High Value Regrowth lost protection in 2013, and is currently being cleared.
- About 125,000 hectares of remnant vegetation including about 12,000 ha of endangered ecosystems has been remapped as exempt on regulatory maps since 2012, for reasons that need to be explained.
- Unexplained, possibly illegal, broadscale clearing of bushland that is still mapped as regulated remnant under the Act has been detected.
- Tens of millions of native animals are being killed every year by land clearing, including threatened species.

INTRODUCTION

In 1999, the Queensland Government introduced the *Vegetation Management Act* (VMA). The chief objective of the new law was to conserve native vegetation so as to prevent the loss of biodiversity, reduce greenhouse gas emissions and prevent land degradation and water pollution.

At that time, Queensland was responsible for the majority of Australia's land clearing. Every year, an area nearly twice the size of the ACT was being cleared on average in Queensland. In 1990, 25% of Australia's greenhouse gas emissions were due to forest destruction and over half of that was in Queensland. In 2003, Environment Australia reported that the end of broadscale clearing in Queensland would make a major contribution to water quality affecting the Great Barrier Reef while thousands of native species would escape becoming threatened.[9]

The amendments of 2004 provided for a ban on broadscale clearing to take effect at the end of 2006 (Fig 1). Prior to that deadline, a final allowance of 500,000 hectares of broadscale clearing was distributed under a ballot system (Fig 1). In addition, the government provided $150 million in financial assistance to landholders and

9 Environment Australia 2003. *Queensland Land Clearing Proposal Potential Benefits for Biodiversity & Landscape Conservation.*

Agforce reacted positively to the protection of High Value Regrowth in 2009 saying that *'the new legislation balances productive land management while maintaining biodiversity values'*

clearing contractors affected by the ban.[10] Nearly 1,500 landholders received grants of up to $100,000. There was also provision for farm exit assistance. Industry representative body Agforce also received funding to assist its members in accessing the assistance provided.

Defying warnings, agricultural production and employment in Queensland actually increased after the ban took effect.[11]

In 2009, the Bligh government fulfilled an election commitment to extend clearing controls to include High Value Regrowth.' This refers to non-remnant vegetation that had been cleared more than 20 years previously, and was now regrowing toward maturity. Only that fraction of such non-remnant vegetation which was undoubtedly of very high conservation value was actually protected from clearing under the new self-assessable clearing codes. To meet this high standard it had also to contain endangered ecosystems, essential habitat for threatened species, wetland and stream buffer zones or high slopes prone to erosion.

Agforce reacted positively to the protection of High Value Regrowth in 2009, saying that 'the new legislation balances productive land management while maintaining biodiversity values.'[12]

Due to these successive policies, land clearing fell to a historic low of 78,000 hectares in 2009-10 (Fig 1). Land clearing emissions in Australia fell to just 6% of total emissions, down from 25% in 1990. The *Vegetation Management Act* in Queensland was the main reason Australia was able to meet its emissions reduction target under the Kyoto Protocol of the UN Convention on Climate Change.[13]

The laws in place at the start of 2012 in Queensland were progressing the Queensland Government's commitments under *Australia's Native Vegetation Framework*, agreed to by the Standing Council on Environment and Water of the Council of Australian Governments to 'Increase the national extent and connectivity of native vegetation' and to 'Maintain and improve the condition and function of native vegetation'.[14]

10 http://www.findlaw.com.au/news/3250/queensland-launches-new-land-clearing-laws.aspx
The Queensland Rural Adjustment Authority was tasked with awarding grants to affected primary producers and clearing contractors under the enterprise, exit and clearing contractor components of the program.
See http://www.qraa.qld.gov.au/__data/assets/pdf_file/0011/1163/200712181604422006_2007-Annual-Report.pdf

11 Williams B 2009. Loss of jobs from clearing disputed. *Courier Mail* 22/06/2009

12 http://www.agforceqld.org.au/file.php?id=211&open=yes

13 http://www.wwf.org.au/?11441/Changing-land-use-to-save-Australian-wildlife

14 http://www.environment.gov.au/system/files/resources/76f709dc-ccb3-4645-a18b-063fbbf0a899/files/native-vegetation-framework.pdf

BUSHLAND AT RISK

Prior to the 2012 state election, the Liberal National Party opposition made a commitment to *'retain the current level of statutory vegetation protection.'* [15]

Upon forming government however, they amended the VMA, with a clear intent to greatly reduce statutory vegetation protection. This was made clear in a speech by then Minister Andrew Cripps, entitled *'Taking the axe to Queensland's land clearing laws.'* [16]

WWF's *Bushland at Risk of Renewed Clearing in Queensland* report [17] issued just prior to the changes to the VMA warned that over one million ha of remnant or mature bushland would be placed at risk of renewed clearing by the proposed lifting of the 2006 ban on broadscale clearing for a new allowable purpose of High Value Agriculture. This included dryland cropping of stockfeed and irrigated pastures for grazing livestock. In addition, about 700,000 hectares of protected High Value Regrowth was made exempt from clearing controls and put at risk of clearing.[18]

The Newman government also reduced protection for instream vegetation by shifting regulatory oversight from the *Water Act* to the amended VMA.

PROMISE TO RESTORE LAND CLEARING CONTROLS

Prior to the 2015 election, soon- to-be Premier Annastacia Palaszczuk committed to: [19]

'Reduce Queensland's carbon emissions by reintroducing Labor's nation-leading land clearing laws'; and

'reintroduce riverine protection permits to guard against excessive clearing of riparian vegetation. These laws will reduce the clearing of native vegetation and contribute to our effort to reduce sediment run-off.'

The Premier instructed the Natural Resources Minister in a letter dated 19 May 2015, to:

'Reinstate the vegetation protection laws repealed by the previous government, to reduce the clearing of native vegetation.' [20]

15 https://www.parliament.qld.gov.au/documents/committees/SDIIC/2013/10-VegetatationMgmtFramewk/submissions/057.pdf
16 http://www.theaustralian.com.au/national-affairs/campbell-newmans-lnp-bulldozing-pre-election-promise/story-fn59niix-1226654740183
17 http://www.wwf.org.au/?6800/bushland-at-risk-of-renewed-clearing-in-queensland
18 Protected by codes by virtue of being endangered, mapped essential habitat, in a stream or wetland buffer zone or on high slopes. Only a fraction of all mapped high value regrowth was actually protected under the codes.
19 Queensland Labor Party 2015. *Saving the Great Barrier Reef: Labor's plan to protect a natural wonder* (2015 Election commitments, January 2015)
20 http://www.cabinet.qld.gov.au/ministers/assets/Charter%20Letter_The%20Hon%20Dr%20Anthony%20Lynham%20MP.PDF

The new government's commitment to restore land clearing controls was a factor in the recent decision of the World Heritage Committee not to list the Great Barrier Reef as endangered.[21] In the report by the Australian Government to the UNESCO World Heritage Committee's 2015 meeting[22] the following key commitments (among others) were made:

'Queensland will strengthen vegetation management laws to protect remnant and High Value Regrowth native vegetation (including in riparian zones)'; and

'the new Queensland Government will introduce riverine protection permits to guard against excessive clearing of riparian vegetation.'

The contribution of land clearing laws to the reduction of carbon emissions causing climate change was also recognised in the report to UNESCO:

... 'the new Queensland Government will contribute to carbon emission reduction efforts by enhancing practical regulatory controls on the clearing of remnant and High Value Regrowth vegetation.'

LAND CLEARING RESURGENCE

Two years since the introduction of the 2013 VMA amendments, we ask: Were the predictions of the *Bushland at Risk* report borne out? Did loosening controls on land clearing result in more land clearing and in particular actual clearing of de-protected areas?

