



FOREST MANAGEMENT PLAN

CYPRESS AND INLAND HARDWOOD FORESTS CUMBERLAND STATE FOREST

2024 to 2027

Draft for consultation –April 2024

Draft for consultation

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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.

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Background and context

The Forest Management Plans for Cypress and Inland Hardwood Forests and Cumberland State Forest, will be incorporated into the [Forest Management Plan for State forests in NSW](#), which was reviewed and updated in 2022 following a period of public consultation and comprises three parts:

Part 1: Our business, environment, community and people

Part 2: Softwood plantations

Part 3: Coastal and tablelands hardwood forests

This document will be incorporated into this document, forming parts 4 and 5.

Combining the Forest Management Plans for the various regions and forest types managed by Forestry Corporation of NSW streamlines the management activities and intentions common to all State forests, while still providing management guidance for these different forests and forest types.

This document has been prepared for consultation purposes and, once finalised, the content will be incorporated into the Forest Management Plan.

Minor changes to numbering and formatting will also be made to part one to incorporate the additional content, but no material changes have been made to other sections.

How to provide feedback:

To provide your feedback you can either:

- [Complete the feedback form](#)
- Email a submission to info@fcnsw.com.au

We welcome feedback by Friday 17 May 2024.

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Part four – Cypress and inland hardwood forests context

This Forest Management Plan is set out in five parts;

- » Part one – Background, Forestry Corporation’s business, environment, community and people
- » Part two – Softwood Plantations
- » Part three – Coastal Hardwood Forests
- » Part four – Cypress and Inland Hardwoods
- » Part five – Cumberland State Forest

Part four is to be read in conjunction with part one, which summarises management activities and commitments that are common across Forestry Corporation of NSW.

9.1 Management considerations

The Hardwood Forests Division (HFD) is organised into three geographic regional areas (Northern, Southern and Western). These regional areas are supported by functional business units; Environment and Sustainability, Forest Stewardship and Commercial Services. Part four of this plan refers to the area managed by the Western region, encompassing the cypress and inland hardwood forests.

9.1.1 Context for sustainable forest management

In addition to the issues described in relation to sustainable forest management in Section 1.1.2, Campbells Island, Koondrook and Perricoota State Forests contain areas that are included on the list of Wetlands of International Importance kept under the Ramsar Convention. The Australian Ramsar management principles are embodied in this FMP as they apply to those forests.

9.1.2 Indicative modelled wood volume availability

Strategic planning is discussed in more detail in Section 8.2.3. 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.

For modelling purposes, forest resources are grouped into sub-regions by location, resource type and management systems. These sub-regions are outlined in the map at Figure 9-1. The relevant sub-regions for this section are Northern Cypress, South West Cypress and Red Gum. The other regions shown on this map are addressed in part three of this FMP.

Wood supply is discussed further in Section 8.2.4.

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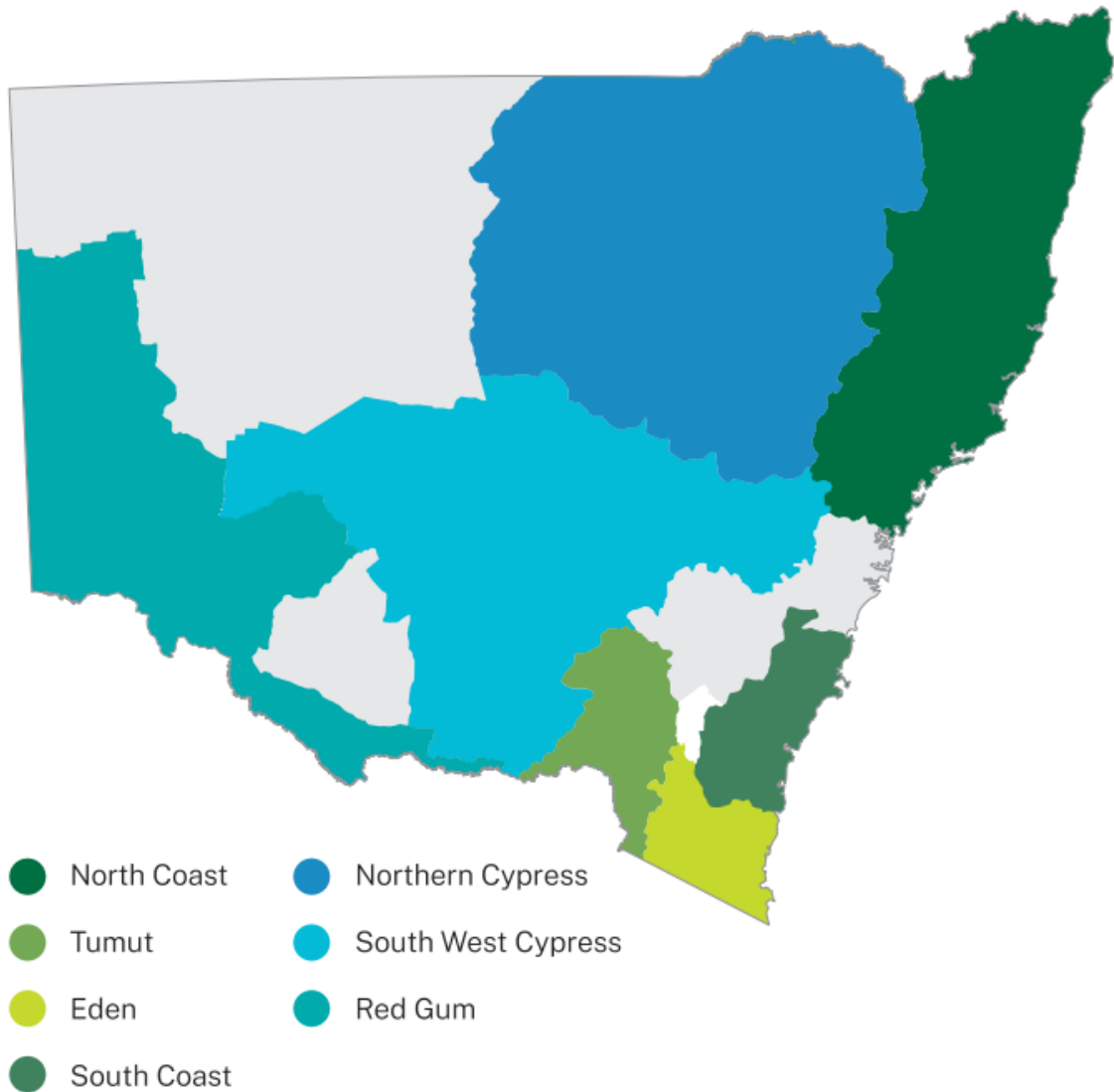


Figure 9-1: strategic planning regions

9.1.3 Forest types and silviculture

The State forests covered by part four of this plan are found from the top of the Great Dividing Range to Cobar in the State’s west and from the Queensland border to the Victorian Border. They cover a very wide array of environmental gradients; low woodland to tall forest, dry to moist habitats, flat to mountainous terrain, low to high annual rainfall and significant north south differences (e.g. rainfall distribution from summer dominant to winter dominant). The forests and woodland contain a wide range of successional ecological stages over many types of forest ecosystems. They include areas dominated by Mallee, White Cypress, Box species, Ironbarks, River Red Gum, Stringybarks and tableland hardwoods, interspersed with patches dominated by Bloodwoods, Belah, Bull Oak, Angophoras, gums and Broombush. Some patches of less common ecosystems also occur.

