

Double standard

The failure of Australia's national environment law to prevent the pastoral industry bulldozing threatened species habitat in Queensland 🌿

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**AUSTRALIAN
CONSERVATION
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Executive summary

Nature in Australia is in serious trouble. Despite being one of only 17 megadiverse nations on earth and home to some of the most unique and remarkable plants and animals on the planet, Australia is in the midst of an extinction crisis.

The 2021 *Australia: State of the Environment* report found that the overall condition of Australia's natural environment was poor and that the trend is deteriorating.¹

Australia holds the dubious record of driving more mammals to extinction than any other nation and ranks third in the world on the total number of extinct and threatened animals, and eighth in the world on extinct and threatened species.²

Habitat destruction and invasive species are the two greatest threats to Australia's threatened species.³ Despite successive government reports warning about the impact of habitat destruction, Australia remains the only developed nation on earth that is a global deforestation hotspot.⁴ The vast majority of this ongoing habitat destruction is occurring on Australia's east coast, and primarily in Queensland. The resulting erosion and water pollution is also a major threat to the World Heritage listed Great Barrier Reef.⁵

In December 2021, the Queensland Government's Statewide Land and Tree Study (SLATS) released the most recent detections of forest and woodland destruction for 2018-19 using a new and more accurate methodology.

This report analyses the 2018-19 SLATS data to quantify destruction of forested habitats for threatened species and threatened ecological communities listed as Matters of National Environmental Significance (MNES) under Australia's national environment law, the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The EPBC Act requires that any action likely to significantly impact a MNES must first be referred to the environment department (“the regulator”) for assessment and if considered ‘significant’, either approved or refused, with some exemptions.

If a significant impact, such as the destruction of threatened species habitat, is not referred, (and is thus neither assessed nor approved), it is potentially unlawful, and should be investigated by the regulator. However, a lack of certainty about exactly what constitutes a ‘significant impact’ under the EPBC Act has led to confusion and uncertainty, a criticism made in Graeme Samuels' recent Independent review of the Act, (the Samuel review). This lack of certainty has also provided an unjustified excuse for the Agricultural industry to ignore its referral obligations of the Act.

In this report we have tried to identify how much forest habitat destruction in Queensland in 2018-19 was referred, and how much was not, and the industries responsible. We developed a novel approach to do this. By using the regulator's own enforcement and controlled action approval records as well as threatened species habitat maps we derived significant impact thresholds for destruction of MNES habitats. These thresholds were used to identify how much habitat destruction was not referred, but should have been.

¹Cresswell I, Janke T & Johnston EL (2022), Overview, Australia: State of the Environment Report 2021 (<https://soe.dcccew.gov.au/sites/default/files/2022-07/soe2021-overview.pdf>)

²International Union for the Conservation of Nature, Summary Statistics, (<https://www.iucnredlist.org/resources/summary-statistics>)

³Table BIO1 in Cresswell ID & Murphy HT (2017). Australia state of the environment 2016: biodiversity, independent report to the Australian Government Minister for the Environment and Energy, Australian Government Department of the Environment and Energy, Canberra; Ward et al., 2021, A national-scale dataset for threats impacting Australia's imperiled flora and fauna (<https://onlinelibrary.wiley.com/doi/full/10.1002/ece3.7920>)

⁴WWF International, 2021, Deforestation Fronts, Drivers and Responses in a Changing World.

⁵Pickering C & Guglyuvatyy E (2019) Negative Impact of Land Clearing and Deforestation on the Great Barrier Reef. *Carbon & Climate Law Review* 13, 195-207.

⁶Exemptions apply for actions covered by programmatic approvals such as Strategic Assessments and Regional Forest Agreements, if they had Commonwealth authorisation prior to the EPBC Act or if they constitute a lawful ongoing use of land (such as livestock grazing) (<https://www.dcccew.gov.au/sites/default/files/documents/agricultural-actions-exempt-approval-under-national-environmental-law-factsheet.pdf>).

⁷Box 14 Complexity of EIA processes p75 in Samuel, G 2020, Independent Review of the EPBC Act – Final Report, Department of Agriculture, Water and the Environment, Canberra, October. ISBN 978-1-76003-357-6.

Key findings

- A total of 421,246 ha of mature or advanced regrowth forest more than 15 years old, which is mapped as “likely to occur” habitat for threatened species or threatened ecological communities, was wholly or partly deforested in Queensland in 2018-19. This is roughly the same area as the Gold Coast.
- 100 animal species, 126 plant species and 11 threatened ecological communities had at least one hectare of likely habitat destroyed.
- In just one year, the iconic endangered koala had 75,547 ha of likely forest habitat destroyed. This is triple the amount of koala habitat formally approved for destruction under the EPBC Act over the decade 2011 to 2021.⁸
- The endangered Brigalow ecological community had 6,296 ha destroyed.
- Almost all (96%) of the MNES habitats destroyed, a vast area of 404,652 ha, were destroyed for livestock pasture expansion on thousands of properties without evidence of any referrals or approvals.
- The last referral for pasture expansion in Queensland was made in 2009. Although there have been several referrals for crops and irrigated pasture cultivation under the now-terminated “High Value Agriculture” provision introduced by the former Newman LNP state government in 2013, clearing for cultivation is distinct from clearing just to remove more trees to grow more grass (“pasture expansion”) for livestock, which is the dominant driver of tree clearing in Queensland.⁹
- There is no public record of any enforcement action taken against unreferral destruction of MNES for pasture expansion in Queensland.
- At least 253,164 ha on 5,545 properties, 60% of the total 421,246 ha deforested in 2018-19, exceeded significance thresholds for 53 MNES (for which thresholds could be derived from the record of decisions by the regulator) and so, should have been referred.

Of this, 170,409 ha was forest that was at least 30 years old and 44,195 ha was mapped as remnant forest in 2018.

- In 2018-19 alone, thousands of prima facie breaches of the EPBC Act may have occurred that should have been investigated by the regulator.
- The majority of these possible breaches, and those with the largest impacts, are in the Brigalow Belt of central and southern Queensland.



In just one year the endangered koala had 75,547 ha of likely forest habitat destroyed in Queensland

Many in the Queensland pastoral industry routinely ignore the EPBC Act as they bulldoze threatened species habitat at vast scales to expand pastures, while other industries such as mining generally follow due process and refer projects for EPBC assessment and approval.

This analysis underestimates the number of properties which had a prima facie significant impact on MNES because we could derive thresholds for only a limited set of MNES¹⁰ and because the current property by property referral approach still fails to take into account the cumulative impacts of multiple actions, another key criticism in the Samuel review.

This is not to say that a developer simply following the EPBC Act referral process amounts to effective environmental practice. The effectiveness of post-referral assessments, approvals, monitoring and compliance has been criticised extensively elsewhere and is not the focus of this study. Rather, our focus is on failures to refer or seek approval for actions likely to have significant impacts on MNES, which is the most crucial first step for the effectiveness of the EPBC Act.

An unjustifiable double standard exists in the application and enforcement of the EPBC Act. Vast destruction of forest habitats for MNES to expand pastures is going unnoticed or being ignored by the regulator. The regulator has never taken enforcement action against unreferral MNES destruction for pasture expansion in Queensland, although actions have been taken against other agricultural developers planning to destroy habitats for cultivation or crops and irrigated pastures.¹¹ This double standard has the effect of a de facto exemption from the EPBC Act for the far more extensive habitat destruction for pasture expansion.

The results of this study highlight the need for fundamental reform, both administrative and legislative, of Australia’s national environmental laws. The establishment of strong national environmental standards and the creation of a fully resourced and independent regulator must address the shocking compliance failures uncovered in this report—a regulatory black hole which is allowing hundreds of thousands of hectares of habitat for threatened species and ecological communities to be destroyed without penalty or consequence.

Vast destruction of forest habitats for MNES to expand pastures is **going unnoticed or being ignored by the regulator.**

⁸ <https://www.acf.org.au/aggravating-extinction>

⁹ EPBC Referral 2009/4934 Eradicate and Control *Dianthium Sericeum* (Queensland Blue Grass)

¹⁰ Cautioning that impacts on MNES would need to be ground-truthed through a full investigation by the regulator in each clearing event we have identified.

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¹¹ Department of Climate Change, Energy, the Environment and Water (2022). Compliance Outcomes (<https://www.awe.gov.au/environment/epbc/compliance-and-enforcement/compliance-outcomes>).

Recommendations

The Australian Government must:

1. **Overhaul Australia's weak national environment laws** and create strong national environmental standards enshrined in law to protect and restore Australia's nationally threatened wildlife and ecosystems.
2. **Create an independent and well-resourced federal compliance and enforcement regulator**, an Environment Protection Authority, to safeguard Australia's environment and ensure all industries comply with their obligations to obtain approval for actions which are likely to have a significant impact on MNES.
3. **The new independent regulator and other national environmental institutions must:**
 - a. **Improve the data, information and systems** to support the application of the EPBC Act, including a nationally consistent, timely and accurate vegetation monitoring program, such as a national equivalent of the Queensland Statewide Landcover and Tree Study (SLATS).
 - b. **Take a proactive and preventative enforcement approach.** Using now-frequent and freely available satellite imagery, and best available detection methodology such as SLATS, the new regulator should be detecting destruction of MNES habitats nationwide that have not been referred and take immediate action to halt destruction until those involved meet their referral obligations of the Act, regardless of who is doing the destruction for what purpose and without regard to what state laws do or do not permit. The data should also inform a risk-based approach to compliance which targets and makes an example of the worst offenders and most serious offences.
 - c. **Take on a strong educational role and provide unambiguous guidance and compliance advice.** Where possible and appropriate this could include quantitative thresholds for likely significance of habitat destruction on MNES, using best scientific advice and accurate habitat maps. This should include special rules to ensure destruction of already transformed, but still important habitats not readily captured by area thresholds, like paddock trees, is not missed.
 - d. **Develop much more accurate and reliable habitat maps** for MNES using best scientific advice.
4. **Reform the law to prevent the "death by 1000 cuts"** that results from project-by-project assessments, each individually deemed non-significant, and so failing to take into account the highly significant cumulative impacts of many such projects. This is also a recommendation of the recent Samuel Review.¹²
5. **Invest in restoring Australia's wildlife and ecosystems.** Adequate investment is essential to restoring the health of Australia's biodiversity. Spending \$2 billion annually for 30 years could restore and protect almost all (99.8%) of Australia's degraded terrestrial ecosystems to at least 30% of their original coverage. The Australian Government should invest at least this amount to recover critical ecological functions and abate almost 1 billion tonnes of carbon dioxide equivalent on public and private land. In addition to public investment, the government can leverage greater private investment in conservation and restoration through credible incentives and mechanisms. Any such schemes should have genuine integrity and strong governance arrangements and be complemented by appropriate public investment.

¹² Recommendation 25: "the EPBC Act should be amended to support more effective planning that accounts for cumulative impacts and past and future key threats and build environmental resilience in a changing climate." in Samuel G (2020) cited above.



Introduction

Under the EPBC Act, a person must not take an action that has a significant impact on a matter of national environmental significance (MNES) without authorisation, with some exemptions.¹³

The process for seeking authorisation is called "referral". A referral is required if an action is likely to have a significant impact. This should entail on-site surveys to see if MNES such as threatened species occur or have habitat there, and if so, a plan of action to reduce the impacts to non-significant levels. Based on referral documentation, the regulator then decides whether the action is "controlled" or otherwise, or is rejected as "clearly unacceptable". A controlled action must proceed through assessment and either rejection or amendment and/or approval before it can commence. If the regulator deems it not a controlled action, that is, it is not likely to have significant impacts on MNES, the action does not need approval under the EPBC Act.

¹³ See footnote 5.

