

# **Queensland's plantation forestry estate**

## **2016 update**

**December 2016**

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# Contents

|   |          |
|---|----------|
| <b>Background</b> .....   | <b>1</b> |
| <b>Findings</b> .....   | <b>1</b> |
| <b>Plantation estate by region</b> .....                              | <b>2</b> |
| North Queensland .....  | 3        |
| South East Queensland .....   | 3        |
| <b>Plantation estate by ownership</b> .....                           | <b>3</b> |
| HQP .....   | 3        |
| Other growers .....   | 4        |
| Softwood .....  | 4        |
| Hardwood.....   | 4        |
| Mixed species .....   | 4        |
| <b>Appendix 1: Methodology</b> .....                                  | <b>5</b> |
| Data sources .....  | 5        |
| HQP .....   | 5        |
| DSITI .....   | 6        |
| Imagery .....   | 6        |
| Data limitations.....   | 6        |
| <b>Appendix 2: North Queensland Plantation Estate maps</b> .....      | <b>7</b> |
| <b>Appendix 3: South East Queensland Plantation Estate maps</b> ..... | <b>9</b> |

## Background

Understanding the spatial extent of plantation forestry and how this changes over time is important for policy development and decision-making. It is also needed to meet monitoring and reporting obligations, and allows comparison of the plantation sector with other agricultural sectors.

A basic spatial layer of Queensland's plantation forestry estate prepared by the Department of Agriculture and Fisheries (DAF) was first released to the public as part of the *Queensland agricultural land audit* in 2013. That coverage assigned a general plantation type—softwood, hardwood or mixed species—to each parcel of plantation land.

This spatial layer was updated and validated by Department of Science, Information Technology and Innovation in 2014. The update (called 'the 2014 plantation coverage') used the best available plantation coverages and satellite imagery. A further update by DAF in 2016 (called 'the 2016 plantation coverage') used plantation datasets from 2016, and satellite imagery from 2014 to 2016. The methodology of updating the spatial data is outlined in Appendix 1.

This paper presents the results of the 2016 update, and includes a comparison of the 2014 and 2016 plantation coverages. The change in the area between the two assessment years provides an insight into the disinvestment in Queensland plantations in this period, largely resulting from the failure of plantations established under managed investment schemes. These schemes were designed to encourage expansion of the plantation estate via taxation benefits to small-scale investors. In addition to the failure of most of these Queensland plantations, there was broadscale failure of the related businesses, which were affected by the global financial crisis.

## Findings

The 2016 plantation coverage identifies approximately 242 400 hectares of plantations (Table 1). This comprises approximately 81% softwoods, 18% hardwoods and less than 1% mixed species. This equates to total estate areas of around 198 500 hectares of softwoods, 43 500 hectares of hardwoods and 400 hectares of mixed species. A further 4000 hectares of potential plantations were identified in the imagery but remain unclassified due to the low confidence in the available data. These 4000 hectares were not included in the findings of this report. The plantation estate in Queensland has two broad categories of ownership—plantations managed by HQPlantations (HQP) and those managed by other growers (typically small-scale operations). HQP's estate equates to roughly 85% of the state's plantations; the remaining 15% is under other private or government ownership. Included in the private growers' plantations is the 4250 hectares of hardwood plantations that were established by the former Forest Enterprises Australia Holdings (FEA).

The change in area of the plantation estate was calculated as the difference between the 2014 and 2016 plantation layers. Data for both years is presented in Table 1 by both forest type and ownership. The 2014 estate covered an area of roughly 265 000 hectares, compared to 242 400 hectares in 2016. The reduction of around 22 500 hectares is largely a result of conversion of failed hardwood plantations established under managed investment schemes. Also contributing to this change were the small areas of softwood and hardwood plantations in North Queensland that were not replanted following Cyclone Yasi in 2011 and Cyclone Marcia in 2015.

