

## World Heritage Sites

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### GONDWANA RAINFORESTS OF AUSTRALIA QUEENSLAND & NEW SOUTH WALES, AUSTRALIA

*This site comprises over fifty protected areas sited near or along the Great Dividing Range escarpment which parallels Australia's east coast. The outstanding geological features of its shield volcanic craters and the high number of rare, threatened and primitive warm temperate and subtropical rainforest species are of international significance for science and conservation.*

**COUNTRY** Australia - Queensland and New South Wales

**NAME** Gondwana Rainforests of Australia [formerly Central Eastern Rainforest Reserves of Australia].

#### NATURAL WORLD HERITAGE SERIAL SITE

1986: The Australian East Coast Temperate and Subtropical Rainforest Parks inscribed on the World Heritage List under Natural Criteria viii, ix and x.

1994: Extended as the Central Eastern Rainforest Reserves of Australia under the same criteria.

#### IUCN MANAGEMENT CATEGORIES

Gondwana Rainforests of Australia comprises 8 separate groups of protected areas, containing 56 sites. The dominant category of the area according to the WDPA record is given for each:

1: Main Range	II	5: Washpool & Gibraltar Range	Ib
2: Focal Peak Group	II + two Ia, Ib	6: New England Group	II + one Ia
3: Shield Volcano Group	II + one Ia, Ib	7: Hastings-Macleay Group	Ib + one Ia
4: Iluka Nature Reserve	IV	8: Barrington Tops Group	II + one Ib

Ia (Strict Nature Reserve) Ib (Wilderness)

II (National Park) IV (Habitat/Species Management Area)

#### BIOGEOGRAPHICAL PROVINCE

Eastern Sclerophyll (6.06.06)

#### GEOGRAPHICAL LOCATION

This property of 57 sites is spread along 500 km of the Great Dividing Range in eastern New South Wales and southern Queensland between 175 km north of Sydney (32°14'S) and 70 km south of Brisbane (27° 54'S) and longitudes 151°18'E to 153 °22'E. The approximate distances south between the centrepoinths of the main groups in New South Wales are: 130 km from the Queensland border to the Washpool and Gibraltar Ranges; 120 km further to the New England Group; 50 km to the Hastings-Macleay Group; and 140 km to Barrington Tops.

#### DATES AND HISTORY OF ESTABLISHMENT

1915-1949: Five National Parks or Reserves established, later to be incorporated in the World Heritage site, starting with Lamington NP in Queensland;

1950-1985: A further 21 protected areas established, later to be incorporated in the World Heritage site;

1986: Australian East Coast Temperate and Subtropical Rainforest Parks designated a World Heritage site incorporating 16 rainforest areas in New South Wales (203,500 ha);

1994: Area extended by 40 sites and name changed to Central Eastern Rainforest Reserves of Australia: all the Queensland sites plus 3 New South Wales National Parks and 15 Flora Reserves added;

2007: Name changed to Gondwana Rainforests of Australia.

## LAND TENURE

Governments of Queensland and New South Wales with 0.4% (14,600 ha) held by trustees. Administered by the Queensland and New South Wales National Parks under the Environmental Protection Agency.

## AREAS

370,000 ha: 310,471 ha in New South Wales, 59,529 ha in Queensland (CERRA, 2000; UNESCO,2008).

Note in the following table:

- o The information is as given in the nomination and the World Heritage Centre list of Gondwana Rainforests of Australia sites, 2008, which does not give coordinates or areas for all the sites.
- o The World Heritage area given is often only a part of the whole national or state protected area.
- o The status of some protected areas has been upgraded after designation (eg: Reserve to Park).

<u>date</u> inscrib.	<u>site</u>	<u>IUCN</u> category	<u>area</u> (ha)	<u>coordinates</u> (south x east)
<b>MAIN RANGE</b>		23,6417ha+		
1994	Main Range National Park	II	11,500	27° 54' x 152° 19'
1994	Mt. Mistake National Park	II	5,500	
1994	Gambubal State Forest #	(II)	2,260	
1994	Goomburra State Forest #	(II)	2,067	
1994	Acacia Plateau Flora Reserve	(II)	585	
1994	Killarney State Forest	(II)	493.7	
1994	Teviot State Forest #	(II)	390	
1994	Emu Vale State Forest #	(II)	268	
1994	Spicers Gap State Forest #	(II)	257	
1994	Wilson's Peak Flora Reserve	(II)	184	
1994	Gilbert State Forest #	(II)	84	
1994	Koreelah National Park	(II)	53	28° 20' x 152° 26' *
1994	Alford Forest Reserve	(II)		
<b>FOCAL PEAK GROUP</b>		17,809.5ha		
1994	Mount Barney National Park	II	9,710	28° 17' x 152° 40'
1994	Toooloom National Park #	II	1,640	28° 27' x 152° 26' *
1994	Toonumber National Park #	II	1,080	28° 30' x 152° 46' *
1994	Burnett Creek State Forest #	(II)	1,076	
1994	Cambridge Plateau Flora Res.#		870	
1994	Cronan Creek State Forest		795	
1986	Mount Nothofagus Flora Reserve #	II	650	28° 17' x 152° 37'
1994	Mount Clunie Flora Reserve #	II	485	
1994	Captains Creek Flora Reserve#	la	380	
1994	Palen Creek State Forest		326	
1994	Mallanganee Flora Reserve	la	222	
1994	Telemon Environmental Park		146.6	
1994	Bungdoozle Flora Reserve		145	
1994	Rabbit Board Paddock Reserve		143.1	
1994	Turtle Cr. Environmental Park		68.8	
1994	Prisons purposes land		46	
1994	Toooloom Scrub Flora Reserve		25	
<b>SHIELD VOLCANO GROUP</b>		66,195ha		
1986	Border Ranges National Park #	II	31,229	28° 21' x 152° 53'
1994	Lamington National Park	II	20,500	28° 08' x 153° 07'
1986	Nightcap National Park #	II	4,945	28° 32' x 153° 17'
1986	Limpinwood Nature Reserve	lb	2,646	28° 18' x 153° 11'
1994	Springbrook National Park #	II	2,480	28° 12' x 153° 18'
1986	Mount Warning National Park	II	2,380	28° 24' x 153° 16'
1994	Mount Chinghee National Park	II	1,110	28° 18' x 152° 57'
1986	Numinbah Nature Reserve	la	858	28° 14' x 153° 17'
1994	Amaroo Flora Reserve		36	
	Mebbin Lagoons Flora Reserve		11	

