

# Forest Stewardship Plan

January 2017



*Developing and implementing forest management systems and practices consistent with internationally recognised forest stewardship standards is a key goal for our business. Our commitment to forest stewardship at HQPlantations is derived from our investors, the community at large and the personal values of each of our employees.*

*The Forest Stewardship Plan provides an overview of our forest management and how that management aims to satisfy a range of economic, social and environmental objectives.*

*The Board, our investors and I all have high expectations of our staff and contractors in regard to forest stewardship. We anticipate that our commitment will be demonstrated every day in some way to our customers, the community, neighbours, forest users and our investors.*



Brian Farmer  
Chief Executive Officer  
HQPlantations Pty Ltd

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**Image on title page:** Southern Pine plantations, Toolara State Forest.

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## 1 INTRODUCTION

### 1.1 HQPlantations Overview

HQPlantations holds a 99-year Plantation Licence (PL) to manage, harvest and re-grow plantation timber on Government-owned lands in Queensland. HQPlantations manages 339,436 hectares (ha) of land of which 209,358 ha is utilised (or planned) for softwood and hardwood plantation production. Each year some 2.5 million tonnes of wood is available for harvesting for sawn timber, plywood, reconstituted panels and woodchip products for domestic and international markets.

This document provides an overview of how HQPlantations meets environmental, social and economic criteria and requirements for wood production as specified in the following standards:

- *Australian Forestry Standard for Sustainable Forest Management (AFS) AS 4708 - 2013*; and
- *Forest Stewardship Council (FSC) Principles and Criteria for Forest Stewardship (FSC International Standard FSC-STD-01-001)*.

The term 'certification', as used in this document, refers to certification under both standards.

This Plan is held as a publicly available document on [www.HQPlantations.com.au](http://www.HQPlantations.com.au).

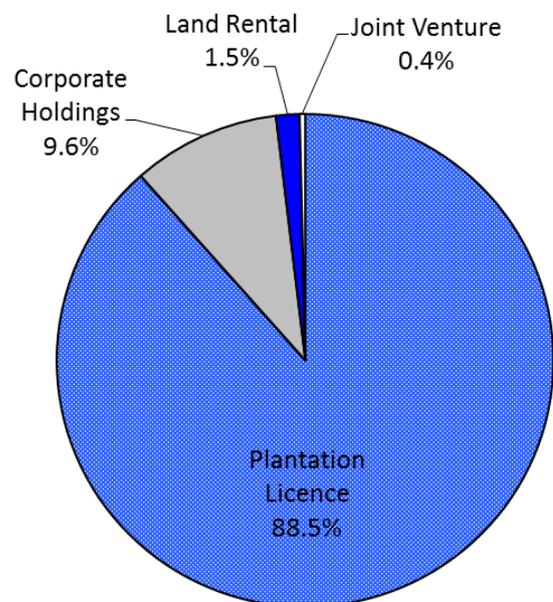


Imbil State Forest

### 1.2 Defined Forest Area

The Defined Forest Area (DFA) that HQPlantations manages totals 339,436 ha as at 30 June 2016 and comprises:

- 300,256 ha (88.5%) Plantation Licence land (Licence Area) on various State Forest tenures;
- 32,689 ha (9.6%) freehold corporate holdings;
- 5,185 ha (1.5%) land rental (including 1,372 ha access to other government lands); and
- 1,260 ha (0.4%) joint venture land (**Figure 1**).



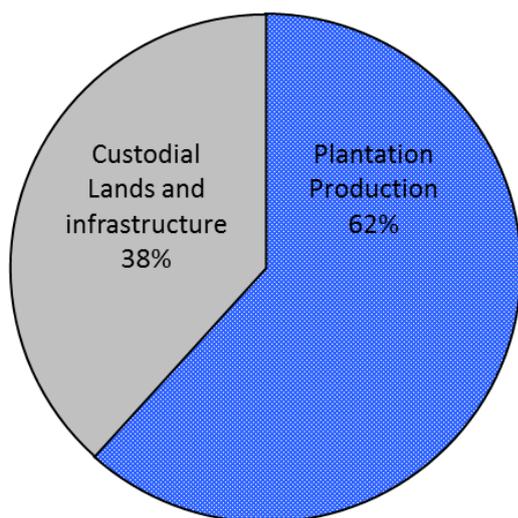
**Figure 1** The DFA encompasses several tenure categories including Plantation Licence (Licence Area) over State Forest

Overview maps of the DFA showing regions and plantation areas are included as **Appendix 1**. They also show surrounding areas of State Forest and National Park lands.

HQPlantations has a full set of property plans covering the Licence Area, freehold properties, joint ventures and land rentals, which collectively comprise the DFA. Maps of the DFA can be viewed on the stewardship section of the website [www.HQPlantations.com.au](http://www.HQPlantations.com.au).

The DFA comprises:

- 209,358 ha (62%) of plantation production land, including land to be planted; and
- 130,078 ha (38%) of custodial lands (comprising buffer areas of mainly native forest) and infrastructure such as roads and forest offices (**Figure 2**).



**Figure 2** The DFA comprises 62% plantation production land and 38% custodial lands (principally native forest buffers)

## 1.3 Scope of Certification

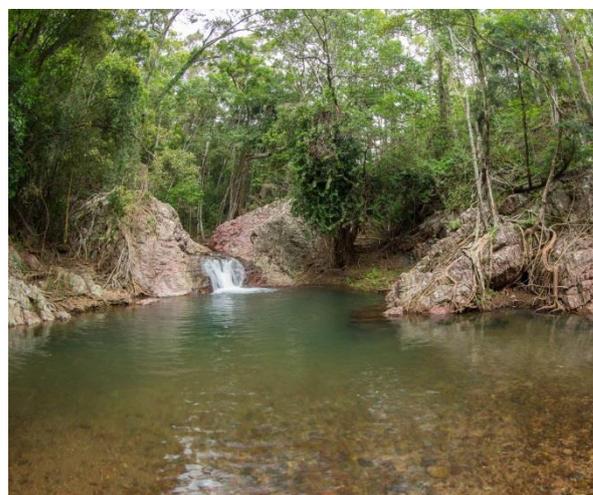
The scope of certification is sustainable forest management operations associated with plantation and custodial lands managed by HQPlantations. This includes the major plantation assets under Plantation Licence (PL) as well as HQPlantations' freehold properties, joint ventures<sup>1</sup> and land rentals.

In accordance with the Plantation Licence, the State, via its Department of Agriculture and Fisheries (DAF), has the right (within the Licence Area) to harvest native forest products in custodial areas and certain hardwood plantations established prior to 1996. The State also has the right to authorise quarrying activities within the Licence Area, subject to certain conditions. The activities of DAF or the State generally are not within the scope of HQPlantations' certification.

<sup>1</sup> Unless the joint partner has elected otherwise



Southern Pine estate, Tuan State Forest



Mary's Creek Waterhole, Imbil State Forest



Southern Pine log export, Port of Gladstone  
© Corbet Group

## 2 MANAGEMENT OBJECTIVES & TARGETS

### 2.1 Objectives and targets

#### Long Term Plan and Strategic Plan

HQPlantations intends to be a value-driven plantation product grower and distributor. Its objectives are to:

- Deliver HQPlantations promise of value (cash and assets) and return on investment targets to HQPlantations' investors;
- protect and maximize the earnings capacity of the plantation asset by a commercial approach to product sales and marketing, an innovative approach to cost management and a robust understanding of the risks affecting its management practices; and
- achieve its commercial goals while recognising the value of sound forest stewardship and safety standards.

The **Long Term Plan (LTP)** looks ahead to the end of the PL and provides a benchmark to which the business operates in terms of sales, revenue, costs and cashflow targets and expected rate of return. The LTP is updated annually to take account of changes to the business environment and management strategies. The LTP is not a publicly available document due to its commercially confidential information.

The **Strategic Plan** operates in tandem with the LTP in setting HQPlantations' business direction. The Strategic Plan sets out our vision *to be recognised as a world leading forest manager* and outlines the , goals and objectives required meet this vision. HQPlantations' goals are summarised as follows:

- **Profitable Growth**  
To grow the business and deliver strong financial outcomes

- **Operational Excellence**

To deliver operational excellence through good governance, stewardship and efficient and effective resources and systems

- **Safe Workplace**

To provide a safe and healthy workplace

- **Aligned Workforce**

To build a workforce that meets our business needs in terms of leadership, capacity and capability

- **Strong Partnerships**

To have positive and genuine partnerships with our customers, suppliers and the community

An annual plan is developed consistent with the Strategic Plan that priority actions for meeting our goals. Annual budgets and business group plans then set out a range of performance criteria consistent with the Strategic Plan. The Strategic Plan, the LTP and the annual budget is developed by HQPlantations management for endorsement by the Board of Directors.

The **HQPlantations Stewardship Policy (Appendix 2)** sets out HQPlantations' position with respect to achieving and implementing sustainable forest management in accordance with relevant forest certification standards. It is available on the public website.

This **Forest Stewardship Plan (FSP)** establishes a framework to achieve the forest management performance requirements of certification standards and compliance with legal and other requirements to which HQPlantations subscribes.

The FSP, along with the Strategic Plan and the LTP, are key documents that direct business performance as well as the settings for operational standards.

HQPlantations’ **Risk Management Policy and Procedures** provides guidance for assessing risks that may arise from or impact upon its operations. Various aspects and impacts of operational activities are identified and their significance assessed as set out in the **Risk and Legal Compliance Register**. Key aspects include those relating to governance, machinery use, fuels and oils, fire, people and chemical use. The register is reviewed annually.

In addition to third party audits, HQPlantations periodically conducts a review of the overall business systems and operations. Arising from the Stewardship Review, objectives and targets are set to mitigate and manage any ‘significant’ risks. The targets and their related actions and timelines are summarised in a corporate **Risk Management Plan**.

**Figure 3** summarises Sustainable Forest Management planning.

## 2.2 Legislative compliance

In relation to its activities, HQPlantations maintains a legal compliance register of relevant Federal and State laws and international conventions to which Australia is a signatory. The register provides a brief description of the relevant legislation or compliance instrument, the activity it relates to and whether compliance requires paying fees, obtaining a specific licence, permit or approval prior to undertaking activities and/or if a general duty of care is required. The register also provides linkages to relevant internal policies and procedures supporting compliance.

HQPlantations is required to pay prescribed fees, levies, taxes and other charges including Forest and Wood Products Australia (FWPA) levies that promote forest sector research and development. It is also subject to charges for various environmental permits, for example relating to hard rock quarries and water extraction licences.

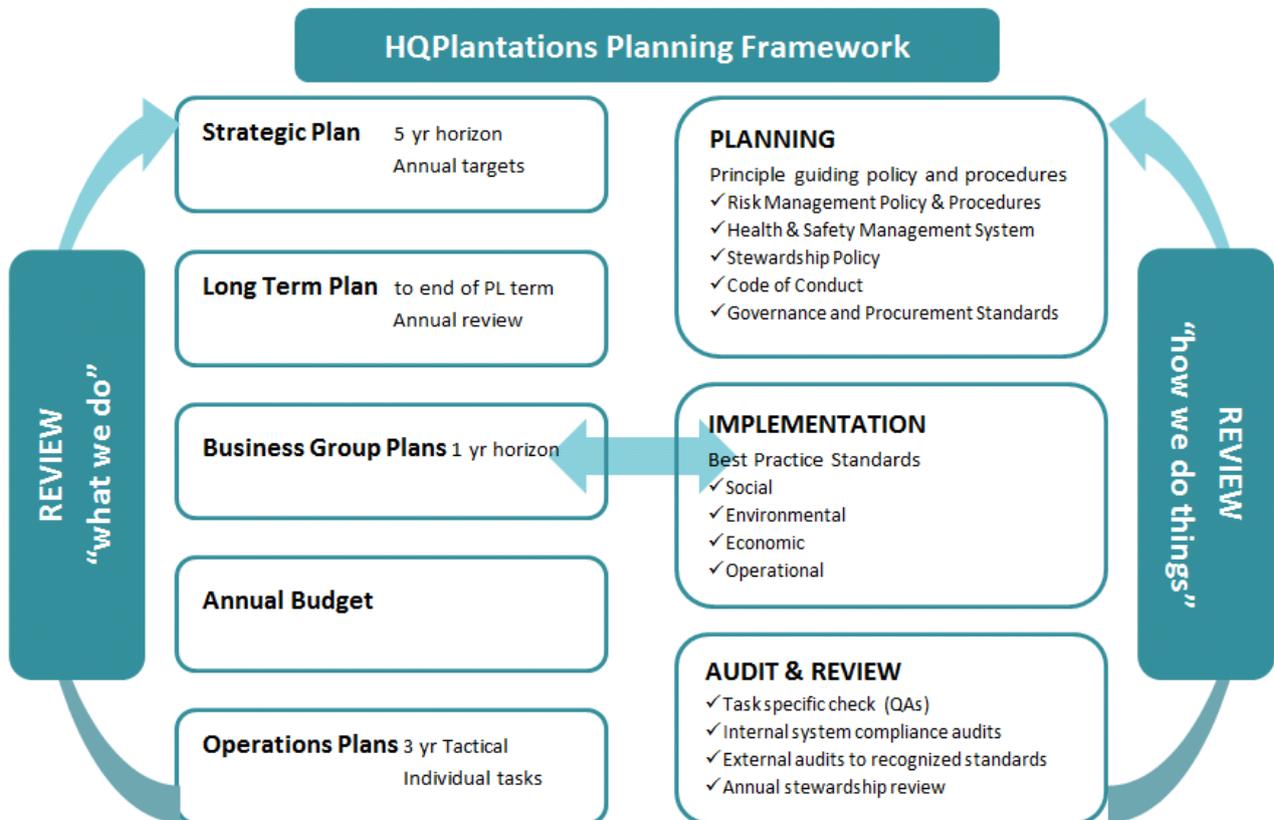


Figure 3 HQPlantations planning framework

## 3 PLANNING FRAMEWORK

At the activity level, operational standards in manuals (e.g. Silviculture Manual) provide objectives, targets and procedures for forest management operations and guidance on managing impacts associated with aspects of particular activities (e.g. site preparation).

At the site level, Operational Plans take account of site-specific aspects and impacts that are not addressed by operations manuals, for example:

- community safety and neighbour issues;
- Workplace Health and Safety (WH&S) risks;
- Endangered, Vulnerable or Near Threatened (EVNT) species and rare ecological communities;
- Transport Management;
- High Conservation Values (HCVs);
- water resources and associated riparian habitats and hydrologic functions;
- soil resources; and
- historical, archaeological and cultural sites.

Where site level assessments indicate the presence of special values, additional management actions are applied to mitigate or eliminate any negative impacts.

Implementation of the forest management system is achieved by adherence to plans and procedures which are underpinned by research that aims to enhance performance and mitigate any negative impacts.

While most of the DFA is managed for productive timber plantations, the remainder (around 130,078 ha or 38 percent) comprises mainly native vegetation plus much smaller areas supporting infrastructure such as roads, fire breaks, powerline easements, quarries and forest depots. These areas are collectively known as **Custodial Lands** and HQPlantations is responsible for their ongoing protection and maintenance.

The entire estate (both plantation production and Custodial Lands) is identified and described in the corporate **Estate Register**.

### 3.1 Organisational structure

The Chief Executive Officer (CEO) is accountable to the HQPlantations' Board of Directors. Key management reporting relationships are shown in the organisation chart (**Figure 4**). Regional boundaries are shown in **Appendix 1**.

