

NEW SOUTH WALES DEFORESTATION DATA ANALYSIS THREE CASE STUDIES 2016-2018



Nature
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Council





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KEY FINDINGS

- **Bulldozing of native bushland has nearly doubled in three study areas in NSW** – North West, Central West and Hunter regions – since the NSW *Native Vegetation Act* 2003 (NVA) was repealed in August 2017.
- **Deforestation increased 2.5x in the Central West, 2.3x in the Hunter Region and 1.6x in the North West.**
- **A total of 4,679 ha of koala habitat was cleared in the study areas over the two years, 1,600 ha in 2016-17 and 3,079 ha in 2017-18.**
- **71 threatened species lost habitat** due to clearing over two years.
- This report's **findings are consistent with earlier analysis of clearing in the Moree Collarenebri region** in the northwest of the state.

INTRODUCTION

This report examines changes in the rate and extent of deforestation and land clearing in three regions of NSW following the repeal of the *Native Vegetation Act* 2003 (NVA) and replacement in much weaker controls over deforestation in the *Biodiversity Conservation Act* 2017 and amendments to the *Local Land Services Act* 2013.

In 2018 we examined an area in northwest NSW on the Queensland border (Fig. 1) and found an almost three-fold increase in rates of deforestation from before the NVA repeal (2016-17) to the year after (2017-18).¹ We extended this study more widely in NSW to see if the pattern of increased deforestation was more general.

Instances of deforestation were detected by systematically visually comparing satellite images of three study areas in NSW covering a total area of 33,527 km² in the Northwest (around Narrabri), Central West (around Dubbo) and Hunter Valley (around Newcastle) (Fig. 1). These areas were chosen to be representative of areas in NSW where there has been significant clearing in the past; two inland and one coastal.

For each study area we obtained and compared three satellite images from the European Space Agency's

Sentinel-2 satellite from mid-2016, mid-2017 and mid-2018. The three images selected for analysis were closest to August when cloud cover is minimal. This enabled us to estimate clearing rates for 2016-17 and 2017-18, hinging around the time that the NVA was repealed in August 2017.²

The areas detected as cleared were classified by intensity of clearing (see Appendix 1 for examples):

- Fully cleared forest (few if any trees left behind),
- Partly cleared forest (only strips of bushland or scattered trees left), or
- Sparse woody clearing (either naturally scattered trees or previously partly cleared areas with scattered regrowth or with mature “paddock trees” remaining, which have now been wholly or partly removed).

The study excludes clearing of any type on land uses other than those with relatively natural environments according to the NSW land-use map for 2014, that is, excluding areas already converted to crops, plantations or settlements by the beginning of the period of study. National parks and state forests were also excluded since the repealed NVA did not apply on these tenures.³

1. WWF-Australia and Nature Conservation Council of NSW, 2018. Bulldozing of bushlands doubles around Moree and Collarenebri after safeguards repealed in NSW. Online, available at: <<https://bit.ly/2lZJGeD>> accessed 14 October 2018.

2. In practice the image dates differed for each study area as detailed in the Appendix. Sentinel imagery has a 10m resolution. That is, one pixel of the image represents an area on the earth surface of approx. 10m x 10m. Images were searched exhaustively in a grid pattern comparing one image with the next to detect changes in land cover. All detection polygons were drawn by Lindsey Gray (NCC) then independently checked and verified, and adjusted or corrected if needed by Martin Taylor (WWF).

3. These were the primary uses Conservation and Natural Environments and Production from Relatively Natural Environments but excluding national parks and state forests which are not subject to vegetation legislation. 6.5.0 Marsh or wetland was included as this could also be forested.