The answer to both questions is unequivocally 'yes.'

There is little doubt that land clearing has resurged dramatically in Queensland. According to final and preliminary estimates by the Queensland Government land clearing monitoring unit (SLATS), total areas of land cleared reached levels in 2013-14 (278,000 hectares) not seen since before the ban on broadscale clearing entered into force in 2006 (235,000 hectares in 2006-7) (Fig 1). The average annual rate of land clearing over the decade prior to the 2006 ban, was 448,000 hectares per year.

The 278,000 hectares of clearing detected in 2013-14, an area larger than that of the ACT (235,800 hectares), represents 61% of the long-term clearing rate prior to the 2006 ban.

Clearing of non-remnant vegetation, which is mostly exempt from the Act, rose dramatically from 54,000 hectares in 2009-10 to 179,000 hectares in 2012-13, but had started to level off by 2013-14, to 183,000 hectares in that year (Fig 1). Much of this increase occurred prior to the legislative changes of 2013 and likely was due to multiple factors: panic clearing in response to the new controls over High Value Regrowth of 2009, anticipation of the change of government and increased clearing of more vigorous regrowth following the high rainfall in 2010-11.

21 http://www.abc.net.au/news/2015-07-01/unesco-great-barrier-reef/6588118
22 http://whc.unesco.org/document/134991

UNDERWATER CORAL, THE GREAT BARRIER REEF © TROY MAYNE

In contrast, clearing of remnant vegetation, most of which is regulated by the Act, nearly doubled from 2012-13 to 2013-14,[23] and has quadrupled since 2009-10 (Fig 1). This change is more readily associated with the change in legislation in 2013.[24]

The rise in land clearing was criticised by the Queensland Auditor General in the recent report on water quality affecting the Great Barrier Reef:

"...land cleared in reef catchments increased by 229 percent, from 31,000 ha per year in 2008–09 to 102,000 ha per year in 2013–14. This result may lead to an increase in the extent of bare ground which, depending on the occurrence of storms and the amount of ground cover provided by the replacement land use, increases the risk of soil erosion within the catchment. Therefore a rise in land clearing rates can contribute greater sediment runoff."[25]

23 Rising from 52,000 to 95,000 hectares (Fig 1)
24 Rising from 24,000 to 95,000 hectares (Fig 1)
25 https://www.qao.qld.gov.au/news/view/173

HIGH VALUE AGRICULTURE CLEARING

RED GOSHAWK NEAR OLIVE VALE STATION, CAPE YORK © LLOYD NEILSEN

Our earlier estimate of over one million hectares put at risk by the new provision for High Value Agriculture clearing was based on maps of A-grade soils produced by the Queensland Government and CSIRO. [26]

High Value Agriculture approvals have, however, been issued which may not meet the criteria for such agriculture, and which extend beyond areas mapped as suitable for crops. This suggests that a much greater area of remnant vegetation could now be at risk of broadscale clearing for High Value Agriculture than previously estimated, since it has not been confined in practice to soils mapped as suitable for crops.

Actual clearing of remnant vegetation for High Value Agriculture depends on specific proposals put forward and approved. As of 11 June 2015, there were 59 decided applications and nine pending according to the Department of Natural Resources.[27] The government has provided WWF with decision notices for 56 decided applications. Of these, 17 have been approved under the current government (since Feb 2015) and 39 under the previous government.

Only 31 of these 56 approvals have the area approved to be cleared recorded on the decision notice (Fig 2). However, the government advises that all approvals to date add up to 112,403 hectares of remnant vegetation approved to be cleared.

Using maps of maximum potential biomass obtained from the National Carbon Accounting System, we estimated that a subset of 24 of these High Value Agriculture approvals, if completely cleared, would release CO_2 emissions of at least 11.7. This is equivalent to 40% of the 28 million tonnes of carbon farming abatement recently purchased by the Commonwealth's Emissions Reduction Fund.[28]

From satellite image analysis, we estimate that more than 11,000 hectares of the areas approved for High Value Agriculture had been cleared as of May 2014. Most of this was in the largest and earliest approved project on Strathmore Station in the Gulf Plains region of northwest Queensland. The second largest approval at Olive Vale Station on Cape York was also being rapidly cleared in April-May of this year. Clearing was recently suspended for consultation over impacts to threatened species (Fig 3).

More details of known High Value Agriculture approvals along with estimates of CO_2 emissions and time-lapse imagery of clearing are found on the online interactive map (Fig 2).

26 http://www.wwf.org.au/?6800/bushland-at-risk-of-renewed-clearing-in-queensland
27 Personal communication with Right to Information Officer and DNRM staff.
28 https://theconversation.com/infographic-emissions-reduction-auction-results-at-a-glance-40728

Flawed process

Satellite data indicated that clearing on Strathmore Station commenced before the High Value Agriculture approval was actually issued. Then Minister Andrew Cripps assured the Queensland Parliament that nothing illegal had occurred, but did not table results of the investigation.[29] The approved clearing area has almost no overlap with soils mapped as suitable for cropping by the Queensland Government.[30]

The Olive Vale approval was issued during the caretaker pre-election period, a time when decisions 'which would bind an incoming government and limit its freedom of action' should not be taken.[31] This approval is of particular concern because the then-opposition had made an election commitment to end High Value Agriculture approvals. The Olive Vale owners only recently sought approval from the Commonwealth over impacts to threatened species, after clearing had commenced.[32] Queensland Government maps show the likelihood of very significant impacts to Commonwealth and state listed species whose habitats overlap the area approved for clearing, none of which appear to have been considered in granting the approval (Fig 4).

The present government commissioned an independent assessment of the suitability of Olive Vale Station for High Value Agriculture.[33] Applying the prevailing guidelines, the independent assessor found that the application "fails to meet the land suitability and financial criteria for High Value Agriculture'". The independent assessor also pointed out serious flaws in the High Value Agriculture provisions, namely that there is no audit and compliance provision in the Act to ensure that the cropping proposed is conducted in a sustainable manner and that the cropping proposed actually takes place and is ongoing, rather than ending up as cattle pasture, for example. As things stand, there seems to be nothing to stop a landholder obtaining approval for High Value Agriculture and simply turning the area cleared into pasture for livestock.

HIGH VALUE REGROWTH CLEARING

By comparing current regulatory maps with previous maps we were able to confirm that about 700,000 hectares of High Value Regrowth bushland had indeed lost protection, as previously reported in the *Bushland at Risk* report.

WWF has detected 16 instances of clearing of High Value Regrowth that lost protection when the law changed up until April/May 2015. These are detailed in the online map (see yellow markers in Fig 2). One confirmed instance of clearing of such regrowth is shown below by way of illustration (Fig 5). Methods are detailed in the Appendix.

29 Estimates hearing of the Agricultural, Resources And Environment Committee Queensland Parliament, Thursday, 17 July 2014.

30 Answer to Question on Notice before the 2014/15 estimates hearing of the Agriculture, Resources and Environment Committee asked on Thursday, 17 July 2014.