WASHPOOL & GIBRALTAR RANGE		45,124ha		
1986	Washpool National Park	II	27,715	29° 52' x 152° 20'
1986	Gibraltar Range National Park	II	17,273	29° 27' x 152° 21'
1986	Iluka Nature Reserve	IV	136	29° 14' x 153° 22'
NEW ENGLAND GROUP		39,506ha		
1986	New England National Park #	II	29,985	30° 28' x 152° 29'
1986	Dorrigo National Park #	II	7,885	30° 21' x 152° 48'
1986	Mt. Hyland Nature Reserve #	1a	1,636	30° 10' x 152° 26'
1994	Cunnawarra Flora Reserve #	II		
HASTINGS-MACLEAY GROUP		134,181ha		
1994	Oxley Wild Rivers National Park #	1b	93,220	30° 52' x 152° 02' *
1986	Werrikimbe National Park #	1b	35,178	31° 10' x 152° 15'
1994	The Castles Flora Reserve	1b	2,360	
1986	Mount Seaview Nature Reserve	1a	1,703	31° 20' x 152° 11'
1986	Willi Willi Flora Reserve #	1b	1,610	31° 09' x 152° 26'
1994	Fenwicks Scrub Flora Reserve			
BARRINGTON TOPS AREA		39,423+ha		
1986	Barrington Tops National Park #	1b	39,120	31° 56' x 151° 29'
	Mt. Royal National Park #	II		32° 12' x 151° 18' *
1994	Kerripit Beech Flora Reserve		243	
1994	Jerusalem Creek Flora Reserve		60	
1994	Main Range National Park			

# = part of a larger park; + = centrepoint of area of National Park

## ALTITUDE

From sea level (at Iluka) to 1,615m (Point Lookout in New England Range).

## PHYSICAL FEATURES

The 51 sites are located in seven groups of reserves spread along the 500 km-long line of mountain ranges, lesser chains and isolated peaks of and radiating from the Great Dividing Range and Great Escarpment which parallel the eastern Australian coast some 100 km inland. The area was uplifted between 90 and 30 million years ago and experienced volcanic activity between 50 and 18 mya, forming plateaus into which erosion, especially from the east, cut steep escarpments and deep ravines. From the Queensland border the Main Range continues north for some 100 km and the Focal Peak and Shield Volcano groups of the McPherson Range extend east along the border some 100 km towards the sea. From the state border the New England Range contains the Washpool and Gibraltar Range group 130 km south and the New England group 250 km south; at 300 km the Hastings-Macleay group surrounds the Hastings Range, and the Mt. Barrington massif is located 440 km south. This backbone is formed of a series of remnant Tertiary shield volcanoes and volcanic basalt and rhyolite lava flows over a basement largely of late Palaeozoic and early Mesozoic sediments, forming plateaus where erosion of the margin has cut the land into dramatic scenery. The soils are moderately fertile red clayey krasnozems on the plateaus and brown prairie soils on the slopes derived from basalt and basic igneous rocks, and yellow podzolic soils from the acid rhyolite and trachyte rocks which are much less fertile. Colluvial and alluvial soils also support rainforests.

**Main Range.** Most of the reserves are contiguous, lying north-south along the range which extends from the Mistake Mountains in the north to the state border. The eastern edge of the range is a steep escarpment generally coinciding with the Great Divide. Peaks up to 1,100m rise above a broad valley to the east. West of the divide the basalt plateau has been strongly dissected by streams, leaving only ridges with small remnants between. The upper scarp consists of basalt cliffs of late Oligocene to early Miocene age of layers of lava up to 900m thick under the highest points of the divide which spread over 160,000 ha of the plateau. Talus slopes often obscure the lower volcanic rocks and the contact with the underlying Mesozoic sediments. There are two formations of almost equal thickness: below the basalt upper layer the Governors Chair volcanics contains trachyte members interbedded with basalts which show in outstanding cliff faces at The Steamers and in Emu Creek. The Main Range is drier than the McPherson Range, but has three major waterfalls (DASET, 1992).

**Focal Peak Group.** This is on the state border between the Main Range and Shield Volcano Group. The sites are contiguous except those extending south along the Richmond Range. The Mount Barney Complex consists of a variety of intrusive igneous rocks some 23-20 million years old, in several centres of basalt and rhyolite eruption along an east-west line, including Mount Gillies and the Focal Peak volcano. Mount Barney itself is composed of granophyre about 24 million years old. The Richmond Range paralleling the Dividing Range on the east has isolated caps of basalt.

**Shield Volcano Group.** The sites, many of which are contiguous, lie in the Border Ranges which include large areas north and south of the state border and along the McPherson Range to the east. These mountains are formed from predominantly basaltic lavas deposited in the Tertiary in many layers. The main Border Range sites are recognisably remnants of the erosion caldera of the Tweed Shield Volcano, one of the largest and best preserved in the world, considering its age of 20.5-23.5 million years, with a floor eroded to the basement rock by the Tweed River. The landscape is characterised by its eroded remains, by sloping valleys below vertical rhyolite cliffs, and features such as the tiers of Mount Lindesay. Mount Chinghee to the north and Mount Warning and the Nightcap Range in New South Wales are isolated massifs.