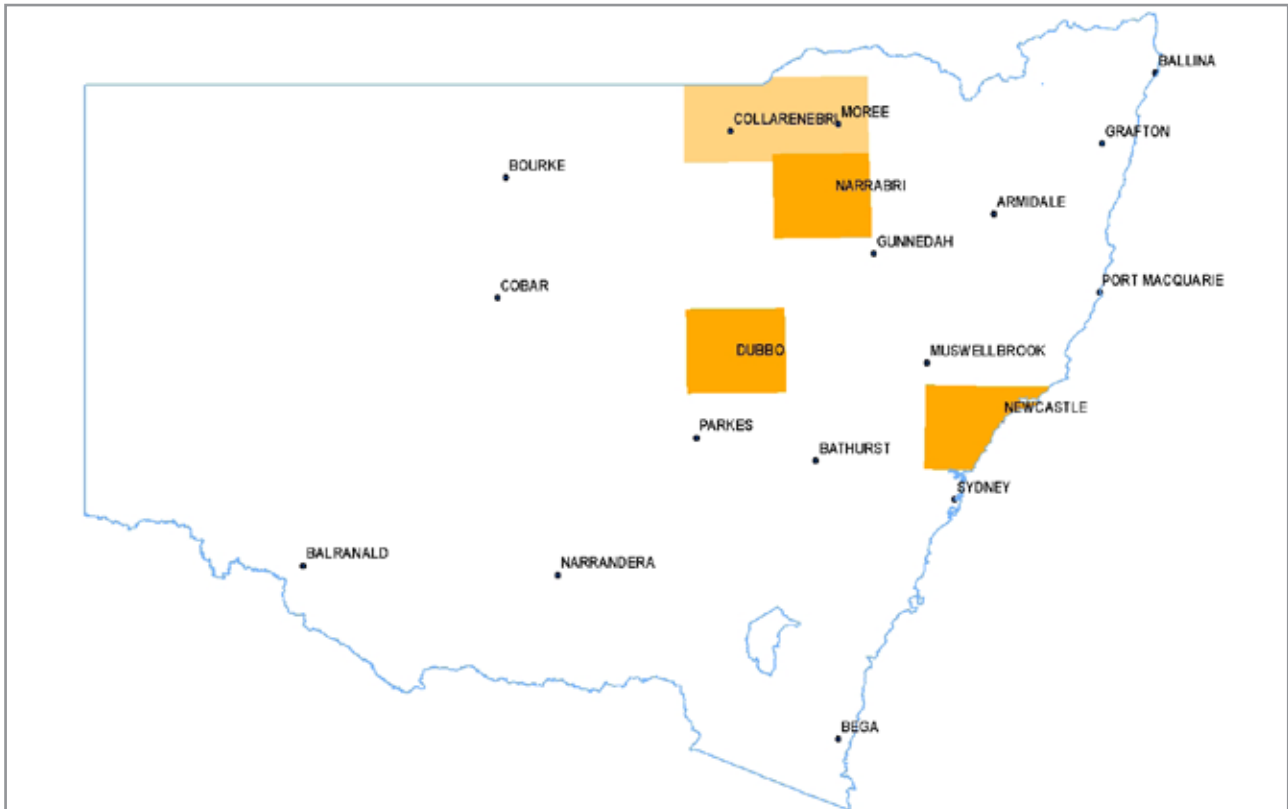


FIG. 1. Study area for this report (coloured orange). Also shown is the study area from our 2018 study for Collarenebri and Moree regions (coloured tan).

RATES OF CLEARING

Area	2016-17 (ha)	2017-18 (ha)	Change
North West (around Narrabri)	953	1,520	1.6x
Central West (around Dubbo)	443	1,098	2.5x
Hunter Region (around Newcastle)	203	470	2.3x
Total	1,599	3,088	1.9x

TABLE 1: Rates of clearing (hectares per annum⁴) and change in rates for all three classes of clearing in the periods 2016-17 and 2017-18.

4. Annual rates of clearing were estimated by dividing the summed areas of polygons drawn around the cleared areas in each intensity class, by the number of days between the two images used to detect the changes, and then multiplying by 365 days.

RATES OF CLEARING BY INTENSITY

Area	2016-17		2017-18		Change
	ha	% of total	ha	% of total	
Full	651	41%	1,057	34%	1.6x
Part	311	19%	1,109	36%	3.6x
Sparse	638	40%	922	30%	1.4x
Total	1,599	100%	3,088	100%	1.9x

TABLE 2: Annual rates of clearing by intensity class, and changes between periods. (See Appendix 1 for visual examples of different classes).

Overall, rates of bulldozing of native bushland have nearly doubled in one year in these three study areas combined. An estimated 3,088 ha were cleared in the past year (Table 1).

Although all intensity classes increased from 2016-17 to 2017-18, there was a change in the pattern of intensity of deforestation, with partial clearing areas rising from 19% to 36% of all clearing,

whereas in 2016-17 full forest clearing dominated (41%) (Table 2). As shown below (see Table 3), this is mostly attributable to an eightfold increase in partial clearing in the North West study area. The repeal of the NVA in August 2017 is likely to be a major contributor to the observed rise in forest and woodland destruction in these study areas.

NORTHWEST

While full scale clearing declined, partial clearing or thinning increased more than eightfold from 2016-17 to 2017-18. Full clearing in this region is most commonly associated with mining, which was not

controlled by the NVA. Thinning of paddocks, usually for livestock, was however controlled by the now repealed NVA.

