

Forest Land Flora Reserve SITE SPECIFIC WORKING PLAN



**FCNSW Compartments:
199, 200, 211, 228, 337, 338, 342 and 343**

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Front cover: Forest Land Flora Reserve. Photo credit: M Lieberman, OEH

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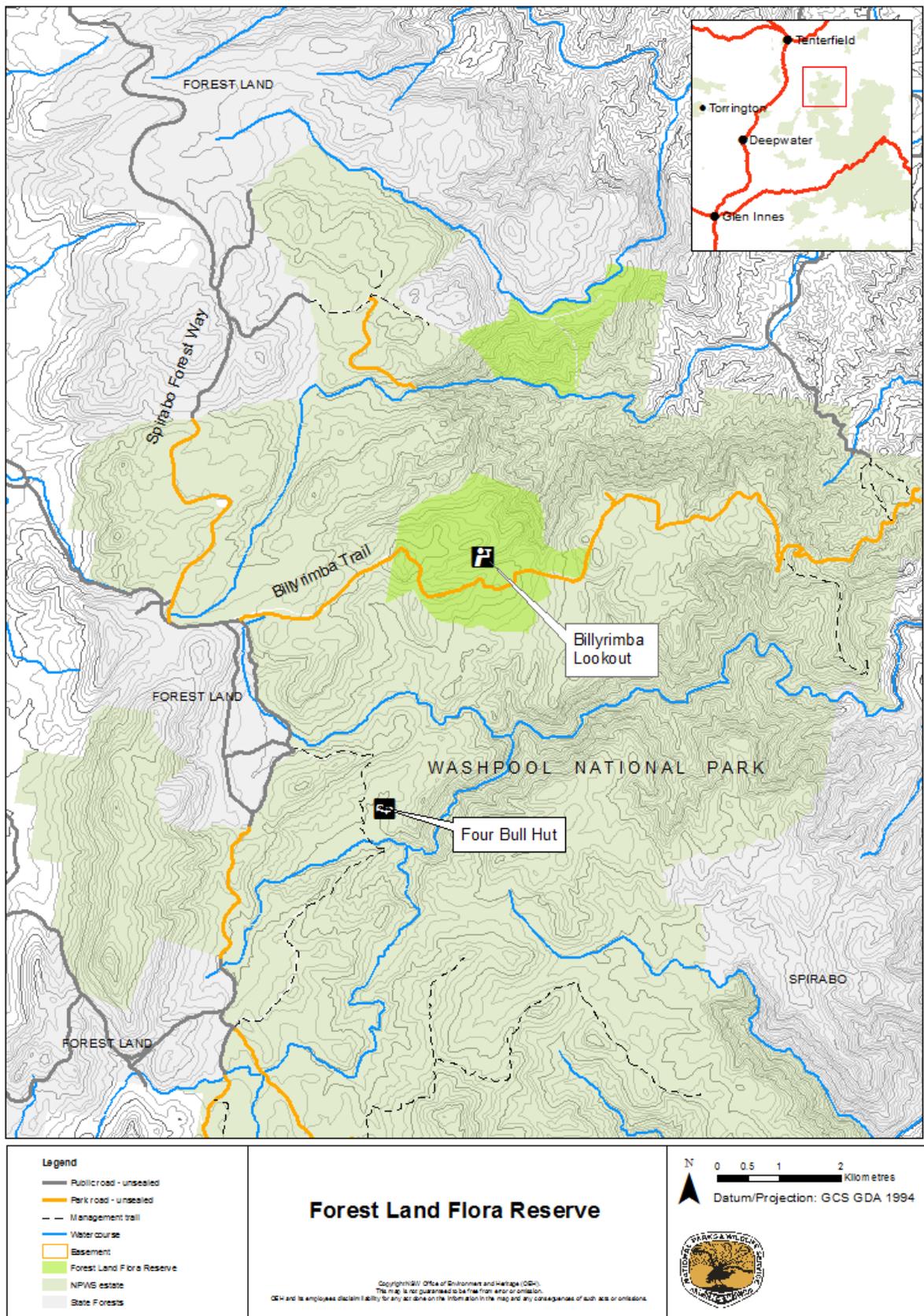


Figure 1 Location map

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1. Introduction

In 2018 the NSW Government dedicated a series of public lands as national park, state conservation area and flora reserve in northern NSW. Many of these new reserves were identified because they protect important koala habitat. Others supported potential habitat or movement corridors and make other significant biodiversity contributions to the NSW reserve system.

Forest Land Flora Reserve (FR) is the subject of this plan and is one of a number of state forest flora reserves which have been added to the NSW conservation reserve network. Under agreement between the Minister for Lands and Forestry and the Minister for the Environment, the NSW National Parks and Wildlife Service (NPWS) has been appointed land manager for the new flora reserves.

Under the *Forestry Act 2012*, flora reserves must be managed for the preservation of native flora in accordance with a working plan. This working plan has been prepared in accordance with section 25 of the *Forestry Act*. Flora reserves offer similar conservation and public use benefits to those offered through the national park estate managed by NPWS. This plan aims to deliver land management integrated with the management of Washpool National Park (NP).

The generic management actions applicable to all flora reserves managed by NPWs are set out in a separate general working plan (Appendix 1). The reserve-specific objectives and actions outlined in this working plan are a combination of local stewardship activities and specific actions to address particular values found in Forest Land FR.

The plan seeks to apply an adaptive management approach, so lessons learnt and information arising can be used by local managers to adjust or change some management activities (Appendix 2) without the need to amend the whole plan, which requires approval by the NSW Government.

This plan has been developed on the basis of information sourced from Forestry Corporation of New South Wales (FCNSW) records and consultations, NSW government databases and local NPWS staff.

2. NPWS Management

Forest Land FR will be managed by NPWS in accordance with the principles, objectives and legislative framework of the *Forestry Act* and the Agreement for the Management of Flora Reserves between the Minister for Forestry and Lands and the Minister for the Environment (OEH 2018). NPWS will draw on its own management frameworks to achieve this.

The western section of Washpool NP was gazetted in 1997 and has been added to several times since then. Washpool NP is managed by NPWS under the Gibraltar Range Group of Parks Plan of Management which was adopted in 2005. In 2000 NPWS purchased the Crown lease to the land now known as Forest Land FR as part of the Upper North East Regional Forest Agreement process.

The management of Forest Land FR will be integrated into the management of western Washpool NP. However, this working plan will stand alone in terms of its role in ensuring the original purpose of the flora reserve dedication is upheld.

The Chief Executive, Office of Environment and Heritage (OEH) has been appointed as land manager of the Forest Land FR by the Minister for Forests under s.57(3) of the *Forestry Act*. This will enable NPWS to manage the land in accordance with this working plan.

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3. Details of the Reserve

3.1 Location

Forest Land FR is located in and adjacent to Washpool NP on the Northern Tablelands of New South Wales, approximately 96 kilometres north-east of Glenn Innes, and 40 kilometres south-east of Tenterfield. Washpool NP is part of the Gibraltar Range group of parks (see Figure 1).