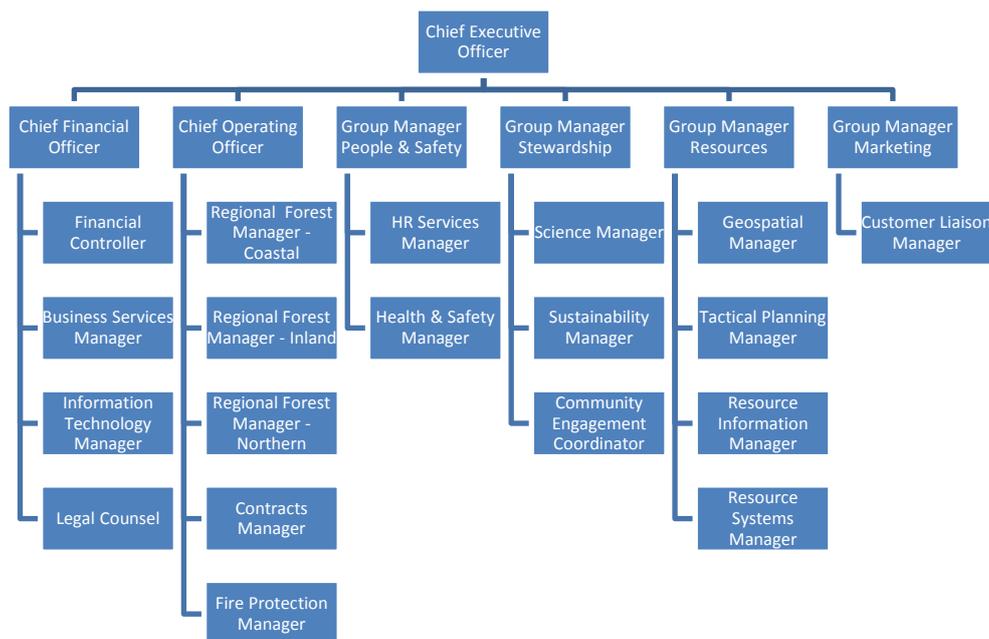


Figure 4 HQPlantations organisational chart summary

## 4 TENURE AND USE RIGHTS

### 4.1 HQPlantations' tenure and use rights

This section summarises HQPlantations' use rights and obligations across its various tenures.

#### 4.1.1 Plantation Licence and associated Deeds

The land and waters comprised in the Licence Area are State land and have been set apart and declared as State Forest under section 25 of the *Forestry Act 1959* and State Plantation Forest under section 32A of the *Forestry Act*. Documents that relate to the PL include:

- the Fire Management and Operations Plan;
- a Delegation Deed; and
- the Operations Deed.

Key aspects of these documents are summarised below. Capitalised words refer to defined terms in the various documents.

#### **General**

The Plantation Licensee (HQPlantations):

- has the exclusive right to deal with (Plantation) Natural Resource Products located within the Licence Area including to get and sell Natural Resource Products;
- has the exclusive right to re-establish Natural Resource Products on the Licence Area after harvesting; and
- has the right to enter and remain in and use the Licence Area on a non-exclusive basis for Plantation Forestry and incidental purposes, including the right to construct and maintain the Plantation Licensee's Works and Tracks for Plantation Forestry.

HQPlantations' rights to access and use the Licence Area:

- is co-extensive with the lawful rights of the public and others to enter and remain in, and use the Licence Area;

- includes the right for HQPlantations to contract with other persons for the sale of Natural Resource Products from the Licence Area;
- does not include any right for the Plantation Licensee or any Permitted Person to get and sell Natural Resource Products on Buffer Areas; and
- is subject to any specific rights, restrictions or conditions imposed on all or any part of the Licence Area under the *Forestry Act 1959*, the Plantation Licence, the Fire Management and Operations Plan and the Operations Deed.

#### **Buffer Areas**

HQPlantations acknowledges that the Buffer Areas are necessary for the safe and environmentally responsible management of the Licence Area and areas adjoining the Licence Area and that HQPlantations:

- must comply with the Buffer Areas Obligations (see section 5.4.1 of this document);
- must not harvest, fell or otherwise remove or deal with any Forest Product or Natural Resource Product located within the Buffer Areas, except to the extent consistent with the Buffer Areas Obligations (e.g. to remove pine wildlings); and
- does not have the right to sell or otherwise deal with carbon stored in a tree or vegetation, or carbon sequestration by a tree or vegetation in the Buffer Areas, except to the extent consistent with the Buffer Areas Obligations.

Except as provided for in the Plantation Licence, the Operations Deed and the Fire Management and Operations Plan, in performing any activities in the Licence Area, the State must, so far as reasonably practicable, ensure that it does not unreasonably interfere with HQPlantations' rights and privileges in the Licence Area.

## State Harvesting

The State has the right to harvest native Forest Products in Buffer Areas and certain hardwood plantations established prior to 1996, in accordance with the *Code of Practice for Native Forest Timber Production on State Lands 2014* and reasonable WH&S and notification protocols.

## Quarrying

HQPlantations may take without fees and use (but not sell) quarry materials from the Licence Area for Plantation Forestry purposes in the Licence Area and otherwise comply with its obligations under the Operations Deed, including use of quarry material for Joint Interest Access Routes (see below).

The right to get and use quarry materials in the Licence Area is not exclusive to HQPlantations. The State reserves the right to get and use quarry materials from Buffer Areas of up to and including 5,000 tonnes per annum (agreed level) from any one site within the Buffer Area (including by granting a licence or permit to a third party allowing the third party to take such Quarry Material). The Plantation Licence also provides for the State to take and use quarry material of greater than the agreed level from any Buffer Area or take and use quarry materials from any other part of the Licence Area subject to certain conditions, including compensation arrangements.



Toolara gravel pit

## Biodiscovery

HQPlantations' rights do not include the right to use "native biological materials" in the Licence Area for "biodiscovery" (each within the meaning of the *Biodiscovery Act 2004* (Qld)).

## Roads, assets and associated arrangements

The Plantation Licence and Operations Deed clarify various dealings relating to roads and tracks and associated access arrangements. Issues covered include:

- dealing with roads used by the public and located within the Licence Area that have been constructed outside the boundary of the Dedicated Road for that Road;
- the allocation of rights and obligations (to HQPlantations) with respect to plantation timber on Unformed Plantation Forest Roads that do not form part of the State Forest or State Plantation Forest, via their inclusion in the Licence Area; and
- the obligation for HQPlantations to obtain any consents that it may require to maintain and harvest plantation timber on the formed Dedicated Road setback and for the tending and taking of such timber.

HQPlantations has a range of supporting infrastructure assets located on State lands outside the Licence Area including fire and communications towers and buildings such as residences, offices and workshops. Similarly, the State has a number of assets located within the Licence Area. The Operations Deed provides for reciprocal access and management arrangements for these assets.

There are roads within the Licence Area and on Relevant State Lands which are of joint interest to HQPlantations and the State. For example, a road within an adjoining (Non-Licence Area) State Forest or National Park that provides access to a plantation within the Licence Area. The Operations Deed provides for the identification, planning and maintenance of these Joint Interest Access Routes, including funding arrangements.

## Delegation Deed

The State has delegated certain functions and powers under the *Forestry Act 1959* to HQPlantations as outlined in a Delegation Deed. This includes the designation and accreditation of Plantation Officers to monitor compliance with regulatory notices, to record contraventions and to manage and regulate the use of the Licence Area. The Deed also provides for delegated officers to issue certain permits in accordance with agreed guidelines. These include visitor use permits, occupation permits, apiary site permits and stock grazing permits.

## 4.2 Corporate Holdings

As at 30 June 2016, HQPlantations owns corporate holdings (freehold tenure) totalling 32,698 ha. These were purchased for the purpose of plantation development. Most have been planted.

## 4.3 Land rental arrangements

HQPlantations has entered into land rental arrangements with other landholders for the purpose of establishing, managing and harvesting timber plantations. To secure its interests over these lands, HQPlantations negotiates and registers a *profit a prendre* over the property and pays an annual rental to the landholder based on the area planted. Most land rental agreements relate to hardwood plantations.

## 4.4 Joint venture arrangements

HQPlantations has joint venture arrangements with other landholders for the purpose of establishing, managing and harvesting timber plantations. Under such arrangements, the joint venture partners share the proceeds of plantation log sales in proportion to the agreed inputs from each partner, as detailed in a joint venture agreement. Most joint ventures relate to hardwood plantations.

## 4.5 Mining exploration

Queensland's *Mineral Resources Act 1989* provides the legislative framework for exploration, development and mining tenure in the State. Several types of mining tenements are granted and administered under this Act including exploration permits, mining development leases and mining leases.

While HQPlantations has no authority to prohibit exploration permit holders from entering and conducting activities on HQPlantations-managed lands, it does impose reasonable conditions to promote safe access, minimal disruption to other core activities, minimal site disturbance, adequate rehabilitation of disturbed areas and, where appropriate, compensation provisions.



Hardwoods plantation, Amamoor

## 4.6 Native title

Native title is the recognition by Federal Australian law that some Indigenous people have rights and interests to land that come from their traditional laws and customs. The native title rights and interests held by particular Indigenous people will depend on both their traditional laws and customs and what interests are held by others in the area concerned. Generally speaking, native title must give way to the rights held by others. The capacity of Australian law to recognise the rights and interests held under traditional law and custom will also be a factor.

Native title rights and interests may include rights to:

- live on the area;
- access the area for traditional purposes, like camping or to perform ceremonies;
- visit and protect important places and sites;
- hunt, fish and gather food or traditional resources like water, wood and ochre; and
- teach law and custom on country.

The *Native Title Act 1993* (NTA) was enacted to recognise and protect native title. It:

- establishes a mechanism for native title claims;
- sets out how and when native title is extinguished; and
- provides ways to validly undertake land and resource dealings (i.e. 'future acts')



Bora ring, Beerburrum

The NTA also established the National Native Title Tribunal (NNTT) ([www.nntt.gov.au](http://www.nntt.gov.au)) and Native Title Representative Bodies (NTRBs). The NNTT assists people to facilitate timely and effective native title outcomes. Set up under the NTA, the Tribunal is a federal government agency and is part of the Attorney-General's portfolio.

There are several registered native title claims over broad areas in south-east and coastal Queensland that encompass parts of the Licence Area. Details of current claims are on the NNTT's website. Where appropriate, HQPlantations will work with the NNTT, the State of Queensland (through DAF's Forest Plantation Oversight group) and other relevant parties, including registered native title claimants or their NTRBs, towards the resolution of claims. In some cases, where it has significant interests, HQPlantations may seek to participate in the process as a registered interested party.

Existing native title determinations affecting the DFA include parts of the:

- Jinibara determination, which includes the western part of Beerburrum, south Jimna, Deer Reserve, Mt Mee and Northbrook Parkway to the north-west of Brisbane;
- Yidinji determination covering most of the Danbulla forest estate near Atherton; and
- Darumbal determination which covers Byfield State Forest to the north of Yeppoon.

To date there have been no requests by the native title holders to develop Indigenous Land Use Agreements over any areas on the DFA.

HQP continues to work with the Butchulla people to determine agreed Cultural Heritage Management arrangements over the Cooononwa Waterholes area at Fraser Coast.

Some prospective HQPlantations activities or 'future acts', such as establishment of new quarries or construction of dams, may affect native title. Such activities are subject to 'Native Title Work Procedures' that are consistent with those used by the Queensland Government.

It is most likely that native title has been extinguished on HQPlantations freehold blocks.

## 4.7 Visitor management

### 4.7.1 Authorised access / activities

The PL requires that, where compatible with broader forest management objectives, HQPlantations continues to permit existing legal uses of areas covered by the PL. In addition to grazing, bee-keeping and occupation permits, other permitted activities include:

- commercial photography and filming;
- scientific permits to conduct research projects (including scientific collections); and
- recreational activities (some subject to permits) including:
  - forest driving (2WD, 4WD, motor cycle);
  - horse riding (including endurance events);
  - competitive car rallies;
  - fossicking (restricted to a defined area at Passchendaele State Forest);
  - camping (at designated sites); and
  - bush walking and nature appreciation.

Activities are managed in accordance with visitor management guidelines, with suitable conditions applying to protect the safety of permittees and other legitimate forest users, the commercial viability of forest operations and the protection of the environment. Further information is available on the HQPlantations website.

Visitors are generally not permitted to access freehold areas forming part of the DFA including freehold corporate holdings, land rental and joint venture partners' properties.



Family cycling in Beerburum State Forest

### 4.7.2 Unauthorised access

Parts of the DFA have been or are subject to various illegal and / or unauthorised activities including illicit substance cultivation, arson, unregistered vehicle use, unlicensed driving, irresponsible use of vehicles on (and off) forest roads, rubbish dumping, hunting, erection of signage, camping and/or unauthorised group activities. HQPlantations records identified instances of illegal activity and liaises with police, neighbours (including neighbouring land management agencies), community groups (including Crime Stoppers), sporting and other interest groups to minimise the level of unauthorised activities and to assist in the development of reasonable response strategies. Overt and covert surveillance techniques are also used at some sites, including support from police. HQPlantations is implementing a framework to manage these activities which recognises our skillset, funding and capacity constraints.



Examples of signage being trialed at Beerburum by the Queensland Government's Litter and Illegal Dumping Unit (LIDU)

### 4.7.3 Temporary prohibition of public access

Public access rights are periodically suspended to ensure community safety such as during periods of high fire danger, flood, cyclone and to enable plantation forestry management. Details are posted to the website, as well as via local media and signage. Physical barriers may also be erected to restrict vehicular access.

## 5 ENVIRONMENTAL VALUES

### 5.1 Landscape context

In most cases, the native forest / plantation matrix within the DFA complements much larger areas of native forest in adjoining state forests, national parks, defence reserves and private forests.

Age-related structural diversity is important in plantations for reasons of sustainable timber production, fire protection, water table management and visual diversity. The size and shape of harvest coupes is determined by a range of factors including planting history, economic considerations, supply commitments, topography and age class. To the extent reasonably possible, structural diversity is also considered in harvest scheduling and plantation redesign.



A mosaic of age classes and buffers promote structural diversity

#### Southern Pines

HQPlantations manages approximately 148,000 ha of Southern Pine plantations, including fallow areas. These are principally located along the coastal lowland strip in South-East Queensland from Caboolture to Bundaberg, with smaller plantations also located in coastal Central Queensland (Byfield), North Queensland and in southern inland Queensland around Toowoomba and Stanthorpe.

The Southern Pine estate is mainly located on gentle to undulating topography, sloping up to about 15 degrees. Soils tend to be sedimentary in origin and generally range from yellow and red lateritic podzolics on the higher slopes to grey podzolics and podzols on the lower slopes. Small

areas of red, yellow and grey earths and alluvials are also present. There are also some soils of granitic and metamorphic origin in Central and North Queensland.

Average rainfall is 900 – 1,500 mm per annum in South-East Queensland and 1,000 – 2,000 mm per annum in Central and North Queensland.



Southern Pine estate, Beerburrum

#### Araucaria

HQPlantations manages approximately 43,000 ha of Araucaria plantations, mainly *Araucaria cunninghamii* (hoop pine). Araucaria plantations are mainly confined to the hilly to steep coastal and sub-coastal ranges in the headwaters of the Brisbane, Mary and Burnett River systems in South-East Queensland (SEQ), although much smaller estates also exist in North Queensland on the Atherton Tableland. Average annual rainfall for SEQ Araucaria plantation centres ranges from 700 to 850 mm. Soils are typically well-drained and volcanic or metamorphic in origin.



Araucaria plantation, Mary Valley

#### Hardwoods

The HQPlantations hardwood plantation estate has primarily been established on gentle to undulating cleared agricultural and pastoral landscapes, mainly in the Burnett region and sub-coastal areas in the Mary River Valley. Mean

annual rainfall varies from 600 mm to over 900 mm. Frost is a risk in inland areas, especially in lower positions in the landscape. Soils are generally well drained and derived from a wide range of parent materials. Remnant vegetation is retained in accordance with the *Vegetation Management Act 1999*. The estate is planned to expand from 15,000 to 20,000 hectares by June 2025. Most of this expansion will occur on the Plantation Licence Area in the upper reaches of the Brisbane River, Burnett River and Mary River catchments.



