Department of Science, Information Technology, Innovation and the Arts

Land cover change in Queensland 2010–11

Statewide Landcover and Trees Study Report

Prepared by: Remote Sensing Centre, Science Delivery, Department of Science, Information Technology, Innovation and the Arts

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Further information

Post: Remote Sensing Centre

Department of Science, Information Technology, Innovation and the Arts

41 Boggo Road

Dutton Park QLD 4102

Phone: +61 7 3170 5686

Email: siproductdelivery@dnrm.qld.gov.au

Web: http://www.dnrm.qld.gov.au/mapping-data/imagery

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List of acronyms

AVHRR	Advanced Very High Resolution Radiometer
BA	Basal area (in m^2/ha)
AGO	Australian Greenhouse Office
CSG	Coal Seam Gas
BRDF	Bi-directional Reflectance Distribution Function
DEM	Digital Elevation Model
DERM	Department of Environment and Resource Management
DE	Department of the Environment
DNR	Department of Natural Resources
DNR&M	Department of Natural Resources and Mines
DNRW	Department of Natural Resources and Water
DPIF	Department of Primary Industries and Fisheries
DSITIA	Department of Science, Information Technology, Innovation and the Arts
EPA	Environmental Protection Agency
ETM+	Enhanced Thematic Mapper Plus
FPC	Foliage Projective Cover
GA	Geoscience Australia
GCP	Ground Control Point
GIS	Geographic Information System
GPS	Global Positioning Systems
HVR	High-value regrowth
LGA	Local Government Area
MGA	Map Grid of Australia
Mt	Megatonnes
NCAS	National Carbon Accounting System
NFI	National Forest Inventory
NHT	Natural Heritage Trust
NRMR	Natural Resource Management Region
NRW	Department of Natural Resources and Water
RE	Regional Ecosystem

RMSE	Root Mean Squared Error
QLUMP	Queensland Land Use Mapping Program
QMDC	Queensland Murray-Darling Committee
SEQ	South East Queensland
SLATS	Statewide Landcover and Trees Study
SRTM	Shuttle Radar Topographic Mission
TM	Thematic Mapper
TRAPS	Transect Recording and Processing System
UNFCCC	United Nations Framework Convention on Climate Change
USGS	United States Geological Survey
VMA	*Vegetation Management Act 1999*
VMOLA	*Vegetation Management and Other Legislation Amendment Act 2004*

Section 1 Summary of results

Statewide clearing

- The statewide average annual woody vegetation clearing rate for 2010–11 was 91 690 hectares per year (ha/year). This is 18% higher than the 2009–10 clearing rate of 77 590 ha/year but still 8% lower than the clearing rate of 99 940 ha/year in 2008–09 (Figure 1, page 1 below). It is noted a significant amount of missed clearing (17%) was detected from the previous era (2009–10) due to unusually prolonged wet and cloudy conditions during 2010. Taking this into account, there would appear to be little difference between clearing rates for 2009–10 and 2010–11 (See section 3.12, page 16 and Appendix F, page 97).
- Clearing of remnant woody vegetation for 2010–11 was 26 050 ha/year or 28% of total clearing. This is a lower percentage of remnant clearing than the 31% in 2009–10, although slightly more remnant vegetation was cleared (Figure 1, this page and Table 7, page 35).
- The 2010–11 era is the first full era where high-value regrowth (HVR) regulations have been in place. Of the 65 640 ha/year of non-remnant woody vegetation clearing in 2010–11, 15 180 ha/year or 17% of total clearing was vegetation mapped as HVR (Figure 1, this page and Table 7, page 35).
- Of the 91 690 ha/year cleared in 2010–11, 26 320 ha/year (29%) had previously been detected as woody vegetation clearing in earlier land cover change periods. The percentage of repeat clearing incidences has steadily increased since the 2001–08 era (Table 10, page 41).

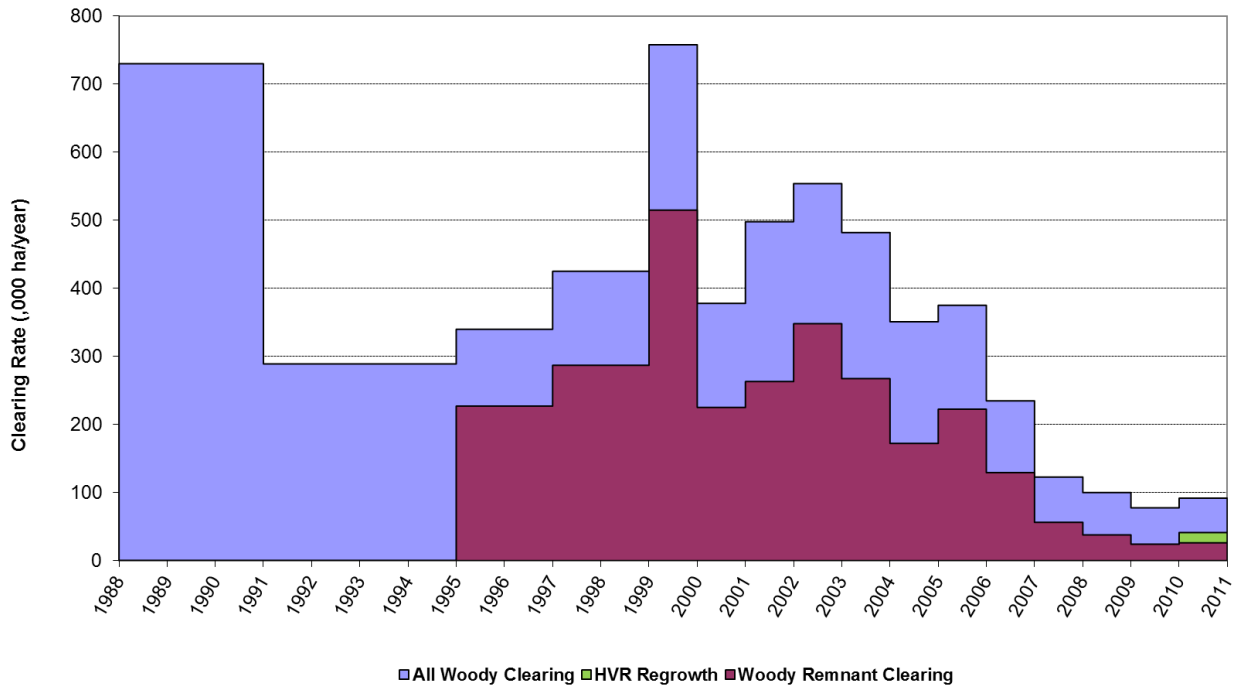


Figure 1: Annual woody vegetation clearing rate in Queensland (1988–2011)[1]

[1] Regional Ecosystem remnant mapping is available from 1995 onwards

Clearing analysis

- The split of total clearing across tenures for 2010–11 was freehold (60%), leasehold (32%), other tenures (less than 1%) and other reserves (8%) (Table 5, page 30).
- Clearing for pasture remained the single major replacement cover, making up 79% of total clearing for 2010–11, whilst clearing for infrastructure and for forestry areas contributed approximately 8% each. 3% was cleared for mining purposes (Table 5, page 30).
- Medium trees (10–30m in height) accounted for 67% of total clearing detected in 2010–11 (Table 8, page 38).
- The Brigalow Belt biogeographic region, with 45 000 ha/year (49% of total clearing) for 2010–11, continued to contribute the highest woody vegetation clearing rate. This represented a 25% increase from the clearing rate reported for the 2009–10 era and 5% higher than the clearing rate reported for the 2008–09 era (Table 11, page 46). A considerable amount of missed 2009–10 era clearing was identified in this region. When taking this into account, the clearing rate remained reasonably consistent across the last three eras.
- The second highest clearing rate occurred in the Mulga Lands biogeographic region (19 650 ha/year), representing an increase of 46% from the previous era (Table 12, page 47).
- Within the Brigalow Belt biogeographic region, 22% of the total woody vegetation clearing was defined as remnant, whilst in the Mulga Lands the figure was 31% (Table 12, page 47).
- The clearing rates for North East Coast and Murray-Darling drainage divisions were about the same, at approximately 39 500 ha/year each. Combined, these two drainage divisions accounted for 86% of the state's clearing (Table 13, page 48).
- The reef catchments are a subset of the North East Coast drainage division, indicated by the blue outline in Figure 26 (page 50). The reef catchments recorded a clearing rate of 34 500 ha/year. This is an 11% increase over the 31 000 ha/year reported in the 2009–10 and 2008–09 eras.
- The local government area of Balonne Shire recorded the highest clearing rate of 12 900 ha/year, which is more than three times the amount identified in 2009–10. A significant amount of this clearing (5 000 ha/year) was identified as clearing to infrastructure. This may possibly be due to filling of previously vegetated, unfilled dams during the major rainfall events during 2010–11 (Table 22, page 94).
- The Natural Resource Management region (NRMR) with the highest clearing rate was Queensland Murray-Darling Committee (QMDC) with 22 330 ha/year, representing a 126% increase from 2009–10 (Tables 14 and 15, page 56).

Section 2 Background

The Statewide Landcover and Trees Study (SLATS) is a major vegetation monitoring initiative of the Queensland Department of Science, Information Technology, Innovation and the Arts (DSITIA). SLATS gathers accurate information on changes in wooded vegetation cover for vegetation management planning and compliance, and for State Government greenhouse gas inventory purposes.

SLATS produces annual reports on land cover change. The following supplementary reports have also been produced:

- *1999–2000 clearing in the Murray-Darling (DNR&M, 2003b), Fitzroy (DNR&M, 2002), Burdekin (DNR&M, 2003c) catchments, and the Burnett/Mary National Action Plan (NAP) Region (DNR&M, 2003d) and the Western South-East National Action Plan (NAP) Region (DNR&M, 2003e).*
- *Clearing in each of the Natural Heritage Trust Natural Resource Management Regions for 2001–03, 2003–04, 2004–05, 2005–06, 2006–07, 2007–08, 2008–09 and 2009–10.*
- *Analysis of vegetation clearing rates in Queensland* (Supplementary report to land cover change in Queensland 2007–08, 2008–09, and 2009–10).

Scope

SLATS maps the extent of all woody vegetation across the state. SLATS only reports on woody vegetation change, rather than change for all vegetation. To complement this assessment, the Queensland Herbarium reports on all woody and non-woody changes to remnant status as part of its Regional Ecosystem mapping program (Accad *et al*., 2013 http://www.ehp.qld.gov.au/ecosystems/remnant-vegetation/index.html).

SLATS has previously completed detailed baseline land cover mapping for the entire state, using 1991 imagery to discriminate areas of woody vegetation from pasture, crop, water, settlement and other land cover types. This was the first medium resolution map of wooded vegetation cover for the entire state of Queensland. More recent land use mapping is now provided by the Queensland Land Use Mapping Program (QLUMP) http://www.qld.gov.au/environment/land/vegetation/mapping/qlump/.

Legislative framework

SLATS monitors Queensland's forests and woodlands to assess vegetation extent and clearing activities, in support of the *Vegetation Management Act 1999* (VMA) and regional planning initiatives. The VMA was introduced in 2000 to regulate the clearing of native vegetation in order to conserve remnant vegetation, prevent land degradation and loss of biodiversity, maintain ecological processes, and reduce greenhouse gas emissions. The Queensland Government monitors compliance with the vegetation management framework through analysis of SLATS data and other information. Most clearing in Queensland falls within statutory exemptions, and does not require further investigation.

This report further highlights the effect of the introduction of the *Vegetation Management and Other Legislation Amendment Act* 2004 (VMOLA) and extension of these laws in October 2009 to protect high-value regrowth vegetation (vegetation not cleared since 31 December 1989), and all regrowth vegetation within 50m of watercourses in priority Great Barrier Reef catchments.

SLATS Reference Group

The SLATS Reference Group (formerly SLATS Advisory Committee) was established to provide feedback on Queensland Government remote sensing research from a wide range of stakeholders and to assist with communicating results to industry, conservation groups and the wider community. The group has representatives from:

- Department of Science, Information Technology, Innovation and the Arts (DSITIA)
- Meat and Livestock Australia
- Queensland Regional Natural Resource Management Groups Collective
- Queensland Farmers Federation
- Queensland Conservation Council
- Brisbane Region Environment Council
- Wildlife Preservation Society of Queensland
- AgForce
- University of Queensland

Section 3 Methods

The following section provides an overview of the methods used in this study. The SLATS website http://www.qld.gov.au/environment/land/vegetation/mapping/slats/ has scientific papers that describe various aspects of the methods in greater detail.

3.1 SLATS analysis periods and spatial resolution

Spatial resolution

SLATS mapping provides a consistent dataset covering the entire state at medium spatial resolution. The mapping is based on analysis of Landsat Thematic Mapper (TM) and Enhanced Thematic Mapper Plus (ETM+) satellite imagery. Landsat imagery has a spatial resolution of 30m, so is typically used to produce maps at a scale of 1:100 000 or coarser. Since SLATS commenced Landsat analysis, the imagery has historically been resampled to 25m spatial resolution. This resampling was the convention used by Geoscience Australia (GA), who was the major supplier of imagery until 2008. From 2008 onwards, SLATS has used Landsat data provided by the United States Geological Survey (USGS) for free. However, for consistency SLATS has maintained the 25m resampling in the 2010–11 analysis period.

Landsat imagery can be used to reliably map areas of woody vegetation change of one hectare or greater. However, the image resolution may limit its suitability for mapping narrow vegetation corridors. SLATS mapping is not intended to be a substitute for high resolution studies of areas such as riparian vegetation or small patches of remnant bushland. These areas would conventionally be studied by using high resolution satellite imagery or aerial photography.

Statistics for 2003–11 in this report have been produced using 25m resolution data sets. Statistics from 1988–2003 in this report are based on the generalised 100 m resolution (previously 1000m for 1991–1999) as provided in previous reports (Table 1, page 6).

Table 1: Imagery source and data resolution of SLATS reports

Reporting period	Satellite and sensor source	Resolution (pixel size)	
		Imagery used	Statistics calculations
1988–91 (DNR&M, 2004)	Landsat 5 TM	30 m (resampled to 25 m)	100 m
1991–95 (DNR, 1999b)	”	”	1000 m
1995–97 (DNR, 1999c)	”	”	”
1997–99 (DNR, 2000)	Landsat 5 TM and Landsat 7 ETM+	”	”
1999–2001 (DNR&M, 2003a)	Landsat 7 ETM+	”	100 m
2001–03 (DNR&M, 2005)	Landsat 7 ETM+ and Landsat 5 TM	”	”
2003–04 (NRM, 2006)	Landsat 5 TM	”	25 m
2004–05 (NRW, 2007)	Landsat 5 TM	”	25 m
2005–06 (NRW, 2008b)	Landsat 5 TM	”	25 m
2006–07 (NRW, 2008a)	Landsat 5 TM	”	25 m
2007–08 (DERM, 2009)	Landsat 5 TM	”	25 m
2008–09 (DERM, 2010)	Landsat 5 TM	”	25 m
2009–10 (DSITIA, 2012)	Landsat 5 TM	”	25 m
2010–11 (DSITIA, 2013)	Landsat 5 TM	”	25 m

Study period

SLATS acquires a range of satellite overpass dates in order to capture suitable cloud-free Landsat satellite images for the entire state each year. The images are typically obtained in the dry winter months between June and October. However, wet weather in 2010-2011 meant images were acquired from a longer than usual period, from February–November 2010 to February–November 2011.

Due to the range of overpass dates, a SLATS analysis period is not a discrete 365-day period. SLATS thus reports on woody vegetation clearing rates rather than actual areas of clearing. Comparing areas of actual clearing is misleading, because variations in the satellite overpass dates means reporting periods may be significantly longer or shorter than a year.

Since 1999, SLATS has acquired and analysed imagery to derive yearly statistics. From 1988 to 1999, imagery was not acquired yearly, so SLATS reporting varied from two to four years (Table 1, page 6). However, the statistics have been calculated as annual clearing rates to provide consistency for comparison (Figure 1, page 1). As SLATS acquires further infill imagery for earlier periods, annual rates of clearing may be re-compiled for these earlier periods. This may lead to a

refinement of the annual rates of clearing in future reports.

A total of 88 satellite scenes or footprints are incorporated in each SLATS analysis period (Figure 2, this page). Theoretically, in any one year, acquisition dates can differ for each of the 88 satellite scenes. However, every attempt is made to acquire consecutive sequences of images with the same overpass date (Figure 3, below). This assists in processing spatial and radiometric corrections for the data.

The “Satellite image footprints and dates for SLATS analysis” spatial dataset depicted in Figure 2 (below) is available for download online from QGIS (http://dds.information.qld.gov.au/DDS/). This layer contains all Landsat scene dates used in the SLATS analysis from 1988–2011.

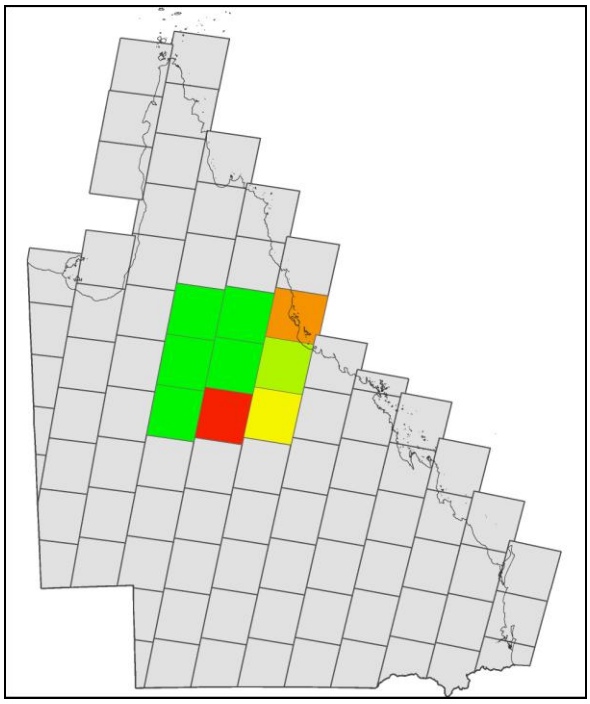


Figure 2: Landsat scene footprints

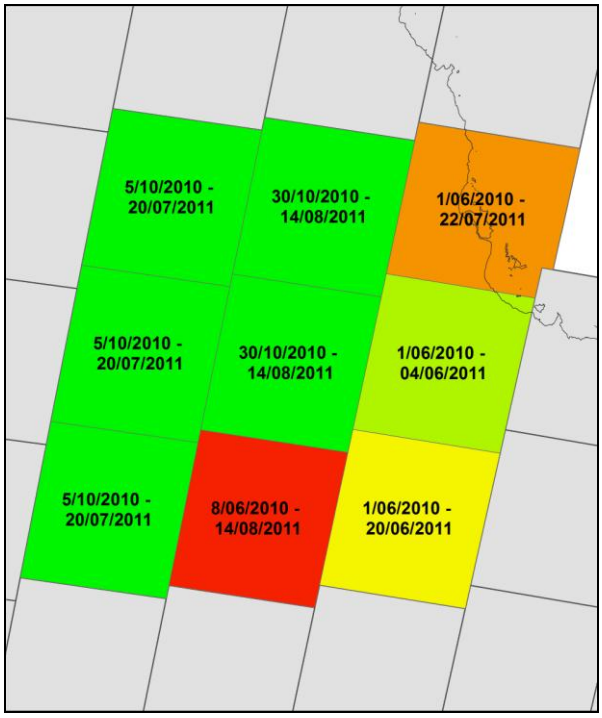


Figure 3: An example of SLATS 2010–11 scene dates

3.2 Calculation of clearing rates

SLATS calculates an annual clearing rate measured in thousands of ha/year. The following examples show how clearing rates are calculated for a scene with analysis periods less than or greater than a year.

Example 1: Analysis period is less than 365 days

SLATS annual woody vegetation clearing rate calculation example:

Area of clearing (ha) = number of pixels x 625 m²/10 000 m²

= 1704 pixels x 625 m²/10 000 m²

= 106.5 ha

Analysis period (days) = 'After date'– 'Before date'

= 20/07/2011 – 05/10/2010

= 288 days

Rate per annum (ha/year) = Area (ha) x 365.25/Analysis period (days)

= 106.5ha x 365.25/288 days

= 135.1 ha/year

The annual woody vegetation clearing rate within a reporting area is then aggregated in the SLATS report. In this example, SLATS would report an annual woody vegetation clearing rate of 135.1 ha/year for the 2010–11 analysis period.

Example 2: Analysis period is greater than 365 days

SLATS annual woody vegetation clearing rate calculation example:

Area of clearing (ha) = number of pixels x 625 m²/10 000 m²

= 2462.4 x 625 m²/10 000 m^2

= 153.9 ha

Analysis period (days) = 'After date'– 'Before date'

= 20/06/2011 – 01/06/2010

= 416 days

Rate per annum (ha/year) = Area (ha) x 365.25/Analysis period (days)

= 153.9 ha x 365.25/416 days

= 135.1 ha/year

In this example, SLATS would report an annual woody vegetation clearing rate of 157.1 ha/year for the 2010–11 analysis period. Due to the different analysis period, this clearing rate is the same as example 1, despite the total area being different.

3.3 Definition of wooded vegetation and woody vegetation

Wooded vegetation

SLATS maps vegetation extent for all perennial wooded vegetation that can be distinguished using Landsat TM/ETM+ imagery. Wooded vegetation is mapped regardless of tree height or density. Wooded vegetation includes stands of native vegetation, disturbed areas of native vegetation, woody regrowth following clearing, plantations of native and exotic species, some woody weeds and urban woody vegetation.

The wooded vegetation extent for 2010 is compiled from the Foliage Projective Cover (FPC) index values, ranging from 1–100%. Only non-wooded pixels (0% FPC) are excluded from the wooded extent area. The method for calculating FPC is explained further in section 3.5 (page 10).

Woody vegetation

SLATS defines woody vegetation as the subset of wooded vegetation that has an FPC of over 10%. Foresters commonly define woody vegetation as 20% crown cover, where the vertically projected tree crown area is greater than 20% of the ground area. SLATS research suggests that 20% crown cover equates to 11% FPC on average (Scarth *et al*., 2008a).

Forest

Under the Kyoto Protocol, ratified by the Australian Government in 2008, the accounting rules have strict definitions for forest and for the areas to be counted as ‘deforestation’ (direct human-induced conversion of forests to other non-forest land use). The definition of forest used in the National Carbon Accounting System (NCAS) is based on a minimum crown cover of 20%, a height of two metres and other constraints according to the Kyoto Protocol (AGO, 2003). The NCAS reports on the subset of the total SLATS reported area that meets the definitional and reporting rules for national greenhouse inventory reporting (AGO, 2006; Macintosh, 2007). The NCAS framework also uses complex modelling to estimate greenhouse gas emissions and sinks for the areas included as ‘Kyoto lands’.

3.4 Imagery selection and pre-processing for 2010–11

Imagery acquisition

SLATS downloaded geometrically corrected Landsat 5 TM satellite imagery at no cost from the United States Geological Survey (USGS) website (www.glovis.usgs.gov). Landsat 5 TM imagery was the best available Landsat imagery for SLATS purposes since the partial failure of the ETM+ instrument on Landsat 7 (USGS, 2003). The downloaded imagery aligns well with the 2002 Landsat 7 ETM+ baseline previously used to rectify imagery purchased from GA. Where the spatial alignment was not sufficiently close, SLATS manually re-rectified the USGS-sourced imagery to match the existing SLATS baseline.

Radiometric standardisation

SLATS applied radiometric standardisation to the Landsat 2010–11 TM images. Radiometric standardisation allows scene-to-scene matching over space and time. This improves mosaicing and classification, and enables the use of statewide field data for time-series analysis. In turn, this improves the accuracy of the data and the certainty of change in rates of clearing. Radiometric standardisation included the removal of the on-board radiometric calibration and replacement with

a vicarious calibration that removes time-based radiometric trends caused by sensor instability (de Vries *et al.,* 2007). Additionally, SLATS applied an empirical radiometric correction to correct for variation in solar incidence angle, solar azimuth, earth-sun distance, viewing angle, systematic atmospheric effects, and the effect of bi-directional reflectance distribution function (BRDF) of the surface measured (Danaher, 2002).

Further research has been conducted in this area, and it is planned that in the future, the SLATS processing chain will be able to make use of the standardised surface reflectance, as described in Flood et al (2013). This is expected to improve the image standardisation, and hence improve the ability to detect clearing.

Topographic corrections

SLATS also applied a simple topographic correction to the reflectance imagery to remove artefacts due to variation in illumination angle on sloping terrain (Dymond and Shepherd, 1999). This correction has the effect of 'flattening' the terrain, by estimating the reflectance as if the surface had been horizontal. This correction reduces the effect of hill slope to provide more uniform estimates of FPC. Classification based on this corrected imagery is therefore more accurate in areas of high slope. This increased accuracy reduces the amount of manual editing required to correct initial misclassifications.

Other corrections

Cloud, smoke and shadow contamination in the imagery was masked out, to avoid impacts on models for wooded extent, FPC index and woody vegetation change (Kitchen & Gillingham, 2006).

3.5 Estimating wooded vegetation extent and FPC

This report calculates wooded vegetation extent for 2010 using the FPC index. This information is included in the tabular statistics associated with woody vegetation clearing by region. SLATS developed a new method in 2010, leading to version 2.3 (V2.3) of the wooded vegetation extent and FPC index time series. In this report, estimates of wooded vegetation extent and FPC were provided based on an annual time-series of Landsat TM and ETM+ imagery. An FPC index was generated for each image date, with separate indices developed for TM and ETM+ image sequences (Lucas *et al.,* 2006; Armston *et al*., 2009). Early SLATS reports calculated the wooded vegetation extent in Queensland based on the SLATS 1991 baseline land cover mapping, adjusted for subsequent clearing and regrowth. As regrowth is difficult to measure properly, this measure of wooded extent has become less accurate over time.

FPC index, version 2.3

Compared to traditional vegetation indices, the FPC indices have reduced sensitivity to background reflectance variability caused by fire scars and soil colour. However, FPC indices are highly sensitive to spatial and temporal changes in green herbaceous ground cover. These FPC indices have been incorporated into the woody vegetation change detection procedure, and are the primary input data in the wooded vegetation extent and FPC index time series products.

The FPC index is an empirical model, based on an extensive field dataset of greater than 2000 observations. In order to predict FPC values across the state, the model relates the field observations to other data, consisting of a gridded climate variable, vapour pressure deficit (VPD), and data from transformed Landsat bands 2–7 and cross-products of these bands. The Landsat band cross-products are used to account for interactions between the Landsat bands and FPC, i.e. the relationship between one Landsat band and FPC depends on the value of a different Landsat

band.

Model predictions of FPC have been compared to estimates of woody FPC from independent field and airborne lidar data captured at 47 sites across a range of regional ecosystems in Queensland between 2004 and 2005 (Armston *et al*., 2009). Lidar measurements were calibrated to estimates of wooded FPC using direct field measurements (Root Mean Squared Error (RMSE) 5.34%). The lidar estimates of FPC showed a strong correspondence with the Landsat FPC index estimates from images captured under dry season conditions (r^2 0.80; RMSE 8.95%) in Armston *et al*. (2009).

The wooded vegetation extent and FPC index time series product V2.3 was developed from an automated decision tree classification based on a time series of Landsat FPC index images (Kitchen *et al*., 2010; Danaher *et al.*, 2010). All SLATS dry-season (May–October inclusive) image dates from 1986–2010 were used in the classification. A decision tree based on simple temporal indices was optimised with a genetic algorithm (a global optimisation technique) using a training dataset of wooded vegetation presence/absence derived from fieldwork and aerial photography. The wooded extent classification model had a Kappa statistic (a measure of the proportion of agreement obtained after removing that which could be expected to occur by chance) of 85%.

SLATS applies a number of corrections to the data:

- The water masking algorithm sometimes falsely detects water in shadowed areas of steep terrain. These commission errors have been removed utilising topographic shadow and incident angle image products.
- Areas with topographic slope greater than 25% and classified as non-woody due to low solar incidence angles were corrected with a time series predicted FPC value.
- In forestry plantation and areas initially classified as non-wooded and not cropping, a simple *t*-test algorithm was used to determine the most recent change-point in the annual time-series (e.g. due to fire or tree clearing). This algorithm significantly improved the wooded extent classification in areas that were regenerating following clearing or burning.
- Cropping areas were classified as non-wooded using crop masks sourced from the Queensland Land Use Mapping Project (QLUMP).
- Any pixels of persistent cloud that prevented pixels being classified successfully by the algorithms were filled in by the most recent non-contaminated pixels.

In order to overcome limitations of the wooded extent and FPC V2.3 product, SLATS scientists are currently assessing estimates of persistent green vegetation cover derived from the entire Landsat-5 TM and Landsat-7 ETM+ archive. The ‘persistent green’ product may be able to be used for detecting long-term changes in woody vegetation, such as regrowth following clearing, encroachment of woody weeds, dieback, thickening and thinning.

3.6 Detecting change in woody vegetation

Automatic analysis

The SLATS method detects change in woody vegetation through automatic analysis to provide a ‘probability of woody vegetation change’ raster, which is then classified by an experienced analyst. This method was first developed for the 2003–04 period (DNR&M, 2006; Scarth *et al*., 2008b). It uses data from the entire SLATS Landsat TM/ETM+ archive from 1987/88 to 2011, including spectral data, and the time series of wooded extent and FPC index values from 1988–2010. This

method accounts for variation across wet and dry season imagery to enable consistent mapping of woody vegetation. Verified change from previous periods is used to train the model to detect change. This change detection method significantly improves efficiency when compared to earlier methods used by SLATS. Due to residual scene mis-registration (Armston *et al.,* 2002; Gill *et al*., 2010a), a filter was applied to remove clumps of one or two pixels (0.125 ha or less) to reduce the 'speckle' effect in the classification.

The minimum level of vegetation that can be mapped as change depends on the conditions at the time of the 2010 and 2011 satellite imagery data capture. Imagery captured during the dry season typically has greatest contrast between woody vegetation and grass. Wet season imagery with green pasture has less contrast, as green grass is spectrally similar to woody areas. This makes separation of woody from non-woody cover more difficult in open woodland during the wet season. It may not be possible to detect change in vegetation with FPC less than 11% using automated processing. However, it may be possible to map it with additional visual interpretation and field work.

Image interpretation and independent checks

Image interpretation has been improved with the increasing availability of higher resolution satellite and aerial imagery which is available through Google Maps, Qld Globe and other image services. Additionally, image interpretation has also been aided by DSITIA's archive of SPOT 4 and 5 imagery (2005–06 and 2009) and 2009 2.5m pan sharpened SPOTmaps coverage of large parts of Queensland.

Extensive work has been undertaken to ensure the integrity of the change analysis. Procedures to analyse the data have been comprehensively documented and are available to SLATS scientists on the project's intranet to ensure consistency between operators. Many of the procedures have been scripted to avoid errors occurring. Log files are recorded, allowing errors to be traced. The SLATS change detection method offers the advantages of both automated and visual methods, with an independent check by an experienced operator to ensure a high level of accuracy and consistency. All analytical methods have been subjected to independent peer review and published in relevant scientific literature and international conference proceedings.

Limitations

The main limitation of the current method lies not in misclassification of change, but in determining the extent (area) of change at a clearing location, particularly in areas of sparse (low FPC) wooded cover. The wooded vegetation extent is very important for determining the area of vegetation change, as it delineates how much woody vegetation existed before clearing. Considerable effort has gone into ensuring that the wooded extent and FPC index V2.3 is well-calibrated to ground vegetation measurements.

3.7 Woody vegetation clearing by biomass

Estimates of total biomass and carbon were modelled using the pre-clearing wooded vegetation extent and FPC product (V2.3) for 2011. Wooded percentage FPC estimates were converted to live stand basal area ($m^2 ha^{-1}$) by:

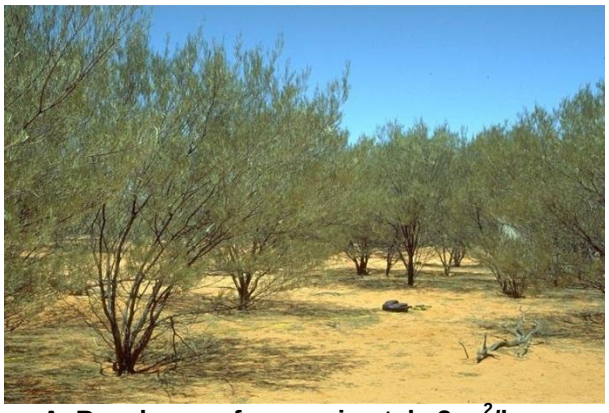
$$SBA = \frac{-38.6 \ln (1 - FPC/100)}{1 - 0.359 \ln (1 - FPC/100)}$$

This relationship is the inverse of Equation 2 in Armston *et al*. (2009), which was developed using a field dataset collected over a wide range of remnant vegetation communities in Queensland (RMSE = 7.26% FPC). It is important to note that this relationship does not account for differences in canopy structure and is not validated for woody regrowth following clearing.

These live stand basal area estimates were then converted to total biomass (above and below ground biomass) using equations developed by Henry *et al*. (2002) from a large number of eucalypt, acacia and rainforest sites in Australia including those from the Transect Recording and Processing System (TRAPS) program (Burrows *et al*., 2002).

