PART C

4 BIOPHYSICAL CHARACTERISTICS

4.1 Climate

The climate of the Region ranges from alpine environment to coastal areas (NSW Government, n.d.b). Temperatures rarely fall below 0°C at sea-level, but frosts are common at higher altitudes in the mountains (NSW Government, n.d.a). Mean annual temperatures range from 10-25°C in Wollongong, to 9-24°C in Eden, and 0.2-27°C in Braidwood (Bureau of Meteorology, 2024).

Rainfall is variable. Precipitation is uniformly distributed among seasons in the northern parts, slightly dominant in summer and autumn on the south coast. Mean annual rainfall is reported as 1,148.4mm in Wollongong, 624.1mm in Eden, and 686.3mm in Braidwood (Bureau of Meteorology, 2024).

Climate change is impacting the Region. In the 30 years to 2019, in South East NSW, annual rainfall has decreased slightly, rainfall leading into autumn has decreased slightly, and there have been more hot days, including more consecutive days above 35°C (Bureau of Meteorology and the CSIRO, 2019). Projections for annual average temperature increases are in the range of 1.1-1.8°C by the year 2050, and 1.2-3.6°C by 2090. Severe fire weather days per year are projected to increase by 1.2 in 2050, and 2.4 in 2090 (NSW DCCEEW, 2024).

4.2 IBRA bioregion and subregions

The Region's bioregions and subregions provide the spatial basis for evaluating the extent to which the current NPWS Reserves and State Forests satisfy CAR principles.

The Region intersects three IBRA bioregions, Sydney Basin (SB), South Eastern Highlands (SEH) and South East Corner (SEC). The IBRA subregions within the Region are:

- Bateman (SEC)
- East Gippsland Lowland (SEC)
- Ettrema (SB)
- Jervis (SB)
- Kybeyan-Gourock (SEH)
- Moss Vale (SB)
- South East Coastal Ranges (SEC)

IBRA subregion boundaries subject to assessment are shown in Figure 5.

The Burragorang subregion, which contains Wingello State Forest, has been excluded from the detailed CAR assessment. The reason is that there are already large areas of NPWS reserved lands in this subregion in the southern Blue Mountains.

Landforms within the Region range from rocky outcrops and steep hills to deep gorges and waterfalls, wide plateaus, and coastal beaches and lagoons. The area includes forests, mixed warm temperate and subtropical rainforest, heath, shrubland and woodland, and coastal sequences with prominent "contour" vegetation patterns, and grasslands. It encompasses landscapes of diverse geology, landforms, soils and vegetation. The key biophysical characteristics of each subregion are summarised Table 5.

Table 5: IBRA Bioregion and Subregion descriptions (Source: NSW National Parks and Wildlife Service, 2003), (NSW Office of Environment & Heritage, 2011)

