



Land cover change in Queensland 2005–06

Statewide Landcover and Trees Study report



Land cover change in Queensland 2005–06

Natural Resource Sciences
Department of Natural Resources and Water
80 Meiers Road
Indooroopilly QLD 4068
www.nrw.qld.gov.au/slats

A Statewide Landcover and Trees Study report

This report may be cited as:

Department of Natural Resources and Water (2008). Land cover change in Queensland 2005–06: a Statewide Landcover and Trees Study (SLATS) Report, Feb, 2008.
Department of Natural Resources and Water, Brisbane.

ISBN 978-1-7417-2881-1

ISBN 978-1741728811



This publication was prepared by officers of the Department of Natural Resources and Water. It may be distributed to other interested individuals and organisations.

This publication is intended to provide information only on the subject under review. It is not intended to, nor does it constitute, expert advice. Readers are warned against relying solely on the information contained herein. Further professional advice should be sought before acting on the information supplied in this report.

While all care has been taken in the preparation of the document, neither the Department of Natural Resources and Water, nor its officers or staff accept any responsibility for any loss or damage that may result from any inaccuracy or omission in the information contained herein.

© The State of Queensland (Department of Natural Resources and Water) 2008.

The Queensland Government supports and encourages the dissemination and exchange of information. However, copyright protects this document. The State of Queensland has no objection to this material being reproduced, made available online or electronically, provided it is for your personal, non-commercial use, or use within your organisation; the material remains unaltered; and the State of Queensland is recognised as the owner.

For further information:

Natural Resource Sciences
80 Meiers Road
Indooroopilly QLD 4068
Phone: 61 7 3896 9597
Email: geoinfo@nrw.qld.gov.au
Website: www.nrw.qld.gov.au/slats

Table of contents	
Table of contents	iii
List of figures	iv
List of tables	v
List of acronyms	vi
Section 1. Summary of results	1
Section 2. Background	3
Section 3. Methods	6
3.1 SLATS analysis periods	6
3.2 Comparison of clearing rates and actual clearing	7
3.3 Definition of woody vegetation	8
3.4 Imagery selection and pre-processing for 2005–06	8
3.5 Woody vegetation change detection	9
3.6 Natural tree death.....	10
3.7 Fodder clearing	10
3.8 Woody thinning.....	10
3.9 Cyclone Larry	11
3.10 Replacement land cover.....	11
3.11 Validation process	13
3.12 Compilation of statewide data sets.....	13
3.13 Accuracy of interpretation.....	14
3.14 Independent science quality review	15
3.15 Future SLATS reporting	15
Section 4. Estimating woody vegetation extent and FPC for Queensland.....	17
Section 5. Statewide assessment of woody vegetation clearing	19
5.1 Woody vegetation clearing by 7.5'x7.5' grid cell (1:25 000 map sheet)	19
5.2 Woody vegetation clearing by remnant status	26
5.3 Woody vegetation clearing by land tenure and replacement land cover.....	27
5.4 Woody vegetation clearing by foliage projective cover and basal area.....	31
5.5 Woody vegetation clearing by biomass	39
Section 6. Regional assessment of woody vegetation clearing.....	42
6.1 Woody vegetation clearing by biogeographic region and sub-region.....	43
6.2 Woody vegetation clearing by catchments.....	56
6.3 Woody vegetation clearing by local government area.....	67
6.4 Woody vegetation clearing by Natural Resource Management regions.....	73
6.5 Woody vegetation clearing by native pasture community	77
Section 7. SLATS products	80
Acknowledgements	81

List of figures

Figure 1: Annual woody vegetation clearing rate in Queensland (1988–2006). 1

Figure 2: Landsat scene footprints..... 6

Figure 3: Sample of SLATS 2005–06 scene dates. 6

Figure 4: Examples of natural tree death in the Desert Uplands. 11

Figure 5: Examples of clearing for fodder in Mulga Lands..... 12

Figure 6: Examples of woody thinning. 12

Figure 7: Examples of Cyclone Larry damage. 12

Figure 8: Average annual woody vegetation clearing rate for each of the SLATS
change periods (1988–99). 20

