Forestry Corporation

Forest Management Plan

SOFTWOOD PLANTATIONS
COASTAL HARDWOOD FORESTS

July 2022 to June 2027

Document history

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Acknowledgement of Country.

Forestry Corporation of NSW acknowledges the traditional custodians of the land on which we live and work, and pay our respects to Elders past, present and future.

We recognise the connection to their land, their waters and surrounding communities and acknowledge their history here on this land.

We also acknowledge our Aboriginal and Torres Strait Islander employees who are an integral part of our diverse workforce and recognise the knowledge embedded forever in Aboriginal and Torres Strait Islander custodianship of Country and culture.

Part one

Background and context

1. PART ONE – Our business, environment, community and people

1.1 Background

1.1.1 About Forestry Corporation of NSW

Forestry Corporation of NSW is a State-Owned Corporation that has been appointed to manage environmental conservation, community access, tourism, fire, land management and renewable timber production across two million hectares of public land on behalf of the NSW Government.

Under the Forestry Act 2012, Forestry Corporation has been charged with a number of equally important objectives:

- to be a successful business and, to this end, to operate at least as efficiently as any comparable business and to maximise the net worth of the State's investment in the corporation
- to have regard to the interests of the community in which it operates
- where its activities affect the environment, to conduct its operations in compliance with the principles of ecologically sustainable development[1]
- to contribute towards regional development and decentralisation
- to be an efficient and environmentally sustainable supplier of wood from Crown-timber land and land owned by it or otherwise under its control or management.

In line with these objectives, we manage one million hectares of forests permanently set aside for conservation (nearly half of which are reserves), partner with Aboriginal communities to manage and protect cultural heritage, provide community facilities such as free visitor areas and access via an extensive roading network, control pests and weeds and facilitate access for primary industries including apiary, grazing and quarrying.

As a statutory firefighting authority, we play a key role in preventing and managing fires and protecting communities as part of the State's coordinated firefighting response. We employ a highly trained and skilled firefighting workforce, carry out annual hazard reduction, training and maintenance programs, and maintain a firefighting fleet, equipment and heavy plant as well as a network of fire trails and fire towers to aid rapid detection and early suppression of fires in State forests.

We also sustainably produce renewable timber products, meeting the community's demand for timber and wood products and supporting regional employment. The same State forests have been harvested and regrown for more than a century, generating renewable timber products while preserving forest values and regrowing in perpetuity.

Our purpose is growing sustainably, managing commercially and supporting communities in a changing world. We value innovation, integrity and the wellbeing of our people and communities, with respect for country, community, customers, suppliers and one another at the forefront of all that we do.

[1] contained in section 6(2) of the *Protection of the Environment Administration Act 1991*

1.1.2 Context for sustainable forest management

Australia was a signatory to the United Nations Conference on Environment and Development, Rio de Janeiro in 1992. It was at this conference that governments recognised the need to redirect international and national plans and policies to ensure that all economic decisions fully considered any environmental impact. The Earth Summit resulted in Forest Principles which led to the Montreal Process, also known as the *Working Group on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests*. It is a voluntary agreement on sustainable forest management. Australia was a member country of the Montreal Process.

The criteria and indicators agreed to at the Montreal Process provide a common framework to describe, monitor, assess and report on national forest trends and progress towards sustainable forest management.

The Australian, State and Territory governments are all signatories to the 1992 National Forest Policy Statement (NFPS). The management of Australia's forests is guided by the NFPS, providing a framework within which governments work cooperatively to achieve sustainable management of Australia's forests.

The NFPS provided the basis for the Regional Forest Agreement (RFA) process. RFAs are 20-year plans for the conservation and sustainable management of Australia's native forests, including State forests as well as the public conservation estate, negotiated between the Australian and some state governments. The RFAs set out the commitments for delivery of effective conservation, forest management and forest industry outcomes. There are three RFAs in NSW, covering the Eden, Southern and North East regions. These were reviewed and renewed by the Commonwealth and NSW Governments in 2018 following an extensive consultation process and extended until 2039. In broad terms, each RFA provides for:

- development of the Comprehensive, Adequate and Representative (CAR) reserve system
- sustainable forest management and use of forested areas in the regions
- long term stability of forests and forest industries.

The CAR reserve system involved the establishment of new national parks and reserves across the landscape in addition to informal reserves in State forests.

The NFPS also recognises that timber plantations provide a wide range of environmental benefits to the community and that their management should be based on sustainable management techniques. Plantations for Australia: The 2020 Vision (1997, 2001) took its lead from the NFPS and states its overarching principle as the enhancement of regional growth and international competitiveness through a sustainable increase in the plantation resource. It is a strategic partnership between the Australian, State and Territory governments and the plantation timber growing and processing industries.

In NSW, a State-wide Forest Management Framework, has been developed by the NSW Government that details how the State delivers on the RFAs. Under the *Forestry Act 2012* Forestry Corporation manages approximately nine per cent of the forested land in NSW. This land includes approximately 1.8 million hectares of native forests, 225,000 hectares of softwood

plantations and 35,000 hectares of hardwood plantations. This land is managed alongside a vast public forest estate managed for conservation by the appointed land managers.

Forestry activities in coastal public native forests are regulated by the Coastal Integrated Forestry Operations Approval (CIFOA), which sets conditions to protect and maintain wildlife habitat, forest flora, water quality and biodiversity across the landscape and to balance responsible timber production with ongoing conservation. The CIFOA only applies to public native forests. Operations in private native forests are regulated under Part 5B of the *Local Land Services Act 2013*.

Operations in timber plantations are regulated by the *Plantations and Reafforestation Act 1999* and the *Plantations and Reafforestation (Code) Regulation 2001*. These aim to promote plantation establishment and contain standards for the establishment, management and harvesting of the trees. These regulations apply to private plantations as well as the State-owned plantations managed by Forestry Corporation.

1.1.3 Our Forest Management System

Forestry Corporation maintains a detailed and robust Forest Management System (FMS), which is a framework of policies, processes and procedures that guides day-to-day operations by outlining how we will plan operations, implement procedures, audit and report operations and review performance to achieve sustainable forest management (refer to Figure 1-1 below)

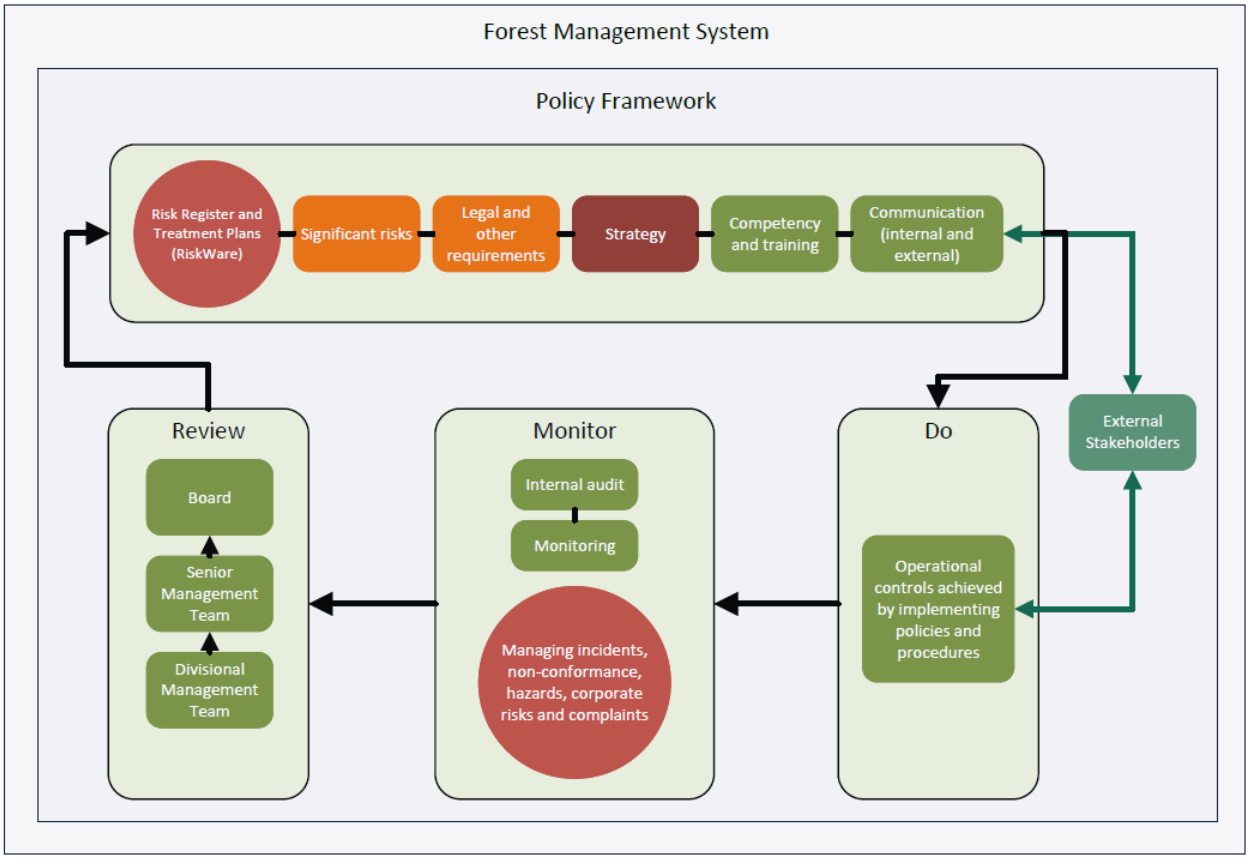

Figure 1-1: Forestry Corporation's Forest Management System

Forestry Corporation has a Forest Management Policy, which outlines our commitments to conserving and advancing a range of forest values such as biodiversity, forest productivity and carbon sequestration in keeping with the principles of sustainable forest management. The policy is delivered through the Forest Management System and is available on our website.

The FMS ensures we have:

- objectives and targets for achieving sustainable forest management that can be tracked and reported on
- controls in place to minimise the impact of our activities on the environment
- a process to identify and resolve issues and continuously improve our operations
- regular audits of what we do and how we do it to ensure our activities and systems comply with regulations and are best practice
- a process to review the performance of our management systems and processes.

It also ensures that State forests are managed according to adaptive management principles. Adaptive management is a systematic process for continually improving management policies and practices by learning from the outcomes of operations and ensuring that our systems and processes allow us to identify and respond to changing circumstances. The development, implementation and continuous improvement of the FMS is overseen by the Senior Management Team and supported by an implementation committee to ensure it remains relevant to business operations.

The FMS is tailored to the requirements of each of Forestry Corporation's two operational divisions - Softwood Plantations and Hardwood Forests.

1.1.4 The Forest Management Plan

This plan summarises our systematic approach to sustainable forest management, outlines our legal and regulatory framework and demonstrates our commitment to maintaining certification to the Australian Standard for Sustainable Forest Management (AS 4708).

It is set out in three parts;

- **Part one** – Background, Forestry Corporation's business, environment, community and people
- **Part two** – Softwood Plantations
- **Part three** – Coastal Hardwood Forests[2]

Part one summarises management activities and commitments that are common to both operating divisions, while parts two and three describe forest management activities specific to softwood plantations and coastal hardwood forests. Additional parts will be added to this suite of documents to incorporate plans for Cumberland State Forest and Western hardwood forests when they are reviewed.

This plan aligns with and is supported by a range of ongoing reports, which Forestry Corporation publishes or contributes to as summarised in the table below:

[2] Coastal hardwood forests include those associated with the foothills and tablelands in eastern NSW

Table 1-1: Related reports

Report	Frequency	Publisher
Annual Report	Annual	Forestry Corporation
Sustainability Report	Annual	Forestry Corporation
Statement of Corporate Intent	Annual	Forestry Corporation
Yield forecasts for hardwood forests	Five-yearly or as required	Forestry Corporation
FRAMES reconciliation report	Five-yearly	Forestry Corporation
NSW Forestry Implementation Report	Annual	Environment Protection Authority
State of the Environment Report	Five-yearly	Environment Protection Authority
State of the Forests Report	Five-yearly	Commonwealth Department of Agriculture, Water and the Environment
Regional Forest Agreement review	Five-yearly	Independent, Joint NSW and Commonwealth Government
Summary audit reports for certification to the Australian Standard for Sustainable Forest Management	Periodic	Forestry Corporation's audit service provider
Various local and regional fire management, weed and pest plans	Periodic	Various

Note that Forestry Corporation's Sustainability Report publishes a range of figures that are updated annually, including information about the forest estate, environmental management and production, and will be referred to throughout this document as the primary source of accurate and up-to-date information.

Together, the Forest Management System and associated policies, processes and standard operating procedures and the regular reports (Table 1-1) meet the forest management and reporting requirements of the Australian Standard for Sustainable Forest Management (AS 4708) as well as our obligations under the RFAs and the *Forestry Act 2012*. This FMP is a revision of the 2016 Forest Management Plans that were prepared for softwood plantations and coastal hardwood forests and aligns with the requirements outlined in Table 1-2 below.

Table 1-2: Forest Management Plan requirements

Instrument	Requirement	How it is met
Forestry Act 2012	The Corporation is to prepare and adopt plans for the management of State forests that contain such information as prescribed by the regulations. The plans for State forests wholly or partly located in the area to which an integrated forestry operations approval applies must be must be in accordance with the IFOA. Before adopting a draft plan, a draft plan must be publicly advertised and submissions considered.	This plan has been prepared in line with the Forestry Regulations. The plans for coastal native forests are consistent with the IFOA. The draft plan will be placed on public display and submissions sought and considered before adoption.
Forestry Regulation 2012	A management plan must contain the ecologically sustainable forest management strategy to be adopted by the Corporation in relation to the State forest to which the plan applies.	Ecologically sustainable forest management is referred to in this document as sustainable forest management. The plan aligns with sustainable forest management principles.
Australian Standard for sustainable forest management (AS4708)	FMP must provide: • an overview of the organisation, its activities and the compliance framework • a description of the defined forest area, including the forest management unit/s and vegetation types and access to maps at appropriate scale • an outline of the forest management objectives • a description of forest values and an overview of how they will be managed to both provide benefits and minimise harm • a rationale for silvicultural regimes • a description of operational planning and control processes • a description of the processes for monitoring condition and performance • an outline of stakeholder engagement processes, including procedures for obtaining further information.	See relevant chapters for details on each of these requirements
Regional Forest Agreements	NSW will implement the Regional ESFM Plan applicable to each region (currently the Forest Management Plan for the Coastal Forests of NSW) – or an equivalent instrument – ensuring review and revision on a regular basis	This FMP meets the requirement to have an ESFM Plan outlined in the RFAs. Forestry Corporation will consult with stakeholders before finalising this plan and will publish the final document on our website.

1.1.5 Significant events since previous plan

The previous FMPs for softwood plantations and coastal hardwood forests were finalised in 2016. Significant events since the implementation of those plans are summarised below.

Legislative changes

Introduction of Coastal IFOA

In November 2018, a new regulation was introduced for native forestry operations in coastal native forests, the Coastal Integrated Forestry Operations Approval (CIFOA). This new regulation was phased in over two years. Refer to Section 2.1 below for key changes.

Renewal of Regional Forest Agreements

The State and Commonwealth Governments renewed the NSW RFAs and extended them by 20 years. This was formalised on 28 November 2018 following assessment, public consultation, independent review and consideration. The NSW RFAs have a 20-year rolling life, with ongoing five-yearly reviews. The NSW Forest Agreements have been incorporated into the RFAs and have not been renewed.

Energy Legislation Amendment

The *Energy Legislation Amendment Bill 2021* passed the NSW Parliament in November 2021. This amended the *Forestry Act 2012* to enable the establishment of renewable energy projects in State-owned exotic softwood plantations. It is expected that evaluation of potential market-led developments will be completed in 2023. This will include a review of the risks and benefits associated with any potential projects. This is discussed further in Section 4.5.4.

Review of Plantations and Reafforestation Act

The *Plantations and Reafforestation Act 1999* and *Plantations and Reafforestation (Code) Regulation 2001* are currently under review by the NSW Government. Any significant changes will be considered in future reviews of this FMP.

Changes in tenure and tenure management

Several changes have been made to the land under Forestry Corporation management. The National Parks and Wildlife Service (NPWS) has been appointed as the land manager for areas[3] of State forest flora reserves and areas have been transferred to national park or State Conservation Area to be managed by the NPWS. Purchases of freehold land have increased the softwood plantation estate by approximately 12,000 hectares since 2016.

[3] It is expected that during the term of this plan additional areas may be transferred to NPWS management – refer to the current Sustainability Report for the most recent area statements

Small areas of State forest have been revoked to meet state infrastructure requirements and some new areas of freehold land have been added to the State forest estate in exchange for the land revoked.

Impact of natural disasters

Forests covered by this plan have been subject to several extreme weather events since the 2016 plan, including fire and flood. The severe fire season of 2019-20 impacted the immediate and longer term management of both plantations and native forests across NSW. Around 830,000 hectares of native State forests and 62,000 hectares of State forest timber plantations were impacted, which is around half the native forest area and 25 per cent of the softwood plantation estate. In softwood plantations, timber harvesting salvage operations were implemented and accelerated replanting commenced to minimise the economic and long-term timber supply impacts of the fires. In hardwood forests, operations were concentrated in hardwood plantations while a range of additional environmental assessments were carried out in impacted native forests and new precautionary measures were developed and implemented for forestry operations in fire-affected areas. Assessments and reviews continue and detailed information on ongoing recovery, including revised sustainable timber yields for hardwood forests, is published on Forestry Corporation's website.

The fires also had significant impacts on the State forest road and infrastructure network, which are continuing to be repaired and restored. The repair program was expanded to include infrastructure damage from subsequent flooding events in 2021 and 2022.

1.1.6 Land to which this plan applies

This FMP applies to the Defined Forest Area[4] managed by the Softwood Plantations Division (SPD), and the coastal and tableland forests managed by the Hardwood Forests Division (HFD). Detailed information about the Defined Forest Area, including maps, is published in Forestry Corporation's Sustainability Report each year.

The Defined Forest Area Maps are also available on Forestry Corporation's open data site. Links are available on our website under Sustainability - Certification or maps available at Maps and Spatial Data.

1.2 Ecologically Sustainable Forest Management

Sustainability is about meeting the needs of the present without compromising the ability of future generations to meet their own needs[5]. The sustainability of our business is founded on sustainable forest management principles, which are to:

» maintain the ecological process within forests
» preserve their biological diversity

[4] AS4708 - An area of forest (including land and water) to which the requirements of the Responsible Wood Standard (AS 4708) are applied

[5] Our Common Future (also known as the Brundtland Report) from the United Nations World Commission on Environment and Development (WCED), published in 1987

» obtain for the community the full range of environmental, economic and social benefits from all forest uses within ecological limits.

There are also ESFM criteria as agreed for NSW set out in the document: Ecologically Sustainable Forest Management Criteria and Indicators for the NSW Forest Agreement regions (EPA 2017). The criteria are:

i. Conservation of biological diversity
ii. Maintenance of productive capacity of forest ecosystems
iii. Maintenance of ecosystem health and vitality
iv. Conservation and maintenance of soil and water resources
v. Maintenance of forest contribution to global carbon cycles
vi. Maintenance and enhancement of long-term multiple socio-economic benefits to meet the needs of societies
vii. Legal, institutional and economic framework for forest conservation and sustainable management.

Forestry Corporation applies a risk-based methodology, recognising that where threats of serious or irreversible damage are identified, a lack of full scientific certainty will not be used as a reason for postponing measures to minimise adverse impacts.

The ability of the forests we manage to provide a range of services and products underpins the long-term success of our business. Successfully balancing society's needs for products and services, such as wood and recreational opportunities, with the needs of forest ecosystems ensures we continue to sustainably produce one of the most renewable natural resources in the world.