Hardwood plantation, South Burnett

## 5.2 Soil

Plantation productivity is a function of soil health and condition, together with other factors such as genetics, climate and pest and disease risk. The sustainability of the plantation estate in terms of growth is clearly and directly linked to the sustainability of its land use practices.

Soil values that can be adversely affected by forest operations include organic carbon and nutrient status, pH, bulk density, soil structure, aeration and infiltration capacity, invertebrate and microbial activity.

To limit negative impacts on soil values, HQPlantations:

- plans and implements activities to account for soil properties, particularly erosion hazard and compaction potential (e.g. harvesting and site preparation);
- implements guidelines to reduce landslip risks on steep sites, including exclusion of harvesting where the risk is considered high;
- avoids areas of concentrated machine activity or remediates compacted areas following harvest;

- plans harvest access to minimise the need for new or upgraded tracks and crossings;
- implements harvest and site preparation systems that retain the majority of nutrient-rich organic material on site;
- accounts for fluctuating water tables and associated machine traffic so as to avoid operating on water-logging prone sites; and
- undertakes fuel reduction burning that emphasises the need to retain the nutrient-rich duff layer above mineral soil.

Guidelines and procedures are based on extensive, relevant research, combined with operational experience. Many reports have been published in peer-reviewed scientific journals or presented at conferences. To support continued improvement in operational performance, research and its application to forest management is supported. For example, existing and planned harvest trafficking trials will monitor impacts on soil properties under a range of operating conditions.



Araucaria plantations in Como State Forest with retained vegetation in gullies and slip-prone areas



Compaction research trial monitors impacts on soil properties and subsequent plantation growth, Yarraman

## 5.3 Water

Water values that can be adversely affected by forest operations include: turbidity, nutrient status, chemical purity and water based organisms – which may lead to adverse impacts to aquatic ecosystem function, a decline in potability for domestic consumption and reduced suitability for irrigation and other on-farm uses.

HQPlantations' **Risk and Legal Compliance Register** identifies, at a broad level, the potential for activities to impact on water values. Individual chapters in Operations Manuals (e.g. Silviculture Manual, Harvesting & Marketing Manual) expand on potential impacts to be considered when planning and implementing operations. Operations Plans provide site-specific assessment of risks and associated controls, and operations are monitored closely, including the use of Quality Audits (refer section 10).

Operational guidelines, planning, implementation and monitoring seek to minimise and provide feedback regarding adverse and positive impacts to water quality. Operational guidelines and site specific planning take account of soil properties (e.g. erodibility, soil moisture status, compaction risk), catchment size and stream power index and associated risks to water quality (e.g. increased run off, increased sediment transport and associated turbidity) prior to operations commencing. Watercourse protection and machinery trafficking guidelines reflect risks and potential impacts and are based on applicable research results combined with operational experience. Examples of controls used to protect water quality include:

- extensive use of debris retention as an integral part of inter-rotation operations;
- water course protection zones (and conditional management zones) that take account of soil erodibility, slope (angle and length), catchment size and stream power index, and are based on accurate digital elevation models;
- machinery trafficking guidelines that limit the extent and severity of permitted compaction and encourage use of preventative

techniques such as placement of harvest debris over snig tracks to reduce impacts;

- staff and contractor training that supports changes to guidelines (e.g. machinery traffic guidelines);
- selection of machine type or system (e.g. cable logging) to mitigate environmental risks;
- reviewing plantation watercourse protection buffers between crop rotations to recognise and establish new plantations consistent with current guidelines;
- recognising riparian vegetation of special significance (for example gallery rainforest remnants) in management planning;
- managing Stock Grazing Permits and similar agreements on freehold lands to reduce environmental impacts;
- pre-harvest surveys for acid sulfate and potential acid sulfate soils in low lying plantations adjacent to estuarine environments;
- suspending log haulage operations during periods of prolonged wet weather or soil-saturated conditions to protect road surfaces and reduce off-site environmental impacts;
- designing and constructing watercourse crossings; and
- monitoring key sites and support for research to promote improved water quality and catchment management outcomes.

Section 5.6 addresses contamination from chemical, fuel and oil pollutants.



A tributary running into Mary's Creek in Mary's Creek State Forest

## 5.4 Biodiversity

At the regional level, significant areas of native forest are protected under various forms of conservation tenure, including national parks. Accordingly, the area of native forest within the DFA that is managed by HQPlantations is quite small when considered in the regional context. These areas total less than 130,200 hectares (around 38 percent of DFA) and are mainly within the Licence Area.

HQPlantations has access to the State's Regional Ecosystems (REs) and Broad Vegetation Groups (BVGs) GIS layers which provide information on vegetation types in these native forest areas and their associated conservation status. These areas primarily occur as buffers and riparian zones surrounding plantation assets and represent a wide cross section of vegetation types typical of those that existed prior to plantation establishment. Some are gazetted as special management areas including Scientific Areas and Feature Protection Areas under the *Forestry Act 1959*.

**Appendix 1** shows the extensive network of National Parks and State Forests adjacent to and near the DFA.



Watercourse crossings, like this one at Stony Creek Byfield, are designed to facilitate fish movement



Riparian zone, Toolara State Forest



Mosaic of native forest buffers and Araucaria plantations, Imbil State Forest

## 5.4.1 Management of native forest

Biodiversity values within the DFA are primarily associated with retained areas of native vegetation such as watercourse protection zones, retained native vegetation protective buffers ('scrub' breaks) surrounding Araucaria plantations, swamps, rocky outcrops and other buffer areas associated with the broader plantation estate.

In the context of the Plantation Licence, **Buffer Areas** comprise:

- (a) those areas within the Licence Area that are natural growth forest, natural growth woodlands and/or naturally occurring grasslands adjacent to areas of established plantation or Watercourses; and
- (b) Scientific Areas and Feature Protection Areas and plantations listed in Schedule 10<sup>2</sup> within the Licence Area.

Buffer Areas have a range of fire protection, social, environmental, aesthetic and cultural benefits in the landscape and, as such, HQPlantations acknowledges that they must be protected and retained. Schedule 3 of the Operations Deed (Buffer Areas Obligations) sets out rights and obligations with respect to these areas and include HQPlantations':

- right to take and sell pine wildlings and native foliage and / or wildflower species (excluding from Scientific Areas and Feature Protection Areas) but only to the extent that any such taking or selling does not compromise or damage the integrity of the Environment in Buffer Areas;
- obligation to perform appropriate fire management and wildfire control regimes in accordance with the terms of the Fire Management and Operations Plans;
- obligation to maintain the integrity of their natural vegetation in a way consistent with sustainable management practices for plantation forests that are generally accepted

in the Australian plantation forestry industry; and

- obligation to perform certain defined pest control measures.

Furthermore, Schedule 3 of the Operations Deed permits HQPlantations to undertake minor clearing of Buffer Areas in certain defined circumstances. Defined circumstances include to construct and build infrastructure (subject to certain area restrictions), fence, road or track clearing up to a 10 metre clearing width, to maintain road infrastructure such as drains and to remove or reduce imminent risks of personal injury or damage to infrastructure.

HQPlantations management operations in areas of retained native vegetation are focused on maintaining or enhancing biodiversity values and protecting the adjacent plantation resource. The frequency, timing and intensity of prescribed burning regimes seek to achieve a balance between protecting biodiversity values and protecting the plantation asset and other community values, especially community safety.

To assist with the ongoing management of native forest areas within the DFA, HQPlantations has developed **Custodial Lands Management Procedures**. The procedures provide for the identification and management of areas for priority conservation activities such as High Conservation Value Forests, Special Management Areas (Scientific Areas and Feature Protection Areas gazetted under the *Forestry Act 1959*), Nature Refuges (under the *Nature Conservation Act 1992*) on freehold lands and strategic native vegetation corridors. They also provide the framework for the identification of Representative Sample Areas (RSAs) for long-term monitoring. Issues such as fire, weed, grazing and apiary site management, access and fire tracks and visitor use issues are also considered, as well as improved resource descriptions and monitoring protocols.

<sup>2</sup> Schedule 10 of the Plantation Licence is a listing of hardwood plantations established prior to 1996 totalling 49 hectares, mainly in the Pomona, Como and Glasshouse Mountains areas of south-east Queensland.

## 5.4.1.1 High Conservation Value Forest

FSC Principle 9 states:

*Management activities in high conservation value forests shall maintain or enhance the attributes which define such forests. Decisions regarding high conservation value forests shall always be considered in the context of a precautionary approach.*

High Conservation Value Forests (HCVFs) are those that possess one or more of the following attributes:

- **HCV 1:** Forest areas containing globally, nationally or regionally significant concentrations of biodiversity values (e.g. endemism, endangered species, refugia);
- **HCV 2:** Forest areas containing regionally significant large landscape forests, contained within, or containing the management unit, where viable populations of most if not all naturally occurring species exist in natural patterns of distribution and abundance;
- **HCV 3:** Forest areas that are in or contain rare, threatened or endangered ecosystems;
- **HCV 4:** Forest areas that provide basic services of nature in critical situations (e.g., watershed protection, erosion control);
- **HCV 5:** Forest areas fundamental to meeting basic needs of local communities (e.g., subsistence, health, well-being); and/or
- **HCV 6:** Forest areas critical to local communities' traditional identity (areas of cultural, economic or religious significance identified in cooperation with such local communities).

The approach HQPlantations uses to identify and assess HCVs is based on the FSC Australia guidelines and the HCVF ProForest Toolkit series and associated documents available at:

- <http://www.proforest.net/en/publications/high-conservation-value-forest-toolkit>



Most HCVF areas are protected in reserves outside the DFA

In Queensland, Governments<sup>3</sup> have pursued various extensive, high-level and consultative forest land use allocation processes to determine areas to be set aside as part of the permanent conservation estate and areas to be managed for long-term timber production.

Some forest areas in Queensland have also been internationally recognised for their significant conservation values and have been listed as world heritage areas (WHA) including Fraser Island, the Tweed Volcano Group rainforests adjoining the New South Wales border (part of the Gondwanan Rainforests of Australia WHA) and the Wet Tropics WHA.

<sup>3</sup> Primarily the State Government but also the Federal Government in the case of World Heritage Areas.

The Interim Biogeographic Regionalisation of Australia (IBRA) classifies Australia into 85 'bioregions', each comprising large, geographically distinct areas of land with common characteristics such as geology, landform patterns, climate, ecological features and plant and animal communities. The 85 regions are further refined into 403 Sub-regions. Maps of each are available at:

- <http://www.environment.gov.au/parks/nrs/science/pubs/regions.pdf>
- <http://www.environment.gov.au/parks/nrs/science/pubs/subregions.pdf>

The DFA primarily occurs within the SEQ Bioregion, with smaller areas in the Central Mackay Coast and Wet Tropics Bioregions.

At the State level, sub-regions are further divided into Regional Ecosystems (REs). Regional Ecosystems are vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil. To facilitate State and regional scale mapping, REs are amalgamated into Broad Vegetation Groups (BVGs). The RE framework is dynamic and is regularly reviewed as new information becomes available. The descriptions and status of REs are available on the EHP website via their Regional Ecosystem Descriptive Database (REDD) at:

<http://www.ehp.qld.gov.au/ecosystems/biodiversity/regional-ecosystems/index.php>



Murphy's Lagoons, part of the high conservation value Tinana Creek riparian corridor within the Fraser Coast forest

There are currently 1,384 Regional Ecosystems recognised in Queensland. For the purpose of identifying 'forest areas that are in or contain rare, threatened or endangered ecosystems' [i.e. HCV 3] within or in close proximity to the DFA, the REDD database (including associated GIS layers) was consulted to determine the location and extent of REs that are listed as 'Endangered' in terms of both their Biodiversity Status and their listing under the *Vegetation Management Act 1999*.

Rare, threatened or endangered forest types within the DFA may be considered HCVF unless they are:

1. Small patches of the forest type where several larger patches exist locally;
2. Very degraded compared to other local examples of the forest type; or
3. A type of forest that is well protected by the existing protected area network.

This assessment has identified several areas that are likely to contain High Conservation Values. These are listed in **Appendix 3**. Further field inspections are ongoing to confirm the suitability and, where appropriate, refine the boundaries of these areas. HQPlantations regularly consults with relevant stakeholders including local catchment management groups and experts from EHP on the management of these areas.



Scribbly gum (*Eucalyptus racemosa*) open forest, Toolara

## 5.4.1.2 Rehabilitation of land to native forest

### **Conservation Handback Plantations and associated buffer areas**

HQPlantations has a number of plantations and associated native forest buffer areas which will not be retained as State Plantation Forest beyond the end of the present harvesting rotation. These areas have some conservation value, for which the intention at the time of harvest will be to optimise returns from the harvest of the mature crop consistent with achieving a residual land/site condition that facilitates long term inclusion in the reserve estate. There are nine such Conservation Areas within the Licence Area totaling approximately 3,429 hectares (approximately 2,178 ha planted), as listed in **Appendix 4**. These areas will be managed in accordance with agreed Conservation Area Rehabilitation and Handback Requirements. The desired conservation outcome is to restore the structure and floristics, as much as possible, of the original forest prior to the establishment of the plantation.

### **Other areas**

From time to time there are areas within the DFA that are identified as not being suitable for plantation establishment or re-establishment for a variety of reasons (e.g. too rocky or in areas better suited for conservation). In addition, there are some sites previously occupied by infrastructure or old quarries, roads or log landings that may be targeted for rehabilitation. Where appropriate, these areas are managed to promote natural regeneration by species and provenances native to the area.

In 2016, five rehabilitation projects were initiated in collaboration with a wide range of local stakeholders:

- Wedgwood – revegetate 11 ha of riparian vegetation along Tinana Creek;
- Tinana Yards – ecological restoration (planting and assisted natural regeneration) of 30 ha of a flood-prone, weed-infested clearings on the western side of Tinana Creek;
- Wolvi Creek – widen and regenerate watercourse protection zone following

plantation harvest and enhance riparian zone corridor within adjacent firebreak (52 ha);

- Murphy’s Lagoons Rehabilitation - reduce sediment transport through improved visitor access and track rehabilitation; and
- Black swamp – revegetate 7 ha along Coonowrin Creek, Beerburum



Ian Mackay, Chair MRCCC, and Susie Duncan, Hinterland Bushlinks, inspect the plantings at Wedgwood, May 2016

## 5.4.1.3 Native forest conversion

With the exception of minor areas, as permitted under its Plantation Licence, HQPlantations does not convert native forest vegetation to plantations or non-forested land use. Plantation development on freehold land is confined to previously cleared areas.

Native forest areas associated with plantations are left undisturbed by management practices, apart from very limited ‘infrastructure’ clearing such as for cable logging ramps, ‘tie-backs’ and construction of harvest access tracks to avoid extensive side cutting or disturbance of watercourses. All instances of small-scale clearing are undertaken within forest certification threshold limits and are offset by former plantation areas that, following harvest, are managed so that they revert naturally to native forest to strengthen water course protection or other special management zones.

HQPlantations is bound by the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and Queensland’s *Vegetation Management Act 1999* (VMA). VMA maps are accessed in EHP offices, and GIS data that identify important habitats and threatened ecosystems are downloaded from EHP records as required.

## 5.4.2 Protection of endangered, vulnerable or near-threatened species and ecosystems

A list of endangered, vulnerable or near-threatened (EVNT) species that are known to occur or are likely to occur within the DFA is maintained by HQPlantations. This includes species included on the Convention on International Trade in Endangered Species (CITES) Appendices 1 and 2, and any species or ecosystem listed as 'rare, threatened or endangered' under relevant State of federal legislation. HQPlantations does not authorise the harvest of any species that are included in Appendix 1 of CITES.

Staff utilise EHP's *Wildlife\_online* database

<http://www.ehp.qld.gov.au/wildlife/wildlife-online/index.html>

to search for records of EVNT species to help identify areas of significant biodiversity value. This database is supported by informal observations by employees and contractors and consultation with relevant regulatory agencies and interest groups. Additional staff training of forest workers, including consultation with relevant regulatory agencies and interest groups, is provided to enhance awareness of EVNT species, their habitat requirements and potential management impacts.