The prominent peak of Mount Warning is separated from the shield by a deep broad valley eroded below the lowest basalts to expose the basement of Palaeozoic and Mesozoic rocks. It is the original neck of a volcano of more resistant syenite, gabbro and monzonite than the surrounding basalt and rhyolite, and stands out as an isolated plug. In its vast erosion caldera, basalts and rhyolites of the shield have been cut back uniformly to give precipitous cliffs in an arc around the central mass. The lavas of its upper slopes have been differentially eroded by radial streams, leaving ridges and sloping remnants of plateau. It is one of the world's largest examples of this landform. Some Triassic volcanic rocks are also exposed north and south of the mountain. A range of rock types from extensive main flows and from numerous subsidiary vents have eroded to form different soil types. (DASET, 1992).

**Washpool and Gibraltar Range.** This group forms a continuous block of mountains at the eastern edge of the New England tablelands, bounded by the Timbarra, Mann and Clarence rivers. The reserve boundary follows the Demon Fault, marked by the Timbarra River on the west and the escarpment on the east. Gibraltar Range is a high tableland at almost 1,200m which extends north into Washpool Park as a series of high ridges and plateaus separated by sharply dissected steep valleys. Swamps up to 0.5 km wide and 2 km long are widespread. The main rock types are a middle Palaeozoic sequence of metasediments (argillites, greywackes and feldspar porphyries with minor chert horizons) which outcrop in the east of both parks, overlaid by a late Permian volcanic complex, over much of the southern part of Washpool Park, and a Permo-Triassic granite, which intrudes both the older rock formations in Gibraltar Range Park and has weathered to give grass balds and sedge swamps on the summit, and the tors that are spectacular landscape features of this Park.

**Iluka Nature Reserve.** A small isolated site on a coastal peninsula 90 km due east of the Washpool and Gibraltar Ranges. It consists of a series of dune ridges of siliceous sand that contain significant quantities of the heavy minerals rutile, zircon and ilmenite. Underlying the sand is a complex of Triassic/Jurassic sedimentary rocks, which outcrop in a series of low headlands. Soils are well-drained and poor in nutrients (DASET, 1992).

**New England Group.** The New England and Dorrigo National Parks and Cunnawarra Flora Reserve include parts of both the Great Escarpment and coastal lowlands. The erosion of the Dorrigo volcanic plateau by the westward retreat of the escarpment is its outstanding feature. Its sweep in a rugged amphitheatre around the remnant plug of Ebor Volcano and the headwaters of Bellinger Valley is one of the most impressive sections of the whole Great Escarpment. Its Tertiary basalt outcrops along the rim of the escarpment in New England National Park and its eroded sediments yield the high nutrient colluvial and alluvial soils lower down. The lowlands below the escarpment overlie a complex of Carboniferous/Permian metamorphic and sedimentary rocks of slate, phyllite, sandstone and conglomerate. Ebor Volcano basalt outcrops only in the west of Dorrigo Park. Much of the plateau is of Carboniferous metamorphic rocks (argillites and slates) which also underlie Mount Hyland Nature Reserve some 35 km north. Igneous rocks of Permian age outcrop in the southern part of Dorrigo Park.

**Hastings-Macleay Group.** This group lies in the rugged upper watersheds of the Hastings, Forbes and Macleay rivers. The spectacular gorges of Oxley Wild Rivers National Park are in the heavily dissected country of the upper Macleay, an extension of the New England Tablelands. It includes part of the Great Escarpment where the sharp break between the plateau and the escarpment appears clearly in the

gorges of the upper Macleay. There are spectacular lookouts at Wollomombi and Long Point. The Forbes and Hastings valleys contrast markedly. Both rivers fall over comparable distances, the Forbes at an even gradient, the Hastings, by a series of steps in a deeply incised gorge with two major waterfalls and several others. The geology of the area was imperfectly known at the time of designation. Both the Forestry Commission (1981) and the National Parks & Wildlife Service (1981) noted discrepancies between their observations and the published geological map. An intrusive complex of dacite with sedimentary and metamorphic rocks of Palaeozoic age comprises the predominant rock form. In the Kunderang Brook section of Werrikimbe National Park and in the southern half of The Castles Flora Reserve, these include a narrow belt of Lower Permian limestone with some caves. On Mount Seaview there are outcrops of Permian ultra-basic serpentine.

**Barrington Tops Area.** Barrington Tops is part of a 1,200-1,580m basalt plateau extension of the Liverpool Range to the east of and partly connected to, the Great Escarpment, with steep rugged slopes on all sides. Before the eruption some 44-45 million years ago of the Barrington Volcano, the land was relatively low with a surface cut across a basement of steeply dipping Palaeozoic sediments. A number of hills of Permian granite rise above the subdued relief. Eruption of the volcano was probably centred close to present Mount Barrington, produced massive basalt lava flows. These now remain only in plateau remnants and ridges at the highest points of the massif. Since the eruptions, erosion has cut steep-sided valleys 1,000m deep and distinct scarps over much of the plateau which forms the upper catchments of six major rivers (DASET, 1992).

## CLIMATE

The escarpment in New South Wales and Queensland forms a barrier to rain-bearing clouds from the east, resulting in relatively high rainfall near the coast. At high levels there is persistent low cloud and fog; Mt. Barrington occasionally even has snow. Rainforests grow where the annual rainfall exceeds 1,500mm; dry rainforest is found when it drops below 1,300mm and some sheltered stands receive less than 900mm. Rain falls year-round but with a late summer maximum which can reach almost 3000mm in northeastern sites, falling to 1,400mm in lower areas further from the coast, and a winter minimum from July to August. Infrequent cyclones from the east and southeast can cause extensive damage, and dry west and northwest winds in winter can aggravate the fire hazard (DASET, 1992). Summer temperatures in the warm subtropical area average 25°-30°C, and 22°-23°C inland, falling to 13°-14°C in winter. Barrington Tops in the south has summer temperatures of 13°-26°C and in winter, 6°-20°C.