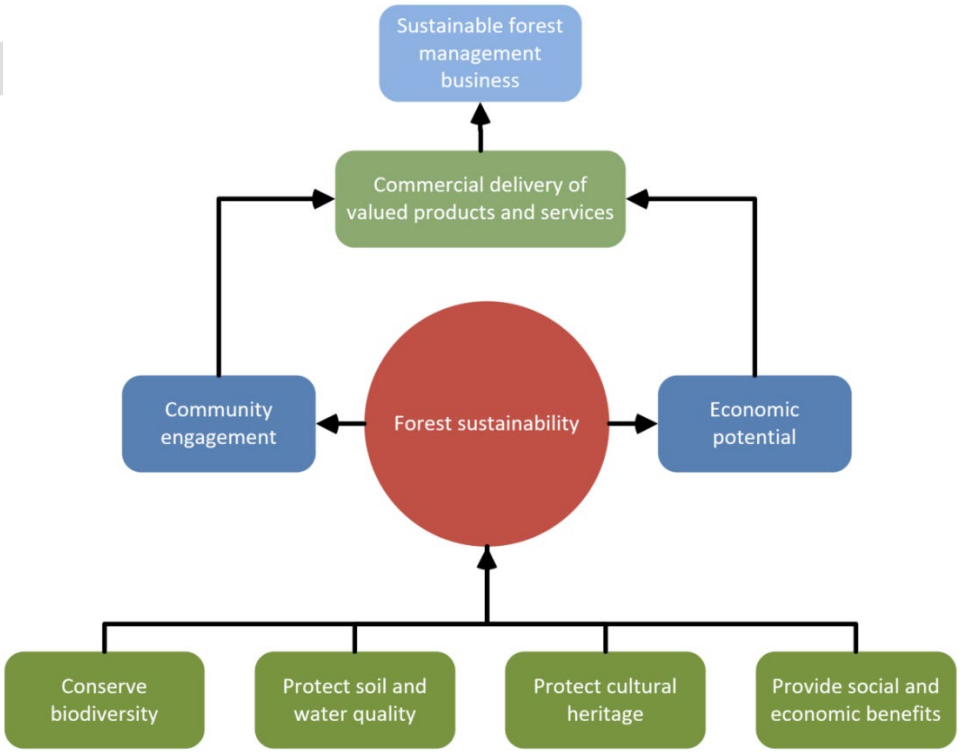

Figure 1-2: Sustainable forest management

This FMP summarises our commitment to sustainable forest management, which is underpinned by robust systems, policies and procedures, ongoing monitoring and reporting, and compliance with relevant regulations.

2. Our business

Sustainability is a core principle underpinning our forest management and is built into every aspect of our operations, from environmental management to community partnerships, staff wellbeing and commercial management.

The information in this Forest Management Plan is organised under four focus areas - Our Business, Our Environment, Our Community and Our Staff. The Annual Report and Sustainability Reports report key outcomes in each of these areas annually.

2.1 Governance

Governance is the process of making and implementing decisions within Forestry Corporation.

2.1.1 Legal framework and other compliance obligations

The NSW Forest Management Framework outlines the key legislation, policy, regulatory instruments and programs that regulate and support forest management in NSW across public forest tenures. In order to ensure operations are conducted within that framework, Forestry Corporation has a systematic approach to identifying and complying with legal and other requirements. Forestry Corporation maintains a register of legal and other compliance obligations that are relevant to the conduct of its activities. It is reviewed and updated regularly. Changes to legislation and other relevant requirements are identified, analysed and then communicated to staff and contractors.

Key forest management instruments include:

- *Forestry Act 2012*
- *Plantations and Reafforestation Act 1999*
- *Rural Fires Act 1997*
- *Protection of the Environment Operations Act 1997*
- *Biodiversity Conservation Act 2016*
- *Crown Land Management Act 2016*
- *National Parks and Wildlife Act 1974*
- *Environmental Planning and Assessment Act 1979*
- *Local Land Services Act 2013*
- Integrated Forestry Operations Approvals (IFOAs).

The Coastal IFOA (CIFOA) commenced on 16 November 2018 and was phased in over two years. It is an integrated licence in line with the RFAs, which allows for the NSW Government to be the regulatory authority for native forestry in public forests. The CIFOA is a robust instrument that operates in the place of separate licences under the Biodiversity Conservation Act, the Fisheries Management Act and the Protection of the Environment Operations Act. The aim of the CIFOA is to deliver clear and enforceable environment protections and a contemporary and adaptively managed regulatory process. The Environment Protection Authority independently regulates compliance with the CIFOA.

2.1.2 Forestry Corporation management structure

Forestry Corporation operates under the direction of a Board, which is constituted under the *Forestry Act 2012* and accountable to the voting shareholders in line with the *State Owned Corporations Act 1989*. Forestry Corporation's senior management team consists of the Chief Executive Officer and five divisional managers. Detailed and up-to-date information on our Board of Directors and organisational structure is published in our Annual Report each year.

Each year, Forestry Corporation enters into an agreement with the shareholders known as the Statement of Corporate Intent (SCI), which is available on our website and details the objectives and strategic direction of the business, along with financial performance targets and other related matters, such as risk management. Forestry Corporation also maintains a corporate strategy, which is summarised in the SCI. This is reviewed annually and provides staff with a clear set of organisational goals and objectives.

2.1.3 Risk management

Risk management underpins Forestry Corporation's FMS. Forestry Corporation uses a risk management framework consistent with ISO 3100:2018-02 Risk Management to ensure we have robust processes for identifying and documenting significant risks, implementing appropriate management measures and carrying out regular reviews. In addition, Forestry Corporation complies with the risk management requirements of the Responsible Wood standard, which ensures certified organisations adopt systematic processes to identify risks, develop controls, review outcomes and undertake corrective action where required. Forestry Corporation's risk management guidelines support the implementation of this framework by staff and the Audit and Risk Committee of the Board is responsible for ensuring Forestry Corporation appropriately discharges these responsibilities and commitments.

Risk management software is used to report, record and mitigate risks and risks and associated controls are documented. Activities are reviewed regularly to ensure that significant risks are identified, and appropriate mitigation strategies are implemented. Forestry Corporation manages a range of risks with potential social, environmental, compliance, technological, safety, financial, reputation and security consequences. Forest operational activities with the greatest potential environmental risk are:

- timber harvesting involving tree felling, log extraction and log haulage
- road construction and maintenance, particularly drainage feature crossings and side cuts on steep side slopes
- fire management, including hazard reduction burning, particularly in ecologically sensitive habitats and streamside buffers
- use of pesticides
- plantation establishment.

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2.1.4 Monitoring and audit

The FMS is a system of monitoring, auditing and reviewing, which allows for continuous improvement and adaptive management. Recommendations from monitoring, audits and reviews are incorporated into corrective actions to improve the FMS over time.

Environmental monitoring in native forests is further discussed in section 7.4.

Forestry Corporation carries out compliance monitoring through:

- using risk and incident registers to understand areas of potential high risk
- internally assessing compliance with environmental regulations on all operations, with a focus on areas of known high risk
- applying a contractor rating system that highlights areas of high performance and areas where improvements can be made.

SPD's Monitoring Audit and Reporting Manual and HFD's compliance monitoring system detail the monitoring processes used in both divisions for forest operations. Local Audit Plans detail required monitoring intensity for different forest operation types. Ongoing monitoring is particularly targeted at the volume of timber products harvested and the area harvested, which are closely compared against predicted yields periodically so anomalies can be investigated.

Active forest operations are visited regularly to identify and record any non-compliance with the operational conditions, which forms an important part of the continuous improvement cycle. This is supplemented by a Compliance Assessment Team, who provide another level of assurance in addition to local area monitoring.

When a non-compliance is identified

- there is an assessment of the potential risk
- the incident is investigated and the cause of the non-compliance is established
- corrective actions are instigated where appropriate
- improvements are made to prevent reoccurrence.

The Audit and Risk Committee of the Board maintains a rolling three-year internal audit plan that provides independent and objective reviews to:

- provide assurance that our financial and operational controls are operating in an efficient and ethical manner and effectively managing risks
- identify opportunities to improve performance.

In addition, specific forest management audits, focused on the Responsible Wood criteria, are carried out in accordance with a planned schedule.

Forestry Corporation's obligations are also monitored by third parties, including the NSW Auditor General (financial), the Environment Protection Authority (environmental) and the Department of Primary Industries' (DPI) Plantation Assessment Unit (plantation management) and Responsible Wood (AS 4708).

2.1.5 Management review

Management review is the process of regularly reviewing whether the FMS is performing as planned. Periodic reviews of incidents, hazards and complaints are carried out at various levels of the organisation to ensure adequate corrective action plans are implemented as planned and deliver the intended result. The process of reviewing corrective actions is overseen by the FMS Implementation Committee and the Compliance Assessment Team.

The underlying aim of the FMS is continual improvement. , The suitability, adequacy and effectiveness of the FMS is assessed on an ongoing basis to reflect new legislation, risks, compliance, review of projects and strategies – refer to Figure 1-1.

2.1.6 Independent forest management certification

Softwood plantations and hardwood forests are both independently certified to the Australian Standard for Sustainable Forest Management (AS4708:2013[6]). This certification provides objective assurance to our customers and stakeholders that we are sustainable and effective forest managers.

Certification to the Australian Standard for Sustainable Forest Management also allows end users to identify certified wood at the time of purchase, providing customers with a guarantee that the wood they are buying has been grown and harvested legally from sustainably managed forests.

2.1.7 Records, information and data management

Documentation and records management is an important component of Forestry Corporation's FMS. Documentation and record keeping requirements are prescribed by the FMS and through Forestry Corporation's records policy and procedures.

Forestry Corporation will maintain appropriate documentation and records to:

- manage risk
- demonstrate how legal and policy requirements are being met
- ensure we operate an efficient and effective business
- facilitate review and continuous improvement.

Data collection

Spatial data and systems underpin Forestry Corporation's activities. Data comes from both internal and external sources, and is used to collect, process, store, analyse and report forest information required for planning. Forestry Corporation GIS libraries contain a suite of information on cadastre, mapping context, topography, the environment, forest disturbances and forest management and we have compliance obligations to provide data to other parties. Other databases linked to the GIS, and which can be represented spatially, include timber inventory, flora and fauna surveys and species location, Aboriginal cultural heritage sites and non-Aboriginal cultural heritage items.

[6] Note that certification at the time of publication relates to AS4708-2013. Forestry Corporation is currently being assessed against the new standard (AS47018:2021).

Forestry Corporation assesses existing data when planning forestry activities to identify whether further information needs to be collected to assess site-specific impacts of the proposed activity and develop any amelioration measures. Mobile mapping is an essential tool for field-based work and include the ability to plan, monitor and report. A key element is the ability to work offline and to do complex spatial calculations in the field.

Forestry Corporation uses existing data alongside additional surveys to gather information or data, for example to inform inventory estimates, delineate boundaries or identify and protect relevant forest features including flora and fauna, cultural heritage, aquatic habitat, soil and water. Spatial data may also be used to monitor compliance, for example data may be collected on movements of machinery or haulage vehicles. Relevant additional data collected is regularly incorporated into Forestry Corporation's databases to ensure strategic and operational planning are based on the most up-to-date information.

2.2 Operations

Forestry Corporation runs a commercial business supplying timber to sawmills and processors throughout NSW and beyond. As a land manager, Forestry Corporation is responsible for around two million hectares of forests. Key activities undertaken by our business include:

- timber harvesting
- growing seedlings for plantations
- native forest regeneration
- plantation establishment and tending
- weed and pest control
- facilitation of recreation
- fire management, including firefighting and prescribed use of fire
- road maintenance and construction
- research and development
- community partnerships and education
- facilitation of primary production and commercial events and activities.

State forests support a range of commercial enterprises including those involved in harvesting and processing wood and other forest products and materials as well as enterprises using State forests for grazing, apiary, quarrying or mining, tourism, special events and hosting infrastructure such as telecommunications towers. In line with its objectives to run a successful business and maximise the value of the State's investment, Forestry Corporation seeks fair market value for the goods and services it provides in support of these commercial enterprises.

These activities are undertaken with specific controls that aim to minimise the risks. This is discussed in more detail in Part 2 (softwood plantations) and Part 3 (coastal hardwood forests).

2.3 Sustainable timber production

Forestry Corporation is committed to providing a sustainable timber supply from the State forests of NSW. This is supported by the National Forest Policy Statement (refer to Section 1.1.2) which identifies ecologically sustainable wood production and the development of an internationally competitive wood products industry as broad national goals for native forests in Australia, and commits the signatories to actively managing the public plantation resource in order to maximise

net returns[7]. In line with these commitments, Forestry Corporation aims to produce high value products efficiently within the framework of ESFM.

To meet this commitment, Forestry Corporation:

- contributes to NSW's landscape-scale comprehensive, adequate and representative (CAR) reserve network of dedicated reserves, informal reserves, and areas that are excluded from harvesting to protect environmental values (see *Our environment*)
- applies a system of adaptive management in planning, implementing and monitoring forest operations to protect rare or threatened flora and fauna and their habitats, along with soils and water (see below and *Our environment*)
- maintains the plantation estate by ensuring timely re-establishment
- periodically reviews timber availability and supply commitments based on performance monitoring and improvement of yield models.

Parts 2 and 3 address how each of the operating divisions manage forest productivity in more detail.

2.4 Research and development

Information derived from research and development drives adaptive management and continuous improvement, which is fundamental to ESFM.

Forestry Corporation invests in and supports a wide range of research and development to improve commercial and environmental outcomes. Research priorities are documented in the Annual Report each year and range from optimisation of harvesting and haulage operations to enhancing plantations, improving technology and processes, and improving understanding of native species habitat use, trend monitoring and detection.

NSW DPI Forest Science group provides technical advice and research and development services to Forestry Corporation under a Service Level Agreement (SLA). This group has scientific and technical expertise in forest ecology and sustainability, forest health and biosecurity, remote sensing technologies, carbon in forests and wood products and bioenergy, and biometrics and forest modelling.

Forestry Corporation also contributes to research through Australian Forest Products Association, Forest and Wood Products Australia, the National Sirex Coordinating Committee and the Radiata Pine Breeding Company and a range of other local research partnerships. .

Forestry Corporation also invests in applied research, with advancements in spatial technology underpinning and driving continual improvement in forest and fire planning and management activities. Forestry Corporation is one of the largest operators of drones in Australia and has facilitated pilot accreditation for large numbers of staff to operate a fleet of drones for mapping, monitoring and fire-related activities.

[7] National Forest Policy Statement, page 26

Following the fires of 2019-20, Forestry Corporation has also been investigating the use of satellite and camera-based detection and notification systems to improve the response to fires impacting the forest estate. This work is being done in consultation with other fire management agencies.

2.5 Fire management and emergency response

Forestry Corporation has obligations as a land manager and as a manager of staff and contractors to ensure effective emergency response procedures. Accordingly, procedures are in place to ensure Forestry Corporation can respond to:

- wildfire
- a pollution incident
- biosecurity incidents
- other public safety risks.

Forestry Corporation's Fire Management Plan includes a description of the objectives, risk management approach, safety aspects, organisational structure and capability and approaches to fire prevention, planning and preparedness, response and recovery.

Damage from wildfire is one of the most significant and recurring threats to the viability of the State forest estate. Forestry Corporation is committed to protecting human life, property, biodiversity and cultural values from fire and, as one of the four fire authorities in NSW, Forestry Corporation has legal fire management obligations under the *Rural Fires Act 1997* and is a member of the NSW Bush Fire Coordinating Committee and regional Bush Fire Management Committees. We work collaboratively with other fire agencies to:

- develop bushfire risk management and operations plans and implement programs for bushfire prevention, mitigation, preparedness, response and recovery
- respond to bushfires to protect life and property and to minimise adverse impacts on social, economic and environmental values.

Plantations represent a significant investment in resources. Radiata pine is not tolerant to fire and, while Southern pine and eucalypt species are less susceptible to low intensity fire, tree health can be compromised and value of the stands can be significantly downgraded. To protect plantations and native forests, Forestry Corporation will:

- use fire under appropriate conditions as a risk reduction strategy and to promote ecosystem health, diversity and resilience in native forests
- use grazing to reduce fuel loads within the plantation estate
- maintain appropriate levels of fire management capability to effectively discharge our responsibilities as a statutory fire authority
- construct and maintains fire trails and strategic breaks throughout the forest estate
- engage with Aboriginal communities to implement cultural burning programs where appropriate
- develop fuel management plans and fire suppression plans, consistent with the coordinated NSW Bush Fire Risk Management Plan
- develop regional fuel management plans that include a comparative assessment of the potential environmental impact of wildfire with and without fuel management burning

- produce fuel reduction plans and submit them to each Bushfire Management Committee showing areas intended for fuel reduction burning in the ensuing year
- provide details of each proposed burn, and the actual areas treated into the Rural Fire Service (RFS)'s fire management systems (BRIMS)
- develop a corporate fire management strategy to guide fire management planning, implementation and cooperation with other agencies wherever Forestry Corporation manages land
- prepare site-specific operational plans for each fuel reduction burning operation that specify measures to be taken to minimise adverse impacts on the environment, reduce the risk of fire escape, and monitor the impacts on the environment
- report on fire prevention and suppression performance annually.

In doing so, Forestry Corporation will:

- make the safety of the public and our staff and contractors the highest priority (including appropriate training – refer to Section 5.2)
- use ecologically sustainable fire regimes
- protect cultural and heritage values
- be sensitive to the needs of local communities.

Further details regarding Forestry Corporation's approach to fire management is available on the website.

2.6 Commercial management

As a State-Owned Corporation, Forestry Corporation is charged with managing State forests commercially.

Financial expectations are set out in the Statement of Corporate Intent, set by the shareholder Ministers and published on our website. Financial performance is reported in our Annual Report, which is independently audited and is provided to our shareholders for tabling in the NSW Parliament and published on our website.

Wood supply sales account for most of the revenue from commercial activities on State forests. The major wood products sourced from State forests include high quality sawlogs, poles, piles and girders, veneer logs, low quality sawlogs and pulpwood. Timber production by category is reported annually in the Sustainability Report.

Commercial operators also source non-timber products including hard rock, sand, gravel, firewood and charcoal. Fees are also collected for areas of State forest that are used under permit for apiary, grazing, commercial tourism ventures, events and infrastructure placement including mines.

Valuation

As a registered Australian company, Forestry Corporation has an obligation to report the value of its assets according to the relevant accounting standards. Forestry Corporation uses a discounted cash flow methodology, primarily based on timber yields modelled in perpetuity. Cashflows are informed by our strategic planning process and reviewed by the NSW Auditor General's office. The biological assets (i.e. plantations) are valued each year in accordance with established

accounting standards. The softwood plantation estate valuation is undertaken externally by experienced forest consultants.

Refer to Forestry Corporation's Annual Report for further details.

3. Our environment

Forestry Corporation is committed to maintaining and enhancing ecosystems and environmental values in the forests it manages wherever possible.

The principles of sustainable forest management entail the maintenance of ecological processes, biodiversity and protection of water quality. Forestry Corporation recognises that healthy forest ecosystems are the basis for promoting and maintaining biodiversity and productivity and for providing a wide range of possible community uses, products and benefits.

3.1 Forest biodiversity

Forests are dynamic, rather than static, systems with biodiversity constantly changing as the forest responds to natural forces such as storms and fire. All forests are in varying states of succession towards an advanced age growth stage.

The *Biodiversity Conservation Act 2016* aims to 'maintain a healthy, productive and resilient environment for the greatest wellbeing of the community, now and into the future, consistent with the principles of ecologically sustainable development'. This includes:

- conserving biodiversity at bioregional and state scales
- maintaining the diversity and quality of ecosystems and enhancing their capacity to adapt to change and provide for the needs of future generations.

State forests provide habitats to a range of protected fauna, including birds, frogs, arboreal mammals, critical weight range ground-dwelling fauna, wallabies and koalas. Biodiversity is managed in State forests through staff education and training, identification and protection of important habitat features in line with legislation and regulations, targeted species monitoring, species-specific research, pest animal and weed control and broader trend monitoring.

Biodiversity generates significant indirect values in terms of the supporting services provided through natural ecosystem processes. The forest estate, including areas managed for conservation and productive areas, contains a diverse range of ecosystems and habitats for native species. Commercial operations are limited in the majority of the State forest estate through some level of legislated protection. In addition, major focus is given to the protection of all biodiversity, including threatened species, in forestry operations and planning. Biodiversity measures are embedded in various legislation, regulations and standard operating procedures and include flora and fauna surveys, protection of threatened ecological communities, protection of habitat including hollow bearing trees, and a range of monitoring programs to provide information on health, fauna species occupancy, and changes of ecosystems and habitats.