The reserve has a total area of 727 hectares which is split between two parcels. The Billyrimba parcel is 461 hectares and is completely surrounded by Washpool NP. The other parcel is 266 hectares and is located on the northern edge of Washpool NP.

The two parcels are separated by approximately 1.6 kilometres at the narrowest point. The Billyrimba parcel is accessed from the west via Spirabo Forest Way which borders the western edge of Washpool NP, and Billyrimba Trail, which traverses the parcel east-west. The northern parcel has no public vehicular access.

3.2 Key Attributes of the Reserve

The Reserve possesses the following identified attributes that are to be protected:

The Forest Land FR is situated within Washpool NP which is part of the Gondwana Rainforests of Australia World Heritage Area and comprises some of the most diverse and least disturbed forested country in New South Wales.

The World Heritage Area includes forty parks and reserves stretching along the Great Escarpment from Barrington Tops in NSW to south east Queensland. The area has a long history of selective logging, dating back to the 1800s when the valuable red cedar trees drew timber cutters with bullocks, axes and crosscut saws. With the development of machinery, the increasing pressure to exploit these mature forests met strong protest action from conservation groups. Ultimately, Washpool NP was created in 1983 after a study found the area contained significant plant and animal populations that either were not found anywhere else in the state or were not well protected in the reserve system.

Forest Land FR is significant for the following values requiring conservation and management:

- remote, well-protected native forests which are part of one of the largest unbroken expanses of wet and dry forests on the northern tablelands
- part of the regional wildlife corridor between Washpool NP and Malara State Forest to the northeast
- habitat for several threatened native animals, particularly the frog *Philoria pughii*, and likely habitat for threatened native plants
- part of Country for the Bundjalung Aboriginal People.

These values are described in more detail in the following sections. To make the document clear and easy to use, natural and cultural heritage, park use and threats to values are dealt with individually, but their interrelationships are recognised.

3.3 General Description

Geography

The landform of the Forest Land Flora Reserve is typical of the rugged plateau landscape of the Northern Tablelands, dissected by watercourses and gorge systems. Altitude within the Forest Land Flora Reserve ranges from 560 – 1100 metres above sea level. The highest point in the

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area is Mount Spirabo at 1474 metres elevation, and approximately 13 kilometres further south in Washpool NP.

The terrain of the Billyrimba parcel of the flora reserve is mostly undulating, but falls more steeply towards its north-east corner, drained by two unnamed watercourses. The northern parcel of the flora reserve is consistently much steeper, rising over 500 metres in elevation towards the north-west. Burra Creek forms its northern border and Billyrimba Creek, the southern border. These creeks drain to Timbarra River to the east.

The flora reserve is located on the very eastern edge of the New England Tableland Bioregion and in fact, the northern parcel lies half within the North Coast Bioregion (DEE 2012). The New England Tableland Bioregion is botanically significant due to its plant species diversity and high level of endemism.

The reserves lie within the administrative regions of the Upper North East Regional Forest Agreement, Northern Tablelands Local Land Services, Moombahlene Local Aboriginal Land Council, NPWS Northern Inlands Branch, Forest Corporation of NSW Northeast Region and Tenterfield Shire Council.

Landscape, geology and soils

The flora reserve occurs in the New England Fold Belt which extends from north of Sydney to the coast of central Queensland. The New England Fold Belt is a belt of complex geology composed of sedimentary rocks dating from the Carboniferous period (358.9 million years ago) of the Palaeozoic Era. These were extensively faulted during a period of rapid continental plate movement associated with granite intrusions in the late Carboniferous period (NPWS 2003). The extensive granite intrusion in the southeast part of the fold belt is known as the New England Batholith.

Numerous faults occur within the region, the most conspicuous being the Demon Fault, which is visible from Billyrimba Lookout, aligned along the bed of the Timbarra River, between the western and eastern sections of Washpool NP. The fault dates from the Middle Triassic period (235 -230 million years ago) and forms a distinctive north-south line running between the Queensland border as far as Guy Fawkes River NP.

The eastern edge of the New England Tableland Bioregion where the flora reserves are located also coincides with the edge of the Great Eastern Escarpment. This is a major geomorphic feature which runs east of the Great Dividing Range along most of Australia's east coast, formed about 80 million years ago from a new continental edge formed by rifting. The Escarpment edge is significant as the separation of two bioregions of vastly different geomorphology: low relief and slow process rates in the tablelands, and the coast zone of moderate relief and rapid process rates.

Rocks in the area of the flora reserve are undifferentiated metasediments of the Coffs Harbour association such as grey-black mudstone and quartz conglomerate. Metasediments are derived from sedimentary rock that shows evidence of having been subjected to metamorphic processes. These basement sediments were later overlain by terrestrial and minor marine sediments.

The soils in the flora reserve are well structured red and brown earths. In the northeast corner of the Billyrimba parcel, six small outcrops of granite occur, the largest approximately 90 x 50 metres. Granitic outcropping is a significant feature of the New England Batholith and has given rise to a high number of rare and restricted flora species (Hunter & Clarke 1998).

Vegetation

An extensive area to the east of the flora reserve is inscribed on the World Heritage list as part of the Central Eastern Rainforest Reserves of Australia (CERRA). This significant vegetation includes ancient and isolated refugia of rainforest communities and supports a great variety of both plant and animal species (OEH 2005). The flora reserve includes pockets of intact and

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mature rainforest, occurring mostly as small discrete patches in gullies and on sheltered slopes (Binns 1995).

Within Forest Land State Forest, 403 native plant species have been recorded (BioNet 2018) but no threatened plants have been recorded (see Appendix 3). As the flora reserve represents only a small portion of the Forest Land State Forest, the records provided are indicative of what flora species may occur there.

Vegetation for the Tenterfield Management Area of former State Forests was described by Binns (1995). Under the North East Comprehensive Regional Assessment (NECRA) standardised ecosystem types were identified across this area.

More recently vegetation mapping by Hunter (1998, 2000, 2005) has been carried out throughout Washpool NP including the Forest Land Flora Reserve, which has expanded on the CRA mapping. The mapping shows that the native vegetation of this area is floristically diverse with 926 plant taxa being recorded within Capoompeta NP and the western additions to Washpool NP (Hunter 2000). The nine vegetation communities occurring in the flora reserve are described in Table 1.

Table 1 Vegetation communities occurring in Forest Land FR

Community name	Key species	Location/Description
Blackbutt – Die-hard Stringybark Forest	New England Blackbutt (<i>Eucalyptus campanulata</i>) – Die-hard Stringybark Tall Open Forests (<i>Eucalyptus cameronii</i>).	Billyrimba, northern parcel Occurs usually on upper to lower slopes, usually on metasediments but also acid volcanics. Structure: Tall Open Forests, also Open Forests. Trees 25-45 m tall. Mixed condition, many areas have been heavily logged in the recent past and are very highly disturbed with thick regeneration.
Blackbutt – Messmate Forests	New England Blackbutt (<i>Eucalyptus campanulata</i>) – Messmate (<i>Eucalyptus obliqua</i>)	Billyrimba Found from mid slopes to upper slopes, primarily on granite. Mainly Tall Open Forests, also Open Forests. Trees 25-50m tall. However, structure is highly variable, depending on depth of soil. Presence of shrub layer is almost entirely dependent on time since burning and fire intensity. Condition is mixed, many areas have been heavily logged in the recent past and are very highly disturbed with thick regeneration.
Dry Escarpment Open Forest	Grey Gum (<i>Eucalyptus biturbinata</i>) – New England Blackbutt (<i>Eucalyptus campanulata</i>) – Broad-leaved Apple (<i>Angophora subvelutina</i>).	Billyrimba, northern parcel Very poorly conserved to inadequately conserved across its range. Occurs along the escarpment and on steep slopes and gorge country. Open Forest structure, sometimes Woodland. Trees 20-25 m tall.