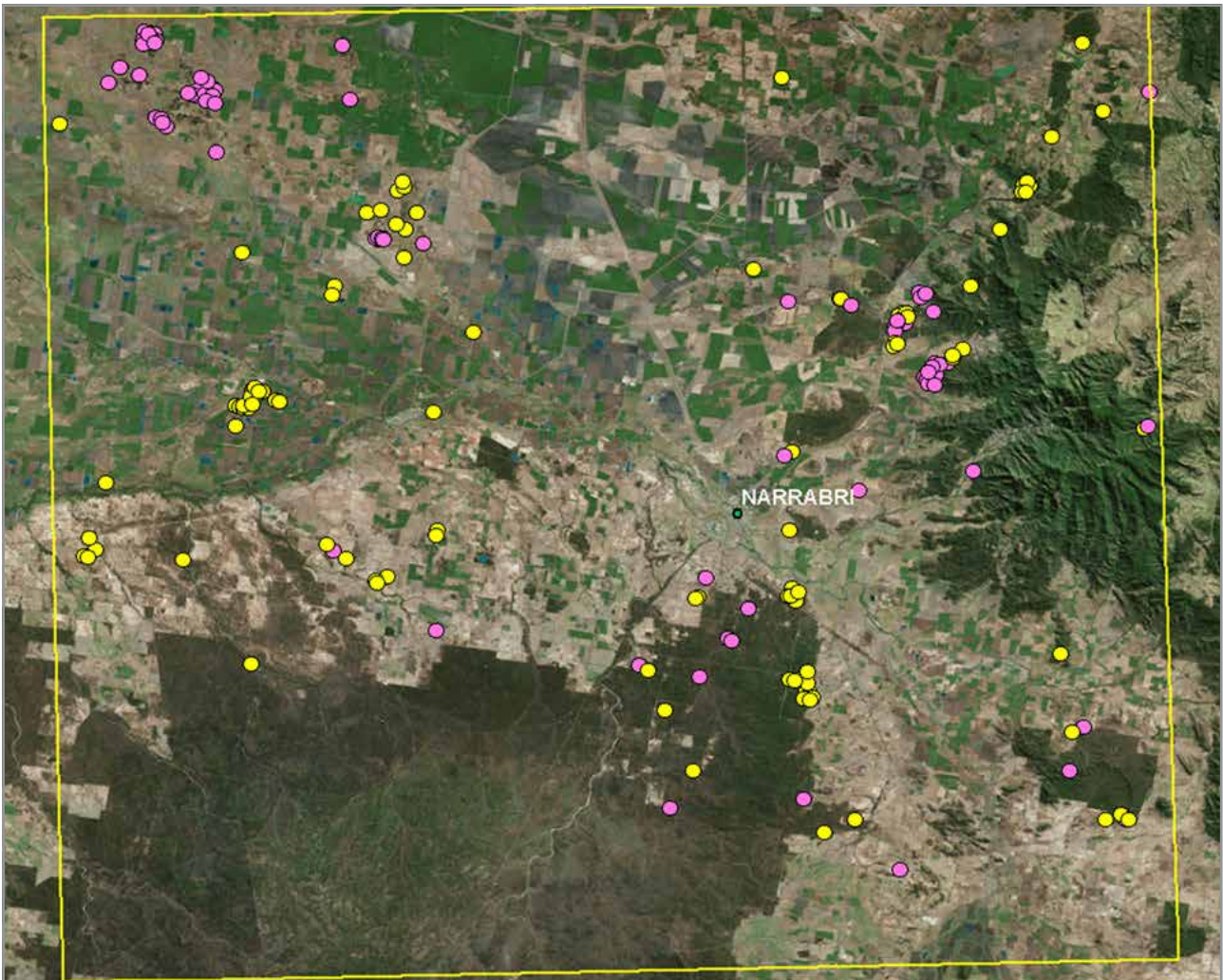


FIG. 2. North West study area (12,046 km²) showing point locations of clearing instances over 1 ha detected in 2016-17 (pink) or 2017-18 (yellow).

Intensity	2016-17 ha	2017-18 ha	Change
Full	454	259	0.6x
Part	101	881	8.7x
Sparse	398	380	same
Total	953	1,520	1.6x

TABLE 3: Rates of clearing observed for the North West study area.

CENTRAL WEST

Central West clearing showed the most consistent increase from 2016-17 to 2017-18, with full clearing increasing nearly fivefold and sparse vegetation

clearing more than doubling (Table 4). Most of the clearing in this region appeared to be for agriculture.