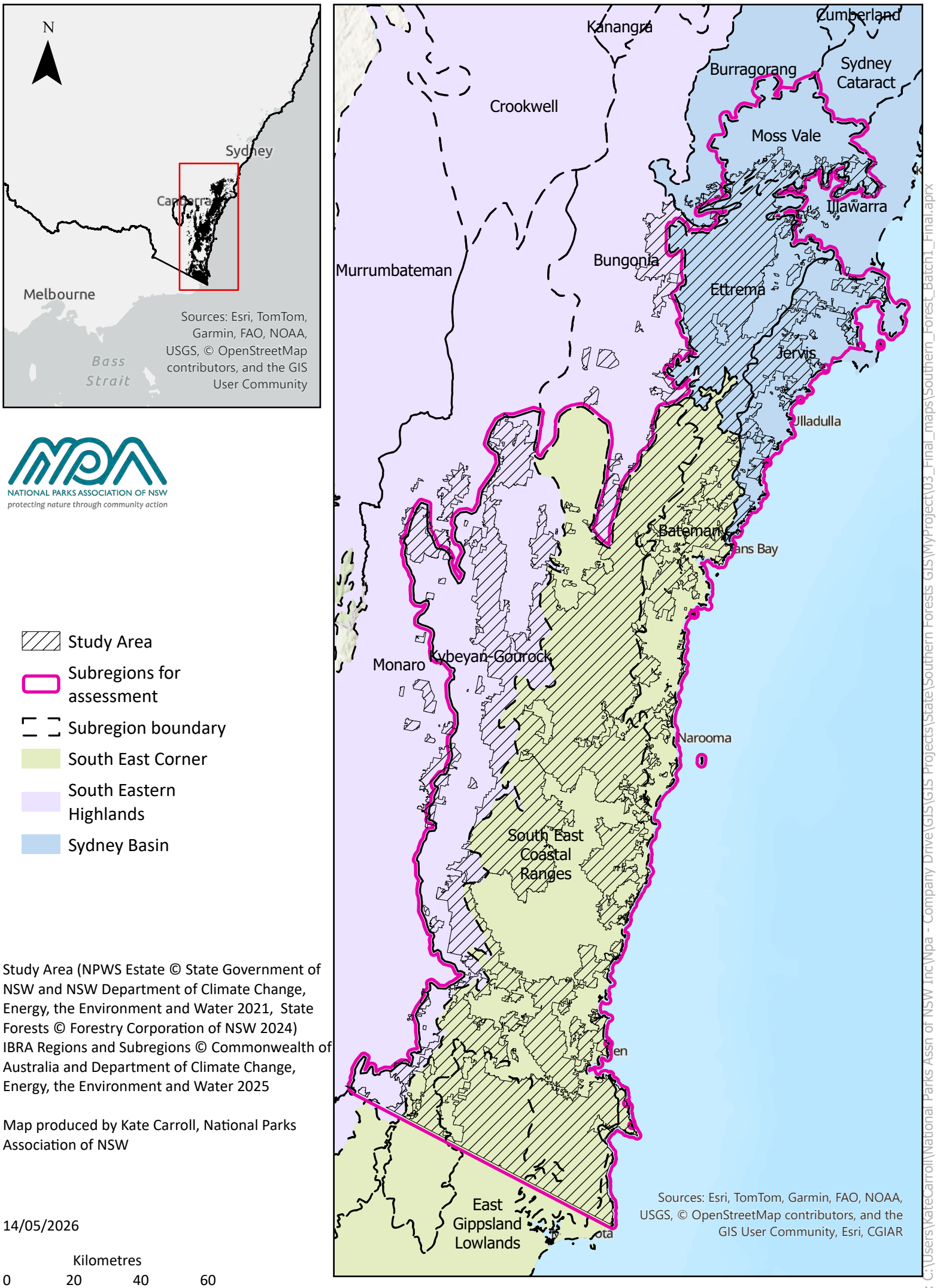
Bioregion	Subregion	Geology	Characteristic landforms	Typical soils	Vegetation	Study Area context
Sydney Basin	Burragorang	Permian and Triassic sandstones and shales on the western edge of the Basin. Limited basalt caps.	Rolling hills on a sandstone plateau with deep gorges and sandstone cliffs in Burragorang valley.	Rocky outcrops, texture contrast soils and uniform sands on sandstone. Bouldery debris with sandy clay matrix below cliffs. Rich loams in alluvium.	Heath, shrubland and woodland with black ash, hard-leaved scribbly gum, Sydney peppermint and red bloodwood on sandstone similar to other parts of the Basin. Deane's gum, turpentine, blue leaved stringybark immediately below escarpment passing to grey gum, narrow leaved ironbark and thin-leaved stringybark on bouldery slopes. River oak along main streams below the plateaus.	A small portion of this subregion occurs in the Study Area. Wingello State Forest and the northwestern end of Morton National Park occur at the southern extent of the Burragorang subregion.
Sydney Basin	Ettrema	Permian horizontal quartz sandstone alternating with shales. Deep gorges expose Silurian volcanics and Carboniferous granite in underlying Lachlan Fold Belt. Limited Tertiary basalt with river gravels.	Low stepped hills on plateau with deeply incised streams off plateau edge below waterfalls on the escarpment.	Alternating sandstone and shale create bare rock benches and soil benches with shallow, often saturated sand. Structured red brown clay loams on basalt.	Very prominent "contour" vegetation pattern. Lichens, mosses and low heath patches on rock, woodlands with dwarfed red bloodwood, black ash, tall heath and sedgeland on soil benches. Better soils have messmate and brown barrel. Gullies support rainforest elements with turpentine, plumwood, coachwood, lillypilly and mountain pepper.	Morton National Park largely covers the subregion. Colymea State Conservation Area and Bugong National Park occur at the eastern extent.
Sydney Basin	Illawarra	Permian siltstones, shale, sandstones and interbedded volcanics on and below the coastal escarpment.	Vegetated cliff faces on coastal escarpment with waterfalls and steep streams. Bouldery debris slopes with sandy clay matrix and low hills and alluvial valleys on	Structured red and red brown loams and clay loams with some areas of mellow texture contrast soils. Fertility high and good water holding capacity. Siliceous sands on	Mixed warm temperate and subtropical rainforest complexes on rich shale soils and alluvium under the escarpment. Coachwood, native tamarind, cabbage	Cambewarra Range Nature Reserve occurs at the southwestern extent of the Illawarra subregion, parts of Barren Grounds Nature