		Usually inaccessibility mean that this community is relatively unmodified and in good condition. Goats and the few wild cattle can cause disturbance.
Mid Slope Tall Open Forest *	New England Blackbutt (<i>Eucalyptus campanulata</i>) – Mountain Gum (<i>Eucalyptus brunnea</i>) – Sydney Blue Gum (<i>Eucalyptus saligna</i>)	Billyrimba Occurs mainly on undulating and plateau areas. Structure varies between Tall Open Forest and Open Forest. Trees 25-40m tall.
Outcrop Heaths and Shrublands (Hunter 2000)	Sticky Wattle (<i>Acacia viscidula</i>) – Kunzea (<i>Kunzea opposita</i>) Heaths & Shrublands.	Billyrimba, northern parcel Restricted to granitic outcrops. Known only from Forest Lands and Billyrimba area. Mainly shrubland but also heaths or herbfields, tree layer rarely present. The mix of species is highly variable due to small population size and harsh environment habitats. The community is little disturbed and in very good condition. Inadequately reserved with major occurrences outside reserve boundaries.
Closed Forest and Scrub *	Brush Bloodwood (<i>Baloghia inophylla</i>) - Socketwood (<i>Daphnandra micrantha</i>) – Black Plum (<i>Diospyros australis</i>)	Billyrimba, northern parcel Occurs as Closed Forest and Closed Scrub in gullies and protected sites at high altitudes, in isolated situations. Trees to 25 m tall. Structure changes considerably depending on exposure and soil depth.
Mountain Gum – Blackbutt Moist Forests	Mountain Gum (<i>Eucalyptus brunnea</i>) – New England Blackbutt (<i>Eucalyptus campanulata</i>) Moist Tall Open Forests.	Billyrimba, northern parcel Occurs in open depressions (creeklines) and also on a variety of slopes. Found on acid volcanic or metasedimentary rock types. Structure is Open Forests to tall Open Forests. Structure is variable due to degree of protection and past fires. Trees 25-50m tall. Structure often staggered due to recent heavy logging.
Upland creeks	Mountain Gum (<i>Eucalyptus brunnea</i>) – New England Blackbutt (<i>Eucalyptus</i>	Billyrimba Restricted to open depressions along shallow creek lines at higher altitudes. Common along all major and minor creeklines, generally

	<i>campanulata</i>) – Sydney Blue Gum (<i>Eucalyptus saligna</i>) – Dorrigo White Gum (<i>Eucalyptus dorrigoensis</i>).	above 900 metres. Structure varies between Open Forest and Tall Open Forest with a dense and very diverse herb layer. Trees 20-50m tall. Disturbed in some places by cattle grazing, small dams and road crossings which increase siltation and runoff. The creek and gully systems promote dispersal of weed propagules, and large numbers of exotic species are sometimes present.
Brushbox Creeks	Brush Box (<i>Lophostemon confertus</i>) – Forest Oak (<i>Allocasuarina torulosa</i>)	Billyrimba, northern parcel Found in open depressions and within steep sided, protected gullies in the gorge country at mid altitudes (c. 600-1000 m). Occurs almost entirely on metasediments. Structure is tall Open forest, trees 25-35 m tall. Highly restricted in occurrence with specific habitat requirements. Prone to weed infestations. Fire is the main threat to this community.

The groundcover in the flora reserve is continuous and consists of grass, ferns, logs and fallen branches, a fairly deep litter layer and occasional rock. Understorey species composition varies with landform and the level of protection it affords from drying winds and fire. For example, ridges and upper slopes have a dry sclerophyll understorey consisting of grass, bracken fern, and occasional shrubs. On the lower slopes and gullies, the understorey becomes more mesic and includes ferns and vines as well as small trees.

No threatened ecological communities or threatened plants have been recorded in the flora reserve or in the vicinity of the reserve. However, species of conservation significance which may occur in the flora reserve include Dorrigo white gum (*Eucalyptus dorrigoensis*) and *Prostanthera petraea*. This *prostanthera* is locally common in riparian wet heath and woodland at Billyrimba Falls (Binns 1995) and prior to 2006 was known as *Prostanthera* species B.

The incidence of non-native plants in the reserve is very low and confined to the verge of Billyrimba Trail following fire or occasional maintenance activities. Weed species that occur in the Billyrimba parcel include introduced grasses such as giant Parramatta grass, whisky grass and African love grass. Lantana could potentially be present in the northern parcel.

Vertebrate fauna

The forests of this area provide a wealth of varied habitat for arboreal mammals and birds. Overall, 171 native animal species have been recorded in Forest Land State Forest, including 91 birds, 45 mammals (of which 22 are bats), 20 reptiles and 16 amphibians.

A total of 22 threatened native animals have been recorded in Forest Land State Forest (see Appendix 4).

Koalas (*Phascolarctos cinereus*) are occasionally recorded in the southern portion of the eastern section of Washpool NP but there is only one record of them occurring in the western section, in 1975. That record was located 2.7 kilometres west of the Billyrimba parcel in New England blackbutt (*Eucalyptus campanulata*), messmate stringybark (*E. obliqua*) vegetation. While there is no record of koalas occurring within the FR itself, in a recovering landscape there is potential for the reserve to provide useful habitat for koalas over time.

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The endangered frog *Philoria pughii*, is of particular interest as this species was only recently identified following a taxonomic review of the *Philoria* species of north-east NSW. It occurs only across a restricted area at mid to high elevations in the New England tablelands and NSW North Coast, from Gibraltar Range State Forest, north-east of Glen Innes, through Gibraltar Range National Park, Washpool National Park and Forest Land State Forest to Girard State Forest west of Casino. The flora reserve would appear to contain core habitat for this species.

Among the main threats to survival of this species are degradation of its habitat as a result of broad scale habitat alteration and removal, infection by amphibian chytrid fungus, trampling of habitat by domestic stock and reduction of moisture levels caused by forest management activities and human induced climate change. While the Forest Land Flora Reserve does provide protection from these vectors, more specifically OEH is implementing a targeted conservation strategy for this species at four sites (two of which are in Washpool NP not far from the flora reserve), under the *Saving Our Species* program.

Climate

The eastern escarpment edge experiences a more varied climate than the overall temperate climate of the Northern Tablelands. Deep gorges and high mountainous areas result in a number of differing microclimates.