**Table 1—Queensland's plantation estate, 2014 and 2016**

|                      | <b>2014 plantation coverage (ha)</b> | <b>2016 plantation coverage (ha)</b> | <b>Difference (ha)</b> | <b>Change (%)</b> |
|----------------------|--------------------------------------|--------------------------------------|------------------------|-------------------|
| <b>Total</b>         | <b>264 960</b>                       | <b>242 442</b>                       | <b>-22 518</b>         | <b>-8</b>         |
| - Softwood           | 202 819                              | 198 457                              | -4 362                 | -2                |
| - Hardwood           | 61 664                               | 43 578                               | -18 086                | -29               |
| - Mixed species      | 477                                  | 407                                  | -70                    | -15               |
| <b>HQP*</b>          | <b>212 027</b>                       | <b>209 927</b>                       | <b>-2 100</b>          | <b>-1</b>         |
| - Softwood           | 195 761                              | 193 943                              | -1 818                 | -1                |
| - Hardwood           | 16 266                               | 15 984                               | -282                   | -2                |
| <b>Other growers</b> | <b>52 933</b>                        | <b>32 514</b>                        | <b>-20 419</b>         | <b>-39</b>        |
| - Softwood           | 7 058                                | 4 514                                | -2 544                 | -36               |
| - Hardwood           | 45 398                               | 27 593                               | -17 805                | -39               |
| - Mixed species      | 477                                  | 407                                  | -70                    | -15               |

\* All HQP parcels classified as either 'clearfallen', 'to be planted' or 'written off' have been attributed to either softwood or hardwood.

## Plantation estate by region

The National Plantation Inventory (NPI) is updated annually by the Australian Bureau of Agricultural Resource Economics and Sciences (ABARES). The most recent update was published in August 2016. The NPI includes data on all major plantation regions in Australia—for Queensland, the two nominal regions are North Queensland and South East Queensland.

To allow for comparison, the 2016 plantation coverage was divided into two regions that align with the NPI data. These regions are:

- North Queensland—Cape York south to Rockhampton
- South East Queensland—Gladstone south to the New South Wales border.

For further analysis, each region was divided into two subregions. For North Queensland, a northern subregion based around Cairns and Townsville was separated from a southern subregion between Mackay and Rockhampton. For South East Queensland, a northern subregion between Gladstone and Bundaberg was created; the resulting southern subregion runs from Bundaberg south to the New South Wales border. This northern subregion is of particular interest in relation to the hardwood estate, because of the extensive plantings there in the mid-2000s under managed investment schemes. Maps of these regions are shown in Appendixes 2 and 3.

Although best efforts have been made to ensure the 2016 plantation coverage is complementary to the NPI data, there will be some discrepancies. This is because there is a difference in source datasets and because the NPI regional boundaries do not include all the plantations that occur in the given region.

## **North Queensland**

In the North Queensland region, the plantation estate is about 32 500 hectares. It includes about 30 800 hectares of softwoods and 1700 hectares of hardwoods.

The softwood and hardwood estate was severely impacted by Cyclones Yasi (2011) and Marcia (2015), which destroyed or severely affected the plantations owned by both HQP and other growers in the region. The data presented for HQP includes areas that HQP have indicated they intend to replant, whereas data for other growers relies on the assumption that any areas without established plantations will not be replanted.

Between 2014 and 2016, the region's plantation estate decreased by 12 000 hectares—85% of this loss was attributed to 'other growers' as cyclone-damaged plantations were cleared or updated imagery better reflected the plantation loss. The damage was more extensive in the northern subregion (Cairns to Townsville) with a total loss in plantation area of almost 8000 hectares. The southern subregion (Mackay to Rockhampton) experienced a loss of roughly 4000 hectares over the same period. In both subregions, the area of damaged hardwood plantations was around twice that of damaged softwood plantations.

## **South East Queensland**

The South East Queensland estate covers around 210 000 hectares; it includes 167 500 hectares of softwoods, 41 500 hectares of hardwoods and 400 hectares of mixed species. In 2014, the estate covered 220 000 hectares, so there has been a decrease of around 10 000 hectares in the two-year period to 2016. During this time, softwood resources remained stable while the hardwood plantations decreased by around 10 000 hectares. This decrease comprised about 3500 hectares in the Bundaberg region and 6500 hectares in the region south of Bundaberg. Mixed species plantations reduced by 70 hectares in the same period.