31 http://www.premiers.qld.gov.au/publications/categories/policies-and-codes/handbooks/cabinet-handbook/caretaker-conventions/basic-conventions.aspx

32 http://www.theguardian.com/environment/2015/jun/16/queensland-land-clearing-project-halted-amid-concerns-over-threatened-species

33 http://www.parliament.qld.gov.au/documents/tableOffice/TabledPapers/2015/5515T567.pdf

FIGURE 2

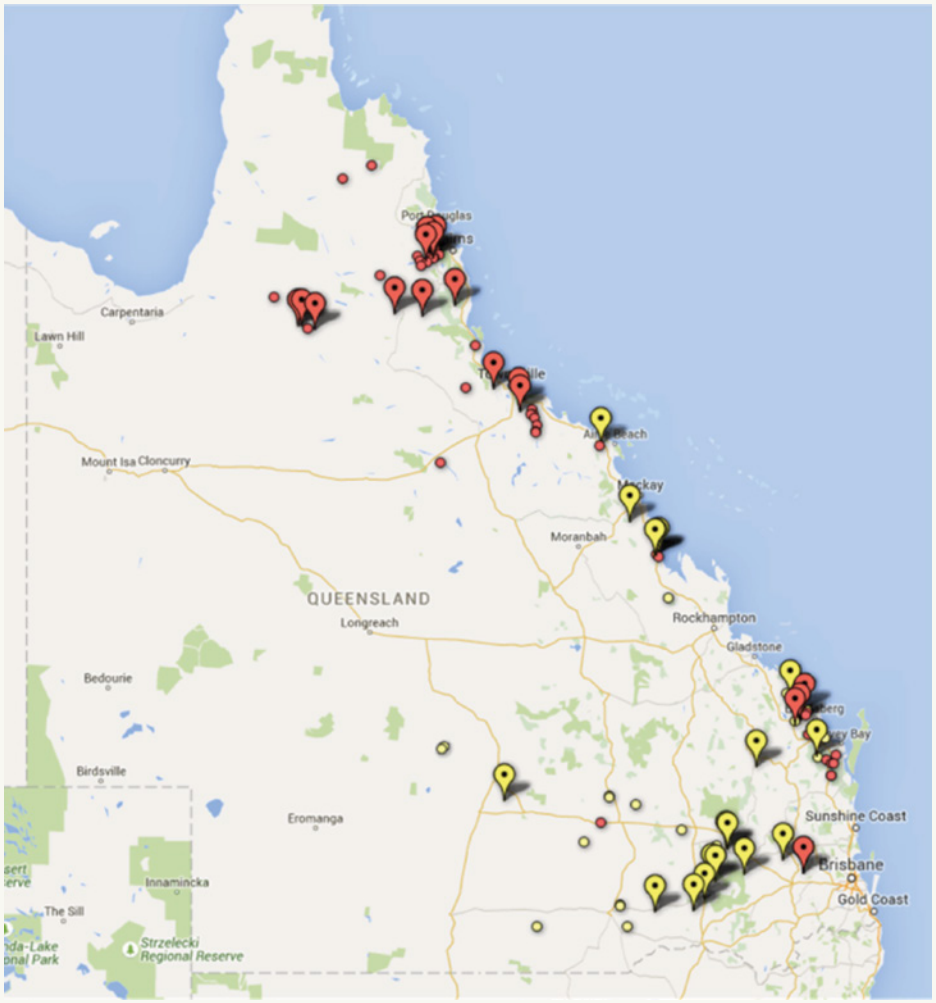
Known instances of clearing of native vegetation that lost protection ('de-protected'), or were unexplained and High Value Agriculture approvals, 2012 to 2015.

Large red markers indicate High Value Agriculture approvals granted since Feb 2015.

Small red markers indicate High Value Agriculture approvals granted prior to Feb 2015.

Large yellow markers indicate detected instances of unexplained clearing or clearing of de-protected vegetation for 2014-15.

Small yellow markers indicate the same thing for the period 2012-2014.



This map is available online in interactive form at wwf.org.au/qldlandclearing or https://drive.google.com/open?id=1iEHc2QyUeWQAcqsY2ZM27cVbW9ZM4qoiRiKfqnc4
Details include areas cleared and time-lapse satellite imagery showing progress of clearing to May 2015.

FIGURE 3

Clearing under a High Value Agriculture approval at Olive Vale Station, northern Great Barrier Reef catchments.

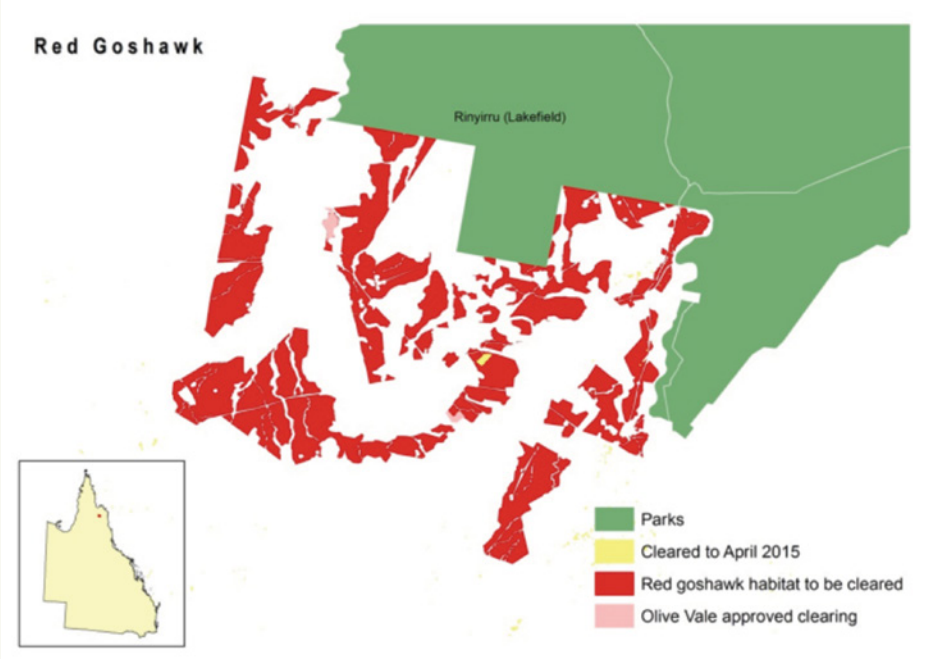
First image shows uncleared savannah bushland in June/ July 2014 prior to clearing. The second image shows the clearing of approx. 280 hectares by mid May 2015. These are Landsat composite infrared images enhanced to remove clouds and shadows and to highlight the difference between bare ground and vegetation. The purple colour shows an area cleared prior to April May 2015. The tan colour shows the area cleared during the first half of May 2015.

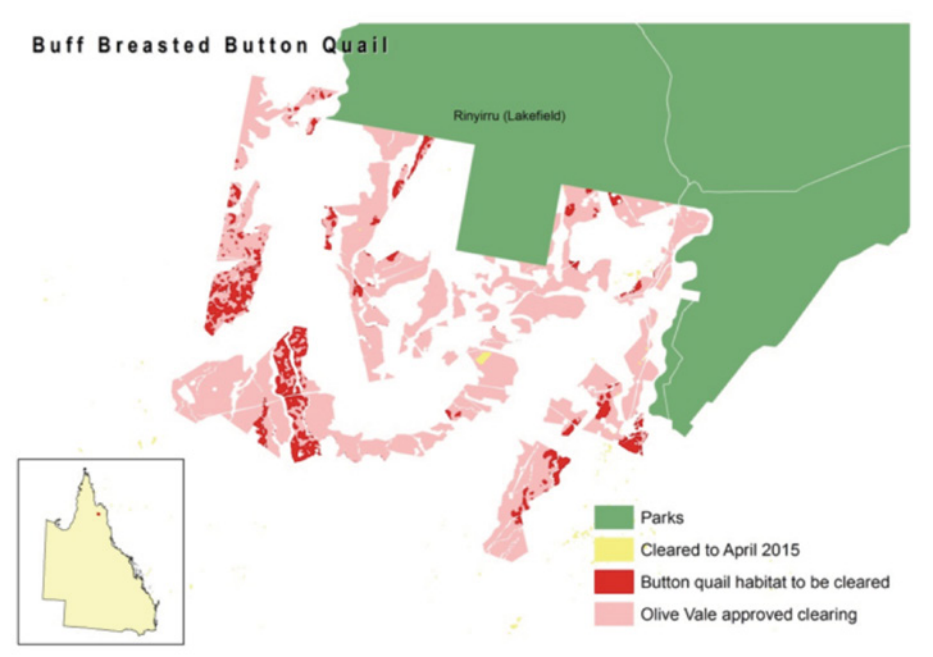
Video footage of the clearing in progress can be viewed at: https://www.youtube.com/ watch?v=qRtl7o_tX8E

FIGURE 4

Overlap of high value habitats for four state and Commonwealth threatened species with the area approved for clearing on Olive Vale Station.