Management operations in areas of retained native vegetation are focused on maintaining or enhancing biodiversity values and protecting the adjacent plantation resource. The frequency, timing and intensity of fuel reduction burning regimes seek to achieve a balance between protecting biodiversity values and protecting the plantation asset and other community values, including community safety. This approach is generally compatible with EVNT species management.

Where planned operations may impact on EVNT species, special measures are taken to minimise any adverse impacts and may include conservation zones and/or other conservation measures for EVNT species and their habitats, such as customized fire or disturbance regimes. These measures are informed by species

management plans, species recovery plans and conservation advice statements where they exist, such as for the mahogany glider (*Petaurus gracilis*), the southern cassowary (*Casuarius casuarius johnsonii*) the black-breasted button quail (*Turnix melanogaster*), the Nangur spiny skink (*Nangura spinosa*), *Grevillea venusta*, *Boronia rivularis*, the macrozamia species *Macrozamia pauli-guilielmi* and the Proston velvet bush (*Lasiopetalum* sub spp 'Proston').

HQPlantations is working with local groups to improve the protection and management of EVNT species. For example, HQPlantations is working with Mary River Catchment Coordinating Committee (MRCCC) regarding development and implementation of the **Mary River Threatened Species Recovery Plan**. This plan is the first of its kind in Australia in that it focuses on a river system (rather than an individual species). It will bring together scientific, local and traditional knowledge to identify threats to threatened species in the Mary River and important ecological processes such as healthy riparian zones and food webs. Aquatic and riparian species such as the Mary River Cod, Mary River Turtle, Australian Lungfish and the Giant Barred Frog will be given special attention.

HQPlantations is also working with groups including the Macadamia Conservation Trust, MRCCC and Burnett Mary Regional Group (BMRG) regarding the **Southern Macadamia Species Recovery Plan**. Two of the four southern macadamia nut species occur within the DFA, the Bauple Nut (*Macadamia integrifolia*) and the Gympie Nut (*M. ternifolia*).



Giant Barred Frog (*Mixophyes iteratus*), Tinana Creek, December 2014

## 5.5 Cultural heritage

HQPlantations has a duty of care to avoid adversely affecting cultural heritage during its management activities. Accordingly, HQPlantations has developed a standard for the management of cultural heritage which includes:

- incorporating a risk assessment for cultural heritage sites into Operational Plans;
- training staff in the primary identification of cultural heritage sites; and
- engaging with relevant stakeholders where cultural heritage sites are identified.

### 5.5.1 Indigenous cultural heritage

The *Aboriginal Cultural Heritage Act 2003* was enacted to protect Queensland's Aboriginal cultural heritage. It establishes a duty of care for organisations such as HQPlantations to avoid adversely affecting indigenous cultural heritage during land management activities. This includes consultation with Indigenous parties where there is risk of harm.

HQPlantations' Cultural Heritage Manual, complemented by information on EHP's website, outlines procedures to be followed by HQPlantations in dealing with Aboriginal cultural heritage. Where sites are known to exist, or may exist, HQPlantations will consult with the relevant Indigenous party, in accordance with its procedures.



Stone Axe located in situ at Benarkin, January 2016

### 5.5.2 Non-indigenous cultural heritage

In accordance with the *Queensland Heritage Act 1992*, HQPlantations has a duty of care to protect important cultural heritage sites. The Queensland Heritage Register is a list of places, trees, natural formations and buildings of cultural heritage significance. The register is available on the EHP website and HQPlantations maintains an up to date version of the register as a GIS layer to be consulted during the development of operational plans.

HQPlantations assesses the importance of non-Indigenous heritage values on a regional basis with reference to relevant studies and forest planning instruments, and supports the protection of important natural heritage and cultural, religious, spiritual and social heritage values, including consultation with local historians. Examples include the recognition and protection of historic homesteads and grave sites.



Forestry in Queensland has a long history

## 5.6 Pollution and waste management

While HQPlantations seeks to reduce its overall reliance on chemical use (refer section 8.4), it also takes measures to ensure that its chemical application activities do not result in transport of chemicals into waterways or other sensitive areas. Protective measures include:

- guidelines for the responsible storage and application of chemicals, and the disposal of any residues;
- centralised control of herbicide purchases;
- contract conditions for supply and application of herbicides and fertiliser, aerially and ground-based that encourage best practice and innovation (e.g. use of low drift nozzles and GPS tracking technology in aerial herbicide application);
- staff and contractor training in chemical application techniques and regular monitoring via in-house quality control systems (Quality Audits);
- prompt reporting and investigation of any incidents (e.g. herbicide spillage, overspray);
- evaluation of alternative chemical products and application technologies to reduce environmental and operator risks and improve effectiveness (e.g. closed-system herbicide transfer technologies for tank-filling, use of granular formulations); and
- specifying buffers around sensitive areas based on risk assessment that takes account of application system, non-target values at risk and prevailing weather conditions.



Guidelines for aerial herbicide application ensure targeted results with minimal offsite impacts

With respect to the broader issue of pollution and waste management, operations are guided by HQPlantations' Standard for Pollution and Waste Management. This document covers a range of issues including:

- legislative requirements;
- responsibilities (at various levels within the organisation);
- waste management 'hierarchy' principles (avoid, reuse, recycle, recover, safe disposal);
- waste disposal options<sup>4</sup>; and
- waste reporting obligations.



A closed-system herbicide transfer station reduces the risk of spillage and improves worker safety

<sup>4</sup> All waste chemical and oil products and containers are taken off site for recycling or disposal

## 5.7 Carbon

The Intergovernmental Panel on Climate Change (IPCC) states in its 2014 Fourth Assessment Report, *Mitigation of Climate Change*, that “...a sustainable forest management strategy aimed at maintaining or increasing forest carbon stocks, while producing an annual sustained yield of timber, fibre, or energy from the forest, will generate the largest sustained mitigation benefit.”<sup>5</sup>

HQPlantations acknowledges that forests have the capacity to act as net carbon sinks, and there is a need to minimise greenhouse gas emissions. Plantations and associated vegetation absorb carbon dioxide from the atmosphere via photosynthesis and store carbon as biomass. Carbon is cycled into the atmosphere through burning, decomposition of litter and dead plant material and it is also stored in the longer-term in harvested wood products arising from its plantation activities.



House frames from Southern Pine provide long-term carbon storage

HQPlantations’ forest management activities have the capacity to maintain and enhance the carbon stored in plantations. This is being achieved through improving plantation productivity, planting long rotation crops (25 – 50 years), maintaining or improving soil carbon through retention of harvesting residues and limited use of residue burning.

HQPlantations is adopting measures to account for and minimise its greenhouse gas emissions including:

- annually accounting for carbon stocks in its plantations;
- adopting silvicultural practices that enhance the amount of carbon stored in trees and soil;
- implementing responsible, well-planned fuel reduction burning programs to minimise the risk of large (CO<sub>2</sub> emitting) wildfires while minimising adverse social and environmental impacts;
- minimising fuel use through the adoption of energy efficient technologies, and through wider adoption of ‘low input’ silviculture approaches; and
- participating in research and development projects to determine the life cycle inventory of timber products, including inputs and emissions from the forest production process.



Collaborative trial with industry and research partners

<sup>5</sup> See [http://www.ipcc.ch/publications and data/ar4/wg3/en/contents.html](http://www.ipcc.ch/publications_and_data/ar4/wg3/en/contents.html)

## 6 COMMUNITY RELATIONS AND LABOUR

### 6.1 Stakeholder engagement

HQPlantations is committed to identifying relevant stakeholders and interested parties, both groups and individuals, directly affected by, or with an interest in, its management activities.

Land adjacent to its estate includes:

- State land containing native forest zoned for timber production or conservation, for example State Forest, Forest Reserve, National Park or unallocated state land;
- Commonwealth Department of Defence Reserves (e.g. Wide Bay and Shoalwater Military Training Areas adjacent to Fraser Coast and Byfield plantation estates respectively);
- State leasehold or freehold grazing land;
- freehold agricultural land; and
- freehold urban and peri-urban development, especially adjacent to Beerburrum plantations.

HQPlantations maintains a database that reflects recent and current interactions with its stakeholders. Issues raised are evaluated and any action arising is communicated to relevant stakeholders.

HQPlantations' stewardship extends to all of the values associated with its forest estate. HQPlantations seeks to understand the perspective of our stakeholders as it establishes, grows, harvests and protects its client's forest investments while maintaining or enhancing the environmental and community values associated with the land.

The proactive management of community relationships and establishment of partnerships with stakeholders also aims to promote HQPlantations' credentials as a responsible manager of environmental and community values, building positive relationships and mutual understanding to reduce business risk. In the long run, these outcomes are essential to HQPlantations achieving its stewardship goals and generating and preserving long-term investment value.

While maintaining a balance between economic, social and environmental considerations HQPlantations' social policy goals are to:

- provide a safe place to work;
- respect the rights of all employees and contractors;
- respect the rights of Indigenous people; and
- engage effectively with the community on social impacts associated with forest investments.

Stakeholder and community categories include:

- those who derive income from the business such as investors, employees, contractors and other providers of services or goods;
- customers;
- statutory authorities;
- neighbours including those living on public access routes into plantations and local people living downstream of plantations; and
- community interest groups such as recreational, catchment, environmental and rural fire brigades.



Crimestoppers presenting at the 2016 Annual Clean Up Australia Day event organised by HQPlantations Beerburrum staff, involving local community groups and individuals, all with the common goal of keeping our forests clean

HQPlantations aims to manage, broadly and specifically, the:

- safety of all staff, contractors and the public;
- rights of workers;
- contribution of its long term social and economic benefits to the community;
- long term productive capacity of adjoining public and private land as influenced by threats arising on HQPlantations-managed land such as soil erosion, chemical use, fire, vermin, noxious weeds and wildings, plantation pests and diseases;
- utility of adjoining land for the owners;
- use of PL roads by the community for property access; and
- neighbouring assets such as fencing and public roads.

Positive relationships and mutual understanding and respect will be built through effective communication with stakeholders through:

- active participation in advisory groups;
- strategic partnerships with stakeholders to achieve mutual goals;
- identification and notification of stakeholders in advance of significant or new activities;
- listening to and documenting the views of stakeholders;
- responding to stakeholder concerns with action where required; and
- conveying HQPlantations' intent, values and forest management practices with communication packages.

HQPlantations welcomes meaningful participation by stakeholders in the development and implementation of forest management plans that potentially impact on stakeholders, and will facilitate such participation in accordance with its **Standard for Stakeholder Engagement** which requires:

- consideration and minimisation of impacts of forest operations where potentially impacting on neighbours; and
- timely notification where activities are planned that may impact on neighbours.

Information that is not commercial in confidence is generally made freely available. Requests for information considered to be commercial in confidence are considered on a case by case basis.

Management decisions by HQPlantations with stakeholders need to be consistent with Plantation Licence obligations and commercial imperatives. HQPlantations aims to resolve stakeholder concerns at the local level wherever possible and has established dispute resolution procedures.



Replanted Araucaria plantation and native forest landscape, Mary Valley

## 6.2 Labour

HQPlantations employs staff in various forest management and administrative roles, mostly based in regional centres close to the plantation base.

HQPlantations engages a diverse contractor base to provide a wide range of services including plantation establishment and maintenance, fire protection, road construction and maintenance, research support, nursery support, seed collection and extraction, administrative support, harvest and haul services for delivered log sales and stevedoring and shipping services for export sales.

### 6.2.1 Workers' rights

HQPlantations is committed to the principles of fairness and equity in dealing with workers rights and the encouragement of an inclusive and diverse workplace culture through merit based employment processes. HQPlantations adopts a zero tolerance approach to workplace discrimination, bullying or sexual harassment.

These commitments are demonstrated through:

- The introduction of a Human Resource Management Framework which sets the standards and expectations in respect to our business conduct and practices when managing our key asset – *our people*.
- Vision 2021 (Strategic Plan) which includes programs for leadership development, corporate training and professional development.
- Good HR governance through compliance with legislation; and
- The early resolution of grievances and disputes through an active workplace consultative committee.

### 6.2.2 Workplace Health and Safety

HQPlantations' **Health and Safety Policy Statement** is reproduced in Appendix 5. The policy is supported by a Health and Safety Management System which gives effect to HQPlantations' corporate commitment to H&S and articulates objectives, strategies, key performance measures and targets for health and safety. The system forms the basis for operational planning, delivery and performance assessment across the organisation.

The Health and Safety Management System includes standards, guidelines and other resources which relate to:

- H&S management system – including roles and responsibilities, planning, communication, review;
- Incident management – including reporting and investigation;
- Risk management – including hazards and risk assessments, inspections, safe work procedures, Personal Protective Equipment (PPE) guidelines;
- Emergency management – including evacuations, and first aid
- Third party management – including contractors and visitors; and
- Health & wellbeing management – including health management programs, rehabilitation, drug and alcohol policy, fitness management, injury management and fatigue management guidelines



Planting Southern Pine

- Various health initiatives including:
  - Voluntary Health Assessment Program including health checks and influenza vaccinations;
  - Voluntary medical testing for hazardous substances;
  - Employee Assistance Program; and
  - Sun-smart awareness.

HQPlantations communicates and consults with workers on H&S issues via a number of strategies including:

- Quarterly meetings of the H&S committee which is comprised of an elected representative from each work group;
- H&S contractor forums are held regularly throughout the State to ensure all contractors are consulted and have the opportunity to provide feedback of H&S issues;
- Safety alerts shared across staff contractors and other forest management companies; and
- Safety inductions.

H&S performance is reviewed regularly at the Corporate Leadership Team and Board level, including reviews of H&S lead and lag indicators.

Operations and workplaces are subject to periodic internal and external audits to identify system deficiencies and promote continuous improvement.



Field Day looking at a wide range of topics, including harvesting, in May 2016

## 6.2.3 Training and development

Training is an integral part of the H&S system and includes training across a wide range of activities.

HQPlantations identifies opportunities and implements appropriate actions to support employment and skills development of forest workers, such as:

- Support to attend conferences, workshops, company meetings and related company visits to enhance skills development and networking;
- Support to develop business management skills;
- Job rotation and relieving opportunities to improve multi-skilling across field-based and administrative roles;
- Facilitating contractor development including the provision of fire fighting training and multi-skilling to provide continuity of seasonal work opportunities and encourage a stable, competent contractor workforce; and
- Provision of vocational work for students (including recent graduates).

Accreditation and training records are held on a corporate training register.



Science staff toured the Southern United States, focusing on genetics and nursery issues in October 2016

## 7 BENEFITS FROM THE FOREST

### 7.1 Plantation forest products

The growth and profitability of the Queensland forest industry and the quality of its timber products are being strengthened through continuous improvement in HQPlantations forest growing efficiency, plantation production, product quality and sustainability.

HQPlantations is primarily focused on the sustainable production of high value sawlogs and plylogs (**Figures 5**) for domestic and export sale. By-products such as roundwood and pulplogs are also produced. The majority of HQPlantations production is currently sold domestically, with the primary conversion of logs occurring at processing facilities located within two hours drive of the plantation, promoting capture of economic benefits at the local and regional level in terms of growing, harvest, transport and processing. In many instances, secondary processing facilities are also located in regional centres.

### 7.2 Chain of custody

To allow Chain of Custody (CoC) tracking by processors and manufacturers of forest products derived from the DFA, HQPlantations provides assistance to help customers with their various verification processes in response to specific requests.

### 7.3 Non-timber forest products

The sale of non-timber forest products and other permitted activities associated within the DFA provide a range of benefits to local and regional communities and include:

- Cattle grazing;
- Apiary site permits;
- Occupation Permits (e.g. to support communications facilities benefiting local communities);
- Pine cone and bark sales;
- Seed and genetic material sales;
- Native foliage sales;
- Income diversification for hardwood plantation partners involved in joint venture and land rental arrangements;
- Commercial photography and filming;
- Research projects; and
- Various recreational activities as outlined in section 4.7.