## **Plantation estate by ownership**

In Queensland, 85% of the plantation estate is owned by HQP. The remaining areas—most of which are in South East Queensland—are owned by a range of other private growers of both softwoods and hardwoods. These private growers maintain a varying range of estate sizes.

## **HQP**

In 2016, the HQP area was 210 000 hectares—194 000 hectares of softwood plantations and almost 16 000 hectares of hardwood plantations. Most of the plantation area (85%) was in South East Queensland; 15% was in North Queensland.

The HQP resource decreased by about 2100 hectares in the two years from 2014 to 2016. This decrease was largely attributed to the sale of small areas around the Byfield region that were no longer needed after the impacts of Cyclone Marcia (2015). HQP has indicated that they intend to replant the remaining areas of plantation that were destroyed and damaged.

## **Other growers**

### **Softwood**

The softwood resource attributed to other growers decreased by roughly 2500 hectares over the two-year period, all of which was in North Queensland. Now only 250 hectares of softwood plantations are in this category in this region.

In South East Queensland, the area of softwood plantation owned by other growers in 2016 was 4250 hectares. There has been no change in this area in the two years from 2014.

### **Hardwood**

The area of hardwood plantations in 2016 was 27 500 hectares, a reduction of 17 800 hectares or almost 40% from the 2014 total of around 45 000 hectares. This reduction was almost all in the 'other growers' category and can be attributed to the failed plantings established under managed investment schemes. This 17 800 hectares of land has subsequently been sold and cleared for agricultural purposes.

In North Queensland, the hardwood plantation area has decreased by 8000 hectares in the two years since 2014, leaving the hardwood resource from other growers covering an area of 1500 hectares. A further 10 000 hectares has been lost from South East Queensland, with the region now supporting around 26 000 hectares of hardwood plantations in the 'other growers' category.

### **Mixed species**

The mixed species estate owned by other growers reduced by roughly 70 hectares or 15% over the two years, to around 400 hectares. This estate is located solely in South East Queensland and includes both plantations and small corridor or screening plantings on farms that have potential for commercial uses. There are likely to be other mixed species plantations that are not captured in this coverage.

## Appendix 1: Methodology

Updated spatial data was obtained from HQP (2016) and DSITI (2015) to complement the existing datasets from ABARES and FEA (2012). To ensure consistency with previous spatial updates, the methodology applied was derived from the 2014 plantation update.

The 2016 plantation coverage was updated using the following process:

1. All datasets (2014 plantation coverage, HQP, DSITI, ABARES and FEA) were combined into a single aggregate map.
2. In the aggregate map, a new 2016 plantation coverage was created by combining the 2016 HQP data with the data sourced from elsewhere for the 2014 plantation coverage.
3. The 2015 DSITI data, obtained from the Queensland Land Use Mapping Program (QLUMP), was interrogated to extract those parcels classified as 'plantation forestry' or 'irrigated plantation forestry' that had been updated since the previous review (updated in 2014 or 2015). These parcels were then added to the 2016 plantation coverage.
4. Each parcel originating from a non-HQP source was double-checked against the most recent imagery to confirm the presence of plantation. If a parcel did not match with plantation in the imagery, it was deleted or, where appropriate, boundaries were amended as accurately as possible.

Attributes in the final dataset include source, class and confidence. Source denotes where the data was obtained. Class indicates the dominant species group—hardwood, softwood or mixed species. Confidence relates to the level of certainty that the area is still plantation (which is mostly subject to the date of the data source and the quality of available imagery) and also whether the spatial data is sufficiently detailed to represent just the net planted area or whether it is a coarser representation of the outer boundary and therefore represents the gross area.

### Data sources

Data for this review was compiled from a mix of sources. The data from both HQP and DSITI had been updated since the last review (2014) and therefore was included. The data obtained from ABARES and FEA was the same as used in the 2014 plantation coverage because there were no recent updates available at the time of the analysis. The data was therefore only used to aid in analysis of parcels where needed.

### HQP

HQP data was provided in January 2016 and was accepted to be the most up-to-date and accurate representation of their estate. The data provided by HQP was used in preference to other datasets, given the high confidence in its accuracy.