Above and below ground biomass were converted to the equivalent mass of CO_2, which is the conventional unit for greenhouse gas accounting. This is based on the established observation that 50% of tree biomass is carbon, which has been confirmed to within 2% for 19 eastern Australian tree species (Gifford, 2000). The corresponding CO_2 mass was then derived using a factor of 3.67, which simply adjusts for the mass of the attached oxygen atoms.

Some examples of basal area values of woody vegetation found throughout Queensland are displayed in Figure 4 (page 14).



A. Basal area of approximately 2 m^2/ha

B. Basal area of approximately 4 m^2/ha

C. Basal area of approximately 11 m^2/ha

D. Basal area of approximately 17 m^2/ha

E. Basal area of approximately 23 m^2/ha

F. Basal area of approximately 29 m^2/ha

Figure 4 (A–F): Examples of various basal areas (m^2/ha) of woody vegetation

3.8 Regrowth

It is difficult to detect regrowth in relatively short timeframes, such as the annual SLATS reporting period. This is due to the relatively slow rate of woody vegetation growth and the low initial density of most regrowth stands. Therefore, an analysis of potential regrowth is not included in this report.

3.9 Fire

Areas affected directly by fire have not been mapped as woody vegetation change. While fires can remove a significant proportion of the foliage of woody vegetation, it is usually a temporary effect. In most cases, the foliage on mature trees recovers quickly. SLATS site data show that, on average, a fire removes less than 2 m^2/ha basal area (John Carter, Grazing Land Systems, DSITIA, pers. comm.). It is not common for fire to change land cover from woody to non-woody in a single event.

3.10 Natural tree death

Very little natural tree death was detected during 2010–11 (0.25% of total woody vegetation change). The areas mapped as natural tree death were not included when calculating woody vegetation clearing rates in this report. Figure 5 (below) shows some examples of natural tree death.

Figure 5: Examples of natural tree death in the Desert Uplands

3.11 Natural disaster damage

During the period December 2010 to March 2011, large parts of Queensland were severely affected by a series of natural disasters, including flooding, cyclone and landslips. See Figure 6 (on page 16) for examples. These mapping categories are used where SLATS analysts have detected damage to woody vegetation that is likely to have been caused by natural disaster events. These areas were not included when calculating woody vegetation clearing rates in this report. This disaster-affected area is an indicative amount, rather than an accurate representation of the extent of damage. See section 4.8 (page 39) for more detail.

Figure 6: Example of landslips near Carnarvon Gorge (top left), Cyclone Yasi damage in pine forest near Cardwell (top right) and flood damage in South East Queensland (lower images).

3.12 Missed clearing in previous era (2009–10)

Each year since 2004, SLATS has identified clearing missed in the previous era. Traditionally, missed clearing is not reported, as it is typically less than 2% of the total clearing rate in that era. However, there was considerably more missed clearing during 2009-10, due to abnormally high rainfall leading up to and during the normally drier winter months, across much of the state. As a result, clearing events were obscured by cloud cover or interpretation was made more difficult due to "greenness" in the imagery. Access to drier, cloud-free imagery from 2011 allowed analysts to detect these areas of missed clearing from previous eras. See Appendix F (page 97) for more detail.

3.13 Woody thinning

Thinning is the partial removal of woody vegetation. It has become more common as a method of clearing. Thinning is carried out for a range of purposes, including property management to allow pasture to grow within woodlands, weed control, rural residential development, restoration of naturally sparse ecosystems, selective logging in plantations and native forests, and certain types of fodder clearing. Examples of fodder clearing and thinning are shown in Figures 7 and 8 (on page 17).

Thinning, as measured by SLATS, is defined as a decrease in FPC at the sub-pixel level. This is where a decrease in the FPC index has occurred, but the pixel is still classified as woody. Using the SLATS change detection method, thinning can be detected where part of the foliage cover is removed, particularly where there is also soil disturbance or changes in groundcover.

However, using Landsat imagery to map sub-pixel change has limitations. Although some of the

thinned areas were verified in the field, thinned areas may not be as accurately mapped as other clearing categories. Hence, thinning has not been included as a separate class, but included in the total figure for clearing to pasture.

Figure 7: Examples of clearing for fodder in Mulga Lands

Figure 8: Examples of woody thinning (Mulga Lands, left and SEQ, right)

3.14 Replacement land cover

SLATS scientists assign each area of woody vegetation clearing to one of the replacement land cover classes in Table 2 (page 18). The assignment of these classes is primarily based on visual interpretation. In areas where there are many different forms of land use, it is sometimes difficult to interpret the final replacement class. For example, land cleared to pasture may later be converted to urban development. The accuracy for interpreting the replacement class is therefore lower than the accuracy for identification of woody vegetation change.

Table 2: Replacement land cover classes for woody vegetation change

Replacement land cover	Description
Pasture	Cleared for pasture includes: woody vegetation clearing for grazing, woody thinning, fodder clearing, rural residential, future urban land-use and privately owned plantations (i.e. not replanted as plantations)
Crops	Cleared for dry land crops
Forest	Forestry clearing includes: all woody vegetation clearing within State forests, plantation and native forest, and cleared private plantations which are replanted
Mining	Cleared for mining activities [including Coal Seam Gas (CSG)]
Infrastructure	Cleared for roads, railways, water storage, etc.
Settlement	Cleared for imminent urban development. Clearing within the SEQ Regional Plan 'urban footprint' and other available regional planning 'urban footprints', was recoded to settlement (excluding infrastructure and mining).

3.15 Field verification

Field verification is an important part of the SLATS process, due to the difficulty of interpreting some types of change. Field inspection is often required in areas of black soil, fire, natural tree death and regrowth clearing, as well as trees killed by stem injection and thinning.

Between February and June 2012, SLATS officers undertook field verification of woody vegetation clearing on representative samples of 50 of the 88 scenes analysed. These 50 scenes accounted for more than 95% of the total detected woody vegetation clearing in the state. The primary purpose of the field checks was to verify the 2010–11 change analysis. At each site, analysts took a digital photograph and logged the following data:

- the accuracy of the classification;
- the method of clearing used;
- a visual estimate of the percentage of cleared timber removed or decayed;
- the amount of coarse woody debris remaining after clearing;
- the replacement land cover;
- the maturity of timber cleared;
- the presence of regrowth;
- the original species;
- the current species;
- soil colour; and
- the presence of termites and fire.

As well as verifying new clearing, SLATS analysts revisited selected sites from previous years to gather data on timber decay rates, regrowth rates and regrowth clearing. An example of the change in coarse woody debris at a field revisit site is shown in Figure 9 (below). Figure 10 (page 20) shows the 305 sites recorded during the field program undertaken in 2012, which have been previously surveyed for coarse woody debris. Each location may have been surveyed between one to six times in field studies since 1999. At each site, a rating of coarse woody debris decline is recorded and a photo is taken. The rate of change of coarse woody debris is influenced by several factors including: the proposed land-use, type of vegetation cleared, rainfall, location and the economics of clearing.

Figure 9: Revisit site showing change in coarse woody debris between 2000 and 2004

Following field verification, SLATS analysts corrected the preliminary woody vegetation change classification. The analysts edited areas of uncertainty and misclassified change, and reclassified these areas to the field verified status. The edited classification was then thoroughly checked by an experienced image interpreter before finalising the analysis. This extensive field validation and checking ensures data consistency and quality across all scenes in the study. The change detection data are also utilised by the Queensland Herbarium for the development of Regional Ecosystem mapping (Queensland Herbarium 2012). Through this process, the Herbarium provides feedback to SLATS on accuracy and errors.

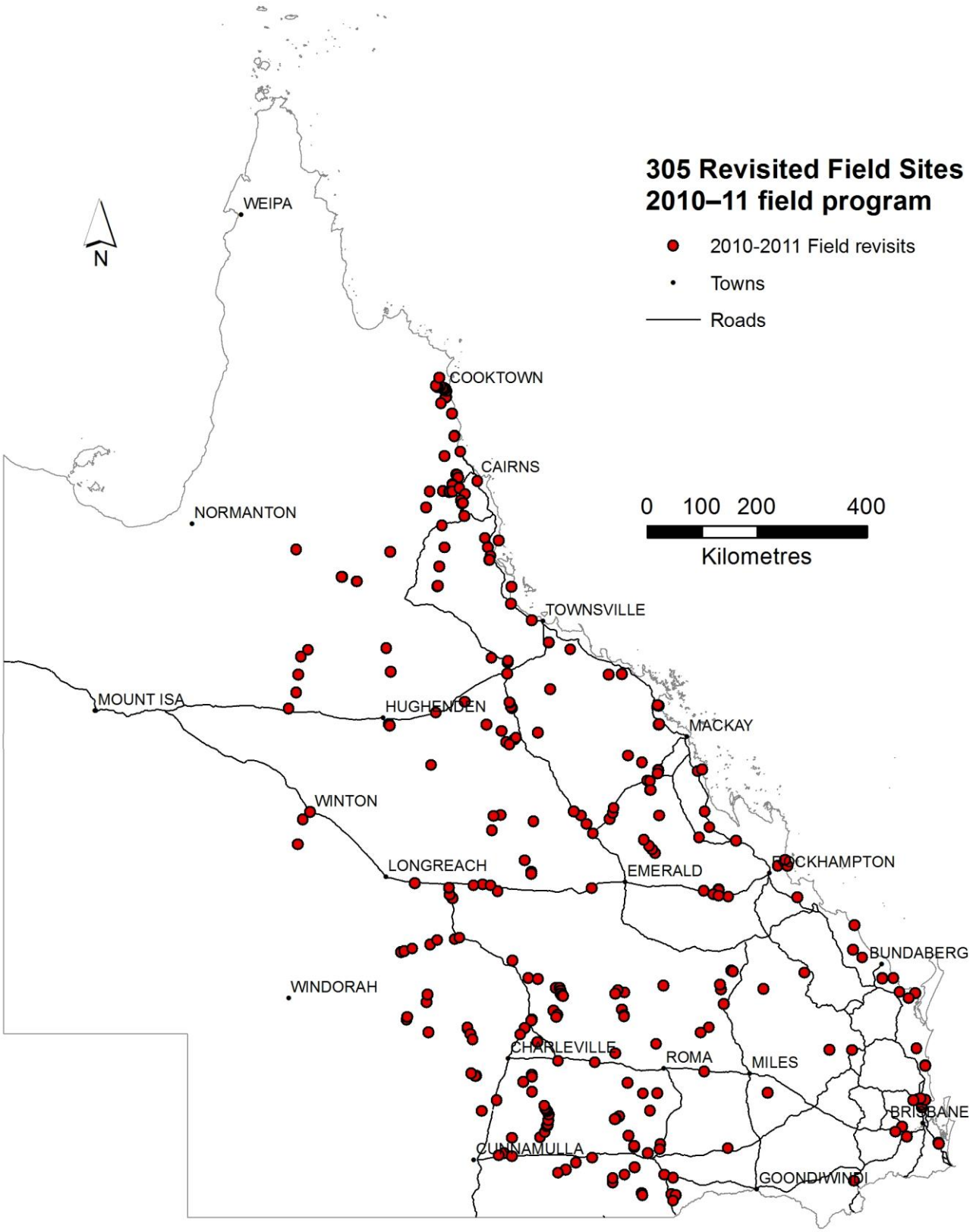


Figure 10: Location of sites revisited during the 2010–11 field program (undertaken in 2012)

3.16 Compilation of statewide data sets

SLATS created large, seamless mosaics of 2010–11 woody vegetation change, wooded extent, and the 2010 FPC index by joining the 88 scenes covering the state. Each scene was trimmed to a standard scene template to minimise overlap. When producing these mosaics, the scenes were overlapped in paths from south to north and paths were joined from west to east. In order to calculate annual woody vegetation clearing rates, a vector geographic information system (GIS) layer was created, with data on the extent and dates of each individual scene change raster in the mosaic.

The mosaic raster of cleared areas was intersected with GIS overlays, such as date, tenure type, 7′30″ x 7′30″ grid cell and catchments, to generate tabular statistics. For the 2010–11 analysis, revised GIS data sets were used as required, including updated tenure mapping, revised Natural Resource Management regions, and Version 7.0. (Queensland Herbarium 2012) Regional Ecosystem mapping.

Woody vegetation clearing rate statistics for 2010–11 were calculated using full resolution data (25 m pixels), with GIS intersections using vector data rather than raster data to improve accuracy. It is important to note that the tabular statistics derived from the intersection of GIS layers generate slightly different clearing totals due to the different scales and accuracy of the various GIS overlays used.

All statistics are generated based on data transformed to an Albers equal-area projection, so woody vegetation clearing rates for different regions are comparable. All the vegetation change statistics in this report have been converted to annual rates to account for the variation in scene dates. The units of clearing rate used in the tables are thousands of ha/year (‘,000 ha/year) not km^2/year as used in some of the earlier reports. One thousand ha/year is equal to 10 km^2/year.

3.17 Accuracy assessment and limitations

The traditional form of accuracy assessment uses an independent data source of higher resolution, such as aerial photography. However, this is not always feasible at a statewide scale. The available aerial photography coverage does not usually align with the capture dates of the satellite imagery. Field validation is limited to a representative sample due to access, time and cost constraints. Therefore, statewide validation using aerial photography or field checking is not a viable option, and other alternatives need to be considered.

SPOT 5 accuracy assessment

Random point analysis using SPOT 5 imagery (10 m resolution) for the 2008–09 era found the amount of missed clearing was small (less than 0.05% of areas mapped as woody vegetation using the 2008 FPC Index), and that over 95% of the woody vegetation clearing mapped by SLATS was verified by the SPOT 5 analysis (Department of Environment and Resource Management [DERM] 2010).

3.18 Independent review of science quality

In 2004, an independent panel of academic, CSIRO and industry members reviewed the research and management of remote sensing science within the Queensland Government. The panel reviewed the quality of research, methods, relevance, and the quality and processes of remote sensing applications. SLATS change detection was a major focus of the review. The review panel praised the quality of SLATS science and suggested that SLATS research be published in refereed

publications. This is now being done—for example, Lucas *et al.,* 2006; de Vries *et al.,* 2007; Armston *et al.,* 2007; Armston *et al.,* 2009; Gill, 2009a; Gill *et al*., 2010a; Gill *et al*., 2010b: Flood *et al*., 2013. Several more scientific papers are being prepared for publication.

SLATS woody vegetation change detection data is available online through QGIS (http://dds.information.qld.gov.au/DDS/), or from DNRM (contact details, page 60). To ensure transparency, accountability and quality, SLATS methods are published at conferences and in peer-reviewed journals. A bibliography is on page 61.

3.19 Future SLATS reporting

The future availability of satellite imagery is one of the risks associated with continuity of the woody vegetation change analysis. In May 2003, a partial failure of the ETM+ instrument on the Landsat 7 satellite resulted in large areas of missing data within the ensuing ETM+ images (USGS, 2003). In November 2011, the USGS suspended Landsat 5 imaging activities. Subsequently, the satellite's imaging capacity was unable to be restored. This means SLATS will need to source alternative imagery for the 2012 date to complete the 2011–12 SLATS report. Landsat 7 ETM+ has been chosen as the replacement. Although Landsat 7 is highly compatible with Landsat 5, the presence of data gaps in every image increases the complexity of the automated analysis and the time required for manual interpretation of images. This will be an issue for the 2011–12 and the 2012–13 SLATS reports. However, NASA's next generation satellite, the Landsat 8 Operational Land Imager will provide continuity of imagery for SLATS reporting beyond 2013. In addition, the European Space Agency's Sentinel-2 is set to be launched in late 2013 and promises a potential alternative to Landsat for SLATS and other projects.

Section 4 Statewide assessment of woody vegetation clearing

4.1 Wooded vegetation extent

The area of wooded vegetation extent in 2010, based on the V2.3 time series FPC index product, is shown in Table 3 (page 25). This table also shows the estimates of wooded vegetation extent for previous eras, based on previous versions of the FPC index product. For further details of these versions, see previous SLATS reports. The latest figures of wooded vegetation extent cannot be directly compared to estimates prior to 2004 because of methodology changes. For this reason, the woody vegetation clearing figures quoted in the SLATS reports should be used, rather than deriving clearing figures from the change in wooded vegetation extent across different time periods.

The changes between methods in wooded extent values for 2004–10 can be attributed mainly to a reduction in omissions, including:

- wooded areas on Cape York that were previously cloud affected and mapped as non-wooded or missing data
- wooded areas within fire scars
- wooded areas corresponding to plantation regrowth
- non-plantation wooded regrowth

In addition, the water mask has reduced wooded extent in 2010-11, due to the unusually large areas of inundation across the state in 2010.

For 2004–10 products, it is often difficult to determine precise estimates of change in wooded vegetation extent for single Landsat scenes. This is due to the sensitivity of wooded vegetation extent estimates to different thresholds selected in the V2.3 method between years (Kitchen *et al*., 2010).

The distribution of wooded vegetation extent in Queensland at 2010 is shown in Figure 11 (page 24). This map was created using the wooded extent and FPC index V2.3. Areas mapped as pasture in Figure 11 include both natural grasslands and areas cleared for pasture. There are significant areas of natural grassland in Queensland, such as the extensive Mitchell Grass Downs, which contain little woody vegetation.

Tabular data for percentages of wooded vegetation extent for Biogeographic regions; Biogeographic sub-regions; catchments; sub-catchments; local government areas; Natural Resource Management regions are contained further in the report and in Appendices C to E (pages 74 to 93).

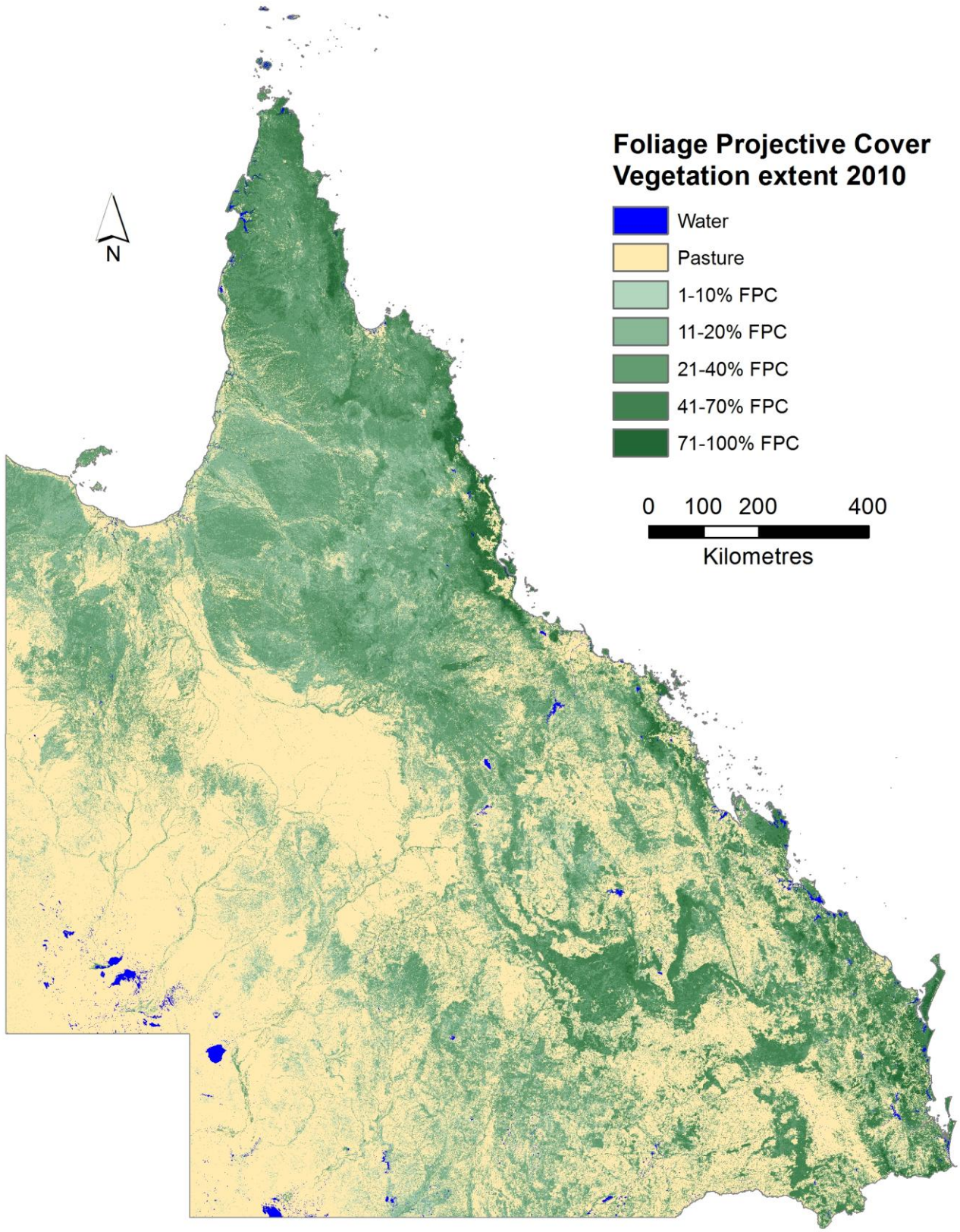


Figure 11: Wooded vegetation extent, FPC (2010)

Table 3: Wooded vegetation extent for Queensland (million ha)

SLATS Reports	Satellite and sensor	Resolution	Method (update in subsequent reports)	Year	Wooded extent mil ha (updated extent)	Wooded extent% of Qld (updated%)
1988-91	Landsat 5 TM	25m	3.	1988	85.8	50
1991-95 1995-97 1997-99	AVHRR	1.1km	1.	1991	76	44
1999-2001	Landsat 5 TM	25m	2.	1999	81.4	47
2001-03	Landsat 5 TM	25m	2.	2001	81.3	47
2001-03	Landsat 5 TM	25m	2.	2003	80.2	46
2003-04 (2004-05; 2005-06)	Landsat 5 TM (and Landsat 7 ETM+)	25m	2. (4; 5)	2004*	79.8 (83.7; 89.4)	46 (48; 52)
2005-06 (2006-07)	Landsat 5 TM and Landsat 7 ETM+	25m	5. (6)	2005*	89.2 (90.0)	52 (52)
2005-06 (2006-07)	Landsat 5 TM and Landsat 7 ETM+	25m	5. (6)	2006*	89.0 (89.1)	51 (52)
2007-08	Landsat 5 TM and Landsat 7 ETM+	25m	6.	2007	88.6	51
2008-09	Landsat 5 TM and Landsat 7 ETM+	25m	6.	2008	88.1	51
2009-10	Landsat 5 TM and Landsat 7 ETM+	25m	6.	2009	88.2	51
2010-11	Landsat 5 TM and Landsat 7 ETM+	25m	6.	2010	87.3	51

* Reported more than once with different methodology.

1. Time-series NDVI - AVHRR (Danaher *et al*. 1992)

2. Woody FPC Index 1991 - with clearing since 1991 removed from wooded extent (Kuhnell *et al*. 1998)

3. MRVI Wooded extent (Goulevitch *et al*. 2002)

4. Time-series wooded extent and FPC V2.0 (Kitchen *et al.* 2010)

5. Time-series wooded extent and FPC V2.1 (Kitchen *et al*. 2010)

6. Time-series wooded extent and FPC V2.3 (Kitchen *et al*. 2010)

4.2 Woody vegetation clearing by 7´30˝ x 7´30˝ Grid Cell (1:25 000 map sheet)

The average annual woody vegetation clearing rate over the period 2010–11 was 91 690 ha/year or 0.053% of the land area of Queensland. In total, this clearing rate represents an area of approximately 30 km x 30 km cleared per year.

A spatial view of the rate of clearing (‘,000 ha/year) within Queensland aggregated to 7´30˝ x 7´30˝ (latitude/longitude) grid cells is shown in Figure 12 (page 26) for 2010–11. These cells are the same size as a 1:25 000 map sheet, approximately 14 km x 14 km. Figure 13 (page 27) illustrates the mean annual clearing rate recorded across all previous SLATS eras. For a historic comparison, Appendix A (page 64) has a series of grid cell maps for each previous SLATS era.

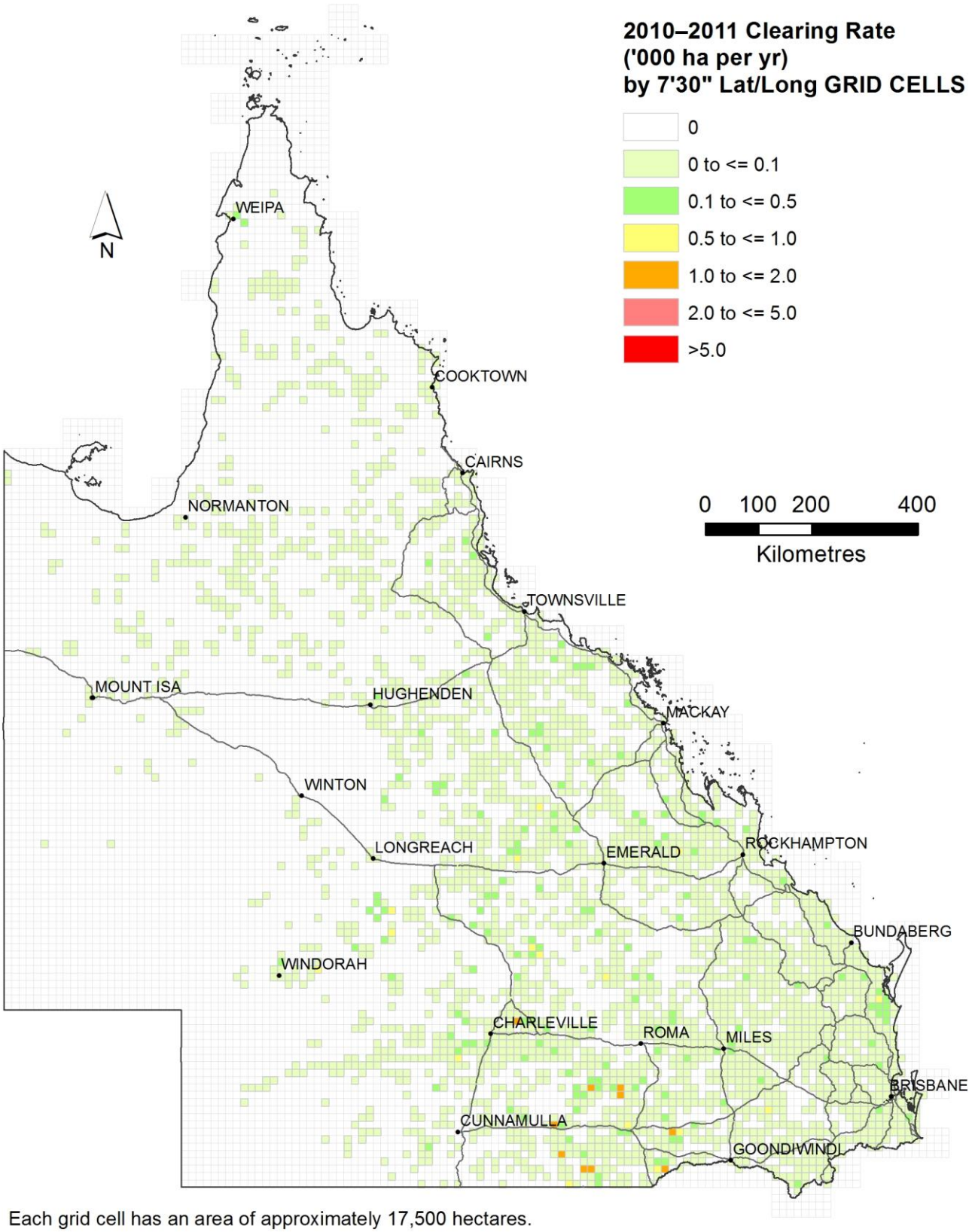


Figure 12: Average annual woody vegetation clearing rate (2010–11)

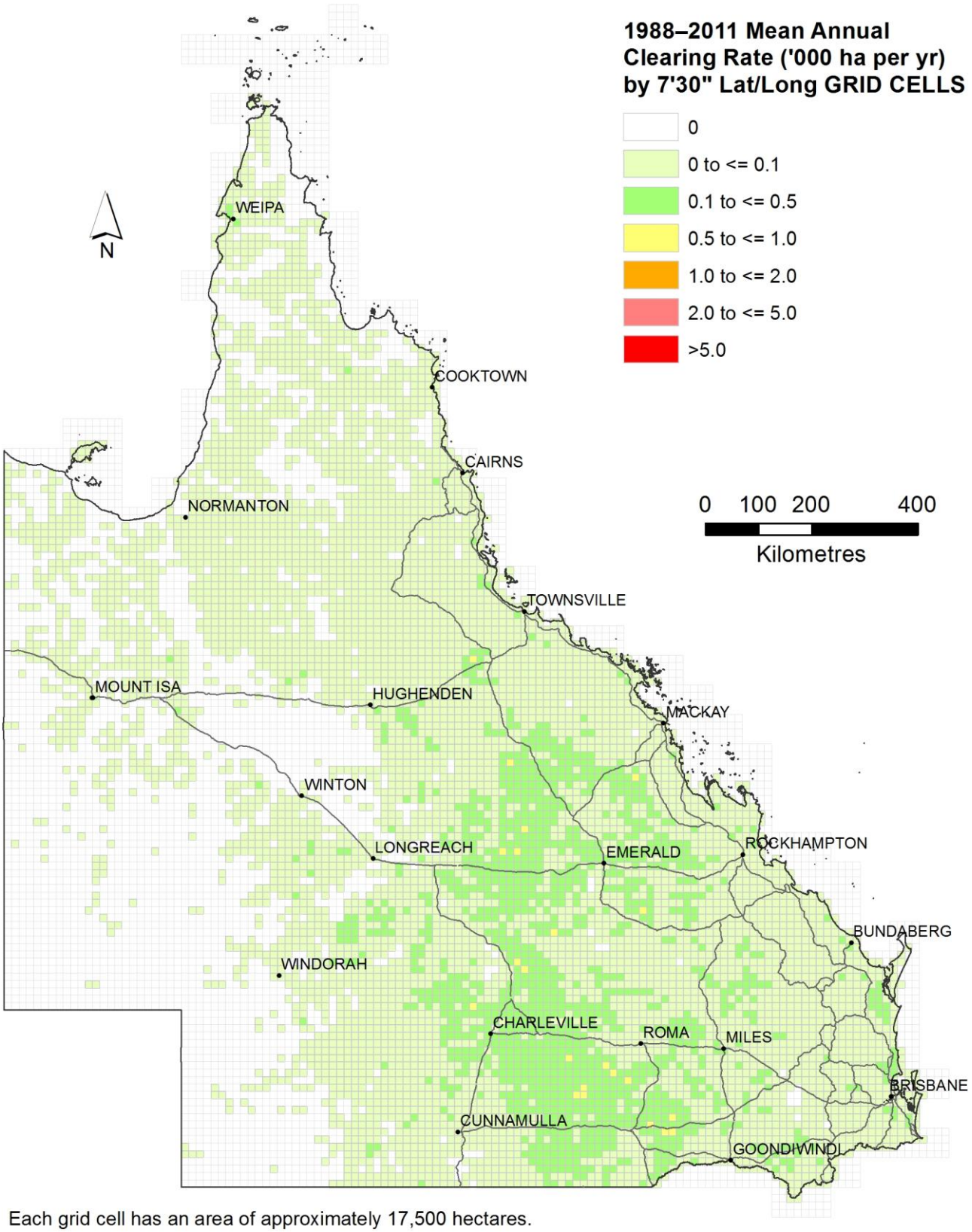


Figure 13: Mean annual clearing rate (1988–2011)

4.3 Woody vegetation clearing by replacement

Woody vegetation clearing for all of the periods mapped between 1988 and 2011 is categorised by replacement land cover in Table 4 (below), and the time sequence presented in Figure 14 (page 29). The majority of woody vegetation clearing was for conversion to pasture for grazing purposes. From 2004 to 2010, forestry was the second largest replacement land cover by area. However, during 2010–11, replacement by infrastructure was higher.