Figure 9: Average annual woody vegetation clearing rate for each of the SLATS
change periods (1999–2003). 21

Figure 10: Average annual woody vegetation clearing rate (2003–04). 22

Figure 11: Average annual woody vegetation clearing rate (2004–05). 23

Figure 12: Average annual woody vegetation clearing rate (2005–06). 24

Figure 13: Woody vegetation extent, FPC and land cover (2005). 25

Figure 14: Trend in clearing of remnant woody vegetation by tenure (1995–2006). 27

Figure 15: Land tenures in Queensland (2005). 28

Figure 16: Trend in woody vegetation clearing rate by land tenure (1988–2006). 29

Figure 17: Trend in woody vegetation clearing rate by replacement land cover (1988–2006). 30

Figure 18: Frequency distributions of woody vegetation clearing using 1991
woody vegetation cover (FPC) mapping (1988–2004). 31

Figure 19: Frequency distributions of woody vegetation clearing using 1991 basal
area mapping (1988–2004). 32

Figure 20: Frequency distributions of woody vegetation clearing using the woody
FPC index V2.1. 33

Figure 21: Frequency distributions of woody vegetation clearing using basal area
derived from the woody FPC index V2.1. 33

Figure 22: Examples of various basal areas (m²/ha) of woody vegetation. 35

Figure 23: Revisit site showing change in coarse woody debris between 2000–04. 39

Figure 24: Location of sites revisited during the 2006 field program. 40

Figure 25: Average annual woody vegetation clearing rate as a percentage of 2005
wooded area by biogeographic sub-region (2005–06). 43

Figure 26: Percentage of area wooded by biogeographic sub-region (2005). 44

Figure 27: Trend in bioregions with the highest woody vegetation clearing rates
from 1988–2006. 45

Figure 28: Average annual woody vegetation clearing rate as a percentage of 2005
wooded area by catchment (2005–06). 56

Figure 29: Percentage of area wooded by catchment (2005). 57

Figure 30: Trend in drainage divisions with the highest woody vegetation clearing rates from 1988–2006	58
Figure 31: Average annual woody vegetation clearing rate as a percentage of 2005 wooded area by local government area (2005–06).	67
Figure 32: Percentage of area wooded by local government area (2005).	68
Figure 33: Average annual woody vegetation clearing as a percentage of 2005 wooded area by natural resource management region (2005–06).	73
Figure 34: Percentage of area wooded by natural resource management region (2005).	74
Figure 35: Queensland native pasture communities (Weston <i>et al.</i> , 1981).	77

List of tables

Table 1: Imagery source and data resolution of SLATS reports.	3
Table 2: Replacement land cover classes for woody vegetation change.	11
Table 3: Woody vegetation extent for Queensland (million ha)	18
Table 4: Area cleared of remnant and non-remnant woody vegetation by tenure (1995–2006)....	26
Table 5: Woody vegetation clearing by tenure type and land cover (2005–06).....	27
Table 6: Woody vegetation clearing by land tenure (1988–2006)	29
Table 7: Woody vegetation clearing by replacement land cover (1988–2006)	30
Table 8: 2005–06 woody vegetation clearing by 2005 woody FPC V2.1	34
Table 9: Woody vegetation clearing by Carnahan Present Vegetation Map class (1988–2006)...	36
Table 10: Woody vegetation clearing by replacement land cover by biogeographic region (2005–06)	46
Table 11: Woody vegetation clearing by land cover by biogeographic sub-region (2005–06)	47
Table 12: Woody vegetation clearing by tenure by biogeographic sub-region (2005–06).....	52
Table 13: Woody vegetation clearing by land cover by drainage division (2005–06)	59
Table 14: Woody vegetation clearing by land cover by catchment (2005–06).....	59
Table 15: Woody vegetation clearing by tenure by catchment (2005–06).....	63
Table 16: Woody vegetation clearing by land cover by local government area (2005–06).....	69
Table 17: Woody vegetation clearing by land cover by natural resource management region (2005–06)	75
Table 18: Woody vegetation clearing by tenure by natural resource management region (2005–06)	75
Table 19: Woody vegetation clearing by land cover by native pasture community (2005–06)	78