¹⁴ Department of Agriculture Water and Environment 2022, *EPBC Act environment assessment process – referral* (<https://www.awe.gov.au/sites/default/files/documents/flow-chart.pdf>)

Exemptions apply for actions that have a pre-EPBC Act environmental authorisation or are a lawful continuation of use (for example, maintaining a firebreak). A lawful continuation of use does not include an expansion or intensification of activities on a property (for example, clearing previously uncleared forest for a new purpose).

The vast majority of destruction of forest and woodland habitats for threatened species in Australia happens without referrals or approvals under the Act, and is almost entirely due to expansion of livestock pasture. About 7 million hectares of threatened species known- or likely-to-occur forest and woodland habitats were destroyed nationwide from 2000 to 2017, without referrals under the Act, representing 93% of all such habitat destruction.¹⁵

MNES habitat destruction is a quite distinct subset of "land clearing" more generally. Land clearing does not always affect MNES, and it may or may not be subject to state law.

¹⁵ Ward MS et al. 2019. Lots of loss with little scrutiny: The attrition of habitat critical for threatened species in Australia. *Conservation Science and Practice*, 1(11), p.e117. (<https://conbio.onlinelibrary.wiley.com/doi/pdf/10.1111/csp2.117>)

The pervasive failure of the agricultural industry to refer the destruction of MNES habitat for approval is recognised in several government reports:

- The Craik review disclosed that agricultural activities are greatly under-represented in the lists of referrals noting that “a total of 165 referrals have been received by DoEE from the agriculture sector since 2000, representing 2.7 per cent of the 6,002 referrals received under the Act”. Of the 165 referrals for agricultural activity, only 60 were deemed by the regulator to be controlled actions.¹⁶
- The Australian National Audit Office concluded that “high volumes of land clearing for agriculture without referral or approval” is a key “compliance risk”.¹⁷

The recent Samuel review of the Act is more concerned with reducing the number of what are assumed to be “unnecessary referrals” and does not reference the evidence cited above that vast areas of habitat destruction evade referral altogether. Nonetheless, both failings can be traced back to the criticism that the “Department has been inconsistent in its application and guidance about requirements under the EPBC Act, which has added to confusion and uncertainty. For example, whether to refer or not to refer, or whether something is a controlled action.”¹⁸ This underscores the need for an independent regulator with a strong educational role that can provide clear guidance and advice on when proposed habitat destruction should be referred.

Following the release of new land clearing spatial data for 2018-19 by the Queensland Government’s Statewide Landcover and Tree Study (SLATS),¹⁹ this study examines the extent to which instances of destruction of MNES forest habitats were referred for approval under the Act, and if they were not, if they should have been.

“high volumes of land clearing for agriculture without referral or approval” is a key “compliance risk”

Results and discussion

Referred and unreferred deforestation of MNES habitats

A total of 681,176 ha of woody vegetation was cleared in Queensland from August 2018 to August 2019.²⁰

Over half of this area, 421,246ha on 9,029 properties was deforestation according to the filtering process used here, which:

- was forested at August 2018 (canopy cover 20%+);²¹
- was under largely undeveloped land uses at the start of the period;
- was remnant (that is, mature or intact) or, if non-remnant, at least 15 years regrown since the last clearing event;
- amounted to more than 1 ha on any given property, after ignoring isolated clearing patches below 0.2ha;
- destroyed “likely-to-occur” habitat for MNES, that is, at least one threatened species or threatened ecological community listed under the EPBC Act. Note that this analysis does not include impacts on other MNES such as World Heritage, Ramsar sites etc.²²

Only a tiny fraction, 1.3% (5,401 ha) of this large area of destruction of forest habitat for MNES, over only 487 of these properties, overlapped a referral of matching type and timing (Table 1).

The majority of non-agricultural actions (Infrastructure, Mining, Housing) overlapped referrals of a relevant type (with the exception of Road developments, which had only 16% overlap) (Table 1).

Small fractions of MNES destruction for agriculture activities (Pasture 0.08% and Crops 2.7%) overlapped relevant referrals, and none for forestry (outside of the exempt south-east Queensland RFA area) overlapped referrals (Table 1).

Pasture expansion for livestock represented 96% of all MNES destruction and yet only 0.08% of pasture-related destruction that overlapped a possibly matching referral (Table 1).

²⁰This was slightly greater than the area of all clearing reported by SLATS of 680,688ha (<https://www.qld.gov.au/environment/land/management/mapping/statewide-monitoring/slats/slats-reports/2018-19-report>). This is because after converting from the native polygon shapefile to 30m rasters some pixels over-represent slender original polygons.

²¹Both the FAO (Food and Agriculture Organisation of the United Nations) and the AFI (Accountability Framework Initiative) have adopted an even more stringent definition of forest as 10 percent tree canopy cover, 0.5 hectare in area and 5 metres in height.

²²Department of the Environment (2013) *Matters of National Environmental Significance: Significant impact guidelines 1.1; Environment Protection and Biodiversity Conservation Act 1999* (https://www.awe.gov.au/sites/default/files/documents/nes-guidelines_1.pdf).

¹⁶Craik W 2019, *Independent review of interactions between the EPBC Act and the agriculture sector*, Independent report prepared for the Commonwealth Department of the Environment and Energy. (<https://www.environment.gov.au/epbc/publications/reviewinteractions-epbc-act-agriculture-final-report>)

¹⁷Australian National Audit Office 2020, *Referrals, Assessments and Approvals of Controlled Actions under the Environment Protection and Biodiversity Conservation Act 1999*. Auditor-General Report No.47 2019–20, (https://www.anao.gov.au/sites/default/files/Auditor-General_Report_2019-2020_47.pdf)

¹⁸Box 14 *Complexity of EIA processes* p. 75 in Samuel, G (2020) cited above.

¹⁹Queensland Government 2021, 2018–19 SLATS Report, 30 December 2021. (<https://www.qld.gov.au/environment/land/management/mapping/statewide-monitoring/slats/slats-reports/2018-19-report>)



Table 1. Areas of MNES forest habitat destruction in Queensland 2018/19 by development purpose and proportions overlapping referrals of a relevant type.

Development purpose ²³	Possibly referred (ha)	Unreferred (ha)	Total (ha)	% of total	% possibly referred
Pasture	316	404,652	404,968	96.1%	0.08%
Mine	3,422	1,191	4,613	1.1%	74.2%
Road ²⁴	725	3,860	4,586	1.1%	15.8%
Crop	121	4,317	4,438	1.1%	2.7%
Forestry ²⁵		1,230	1,230	0.3%	0%
Infrastructure	499	466	965	0.2%	51.7%
Settlements	317	129	446	0.1%	71%
Total	5,401	415,844	421,246	100.0%	1.3%
% of total	1.3%	98.7%	100.0%		

²³Mostly as assigned by SLATS except for Road (see next footnote). Developments are ordered in descending order of total area cleared.

²⁴SLATS does not have a Road purpose, all deforestation within roadway parcels identified from the Cadastre was reassigned to a Road purpose.

²⁵Excludes plantation harvest and forestry inside the Southeast Queensland Regional Forest Agreement exemption area. Sect. 40 of the Act provides that (1) A person may undertake forestry operations in an REA region in a State or Territory without approval under Part 9 for the purposes of a provision of Part 3 if there is not a regional forest agreement in force for any of the region.

MNES impacted by forest habitat destruction in 2018-19

There were 326 listed threatened and migratory species losing at least 1 ha of likely-to-occur forest habitat over all properties and destruction events, regardless if referred or otherwise, including 20 critically endangered species, and 100 animal species (Table 2). Eleven endangered ecological communities also lost likely-to-occur forest habitat more than 15 years old (Table 2).

MNES with some of the largest losses of forest habitat (Appendix 1 were):

- The then-vulnerable, but now endangered, koala lost 75,547 ha.
- The endangered star finch lost 118,558 ha.
- Ooline—a vulnerable dry rainforest relict tree—lost 89,192 ha.
- The endangered Brigalow ecological community lost 6,296 ha.

²⁶Department of Climate Change, Energy, the Environment and Water (2022) *Species of National Environmental Significance* (webpage <https://www.awe.gov.au/environment/environmental-information-data/databases-applications/snes>)

²⁷Simmonds JA, Watson JEM (2019) All threatened species habitat is important. *Animal Conservation* 22 (4) 324-325. (<https://doi.org/10.1111/acv.12518>)

The ecological impact is likely to be greater than these numbers suggest because:

- Areas shown are for habitat destroyed only in one year, 2018/19, not including all the destruction of previous years on the same properties.
- Deforestation also fragments or breaks up remaining forest habitats and the ecological impact goes beyond just the area of land cleared.
- Although habitat mapped by the Australian government's environment department is often broad brush and is likely to overstate actual habitat at finer scales,²⁶ the maps may also include many areas already deforested.
- To ecologists, loss of any habitat at all, especially for endangered species, is significant.²⁷ However, when enforcing the Act, regulators will, amongst other factors, consider past decisions regarding habitat destruction to determine what is a legally defensible 'significant impact' in the case before them. We have analysed these regulatory decisions, derived significance thresholds, and have then applied them to MNES destruction in Queensland 2018/19.

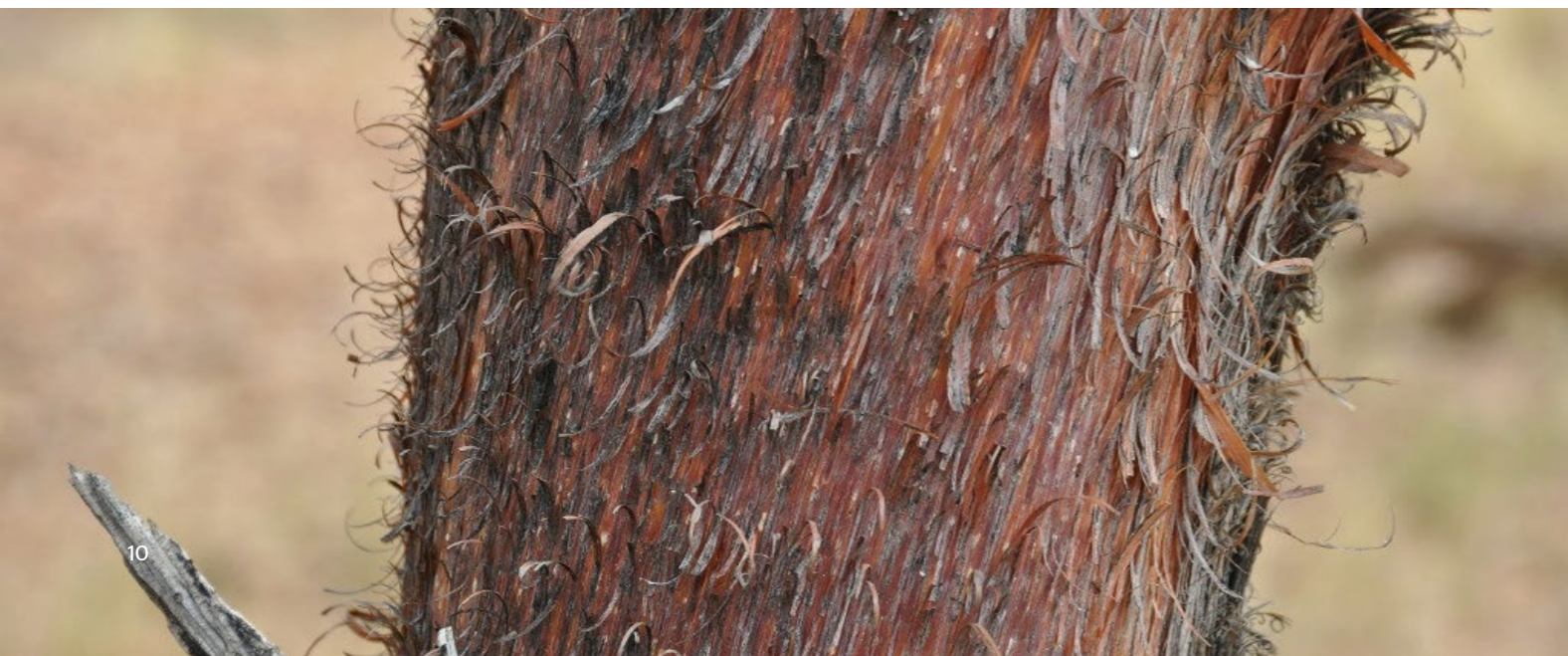


Table 2. EPBC Act listed threatened/migratory species (SNES) and communities (TECs) losing at least 1ha of likely-to-occur forest habitat destroyed in Queensland in 2018-19 (Listed in Appendix 1).