Bioregion	Subregion	Geology	Characteristic landforms	Typical soils	Vegetation	Study Area context
		Quaternary alluvium and coastal sands.	coastal ramp. Barrier systems at Lake Illawarra and Nowra.	beaches and dunes, podsol profiles in older dunes, peaty sands and organic silts in swamps and estuaries.	tree palm, Port Jackson fig, cheese tree, with soft tree fern and rough tree fern understorey. Adjacent tall forests; Sydney peppermint, brown barrel, yellow stringybark, coastal white box. Coastal dunes; coast wattle, tea-tree, banksia, and blackbutt. Common reed in fresh swamps and lakes, mangroves and limited saltmarsh in estuaries.	Reserve occur within Illawarra, and Morton National Park is also present in its western areas.
Sydney Basin	Jervis	Permian quartz sandstone and mixed shale and lithic sandstones. Tertiary trachyte intrusives at Milton. Limited Tertiary sands and more extensive Quaternary coastal sands.	Escarpment faces west and south and sandstone plateau rises to small peaks like Pigeon House. Waterfalls and gorges off the escarpment but low hills and coastal ramp on siltstones to Jervis Bay. Well-developed coastal barrier with Jervis Bay enclosed by tied islands. Pleistocene cliff top dunes on the peninsula with fresh lakes created by water table windows.	Poor shallow sands on quartz sandstone plateau similar to Ettrema. Deep texture contrast soils with loam topsoils on coastal shales, moderate fertility but waterlogged valley floors. Coastal barriers extend from clean dune sands to deep podsols in Pleistocene dunes. Organic sands and muds in swamps and estuary.	Coastal forests on shale dominated by spotted gum, blackbutt, black ash, and bangalay. Rainforest elements on trachyte, watergum along streams. Open understorey with macrozamia. Sand dunes have barrier sequence of tea-tree, banksia, wattles merging to protected forests and scrubs with smooth-barked apple, red bloodwood, forest oak, bangalay and blackbutt. Gahnia sedgelands with black wattle in steep wet gullies. Common reed swamps and sedgeland in wide valleys on shale and behind dunes. Swamp oak, salt marsh and mangrove sequence in estuaries.	Conjola National Park occurs at the central extent of the Jervis subregion, while Currambene, Yerriyong, McDonald, and Termeil State Forests all occur within the subregion. Meroo National Park is located at its southern extent, Morton National Park occurs along parts of the subregion's boundaries, and Jerrawangala National Park, Parma Creek Nature Reserve, and Jervis Bay National Park occur at its northern extent.