The yellow patch shows clearing to April/May 2015 and matches the purple patch in Fig. 3. One month later, clearing had more than doubled as shown by the tan coloured patch in Fig 3. [34]



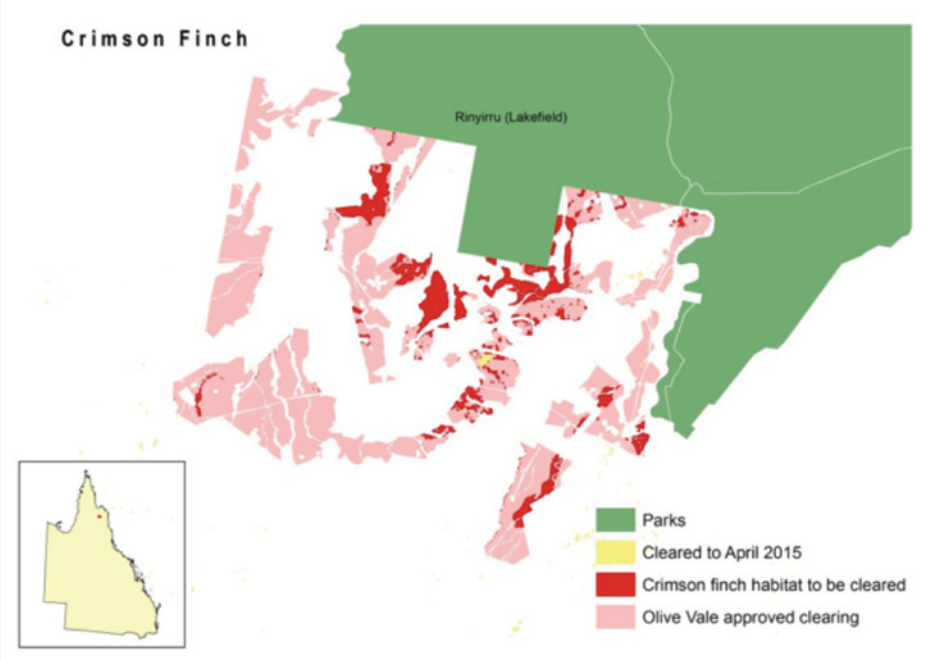


34 SOURCES: Queensland Government 2015 *Modelled potential habitat for selected threatened species in Queensland* (11 May 2015 release) http://qldspatial.information.qld.gov.au/catalogue/custom/detail.page?fid={ED7DB3C0-2652-4B00-A00E-B9AD5BC05AF7} and State Assessment and Referral Agency Decision Notice for high value agriculture clearing on Olive Vale Station http://dlgp002pw.server-web.com/mydasmpa/SDA-1114-015866.html

FIGURE 4 (CONTINUED)

Overlap of high value habitats for four state and Commonwealth threatened species with the area approved for clearing on Olive Vale Station.

The yellow patch shows clearing to April/May 2015 and matches the purple patch in Fig. 3. One month later, clearing had more than doubled as shown by the tan coloured patch in Fig 3. [34]



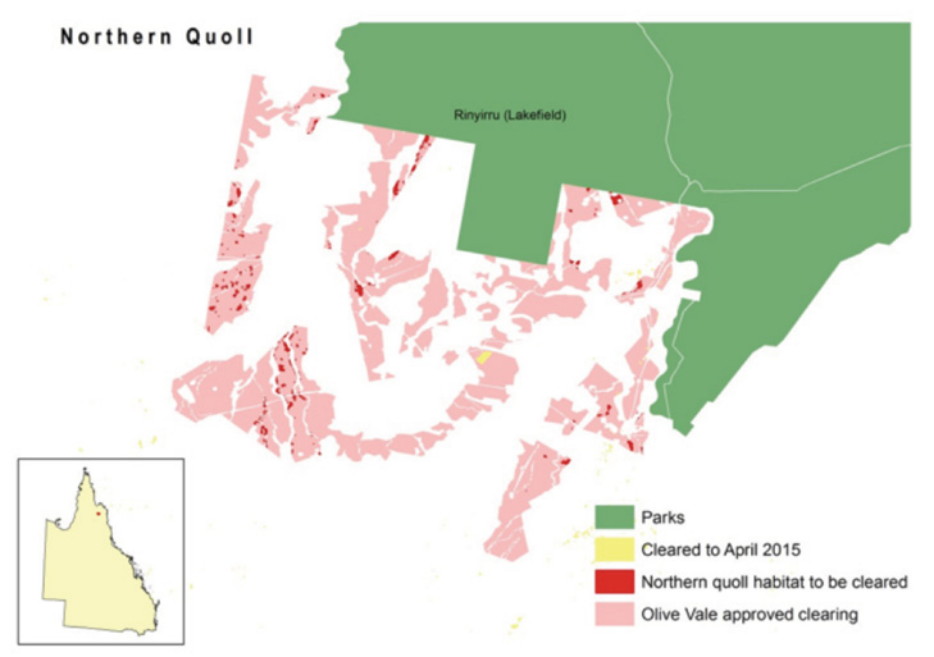
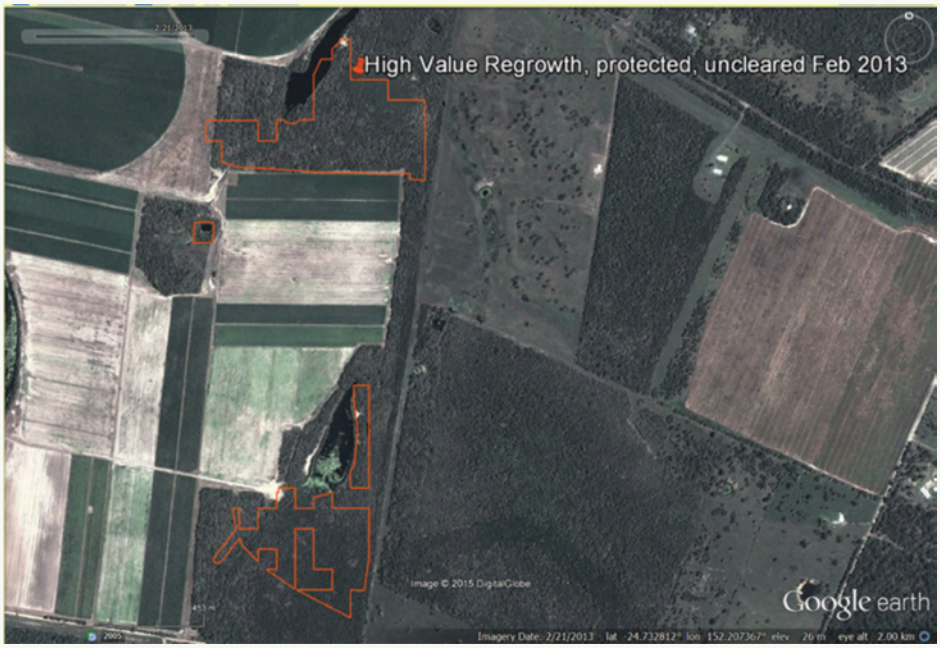


FIGURE 5

Clearing of de-protected High Value Regrowth near Bundaberg.