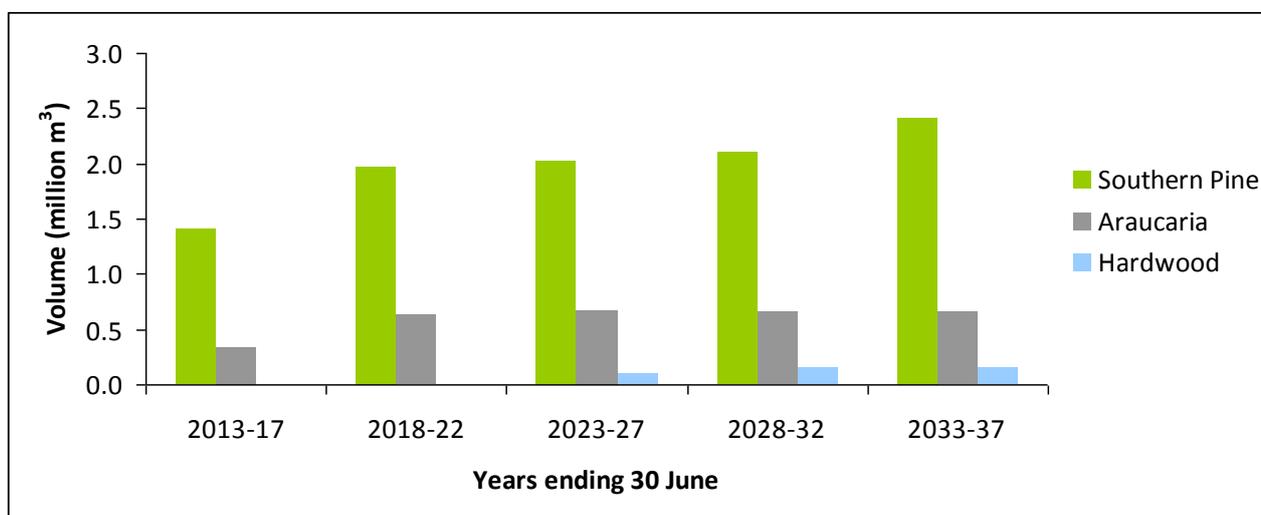


Figure 5 Average annual projected wood flow (per 5-year period) for Southern Pine and Araucaria, SEQ.

## 8 PLANTATION OPERATIONS

### 8.1 Species selection and matching to sites

Species grown for timber production include several 'southern pine species', Araucaria and several hardwood species. Species selection is predominantly determined by the requirements to maximise the return to the investors, to meet commitments to customers and to minimise business risk. HQPlantations does not use genetically modified organisms.

#### Southern Pines (*Pinus* species)

For convenience, and to support international marketing, HQPlantations' *Pinus* plantings are collectively called 'Southern Pines'. The main Southern Pine taxa grown include:

***Pinus elliottii* var. *elliottii* (PEE) – Slash Pine:** Currently makes up 3 percent of the Southern Pine estate by area, restricted to SEQ. Slash Pine has excellent wood properties, stem form and tolerance to water-logging. Since the development of the hybrid, new plantings are now restricted to the very wettest sites in SEQ (typically less than 50 ha per year).

***Pinus caribaea* var. *hondurensis* (PCH) – Honduran Caribbean Pine:** Currently makes up 24 percent of the Southern Pine estate by area. PCH is the dominant species planted to date in Central and Northern Queensland (CQ and NQ respectively). PCH is more productive than PEE, is better adapted to tropical environments and has greater drought tolerance, although it has lower wood density and generally poorer form. Following extensive damage to plantations in the Ingham / Cardwell area in the wake of severe tropical cyclone Yasi in February 2011, it is planned to replace PCH with the closely related yet more wind-firm *P. caribaea* var. *caribaea* (PCC) on poorly drained sites.

***Pinus elliottii* var. *elliottii* × *Pinus caribaea* var. *hondurensis* hybrid (PEE × PCH) – Hybrid Pine:** This hybrid currently makes up 70 percent of the Southern Pine estate by area. It exhibits the best properties from both of its parents and is now the dominant species planted in SEQ and CQ.

***Pinus taeda* (Loblolly Pine) and *P. radiata* (Radiata Pine):** Minor plantings comprising 3 percent of Southern Pine estate by area, restricted to SEQ higher elevation inland areas of Gambubal, Passchendaele and Pechey, where the cooler climate restricts planting of PEE × PCH or PCH.



Mature Southern Pine plantation (*Pinus elliottii* var. *elliottii*), Toolara State Forest

Use of Southern Pines is based on early species trials in Queensland seeking softwood species suited to the generally infertile coastal lowland sites available for plantation development. Timber production from these species has been pursued due to:

- returns on investment are maximised;
- the reduced risk resulting from the large body of operational experience and silvicultural research knowledge developed over a long period including over 50 years of tree breeding to improve growth, form and other characteristics (including wood properties);
- the development of a large domestic processing industry in Queensland based on Southern Pines as the basic raw material;
- the mix of Southern Pines, when appropriately deployed, being relatively drought tolerant and flexible in silvicultural management regimes over a wide range of sites enabling the accumulation of substantial estates to supply industry;
- wood characteristics of the Southern Pines make them versatile for a broad range of processes and uses, with a large underpinning market in the building industry. Product markets are well established;
- HQPlantations has lower risk, stable markets through supply commitments to industry; and
- reduced risk from pest and disease attack.

The need to limit the spread of introduced species, provenances or populations used in plantations, especially to adjacent native vegetation, to protect its biodiversity values is recognised.

The impact of *Pinus* wildlings from plantations on neighbouring lands is managed in accordance with guidelines in the document *Management of Southern Pine Wildlings Originating from HQPlantations' lands*.

## Araucaria

*Araucaria cunninghamii* (Hoop Pine) is one of the few endemic rainforest species that has been successfully domesticated for timber production. It is well-adapted and occurs naturally on the majority of sites where it is currently growing in plantations. *Araucaria bidwillii* (Bunya Pine) has also historically been planted on some frost-prone sites within the broader Araucaria estate however these sites are generally replanted with Hoop Pine (or hardwoods) using improved silvicultural techniques.

Araucaria plantations utilise improved genetic material through tree breeding programs derived from trees originally selected in natural forests occurring naturally within and surrounding the current plantation estate. These plantations do not present a significant risk in terms of natural spread or gene flow.



Mature Araucaria plantation (*Araucaria cunninghamii*)

## Hardwoods

The hardwood plantation estate is dominated by species that occur naturally in south-east Queensland. Spotted gum (*Corymbia citriodora* sub. spp. *variegata*) is planted on most sites, Western white gum (*Eucalyptus argophloia*) is planted on frost-prone sites and Gympie messmate (*E. cloeziana*) is planted on higher rainfall sites on deeper soils. While most hardwood plantations adjoin cleared farmlands or heavily modified grazing lands, observations to date suggest that where hardwood plantations adjoin native forest areas, they have not become invasive.



## 8.2 Seed and nursery production

All Araucaria and Southern Pine seed is sourced from HQPlantations seed orchards, arising from its long-term tree improvement programs.

The Toolara nursery, which produces all of HQPlantations' Araucaria and Southern Pine planting stock, is accredited under the Nursery Industry Accreditation Scheme, Australia (NIASA). Accreditation is based on adherence to guidelines and recommendations to ensure quality control and crop hygiene, particularly disease, pest and weed control and nursery hygiene.

Container-based hardwood stocks are sourced from external private nurseries.



An extensive breeding and testing program supports the production of Southern Pine seed production



Toolara Nursery staff assess a seedling germination trial

## 8.3 Silviculture

### Southern Pines

Southern Pines are mainly grown for sawlog production over a 26-28 year rotation. A typical silviculture regime is as follows:

- 3 year tactical harvest plan sets out areas scheduled for harvesting and re-establishment and identifies any key planning considerations that may be required such as major roading projects, social impact assessments, planned nursery stock/seed demand;
- Operational planning commences 12 months prior to harvesting, on a site by site basis, how a plantation will be harvested and re-established with regard to a range of legislative, environmental, social and economic criteria;
- Site preparation, with a focus on debris retention and minimal inputs needed for effective establishment. Where possible, re-planting occurs along existing mounds or rows;
- Pre-plant tending, typically via aerial herbicide application;
- Hand planting when soil moisture is acceptable;
- Survival counts and refilling where required;
- A single fertiliser application within the first 12 months on some sites depending on soil type and past fertiliser history; and
- Post plant weed control using a combination of chemical and mechanical techniques. Generally, weed control occurs within the first 12 months plus a later age tend if woody weeds are a problem.



Chopper roller breaks down larger debris prior to planting, maximising debris retention



Helicopters are used for pre-plant weed control



Contractors plant container seedlings by hand when soil moisture is adequate

## Araucaria

On the best sites, Araucaria is grown for high value clearwood over a 45-50 year rotation. Elsewhere, a standard sawlog regime is favored. A typical silviculture regime is as follows:

- Tactical and operational planning as for Southern Pines;
- Site preparation, with a focus on maximum debris retention and minimal inputs needed for effective establishment;
- Pre-plant tending, typically via aerial herbicide application;
- Hand planting when soil moisture is acceptable;
- Fertiliser is generally not required, except on specific sites (e.g. compacted ramp sites);
- Post plant weed control using a combination of chemical and mechanical techniques. Generally, two to three treatments are applied within the first 12 months plus one or two later age treatments for access, woody weed control or to reduce habitat suitability for rats which can damage young plantations. Araucaria can tolerate a number of herbicides that are used to target a wide weed spectrum, allowing post plant aerial spraying to occur. This has significant H&S and economic benefits, especially on steep slopes where access is difficult;
- On high productivity sites (typically the best 15 percent depending on location and terrain), pruning is carried out on the most vigorous, straight 350 to 400 stems per hectare at age 10-12 years, to a height of 4.8m; and
- Pre commercial thinning (PCT), involving the early removal of unpruned stems, at around pruning age, occurs on areas that are pruned to encourage clearwood production on the pruned section of the remaining stems. Unpruned stands are grown on until clearfall (i.e. no commercial thinning). For older stands that did not receive PCT, commercial thinning is an option, subject to access constraints and market conditions.



Araucaria plantations in Branch LA, Imbil (Borumba Dam in background)

## Hardwoods

Hardwood plantations are being established to produce high value timber products, including sawlogs, roundwood and composite products. Current plantations are still too young to harvest. The expected rotation age is around 25 years. As a consequence, suitable processing facilities have not yet been established. A typical silviculture regime is as follows:

- Tactical and operational planning as for Southern Pines;
- Site preparation typically involves some form of row cultivation on the contour as soils tend to be hard-setting;
- Pre-plant weed control involves combinations of slashing and herbicide application. Knock-down and residual herbicides are applied to row lines, or as an overall spray to control vigorous weeds;
- Hand planting occurs under favorable soil moisture and weather conditions;
- Fertiliser is applied within 3 months of planting. The main deficient element on hardwood sites is phosphorus, with boron, zinc and, to a much lesser extent, potassium and copper on specific sites. The type and rate of fertiliser applied varies based on results of soil analyses. Remedial fertiliser application may be applied later in the rotation if nutritional disorders are detected;
- Post plant weed control occurs using a combination of chemical and mechanical techniques. Generally, 2 to 3 treatments are applied within the first 12 months on ex-grazing or cultivated sites;
- Form pruning may be undertaken when plantations are young to maximise the number of trees that have a single leader;
- On some sites, pruning occurs in two lifts (ground pruning and carry up pruning to a height of 6m); and
- On productive areas pre-commercial thinning is generally carried within 1-2 years of pruning to remove unwanted stems and maintain residual stem vigor and stocking; the remainder is grown on until clearfall.



Cattle graze under 11 year old *Eucalyptus dunnii* near Amamoor

## 8.4 Chemical use

HQPlantations is committed to reducing its reliance on the use of chemicals for its forest management activities, where an equivalent or better economic, ecological and environmental outcome is possible. Specifically if chemical use is required it is HQPlantations preference to use low toxicity and low residual formulations, less frequently, whilst utilizing guidelines to ensure their targeted application in minimises offsite impacts.

Silvicultural practices regularly reviewed, with a view to developing techniques that use fewer inputs to achieve better economic, ecological and environmental outcomes. This work is supported by a long-term commitment to applied research.

Initiatives supporting reduced inputs for plantation silviculture include a focus on only those weeds known to impact on plantation growth and widespread use of debris retention which in some cases can suppress weed regrowth and reduce the need for herbicides, as well as maintaining important soil organic matter, nutrient pools and soil moisture. Monitoring trials are in place to evaluate new approaches to weed control, including the post-plant aerial application of knockdown herbicides.

The adoption of such strategies has seen a significant reported reduction in, and better targeting of chemical use by HQPlantations over a number of years.

Chemical manufacturers do not always include specific reference to 'forestry use' in their product labels. Where HQPlantations seeks to use such chemicals it must apply for an "off-label" permit from the Australian Pesticides and Veterinary Medicines Authority (APVMA). Permits are issued for defined time periods and are subject to specific conditions.

A review of long-term growth trends across a suite of fertiliser trials in coastal Southern Pine plantations revealed that on most soil types where phosphorus had been applied in the first rotation, there was little benefit to be gained in re-applying similar rates of phosphorous at time of second rotation establishment. Accordingly, HQPlantations has revised its fertiliser

prescription resulting in reduced (<50%) application rates and areas. Supplementary trials have been established to monitor long-term growth impacts associated with this changed practice.

HQPlantations only uses chemicals which are registered for use in Australia. In addition, the Forest Stewardship Council (FSC) requires certified Forest Managers to obtain derogations (with use conditions) prior to using chemicals they have deemed to be highly hazardous. HQPlantations currently holds an FSC derogation for Sodium monofluoroacetate (1080) use to limit rat damage to young Araucaria plantations and to control legally declared feral animals (wild dogs, foxes and pigs) on the DFA as part of broader community-supported baiting programs.

## 8.5 Plantation growth and yield regulation

Plantation yield projections are underpinned by customised growth models, inventory surveys, permanent growth plots and silvicultural research. Inventory stages in plantations occur at an early age and after major events such as wildfire, thinning or wind-throw events. The introduction of pre-harvest inventory is proposed for some plantation types to support a transition to mill door log sales.

HQPlantations' yield modelling system has been confirmed to be sound by independent reviews.



Accurate mapping of plantation boundaries feeds into the GIS and inventory systems



Assessment of permanent growth plots feeds into plantation yield predictions

## 8.6 Monitoring long-term plantation productivity

HQPlantations maintains an extensive network of permanent growth plots across different plantation species, and growing regions. These plots support the plantation yield regulation system and enable customised growth models to be developed for different combinations of species and growing regions. Long-term comparisons of year-on-year site index<sup>6</sup> trends for the various species / growing regions indicates no evidence of second or subsequent rotation decline associated with any of the major plantation species. Decline in production would indicate a loss of soil, nutrients or health issues. In fact, recent revisions to growth models indicate a trend of increasing productivity.

HQPlantations maintains an extensive network of research trials that enable it to compare long-term plantation productivity under different combinations of site, site management, genetic and silvicultural treatments. Results from many of these trials are documented in internal research reports and, in some cases, as published papers in peer-reviewed journals.

HQPlantations maintains a long-term trial at Yarraman to monitor soil compaction in an Araucaria plantation under varying machine trafficking conditions. Further similar trials have been recently established on different sites, including on second rotation Southern Pine plantation sites. As well, an extensive series of genetic gain and species (taxa) comparison trials enables informed decisions regarding genetic deployment. Many of these trials are designed to enable long-term comparisons of growth, form, wood quality and grade recovery.

<sup>6</sup> Site index is the estimated average height (m) of the tallest 50 stems per hectare at age 25 years

## 8.7 Plantation harvesting

Plantation management aims to produce a range of forest products including sawlog, plylog and pulpwood. Options exist in managing the crop in regard to thinning and age of events. Such options can be utilised to enhance product development, stand health and commercial results.