Bioregion	Subregion	Geology	Characteristic landforms	Typical soils	Vegetation	Study Area context
Sydney Basin	Moss Vale	Triassic Wianamatta Group shales, Tertiary basalts and trachyte intrusions, large Quaternary peat swamp.	Shale and basalt plateau with rolling hills and shallow valleys. Very large peat swamp at Wingecarribee.	Structured red and red-brown clay loams and loams, and loamy alluvium with high fertility. Areas of sandstone at the margins thin, waterlogged sandy soils. Organic peat in swamps. Stony slope debris on larger intrusions.	Tall forest of narrow-leaved peppermint, Sydney peppermint, monkey gum, black ash, messmate, coastal white box, and brown barrel on shale and basalts. Extensive sedgelands and hanging swamps on sandstone. Wingecarribee raised sphagnum bog. Sydney peppermint, narrow-leaved peppermint, and gully ash on trachyte domes.	Meryla State Forest occurs within the Moss Vale subregion, and parts of Morton National Park occurs along its southern boundary.
South East Corner	Bateman	Tightly folded fine grained Ordovician metamorphic rocks with several intrusions of granite. Western margin is a tight synclinal fold in Devonian sandstone and siltstone. Small areas of Tertiary basalt and quartz sands behind the coastal headlands. Quaternary alluvium on main valley floors and in the estuaries.	Steep hills below the Great escarpment oriented north-south and controlled by rock structure. Lines of hills become lower toward the coast with a slight upturn along the coastal margin. Coastal barrier systems are small and estuarine fills limited.	Mostly texture contrast soils. Red clay subsoils with thin topsoil on metamorphic rocks, deeper coarser grained profiles on granite. Red brown structured loams on basalt and deep siliceous sands with some podsol development on Tertiary sands and coastal dunes.	Hakea, melaleuca, coast rosemary and dwarfed red bloodwood heath on headlands. Red bloodwood and spotted gum forests to 300 m. Yellow stringybark, grey ironbark and woollybutt to 550 m. Brown barrel, black ash, Sydney peppermint, large-fruited red mahogany, Sydney blue gum and monkey gum to 900 m, then snow gum.	Flat Rock, Clyde, Shallow Crossing, Boyne, Benandarah, Mogo, Moruya, and Bodalla State Forests occur from north to south across the Bateman subregion.
South East Corner	South East Coastal Ranges	Extensive areas of granite amongst Ordovician and Silurian metamorphosed sedimentary and volcanic rocks; slates, chert, quartzites. Gently folded red and purple Devonian sandstones and shales, limited areas of Tertiary basalt and sand deposits. Quaternary coastal	Very abrupt margin on the Great Escarpment. Deep gorges with rapids and waterfalls in the main streams including the lower Snowy River. Extensive subdued basin with rolling hills on the Bega granite with steep hillslopes at the contact aureole. Streams carry large	Coarse texture contrast soils on granite, thinner profiles on metamorphics with red and yellow clay subsoils. Deep coarse sands in granite derived alluvium often deposited in swampy valley flats. Deep fine sands in	Red bloodwood and spotted gum forests to 300 m. Spotted gum less common in the south. Yellow stringybark, grey ironbark, black ash, yertchuk and woollybutt to 550 m. Brown barrel, black ash, large-fruited red	Deua National Park occurs extensively within the South East Coastal Ranges subregion, Wadbilliga National Park occurs in its central areas, and South East Forest National Park occurs at its southern extent.