The data provided by HQP was classified according to plantation type as either 'hardwoods', 'exotic conifer', 'native conifer', 'unplanted', 'written off', 'clearfallen' or 'to be planted'. For the purposes of this project, 'exotic conifer' and 'native conifer' were combined into a single class called 'softwood'. To assess the current state of Queensland's plantation estate, those HQP parcels classified as 'unplanted' were excluded from the data frame for this update. These parcels were identified by HQP as areas where planting has not occurred due to gullies, watercourses, native forest or poor-quality land. The remaining classifications of 'written off', 'clearfallen' and 'to be planted' were included in the 2016 plantation coverage, as these parcels were waiting planting. Definitions of these classifications are:

- written off—where plantation has failed and a decision has not yet been made as to whether to replant
- clearfallen—where previous plantation crops have been harvested but not yet replanted
- to be planted—where planting is yet to occur but there is designation for potential planting.

For the purposes of this project, those parcels deemed to be in fallow were attributed to either softwood or hardwood forest types. Classifications were based on either historical or regional preferences for either type. These parcels were included in the total calculation of HQP's plantation estate, as the land will contribute to their resource in the future.

## **DSITI**

Data provided by DSITI was extracted from the QLUMP dataset. For this update, those features classified as 'plantation forestry' or 'irrigated plantation forestry' were extracted from the statewide dataset. These features were then assessed based on their currency. Only features that were updated after the previous layer was completed (those dated 2014 or 2015) were included. Where older (dated before 2014) QLUMP features were outside of the 2014 plantation coverage, they were analysed using updated satellite imagery to determine whether they should be included in the 2016 plantation coverage.

## **Imagery**

Aerial and satellite imagery were used to cross-reference parcel boundaries and plantation types. All imagery was from the years 2014 to 2016 and was more current than imagery used in the 2014 plantation update. Imagery was obtained from both government and publicly available sources.