Forestry Corporation protects biodiversity values at multiple scales across the landscape including by addressing specific issues that directly impact on biodiversity and maintaining a network of reserves and multi-aged forests accounting for the wide range of habitat needs of species inhabiting the forests.

While Forestry Corporation manages the softwood plantation estate primarily for wood production, there are often important opportunities for biodiversity conservation within plantations[8] . Research has shown that, in tableland areas, plantations have greater diversity than the cleared lands they have replaced[9]. While most early plantations were developed on timbered Crown land, from 1966 to 1977, large areas of cleared and semi-cleared agricultural land were acquired and planted to enable NSW to meet commitments under the Commonwealth Softwood Agreement. Since then, planting has only occurred on substantially cleared agricultural land or former plantation sites.

Forestry Corporation notes the value of retained native vegetation within plantations and manages these areas in accordance with the FMZ system (see Section 3.2).

The NSW Biodiversity Strategy identifies the Comprehensive Regional Assessment (CRA) program that was completed in the Regional Forest Agreement and resulted in the establishment of a network of Comprehensive, Adequate and Representative (CAR) reserves across the landscape as one of the key initiatives undertaken in NSW to protect core areas of biodiversity. It also identifies ecologically sustainable forest management, which includes species recovery planning and pest management programs, as a means of protecting biodiversity on all forested tenures.

Forestry Corporation:

- contributes to the management of biodiversity across the forested landscape[1]
- uses adaptive management principles and actions within State forests to complement the management of the CAR reserve system.

The Forest Management Zoning (FMZ) system (further described in Section 3.2), Forestry Corporation's standard operating procedures (SOPs), and the regulatory framework, ensure that biodiversity is protected during forestry operations within State forests. Additionally Forestry Corporation:

- implements biodiversity monitoring across the State forest estate in line with regulatory requirements under the CIFOA[2] and the Softwood Plantations Division (SPD) Biodiversity Monitoring Manual
- manages dedicated and informal reserves using approved plans
- manages special prescription areas through the provisions of the FMZ system and the CIFOA
- uses the results of best practice ecological survey techniques in identifying flora, fauna, fish and heritage values to inform and guide the development of operational plans as prescribed in the CIFOA
- develops plans and local annual programs for control of pest animals and weeds
- plans for fire fuel hazard reduction burning to be conducted in accordance within defined parameters so that burning activity minimises impacts in sensitive environments, reduces the risk of high intensity uncontrolled wildfire and enhances forest ecosystem values

[8] Plantation forests and biodiversity conservation, DB Lindenmayer, RJ Hobbs and D Salt, 2003, Australian Forestry, April 2013, p 61

[9] Borsboom et al. (2002) and Klomp and Grabham (2002)

- schedules operations to maintain a diverse range of forest structures, providing a full suite of potential habitats and niches for flora and fauna
- monitors and reports biodiversity conservation performance to Montreal criteria standard[10] and undertakes operational compliance monitoring
- trains and, where necessary, accredits planning and management staff to a standard necessary to achieve biodiversity conservation outcomes
- undertakes cooperative research to improve biodiversity conservation outcomes
- cooperates with other government agencies, neighbours and community organisations in the delivery of coordinated land management planning instruments that affect biodiversity values in forested landscapes.

3.1.1 Forest structure

Forest structure refers to the physical features of a forest that reflect its natural environment and management history. Largely determined by forest type, age and past disturbance such as harvesting and fire, forest structure is an important consideration when planning future management, including harvesting of forests. The structure of the forest is reflected by the proportion of trees of different age and size over a given area and can be used to interpret the overall health of an area.

Growth stage information is reported in the Australian Government State of the Forests report. NSW native forests are further described in Section 7.4.4.1.

3.1.2 Forest activities

It is recognised that forestry operations such as harvesting, thinning and hazard reduction burning can have temporary impacts on species diversity and abundance and on ecosystems at the time and place of disturbance. To ameliorate these impacts, forestry operations are wherever possible dispersed in space and time to create a mosaic of undisturbed and disturbed forest throughout the landscape. In addition, formal and informal reserves are interspersed throughout the landscape, providing biodiversity refuges and sites from which recruitment of new populations can occur. An average of 43 per cent of the coastal hardwood state forest areas are set aside as reserves (Slade and Law, 2016)[11].

Within disturbance areas, operational conditions are applied to reduce the level of impact on forest-dependent species and to maintain critical ecosystem components that further supplement the protection provided by the formal and informal reserve system. As forests regenerate and develop over time, a diverse range of forest ages and stages is beneficial to maintaining biodiversity throughout the landscape.

[10] See Criteria, Indicators, Targets and Monitoring Processes of Ecologically Sustainable Forest Management for the UNE and LNE RFA Regions.

[11] Slade, C & Law B. 2016. The other half of the coastal State Forest estate in New South Wales; the value of informal forest reserves for conservation. Australian Zoologist

3.2 Forest Management Zoning

Protection of certain landscape features, communities and habitat components is an important part of maintaining a balance between timber production and conservation outcomes. Through the National Forest Policy Statement (NFPS) the resulting comprehensive regional assessment (CRA) and comprehensive, adequate and representative (CAR) reserve system, substantial areas of NSW State forest have been set aside specifically for conservation. The CAR reserve system comprises dedicated reserves, informal reserves and values protected by prescription.

Forestry Corporation's landscape level system, known as Forest Management Zoning (FMZ), uses a spatial format to classify the forest in line with the nationally agreed reserve criteria[12]. The FMZ system differentiates between areas of State forest that are specifically set aside for conservation and areas that are available for other activities, including timber harvesting. Implementing the FMZ system ensures forest management contributes both to regional biodiversity and provision of a constant and sustainable supply of timber to the forest industry.

The FMZ outlines what activities are appropriate in each area depending on its classification, as summarised in the table below and further explained in the circular Managing Our Forests Sustainably - Forest Management Zoning in NSW State Forests available from the Forestry Corporation website.

Forestry Corporation is committed to maintaining biodiversity values through:

- Managing the forest estate in line with the FMZ management principles.
- Using the FMZ system to inform operational plans. Where areas zoned FMZ 1, 2 or 3A are identified, prescriptions are developed that to protect the special values of the area and are added to the site-based plan for implementation in the field. Operations are monitored to ensure compliance.
- Maintaining a GIS data layer that spatially records the locations of threatened and vulnerable species in and around the softwood plantations estate and accessing the data when planning an operation to determine where additional protection needs to be applied. The GIS layer is maintained using data provided by the Department of Planning and Environment and updated with information from NSW Scientific Committee and by the results of pre-harvest surveys carried out by Forestry Corporation's Hardwood Forest Division (HFD) on a regular basis.
- Managing dedicated and informal reserves using approved plans.
- Implementing a suite of operational controls, including due diligence, that is developed for each site and included in a site-based plan that is specific, adaptive and subject to monitoring and audit processes.
- Contributing to research and development programs that deliver improvements in conservation outcomes through better informed management.

[12] The Commonwealth, State and Territory Governments agreed to the development of National Forest Reserve Criteria, in accordance with the National Forest Policy Statement. The Joint ANZECC/MCFFA National Forest Policy Statement Implementation Sub-Committee (known as JANIS) produced a report outlining criteria setting out the components of the Comprehensive, Adequate and Representative (CAR) reserve system.

» Implementing relevant new information into operations as part of our adaptive management processes and commitment to continuous improvement.
» Recognising the potential impacts of forest operations on biodiversity priorities in Forestry Corporation's risk register.

Table 3-1: Forest Management Zoning management principles

Management intent	Management principles
Formal Reserves (Flora Reserves)[13] FMZ 1 – Special Protection	Dedicated reserve areas managed to maximise protection of very high natural and cultural conservation values.
Informal Reserves (Special Management Zones)[14] FMZ 2 – Special Management and FMZ 3A – Harvesting Exclusion	Informal reserve areas are managed to maximise protection of special conservation values.
Protected by prescription[15]FMZ2 – Special Management, FMZ 3A - Harvesting Exclusion and 3B - Special Prescription	Management for conservation of identified values and/or forest ecosystems and their natural processes, whilst also facilitating other management and production activities
General Management FMZ 4	Management native forests for timber production utilising the full range of silvicultural options as appropriate and for conservation of broad area habitat and environmental values that are not dependent on the structure of the forest
Hardwood Plantations FMZ 5	Management of hardwood plantations to maximise sustainable timber production on a continuing and cyclical basis.
Softwood Plantations FMZ 6	Management of softwood plantations to maximise sustainable timber production on a continuing and cyclical basis.
Non-Forestry Uses FMZ 7	Management of cleared (non-forest) areas such as those used for special developments
Further Assessment FMZ 8	An interim zoning of areas where field investigation was required to determine final FMZ classification

[13] Formal reserves are in the form of national parks, nature reserves, and, on State forest, flora reserves. These areas are equivalent to International Union of Conservation and Nature (IUCN) Protected Area categories I, II or IV and on State forest are classified as Forest Management Zone (FMZ) 1 – Special Protection.

[14] Informal reserves include Crown Reserves, State Recreation Areas and State Conservation Areas. On State forests they are FMZ 2 – Special Management areas that are greater than 40 hectares and have a minimum width of 200 metres or are adjacent to dedicated reserves. They also include special management zones where they have been created under Section 18 of the Forestry Act 2012. All are equivalent to IUCN Protected Area categories II, III, IV or VI.

[15] Protected by prescription comprise those elements of habitat that are protected by regional prescription as detailed in the IFOA. They also include FMZ 3A - Harvesting Exclusion, FMZ 3B - Special Prescription where harvesting will be modified and FMZ 2 - Special Management that have not been included in the informal reserve system because of size, configuration or location. Areas are equivalent to IUCN category IV.

Forestry Corporation will use the ESFM criteria and indicators identified in the CRA to monitor and report annually the:

» progressive change in State forest area
» extent and proportion of State forest area contributing to conservation of natural and cultural heritage in the CAR reserve system
» completion of operational and management plans, their implementation and relevance
» changes in management intent and any amendments to FMZs.

This information is published in our Sustainability Report.

3.3 Forest health

Forest health is related to the set of forest conditions which contribute to the resilience and persistence of biophysical processes which lead to sustainable ecological conditions, and forest productivity. There are a number of potential risks to forest health. These include weeds, pest animals (vertebrate and invertebrate), other pests and diseases, high intensity and frequent fire, weather factors such as drought, wind, frost, and damage to growing stock while harvesting including poor silvicultural techniques.

The most significant risks are further discussed below;

3.3.1 Weed management

Weeds can impact:

» biodiversity in native forests, as they may prevent germination and regeneration of native forest canopy forming species, interrupt the lifecycle of plants, threaten habitat and threaten forest values at recreation and cultural heritage sites
» productivity and management of plantations, as they may slow growth rates, hinder access to roads and impede access for fire fighting
» neighbouring properties, as they may result in economic and social impacts.

Under the *Biosecurity Act 2015*, land managers have a general obligation to be aware of their surroundings and take action to prevent the introduction and spread of pests, diseases, weeds and contaminants. Local Land Services (LLS) have coordinated the development of Regional Strategic Weed Management Plans. These plans outline how government agencies, including Forestry Corporation, community groups and individual landholders will:

» share responsibility and work together to prevent, eradicate, contain and manage the impacts of weeds
» establish strategies and actions to achieve goals
» guide resource allocation and investment across the state and provide a consistent basis for regional planning and delivery.

Forestry Corporation works in line with these collaborative plans towards effective weed management and positive outcomes for forest health and biodiversity. to the scale of certain invasive weeds such as blackberry in some areas is significant, requiring further research, ongoing assessment and a coordinated approach with other land management agencies.

In managing weeds Forestry Corporation aims to:

- prioritise its resources to those species and areas where the benefits of control are likely to be greatest, particularly on boundaries with private property
- respond to stakeholder concerns regarding weed treatment
- manage weeds under weed management plans, which identify the major or priority weed species in each area, their distribution and establish the criteria for prioritising control programs
- use integrated weed management techniques, including biological controls where ecologically and economically appropriate
- develop an annual weed control program around known weed infestations, infestations associated with forest neighbours and cooperative programs
- ensure staff have the relevant training when storing, transporting, handling and using agricultural chemicals
- monitor the amount of herbicide used each year
- contribute towards, and participate in, research into alternative practices such as biological control methods.

Data on weed control is reported annually in Forestry Corporation's Sustainability Report.

Refer to Sections 6.4.3 and 7.4.2 for more details regarding the management of weeds within each operating division.

3.3.2 Pest animal management

Pest animals can impact on biodiversity, the economic values of the forest, particularly in a plantation, and forest neighbours. Cats, foxes, wild dogs, rabbits, deer, goats and pigs have been identified as pest species that may be found within the forest estate.

Most pests are highly mobile, and actions to control them need to be planned and coordinated across a broad area, as individual control programs are unlikely to have a lasting effect. Forestry Corporation works with LLS, local government, other agencies and stakeholders to develop regional strategies to manage pest animals across the landscape. To mitigate the impact of pest animals, Forestry Corporation:

- implements pest animal management plans that identify species of concern, their distribution, priorities for control programs and methods to be used to control them
- undertakes control work in line with the NSW Vertebrate Pesticide Manual, which outlines the legislative, administrative and poisons and fumigants policy requirements for pest animal management as prescribed in the Pesticide Control Orders gazetted under the *Pesticides Act 1999*
- develops an annual program of work based on information from the requirements of the Regional Strategic Pest Animal Management Plan, previous programs, land holders, current information from LLS and other agencies and implements the work program applying the procedures in the pest animal management plan
- monitors activity around bait stations, baits taken and reports of predation on livestock.

Data on pest animal control is published annually in Forestry Corporation's Sustainability Report.

3.3.3 Other pests and diseases

Pests and diseases can damage trees in all stages of development and affect the ability of both natural forests and plantations to regenerate and grow. These are discussed below in more detail for softwood plantations (Section 6.4.4) and coastal hardwood forests (Section 6.4.4).

Monitoring data is reported annually in Forestry Corporation's Sustainability Report.

3.3.4 Fire

High intensity fire generally will have significant impact on the health and productivity of forests - refer to section 2.5 for details about management of wildfire. However, research has shown that intentional, frequent, low-intensity fire regimes result in a spatial and temporal mosaic of burnt and unburnt areas and that many fire sensitive plants are protected by their position in the landscape. In most situations, frequent, low-intensity fires can be used to mitigate eucalypt decline. This informs Forestry Corporations fire management approach.

3.3.5 Damage to growing stock while harvesting

Trees that are retained for crop management, silvicultural and habitat purposes during timber harvesting operations within plantations and native forests are susceptible to damage from the harvesting of adjacent trees and machine movements. Forestry Corporation reduces the risk of this through machine operator training and ongoing monitoring.

3.4 Waste and recycling

Forestry Corporation's Forest Management Policy includes commitments to minimising the generation of waste. A Resource Consumption and Waste Management Procedure provides guidance on how to implement this policy commitment.

3.5 Soil and water

Soil and water resources are an integral part of the forest landscape. State forest areas form vital water catchments and forests play an important role in providing clean water and regulating water flow. Maintaining adequate vegetation cover is important in increasing water infiltration, reducing overland flow, flooding and potential for soil loss. This is discussed in more detail for softwood plantations in Section 6.4.5 and hardwood forests in Section 7.4.5.

3.6 Use of pesticides

Chemical use is required for a broad range of activities from weed control, to pest and disease control, fire suppression, as fuel and in the form of fertilisers. Forestry Corporation is committed to using pesticides only where appropriate, and with care for the maintenance and protection of water quality, biodiversity, soil values and neighbouring land uses. Forestry Corporation aims to minimise the use of chemicals while meeting our legal obligations to manage pests and weeds.

Forestry Corporation's use of chemicals is detailed in its Manual for the Use of Chemicals. The use of chemicals is identified in the Forestry Corporation risk register and the following broad strategies are employed to minimise the risk associated with chemical use:

- consideration of alternatives (including eliminating and substituting products)
- understanding the products used
- application in accordance with manufacturer's recommendations or the off-label permit conditions
- maintaining equipment
- consideration of where and when to apply them.

Operational plans specify the requirements associated with chemical application, including any requirements to consult with or advise neighbouring landholders prior to chemical application. Forestry Corporation implements the requirements of our Pesticide Use Notification Plan, which describes how we provide the public with notice about our pesticide use in outdoor public places. Operational plans specify the requirements associated with chemical application, including identification of any sensitive areas.

All those who handle and use pesticides must hold current accreditation in pesticide application and specific training requirements are identified for supervisors involved in aerial application of pesticides. Water sampling may be undertaken after using herbicides to ensure they are not found in waterways. The decision to undertake sampling is based on risk to the environment, compliance and stakeholders and considers the type of herbicide, ground conditions and application method.

Further specific measures for softwood plantations are detailed in Section 6.4.4 and measures for hardwood forests are detailed in Section 7.4.2.

3.7 Road and infrastructure network

State forests contain an extensive road network that has been constructed progressively since the early twentieth century and maintained and upgraded as required. Forestry Corporation will maintain the road network to:

- minimise the risk of water pollution
- ensure harvested wood can reach the mill in a cost effective and reliable manner to meet customer commitments
- maintain adequate access for fire protection and management
- facilitate public access where suitable for recreation and tourism as a community service.

In managing its road network Forestry Corporation:

- meets its regulatory requirements
- has due regard to the needs of harvesting traffic, public safety, state of repair and potential for environmental harm.

The following broad strategies are used to minimise the risks associated with road building and maintenance:

- identifying future network requirements and any major new construction of roads that may be necessary through the tactical and strategic planning processes and incorporating these into annual schedules of work
- identifying infrastructure repair needs in response to infrastructure degradation and/ or major climatic events such as floods or wildfires

» providing and maintaining a road network to assist with fire suppression and management
» ensuring the workforce is trained, competent and accredited where required
» investigating and implement innovative uses of materials to improve environmental outcomes and cost effectiveness
» developing, implementing and monitoring conformance with operational plans for road works.
» strategically preparing for and responding to major environmental impacts, natural disasters or emergencies.

3.8 Climate change

Forestry Corporation recognises the important role forests play in the carbon cycle. Carbon dioxide is absorbed by growing trees through photosynthesis. This carbon is stored in the tree for the life of the timber, even after it has been harvested and processed into a timber product.

The benefit to the environment of turning forest timber into products is that if trees are left to decompose in the forest, the carbon is returned to the atmosphere. In addition, the younger trees that become established in their place absorb carbon faster since they grow faster than older trees.

In addition to measures to monitor carbon balance and reduce emissions detailed below, Forestry Corporation is finalising its Climate Change Strategy, and is part of an Inter-Agency Steering Group (IASG) established by the Minister for the Environment to provide oversight for the Assessing NSW Government Agencies Preparedness for Climate Risks project.

This includes shaping and endorsing an appropriate process to assess current actions by NSW Government agencies to identify and manage climate change risk to agency assets, agency infrastructure and agency service provision.

3.8.1 Contribution to carbon cycles

In the sustainable management of forests for timber and other products, Forestry Corporation will maintain the carbon cycle and contribute to Australia's net emission reduction program by:

» enabling captured carbon to be stored long term in harvested timber products
» providing for further net atmospheric carbon capture in the growth of vegetation following timber harvesting and the establishment of new plantations
» reducing the potential for large intense wildfires, which generate greenhouse gases (see section 2.5)
» maintaining or improving the productive capacity of the native and plantation forest estate, as the level of carbon sequestration is proportional to the vigour of the trees
» seeking opportunities for the potential use of for harvesting waste and residues in line with environmental regulations.

Forestry Corporation actively calculates and reports annually on the carbon balance of its activities and carbon that is sequestered and stored in the forest estate and timber harvested. This data is published in our Sustainability Report.

3.8.2 Reducing emissions

Forestry Corporation aims to reduce carbon emissions by increasing the efficiency of its operations. Forestry Corporation actively works to reduce the amount of carbon emitted by heavy plant, vehicles and burning, by using the most efficient operational practices available. Forestry Corporation minimises its use of fossil fuels by:

» ensuring competitive tender processes are used to find the most efficient means of timber extraction
» using scheduling optimisers to minimise distances between harvest areas and customers.

The use of vehicles for the transport of staff and equipment is managed to minimise the use of fuel. Vehicle numbers and efficiency are both factors that are considered in the management of the light vehicle fleet. Forestry Corporation supports the NSW Government's Net Zero Plan: 2020-2030, which seeks to improve the environmental performance of the government vehicle fleet by encouraging use of smaller, more fuel efficient vehicles.