Table 4: Woody vegetation clearing by replacement land cover (1988–2011)

Period	Clearing	Pasture	Crop	Forest	Mining	Infra -structure	Settlement	Total
1988–1991	Rate (,000ha/yr)	649.12	55.79	3.27	2.43	16.01	3.05	729.66
	% of state clearing	88.96	7.65	0.45	0.33	2.19	0.42	100.00
1991–1995	Rate (,000ha/yr)	266.12	12.59	4.78	1.56	2.45	2.34	289.84
	% of state clearing	91.81	4.34	1.65	0.54	0.85	0.81	100.00
1995–1997	Rate (,000ha/yr)	292.74	29.40	4.70	2.68	8.25	2.51	340.28
	% of state clearing	86.03	8.64	1.38	0.79	2.42	0.74	100.00
1997–1999	Rate (,000ha/yr)	363.75	40.77	7.37	2.08	9.90	1.48	425.35
	% of state clearing	85.52	9.58	1.73	0.49	2.33	0.35	100.00
1999–2000	Rate (,000ha/yr)	716.40	19.98	6.50	1.44	11.49	1.98	757.79
	% of state clearing	94.54	2.64	0.86	0.19	1.52	0.26	100.00
2000–2001	Rate (,000ha/yr)	355.31	4.36	8.24	1.93	8.84	1.48	380.16
	% of state clearing	93.46	1.15	2.17	0.51	2.33	0.39	100.00
2001–2002	Rate (,000ha/yr)	481.49	0.73	5.70	1.69	6.66	1.63	497.90
	% of state clearing	96.70	0.15	1.14	0.34	1.34	0.33	100.00
2002–2003	Rate (,000ha/yr)	538.14	0.67	5.73	1.53	4.27	3.57	553.91
	% of state clearing	97.15	0.12	1.04	0.28	0.77	0.64	100.00
2003–2004	Rate (,000ha/yr)	464.47	0.37	3.58	3.42	6.99	3.53	482.36
	% of state clearing	96.29	0.08	0.74	0.71	1.45	0.73	100.00
2004–2005	Rate (,000ha/yr)	329.69	1.60	9.36	3.01	5.50	1.73	350.88
	% of state clearing	93.96	0.45	2.67	0.86	1.57	0.49	100.00
2005–2006	Rate (,000ha/yr)	356.99	0.26	10.27	3.56	2.26	1.80	375.13
	% of state clearing	95.17	0.07	2.74	0.95	0.60	0.48	100.00
2006–2007	Rate (,000ha/yr)	218.33	0.20	6.60	4.23	2.80	2.67	234.83
	% of state clearing	92.97	0.08	2.81	1.80	1.19	1.14	100.00
2007–2008	Rate (,000ha/yr)	103.50	0.15	10.06	3.81	2.47	2.77	122.78
	% of state clearing	84.30	0.12	8.20	3.10	2.02	2.26	100.00
2008–2009	Rate (,000ha/yr)	88.92	0.07	4.73	1.98	2.39	1.85	99.94
	% of state clearing	88.97	0.07	4.73	1.98	2.40	1.85	100.00
2009–2010	Rate (,000ha/yr)	64.58	0.09	6.94	2.99	1.66	1.33	77.59
	% of state clearing	83.23	0.12	8.94	3.85	2.14	1.72	100.00
2010–2011	Rate (,000ha/yr)	72.62	0.46	6.94	2.80	7.46	1.40	91.69
	% of state clearing	79.21	0.50	7.57	3.05	8.14	1.53	100.00

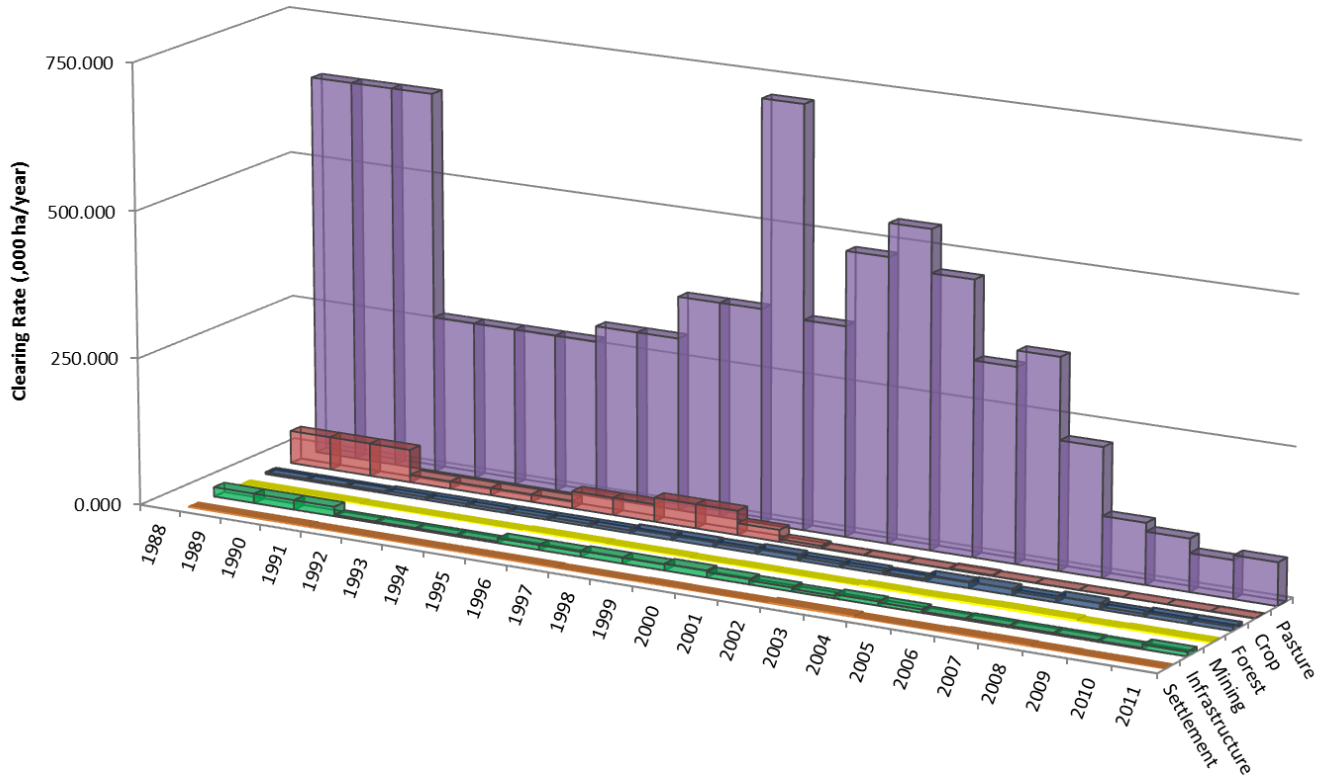


Figure 14: Trend in woody vegetation clearing rate by replacement land cover (1988–2011)

4.4 Woody vegetation clearing by tenure

Tenure data source

The tenure classes are derived from a 2009 extraction of the State's Digital Cadastral Database (DCDB) to give the best representation of the tenure prior to a clearing event in the 2010–11 era. Leasehold tenure is the dominant tenure by area in Queensland. Figure 15 (page 31) is a map of the four broad tenure classes used in tables throughout this report.

Clearing by replacement cover class and tenure

The 2010–11 woody vegetation clearing rates have been grouped by replacement land cover and tenure in Table 5 (below), while Table 6 (page 32) and Figure 16 (page 33) show the woody vegetation clearing rate by tenure for the periods mapped between 1988 and 2011.

Table 5: Woody vegetation clearing by tenure type and replacement land cover (2010–11)

Tenure	Area (,000ha)	Clearing rate (,000ha/yr)							2010 Wooded vegetation cover[1] (,000ha)	% of total clearing in QLD
		Pasture	Crop	Forestry	Mining	Infra-structure	Settle-ment	Total		
Freehold	45513	46.363	0.451	0.145	1.467	5.494	1.294	55.214	19884	60.22
Leasehold[2]	115429	26.104	0.006	0.047	0.965	1.945	0.102	29.170	57563	31.81
Other tenures[3]	440	0.004	0.000	0.000	0.319	0.000	0.002	0.326	407	0.36
Other reserves[4]	11657	0.153	0.000	6.751	0.051	0.022	0.000	6.977	9387	7.61
Totals	**173039**	72.625	0.458	6.944	2.802	7.460	1.397	91.686	87241	100.00

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

[2] Includes roads and rivers

[3] Includes Commonwealth lands, mining, main roads, railways, ports, action pending etc.

[4] State forest, timber reserves and national parks

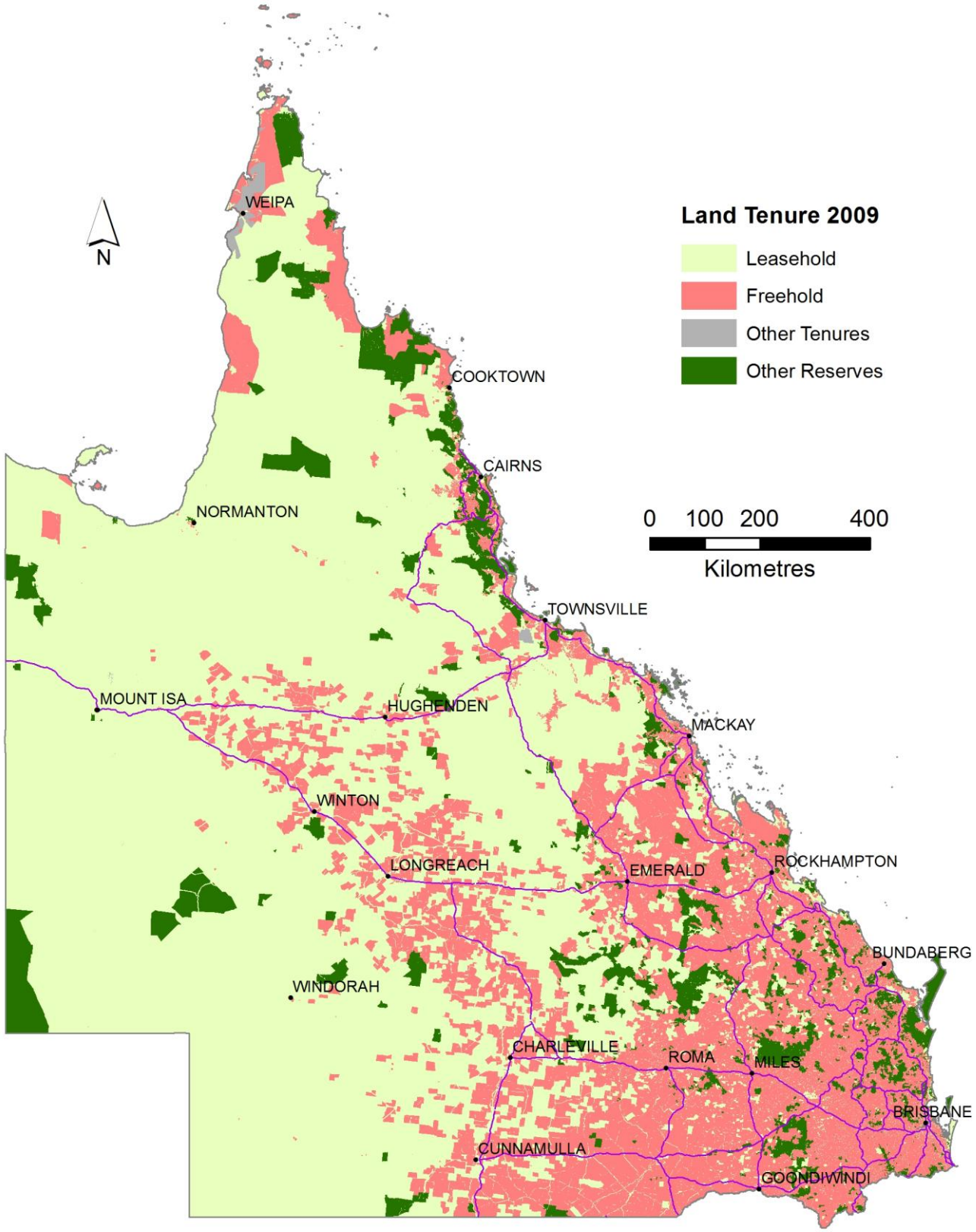


Figure 15: Land tenures in Queensland (2009)

Table 6: Woody vegetation clearing by land tenure (1988–2011)

Period	Clearing	Freehold	Leasehold	Other tenures	Other reserves	Total
1988–91	Rate (,000ha/yr)	333.25	384.22	5.74	6.46	729.66
	% of state clearing	45.67	52.66	0.79	0.88	100.00
1991–95	Rate (,000ha/yr)	127.72	155.72	1.57	4.83	289.84
	% of state clearing	44.07	53.73	0.54	1.67	100.00
1995–97	Rate (,000ha/yr)	197.97	134.03	3.10	5.18	340.28
	% of state clearing	58.04	39.53	0.91	1.52	100.00
1997–99	Rate (,000ha/yr)	254.39	161.40	3.06	6.50	425.35
	% of state clearing	59.81	37.95	0.72	1.53	100.00
1999–2000	Rate (,000ha/yr)	497.29	254.00	0.78	5.71	757.79
	% of state clearing	65.62	33.52	0.10	0.75	100.00
2000–01	Rate (,000ha/yr)	169.95	202.65	0.74	6.82	380.16
	% of state clearing	44.70	53.31	0.20	1.79	100.00
2001–02	Rate (,000ha/yr)	247.18	239.62	4.86	6.23	497.90
	% of state clearing	49.65	48.13	0.98	1.25	100.00
2002–03	Rate (,000ha/yr)	323.50	224.02	0.28	6.11	553.91
	% of state clearing	58.40	40.44	0.05	1.10	100.00
2003–04	Rate (,000ha/yr)	267.63	206.28	1.25	7.20	482.36
	% of state clearing	55.48	42.77	0.26	1.49	100.00
2004–05	Rate (,000ha/yr)	191.68	150.11	0.97	8.12	350.88
	% of state clearing	54.63	42.78	0.28	2.31	100.00
2005–06	Rate (,000ha/yr)	198.01	168.47	1.55	7.06	375.09
	% of state clearing	52.79	44.91	0.41	1.88	100.00
2006–07	Rate (,000ha/yr)	112.63	112.46	1.97	7.77	234.83
	% of state clearing	47.96	47.89	0.84	3.31	100.00
2007–08	Rate (,000ha/yr)	63.88	47.58	1.98	9.34	122.78
	% of state clearing	52.03	38.75	1.61	7.61	100.00
2008–09	Rate (,000ha/yr)	45.09	48.92	1.02	4.90	99.94
	% of state clearing	45.12	48.95	1.02	4.90	100.00
2009–10	Rate (,000ha/yr)	42.50	27.42	0.62	7.05	77.59
	% of state clearing	54.78	35.34	0.80	9.08	100.00
2010–11	Rate (,000ha/yr)	55.21	29.17	0.33	6.98	91.69
	% of state clearing	60.22	31.81	0.36	7.61	100.00

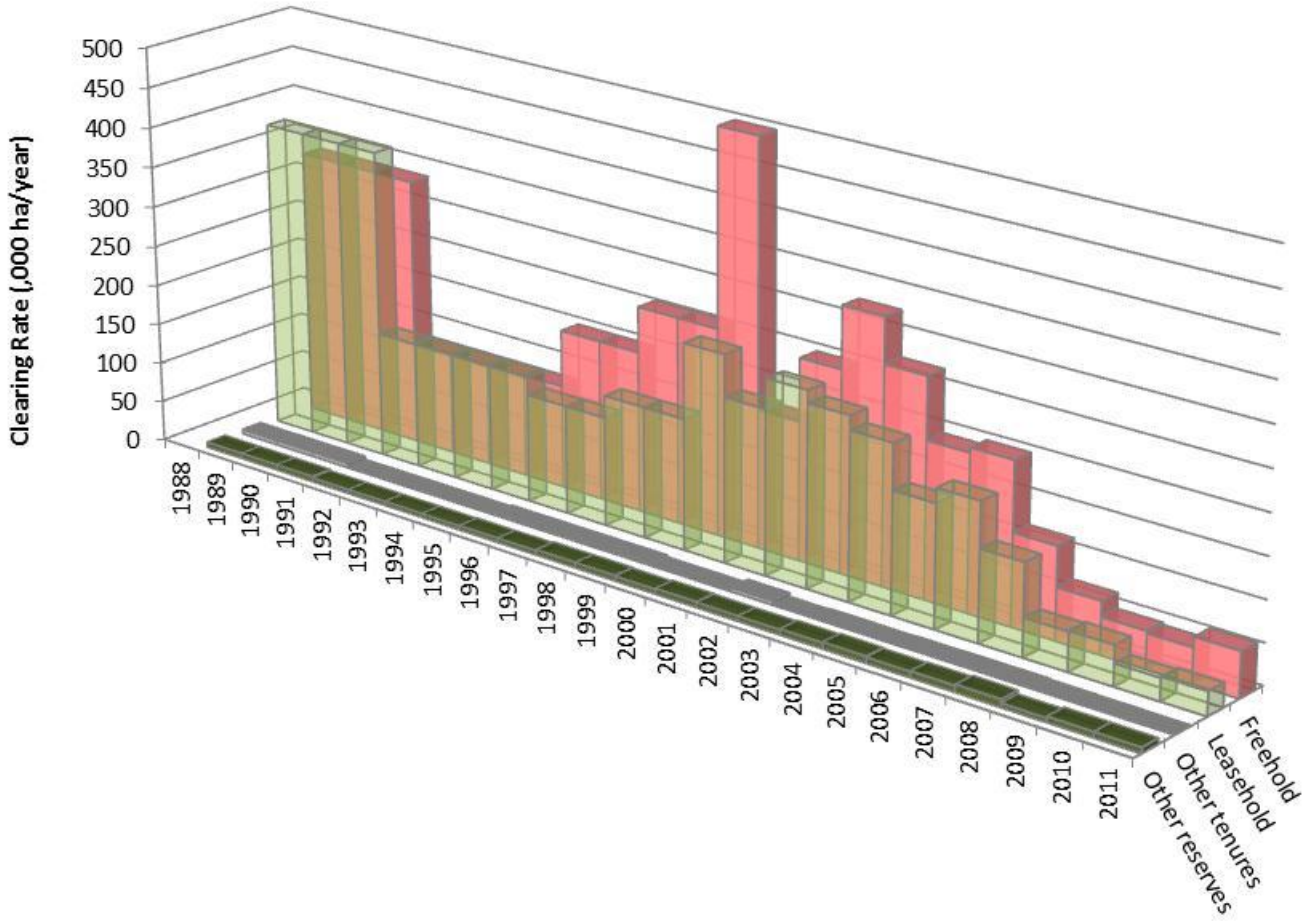


Figure 16: Woody vegetation clearing trend by tenure (1988–2011)

4.5 Woody vegetation clearing by remnant status

Definition of remnant vegetation

Remnant status vegetation is defined in the *Vegetation Management Act 1999* (VMA) as vegetation shown on a Regional Ecosystem (RE) or remnant map. Woody vegetation is mapped as remnant by the Queensland Herbarium where the dominant canopy:

- has greater than 70% of the height, and greater than 50% of the cover, relative to the undisturbed height and cover of that stratum and;
- is dominated by species characteristic of the vegetation's undisturbed canopy.

An undisturbed stratum (or layer) is defined as one that shows no evidence of extensive mechanical or chemical disturbance, such as logging, clearing or poisoning, during field inspections or on the available historical aerial photographic record. This definition of remnant vegetation includes woody vegetation, non-woody vegetation such as grasses, and areas of remnant vegetation as defined by the RE mapping (Queensland Herbarium 2012). Accad *et al*., 2013 provides a comprehensive report for regional ecosystems (woody and non-woody remnant vegetation) from 1997 to 2011.

Definition of high-value regrowth

The amendments in 2009 to the VMA introduced regulation of clearing of *high-value regrowth* (HVR). HVR is defined by the Regrowth Vegetation Map and includes mature regrowth not cleared since 31 December 1989, and vegetation within 50m of certain watercourses in the priority Great Barrier Reef catchments of the Burdekin, Mackay – Whitsundays and Wet Tropics.

Clearing by remnant and regulated regrowth status

To define remnant status of woody vegetation clearing, SLATS 2010–11 clearing data were intersected with Version 7.0 (Queensland Herbarium 2012) remnant vegetation data. A similar intersection with remnant status has previously been done for the periods from 1995–2010. With the introduction of HVR mapping, 2010–11 woody vegetation clearing was also intersected with the HVR data to identify HVR amongst the non-remnant clearing.

Figure 17 (below) shows the clearing rate for vegetation mapped as remnant, HVR and non-remnant for each tenure class.

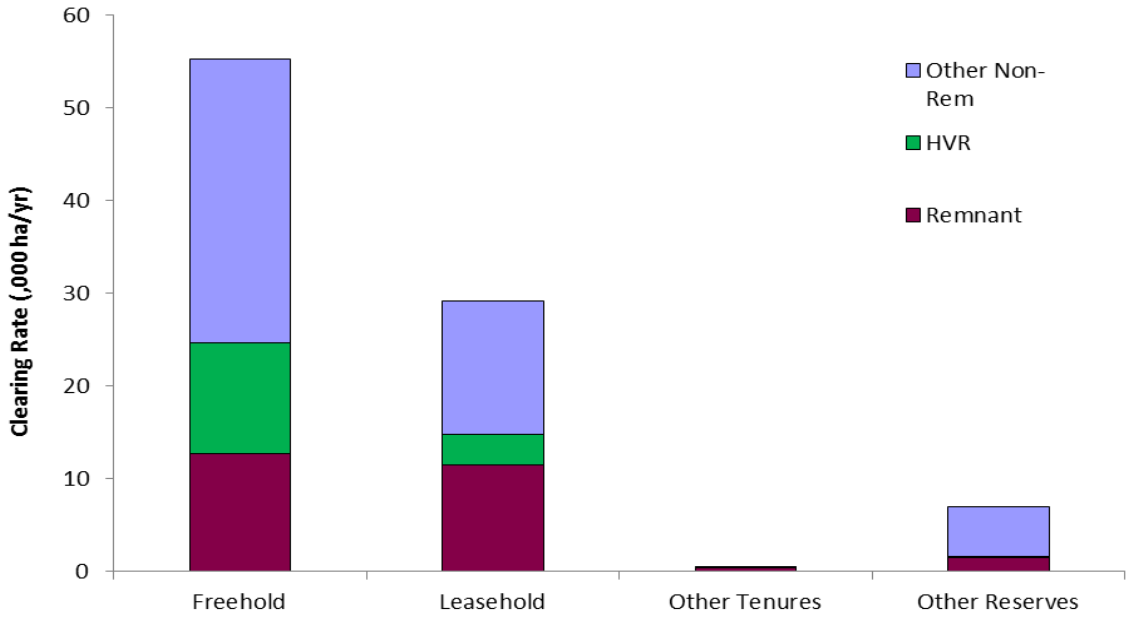


Figure 17: Clearing woody vegetation by tenure split by vegetation status (2010–2011)

The following SLATS figures (Table 7, page 35) refer to the clearing of remnant, HVR and non-remnant woody vegetation. For periods prior to 2010–11, remnant and non-remnant figures are copied from previous SLATS reports, and not updated using more recent RE data. The 1988–95 change data was not included in the analysis because 1995 is the earliest year for which RE maps were available. Also, RE mapping was incomplete at the time of the 1995–97 and 1997–99 SLATS change reporting. Hence, the remnant clearing rates for these periods were based on an extrapolation of a sample of clearing for which RE mapping was available. The sample contained greater than 90% of the total state clearing area.

Table 7: Area cleared of remnant and non-remnant woody vegetation by tenure (1995–2011)

Period	Remnant Status	Clearing rate (,000ha/yr)				
		Freehold	Leasehold[1]	Other tenures[2]	Other reserves[3]	Total
1995–97	Remnant	125.2	95.9	2.6	3.5	227.2
	Non-remnant	72.8	38.1	0.5	1.7	113.1
1997–99	Remnant	168.2	113.6	2.6	1.9	286.3
	Non-remnant	86.1	47.8	0.4	4.6	138.9
1999–2000	Remnant	322.63	179.90	0.73	1.50	504.75
	Non-remnant	174.66	74.11	0.05	4.21	253.04
2000–01	Remnant	76.21	134.13	0.71	1.96	213.01
	Non-remnant	93.74	68.52	0.03	4.86	167.16
2001–02	Remnant	121.07	152.86	0.01	1.54	275.48
	Non-remnant	126.12	91.51	0.11	4.69	222.42
2002–03	Remnant	181.15	183.41	0.21	1.14	365.91
	Non-remnant	142.35	40.61	0.07	4.97	188.00
2003–04	Remnant	133.85	130.82	0.96	1.63	267.25
	Non-remnant	133.78	75.46	0.29	5.57	215.10
2004–05	Remnant	59.96	108.78	0.79	2.60	172.13
	Non-remnant	131.72	41.33	0.18	5.52	178.75
2005–06	Remnant	85.08	134.89	0.90	1.48	222.35
	Non-remnant	112.93	33.57	0.65	5.59	152.74
2006–07	Remnant	46.24	79.58	1.86	1.49	129.17
	Non-remnant	66.40	32.87	0.11	6.28	105.66
2007–08	Remnant	23.97	27.11	1.74	3.43	56.25
	Non-remnant	39.91	20.47	0.24	5.92	66.53
2008–09	Remnant	15.40	19.77	0.93	1.58	37.68
	Non-remnant	29.70	29.15	0.09	3.32	62.26
2009–10	Remnant	11.96	10.54	0.57	0.99	24.06
	Non-remnant	30.54	16.88	0.05	6.06	53.53
2010–11	Remnant	12.69	11.51	0.32	1.53	26.05
	HVR Regrowth	11.91	3.23	0.00	0.04	15.18
	Non-remnant	30.61	14.43	0.01	5.41	50.46

[1] Includes roads and rivers

[2] Includes Commonwealth lands, mining, main roads, railways, ports, action pending etc.

[3] State forest, timber reserves and national parks

4.6 Woody vegetation clearing by foliage projective cover and basal area

Woody vegetation clearing related to the FPC Index V2.3

Recent methods for mapping FPC have enabled more accurate mapping of woody vegetation cover, particularly in areas of regrowth. The time series model was used to compute the wooded vegetation extent and FPC (V2.3) for 2005–10. This was then intersected with the 2005–11 woody vegetation clearing to produce the frequency distribution graph in Figure 18 (below). The corresponding intersection with basal area produces the graph in Figure 19 (page 37).

The two graphs have a very similar shape – including the same peak FPC value – when compared. The highest frequency of woody vegetation clearing occurs at 22% FPC or 8.8 m^2/ha basal area for 2010–11, using the wooded vegetation extent and FPC V2.3 (Figures 18 and 19). This is similar to the 1991 baseline FPC intersection shown in previous SLATS reports. The main difference is that the area under the curve (amount of woody vegetation clearing) is higher with the wooded vegetation extent and FPC V2.3, due primarily to the inclusion of regrowth in the FPC analysis. Previously, regrowth was given a low FPC or zero FPC if not identified and mapped as regrowth. It should be noted that when interpreting Figure 19 (clearing by basal area), the relationship between FPC and basal area has only been validated for mature forests (Armston *et al*., 2009). The basal area of regrowth may be overestimated.

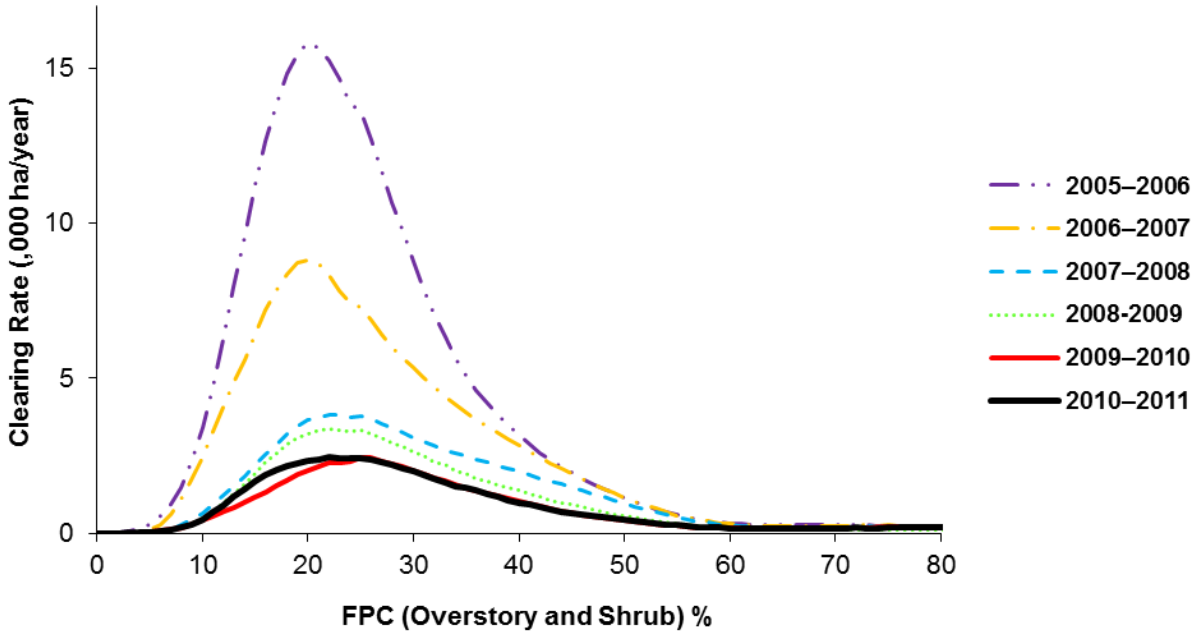


Figure 18: Frequency distributions of woody vegetation clearing using the FPC Index V2.3

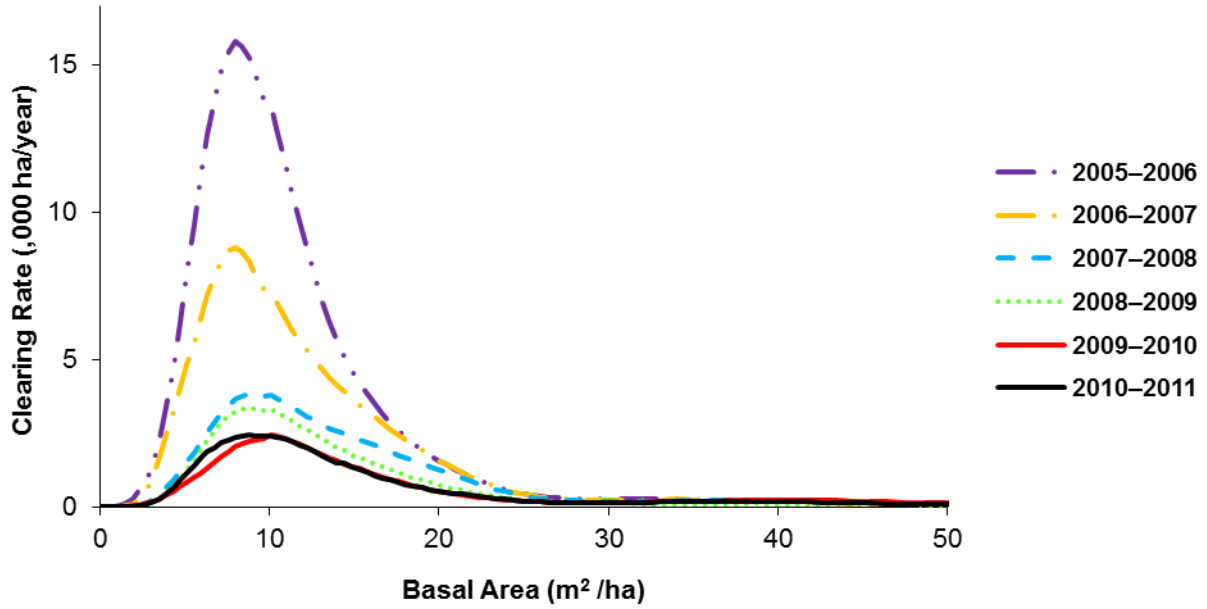


Figure 19: Frequency distributions of woody vegetation clearing using basal area derived from the FPC Index V2.3

Woody vegetation clearing by Carnahan cover class and mapping

The state woody vegetation clearing data for each SLATS era were intersected with the vegetation cover classes from the 1:5 000 000 Carnahan present vegetation map (Carnahan, 1988). The results are shown in Appendix B (page 68). The 2010–11 clearing across Carnahan vegetation classes is shown in Table 8 (page 38). Not all vegetation classes in which woody vegetation clearing occurred have been included in Table 8.

In the previous national and state greenhouse gas inventories, woody vegetation clearing was grouped into three vegetation types that are combinations of Carnahan classes. The three groups are tropical and temperate closed forests (T4, M4, L4, T3), dense woodlands and open forests (M3, L3), and open woodlands (M2, L2). In Queensland, additional classes with extensive clearing were added to the open woodland class.

The Carnahan classes are geographically large and represent the dominant vegetation formation, but may also include significant areas of other vegetation types. Apparent anomalies, such as no clearing in T4 (trees > 30 m height and 70% foliage cover) in Queensland, may be attributed to this aggregation of woodland classes. A small area of the state does not have a Carnahan mapping class, and therefore totals in Table 8 can differ slightly to other totals shown in the report.

Table 8: Woody vegetation clearing by Carnahan present vegetation map class (2010–2011)

Carnahan vegetation class	Description	Clearing 2010–11	
		Rate (,000ha/yr)	% of State clearing total
M1	Medium trees (10–30 m) <10% foliage cover	27.87	30.73
M2	Medium trees (10–30 m) 10–30% foliage cover	25.43	28.04
M3	Medium trees (10–30 m) 30–70% foliage cover	6.35	7.00
M4	Medium trees (10–30 m) >70% foliage cover	0.78	0.86
L1	Low trees (<10 m) <10% foliage cover	9.17	10.11
L2	Low trees (<10 m) 10–30% foliage cover	7.84	8.64
L3	Low trees (<10 m) 30–70% foliage cover	0.16	0.18
L4	Low trees (<10 m) >70% foliage cover	0.03	0.04
S1	Tall shrubs (>2 m) <10% foliage cover	1.06	1.17
S2	Tall shrubs(>2 m) 10–30% foliage cover	0.32	0.36
Z1	Low shrubs (<2 m) <10% foliage cover	0.02	0.02
Z3	Low shrubs (<2 m) 30–70% foliage cover	0.03	0.03
F3	Other herbaceous plants 30–70% foliage cover	0.00	0.00
F4	Other herbaceous plants >70% foliage cover	0.95	1.05
G2	Tussocky or tufted grasses 10–30% foliage cover	1.08	1.19
G3	Tussocky or tufted grasses 30–70% foliage cover	9.15	10.09
G4	Tussocky or tufted grasses 70% foliage cover	0.45	0.50
H2	Hummock grasses 10–30% foliage cover	0.00	0.00
Total		90.70	100.00

4.7 Woody vegetation clearing by biomass

It is estimated that approximately 8.63 Mt of dry biomass or 4.32 Mt of carbon were cleared during the 2010–11 era. This is up 0.5% from 8.60 Mt of biomass and 4.30 Mt of carbon in 2009–10. The estimated eventual emission of CO_2 from all clearing (above and below ground live woody biomass) for 2010–11 is 15.84 Mt. This represents an increase of 0.06 Mt relative to the previous era (2009–10).