## VEGETATION

Rainforests cover only about 0.3 % of Australia, but they contain about half of all Australian plant families. The nominated sites include one of the most extensive areas of subtropical rainforest in the world, large areas of warm temperate rainforest and nearly all Australia's cool temperate rainforest of Antarctic beech *Nothofagus moorei*, plus dry rainforest, wet sclerophyll forests and montane heathlands. The property is an archipelago of sites in a sea of fire-prone eucalypt forest and agricultural lands, harbouring over 200 species of conservation significance. Among them are rare and endemic plants and animals, some relatively recently evolved, others, relict and primitive plant families. Several of these are related to fossils from Gondwanaland, the landmass that Australia parted from between approximately 53 to 45 million years ago. Its forests were dominated by two ancient genera, *Nothofagus* and *Araucaria* and the sites cover the best areas in Australia where the two genera still co-exist. Especially along the border between the states, a large number of distinct habitat types occur in the relatively small area of the transition zone between tropical northern and temperate southern biomes. However, in many places, due to extensive past logging and clearing, major occurrences of rainforest are limited to mountain slopes, lower gulleys and valleys. A comprehensive description of vegetation types and list of the vascular plants recorded throughout the nominated sites plus a list of rare, endangered and poorly known species is given in DASET (1992).

**Main Range.** Cool subtropical rainforest is the major rainforest type along the Main Range but it also contains tall open forest, woodland, tall scrubland and steep rock pavements. The rainforest is virtually restricted to land above 700m on fertile basalt soils. It is notably different from the type found in the McPherson and Tweed Ranges. Some warm temperate rainforest grows in small stands on sheltered southerly slopes in the south of the region. Several tall open forest communities grow on the Main Range with many species at the northern limit of their distribution. They are dominated by eucalyptus forests along the summit and western slopes. In exposed elevations above the cliffs the mountain top is covered with *Leptospermum* and *Prostanthera* scrub, with an unusual 10m low closed forest of muttonwood *Rapanea variabilis* carrying a dense cover of epiphytic bryophytes. Rocky heath

communities include *Helichrysum lindsayanum* and *Wahlenbergia glabra*. Two nationally endangered species *Marsdenia coronata* and *M. longiloba* occur in the property (DASET, 1992).

**Focal Peak Group.** Cool subtropical rainforest covers much of the western half of Mount Barney above 600m. Above 900m cool temperate rain forest grows above 900m on Mount Nothofagus and Mount Ballow, with the largest single stand of *Nothofagus moorei* in the area. Open forest communities of Eucalyptus species with many vines also grow on Mount Barney, especially the north-eastern section. *Eucalyptus michaeliana* has been recorded. The tall open forest with white mountain ash *Eucalyptus oreades* and associated montane heath shrublands is notable. These include a range of narrowly endemic and several rare and endangered species: *Banksia conferta*, *Callitris monticola*, *Comesperma esulifolium*, *Cooperookia scabridiuscula*, *Helichrysum lindsayanum*, *H. whitei*, *Hibbertia monticola*, *Leucopogon* ssp. 'Mount Barney', *Plectranthus alloplectus*, *Pultenaea whiteana*, *Rulingia salviifolia*, *Wahlenbergia scopulicola* and *Westringia blakeana*. The vegetation in Mount Clunie Reserve is subtropical rainforest with a small stand of warm temperate rainforest, and a large stand of unlogged hoop pine *Araucaria cunninghamii* forest. Coachwood *Ceratopetalum apetalum* is absent from the warm temperate rainforest. As with the neighboring Shield Volcano group, the scenery is spectacular, with many waterfalls.

**Shield Volcano Group.** Warm subtropical rainforest, the most complex of rainforest types, is found at levels below 800m on basalts on Lamington Plateau and on lower mountain slopes. This area preserves the largest remaining undisturbed tract of such forest, characterised by vines, palms, ferns and tree ferns. Notable stands also grow on basalt shelves and lower slopes within the Mount Warning erosion caldera, which contains many rare and threatened species. This is dominated by white booyong *Argyrodendron trifoliolatum* with yellow carabeen *Sloanea woollsii*. As the major rainforested creeks run downstream into broader, drier valleys a floristically distinct gallery fringe develops. Between 800m and 1100m, warm subtropical rainforest is replaced by cool subtropical rainforest. In Lamington National Park, closed forests in which corkwood *Ackama paniculata* with pockets of coachwood *Ceratopetalum apetalum* dominate the canopy form in an ecotone between cool subtropical and cool temperate *Nothofagus* rain forest. Dry rain forest, with a discontinuous overstorey of hoop pine *Araucaria cunninghamii* with pinkwood *Eucryphia moorei* in the south, lacebark *Brachychiton discolor* and crows ash *Flindersia australis*, occurs mainly at lower altitudes, although it can extend above 700m. Many areas have been heavily logged and disturbed, but the largest unlogged stands are within the nominated property. Sclerophyll forests both wet and dry develop on drier sites, particularly where soil fertility is low and fires are not uncommon. The southernmost occurrence of Moreton Bay ash *Eucalyptus tessellaris* is found here.

Warm temperate rainforest, a floristically less complex type, approaches the northern limit of its distribution in the area, although there are outliers in northern Queensland. This forest is found mainly on sites that cannot support subtropical rainforest, either because of infertile acid soils on rhyolite or on windswept ridges where shallow soils and exposure to strong cool winds prevent the development of subtropical forest. Cool temperate rainforest, floristically the most simple type, is dominated by *Nothofagus* which reaches its northern limit in the property. Although rainforest is the major vegetation type, there are also large stands of open forest and woodlands. A number of shrub-dominated communities occur on exposed rock knolls and cliff lines. Montane heathlands contain a concentration of rare and restricted species.