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9.1.3.1 River Red Gum

River Red Gum (*Eucalyptus camaldulensis*) is relatively fast growing where access to water is not restricted. Regeneration occurs mainly from seed, whenever sufficient light, space and moisture exist. Flooding provides the best stimulus for regeneration, although appropriately managed ground disturbance and fire will also stimulate germination. The main threat to seedling survival is a lack of soil moisture during the first summer following germination.

The [Koondrook-Perricoota Flood Enhancement Project](#), provides an opportunity for active water management to promote regeneration while contributing to the growth of established stands within the watering footprint of these forests. In areas of forest where inadequate river red gum regeneration exists, opening the canopy through tree removal may also promote regeneration. Thinning of young, advanced river red gum stands improves the health and growth of the retained trees particularly during periods of extended drought. In the absence of thinning, widespread tree death is common during extended periods of drought.

9.1.3.2 White Cypress

White Cypress (*Callitris gaucophylla*) has a widespread natural distribution extending from central western Queensland, through NSW to Victoria. White Cypress has a number of characteristics which sets it apart from other commercially important Australian timber species. These include:

- » an ability to regenerate prolifically from seed at stocking rates of many thousands per hectare under favourable climatic conditions
- » it is fire sensitive
- » it is highly tolerant of competition and is prone to 'lock-up', where competition between trees prevents further growth without removal of some trees.

Active management through the use of approved silvicultural practices optimises both yield and size of sawlogs produced from Cypress forests. To optimise timber production and maintain a healthy functioning forest ecosystem requires:

- » early thinning of regeneration to a predetermined stocking and basal area to minimise competition and avoid 'lock-up'
- » one or more thinnings to further reduce competition on retained stems and create an open canopy to encourage the next wave of regeneration
- » once regeneration is well established, a harvest to release the young regeneration from competition with the mature trees.

In many western forests white cypress is a component of mixed species stands that include other trees such as eucalypts and casuarina. In these forests there may be circumstances requiring harvesting to be limited, excluded or modified. For example, tree retention to ensure diversity of stand structure.

The western hardwood and tableland forests, like the River Red Gum and White Cypress forests, have also been managed for timber production for long periods. As with most eucalypts, seed production of the Boxes, Ironbarks and tableland hardwoods is influenced by crown class with the dominant stems usually the best producers and fire damaged or drought stressed crowns poor producers. Regeneration will usually appear in gaps created by harvesting or other disturbance events such as fire or storm damage. The composition of regeneration usually reflects the species make-up of the original stand.

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9.1.3.3 Maintaining local gene pools

The silviculture Forestry Corporation applies for regeneration harvesting events in native forests will always involve retention of trees that are capable of producing seed in situ. Other trees retained in accordance with the requirements prescribed by the IFOA also serve the purpose of providing a seed source. Where specific requirements for seed tree retention are determined through the harvest planning process, they will be documented in the operational harvest plan.

Supplementary planting is not undertaken in Western forests.

9.1.3.4 Native forest regeneration

Assessing the success of regeneration is an important aspect of maintaining the productive capacity of native forests. Obligations on the assessment of regeneration are contained in the IFOAs. 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 is documented in the operational harvest plan
- » compliance monitoring of harvesting operations to ensure that silviculture objectives are achieved.

A characteristic of the commercial western timber species, particularly White Cypress (*Callitris glaucohylla*) and River Red Gum (*Eucalyptus camaldulensis*) is the episodic nature in which they regenerate. Unlike coastal tree species that rely on soil disturbance and/or fire to trigger regeneration, these tree species are fire sensitive and their regeneration is triggered by high soil moisture conditions. For example, in the case of White Cypress, significant regeneration events coincided with years of high rainfall in 1880-1905, 1952-56 and 2010-11. Similarly, significant regeneration events of River Red Gum have been recorded in during the flood years of 1956, 1974, 1992-93 and 2010-11.

9.1.4 Forest health

Chronic decline occurs when there is environmental stress such as exclusion of fire, changes to hydrological regimes (e.g. as a result of river regulation) or salinisation. A range of insect species and parasites are attracted to trees under stress and decline. For example, populations of gum leaf skeletoniser, mistletoes and native cherry build up because physiological changes in the trees improve their nutritional value to the pest species.

Dieback is a reaction to acute stress such a drought or prolonged flooding. It is a protective mechanism and otherwise healthy trees recover when the stress is removed.

In White Cypress, chronic decline shows up as crown defoliation, and resin exuding from the bark. It occurs sporadically on well drained soils where exclusion of fire has promoted dense competing regeneration.

Fungal diseases, commonly *Phytophthora* and *Armillaria*, often occur in declining forests. Fungal attack commonly affects the roots and can affect the seed, seedlings, stems and leaves. Fungal

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attack (punk rot) in River Red Gum is a major contributor to the development of defect inside the stems of trees and is often a precursor to secondary infestation by insects.

Yellow rot is a significant defect of White Cypress trees. It generally enters through a point of bark damage or a broken green limb.

Forest insects, at some stage in their lifecycle, generally utilise some part of a tree – leaves, bark, wood, limbs and roots, whether it be for sustenance, protection or egg laying. Insect herbivory is often more apparent on trees that are stressed by other factors. As well as impairing tree health and vigour, insects may degrade timber.

A number of leaf eating insects attack River Red Gum, with the gum leaf skeletonizing moth (*Uraba lugens*) able to cause severe defoliation when in plague proportions. Parasites such as mistletoe and Native Cherry are linked to a reduction in tree vigour but rarely cause tree death. Severe infestations by insects and parasites appear to be related to river regulation and less frequent, less extensive forest flooding, or changed fire regimes.

Outbreaks of native organisms can also contribute to chronic decline in native forests. The potential impact of insect pests and diseases will be reduced, where possible, in river red gum forests through reinstatement of more natural flooding regimes, by ecological burning and by thinning in timber production areas to reduce stressful competition.

During the 2000-10 drought, dieback and tree death was widespread in White Cypress and River Red Gum forests. In patches where the dieback is such that tree recovery is unlikely, salvage of the commercial timber may be undertaken.

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

- » 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
- » collaborates with other agencies (particularly the Department of Primary Industries) and landholders to develop and implement management practices
- » uses Light Detection and Ranging (LiDAR) and the use of Remote Piloted Aircraft (drones) to assist in identification of areas of forest decline.

9.1.5 Grazing management

Grazing of domestic stock is common in the western State forests. Open, grassy understorey has been an attractive feed source for graziers for over 150 years. The main timber species (River Red Gum and White Cypress) are quite fire sensitive, so fire protection is a very high priority and hazard reduction burning has limited application. The development of the Western Region Grazing Management Strategy has changed the focus of grazing management to now embody conservation as well as production and fuel reduction objectives.

Current grazing practices have been developed to maintain ecological systems and processes and protect species diversity. The strategies and conditions developed for each grazing area are

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designed to maintain or enhance ecological values, primarily through the manipulation of the ground layer in favour of endemic species.

Forestry Corporation will progressively include site-specific detailed grazing objectives for new and existing grazing permits, in accordance with the Western Grazing Management Plan. Grazing will continue where it is compatible with silviculture and ecological objectives however, will be removed/excluded from areas requiring establishment of regeneration and environmentally sensitive areas that cannot be sustainably grazed according to the principles in the grazing management plan. Forestry Corporation will monitor implementation of Forest Permit conditions.

Renewal of Forest Permits will be contingent on permittee compliance with permit conditions.

9.1.6 Pest animal management

Within the western State forests cats, foxes, wild dogs, rabbits, deer, goats and pigs have been identified as pest species. Forestry Corporation works with Local Land Services (LLS) regions, local government, other agencies and stakeholders to develop regional strategies to manage these pest animals.