Taxon group	Critically Endangered	Endangered	Vulnerable	Migratory	Total
Mammals		9	18		27
Birds	4	13	6	17	40
Reptiles	3	4	11		18
Frogs	2	4	3		9
Other animals	3	3			6
Animals	12	33	38	17	100
Plants	8	66	152		226
SNES	20	99	190	17	326
TECs	4	7			11

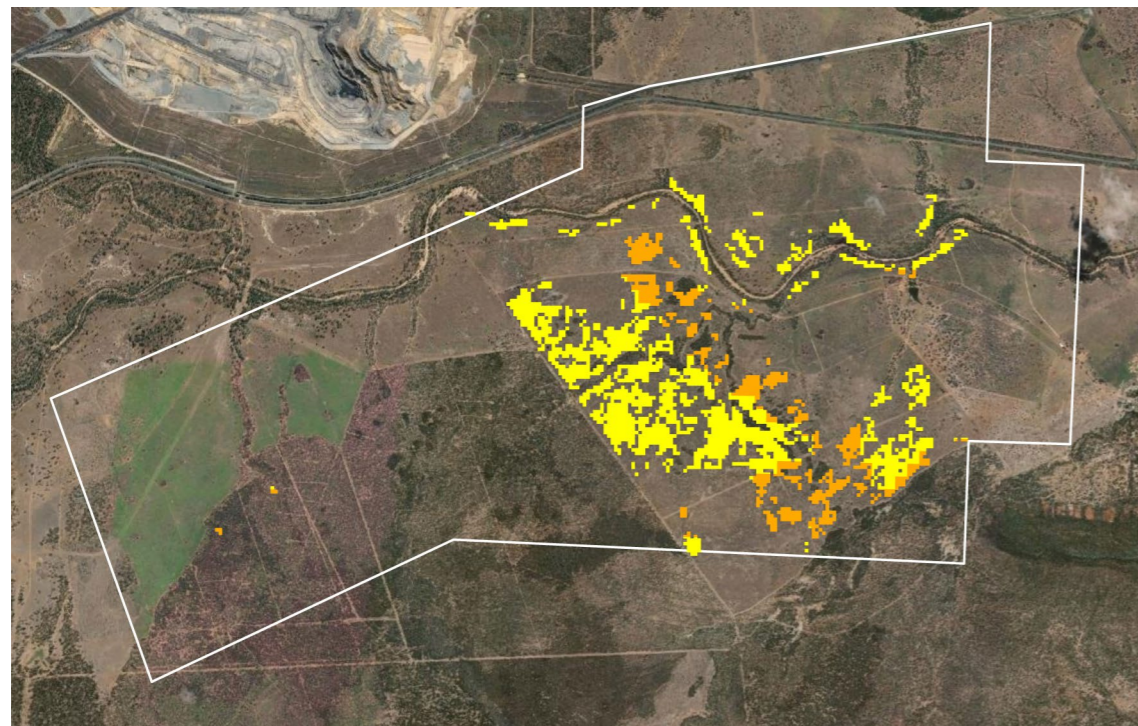


Figure 1. Referral footprint (white line) for referral number 2012/6483 for the since-withdrawn Harrybrandt Open Cut Coal Mine in the Bowen Basin, overlaid with 52ha of likely Brigalow habitat cleared (orange) and 207 ha of likely-to-occur koala habitat (yellow) deforested for pasture in 2015/16 without a referral evident in the public record. While this clearing occurred outside the 2018/19 study period, it typifies the double standard at play.

Properties that did not, but should have, referred pasture expansion

Table 1 indicates a double standard whereby MNES habitat destruction for pasture goes almost totally unreferral and unenforced in Queensland at a vast scale.

The double standard is further evidenced by unreferral MNES destruction for pasture on the very same properties where comparable MNES destruction for other industries had been referred and deemed to be a controlled action, that is, likely to have a significant impact.

One such example is referral 2012/6483 for the Harrybrandt Open Cut Coal Mine in the Bowen Basin, which was deemed a controlled action in August 2012, and thus likely to have a significant impact on MNES (Figure 1). The referral states that koalas are likely-to-occur on site without stating how much koala habitat would be destroyed.²⁸ The referral also revealed that about 95 ha of endangered Brigalow would be destroyed. However, the proposal was later withdrawn in 2015 and mining was not commenced. In contrast, on the exact same property and after the coal mine had been deemed a controlled action, 207 ha of vulnerable koala likely-to-occur forest habitat and 53 ha of endangered Brigalow was deforested for pasture in 2015/16 according to SLATS, without any referral evident in the public record.²⁹

But this does not answer the fundamental question of how much of the unreferral MNES destruction should have been referred but was not? The major challenge for answering this question is the lack of unambiguous, quantitative thresholds for destruction of MNES above which projects must be referred.

²⁸ EPBC referral 2012/6483 documentation (http://epbcnotices.environment.gov.au/_entity/annotation/5bc7eb91-9069-e511-b93f-005056ba00a7/a71d58ad-4cba-48b6-8dab-f3091fc31cd5)

²⁹ SLATS for 2015/16 was clipped to include areas only with Foliage Projective Cover for 2014 of 11% of more, that is, meeting the national definition of forest.



Thresholds for impact significance derived from enforcement and approval records

Data which permit derivation of quantitative thresholds for impact significance comes from the online published record of enforcement actions undertaken by the regulator against unauthorised destruction of MNES³⁰ and the approvals of referrals deemed by the regulator to be “controlled actions” and thus, have a significant impact.³¹

We combined and filtered this data to identify compliance actions or approvals with the lowest recorded area of habitat destruction for specific threatened species and communities that were deemed by the regulator to be controlled actions. If these recorded areas were less than 1 ha we set the threshold at 1 ha. These de facto thresholds for significance were then applied to the instances of unrefereed clearing for pasture expansion in Queensland 2018-19 to see which properties exceeded thresholds for the MNES as derived from the compliance and approval decisions. These MNES and thresholds derived are shown in Appendix 2.

Based on the thresholds for these 53 MNES (Appendix 2), 253,164 ha of MNES habitats were deforested for pasture expansion on 5,545 properties, which did not overlap an agricultural referral, but were in excess of thresholds for at least one MNES on each property and so should probably have been referred. These properties represent 60% of the total area of 421,246 ha deforested in 2018-19 (Fig. 2).

On 890 of these properties, exactly the minimum threshold area of 1ha was deforested.³² On the remaining properties, the area of deforested habitat was at least double the threshold for at least one MNES, with the maximum observed exceedance on one property being 902 times the threshold for significance.

The majority of these properties, and those with the largest areas of habitat deforested for pasture without referrals, are in the Brigalow Belt and Mulga Lands of southern central Queensland (Fig. 3).

Of the total of 75,546.6 ha of “koala likely-to-occur” habitat deforested in 2018-19, 78% or 58,470 ha was cleared for pastures without referral on properties that exceeded the threshold (Compare koala entries in Appendices 1, 2).

However, these figures are based on forest that was at least 15 years old in 2018, that is, it was not cleared according to SLATS in the entire 2003-2018 period.

We also applied thresholds only to deforestation of likely-to-occur habitats that was forest in 2018 but that was at least 30 years old or remnant. By 30 years old we mean that it was forest according to canopy cover in 2018, but had not been mapped as cleared (or lost due to natural causes) during the entire 1988-2018 record of SLATS. Such forest is likely to have been remnant, mature or intact in 2000 when the EPBC Act entered into force. The subset of this which was remnant in 2018, was assuredly remnant also in 2000. We found that 170,409 ha on 5,105 properties was likely MNES forest habitat at least 30 years old in 2018 deforested in excess of thresholds (Fig. 2). Constraining this even further, 44,195 ha on 1,581 properties was remnant forest habitat in 2018 that was deforested for pasture without referral in excess of thresholds for at least one MNES (Figures 2,3).

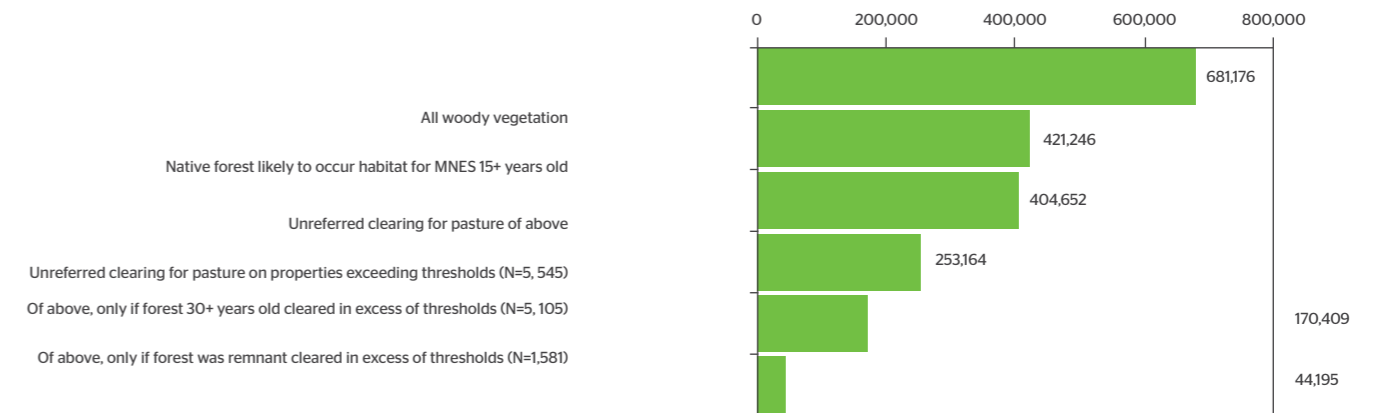


Figure 2. Breakdown of areas of woody vegetation clearing in Queensland in 2018/19 and unrefereed deforestation (ha) for pasture expansion of likely-to-occur forest habitats in excess of significance thresholds for threatened species and ecological communities listed under Australia's *Environment Protection and Biodiversity Conservation Act* constrained by age.

The endangered northern quoll had 67,115.9 hectares of habitat destroyed in just one year



³⁰ Department of Climate Change, Energy, the Environment and Water (2022) Compliance Outcomes (<https://www.dceew.gov.au/environment/epbc/compliance-and-enforcement/compliance-outcomes>)

³¹ ACF 2022 Aggravating extinction: How the Australian government approves the destruction of threatened species habitat (https://assets.nationbuilder.com/auscon/pages/20116/attachments/original/1647489840/Aggravating_extinction.pdf and database: <https://www.acf.org.au/habitat-destruction-data-intro>)

³² It is still possible that these clearing events would be found to meet the threshold of significance with ground-truthing. However this is out of scope for the purposes of this analysis.