**Iluka Nature Reserve.** The reserve contains the state's largest single stand of littoral rainforest, a distinctive coastal variant, and the least extensive of all New South Wales rainforest types. The herb layer is generally sparse. East of the rainforest on the shore dunes, is a characteristic east coast dune flora with the pioneer grass *Spinifex sericeus*. As elsewhere along the coast, the introduced weed shrub boneseed *Chrysanthemoides monilifera* is a major component. To the west, the rainforest abuts open forest of *Lophostemon* -*Eucalyptus* species. Its western edge may be maintained by the incidence of fire.

**Washpool and Gibraltar Range.** The outstanding feature of this area is the diversity of plant communities and its mosaic of wet sclerophyll and rainforest communities. The warm temperate rainforest of Washpool National Park is the largest rainforest wilderness in New South Wales. Small areas occur in Gibraltar Range National Park but much was logged before its dedication. Its major association is a sub alliance of coachwood *Ceratopetalum apetalum*, crabapple *Schizomeria ovata* and corkwood *Ackama paniculata*. Willowie Scrub in Washpool Range Park is the largest coachwood rainforest remaining in Australia and the world. Subtropical rainforest is restricted to more sheltered

sites on better soils. There is a limited area of dry rainforest. Despite the very high rainfall at high altitude, cool temperate rainforest is absent. The more extensive cool subtropical rainforest associations are characterised by yellow carabeen, rose mahogany *Dysoxylum fraserianum*, black booyong *Argyrodendron actinophyllum* and corkwood. Stands are restricted to moist aspects in gully heads protected from fire and on deep moderately fertile soil.

Wet sclerophyll forest, frequently with a well-developed rainforest understorey, is an outstanding feature of both national parks. At high altitudes along ridges the dominant eucalypt is blackbutt *Eucalyptus campanulata*, with tallowwood *E. microcorys*, Sydney blue gum *E. saligna* and brush box *Lophostemon confertus* communities at lower levels. Wet and dry heath is restricted to steep rocky outcrops at high altitudes. Several of the heathland community species are endemic to the Gibraltar Range. Natural grasslands occupying frost hollows and sedge swamps occur on the granite of the summit of Gibraltar Range and in the southernmost part of Washpool Park.

**New England Group.** The two parks contain a great variety of habitats over a wide range of altitudes. Conditions on the high, cold, windswept and frequently mist-shrouded plateau margins contrast starkly with the warm sheltered environments of the lower river valleys. The two extremes have few species in common. The region is one of the four distribution centres for *Nothofagus* which predominates in cool temperate rain forest. Other vegetation types are subtropical rainforest, warm temperate rainforest, wet sclerophyll rain forest and tall open eucalypt forest, both with a considerable variety of eucalyptus species, intermediate subtropical-warm temperate rainforest, subalpine heath, extensive grasslands and swamps. A number of rare species are present, particularly in Dorrigo National Park, including five-leaved bonewood *Bosistoa floydii* and anise myrtle *Backhousia anisata*. Mount Hyland is predominantly warm temperate rainforest.

**Hastings-Macleay Group.** The vegetation is extremely diverse and includes cool temperate, warm temperate, sub-tropical and dry rainforests, a range of eucalypt dominated communities as well as heath and swamp. In the cool temperate rain forest, which contains some of the largest *Nothofagus* trees in existence, there are abundant small epiphytes and often a well-developed understorey of warm temperate species. The two major warm temperate rainforest associations in the area are a coachwood-sassafras *Ceratopetalum-Doryphora* sub-alliance and a *Ceratopetalum-Schizomeria-Argyrodendron-Sloanea* sub-alliance. In Mount Seaview Nature Reserve, warm temperate rain forest at the head of Cedar Creek is notable for the absence of *Ceratopetalum*. A small stand of lowland subtropical rainforest grows in Mount Seaview Reserve but it is not abundant. The higher altitude form of subtropical rain forest, with *Sloanea woollsii* as a prominent species, is found at the heads of sheltered valleys below the plateau to the east of Forbes River.

Dry rain forest communities dominated usually by shatterwood *Backhousia sciadophora* are found in five protected gullies in Oxley Wild Rivers National Park and the Kunderang Brook section of Werrikimbe National Park. The bush-headed tree grass *Xanthorrhoea australis* grows in Werrikimbe, and in the steeper, rockier sections of the gorges, vine thickets grow. The Castles Reserve includes one of the few occurrences of rain forest on limestone in New South Wales (Forestry Commission, 1989). A wide variety of wet and dry sclerophyll communities is present within the reserves. The single most important commercial hardwood species in northern New South Wales is blackbutt *Eucalyptus pilularis*, which predominates over a range of understoreys from wet to dry sclerophyll forest. Unlogged stands are rare, but a good example of unlogged blackbutt forest is preserved in Mount Seaview Nature Reserve. The drier blackbutt community occurs at lower altitudes on the northern slopes of Mount Willi Willi. The plateau supports an open forest comprising a range of eucalypts collectively referred to as New England hardwoods; also swamps, grassland, and areas of heath and scrub. Threatened or rare species found on site include pygmy cypress pine *Callitris oblonga* (VU) and the orchids *Sarcochilus fitzgeraldii* and *S. hartmanii* (DASET, 1992).