4. Our community

With State forests spread across NSW, Forestry Corporation is part of the NSW community. The estate shares boundaries with neighbours and communities, includes thousands of kilometres of public roads and attracts visitors undertaking an array of recreational pursuits. Forestry Corporation's objectives include having regard to the interest of the community in which it operates and contributing towards regional development and decentralisation.

4.1 Neighbour and stakeholder relations

Forestry Corporation's stakeholders include, but are not limited to, neighbours, local communities, customers, contractors, forest users, regulators, government agencies, industry and employee groups, Aboriginal groups and communities and non-government organisations.

Forestry Corporation acknowledges the positive contribution that stakeholders make to forest management and is committed to facilitating and encouraging meaningful engagement of stakeholders by providing opportunities for stakeholders to make their views known and by considering and incorporating these views into planning processes.

Forestry Corporation will consider all stakeholder feedback received in the development of this FMP.

Stakeholder engagement guidelines

Forestry Corporation recognises that a wide range of diverse stakeholders are interested in or affected by our land management activities and our operations.

Forestry Corporation is committed to meaningful stakeholder engagement in line with our Stakeholder Engagement Policy and our certification to the Australian Standard for Sustainable Forest Management, Responsible Wood (AS 4708:2013).

In engaging with stakeholders we seek to share information, listen to and understand a range of perspectives, build relationships and collaborate for better outcomes, while balancing our responsibilities and obligations under the *Forestry Act 2012*.

We have developed guidelines to assist both our stakeholders and our staff to foster meaningful engagement and positive collaboration by detailing our engagement processes as well as our forest management responsibilities and obligations. These summarise our stakeholder engagement policy, principles, processes and complaints management procedures.

4.2 Customer focus

Forestry Corporation is committed to providing a long term stable and sustainable wood supply for industries and to enable other forest-based opportunities, particularly in the areas of tourism and recreation, to develop and prosper.

The timber industry plays an important role in many regional areas through direct employment in wood processing and in the support services such as equipment maintenance and supplies and Forestry Corporation is committed to active and responsive engagement with customers. The sustainable forest management principles outlined in this FMP will underpin the viability of long-term renewable wood supply and other forest-based commercial ventures.

4.3 Community services

Forestry Corporation provides a number of community services on behalf of the NSW Government. These are partially funded by an annual Community Service Obligation (CSO) grant received from the NSW Government and managed through a service level agreement between Forestry Corporation and the NSW DPI. The primary services funded by CSO include:

- road maintenance for community use
- community firefighting and prevention
- non-commercial forest management
- recreation and tourism
- government relations and non-commercial community engagement
- DPI research services.

Forestry Corporation supplements CSO funding via direct investment on community services across the estate.

4.4 Recreation, tourism and community access

State forests are available for free public use for a wide range of recreational pursuits including camping, bushwalking, mountain bike riding, horse riding, trail bike and four-wheel-driving, and competitive motorsport events. Recreation areas include camping and picnic areas, lookouts and walking tracks as well as roads, fire trails and mountain bike tracks.

Management of recreation and tourism activities is guided by:

- the Recreation and Tourism Policy, which sets the broad objectives of providing the public with access to forests for recreation and tourism
- the Recreation and Tourism Forest Permits Toolkit, which establishes the framework for assessing and managing commercial, non-commercial and community-based activities on State forests
- inclusion in state, regional and local Destination Management Plans.

Forest permits are used to facilitate formal recreation and tourism activities in State forests, such as recreational events and tourism infrastructure. Permits may be for an activity for a specified period of time, or for occupation of land over a longer period. Forest Permits are issued to both not-for-profit groups and commercial entities, and can be issued for a single day, multiple days or longer periods of time.

Examples of activities undertaken under Forest Permit include mountain bike races, car rallies, large youth camps and weddings. Examples of land occupied under Forest Permit include commercial recreation-based businesses such as treetop adventure parks or paintball facilities, and non-commercial operations such as archery clubs, pony clubs and recreational shooting facilities.

Public safety

State forests contain many unseen and unpredictable hazards that cannot be removed or controlled, such as overhead hazards from tree limbs and uneven slippery surfaces. These may be exacerbated during periods of extreme weather, such as fire, flood, wind and rain. .

While there is little control over naturally occurring risks, the safety of all people who may be impacted by Forestry Corporation's operations, including members of the public, is paramount. Management of safety around operations is underpinned by the incident investigation and corrective action process (refer to Section 5.1).

Areas in which forest operations, such as timber harvesting or aerial herbicide application, are underway are clearly signposted to ensure members of the public are aware of the risks and informed on what they should and should not do. Contractors and Forestry Corporation staff have clear procedures to enable communication to monitor entry.

Forestry Corporation imposes speed limits and monitors load restrictions on log trucks and uses signage on forest roads to indicate areas where log truck traffic may be high. Forestry Corporation routinely undertakes consultation with local communities as part of the planning process where log truck traffic is expected to increase or be of concern and a dedicated phone number is also advertised on the back of haulage trucks in some areas of the state to encourage members of the public to report poor or exemplary driver behaviour or hazards. Calls are followed up with the haulage contractor and caller to identify appropriate corrective action where applicable.

Recreational hunting is permitted in some State forests. Hunting on State forests is regulated and licensed by NSW Department of Primary Industries - Hunting. To keep our staff, contractors and visitors safe, Forestry Corporation has completed a risk assessment of hunting on State forests, which is available on our website. This risk assessment is reviewed every year.

4.5 Other commercial activities

Forest permits are also used to facilitate a range of other commercial activities. These are described below.

4.5.1 Grazing

Grazing on State forests is managed through the issue of Forest Permits and is limited to certain Forest Management Zones (FMZs) as detailed in the circular Managing Our Forests Sustainably - Forest Management Zoning in NSW State Forests available on the Forestry Corporation website. Access to State forests for grazing is an opportunity for local communities and assists with fuel load reduction. Grazing of domestic stock is limited to areas with a grassy understorey and reliable water source and may be restricted at times due to operational considerations.

In plantations, areas are generally not available for grazing until the trees are approximately three years of age, which is when they are large enough to withstand grazing pressure and physical damage from rubbing.

Grazing must comply with the requirements of the *Local Land Services Act 2013*, particularly in relation to stock identification and management of notifiable diseases. Permits and leases are also subject to local government and Local Land Services rates and levies. In addition, under the

Plantations and Reafforestation Code, retained areas of native vegetation within the authorised plantation area must be managed to conserve biodiversity and ecological integrity.

4.5.2 Apiary

Forestry Corporation issues beekeeping permits for State forests and Crown Timber land over areas of land known as ranges. This process is currently administered by DPI on behalf of all public land managers. Permits allow apiarists to set down hives in a defined area, unencumbered by other apiary sites. Permit areas are generally 1.5 square kilometres in size and usually located in native forest.

Permits are limited to certain Forest Management Zones (FMZs) as detailed in the circular Managing Our Forests Sustainably - Forest Management Zoning in NSW State Forests available on the Forestry Corporation website.

The number of apiculture sites made available is reported annually in the Sustainability Report on Forestry Corporation's website.

4.5.3 Forest materials and products

In addition to timber and wood products, a range of other forest products are available and extracted from the forest each year. These include, but are not limited to hard rock, sand, gravel, firewood and charcoal. Deposits of hard rock, sand and gravel resources are managed consistent with the provisions of the *Forestry Act 2012*, *Environmental Planning and Assessment Act 1979* and the *Mining Act 1992* and the *Petroleum (Onshore) Act 1991*. Forest Products and Forest Materials Licences can be issued to authorise the extraction of these resources. The NSW Government may issue mining or exploration licences for State forests. In these instances, Forestry Corporation is required to provide reasonable access for approved mining projects in much the same way as any other landholder, but is entitled to negotiate orderly access arrangements and compensation. This is managed through the Forest Permit process.

Permits are issued for firewood collection in suitable areas, which is generally those that have been recently harvested. Conditions apply to these permits to ensure the activity is consistent with sustainable forest management.

4.5.4 Renewable energy projects

Amendments to the Forestry Act 2012 passed in November 2021 allow the potential development of renewable energy infrastructure within State-owned exotic softwood plantations. Forestry Corporation will investigate whether feasible opportunities exist for renewable energy infrastructure to operate within State forests. In line with the legislation, a proposal will be considered if it:

- is within a pine plantation
- is limited to less than 0.7 per cent of the plantation estate
- offsets any land affected with replacement plantable land at a two for one scale, thereby increasing the area of public land dedicated to growing pine plantations
- maintains Forestry Corporation's ability to meet its timber supply commitments.

If suitable proposals are identified, they will undergo the normal state planning processes, which include detailed requirements for community consultation and environmental assessments.

4.6 Cultural values

4.6.1 Aboriginal cultural heritage

Forestry Corporation is committed to protecting and managing Aboriginal cultural heritage in cooperation with Aboriginal communities and in accordance with legislative requirements. Aboriginal cultural heritage includes physical and spiritual sites, places, objects, stories, oral histories, flora and fauna that are of significance to First Nations people because of their connection to country through traditions, lore, customs and beliefs, and documents relating to Aboriginal life before and after European contact.

Forestry Corporation's Aboriginal Partnerships team works with Aboriginal communities throughout NSW, to protect, nurture, and manage Aboriginal cultural heritage and significant sites and places whilst creating sustainable partnerships with the Aboriginal community.

Forestry Corporation acknowledges that First Nations people should determine the significance of their heritage and how to maintain and protect it.

Forestry Corporation manages cultural heritage values on State Forest under the provisions of the:

- *National Parks and Wildlife Act 1974*, which provides statutory protection for all Aboriginal objects and Aboriginal places
- Plantations and Reafforestation (Code) Regulation, which applies to authorised plantations
- Forestry Corporation's Operational Guidelines for Aboriginal Cultural Heritage Management (A Due Diligence Code of Practice).

The Operational Guidelines for Aboriginal Cultural Heritage Management (A Due Diligence Code of Practice), describes:

- the types of activities Forestry Corporation undertakes, and their potential impacts
- the types of Aboriginal cultural heritage items that may be found on State forest and should be considered during operations
- the cultural heritage assessment process
- the consultative framework Forestry Corporation uses
- operational guidelines, including staff training requirements
- data management requirements.

In addition, Forestry Corporation will:

- explore opportunities to work with Aboriginal people
- respect confidentiality about the location and details of Aboriginal sites and cultural knowledge shared by Aboriginal communities
- refer inquiries from third parties on cultural heritage or sites to local Aboriginal community representatives.

Information management

The Aboriginal Heritage Information Management System (AHIMS) is maintained by Heritage NSW. Forestry Corporation and Heritage NSW have a Memorandum of Understanding (MOU) for the supply of information relevant to State forests, which includes protocols for handling, distribution and use of the database information within the organisation.

Forestry Corporation is required under section 89A of the *National Parks and Wildlife Act 1974* to provide Heritage NSW with information about new Aboriginal heritage sites.

4.6.2 Aboriginal joint management options

4.6.2.1 Partnerships and MOUs

Forestry Corporation recognises the spiritual and cultural responsibilities and obligations of Traditional Owners to their traditional lands and sea countries along with the custodial responsibilities and obligations of local Aboriginal communities where forest estates are situated.

Forestry Corporations' Aboriginal Partnerships team works to conserve the qualities and attributes of places that have spiritual, cultural, or social value for past, present, and future generations and to support community responsibilities to these places within Forest. The team liaises with Traditional Owners, Native Title Claimants, Aboriginal Land Councils, Elders, and Aboriginal community members and organisations to gain understanding of their spiritual connection with the land, to ascertain evidence of past Aboriginal activities in the forest and to care for country, which includes conducting cultural burns.

Partnerships include permits for activities, land use, MOUs, joint management of Aboriginal Places and cultural areas, joint management initiatives with native title holders and permits for community enterprise development.

If an Indigenous Land Use Agreement (ILUA, see below) is not in place, other joint management arrangements may be entered into whereby Forestry Corporation and the local Aboriginal community may work together on a range of issues including protection of high significance sites, places and landscapes providing access to forests, and involving Aboriginal people in management decisions. These agreements may take the form of an MOU between Forestry Corporation and Aboriginal communities. Forestry Corporation has a number of MOUs in place, is committed to establishing and maintaining meaningful partnerships with Aboriginal communities and will pursue opportunities to establish MOUs in the future.

4.6.2.2 Native Title and Indigenous Land Use Agreements

Native Title is the legal recognition of the individual or communal rights and interests which Aboriginal people have in the land and water, where Aboriginal people have continued to exercise their rights and interests in accordance with traditional law and customs, since before the British asserted sovereignty over Australia.

Native Title rights and interests may be formally recognised under the *Native Title Act 1993*

over areas including vacant Crown land such as National Park, State Forest, Crown Reserves, some types of non-exclusive leases, land covered by permissive occupancy and licences, inland

waters and the sea. Areas where native title is excluded includes Crown leases, freehold land and land previously purchased as freehold land prior to dedication.

Equivalent benefit areas may be recognised within the determination boundary for the practice of Native Title rights and benefits over extinguished lands. For example, Forestry Corporation has included extinguished plantation and other areas for recognition of these benefits and for consultation in regard to management of cultural values. State Forests dedicated over Crown Leases are not included under Native Title or equivalent benefits.

Native title rights and interests, if recognised, must co-exist with any interest's other people have in the same land or water.

Native Title does not prevent native forest operations or plantation operations from being undertaken by Forestry Corporation in accordance with the law. However, Native Title holders have the right to be consulted regarding management activities which may affect Native Title rights or affect cultural heritage and values before these activities take place. These consultation regimes must be maintained to allow the co-existence of native title rights and forestry operations; and to ensure cultural heritage sites and values are protected in line with legislative requirements.

Indigenous Land Use Agreements (ILUA) are whole-of-government agreements with Aboriginal groups that have demonstrated credible evidence of Native Title and had a Native Title application determined by the Federal court. They are legally binding agreements about the management of public land in the area covered by the native title claim.

If the ILUA is registered on the Register of Indigenous Land Use Agreements, it binds all parties and all native title holders to the terms of the agreement.

ILUAs are negotiated by the NSW Government on behalf of agencies including Forestry Corporation. Forestry Corporation participates in negotiations in relation to joint management of State forests and the protection of cultural heritage and works with Aboriginal groups who have been determined to hold Native Title to help promote culture and reconciliation on State forests covered by their determination.

4.6.3 Non-Aboriginal cultural heritage

Non-Aboriginal heritage items and places are those with heritage significance that the community wants to keep for future generations and are subject to the provisions of the *Heritage Act 1977*. Forestry Corporation's Guidelines for Non-Aboriginal Cultural Heritage Management ensure that we:

- engage with relevant stakeholders in management of sites of community interest
- maintain records and spatial datasets of non-Aboriginal heritage items, including in the FMZ system, and consult them during planning processes
- apply appropriate site-specific prescriptions and protection when undertaking forest activities
- maintain the State Heritage Inventory database and link it to spatial representation in Forestry Corporation's Geographic Information System (GIS)
- ensure staff involved in non-Aboriginal heritage management are appropriately trained and competent
- develop management plans for sites where necessary under the *Heritage Act 1977*

- monitor adherence to guidelines and prescriptions during operational implementation
- cease operations in the area if a site is uncovered while the operation is in progress until appropriate assessment and protection measures can be determined
- use GIS to manage site-specific non-Aboriginal cultural heritage information.

5. Our people

Sustainability is a core principle underpinning our forest management and is built into every aspect of our operations, from environmental management to community partnerships, staff wellbeing and commercial management.

The Annual Report and Sustainability Report provide detailed reporting on our people every year.

5.1 Health and safety

Forestry Corporation's goal is to provide a safe place to work for staff and other people who are affected or impacted by our activities, in line with our health and safety policy. Forestry Corporation is committed to taking a proactive risk management approach to work activities in consultation with staff and complying with the *Work Health and Safety Act 2011*, Work Health and Safety Regulations 2017 and all other relevant statutory requirements to safeguard the health and safety of staff, contractors and the public in all our activities.

To help achieve these aims, Forestry Corporation maintains a Work Health and Safety Management System (WHSMS) that is aligned to ISO 45001:2018 Occupational health and safety management systems. The WHSMS contains elements relating to:

- policy
- planning
- implementation, including procedures relating to specific hazards, risk management, training and document control to assist staff in safely carrying out their roles
- measurement and evaluation, including procedures relating to incident reporting and auditing and measurable objectives and targets
- system review, including how we will assess and address safety system performance.

Forestry Corporation has a centralised system enabling reporting of hazards, near misses and incidents to ensure the risk associated with them is minimised and any improvements identified are incorporated into the system.

Public safety is discussed in Section 4.4.

Refer to the Annual Report and Sustainability Report for current targets and performance.

5.2 Setting and maintaining standards

Forestry Corporation is committed to ensuring staff and contractors working in the forest have the appropriate training, education or experience to comply with the regulations developed to minimise the impact of their work on the environment. We demonstrate industry best practice by focusing on regular up-skilling and re-assessment of core technical skills against units of national competence. Procedures are in place to regularly review staff competencies and each division prepares annual training plans to ensure competencies are maintained.

Forestry Corporation, and our forest industry partners, are committed to ensuring that all forest workers[16] hold a statement of attainment of approved nationally recognised units of competency when undertaking any task that involves operating heavy plant, chainsaws or driving log trucks.

All forest workers must hold a statement of attainment for units of competency[17] related to:

- following work health and safety policies and procedures
- following environmental care procedures
- following cultural heritage[18] requirements
- complying with soil and water protection.

In addition to these general requirements, they must also hold a statement of attainment for a unit of competency related to the hazardous activity they are conducting those listed in the Safe and Skilled Essential Training Standards as published by the Australian Forest Products Association (AFPA) and Australian Forest Contractors Association (AFCA) and updated from time to time.

In recognition of the specific requirements associated with fire management, a dedicated policy is in place to ensure fire training currency and competency. Contractors to Forestry Corporation are responsible for ensuring their staff are competent and appropriately skilled or qualified to carry out the work required. Forestry Corporation contributes to industry skills development by requiring contractors working on our operations to meet minimum competency standards and by actively participating in industry forums to share knowledge and encourage capacity building across the sector.