Clearfall typically occurs at age 26 to 28 years for Southern Pines. For Araucaria, clearfall age is around 50 years, although 40–45 years is targeted for areas planted with improved genetic stock that have grown under a low stocking regime from an early age. Harvesting of hardwood plantations is still some years away.

Harvesting is conducted within environmental guidelines to limit on and off-site disturbance and to maintain site productivity. Guidelines relate to implementation of buffer zones, limits on the placement of harvest extraction tracks, restrictions on locations where log processing can occur and guidelines on tree felling adjacent to sensitive areas such as native forests.

Most harvesting operations are fully mechanised and provide highly productive and safe work environments. Exceptions occur in some older plantations and on difficult terrain where either tree size or access is beyond safe machinery capabilities. In these cases felling and/or log making occurs manually with chainsaws.

The key harvesting systems fall broadly into two categories:

- Ground-based harvesting; and
- Cable harvesting.

Selection of the appropriate system for a particular plantation unit is based on consideration of:

- environmental impact;
- customer requirements;
- cost;
- safety; and
- productivity in relation to terrain, slope and soil conditions.

Ground based harvest systems vary from long or tree length harvest to cut to length forwarder based operations. These systems utilise low ground pressure and other modern harvesting machinery and integrated harvesting systems (mechanical felling, processing, forwarding, loading and hauling) to minimise site disturbance and maximise operational flexibility during wet conditions. Cable extraction or shovel logging systems that utilise specialised equipment on a level-swing excavator are used on sites too steep for standard ground based systems.

It is a requirement for harvesting operators to demonstrate competency from a safety, environmental and operational perspective. Contractors are expected to operate with a high degree of self-management and to embrace these commitments by providing a high standard of production and operating performance.

Timber harvesting is carried out by contractors directly engaged by HQPlantations and by contractors engaged by log purchasers.



Folding skel truck commonly used for Araucaria logs



Southern Pine ground based harvesting.

Selection of HQPlantations contractors is based upon a range of criteria including:

- Experience and reliability
- past environmental, safety and production performance;
- machinery capability for the task and terrain; and
- price.

For thinning operations, limits upon damage to retained stems are specified in contracts and the extent of damage during operations is monitored and recorded. Log purchasers, harvesting contractors and silvicultural contractors are requested to take corrective and preventative action where avoidable damage has occurred, or a penalty may be applied.



Most Southern Pine log production in south-east Queensland is converted to sawlogs



Assessing acoustic velocity on select trees to support the genetic improvement strategy

## 8.8 Efficient use of forest products

HQPlantations' commercial objectives are managed via its Long Term Plan, having due regard to economic, social and environmental requirements of relevant laws and forest certification standards. Creating and enhancing asset value is an important focus for HQPlantations as demonstrated by the following:

- Maintenance and enhancement of comprehensive resource assessment and yield regulation systems to provide detailed and timely information on the projected availability of various plantation products;
- Commitment to long-term tree breeding to improve commercially important traits such as volume, stem form, branch angle, internode length (Araucaria), site adaptation and various wood properties;
- Silvicultural focus on production of high value products such as sawlogs and ply logs. For example over 90 percent of Southern Pine log production in south-east Queensland is converted to sawlogs and ply logs (95 % by value). As well, pruning and heavy early thinning occurs on some sites (e.g. some hardwood and higher quality Araucaria sites) to improve the value of butt logs;
- Emphasis on competitive sales processes and terms for plantation logs;
- Transition from 'at-stump' to delivered log sales (to mill or wharf) for an increasing proportion of the harvest, providing further opportunities for log optimisation, value recovery and management of environmental impacts;
- Utilising planning and performance review processes to ensure expectations are met in regard to production, protection and learning; and
- Forward planning, construction and maintenance of HQPlantations' road network and liaison with relevant authorities regarding regional transport networks (including port authorities in some locations) to ensure safe and efficient transport of logs.

## 8.9 Pests and diseases

The **HQPlantations Pest Management Standard** provides guidance for dealing with (plant and animal) pests that are declared under the *Biosecurity Act 2014* and *Biosecurity Regulation 2016*. The standard is also referenced in Plantation Licence conditions. Various government and other websites provide suitable information regarding the identification and management of declared pests. This is supported by local training and liaison with officers from regional councils and DAF. Some declared pests of concern that occur within the DFA include Giant Rats Tail Grass (*Sporobolus pyramidalis*), Groundsel Bush (*Baccharis halimifolia*), Mother of Millions (*Bryophytum* species), Siam Weed (*Chromolaena odorata*), Feral dogs and Feral pigs.

HQPlantations is a member of the State Lands Pest Management Committee and provides an annual report of company pest management activities to this forum.

For plantation-specific damage agents, HQPlantations has a dedicated Plantation Health Officer (PHO). The PHO's role includes the identification, assessment, monitoring and prioritisation of potential damaging agents to the plantations (and surrounding native forest). The PHO maintains an active network of contacts with experts in relevant fields to provide diagnostic and other support services. The PHO also participates in various National and State committees related to plantation health such as the National Sirex Co-ordinating Committee.

Current and potential pests and diseases and other potential damage agents associated with the key plantation types are summarised in **Appendix 6**. Good plantation health, achieved by site selection, site preparation, fertilising, plantation maintenance and spacing, is the key to minimising disease and insect attack.

HQPlantations uses an integrated approach to pest management based on the complimentary use of mechanical and chemical application techniques selectively applied as a regime based on a good understanding of pest life cycles and effects on plantations.

In conformance with national guidelines, HQPlantations utilises a range of biocontrol agents to control plantation tree pests or to reduce the impact of serious environmental weeds. Examples include:

- Deployment of a nematode (*Beddingia siridicola*) and parasitic wasps to limit the impacts of Sirex wood wasp (*Sirex noctilio*) on *Pinus* plantations;



Parasitic wasp *Megarhyssa* released as part of the biocontrol strategy for Sirex wood wasp

- Participation in a national research trial to introduce a parasitic wasp (*Diaeretus essigellae*) to control Californian pine aphid (*Essigella californica*); and
- Release of approved biological control agents to suppress Weeds of National Significance, including lantana (*Lantana camara*) cat's claw creeper (*Dolichandra unguis-cati*), and Madeira vine (*Anredera cordifolia*).



Jewel beetle damage on Cat's Claw Creeper, a Weed of National Significance.

## 8.10 Fire

Loss of plantation assets through wildfire is identified to be HQPlantations' greatest asset risk. It is therefore necessary to have in place an effective fire management system to eliminate or mitigate damage from fire.

With respect to the Licence Area, HQPlantations' **Fire Management Policy** states:

*HQPlantations will manage the risk of plantation damage and loss from wildfire to enhance its economic performance in a professional manner, consistent with its commercial objectives, legal obligations and community expectations.*

*Towards these ends HQPlantations will:*

- *implement wildfire prevention, mitigation or suppression activities appropriate to the forest type to be protected in close liaison with the State and other neighbours;*
- *determine priorities in response to wildfires in the light of its (and in consideration of the State's) responsibilities, value of assets at risk, HQPlantations and third party capacity and presence, protection of human life being the highest priority;*
- *comply with legislative, contractual and other external requirements, including environmental, cultural and social responsibilities;*
- *maintain and manage a well trained and equipped fire management operation in accordance with its contractual obligations to the State and the Fire Commissioner in the Fire Management and Operations Plan, procedures, guidelines and other planning instruments, supported by appropriate documentation and records; and*
- *monitor developments in fire management, undertake research and development where necessary, and adopt industry standard procedures and guidelines appropriate for the forest types.*

While the above comments apply specifically to HQPlantations' obligations on and around the Licence Area, they also reflect HQPlantations' approach to fire management throughout the DFA.

Fire protection strategies include staff and contractor training, communication and detection technology infrastructure and hardware, fire equipment, surveillance, firebreaks, access, water supply, fuel reduction burning, fire fighting, logistics, inter-operability and co-operation with other fire agencies and management.

Planning is a key element of fire management. Components include:

- Long term forward planning (plantation design with respect to firebreak system/ access/ species/ age class mosaic planting considered in tactical and operations plans);
- Short term forward planning (annual protection and maintenance program, resources and external support);
- Fire preparedness (training and competency, access to human and equipment resources, weather information); and
- Wildfire incident response and management.



Prescribed burning reduces fuel loads

## 8.10.1 Fire management on and around the Licence Area

The **Fire Management and Operations Plan** (FM&OP) is a deed between the State of Queensland, HQPlantations and the Fire Commissioner, Queensland Fire and Emergency Service (QFES) for the control, prevention and management of fire on and around the Licence Area. Broadly, the parties' responsibilities are as follows:

- The State (through DNPSR & DAF) is responsible for the management of fire on Adjacent State Land including pursuant to the *Nature Conservation Act 1992*, the *Forestry Act 1959* and the *Land Act 1994*.
- The Fire Commissioner is responsible for managing the operations of QFES including, amongst other things, registration of Rural Fire Brigades under the *Fire and Emergency Services Act 1990*.
- HQPlantations is responsible for the management of fire on the Licence Area pursuant to the Plantation Licence, the *Forestry Act 1959* and the *Fire and Emergency Services Act 1990*.

The FM&OP obliges HQPlantations to become a **Plantation Rural Fire Brigade** and to comply with the **Plantation Licensee Fire Management Plan** and minimum standards obligations. These ensure that fire fighting equipment, detection and surveillance resources, as well as related training, are consistent with good fire industry practice. In addition, regional (or sub-region) Fire Management Plans are also required. Regional plans define the protection program and cover protection strategies and joint planning arrangements. They include maps showing forest buffer areas, access roads/tracks, firebreaks, helipads, assembly points, water points, high risk areas, burning history, and prescribed burning proposals.

Under section 68 of the *Fire and Rescue Service Act 1990*, as an occupier of land, HQPlantations 'employees can enter land within 1.6 km of the boundary of the Licence Area to extinguish fires which constitute a risk to the Licence Area. If it is practical to do so, HQPlantations must first notify a prescribed person (excluding an officer of its Plantation Rural Fire Brigade).

The FM&OP requires the State to provide reasonable notification to HQPlantations regarding the issue of Fire Permits issued over Neighbouring Lands (within 3 km of the Licence Area) including the opportunity for HQPlantations to comment on the conditions applying to the proposed permit.

HQPlantations must obtain a Fire Permit prior to lighting any fire on the Licence Area. Subject to several conditions, especially the detailed provisions outlined in the **Plantation Licensee Fire Management Plan**, the Fire Commissioner may issue a Fire Permit for a Burn Period on an annual basis (Annual Permit).

### Fire management obligations on Joint Management Areas

HQPlantations and the State acknowledge and agree that they have common areas of interest in relation to the control, prevention and management of fire on lands which are not within their Area of Responsibility and that the effective control, prevention and management of fire on each party's Area of Responsibility will require the co-operation and co-ordination of the other party. Accordingly, HQPlantations and the State have developed and comply with a Joint Management and Response Protocol, including the establishment of Joint Management Committees for geographic regions of the Licence Area.



Wildfire in Cooloola National Park threatens adjacent Toolara plantation estate.

## 8.10.2 Fuel reduction burning

Fuel reduction burning is the skillful application of fire to vegetation and related fuels under conditions of weather, fuel moisture and soil moisture that will allow confinement of the fire to a predetermined area, at rates of spread and intensity appropriate to providing planned benefits with minimum damage at an acceptable cost.

Desirable outcomes for most fuel reduction burns are:

- no significant scorch to tree canopy through average flame heights of no greater than 1 m;
- 70%-90% coverage in a mosaic pattern;
- approximately 75% consumption of available fuels with retention of the surface organic layer;
- rates of spread in the range 40-100m/hr; and
- intensities below 500 kw/m.

Fuel reduction burns are generally completed between May and August. Autumn burns may be warranted where fuel types require warm stable weather conditions or conditions suit older age plantation burns. Burning can be carried out by both aerial and ground ignition means.

The network of tracks and firebreaks maintained by HQPlantations, combined with variations in vegetation type within tracked areas, enables a mosaic of burnt and unburnt areas to be maintained across the DFA.



HQP staff undertake annual prescribed burning in optimum conditions

As well as benefiting plantation protection, this contributes to biodiversity at the landscape scale. The frequency of burning for any particular forest area is determined by the risk it may present to the adjoining plantations or other assets, the nature of the vegetation and also weather conditions. Previous wildfire history is considered, as are State recommendations (from an environmental perspective) regarding fire frequency and intensity, when planning fuel reduction burns.

Araucaria is sensitive to fire, hence fuel reduction burning within these plantations is not practiced. The primary Araucaria protection system is a series of retained buffers of rainforest vegetation, generally referred to as 'scrub breaks'. In conjunction with the scrub breaks, a network of fire breaks are established on the native eucalypt forest surrounding the plantations. Fuel reduction burning is carried out on a regular basis in strategic areas of open eucalypt forests to reduce fuel loads and therefore fire hazard. Cattle grazing under permit arrangements also act to reduce fuel loads.

Fuel reduction burning under Southern Pine plantations during the cooler months of the year is an important practice to minimise wildfire risk.

There has been limited fuel reduction burning within the hardwood plantation estate with grazing being the primary means of reducing fuel loads.



Desirable outcome for a prescribed burn in Southern Pine

## 8.10.3 Smoke management

HQPlantations recognises that smoke may be a nuisance and impact on community health, crops, visual amenity and traffic safety. However, HQPlantations also recognises that the key benefit of fuel reduction burning is to reduce the negative and often serious impacts of wildfire and to provide fire fighters and the public at large with a safer environment. All fire management practices are planned to mitigate negative impacts of smoke. Persons potentially impacted are consulted or advised, and warning signs are strategically placed. Key issues to be considered when managing smoke are traffic safety, public health, public visibility and neighbouring farm produce. To minimise adverse impacts, considerations, including season, weather forecast, block size, forest type and existing atmospheric pollution, are taken into account.



Smoke modeling (lower image) compares favorably with actual (upper image) and is used to minimise impacts on surrounding communities

## 8.10.4 Wildfire management

HQPlantations has a comprehensive fire detection/protection system to prevent or minimise the impact of unplanned fires. Aspects include: staff and contractor training, stand-by, fire tower and remote camera surveillance, ground and aerial patrols, fire fighting equipment, maintenance of plant and equipment, fuel reduction burning, communication systems, co-operation with other agencies and fire fighting.

With respect to incident management, response to wildfires is based on the Australasian Inter-agency Incident Management System (AIIMS) including adherence to the following principles:

- Management by objectives;
- Span of control; and
- Functional management



Fire room at Toolara with remote surveillance cameras



Filling up a mop up unit on the back of a vehicle from a waterpoint, Toolara State Forest

## 8.11 Managing degraded plantation areas

From time to time, plantation areas can be degraded due to factors including wildfire, windstorms, cyclones, lightning strikes, drought, floods, landslips and pest and disease attack. HQPlantations maintains and periodically tests contingency plans to manage such events. In the event that a plantation is damaged, affected areas are assessed to determine prospects for commercial salvage as well as options for rehabilitation. Factors to be considered include:

- Location, size and age of affected areas in relation to adjoining (unaffected) plantations; and
- Estimated quantity and quality of affected timber and potential markets and associated logistics including timeframes for salvage, harvest and haulage and anticipated prices.

The suite of actions implemented for a particular area of degraded forest is invariably determined on a case by case basis based on an analysis of local factors. Depending on the situation, resource estimates, including net stocked area and future plantation growth potential, may need to be updated based on a post-damage / post-salvage inventory.



Severe Tropical Cyclone Marcia (February 2015) caused extensive damage to Southern Pine plantations near Byfield, Central Queensland. The area is currently being re-established. (© Corbet Group)



Areas damaged by wildfires are monitored for pest incursion



Network of linked burrows excavated by the Pale Field Rat (*Rattus tunneyi*) beneath young Araucaria tree

## 9 RESEARCH

HQPlantations supports a mix of short, medium and long term research projects to support its Vision 2021 objectives. In broad terms these relate to:

- Productivity improvement;
- Resource characterisation and product diversification;
- Cost reductions; and
- Improved risk management and environmental performance.