First image is prior to clearing. Second image shows clearing shortly after loss of protection. The coloured lines highlight just High Value Regrowth that lost protection due to the 2013 amendments and was cleared in the second image. The total area cleared was actually larger.



REMNANT VEGETATION REMAPPED AS EXEMPT

In comparing regulatory maps between 2012 and 2015, we also found newly exempted areas we did not anticipate in the *Bushland at Risk* report as being placed at risk. We found that about 125,000 hectares of vegetation which was mapped as remnant in 2012, including about 12,000 hectares of endangered regional ecosystems, was later remapped as exempt from all clearing controls over the period 2012-15.

The reasons for this remain unclear. Most of the change was likely a result of new Property Maps of Assessable Vegetation (PMAVs), which are negotiated directly between the Department of Natural Resources and Mines (DNRM) regional officers and landholders.

One example involves a remnant regional ecosystem at the mouth of the Burrum River near Hervey Bay that is listed as 'of-concern' under the VMA. This bushland is also habitat for a Commonwealth listed vulnerable species, the Goodwood Gum (*Eucalyptus hallii*). A large area of this remnant vegetation was made exempt from clearing controls in June 2013 through a PMAV (Fig 6).

It appears that such drastic changes to maps are not required to be reviewed and agreed to by the agencies responsible for biodiversity conservation and regional ecosystem mapping (principally the Queensland Herbarium and the Department of Environment and Heritage Protection). The processes for exemption from clearing controls of remnant vegetation that contains a threatened species would benefit from greater rigour, oversight and transparency.

WWF has detected six instances of clearing of such remnant vegetation which has lost protection due to changes in the regulatory maps (Fig 2).

UNEXPLAINED CLEARING OF REGULATED REMNANT VEGETATION

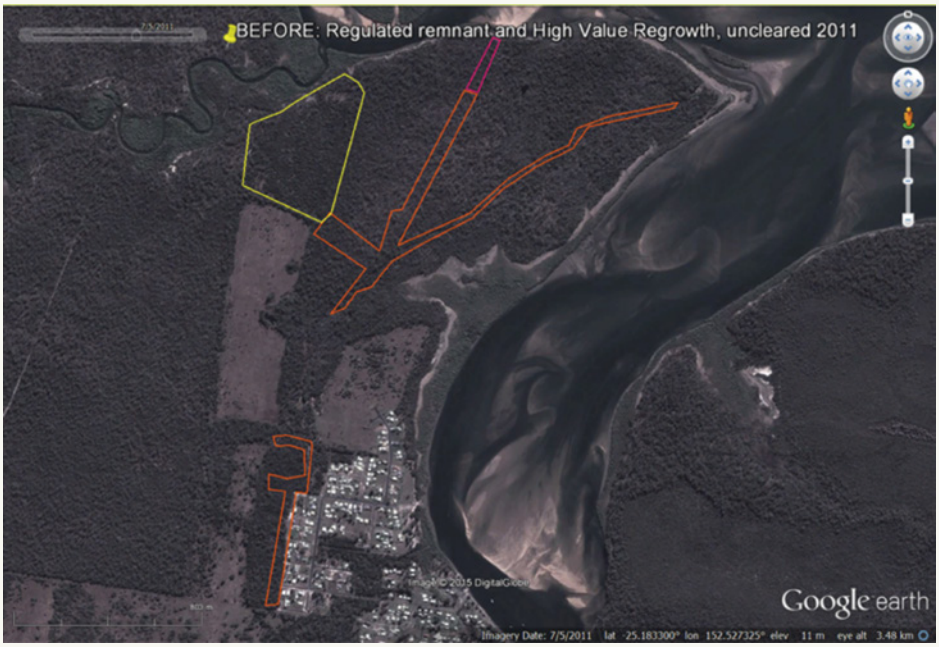
During satellite image analysis we also found 14 instances (Fig 2) of unexplained clearing of regulated remnant vegetation. This is bushland currently mapped as regulated remnant vegetation (Category B) according to the official regulatory map downloaded in Feb 2015, but which has now been quite extensively cleared for what appears, on the face of it, to be broadscale pasture development. Broadscale clearing for pasture was banned in 2006 and remains banned despite the new provision for High Value Agriculture clearing. Clearing for pasture is only permissible if it is irrigated and explicitly approved under a High Value Agriculture application.

The instance of most concern is an area of about 4,800 ha of remnant forest and woodland cleared from February to July of 2015. The area cleared includes over 300 ha of endangered brigalow forest (Fig 7).

FIGURE 6

Clearing of 'of concern' remnant forest in southeast Queensland on the Burrum River.

Red lines indicate forest that was regulated under the Act in 2012, but made exempt under a Property Map of Assessable Vegetation issued in June 2013 and cleared. Purple lines show clearing of an area that is still mapped as regulated remnant vegetation. Yellow lines show clearing of an area that, although High Value Regrowth, was not protected under previous codes. First image shows the area before clearing, and the second image, the area after clearing.



"THINNING" OF IRONBARK FOREST © QUEENSLAND GOVERNMENT

BROADSCALE CLEARING UNDER SELF-ASSESSABLE CODES

After the 2006 ban on broadscale clearing the only form of broadscale clearing allowed to continue was in the mulga forests of southwest Queensland. Mulga forests could be 'pushed over' or lopped under permit so that livestock could feed on the foliage ('fodder harvest'). Mulga was meant to resprout after such treatment. Under restricted circumstances, permits could also be issued to thin-out forests that could be shown to have grown into 'unnatural' thickets.

The Newman government changed legislation to allow 'fodder harvest' and 'thinning' under new 'self-assessable codes', which means that the landholder no longer had to obtain a permit so long as they complied with prescriptions in the code. The broadscale clearing shown in Fig 7 was apparently conducted under the thinning code according to the landholder.[35] Other instances of broadscale clearing of thousands of hectares of remnant vegetation have been uncovered which reportedly were also conducted under 'thinning' codes or permits.

35 http://www.abc.net.au/news/2015-08-21/augathella-tree-clearing/6714802

The self-assessable code for 'thinning' has greatly undermined the 2006 ban on broadscale clearing. There is little ecological support for the view that 'thickening' of vegetation is either widespread or even if it were, that it is an 'unnatural' process that needs remediation by driving bulldozers through uncleared bushland. [36] Moreover, 'thickening' where found, is better for bird biodiversity than thinned or cleared areas.[37]

Under the self-assessable thinning code in present form:

- There is no requirement to demonstrate that 'unnatural' vegetation thickening has actually taken place. A peer-reviewed published protocol for thinning which requires such evidence was not adopted in the current codes.[38]
- Instead, the code sets arbitrary thresholds for tree densities and allows intact forests to be cleared down to those arbitrary threshold densities.
- Clearing of virtually unlimited areas of remnant vegetation is allowed to create 'laneways' of pasture between strips of intact trees. Only large trees are spared.
- The code allows forests to be cleared down to 25% of original extent (in the case of cypress).
- Pushing over and thinning methods include bulldozers fitted with blades, "chopper-rollers" or "thinning bars" as well as herbicide treatments. The photo above taken from the code, illustrates that what is now considered to be valid thinning is little different from broadscale clearing.[39]
- 252 of 1383 regional ecosystems can be thinned in this way, including 18 endangered and 55 of-concern ecosystems.