Areas along the edge of the escarpment receive 1500-1700 millimetres of rainfall on average per year but this reduces to 1100-1200 millimetres on the plateau. Rainfall is summer dominated.

Mean annual temperatures are greatest within the lower altitude gorge areas (17-18°C) but are at their lowest on the higher parts of the landscape particularly on top of Mount Spirabo (11-12°C). High country is likely to be exposed to drying winds from the south-west.

Droughts occur periodically in the region but are not uncommon; twenty-two droughts were declared in the Tenterfield area between 1871 and 1994 (Hunter 2000).

Under climate change, minimum and maximum temperatures in the New England North West region are expected to increase by 0.4 – 1.0°C and the region will experience more hot days (over 35°C). Similarly, rainfall is projected to decrease in winter and increase in autumn but the projections for summer span both wetting and drying scenarios, and reflect the variability across the region (OEH 2014). It is possible under a drying scenario that the flora reserve and wetter areas of the Washpool Ranges, being some distance from the coast, could in the future, become more important as refugia for biodiversity.

Neighbours

The northern parcel is adjoined by Forest Land State Forest and the Billyrimba parcel is completely surrounded by Washpool NP. At the time of writing no encroachments on the reserve were known.

3.4 History

Aboriginal history and heritage

The lands now in the Forest Land Flora Reserve are within the traditional Country of the Bundjalung People which included more accessible lands to the north-east of the Northern Tablelands as far as the coast and extending north into Queensland. The Jukambal People inhabited the area to the north of the reserve towards Tenterfield and the Ngarrabul People inhabited the area to the west and south towards Glen Innes. An Aboriginal literature review and cultural heritage assessment has been produced for the Gibraltar Range area by Longdin (2000).

There are very few Aboriginal sites recorded in Washpool NP and none are recorded in the flora reserve. It has been suggested that the rugged mountainous terrain was rarely occupied by Aboriginal people for long periods but was primarily used for ceremony and as a route between the coast and tablelands, for example moving towards the east during colder months of the year. A ceremonial bora ring has been recorded to the east of the Billyrimba parcel on Malara Creek.

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According to the season, the area would have yielded useful resources such as rainforest fruits and possum fur for clothing (Longdin 2000).

Archaeological evidence suggests the tableland Aborigines traded with groups on the western slopes and that a range of stone tools such as jagged spears, boomerangs and waddies were developed with local and traded stone and local hardwood (Halliday 2004).

Tenterfield and its surrounds were first settled by Europeans from 1839 onwards. As sheep and cattle grazing and other agricultural uses steadily displaced Aboriginal people, they withdrew to the more inaccessible country of the Gibraltar Range, which became important as a refuge. In the early 1880s the Aborigines Protection Board was established in New South Wales and displacement of Aboriginal people from traditional lands became permanent with the establishment of Aboriginal reserves and missions. Many Aboriginal people worked on stations in the pastoral industry.

The Bundjalung People continue to value connection to Country and NPWS works in collaboration with the relevant local Aboriginal land councils, elders' groups and others to incorporate Aboriginal interests in managing Washpool NP. Actions in the *Gibraltar Range Group of Parks Plan of Management* include:

- undertake cultural heritage surveys and where appropriate the recording of oral histories in collaboration with relevant Aboriginal communities and individuals
- collaborate with the appropriate Aboriginal people about interpretation of Aboriginal cultural heritage.

The Western Bundjalung People lodged a native title claim in 2011 over part of Washpool NP and lands to the north and east, outside the western section of Washpool NP where the flora reserve is located. A determination on 29 August 2017 found that native title exists in part of the area (NCD2017/002) and an Indigenous Land Use Agreement involving NPWS and other stakeholders will be developed in due course.

Shared heritage

The first record of a European visiting the New England Tablelands was John Oxley in 1818 during his exploration of northern NSW. Fertile volcanic soils in the tablelands attracted sheep and cattle grazing. Wooded land on the eastern and western slopes were most suited to cattle grazing. The combination of extremely rugged terrain and low productivity soils made the area around Washpool NP less accessible for farming but timber was harvested from the mid-1800s onwards.

Initially timber getters harvested red cedar on the escarpment. By the late 1860s sawmills were set up in the region and by the 1880s there were sleeper cutting operations in the Mount Spirabo area (Pearson 1992 cited in Hunter 2000). Most of the timber for the Great Northern Railway completed in the 1880s was obtained from timber gathered from Forestland State Forest and Little Spirabo State Forest (Byrne 1993 cited in Hunter 2000). The Forestry Commission was created in 1917 (Byrne 1993 cited in Hunter 2000) and timber harvesting developed into a major industry for the region, spanning over 100 years of forestry activity.

In 1992, the Commonwealth, State and Territory Governments joined forces to work towards a shared vision of Australia's forests. After developing a National Forest Policy Statement to recognise competing interests in forest use, a process for developing long term regional forest agreements (RFAs) was developed for regions where commercial wood production is a major native forest use.

The North East (Upper and Lower) RFA is one of three that applies in New South Wales and extends from the Queensland border to the Hunter Valley.

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Forest management history

Logging and grazing

The flora reserve was originally part of Forest Land State Forest (SF), and the earliest parts of the forest were declared under the *Forestry Act 1916* in 1917. In 2014 Forest Land State Forest had a total area of 8227 hectares (Forestry Corporation n.d.). It now consists of three main parcels adjoining the western edge of Washpool NP.

Selective harvesting for hardwood timber began in Forest Land SF during the 1870s, producing timber for the Great Northern Railway Line. Evidence remains of large ring-barked tallowwood and ironbark trees.

Cattle grazing has also historically occurred in the state forests of this region for over 100 years up until the 1980s. There are no grazing permits current over the reserve.

While OEH has owned the crown forestry leases over these land parcels since 2000, FCNSW retained the rights to standing timber for the purpose of timber harvesting. Dedication as a flora reserve and management under this working plan removes any further potential for logging in the future. The most recent selective harvesting in the land within Forest Land Flora Reserve was in 2009 (see Table 3). Native tree species harvested in the forest include: New England blackbutt, silvertop stringybark, grey gum, grey ironbark, white mahogany, round-leaved gum, tallowwood and ironbark.

Table 2 – Recent logging history

Parcel	FCNSW Compartment	Year	Area (ha)
Billyrimba	338, 211	1987-1988	380
	337	1995	162
	338, 211, 337	2009	179
Northern	342	1994	38

FCNSW has advised that 38 hectares of the northern parcel were logged in 1994 but no information about more recent harvesting has been provided. It appears that the steep terrain may have limited forestry opportunities in the northern parcel.

More harvesting activity has occurred in the Billyrimba parcel. The most recent Harvest Plan Operational Map (FCNSW 2009) indicates that approximately 40% of the parcel was selectively logged, approximately 40% of the parcel is high conservation old growth forest, and the remaining 20% is too steep and rocky or otherwise excluded from harvesting. Within the area harvested in 2009, exclusions were also in place to avoid adverse impact on threatened fauna species, for example by retaining marked habitat trees. Silvicultural activities were aimed at “maximising the practical yield of products with the highest economic end use and providing an optimal gap and cluster mosaic for commercial wood productivity within the nett harvest area, whilst maintaining high biodiversity and vigorous growth of good form” (FCNSW 1995).