List of Acronyms

ACRES	Australian Centre for Remote Sensing
AVHRR	Advanced Very High Resolution Radiometer
BA	Basal area (in m ² /ha)
AGO	Australian Greenhouse Office
BRDF	Bi-directional Reflectance Distribution Function
DEM	Digital Elevation Model
DNR	Department of Natural Resources
DNR&M	Department of Natural Resources and Mines
DNRW	Department of Natural Resources and Water
DPI&F	Department of Primary Industries and Fisheries
EPA	Environmental Protection Agency
ETM+	Enhanced Thematic Mapper Plus
FPC	Foliage Projective Cover
GIS	Geographic Information System
MGA	Map Grid of Australia
NCAS	National Carbon Accounting System
NFI	National Forest Inventory
NHT	National Heritage Trust
NRMR	Natural Resource Management Region
NRW	Department of Natural Resources and Water
RE	Regional Ecosystem
SLATS	Statewide Landcover and Trees Study
TM	Thematic Mapper
UNFCCC	United Nations Framework Convention on Climate Change
USGS	United States Geological Survey
VMA	Vegetation Management Act

Section 1 Summary of results

- The Statewide average annual woody vegetation clearing rate for the 2005–06 period was 375 000 ha/year. This is 49% lower than the peak measured woody vegetation clearing rate in 1999–2000 of 758 000 ha/year and 7% higher than the previous period (2004–05) of 351 000 ha/year (Figure 1, this page). Levels of clearing in 2005–06 are indicative of final broadscale clearing permits being activated prior to the end of broadscale clearing on 31 December 2006.
- Clearing of remnant woody vegetation, as defined by the Queensland Herbarium Regional Ecosystem mapping (Accad *et al.*, 2006 (based on 2003 data), for the period 2005–06 was 222 000 ha/year. This represents a 29% increase on the 2004–05 figures (Figure 1).
- Remnant woody clearing in 2005–06 amounted to 59% of total woody vegetation clearing, an increase of 10% on the 2004–05 figures. More of the increase occurred on freehold tenure (42%) than leasehold tenure (24%) (Table 4 on page 26).