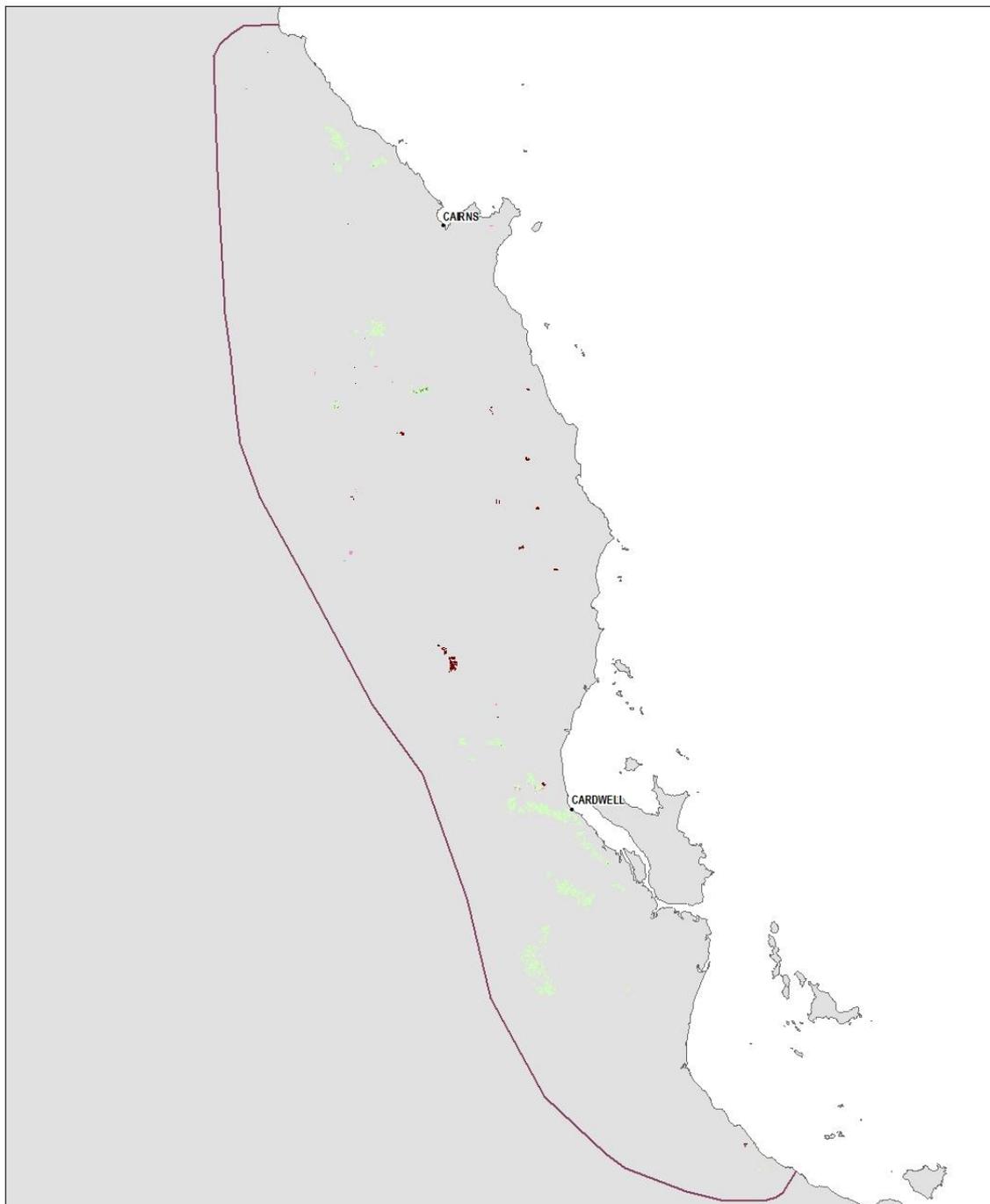
## **Data limitations**

The 2016 plantation coverage contains only those areas previously identified in the source datasets. It is possible that some areas of plantation have not been identified. While these may be significant locally, it is unlikely that any plantations that are significant at a regional or state level have been missed. For some sources, the mapped extent is likely to be an overestimate, as it describes the outer boundary of a land parcel containing some plantation and also includes some areas of non-plantation vegetation such as buffers, roads or unplanted areas. It is also likely that some areas included in the coverage may no longer support plantation due to ongoing effects from natural events (such as cyclones or drought) since they were mapped in their source dataset. Also, there may be inaccuracies because of a lack of updated aerial or satellite imagery of the area.

Areas in this report attributed to the 2014 plantation coverage may differ from those presented in the previously available dataset. Some of the 2014 classifications were reassessed in order to fit with the classifications used in the development of the 2016 plantation coverage. For example, in the preparation of the 2014 plantation coverage, any parcels classified by HQP as 'written off' or 'to be planted' were excluded from the dataset. These parcels have been included in this analysis. HQP also indicated that small errors may have been made in the mapping of their 2014 estate footprint. This contributed to the statistics attributed to the 2014 plantation coverage in this report differing from those in the previous dataset.

## Appendix 2: North Queensland Plantation Estate maps

Figure 1—North Queensland Plantation Estate 2016 (Cairns–Townsville Node)



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0 25 50  
Kilometres

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### Plantation Ownership and Type

- HQP - Softwood
- HQP - Hardwood
- Other Growers - Softwood
- Other Growers - Hardwood
- NQ Region (Cairns-Townsville node)