Logged areas show signs of previous disturbance but are now in various stages of regeneration.

Fire history

This area of Washpool NP has been affected by relatively frequent wildfire (see Table 4). The circumstances which promote fire in this elevated area are varied. Due to the high elevation, rainfall promotes a grassy understorey layer which can build up quite rapidly and return to high

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fuel levels within five years. When drying conditions prevail, some fires have entered Washpool NP from private land to the east and to the west. Fires have also been ignited on the uplands by lightning strikes, and move quickly along ridgelines before trickling down into the lower slopes.

The majority of fires which have affected this area have been weather driven. Under catastrophic weather conditions, wildfires can quickly blow out to cover very extensive areas. For example, the 2002-03 wildfire was a broad scale fire event which started well to the north at Ballandean in Queensland, and moved south to New South Wales under catastrophic, hot, dry, weather conditions.

The vegetation in this region has evolved under frequent fire. In grassy forests, there is a relatively high degree of floristic uniformity in the dominant understorey species over a large range of sites with varying physical attributes. This suggests that the fire regime may have been a key determinant of floristic species composition (Binns 1995). Steep narrow gorges which are not penetrated by fire, or less frequently, maintain more mesic conditions and sometimes fire-sensitive species.

Table 3 Fire history affecting the flora reserve lands

Fire event	Year(s)	Extent of fire (ha)
Demon Creek	2016-17	6706
Spirabo	2016-17	3807
Sweeneys Fire	2007-08	2018
The Oaks	2003-04	7591
Spirabo Complex	2002-03	84,137
NA	1994-95	12,061
NA	1990-91	5795
NA	1989-90	655
NA	1987-88	601

Fire is one of the key management issues for the flora reserve. Inappropriate fire regimes can have deleterious effects on forest health, through loss of refuge for fauna, loss of habitat for threatened native plants and animals, and interruption to vital ecosystem services. High frequency fire is listed as a key threatening process under *the Biodiversity Conservation Act 2016* (NSW SC 2000).

Records indicate that a hazard reduction burn was undertaken across the entire Billyrimba parcel in August 2009. The north-west edge of the northern parcel was burnt as part of a hazard reduction burn in May 2008.

Between 2012 and 2017 NPWS has conducted hazard reduction burning over land to the west, south and southeast of the reserve, as part of the fire reserve management strategy for the Gibraltar Range group of parks.

NPWS will manage wildfire, fuel loads and response capabilities in accordance with the regional bushfire strategy, in conjunction with the local bushfire committee and in collaboration with FCNSW, NPWS wildlife ecologists and neighbours. When preparing burn plans NPWS considers the biodiversity thresholds for the vegetation types proposed to be burnt and the fuel loading of the area.

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3.5 Current Usage

At the time of dedication, the only management activities occurring in Forest Land Flora Reserve are regular vertebrate pest control, occasional weed spraying and occasional road maintenance following fire along Billyrimba Trail.

Control of wild dog (*Canis lupus familiaris / dingo*) and fox (*Vulpes vulpes*) has been carried out in the Billyrimba parcel of the flora reserve using twice yearly ground-baiting (autumn and spring), and annual aerial baiting for more inaccessible areas. Wild dogs have been known to attack calves on private properties to the east and west. The control program has been carried out in collaboration with FCNSW, Local Land Services and neighbouring property owners.

Billyrimba Trail also provides access for informal use by visitors to the northern portion of Washpool NP. However, in this remote part of the park, the level of visitation is low and is limited to:

- sightseeing at the Billyrimba Lookout – comprising a metal, fire-proof platform and a cleared flat area for parking
- horse riding
- four-wheel driving and car touring
- licenced use by groups for one-off events e.g. charity car rally and school groups
- birdwatching.

Four Bull Hut was recently established approximately 7.5 kilometres south of the flora reserve in Washpool NP, accessed by Farnell Road and Four Bull Trail. It provides hard-roofed accommodation for visitors in a remote forest setting. Visitor use of this facility is likely to add to the number of visitors accessing Billyrimba Lookout.

This flora reserve forms part of public land that has been declared for the purposes of hunting under the *Game and Feral Animal Control Act 2002*. It currently forms part of areas in this forest that are excluded to hunting either because of low visitation by hunters, access issues or operational activities that prevent hunting access. This may be revised should the circumstances around the exclusion change.

There are no grazing permits applying to the flora reserve. Whilst there are no apiary sites in the flora reserve, bee foraging ranges from sites in the adjacent state forest extend across the reserve.

4. Details of Management

4.1 Objectives of Management

Forest Land FR is gazetted over state forest land. Timber harvesting is now excluded from this area and the reserve will be managed by NPWS for conservation purposes as guided by the principles and objectives of the NPW Act.

General objectives for the management of all flora reserves managed by NPWS are set out in Section 1.1 of the General Working Plan for NPWS Managed Flora Reserves (Appendix 1). This includes applying local NPWS operational plans and strategies including those for fire, pests and weeds.

In addition to that general guidance, the objectives for Forest Land FR will be to:

- integrate management of the flora reserve with management of Washpool NP in accordance with the *Gibraltar Range Group of Parks Plan of Management*

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- maintain the isolation of the northern parcel except for management requirements such as fire and pest control.

4.2 Management Strategies (Policies)

Stewardship activities within the reserve are enabled by this working plan as informed by the *Gibraltar Range Group of Parks Plan of Management* and the general requirements of the NPWS Parks Management Framework.

General management strategies (policies) for the management of all flora reserves managed by NPWS are set out in Section 1.2 of the General Working Plan for NPWS Managed Flora Reserves (Appendix 1). This includes policies applying from local NPWS operational plans and strategies including those for fire, pests and weeds.

In addition to that general guidance, the management objectives in Section 4.1 will be met through the management strategies (policies) identified below and the adaptable works program at Appendix 2.

Biodiversity management and ecological knowledge

- As per the General Working Plan and any actions in the adaptable works program.

Pest and weed management

- As per the General Working Plan and any actions in the adaptable works program.

Fire

- Fire planning and operations will be managed and conducted in collaboration with FCNSW, the Northern Tablelands Bushfire Management Committee and other adjoining landowners.
- This working plan and the reserve's values and boundaries will be considered in any review of the *Washpool NP & SCA Fire Management Strategy* and NPWS burn plans.

Roads and infrastructure

- Billyrimba Trail is vested in the Minister for the Environment under Part 11 of the National Parks and Wildlife Act. Billyrimba Trail will continue to be maintained by NPWS for public access to 4WD all-weather standard.

Visitor opportunity and management

- Maintain the Billyrimba Lookout to support continuing visitor appreciation and enjoyment of the reserve. Maintain visitor infrastructure to meet relevant NPWS guidelines and standards.
- Group and or special use events will be permitted in the Billyrimba parcel of the reserve via licence or consent.
- Group and or special use events will not be permitted in the Northern parcel of the reserve due to its isolation and rugged terrain.