Bioregion	Subregion	Geology	Characteristic landforms	Typical soils	Vegetation	Study Area context
		sediments and small areas of alluvium.	volumes of sand to valley floors and estuaries. Small beach, dune, lagoon barrier systems	dunes. Peaty sands in lagoons and swamps	mahogany, and monkey gum to 900 m, then snow gum.	Dampier, Bodalla, Wandella, Mumbulla, East Boyd, Nadgee, and Timbillica State Forests occur across the central and southern areas of the subregion.
South East Corner	East Gippsland Lowlands	Granites in the head of the Genoa River. Small areas of Devonian sandstone overlain by Tertiary sands and Quaternary coastal dunes near Cape Howe.	Low rounded coastal hills on granite, higher and steeper on Devonian sandstones. Beach, dune and lagoon barrier development on the main streams with dunes some distance inland at Cape Howe.	Coarse texture contrast soils on granite, subject to high rates of erosion even under forest cover. Deep sands in dunes. Peaty sands in lagoons and swamps.	Coastal sequence on dunes with thickets of coast tea-tree and sedge communities around swamps. Stunted black ash and red bloodwood clumps close to the coast becoming taller inland with bangalay, rough-barked apple, river peppermint, coast grey box, black she-oak and blue gum.	Nadgee Nature Reserve and Beowa National Park occur near the southern coastal areas of the East Gippsland Lowlands subregion, South East Forest National Park occurs at its western extent, and Yambulla State Forest covers much of the subregion.
South Eastern Highlands	Bungonia	Primarily fine-grained Palaeozoic sedimentary and meta-sedimentary rocks, with minor areas of acid volcanics and limestone. Areas of Tertiary river terrestrial sediments and low sandsheets in the south with very limited basalt.	Distinct plateau with very steep, deep margins on the Great Escarpment dropping into the Shoalhaven River. Strong linear ridges on resistant sandstones and volcanics, wide valleys with some cold air drainage and inverted tree lines.	Mostly yellow texture contrast soils some with harsh clay subsoils. Shallow structured organic loams on limestone and basalt, deep siliceous sands and clayey sands on Tertiary sediments.	Mottled gum, broad-leaved peppermint, white gum, red stringybark and black ash forests and woodlands. Snow gum with and snow grass in cold pockets. Black she-oak common as understorey and in regeneration areas. Limited distribution of argyle apple.	Morton National Park and Bungonia State Conservation Area occur at the northeastern extent of the Bungonia subregion, while Nadgigomar Nature Reserve, Monga National Park, and Monga State Conservation Area occur from central to southern areas of the subregion.

Bioregion	Subregion	Geology	Characteristic landforms	Typical soils	Vegetation	Study Area context
South Eastern Highlands	Kybeyan-Gourock	Devonian quartz-rich sedimentary rocks with minor areas of limestone, and areas of Silurian Devonian granitoids at higher elevations in the south. Ordovician quartz rich sedimentary and metamorphic rocks in the west.	Rocky ranges, moderate to steep lower to and mid slopes. Stony outcrops along ridgelines.	Red and yellow texture contrast soils, becoming deeper and more poorly drained down slope. Thin brown stony loams and transitional alpine humus derived from granitoids at higher elevations in the south.	*Eucalyptus fastigata, Eucalyptus viminalis*, and *Eucalyptus radiata* on hillslopes, with *Eucalyptus melliodora Eucalyptus blakelyi* and *Eucalyptus mannifera* at lower elevations. Some west facing patches of *Allocasuarina nana* heathland. Strong aspect influences on plant associations.	Tallaganda, Badja, Glenbog, and Tantawangalo State Forests occur from north to south across the Kybeyan-Gourock subregion, as do Tallaganda, Deua, Wadbilliga, and South East Forest National Parks.
South Eastern Highlands	Monaro	Block faulted ranges and closed lake basins in Silurian and Devonian acid fine grained sedimentary and metamorphic rocks with some granites. Extensive areas of thin Tertiary basalt flows over lake and river sediments.	Sloping plateau rising from 600 to 1300 m north to south. Structural ridges of more resistant rock. Stepped plains on basalt with intervening low areas of granite or sedimentary rocks. Numerous shallow lakes and swamps, a few permanent, many are closed basins and periodically dry. Area is in rain shadow with rainfall 450-700mm.	Harsh yellow texture contrast soils in general. Shallow red brown to black stony loams on basalt.	Snow gum, ribbon gum, candle-bark gum, broad-leaved peppermint and mountain gum open woodlands with kangaroo grass understorey. White gum, mottled gum on hills. Brown barrel and black ash forests in east with west facing patches of dwarf casuarina heathland. Extensive grasslands of snow grass, spear grass and wallaby grass on the driest plains with clumps of snow gum amongst rocky outcrops.	A small portion of this subregion occurs in the Study Area. Yanununbeyan State Conservation Area, Tinderry Nature Reserve, Macanally State Conservation Area, Coornartha Nature Reserve, Dangelong Nature Reserve, and Kybeyan State Conservation Area occur along the western boundary of the Monaro subregion.