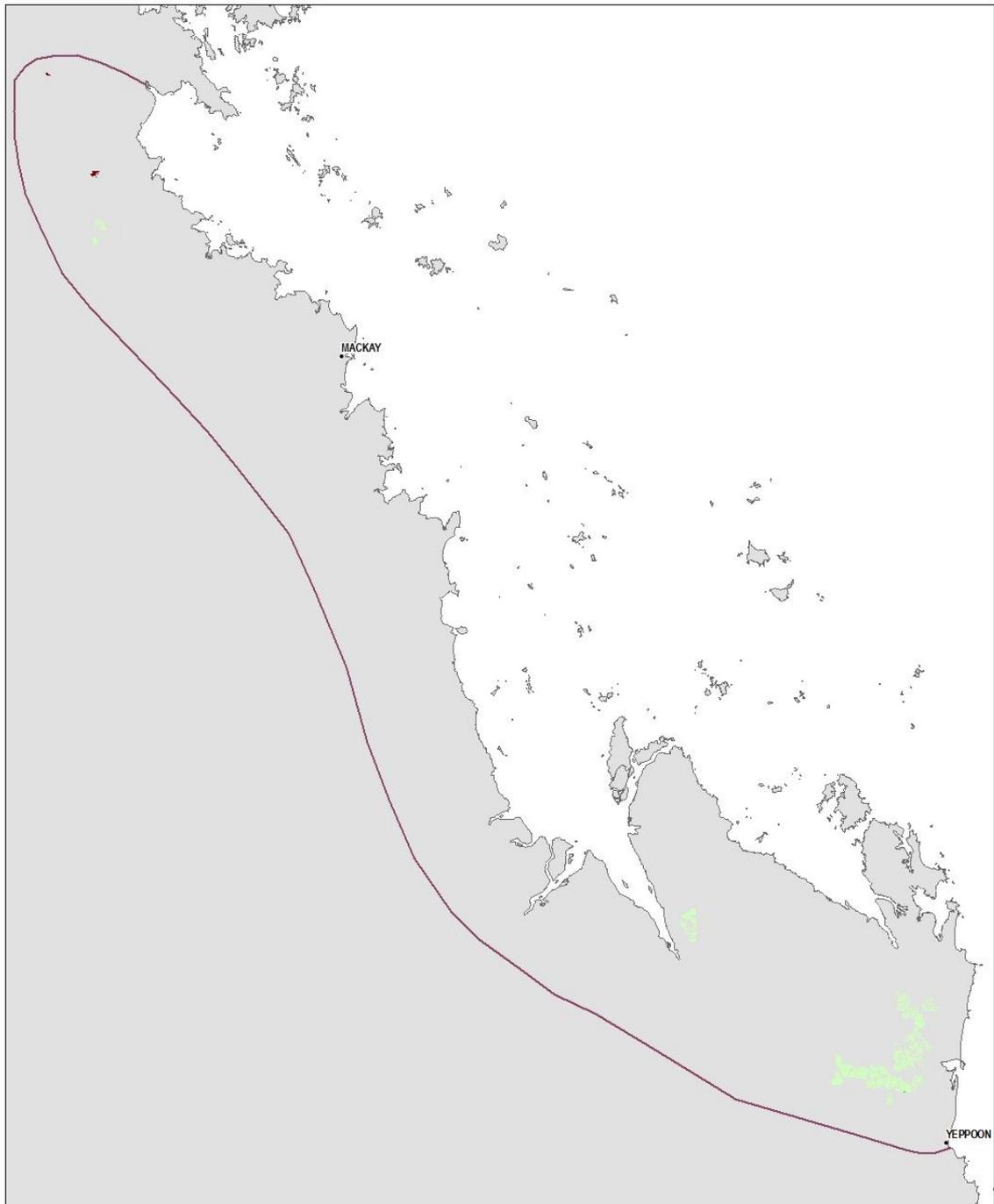
### North Queensland Plantation Estate 2016 (Cairns-Townsville Node)

GDA 1994 MGA Zone 56  
Date of Preparation 13/12/2016

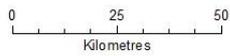


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**Figure 2—North Queensland Plantation Estate 2016 (Mackay–Rockhampton Node)**



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**Plantation Ownership and Type**

- HQP - Softwood
- HQP - Hardwood
- Other Growers - Hardwood
- NQ Region (Mackay-Rockhampton node)