At this stage no account is made for cleared and dead woody debris or low biomass found in regrowth communities. While the biomass cleared will eventually decay, the rate of release of CO_2 depends on the clearing method, post clearing management of woody debris and climate factors (Henry *et al.,* 2002).

4.8 Natural disaster damage in 2010–11

In addition to reporting on annual clearing rates for 2010–11, SLATS mapped approximately 94 000 ha of damage to woody vegetation across the state caused by several major natural disasters – flood, landslip and cyclone. The majority of this damage occurred in the Wet Tropics, due to Cyclone Yasi. Areas of natural disaster damage are listed in Table 9 (below).

Table 9: Natural disaster damage by Biogeographic region

	Map Ref.	Flood[1]	Landslip[1]	Cyclone Yasi[1]	Natural Tree Death[1]	Total[1]	% of total damage
Northwest Highlands	1	0.000	0.000	0.000	0.000	0.000	0.00
Gulf Plains	2	0.152	0.000	0.000	0.000	0.152	0.16
Cape York Peninsula	3	0.000	0.000	0.000	0.000	0.000	0.00
Mitchell Grass Downs	4	0.000	0.000	0.000	0.002	0.002	0.00
Channel Country	5	0.000	0.000	0.000	0.000	0.000	0.00
Mulga Lands	6	0.015	0.000	0.000	0.014	0.029	0.03
Wet Tropics	7	0.000	0.006	83.376	0.000	83.381	88.63
Central Queensland Coast	8	0.000	0.032	0.000	0.000	0.032	0.03
Einasleigh Uplands	9	0.033	0.000	6.759	0.000	6.792	7.22
Desert Uplands	10	0.000	0.000	0.000	0.000	0.000	0.00
Brigalow Belt	11	1.466	0.248	0.223	0.409	2.346	2.49
Southeast Queensland	12	1.263	0.003	0.000	0.000	1.266	1.35
New England Tableland	13	0.077	0.000	0.000	0.000	0.077	0.08
Grand Total		**3.006**	**0.289**	**90.358**	**0.425**	**94.077**	

[1] Damage is recorded as thousands of hectares (,000 ha). It is not shown as a rate, because the damage occurred in finite events.

4.9 Clearing trends 1988–2011

SLATS has produced estimates of annual clearing rates from winter 1988 to winter 2011. Figure 20 (page 40) illustrates the clearing rate for all woody vegetation, and the proportion with a FPC value greater than or equal to 11%. The greatest difference between the two estimates will be in years with a high proportion of young regrowth clearing or high amounts of clearing in western areas, where FPC is generally lower. There is less difference between the two estimates in terms of carbon loss, as areas with less than 20% canopy cover have low biomass.

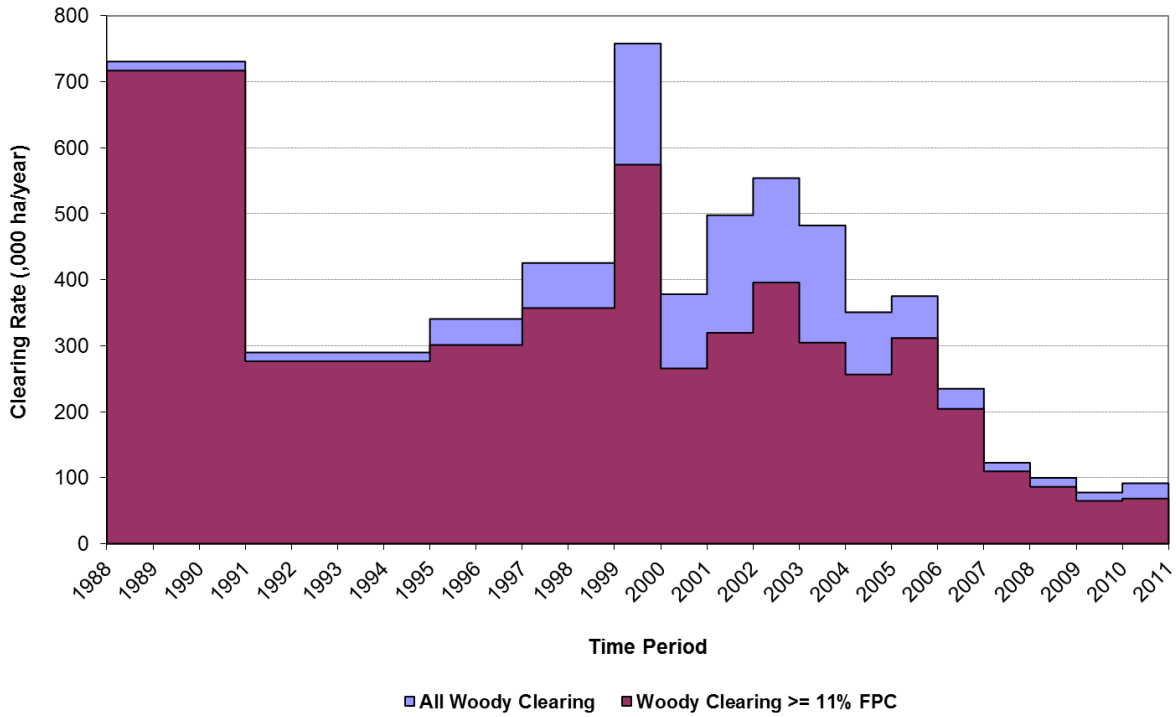


Figure 20: Clearing trends 1988–2009 (1988–2011).[1]

[1] Do not aggregate clearing rates from individual years to give an overall estimate of rate of clearing. Clearing of regrowth, following earlier failed clearing, can contribute significantly to the total.

Through analysis of the annual clearing rates from 1988 to 2011, SLATS has compiled statistics showing the number of repeat clearing events within each era. Figure 21 (below) illustrates the woody vegetation clearing rate for all woody vegetation clearing, and the proportion which has been previously detected in earlier land cover change eras.

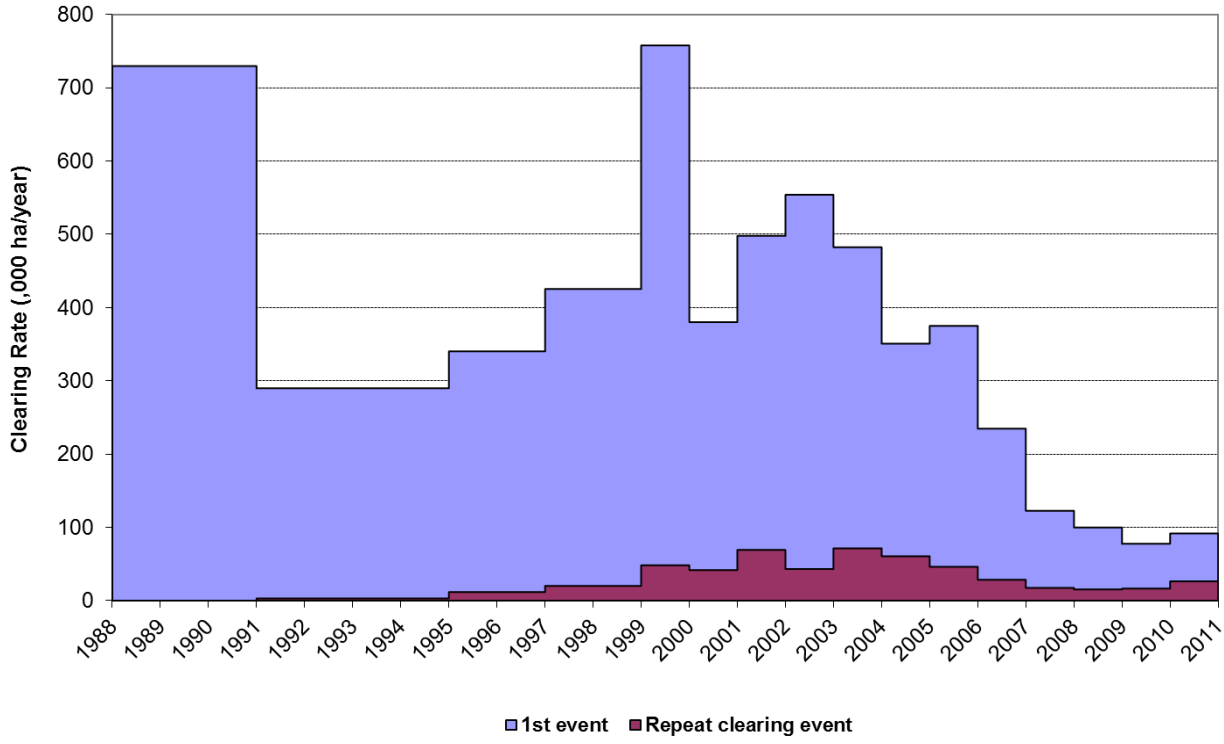


Figure 21: Time series for clearing rates for initial and repeat clearing events (1988–2011).

For the 2010–11 era, of the 91 690 ha/year cleared, 26 320 ha/year (29%) has previously been detected as woody vegetation clearing. Table 10 (below) shows the rates of woody vegetation change for repeat clearing events for each era.

Table 10: Woody vegetation clearing by repeat incidence (1988–2010)

Period	Rate of woody vegetation change (,000ha/yr) for repeated clearing events					
	1st event	2nd event	3rd event	4th event	Total	% of repeat clearing
1988–91	729.70	0.00	0.00	0.00	729.70	0.00
1991–95	286.71	3.09	0.00	0.00	289.80	1.07
1995–97	328.49	11.80	0.00	0.00	340.30	3.47
1997–99	405.04	20.20	0.07	0.00	425.30	4.76
1999–2000	709.56	47.93	0.30	0.00	757.78	6.36
2000–01	338.45	41.45	0.30	0.00	380.20	10.98
2001–02	428.61	67.95	1.34	0.00	497.90	13.92
2002–03	510.72	42.40	0.79	0.00	553.91	7.80
2003–04	410.88	69.21	2.25	0.01	482.36	14.82
2004–05	290.16	58.50	2.20	0.02	350.88	17.30
2005–06	328.77	44.47	1.87	0.03	375.13	12.36
2006–07	206.30	26.96	1.55	0.02	234.83	12.15
2007–08	105.44	16.19	1.11	0.03	122.78	14.11
2008–09	84.70	14.41	0.81	0.01	99.94	15.25
2009–10	61.14	15.44	0.99	0.02	77.59	21.21
2010–11	65.37	23.75	2.49	0.08	91.69	28.71

Section 5 Regional assessment of woody vegetation clearing

SLATS analysed woody vegetation change by using Geographic Information System (GIS) overlays to calculate the rate of woody vegetation clearing as a percentage of the area of 2010 wooded vegetation extent. SLATS also calculated the remaining wooded vegetation cover in 2010, by different regions.

The following GIS layers were used:

1. Biogeographic regions and sub-regions version 5.0 (section 5.1, page 42)
2. Catchments (section 5.2, page 48)
3. Local government areas (section 5.3, page 52)
4. Natural Resource Management regions (section 5.4, page 54)
5. Queensland native pasture communities (section 5.5, page 57).

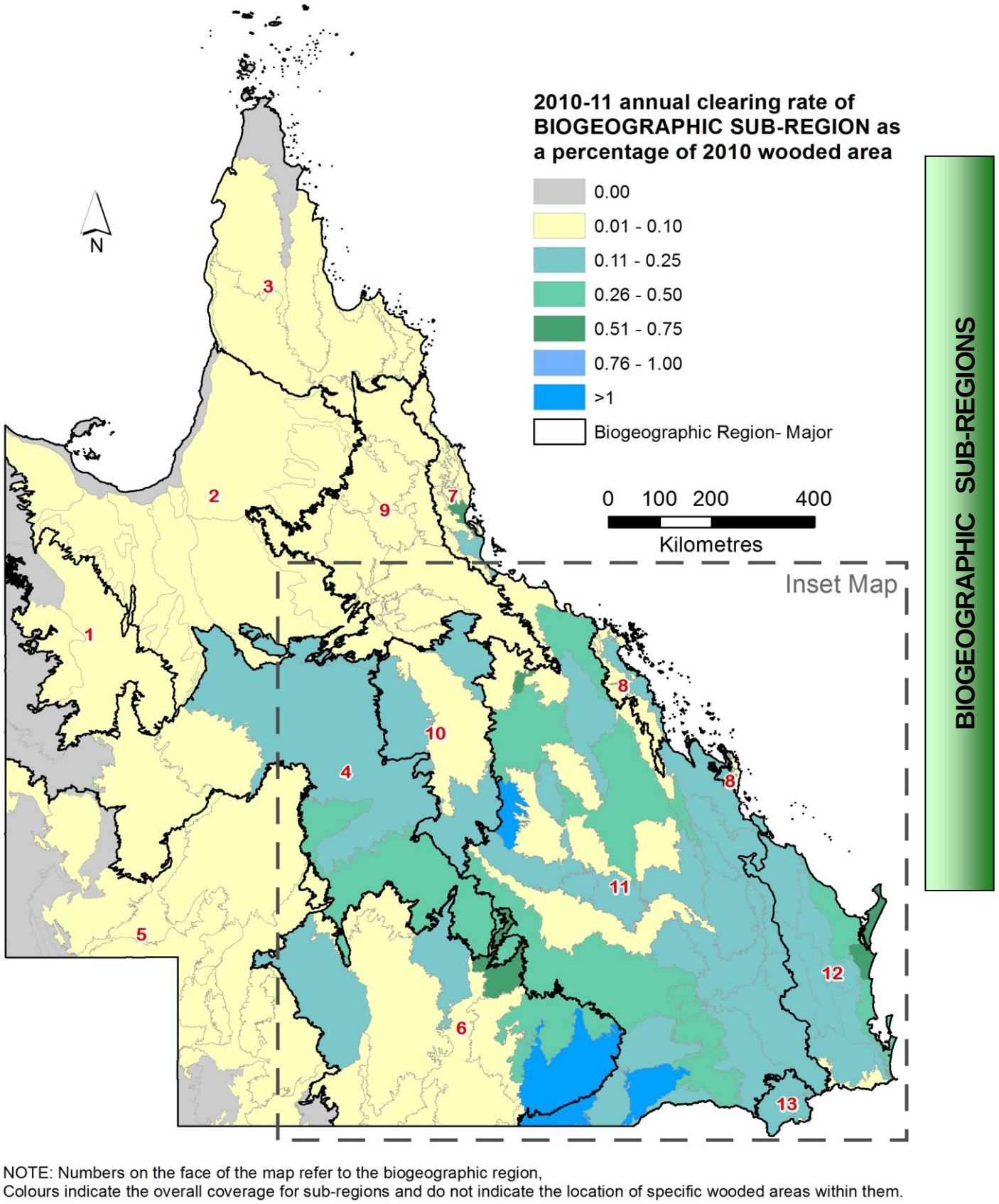
Woody vegetation clearing totals were compiled for each of the GIS layers (1–4 above) and statistics for each are provided in map and tabular forms. A similar analysis was completed for native pasture communities, but these statistics are presented in tabular form only (Table 16, page 58). The extent of native pasture communities in Queensland is displayed in Figure 30 (page 57). Note that in the catchment GIS layer, some of the small coastal catchments have been amalgamated and named after one of the rivers—for example, the amalgamated Sunshine Coast catchments are called Maroochy. This report contains only a selection of possible data tables. Spreadsheets containing additional data are available on request. See page 60 for contact details.

5.1 Woody vegetation clearing by biogeographic region and sub-region

The clearing rate for the biogeographic regions is shown in Table 11 (page 46). Appendix C (page 74) has a full analysis of clearing rates for the sub-regions, broken down by tenure and replacement cover. The maps shown in Figure 22 (page 43) and Figure 23 (page 44) show the percentage of woody vegetation cleared for each biogeographic sub-region.

Results

- The Brigalow Belt biogeographic region, with 45 000 ha/year (49% of total clearing) for 2010–11, continued to contribute the highest woody vegetation clearing rate. This represented a 25% increase from the 2009–10 era and was 5% higher than the clearing rate reported for the 2008–09 era (Table 12, page 47).
- The second highest clearing rate occurred in the Mulga Lands biogeographic region (19 650 ha/year), representing an increase of 46% from the previous era (Table 12, page 47).
- Within the Brigalow Belt biogeographic region, 22% of the total woody vegetation clearing was defined as remnant, while in the Mulga Lands the figure was 31% (Table 12, page 47).
- In the Desert Uplands biogeographic region, there was a 260% increase in the rate of woody vegetation clearing, from the 1 600 ha/year detected in the previous period to 4 200 ha/year. This large variation can be partially explained by the 1 500 ha/year of missed clearing from 2009–10.



NOTE: Numbers on the face of the map refer to the biogeographic region,
Colours indicate the overall coverage for sub-regions and do not indicate the location of specific wooded areas within them.

Figure 22: Average annual woody vegetation clearing rate as a percentage of 2010 wooded area by biogeographic sub-region (2010–11)

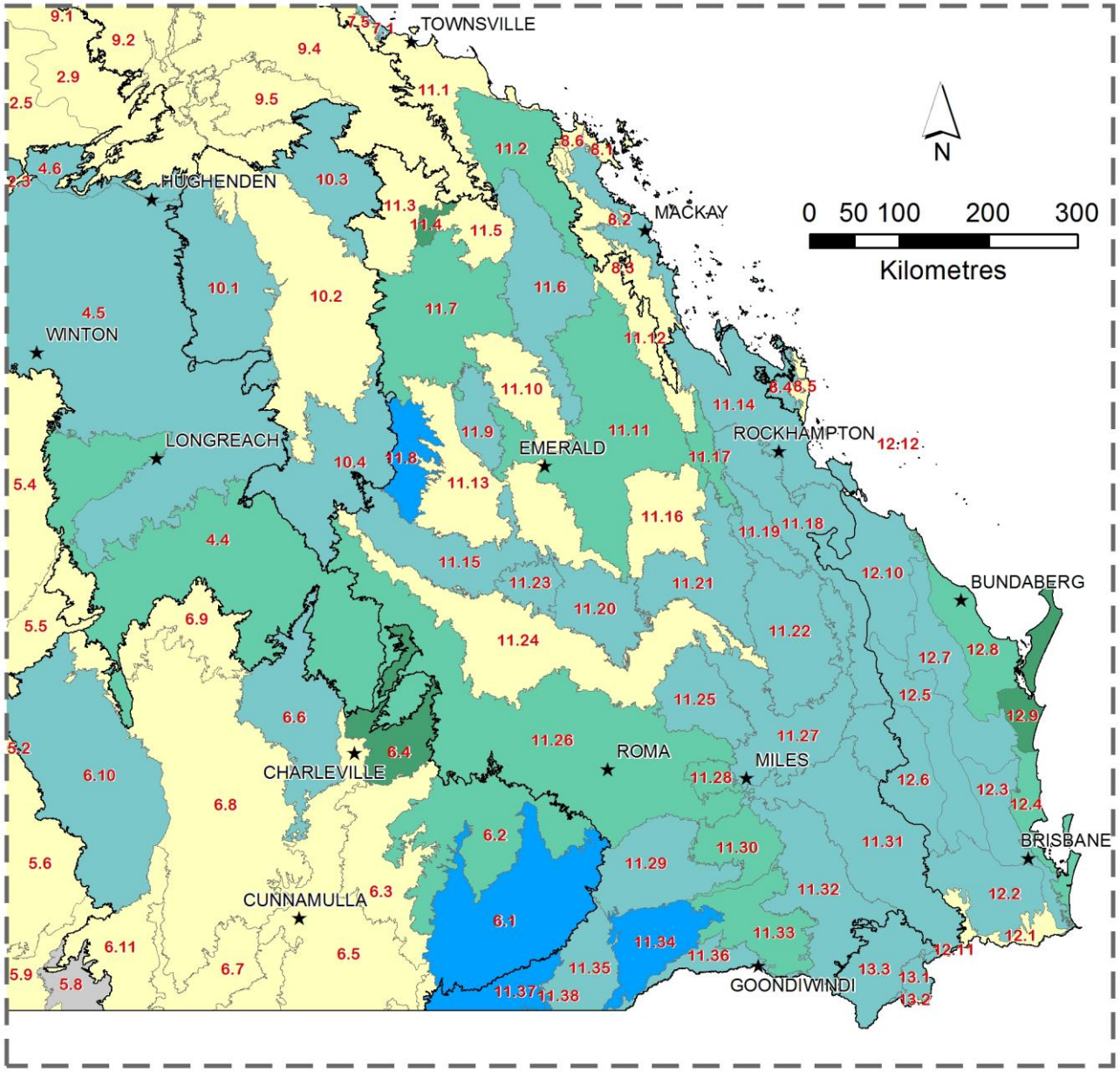


Figure 23: Inset: Average annual woody vegetation clearing rate as a percentage of 2010 wooded area by biogeographic sub-region (2010–11)

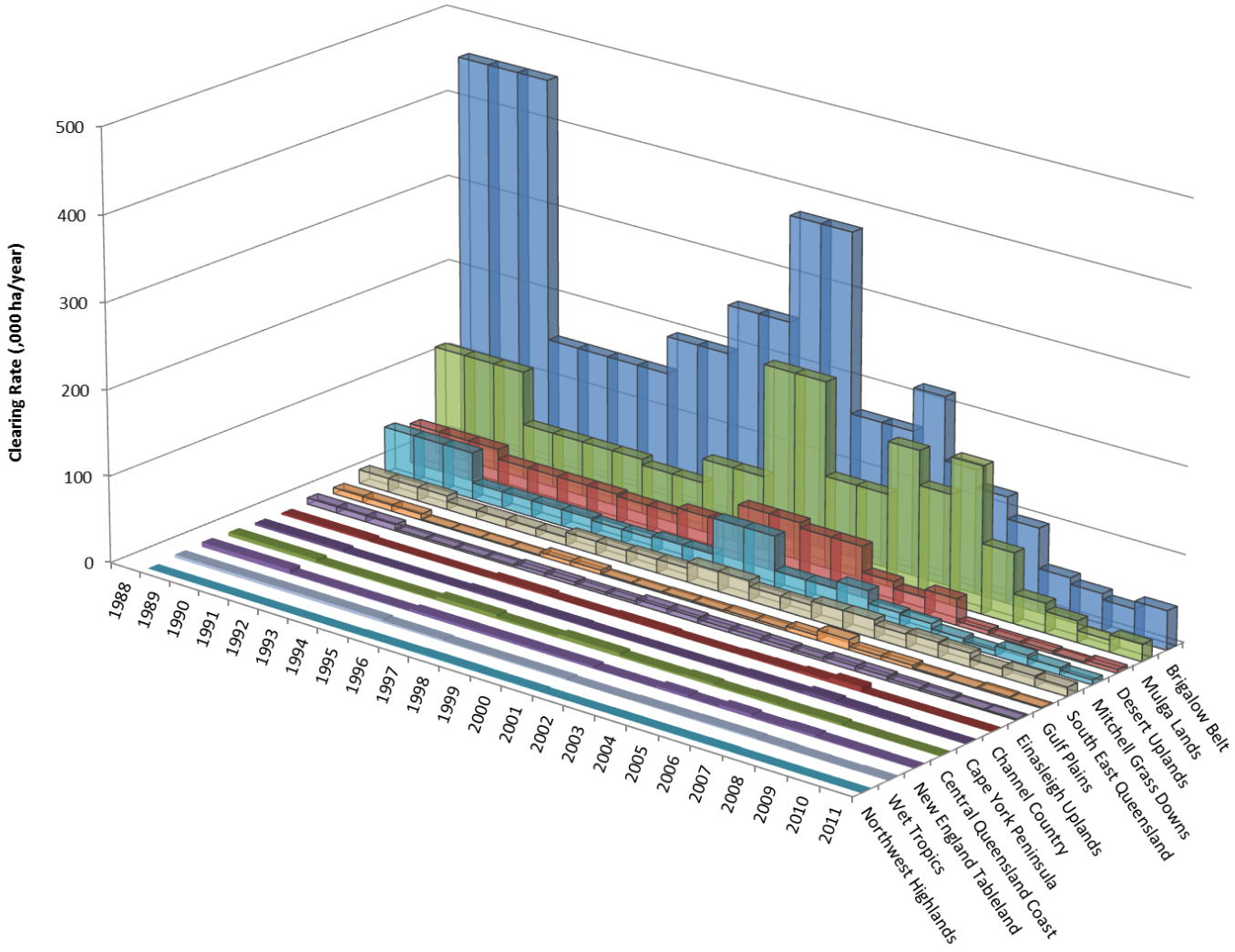


Figure 24: Trend in bioregions woody vegetation clearing rates (1988–2011)

Table 11: Woody vegetation clearing by replacement land cover by biogeographic region (2010–11)

Biogeographic region			Rate of woody vegetation change (,000ha/yr) for							% wooded vegetation cover 2010[1]	% total clearing in Qld
Name	Map Ref	Area (,000ha)	Pasture	Crops	Forest	Mining	Infra-structure	Settle-ment	Total		
Northwest Highlands	1	7344	0.020	0.000	0.000	0.142	0.007	0.003	0.172	60.35	0.19
Gulf Plains	2	21911	0.821	0.000	0.000	0.003	0.217	0.000	1.041	71.46	1.13
Cape York Peninsula	3	12305	0.478	0.000	0.000	0.328	0.214	0.003	1.024	93.29	1.12
Mitchell Grass Downs	4	24162	5.635	0.000	0.000	0.001	0.027	0.000	5.663	13.62	6.18
Channel Country	5	23217	0.290	0.000	0.000	0.000	0.080	0.000	0.369	11.17	0.40
Mulga Lands	6	18606	18.244	0.000	0.000	0.000	1.395	0.009	19.648	48.43	21.43
Wet Tropics	7	1993	0.246	0.014	0.457	0.000	0.047	0.022	0.786	84.25	0.86
Central Queensland Coast	8	1484	0.274	0.001	0.505	0.001	0.011	0.030	0.822	77.25	0.90
Einasleigh Uplands	9	11626	1.057	0.001	0.000	0.016	0.334	0.002	1.409	86.41	1.54
Desert Uplands	10	6941	4.082	0.000	0.000	0.061	0.100	0.001	4.245	64.12	4.63
Brigalow Belt	11	36528	36.746	0.311	1.170	2.051	4.563	0.150	44.989	50.94	49.07
Southeast Queensland	12	6248	3.875	0.127	4.738	0.195	0.464	1.178	10.578	70.62	11.54
New England Tableland	13	775	0.855	0.004	0.075	0.004	0.004	0.001	0.942	61.80	1.03

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

Table 12: Woody vegetation clearing by tenure by biogeographic region, showing HVR and remnant status (2010–11)

Biogeographic region				Rate of woody vegetation change (,000ha/yr) on					
Name	Map Ref.	Area (,000ha)	Remnant Status	Freehold	Leasehold	Other Tenures	Other Reserves	Total	% Remnant clearing
Brigalow Belt	11	36528	Remnant	5.087	3.569	0.000	1.129	9.786	22
			HVR	5.792	2.162	0.000	0.009	7.963	
			Non-remnant	21.392	5.810	0.000	0.040	27.241	
Channel Country	5	23217	Remnant	0.002	0.352	0.000	0.000	0.354	96
			HVR	0.000	0.000	0.000	0.000	0.000	
			Non-remnant	0.000	0.015	0.000	0.000	0.015	
Central Queensland Coast	8	1484	Remnant	0.112	0.032	0.000	0.043	0.187	23
			HVR	0.093	0.013	0.000	0.024	0.130	
			Non-remnant	0.047	0.013	0.000	0.445	0.505	
Cape York Peninsula	3	12305	Remnant	0.107	0.465	0.311	0.040	0.923	90
			HVR	0.021	0.022	0.001	0.000	0.043	
			Non-remnant	0.019	0.031	0.007	0.001	0.058	
Desert Uplands	10	6941	Remnant	0.278	1.127	0.000	0.013	1.417	33
			HVR	0.092	0.037	0.000	0.000	0.128	
			Non-remnant	0.857	1.842	0.000	0.000	2.700	
Einasleigh Uplands	9	11626	Remnant	0.051	1.221	0.004	0.001	1.277	91
			HVR	0.008	0.037	0.000	0.000	0.045	
			Non-remnant	0.014	0.073	0.000	0.000	0.087	
Gulf Plains	2	21911	Remnant	0.056	0.900	0.000	0.000	0.956	92
			HVR	0.000	0.006	0.000	0.000	0.006	
			Non-remnant	0.004	0.074	0.000	0.000	0.079	
Mitchell Grass Downs	4	24162	Remnant	1.330	0.976	0.000	0.000	2.306	41
			HVR	0.273	0.121	0.000	0.000	0.395	
			Non-remnant	1.718	1.244	0.000	0.000	2.962	
Mulga Lands	6	18606	Remnant	3.585	2.438	0.000	0.001	6.023	31
			HVR	3.341	0.707	0.000	0.000	4.048	
			Non-remnant	4.412	5.165	0.000	0.000	9.577	
New England Tableland	13	775	Remnant	0.237	0.013	0.000	0.012	0.262	28
			HVR	0.311	0.011	0.000	0.001	0.323	
			Non-remnant	0.306	0.003	0.000	0.049	0.357	
Northwest Highlands	1	7344	Remnant	0.000	0.148	0.000	0.000	0.148	86
			HVR	0.000	0.001	0.000	0.000	0.001	
			Non-remnant	0.000	0.021	0.002	0.000	0.023	
Southeast Queensland	12	6248	Remnant	1.769	0.187	0.000	0.220	2.178	21
			HVR	1.947	0.100	0.000	0.007	2.055	
			Non-remnant	1.760	0.117	0.000	4.468	6.345	
Wet Tropics	7	1993	Remnant	0.082	0.083	0.000	0.069	0.234	30
			HVR	0.029	0.015	0.000	0.002	0.046	
			Non-remnant	0.080	0.022	0.000	0.404	0.506	

5.2 Woody vegetation clearing by catchments

The clearing rates for the major drainage divisions are shown in Table 13 on this page and historically in Figure 25 (page 49). Appendix D (page 84) has a full analysis of clearing rates for each catchment, broken down by tenure and replacement cover. The maps shown in Figure 26 (page 50) and Figure 27 (page 51) show the percentage of woody vegetation cleared for each catchment.

Results

- The clearing rates for North East Coast and Murray-Darling drainage divisions were about the same - approximately 39 500 ha/year each. Combined, these two drainage divisions accounted for 86% of the state's clearing (Table 13, below).
- The reef catchments are a subset of the North East Coast drainage division indicated by the blue outline in Figure 26 (page 50). These catchments recorded a clearing rate of 34 500 ha/year. This is an 11% increase over the 31 000 ha/year reported in the 2009–10 and 2008–09 eras.