**Barrington Tops Area.** The park contains an unsurpassed mosaic of eucalypt forests and rainforest types, plus subalpine woodlands, swamps and grasslands varying with altitude, aspect, soil type, rainfall and fire regime. The major rainforest forms are cool subtropical and cool temperate, with relatively smaller areas of warm temperate rainforest. Lower altitude subtropical rain forest is well-developed on the south-eastern slopes of the plateau and on the alluvial flats of Boonabilla Creek where a very different type of subtropical rainforest has developed of colonising and late secondary successional species, indicating major disturbance in the past. The subtropical rainforest occurs up to 1,000m and contains many warm temperate rainforest species. Curiously, a normally major warm temperate rainforest species, *Ceratopetalum apetalum*, is virtually absent.

Towards the heads of the valleys subtropical elements mingle with cool temperate rain forest which is the most extensive in Australia. Barrington Tops mark the southern limit of *Nothofagus moorei*, with stands also occurring in Kerripit Beech Reserve. Wet sclerophyll forest types include a *Eucalyptus saligna*-*E. quadrangulata* association which is widespread on valley slopes and often merges with rainforest or rainforest understorey. At high altitudes, normally on more fertile soils and associated with *Nothofagus*, grow tall forests of *Eucalyptus obliqua* and *E. fastigata*. On drier slopes, a *E. campanulata* - *E. biturbinata* - *E. canaliculata* - *E. propinqua* alliance is predominant. On the plateau, subalpine woodlands are associated with an extensive series of open swamps. Grassland balds probably of natural origin occur on the summits of a number of peaks. Barrington Tops mark the northern or southern limits of distribution of a number of species. Of scientific interest is the rare endemic Tasmanian pepper *Tasmannia purpurascens*, among the most primitive of living angiosperms. A recently described species, *T. glaucifolia*, is restricted to Barrington Tops and near Point Lookout in New England National Park. Other threatened or rare species include the orchid *Dendrobium tenuissimum*, *Plantago cladarophylla* and *P. palustris* (DASET, 1992).

## FAUNA

Rainforests cover only about 0.3 % of Australia, but they contain about a third of Australia's species of mammals and birds. The nominated area, especially at the northern end, has a richly varied fauna of mammals, birds, reptiles and amphibians; probably also of fish and invertebrates, which for some groups is the most diverse in the country due to the large number of distinct habitats in the transition zone between tropical and temperate faunal regions. The area may historically have been a refuge for rainforest biota. More than 20 vertebrate species have the major part of their distribution in the property. Most of the vertebrate animals occur in sites throughout the nominated area. The recorded 80 species of mammals are 32% of Australia's terrestrial mammal fauna. These include the two species of monotremes, echidna *Tachyglossus aculeatus* and platypus *Ornithorhynchus anatinus*, also 32 marsupials, 31 bats and 10 rodents. The Border Ranges have the highest concentration of marsupials in Australia. Some 30 species inhabit rainforest and wet sclerophyll forest, of which at least one-third are largely confined to them. Although no mammal species are restricted to the region it covers the major part of the distribution of the Parma wallaby *Macropus parma* and Hastings River mouse *Pseudomys oralis* (EN). Characteristic of rainforests are red-necked and red-legged pademelons *Thylogale thetis* and *T. stigmatica*, and of wet sclerophyll forests, mountain brushtail and common possums, *Tricosurus caninus* and *T. vulpecula*

Several other species have the major part of their distribution within the rain forest and wet sclerophyll forests of the region. 45 species of frog are present, 25% of Australia's total, several of which are restricted largely to the property. These include species in the relict genera *Phylloria kundagungan* (EN), *P. loveridgei* (EN), *P. sphagnicolus* (EN), *P. pughi* (EN), *P. richmondensis*, (EN), *Mixophyes fleayi* (EN), *Litoria booroolongensis* (CR), *L. subglandulosa* (VU), *L. pearsoniana*, and the unusual pouched frog *Assa darlingtoni*. Reptile species number over 140. Genera largely restricted to the region include *Phyllurus* among the geckoes, *Gonocephalus spinipus* among the dragon lizards, eight genera of skink, and *Cacophis* and *Tropidechis* among the snakes (DASET, 1992). The invertebrates are highly diverse, and include many which are endemic and confined to the region. Land snail diversity is remarkably high even by world standards. Insect fauna is very rich, second only in Australia to that of the Wet Tropics of Queensland World Heritage site (DASET, 1992).

The avifauna is the most diverse of any area in Australia, with 270 species, 38% of Australia's total, in 175 genera and 71 families (85% of the total). The wet sclerophyll forest of northeast New South Wales is especially rich. Of importance are members of the primitive Corvidae family: Albert's lyrebird *Maenura alberti* (VU) (essentially confined to the Shield Volcano/Border Ranges), the superb lyrebird *M. novahollandiae* and rare rufous scrub-bird *Atrichornis rufescens* (VU), both of which are members of families with only two species and endemic to Australia. Also notable are eastern bristlebird *Dasyornis brachypterus* (EN), marbled frogmouth *Podargus ocellatus*, the dwarf fig parrot *Cyclopitta diophthalmia coxeni*, considered to be endangered, the regent and satin bowerbirds *Sericulus chrysocephalus* and *Ptilorhynchus violaceus*, the paradise riflebird *Ptiloris paradiseus* and the black-breasted button quail *Turnix melanogaster* (VU). Other species are Australian brush-turkey *Alectura lathamii*, and the monotypic endemic species wonga and topknot pigeons *Leucosarcia melanoleuca* and *Leupholaimus antarcticus*. The largest raptors are the wedge-tailed eagle *Aquila audax* and grey goshawk *Accipiter novaehollandiae*.