To mitigate the impact of pest animals Forestry Corporation:

- » consults with LLS and develops a pest animal management plan that meets the requirements of the licence under the *Biodiversity Conservation Act 2016*. The plans identify species of concern, their distribution, priorities for control programs and methods to be used. Generally, control programs target:
 - › foxes, in target areas, with treatments identified in the Fox Threat Abatement Plan developed under the Biodiversity Conservation Act
 - › wild dogs, pigs and other species of local importance, where they are a threat to domestic stock and the environment
- » undertakes control work in line with the NSW Agriculture Vertebrate Pest Control Manual and implements the requirements of the *Pesticides Act 1999*
- » develops an annual program of pest control work based on information from previous programs, landholders, LLS and other agencies, and apply the procedures as prescribed in the Pest Animal Management Plan
- » monitors activity around bait stations, including baits taken and reports of predation on livestock.

9.1.7 Weed management

Weed management responsibilities are defined under the *Biosecurity Act 2015* and are administered by LLS through Regional Strategic Weed Management Plans (RSWMP). Forestry Corporation's Western Region manages forests in North West, Central West, Central Tablelands, Riverina, Murray and Western LLS regions. Each LLS region has a unique RSWMP with weeds classified by four priority objectives; prevention, eradication, containment or asset protection.

Where the priority objective is eradication or containment, weeds will be managed on State forest. Where the priority objective is asset protection, the weed is generally considered to be so widespread that it can only be managed in limited areas around significant assets. There are few such areas on State forests within the Western Region.

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Each LLS Region has prioritised its weeds independently. Below is a comparison of the priorities assigned to various weeds that are likely to be significant to Forestry Corporation’s Western Region (Table 9-1).

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Table 9-1: Western Region Significant weeds by LLS Region (as prescribed in the RSWMP's)¹

Priority objectives

Prevent	Eradicate	Contain	Asset Protection	Manage

Species	Regional LLS Management Objectives					
	West	North West	Central West	Riverina	Murray	Central Tablelands
African boxthorn (<i>Lycium ferocissimum</i>)						
Alligator weed (<i>Alternanthera philoxeroides</i>)						
Blackberry (<i>Rubus fruticosus</i> agg)						
Boxing glove/Coral cactus (<i>Cylindropuntia fulgida</i>)						
Bridal creeper (<i>Asparagus asparagoides</i>)						
Chilean needlegrass (<i>Nassella neesiana</i>)						
Coolatai grass (<i>Hyparrhenia hirta</i>)						
Devil's rope (<i>Cylindropuntia imbricata</i>)						
Gorse (<i>Ulex europaeus</i>)						
Hudsons pear (<i>Cylindropuntia rosea</i>)						
Mother of millions (Bryophyllum spp. and hybrids)						
Prickly pears (Opuntia spp. excl Opuntia ficus-indica)						
Serrated tussock (<i>Nassella trichotoma</i>)						
Silverleaf nightshade (<i>Solanum elaeagnifolium</i>)						
Spiny burrgrass (<i>Cenchrus longispinus</i> , <i>Cenchrus spinifex</i> (syn. <i>C. incertus</i>))						
St John's wort (<i>Hypericum perforatum</i>)						
Sweet briar (<i>Rosa rubiginosa</i>)						
Water hyacinth (<i>Eichhornia crassipes</i>)						

NB: This is not a complete list of weeds in the RSWMP. For the full list refer to the relevant plan.

9.1.8 Cooperative water management

The health and development of the River Red Gum forests is dependent on a regime of regular flooding. Disruption to the natural flooding patterns as a result of river regulation is directly related to a reduction in tree vigour and forest health, and degradation of floodplain wetlands.

The 2000-10 drought exacerbated the changes due to river regulation and tree stress in the River Red Gum forests on all tenures. The ability to use the Torrumbarry channel and associated levees and works to provide frequent extended flooding, when water is available, provides some security for the health of the Perricoota and Koondrook State Forests even in the event of extended dry times in the future. Campbells Island State Forest does not have any water management structures and relies on uncontrolled flooding events.

¹ (Derived from Western RSWMP 2017-2022, Appendix 3 and Central Tablelands RSWMP 2017-2022 Appendices 1 and 2).

The purpose of the infrastructure is to water the Koondrook and Perricoota Forests to improve forest health and ecosystem function. Actively managed flooding must be in accord with the consent provisions issued by the Department of Planning, with NSW Office of Water and Forestry Corporation being the co-proponents. Under The Living Murray initiative an Environmental Water Management Plan (EWMP) has been developed for the Koondrook and Perricoota State Forests identifying management objectives and targets, water delivery options and the specific watering regimes required at each site. Forestry Corporation is actively participating in The Living Murray process by maximising the benefits for forest health.

To the extent that funding is available, Forestry Corporation will, for Koondrook and Perricoota State Forests:

- » contribute to the implementation of the EWMP, including the monitoring components:

Key ecological monitoring includes:

- › tree crown response (crown extent and density)
- › understorey vegetation (species and % cover)
- › wetland response, including vegetation, macroinvertebrates and frogs
- › fish behaviour, particularly passage through structures and spawning
- › waterbird behaviour, particularly mating, nesting and fledging

Key flood monitoring includes:

- › inundation extent, flow path and rate of spread
- › duration of the event
- › time of year/season
- › characteristics of the inflow hydrograph

- » instigate flooding in accord with the Operation Environmental Management Plan
- » pursue resolution of downstream flow restrictions.

The health of the Koondrook and Perricoota State Forests (part of the Central Murray Forests - Ramsar site) will be maintained through sound planning and active management. Forestry Corporation will monitor and report on the state of the ecological character and related limits of acceptable change in the Ramsar Ecological Character Description (ECD) of these State forests within the Ramsar wetland and will implement mechanisms to deal with the impact of actions that individually or cumulatively may endanger its ecological character.

Understocked stands of River Red Gum, identified in appropriate Forest Management Zones, may be rehabilitated through active water management to regenerate a vigorous canopy of trees native to the area.

Forestry Corporation will report on the outcomes of water management actions through The Living Murray program.

9.1.9 Research and development

Forestry Corporation's priorities in forest research and development include:

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- » developing management prescriptions for sensitive and/or threatened species through review of the IFOAs by the corporation’s ecologists and operational staff in conjunction with the DPI Forest Science group
- » improving understanding of the environmental impacts of forest disturbance through development of biodiversity monitoring programs
- » continuing to implement the Environmental Water Management Plan that has been developed for the Koondrook and Perricoota State Forests as part of the Living Murray project.

Current hardwood forest research and development priorities being undertaken by DPI and Forestry Corporation for Western Region include;

Forest ecology and sustainability:

- » designing and developing landscape scale biodiversity monitoring systems with a focus on low-cost new technology
- » targeted research on threatened species and their habitat such as the radio tracking of forest bats (Pilliga forests)
- » scientific assessment of the ecological sustainability of forest practices such as ecological impacts of thinning cypress regrowth (Pilliga) and young red gum (Koondrook and Perricoota State Forests)
- » developing, testing and applying automated methods for the identification of calls from different species, including echolocating bats.

Remote sensing technologies:

- » evaluating and facilitating the adoption of remote sensing technologies including the use of drones
- » Biometrics and forest modelling
- » inventory designs and procedures to inform operations about available timber products and standing volumes
- » providing biometrical support to ensure statistically robust research and monitoring programs.

9.1.10 Wood supply

Each IFOA specifies a maximum harvestable volume for the species authorised to be cut. These volumes for timber products were informed by modelling and inventory undertaken both by Forestry Corporation and by independent external sources. The maximum allowable cuts for the Western forests are summarised in the Table 7-2 below.

The Western IFOAs were scheduled for review as part of the NSW Government Forest Industry Road map.