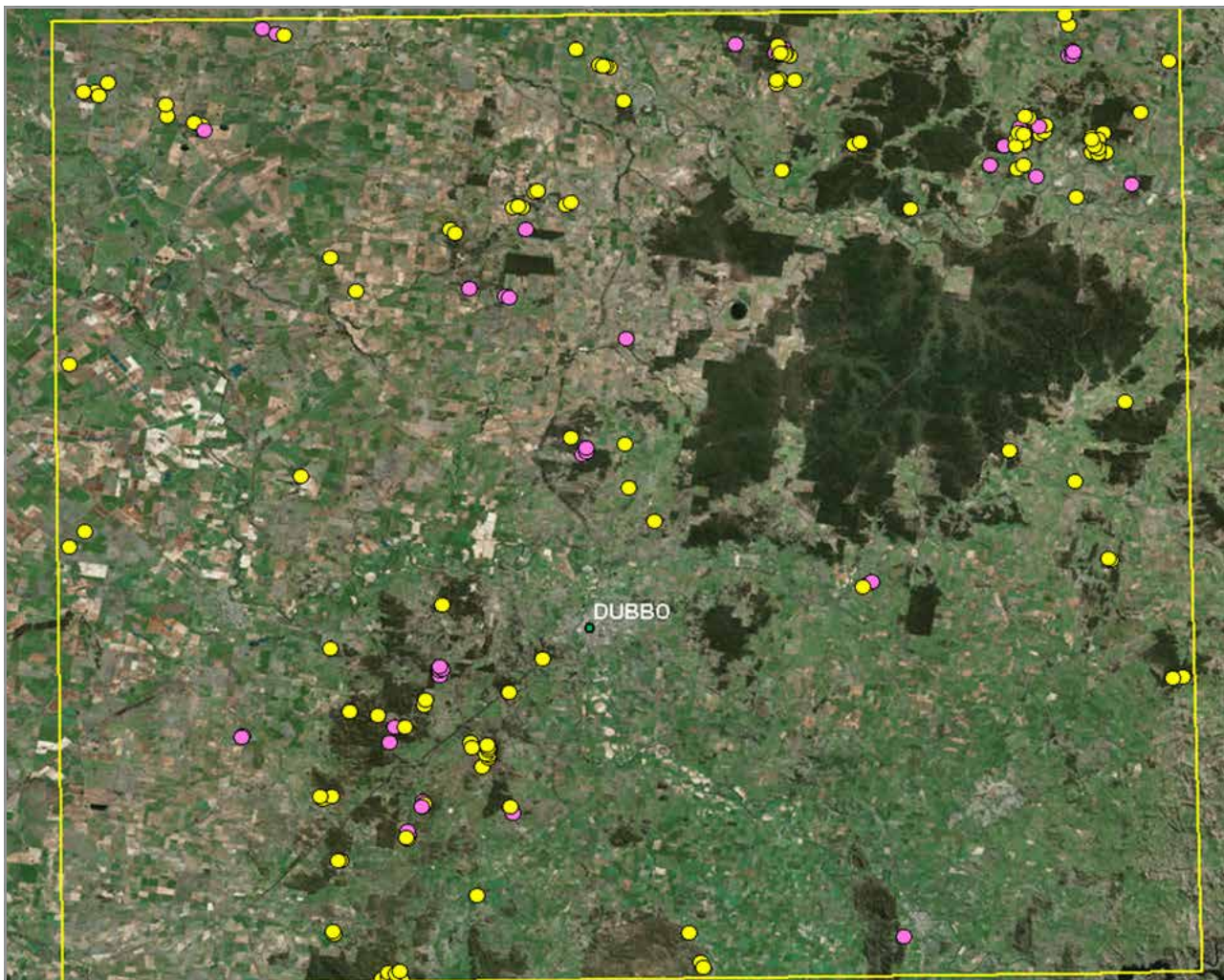


FIG 3. Central West (12,058 km²) study area showing point locations of clearing instances over 1 ha detected in 2016-17 (pink) or 2017-18 (yellow).

Intensity	2016-17 ha	2017-18 ha	Change
Full	108	509	4.7X
Part	157	190	1.2X
Sparse	178	399	2.2X
Total	443	1,098	2.5X

TABLE 4. Rates of clearing observed for the Central West study area.

HUNTER

Full-forest clearing increased more than threefold, while sparse woodland or regrowth clearing more than doubled (Table 5). Partial clearing was a small

component of observed clearing and showed a minor decline. Most of the clearing in this region appeared to be for mining or urban/industrial purposes.

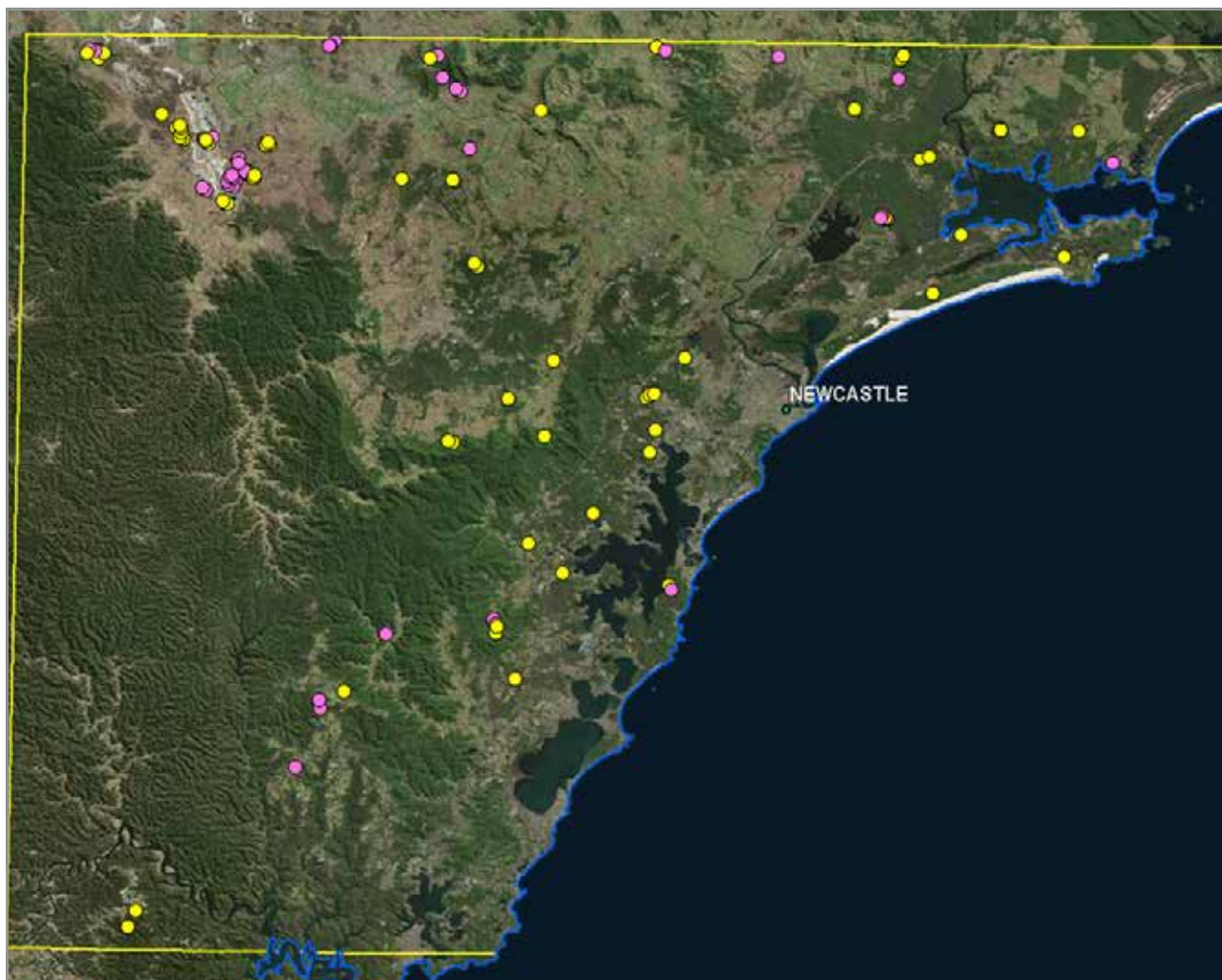


FIG 4. Hunter Region study area (9,423 km²) showing point locations of clearing instances over 1 ha detected in 2016-17 (pink) or 2017-18 (yellow).