Table 13: Woody vegetation clearing by land cover by drainage division (2010–11)

Drainage division		Rate of woody vegetation clearing (,000ha/yr)							% wooded vegetation cover 2010[1]	% total clearing in QLD
Name	Total area (,000ha)	Pasture	Crops	Forest	Mining	Infra-structure	Settle-ment	Total		
Bulloo	5185	0.472	0.000	0.000	0.000	0.080	0.000	0.552	29.46	0.60
Gulf Rivers	45269	1.878	0.000	0.000	0.476	0.625	0.003	2.981	72.40	3.25
Lake Eyre	51002	8.855	0.000	0.000	0.001	0.204	0.001	9.061	20.26	9.88
Murray-Darling	26247	32.650	0.207	0.970	0.400	5.416	0.015	39.658	48.69	43.26
North East Coast	45019	28.769	0.251	5.974	1.925	1.136	1.377	39.432	65.94	43.01
Reef Catchments[2]	42305	27.615	0.241	3.802	1.799	0.719	0.374	34.551	73.15	37.68

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

[2] Reef catchments are a large component of the North East Coast drainage division, not a separate division

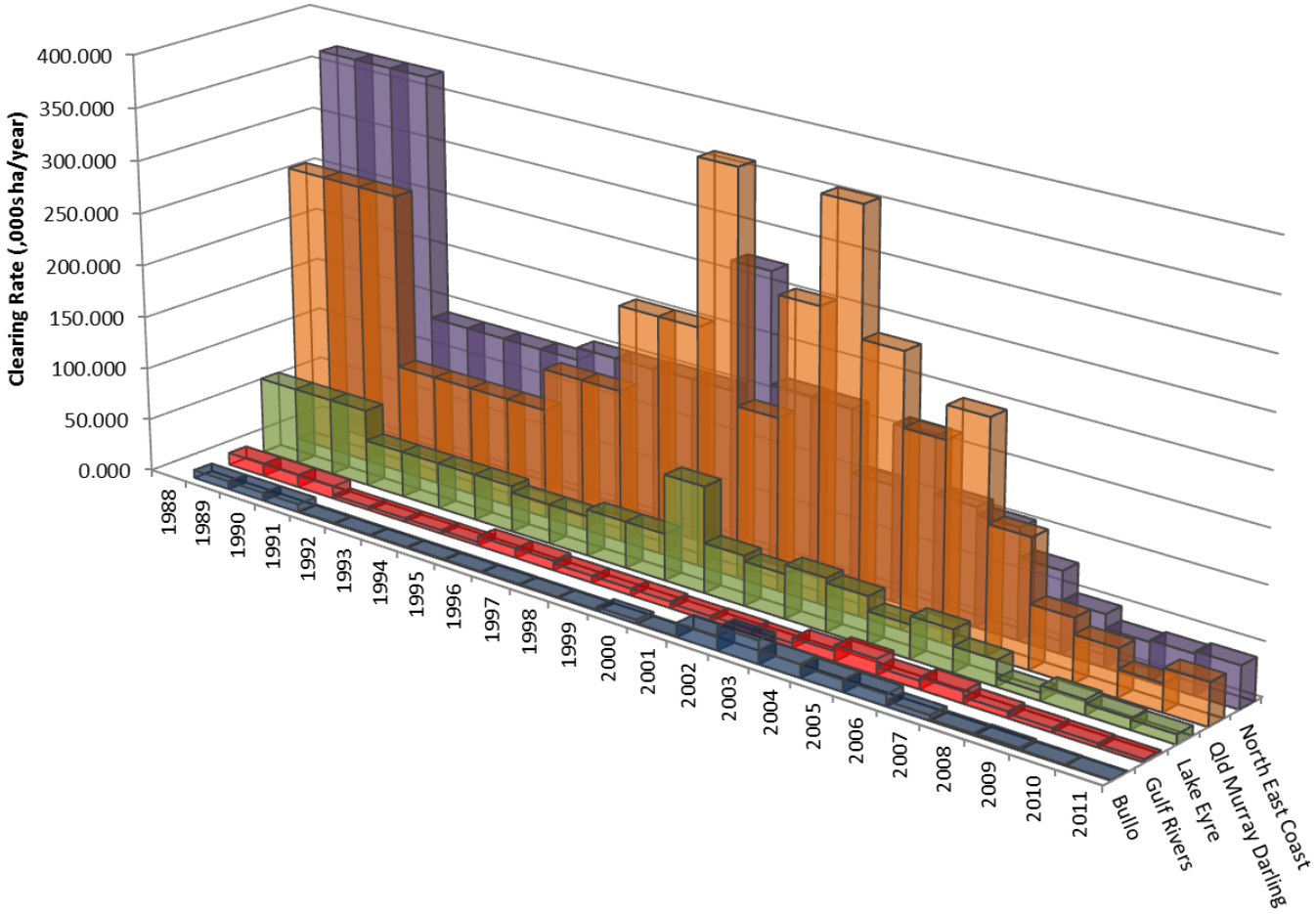
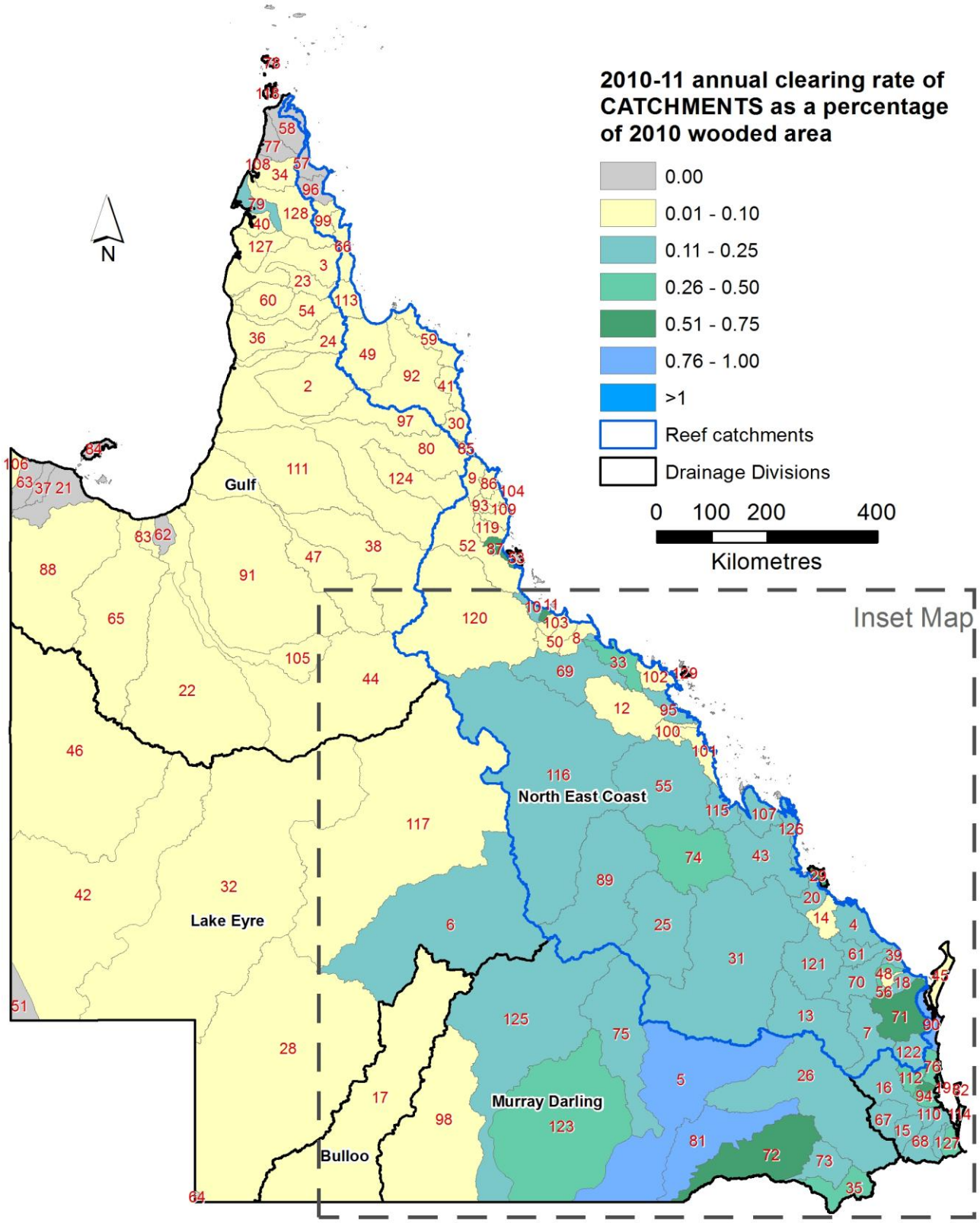


Figure 25: Trend in drainage divisions with the woody vegetation clearing rates (1988–2011)



NOTE: Numbers on the face of the map refer to the catchment reference number in the accompanying table.
Colours indicate the overall coverage for catchments and do not indicate the location of specific wooded areas within them.

Figure 26: Average annual woody vegetation clearing rate as a percentage of 2010 wooded area by catchment (2010–11)

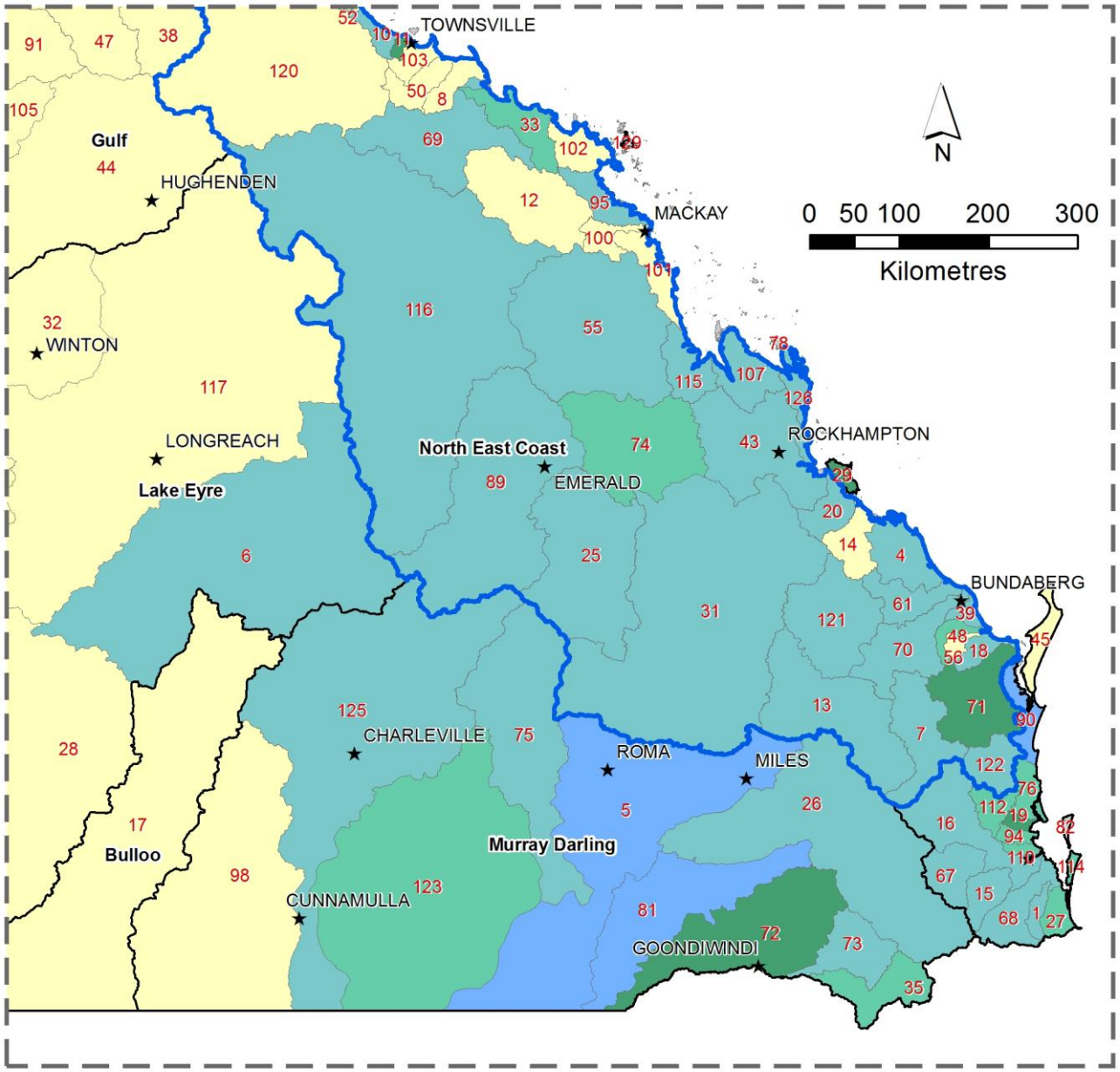


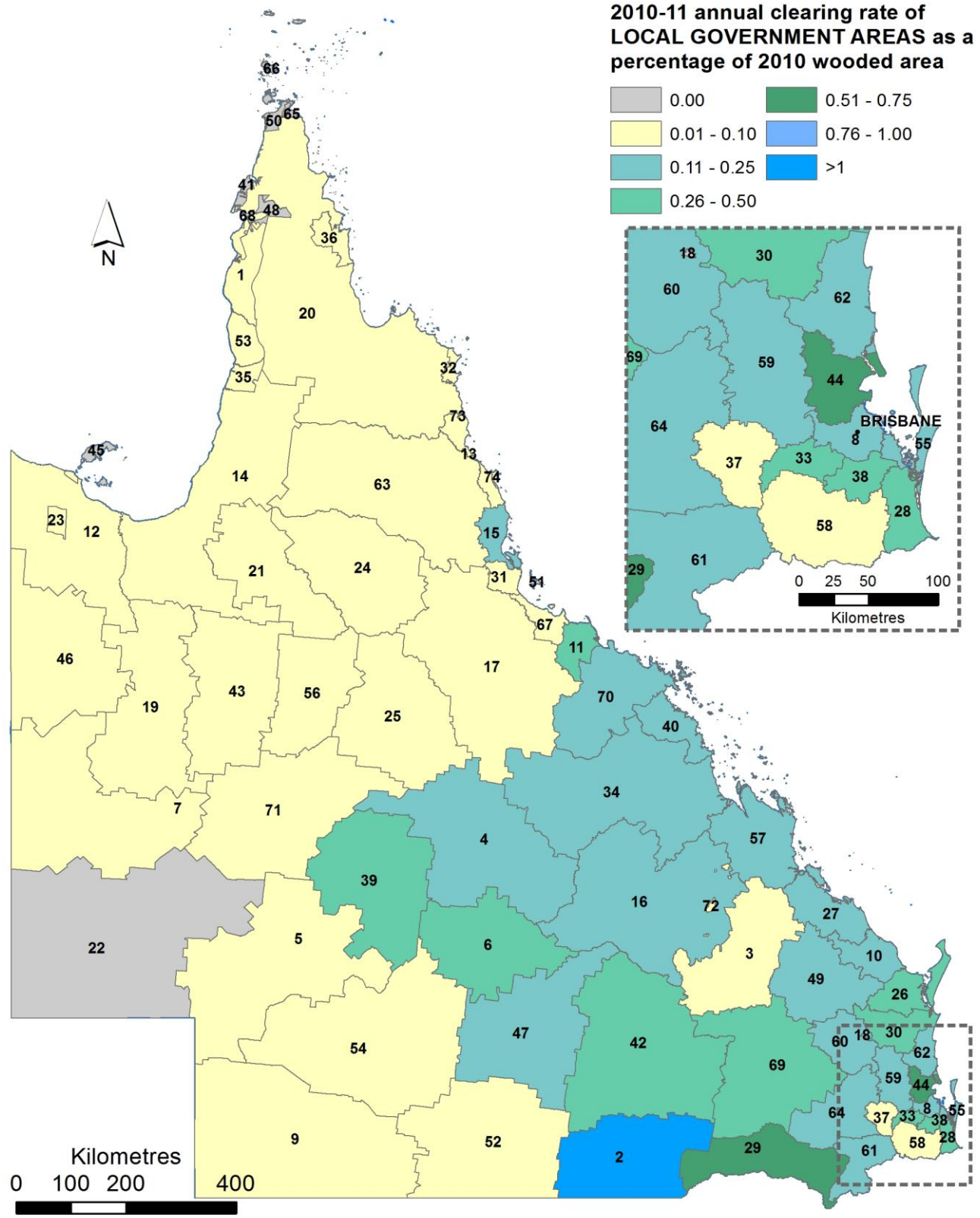
Figure 27: Average annual woody vegetation clearing rate as a percentage of 2010 wooded area by catchment (2010–11)

5.3 Woody vegetation clearing by local government area

The clearing rates for local government areas are shown in Figure 28 (page 53) as a percentage of woody vegetation cleared for each catchment. A full breakdown of clearing in local government areas can be found in Table 22 (page 98).

Results

- The local government area of Balonne Shire recorded the highest clearing rate of 12 900 ha/year. This is more than 3 times the amount identified in 2009–10. A significant amount of this clearing (5 000 ha/year) was identified as clearing to infrastructure. This may be due to filling of previously vegetated, unfilled dams during major rainfall events in 2010–11.



NOTE: Numbers on the face of the map refer to the LGA reference number in the accompanying table.
Colours indicate the overall coverage for LGA's and do not indicate the location of specific wooded areas within them.

Figure 28: Average annual woody vegetation clearing rate as a percentage of 2010 wooded area by local government area (2010–11)

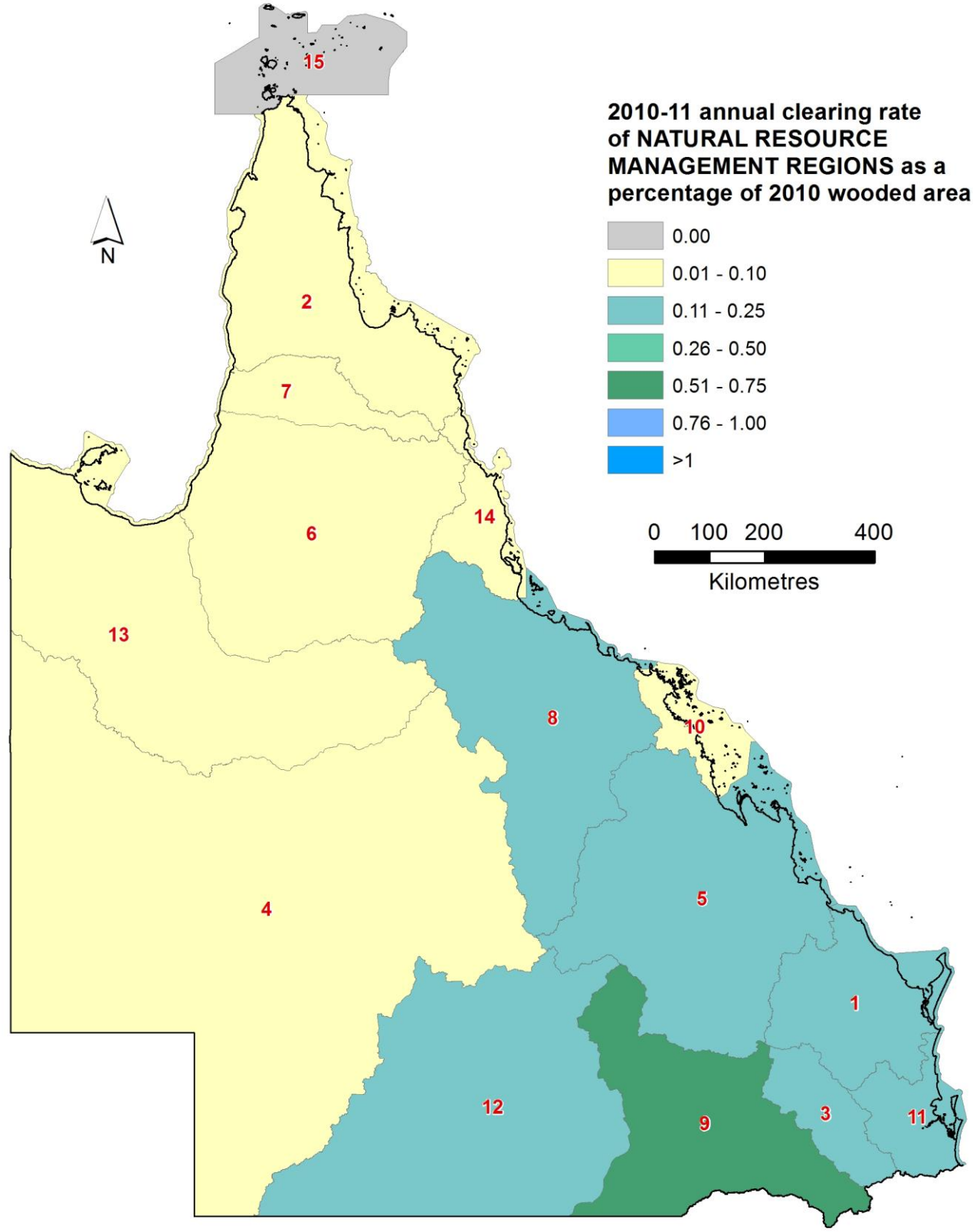
5.4 Woody vegetation clearing by Natural Resource Management region

The clearing rates for the Natural Resource Management regions (NRMR) are shown in Figure 29 (page 55) as a percentage of woody vegetation cleared for each region. A breakdown of clearing rates by replacement land cover and tenure are displayed in Tables 14 and 15 (page 56) respectively.

A more detailed analysis of clearing in each NRMR can be found in the Addenda Reports on the SLATS website http://www.qld.gov.au/environment/land/vegetation/mapping/slats/.

Results

- The NRMR with the highest clearing rate was Queensland Murray-Darling Committee (QMDC) with 22 330 ha/year, representing a 126% increase from 2009–10 (Tables 14 and 15, page 56).



NOTE: Numbers on the face of the map refer to the NRMR reference number in the accompanying table.
Colours indicate the overall coverage for NRMR and do not indicate the location of specific wooded areas within them.

Figure 29: Average annual woody vegetation clearing as a percentage of 2010 wooded area by

Natural Resource Management region (2010–11)

Table 14: Woody vegetation clearing by land cover by Natural Resource Management region (2010-11)

NRM region			Rate of woody vegetation clearing (,000ha/yr)							% wooded vegetation cover 2010[1]	% total clearing in QLD
Name	Ref.	Total area (,000ha)	Pasture	Crops	Forest	Mining	Infra-structure	Settle-ment	Total		
Burnett Mary	1	5595	4.762	0.121	4.018	0.031	0.039	0.126	9.097	69.18	9.91
Cape York[2]	2, 7	13685	0.535	0.000	0.000	0.328	0.248	0.003	1.114	92.29	1.21
Condamine	3	2544	1.260	0.022	0.325	0.104	0.053	0.005	1.768	39.26	1.93
Desert Channels	4	51000	8.855	0.000	0.000	0.001	0.204	0.001	9.061	20.26	9.87
Fitzroy	5	15725	12.629	0.105	0.340	1.645	0.548	0.104	15.371	55.32	16.74
Northern Gulf[3]	6, 7	19410	0.809	0.000	0.000	0.001	0.492	0.000	1.302	88.40	1.42
NQ Dry Tropics	8	14090	9.562	0.001	0.007	0.122	0.270	0.098	10.060	64.46	10.95
QMDC[4]	9	10176	16.143	0.184	0.646	0.296	5.063	0.001	22.334	42.99	24.32
Reef	10	934	0.203	0.001	0.324	0.001	0.011	0.027	0.568	67.53	0.62
SEQ	11	2368	1.086	0.009	0.835	0.126	0.134	1.003	3.193	66.68	3.48
South West	12	18711	15.719	0.000	0.000	0.000	0.380	0.009	16.108	47.74	17.54
Southern Gulf	13	19460	0.835	0.000	0.000	0.146	0.076	0.003	1.060	49.16	1.15
Terrain	14	2224	0.280	0.014	0.450	0.000	0.040	0.018	0.801	84.71	0.87
Torres Strait	15	85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.71	0.00

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

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

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

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

Table 15: Woody vegetation clearing by tenure by Natural Resource Management region (2010–11)

NRM region			Rate of woody vegetation clearing (,000ha/yr)					% wooded vegetation cover 2010[1]	% total clearing in QLD
Name	Ref.	Total area (,000ha)	Freehold	Leasehold	Other	Reserves	Total		
Burnett Mary	1	5595	4.706	0.481	0.000	3.909	9.097	69.18	9.91
Cape York[2]	2, 7	13685	0.167	0.588	0.319	0.041	1.114	92.29	1.21
Condamine	3	2544	1.397	0.044	0.000	0.327	1.768	39.26	1.93
Desert Channels	4	51000	5.042	4.018	0.000	0.001	9.061	20.26	9.87
Fitzroy	5	15725	11.097	3.824	0.000	0.447	15.369	55.32	16.74
Northern Gulf[3]	6, 7	19410	0.038	1.264	0.000	0.001	1.302	88.40	1.42
NQ Dry Tropics	8	14090	2.907	7.124	0.004	0.024	10.060	64.46	10.95
QMDC[4]	9	10176	19.908	1.797	0.000	0.629	22.334	42.99	24.32
Reef	10	934	0.204	0.031	0.000	0.333	0.568	67.53	0.62
SEQ	11	2368	2.182	0.210	0.000	0.800	3.193	66.68	3.48
South West	12	18711	7.246	8.861	0.000	0.001	16.108	47.74	17.54
Southern Gulf	13	19460	0.166	0.892	0.002	0.000	1.060	49.16	1.15
Terrain	14	2224	0.162	0.173	0.000	0.465	0.801	84.71	0.87
Torres Strait	15	85	0.000	0.000	0.000	0.000	0.000	70.71	0.00

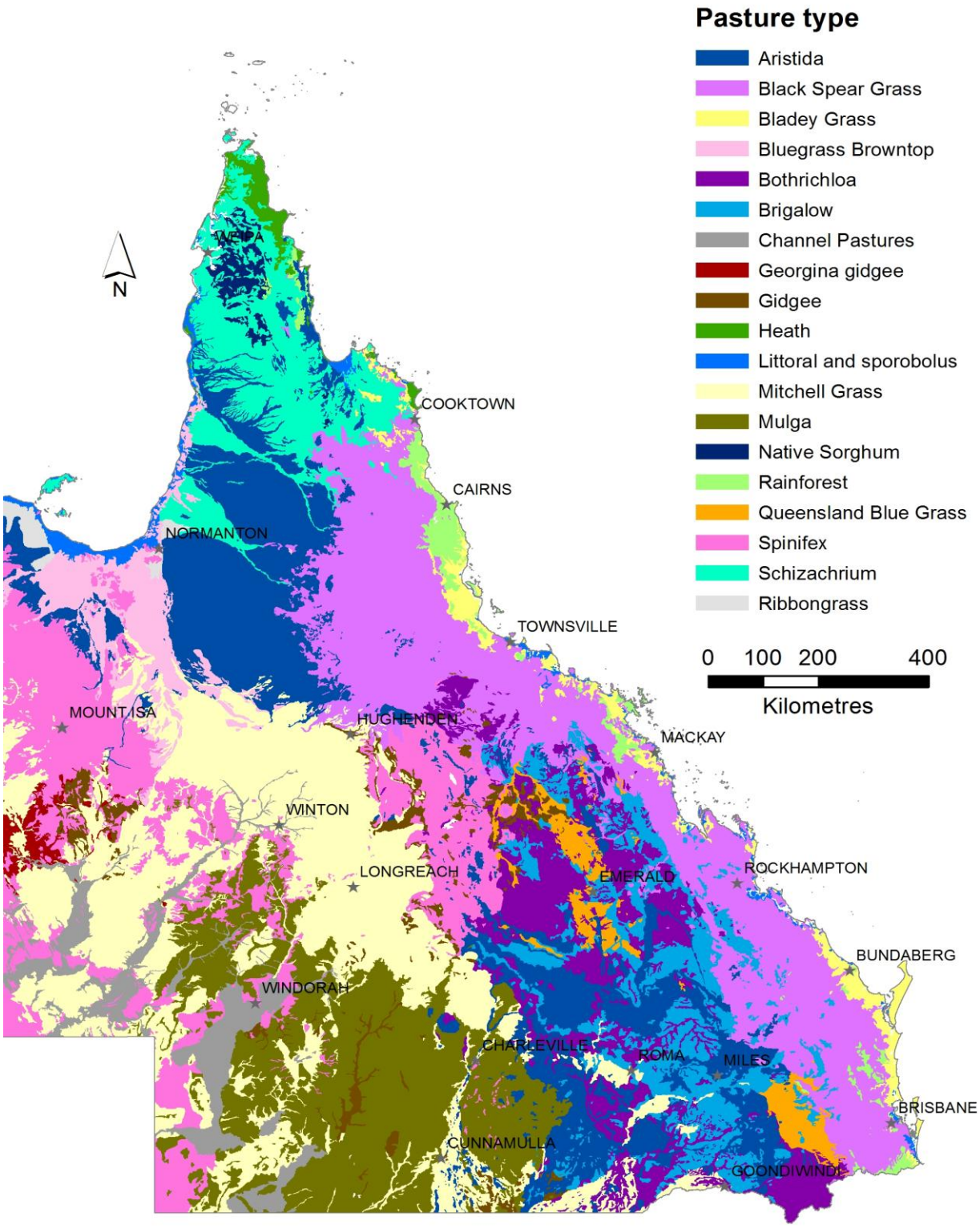
[1] Based on the wooded extent and FPC index V2.3

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

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

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

5.5 Woody vegetation clearing by native pasture community



NATIVE PASTURE COMMUNITIES

Figure 30: Queensland native pasture communities (Weston et al., 1981)

Table 16: Woody vegetation clearing by land cover by native pasture community (2010–11)

Native pasture community		Rate of woody vegetation clearing (,000ha/yr)							% wooded vegetation cover 2010[1]	% total clearing in QLD
Name	Total area (,000ha)	Pasture	Crops	Forest	Mining	Infra-structure	Settle-ment	Total		
Aristida-Chrysopogon (tea tree)	9215	0.545	0.000	0.000	0.000	0.220	0.000	0.765	88.21	0.83
Aristida-Chrysopogon (W. Einasleigh)	2535	0.071	0.000	0.000	0.000	0.050	0.000	0.121	89.97	0.13
Aristida-Cleistochloa (sandstone hills)	3627	1.720	0.000	0.085	0.025	0.079	0.000	1.910	85.02	2.08
Aristida-Eragrostis (cypress pine)	1074	1.183	0.000	0.183	0.000	0.009	0.000	1.375	76.52	1.50
Aristida-Eragrostis (southern sandstone)	1726	1.878	0.018	0.534	0.368	0.069	0.000	2.867	75.17	3.13
Aristida-Thyridolepis (poplar box)	2585	9.820	0.000	0.102	0.000	1.084	0.000	11.006	51.08	12.01
Aristida-Triodia (lancewood)	2425	0.399	0.000	0.000	0.000	0.009	0.000	0.409	91.10	0.45
Black Spear Grass (central)	5935	4.280	0.088	0.200	0.520	0.391	0.084	5.562	67.05	6.07
Black Spear Grass (northern)	13175	1.639	0.000	0.000	0.025	0.317	0.096	2.077	84.88	2.27
Black Spear Grass (southern)	6052	4.882	0.024	2.349	0.075	0.091	0.778	8.199	68.40	8.95
Bladey Grass (central)	578	0.193	0.000	0.322	0.001	0.011	0.023	0.550	47.92	0.60
Bladey Grass (northern)	1029	0.216	0.014	0.423	0.004	0.035	0.008	0.699	72.93	0.76
Bladey Grass (southern)	987	0.584	0.081	2.161	0.070	0.055	0.230	3.181	78.90	3.47
Bluegrass Browntop	4775	0.112	0.000	0.000	0.003	0.005	0.000	0.120	36.54	0.13
Bothriochloa-Chloris (central)	4514	5.529	0.001	0.006	0.806	0.156	0.017	6.514	55.06	7.11
Bothriochloa-Chloris (south)	5286	10.809	0.047	0.139	0.043	0.337	0.001	11.376	50.83	12.41
Bothriochloa-Danthonia (traprock)	328	0.210	0.000	0.000	0.000	0.000	0.000	0.210	58.92	0.23
Brigalow (northern)	3918	3.541	0.000	0.000	0.237	0.022	0.005	3.806	34.18	4.15
Brigalow (Roma region)	1622	0.857	0.028	0.087	0.065	0.002	0.003	1.043	30.52	1.14
Brigalow and Belah (southern)	3226	2.702	0.121	0.112	0.027	0.122	0.002	3.086	22.43	3.37
Channel Pastures	5534	0.049	0.000	0.000	0.000	0.008	0.000	0.057	10.97	0.06
Georgina gidgee	1637	0.003	0.000	0.000	0.000	0.000	0.000	0.003	10.83	0.00
Gidgee (central)	1317	1.732	0.000	0.000	0.000	0.000	0.000	1.733	36.33	1.89
Gidgee (far west)	611	0.001	0.000	0.000	0.000	0.000	0.000	0.001	17.12	0.00
Gidgee (southern)	772	0.691	0.000	0.000	0.000	0.011	0.000	0.702	41.81	0.77
Heath	942	0.029	0.000	0.000	0.000	0.005	0.000	0.035	94.85	0.04
Littoral and sporobolus	1488	0.421	0.000	0.000	0.010	0.027	0.061	0.520	39.60	0.57
Mitchell Grass (Ashy Downs)	2556	0.018	0.000	0.000	0.000	0.000	0.000	0.018	5.99	0.02
Mitchell Grass (Northern Downs)	21962	4.897	0.000	0.000	0.000	0.025	0.000	4.923	11.81	5.37
Mitchell Grass (Southern Downs)	2552	1.658	0.000	0.000	0.000	0.006	0.000	1.664	29.48	1.82
Mitchell Grass (Southern Flooded)	875	0.116	0.021	0.000	0.000	3.480	0.000	3.617	27.19	3.95
Mitchell Grass (Stony Downs)	2144	0.000	0.000	0.000	0.000	0.009	0.000	0.009	4.24	0.01
Mulga on residuals	8023	0.939	0.000	0.000	0.000	0.046	0.000	0.984	29.57	1.07

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

Table 16 (continued): Woody vegetation clearing by land cover by native pasture community (2010–11)

Native pasture community		Rate of woody vegetation clearing (,000ha/yr)							% wooded vegetation cover 2010[1]	% total clearing in QLD
Name	Total area (,000ha)	Pasture	Crops	Forest	Mining	Infra-structure	Settle-ment	Total		
Mulga-Whitewood	637	0.002	0.000	0.000	0.000	0.001	0.000	0.003	20.52	0.00
Native Sorghum	1013	0.089	0.000	0.000	0.017	0.001	0.000	0.107	95.75	0.12
Queensland Blue Grass (central)	1574	0.421	0.004	0.000	0.052	0.034	0.000	0.511	35.21	0.56
Queensland Blue Grass (southern)	940	0.092	0.001	0.008	0.000	0.001	0.002	0.104	14.17	0.11
Rainforest	1849	0.252	0.011	0.232	0.000	0.017	0.055	0.567	88.87	0.62
Ribbongrass	847	0.018	0.000	0.000	0.000	0.002	0.000	0.021	95.44	0.02
Schizachrium (flooded plains)	1782	0.033	0.000	0.000	0.000	0.006	0.000	0.038	73.12	0.04
Schizachrium (hills and plains)	7575	0.228	0.000	0.000	0.311	0.160	0.003	0.702	96.46	0.77
Soft and hard mulga on red plain	10119	6.808	0.000	0.000	0.000	0.278	0.009	7.096	52.26	7.74
Spinifex (CQ desert)	4743	2.620	0.000	0.000	0.000	0.138	0.001	2.759	65.82	3.01
Spinifex (hard on sand dunes)	5458	0.194	0.000	0.000	0.000	0.107	0.000	0.301	6.21	0.33
Spinifex (hard with eucalypts and acacia)	1987	0.053	0.000	0.000	0.000	0.010	0.000	0.063	35.41	0.07
Spinifex (Mt Isa highlands)	8895	0.073	0.000	0.000	0.143	0.010	0.003	0.228	59.19	0.25

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

Section 6 SLATS products

For information on SLATS derived products such as land cover change, wooded extent and FPC index rasters contact:

Senior Spatial Information Officer

Client Outcomes (Product Delivery)

Spatial Information

Department of Natural Resources and Mines

Phone: 61 7 3896 3175

Fax: 61 7 3896 3165

Email: siproductdelivery@dnrm.qld.gov.au

For information on SLATS image data contact:

Spatial Information Officer

Imagery Management

Department of Natural Resources and Mines

Phone: 61 7 3896 3187

Fax: 61 7 3896 3573

Email: sidmaimageryacquisition@dnrm.qld.gov.au

Landsat imagery is also free to download from the USGS website http://glovis.usgs.gov/.