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Table 9-2: Western Region maximum allowable cut

IFOA Area	Species	Product	Period Cap m ³	Expiry / Term	Annual Cap m ³
Brigalow / Nandewar²	White Cypress	logs (any kind & quality)	716,492	17 years	57,000
	Western Ironbark trees	logs (any kind & quality)	35,648		2870
	Other species	logs (any kind & quality)			1500
	Any species	timber products			1500
	Western Ironbark trees, Bull Oak and White Cypress	firewood	65,000	10 years	9100
South West Cypress³	White Cypress (North of Mitchell Hwy excluding Western Land Leases)	logs (any kind & quality)	43,500		
	White Cypress	timber products			5000
	White Cypress and Bull Oak	residue	na		-
	White Cypress (South of Mitchell Hwy)	logs (any kind & quality)	328,895	14.5 years	31,346
Riverina Red Gum⁴	Red Gum	high quality large	90,253	20 years	-
	Red Gum	low quality	na		-
	Red Gum	residue (State forests)	359,428	20 years	-
	Red Gum	residue (early thinnings State forests)	176,850	5 years	-
	Red Gum	residue (western lands leases -dry)	410,000	14.5 years	-
	Red Gum	residue (Western land leases -green)	315,000	14.5 years	-

9.1.10.1 Native forest timber industry

The forest assessment processes are premised upon the concept of ESFM and provide the foundation for a long term stable and secure timber industry. Within the area covered by this section of the FMP, Forestry Corporation supplies wood or forest products to more than 18 customers that play an important role in regional communities. These customers vary in size and capacity with intakes from less than 1,000 m³ to over 20,000 m³ per annum.

In addition to mills supplied from State forest and Crown timber lands, there are a number within the region supplied from private property.

² Expires 31 December 2025

³ Expires 31 December 2025

⁴ Expires 31 December 2030

9.1.10.2 Wood supply commitments

Wood processing facilities are highly capital intensive and require long term supply agreements to support investment. To facilitate this, the NSW Government entered into contractual Wood Supply Agreements (WSAs) that align with and do not exceed available volumes and seek to utilise all sizes and quality of sawlogs. The resource security offered by the agreements has promoted investment in new machinery to more efficiently utilise a range of log sizes and to develop value adding through establishment of kiln drying and dressing of high quality timber.

WSAs are managed as commercial contracts by Forestry Corporation and are subject to change from time to time. Wood supply commitment volumes are often below the sustainable levels described above due to limitations of timber markets available at a given point of time.

The timber volumes currently available for harvest under the Western IFOAs are detailed in Table 9-3 below. Major wood supply agreement are published on Forestry Corporation's website.

Table 9-3: Western Region Annual Wood Supply Agreement commitments (as at 20 June 2023)

Product	Species	Annual WSA Volume
High quality sawlogs	Red Gum	4,413 m ³
	Cypress	49,390 m ³
Low quality sawlogs	Red Gum	4,378 m ³
Residue logs	Early Thinning Residue	35,000 tonnes (26,250 m ³) ¹
	Other	17,533 tonnes (13,150 m ³) ¹
	Western Lands	51,000 tonnes (38,250 m ³) ¹
Total volume		135,830 m³

Note 1. Conversion assumed to be 0.75 m³ per tonne.

9.1.11 Community

Forestry Corporation provides a number of community services on behalf of the NSW Government. These are funded by Community Service Obligation (CSO) funding. 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 forest research services.

9.1.11.1 Grazing

Access to State forests for grazing is an opportunity for local communities and assists with fire hazard reduction. Grazing of domestic stock is limited to areas with a grassy understory and reliable water source and may be restricted at times due to operational, silvicultural or environmental considerations. Grazing must comply with the requirements of the *Local Land*

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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.

Grazing is managed through the issue of Forest permits and leases. Grazing is limited to Forest Management Zones 3A, 3B, 4, 5, 6 and 7. In accordance with the IFOA, the Western Region has developed a Grazing Management Plan to manage any adverse impacts on the environment by grazing animals.

9.1.11.2 Apiary

NSW DPI issues beekeeping permits on behalf of Forestry Corporation for State forests and some Crown timber land (with consent from the relevant land manager) over areas known as ranges or sites. Permits are issued which allow apiarists to set down hives in a defined area, unencumbered by other apiary hives. ranges are located in FMZ 3B, 4, 5, 6 and 7. Other FMZ areas (1, 2 and 3A) that have historically been used by apiarists may continue with approval of the relevant Forestry Corporation manager.

9.1.11.3 Forest materials and products

In addition to timber, 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, Broombush and charcoal. Permits are issued for firewood collection in approved 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.

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PART FIVE – Cumberland State Forest context

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Part five is to be read in conjunction with part one, which summarises management activities and commitments that are common across Forestry Corporation of NSW.

10.1 Background

Cumberland State Forest at West Pennant Hills is a dynamic and unique urban forest environment within which the principles of ecologically sustainable forest management are demonstrated in conjunction with recreation, education, research and commercial activities. No commercial timber harvesting operations are undertaken within the forest. The site also contains a corporate facility, accommodating offices for approximately 70 Forestry Corporation staff and approximately 40 NSW Rural Fire Service staff.

Cumberland State Forest is Australia's only metropolitan State forest, located only half an hour from the Sydney CBD. Cumberland State Forest contains nearly 40 hectares of native forest. The original privately-owned land was cleared in 1908. In 1938 its management was taken over by the then NSW Forestry Commission and was dedicated as a State forest in 1939. One third of the land was planted as an arboretum while the rest was allowed to regenerate naturally. The ecological sustainable management of the forest has protected natural values while at the same time providing for multiple use activities, including recreation, research, commercial and corporate activities.

Commercial enterprises that occur in Cumberland State Forest include:

- » on-site businesses operated under permit including a café, nursery and TreeTops Adventure Park
- » infrastructure including telecommunications towers located on the site.

10.2 Management and certification considerations

Cumberland State Forest covers 39.57 hectares and is managed by the Forestry Corporation of NSW as outlined in Section 1.1. It is not covered by any RFA. As such, none of the operations undertaken at Cumberland State Forest are regulated by the CIFOA.

Cumberland State Forest is not within the Defined Forest Area for the Coastal Forests of NSW, however it is within the scope for certification to the Australian Standard for Sustainable Forest Management (AS4708:2021).

Cumberland State Forest does not contain any commercial hardwood or softwood plantations. The arboretum is planted, but not managed commercially.

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Forestry Corporation manages Cumberland State Forest using standard operating procedures and operating within the constraints of environmental and local government regulations and by applying adaptive management principles.

10.3 Planning

As no wood harvesting activities are undertaken in Cumberland State Forest there is no requirement to undertake long, medium or short-term wood supply models and plans. Site-based plans are prepared for prescribed burning, new road and trail construction, weed management and emergency response and act as a blueprint for implementing these activities by staff and contractors.

10.4 Operational planning

The key operations that are undertaken at Cumberland State Forest include:

- » road and trail maintenance (see 4.7 Roads and infrastructure)
- » fire management, including hazard reduction burning (see section 4.3 Forest health)
- » emergency response (see section 3.5 Fire management and emergency response)
- » recreation facility construction and maintenance (see 5.3 Community services)
- » pest animal control (see section 4.1 Biodiversity and 4.3 Forest health)
- » weed control (see section 4.1 Biodiversity and 4.3 Forest health).

The operational planning undertaken at Cumberland State Forest for the above activities is undertaken as outlined in the relevant sections noted above.

10.5 Monitoring and audit

The FMS encapsulates a system of monitoring, auditing and reviewing processes, which allows for continuous improvement and adaptive management. Monitoring and audit of Cumberland State Forest operations is conducted consistent with Section 3.1.4.