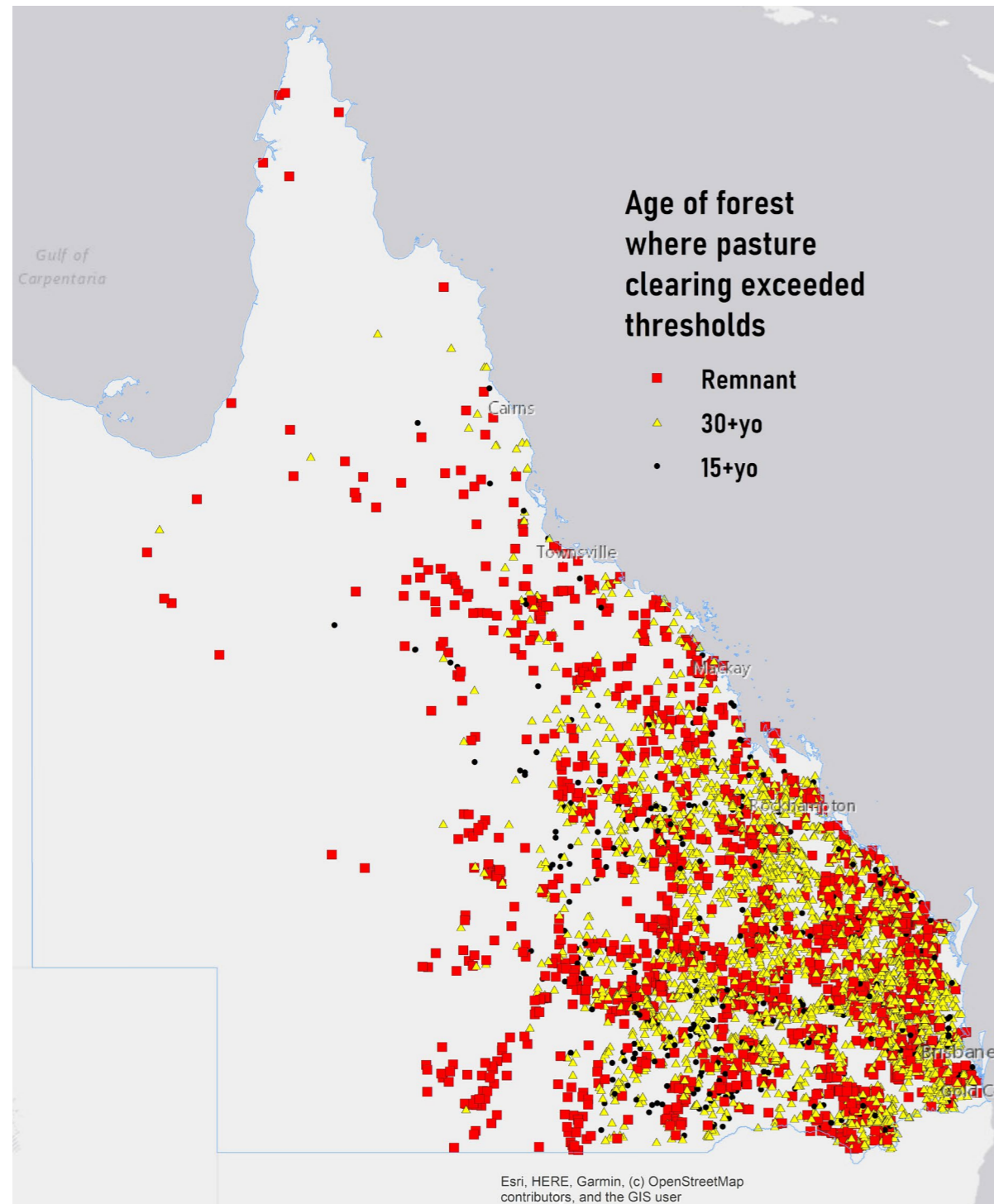


Figure 3. Locations of 5,545 properties in Queensland where MNES habitats were deforested for pastures without referral, in excess of significance thresholds, by maximum age class of vegetation where deforestation exceeded thresholds (see also Figure 1).

Limitations of our novel approach

The thresholds used here are highly heterogeneous as they are based on a limited and unsystematic dataset of informative decisions by the regulator. For species like the koala with a relatively small significance threshold (1.3 ha) but large areas mapped as likely-to-occur habitat, a large number of properties destroyed likely-to-occur forest habitat over 15 years old in excess of the threshold, without referral. In contrast, clearing of 239 ha of Palm Cockatoo likely-to-occur habitat on just one property exceeded the comparatively high threshold of 176 ha (Appendix 2). The palm cockatoo also has a restricted distribution on Cape York.

This example demonstrates two limitations with the approach taken. First, the thresholds are drawn from the happenstance of referrals and decisions made by the regulator for those referrals (or unauthorised habitat destruction in two cases). Very few actions impacting palm cockatoo habitat have ever been referred to the regulator—and, had more projects with smaller impacts been considered by the regulator (like for the koala), the threshold is likely to have been lower.

Second, each project and clearing event is analysed on its merits and usually requires ground-truthing and expert ecological advice. This means that 1.3 ha of likely koala habitat could be significant in one place and not another, depending on the ground-truthed features of the forest habitat.

Further, we could not identify and remove instances in which clearing might have been covered by a pre-EPBC Act environmental authorisation or represented a lawful continuation of use. It is possible that some cyclical clearing that was originally cleared before the EPBC Act was captured in the data given the regrowth age is set to 15 years and older. We tried to reduce this possible source of error by considering only forest that was at least 30 years old or remnant in 2018. However, in the unlikely event the magnitude of clearing explored in this report is entirely lawful

under those exemptions, this provides a strong case study for reform of the grandfathering exemptions of the EPBC Act.

Significant clearing events will be missed by using this approach and conversely it is possible some low-impact clearing events have been included. Nevertheless, we are confident the thresholds tell us with certainty which examples of clearing in the data are prima facie significant and would have required further investigation by the regulator, and expert scientific and legal advice. The analysis was made more conservative by replacing minimum area actual thresholds less than 1 ha with a 1 ha minimum threshold (Appendix 2).

It is clear that the thresholds in this report are incomplete and very heterogeneous. The results reported here are likely to be quite different from those that would derive from better and more scientifically robust thresholds and maps. This highlights the overriding importance of deriving transparent and ecologically robust species- and community-specific thresholds for significance of habitat destruction alongside accurate maps of habitat to which the thresholds apply.

Such thresholds would aid the regulator in communicating with the regulated community about proposals likely to require referral, and could be applied across data to inform a risk-based approach to compliance.

It is reasonable to conclude that the majority of pasture expansion on thousands of properties deforesting likely-to-occur forest habitat in Queensland in 2018-19, prima facie were likely to have had a significant impact on MNES based on the regulator's own records of decisions, and so should have been referred under the Act.

The analysis also has the following important limitations:

1. This analysis is only intended to indicate whether an instance of MNES destruction on a single property was likely to have a significant impact and so should have been referred. This does not mean that the observed clearing actually did have such an impact. Nonetheless, the whole point of referral is to ensure that prior groundwork and field surveys are done to determine more precisely if a significant impact would result and to propose mitigations or offsets to reduce that impact.
2. It is assumed that the likely-to-occur maps provided by the Department are representative of the types of habitat actually cleared or proposed to be cleared in actions deemed to be controlled action in the databases used to derive thresholds. This may not be a good assumption in practice because these cases doubtless relied on ground-truthed habitat identification rather than a desktop approach using the public maps as done here. As mentioned above, the regulator should, as a priority, develop much more accurate and reliable habitat maps for MNES using best scientific advice.
3. No thresholds were derived or applied for non-threatened listed species or other MNES including World Heritage or Ramsar sites, which were omitted from this analysis.
4. The analysis only applies to forest habitat destruction, not all types of terrestrial habitats such as savannahs and grasslands.

5. The threshold approach here is applied MNES by MNES and property-by-property. This assumes MNES destruction in this one year 2018-19 on one property for one MNES constitutes a discrete action which must be referred. This does not account for cumulative impacts of three types:
 - a. MNES destruction on the same property for the same purpose in previous years.
 - b. MNES destruction on other properties owned or managed by the same proponent.
 - c. MNES destruction more widely on other properties by other proponents.

The regulator should, as a priority, **develop much more accurate and reliable habitat maps** for MNES using best scientific advice.

One of the major weaknesses of the Act and its administration highlighted in the recent Samuel review is this “death by 1000 cuts” problem of project-by-project assessment without regard to cumulative impact:

“Most decisions of the Commonwealth that determine environmental outcomes are made on a project-by-project basis only when impacts exceed a certain size, and only for those parts of the environment protected under the EPBC Act. This means that cumulative impacts on the environment are not systematically considered. Rather than an integrated system of environmental management that ensure cumulative impacts are well managed, pressure to manage impacts is placed on individual projects.”³³

³³Samuel G (2020) cited above.

Conclusions

A vast area of 404,652 ha of forest habitats for EPBC Act listed species and threatened ecological communities in Queensland was deforested in just the one year 2018-19 for livestock pasture expansion on thousands of properties without evidence of any referral being made and despite the aggregate of all deforestation affecting 100 listed animal species, 126 threatened plant species, and 11 threatened ecological communities (Appendix 1). This represents 96% of all such MNES deforestation in the state in that one year. In stark contrast, much smaller areas of MNES habitats deforested for mines, infrastructure and settlements are mostly referred for approval under the Act.

Knowing which of these property-specific MNES destruction events should have been referred has hitherto been stymied by the lack of robust, quantitative habitat destruction thresholds for impacts to MNES to be considered "significant" under the meaning of the Act.

Here a novel approach is taken. We use the record of decisions by the regulator which deem habitat destruction instances to be "controlled actions" with significant impact on particular MNES, to develop just such thresholds.

This study reveals that **there is a double standard operating**, where many in the pastoral industry in Queensland **typically ignore the Act as they deforest threatened species habitats** at vast scales to expand pasture, while other industries more commonly follow legal process.

Based on these thresholds we estimate that 253,164 ha of MNES habitats on 5,545 properties was deforested for pasture and was not referred, but should have been, representing 60% of the total 421,246 ha of all MNES forest habitat deforested in 2018-19 (Table 1). This includes 170,409 ha of forest habitat 30 or more years old and 44,195 ha of remnant forest habitat that was deforested in excess of thresholds for pasture without referral.

The majority of these properties, and those with the largest impacts, are in the Brigalow Belt of central southern Queensland. Our approach is conservative as it is based on current practice of project-by-project referrals which fails to take into account the cumulative impact across multiple such projects, a major failing of the Act identified in the Samuel review.

This study reveals that there is a double standard operating, where many in the pastoral industry in Queensland typically ignore the Act as they deforest threatened species habitats at vast scales to expand pasture, while other industries more commonly follow legal process. The last referral for pasture expansion in Queensland was made in 2009 and involved eradication of a native grass, not deforestation.³⁴

This double standard is entrenched by an under-resourced regulator, which has never taken enforcement action against the pastoral industry in Queensland for failure to refer destruction of MNES habitat, although actions have been taken in regard to deforestation of habitats to plant crops or irrigated pastures.³⁵

Departmental representatives when questioned about this pervasive lack of compliance with and enforcement of the Act in Queensland merely repeat the truism that the law only pertains to significant impacts on MNES, not all land clearing. And yet it is just such MNES impacts, not any and all land clearing, which is the subject of this analysis.³⁶

The regulator's failure to enforce the law effectively and even-handedly is also enabled by the vagueness in the Act about the meaning of "significant impact" and the vagueness of the regulator's own "significant impact guidelines", criticisms made in the recent Samuel review of the Act. That review also lists other institutional barriers to effective enforcement.

The regulator should be required to take a proactive and preventative enforcement approach using satellite imagery to detect instances of destruction of MNES habitats that have not been referred and take prompt action to halt destruction until the proponent adheres to the referral obligations of the Act, without regard to who is doing the destruction or why.