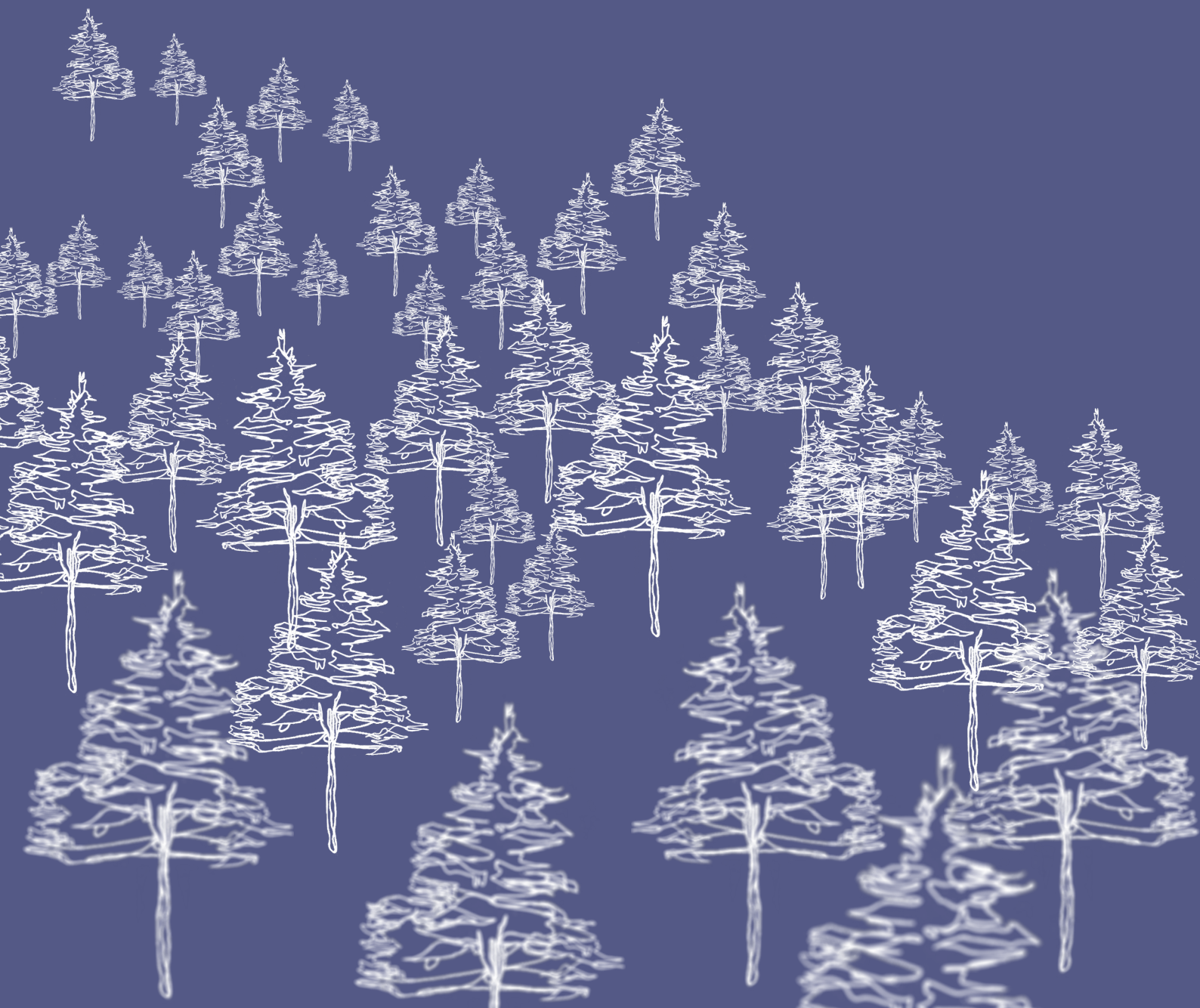
[16] In this context, forest workers means those undertaking operational tasks in the forest including harvesting and log transport

[17] These are contained in the skill set *FWPSS00018 - Skill set for a plantation forest operator*. See www.training.gov.au for current units of competency codes. Equivalent units of competency from nationally recognised training packages may include state-based industry standards.

[18] Note – training packages are reviewed and updated periodically, and at the time of publishing this unit is being revised to be finalised by the end of 2022

Part two

Softwood plantations



6. PART TWO –softwood plantations

6.1 Management structure

Management of Forestry Corporation's Softwoods Plantation Division (SPD) is broken down geographically into two regions and four management areas.

» Northern Softwoods Region – Bathurst, Walcha and Grafton Management Areas
» Snowy Region – Tumut (including plantations at Moss Vale and Tallaganda), and Bombala Management Areas.

6.2 Planning Framework

SPD undertakes long-term, medium-term and short-term planning to ensure that we maintain timber supply for future generations while meeting current contractual commitments. We also complete detailed site-specific and activity-specific planning to ensure each operation is carried out in an environmentally sustainable manner and consider the needs of forest users and the local community.

Long-term strategic planning uses models to predict the amount of timber available over a 70-year planning horizon, tactical planning looks at a five-year timeframe, and site-based operational planning considers operations within two years. Process maps identify the key activities undertaken in the planning of forestry activities. They are used as a means of ensuring that important aspects of the planning process, such as environmental compliance and consultation with stakeholders are completed.

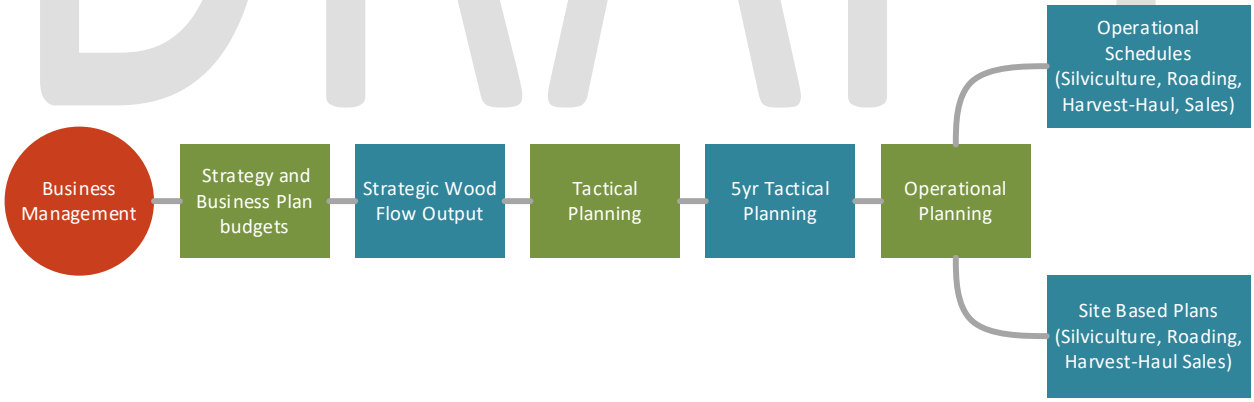


Figure 6-1 SPD planning process

6.2.1 Strategic planning

Forestry Corporation needs reliable estimates of the wood available to confidently deliver on long-term wood supply agreements, optimise the utilisation of the resource and identify other business opportunities. Robust predictions of when, where and how much timber can be harvested underpin efficient harvest planning.

In simple terms, sustainable timber supply or the sustainable yield, is the level of supply that can be maintained in perpetuity by providing a balance between the volume of timber harvested and the volume of timber produced through growth each year.

The aim of the strategic planning process is to determine a sustainable wood flow across the forest estate. Strategic planning has a 70-year planning horizon, which equates to approximately two plantation rotations. The following elements contribute to the modelling of forest timber yields:

- area and stand history records, which define the area, age and condition of the plantation areas
- inventory plots, which are sample plots across the estate where measurements of tree diameter, height and timber characteristics such as form and stem are recorded to provide a snapshot of the current volume standing in the forest and derive product estimates
- permanent growth plots, which are repeatedly measured on a regular basis to estimate tree growth rates and to support development of forest growth models
- computer-based modelling, which is generally done using specialist software developed for forest modelling
- calibration of predicted versus actual harvested yield through yield reconciliation.

6.2.2 Tactical planning

The tactical plan includes a schedule of harvesting units that have been identified as practically, economically and legally available and ready for harvesting within a five-year timeframe. The plan identifies areas where licensed contractors may harvest timber, under instruction by Forestry Corporation, to meet wood supply commitments to customers and informs roading and site establishment programs

Tactical plans are prepared at a regional level and are derived from the strategic plan. The tactical plan relies on accurate mapping of stocked and thinned area, and current yield information.

The volume of timber products harvested and area harvested are monitored against predicted yields. This, along with other data, provides feedback to predictive model components that assists in further refining and developing future timber yield estimates.

6.2.3 Operational planning

Operational planning looks forward two years and comprises:

- operational scheduling, which details the timeframe and order in which activities are completed, and the resources allocated to each operation
- site-based plans, which provide instructions to operators. These are written in accordance with the Plantations and Reafforestation (Code) Regulation and SPD's best practice requirements
- production (to roadside) and woodflow (haulage / distribution) plans, which set out short term log making and log delivery expectations on a weekly or monthly basis.

6.2.4 Annual schedules

In addition to the operational schedule, annual schedules may detail activities such as:

- Road construction and maintenance, which are determined in accordance with road and fire trail management plans. Roads required for harvesting are closely aligned with harvesting requirements, while other road works will be scheduled according to potential for environmental harm, safety and the requirements of forest users.

- Fuel management, which is managed in accordance with the Forestry Corporation Fire Management Plans. Individual plans are managed within the Rural Fire Service planning system (BRIMS) and available to the District Bush Fire Management Committee. The schedule is influenced by the need for asset protection within and near State forests, ecosystem management and the desire to reduce excessive fuel loads before or after harvesting.
- Plantation establishment, which considers fallow land, areas of previously established plantation that have failed and budget constraints.
- Pest and weed control, which is managed to implement the strategies in the Pest Animal Management Plan and Weed Management Plans, and address concerns of stakeholders.

A range of measures are applied to mitigate risks in operational planning, including:

- application of the Plantations and Reafforestation (Code) Regulation
- adherence to the Forest Practice Codes, which apply to plantation timber harvesting and road maintenance and construction
- use of operational plan templates that contain instructions designed to address key risks and guide the activity, while protecting natural and cultural environment values
- monitoring of operational compliance with plan conditions and completion of remedial works and recurrence prevention measures where non-compliance is found
- reporting and incorporation of results into subsequent planning and implementation processes in line with adaptive management principles are used in all forestry operations that underpin every part of the continuous improvement cycle
- capturing of any new risks identified in Forestry Corporation's risk register and developing and implementing control measures.

6.2.5 Site-based plans

Site-based plans are prepared for operational activities as required by the Plantations and Reafforestation (Code) Regulation , as well as those activities that pose a significant risk to the environment or safety. They contain site-specific instructions to protect natural and cultural values during the activity. A site-based plan contains a map as well as relevant safety information, including the location of emergency meeting points. Plans may be amended during operations where necessary to ensure values are protected.

The degree of site-based planning, supervision and monitoring undertaken depends on the nature and intensity of operations and the potential environmental impacts and safety risks.

During operations, new information may make it necessary to amend a site-based plan. Any decision to amend a plan is documented.

Implementing the site-based plan

Forestry Corporation staff oversee all operations undertaken by contractors. The level of supervision required is based on risk and elements such as the nature of the activity, the experience of the contractor and prevalent weather conditions. Prior to the commencement of activities, relevant staff and operators are briefed on the contents of the site-based plan to ensure that they share a common understanding of the plan's requirements.

Contractors, operators and Forestry Corporation supervisory staff are required to be trained and accredited to a recognised level of competence in the various tasks they undertake. Refer to Section 5.2.

6.3 Productive capacity of softwood plantations

6.3.1 Stand record system

Forestry Corporation maintains a stand record system, which is a spatially-linked record of all plantation areas, site treatments, harvesting and yield monitoring. It provides a snapshot of the current state of the forest and is the starting point for all modelling of future yield predictions.

6.3.2 Estate modelling

Forestry Corporation calculates the amount of timber available now and into the future using a predictive tool that allows us to evaluate multiple objectives and to explore management options to meet a number of different constraints. Among other things, modelling considers supply commitments, market and product demand, the estimated capacity of the forest, the ability of the forest to support harvesting operations during periods of wet weather and logistical issues.

Refer to Section 6.2.1 for further details.

Estate modelling allows Forestry Corporation to:

- optimise the value of the resource within supply commitment constraints over a timeframe of approximately 70 years
- optimise volume of the resource to meet commercial objectives
- identify opportunities for further sales and timber industry growth.

SPD implements plot measurement programs that span strategic through to operational (pre-harvest) inventory and also completes assessments for operational control and biometric analysis. For this to work, growth models and other forest information systems must be compatible and linked efficiently. This is done through geographic information systems (GIS), inventory databases, growth models and yield scheduling and optimising software.

Forestry Corporation:

- runs strategic models as required, usually annually
- reviews stratification of planted forest areas to assist future sampling and modelling
- refines harvestable area predictions
- measures inventory plots in accordance with the inventory framework
- maintains the permanent growth plot data system
- maintains yield tables and growth models with additional field data
- improves growth and mortality models
- monitors and incorporate progressive yield data between five yearly review periods.

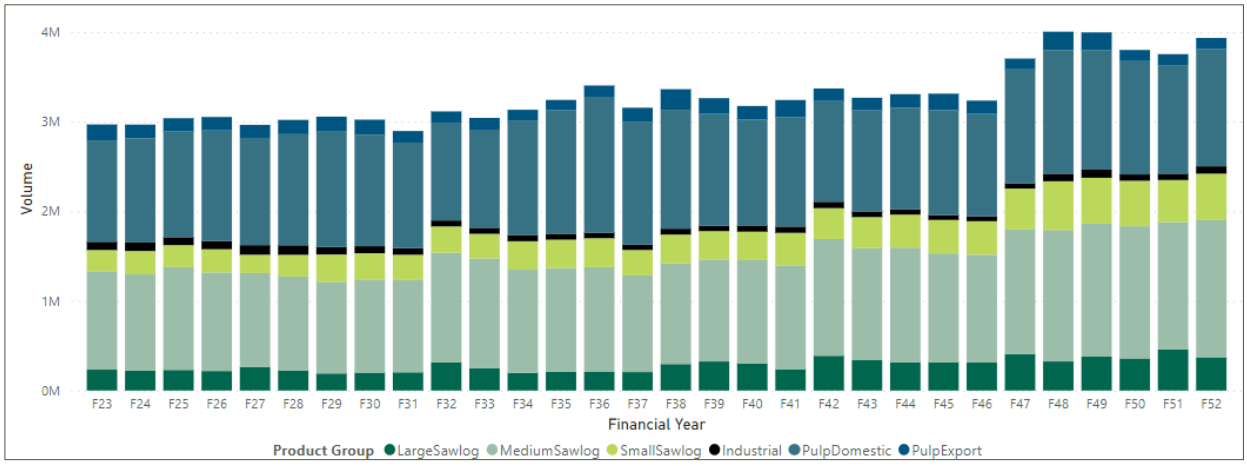


Figure 6-2: Long-term yield forecast from softwood plantations

6.3.3 Yield reconciliation

The predictive nature of estate modelling is balanced by real world checks, including ongoing review of whether silvicultural strategies met their objectives and comparison of predicted and actual harvest yields. Yield reconciliation is a process where we compare predicted product and volume outturn with what was actually harvested.

SPD runs a yield reconciliation every quarter. Where variation is identified, investigation is undertaken to identify what factors could be contributing to the variation. Consistent bias between predicted and actual will result in adjustments to long term yield projections.

6.4 Softwood estate and timber production

6.4.1 Biodiversity

In addition to the commitments detailed in part one of this FMP, SPD is committed to maintaining biodiversity values within softwood plantations through:

- Implementing the requirements of the *Plantations and Reafforestation Act 1999* and associated regulation. The regulation has controls in place for managing remnant vegetation and endangered species, protecting riparian areas, ensuring that plantations are only established on previously cleared land as well as ongoing controls over ongoing plantation activities.
- Completing tactical plans in spatial format to show the mosaic of age classes as well as the retained native vegetation. Doing this enables us to examine data on a landscape scale.
- Implementing silvicultural strategies outlined in the Planted Forests Silviculture Manual.

The softwood plantation estate covers a range of geographic areas. The Sustainability Report provides a summary of the total area managed by region and species/category. Maps showing area for each Management Area are available on our Open Data site, which can be accessed through the website under Sustainability - Certification or About – Maps and Spatial Data.

6.4.2 Species grown

SPD maintains a Plantation Silvicultural Manual that defines the silvicultural policy for the softwood plantation estate. The manual outlines species selection and site evaluation and describes species characteristics, specifications for cultivation, seedling quality, planting, nutrient management, weed control, pruning and management of stand density.

6.4.2.1 Genetics

Forestry Corporation produces most of the radiata pine planting stock required to restock harvested plantations at the Forestry Corporation nursery at Blowering (Tumut). A small proportion of the seedlings used are grown at our Grafton Nursery, while the remainder is purchased from nurseries elsewhere, including Victoria.

Most seed is purchased from New Zealand and is a product of the genetic improvement program managed by the Radiata Pine Breeding Company (RPBC), of which Forestry Corporation is a shareholder. Forestry Corporation also actively manages a seed orchard site, Australian Seed Orchards at Gelliondale, in conjunction with HVP Victoria, to mitigate the risks associated with reliance on overseas seed.

Seeds are selected for the characteristics of desirable growth rates, growth form and habit, pest and disease resistance and wood properties, with the aim of maximising wood quality and forest health.

SPD does not use genetically modified trees.

6.4.2.2 Radiata pine (*Pinus radiata*)

Since 1947, radiata pine (*Pinus radiata*) has been the most widely planted species in Forestry Corporation plantations, as it is suited to a considerable range of growing conditions, is easily raised and planted, and provides larger yields of usable timber in a shorter time than many native species.

Radiata pine is mostly grown in large plantations near Tumut, Bathurst and Bombala. Smaller plantations are grown on the Northern tablelands near Walcha. Generally, stands are established with between 1,000 to 1,350 stems per hectare. On steeper slopes, where no thinning operations are likely, stands are established with a lower stocking of around 800 to 900 stems per hectare.

The timber can be readily sawn, peeled, or converted to pulp to make newsprint or medium-density fibreboard, has good nail-holding power, works well, can be easily stained, and, when treated with preservatives, is suitable for long-life applications in the ground.

Traditionally, radiata pine plantations receive one or more thinnings prior to clearfall as a means of improving crop value. The decision to thin a particular area is, however, dependent on a number of variables such as sales opportunities, slope, drought exposure, initial stocking, tree health and customer product requirements.

6.4.2.3 Southern pine (*P. elliottii var. elliottii, P. taeda* and *P. Caribaea var. hondurensis*)

Southern pine is planted in the Grafton Management Area. The southern pine species planted in NSW have been a combination of *P. elliotti* and *P. taeda* with some *P. caribaea*. The hybrid

between *P. elliottii* var. *elliottii* (PEE) and *Pinus caribaea* var. *hondurensis* (PCH) has also been planted on a large scale. The hybrid combines the high growth rate of PCH with PEE's tolerance of poorly drained sites, wind-firmness, small branches and stem straightness.

Plantations of the hybrid have been successfully established in the coastal lowlands and into the northern escarpment, up to an elevation of around 760 metres, in both summer dominant and uniform rainfall areas. It is planted as container stock and shows a useful tolerance to mild fire once established. However, concerns have been raised by processors in relation to the wood properties of the faster degrowing hybrids, an issue that requires ongoing monitoring and management.

6.4.2.4 Hoop pine (*Araucaria cunninghamii*)

The Grafton Management Area also contains a small planting of hoop pine (*Araucaria cunninghamii*), which is native to the coastal rainforests from northern NSW to northern Queensland. This is the result of a planting program undertaken between 1938 and 1954. The old plantation stands have received up to five thinnings and are now being progressively clear-felled.

The timber is well regarded, however it often competes directly with the timber from exotic conifers such as southern and radiata pine, which can be grown much more economically.

6.4.3 Weed management

Total eradication of weeds is rarely feasible. As such, SPD directs resources to those species and areas where the benefits of control are likely to be greatest, particularly on boundaries with private property. Effective weed management requires focus on small geographic areas (patch/ property and local) with support and coordination provided at an appropriate level (regional, state and national).

Pine wildings, while not a declared noxious species, have the potential to invade areas of native vegetation adjacent to mature plantation sites. This can have an adverse visual impact and, in some instances, compromise natural ecosystems. This issue is most prominent in drier native forest types and is controlled using a range of methods including the use of prescribed fire, physical culling, including commercial harvesting, and chemical herbicide application.

Blackberry is present in most southern State forest plantation areas and may also be present on properties purchased for plantation establishment. Chemical control is targeted at new infestations and plantation boundaries. Biological control has been partially effective, through the release of various strains of rust. The ability of grazing animals such as goats, in particular, to control weeds is the subject of ongoing research.

6.4.4 Diseases and other potential risks

Fungal diseases are a serious hazard to the health of radiata pine. The species is susceptible to several needlecast diseases including *Dothistroma septosporum* and *Cyclaneusma minus*. *Dothistroma* is most prevalent in plantations on the Northern Tablelands, and can cause serious defoliation and growth losses in stands up to 20 years old, especially in moist gullies or other locations with high humidity and restricted air movement. *Cyclaneusma* is more widespread but less damaging than *Dothistroma* and is most prevalent in stands 15-20 years old.

Diplodiea sapinea is a fungal disease that causes stem cankers, shoot dieback, dead topping or stem death. Infection begins in wounds or weakened trees and the disease is common on drought-affected or hail-damaged sites. There is a range of other fungal diseases that may significantly impact trees, for example, trees have been killed by *Phytophthora* and *Armillaria* root disease, but incidences of these are rare.

While outbreaks of insects may occur in vigorous healthy stands as well as in those that are stressed or declining, insects always have a greater impact on trees that had already exhibited sub-optimal growth. As well as impairing tree health and vigour, insects may also degrade timber. The main insect pests affecting radiata pine are the *Sirex noctilio* woodwasp and the Monterey pine aphid *Essigella californica*. Bark beetles (*Ips grandicollis*) can damage felled logs and fire damaged trees and in suitable conditions attack living trees.