10.6 Operations

Cumberland State Forest differs to the operations undertaken in other divisions as no wood harvesting or plantation establishment and tending is undertaken.

Key activities that are undertaken in Cumberland State Forest include:

- » weed and pest control
- » prescribed use of fire
- » road construction and maintenance
- » recreation and tourism.

These activities are undertaken with specific controls that aim to minimise the risks.

10.6.1 Roads and infrastructure

Within Cumberland State Forest there are a number of built assets including two forest cottages, a corporate facility, a commercial nursery, a visitor centre, a high ropes course and an onsite café. The forest is bounded on the northern, eastern and southern sides by residential houses and on

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the western side by a site subject to a future housing development which includes an area of privately managed forest. The forest also contains infrastructure including:

- » two telecommunication towers - one near Castle Hill Road and the at the rear of the nursery in the middle of the forest
- » underground power, water and sewage services
- » a public entry and exit road
- » an extensive walking track and fire trail network.

The 3.4 kilometres of sealed road within the forest provides an all-weather scenic circuit through the forest suitable for two wheel drive vehicles. On average almost 2,000 vehicles are recorded entering Cumberland State Forest weekly, including visitors to the nursery, visitor centre, high ropes course and café as well as employees at these businesses and the corporate facility. The months of October to February are the busiest months of the year for visitors.

The verges of the road are well protected with gravel or leaf litter and regular maintenance of pipe inlets and outlets maintains good drainage and prevents soil erosion. The 3.1 kilometres of trails in the forest are natural surface, used primarily for access for fire management but also by maintenance vehicles, cyclists and pedestrian traffic.

In Cumberland State Forest, Forestry Corporation maintains the road network to:

- » minimise the risk of water pollution
- » maintain adequate access for fire protection and management
- » provide appropriate public access.

In managing the road network at Cumberland State Forest, Forestry Corporation:

- » has due regard to the needs of traffic, public safety, state of repair and potential for environmental harm in determining which roads will be available for public use
- » provides services to the public such as access for recreation and tourism as a community service obligation.

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

- » identifying future network requirements and any major new construction of roads that may be necessary
- » providing and maintaining a road network to assist with fire suppression and management
- » ensuring the relevant workforce is trained, competent and accredited where required
- » undertaking regular maintenance and monitoring of the road and trail network.

10.7 Forest estate

Cumberland State Forest is a 39.57-hectare forest located within West Pennant Hills, an urban suburb 20 kilometres north-west of the Sydney central business district. Originally privately owned land, the area was cleared for agriculture in 1908. Purchased by the Forestry Commission in 1938, one third was planted as an arboretum and the remainder was allowed to regenerate and has been developed with a recreational and sustainable forest management focus. No commercial wood harvesting operations are conducted in the forest.

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Cumberland State Forest is bounded on all sides by residential development. The forest is located less than two kilometres from major arterial roads including Pennant Hills Road, the Cumberland Highway and the M2 motorway. The main entry to the forest is from Castle Hill Road and there is a secondary entrance located on Oratava Avenue.

Cumberland State Forest is situated immediately south of the ridge forming the watershed between Berowra Creek to the north and the Parramatta River. The forest is on the south-western escarpment of the Hornsby Plateau near the Hornsby Warp that separates the Plateau from the Cumberland Basin. Due to its location at the top of the Parramatta River catchment the forest forms an important link in the corridor of vegetation between Lake Parramatta Reserve and Berowra Water Regional Park.

Cumberland State Forest lies at the interface between the Hawkesbury sandstone and the overlying Wianamatta shale generating two distinctly different soil types and three dominant forest associations. Wianamatta shale underlies the northern and highest section of the forest with Hawkesbury sandstone underlying the southern and lower sections. This geology has produced the clay dominated Cumberland association soils in the north and sandstone based Hammondville association soils in the south, with transitional soils occurring in the centre of the forest. The two basic rock types produce totally different landforms: the northern section of Cumberland State Forest reflects its shale origin in a gently undulating topography while in the south minor outcrops and small cliffs consistent with the sandstone geology are evident (see the Lidar digital elevation model image for Cumberland State Forest in 10-1).

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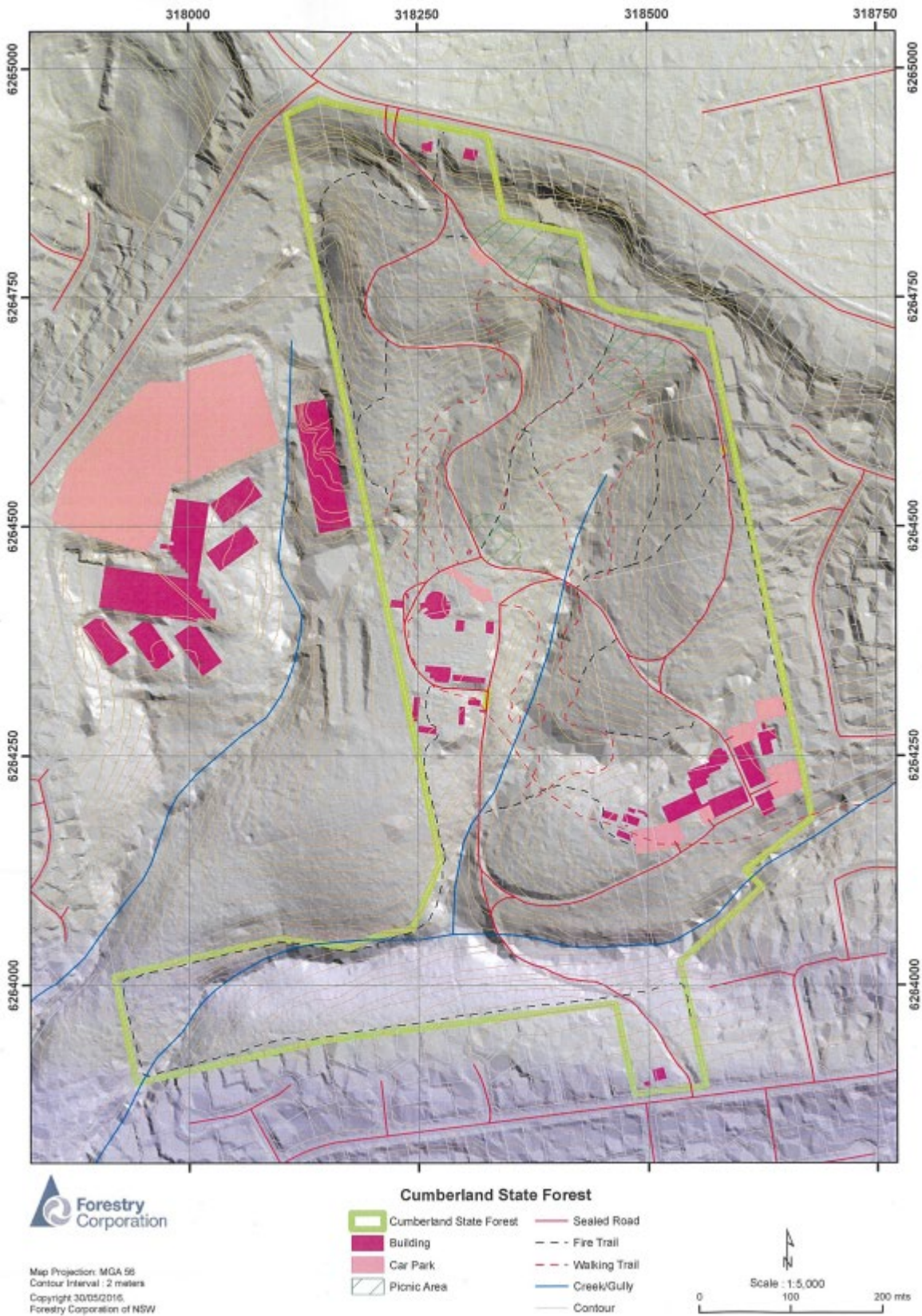


Figure 10-1: Lidar digital elevation model image for Cumberland State Forest

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Forest types

Cumberland State Forest is of conservation significance as it not only provides one of the largest extant examples of wet sclerophyll forest on Wianamatta shale in the Sydney metropolitan area (that were all but cleared for agriculture, orchard and residential purposes) but also provides an island of habitat for numerous species of flora and fauna within the highly developed urban areas that surround it.