Some Queensland Government spatial data can be downloaded through the QGIS website http://dds.information.qld.gov.au/dds/.

More information can be found on the SLATS website at http://www.qld.gov.au/environment/land/vegetation/mapping/slats/.

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Appendix A Woody vegetation clearing by 7’30” grid maps (1988–2011)

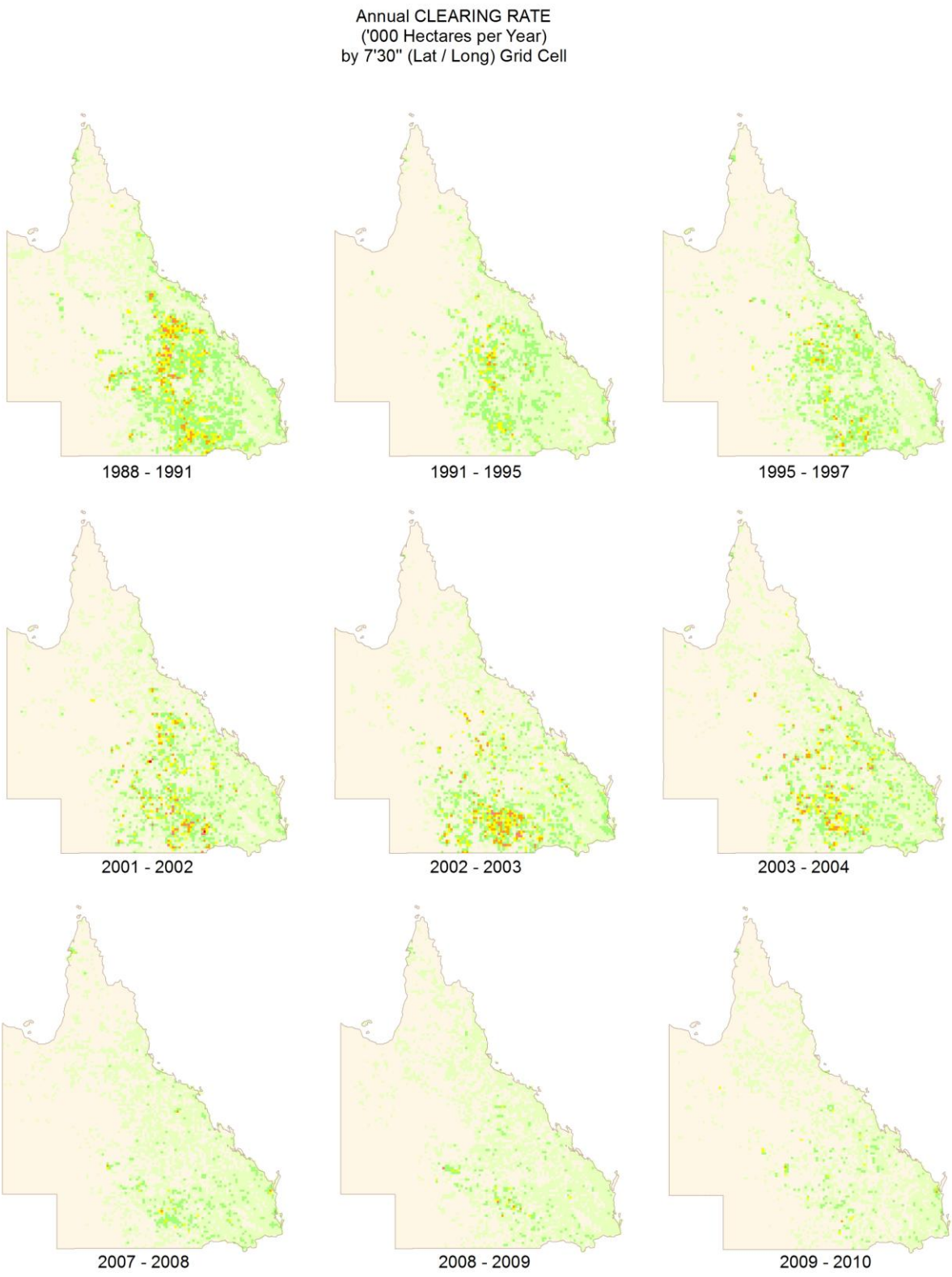

Figure 31: Average annual woody vegetation clearing rate for each of the SLATS change periods (1988–2011) by 7’30” Grid Cells

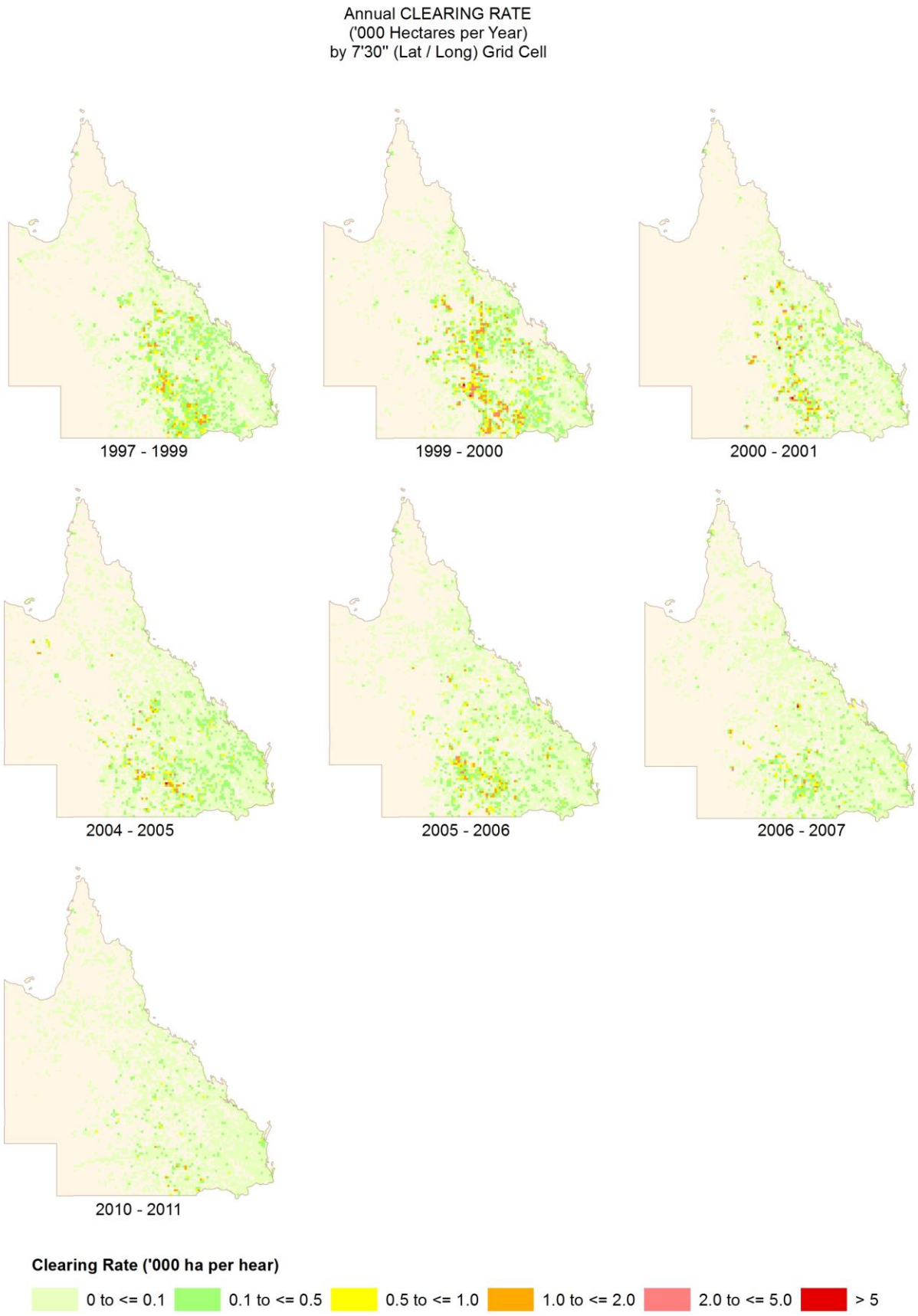

Figure 32: Average annual woody vegetation clearing rate for each of the SLATS change periods (1988–2011) by 7’30” Grid Cells

Appendix B Woody vegetation clearing by Carnahan class analysis (1988–2011)

Table 17: Woody vegetation clearing by Carnahan class (1988–2011)

Carnahan vegetation class	Description	Clearing 1988–91		Clearing 1991–95		Clearing 1995–97	
		Rate (,000ha /yr)	% of State clearing total	Rate (,000ha /yr)	% of State clearing total	Rate (,000ha /yr)	% of State clearing total
M1	Medium trees (10–30 m) <10% foliage cover	199.96	27.5	68.42	23.74	102.86	30.09
M2	Medium trees (10–30 m) 10–30% foliage cover	228.83	31.47	82.86	28.75	109.22	31.95
M3	Medium trees (10–30 m) 30–70% foliage cover	44.7	6.15	25.02	8.68	23.38	6.84
M4	Medium trees (10–30 m) >70% foliage cover	0.96	0.13	0.79	0.27	0.69	0.2
L1	Low trees (<10 m) <10% foliage cover	69.23	9.52	33.93	11.77	19.28	5.64
L2	Low trees (<10 m) 10–30% foliage cover	50.64	6.96	33.92	11.77	25.57	7.48
L3	Low trees (<10 m) 30–70% foliage cover	3.36	0.46	0.92	0.32	1	0.29
L4	Low trees (<10 m) >70% foliage cover	0.02	0	0.03	0.01	0.02	0.01
S1	Tall shrubs (>2 m) <10% foliage cover	1.46	0.2	0.84	0.29	1.29	0.38
S2	Tall shrubs(>2 m) 10–30% foliage cover	0.48	0.07	0.48	0.17	0.28	0.08
Z1	Low shrubs (<2 m) <10% foliage cover	1.16	0.16	0.07	0.02	0.03	0.01
Z3	Low shrubs (<2 m) 30–70% foliage cover	0.04	0.01	0	0	0	0
F3	Other herbaceous plants 30–70% foliage cover	0	0	0.04	0.01	0.05	0.01
F4	Other herbaceous plants >70% foliage cover	3.41	0.47	1.39	0.48	3.79	1.11
G2	Tussocky or tufted grasses 10–30% foliage cover	18.11	2.49	4.09	1.42	7.67	2.24
G3	Tussocky or tufted grasses 30–70% foliage cover	102.2	14.06	33.36	11.58	44.51	13.02
G4	Tussocky or tufted grasses 70% foliage cover	2.6	0.36	2.02	0.7	2.08	0.61
H2	Hummock grasses 10–30% foliage cover	0	0	0	0	0	0
Total		727.16	100.00	288.18	100.00	341.72	100.00

Table 17(continued): Woody vegetation clearing by Carnahan class (1988–2011)

Carnahan vegetation class	Description	Clearing 1997–99		Clearing 1999–2001		Clearing 2001–03	
		Rate (,000ha /yr)	% of State clearing total	Rate (,000ha /yr)	% of State clearing total	Rate (,000ha /yr)	% of State clearing total
M1	Medium trees (10–30 m) <10% foliage cover	129.05	30.28	156.25	27.24	131.04	24.9
M2	Medium trees (10–30 m) 10–30% foliage cover	139.41	32.72	183.74	32.03	153.85	29.24
M3	Medium trees (10–30 m) 30–70% foliage cover	27.99	6.57	28.45	4.96	38.19	7.26
M4	Medium trees (10–30 m) >70% foliage cover	0.48	0.11	0.66	0.12	0.49	0.09
L1	Low trees (<10 m) <10% foliage cover	25.15	5.9	65.63	11.44	74.57	14.17
L2	Low trees (<10 m) 10–30% foliage cover	42.26	9.92	69.95	12.19	57.83	10.99
L3	Low trees (<10 m) 30–70% foliage cover	0.66	0.15	1.19	0.21	0.68	0.13
L4	Low trees (<10 m) >70% foliage cover	0.03	0.01	0.05	0.01	0.08	0.01
S1	Tall shrubs (>2 m) <10% foliage cover	1.47	0.34	2.64	0.46	23.22	4.41
S2	Tall shrubs(>2 m) 10–30% foliage cover	0.38	0.09	0.17	0.03	1.15	0.22
Z1	Low shrubs (<2 m) <10% foliage cover	0	0	0.01	0	0.51	0.1
Z3	Low shrubs (<2 m) 30–70% foliage cover	0.03	0.01	0	0	0.01	0
F3	Other herbaceous plants 30–70% foliage cover	0.02	0	0	0	0	0
F4	Other herbaceous plants >70% foliage cover	2.91	0.68	3.41	0.59	3.01	0.57
G2	Tussocky or tufted grasses 10–30% foliage cover	4.75	1.11	11.19	1.95	7.93	1.51
G3	Tussocky or tufted grasses 30–70% foliage cover	49.82	11.69	48.58	8.47	32.49	6.17
G4	Tussocky or tufted grasses 70% foliage cover	1.71	0.4	1.73	0.3	1.18	0.22
H2	Hummock grasses 10–30% foliage cover	0	0	0.01	0	0	0
Total		426.12	100.00	573.67	100.00	526.23	100.00

Table 17(continued): Woody vegetation clearing by Carnahan class (1988–2011)

Carnahan vegetation class	Description	Clearing 2003–04		Clearing 2004–05		Clearing 2005–06	
		Rate (,000ha /yr)	% of State clearing total	Rate (,000ha /yr)	% of State clearing total	Rate (,000ha /yr)	% of State clearing total)
M1	Medium trees (10–30 m) <10% foliage cover	101.49	21.18	84.85	24.35	87.5	23.48
M2	Medium trees (10–30 m) 10–30% foliage cover	152.58	31.84	96.5	27.69	91.58	24.57
M3	Medium trees (10–30 m) 30–70% foliage cover	44.73	9.33	21.78	6.25	20.61	5.53
M4	Medium trees (10–30 m) >70% foliage cover	0.6	0.13	0.32	0.09	0.67	0.18
L1	Low trees (<10 m) <10% foliage cover	61.77	12.89	57.58	16.52	72.68	19.5
L2	Low trees (<10 m) 10–30% foliage cover	56.47	11.78	35.74	10.26	57.28	15.37
L3	Low trees (<10 m) 30–70% foliage cover	0.81	0.17	0.57	0.16	1.35	0.36
L4	Low trees (<10 m) >70% foliage cover	0.6	0.12	0.47	0.14	0.15	0.04
S1	Tall shrubs (>2 m) <10% foliage cover	5.95	1.24	7.75	2.22	8.63	2.31
S2	Tall shrubs(>2 m) 10–30% foliage cover	1.41	0.29	0.4	0.12	0.34	0.09
Z1	Low shrubs (<2 m) <10% foliage cover	0.02	0	0.2	0.06	0.05	0.01
Z3	Low shrubs (<2 m) 30–70% foliage cover	0.03	0.01	0.14	0.04	0	0
F3	Other herbaceous plants 30–70% foliage cover	0	0	0	0	0	0
F4	Other herbaceous plants >70% foliage cover	3.2	0.67	3.74	1.07	3.16	0.85
G2	Tussocky or tufted grasses 10–30% foliage cover	13.71	2.86	8.34	2.39	8.23	2.21
G3	Tussocky or tufted grasses 30–70% foliage cover	33.97	7.09	28.34	8.13	17.81	4.78
G4	Tussocky or tufted grasses 70% foliage cover	1.88	0.39	1.77	0.51	2.66	0.71
H2	Hummock grasses 10–30% foliage cover	0	0	0	0	0.01	0
Total		479.21	100.00	348.49	100.00	372.71	100.00

Table 17(continued): Woody vegetation clearing by Carnahan class (1988–2011)

Carnahan vegetation class	Description	Clearing 2006–07		Clearing 2007–08		Clearing 2008–09	
		Rate (,000ha /yr)	% of State clearing total	Rate (,000ha /yr)	% of State clearing total	Rate (,000ha /yr)	% of State clearing total
M1	Medium trees (10–30 m) <10% foliage cover	50.49	21.66	29.5	24.33	22.87	23.19
M2	Medium trees (10–30 m) 10–30% foliage cover	74.32	31.89	38.76	31.97	28.09	28.47
M3	Medium trees (10–30 m) 30–70% foliage cover	17.77	7.62	17.14	14.14	8.23	8.34
M4	Medium trees (10–30 m) >70% foliage cover	0.57	0.24	0.66	0.54	0.41	0.41
L1	Low trees (<10 m) <10% foliage cover	42.59	18.27	13.7	11.3	15.43	15.64
L2	Low trees (<10 m) 10–30% foliage cover	20.31	8.71	7.92	6.53	7.08	7.17
L3	Low trees (<10 m) 30–70% foliage cover	1.72	0.74	0.09	0.08	0.78	0.79
L4	Low trees (<10 m) >70% foliage cover	0.01	0.01	0.01	0.01	0.12	0.13
S1	Tall shrubs (>2 m) <10% foliage cover	5.83	2.5	0.85	0.7	1.76	1.79
S2	Tall shrubs(>2 m) 10–30% foliage cover	1.26	0.54	0.6	0.5	0.78	0.79
Z1	Low shrubs (<2 m) <10% foliage cover	0.09	0.04	0.02	0.02	0	0
Z3	Low shrubs (<2 m) 30–70% foliage cover	0.07	0.03	0	0	0.02	0.02
F3	Other herbaceous plants 30–70% foliage cover	0	0	0	0	0	0
F4	Other herbaceous plants >70% foliage cover	2.21	0.95	2.57	2.12	1.83	1.85
G2	Tussocky or tufted grasses 10–30% foliage cover	1.34	0.58	1.71	1.41	2.98	3.02
G3	Tussocky or tufted grasses 30–70% foliage cover	13.31	5.71	6.83	5.64	7.69	7.8
G4	Tussocky or tufted grasses 70% foliage cover	1.15	0.5	0.87	0.72	0.58	0.58
H2	Hummock grasses 10–30% foliage cover	0.02	0.01	0	0	0	0
Total		233.06	100.00	121.24	100.00	98.66	100.00

Table 17(continued): Woody vegetation clearing by Carnahan class (1988–2011)

Carnahan vegetation class	Description	Clearing 2009–10		Clearing 2010–11	
		Rate (,000ha /yr)	% of State clearing total	Rate (,000ha /yr)	% of State clearing total
M1	Medium trees (10–30 m) <10% foliage cover	19.68	25.61	27.87	30.73
M2	Medium trees (10–30 m) 10–30% foliage cover	18.27	23.78	25.43	28.04
M3	Medium trees (10–30 m) 30–70% foliage cover	8.06	10.49	6.35	7.00
M4	Medium trees (10–30 m) >70% foliage cover	0.4	0.53	0.78	0.86
L1	Low trees (<10 m) <10% foliage cover	8.71	11.34	9.17	10.11
L2	Low trees (<10 m) 10–30% foliage cover	6.97	9.08	7.84	8.64
L3	Low trees (<10 m) 30–70% foliage cover	0.17	0.22	0.16	0.18
L4	Low trees (<10 m) >70% foliage cover	0.03	0.04	0.03	0.04
S1	Tall shrubs (>2 m) <10% foliage cover	0.30	0.40	1.06	1.17
S2	Tall shrubs(>2 m) 10–30% foliage cover	0.26	0.34	0.32	0.36
Z1	Low shrubs (<2 m) <10% foliage cover	0.02	0.02	0.02	0.02
Z3	Low shrubs (<2 m) 30–70% foliage cover	0.01	0.01	0.03	0.03
F3	Other herbaceous plants 30–70% foliage cover	0.00	0.00	0.00	0.00
F4	Other herbaceous plants >70% foliage cover	1.14	1.49	0.95	1.05
G2	Tussocky or tufted grasses 10–30% foliage cover	3.20	4.17	1.08	1.19
G3	Tussocky or tufted grasses 30–70% foliage cover	9.32	12.13	9.15	10.09
G4	Tussocky or tufted grasses 70% foliage cover	0.29	0.37	0.45	0.50
H2	Hummock grasses 10–30% foliage cover	0.00	0.00	0.00	0.00
Total		76.83	100.00	90.70	100.00

Appendix C Woody vegetation clearing by biogeographic sub-region (2010–11)

Table 18: Woody vegetation clearing by land cover by biogeographic sub-region (2010–11)

Biogeographic sub-region[2]			Rate of woody vegetation clearing (,000ha/yr)							% wooded vegetation cover 2010[1]	% total clearing in Qld
Name	Ref. No.	Total area (,000ha)	Pasture	Crops	Forest	Mining	Infra-structure	Settle-ment	Total		
Southwestern Plateaus and Floodouts	1.1	1334	0.002	0.000	0.000	0.000	0.000	0.000	0.002	61.52	0.00
Thorntonia	1.2	779	0.000	0.000	0.000	0.000	0.000	0.000	0.000	48.26	0.00
Mount Isa Inlier	1.3	4642	0.019	0.000	0.000	0.142	0.007	0.003	0.170	59.01	0.19
McArthur	1.4	589	0.000	0.000	0.000	0.000	0.000	0.000	0.000	84.37	0.00
Karumba Plains	2.1	1071	0.000	0.000	0.000	0.000	0.000	0.000	0.000	36.79	0.00
Armraynald Plains	2.2	1589	0.006	0.000	0.000	0.000	0.003	0.000	0.009	46.18	0.01
Woondoola Plains	2.3	2375	0.039	0.000	0.000	0.000	0.002	0.000	0.041	28.84	0.04
Mitchell - Gilbert Fans	2.4	5263	0.241	0.000	0.000	0.000	0.023	0.000	0.264	87.06	0.29
Claraville Plains	2.5	3738	0.229	0.000	0.000	0.000	0.166	0.000	0.395	81.26	0.43
Holroyd Plain - Red Plateau	2.6	2208	0.021	0.000	0.000	0.000	0.015	0.000	0.036	92.66	0.04
Doomadgee Plains	2.7	1685	0.032	0.000	0.000	0.000	0.001	0.000	0.032	91.85	0.04
Donors Plateau	2.8	2450	0.155	0.000	0.000	0.003	0.004	0.000	0.162	48.43	0.18
Gilberton Plateau	2.9	1404	0.097	0.000	0.000	0.000	0.004	0.000	0.101	95.30	0.11
Wellesley Islands	2.10	128	0.000	0.000	0.000	0.000	0.000	0.000	0.000	84.05	0.00
Coen - Yambo Inlier	3.1	2313	0.058	0.000	0.000	0.000	0.090	0.000	0.148	97.47	0.16
Starke Coastal Lowlands	3.2	514	0.138	0.000	0.000	0.000	0.004	0.003	0.145	94.17	0.16
Cape York - Torres Strait	3.3	102	0.000	0.000	0.000	0.000	0.000	0.000	0.000	67.20	0.00
Jardine - Pascoe Sandstones	3.4	1451	0.000	0.000	0.000	0.000	0.000	0.000	0.000	97.02	0.00
Battle Camp Sandstones	3.5	505	0.000	0.000	0.000	0.000	0.008	0.000	0.008	99.42	0.01
Laura Lowlands	3.6	1792	0.074	0.000	0.000	0.000	0.033	0.000	0.107	93.36	0.12
Weipa Plateau	3.7	2876	0.155	0.000	0.000	0.328	0.004	0.000	0.488	95.21	0.53
Northern Holroyd Plain	3.8	2464	0.052	0.000	0.000	0.000	0.075	0.000	0.127	89.38	0.14
Coastal Plains	3.9	289	0.001	0.000	0.000	0.000	0.000	0.000	0.001	51.40	0.00
Georgina Limestone	4.1	1438	0.000	0.000	0.000	0.000	0.000	0.000	0.000	12.30	0.00
Southwestern Downs	4.2	3715	0.001	0.000	0.000	0.001	0.000	0.000	0.002	6.44	0.00
Kynuna Plateau	4.3	2293	0.000	0.000	0.000	0.000	0.000	0.000	0.000	28.08	0.00
Southern Wooded Downs	4.4	4721	4.699	0.000	0.000	0.000	0.021	0.000	4.720	30.90	5.15
Central Downs	4.5	9379	0.701	0.000	0.000	0.000	0.000	0.000	0.701	5.54	0.76
Flinders	4.6	435	0.233	0.000	0.000	0.000	0.006	0.000	0.239	29.86	0.26
Barkly Tableland	4.7	2181	0.000	0.000	0.000	0.000	0.000	0.000	0.000	5.62	0.00

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

[2] Analysis against version 5.0 of the biogeographic sub-region dataset resulted in a change in some names and reference numbers relative to previous SLATS reports. Refer to companion spreadsheet for full details on how the new sub-regions relate to previous SLATS reports.

Table 18 (cont.): Woody vegetation clearing by land cover by biogeographic sub-region (2010–11)

Biogeographic sub-region[2]			Rate of woody vegetation clearing (,000ha/yr)							% wooded vegetation cover 2010[1]	% total clearing in QLD
Name	Ref. No.	Total area (,000ha)	Pasture	Crops	Forest	Mining	Infra-structure	Settle-ment	Total		
Toko Plains	5.1	498	0.000	0.000	0.000	0.000	0.000	0.000	0.000	14.31	0.00
Sturt Stony Desert	5.2	5774	0.002	0.000	0.000	0.000	0.001	0.000	0.003	2.67	0.00
Georgina - Eyre Plains	5.3	1213	0.000	0.000	0.000	0.000	0.000	0.000	0.000	5.71	0.00
Goneaway Tablelands	5.4	5182	0.272	0.000	0.000	0.000	0.028	0.000	0.301	26.24	0.33
Cooper - Diamantina Plains	5.5	3438	0.013	0.000	0.000	0.000	0.028	0.000	0.041	11.12	0.04
Noccundra Slopes	5.6	1799	0.000	0.000	0.000	0.000	0.020	0.000	0.020	13.68	0.02
Lake Pure	5.7	985	0.001	0.000	0.000	0.000	0.003	0.000	0.004	3.67	0.00
Bulloo Dunefields	5.8	1077	0.000	0.000	0.000	0.000	0.000	0.000	0.000	6.62	0.00
Bulloo	5.9	619	0.001	0.000	0.000	0.000	0.000	0.000	0.001	11.21	0.00
Simpson Desert	5.10	1965	0.000	0.000	0.000	0.000	0.000	0.000	0.000	6.39	0.00
Dieri	5.11	259	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.56	0.00
Strzelecki Desert	5.12	402	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.72	0.00
Coongie	5.13	6	0.000	0.000	0.000	0.000	0.000	0.000	0.000	6.46	0.00
West Balonne Plains	6.1	1991	8.215	0.000	0.000	0.000	1.003	0.000	9.217	40.73	10.05
Eastern Mulga Plains	6.2	1563	2.694	0.000	0.000	0.000	0.018	0.000	2.711	61.44	2.96
Nebine Plains	6.3	1208	0.622	0.000	0.000	0.000	0.012	0.000	0.634	64.70	0.69
North Eastern Plains	6.4	660	2.214	0.000	0.000	0.000	0.005	0.000	2.219	58.55	2.42
Warrego Plains	6.5	2168	0.377	0.000	0.000	0.000	0.154	0.009	0.540	50.25	0.59
Langlo Plains	6.6	1290	2.207	0.000	0.000	0.000	0.014	0.000	2.221	70.14	2.42
Cuttaburra - Paroo	6.7	644	0.206	0.000	0.000	0.000	0.025	0.000	0.231	69.58	0.25
West Warrego	6.8	4221	1.004	0.000	0.000	0.000	0.106	0.000	1.110	44.94	1.21
Northern Uplands	6.9	1148	0.012	0.000	0.000	0.000	0.000	0.000	0.012	75.03	0.01
West Bulloo	6.10	2852	0.687	0.000	0.000	0.000	0.057	0.000	0.743	23.84	0.81
Urisino Sandplains	6.11	860	0.008	0.000	0.000	0.000	0.002	0.000	0.010	22.16	0.01
Herbert	7.1	222	0.102	0.014	0.011	0.000	0.006	0.010	0.144	54.21	0.16
Tully	7.2	139	0.042	0.000	0.403	0.000	0.032	0.001	0.477	59.04	0.52
Innisfail	7.3	196	0.013	0.000	0.000	0.000	0.001	0.006	0.020	53.80	0.02
Atherton	7.4	177	0.010	0.000	0.000	0.000	0.000	0.002	0.012	80.37	0.01
Paluma - Seaview	7.5	234	0.040	0.000	0.000	0.000	0.006	0.000	0.046	99.41	0.05
Kirrama - Hinchinbrook	7.6	283	0.013	0.000	0.030	0.000	0.000	0.000	0.043	98.66	0.05
Bellenden Ker - Lamb	7.7	271	0.014	0.000	0.000	0.000	0.002	0.000	0.017	97.59	0.02
Macalister	7.8	113	0.006	0.000	0.012	0.000	0.000	0.002	0.020	95.13	0.02
Daintree - Bloomfield	7.9	358	0.006	0.000	0.000	0.000	0.000	0.000	0.006	96.43	0.01
Whitsunday	8.1	91	0.000	0.000	0.000	0.000	0.000	0.002	0.002	93.87	0.00
Proserpine - Sarina Lowlands	8.2	472	0.053	0.000	0.233	0.001	0.008	0.024	0.321	48.05	0.35

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

[2] Analysis against version 5.0 of the biogeographic sub-region dataset resulted in a change in some names and reference numbers relative to previous SLATS reports. Refer to companion spreadsheet for full details on how the new sub-regions relate to previous SLATS reports.