Community engagement

- As per the General Working Plan and any actions in the adaptable works program.

Licenses and other third-party agreements

- As per the General Working Plan and any actions in the adaptable works program.

Observation, reporting, review and adaption

- Implement a 10-year review cycle or as required to link with reviews of the *Gibraltar Range Group of Parks Plan of Management*.

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- Further or refined review may be undertaken via the adaptable works program.

4.3 Activity Permissions

Activities permitted without approval or conditions

- All actions consistent with the management strategies identified in the general working plan for NPWS managed flora reserves (at the time of writing this included weeds, pest, fire, infrastructure and visitation management)
- use of registered motor vehicles operated by licenced drivers on publicly accessible roads and trails
- nature-based activities such as bushwalking, bird watching and photography
- horse riding, as allowed under the *Gibraltar Range Group of Parks Plan of Management*
- recreational cycling on park roads and management trails as allowed under the *Gibraltar Range Group of Parks Plan of Management*
- group recreational activities (less than 40 people)
- Aboriginal cultural activities not requiring a permit
- activities allowed by a continuing valid permit, e.g. scientific licence.

Activities permitted with conditions

Activities requiring permission will generally be subject to assessment and, if permitted, have conditions applied by the land manager (NPWS) consistent with the Forestry Act and its applying policies and guidelines. Permits can only be issued for activities within flora reserves following approval by the OEH Chief Executive under s.61(1) of the Forestry Act.

No activities specific to Forest Land FR are listed as requiring permitting. Activities general to all flora reserves that require permitting are listed in the general working plan of NPWS managed flora reserves.

Activities not permitted

The following activities will not be permitted in the Forest Land Flora Reserve:

- timber harvesting
- removal of forest products and materials
- grazing by domestic stock
- gravel or hard rock quarrying¹
- mineral and petroleum exploration and mining²
- recreational vehicle access on closed or dormant roads and trails or off trail
- use of unregistered vehicles
- lighting of camp fires and any other unauthorized fires
- camping
- domestic dogs
- mineral fossicking

¹ Under the Forest Management Zoning (FMZ) system, flora reserves are zoned FMZ1 and such activities are generally not permitted unless authorised by the Minister administering the Mining Act 1992

² As above.

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- hunting of any native or non-native species
- bee keeping.

4.4 Observation, reporting and review

Observation, reporting and review will be undertaken in accordance with section 3 of the *General Working Plan for Flora Reserves Managed by NPWS* in Appendix 1.



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APPENDIX 1 – General Working Plan under Forestry Act for NPWS Managed Flora Reserves

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GENERAL WORKING PLAN FOR FLORA RESERVES MANAGED BY NPWS

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INTRODUCTION

From 2017 the NSW Government began allocating management of new and existing flora reserves to National Park and Wildlife Service (NPWS). Many of these new reserves protect important koala habitat. Others support potential habitat or movement corridors. Most make significant biodiversity contributions to the NSW and national reserve systems.

This plan has been prepared in accordance with the terms of section 25 of the *Forestry Act 2012* with the objective of providing for the future management of flora reserves within gazetted State Forests of NSW. It is written using a template provided by FCNSW. Minor changes have been made to accommodate the practicalities of local NPWS staff managing small reserves in a landscape containing much larger NPWS reserves.

This plan identifies a generic approach to managing the suite of flora reserves managed by NPWS. It is supported by reserve-specific plans detailing the values of individual Flora Reserves and providing actions and guidelines to protect those values.

Outlined below are management objectives and actions that will be applied, unless otherwise stated in the reserve-specific working plans, to all flora reserves managed by NPWS.

MANAGEMENT

1.1 Objectives of Management

- To preserve native flora and fauna species, particularly the maintenance of populations of rare and threatened flora and fauna species.
- To protect examples of forest ecosystems in the area and contribute to a Comprehensive Adequate and Representative reserve system
- To maintain reference stands within the natural forest to provide for scientific study, and for assessing the effects of alternative land use in surrounding areas.
- To provide for appropriate and safe public recreation in a natural setting.
- To conserve soil resources and water catchment capabilities.
- To minimise harm by inappropriate fire regimes and to protect adjoining lands from wildfire.
- To protect Indigenous archaeological and cultural values.

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- To respond to the expectations of the community with respect to the management of the Flora Reserves, consistent with Forestry Act and Government policy.

1.2 Management Strategies (Policies)

Under Forestry Corporation’s Forest Management Zoning (FMZ) system Flora reserves are zoned FMZ 1 and therefore contribute to the dedicated (formal) Comprehensive Adequate and Representative reserve system in NSW.

Minister for Forestry approval, by notice in the Gazette, is required for new declarations, revocations or boundary amendment.

The following management policies will be adopted generally for all the flora reserves, subject to any additional management directions identified in the reserve-specific working plans for an individual reserve:

1.2.1 General

- Except as otherwise specified below, no logging, leaf harvesting or other activities likely to disturb the flora or fauna of the reserve shall be permitted, and any such activities carried out adjacent to the reserve should be performed in a manner so as not to cause damage or disturbance to the reserve.
- Native flora and fauna in the reserve will be completely protected, except for trapping or collecting in the course of scientific studies approved by NPWS, and where necessary minimal vegetation clearing, including trees, may be required to allow for boundary fences to be maintained.
- Activities that lead to alterations of the natural flow regime of streams will be prohibited and any works required to be undertaken within or adjacent to the reserves will be undertaken in accordance with the applying legislation and policies.
- Sale or removal of soil, rocks, sand or gravel will be prohibited.
- Grazing by domestic stock will be excluded. No new grazing permits will be issued for reserves and any existing grazing permits will be phased out.
- Weed and pest animal control will be undertaken in the reserve where necessary. Any pesticide application will be applied in accordance with NSW and NPWS procedures and policies, and pesticide label conditions.
- Where appropriate, conduct pest and weed management works in collaboration with FCNSW, Local Land Services and neighbouring property owners.

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- Maintain reserve public roads and trails shown on the specific working plan maps to the standards described in those documents consistent with the plans of management associated with the reserves.
- Maintain management trails to the standards identified in fire management strategies.
- All roads, management trails and other park infrastructure will be recorded in the NPWS asset management system.
- Roads and trails with public access within Flora reserves may be reviewed for any requirement to temporarily or permanently restrict public vehicular access via the Reserve-Specific Working Plan.
- NPWS may temporarily or permanently restrict public vehicular access to the publicly accessible roads and trails where necessary for park operations or where access presents a risk to the public.
- Where necessary, additional barriers and gates preventing unauthorised vehicle access to internal roads and trails may be constructed. Signage alerting people to the conservation values of the Flora Reserve should accompany any such barriers and gates.
- Maintenance will be carried out on internal roads and trails where necessary. This may include, but is not limited to road and trail surfaces, drains and sediment control structures and vegetation encroachment.
- Any internal road or trail that was not managed by FCNSW as a formal public access and not required for management may be closed or made dormant.
- Snig and other informal roads or tracks such as those previously used for harvesting activities may be classified as 'dormant' and closed to public access. These decisions will be reviewed in any update of the applying reserve fire management strategy.
- NPWS will follow standard road maintenance and roadside rehabilitation procedures, including soil erosion control practices and soil hygiene protocols. Any vegetation planting will be with endemic flora species in accordance with NPWS best practice.
- Reserve management activities, including fencing, signage, infrastructure maintenance, unsafe tree removal, habitat rehabilitation and pest animal and weed control in accordance with applying guidelines and procedures.
- Pest and weed control and management in the reserve will be undertaken in accordance with legislative requirements, NPWS guidelines, regional pest and weed management strategies and other applicable guidelines, plans and strategies.