Three main vegetation communities have been identified as occurring within Cumberland State Forest:

- » Dry Sclerophyll Forest (shrubby sub formation)
- » Wet Sclerophyll Forest
- » Rainforest Communities (planted arboretum).

Within these communities there are several canopy species associations that gradually change with the local topography and geology. These have been identified below in Table 10-1.

Table 10-1: Vegetation communities within Cumberland State Forest

Vegetation Communities	Vegetation Associations/Forest Types
Rainforest Communities (Planted Arboretum)	Planted Arboretum includes species such as: Water gum <i>Tristaniaopsis laurina</i> Bangalow Palm <i>Archontophoenix cunninghamiana</i> Cabbage Tree Palm <i>Livistonia australis</i> Sandpaper Fig <i>Ficus coronate</i> Hoop Pine <i>Araucaria cunninghamii</i> Bunya Pine <i>Araucaria bidwilli</i> Norfolk Island Pine <i>Araucaria heterophylla</i>
Wet Sclerophyll Forest	Forest associations include: <ul style="list-style-type: none"> » Sydney Blue Gum (<i>Eucalyptus saligna</i>) » Blackbutt (<i>Eucalyptus pilularis</i>)/Sydney Blue Gum » Grey Ironbark (<i>Eucalyptus paniculata</i>)/Sydney Blue Gum » Blackbutt/Turpentine (<i>Syncarpia glomulifera</i>)
Dry Sclerophyll Forest	Forest associations include: <ul style="list-style-type: none"> » Forest Red Gum (<i>Eucalyptus tereticornis</i>)/Grey Gum (<i>Eucalyptus punctata</i>)/Grey Ironbark (<i>Eucalyptus paniculata</i>) » Turpentine (<i>Syncarpia glomulifera</i>)

The distribution of forest types is influenced by the transition in geology through the forest. The northern section of the forest consists primarily of a Blue Gum (*Eucalyptus saligna*) /Grey Ironbark (*E. paniculata*) ecosystem associated with soils derived from the Wianamatta Shale. As the sandstone influence increases in the central section Blackbutt (*E pilularis*) replaces the ironbark in association with the Blue Gum (*E. saligna*). In the southern section there is greater shelter and the sandstone influence dominates and Blackbutt becomes associated with Turpentine (*Syncarpia glomulifera*) and Blue Gum becomes less dominant.

10.7.1.1 Arboretum

During 1937 the Commissioner for Forests, Mr E.H.F (Harold) Swain, directed that a search be made in the Sydney metropolitan area for an area suitable for the purpose of ornamental tree production, an arboretum, forest experimentation and conferencing. In 1938, land was purchased and dedicated as Cumberland State Forest.

A mixture of Australian and exotic tree species was planted on substantially cleared areas of Cumberland State Forest as an arboretum for scientific study. Planting of seedlings commenced in 1939 and the majority were established by 1944. The arboretum was originally established in the eastern part of the forest and later plantings were made along a minor creek line to protect rainforest gullies. The arboretum was established by Wilfred de Beuzeville, who had begun his career as a forest assessor in the Pilliga Cypress forests in 1915 and went on to eventually head the forest ecology division of the Forestry Commission in 1947.

Species were initially planted in circular groups, but this primary spatial structure has been lost with the death of many trees. An uneven pattern of species survival has probably resulted from the site not meeting physiological requirements while death of individuals could be caused by competition and changing environmental conditions including water availability and pollution.

The arboretum contains an extensive collection of tree species of great scientific, botanical and educational value including nine species considered rare or threatened in their natural occurrence (ie *Austrobuxus swainii*, *Choricarpia subargentea*, *Eucalyptus curtisii*, *Eucalyptus guilfoylei*, *Eucalyptus kartzoffiana*, *Eucalyptus macarthurii*, *Eucalyptus rummeryi*, *Eucalyptus scoparia*, *Eucalyptus squamosa*).

These historical plantings have scientific value but also form part of the cultural heritage, recreational and educational resource of Cumberland State Forest.

10.7.1.2 Native forest structure

As private property, the forest was substantially logged prior to purchase and dedication as State forest by the Forestry Commission of NSW in 1938. Cumberland State Forest is today predominantly a mixture of mature and early-mature secondary forest ecosystems. There are some older trees which have developed hollows, in branches and stems, which are used by a variety of arboreal (tree dwelling) fauna.

The absence of disturbance such as frequent low intensity fire and occasional wildfire has led to a reduction in diversity of age classes of canopy forming species. Nevertheless, aging of various components of the forest has improved the ecological niches associated with older trees and the conservation value of the forest.

As mature trees age with time, they will develop more hollows and the periodic removal of some trees, either naturally or artificially, will increase regeneration of canopy forming species, further increasing the complexity of the forest structure.

10.7.2 Biodiversity and forest health

Low intensity prescribed burning is undertaken at Cumberland State Forest to protect forest health, economic assets and people. Cumberland State Forest also has in place a weed

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management strategy to manage against invasive weeds. This is complemented by the bushcare volunteer group that is active in the forest.

No wood harvesting or forest silvicultural activities are undertaken in Cumberland State Forest except from time-to-time for demonstration or educational purposes or when a tree is generally being felled for safety reasons.

10.7.2.1 Biodiversity

The Blue Gum High Forest in the Sydney Basin Bioregion is listed as a critically endangered ecological community under the NSW *Biodiversity Conservation Act 2016* and also under Commonwealth legislation. The Sydney Turpentine-Ironbark Forest is listed as an endangered ecological community under the same NSW legislation and is listed as critically endangered by the Commonwealth. Modelling of these ecosystems indicates that they may occur on some sections of Cumberland State Forest. No threatened flora species are known to exist in Cumberland State Forest.

The forest provides habitat for a variety of common and threatened avifauna, insectivorous bats, insects, reptiles, amphibians and arboreal mammals. The size of the forest generally limits the number of species that can develop viable populations within its precincts however more mobile species, particularly birds and flying mammals can use the forest as part of their home range.

Threatened species, as identified under the *Biodiversity Conservation Act 2016*, known to occur within and adjacent to Cumberland State Forest include:

- » Powerful Owl *Ninox strenua* (Vulnerable - NSW)
- » Eastern Freetail Bat *Mormopterus norfolkensis* (Vulnerable - NSW)
- » Greater Broad-nosed Bat *Scoteanax rueppellii* (Vulnerable - NSW)
- » Little Bentwing-bat *Miniopterus australis* (Vulnerable - NSW)
- » Yellow-bellied Sheath-tailed Bat *Saccolaimus flaviventris* (Vulnerable - NSW)
- » Eastern Bentwing-bat *Miniopterus schreibersii oceanensis* (Vulnerable – NSW)
- » Grey Headed Flying Fox *Pteropus poliocephalus* (Vulnerable - NSW), and
- » Swift Parrot *Lathamus discolor* (Endangered - NSW).