The regulator should also develop quantitative habitat destruction thresholds for significance of impacts on MNES such as developed here, using best scientific advice and accurate habitat mapping, so that proponents have a very clear idea when and if they are liable. Such data could enable smart risk-based compliance work.

The law must also be reformed to ensure the regulator takes the approach outlined above and to go further to prevent the "death by 1000 cuts" that results from the current practice of project-by-project assessments, each individually deemed non-significant, and so failing to take into account the cumulative impacts of many such projects.



³⁴ Referral number 2009/4934 Eradicate and Control *Diacanthium Sericeum* (Queensland Blue Grass)

³⁵ Department of Climate Change, Energy, the Environment and Water (2022) *Compliance Outcomes* (<https://www.dcccew.gov.au/environment/epbc/compliance-and-enforcement/compliance-outcomes>)

³⁶ Answer to Question on Notice 47 at the Australian Senate Supplementary Estimates 2017-18.

Methods

We used the following Queensland Government³⁷ spatial inputs for this analysis:

- SLATS woody vegetation change shapefiles for all years 2004-19;
- Foliage Projective Cover 2018 and 2019 rasters (“FPC18” 30 Dec 2021 release);
- Queensland Statewide Land Use current to the period 1999-2017 (“Land use” 14 Jun 2019 release);
- Property boundaries Queensland (“Properties” Feb 2018 release);
- Biodiversity Status of Regional Ecosystems version 11, current to 2017 (archived copy not available online).

We also used the following Australian Government³⁸ spatial inputs for analysis of impacts on EPBC-listed species and communities:

- EPBC Act referrals (“Referrals” Dec 2021 release);
- Species of National Environmental Significance public grids (“SNES” June 2020);
- Threatened Ecological Communities public grids (“TECs” June 2020 release).

Extracting deforestation from all SLATS woody vegetation loss

To ensure we were dealing only with destruction of native forest habitat for threatened species and ecological communities, from the SLATS 2018-19 shapefile produced by Queensland’s SLATS unit we filtered out:

- forest loss due to natural causes (using instances classified by SLATS as due to drought and storms. SLATS already excludes bushfires from clearing products);
- non-forest clearing;
- clearing of regrowing forests inferred to be less than 15 years old;
- clearing in patch sizes below 0.2 ha;
- already developed or irrelevant land uses prior to clearing (plantations, sown pastures, crops, mines, industry, housing, water).

Only undeveloped forest habitat was included. SLATS 2018-19 woody clearing and FPC 2018 rasters (originally in GDA94 Australian Albers projection, 10m pixels) were resampled, reprojected and snapped to the SLATS base grid used in previous years, which is in the Albers conical projection for Queensland used by SLATS, with 30m pixel size.³⁹ The cubic spline resampling method was used to resample 10m pixel values for FPC using the majority rule for SLATS development purpose codes. The tiny 7 ha of vegetation loss due to natural causes was excluded.

Age filter

The state *Vegetation Management Act* defines “High Value Regrowth” as any regrowth 15 years or older. Young regrowth from less than 15 years of age was filtered out as less likely to provide useful habitat for forest dependent MNES. The regulator’s own referral guidelines for Brigalow, for example, exempt clearing of re-growing Brigalow 15 years old or younger from the obligation to refer.⁴⁰ All SLATS woody clearing spatial data over the preceding period 2004-2018 was combined into a single 30m raster snapped to the base grid. Any 2018-19 clearing pixels that were previously cleared within that period could not have been 15 years or older in 2018 and were excluded.

Forest filter

To ensure that we only considered forest habitat cleared, we filtered to include only SLATS 2018-19 cleared areas that were also 11% or greater FPC in 2018, the equivalent of 20% canopy cover, prior to the clearing instance⁴¹

Land use filter

Clearing of areas already developed at the commencement of 2018-19 period was excluded by removing pixels under intensive uses (except Rural residential which can have significant native tree cover) or under crops or plantations, or water bodies (except marshes, which can have forest cover) as of 2017 or earlier. Only land uses deemed undeveloped in the Queensland Land Use 2019 shapefile were retained (Appendix 3). This was converted to a 30m raster aligned to the base grid. SLATS pixels not overlapping this filter were removed.

After applying these three filters, the area of presumptive undeveloped, native forest cleared was 453,016 ha, 66% of the total SLATS area cleared. The filtered raster was converted back to vector shapefile and polygon areas calculated in the base Albers projection. Any isolated clearing patches of less than 0.2 ha were then removed. This left 424,918 ha of presumed native forest deforestation.

Property x purpose deforestation events

The resulting deforestation layer extracted from SLATS woody vegetation clearing 2018-19 and classified by purpose was then intersected with Queensland properties boundaries from the Digital Cadastral Database of Feb 2018 (archived copy selected because it was current prior to the commencement of clearing detection by SLATS in Aug 2018).

All tenures were included, including state lands and roadways. When property names were available, these were used in preference to lot numbers, because named properties can include multiple lots. However, unlike lot numbers, names are not necessarily unique. To reduce ambiguity, names of roads and named properties were combined with local government area names.

Where clearing occurred in a roadway parcel, the purpose assigned by SLATS was changed to Road. Any clearing on mining tenures was likewise changed to Mining. Properties with less than 1 ha of deforestation were removed from further analysis. However, clearing for different purposes on the same property were distinguished as separate polygons or sets of polygons. This filtering brought the total area deforested down to 421,660 ha.

Forestry in Southeast Queensland is exempt from referral under the EPBC Act because it is in a Regional Forest Agreement (RFA) area.⁴² Accordingly, all deforestation attributed to forestry by SLATS in the Southeast Queensland bioregion was removed.

This left 421,239 ha of deforestation which could be subject to the application of the Act. The final filtered raster for deforestation in Queensland in 2018-19 segmented into properties and purposes, is termed “Deforestation 18-19”.

³⁷Downloaded from <https://qldspatial.information.qld.gov.au/catalogue/custom/index.page>

³⁸Downloaded from <http://www.environment.gov.au/fed/>

³⁹D PROJCS["Albers_Conical_Equal_Area",GEOGCS["GCS_GDA_1994",DATUM["D_GDA_1994",SPHEROID["GRS_1980",6378137,298.257222101]],PRIMEM["Greenwich",0],UNIT["Degree",0.017453292519943295]],PROJECTION["Albers"],PARAMETER["standard_parallel_1",-12],PARAMETER["standard_parallel_2",-28],PARAMETER["latitude_of_origin",-28],PARAMETER["central_meridian",145],PARAMETER["false_easting",0],PARAMETER["false_northing",0],UNIT["Meter",1]]

⁴⁰Department of Environment (2003) Brigalow Regrowth and the EPBC Act (<https://www.awe.gov.au/sites/default/files/documents/brigalow-regrowth.pdf>).

⁴¹Scarth P (2012) On the relationship between crown cover, foliage projective cover and leaf area index. figshare. Journal contribution. (<https://doi.org/10.6084/m9.figshare.94249.v1>)

⁴²Regardless there was never an RFA made in Queensland, the SE Qld RFA area still has statutory force as an exempt area for forestry referrals under sect 40 of the Act.

Deforestation of likely MNES habitats

We intersected property and purpose specific Deforestation 18-19 with *Species of National Environmental Significance (SNES)* and *Threatened Ecological Communities (TECs)* public grids published by the Department of Environment (June 2020 releases).

SNES and TECs were excluded:

- that were entirely marine or aquatic or not listed as threatened;
- otherwise unlikely to depend on forest habitat such as grassland specialists;
- if first listed after 2018 and so not relevant to deforestation in 2018-19.

Properties were removed from *Deforestation 18-19* if they intersected with less than 1 ha of any MNES (threatened species or ecological communities) across all purposes.



The endangered star finch had 118,558 hectares of habitat destroyed in just one year”

Referral matching

The reduced *Deforestation 18-19* of properties with at least 1 ha of MNES destroyed was also intersected with the EPBC Act Referrals spatial database (Dec 2021 release).

Referrals were excluded if:

- the submission date was 2019 or later (after the deforestation took place);
- they were still in pre-approval stage (except for those deemed not controlled actions);
- they did not intersect Deforestation 18-19;
- they did not entail native vegetation destruction such as biocontrol of rabbits;⁴³
- the purpose category of the referral did not match the SLATS-assigned purpose (as modified above) for deforestation.

Some purposes did not directly align, but were deemed to possibly align. These were assigned half weights of 0.5, compared with a directly relevant purpose which was weighted 1 (Appendix 4).

The final product was a layer of deforestation events in 2018-19 for each property and each clearing purpose that destroyed more than 1 ha of likely habitat for threatened species or communities, with areas sorted into those possibly referred and either deemed controlled actions or not under the EPBC Act, and those for which no referral of matching relevant type could be identified (“Unreferred”).

Areas were calculated in hectares in the Queensland Albers Equal Area projection as used by SLATS and cited above.

⁴³Department of Climate Change, Energy, the Environment and Water (2022) Decisions on referred actions under the EPBC Act (webpage <https://www.awe.gov.au/environment/epbc/advice-for-complying-with-the-epbc-act/decisions-on-referred-actions>)

Limitations of method for linking clearing to referrals

Linking of habitat destruction events to referrals relied on coincidence in purpose, space and time in spatial analysis. This makes a causal connection likely but not guaranteed. There are sure to be false positive and false negative errors in this method.

A false positive occurs if there is an overlap with a referral area of a relevant type but the destruction was not actually done pursuant to that referral.

A false negative occurs if the purpose of the destruction as described by the Queensland Government SLATS unit or as described in the Australian Government’s referrals database were incorrect, and an overlap with a relevant type of referral was therefore missed. For example, if destruction described as being for pasture in SLATS was in fact for mining, and had in fact been referred. Conversely, destruction described correctly by Queensland as being for pasture may have been done under a referral that was described as being for cropping.

To estimate reliably the incidence of false negatives and positives requires delving into the details of referrals and destruction events which is beyond the scope of this study. Confirming conclusively whether or not a given habitat destruction event was conducted pursuant to a given referral may require confirmation from the proponents themselves.

Care was taken to the extent possible in this desktop analysis to match types of destruction and referral as closely as possible using the limited information provided in databases to reduce such errors. Uncertainties about whether there was a valid linkage were dealt with by weighting a lower tier of possible but less likely linkages by half (Appendix 4). By casting the net wider to catch all possible linkages to referrals erred on the side of false positive errors, which means we had higher confidence that instances of MNES destruction not linked to a referral were in fact not referred.

Derivation of significance thresholds

To determine if an instance of MNES destruction on a given property was likely to be significant we compiled areas for threatened species and ecological communities for enforcement actions and approvals made by the regulator.⁴⁴ We found the minimum area of habitat destruction for any one MNES and nominated this as the minimum threshold for habitat destruction to be deemed significant for that MNES. If the minimum area was less than 1 ha we set the threshold to be 1 ha (Appendix 2).

Then for each property with unreferred MNES destruction for pasture, we calculated if areas of forest habitat destroyed for those MNES exceeded these thresholds, and rejected properties that fell below the thresholds for all MNES.

- We constrained the age of forest deforested needed to exceed the threshold in three categories:
- 15 years or older (that is, was 20% canopy cover in 2018 and had not been mapped as cleared or lost over the SLATS record from 2003 to 2018, including remnant).
- 30 years or older (that is, was 20% canopy cover in 2018 and had not been mapped as cleared or lost over the entire SLATS record from 1988 to 2018, including remnant).
- Remnant (that is, was 20% canopy cover in 2018 and was mapped as remnant in the Queensland Herbarium’s Regional Ecosystems spatial database version 11 current to 2017).