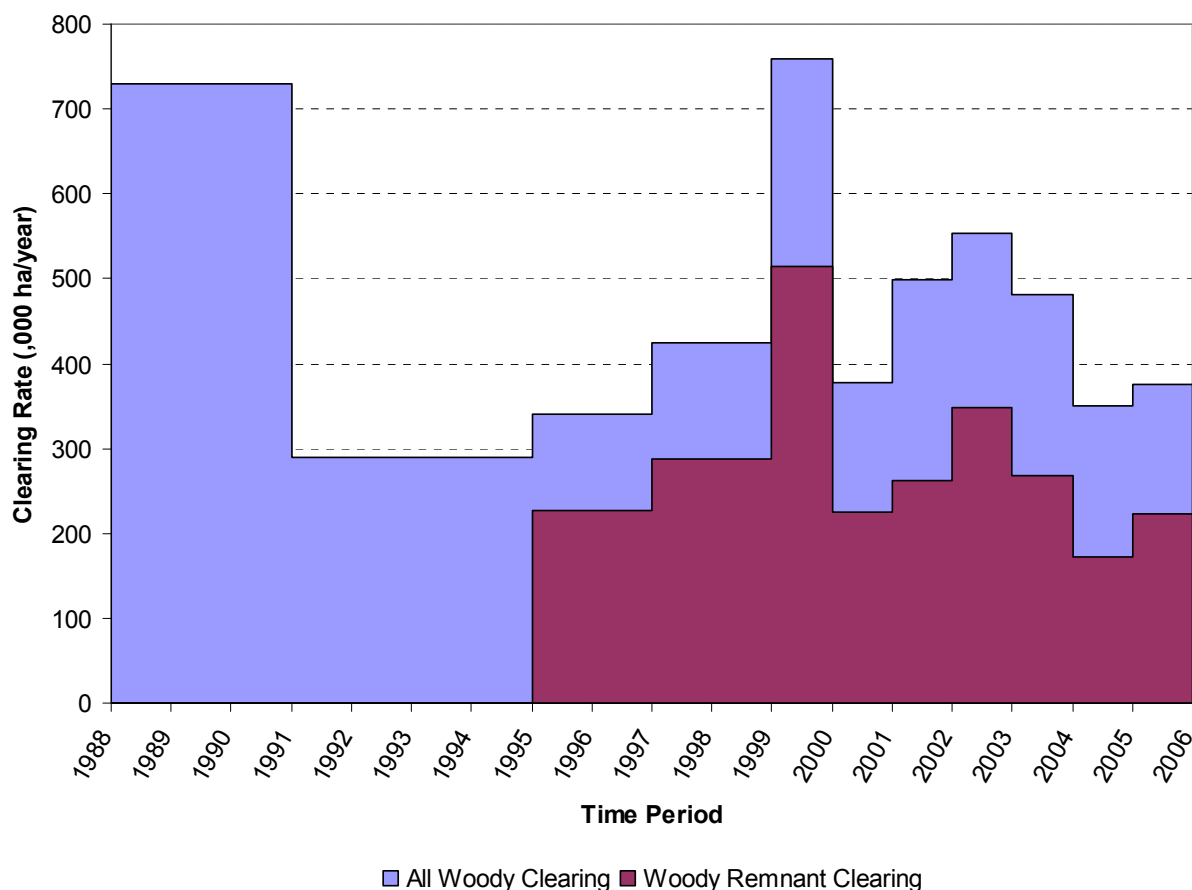


Figure 1: Annual woody vegetation clearing rate in Queensland (1988–2006).¹

¹ The earliest available Regional Ecosystem remnant mapping is for 1995

- For 2005–06, 45% of the State woody vegetation clearing was on leasehold land and 53% was on freehold land (Table 6 on page 29).
- Clearing to pasture remained the single major replacement cover, making up 95% of State woody vegetation clearing for 2005–06 (Table 7 on page 30).
- The biogeographic region with the highest woody vegetation clearing rate for 2005–06 was the Mulga Lands, with 169 500 ha/year, or 45% of all State woody vegetation clearing for the period, followed by the Brigalow Belt, with 32% of State woody vegetation clearing (Table 10 on page 46). This represents a reversal from 2004–05,

where the Brigalow Belt was highest. Anecdotal evidence (including field observations and an increase in permits for fodder clearing) suggests that clearing for animal fodder in response to sustained drought in the Mulga Lands was significant in the 2005–06 period.

- The woody vegetation clearing rate for the South East Queensland bioregion has decreased from 21 400 ha/year in 2004–05 to 15 500 ha/year in 2005–06. This figure is the lowest rate since 2000–01 and reverses the upward trend since that era (Figure 27 on page 45).
- The Queensland Murray Darling continued to be the Drainage Division with the highest woody vegetation clearing rate, with 214 500 ha/year or 57% of state woody vegetation clearing (Table 13 on page 59). This represents a 17% increase on the previous year. Gulf Rivers Drainage Division saw a 94% decrease in woody vegetation clearing from 2004–05 (Figure 30 on page 58).
- For 2005–06, the South West Region (46% of the State woody vegetation clearing) continued to be the National Heritage Trust (NHT) Natural Resource Management Region (NRMR) with the highest woody vegetation clearing rate. This represents a 41% increase in the rate of woody vegetation clearing from 2004–05. The next highest NHT NRMR woody vegetation clearing rate was the Fitzroy Region (12%), followed by the Desert Channels (10%), and Maranoa Balonne (9%) (Table 17 on page 75).