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- Volunteer organisations will be allowed to undertake environmental work and/or maintenance in the reserve with appropriate, ongoing assistance and support provided by NPWS.
- Hunting of game and feral animals may be allowed in the reserve, subject to any declaration of the relevant State Forest for hunting under the *Game and Feral Animal Control Act, 2002*, in accordance with Forestry Corporation and NPWS policies and procedures and other NSW Government agreements.
- As opportunities arise, NPWS will encourage or undertake native flora and fauna surveys to improve existing knowledge of biodiversity values in the reserve. Priority will be given to threatened species, regionally significant species and species recovery after fire and logging.
- Local observations and reporting will be undertaken annually on the condition of values, management effectiveness and public use of the reserves. Of primary interest is any change in native vegetation communities following the cessation of logging.
- Separate approval may be sought for cultural use in exemption to the above.
- NPWS will work with FCNSW, the police and other land management authorities to suppress unauthorised uses and ameliorate their impacts.
- NPWS may engage the community on shared issues, for example, with Aboriginal groups about Aboriginal heritage. NPWS will also continue to work with FCNSW, Local Land Services and other stakeholders as required.
- Mostly stakeholder engagement will occur via any processes set out in the relevant plan of management and/or in accordance with the general requirements of the NPWS Parks Management Framework.

1.2.2 Fire

- Fire management including hazard reduction and wildfire response on NPWS-managed reserves will be conducted in accordance with the applying reserve fire management strategy. These will be updated over time to include the needs of the flora reserves.
- The overall goals of NPWS fire management in the flora reserves are to protect life and property, reduce the incidence of unplanned fire events, exclude fire from old growth forest where possible and meet fire frequency thresholds for all vegetation types as per NPWS Guidelines for Ecologically Sustainable Fire Management (2004) and/or any other emerging state guidelines on the protection of biodiversity in bushfire prevention operations.

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- The use of large scale back burns and fire breaks to control advancing wildfire will be avoided in the flora reserves unless deemed absolutely necessary.
- The lighting of unauthorised fires will be prohibited. Appropriate signage restricting the use of fire will be provided as necessary.

1.2.3 Recreational

- Mountain bike riding and walking will be permitted on existing public vehicle tracks. The development of new walking and bike riding tracks will be prohibited.
- Camping in the reserves will be prohibited. Where required signage alerting people of this will be provided.
- Horse riding will only be permitted on existing roads and fire trails.
- NPWS may restrict or prohibit any recreational activity carried out in the reserve where it breaches the objectives of management outlined in 1.1 Objectives of Management.

1.2.4 Protection of other significant biological values

- FCNSW and NPWS will support survey work to locate any previously unknown biology within the reserve.
- If other significant biological values in the reserve are identified, NPWS will incorporate these values into future management. Where necessary, NPWS may place restrictions on any permitted activities or alter management in the reserve to protect and/or enhance such values.
- Where feasible FCNSW and NPWS will support programs to investigate the ecological characteristics and requirements of threatened or significant native plants and animals and the threats to these within the flora reserves.

1.2.5 Activities Not Permitted

The following activities are not permitted:

- Timber harvesting
- Removal of forest products and materials

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- Grazing by domestic stock
- Gravel or hard rock quarrying
- Mineral and petroleum exploration and mining
- Recreational vehicle access on closed roads and trails or off trail.
- Use of unregistered vehicles
- Lighting of camp fires and any other unauthorized fires.
- Camping
- Entering with domestic dogs

1.2.6 Activities Permitted with Standard Conditions

The following activities will be permitted subject to standard conditions consistent with the all applying codes of practice, protocols, policies, approvals environmental impact assessment requirements:

- Scientific studies (e.g. fauna surveys including trapping)
- Maintenance of existing roads and fire trails within, and if under agreement, adjacent to the reserve
- Limited tree removal for safety reasons, weed control or the maintenance of any boundary fences only
- Pest animal and weed control potentially including non-endemic problem native species.
- General access for activities such as bush walking, swimming and photography
- Beekeeping, by way of a license (permits for existing set-down sites only. New set-down sites will not be approved)
- Bushfire risk management activities and suppression of wildfire
- Construction of communication towers and associated infrastructure
- Mountain bike, orienteering or similar recreational events, subject to issue of a Forest Permit, in accordance with section 61 of the *Forestry Act 2012*. Mountain bike events are restricted to the use of existing vehicular tracks
- Construction and maintenance of boundary fences, including appropriate vegetation clearing

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- Installation/maintenance of barriers, fences and signage to restrict or control access
- Group recreational activities involving more than 40 people
- Adventure activities (including rock climbing, abseiling, canyoning)
- Aboriginal use of forest products - an Aboriginal person may be permitted to carry out forest product operations within the reserve. This authorisation will only occur where no other land is reasonably accessible to the person and the scale and intensity of the activity is consistent with the maintenance of the conservation values to be protected in the reserve.

1.2.7 Activities Permitted with Special Conditions

The following activities will be permitted subject to special conditions approved by the NPWS Branch Director and consistent with the Codes of Practice, Operational Circulars, protocols, licenses and Management/ Recovery Plans:

Construction of New Roads and Trails

The construction of new roads and fire trails will be permitted with special conditions. Construction will only be permitted in exceptional instances and consistent with the following principles:

- No practical alternative is available
- The values of the reserve will not be significantly compromised as indicated by an initial environmental impact assessment process
- Opportunity is provided for public comment on the proposal
- Ministerial approval is given for the proposal

Construction of communication towers and associated buildings

These will be determined on a case by case basis and must meet the requirements of the relevant NPWS plan of management applicable to the surrounding NPWS estate and environmental impact assessment requirements.

MANAGEMENT RESPONSIBILITY

The reserve will be administered by the relevant NPWS Branch, who shall ensure:

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- The reserve is managed consistently with this generic working plan and the relevant site-specific working plan;
- Occupation and Special Purposes permits are issued only for activities consistent with the management objectives for the reserve.

REVIEW, EVALUATION AND ADAPTIVE MANAGEMENT

The NPWS managed flora reserves are mostly small parcels of land enclosed by, adjoining or near to national parks, nature reserves or state conservation areas. Accordingly, the flora reserves will be managed consistently with the plans of management for those reserves. This includes managing for biodiversity, heritage, pests, weeds, bushfire and visitation. This management approach must be enabled via the working plans to comply with the Forestry Act.