Other potential risks to plantation health include weather factors such as drought, wind, and frost, nutritional deficits, damage to growing stock while harvesting and fire (see section 3.3).

Forestry Corporation maintains or enhances the health and productivity of the forests it manages to keep them in a healthy, productive condition. Forestry Corporation:

- uses appropriate site selection and undertakes silviculture, including thinning, fertilising and weed control as appropriate
- uses integrated pest management, for example by using appropriate site selection and silviculture in conjunction with pesticides and other methods of pest and weed control
- manages *Sirex* through an annual biological control program involving trap trees and injection with nematodes
- arranges annual health and biosecurity monitoring of plantations by DPI Forest Health
- seeks technical advice from DPI Forest Health on management of biosecurity, key pests and diseases, such as the biological control of *Essigella*
- coordinates appropriate response treatment in accordance with environmental and commercial principles through the SPD Plantation Plant Pest Management Plan
- implements biosecurity measures and emergency responses in accordance with the Plantation Forest Biosecurity Plan and Biosecurity Manual for the Plantation Timber Industry (2015), Industry Biosecurity Plan for the Nursery Industry (2013) and the Biosecurity Manual for the Nursery Production Industry (2010)
- maintains appropriate fire preparedness and hazard reduction burning
- adheres to standards for acceptable levels of stand damage during harvesting
- is a member of regional pest animal and weed committees.

6.4.5 Soil and water

Timber plantations provide benefits such as lower soil erosion and improved water quality to catchments and assist in reversing salinity and erosion.

All vegetation types impact on water resources by reducing the amount of water runoff and infiltration, and in some cases, through the direct extraction of groundwater. Plantation forestry is no exception, as regardless of species, forest canopy cover causes reduced runoff and groundwater recharge in a process known as interception. In addition, in places where the depth to the groundwater is less than six metres, plantation forests may directly extract groundwater.

While plantations use more water than pasture, the change in stream flow after reforestation or clearing is largely proportional to the catchment area affected. Research has shown it is difficult to detect an impact on water quantity when less than 20 per cent of the catchment is plantation. In major plantation regions, plantations occupy between one and six per cent of large catchments.

SPD mitigates some of the impacts on water quantity by establishing plantations in line with the following principles:

» giving consideration to local government planning and the spread of plantations across the landscape, ensuring a spread of age classes
» establishing plantations away from streams and across the contour.

Forestry Corporation will continue to conserve soil and protect water values by implementing the collective provisions of:

» the Plantations and Reafforestation (Code) Regulation
» best practices provisions detailed in Forestry Corporation's Standard Operating Procedures.

To reduce soil erosion and minimise water pollution during forestry operations Forestry Corporation implements a range of management practices including use of riparian buffer strips to reduce connectivity between areas of disturbance and the stream network

In addition, Forestry Corporation will use adaptive management principles to continuously improve planning and field implementation and will:

» maintain and incorporate soil regolith data into operational planning (see Section 6.2.3)
» monitor and report operational implementation of soil conservation and water quality maintenance measures
» continue collecting data to allow ongoing research into the effects of plantations on water quality.

In addition to operations located in the forest, the nursery at Tumut (Blowering) has been designed as a nil flow-off site. Water is sourced from permanent and casual licenses from the Murrumbidgee Irrigation Area river supply. The nursery uses container crop growing with boom irrigation, which results in minimal excess watershed.

6.4.6 Silviculture and operations

Silviculture refers to a branch of forestry dealing with the development and care of forests.

Silvicultural practices applied in SPD aim to:

» provide a sustainable supply of forest products while protecting other values
» maximise financial return from timber productivity
» protect forest health
» maintain flexibility to cope with market opportunities.

To implement these objectives, SPD will:

» apply silvicultural practices (including harvesting) that provide a sustainable flow of timber from plantations in the most cost-effective manner

- maintain the productive capacity of the land base by minimising the amount of plantable land that is unplanted, known as landbank
- protect forest stands from damage by pests, diseases, fire or other destructive events
- protect soil and water
- manage the forest so as to be able to adapt to changing markets and circumstances
- ensure the workforce has technical skill and experience in silviculture required to meet all the above objectives.

6.4.6.1 Nurseries

Forestry Corporation's Blowering nursery is one of the largest *Pinus radiata* seedling producers in Australia. Following the 2019-20 fire season, the facility was expanded, to allow for production of up to 8.5 million seedlings, which will be used to re-establish plantations across the state, including those that were destroyed by fire. Forestry Corporation also operates a nursery located at Grafton, which, as part of its annual crop, produces up to 1.5 million softwood seedlings a year to re-establish plantations.

6.4.6.2 Site preparation

Preparing the area before planting is done to enhance the prospect of achieving a vigorous and well stocked plantation. Preparing a site to plant involves clearing any existing debris (woody material and weeds), cultivation and weed control. Additional road works may also be required to provide access.

On former plantation sites, harvesting residue (bark, branches, needles and log offcuts) is retained as much as possible in order to maintain the productive nature of the site. Residue is left across the harvested area and the land is then cultivated. In areas where there is a higher than normal level of debris, chopper rolling may be undertaken, or the debris may be pushed into heaps known as windrows, which are burnt. Burning is minimised because it has the potential to remove nutrients from the site. The management of residues on second rotation sites can be problematic in areas where markets are limited.

Site cultivation improves root depth, provides a path for moisture to penetrate the soil, elevates seedlings out of saturated soils, improves planting conditions and improves the effectiveness of weed control measures. Cultivation can be constrained by characteristics of the site, which are identified in the planning process.

Risks are assessed on each site and managed through the implementation of a site-specific plan. SPD:

- implements the requirements of the Plantations and Reafforestation (Code) Regulation
- aims to minimise the landbank (fallow land) and maintain the productive capacity of the land
- is mindful of nutrient cycles and water quality and quantity and soil quality.

Data on replanting is published annually in the Sustainability Report.

6.4.6.3 Use of pesticides

The use of pesticides in plantation establishment and for general management on State forests is governed by legislation and detailed in the Forestry Corporation Manual for the Use of Chemicals and the SPD Silvicultural Manual. Herbicide is primarily used to minimise weed

competition for moisture and nutrients. Weed control is particularly important in the first two years of the rotation, when the seedlings are more susceptible to this competition. Most herbicide use occurs in this time.

The Australian Plantation Forest Industry Herbicide Research Consortium has a primary focus on sourcing and trialling alternative herbicide products. As an active member of this group, SPD participates in field trials of options.

6.4.6.4 Forest nutrition

Nutrition is important to maintain tree health and vigorous growth and to efficiently produce straight stems that are suitable for timber production.

Forestry Corporation completes targeted, foliage nutrient analysis and undertakes remedial fertilising where a deficiency is detected, particularly in the case of a boron deficiency. Late age (post-thinning) fertilising may also be undertaken when necessary. Nutrition in plantations is addressed in the SPD Silviculture Manual.

6.4.7 Harvesting

Forestry Corporation carries out two types of plantation harvesting activities - thinning and clearfall. Thinning is the process by which excess, defective or poor quality trees are identified and removed to encourage growth in the remaining trees. This is helpful in managing stand density.

Stand density affects the total amount and quality of the wood produced, the potential for wind and snow damage, and plantation health. It is managed by varying the number of trees planted and their geometric spacing at planting, and by the timing and intensity of subsequent spacing (thinning) treatments.

Clearfall is the final harvest and is undertaken at the commercial endpoint of the stand. The timing of both thinning and clearfall harvest events depends on a number of practical considerations such as species and growth rates, stand or site history, stocking and market requirements at the time of harvest.

Each plantation would usually undergo up to two thinning operations, a clearfall and subsequent re-establishment. The silvicultural strategy, including planting rates, thinning and final harvest regimes is monitored and can be reviewed depending on economic and market considerations.

All harvesting operations will have a site-based plan that identifies the site-specific silviculture objectives as well as key safety, environmental, and financial risk factors and mitigation measures.

Figure 6-3 and Figure 6-4 below provide the age class profile by silvicultural status and species for each of the two SPD regions.

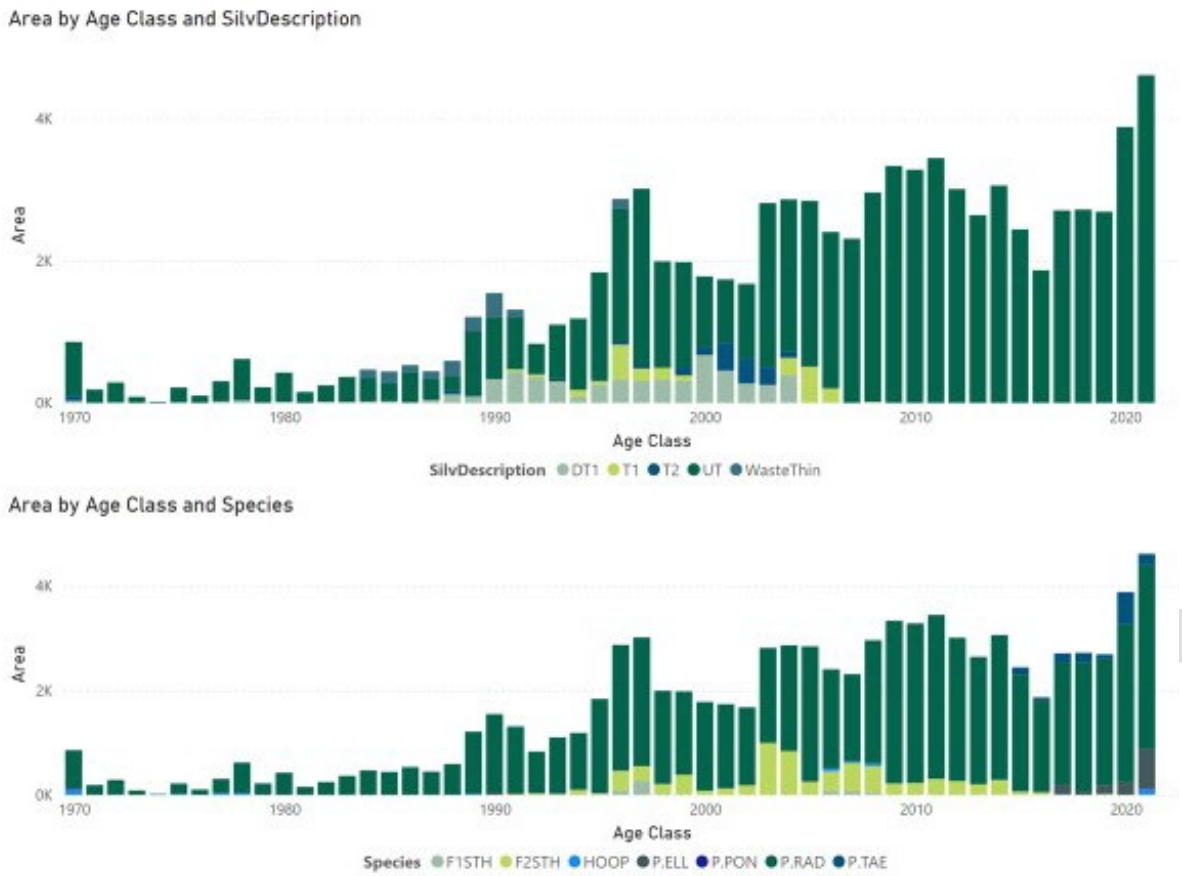


Figure 6-3: Northern Softwoods - Area by age class, silvicultural status and species

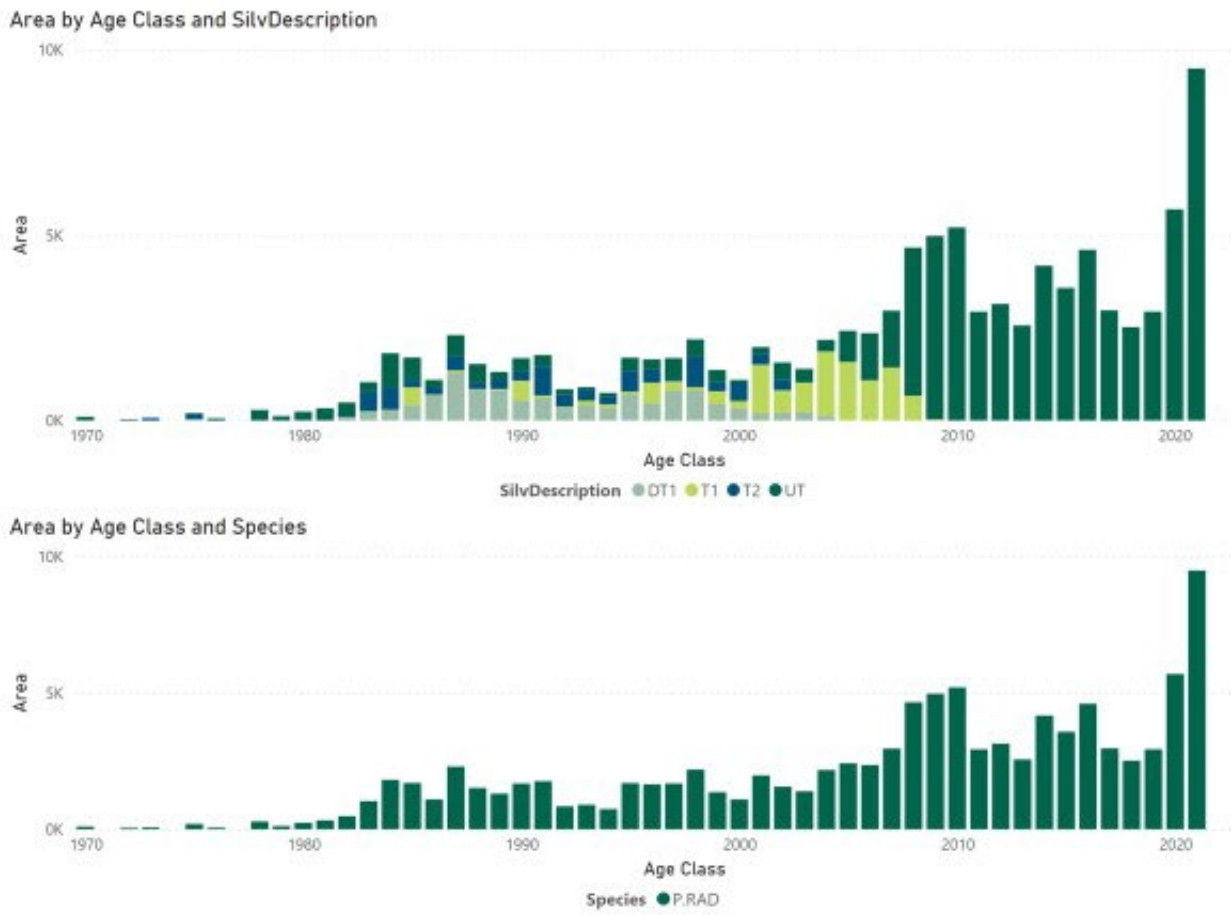


Figure 6-4: Snowy Region - Area by age class, silvicultural status and species

6.4.8 Biofuels / forest residue

Use of end-of-rotation felling waste (residue) offers the energy industry an opportunity to generate electricity and other products such as biochar from a renewable resource as an alternative to using fossil fuels. This activity minimises post-harvesting debris and reduces the cost of re-establishment, eliminates the requirement to burn the debris on site as well as reducing environmental impacts.

The market, through global demand for biofuel and/ or forest products is increasing demand for forest residue.

6.5 2019-20 fire recovery

Refer to Section 1.1.5. Details regarding the broader impact of the 2019-20 bushfires and the status of recovery operations can be found on the Forestry Corporation website.

Softwood plantation supply impacts

While pine trees are less fire tolerant than many native Australian species, pine trees that have been affected by fire can still be harvested and processed into timber products in much the same way as unburnt trees. Once the outer bark is removed, the timber underneath is still strong and suitable for a range of uses including landscaping and structural timber.

Timber supply has been impacted in the medium to long term, particularly in the Tumut, Bombala and Grafton Management Areas and Forestry Corporation continues to work with customers to move timber around the state to meet varying demand. A small volume of timber may be exported where there is not a suitable domestic processing solution, however, the focus is on supplying domestic customers.

The planting program to restock fire-affected pine plantations began in 2020 and will be largely completed by 2026. During this period projected total planting areas are more than 12,000 hectares per annum and opportunities will be pursued to complete replanting earlier where additional seedlings are available.

Part three

Coastal hardwood forests

7. PART THREE –coastal hardwood forests

7.1 Management structure

The Hardwood Forests Division (HFD) is organised into five functional business units and one geographical business unit for Western NSW. The coastal hardwood forests are managed by the five functional business units, being Forest Stewardship, Marketing, Planning, Production North and Production South.

7.2 ESFM management outcomes

HFD maintains a Forest Management Improvement Plan (FMIP), which sets management objectives and actions over a five-year period. The table below summarises the ESFM management outcomes in the FMIP.

Table 7-1: Hardwood Forests ESFM Outcomes

Aspect	Objective	Actions
Our business	To be a long term financially sustainable provider of wood for the benefit of the people of NSW	» maintain continuity of wood supply by ensuring timely and thorough tactical and strategic planning » capture additional value for non-wood forestry products » maintain certification under the Australian Standard for Sustainable Forest Management (AS4708:2021) Standard » ensure compliance monitoring is consistently undertaken across the Division and that continual improvement underpins management systems » identify and manage risks in all operations to meet or exceed expected environmental outcomes
Our environment	Maintain the full suite of environment and heritage values across the forested landscape	» contribute to improvement of forest health by undertaking targeted pest and weed management programs » contribute to understanding and control of eucalypt decline in collaboration with other government agencies » maintain the productive capacity of the forest estate » maintain existing monitoring, develop and implement trend and species-specific monitoring programs. » minimise the pollution risk from forest roads and trails » contribute to carbon cycle research and maintain carbon accounting requirements

Our community	Ensure that Forestry Corporation is a valued contributor to the social, cultural and economic well-being of regional communities	» be seen as a reliable land manager, good neighbour and corporate citizen » have active engagement with Aboriginal groups and traditional owners » provide training for Aboriginal communities to conduct cultural burns » build relationships with non-government organisations » be regarded as a reliable wood supply partner » meet fire suppression and hazard reduction obligations under the *Rural Fires Act 1997* » promote and grow the multiple-use values of State forests.
Our staff	To build on the qualities of our people to develop a dynamic workforce for the future	» develop the resilience of employees » have a workforce committed to positive health and safety outcomes with strong safety leadership and engagement » ensure that staff are productive and motivated » all staff to have individual Personal Development Schemes in place » provide training and access to leading technology

7.3 The planning framework

Forestry Corporation has developed a series of process maps designed to identify all the key activities undertaken in the planning of forestry activities. They are used as a means of ensuring that important aspects of the planning process, such as environmental compliance, consultation with stakeholders and appropriate communication within Forestry Corporation, are completed.

7.3.1 Operational planning

Forestry Corporation undertakes thorough operational planning processes to ensure that the potential for environmental impacts from all forest management activities is managed and mitigated.

For timber harvesting in native forest areas the Coastal Integrated Forestry Operations Approval (CIFOA - refer to Section 2.1.1) integrates the regulatory regimes for environmental planning and assessment timber harvesting and associated operations, for protection of the environment and for threatened species conservation[19].

Hardwood plantation operations are managed under the *Plantations and Reafforestation Act 1999* (P&R Act) and Plantations and Reafforestation (Code) Regulation 2001. The objective of the P&R Act is to facilitate plantation establishment and management to best practice environmental standards.

Operational planning for forestry activities ensures a range of measures are applied to mitigate the risks, including:

- implementing relevant environmental legislation and associated standard operating procedures (SOPs) during native forest and plantation timber harvesting operations, and for road maintenance, construction, and drainage feature crossing management
- in relevant native forest operations, conducting a range of pre-operational targeted flora and fauna surveys, and well as broad area habitat searches and incorporating the results of these searches into the operational plans with the application of a range of exclusions and protective measures to mitigate the risks to the environment
- using operational plan templates that have been developed to address key risks and are designed to ensure plans include site specific instructions and approve and guide the activity while protecting natural environmental and cultural values
- applying adaptive management principles in all forestry operations and in every part of the continuous improvement cycle
- monitoring and auditing operations to track compliance with plan conditions and, if a non-compliance is identified, undertaking remedial works and recurrence prevention measures where necessary
- reporting results and incorporating them into subsequent planning and implementation processes and capturing any new risks identified in Forestry Corporation's risk management system, with control measures developed and implemented.