The thinning code is no less than broadscale clearing by stealth. It is not supported by ecological science and runs counter to the purposes the *Vegetation Management Act* to conserve native vegetation and biodiversity. The thinning code should be revoked as soon as possible.

36 A study using land survey records found 'only minor vegetation thickening has occurred in the Darling Downs since the early land surveys' (Fensham and Holman 1998, The use of the land survey record to assess changes in vegetation structure. a case study from the Darling Downs, Queensland, Australia. *The Rangeland Journal* 20, 132 – 142).
Others found only a minor increase in mulga canopy cover of less than 4% which could however be attributed to climatic change, not to 'unnatural' causes (Witt et al 2010, Is 'vegetation thickening' occurring in Queensland's mulga lands – a 50-year aerial photographic analysis, *Australian Journal of Botany* 57, 572–582).

37 Tassicker et al 2006, The effects of vegetation structure on the birds in a tropical savannah woodland in north-eastern Australia. *The Rangeland Journal* 28, 139–152.

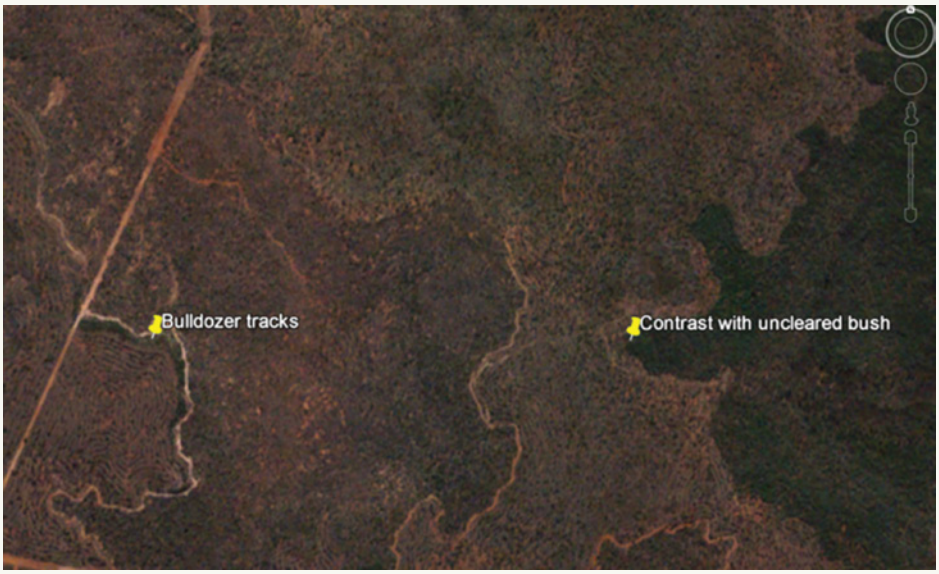
38 Fensham 2008. A protocol for assessing applications to selectively clear vegetation in Australia. *Land Use Policy* 25, 249-258.

39 https://publications.qld.gov.au/dataset/self-assessable-vegetation-clearing-codes/resource/71609795-5bfa-4833-934e-b5111d94eff4

FIGURE 7

Extensive clearing of about 4,800 hectares of vegetation still mapped as regulated remnant under the VMA, east of Augathella in south-central Queensland, between December 2014 and July 2015, apparently conducted under the thinning code.

Only a fraction of the total area cleared is shown. The first image shows remnant vegetation in 2006 from Google Earth. The second image is a matching Rapideye satellite image taken 29 July 2015. Bulldozer tracks are clearly visible in places as new roadways or cleared laneways between small remnant strips of trees. The overall reduction in standing forest canopy is evident by comparison with uncleared areas on the right of the image.



PANIC CLEARING

The historical record shows that landowners tend to rush into land clearing they might not otherwise do if faced with the likelihood that it will soon be restricted.

The largest single spike in the recent history of land clearing in Queensland was in 1999-00 just prior to the Act itself coming into force (Fig 1). A second spike in 2002-03 preceded the amendments of 2004 which put in place the arrangements for a total ban on broadscale clearing to take effect in 2006. In May 2003, a moratorium on acceptance of land clearing applications was imposed, suppressing most panic clearing. Subsequent to the 2004 amendments and prior to the final ban in 2006, clearing was only allowed to continue within a set cap, under a ballot system.[40]

A moratorium was also put in place by the Bligh government in 2009, prior to the announcement of new restrictions on clearing of High Value Regrowth. This moratorium did much to prevent the sort of panic clearing seen prior to 2003. However, the rapid rise of clearing of regrowth after 2009 may reflect to some extent a reaction by landholders who may have cleared still unprotected regrowth to pre-empt any further restrictions that might ensue (Fig 1).

Prior to the January 2015 state election, the present government committed to restore the land clearing laws of the earlier Labor government.

However as of August 2015, there had been no change in the Act, its regulations or codes. The prospect that native vegetation currently exempt from clearing controls may soon become restricted again is a potent stimulus for panic clearing unless a moratorium is put in place, as happened in 2003 and in 2009.

Panic clearing is not necessarily illegal. Panic clearing includes precipitous or rushed clearing of areas that are legal to clear, as a reaction to the fear that the areas currently legal to clear may no longer be legal to clear due to a known or anticipated change in government policy.

While there is no statistical evidence yet available to indicate panic clearing, we have uncovered a number of large instances of recent land clearing which could indicate panic clearing (Fig 2). One large clearing instance that started at the time the government changed in February 2015 gives further creedence to panic clearing (Fig 7).

Based on past behaviour, it is highly likely that land clearing in the first year of the Palaszczuk government will exceed the already high levels found in 2013-14 due to panic clearing, unless the government acts promptly to prevent it.

It is highly likely … that land clearing in the first year of the Palaszczuk government will exceed the already high levels of 2013-14 due to panic clearing unless the government acts promptly to prevent it.

40 McGrath C (2007) End of broadscale clearing in Queensland. http://envlaw.com.au/wp-content/uploads/vegetation5.pdf

KROOMBIT TOPS © QUEENSLAND GOVERNMENT

CLEARING AND CLEARING APPROVALS CONTINUE UNDER THE UNREFORMED LEGISLATION

Despite the government's stated intent to restore stronger laws, High Value Agriculture clearing applications are still being accepted and approvals are being granted, 17 so far since the change of government in February 2015 (Large red symbols in Fig 2).

Until there is action to implement the government's election commitment, High Value Agriculture clearing applications must be assessed under the unreformed laws as they are when the application is lodged.

Native vegetation currently exempt from clearing controls, including remnant vegetation recently remapped as exempt and High Value Regrowth on freehold and Indigenous land, may now be cleared without restraint and is being cleared.

Broadscale clearing under self-assessable codes that allow broadscale clearing of remnant vegetation may also continue until such time as the codes are revised to reflect the new government's policies.

These facts underline the urgent need for prompt action to implement the government's election commitments.

WHY LAND CLEARING NEEDS TO BE CONTROLLED

Retention of healthy bushland is vital for agriculture and for the Queensland economy generally, by: [41]

- securing supplies of abundant clean water;
- creating and conserving topsoil;
- preventing waterlogging and salt contamination of soil;
- providing shelter from wind and weather for crops, livestock and dwellings;
- conserving a benign rainfall and temperature regime; [42]
- providing habitat for crop pollinators, predators of pests and other beneficial species such as the wild relatives of the cultivated Queensland (Macadamia) nut; and
- providing tourism and recreation opportunities and experiences.