**North Queensland  
Plantation Estate 2016  
(Mackay-Rockhampton Node)**

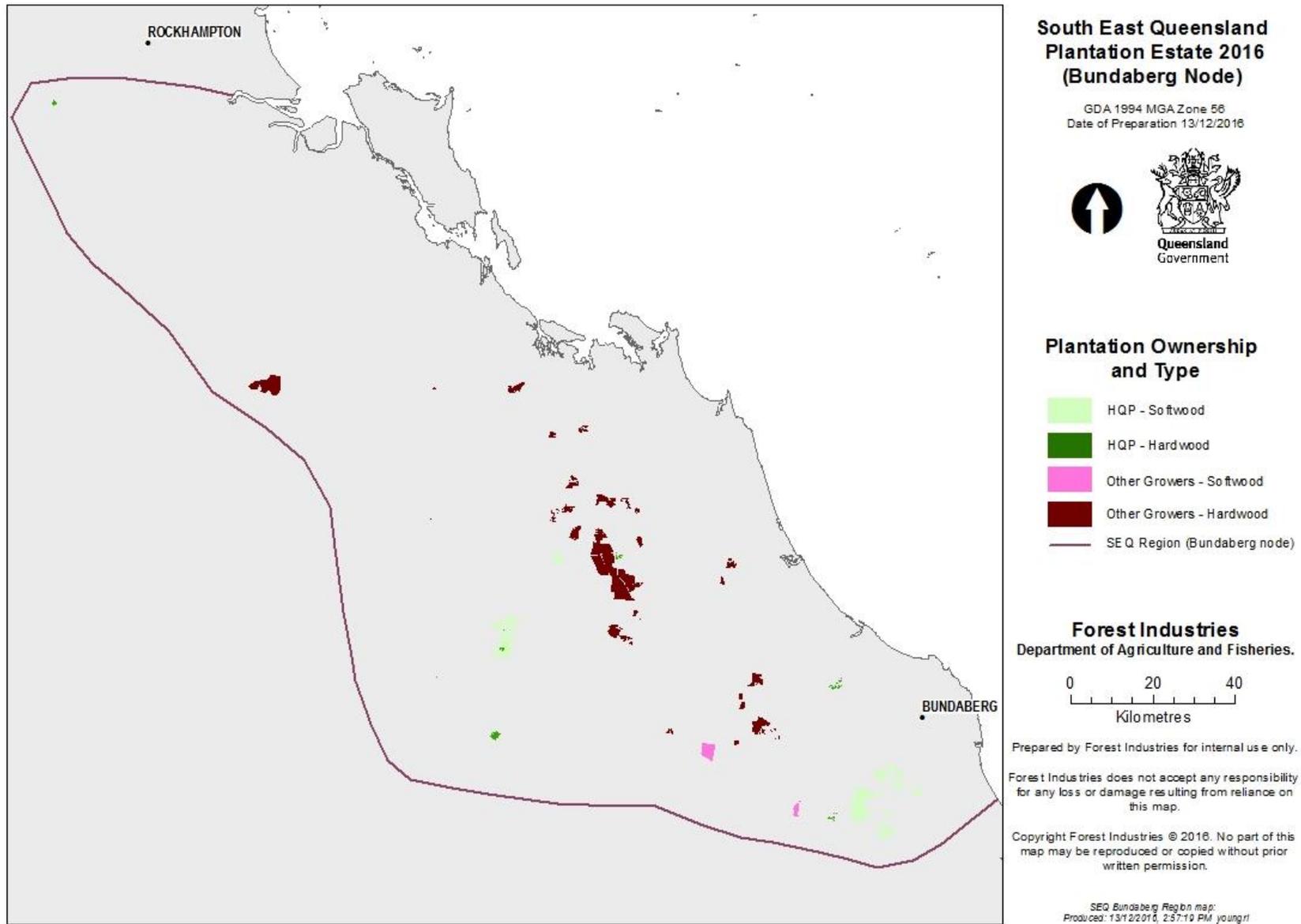
GDA 1994 MGA Zone 56  
Date of Preparation 13/12/2016