In general, NPWS will make observations the flora reserves and record the condition of key values, the condition of tracks and roads, the compliance of users, the outcomes of any scientific research and the integrity of its boundaries. This information will be used in review and evaluation. The NPWS 'State of the Parks' platform may be applied.

Review of a working plan for a NPWS managed flora reserves will occur every 10 years or when the associated plan of management for adjacent or nearby NPWS reserves are reviewed and or rewritten, whichever comes first.

Management of the reserves will be undertaken in accordance with the OEH [Adaptive Management Position Statement](#). In simple terms this means implementing safe and suitable management actions while learning about which actions and techniques are most effective at achieving the required objectives.

An adaptive management model NPWS uses to meet the needs of reserve management planning is shown in Figure 1. For each flora reserve, NPWS proposes to apply an adaptive approach via the reserve specific working plan's 'adaptable works program' and/or also via its associated plan of management, if applicable.

The adaptable works program is a set of 'live' actions appended to each site-specific working plan. These actions have been developed to meet specific management objectives and they can be changed by local NPWS Branches should they be found to be not meeting the objectives well.

In the longer-term, evaluation may determine that the objectives of the working plans are not suitable and require changing. Newly discovered values, significant emerging threats or a reduction in management resources could also trigger such a need. Changes to the objectives would require an amendment of the working plans and adoption by the Minister for Lands and Forest.

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	Element	Description
→ 1	Objectives	Set clear objectives and measurable performance indicators for management.
→ 2	Process model	Describe the threats and processes that influence the objectives. Describe how management actions are expected to achieve objectives.
→ 3	Plan	Plan which management actions will be trialled. Plan how management actions will be implemented in the field. Plan monitoring of management effectiveness.
→ 4	Implement and feedback	Carry out the implementation and monitoring plans. Analyse and evaluate monitoring data. Update the process model and use the information in management decisions.

Figure 1. Elements of an adaptive management process for management plans (OEH 2017)

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APPENDIX 2 – Adaptable works program

This list of actions has been developed from discussions with local staff referencing the objectives in Section 4.1 and the strategies/policies in Section 4.2.

In keeping with an adaptive management approach, the actions below may be revised or deleted and new actions may be added by the local NPWS Branch in order to better meet the objectives of the working plan. This may occur after they have been undertaken or attempted, when new information arises or to suit changing circumstances. The priorities applied to these actions may also be revised.

The priority rating in the table below have been agreed with local operational staff and reflect the importance of the list of actions relative to the situation in the reserve.

No.	Adaptable management actions	Priority
1	<p>Biodiversity management and ecological knowledge</p> <p>Biodiversity management will prioritise habitat recovery and threatened species conservation (such as those in Appendix 4).</p>	1
2	<p>Pest and weed management</p> <p>Until the flora reserve is established in the regional pest strategy, priority pest control works will include:</p> <ul style="list-style-type: none"> • Systematic control and monitoring of foxes and wild dogs - extensive fox and wild dog baiting programs have been undertaken by FCNSW, OEH and Local Land Services as part of a permanent landscape-scale predator control program across the reserves and adjoining areas. NPWS will continue existing fox and wild dog control and monitoring programs to maintain this lowered level of introduced predators. • Annual trapping of pigs – NPWS will continue annual trapping of pigs, particularly in moist gullies, creek lines and other wet areas. • Observation and recording of deer distribution and densities – deer are recognised as an emerging threat but are not yet a priority issue in nearby parts of Washpool NP. This situation will be observed by NPWS and control works will be designed and implemented if required. <p>No significant weed threats have been identified in Forest Land Flora Reserve. Until the flora reserve is established in the regional weed strategy, priority weed control works will include:</p> <ul style="list-style-type: none"> • Observation for new weed incursions or the expansion of existing weed populations. 	1
3	<p>Fire management</p> <p>Forest Land FR will be managed as a Land Management Zone consistent with the zoning of nearby national park estate. The rugged terrain, isolation and absence of built assets supports this decision. The overarching objective of LMZ's is to conserve biodiversity and protect cultural heritage, and to manage fire within biodiversity thresholds.</p> <p>Adjacent parts of Washpool NP have experienced frequent fire. Ensure any prescribed burns proposed for the reserve are within thresholds as per NPWS Guidelines for Ecologically Sustainable Fire Management (2004).</p>	1

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4	<p>Roads and infrastructure</p> <p>Formalisation of historic snig tracks for walking or vehicle access may be considered where recreational attractions are present and the landform is suitable.</p>	2
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APPENDIX 3 – Threatened native plants recorded in and nearby Forest Land Flora Reserve

No threatened plants recorded.

Source: *NSW BioNet: Atlas of NSW Wildlife* (OEH 2018).

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APPENDIX 4 – Threatened native animals recorded in and nearby Forest Land Flora Reserve

Common Name	Scientific Name	NSW status*	Comm. Status#	Forest Land Flora Reserve@	Forest Land State Forest ¹
Mammals					
Brush-tailed Phascogale	<i>Phascogale tapoatafa</i>	V		Known	Present
Eastern Bentwing-bat	<i>Miniopterus schreibersii oceanensis</i>	V			Present
Eastern False Pipistrelle	<i>Falsistrellus tasmaniensis</i>	V		Known	Present
Golden-tipped Bat	<i>Kerivoula papuensis</i>	V			Present
Greater Broad-nosed Bat	<i>Scoteanax rueppellii</i>	V		Known	Present
Greater Glider	<i>Petauroides volans</i>		V		Present
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	V	V		Present
Little Bentwing-bat	<i>Miniopterus australis</i>	V			Present
Southern Myotis	<i>Myotis macropus</i>	V			Present
Spotted-tailed Quoll	<i>Dasyurus maculatus</i>	V	E	Known	Present
Yellow-bellied Glider	<i>Petaurus australis</i>	V		Known	Present
Birds					
Glossy Black-Cockatoo	<i>Calyptorhynchus lathami</i>	V			Present
Little Lorikeet	<i>Glossopsitta pusilla</i>	V			Present
Masked Owl	<i>Tyto novaehollandiae</i>	V		Known	Present
Powerful Owl	<i>Ninox strenua</i>	V		Known	Present
Scarlet Robin	<i>Petroica boodang</i>	V			Present
Sooty Owl	<i>Tyto tenebricosa</i>	V		Known	Present
White-throated Needle-tail	<i>Hirundapus caudacutus</i>		C,J,K		Present
Wompoo Fruit-Dove	<i>Ptilinopus magnificus</i>	V			Present
Amphibians					
Glandular Frog	<i>Litoria subglandulosa</i>	V			Present
Pugh's Sphagnum Frog	<i>Philoria pughii</i>	E		Known	Present
Stuttering Frog	<i>Mixophyes balbus</i>	E	V		Present

* Listing NSW Biodiversity Conservation Act 2016

Listing Commonwealth Environment Protection and Biodiversity Conservation Act 1999

@ "Known" is defined as all records occurring within the flora reserve and or within 1000 metres of the boundary of the reserve

¹ Present is within the adjoining State Forest

Source: NSW BioNet: Atlas of NSW Wildlife (OEH 2018).