The biodiversity and ecological impacts of land clearing are severe. The Queensland Government's *State of the Environment 2011* report finds that: [43]

- fertility of topsoil across the main grain growing regions is severely depleted, costing industry about $144 million a year to supplement; [44]
- coastal rivers are degraded by high sediment and chemical pollution;
- up to 30% of coastal wetlands – vital for good water quality – have been lost; [45]
- large areas of high value native vegetation continue to be cleared or are at risk of clearing; [46]
- 794 native species are threatened with extinction; [47]
- 90 regional ecosystems as 'endangered' and 532 'of concern.' [48]

A panel of eminent biologists estimated in 2003 that:

'between 1997 and 1999, approximately 100 million native mammals, birds and reptiles die yearly as a result of the broadscale clearing of remnant vegetation' [49]

This was at a time when 446,000 hectares were being cleared annually. With current clearing rates returning to about 278,000 hectares per year, it is fair to conclude that individual native animal deaths due to increased clearing number in the tens of millions every year.

The Queensland Auditor General recently pointed to land clearing as a threat to the Great Barrier Reef as a result of reduced water quality, as noted above. [50]

41 http://www.wwf.org.au/?11441/Changing-land-use-to-save-Australian-wildlife
42 Rezaul, M. et al. (2014) Land cover changes and their biogeophysical effects on climate. *International Journal of Climatology* 34, 929-953.
43 Department of Environment and Heritage Protection (2012) *State of the Environment Queensland 2011* (http://www.ehp.qld.gov.au/state-of-the-environment/report-2011/index.html).
44 Ibid p. 177 in 'Part 5 Impacts' (http://www.ehp.qld.gov.au/state-of-the-environment/report-2011/pdf/impacts.pdf)
45 Ibid p. 72 'Part 4 State' (http://www.ehp.qld.gov.au/state-of-the-environment/report-2011/pdf/state.pdf)
46 Ibid P. 24-28 'Part 3 Pressures' (http://www.ehp.qld.gov.au/state-of-the-environment/report-2011/pdf/pressures.pdf)
47 http://www.ehp.qld.gov.au/wildlife/threatened-species/ (6/11/14)
48 *State of the Environment Queensland 2011* p. ix (http://www.ehp.qld.gov.au/state-of-the-environment/report-2011/pdf/executive-summary.pdf);
49 Cogger H et al 2003, *Impacts of Land clearing on Australian Wildlife in Queensland*. WWF-Australia (Available at http://metadatasearch.condamineralliance.com.au/uploads/files/sp128impactslandclearingonaustralianwildlifeqld1jan03-2.pdf).
50 https://www.qao.qld.gov.au/news/view/173

KOALA STRANDED IN A TREE AFTER LAND CLEARING © ABC

CONCLUSIONS

Principal conclusions from this analysis are:-

- *Loss of protection leads to clearing:* Areas placed at risk by loss of protection have indeed been cleared. Some instances occurred almost immediately after the amendments of 2013 were enacted.
- *Panic clearing likely happening:* Clearing is likely to accelerate now that the Palaszczuk government has committed to restoring protection to areas placed at risk in 2013, but has not yet changed the legislation. The discovery of many, some quite large, clearing instances since mid-2014 until July 2015 suggests that panic clearing is underway (Fig 2).
- *Unexplained exemptions:* The exemption of 125,000 hectares of remnant vegetation from clearing controls via changes to the regulatory maps, through PMAVs or other means, as discovered and reported here, suggest greater oversight, rigour and transparency is needed around such important changes to maps.
- *Unexplained broadscale clearing:* Unexplained broadscale clearing of vegetation, which is mapped as remnant category B under the current regulatory map, represents either a lack of transparency; if it turns out they are approved or legal despite being mapped within a regulated layer, or a shortcoming of compliance and enforcement. The government advised that only one of six such examples presented by WWF had been investigated. Given the reduced resources for compliance work, compliance officers are forced to filter out all but the most egregious of cases.
- *Mulga clearing not the chief driver:* We found relatively few instances of clearing in the Mulga Lands (Fig 2). This provides little support to a recent claim that the observed rise in clearing (Fig 1) is due to mulga fodder clearing to feed livestock during drought.[51]

51 http://www.queenslandcountrylife.com.au/news/agriculture/general/healthcare/drought-drives-mulga-hunger/2724451.aspx

POLICY RECOMMENDATIONS

Policy responses indicated by this analysis include steps that do not require amendment of the Act and steps that do.

Actions can be taken to significantly advance progress of the government's election commitments without an immediate need to amend the Act itself.

Immediate steps

The government should act immediately to stop 'panic clearing' and tighten some of the loopholes created by the previous government.

- *Announce a time bound process to implement the Government's election commitment:* The Government should immediately announce a process with clear deadlines for delivering their election commitment to restore stronger controls over land clearing.
- *Halt clearing of areas the government has committed to protecting again:* The government has enhanced actions against illegal clearing.[52] However this does little to deter panic clearing because panic clearing may be legal. Nor does it stop broadscale clearing applications for High Value Agriculture being accepted and processed under the 2013 amendments until those amendments are reversed. The present government has committed to restoring protection of regrowth made exempt by the previous government, and this expressed intent acts as a potent stimulus for panic clearing. The government has the means to prevent clearing of high conservation value bushland and land subject to degradation using the declared area provisions of the current Act. These provisions can over-ride exemptions previously granted, including High Value Agriculture approvals and High Value Regrowth if there is a clear conservation need. An interim declared area can be declared immediately, within which all clearing must cease. An interim declaration has effect for three months.
- *Amend codes and processes for High Value Agriculture assessments:* The analysis above and the independent review of the approval for High Value Agriculture clearing on Olive Vale Station found that checks and balances are lacking. Until such time as High Value Agriculture can be removed as an allowable purpose by amending the Act, the government should immediately revise codes and criteria for assessment of such applications. In particular, approvals should require concurrence of biodiversity experts within the Herbarium or the Environment Department.
- *Enhance compliance actions:* Investigation and enforcement activities to prosecute and prevent illegal land clearing, especially clearing under self-assessed codes, should be boosted and better funded as a high priority. The unexplained clearing of remnant vegetation found in this analysis is likely only a fraction of all such clearing in reality. Unexplained clearing needs to be investigated and if shown to be illegal, prosecuted.

52 http://www.queenslandcountrylife.com.au/news/agriculture/general/news/strong-stance-against-illegal-tree-clearing/2733369.asp

Near-term steps

- *Release data:* The Queensland Government's SLATS analysis facility is automated and detects clearing instances almost immediately when the satellite images become available.[53] And yet release of SLATS reports and spatial data typically takes two years from acquisition. The Government should commit to the public release of spatial data within one month of confirming that clearing has taken place (as opposed to natural causes such as fire). In addition, the Act already requires public posting of notifications of self-assessable clearing, but no register has yet been posted. Prompt release of data is necessary to explain to the Queensland public why remedial action is needed and later on, to demonstrate that remedial action is working.
- *Update habitat maps:* The operation of self-assessment and development assessment codes under the Act is dependent on Essential Habitat maps (for remnant and High Value Regrowth only). These maps are currently based almost entirely on typically sparse or biased point occurrence records of threatened species, although for some species modelled habitats are used. Point records, where species happened to be observed in the past, are a very poor indication of suitable habitat. Robust new habitat models are now available for all threatened species (for example Fig 4). Essential Habitat maps should be revised to incorporate this new information.
- *Investigate probity of approvals:* In light of the flawed processes identified above, previous approvals for High Value Agriculture clearing should be investigated for adherence to due process.
- *Reform the granting of exemptions via changes to regulatory maps:* 125,000 hectares of exemptions of mapped remnant vegetation have been detected by comparing 2012 and 2015 regulatory maps. These should be investigated and administrative processes reformed to ensure all exemptions recorded on maps require the concurrence of government biodiversity experts in the Queensland Herbarium or Environment Department. Such substantive changes to maps should only be made if adequate ground-based evidence proves that the maps are genuinely in error.