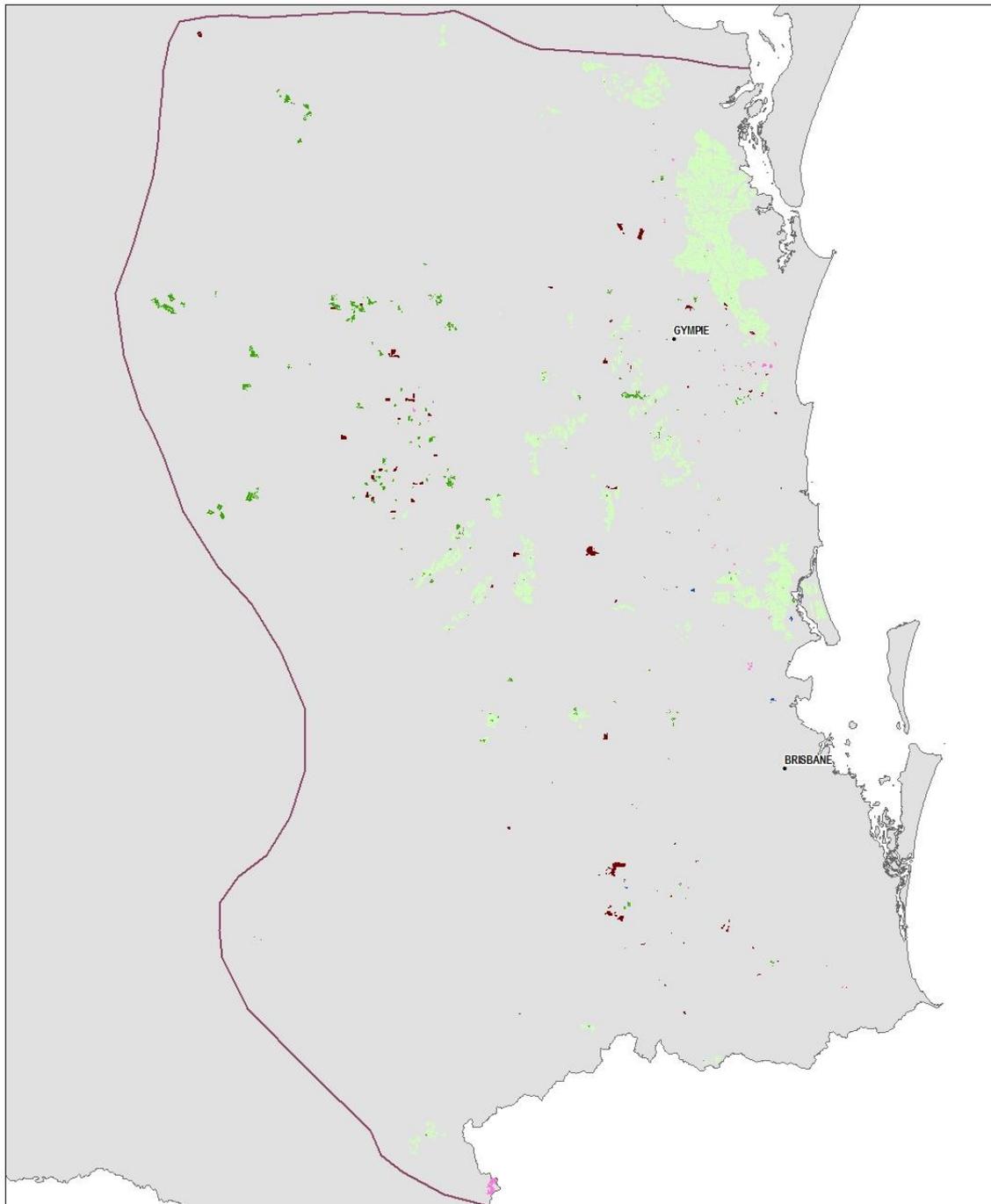
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# Appendix 3: South East Queensland Plantation Estate maps

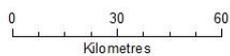
Figure 3—South East Queensland Plantation Estate 2016 (Bundaberg Node)



**Figure 4—South East Queensland Plantation Estate 2016 (Southern Node)**



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**Plantation Ownership and Type**

- HQP - Softwood
- HQP - Hardwood
- Other Growers - Softwood
- Other Growers - Hardwood
- Other Growers - Mixed Species
- SEQ Region (Southern node)

**South East Queensland  
Plantation Estate 2016  
(Southern Node)**

GDA 1994 MGA Zone 56  
Date of Preparation 13/12/2016



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