⁴⁴For enforcement actions see Department of Climate Change, Energy, the Environment and Water (2022) Compliance Outcomes (webpage <https://www.dcceew.gov.au/environment/epbc/compliance-and-enforcement/compliance-outcomes>). For approvals see ACF 2022 Aggravating extinction: How the Australian government approves the destruction of threatened species habitat (https://assets.nationbuilder.com/auscon/pages/20116/attachments/original/1647489840/Aggravating_extinction.pdf) and database: <https://www.acf.org.au/habitat-destruction-data-intro>.



Appendix 1. EPBC Act listed MNES (threatened species and ecological communities) with more than 1ha of “likely to occur” habitat deforested 2018/19 in Queensland on any one property.

Group	MNES (ID, Status) ⁴⁵	Deforested (ha) ⁴⁶
1. Mammals	Koala (85104, VU)	75,546.6
1. Mammals	Northern Quoll (331, EN)	67,115.9
1. Mammals	Ghost Bat (174, VU)	63,058.2
1. Mammals	Grey-headed Flying-fox (186, VU)	26,202.0
1. Mammals	Corben's Long-eared Bat (83395, VU)	24,697.8
1. Mammals	Large Pied Bat (183, VU)	21,010.6
1. Mammals	Greater Glider (254, VU)	9,718.4
1. Mammals	Yellow-footed Rock-wallaby (87608, VU)	6,568.3
1. Mammals	Tiger Quoll (75184, EN)	6,246.1
1. Mammals	New Holland Mouse (96, VU)	4,330.5
1. Mammals	Brush-tailed Rock-wallaby (225, VU)	4,275.9
1. Mammals	Bare-rumped Sheath-tailed Bat (66889, VU)	2,362.1
1. Mammals	Large-eared Horseshoe Bat (87639, VU)	1,903.7
1. Mammals	Water Mouse (66, VU)	894.9
1. Mammals	Long-nosed Potoroo (66645, VU)	358.2
1. Mammals	Black-footed Tree-rat (87620, VU)	324.4
1. Mammals	Mahogany Glider (26775, EN)	182.5
1. Mammals	Bridled Nailtail Wallaby (239, EN)	109.2
1. Mammals	Julia Creek Dunnart (305, VU)	91.0
1. Mammals	Hastings River Mouse (98, EN)	59.8
1. Mammals	Mount Claro Rock Wallaby (59281, VU)	37.6
1. Mammals	Cape York Rock-wallaby (59278, EN)	29.1
1. Mammals	Proserpine Rock-wallaby (226, EN)	16.3
1. Mammals	Spotted-tailed Quoll (64475, EN)	15.2
1. Mammals	Northern Bettong (214, EN)	4.3
1. Mammals	Semon's Leaf-nosed Bat (180, VU)	3.8
1. Mammals	Greater Bilby (282, VU)	2.4
2. Birds	Fork-tailed Swift (678, MI)	421,239.1

Disclaimer

This research was funded by the Australian Conservation Foundation.

The views and analyses presented are the authors' own and do not represent those of the University of Queensland.

No claim is made or advanced here that any particular person is in breach of the law. Whether an action by any party is in breach of the law is a matter for the regulator or law courts to determine.

This report has not been published through anonymous peer review, only informal review by colleagues.

Above. Brigalow. Photo. Martine Maron

⁴⁵ All species were listed as of 1 June 2018 but status may have changed since. "CE" = Critically endangered, "EN" = Endangered, "VU" = Vulnerable, "MI" = Migratory, not threatened.

⁴⁶ Species ordered by taxon group and within that declining area cleared.

Appendix 1. Continued...

Group	MNES (ID, Status) ⁴⁵	Deforested (ha ⁴⁶)
2. Birds	Red Goshawk (942, VU)	168,335.0
2. Birds	Squatter Pigeon (64440, VU)	144,558.2
2. Birds	Painted Honeyeater (470, VU)	124,262.6
2. Birds	Star Finch (26027, EN)	118,558.1
2. Birds	Painted Snipe (77037, EN)	118,059.6
2. Birds	Black-faced Monarch (609, MI)	83,324.9
2. Birds	Satin Flycatcher (612, MI)	56,124.6
2. Birds	Osprey (952, MI)	37,728.5
2. Birds	Rufous Fantail (592, MI)	36,490.7
2. Birds	Southern Black-throated Finch (64447, EN)	30,606.1
2. Birds	Plains-wanderer (906, CE)	17,990.2
2. Birds	Black-breasted Button-quail (923, VU)	13,508.8
2. Birds	Spectacled Monarch (610, MI)	8,335.8
2. Birds	Swift Parrot (744, CE)	7,063.9
2. Birds	Regent Honeyeater (82338, CE)	6,727.4
2. Birds	Yellow Wagtail (644, MI)	3,614.0
2. Birds	Palm Cockatoo (67033, VU)	2,231.8
2. Birds	Northern Masked Owl (26048, VU)	1,623.6
2. Birds	Eastern Bristlebird (533, EN)	1,106.8
2. Birds	Oriental Cuckoo (86651, MI)	1,106.4
2. Birds	Gouldian Finch (413, EN)	1,057.5
2. Birds	Night Parrot (59350, EN)	907.3
2. Birds	Australasian Bittern (1001, EN)	663.7
2. Birds	Buff-breasted Button-quail (59293, EN)	353.2
2. Birds	Great Frigatebird (1013, MI)	308.8
2. Birds	Capricorn Yellow Chat (67090, CE)	283.3
2. Birds	Lesser Frigatebird (1012, MI)	266.8
2. Birds	Barn Swallow (662, MI)	228.3
2. Birds	Cassowary (25986, EN)	172.9
2. Birds	Coxen's Fig-Parrot (59714, EN)	144.4
2. Birds	Golden-shouldered Parrot (720, EN)	141.7
2. Birds	Black-winged Monarch (607, MI)	55.6

Group	MNES (ID, Status) ⁴⁵	Deforested (ha ⁴⁶)
2. Birds	Latham's Snipe (863, MI)	43.2
2. Birds	Pin-tailed Snipe (841, MI)	38.3
2. Birds	Swinhoe's Snipe (864, MI)	38.3
2. Birds	Crimson Finch (64443, EN)	19.7
2. Birds	Grey Wagtail (642, MI)	18.8
2. Birds	Red-rumped Swallow (80610, MI)	13.3
2. Birds	Carpentarian Grasswren (558, EN)	13.1
3. Reptiles	Ornamental Snake (1193, VU)	56,567.8
3. Reptiles	Yakka Skink (1420, VU)	52,818.0
3. Reptiles	Fitzroy River Turtle (1761, VU)	46,712.2
3. Reptiles	White-throated Snapping Turtle (81648, CE)	10,202.3
3. Reptiles	Dunmall's Snake (59254, VU)	4,589.4
3. Reptiles	Border Thick-tailed Gecko (84578, VU)	4,407.0
3. Reptiles	Allan's Lerista (1378, EN)	3,470.8
3. Reptiles	Adorned Delma (1656, VU)	3,369.4
3. Reptiles	Plains Death Adder (83821, VU)	1,145.5
3. Reptiles	Mary River Turtle (64389, EN)	679.6
3. Reptiles	Long-legged Worm-skink (25934, VU)	648.9
3. Reptiles	Bell's Turtle (86071, VU)	121.2
3. Reptiles	Nangur Spiny Skink (59550, CE)	62.6
3. Reptiles	Condamine Earless Dragon (87888, EN)	45.0
3. Reptiles	Gulf Snapping Turtle (67197, EN)	22.7
3. Reptiles	Atherton Delma (25931, VU)	7.9
3. Reptiles	Mount Cooper Striped Skink (1308, VU)	2.4
3. Reptiles	Gulbaru Gecko (84753, CE)	2.1
4. Frogs	Fleay's Frog (25960, EN)	930.1
4. Frogs	Eungella Day Frog (1887, EN)	617.0
4. Frogs	Waterfall Frog (1817, EN)	112.5
4. Frogs	Common Mistfrog (1802, EN)	82.7
4. Frogs	Wallum Sedge Frog (1821, VU)	77.5
4. Frogs	Kroombit Tinker Frog (1889, CE)	57.7
4. Frogs	Magnificent Brood Frog (64385, VU)	31.2

Appendix 1. Continued...

Group	MNES (ID, Status) ⁴⁵	Deforested (ha) ⁴⁶
4. Frogs	Mountain Mistfrog (1820, CE)	23.1
4. Frogs	Stuttering Frog (1942, VU)	1.3
5. Arthropods	Australian Fritillary (88056, CE)	181.1
5. Arthropods	Antbed Parrot Moth (84159, EN)	82.6
5. Arthropods	Spiny crayfish (86598, CE)	34.8
6. Molluscs	Dulacca Woodland Snail (83885, EN)	3,303.5
6. Molluscs	Brigalow Woodland Snail (83886, EN)	1,844.9
6. Molluscs	Boggomoss Snail (67458, CE)	417.7
7. Plants	Ooline (9828, VU)	89,192.5
7. Plants	Bluegrass (14159, VU)	71,989.9
7. Plants	Cycas ophiolitica (55797, EN)	20,001.4
7. Plants	Cycas megacarpa (55794, EN)	11,698.6
7. Plants	Toadflax (15202, VU)	11,391.9
7. Plants	Quassia (29708, VU)	10,641.2
7. Plants	Sclerolaena walkeri (16152, VU)	10,207.3
7. Plants	King Blue-grass (5481, EN)	9,503.8
7. Plants	Yellow Satinheart (16091, VU)	9,468.2
7. Plants	Wedge-leaf Tuckeroo (3205, VU)	5,633.7
7. Plants	Cossinia (3066, EN)	5,284.4
7. Plants	Eucalyptus virens (10181, VU)	4,571.3
7. Plants	Smooth-shelled Macadamia (7326, VU)	4,059.4
7. Plants	Lesser Swamp-orchid (5872, EN)	4,033.6
7. Plants	Pineapple Zamia (5712, EN)	3,786.5
7. Plants	Hoop Pine Orchid (6649, VU)	3,382.5
7. Plants	Westringia parvifolia (4822, VU)	3,074.6
7. Plants	Austral Cornflower (22647, VU)	2,975.3
7. Plants	Small-leaved Denhamia (18106, VU)	2,611.8
7. Plants	Marsdenia brevifolia (64585, VU)	2,477.7
7. Plants	Hakea maconochieana (66351, VU)	2,207.0
7. Plants	Blotched Sarcophilus (12673, VU)	2,118.5
7. Plants	Solanum johnsonianum (84820, EN)	1,917.4
7. Plants	Solanum dissectum (75720, EN)	1,917.4

Group	MNES (ID, Status) ⁴⁵	Deforested (ha) ⁴⁶
7. Plants	Black Ironbox (16344, VU)	1,699.0
7. Plants	Fontainea venosa (24040, VU)	1,509.7
7. Plants	Tylophora linearis (55231, EN)	1,489.4
7. Plants	Stream Clematis (4311, VU)	1,057.1
7. Plants	Macrozamia platyrhachis (3412, EN)	1,051.5
7. Plants	Acacia ammophila (3763, VU)	995.1
7. Plants	Aristida annua (17906, VU)	953.8
7. Plants	Tall Velvet Sea-berry (16839, VU)	937.8
7. Plants	Macrozamia conferta (64582, VU)	872.4
7. Plants	Germainia capitata (14069, VU)	859.2
7. Plants	Slender Darling-pea (6765, VU)	856.7
7. Plants	Gympie Nut (7214, VU)	847.4
7. Plants	Omphalea celata (64586, VU)	838.5
7. Plants	Rhaphidospora bonneyana (8029, VU)	807.1
7. Plants	Wandering Pepper-cress (14035, EN)	799.0
7. Plants	Three-veined Hakea (15931, VU)	790.5
7. Plants	Macrozamia machinii (64583, VU)	742.6
7. Plants	Pultenaea setulosa (2705, VU)	734.5
7. Plants	Mt Berryman Phebalium (81869, CE)	727.7
7. Plants	Glen Geddes Bloodwood (64021, VU)	721.7
7. Plants	White Gum (19748, VU)	719.4
7. Plants	Chocolate Tea Tree Orchid (13585, VU)	675.6
7. Plants	Macrozamia parcifolia (64682, VU)	614.9
7. Plants	Cajanus mareebensis (8635, EN)	594.4
7. Plants	Blue Knob Orchid (4124, VU)	587.8
7. Plants	Ant Plant (11852, VU)	562.5
7. Plants	Zieria verrucosa (56761, VU)	557.6
7. Plants	Macrozamia cranei (64681, EN)	546.9
7. Plants	Hando's Wattle (14928, VU)	512.7
7. Plants	Acacia attenuata (10690, VU)	494.0
7. Plants	Kogan Waxflower (64944, VU)	491.0
7. Plants	Homoranthus decumbens (55186, EN)	485.5

Appendix 1. Continued...