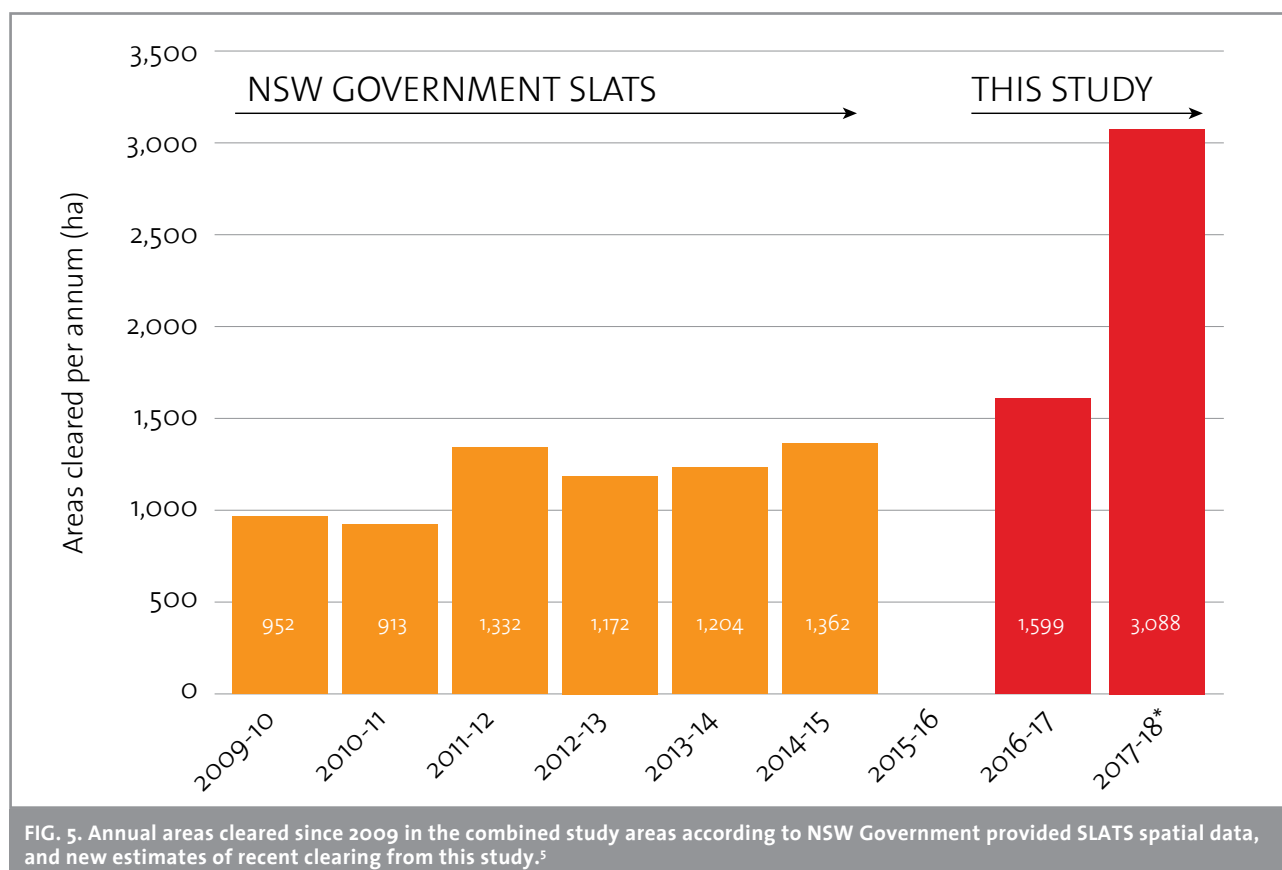
Intensity	2016-17 ha	2017-18 ha	Change
Full	88	289	3.3X
Part	53	38	0.7X
Sparse	62	143	2.3X
Total	203	470	2.3X

TABLE 5. Rates of clearing observed in the Hunter region of the study area.

COMPARISON WITH NSW GOVERNMENT DATA

Annual clearing in the combined study areas as detected by the NSW Government Statewide Land and Tree Study (SLATS) grew from 952 ha to 1,362 ha from 2009-10 to the most recent year made available

to us by the government 2014-15 (Fig. 5). Areas detected as cleared in all three categories in 2017-18 show significant increases relative to the clearing detected in 2016-17 and the earlier SLATS period (Fig. 5).



IMPACTS ON NATIVE ANIMALS AND PLANTS

Clearing in the study area has destroyed known or likely-to-occur habitat for 71 species of national environmental significance, including 19 listed as endangered, and five critically endangered under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (Table 6, Appendix 2).

Another 36 native threatened animal species and 11 threatened native plant species are known to occur in the study area (Appendix 3). However, records of occurrence are necessarily incomplete and do not give a good representation of actual habitats. Any of these species could have been directly killed or harmed by the clearing in the study area over the 2016-18 period.

⁵ excluding natural change, fire, and plantation harvest, and repeat clearing within the 2000-15 period.

RATES OF CLEARING OF THREATENED SPECIES HABITAT

Species	Status (EPBC Act)	Cleared 2016-17 ha	Cleared 2017-18 ha	Change	Region most loss 2017-18
Koala	Vulnerable	1,600	3,079	1.9x	North West
Painted Honeyeater	Vulnerable	1,588	3,066	1.9x	North West
Grey-headed Flying-fox	Vulnerable	853	1,870	2.2x	Central West
Swift Parrot	Endangered	593	1,432	2.4x	Central West
Spotted-tail Quoll	Endangered	242	815	3.4x	Hunter
Brush-tailed Rock-wallaby	Vulnerable	356	622	1.7x	Hunter

TABLE 6. Habitat loss for selected threatened animal species in respective study areas in 2017-18. For the full table see Appendix 2.