Other operations that have lesser potential for environmental impacts have been recognised and addressed in other parts of this plan or in supplementary plans. These include regeneration, recreation, disease and wildfire, pest animals and weeds, grazing and apiary.

7.3.1.1 The make-up of operational plans

Operations such as harvesting, road maintenance and hazard reduction burning, are required to have an operational plan. The operational plan is the key document describing how an activity will be undertaken. Each operational plan will contain an operational map at a scale of 1:15,000 (or 1:25,000 for more extensive areas) which will identify:

- location, extent and boundaries of the proposed activity
- topographic features such as contours, drainage and rocky areas
- area where the activity is excluded and the reason for the exclusion
- any area which has a special prescription over and above the general prescription
- access roads and tracks
- potential significant impact sites, for example log dumps in harvesting operations and stream crossings in road works.

The written section of the operational plan will contain, where necessary, details of:

- activity objectives
- nature and extent of the activity or activities
- forest structure and, where appropriate, silvicultural techniques to be used
- flora and fauna general habitat, site-specific and threatened species habitat protection
- threatened fish habitat and native fish passage protection
- general and site-specific measures to control soil erosion, minimise transport of soil particles and protect water quality

» general and site-specific measures to protect cultural heritage values
» additional searches to be carried out during operations.

All HFD operational plans integrate use of Forestry Corporation's mobile mapping and data recording application called Map App. Use of mobile mapping technology allows planning and operational staff to better identify and record environmental and operational features critical to operational management, as well as to record operational progress and outcomes. Map App also provides access to the most current operational plan information for all Forestry Corporation staff as well as forest contractors and regulators.

Operational plans will be reviewed prior to approval by the Planning Supervisor. Documentation supporting development of the plan will be available for public inspection through the Plan Portal.

7.3.1.2 Operational plan implementation

Each operation has a designated supervisor who is responsible for implementation of the operational plan.

Before operations commence, the relevant supervisor, contractors, operators and employees are briefed on the contents of the operational plan to ensure that they share a common understanding of the plan's requirements. Where Forestry Corporation engages a contractor to undertake harvesting or other operations, in most cases, the control of the site is handed over to the contractor to ensure safe conduct of the activity.

Contractors, operators and Forestry Corporation supervisory staff are required to be trained and accredited to a recognised level of competence in the various tasks they undertake (refer to Section 5.2.)

7.3.2 Annual schedules

Annual schedules or programs are the means by which Forestry Corporation plans activity in alignment with customer and budget cycles. An annual schedule is usually a list of priority areas for a given financial year and forms part of the budget process. Annual schedules also enable the tracking and reporting of progress and are developed for:

» Harvesting, in the form of a plan of operations that is verified for volumes and species and takes into consideration the requirements of customers, markets and weather-related constraints.
» Road construction and maintenance, priorities for which are determined in accordance with road and fire trail management plans. Roads required for harvesting are closely aligned with the harvesting plan of operations, while other road works will be scheduled according to the level of usage, potential for environmental harm and safety.
» Fire fuel management, where the details of proposed hazard reduction burn areas are entered into the NSW Rural Fire Service (RFS) fire management system and available to District Bush Fire Management Committees. The schedule is influenced by the need for asset protection within and near State forests, ecosystem management and to reduce excessive fuel loads before or after harvesting.
» Plantation establishment, which takes into consideration the available land bank, areas of previously established plantation that have failed and budget constraints.

» Rehabilitation of areas affected by eucalypt decline, which prioritises effort based on severity of decline, the ability to affect a real change in forest health and the budgets available to undertake works.
» Forest regeneration works, which are prioritised based on the nature of the site and the ability to improve regeneration outcomes. Factors considered in selecting sites for regeneration works include the productivity of the site, time since disturbance, potential for implementing effective prescribed burns and the size of the issue.
» Pest and weed control, which are developed in line with priorities identified by regional weed and pest committees and to address concerns of stakeholders.

7.3.3 Strategic wood supply planning

The FRAMES model informs strategic planning processes and decision making in NSW State forests. The system was developed within the framework of the Comprehensive Regional Assessment (CRA) process in 1997 and has been reviewed many times, both internally and by independent external experts. These reviews and reports are available on our website.

The purpose of FRAMES is to model the availability of wood products over time, often with a focus on high quality logs, but also incorporating estimates of other locally important log classifications. This was a major consideration in the allocation of land to production or conservation purposes during the CRA process. It has subsequently been used for growth, yield and sustainability modelling in native forests, primarily associated with Regional Forest Agreement (RFA) requirements, but also providing information for strategic decision making, land use decisions and policy development.

FRAMES[20] comprises:

» An estimate of net harvestable area – the gross area is determined and systematically reduced to account for known physical and environmental factors such as streamside buffers, high conservation value forests, wetlands, rocky outcrops, steep areas, heaths and mapped species-specific exclusion areas. Modifiers are then applied to account for unidentified features requiring harvest exclusion encountered during the harvest planning process. This includes unmapped drainage and habitat retention prescriptions required due to the presence of threatened species.
» Characterisation of the forest through the measurement of field-based inventory plots. These plots are a tenth of a hectare in size and are established randomly throughout the production forest estate All trees within the plot that are greater than 10 centimetres in diameter are measured for size, species, height and potential wood products present.
» Growth and yield simulation –a suite of models is applied to the plot based inventory to project its growth into the future, and simulate harvest and regeneration events.
» Yield scheduling – forest modelling software determines the rate forest products can be sustainably harvested from the forest estate.

FRAMES is depicted schematically in Figure 7-1.

[20] The system is described in the Forestry Corporations Forest Resource and Management Evaluation System (FRAMES): A report on its development and implementation to 31 July 2013.

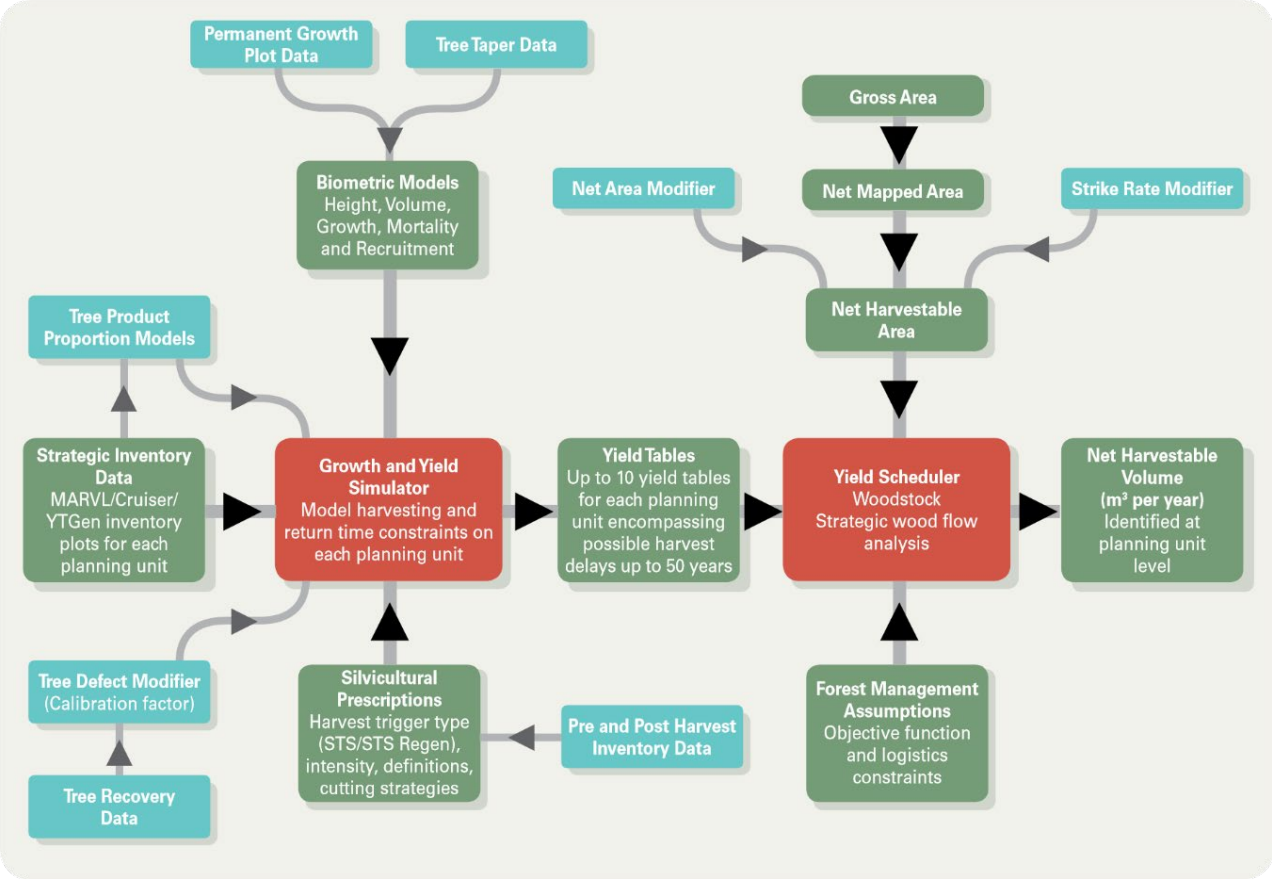


Figure 7-1: FRAMES information flow

7.3.3.1 Continuous FRAMES improvements

The RFAs contain targets for the continual improvement of FRAMES. FRAMES is constantly being improved and adjusted as new models are developed and information on the forest estate improves. A detailed account of FRAMES development and upgrades through its history can be found on the website. Recent major improvements include:

- development of models to characterise fire damage, mortality and subsequent wood product degradation as a result of wildfire
- update of volume recovery modifiers for inventory to account for assessor level variation
- update of Net Harvest Area Modifiers to account for CIFOA requirements
- LiDAR acquisitions in the Wauchope and New England tablelands area to better characterise the forest estate
- development of volume surfaces based on both LiDAR derived and empirically modelled volume information to downscale strategic volume estimates to tactical and operational scales.

The inventory base is also constantly updated, with plots being replaced approximately every 10 years, or after harvest to ensure a contemporary characterisation of the forest resource.

The sustainable yield is comprehensively reviewed every five years in line with RFA commitments. An additional interim review of sustainable yield was undertaken using FRAMES

following the 2019-20 wildfires due to the scale of the impact. This work is published on the website.

7.3.3.2 Yield reconciliation

An important part of the continual improvement process is a routine evaluation of FRAMES ability to accurately predict volume production from the productive forest estate. This is monitored through yield reconciliation – a comparison of predicted against realised volume at an appropriately strategic spatial scale.

Yield reconciliation is conducted periodically and is published according to the requirements of the RFA and on Forestry Corporation's website as part of our sustainability reporting.

Due to the spatial limitations of FRAMES, yield reconciliation has not been attempted in the aftermath of the 2019-20 bushfire season and subsequent floods in 2021 and 2022. Forestry Corporation remains committed to yield reconciliation and will recommence this work when conditions allow.

7.3.3.3 Indicative modelled wood volume availability

The calculation of indicative modelled wood availability is a complex process that reconciles short term commitments to supply wood in accordance with Wood Supply Agreements (WSA) with long-term sustainable yield. The projections do not necessarily reflect the total productive capacity of the forest estate.

The figures below reflect the indicative wood volume availability as assessed in March 2021.

For modelling purposes, forest resources are grouped into sub-regions by location, resource type and management systems. These sub-regions are outlined in Figure 7. The relevant sub-regions for this plan are the North Coast, South Coast, Eden and Tumut. The Northern and Southwest Cypress and Riverina subregions being covered by the Western Forest Management Plan.

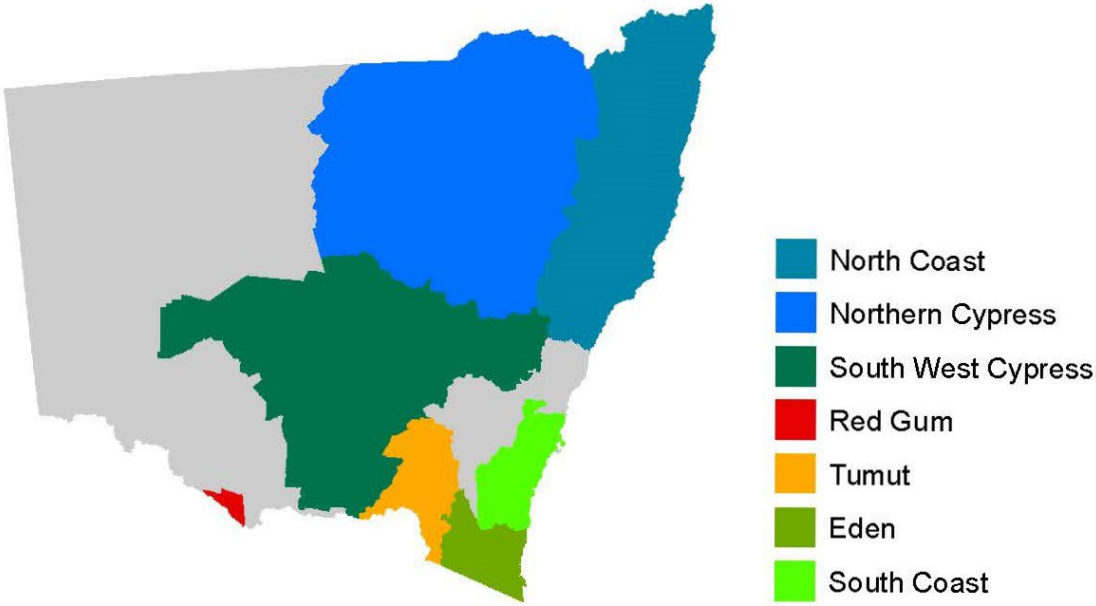


Figure 7-2: Strategic planning regions

Modelled yields were incorporated into the RFA process. The Sustainable Yield in NSW Regional Forest Agreement regions (2018) report details forecast volumes at that time.

7.3.4 Wood supply commitments

Forestry Corporation and the NSW Government have a number of long-term WSAs with commercial customers that are made in line with the RFAs. The WSAs are managed as commercial contracts by Forestry Corporation and are subject to change from time to time.

In negotiating WSAs, the Government sought to utilise all sizes and quality of sawlogs. The volumes of the current agreements are detailed in Table 7-2 for the north and south coastal areas.

Within the total volumes allocated, there are a number of different types of agreements that provide Forestry Corporation with some flexibility to manage wood volumes over time. WSA types include:

- Type A agreements are for a fixed volume for a twenty-year period
- Type B agreements are more flexible and allow for reviews in years 10 and 15 using the most recent inventory data and wood assessment models to determine future supply levels
- Type C and D are based on a share of production, so that where there is lower production in any year, the available volume is distributed equitably amongst customers as a share of the total production in that year.

  Other agreements in place between Forestry Corporation and its customers include:
  - high quality sawlog agreement which was developed to reduce the sawlog volume commitment subsequent to review of sustained yields

› parcel sale agreements are utilised where the capacity of the forest to produce low grade, or high defect, wood products exceeds the markets into which those products can be sold. This situation enables short term parcel sale agreements to be entered into for the sale of these products which enhances silviculture and business outcomes.

Current WSAs are published on Forestry Corporation's website.

Table 7-2: Wood Supply Commitments (As at 1.1.2022)

North Coast Wood Supply Agreement Commitments (as at 1/1/2022)	
Product	WSA Volume (m^3)
High Quality Sawlogs	173,121
Poles, Piles and Girders, Veneer	52,512
Low Quality Sawlogs	143,518
Pulp Logs	101,500
Total Volume	470,651
South Coast Wood Supply Agreement Commitments (as at 1/1/2022)	
Product	WSA Volume (m^3)
High Quality Sawlogs	71,130
Poles, Piles and Girders, Veneer	500
Low Quality Sawlogs	26,574
Pulp Logs	343,000
Total Volume	441,204

7.4 Forest estate and timber production

7.4.1 Wood supply

Forestry Corporation is committed to maintaining a sustainable wood supply. As discussed in Section 7.3.3, Forestry Corporation uses FRAMES to inform strategic planning processes and decision making. It models the long-term sustainable supply of wood products, with a focus on maximising high-quality logs over the long term and is used as a strategic planning tool to inform where and when operations should take place across the State forest estate.

Hardwood plantation yields are initially modelled separately to maximise high quality wood production and combined with native forests yields to provide a long-term sustainable yield for hardwood high quality logs on the north coast.

Forestry Corporation aims to maximise the potential for growth and development of commercial timber and wood-based products on the areas of forest available for wood production, while

maintaining a commitment to manage State forests in a socially and environmentally responsible way.

In meeting its obligations to provide an ecologically sustainable wood supply, Forestry Corporation will:

- maintain its contribution to a Comprehensive, Adequate and Representative (CAR) reserve network across the landscape of dedicated reserves, informal reserves, and values protected by prescriptions which exclude harvesting
- adhere to a system of adaptive management in planning, implementing and monitoring of harvesting to protect rare or threatened flora and fauna and their habitats along with soils and water quality
- maintain forest cover by using appropriate silviculture during harvesting and ensure natural regeneration or rehabilitation where appropriate
- complete regular periodic reviews of wood availability and supply commitments based on performance monitoring, improved yield models and improvements to FRAMES.

Harvested volumes are reported in Forestry Corporation's Sustainability Report.

7.4.2 Weed management

Bitou bush and a number of exotic grasses have been declared threatening processes in the coastal State forests and Forestry Corporation is working with local government, other agencies and stakeholders to develop regional strategies to manage these weeds and other plants of concern.

In all State forest areas, some major plants of concern include:

- blackberry (Rubus fruiticosus)
- giant Parramatta grass (Sporobolus indicus var. major)
- lantana (Lantana camara)
- crofton weed (Ageratina adenophora)
- nodding thistle (Carduus nutans)
- scotch broom (Cystisus scoparius)
- groundsel bush (Baccharis halimifolia)
- pampas grass (Cordaderia spp.)
- alligator weed (Alternanthera philoxeroides).

7.4.3 Forest health, eucalypt decline, disease and insects

Dieback in trees occurs naturally as a result of short term adverse physical impacts such as drought, unseasonably high soil moisture or damaging wildfire. Dieback may also be due to natural biological factors such as insect plague and spread of fungal disease. Dieback in native forests is not common, especially over large areas, and is often followed by tree recovery or regeneration when conditions ameliorate.

Chronic decline may occur when long-term environmental changes impair tree health. Increasing decline, including canopy vigour reduction through lack of semi-regular low-intensity fire and bell-miner associated decline, has been observed throughout dry and moist eucalypt forests, particularly in coastal areas. Significant areas of forest in the coastal region of NSW, across all

tenures, are thought to be susceptible to this sort of decline and many areas are showing signs of decline.

The potential impact of pests and diseases can be reduced in some forests by reinstating more natural low intensity fire regimes. This aims to reduce the mesic understory that has increased in density and extent in recent decades through reduced fire in the landscape, which has led to increased soil moisture and higher susceptibility to soil borne pathogens. Competition between trees is another factor which can lead to stress and increase the susceptibility of trees to disease and insect attack. Thinning (selective removal of some trees) stands of trees can be used to reduce competition and lower the likelihood of disease and insect attack.

To combat the causes and effects of eucalypt decline, disease and insects, Forestry Corporation:

- maintains and implements a Eucalypt Decline, Pests and Diseases Management Plan
- conducts assessments of harvest areas to determine
  - the forest stand type
  - whether there is potential to conduct a harvesting operation
  - whether it is possible to achieve forest health improvements through prescribed burning and/or supplementary planting
- continues to monitor and evaluate the extent and severity of Bellbird Minor Associated Dieback (BMAD) through aerial surveillance and apply adaptive management principles where practicable
- collaborates with other agencies, particularly the Department of Primary Industries, and landholders to develop and implement management practices
- further develops LiDAR and modelling technologies to assist in identification of areas of forest decline.