HQPlantations' Science section oversees the delivery of the research program and coordinates projects involving a range of research providers, external funding sources and internal resources. HQPlantations is a member of a number of research consortiums such as Forests and Wood Products Association, Australian Plantation Forest Industry Herbicide Research Consortium and the National Sirex Committee and maintains strong network ties to a number of university and government research providers.

Some of the key research programs are outlined below.

### Genetic Improvement

HQPlantations maintains a long-term commitment to softwood plantation tree improvement seeking commercial gains in traits such as volume, stem straightness, branching, wind firmness and wood quality.



Stem segments being prepared for assessment at DAF's Salisbury facility as part of Southern Pine Resource Characterisation study

### Silviculture

Research focuses on testing a range of short to long term treatment responses to a range of treatment, taxa and site combinations, this program continues to shape the basis for HQPlantations current silviculture regimes as described in section 8.

### Stewardship

HQPlantations undertakes or supports research into a variety of stewardship areas. Examples include population surveys of endangered species such as the Nangur Spiny Skink (*Nangura spinosa*) and the Proston Velvet Bush (*Lasiopetalum* spp. Proston). HQPlantations also maintains a series of long term trials investigating the impacts and remediation of soil compaction following machine trafficking. Extensive forest hydrology research over the last 30 years underpins current best practices for soil protection and monitoring of key watercourses continues through collaboration with regional Waterwatch networks.



Trialling UAV technology for a range of potential forest inventory and surveillance activities

## 10 MONITORING AND REVIEW

HQPlantations monitors and evaluates forest management activities and their outcomes to ensure that forest management performance requirements are met, and that deficiencies are corrected where identified to support continual improvement in forest management.

Compliance with operational standards is monitored and verified by regular and formal field checks ) through the use of a **Quality Audit (QA)** checklists. QAs are based on the performance requirements of the relevant operational standards and exist for a wide range of activities including site preparation, weed control, tree-marking, pruning and sale area management. QAs are updated whenever policies or procedures are reviewed. QAs assess performance against a range of job-specific criteria. Results are entered into a corporate database to enable rapid follow up for any non-conformances and to facilitate reviews of operational performance.

In addition to the QA system, an Incident Reporting System is in place for 'exception' reporting of incidents, and for dealing with system elements not captured by QAs. Incidents observed (and not captured by a QA) are recorded on the corporate database by field managers or supervisors and the system includes prompts to ensure that any related follow up actions are monitored and 'closed off'. Significant incidents are reported directly to the Corporate Leadership team (CLT) for consideration and if necessary response.

The introduction of the new Forest Management Systems (Tech1) has enabled desktop auditing of operational planning and compliance with company procedures to be undertaken in an efficient and systematic manner.

At a broader level, HQPlantations has developed 'second party' audit procedures to monitor and review compliance with the procedural and performance requirements of its forest managementsystem. The results of these reviews, and any issue-specific reviews, are considered by the CLT for action.

HQPlantations' compliance with the relevant forest stewardship standards (AFS and FSC) is assessed by qualified, independent 'third party' auditors on a regular basis, with audits sampling a wide range of activities across central office and regional operations. A copy of summary audit reports are available to the public upon request. Additionally, HQPlantations provides an annual compliance report to the responsible Minister in respect of its adherence to key Plantation Licence conditions.

HQPlantations maintains a register of **Audit non-conformances and corrective actions** on iHQP, identifying corrective actions, dates and responsible officers.

HQPlantations maintains a register of relevant Federal and State laws and international conventions, which is reviewed at least annually.

HQPlantations' active research program supports continuous improvement in its sustainable forest management system. Summaries are posted to the HQPlantations intranet and cover a wide range of topics. Workshops and field days are also held with staff and relevant stakeholders to support technology transfer.

Components of the overall stewardship system are updated frequently and the various standards are regularly reviewed and updated to reflect best management practices.

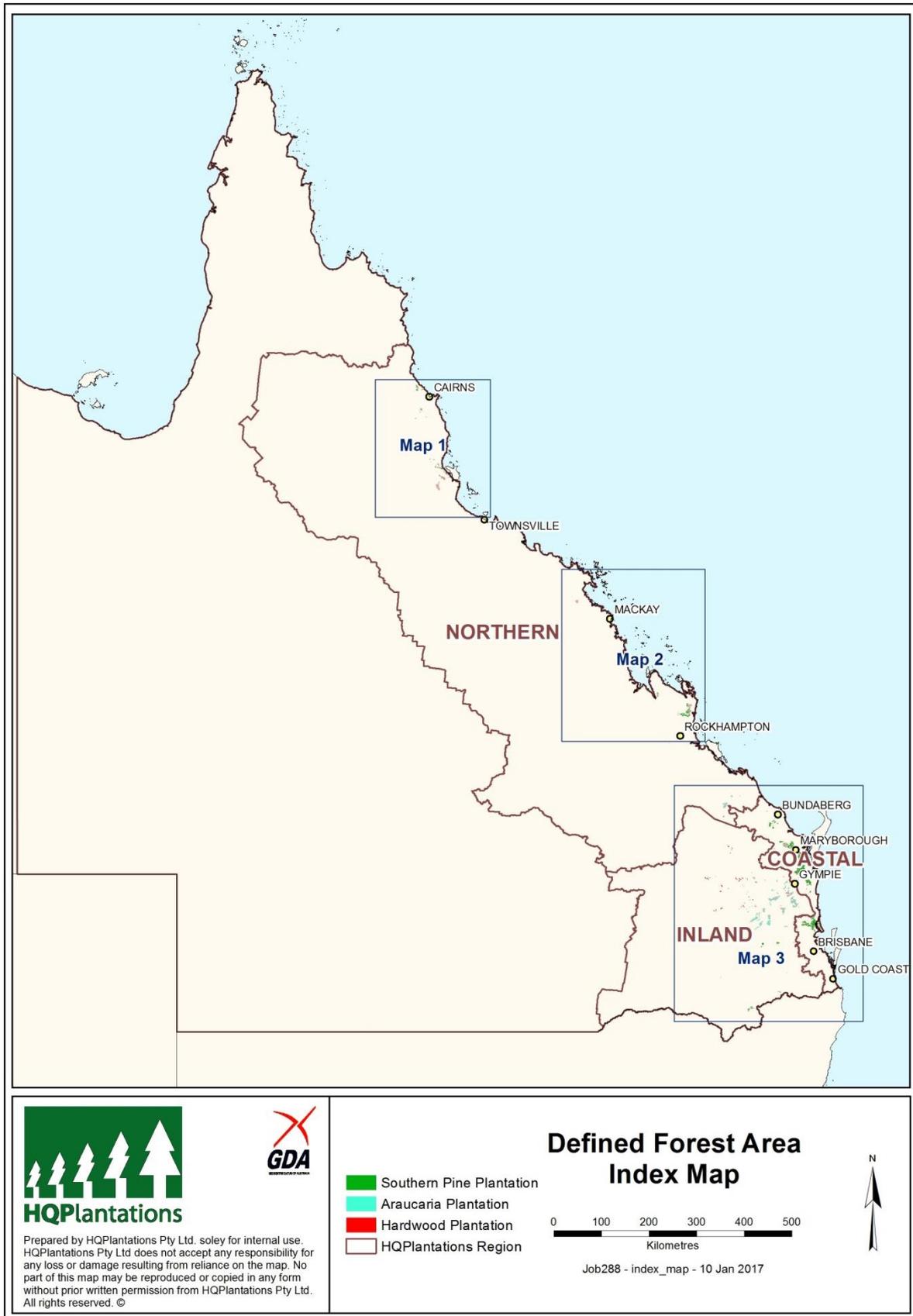
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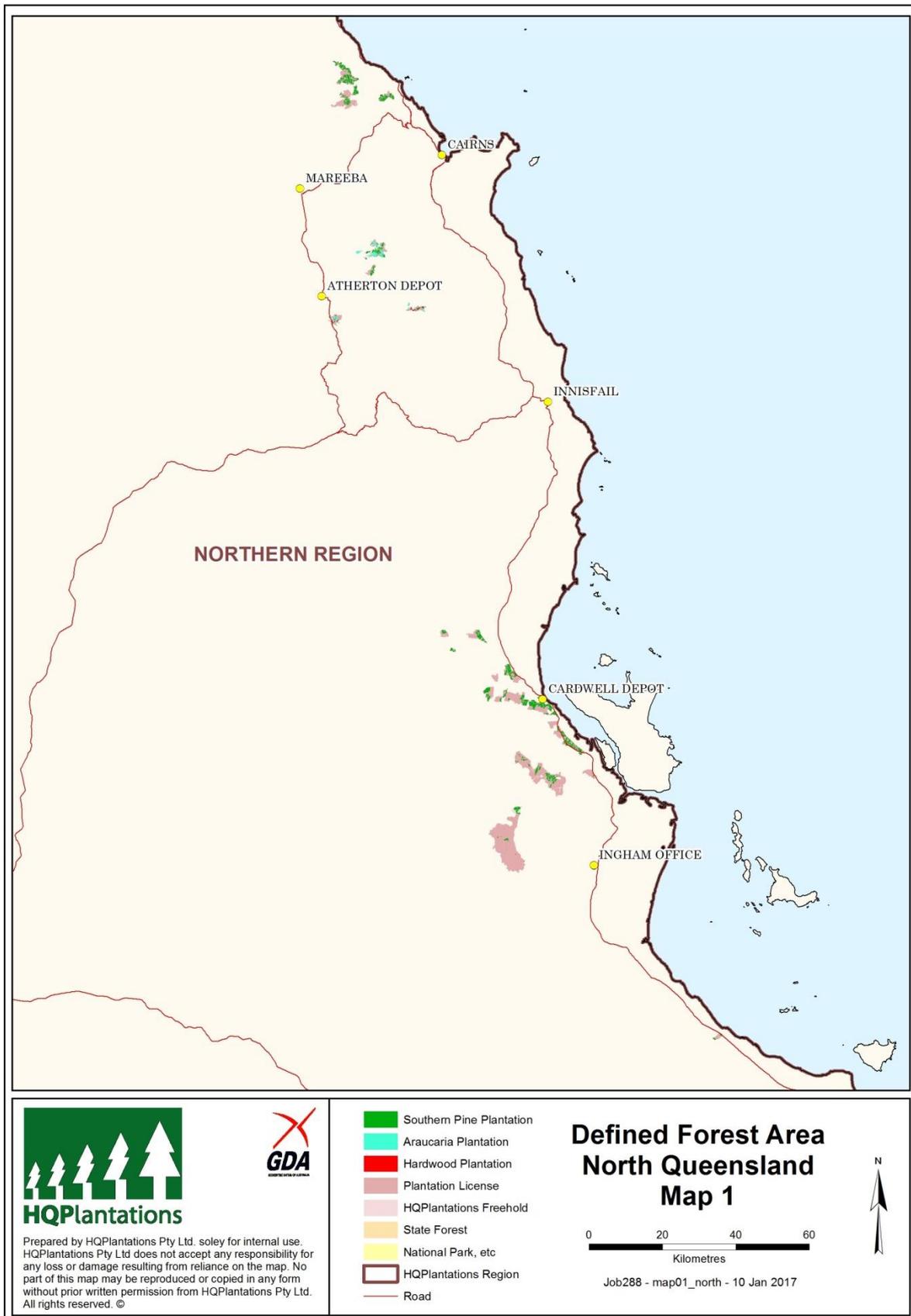
This Plan will be subject to minor annual revisions and a major review, including stakeholder consultation, every five years.

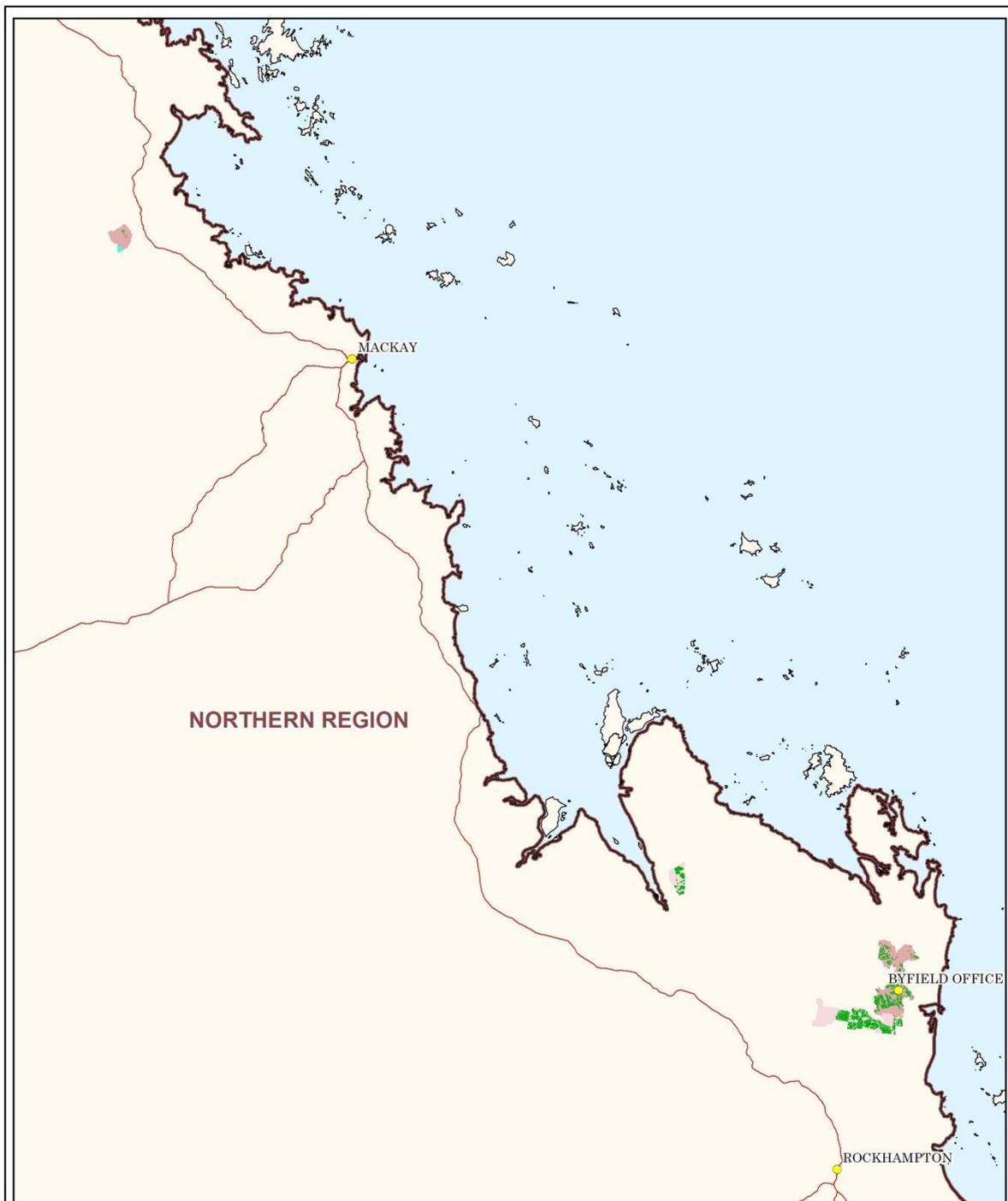
## LIST OF ABBREVIATIONS

Abbreviation	Meaning
AFS	Australian Forestry Standard
APVMA	Australian Pesticides and Veterinary Medicines Authority
BMRG	Burnett – Mary Regional Group
BVG	Broad Vegetation Group
CH	Corporate Holdings
CoC	Chain of Custody
CO <sub>2</sub>	carbon dioxide
DAF	(Queensland) Department of Agriculture and Fisheries
DFA	Defined Forest Area
DNPSR	(Queensland) Department of National Parks, Sport & Racing
DNRM	(Queensland) Department of Natural Resources and Mines
EA	Enterprise Agreement
EHP	(Queensland) Department of Environment and Heritage Protection
EPBC	<i>Environment Protection and Biodiversity Conservation Act</i> (Comm)
ERA	Environmentally Relevant Activity
EVNT	Endangered, Vulnerable or Near Threatened (species)
FSC	Forest Stewardship Council
FSP	Forest Stewardship Plan
FWPA	Forest and Wood Products Australia
GIS	Geographical Information System
ha	Hectare
HCVF	High Conservation Value Forest
hr	hour
H&FS	Horticulture and Forestry Science, DAF
H&S	Health and Safety
IBRA	Interim Biogeographic Regionalisation of Australia
ILUA	Indigenous Land Use Agreement
LTP	Long Term Plan
m	metre
mm	millimetres
MRCCC	Mary River Catchment Co-ordinating Committee
NNTT	National Native Title Tribunal
NSW	New South Wales, State of Australia
NTA	<i>Native Title Act 1993</i>
NTRB	Native Title Representative Bodies
REDD	Regional Ecosystem Descriptive Database
PEFC	Programme for the Endorsement of Forest Certification Schemes
PHO	Plantation Health Officer
PL	Plantation Licence
QA	Quality Audit
Qld	Queensland, State of Australia
QPWS	Queensland Parks and Wildlife Service
RE	Regional Ecosystem
RSA	Representative Sample Areas
SEQ	South-East Queensland
SF	State Forest
SIA	Social Impact Assessment
SFM	Sustainable Forest Management
UNESCO	United Nations Education Scientific and Cultural Organisation
VMA	Vegetation Management Act (Queensland)
WHA	World Heritage Area