The forest acts as a corridor for avifauna (bird) migration and breeding. A number of bird species have also been identified as possibly inhabiting the forest and adjacent lands by local avifauna experts such as the Cumberland Bird Observers Club. These species include:

- » Dusky Woodswallow *Artamus cyanopterus cyanopterus* (Vulnerable – NSW)
- » Varied Sitella *Daphoenositta chrysoptera* (Vulnerable – NSW)
- » Little Lorikeet *Glossopsitta pusilla* (Vulnerable – NSW)
- » Superb-fruit-dove *Ptilinopus superbis* (Vulnerable – NSW)
- » Gang-gang cockatoo *Callocephalon fimbriatum* (Vulnerable – NSW), and
- » Black-chinned Honeyeater *Melithreptus gularis gularis* (Vulnerable – NSW)

A one-off sighting of a single male Koala (*Phascolarctos cinereus* – Vulnerable) occurred in Cumberland State Forest in 2002. It was tracked in the forest from 4 April 2002 to 12 July 2002 and no trace of the animal was detected after this period. Many formal and informal fauna surveys have been undertaken in Cumberland State Forest since this time, including a fauna survey conducted by Forestry Corporation's ecologist in 2007, a review of environmental factors for the

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high ropes course, observations by local bird clubs and scientific studies by secondary and tertiary students. No wild koala sightings have been recorded in Cumberland State Forest or adjacent properties since this sighting in 2002. It is also considered that Cumberland State Forest and adjacent properties do not provide a large enough bushland area to support a viable population of koalas.

Regionally/locally significant fauna also recorded as occurring within Cumberland State Forest include the Sugar Glider *Petaurus breviceps*.

Rabbits and foxes have been observed in the forest and, together with pets which have escaped captivity or are allowed to roam in the forest, are thought to be having an increasing impact on the native fauna of the forest. Continuation of the current levels of activity may lead to significant reduction in native species populations. However, control programs will only be successful if they have community support and participation.

Cumberland State Forest has facilitated research into habitat augmentation, particularly through artificial nesting boxes to supplement natural arboreal nesting sites. The research appears to have assisted in maintaining the suite of arboreal mammals and micro-bats.

Cumberland State Forest, together with the adjoining private property and Bidigal Reserve form a forested stepping stone within the fragmented fauna and flora corridor between Lake Parramatta Reserve and Berowra Valley Regional Park and serve as an important corridor from Lane Cove National Park. As with all metropolitan forested areas, these corridors are important in the context of urbanisation.

As no commercial wood harvesting operations are undertaken at Cumberland State Forest, Forestry Corporation will not carry out all the actions listed in the FMP, including establishing metrics to enable tracking of outcomes on flora, fauna and soil. Forestry Corporation will:

- » develop a fuel management plan for Cumberland State Forest
- » develop a weed management strategy for the forest, within the context of the Greater Sydney Regional Weed Management Plan
- » undertake trapping programs for pest animals on an as needs basis
- » train and, where necessary, accredit staff to a standard necessary to achieve biodiversity conservation outcomes
- » undertake cooperative research to improve biodiversity conservation outcomes as required
- » cooperate with other government agencies, neighbours and community organisations in the managing the biodiversity values in the forest.

10.7.2.2 Eucalypt decline, disease and insects

Insectivorous damage (leaf miners), particularly to the Blue Gum forests has been recorded and researched for many years. Seasonal change and drought conditions are reported to vary the infestation and recovery rate of the forest. The presence of Bell Miners, in competition with other native insectivorous avifauna, and the absence of fire are also considered to be potential causes of poor forest health. Ecological burning has been proposed as a potential remedial action.

To combat the causes and effects of eucalypt decline, disease and insects at Cumberland State Forest, Forestry Corporation management activities will be informed by ongoing external research.

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10.7.2.3 Pest Animal Management

Vertebrate pest animals recorded on Cumberland State Forest include rabbits, cats and foxes. Most are either domestic wanderers (neighbours' cats) or feral animals and appear to be increasing in line with population growth. Herbivores such as the rabbit have potential to impact on native plant species while there is anecdotal evidence that the carnivores are impacting on indigenous fauna populations, particularly breeding birds.

Continued unabated predation by pests may lead to significantly reduced native populations which in turn will reduce the conservation value of the forest in the local and regional context. Community support to limit the free ranging of pets and to establish control programs will be essential to the success of such programs.

To mitigate the impact of pest animals in Cumberland State Forest, Forestry Corporation will:

- » consult with appropriate bodies including the Sydney North Vertebrate Pest Committee, LLS and local council
- » undertake control work in line with the NSW Agriculture Vertebrate Pest Control Manual and implement the requirements of the *Pesticides Act 1999*
- » undertake pest animal control based on incidental sightings and information from previous programs and other agencies, on an as needs basis.

10.7.2.4 Weed Management

Dumping of garden weeds and the inadvertent spread of garden plants from neighbouring properties contributes significantly to the spread of weeds and disease through Cumberland State Forest, particularly along creek lines. The volunteer bush regeneration program is helping to control weeds and reinstate endemic species. The use of fire to reduce vegetation mass may facilitate hand weeding or could assist in reducing the amount of chemicals on the forest.

Community support to reduce dumping and the spread of garden plants will be essential to ensure the continued success of control programs. To mitigate the effects of weeds in Cumberland State Forest and adjoining tenures, Forestry Corporation will:

- » have in place a weed management strategy that identifies the weeds, their distribution and control techniques. Where control involves the use of herbicides, the type of herbicide, appropriate application techniques, environment protection measures and the safe storage, handling and disposal of chemicals and containers will also be addressed
- » respond to stakeholder concerns regarding weed treatment
- » monitor the results of weed management.

10.7.3 Fire Management

The forest contains a mosaic of ecosystems that reflects the interaction of plants, climate and soil. Typically, these ecosystems evolved under a fire regime of ignition by lightning and Aboriginal people with fire suppression largely reliant on natural barriers and prevailing climatic conditions. The fire history of Cumberland State Forest is poorly understood, although one wildfire in 1925 is recalled by neighbours to the forest.

No major fire events have been recorded across the landscape of Cumberland State Forest since the time of land purchase in 1938 and commencement of forest regrowth some 70 years ago.

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Some manual removal of fuel was undertaken in the early 1980s. As part of the 1984 Management Plan a fire management plan was developed, however population growth around the forest made this difficult to implement.

There have however been small areas which have been treated with fuel management burns. Records indicate that fuel reduction burns have been conducted since 1991, although records prior to this date are not available. A moist understorey and associated weed growth has developed in many areas of the forest, possibly as a result of the absence of low intensity fires before 1991.

Although intensive development surrounding Cumberland State Forest reduces the risk of fire entering the forest from outside, there is some potential for fire ignition within the boundaries of the forest as a result of arson or lightning.

Forestry Corporation has a number of business and risk management imperatives to maintain an effective and efficient fire management capacity. In relation to Cumberland State Forest, appropriate fuel management strategies will aid in the protection of internal built assets such as recreational infrastructure, the corporate facility, nursery, high ropes course, visitor centre and café, internal environmental assets such as the historical arboretum and threatened species and external assets such as adjoining residential properties. In total, these assets are valued at more than \$100 million, with the corporate facility within Cumberland State Forest alone valued at approximately \$6 million.

A Cumberland State Forest Fuel Management Plan 2021-2026 has been developed. This encapsulates how fuel is to be managed within specific management zones within Cumberland State Forest. From this, prescribed operational burn plans are developed to manage the fuel loads within the forest.

The limited fire history in the forest has impacted on the general health of trees and is considered to be one of the causes of die back in the Blue Gum forest. The application of fire and establishment of appropriate fire regimes as an ecological management tool and to address forest health requires further investigation.