53 With the caveat that SLATS analysis normally runs from winter to winter. Winter imagery has the least cloud cover and the least interference from green ground cover.

RECENTLY RE-LEGALISED BROADSCALE CLEARING CAPE YORK © KERRY TRAPNELL

AMENDMENTS OF THE VEGETATION MANAGEMENT ACT AND REGULATION

Ultimately the government should amend the *Vegetation Management Act*, associated regulations and related Acts.[54]

- *Restore protection of High Value Regrowth:* About 700,000 hectares of regrowing bushland more than 20 years old on freehold and Indigenous land was protected in 2012 but was made exempt from clearing controls with the amendments of 2013. In some instances, the de-protected bushland was cleared almost immediately (see an example in Fig 5). The high conservation value of this bushland was never in doubt. It is at an advanced stage of recovery, and includes endangered ecosystems or essential habitat for threatened species, riparian and wetland buffer zones or high slopes at risk of erosion.
- *Extend protection of watercourse and wetland buffers across all Great Barrier Reef catchments:* The legislative protection for Great Barrier Reef watercourses and wetlands has never been adequate. In 2009, the Bligh government extended protection to all native regrowth vegetation in 50m buffers around certain watercourses and 100m buffers around wetlands in the northerly Reef catchments. The Newman government retained that protection. However, this protection was never adequate to the critical task of protecting the Reef. The catchments from the Fitzroy River down to the Burnett Mary catchments feed into the southern Great Barrier Reef. Watercourse and wetland buffers should also be protected in these catchments.

54 The *Water Act* and *Sustainable Planning Act*.

- *Restore the ban on broadscale clearing:* The 2013 amendments introduced a new allowable purpose of High Value Agriculture.' This essentially ended the 2006 ban on broadscale clearing and as a result, broadscale clearing has recommenced, with all the environmental problems that entails. The government should remove this purpose from the Act. Likewise, the 'necessary environmental clearing' purpose introduced in 2013 is dubiously termed environmental, as it includes channelization and dredging of natural streams, and should also be removed.[55]
- *Restore enforcement capability:* The 2013 amendments removed landowner deemed liability for clearing offences, and introduced the 'honest mistake of fact' defence to the Act. Both changes greatly reduced the power of the government to effectively prosecute illegal clearing. The government should restore landholder deemed liability, which is quite appropriate to cases of land clearing, and remove the 'honest mistake of fact' defence, which is highly subjective and requires the prosecution to prove the landholder had a certain state of mind.
- *Restore riverine protection permits:* Prior to the 2013 amendments clearing of instream vegetation was regulated under the *Water Act*, not under the VMA. Clearing of instream vegetation could only take place under very limited circumstances and required the issuance of a 'Riverine Protection Permit'. The amendments of 2013 also included a change to the *Water Act* to remove this requirement. Instead, clearing of instream vegetation was built into the codes under the VMA. The net effect was to open instream vegetation to a wider array of clearing risks than was previously the case. The government has already committed to restoring riverine protection permits.
- *Review and amend exemptions:* Existing exemptions for community infrastructure and urban development should be removed or restricted. These exemptions are inequitable, ill-defined and open to abuse. There is no regulatory map defining the urban areas within which this exemption applies. There should be no exemptions for clearing over a quarter of a hectare in scale on any given property for any purpose, and no exemptions for any clearing at any scale of threatened ecosystems or species habitats, of riparian buffer zones or on high slopes.
- *Review and amend assessment codes and thresholds for self-assessment:* The codes governing self-assessment of clearing and development application assessments should be reviewed and revised. Clearer, less complex codes will reduce costs of auditing and compliance. Clear thresholds of scale and ecological impact need to be set, below which clearing under self-assessable codes can be done, and above which a development application should be required. Self-assessable codes should only apply for clearing less than 10 hectares in scale of low risk ecosystems. Clearing at any scale of threatened ecosystems or species habitats, of riparian buffer zones or on high slopes should require a development approval. The thinning code in particular is not supported by science, and runs counter to the purposes of the VMA and should be revoked as soon as possible.

55 https://www.dnrm.qld.gov.au/__data/assets/pdf_file/0020/111296/guideline-environmental-clearing.pdf

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METHODS

INDEPENDENT DETECTION OF LAND CLEARING

We conducted two rounds of training of the 'Random Forests' algorithm in Google Earth Engine under an arrangement with Google.[56]

In the first round, we searched for major clearing instances by visually comparing the Landsat 7 composite image for 2012, and the Landsat 8 composites for July-Aug 2014 and April-May 2015, respectively. Categories of change detected by visual inspection of satellite imagery included: cleared, crop harvest or crop growth (as distinct from forest change), non-forest, forest or woodland, burns, water, drying out of water bodies, cloud cover, haze or shadows.

The initial prediction of land cover change derived from these spatial layers and training polygons was then exported and subsampled systematically to ensure stratified random sampling across bioregions where significant land clearing was found. We checked each predicted land cover change in this sample against the Landsat imagery and corrected the land cover change assignment as necessary. The corrected set of polygons with confirmed land cover change were then used in the second round to train a second iteration of the random forests model.

We masked out land uses and tenures not governed by the Act (such as state forests, national parks and urban areas) using land use and tenure layers published by the Queensland Government. We then subsampled 1,000 properties with the largest total areas of clearing of remnant or High Value Regrowth predicted and examined each of them against the original Landsat imagery and against high resolution imagery in Google Earth (if available) to confirm whether or not clearing had taken place. Visual evidence of land clearing comprises straight or even boundaries, an absence of discernible tree crowns visible in an earlier image, and the presence of windrows and brush piles. Only a small subsample comprising the more extensive examples of the hundreds of thousands of candidate woody vegetation loss events detected in the Google Earth Engine model, could be checked against high resolution Google Earth imagery to verify if clearing had taken place. In some cases, despite lack of high resolution imagery, the coarser scale Landsat imagery unequivocally supported the conclusion that the areas examined had been cleared rather than lost due to other causes, such as fire. The detection model also included explicit prediction for cropping and burned areas to reduce misclassification of burned or crop harvest areas as cleared. Plantation harvest events, while used to train the model, were masked out using the land use layers published by the Queensland Government.

56 https://earthengine.google.org/#intro

Instances of clearing of vegetation detected and reported here, fell into four basic categories:

- remnant vegetation made exempt on the regulatory map for reasons unclear (usually a PMAV);
- High Value Regrowth protected under the codes in force in 2012, but made exempt ('de-protected') by changes to the law in 2013;
- remnant vegetation made exempt through a High Value Agriculture approval;
- remnant vegetation in Category B on the regulatory map but nonetheless cleared and therefore unexplained and potentially illegal.

Since only a non-random sample of woody cover loss instances could be checked and confirmed as clearing, we are unable to produce statistics such as total areas cleared with any confidence.

RE-ESTIMATION OF AREAS PLACED AT RISK

We obtained current official maps of regulated vegetation and compared those with maps of regulated remnant vegetation as of March 2012, as well as the maps of protected regrowth developed as reported in *Bushland at Risk*. We intersected the two maps of regulated vegetation and estimated areas that changed regulatory status due to the amendments of 2013.

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Earth Hour was co-founded by WWF-Australia and has evolved into one of the most recognised campaigns in history.

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