RECOMMENDATIONS

The NSW Government must introduce stronger land-clearing laws and invest in forward-looking solutions to biodiversity conservation and land protection. This will require significant improvements to current laws that go above and beyond the *Native Vegetation Act 2003* (repealed 2016) and the current *Local Land Services Act 2013* (amended 2016) and the *Biodiversity Conservation Act 2016*. The NSW Government must enact strong laws and dedicate funds that achieve the following outcomes:

1. MANDATE THE CONSERVATION AND ENHANCEMENT OF BIODIVERSITY IN LEGISLATION

Legislation must require decision makers to conserve and enhance biodiversity. This requirement must be achieved at state, regional and local scales, and must address the full range of biodiversity and conservation values, including threatened species, water quality, habitat quality, soil quality and salinity.

2. PROTECT ALL REMNANT AND HIGH-CONSERVATION-VALUE REGROWTH VEGETATION

Legislation must ensure all remnant and high-conservation-value (HCV) regrowth forest and bushland is protected from clearing across all sectors, including agriculture, urban development, infrastructure and mining. This will require changes across biodiversity conservation, agricultural, planning and mining legislation. The definition of “high-conservation-value” should be consistent with the international definition as outlined by the HCV Resource Network. This protection should not be arbitrarily restricted by vegetation age.

3. PROTECT AND RESTORE KOALA HABITAT TO SAVE THE SPECIES FROM EXTINCTION

Prohibit clearing of core koala habitat across all land tenures. Strengthen implementation of and compliance with SEPP 44 by local councils to ensure permanent protection from urban development. Restore effective landscape linkages to enable dispersal of koalas in over-cleared regions, and movement of koalas into climate refugia. Finalise and release koala habitat mapping at state, regional and local scales.

4. PROTECT AND RESTORE FORESTS, BUSHLAND AND CATCHMENTS FOR CARBON STORAGE AND RAIN MAKING

Legislation and policies must mandate protection and restoration of trees to enhance storage of carbon in landscapes to support carbon emissions abatement and carbon sequestration. Clearing of trees is linked to declining rainfall and hotter and longer droughts, and this action will therefore improve long-term outcomes for regional communities by generating more rain and keeping temperatures cooler.

5. RESTRICT CODE-BASED CLEARING

Clearing under self-assessable codes should be strictly limited to small-scale maintenance activities that have low ecological impacts, such as creating firebreaks, fence lines, and critical infrastructure.

6. PROTECT URBAN BUSHLAND AND TREES

Urban bushland and trees are vital for human wellbeing and for climate change adaptation by keeping towns and villages cool. Ensure existing urban bushland, trees and green spaces are protected by removing provisions that allow tree clearing to occur under various instruments, such as the Vegetation in Non-Rural Areas SEPP, Exempt and Complying Development Code and the 10/50 Bushfire Code. The government must mandate robust, uniform tree-preservation rules for councils, provide legal protection for green spaces, and support local governments by investing in increasing green space and expanding urban tree canopies.



7. PUT THE ENVIRONMENT MINISTER IN CHARGE OF TREE-CLEARING DECISIONS

Where Ministerial approval is required for clearing, it must be the Environment Minister that has primary responsibility for assessing and determining clearing proposals, using an objective scientific assessment methodology. That is, recent changes to land-clearing laws that gave the Local Land Service and Minister for Primary Industries responsibility for clearing decisions should be amended to give responsibility back to the Environment Minister and his/her department. The Environment Minister should be responsible for the monitoring and enforcement of tree-clearing laws. Similarly, the Environment Minister must have a concurrence role with the Planning Minister in the determination of major projects that involve clearing.

8. COMPLETE AND PUBLICLY RELEASE NATIVE VEGETATION MAPPING

The release of native vegetation maps for the whole of NSW was a key component of the government's new regime of land-clearing laws when details were announced, yet these maps have not been completed. Mapping must be completed as a matter of priority, and should support strengthened legislation (e.g., by including areas of high conservation value that are off limits to clearing). Maps must be created using a method that can accurately identify vegetation communities (e.g., Digital Aerial Photographic Interpretation), and be ground-truthed by OEH staff. Mapping must accurately and comprehensively identify all remnant and high-conservation-value regrowth forest and bushland.

9. ADEQUATELY RESOURCE MONITORING AND COMPLIANCE

Adopt an early detection system akin to the Queensland Government model whereby satellite imagery is monitored on a regular basis (fortnightly intervals) to identify suspect clearing and allow intervention by environmental officers to prevent further losses.

10. RELEASE PROMPT, TRANSPARENT AND REGULAR STATEWIDE CLEARING DATA

NSW should publish an annual report and data on statewide clearing similar to the Queensland Government's annual SLATS report. The report should clearly state how much remnant and regrowth vegetation has been cleared over 12 months, with a breakdown by bioregion, catchment area, state electorate and local government area. The data should quantify clearing by industry (e.g., grazing, mining, etc.), by type of clearing permit granted and identify clearing locations. Estimates should also be provided of greenhouse gas emissions resulting from clearing.