Group	MNES (ID, Status) ⁴⁵	Deforested (ha ⁴⁶)
7. Plants	Xerothamnella parvifolia (3141, VU)	480.1
7. Plants	Callistemon pungens (55581, VU)	455.3
7. Plants	Polianthion minutiflorum (82772, VU)	414.5
7. Plants	Calophyllum bicolor (11371, VU)	381.3
7. Plants	Pimelea leptospermoides (20849, VU)	380.3
7. Plants	Leafless Tongue-orchid (19533, VU)	366.5
7. Plants	Cycas platyphylla (55796, VU)	360.2
7. Plants	Fontainea rostrata (24039, VU)	350.5
7. Plants	Sophora fraseri (8836, VU)	347.5
7. Plants	Lloyd's Olive (15002, VU)	344.3
7. Plants	Waxy Cabbage Palm (64581, VU)	332.6
7. Plants	Acacia grandifolia (3566, VU)	331.4
7. Plants	Xerothamnella herbacea (4146, EN)	292.6
7. Plants	Curly-bark Wattle (3908, VU)	290.1
7. Plants	Rusty Desert Phebalium (17140, VU)	255.3
7. Plants	Tara Wattle (4165, VU)	244.2
7. Plants	Bulberin Nut (55597, EN)	237.0
7. Plants	Phaius pictus (22564, VU)	232.5
7. Plants	Macrozamia lomandroides (55406, EN)	221.1
7. Plants	Neoroepora buxifolia (13375, VU)	220.3
7. Plants	Glossy Spice Bush (14747, EN)	203.3
7. Plants	Bertya opponens (13792, VU)	202.1
7. Plants	Grevillea quadricauda (64651, VU)	199.5
7. Plants	Euphorbia carissoides (12431, VU)	196.4
7. Plants	Native Jute (14659, EN)	177.2
7. Plants	Vappodes phalaenopsis (78894, VU)	169.1
7. Plants	Goodwood Gum (20433, VU)	164.8
7. Plants	Paspalidium grandispiculatum (10838, VU)	162.8
7. Plants	Hawkweed (10839, VU)	160.3
7. Plants	Solanum dunalianum (13819, VU)	140.2
7. Plants	Lindsaea pulchella var. blanda (20842, VU)	139.4
7. Plants	Button Grass (10584, EN)	132.6

Group	MNES (ID, Status) ⁴⁵	Deforested (ha ⁴⁶)
7. Plants	Satin-top Grass (15961, VU)	126.7
7. Plants	Capparis thozetiana (6021, VU)	124.9
7. Plants	Cepobaculum carronii (78700, VU)	114.5
7. Plants	Stinking Laurel (11976, VU)	108.4
7. Plants	Boonah Tuckeroo (3322, VU)	105.1
7. Plants	Plectranthus habrophyllus (64589, EN)	104.8
7. Plants	Calytrix gurulmundensis (24241, VU)	101.9
7. Plants	Plectranthus omissus (55729, EN)	100.5
7. Plants	Dendrobium bigibbum (10306, VU)	94.6
7. Plants	Ravine Orchid (19131, VU)	93.8
7. Plants	Rough-shelled Macadamia (6581, VU)	87.5
7. Plants	Daviesia discolor (3567, VU)	86.0
7. Plants	Plectranthus leiperi (64590, VU)	85.9
7. Plants	Black Plum (17340, EN)	84.8
7. Plants	Macrozamia occidua (64584, VU)	83.5
7. Plants	Penda (8738, VU)	83.3
7. Plants	Rhinerrhizopsis matutina (82846, VU)	82.6
7. Plants	Prostanthera sp. Dunmore (84115, VU)	82.3
7. Plants	Acacia deuteroneura (12836, VU)	81.3
7. Plants	Astrotricha roddii (56312, EN)	78.1
7. Plants	Tylophora woollsii (20503, EN)	76.0
7. Plants	Pink Gidgee (10927, VU)	72.7
7. Plants	Bacon Wood (13451, VU)	69.6
7. Plants	Floyd's Walnut (52955, EN)	65.4
7. Plants	Small Helmet-orchid (6494, VU)	63.3
7. Plants	Pterostylis bicornis (9074, VU)	63.3
7. Plants	Bean's Ironbark (56320, VU)	62.0
7. Plants	Granite Boronia (18598, EN)	62.0
7. Plants	Cycas cairnsiana (5780, VU)	61.2
7. Plants	Yellow Swamp-orchid (4918, EN)	58.4
7. Plants	Black-clubbed Spider-orchid (20859, EN)	58.2
7. Plants	Isis Tamarind (6416, EN)	57.5

Appendix 1. Continued...

Group	MNES (ID, Status) ⁴⁵	Deforested (ha ⁴⁶)
7. Plants	Possum Nut (15762, VU)	57.5
7. Plants	Belson's Panic (2406, VU)	55.2
7. Plants	Middle Filmy Fern (87494, EN)	54.9
7. Plants	Narrow-leaved Peppermint (20992, VU)	49.3
7. Plants	Androcalva procumbens (87153, VU)	48.7
7. Plants	Bertya Ernestiana (78349, VU)	47.9
7. Plants	Water Tassel-fern (86553, VU)	46.8
7. Plants	Proston Lasiopetalum (68391, CE)	45.5
7. Plants	Diplazium cordifolium (15585, VU)	44.5
7. Plants	Lastreopsis walleri (18229, VU)	42.8
7. Plants	Cycas silvestris (55778, VU)	41.5
7. Plants	Hairy-joint Grass (9338, VU)	40.9
7. Plants	Swamp Stringybark (3160, EN)	39.7
7. Plants	Chingia australis (24603, EN)	39.3
7. Plants	Aponogeton bullosus (8299, EN)	37.6
7. Plants	Canarium acutifolium (23956, VU)	36.3
7. Plants	Native Moth Orchid (87535, EN)	36.2
7. Plants	Pale Chandelier Orchid (83928, VU)	36.1
7. Plants	Dwarf Butterfly Orchid (78893, EN)	35.5
7. Plants	Rat's Tail Tassel-fern (86551, EN)	34.8
7. Plants	Durikai Mallee (55145, VU)	34.3
7. Plants	Carronia pedicellata (24178, EN)	33.0
7. Plants	Border Boronia (21315, EN)	32.0
7. Plants	Spiny Gardenia (10577, EN)	29.3
7. Plants	Macropteranthes montana (9003, VU)	28.8
7. Plants	Grevillea glossadenia (7979, VU)	28.1
7. Plants	Red Lilly Pilly (3539, VU)	27.9
7. Plants	Velvet Wattle (19799, VU)	27.7
7. Plants	Velvet Jewel Orchid (46794, VU)	27.5
7. Plants	Blue Tassel-fern (86550, EN)	27.0
7. Plants	Homoranthus montanus (24319, VU)	26.0
7. Plants	Wallum Leek-orchid (55148, VU)	25.8

Group	MNES (ID, Status) ⁴⁵	Deforested (ha ⁴⁶)
7. Plants	Diplazium pallidum (12764, EN)	25.0
7. Plants	Tomophyllum walleri (83507, VU)	24.6
7. Plants	Square Tassel Fern (86555, VU)	22.7
7. Plants	Xylopia monosperma (82030, EN)	21.8
7. Plants	Dendrobium nindii (11289, EN)	20.3
7. Plants	Bertya pinifolia (8587, VU)	20.3
7. Plants	Marbled Balogia (8463, VU)	20.2
7. Plants	Allocasuarina thalassoscopica (21927, EN)	19.2
7. Plants	Romnalda strobilacea (5948, VU)	19.0
7. Plants	Knotweed (5831, VU)	17.2
7. Plants	Plesioneuron tuberculatum (24604, EN)	17.1
7. Plants	Homoranthus porteri (55196, VU)	17.0
7. Plants	Purple-flowered Wattle (61156, CE)	17.0
7. Plants	Dipodium pictum (2723, EN)	16.5
7. Plants	Mt Emu She-oak (21926, EN)	15.9
7. Plants	Mt Larcom Silk Pod (64587, VU)	14.5
7. Plants	Tectaria devexa (14767, EN)	13.8
7. Plants	Bertya calycina (78344, VU)	13.5
7. Plants	Thin Feather Orchid (82771, VU)	13.3
7. Plants	Kardomia granitica (83201, VU)	13.1
7. Plants	Corymbia rhodops (64015, VU)	12.3
7. Plants	Prostanthera spathulata (88266, VU)	12.2
7. Plants	Mangrove Orchid (14310, EN)	11.8
7. Plants	Rupp's Wattle (7559, EN)	10.6
7. Plants	Onionwood (11344, VU)	10.1
7. Plants	Nightcap Plectranthus (55742, EN)	10.0
7. Plants	Leionema obtusifolium (64925, VU)	9.8
7. Plants	Torrington Pea (56308, VU)	9.7
7. Plants	Asplenium wildii (19154, VU)	9.6
7. Plants	Zieria collina (2178, VU)	9.4
7. Plants	Tephrosia leveillei (16946, VU)	9.3
7. Plants	Byfield Matchstick (9002, VU)	8.9

Appendix 1. Continued...