Table 18 (cont.): Woody vegetation clearing by land cover by biogeographic sub-region (2010–11)

Biogeographic sub-region[2]			Rate of woody vegetation clearing (,000ha/yr)							% wooded vegetation cover 2010[1]	% total clearing in QLD
Name	Ref. No.	Total area (,000ha)	Pasture	Crops	Forest	Mining	Infra-structure	Settle-ment	Total		
Clarke - Connors Ranges	8.3	632	0.195	0.001	0.090	0.000	0.003	0.000	0.289	93.06	0.31
Byfield	8.4	128	0.000	0.000	0.181	0.000	0.000	0.001	0.182	95.89	0.20
Manifold	8.5	80	0.000	0.000	0.000	0.000	0.000	0.002	0.002	82.08	0.00
Debella	8.6	82	0.026	0.000	0.000	0.000	0.000	0.001	0.027	70.87	0.03
Georgetown - Croydon	9.1	1041	0.033	0.000	0.000	0.000	0.059	0.000	0.092	85.87	0.10
Kidston	9.2	2930	0.238	0.000	0.000	0.000	0.150	0.000	0.388	94.42	0.42
Hodgkinson Basin	9.3	1607	0.090	0.000	0.000	0.001	0.056	0.000	0.147	93.38	0.16
Broken River	9.4	3310	0.412	0.001	0.000	0.013	0.049	0.002	0.476	75.40	0.52
Undara - Toomba Basalts	9.5	2076	0.092	0.000	0.000	0.002	0.016	0.000	0.110	84.60	0.12
Herberton - Wairuna	9.6	662	0.192	0.000	0.000	0.000	0.004	0.000	0.196	95.58	0.21
Prairie - Torrens Creeks Alluvials	10.1	1580	0.855	0.000	0.000	0.000	0.011	0.000	0.866	51.43	0.94
Alice Tableland	10.2	2867	1.101	0.000	0.000	0.000	0.015	0.000	1.116	73.96	1.22
Cape - Campaspe Plains	10.3	1007	0.740	0.000	0.000	0.006	0.004	0.000	0.749	61.39	0.82
Jericho	10.4	1487	1.387	0.000	0.000	0.056	0.070	0.001	1.514	60.47	1.65
Townsville Plains	11.1	768	0.150	0.000	0.000	0.004	0.011	0.089	0.254	45.59	0.28
Bogie River Hills	11.2	1055	1.599	0.000	0.000	0.000	0.045	0.001	1.645	62.28	1.79
Cape River Hills	11.3	748	0.163	0.000	0.000	0.009	0.003	0.000	0.175	72.30	0.19
Beucazon Hills	11.4	96	0.289	0.000	0.000	0.000	0.002	0.000	0.291	57.35	0.32
Wyarra Hills	11.5	398	0.047	0.000	0.000	0.000	0.005	0.000	0.052	71.18	0.06
Northern Bowen Basin	11.6	1317	0.152	0.000	0.000	0.835	0.037	0.027	1.050	59.61	1.15
Belyando Downs	11.7	1772	2.315	0.000	0.000	0.000	0.009	0.000	2.324	40.05	2.53
Upper Belyando Floodout	11.8	466	1.607	0.000	0.000	0.000	0.092	0.000	1.699	31.75	1.85
Anakie Inlier	11.9	382	0.675	0.000	0.002	0.075	0.008	0.001	0.760	85.64	0.83
Basalt Downs	11.10	1275	0.166	0.004	0.004	0.041	0.030	0.000	0.245	36.80	0.27
Isaac - Comet Downs	11.11	2693	2.967	0.001	0.000	0.434	0.130	0.006	3.538	39.13	3.86
Nebo - Connors Ranges	11.12	449	0.252	0.000	0.000	0.005	0.001	0.000	0.258	65.45	0.28
South Drummond Basin	11.13	1009	0.418	0.000	0.000	0.000	0.001	0.000	0.419	56.02	0.46
Marlborough Plains	11.14	1217	1.097	0.021	0.003	0.080	0.012	0.014	1.227	58.16	1.34
Claude River Downs	11.15	1026	0.777	0.000	0.002	0.000	0.000	0.000	0.779	56.43	0.85
Woorabinda	11.16	750	0.374	0.000	0.001	0.000	0.019	0.000	0.394	85.86	0.43

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

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Table 18 (cont.): Woody vegetation clearing by land cover by biogeographic sub-region (2010–11)

Biogeographic sub-region[2]			Rate of woody vegetation clearing (,000ha/yr)							% wooded vegetation cover 2010[1]	% total clearing in QLD
Name	Ref. No.	Total area (,000ha)	Pasture	Crops	Forest	Mining	Infra-structure	Settle-ment	Total		
Boomer Range	11.17	221	0.421	0.000	0.000	0.000	0.000	0.000	0.421	72.34	0.46
Mount Morgan Ranges	11.18	1276	0.795	0.003	0.096	0.055	0.009	0.005	0.962	62.82	1.05
Callide Creek Downs	11.19	301	0.137	0.013	0.000	0.021	0.000	0.000	0.171	28.87	0.19
Arcadia	11.20	715	0.462	0.000	0.000	0.009	0.001	0.000	0.472	64.73	0.51
Dawson River Downs	11.21	983	0.393	0.001	0.000	0.067	0.001	0.000	0.462	30.61	0.50
Banana - Auburn Ranges	11.22	1548	1.937	0.066	0.079	0.000	0.002	0.000	2.085	58.93	2.27
Buckland Basalts	11.23	281	0.447	0.000	0.000	0.000	0.000	0.000	0.447	95.29	0.49
Carnarvon Ranges	11.24	2264	1.947	0.000	0.053	0.018	0.010	0.000	2.029	91.07	2.21
Taroom Downs	11.25	652	0.190	0.000	0.000	0.000	0.000	0.000	0.191	15.52	0.21
Southern Downs	11.26	4265	5.892	0.000	0.464	0.000	0.048	0.000	6.405	44.17	6.99
Barakula	11.27	1302	0.889	0.000	0.211	0.288	0.043	0.000	1.432	66.89	1.56
Dulacca Downs	11.28	162	0.114	0.014	0.000	0.000	0.001	0.000	0.130	23.29	0.14
Weribone High	11.29	967	0.672	0.008	0.000	0.000	0.076	0.000	0.755	40.25	0.82
Tara Downs	11.30	511	0.309	0.000	0.000	0.000	0.000	0.000	0.309	15.00	0.34
Eastern Darling Downs	11.31	1698	0.465	0.020	0.000	0.004	0.004	0.005	0.499	21.39	0.54
Inglewood Sandstones	11.32	1219	1.543	0.009	0.252	0.104	0.041	0.000	1.949	70.81	2.13
Moonie R. - Commoron Creek Floodout	11.33	751	0.567	0.059	0.002	0.000	0.000	0.000	0.628	27.25	0.68
Moonie - Barwon Interfluve	11.34	689	6.258	0.070	0.000	0.000	0.013	0.000	6.340	26.64	6.92
Warrambool - Moonie	11.35	574	0.152	0.016	0.000	0.000	0.181	0.000	0.348	30.96	0.38
Macintyre - Weir Fan	11.36	292	0.099	0.007	0.000	0.000	0.006	0.000	0.112	22.36	0.12
Culgoa - Bokhara	11.37	420	0.008	0.000	0.000	0.000	3.569	0.000	3.577	37.48	3.90
Narrandool	11.38	16	0.001	0.000	0.000	0.000	0.152	0.000	0.153	59.08	0.17
Scenic Rim	12.1	229	0.011	0.000	0.015	0.000	0.010	0.002	0.037	84.75	0.04
Moreton Basin	12.2	785	0.422	0.004	0.054	0.046	0.043	0.430	0.997	58.68	1.09
Burringbar - Conondale Ranges	12.3	535	0.301	0.000	0.262	0.013	0.028	0.348	0.953	77.49	1.04
Sunshine Coast - Gold Coast Lowlands	12.4	365	0.145	0.004	0.332	0.067	0.053	0.224	0.824	64.87	0.90
Brisbane - Barambah Volcanics	12.5	807	0.488	0.003	0.134	0.000	0.000	0.000	0.626	62.01	0.68
South Burnett	12.6	564	0.361	0.017	0.251	0.009	0.002	0.004	0.645	53.98	0.70
Gympie Block	12.7	859	0.958	0.009	0.560	0.000	0.004	0.014	1.545	73.41	1.68
Burnett - Curtis Coastal Lowlands	12.8	707	0.628	0.091	1.029	0.001	0.015	0.084	1.848	70.54	2.02

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

[2] Analysis against version 5.0 of the biogeographic sub-region dataset resulted in a change in some names and reference numbers relative to previous SLATS reports. Refer to companion spreadsheet for full details on how the new sub-regions relate to previous SLATS reports.

Table 18 (cont.): Woody vegetation clearing by land cover by biogeographic sub-region (2010–11)

Biogeographic sub-region[2]			Rate of woody vegetation clearing (,000ha/yr)							% wooded vegetation cover 2010[1]	% total clearing in QLD
Name	Ref. No.	Total area (,000ha)	Pasture	Crops	Forest	Mining	Infra-structure	Settle-ment	Total		
Great Sandy	12.9	362	0.042	0.000	2.079	0.000	0.005	0.003	2.129	89.39	2.32
Burnett - Curtis Hills and Ranges	12.10	1032	0.519	0.000	0.023	0.059	0.303	0.068	0.973	82.07	1.06
Woodenbong	12.11	3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	41.29	0.00
Southern Great Barrier Reef	12.12	<1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	23.38	0.00
Stanthorpe Plateau	13.1	138	0.031	0.003	0.062	0.000	0.000	0.001	0.098	69.31	0.11
Tenterfield Plateau	13.2	7	0.000	0.000	0.000	0.000	0.000	0.000	0.001	60.08	0.00
Nandewar Northern Complex	13.3	629	0.823	0.000	0.013	0.004	0.003	0.000	0.844	60.19	0.92

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

[2] Analysis against version 5.0 of the biogeographic sub-region dataset resulted in a change in some names and reference numbers relative to previous SLATS reports. Refer to companion spreadsheet for full details on how the new sub-regions relate to previous SLATS reports.

Table 19: Woody vegetation clearing by tenure by biogeographic sub-region (2010–11)

Biogeographic sub-region[2]			Rate of woody vegetation clearing (,000ha/yr)					% wooded vegetation cover 2010[1]	% total clearing in QLD
Name	Ref. No.	Total area (,000ha)	Freehold	Leasehold	Other	Reserves	Total		
Southwestern Plateaus and Floodouts	1.1	1334	0.000	0.002	0.000	0.000	0.002	61.52	0.00
Thorntonia	1.2	779	0.000	0.000	0.000	0.000	0.000	48.26	0.00
Mount Isa Inlier	1.3	4642	0.000	0.168	0.002	0.000	0.170	59.01	0.19
McArthur	1.4	589	0.000	0.000	0.000	0.000	0.000	84.37	0.00
Karumba Plains	2.1	1071	0.000	0.000	0.000	0.000	0.000	36.79	0.00
Armraynald Plains	2.2	1589	0.000	0.009	0.000	0.000	0.009	46.18	0.01
Woondoola Plains	2.3	2375	0.000	0.041	0.000	0.000	0.041	28.84	0.04
Mitchell - Gilbert Fans	2.4	5263	0.004	0.260	0.000	0.000	0.264	87.06	0.29
Claraville Plains	2.5	3738	0.021	0.374	0.000	0.000	0.395	81.26	0.43
Holroyd Plain - Red Plateau	2.6	2208	0.001	0.035	0.000	0.000	0.036	92.66	0.04
Doomadgee Plains	2.7	1685	0.009	0.023	0.000	0.000	0.033	91.85	0.04
Donors Plateau	2.8	2450	0.025	0.137	0.000	0.000	0.162	48.43	0.18
Gilberton Plateau	2.9	1404	0.001	0.101	0.000	0.000	0.102	95.30	0.11
Wellesley Islands	2.10	128	0.000	0.000	0.000	0.000	0.000	84.05	0.00
Coen - Yambo Inlier	3.1	2313	0.011	0.137	0.000	0.000	0.148	97.47	0.16
Starke Coastal Lowlands	3.2	514	0.114	0.009	0.000	0.021	0.145	94.17	0.16
Cape York - Torres Strait	3.3	102	0.000	0.000	0.000	0.000	0.000	67.20	0.00
Jardine - Pascoe Sandstones	3.4	1451	0.000	0.000	0.000	0.000	0.000	97.02	0.00
Battle Camp Sandstones	3.5	505	0.003	0.005	0.000	0.000	0.008	99.42	0.01
Laura Lowlands	3.6	1792	0.011	0.090	0.000	0.006	0.107	93.36	0.12
Weipa Plateau	3.7	2876	0.000	0.156	0.319	0.013	0.488	95.21	0.53
Northern Holroyd Plain	3.8	2464	0.007	0.120	0.000	0.000	0.127	89.38	0.14
Coastal Plains	3.9	289	0.001	0.001	0.000	0.000	0.002	51.40	0.00
Georgina Limestone	4.1	1438	0.000	0.000	0.000	0.000	0.000	12.30	0.00
Southwestern Downs	4.2	3715	0.000	0.002	0.000	0.000	0.003	6.44	0.00
Kynuna Plateau	4.3	2293	0.000	0.000	0.000	0.000	0.001	28.08	0.00
Southern Wooded Downs	4.4	4721	2.724	1.996	0.000	0.000	4.721	30.90	5.15
Central Downs	4.5	9379	0.503	0.198	0.000	0.000	0.702	5.54	0.77
Flinders	4.6	435	0.094	0.145	0.000	0.000	0.239	29.86	0.26
Barkly Tableland	4.7	2181	0.000	0.000	0.000	0.000	0.000	5.62	0.00
Toko Plains	5.1	498	0.000	0.000	0.000	0.000	0.001	14.31	0.00
Sturt Stony Desert	5.2	5774	0.000	0.003	0.000	0.000	0.003	2.67	0.00
Georgina - Eyre Plains	5.3	1213	0.000	0.000	0.000	0.000	0.000	5.71	0.00
Goneaway Tablelands	5.4	5182	0.000	0.300	0.000	0.001	0.301	26.24	0.33
Cooper - Diamantina Plains	5.5	3438	0.002	0.039	0.000	0.000	0.041	11.12	0.04

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

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Table 19 (continued): Woody vegetation clearing by tenure by biogeographic sub-region (2010–11)

Biogeographic sub-region[2]			Rate of woody vegetation clearing (,000ha/yr)					% wooded vegetation cover 2010[1]	% total clearing in QLD
Name	Ref. No.	Total area (,000ha)	Freehold	Leasehold	Other	Reserves	Total		
Noccundra Slopes	5.6	1799	0.000	0.020	0.000	0.000	0.020	13.68	0.02
Lake Pure	5.7	985	0.000	0.004	0.000	0.000	0.004	3.67	0.00
Bulloo Dunefields	5.8	1077	0.000	0.000	0.000	0.000	0.000	6.62	0.00
Bulloo	5.9	619	0.000	0.001	0.000	0.000	0.001	11.21	0.00
Simpson Desert	5.10	1965	0.000	0.000	0.000	0.000	0.000	6.39	0.00
Dieri	5.11	259	0.000	0.000	0.000	0.000	0.000	0.56	0.00
Strzelecki Desert	5.12	402	0.000	0.000	0.000	0.000	0.000	1.72	0.00
Coongie	5.13	6	0.000	0.000	0.000	0.000	0.000	6.46	0.00
West Balonne Plains	6.1	1991	6.073	3.145	0.000	0.000	9.218	40.73	10.05
Eastern Mulga Plains	6.2	1563	1.925	0.786	0.000	0.000	2.712	61.44	2.96
Nebine Plains	6.3	1208	0.355	0.278	0.000	0.000	0.634	64.70	0.69
North Eastern Plains	6.4	660	1.803	0.416	0.000	0.000	2.219	58.55	2.42
Warrego Plains	6.5	2168	0.252	0.289	0.000	0.000	0.541	50.25	0.59
Langlo Plains	6.6	1290	0.066	2.155	0.000	0.000	2.221	70.14	2.42
Cuttaburra - Paroo	6.7	644	0.203	0.027	0.000	0.001	0.231	69.58	0.25
West Warrego	6.8	4221	0.089	1.021	0.000	0.000	1.111	44.94	1.21
Northern Uplands	6.9	1148	0.000	0.012	0.000	0.000	0.012	75.03	0.01
West Bulloo	6.10	2852	0.572	0.171	0.000	0.000	0.743	23.84	0.81
Urisino Sandplains	6.11	860	0.000	0.010	0.000	0.000	0.010	22.16	0.01
Herbert	7.1	222	0.104	0.027	0.000	0.013	0.144	54.21	0.16
Tully	7.2	139	0.016	0.044	0.000	0.417	0.477	59.04	0.52
Innisfail	7.3	196	0.019	0.001	0.000	0.000	0.020	53.80	0.02
Atherton	7.4	177	0.009	0.003	0.000	0.000	0.012	80.37	0.01
Paluma - Seaview	7.5	234	0.013	0.032	0.000	0.000	0.046	99.41	0.05
Kirrama - Hinchinbrook	7.6	283	0.000	0.012	0.000	0.031	0.043	98.66	0.05
Bellenden Ker - Lamb	7.7	271	0.015	0.001	0.000	0.001	0.018	97.59	0.02
Macalister	7.8	113	0.008	0.001	0.000	0.011	0.020	95.13	0.02
Daintree - Bloomfield	7.9	358	0.006	0.000	0.000	0.000	0.006	96.43	0.01
Whitsunday	8.1	91	0.001	0.000	0.000	0.000	0.002	93.87	0.00
Proserpine - Sarina Lowlands	8.2	472	0.081	0.007	0.000	0.233	0.321	48.05	0.35
Clarke - Connors Ranges	8.3	632	0.152	0.038	0.000	0.099	0.289	93.06	0.32
Byfield	8.4	128	0.001	0.001	0.000	0.180	0.182	95.89	0.20
Manifold	8.5	80	0.002	0.000	0.000	0.000	0.002	82.08	0.00
Debella	8.6	82	0.015	0.012	0.000	0.000	0.027	70.87	0.03
Georgetown - Croydon	9.1	1041	0.000	0.092	0.000	0.000	0.093	85.87	0.10

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

[2] Analysis against version 5.0 of the biogeographic sub-region dataset resulted in a change in some names and reference numbers relative to previous SLATS reports. Refer to companion spreadsheet for full details on how the new sub-regions relate to previous SLATS reports.

Table 19 (continued): Woody vegetation clearing by tenure by biogeographic sub-region (2010–11)

Biogeographic sub-region[2]			Rate of woody vegetation clearing (,000ha/yr)					% wooded vegetation cover 2010[1]	% total clearing in QLD
Name	Map Ref. No.	Total area (,000ha)	Freehold	Leasehold	Other	Reserves	Total		
Kidston	9.2	2930	0.000	0.388	0.000	0.000	0.388	94.42	0.42
Hodgkinson Basin	9.3	1607	0.040	0.106	0.000	0.001	0.147	93.38	0.16
Broken River	9.4	3310	0.006	0.466	0.004	0.000	0.476	75.40	0.52
Undara - Toomba Basalts	9.5	2076	0.005	0.105	0.000	0.000	0.110	84.60	0.12
Herberton - Wairuna	9.6	662	0.023	0.174	0.000	0.000	0.196	95.58	0.21
Prairie - Torrens Creeks Alluvials	10.1	1580	0.551	0.315	0.000	0.000	0.866	51.43	0.94
Alice Tableland	10.2	2867	0.346	0.758	0.000	0.013	1.117	73.96	1.22
Cape - Campaspe Plains	10.3	1007	0.001	0.747	0.000	0.000	0.749	61.39	0.82
Jericho	10.4	1487	0.328	1.185	0.000	0.000	1.514	60.47	1.65
Townsville Plains	11.1	768	0.188	0.065	0.000	0.000	0.254	45.59	0.28
Bogie River Hills	11.2	1055	0.441	1.202	0.000	0.002	1.645	62.28	1.79
Cape River Hills	11.3	748	0.001	0.174	0.000	0.000	0.175	72.30	0.19
Beucazon Hills	11.4	96	0.000	0.291	0.000	0.000	0.292	57.35	0.32
Wyarra Hills	11.5	398	0.000	0.052	0.000	0.000	0.052	71.18	0.06
Northern Bowen Basin	11.6	1317	0.606	0.444	0.000	0.000	1.051	59.61	1.15
Belyando Downs	11.7	1772	1.257	1.067	0.000	0.000	2.324	40.05	2.53
Upper Belyando Floodout	11.8	466	0.839	0.861	0.000	0.000	1.700	31.75	1.85
Anakie Inlier	11.9	382	0.252	0.502	0.000	0.006	0.761	85.64	0.83
Basalt Downs	11.10	1275	0.176	0.065	0.000	0.004	0.245	36.80	0.27
Isaac - Comet Downs	11.11	2693	2.906	0.632	0.000	0.000	3.538	39.13	3.86
Nebo - Connors Ranges	11.12	449	0.037	0.221	0.000	0.000	0.258	65.45	0.28
South Drummond Basin	11.13	1009	0.013	0.407	0.000	0.000	0.420	56.02	0.46
Marlborough Plains	11.14	1217	0.890	0.334	0.000	0.003	1.227	58.16	1.34
Claude River Downs	11.15	1026	0.309	0.468	0.000	0.002	0.780	56.43	0.85
Woorabinda	11.16	750	0.274	0.117	0.000	0.002	0.394	85.86	0.43
Boomer Range	11.17	221	0.411	0.009	0.000	0.000	0.421	72.34	0.46
Mount Morgan Ranges	11.18	1276	0.841	0.092	0.000	0.030	0.963	62.82	1.05
Callide Creek Downs	11.19	301	0.164	0.006	0.000	0.000	0.171	28.87	0.19
Arcadia	11.20	715	0.237	0.235	0.000	0.000	0.472	64.73	0.51
Dawson River Downs	11.21	983	0.378	0.084	0.000	0.000	0.462	30.61	0.50
Banana - Auburn Ranges	11.22	1548	1.636	0.374	0.000	0.075	2.085	58.93	2.27
Buckland Basalts	11.23	281	0.000	0.447	0.000	0.000	0.448	95.29	0.49
Carnarvon Ranges	11.24	2264	0.402	1.503	0.000	0.124	2.029	91.07	2.21
Taroom Downs	11.25	652	0.139	0.051	0.000	0.000	0.191	15.52	0.21
Southern Downs	11.26	4265	4.800	1.143	0.000	0.461	6.405	44.17	6.98

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

[2] Analysis against version 5.0 of the biogeographic sub-region dataset resulted in a change in some names and reference numbers relative to previous SLATS reports. Refer to companion spreadsheet for full details on how the new sub-regions relate to previous SLATS reports.

Table 19 (continued): Woody vegetation clearing by tenure by biogeographic sub-region (2010–11)

Biogeographic sub-region[2]			Rate of woody vegetation clearing (,000ha/yr)					% wooded vegetation cover 2010[1]	% total clearing in QLD
Name	Map Ref. No.	Total area (,000ha)	Freehold	Leasehold	Other	Reserves	Total		
Barakula	11.27	1302	0.976	0.248	0.000	0.208	1.432	66.89	1.56
Dulacca Downs	11.28	162	0.126	0.003	0.000	0.000	0.130	23.29	0.14
Weribone High	11.29	967	0.699	0.056	0.000	0.000	0.755	40.25	0.82
Tara Downs	11.30	511	0.289	0.020	0.000	0.000	0.309	15.00	0.34
Eastern Darling Downs	11.31	1698	0.488	0.011	0.000	0.000	0.499	21.39	0.54
Inglewood Sandstones	11.32	1219	1.644	0.048	0.000	0.258	1.949	70.81	2.13
Moonie R. - Commoron Creek Floodout	11.33	751	0.594	0.034	0.000	0.000	0.628	27.25	0.68
Moonie - Barwon Interfluve	11.34	689	6.291	0.049	0.000	0.000	6.340	26.64	6.91
Warrambool - Moonie	11.35	574	0.335	0.013	0.000	0.000	0.348	30.96	0.38
Macintyre - Weir Fan	11.36	292	0.105	0.008	0.000	0.000	0.113	22.36	0.12
Culgoa - Bokhara	11.37	420	3.433	0.144	0.000	0.000	3.578	37.48	3.90
Narrandool	11.38	16	0.094	0.059	0.000	0.000	0.153	59.08	0.17
Scenic Rim	12.1	229	0.019	0.002	0.000	0.016	0.038	84.75	0.04
Moreton Basin	12.2	785	0.895	0.047	0.000	0.055	0.998	58.68	1.09
Burringbar - Conondale Ranges	12.3	535	0.647	0.048	0.000	0.257	0.953	77.49	1.04
Sunshine Coast - Gold Coast Lowlands	12.4	365	0.415	0.110	0.000	0.300	0.824	64.87	0.90
Brisbane - Barambah Volcanics	12.5	807	0.466	0.024	0.000	0.136	0.626	62.01	0.68
South Burnett	12.6	564	0.387	0.007	0.000	0.251	0.645	53.98	0.70
Gympie Block	12.7	859	0.957	0.029	0.000	0.558	1.545	73.41	1.68
Burnett - Curtis Coastal Lowlands	12.8	707	0.748	0.073	0.000	1.027	1.848	70.54	2.02
Great Sandy	12.9	362	0.043	0.014	0.000	2.071	2.129	89.39	2.32
Burnett - Curtis Hills and Ranges	12.10	1032	0.898	0.049	0.000	0.024	0.971	82.07	1.06
Woodenbong	12.11	3	0.000	0.000	0.000	0.000	0.000	41.29	0.00
Southern Great Barrier Reef	12.12	0	0.000	0.000	0.000	0.000	0.000	23.38	0.00
Stanthorpe Plateau	13.1	138	0.047	0.002	0.000	0.049	0.098	69.31	0.11
Tenterfield Plateau	13.2	7	0.000	0.000	0.000	0.000	0.001	60.08	0.00
Nandewar Northern Complex	13.3	629	0.806	0.025	0.000	0.013	0.844	60.19	0.92

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

[2] Analysis against version 5.0 of the biogeographic sub-region dataset resulted in a change in some names and reference numbers relative to previous SLATS reports. Refer to companion spreadsheet for full details on how the new sub-regions relate to previous SLATS reports.

Appendix D Woody vegetation clearing by catchment (2010–11)

Table 20: Woody vegetation clearing by land cover by catchment (2010–11)

Catchment			Rate of woody vegetation clearing (,000ha/yr)							% wooded vegetation cover 2010[1]	% total clearing in QLD
Name	Map Ref.	Total area (,000ha)	Pasture	Crops	Forest	Mining	Infra-structure	Settle-ment	Total		
Albert	1	78	0.024	0.000	0.000	0.013	0.000	0.037	0.074	70.77	0.08
Alice	2	1294	0.004	0.000	0.000	0.000	0.069	0.000	0.072	89.59	0.08
Archer	3	1061	0.090	0.000	0.000	0.000	0.006	0.000	0.095	94.26	0.10
Baffle Creek[2]	4	399	0.410	0.024	0.030	0.000	0.013	0.024	0.502	82.20	0.55
Balonne	5	3828	5.228	0.029	0.489	0.288	4.827	0.000	10.862	36.34	11.85
Barcoo	6	5323	5.740	0.000	0.000	0.000	0.063	0.001	5.803	44.83	6.33
Barker and Barambah Creeks[2]	7	594	0.423	0.001	0.150	0.009	0.001	0.002	0.586	59.10	0.64
Barratta Creek[2]	8	183	0.027	0.000	0.000	0.003	0.000	0.000	0.030	26.75	0.03
Barron[2]	9	219	0.011	0.000	0.012	0.000	0.000	0.002	0.024	79.13	0.03
Black[2]	10	106	0.059	0.001	0.007	0.001	0.005	0.020	0.092	85.19	0.10
Bohle[2]	11	37	0.014	0.000	0.000	0.000	0.005	0.072	0.091	45.59	0.10
Bowen[2]	12	945	0.080	0.000	0.000	0.032	0.034	0.003	0.149	70.61	0.16
Boyne and Auburn[2]	13	1299	1.341	0.014	0.080	0.000	0.000	0.003	1.438	63.98	1.57
Boyne[2]	14	259	0.070	0.000	0.021	0.012	0.004	0.005	0.113	82.59	0.12
Bremer	15	203	0.037	0.000	0.000	0.023	0.010	0.111	0.181	54.67	0.20
Brisbane	16	697	0.277	0.002	0.238	0.014	0.022	0.177	0.729	65.33	0.79
Bulloo	17	5185	0.472	0.000	0.000	0.000	0.080	0.000	0.552	29.46	0.60
Burrum[2]	18	121	0.038	0.000	0.203	0.000	0.000	0.019	0.260	88.41	0.28
Caboolture	19	47	0.110	0.003	0.000	0.000	0.001	0.048	0.161	65.17	0.18
Calliope[2]	20	224	0.238	0.000	0.000	0.040	0.010	0.045	0.332	59.99	0.36
Cliffdale	21	618	0.000	0.000	0.000	0.000	0.000	0.000	0.000	89.72	0.00
Cloncurry	22	4734	0.126	0.000	0.000	0.003	0.006	0.000	0.135	26.73	0.15
Coen	23	321	0.070	0.000	0.000	0.000	0.002	0.000	0.072	96.50	0.08
Coleman	24	534	0.021	0.000	0.000	0.000	0.038	0.000	0.059	92.99	0.06
Comet[2]	25	1730	1.063	0.002	0.000	0.028	0.014	0.000	1.108	55.39	1.21
Condamine	26	3041	1.398	0.022	0.196	0.105	0.053	0.005	1.780	34.12	1.94
Coomera and Nerang	27	130	0.028	0.000	0.000	0.007	0.018	0.191	0.245	72.30	0.27
Cooper Creek	28	9576	0.763	0.000	0.000	0.000	0.107	0.000	0.869	11.82	0.95
Curtis Island	29	58	0.006	0.000	0.000	0.000	0.278	0.000	0.284	83.74	0.31
Daintree[2]	30	210	0.005	0.000	0.000	0.000	0.000	0.000	0.005	97.02	0.01
Dawson[2]	31	5076	2.764	0.081	0.128	0.156	0.027	0.000	3.156	50.92	3.44
Diamantina	32	11919	0.063	0.000	0.000	0.000	0.002	0.000	0.065	13.03	0.07
Don[2]	33	369	0.819	0.000	0.000	0.000	0.011	0.000	0.830	52.86	0.90
Ducie	34	358	0.008	0.000	0.000	0.000	0.000	0.000	0.008	96.85	0.01
Dumaresq	35	432	0.730	0.001	0.075	0.004	0.003	0.001	0.814	64.65	0.89
Edward	36	752	0.032	0.000	0.000	0.000	0.007	0.000	0.040	85.01	0.04
Eight Mile Creek	37	163	0.000	0.000	0.000	0.000	0.000	0.000	0.000	91.58	0.00
Einasleigh	38	2437	0.191	0.000	0.000	0.000	0.165	0.000	0.356	91.09	0.39

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

[2] Reef catchment – shaded blue.

Table 20 (continued): Woody vegetation clearing by land cover by catchment (2010–11)

Catchment			Rate of woody vegetation clearing (,000ha/yr)							% wooded vegetation cover 2010[1]	% total clearing in QLD
Name	Map Ref.	Total area (,000ha)	Pasture	Crops	Forest	Mining	Infra-structure	Settle-ment	Total		
Elliott[2]	39	71	0.013	0.015	0.014	0.000	0.000	0.014	0.056	58.43	0.06
Embley	40	192	0.001	0.000	0.000	0.046	0.000	0.000	0.047	94.13	0.05
Endeavour[2]	41	218	0.033	0.000	0.000	0.000	0.003	0.003	0.039	97.77	0.04
Eyre	42	7178	0.002	0.000	0.000	0.000	0.000	0.000	0.003	6.72	0.00
Fitzroy[2]	43	1143	1.075	0.014	0.084	0.083	0.014	0.009	1.280	58.08	1.40
Flinders	44	5188	0.519	0.000	0.000	0.002	0.021	0.000	0.543	39.14	0.59
Fraser Island	45	166	0.001	0.000	0.000	0.000	0.000	0.000	0.001	94.69	0.00
Georgina	46	7210	0.010	0.000	0.000	0.001	0.000	0.000	0.011	23.37	0.01
Gilbert	47	2203	0.101	0.000	0.000	0.000	0.037	0.000	0.138	85.86	0.15
Gregory[2]	48	91	0.201	0.010	0.001	0.000	0.000	0.000	0.211	74.34	0.23
Hann[2]	49	956	0.007	0.000	0.000	0.000	0.046	0.000	0.053	87.80	0.06
Haughton[2]	50	222	0.041	0.000	0.000	0.000	0.003	0.000	0.044	56.61	0.05
Hay	51	277	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.68	0.00
Herbert[2]	52	984	0.180	0.014	0.005	0.000	0.004	0.008	0.211	87.25	0.23
Hinchinbrook Island	53	39	0.000	0.000	0.000	0.000	0.000	0.000	0.000	97.55	0.00
Holroyd	54	544	0.002	0.000	0.000	0.000	0.001	0.000	0.003	96.68	0.00
Isaac[2]	55	2237	0.783	0.000	0.000	0.888	0.138	0.026	1.834	57.25	2.00
Isis[2]	56	53	0.015	0.000	0.012	0.000	0.012	0.000	0.039	87.63	0.04
Jacky Jacky Creek[2]	57	296	0.000	0.000	0.000	0.000	0.000	0.000	0.000	96.49	0.00
Jardine	58	328	0.000	0.000	0.000	0.000	0.000	0.000	0.000	97.53	0.00
Jeannie[2]	59	363	0.105	0.000	0.000	0.000	0.010	0.000	0.115	94.04	0.13
Kendall	60	485	0.009	0.000	0.000	0.000	0.000	0.000	0.009	98.85	0.01
Kolan[2]	61	290	0.342	0.012	0.000	0.000	0.003	0.005	0.363	75.87	0.40
L Creek	62	194	0.000	0.000	0.000	0.000	0.000	0.000	0.000	43.24	0.00
Lagoon Creek	63	283	0.000	0.000	0.000	0.000	0.000	0.000	0.000	93.14	0.00
Lake Frome	64	15	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.13	0.00
Leichhardt	65	3288	0.027	0.000	0.000	0.142	0.005	0.003	0.176	66.36	0.19
Lockhart[2]	66	288	0.001	0.000	0.000	0.000	0.000	0.000	0.001	97.88	0.00
Lockyer Creek	67	301	0.211	0.004	0.000	0.000	0.000	0.004	0.218	63.44	0.24
Logan	68	336	0.127	0.000	0.000	0.003	0.036	0.231	0.398	66.76	0.43
Lower Burdekin[2]	69	1047	0.810	0.000	0.000	0.000	0.007	0.000	0.817	55.85	0.89
Lower Burnett[2]	70	569	0.486	0.030	0.096	0.010	0.000	0.019	0.640	59.69	0.70
Lower Mary[2]	71	676	0.629	0.011	1.832	0.001	0.002	0.034	2.510	73.05	2.74
Macintyre and Weir	72	1541	3.860	0.100	0.087	0.000	0.008	0.000	4.056	39.71	4.42
Macintyre Brook	73	432	0.264	0.000	0.016	0.000	0.005	0.000	0.286	60.17	0.31
Mackenzie[2]	74	1298	2.407	0.000	0.000	0.327	0.023	0.001	2.757	45.96	3.01

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

[2] Reef catchment – shaded blue.