## **CULTURAL HERITAGE**

Aboriginal use of the subtropical rainforests may have started about 9,000 to 10,000 years ago. Hunter-gatherers used them as one of a number of habitats within their tribal range, more for gathering food than to live in. Excavations at Terrania Creek cave showed this was done in Nightcap Park 4,000 years ago. On the southern rim of the Mount Warning crater, rhyolite cliffs were undercut and formed rock shelters. And in the New England-Dorrigo region, people may have visited the tablelands in summer. These activities caused very minor disturbance to the ecosystem. In contrast, the use of fire as a land management tool had more drastic consequences; the rainforest boundaries documented in early historic records may have resulted from such traditional management practices. Some of the main geographical features of the Border Ranges and other areas are regarded as sacred by Aboriginal communities.

Western penetration of the area began around the middle of the 19th century and in the ensuing 130 years until about 1970, it is estimated that three-quarters of the rainforests of New South Wales were destroyed by fire as much as for timber. Hoop pine *Araucaria cunninghamii* and the low altitude warm subtropical rainforests were the most targeted for timber and land clearance for dairy farms. Other trees taken were red cedar and giant *Toona australis* and *T.ciliata*, white beech *Gmelina leichhardtii*, rose mahogany *Dysoxylum fraserianum*, native teak *Flindersia australis* and coachwood *Ceratopetalum apetalum* (DASET, 1992; CERRA, 2000).

## **LOCAL HUMAN POPULATION**

The area was most extensively cleared between 1920 and 1960 when the need for conservation began to be taken more seriously. The boundaries of the present sites generally adjoin public or private forests, and on the plateaus, pastureland. But since their designation, the reserves have no permanent residents. However, native title claims have been registered for five Aboriginal groups of which the Gidjhal and Bunjulung Nations in the Queensland border sites are the most extensive (CERRA, 2000).

## **VISITORS AND VISITOR FACILITIES**

Queensland and New South Wales annually receive some 1.4 million and 0.6 million visitors per year respectively. In 1986 estimated figures for annual visitor attendance were: Dorrigo National Park, 64,000, New England National Park, 47,000 with Mount Hyland Nature Reserve, 400. Both national parks have visitor centres and Dorrigo has long been long one of the two most heavily visited of the parks. In 1986, Mt. Warning had 49,500 visitors, Nightcap Park, 29,500, Border Ranges, 15,100, Limpinwood, 100 and Numinah 100. Barrington Tops is a popular location and the Natural Bridge section of Springbrook National Park has long been heavily used. The variety of parks and reserves permits a wide range of visitor activities, and facilities are provided for forms of recreation from adventure tourism and wildlife tracking to picnicking. Bushwalking, camping, off-road driving, birdwatching, ecotourism, self-guided and educational tours are popular. Washpool/Gibraltar Range has good visitor facilities. Access roads, picnic grounds and information brochures and limited basic camping facilities are available at many sites though there is a need to develop a better infrastructure for tourism (CERRA, 2000). There is accommodation in several of the surrounding towns.

## **SCIENTIFIC RESEARCH AND FACILITIES**

Early colonial administrators employed official botanists to record and document the resources of the continent including the rain forests. More recent surveys of rain forest fauna, particularly reptiles and amphibians, were made in rain forests of New South Wales in the 1990s (DASET, 1992; 1993). Surveys and research on a wide range of subjects have been undertaken by several institutions beside the National Parks & Wildlife Service: the Commonwealth Scientific and Industrial Research Organisation, the Australian Museum and the Universities of New England, Queensland, New South Wales and Sydney. Each year in the 2000s some 200-300 scientific and technical studies are undertaken, and number of discoveries have been made. Each relevant park agency reports on monitoring indices such as vegetation mapping, species-specific and flora/fauna community projects, visitor numbers and bush campsite numbers (CERRA, 2000).

## **CONSERVATION VALUE**

The sites contain a great diversity of largely undisturbed rainforests with endemic and rare flora and fauna. It also contains the geologically notable Shield Erosion Caldera and the Great Escarpment as outstanding examples of major stages of the earth's development and biological evolution, with important habitats for the conservation of biological diversity. The Park lies within a WWF Global 200 Eco-region, a WWF/IUCN Centre of Plant Diversity and a BirdLife-designated Endemic Bird Area

## CONSERVATION MANAGEMENT

The sites are administered by the New South Wales and Queensland National Parks Services under the Environmental Protection Agency and the National Parks & Wildlife Act of 1974 amended 2001, and the Wilderness Act of 1987; also the Environment Protection & Biodiversity Conservation Act (1999); the Nature Conservation Act (1992); the Rural Lands Protection Act (1985); and Forestry Act (1959). National parks are managed for protection of all their aspects, public appreciation, ecologically sustainable recreation, and research. In Nature Reserves, the care, study and appreciation of wildlife are more important than recreation facilities. In Wildernesses the aims are to restore and protect the areas' unmodified condition. Flora Reserves in new South Wales, administered by the State Forest Service, strictly protect reference stands of particularly interesting native flora. In Queensland the non-commercial State Forests are managed by the Department of Natural Resources which permits some public access and activity within clearly defined local areas.

The property is well maintained. Changes in tenure, particularly of adjacent properties, have enhanced the protection of the sites though there is need for coordinated management and better enforcement to manage key threats. The Technical & Scientific Advisory Committee has drawn up a strategy for research and monitoring which aims to review and update World Heritage values in each reserve as necessary, to make baseline studies, undertake and support research into patterns of visitor use and impacts, and to report regularly. Implementation of the Strategic Overview with both the Community and Technical & Scientific Advisory Committees, coordination of management and research, consultation with and involvement of indigenous people are all important to maintain and enhance the natural and cultural values of the sites.