Group	MNES (ID, Status) ⁴⁵	Deforested (ha) ⁴⁶
7. Plants	Red Silky Oak (56400, VU)	8.7
7. Plants	Drosera prolifera (9940, VU)	8.4
7. Plants	Phaleria biflora (82049, VU)	8.3
7. Plants	Tonsil Orchid (83575, EN)	8.3
7. Plants	Clear Milkvine (2794, VU)	8.1
7. Plants	Antelope Orchid (15240, EN)	8.1
7. Plants	Cooneana Olive (81858, CE)	7.9
7. Plants	Yarwun Whitewood (55417, EN)	7.7
7. Plants	Cape York Vanda (4494, VU)	7.5
7. Plants	Sarcochilus hirticalcar (11388, VU)	7.5
7. Plants	Pomaderris clivicola (55151, VU)	7.4
7. Plants	Logania diffusa (24159, VU)	7.3
7. Plants	Corymbia clandestina (64072, VU)	6.1
7. Plants	Toechima pterocarpum (4690, EN)	5.4
7. Plants	Plectranthus torrenticola (55728, EN)	5.4
7. Plants	Rusty Rose Walnut (13866, VU)	5.1
7. Plants	Scented Acronychia (8582, EN)	4.8
7. Plants	Key's Boronia (21632, VU)	4.8
7. Plants	Angle-stemmed Myrtle (78866, EN)	4.5
7. Plants	Wallangarra White Gum (9640, VU)	4.0
7. Plants	Phlegmariurus lockyeri (86552, VU)	3.8
7. Plants	Southern Fontainea (24037, VU)	3.5
7. Plants	Velvet Hopbush (15140, VU)	3.3
7. Plants	Aristida granitica (4065, EN)	3.1
7. Plants	Phebalium whitei (19322, VU)	2.9
7. Plants	Small Snake Orchid (18325, EN)	2.8
7. Plants	Triplarina nitchaga (64593, VU)	2.3
7. Plants	Prostanthera clotteniana (76165, CE)	2.2
7. Plants	Southern Ochrosia (11350, EN)	2.1
7. Plants	Coolamon (12284, VU)	2.1
7. Plants	Shrubby Hazelwood (19010, VU)	2.1
7. Plants	Bopple Nut (21189, VU)	2.1

Group	MNES (ID, Status) ⁴⁵	Deforested (ha) ⁴⁶
7. Plants	Small-leaved Tamarind (21484, EN)	2.1
7. Plants	Smooth Davidson's Plum (67178, EN)	2.1
7. Plants	Tallebudgera spikemoss (67901, VU)	2.1
7. Plants	Sweet Myrtle (78867, EN)	2.1
7. Plants	Ormeau Bottle Tree (84105, CE)	2.1
7. Plants	Ozothamnus eriocephalus (56133, VU)	1.7
7. Plants	Whiskered Rein Orchid (87197, EN)	1.7
7. Plants	Sclerolaena blakei (5706, VU)	1.5
7. Plants	Mossman Fairy Orchid (5388, CE)	1.2
7. Plants	Rock Tassel-fern (86556, CE)	1.2
8. TEC	Weeping Myall Woodlands (98, EN)	6,882.5
8. TEC	Brigalow (Acacia harpophylla dominant and co-dominant) (28, EN)	6,840.2
8. TEC	Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions (66, EN)	1,576.3
8. TEC	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (43, CE)	705.6
8. TEC	Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions (24, EN)	677.2
8. TEC	The community of native species dependent on natural discharge of groundwater from the Great Artesian Basin (26, EN)	666.0
8. TEC	Lowland Rainforest of Subtropical Australia (101, CE)	108.7
8. TEC	Broad leaf tea-tree (Melaleuca viridiflora) woodlands in high rainfall coastal north Qld (122, EN)	23.0
8. TEC	Littoral Rainforest and Coastal Vine Thickets of Eastern Australia (76, CE)	19.8
8. TEC	Coastal Swamp Oak (Casuarina glauca) Forest of NSW and South East Qld (142, EN)	7.4
8. TEC	Swamp Tea-tree (Melaleuca irbyana) Forest of South-east Qld (33, CE)	1.5

Appendix 2. Matters of national environmental significance (MNES): “likely-to-occur” forest habitats cleared for pasture expansion without referral, on properties that exceeded significance thresholds.

Group	Matter of National Environmental Significance	Status ⁴⁷	Threshold (ha) ⁴⁸	Source ⁴⁹	Area cleared ⁵⁰ 15+yo	Area cleared 30+yo	Area cleared Remnant
Mammals	Bare-rumped Sheath-tailed Bat	VU	22	2017/8047	569	514	180
Mammals	Brush-tailed Rock-wallaby	VU	37	2017/7974	730	594	38
Mammals	Corben's Long-eared Bat	VU	54	2015/7463	10,708	7,274	1,459
Mammals	Ghost Bat	VU	18	2018/8163	38,081	26,700	3,226
Mammals	Greater Glider	VU	17	2016/7796	4,840	3,803	582
Mammals	Grey-headed Flying-fox	VU	1*	2011/6214	21,700	17,577	2,431
Mammals	Koala	VU	1.3	2017/8084	58,470	44,626	7,413
Mammals	Large Pied Bat	VU	1*	2011/6214	16,277	13,181	2,185
Mammals	Mahogany Glider	EN	1*	2009/5109	115	94	5
Mammals	Tiger Quoll	EN	1*	2011/6214	3,932	3,400	464
Mammals	Water Mouse	VU	1*	2012/6643	600	476	154
Birds	Black-breasted Button-quail	VU	8.1	2017/7941	7,799	6,945	784
Birds	Capricorn Yellow Chat	CE	6.8	2012/6459	184	169	13
Birds	Cassowary	EN	1*	2009/5109	77	54	6
Birds	Gouldian Finch	EN	9.3	2014/7210	403	388	291
Birds	Night Parrot	EN	91	2016/7727	467	466	466
Birds	Painted Honeyeater	VU	28	2017/7974	83,911	49,488	16,070
Birds	Painted Snipe	EN	24	Anglo Coal	65,133	43,926	4,465
Birds	Palm Cockatoo	VU	176	2016/7706	240	239	238
Birds	Red Goshawk	VU	22	2017/8047	98,464	70,622	13,095
Birds	Regent Honeyeater	CE	1*	2011/6214	4,186	3,497	481
Birds	Southern Black-throated Finch	EN	55	2012/6562	18,955	12,181	3,125
Birds	Squatter Pigeon	VU	18	2018/8141	95,124	63,756	13,461
Birds	Swift Parrot	CE	1*	2011/6214	4,471	3,909	542
Reptiles	Adorned Delma	VU	3.1	2012/6643	2,703	1,919	203
Reptiles	Dunmall's Snake	VU	7.4	2013/6868	2,908	2,035	975

⁴⁷ At the time of the referral from which the threshold was taken. VU = vulnerable, EN = Endangered and CE = Critically endangered.

⁴⁸ Determined as the minimum area of habitat destruction approved for controlled actions or subject to enforcement action. * indicates that the area was less than 1 ha and threshold was set to 1 ha arbitrarily.

⁴⁹ Referral number the source for the threshold area. "Anglo Coal" refers to an enforceable undertaking for a compliance breach (<https://www.awe.gov.au/sites/default/files/documents/enforceable-undertaking-anglo-coal-2021.pdf>).

⁵⁰ Sums of areas of "likely to occur" habitat cleared (ha) across all properties where area exceeded thresholds, for forest in 2018 that was 15+ years old, 30+ years old or remnant in 2017, respectively.

Appendix 2. Continued...

Group	Matter of National Environmental Significance	Status ⁴⁷	Threshold (ha) ⁴⁸	Source ⁴⁹	Area cleared ⁵⁰ 15+yo	Area cleared 30+yo	Area cleared Remnant
Reptiles	Fitzroy River Turtle	VU	941	2009/5173	2,538	1,064	
Reptiles	Long-legged Worm-skink	VU	60	2015/7463	60	60	
Reptiles	Ornamental Snake	VU	1*	2014/7240	42,252	30,708	2,718
Reptiles	Yakka Skink	VU	3.1	2012/6643	40,543	24,071	4,600
Frogs	Magnificent Brood Frog	VU	3.0	2018/8289	8	7	7
Frogs	Wallum Sedge Frog	VU	1*	2018/8166	4	4	3
Invertebrates	Boggomoss Snail	CE	2.4	2008/4313	348	255	
Invertebrates	Brigalow Woodland Snail	EN	6.1	2017/7902	1,212	869	155
Invertebrates	Dulacca Woodland Snail	EN	1.5	2018/8368	2,669	2,110	603
Plants	Aristida annua	VU	6.5	2010/5782	636	465	45
Plants	Cycas ophiolitica	EN	235	2012/6643	3,317	2,417	
Plants	Homoranthus porteri	VU	5.1	2011/6228	8	7	7
Plants	King Blue-grass	EN	5.8	2012/6459	6,889	4,115	746
Plants	Leafless Tongue-orchid	VU	1*	2011/6214	294	226	43
Plants	Lesser Swamp-orchid	EN	2.7	2006/2912	2,224	1,947	489
Plants	Ooline	VU	4.0	2013/7047	65,312	44,745	6,763
Plants	Rough-shelled Macadamia	VU	1*	2010/5296	63	62	1
Plants	Scented Acronychia	EN	1*	2010/5296	3	1	
Plants	Spiny Gardenia	EN	1*	2010/5296	13	12	2
Plants	Stinking Laurel	VU	1*	2010/5296	78	74	7
TEC	Brigalow	EN	3.3	Anglo Coal	4,338	2,335	779
TEC	Grassy Box Woodland	CE	1*	2015/7476	408	346	157
TEC	Great Artesian Basin springs	EN	5.6	2008/4313	512	307	37
TEC	Lowland Subtropical Rainforest	CE	1*	2015/7588	75	74	27
TEC	N Qld coastal tea tree woodlands	EN	1.5	2015/7461	10	10	7
TEC	Semi-evergreen vine thickets	EN	2.9	2012/6603	356	287	117
TEC	Weeping Myall Woodland	EN	1.5	2017/7989	4,419	3,720	2,256

Appendix 3. Land uses deemed “undeveloped” and so likely to hold native forest.

QLUMP	ALUM	Primary	Secondary	Tertiary
2	1.1.1	Conservation and natural environments	Nature conservation	Strict nature reserves
4	1.1.3	Conservation and natural environments	Nature conservation	National park
5	1.1.4	Conservation and natural environments	Nature conservation	Natural feature protection
6	1.1.5	Conservation and natural environments	Nature conservation	Habitat/species management area
7	1.1.6	Conservation and natural environments	Nature conservation	Protected landscape
8	1.1.7	Conservation and natural environments	Nature conservation	Other conserved area
9	1.2.0	Conservation and natural environments	Managed resource protection	Managed resource protection
11	1.2.2	Conservation and natural environments	Managed resource protection	Surface water supply
14	1.2.5	Conservation and natural environments	Managed resource protection	Traditional indigenous uses
15	1.3.0	Conservation and natural environments	Other minimal use	Other minimal use
16	1.3.1	Conservation and natural environments	Other minimal use	Defence
17	1.3.2	Conservation and natural environments	Other minimal use	Stock route
18	1.3.3	Conservation and natural environments	Other minimal use	Residual native cover
19	1.3.4	Conservation and natural environments	Other minimal use	Rehabilitation
20	2.1.0	Production from relatively natural environments	Grazing native vegetation	Grazing native vegetation
21	2.2.0	Production from relatively natural environments	Production native forests	Production native forests
22	2.2.1	Production from relatively natural environments	Production native forests	Wood production forestry
135	5.4.2	Intensive uses	Residential and farm infrastructure	Rural residential with agriculture
136	5.4.3	Intensive uses	Residential and farm infrastructure	Rural residential without agriculture
137	5.4.4	Intensive uses	Residential and farm infrastructure	Remote communities
186	6.5.0	Water	Marsh/wetland	Marsh/wetland
187	6.5.1	Water	Marsh/wetland	Marsh/wetland - conservation
188	6.5.2	Water	Marsh/wetland	Marsh/wetland - production
190	6.5.4	Water	Marsh/wetland	Marsh/wetland - saline

Appendix 4. Weights used to match EPBC referral categories with SLATS categories of development purposes.

Referrals development purpose	SLATS development purpose					
	Crop	Infrastructure	Mine	Pasture	Road	Settlement
Agriculture and Forestry	1			1		
Aquaculture	1					
Commercial Development		1			0.5	1
Energy Generation and Supply (non-renewable)		1	0.5		0.5	
Energy Generation and Supply (renewable)		1	0.5		0.5	
Manufacturing					0.5	1
Mining		0.5	1		0.5	
Natural Resources Management					0.5	
Residential Development		0.5			0.5	1
Telecommunications		1				
Tourism and Recreation						1
Transport - Air and Space		1				0.5
Transport - Land		1	0.5		1	0.5
Transport - Water			0.5		1	
Waste Management (non-sewerage)			0.5			1
Waste Management (sewerage)		1				0.5
Water Management and Use		1	0.5			0.5

We love **our beautiful planet**

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