Table 20 (continued): Woody vegetation clearing by land cover by catchment (2010–11)

Catchment			Rate of woody vegetation clearing (,000ha/yr)							% wooded vegetation cover 2010[1]	% total clearing in QLD
Name	Map Ref.	Total area (,000ha)	Pasture	Crops	Forest	Mining	Infra-structure	Settle-ment	Total		
Maranoa	75	2004	1.591	0.000	0.106	0.000	0.210	0.000	1.906	65.26	2.08
Maroochy	76	154	0.052	0.001	0.169	0.001	0.017	0.056	0.296	69.36	0.32
Mcdonald	77	271	0.000	0.000	0.000	0.000	0.000	0.000	0.000	97.33	0.00
Misc. Other Islands	78	176	0.000	0.000	0.000	0.000	0.000	0.000	0.000	76.95	0.00
Mission	79	268	0.000	0.000	0.000	0.283	0.000	0.000	0.283	91.95	0.31
Mitchell	80	4143	0.073	0.000	0.000	0.000	0.034	0.000	0.107	86.51	0.12
Moonie	81	1442	4.331	0.054	0.001	0.003	0.011	0.000	4.399	33.74	4.80
Moreton Island	82	17	0.000	0.000	0.000	0.000	0.000	0.000	0.000	90.84	0.00
Morning Inlet	83	173	0.003	0.000	0.000	0.000	0.001	0.000	0.004	56.12	0.00
Mornington Island	84	100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	88.20	0.00
Mossman[2]	85	47	0.000	0.000	0.000	0.000	0.000	0.003	0.003	86.23	0.00
Mulgrave[2]	86	131	0.006	0.000	0.001	0.000	0.002	0.002	0.012	82.97	0.01
Murray[2]	87	111	0.045	0.000	0.433	0.000	0.030	0.000	0.508	78.09	0.55
Nicholson	88	3564	0.025	0.000	0.000	0.000	0.001	0.000	0.025	61.54	0.03
Nogoa[2]	89	2770	3.596	0.002	0.008	0.122	0.033	0.006	3.767	57.80	4.11
Noosa	90	194	0.093	0.001	1.358	0.000	0.010	0.013	1.475	87.99	1.61
Norman	91	5042	0.357	0.000	0.000	0.000	0.142	0.000	0.499	85.51	0.54
Normanby[2]	92	1485	0.080	0.000	0.000	0.000	0.038	0.000	0.118	94.65	0.13
North Johnstone[2]	93	103	0.009	0.000	0.000	0.000	0.000	0.000	0.009	82.51	0.01
North Pine	94	60	0.072	0.000	0.000	0.000	0.011	0.053	0.136	71.79	0.15
O'connell[2]	95	238	0.044	0.000	0.324	0.000	0.000	0.024	0.392	69.30	0.43
Olive[2]	96	205	0.000	0.000	0.000	0.000	0.000	0.000	0.000	98.01	0.00
Palmer	97	832	0.018	0.000	0.000	0.000	0.013	0.000	0.031	96.42	0.03
Paroo	98	3654	0.870	0.000	0.000	0.000	0.073	0.000	0.944	49.55	1.03
Pascoe[2]	99	212	0.008	0.000	0.000	0.000	0.000	0.000	0.008	99.34	0.01
Pioneer[2]	100	157	0.038	0.000	0.000	0.000	0.000	0.000	0.038	70.90	0.04
Plane Creek[2]	101	253	0.061	0.001	0.000	0.001	0.011	0.000	0.074	57.77	0.08
Proserpine[2]	102	252	0.060	0.000	0.000	0.000	0.000	0.003	0.063	71.19	0.07
Ross[2]	103	134	0.028	0.000	0.000	0.000	0.002	0.003	0.032	61.35	0.04
Russell[2]	104	67	0.008	0.000	0.000	0.000	0.000	0.000	0.008	78.87	0.01
Saxby	105	1015	0.124	0.000	0.000	0.000	0.042	0.000	0.166	53.29	0.18
Settlement	106	111	0.011	0.000	0.000	0.000	0.000	0.000	0.011	88.22	0.01
Shoalwater[2]	107	360	0.274	0.000	0.000	0.000	0.002	0.000	0.276	72.96	0.30
Skardon	108	44	0.000	0.000	0.000	0.000	0.000	0.000	0.000	94.04	0.00

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

[2] Reef catchment – shaded blue.

Table 20 (continued): Woody vegetation clearing by land cover by catchment (2010–11)

Catchment			Rate of woody vegetation clearing (,000ha/yr)							% wooded vegetation cover 2010[1]	% total clearing in QLD
Name	Map Ref. No.	Total area (,000ha)	Pasture	Crops	Forest	Mining	Infra-structure	Settle-ment	Total		
South Johnstone[2]	109	129	0.008	0.000	0.000	0.000	0.000	0.000	0.008	69.73	0.01
South Pine	110	42	0.016	0.000	0.000	0.000	0.013	0.076	0.105	74.97	0.11
Staaten	111	2557	0.015	0.000	0.000	0.000	0.000	0.000	0.015	93.22	0.02
Stanley	112	154	0.102	0.000	0.406	0.000	0.000	0.007	0.515	69.69	0.56
Stewart[2]	113	274	0.013	0.000	0.000	0.000	0.000	0.000	0.014	96.20	0.01
Stradbroke Islands	114	29	0.000	0.000	0.000	0.066	0.000	0.000	0.066	85.17	0.07
Styx[2]	115	301	0.306	0.000	0.000	0.000	0.001	0.000	0.307	56.01	0.34
Suttor[2]	116	7395	7.110	0.000	0.000	0.073	0.149	0.000	7.333	58.70	8.00
Thomson	117	9507	2.278	0.000	0.000	0.000	0.032	0.000	2.309	32.48	2.52
Torres Strait Islands	118	29	0.000	0.000	0.000	0.000	0.000	0.000	0.000	92.61	0.00
Tully[2]	119	168	0.006	0.000	0.000	0.000	0.003	0.002	0.011	79.67	0.01
Upper Burdekin[2]	120	3625	0.575	0.001	0.000	0.013	0.053	0.000	0.641	80.30	0.70
Upper Burnett[2]	121	860	0.730	0.000	0.006	0.000	0.001	0.000	0.737	66.52	0.80
Upper Mary[2]	122	271	0.072	0.002	0.256	0.000	0.003	0.006	0.338	76.91	0.37
Wallam Creeks	123	4704	8.232	0.000	0.000	0.000	0.065	0.000	8.297	56.70	9.05
Walsh	124	896	0.051	0.000	0.000	0.001	0.033	0.000	0.084	89.86	0.09
Warrego	125	5169	6.144	0.000	0.000	0.000	0.161	0.009	6.315	56.63	6.89
Waterpark Creek[2]	126	183	0.048	0.007	0.100	0.000	0.000	0.011	0.166	86.80	0.18
Watson	127	468	0.001	0.000	0.000	0.000	0.000	0.000	0.001	96.95	0.00
Wenlock	128	752	0.000	0.000	0.000	0.000	0.003	0.000	0.003	96.51	0.00
Whitsunday Island	129	11	0.000	0.000	0.000	0.000	0.000	0.000	0.000	95.79	0.00

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

[2] Reef catchment – shaded blue.

Table 21: Woody vegetation clearing by tenure by catchment (2010–11)

Catchment			Rate of woody vegetation clearing (,000ha/yr)					% wooded vegetation cover 2010[1]	% total clearing in QLD
Name	Map Ref. No.	Total area (,000ha)	Freehold	Leasehold	Other	Reserves	Total		
Albert	1	78	0.072	0.002	0.000	0.000	0.074	70.77	0.08
Alice	2	1294	0.000	0.072	0.000	0.000	0.072	89.59	0.08
Archer	3	1061	0.001	0.094	0.000	0.000	0.095	94.26	0.10
Baffle Creek[2]	4	399	0.452	0.019	0.000	0.031	0.502	82.20	0.55
Balonne	5	3828	9.850	0.529	0.000	0.484	10.862	36.34	11.85
Barcoo	6	5323	3.169	2.634	0.000	0.000	5.803	44.83	6.33
Barker and Barambah Creeks[2]	7	594	0.410	0.024	0.000	0.152	0.586	59.10	0.64
Barratta Creek[2]	8	183	0.014	0.016	0.000	0.000	0.030	26.75	0.03
Barron[2]	9	219	0.012	0.001	0.000	0.011	0.024	79.13	0.03
Black[2]	10	106	0.077	0.006	0.000	0.009	0.092	85.19	0.10
Bohle[2]	11	37	0.082	0.009	0.000	0.000	0.091	45.59	0.10
Bowen[2]	12	945	0.054	0.094	0.000	0.002	0.149	70.61	0.16
Boyne and Auburn[2]	13	1299	1.161	0.197	0.000	0.080	1.438	63.98	1.57
Boyne[2]	14	259	0.088	0.004	0.000	0.021	0.113	82.59	0.12
Bremer	15	203	0.165	0.013	0.000	0.003	0.181	54.67	0.20
Brisbane	16	697	0.474	0.017	0.000	0.237	0.729	65.33	0.79
Bulloo	17	5185	0.009	0.544	0.000	0.000	0.552	29.46	0.60
Burrum[2]	18	121	0.039	0.018	0.000	0.203	0.260	88.41	0.28
Caboolture	19	47	0.150	0.011	0.000	0.000	0.161	65.17	0.18
Calliope[2]	20	224	0.313	0.019	0.000	0.001	0.332	59.99	0.36
Cliffdale	21	618	0.000	0.000	0.000	0.000	0.000	89.72	0.00
Cloncurry	22	4734	0.018	0.117	0.000	0.000	0.135	26.73	0.15
Coen	23	321	0.000	0.059	0.000	0.013	0.072	96.50	0.08
Coleman	24	534	0.000	0.059	0.000	0.000	0.059	92.99	0.06
Comet[2]	25	1730	0.389	0.719	0.000	0.000	1.108	55.39	1.21
Condamine	26	3041	1.518	0.059	0.000	0.202	1.780	34.12	1.94
Coomera and Nerang	27	130	0.228	0.017	0.000	0.000	0.245	72.30	0.27
Cooper Creek	28	9576	0.574	0.296	0.000	0.000	0.869	11.82	0.95
Curtis Island	29	58	0.275	0.009	0.000	0.000	0.284	83.74	0.31
Daintree[2]	30	210	0.005	0.000	0.000	0.000	0.005	97.02	0.01
Dawson[2]	31	5076	2.012	0.972	0.000	0.173	3.156	50.92	3.44
Diamantina	32	11919	0.000	0.065	0.000	0.001	0.065	13.03	0.07
Don[2]	33	369	0.402	0.428	0.000	0.000	0.830	52.86	0.90
Ducie	34	358	0.000	0.008	0.000	0.000	0.008	96.85	0.01
Dumaresq	35	432	0.726	0.026	0.000	0.062	0.814	64.65	0.89
Edward	36	752	0.002	0.037	0.000	0.000	0.040	85.01	0.04
Eight Mile Creek	37	163	0.000	0.000	0.000	0.000	0.000	91.58	0.00
Einasleigh	38	2437	0.000	0.356	0.000	0.000	0.356	91.09	0.39

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

[2] Reef catchment

Table 21 (continued): Woody vegetation clearing by tenure by catchment (2010–11)

Catchment			Rate of woody vegetation clearing (,000ha/yr)					% wooded vegetation cover 2010[1]	% total clearing in QLD
Name	Map Ref. No.	Total area (,000ha)	Freehold	Leasehold	Other	Reserves	Total		
Elliott[2]	39	71	0.037	0.005	0.000	0.014	0.056	58.43	0.06
Embley	40	192	0.000	0.001	0.046	0.000	0.047	94.13	0.05
Endeavour[2]	41	218	0.017	0.005	0.000	0.016	0.039	97.77	0.04
Eyre	42	7178	0.000	0.003	0.000	0.000	0.003	6.72	0.00
Fitzroy[2]	43	1143	0.946	0.249	0.000	0.084	1.280	58.08	1.40
Flinders	44	5188	0.118	0.425	0.000	0.000	0.543	39.14	0.59
Fraser Island	45	166	0.001	0.000	0.000	0.000	0.001	94.69	0.00
Georgina	46	7210	0.000	0.011	0.000	0.000	0.011	23.37	0.01
Gilbert	47	2203	0.001	0.137	0.000	0.000	0.138	85.86	0.15
Gregory[2]	48	91	0.206	0.004	0.000	0.001	0.211	74.34	0.23
Hann[2]	49	956	0.000	0.053	0.000	0.000	0.053	87.80	0.06
Haughton[2]	50	222	0.036	0.007	0.000	0.000	0.044	56.61	0.05
Hay	51	277	0.000	0.000	0.000	0.000	0.000	2.68	0.00
Herbert[2]	52	984	0.089	0.118	0.000	0.005	0.211	87.25	0.23
Hinchinbrook Island	53	39	0.000	0.000	0.000	0.000	0.000	97.55	0.00
Holroyd	54	544	0.000	0.003	0.000	0.000	0.003	96.68	0.00
Isaac[2]	55	2237	1.088	0.746	0.000	0.000	1.834	57.25	2.00
Isis[2]	56	53	0.015	0.010	0.000	0.014	0.039	87.63	0.04
Jacky Jacky Creek[2]	57	296	0.000	0.000	0.000	0.000	0.000	96.49	0.00
Jardine	58	328	0.000	0.000	0.000	0.000	0.000	97.53	0.00
Jeannie[2]	59	363	0.101	0.009	0.000	0.005	0.115	94.04	0.13
Kendall	60	485	0.000	0.009	0.000	0.000	0.009	98.85	0.01
Kolan[2]	61	290	0.348	0.014	0.000	0.000	0.363	75.87	0.40
L Creek	62	194	0.000	0.000	0.000	0.000	0.000	43.24	0.00
Lagoon Creek	63	283	0.000	0.000	0.000	0.000	0.000	93.14	0.00
Lake Frome	64	15	0.000	0.000	0.000	0.000	0.000	2.13	0.00
Leichhardt	65	3288	0.000	0.174	0.002	0.000	0.176	66.36	0.19
Lockhart[2]	66	288	0.001	0.000	0.000	0.000	0.001	97.88	0.00
Lockyer Creek	67	301	0.209	0.009	0.000	0.000	0.218	63.44	0.24
Logan	68	336	0.372	0.025	0.000	0.000	0.398	66.76	0.43
Lower Burdekin[2]	69	1047	0.000	0.817	0.000	0.000	0.817	55.85	0.89
Lower Burnett[2]	70	569	0.621	0.019	0.000	0.000	0.640	59.69	0.70
Lower Mary[2]	71	676	0.656	0.026	0.000	1.829	2.510	73.05	2.74
Macintyre and Weir	72	1541	3.931	0.038	0.000	0.086	4.056	39.71	4.42
Macintyre Brook	73	432	0.256	0.014	0.000	0.015	0.286	60.17	0.31
Mackenzie[2]	74	1298	2.597	0.160	0.000	0.001	2.757	45.96	3.01

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

[2] Reef catchment

Table 21 (continued): Woody vegetation clearing by tenure by catchment (2010–11)

Catchment			Rate of woody vegetation clearing (,000ha/yr)					% wooded vegetation cover 2010[1]	% total clearing in QLD
Name	Map Ref. No.	Total area (,000ha)	Freehold	Leasehold	Other	Reserves	Total		
Maranoa	75	2004	0.736	1.065	0.000	0.106	1.906	65.26	2.08
Maroochy	76	154	0.143	0.015	0.000	0.138	0.296	69.36	0.32
Mcdonald	77	271	0.000	0.000	0.000	0.000	0.000	97.33	0.00
Misc. Other Islands	78	176	0.000	0.000	0.000	0.000	0.000	76.95	0.00
Mission	79	268	0.000	0.009	0.273	0.000	0.283	91.95	0.31
Mitchell	80	4143	0.009	0.098	0.000	0.000	0.107	86.51	0.12
Moonie	81	1442	4.288	0.110	0.000	0.001	4.399	33.74	4.80
Moreton Island	82	17	0.000	0.000	0.000	0.000	0.000	90.84	0.00
Morning Inlet	83	173	0.000	0.004	0.000	0.000	0.004	56.12	0.00
Mornington Island	84	100	0.000	0.000	0.000	0.000	0.000	88.20	0.00
Mossman[2]	85	47	0.003	0.000	0.000	0.000	0.003	86.23	0.00
Mulgrave[2]	86	131	0.010	0.001	0.000	0.001	0.012	82.97	0.01
Murray[2]	87	111	0.012	0.048	0.000	0.448	0.508	78.09	0.55
Nicholson	88	3564	0.009	0.016	0.000	0.000	0.025	61.54	0.03
Nogoa[2]	89	2770	2.916	0.782	0.000	0.069	3.767	57.80	4.11
Noosa	90	194	0.099	0.024	0.000	1.352	1.475	87.99	1.61
Norman	91	5042	0.008	0.491	0.000	0.000	0.499	85.51	0.54
Normanby[2]	92	1485	0.027	0.085	0.000	0.006	0.118	94.65	0.13
North Johnstone[2]	93	103	0.008	0.001	0.000	0.000	0.009	82.51	0.01
North Pine	94	60	0.123	0.013	0.000	0.000	0.136	71.79	0.15
O'connell[2]	95	238	0.065	0.003	0.000	0.324	0.392	69.30	0.43
Olive[2]	96	205	0.000	0.000	0.000	0.000	0.000	98.01	0.00
Palmer	97	832	0.000	0.030	0.000	0.001	0.031	96.42	0.03
Paroo	98	3654	0.293	0.650	0.000	0.001	0.944	49.55	1.03
Pascoe[2]	99	212	0.007	0.002	0.000	0.000	0.008	99.34	0.01
Pioneer[2]	100	157	0.029	0.000	0.000	0.008	0.038	70.90	0.04
Plane Creek[2]	101	253	0.072	0.002	0.000	0.000	0.074	57.77	0.08
Proserpine[2]	102	252	0.037	0.026	0.000	0.000	0.063	71.19	0.07
Ross[2]	103	134	0.029	0.004	0.000	0.000	0.032	61.35	0.04
Russell[2]	104	67	0.007	0.000	0.000	0.000	0.008	78.87	0.01
Saxby	105	1015	0.021	0.145	0.000	0.000	0.166	53.29	0.18
Settlement	106	111	0.000	0.011	0.000	0.000	0.011	88.22	0.01
Shoalwater[2]	107	360	0.127	0.149	0.000	0.000	0.276	72.96	0.30
Skardon	108	44	0.000	0.000	0.000	0.000	0.000	94.04	0.00
South Johnstone[2]	109	129	0.008	0.000	0.000	0.000	0.008	69.73	0.01
South Pine	110	42	0.097	0.007	0.000	0.000	0.105	74.97	0.11
Staaten	111	2557	0.000	0.015	0.000	0.000	0.015	93.22	0.02

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

[2] Reef catchment

Table 21 (continued): Woody vegetation clearing by tenure by catchment (2010–11)

Catchment			Rate of woody vegetation clearing (,000ha/yr)					% wooded vegetation cover 2010[1]	% total clearing in QLD
Name	Map Ref. No.	Total area (,000ha)	Freehold	Leasehold	Other	Reserves	Total		
Stanley	112	154	0.104	0.011	0.000	0.400	0.515	69.69	0.56
Stewart[2]	113	274	0.000	0.013	0.000	0.000	0.014	96.20	0.01
Stradbroke Islands	114	29	0.000	0.066	0.000	0.000	0.066	85.17	0.07
Styx[2]	115	301	0.295	0.013	0.000	0.000	0.307	56.01	0.34
Suttor[2]	116	7395	2.197	5.123	0.000	0.013	7.333	58.70	8.00
Thomson	117	9507	1.299	1.010	0.000	0.000	2.309	32.48	2.52
Torres Strait Islands	118	29	0.000	0.000	0.000	0.000	0.000	92.61	0.00
Tully[2]	119	168	0.007	0.004	0.000	0.000	0.011	79.67	0.01
Upper Burdekin[2]	120	3625	0.016	0.621	0.004	0.000	0.641	80.30	0.70
Upper Burnett[2]	121	860	0.622	0.113	0.000	0.002	0.737	66.52	0.80
Upper Mary[2]	122	271	0.073	0.012	0.000	0.252	0.338	76.91	0.37
Wallam Creeks	123	4704	4.350	3.947	0.000	0.000	8.297	56.70	9.05
Walsh	124	896	0.020	0.064	0.000	0.000	0.084	89.86	0.09
Warrego	125	5169	2.594	3.721	0.000	0.000	6.315	56.63	6.89
Waterpark Creek[2]	126	183	0.064	0.003	0.000	0.099	0.166	86.80	0.18
Watson	127	468	0.000	0.001	0.000	0.000	0.001	96.95	0.00
Wenlock	128	752	0.002	0.000	0.000	0.000	0.003	96.51	0.00
Whitsunday Island	129	11	0.001	0.000	0.000	0.000	0.002	95.79	0.00

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

[2] Reef catchment

Appendix E Woody vegetation clearing by local government area (2010–11)

Table 22: Woody vegetation clearing by land cover by local government area (2010–11)

Local government area			Rate of woody vegetation clearing (,000ha/yr)							% wooded vegetation cover 2010[1]	% total clearing in QLD
Name	Map Ref. No.	Total area (,000ha)	Pasture	Crops	Forest	Mining	Infra-structure	Settle-ment	Total		
Aurukun Shire	1	736	0.018	0.000	0.000	0.000	0.000	0.000	0.018	92.53	0.02
Balonne Shire	2	3109	7.905	0.016	0.000	0.000	4.980	0.000	12.900	38.80	14.07
Banana Shire	3	2855	0.990	0.080	0.019	0.136	0.003	0.000	1.228	50.57	1.34
Barcaldine Shire	4	5353	5.129	0.000	0.000	0.056	0.162	0.001	5.348	41.66	5.83
Barcoo Shire	5	6181	0.878	0.000	0.000	0.000	0.068	0.000	0.946	19.04	1.03
Blackall Tambo Regional	6	3039	3.875	0.000	0.000	0.000	0.021	0.000	3.895	42.68	4.25
Boulia Shire	7	6088	0.002	0.000	0.000	0.000	0.000	0.000	0.002	14.69	0.00
Brisbane City	8	135	0.010	0.000	0.000	0.000	0.035	0.163	0.208	78.44	0.23
Bulloo Shire	9	7366	0.012	0.000	0.000	0.000	0.018	0.000	0.029	13.27	0.03
Bundaberg Shire	10	644	0.715	0.086	0.028	0.000	0.014	0.037	0.879	70.32	0.96
Burdekin Shire	11	504	0.616	0.000	0.000	0.003	0.002	0.000	0.621	46.49	0.68
Burke Shire	12	3999	0.039	0.000	0.000	0.000	0.000	0.000	0.039	72.05	0.04
Cairns Regional	13	411	0.012	0.000	0.000	0.000	0.000	0.007	0.019	87.52	0.02
Carpentaria Shire	14	6410	0.153	0.000	0.000	0.000	0.052	0.000	0.205	71.32	0.22
Cassowary Coast Regional	15	469	0.060	0.000	0.433	0.000	0.033	0.002	0.528	76.80	0.58
Central Highlands Regional	16	5983	4.663	0.004	0.008	0.251	0.069	0.005	5.000	56.22	5.45
Charters Towers Regional	17	6837	1.629	0.001	0.000	0.023	0.076	0.000	1.728	76.67	1.88
Cherbourg Aboriginal Shire	18	3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	82.76	0.00
Cloncurry Shire	19	4798	0.067	0.000	0.000	0.003	0.006	0.000	0.076	39.04	0.08
Cook Shire	20	10593	0.458	0.000	0.000	0.328	0.199	0.003	0.987	95.36	1.08
Croydon Shire	21	2949	0.260	0.000	0.000	0.000	0.058	0.000	0.318	93.45	0.35
Diamantina Shire	22	9462	0.000	0.000	0.000	0.000	0.000	0.000	0.000	4.62	0.00
Doomadgee Aboriginal Shire	23	183	0.008	0.000	0.000	0.000	0.001	0.000	0.009	85.82	0.01
Etheridge Shire	24	3924	0.303	0.000	0.000	0.005	0.200	0.000	0.508	91.74	0.55
Flinders Shire	25	4119	0.998	0.000	0.000	0.002	0.031	0.000	1.031	49.52	1.12
Fraser Coast Regional	26	714	0.440	0.004	1.745	0.001	0.000	0.042	2.233	84.02	2.44
Gladstone Regional	27	1076	0.751	0.000	0.051	0.055	0.314	0.074	1.244	73.71	1.36
Gold Coast City	28	137	0.027	0.000	0.000	0.013	0.018	0.201	0.259	66.62	0.28
Goondiwindi Regional	29	1926	3.880	0.122	0.031	0.004	0.009	0.000	4.047	39.84	4.41
Gympie Regional	30	692	0.445	0.010	1.840	0.000	0.007	0.014	2.317	71.82	2.53
Hinchinbrook Shire	31	281	0.079	0.014	0.005	0.000	0.002	0.007	0.106	65.94	0.12

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

Table 22 (continued): Woody vegetation clearing by land cover by local government area (2010–11)

Local government area			Rate of woody vegetation clearing (,000ha/yr)							% wooded vegetation cover 2010[1]	% total clearing in QLD
Name	Map Ref. No.	Total area (,000ha)	Pasture	Crops	Forest	Mining	Infra-structure	Settle-ment	Total		
Hope Vale Aboriginal Shire	32	111	0.025	0.000	0.000	0.000	0.000	0.000	0.025	92.60	0.03
Ipswich City	33	109	0.034	0.000	0.000	0.036	0.000	0.204	0.274	59.26	0.30
Isaac Regional	34	5874	4.183	0.001	0.002	1.119	0.166	0.028	5.499	53.55	6.00
Kowanyama Aboriginal Shire	35	254	0.001	0.000	0.000	0.000	0.013	0.000	0.014	65.66	0.02
Lockhart River Aboriginal Shire	36	358	0.008	0.000	0.000	0.000	0.002	0.000	0.011	98.59	0.01
Lockyer Valley Regional	37	227	0.136	0.000	0.000	0.000	0.000	0.003	0.139	64.61	0.15
Logan City	38	96	0.011	0.000	0.000	0.009	0.033	0.179	0.232	78.39	0.25
Longreach Regional	39	4057	3.627	0.000	0.000	0.000	0.002	0.000	3.629	26.57	3.96
Mackay Regional	40	760	0.223	0.000	0.324	0.001	0.011	0.024	0.583	70.01	0.64
Mapoon Aboriginal Shire	41	51	0.000	0.000	0.000	0.000	0.000	0.000	0.000	93.43	0.00
Maranoa Regional	42	5871	9.889	0.000	0.509	0.018	0.082	0.000	10.498	52.30	11.45
McKinlay Shire	43	4073	0.104	0.000	0.000	0.000	0.085	0.000	0.189	25.05	0.21
Moreton Bay Regional	44	207	0.228	0.003	0.402	0.000	0.020	0.134	0.787	71.50	0.86
Mornington Shire	45	120	0.000	0.000	0.000	0.000	0.000	0.000	0.000	86.97	0.00
Mount Isa City	46	4310	0.003	0.000	0.000	0.142	0.001	0.003	0.149	50.54	0.16
Murweh Shire	47	4070	6.029	0.000	0.000	0.000	0.139	0.009	6.178	62.41	6.74
Napranum Aboriginal Shire	48	199	0.000	0.000	0.000	0.000	0.000	0.000	0.000	96.04	0.00
North Burnett Regional	49	1967	2.019	0.006	0.109	0.010	0.001	0.001	2.146	66.88	2.34
Northern Peninsula Area Regional	50	101	0.000	0.000	0.000	0.000	0.000	0.000	0.000	93.74	0.00
Palm Island Aboriginal Shire	51	7	0.000	0.000	0.000	0.000	0.000	0.000	0.000	94.33	0.00
Paroo Shire	52	4761	1.139	0.000	0.000	0.000	0.084	0.000	1.223	52.45	1.33
Pormpuraaw Aboriginal Shire	53	438	0.001	0.000	0.000	0.000	0.002	0.000	0.002	77.07	0.00
Quilpie Shire	54	6743	0.577	0.000	0.000	0.000	0.145	0.000	0.721	35.00	0.79
Redland City	55	54	0.003	0.000	0.000	0.066	0.000	0.040	0.109	82.69	0.12
Richmond Shire	56	2658	0.221	0.000	0.000	0.000	0.032	0.000	0.253	38.70	0.28
Rockhampton Regional	57	1847	1.480	0.021	0.184	0.080	0.013	0.020	1.798	64.25	1.96
Scenic Rim Regional	58	425	0.163	0.000	0.000	0.001	0.012	0.009	0.184	61.97	0.20
Somerset Regional	59	537	0.272	0.004	0.121	0.000	0.001	0.007	0.404	64.95	0.44
South Burnett Regional	60	838	0.748	0.015	0.228	0.009	0.001	0.004	1.006	54.75	1.10
Southern Downs Regional	61	710	0.772	0.003	0.088	0.000	0.003	0.001	0.869	56.41	0.95

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

Table 22 (continued): Woody vegetation clearing by land cover by local government area (2010–11)

Local government area			Rate of woody vegetation clearing (,000ha/yr)							% wooded vegetation cover 2010[1]	% total clearing in QLD
Name	Map Ref. No.	Total area (,000ha)	Pasture	Crops	Forest	Mining	Infra-structure	Settle-ment	Total		
Sunshine Coast Regional	62	316	0.165	0.001	0.262	0.001	0.017	0.067	0.514	72.66	0.56
Tablelands Regional	63	6475	0.230	0.000	0.013	0.001	0.057	0.002	0.302	92.88	0.33
Toowoomba Regional	64	1296	0.851	0.003	0.167	0.018	0.005	0.003	1.047	36.79	1.14
Torres Shire	65	93	0.000	0.000	0.000	0.000	0.000	0.000	0.000	86.83	0.00
Torres Strait Island Regional	66	47	0.000	0.000	0.000	0.000	0.000	0.000	0.000	59.00	0.00
Townsville City	67	373	0.136	0.001	0.007	0.001	0.015	0.095	0.254	68.58	0.28
Weipa Town	68	1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	60.56	0.00
Western Downs Regional	69	3794	2.930	0.064	0.368	0.378	0.085	0.002	3.826	39.47	4.17
Whitsunday Regional	70	2383	1.933	0.000	0.000	0.032	0.053	0.005	2.024	61.84	2.21
Winton Shire	71	5381	0.066	0.000	0.000	0.000	0.005	0.000	0.071	19.81	0.08
Woorabinda Aboriginal Shire	72	39	0.000	0.000	0.000	0.000	0.000	0.000	0.000	71.35	0.00
Wujal Wujal Aboriginal Shire	73	1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	99.70	0.00
Yarrabah Aboriginal Shire	74	16	0.000	0.000	0.000	0.000	0.002	0.001	0.003	98.13	0.00

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

Appendix F Missed clearing analysis (1988–2011)

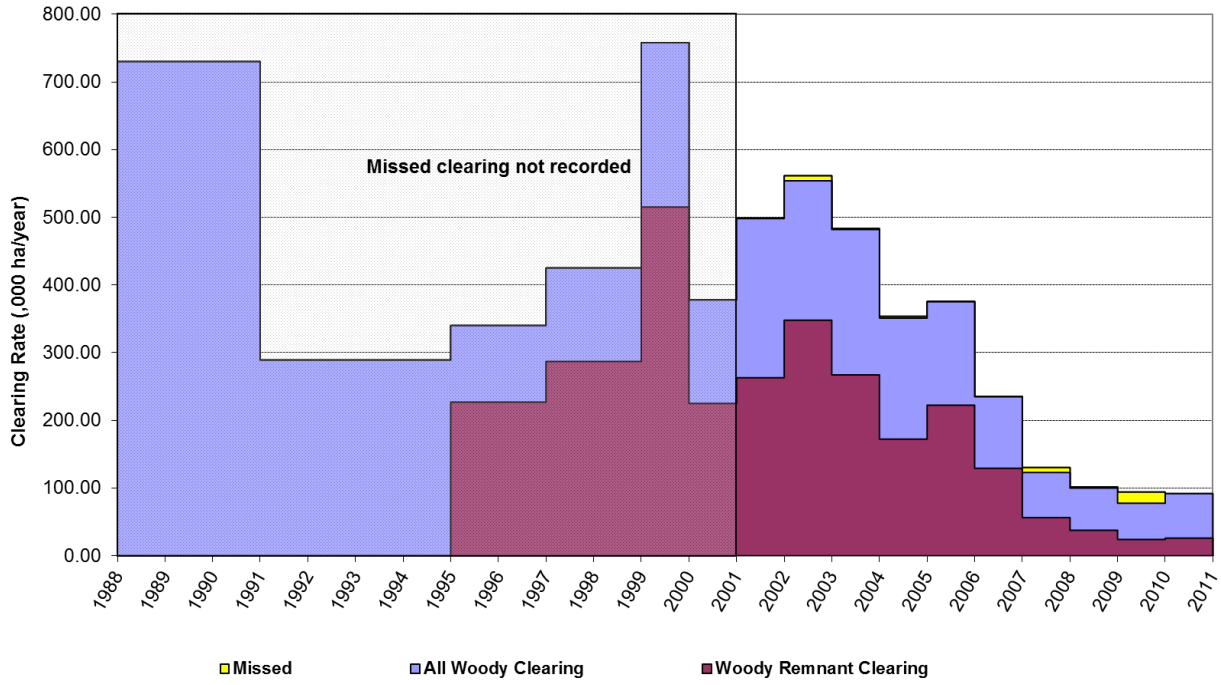

Figure 33: Annual woody vegetation clearing rate in Queensland (1988–2011) with identified missed clearing backfilled[1]

[1] Missed clearing is actual area, and has not been converted to ha/year clearing rate.

Table 23: Clearing identified as missed in subsequent period

	Reported clearing rate (000 ha/yr)	Missed clearing (000 ha)[1]	% of total era clearing
0102	498.0	0.69	0.1%
0203	554.0	7.33	1.3%
0304	482.0	1.26	0.3%
0405	351.0	2.50	0.7%
0506	375.1	0.48	0.1%
0607	234.8	0.45	0.2%
0708	122.8	7.48	5.7%
0809	99.9	1.87	1.8%
0910	77.6	16.34	17.4%

[1] Missed clearing is actual area, and was not converted to ha/year clearing rate.