## APPENDIX 1: MAP OF HQPLANTATIONS REGIONS





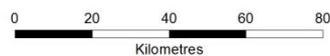


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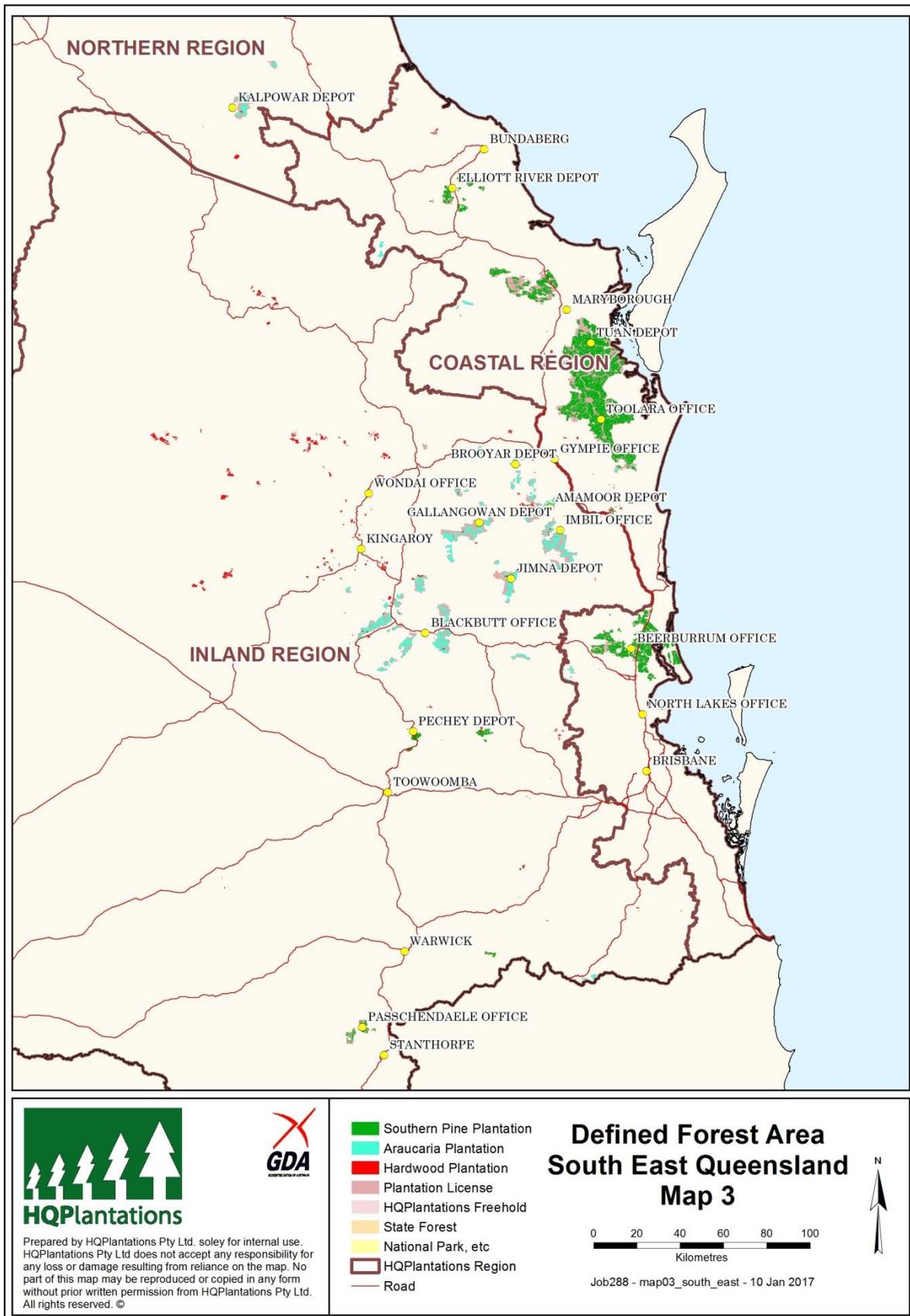


- Southern Pine Plantation
- Araucaria Plantation
- Hardwood Plantation
- Plantation License
- HQPlantations Freehold
- State Forest
- National Park, etc
- HQPlantations Region
- Road

## Defined Forest Area Central Queensland Map 2



Job288 - map02\_central - 10 Jan 2017



## APPENDIX 2: HQPLANTATIONS' STEWARDSHIP POLICY

### HQPlantations Pty Ltd Stewardship Policy



*HQPlantations is committed to sound Forest Stewardship by ensuring the economic, environmental and social integrity of its plantation forest management. HQPlantations will:*

- a. Conduct operations in accordance with all legal and other requirements.
- b. Achieve sound and balanced stewardship outcomes by:
  - collaborating in the development of policies and standards;
  - meeting all sustainable forest management requirements covering environmental, economic and social aspects as prescribed;
  - regular independent review; and
  - assessing its activities in the context of long term sustainability and the need to deliver the best balance between the various economic, social and environmental aspects of its management activities.
- c. Allocate sufficient resources to sustain the production systems over time, based on sound scientific principles, applied research and community standards.
- d. Strive to continually improve operations to enhance production and prevent loss, waste and pollution.
- e. Ensure operations are carried out in a safe and healthy manner by competent staff and contractors.
- f. Consult with, and consider the views of our stakeholders and interested parties, and openly communicate plantation management activities and outcomes both internally and externally.
- g. Gain public recognition as a socially and environmentally responsible commercial forest plantation manager including compliance with the Australian Forestry Standard and Forest Stewardship Council Principles and Criteria.
- h. Continuously review our management processes so as to maintain a systematic approach to plantation forest management.

5 May 2016

Brian Farmer  
Chief Executive Officer

## APPENDIX 3: POTENTIAL HIGH CONSERVATION VALUE FOREST AREAS

Broad description including endangered Regional Ecosystem (RE) code(s)	Locations State Forest, Logging Area
Complex semi-evergreen notophyll vine forest of uplands on basalt ('Mabi Forest') [7.8.3]	Wongabel (SF 191)
Endangered regional ecosystems of the Hinchinbrook coastal lowlands [various REs]	Ingham (SF 461), Lannercost (SF 700), Abergowrie (SF 591), Cardwell (SF 461), Murray Upper (SF 861)
Forest Red Gum ( <i>Eucalyptus tereticornis</i> ) woodland to open forest on alluvial plains [12.3.3]	Kalpowar (SF 695)
Turpentine ( <i>Syncarpia glomulifera</i> ) open forest on complex of remnant Tertiary surface and Tertiary sedimentary rocks [12.5.11]	Elliott River (SF 840)
Tinana Creek Riparian Corridors	Tuan (SF 915), Toolara (SF 1004)
Endangered regional ecosystems near Como (Toolara State Forest) including microphyll to notophyll vine forest +/- Hoop Pine ( <i>Araucaria cunninghamii</i> ) on remnant Tertiary surfaces [12.5.13]	Toolara, Como (SF 1004)
Endangered regional ecosystems of Ringtail State Forest including: <ul style="list-style-type: none"> <li>• <i>Eucalyptus tindaliae</i> and/or <i>E. racemosa</i> open forest on remnant Tertiary surfaces [12.5.3]; and</li> <li>• Gallery rainforest on alluvial plains [12.3.1]</li> </ul>	Ringtail (SF 997)
Lowland rainforests of the Mary Valley potentially including REs 12.3.1, 12.5.13, 12.11.1, 12.11.10, 12.12.1 & 12.12.16	Brooyar (SF 82), Widgee (SF 242), (SF 124), Amamoor (SF 435), Imbil North (SF 256), Imbil (SF 135), Tamlyn (SF 918)
Endangered regional ecosystems of the South Burnett including: <ul style="list-style-type: none"> <li>• microphyll to notophyll vine forest +/- <i>Araucaria cunninghamii</i> on remnant Tertiary surfaces [12.5.13]</li> <li>• Semi-evergreen vine thicket with Bottle Tree (<i>Brachychiton rupestris</i>) on sedimentary rocks [12.9-10.15]</li> <li>• <i>Eucalyptus siderophloia</i>, <i>E. propinqua</i>, <i>E. microcorys</i> and/or <i>E. pilularis</i> open forest on remnant Tertiary surfaces. Usually deep red soils [12.5.6]</li> </ul>	Yarraman (SF 289), Googa (SF 257), Mt Binga (SF 258)  Benarkin (SF 283)

## APPENDIX 4: 'CONSERVATION HANDBACK' AREAS

Conservation Handback Areas (State Forest Number)	Approx. planted area (ha)	Total Area* (ha)
Palen Creek (SF 200)	341	557
Mt Mee (SF 893)	96	106
Yuroi (SF 952)	62	130
Oakview (SF 220)	47**	71
Brooweena (SF 1294)	98	168
Watalgan (SF 898)	59 **	91
Bulburin (SF 391)	503**	874
Wongabel (SF 191)	223	646
Goodnight Scrub (SF 169)	749**	786
<b>Total Area</b>	<b>2,178</b>	<b>3,429</b>

\* Includes plantation and native forest areas

\*\* Harvesting and / or handback completed or commenced

## APPENDIX 5: HEALTH AND SAFETY POLICY STATEMENT



### Health and Safety Policy

#### HEALTH AND SAFETY VISION

Every day, everyone returns home safe.

#### HEALTH AND SAFETY GOALS

HQPlantations goals are to ensure that:

- safety is our first priority;
- our workplaces are safe and healthy;
- we achieve zero harm;
- our safety culture is strong and positive;
- we continually improve our health and safety performance; and
- our safety obligations are consistently met.

#### HEALTH AND SAFETY COMMITMENTS

HQPlantations is committed to providing our employees, contractors, business partners and other persons with a safe work environment. This will be achieved by the following principles:

##### Responsibilities

- All workers are responsible for acting safely without risk to themselves or others. Working safely is a key condition of all employment contracts and contractor engagements.
- Management at all levels are responsible and accountable for workplace health and safety and are required to provide visible leadership.
- All accidents, incidents and near-misses will be promptly reported and corrective actions developed to prevent future occurrences.
- Health and safety hazards will be reported and effective control measures implemented so far as is reasonable practicable.
- Health and safety performance will be continuously measured, reviewed and improved.

##### Resources

- Resources such as PPE will be provided to meet our health and safety requirements
- An effective Health and Safety Management System will be maintained to ensure our safety practices, processes and work activities in accordance with legislation, relevant standards and codes.

##### Consultation & Communications

- Workers will be encouraged to freely discuss health and safety and raise concerns they may have at any time.
- Consultation and communication with all who work in, or with HQPlantations, will be fundamental to improving health and safety performance.

##### Safety Culture

- An effective workplace culture that embraces health and safety will be encouraged and developed
- Safety will be an integral part of all business activities and processes and the first priority in all aspects of our business.
- The belief that all injuries are preventable; that serious injuries are unacceptable and no activity is so important that it cannot be done safety will underpin all work practices.
- Our workers will be encouraged to take the lead on safety.



Brian Farmer  
Chief Executive Officer

Version 2 - 15/09/2015

Review 15/09/2016

## APPENDIX 6: EXISTING AND POTENTIAL PLANTATION PESTS AND DISEASES

### Southern Pine

- Sirex wood wasp (*Sirex noctilio*)
- Cinnamon fungus (*Phytophthora cinnamomi*)
- Diplodia (*Sphaeropsis sapinea*)
- Dothistroma needle blight (*Dothistroma septosporum*)
- Five-spined bark beetle (*Ips grandicollis*)
- Pine aphids (*Essigella californica* and *Eulachnus thunbergii*)



Static panel trap to detect Sirex wood wasp during flight season

### Araucaria

- Araucaria bark weevil (*Aesiotes notabilis*)
- Ambrosia beetle (*Hyleops glabratus*)
- Longicorn beetle (*Strongylurus decoratus*)
- Bark beetle (*Hylurdreconus piniarius*)
- Pale field rat (*Rattus tunneyi* var. *culmorum*)
- Red deer (*Cercus elaphus*)
- Scrub turkeys (*Alectura lathamii*)
- Yellow-tailed Cockatoo (*Calyptorhynchus fumereus* var. *fumereus*)
- Sulphur-crested Cockatoo (*Cacatua galerita galerita*)
- Root disease fungi (*Phellinus noxius* and *Rigidoporus vincta*)



Rat damage to young Araucaria roots

### Hardwoods - Diseases

- Boot-Lace fungus (*Armillaria* sp.)
- Quambalaria Shoot Blight (*Quambalaria pitereka*)
- Leaf Crinkle Disease (*Mycosphaerella* sp.)
- Target Spot (*Aulographina eucalypti*)
- Leaf blight (*Cryptosporiopsis eucalypti*)
- Purple Leaf Spot (*Phaeophleospora epicoccoides* [syn. *Kirramyces epicoccoides*])
- Secondary fungus (*Pestalotiopsis* sp.)
- Dothiorella blight (*Botryosphaeria ribis*)
- Myrtle Rust (*Puccinia psidii*)



Quambalaria Shoot Blight on young Spotted Gum (© Geoff Pegg, DAFF)

### Hardwoods - Pests

- Leaf beetle (*Chrysomelid*)
- Leaf galling wasp (*Chalcidoid*)
- Leaf beetle (*Cryptocephalus iridipennis*)
- Moth caterpillar (*Anthela* sp.)
- Christmas beetle (*Anoplognathus* sp.)
- Leaf beetle (*Paropsis* sp., *Paropsis atomaria*, *Paropsis variolosa*)
- Leaf beetle (*Chrysophtharta cloelia*)
- Erinose mite (*Rhombacus* sp.)
- Scale insect (*Cardiaspina maniformis*)
- Lagriid Leaf beetle (*Ecnolagria* sp.)
- Scarab beetle (*Liparetrus* sp.)
- Case moth (*Hyalarcta nigrescens*, *Hyalarcta huebneri*)
- Cicada (*Psaltoda* sp.)
- Gum tree bug (*Amorbus* sp.)
- Gum tree psyllid (*Ctenarytaina* sp.)
- Scale insect (*Eriococcus coriaceus*)



Leaf-eating beetle and eggs on young eucalypt © Simon Lawson, DAFF