7.4.4 Silviculture and operations

7.4.4.1 Native forest types and silviculture

Forest vegetation communities are classified into forest types. The species composition of a forest type is driven by site characteristics such as rainfall, soil properties, altitude, aspect, and management and disturbance history. Variation in these elements has resulted in a range of forest types across the landscape, which in turn influences the type of silviculture that will be appropriate in wood harvesting operations in different locations.

All silviculture[21] undertaken by Forestry Corporation aims to maintain the species composition that is on site by applying silvicultural techniques which mimic natural forest disturbances, to work with natural regeneration processes of species within the forest.

Forestry Corporation's Native Forest Silviculture Manual outlines the ecological principles driving forest dynamics and describes forest events such as harvesting and fire fuel management. The manual describes how to assess the condition of the forest on a site-specific basis and formulate the appropriate silvicultural approach for regeneration and growth. IFOAs specify further

[21] Silviculture includes removing trees through harvesting to provide optimum growing conditions for the remaining trees in order to meet required outcomes

constraints that apply to harvesting, such as the scale or extent of harvesting, basal area limits and habitat and other retained tree retention requirements, ensuring ecological outcomes are achieved.

Forestry Corporation applies appropriate site-specific operational controls such as, plan inductions, marking of trees in field and mapping of important features to ensure that the required silviculture and regulatory outcomes are achieved.

There are a range of factors not related to the stand itself that are also considered in planning all wood harvesting activities, including:

» remoteness of the forest and the cost of road access
» size of the harvest area and potential wood volumes being harvested
» wood markets available, particularly for low grade products.

The aim of the silvicultural planning process undertaken by Forestry Corporation is to find a balance that delivers a sound outcome for the forest and its ecological and production values, for the wider community and for the business interests of the organisation.

7.4.4.2 Eucalypt response to disturbance and principles of silviculture applied

Eucalypts are among the most shade and competition intolerant of any tree species in the world, which has a profound influence on the types of silviculture treatments that are likely to be effective. The following basic principles are fundamental in determining appropriate silviculture in NSW State forests:

» Very intolerant species (such as flooded gum and alpine ash) tend to be faster growing, are less tolerant of fire and regenerate mainly from seed. The light demanding nature of these species means that more intensive harvesting and removal of overstorey is beneficial to the establishment and development of regeneration.
» Less intolerant species generally have persistent lignotubers (a woody swelling at the base of the tree that store starch and can enable trees to regenerate following disturbances such as low intensity fire), coppice readily (the ability to develop a new stem from the stump of a tree that has been killed by fire or cut down), and are more tolerant of fire. These species often readily regenerate from lignotuber or coppice and will tolerate retention of a higher proportion of overstorey trees.

7.4.4.3 Coastal blackbutt dominated forests

The coastal blackbutt dominated forests are among the most commercially productive native forests in NSW. Blackbutt *(Eucalyptus pilularis)*, is one of the fastest growing species in NSW, it regenerates reliably with appropriate silviculture, has a reasonable tolerance to fire and has been, and remains, a vital component of the NSW timber industry and broader community.

Blackbutt has a narrow coastal distribution, but its latitudinal range extends all the way from southern NSW to south east Queensland. The species forms a range of forest types in association with other species, but invariably forms the dominant component of the stand.

The varied but extensive management history of coastal State forests has created a mosaic of stand structures. Intensive harvesting, stand improvement and clearfelling after World War II created areas of generally even-aged stands that are now mature. Other stands have a more

variable structure comprising two or more age classes resulting from natural disturbances such as fire, or previous selective harvesting.

The silviculture applied in any situation is tailored to the attributes of the site and stand. In general, however, productive blackbutt sites that contain generally mature stands are harvested using more intensive disturbance with retention of seed trees to provide an open structure that promotes healthy regeneration. Drier stands of a more mixed composition, both in species and structure, will generally be harvested more selectively.

7.4.4.4 Coastal spotted gum dominated forests

Spotted gum *(Corymbia maculata)* forests are the most commercially significant forest type on the south coast. Spotted gum also forms an important part of the product mix from the north coast of NSW. Like blackbutt, spotted gum has a wide ecological amplitude and will occupy quite a range of sites, although it prefers heavier textured soils and tolerates lower rainfall than blackbutt. Spotted gum has been highly sought after since European settlement and historically the wood has been most intensively harvested from the more accessible forests.

Spotted gum forest types generally regenerate readily on both moist and drier sites, partly due to the lignotuberous habit of the species and its ability to coppice, though in moister stands seedling regeneration becomes more dominant. As for other forest types, the silvicultural regime is determined by the characteristics and history of the site.

All eucalypts require open, sunny conditions with side light, which can be impeded where only small canopy openings are created. Accordingly, moister, taller stands with a thick mid storey require more intensive silviculture to effectively regenerate. Sites containing a paucity of lignotuberous stock may be more problematic to regenerate, and there is evidence that this can be more apparent on moister sites and where there has been an absence of disturbance from fire. As such, there is mounting evidence the use of regular low intensity burning is beneficial in maintaining a healthy spotted gum forest.

7.4.4.5 Moist coastal/ escarpment forests

Moist coastal hardwood forests generally comprise Sydney blue gum *(E. saligna)* and tallowwood *(E. microcorys)*. A range of species such as white mahogany *(E. acmenoides)*, turpentine *(Syncarpia glomulifera)* and some stringybark species are also regularly associated with this forest type. This forest type is found on fertile sites, mainly in the hinterland escarpment zone of the north coast from Dungog through to Queensland, and is usually associated with the occurrence of rainforest which may occupy the more sheltered and moister sites. This hardwood forest type produces sought after timbers including tallowwood, which is highly regarded for its durability.

These sites present some challenges to successful regeneration due to the capacity for dense mesic understorey to regenerate prolifically and shade disturbed areas. As with other eucalypts, because these species favour moist, productive sites, more intensive silviculture may be necessary to establish regeneration. Forestry Corporation will review requirements on a site-by-site basis to determine the most suitable silviculture.

7.4.4.6 Dry coastal forests

Dry coastal hardwoods are the most widely distributed forest communities in coastal NSW and stands comprise mosaics of different species. The most commonly occurring species are grey gum *(E. propinqua)*, grey ironbark *(E. paniculata)*, coastal grey and steel box *(E. moluccana, bosistoana, rummeryi)*, red/ white mahogany *(E. resinfera, E. acmenoides/ umbra)*, stringybarks *(E. globoidea, E.cameronii, E. sparsifolia)* and smooth-barked apple *(Angophora costata)*.

Many of the species that comprise the dry coastal forests are highly valued for their durability. In general however, higher rates of internal wood defects and slower growth rates mean these forests are of less commercial value than the other more productive forests described in this plan.

Silviculture is generally much more flexible in these forests because most species regenerate easily. Direct establishment of seedlings may occur in some of the more mesic stands, though regeneration from lignotubers and coppice is more common in the drier phases. In this way, dry hardwood stands have a very similar response to disturbance as the spotted gum types and will be similarly managed from a silvicultural perspective.

7.4.4.7 Moist tableland forests

The moist tableland forests have a discontinuous distribution at the higher elevations from the Victorian to Queensland borders and are best characterised by the occurrence of brown barrel *(E. fasitgata)*, messmate *(E. obliqua)*, silvertop stringybark *(E. laevopinea),* yellow stringybark *(E. muelleriana)*, mountain grey gum *(E. dalrympleana)*, manna gum *(E. viminalis)* and New England blackbutt *(E. campanulata)*.

The moist tableland forests often grow on highly productive sites. They can, however present difficulties in establishing regeneration due to a combination of:

- inconsistent seeding habits from some species
- invasion of tussock grass on fertile basalt sites
- frost
- inconsistent response to fire for establishing a seed bed.

As with all forest stands, the specific structure, species and site productivity of the stand will determine the type of silviculture applied. Good results have been achieved on both burnt and unburnt sites. Timing of harvesting with heavy seedfall events can be effective, provided sufficient ground disturbance and exposed soil is created through harvesting. However, dry or particularly cold frosty periods can prevent or delay the onset of regeneration. Shelterwood systems, which retain a proportion of the overstorey as shelter, have been used in some situations to mitigate the effects of tussock grass development and frost.

On more even-aged, mature stands it will generally be appropriate to apply more intensive harvesting. However, the type and intensity of harvesting will vary and, in some cases, a two-stage or other harvest system may be applied to prevent stands from being too heavily harvested or to mitigate against some of the regeneration challenges described above.

7.4.4.8 Alpine Ash Forests

In the context of NSW forests, the alpine ash *(E. delegetensis)* forests represent a relatively small but locally significant forest type that occurs in the Bago-Maragle State forests to the east of

Tumbarumba and the Bondo-Micalong State forests to the north east of Tumut. While the extent of this forest type is restricted, the highly productive nature of these forests and the valued wood products derived make it an important type for the delivery of wood supply from the southern forests.

The alpine ash forests on State forest occur generally at higher elevation, around 1100 – 1300 metres, on the more fertile, favoured sites and produce tall trees often over 45 metres in height. Alpine ash is a fire sensitive, intolerant species. Consequently, fire plays an important role in the distribution and structure of alpine ash forests for several reasons. Firstly, alpine ash is more sensitive to fire than its common associates, mountain gum *(E. dalrympleana)*, manna gum *(E. viminalis)*, and peppermint *(E. radiata)*. Secondly, alpine ash is a prolific seeder that does not develop lignotubers or coppice well. As a consequence, alpine ash can regenerate prolifically following moderate or higher intensity fires, given the right conditions, resulting in almost pure stands. Conversely, where frequent low intensity fires have occurred a shift in the species composition toward mountain gum and peppermint may occur.

Ecosystem mapping and forest type mapping show that the extent of Alpine Ash forest type on State forest is 21,000 hectares, which is 27% of all Alpine Ash in NSW. The 2020 Dunn's Rd fire impacted the majority of Alpine Ash stands in the Tumut Management Area. Only 4,650 hectares (six per cent of the total Alpine Ash area) has not been impacted by fire since 2000, and all of this area is in Bondo State Forest. Strong regeneration has been observed in the Alpine Ash forests following the wildfires of 2020. However, as a result, a large area of this forest type remains in an immature state (younger than seed bearing age). Consequently, any future harvesting of Alpine Ash stands will take into account the further risk of wildfire.

7.4.4.9 Silvertop ash dominated forests of the south coast

The silvertop ash *(E. sieberi)* forests extend from Wyong to the Blue Mountains area through the southern areas of NSW and down into Victoria and Tasmania. The best development of this type occurs in the Eden area, where State forests have been extensively used for sawlog and pulpwood production over many decades. The type has a number of associated species including stringybarks, scribbly gums and peppermints and is generally associated with lower fertility sites in eastern NSW.

Silvertop ash falls into the very shade intolerant class of eucalypts and accordingly silviculture practices in these forests are typically more intensive. These stands generally regenerate effectively from more intense disturbance events, as evidenced by the even-aged stands that have regenerated following historical fire events and harvest events.

The typical silviculture applied in silvertop ash forests is known as alternate coupe. This practice involves the intensive removal of the majority of trees within defined areas in two or more cycles so that harvesting operations are dispersed over different areas at different times, thus mitigating environmental impacts. Within each coupe a modified shelterwood system is applied, which involves retention of trees and groups of trees to provide seed, habitat for wildlife and structural diversity.

The CIFOA defines the limits that apply to harvesting in silvertop ash forests.

7.4.4.10 Maintaining local gene pools

The silviculture Forestry Corporation applies for regeneration harvesting events in native forests will always involve retention of seed trees in situ. Seed trees may in some situations be specifically retained, however habitat trees and all other trees retained during harvesting operations, including those retained in accordance with the requirements prescribed by the CIFOA, also serve the purpose of providing a seed source. The specific requirements for seed tree retention are determined through the harvest planning process and documented in the operational harvest plan.

Supplementary planting may be required on rare occasions in areas of degraded native forest or in specific areas that have been identified in the harvest planning process or during broader rehabilitation planning. In these cases, seed will be sourced locally or from equivalent locations to ensure the maintenance of local gene pools and genetically modified trees will not be used.

7.4.4.11 Native forest regeneration

Forestry Corporation is committed to maintaining the productive capacity of its native forest estate and has obligations to assess and report on the success of regeneration following harvesting as licence conditions under the CIFOA. In meeting its commitments to ensure adequate stocking is maintained following harvesting Forestry Corporation undertakes:

- appropriate pre-planning of harvesting operations to identify potential barriers to the establishment of regeneration
- silviculture that is tailored to the requirements of the site and species present and is documented in the operational harvest plan
- compliance monitoring of harvesting operations to ensure that silviculture objectives are achieved
- regeneration assessments, in accordance with Forestry Corporation's regeneration assessment procedure and the CIFOA
- broadscale forest health surveys in conjunction with NSW DPI Forest Science group
- prescribed burning activities, which may be targeted to areas of failed regeneration or to sites identified as benefiting from pre-harvest burning
- targeted rehabilitation activities, which may include site preparation and direct planting.

Forestry Corporation publishes the results of the annual regeneration survey program in its annual Sustainability Report.

7.4.5 Hardwood plantations

Plantations managed by Forestry Corporation are authorised as plantations under the *Plantation and Reforestation Act 1999* (P&R Act).

Establishment, roading and harvesting operations are subject to the conditions of the Plantation and Reafforestation (Code) Regulation 2001, and site-specific plans will be developed to identify and manage risks associated with each activity.

The eucalypt plantations managed by Forestry Corporation were initially established largely in two waves, first during the 1960-80 period and later during the 1990s and early 2000s. Plantations are continually replanted after harvesting.

7.4.5.1 Early plantation estate (referred to as the Pre-94 plantation estate)

Plantations that were initially established prior to 1994 include:

- Private plantations that were established by Australian Paper Manufacturers on predominantly pasture and planned as an export pulp resource (mainly flooded gum, *E. grandis*). These were purchased by Forestry Corporation (then Forestry Commission of NSW) in 1984.
- Plantations that were established on identified degraded forests, again largely planted for an export pulp crop with flooded gum planted outside of its preferred range. Some areas of other species also planted, including blackbutt, Sydney blue gum or stringybarks.

Forestry Corporation is currently in a harvesting and reestablishment phase (second rotation) of these areas, with the aim of finding appropriate markets for much of the low value plantation estate (flooded gum) and replanting the authorised plantation areas with appropriate species (predominantly blackbutt), from which higher value and better growth performance is expected. Other species such as Gympie Messmate have been identified as appropriate alternative species for their high durability and fire impact resistance.

7.4.5.2 Post-1994 plantation estate

The plantations established after 1994 were established between Newcastle and the Queensland border and included joint ventures or annuity arrangements with private landholders. A range of different species were planted to suit the dispersed and varied sites chosen including Spotted Gum and Dunns White Gum. The Dunns White Gum has proven to be unsuitable for growing into sawlogs or high value timber and as such has been clearfelled early to match low value market demand.

These plantations will continue to be managed to adapt to sporadic low value markets and lower quality timber.

The area of hardwood plantation is reported in the Sustainability Report.

7.4.5.3 Site preparation

Site preparation is the process undertaken before plantation establishment to enhance the prospect of achieving a vigorous and well stocked plantation. The process generally involves preparation of the planting area. Site preparation involves residue management, cultivation and weed management. Each site is assessed for site specific risks which are identified and managed in a site establishment plan.

Residue management

Harvesting residue can have a significant impact on re-establishment costs and the available plantable area of second rotation sites. The volume of residue retained on site is heavily influenced by the available markets for low quality wood such as pulp, paper and biofuels.

Where residue is retained on site, management will generally require pushing over the residual standing trees and the stacking of debris into windrows which is subsequently burnt to reduce the impact on the plantable area and minimise the risk associated with management of fire. Broadscale burning or chopper rolling may be undertaken in lighter residue loads.

Cultivation

Cultivation is used to create optimal conditions for survival of seedlings by enhancing the characteristics of the planting zone and is undertaken to:

» improve root depth
» address potential soil compaction and allow rainfall water penetration
» concentrate nutrient rich topsoil around seedlings
» elevate seedlings out of saturated soils
» improve the effectiveness of weed control measures.

The use of cultivation can be constrained by the particular characteristics of the site which are identified in the Plantations and Reafforestation (Code) Regulation 2001 and will be identified and documented in the site establishment plan.

Nursery

Forestry Corporation's Grafton nursery produces an annual crop of hardwood and softwood seedlings to re-establish plantations.

Weed control

Weed control is an important element of plantation management. It is further addressed in section 3.3.1.

Forestry Corporation is exploring innovative means to reduce the amount of chemicals used in weed control, and the accuracy and effectiveness of application techniques. The use of Unmanned Aerial Vehicles (UAVs), or drones, is one avenue being employed to ensure steep and discrete areas of plantation can be treated whilst reducing the overall quantity and extent of herbicide used.

7.4.5.4 Plantation harvesting

Plantation harvesting involves thinning and clearfelling.

» thinning is the process by which a selection of trees are harvested to remove defective trees and to reduce competition among the remaining trees
» clearfall is the harvest of all remaining trees, which is undertaken at the commercial endpoint of the crop or rotation.

The timing of both thinning and clearfall harvest events varies considerably depending on practical considerations such as species and growth rates, stand or site history and stocking, and the markets available at the time of harvest. All plantation harvesting operations will have an operational plan that identifies key risk factors and mitigation measures.

7.4.6 Soil and water

To reduce soil erosion and minimise water pollution during forestry operations, Forestry Corporation implements a range of management practices including:

» the use of riparian buffer strips to reduce connectivity between areas of disturbance and the stream network

» managing runoff from roads, tracks and log landings
» applying rainfall seasonality, slope and soil type restrictions
» suspending harvesting during wet weather, and
» disperse timber harvesting across catchments to minimise possible local effects on water quality and quantity

Monitoring of the impacts of forestry operations on water quality by Forestry Corporation, CSIRO and universities have consistently shown that these management practices are effective in reducing the impacts of forestry operations on water quality, and where there are impacts, they are transitory and within default water quality guidelines.

Forestry Corporation will continue to conserve soil and protect water quality by implementing the collective provisions of:

» best practices provisions and SOPs related to protection of soil and water values
» the CIFOA or the provisions of the Plantations and Reafforestation (Code) Regulation when operating in the plantation estate.

7.5 Fire recovery

Refer to Section 1.1.5. Details regarding the impact of the 2019-20 bushfires and the status of recovery operations are available on the Forestry Corporation website.

8. Glossary

AHIMS	Aboriginal Heritage Information Management System
AS4708:2021	Australian Standard for Sustainable Forest Management
BRIMS	Bushfire Risk Information Management System
CAR	Comprehensive Adequate and Representative
CRA	Comprehensive Regional Assessment
CSO	Community Service Obligations
DFA	Defined Forest Area
DPI	Department of Primary Industries
DT1	Delayed First Thinning
ESFM	Ecologically Sustainable Forest Management
F1STH	First generation *Hyrbrid P. elliottii* var. *elliottii* (PEE) and *Pinus caribaea* var. *hondurensis*
F2STH	Second generation *Hyrbrid P. elliottii* var. *elliottii* (PEE) and *Pinus caribaea* var. *hondurensis*
FMP	Forest Management Plan
FMS	Forest Management System
FMZ	Forest Management Zoning
Forestry Corporation	Forestry Corporation of NSW
GIS	Geographic Information System
HFD	Hardwood Forest Division
HOOP	*Hoop Pine*
IASG	Inter-Agency Steering Group
IFOA	Integrated Forestry Operations Approvals
ILUA	Indigenous Land Use Agreement
LiDAR	Light Detection and Ranging
LLS	Local Land Service
JANIS	Joint ANZECC/MCFFA National Forest Policy Statement Implementation Sub-Committee
NFPS	National Forest Policy Statement
MAI	Mean Annual Increment

MOU	Memorandum of Understanding
P&R code	Plantations and Reafforestation (Code) Regulation
PCH	*Pinus caribaea* variation *hondurensis*
P.ELL	*Pinus elliottii* variation *elliottii*
P.PON	*Pinus ponderosa*
P.RAD	*Pinus radiata*
P.TAE	*Pinus taeda*
RFA	Regional Forest Agreement
RFS	Rural Fire Service
SEEDS	Social Environmental and Economic Data Storage
SLA	Service Level Agreement
SPD	Softwood Plantations Division
SOC	State Owned Corporation
SOP	Standard operating procedure
T1	First Thinning
T2	Second Thinning
UT	Unthinned
WHSMS	Work Health and Safety Management System

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