Management plan strategies differ slightly between the two states. Information is given in CERRA (2000):

<u>date</u>	<u>site</u>	<u>management</u>	<u>notes</u>
<b>MAIN GROUP</b>			
1994	Main Range National Park	Management Strategy in preparation (2000)	
1994	Mt. Mistake National Park	Management Strategy in preparation (2000)	northernmost protected area
1994	Gambubal State Forest	No plan beyond planning processes (1996)	
1994	Goomburra State Forest	No plan beyond planning processes (1996)	
1994	Acacia Plateau Flora Reserve	Working Plan approved	not in WHC list by that name
1994	Killarney State Forest	Management Strategy in preparation (2000)	
1994	Teviot State Forest	Management Strategy in preparation (2000)	
1994	Emu Vale State Forest	No plan beyond planning processes (1996)	
1994	Spicers Gap State Forest	No plan beyond planning processes (1996)	
1994	Wilson's Peak Flora Reserve	Working Plan approved	in National Park ?
1994	Gilbert State Forest	Management Strategy in preparation (2000)	
1994	Koreelah National Park	Management Strategy in preparation (2000)	
1994	Alford Forest Reserve	No plan beyond planning processes (1996)	omitted from WHC list
<b>FOCAL PEAK GROUP</b>			
1994	Mount Barney National Park	Management Strategy in preparation (2000)	
1994	Tooloom National Park	Management Plan adopted 2000	
1994	Toonumber National Park	Draft Management Plan exhibited 2002	
1994	Burnett Creek State Forest	No plan: planning processes only	
1994	Cambridge Plateau Flora Reserve	Draft Management Plan exhibited 2002	in Richmond Range

1994	Cronan Creek State Forest	No plan beyond planning processes (1996)	
1986	Mount Nothofagus Flora Reserve	Working Plan approved 1987	
1994	Mount Clunie Flora Reserve	Working Plan approved 1987	
1994	Captains Creek Flora Reserve	Working Plan approved 1987	
1994	Palen Creek State Forest	No plan beyond planning processes (1996)	
1994	Mallanganee Flora Reserve	Draft Management Plan exhibited 2002	
1994	Telemon Environmental Park		
1994	Bungdoozle Flora Reserve	Working Plan approved 1987	
1994	Rabbit Board Paddock Reserve		
1994	Turtle Cr. Environmental Park		
1994	Prisons purposes land		
1994	Tooloom Scrub Flora Reserve	Working Plan approved 1987	
<b>SHIELD VOLCANO GROUP</b>			
1986	Border Ranges National Park	Joint Management Plan adopted 1989. New joint draft Management Plan exhibited 2001	contains wilderness area established 1915
1994	Lamington National Park	Draft Management Plan exhibited 1999	
1986	Nightcap National Park	New joint Management plan exhibited 2001	
1986	Limpinwood Nature Reserve	New joint Management plan exhibited 2001	
1994	Springbrook National Park	Draft Management plan exhibited 1999	contains wilderness area
1986	Mount Warning National Park	New joint Management plan exhibited 2001	
1994	Mount Chinghee National Park		
1986	Numinbah Nature Reserve	New joint Management plan exhibited 2001	
1994	Amaroo Flora Reserve	Working Plan approved 1987	
	Mebbin Lagoons Flora Reserve	New joint Management plan exhibited 2001	
<b>WASHPOOL &amp; GIBRALTAR RANGE</b>			
1986	Washpool National Park		contains wilderness area
1986	Gibraltar Range National Park		contains wilderness area
1986	Iluka Nature Reserve		
<b>NEW ENGLAND GROUP</b>			
1986	New England National Park	Management Plan adopted 1990	contains wilderness area established 1927
1986	Dorrigo National Park	Management Plan adopted 1998	
1986	Mt. Hyland Nature Reserve		
1994	Cunnawarra Flora Reserve		
<b>HASTINGS-MACLEAY GROUP</b>			
1994	Oxley Wild Rivers National Park	Draft Management Plan exhibited	contains wilderness area
1986	Werrikimbe National Park	Draft Management Plan in preparation	contains wilderness area
1994	The Castles Flora Reserve	Draft Management Plan exhibited	
1986	Mount Seaview Nature Reserve	Draft Management Plan exhibited	
1986	Willi Willi Flora Reserve	Working Plan approved	formerly Banda Banda Fl. Reserve
1994	Fenwicks Scrub Flora Reserve		

## BARRINGTON TOPS AREA

1986	Barrington Tops National Park Mt. Royal National Park	Draft Management Plan exhibited 1989. Co-managed with Hunter Water Corp	contains wilderness area omitted from WHC list
1994	Kerripit Beech Flora Reserve	Working Plan approved 1987	

## MANAGEMENT CONSTRAINTS

The major biological threats to the sites are the uncontrolled use of fire, invasion by pest species including weeds, feral animals and fungal pathogens, biodiversity loss, and the consequences of global climate change. Some instances are: feral pigs on the Main Range, the spread of broom in the open forests and grasslands of Barrington Tops, invasion of Iluka Nature Reserve by boneweed, and of Dorrigo National Park by mist flower, kahill ginger and madeira vine. The major social threats to the sites are inappropriate tourist and commercial activities and infrastructure, incompatible residential and tourist development on adjoining properties, diversity in local government zoning policies which cause inconsistent planning, and the increasing pressures from population and urbanization. Visitor pressure became a problem in parts of Lamington and Springbrook National Parks as early as the 1990s (DASET, 1993).

## STAFF

Present staff numbers have not been identified but should be available from management plans. In 1986 WCMC site sheets gave a total staff for the Shield Volcano group reserves of 6, and for the New England group, 3.

## BUDGET

Funds are provided by both State and Commonwealth agencies but funding is considered inadequate to deal with threats such as weed and pest control, the rehabilitation of degraded areas, and for systematic monitoring.

## LOCAL ADDRESSES

National Parks & Wildlife Service, Northern Region Office, PO Box 67, Grafton, NSW 2460, Australia.  
National Parks & Wildlife Service, PO Box 155, Albert Street, Brisbane, QLD 4002.  
Department of the Environment, Water, Heritage & the Arts. PO Box 787. Canberra ACT 2601.

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