In executing its fire management responsibilities in Cumberland State Forest, Forestry Corporation will:

- » develop fuel management plans and emergency response and inclement weather procedures, which are consistent with, and aim to achieve the objectives of, NSW Bush Fire Risk Management Plans
- » develop pre-incident plans to provide consistent instructions and information to staff about resourcing, key contacts and logistics
- » provide details of each proposed hazard reduction burn into the Rural Fire Service (RFS)'s fire management systems and ensure areas burnt are updated as required
- » contribute to a corporate fire management strategy to guide fire management planning, implementation and cooperation with other agencies
- » 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

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- » report on fire prevention and suppression performance annually in Forestry Corporation's Sustainability Report.

10.7.4 Soil and water

Cumberland State Forest falls within the Parramatta River catchment and Darlings Mills sub catchment. First order streams are located within the upper slopes of CSF and form tributaries of the second order stream known as Darlings Mills Creek. The quantity and quality of water flowing from the Castle Hill Road and surrounding properties has changed over the years. The health of different parts of the forest reflects some of those changes to the surface and ground water. Establishments in Cumberland State Forest use water from the metropolitan reticulation system.

At Cumberland State Forest, Forestry Corporation will:

- » manage forest fuels to minimise potentially catastrophic wildfire damage
- » maintain the road and trail network to minimise sediment input to the stream network
- » train and accredit, where necessary, staff and contractors with operational and supervisory roles in road works.

10.7.5 Community Service Obligation

The management of Cumberland State Forest (excluding the management functions undertaken at the corporate facility) is primarily funded by Community Service Obligation (CSO) funding as the key activities undertaken on-site are:

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

10.7.6 Recreation and tourism

The development of Cumberland State Forest as a recreational resource commenced with the establishment of walking trails through the arboretum but was substantially enhanced during the 1970s and 1980s. Today, with its environment, facilities and programs, Cumberland State Forest currently attracts visitors of all ages and nationalities and from a variety of backgrounds.

Typically visits are focused on one or several of the following:

- » Recreation: dog walkers, visitors using the high ropes course, Tai Chi enthusiasts, picnickers, birdwatchers, artists
- » Exercise: joggers, walkers, cyclists
- » Shopping: visiting the nursery
- » Refreshment: visiting the café
- » Bus tours: as a rest-stop as part of a wider tour of the area
- » Education: student groups from primary, secondary and tertiary institutions learning broad context science, geography, forestry and environmental studies

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- » Filming: film, advertising and television location shoots
- » Functions: weddings, parties and promotional events
- » Professional visits: local, national and international visitors.

The forest allows a variety of activities with the café, nursery and visitor centre and high ropes course all well patronised. Variety and intensity of use impacts on the forest and its facilities and for its size Cumberland State Forest experiences a high visitation level.

There are four picnic areas located within Cumberland State Forest. Facilities included at some of these sites include open picnic tables, BBQs, covered shelters, power, toilets and drinking water. Facilities have generally been dispersed to reduce population pressures in any given area. The 2.8-kilometres of walking trails provide popular recreation for able-bodied visitors and form an important component of the education program. The Sensory Trail, one of the last to be developed, has light grades and is accessible to wheelchairs.

10.7.7 Education

Forestry Corporation delivers school and community education programs at Cumberland State Forest to increase awareness about sustainable forest management. The school education program encompasses a comprehensive range of topics on broad environmental and general science areas in line with the Australian curriculum. These programs are promoted as part of the Forest and Wood Products Australia Forest Learning initiative, of which Forestry Corporation is an active participant.

10.7.8 Forest permits

Cumberland State Forest generates revenue through land rental activities such as:

- » leasing sites for telecommunication towers
- » lease of the retail nursery site under permit
- » lease of the café premises under permit
- » easements for the provision of essential services to neighbouring properties
- » commercial recreation opportunities including the high ropes course.

There are no grazing, apiary, forest product or material operations at Cumberland State Forest.

10.8 Cultural values

10.8.1 Aboriginal cultural heritage

Cumberland State Forest lies in the country of the Dharug peoples. The Dharug were the inland Aboriginal group of the Sydney hinterland, making use of both the rich diversity of the Hawkesbury River food supplies and the land animals and plants of the adjacent valleys and hills.

Early European colonisers of the area reported several different groups or clans inhabiting the locality, including the Darramurragal, Gamaraygal, Bediagal and Walumedegal. The exact boundaries of these groups are not known, although it is thought that the Gamaraygal inhabited the lower north shore of Sydney west to the Lane Cove River whilst the Walumedegal lived west of the Lane Cove River through Ryde to Parramatta, the Bediagal probably inhabited the area to the north-west of Parramatta, between Parramatta and Hawkesbury River, possibly around

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present day Castle Hill and the Darramurragal were from the Upper North Shore area at the head water of Lane Cove.

No physical evidence of occupation by Aboriginal people has been found on Cumberland State Forest. The forest however forms part of an area that was extensively used by Aboriginal people and it can be expected that Cumberland State Forest is no exception. Known and unknown sites are protected under the *National Parks and Wildlife Act 1974*.

Forestry Corporation undertakes activities at Cumberland State Forest in a manner consistent with the Operational Guidelines for Aboriginal Cultural Heritage Management (A Due Diligence Code of Practice).

10.8.2 Aboriginal joint management options

There are no Indigenous Land Use Agreements (ILUA), partnerships or Memoranda of Understanding in place with Aboriginal people or communities for Cumberland State Forest.

10.8.3 Non-Aboriginal cultural heritage

At the time of European settlement, the land on which the majority of Cumberland State Forest lies was naturally forested with Blackbutt, Ironbark and Blue Gum. The land was granted to John Shepherd and called 'Shepherd's Bush'. Records suggest that the land was harvested for timber products including general purpose hardwoods for building and joinery in the Sydney area and some of this was milled at the sawmill in Hull Road in West Pennant Hills which operated into the 1970s.

During 1937, the Commissioner for Forests, Mr E.H.F Swain, directed that a search be made in the Sydney metropolitan area for an area suitable for the purpose of ornamental tree production, an arboretum, forest experimentation and conferencing. As a result, one main property and five adjoining properties were purchased by the Forestry Commission and dedicated as Cumberland State Forest between 1937 and 1943.

When purchased the northern section of the main property was already cleared and suitable for the establishment of an arboretum, while the remaining land was covered in what was regarded as "second growth forest".

In 1938 land was purchased and dedicated as Cumberland State Forest. At the time of dedication the land was bounded by farming properties owned by the Bellamys and Mobbs.

None of the built assets within the forest have been formally declared as cultural heritage however there are some structures and land forms that have been identified as providing evidence to its past land use and cultural history. Special features within Cumberland State Forest include the historical fence line located along the southern boundary that would have formed the boundary fence between the forest and the Bellamys and the western boundary that would have formed the boundary fence between forest and the Mobbs property.

A sawpit provides evidence of very early forest use for timber production while remnants of an old quarry point to provision of regional road infrastructure. These sites are recorded in the Local Environment Plan for The Hills Shire Council.

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The establishment of the arboretum commenced in 1939 with walking trails built through the groves. This was the beginning of a policy of deliberate recreational development which led to the current facilities.

In line with the original purpose of acquisition, facilities were developed in the south eastern corner of the forest for wood technology research and conference purposes and an extensive library of forestry principle and practice was established. The Research Division of the Forestry Commission moved to the site in 1972.

Cultural heritage sites are protected under the NSW *Heritage Act 1977*. The sawpit and quarry are recorded in the Local Environmental Plan for the Hills Shire Council. Activities in Cumberland State Forest will be managed consistent with Forestry Corporation's Guidelines for Non-Aboriginal Cultural Heritage Management.

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