11. ESTABLISH A \$1.5 BILLION LAND AND BIODIVERSITY FUND

Establish a flagship \$1.5 billion Land and Biodiversity Fund to support biodiversity conservation and land-sector carbon projects. This will have the added benefit of increasing rainfall. The fund should be overseen by an independent committee, with projects required to meet minimum standards. From that fund, \$1 billion should be allocated to support farmers and Indigenous landholders to protect trees and revegetate landscapes, create jobs in land restoration and carbon sequestration in regional and rural areas, and to prevent erosion to protect waterways and water quality. Revegetation targets should be set to guide investments to increase the extent and condition of native vegetation at regional and state levels. In addition, \$500 million should be invested in biodiversity conservation on public and private land. Measures must also be put in place to ensure funds are spent only on lands that are subject to perpetual conservation agreements so benefits of the investment are enduring.

APPENDIX 1: ILLUSTRATIONS OF CLEARING INTENSITY TYPES

FULLY CLEARED

This example in the Northwest region was detected as fully cleared from 2017 to 2018. Boundaries have been drawn conservatively to avoid tree cover or even tree shadows. Small areas although probably cleared have not all been captured.

Other areas cleared between 2015 and 2017 can be discerned comparing the two images, and so are not within the boundary for 2017-18 clearing. Note that coarser scaled (10 m pixel) Sentinel 2 satellite photos were used for detections, and were confirmed by reference to the Google Earth high resolution (sub metre pixel) imagery if any was available in the right date range.



GOOGLE EARTH HIGH RESOLUTION IMAGE FROM 15 SEPTEMBER, 2018:



PARTIAL CLEARING

This example from the Northwest region shows a typical thinning operation, usually for livestock pasture.



GOOGLE EARTH IMAGE FROM 12 AUGUST, 2018 (NOTE THE LINES OF PILED UP TREE TRUNKS AND BRANCHES RUNNING NORTH-SOUTH):



SPARSE CLEARING

This example from the North West region shows paddock tree removal from 2017 to 2018. All or most of the trees had to be removed for an instance of clearing to be counted



GOOGLE EARTH IMAGE FROM 12 AUGUST, 2018 (NOTE THE LINES OF PILED UP TREE TRUNKS AND BRANCHES RUNNING NORTH-SOUTH):



APPENDIX 2: EPBC LISTED THREATENED SPECIES LOSING HABITAT IN THE STUDY AREA, CHANGE OVER THE PERIOD, AND REGION WITH GREATEST AMOUNT CLEARED

Class	Name	Cwlth	NSW	Cleared 2016-17 ha	Cleared 2017-18 ha	Change	Region most cld 2017/18
Mammal	Koala	VU	VU	1,600	3,079	1.9x	North West
	South-eastern Long-eared Bat	VU	VU	1,452	2,777	1.9x	North West
	Large Pied Bat	VU	VU	1,496	2,697	1.8x	North West
	Grey-headed Flying-fox	VU	VU	853	1,870	2.2x	Central West
	Spotted-tail Quoll	EN	VU	242	815	3.4x	Hunter
	Brush-tailed Rock-wallaby	VU	EN	356	622	1.7x	Hunter
	New Holland Mouse, Pookila	VU	-	189	520	2.7x	Hunter
	Pilliga Mouse	VU	VU	49	296	6.1x	North West
	Long-nosed Potoroo	VU	VU	48	111	2.3x	Hunter
	Hastings River Mouse	EN	EN	22	51	2.4x	Hunter
Bird	Australian Painted Snipe	EN	EN	1,600	3,079	1.9x	North West
	Painted Honeyeater	VU	VU	1,588	3,066	1.9x	North West
	Regent Honeyeater	CE	CE	877	2,694	3.1x	North West
	Superb Parrot	VU	VU	734	2,462	3.4x	North West
	Malleefowl	VU	EN	788	2,326	3.0x	North West
	Swift Parrot	EN	EN	593	1,432	2.4x	Central West
	Australasian Bittern	EN	EN	308	993	3.2x	Central West
	Eastern Bristlebird	EN	EN	61	134	2.2x	Hunter
	Squatter Pigeon	VU	CE	20	14	0.7x	North West
	Reptile	Long-legged Worm-skink	VU	EN	831	1,329	1.6x
Border Thick-tailed Gecko		VU	VU	386	492	1.3x	North West
Pink-tailed Worm-lizard		VU	VU	261	484	1.9x	Central West
Broad-headed Snake		VU	EN	13	34	2.6x	Hunter
Frog	Green and Golden Bell Frog	VU	EN	76	204	2.7x	Hunter
	Booroolong Frog	EN	EN	266	112	0.4x	North West
	Heath Frog	VU	VU	23	63	2.7x	Hunter
	Stuttering Frog	VU	EN	53	56	1.0x	Hunter
	Giant Burrowing Frog	VU	VU	20	35	1.7x	Hunter
Plant	Tylophora linearis	EN	VU	631	1,438	2.3x	Central West
	Slender Darling-pea	VU	VU	743	1,172	1.6x	North West
	Austral Toadflax	VU	VU	408	645	1.6x	Hunter
	Philothea ericifolia	VU	-	44	592	13.3x	Central West
	Homoranthus darwinoides	VU	VU	80	573	7.1x	Central West
	Euphrasia arguta	CE	CE	194	440	2.3x	Hunter

Class	Name	Cwlth	NSW	Cleared 2016-17 ha	Cleared 2017-18 ha	Change	Region most clrd 2017/18
Plant	Wybong Leek Orchid	CE	-	131	366	2.8x	Central West
	Tarengo Leek Orchid	EN	EN	131	366	2.8x	Central West
	Illawarra Greenhood	EN	EN	129	341	2.6x	Hunter
	Slaty Red Gum	VU	VU	61	220	3.6x	Hunter
	Androcalva procumbens	VU	VU	143	210	1.5x	Central West
	Leafless Tongue-orchid	VU	VU	51	138	2.7x	Hunter
	Ooline	VU	VU	85	113	1.3x	North West
	Black-eyed Susan	VU	VU	44	103	2.3x	Hunter
	Belson's Panic	VU	EN	57	102	1.8x	North West
	Small-flower Grevillea	VU	VU	25	87	3.5x	Hunter
	Bertya opposens	VU	VU	22	66	2.9x	North West
	Omeo Stork's-bill	EN	EN	20	62	3.1x	Hunter
	Biconvex Paperbark	VU	VU	19	62	3.3x	Hunter
	Earp's Gum	VU	VU	22	46	2.1x	Hunter
	Bynoe's Wattle	VU	EN	20	39	1.9x	Hunter
	Lesser Swamp-orchid	EN	EN	9	36	4.2x	Hunter
	Olearia cordata	VU	VU	7	33	4.7x	Hunter
	Charmhaven Apple	VU	VU	2	23	11.1x	Hunter
	Asterolasia elegans	EN	EN	2	16	9.8x	Hunter
	Yellow Gnat-orchid	EN	EN	12	14	1.2x	Hunter
	North Rothbury Persoonia	CE	CE		12	23.3x	Hunter
	Magenta Lilly Pilly	VU	EN	17	11	0.6x	Hunter
	Pimelea curviflora	VU	VU	10	10	0.9x	Hunter
	Eastern Underground Orchid	EN	VU	7	9	1.2x	Hunter
	Square Raspwort	VU	VU	4	8	2.1x	Hunter
	Heath Wrinklewort	VU	VU	1	8	7.3x	Hunter
	Allocasuarina glareicola	EN	EN		7	>7x	Hunter
	Hairy Persoonia	EN	EN		7	>7x	Hunter
	Darwinia biflora	VU	VU		7	>7x	Hunter
	Kunzea rupestris	VU	VU		7	>7x	Hunter
	Deane's Melaleuca	VU	VU	4	5	1.3x	Hunter
	Wyong Midge Orchid 1	CE	CE	3	5	1.4x	Hunter
	Camfield's Stringybark	VU	VU	4	3	0.9x	Hunter
	Acacia gordonii	EN	EN		3	>3x	Hunter
	Zieria involucrata	VU	EN		3	>3x	Hunter
	Newcastle Doubletail	VU	VU	3	3	1.0x	Hunter
	Somersby Mintbush	EN	EN		2	>2x	Hunter

APPENDIX 3: NATIVE VERTEBRATE AND PLANT SPECIES WITH RECORDS OF OCCURRENCE IN STUDY AREA

All threatened native species with records of occurrences in the three study areas from the Atlas of Living Australia other than those in Appendix 2, showing state (NSW) and commonwealth (C'wth) conservation status. Sources: Atlas of Living Australia , NSW Bionet

Class	Name	C'wth	NSW	ALA records
Mammals	Little Bentwing-Bat	-	VU	1,179
	Yellow-Bellied Glider	-	VU	1,070
	Squirrel Glider	-	VU	1,033
	Eastern Bent-Wing Bat	-	VU	906
	Greater Broad-Nosed Bat	-	VU	435
	Yellow-Bellied Sheathtail-Bat	-	VU	254
	Eastern Cave Bat	-	VU	150
	Little Pied Bat	-	VU	61
	Parma Wallaby	-	VU	34
	Eastern Chestnut Mouse	-	VU	20
	Rufous Bettong	-	VU	7
	Delicate Mouse	-	EN	4
	Southern Brown Bandicoot	EN	EN	3
	Northern Free-Tailed Bat	-	VU	2
Broad-Toothed Rat	VU	VU	1	
Birds	Gang-Gang Cockatoo	-	VU	1,203
	Turquoise Parrot	-	VU	662
	Red-Tailed Black Cockatoo	-	CE	27
	Major Mitchell's Cockatoo	-	VU	17
	Plains-Wanderer	CE	VU	8
	Glossy Black-Cockatoo	-	VU	7
	Eastern Ground Parrot	-	VU	4
	Regent Parrot	VU	VU	1
Reptiles	Pale-Headed Snake	-	VU	54
	Stephens' Banded Snake	-	VU	49
	Heath Monitor	-	VU	41
	White-Crowned Snake	-	VU	1
	Little Whip Snake	-	VU	1
Frogs	Red-Crowned Toadlet	-	VU	602
	Wallum Froglet	-	VU	451
	Giant Barred Frog	EN	EN	154
	Mahony's Toadlet	-	EN	65
	Sloane's Froglet	-	VU	3
Insects	Giant Dragonfly	-	EN	11
	Golden Sun Moth	CE	EN	1

Class	Name	C'wlth	NSW	ALA records
Plants	Wyong Sun Orchid	CE	CE	154
	Red Helmet Orchid	-	EN	110
	Pokolbin Mallee	VU	VU	93
	Pine Donkey Orchid	-	VU	50
	Singleton Mallee	-	VU	46
	Thick Lip Spider Orchid	VU	EN	12
	Small Snake Orchid	EN	EN	5
	Spider Orchid	-	EN	3
	Sand hill Spider Orchid	EN	EN	1
	Bird Orchid	-	EN	1
	Brown Butterfly Orchid	-	EN	1