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- Study Area
- Subregions for assessment
- Subregion boundary
- South East Corner
- South Eastern Highlands
- Sydney Basin

Study Area (NPWS Estate © State Government of NSW and NSW Department of Climate Change, Energy, the Environment and Water 2021, State Forests © Forestry Corporation of NSW 2024) IBRA Regions and Subregions © Commonwealth of Australia and Department of Climate Change, Energy, the Environment and Water 2025

Map produced by Kate Carroll, National Parks Association of NSW

14/05/2026

Kilometres
0 20 40 60

Figure 5: IBRA subregions subject to assessment

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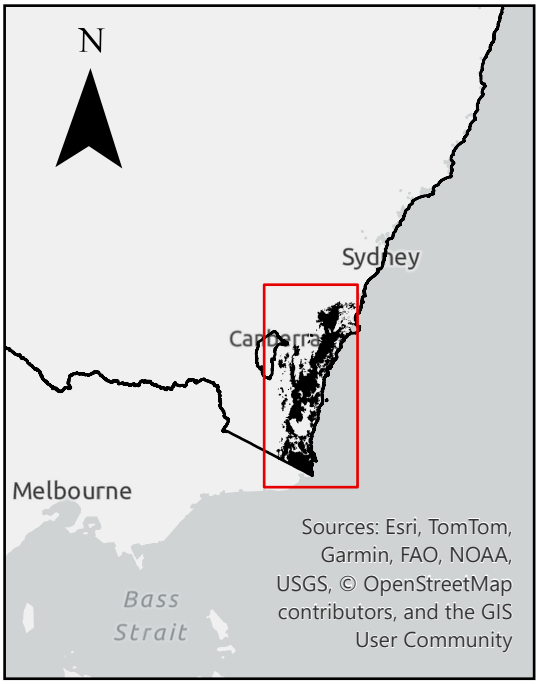
4.3 Forest productivity

Early forest reservation focused on lands with valuable timber within navigable distance to water and railway (Bickford, Brayshaw and Proudfoot, 1998). The emphasis on forest selection is economic value, rather than ecological value, and points towards preferential selection of more productive forests.

The Commonwealth government mapped the Forest Productivity Index (FPI) which estimates forest growth based on the relationship between the amount of photosynthetically active radiation absorbed by plant canopies and various productivity modifiers that affect plant growth. Various soil and climate inputs as well as a normalised difference vegetation index (NDVI) are included in the FPI model. The NDVI provides an estimate of vegetation health and a means of monitoring changes in vegetation over time and is one of the most common vegetation indices derived from remotely sensed data. FPI for 2022 in the Region is mapped in Figure 6. The 2022 mapping was selected as the most recently available data. The highest productivity areas of the South East include many of the State Forests in the coastal areas, extending from McDonald State Forest to the far south coast, including some forests in the far south tablelands such as Bondi State Forest. All forests around the Eurobodalla area have high productivity.



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State Forest

NPWS Reserves

Forest Productivity Index

20

0

Map produced by Kate Carroll, National Parks Association of NSW

14/05/2026

Kilometres

0 25 50 75

Figure 6: Productivity mapping of the Region

5 VEGETATION

5.1 Vegetation classifications

Forest ecosystems in south-eastern NSW are biologically diverse and structurally complex, supporting high species richness, endemic and threatened taxa, and critical habitat features such as hollow-bearing trees and complex understories. They play a key role in carbon storage, climate change mitigation, and landscape-scale resilience through microclimate regulation, water cycle stabilisation, and erosion control, while also supporting catchment health and regional productivity.

Despite these values, many forested IBRA subregions remain under-represented in the reserve system and continue to face logging and other extractive pressures. Historically, the establishment of protected areas has favored lands considered undesirable for agriculture (Pressey *et al.*, 2002), leaving many ecologically valuable forests unprotected. Protecting forests through the formal reserve system provides a strong foundation for improving representativeness and securing long-term conservation outcomes.

Three levels of vegetation classification have been systematically mapped across NSW:

1. Vegetation Formations
2. Vegetation Classes
3. Plant Community Types (PCTs)

Vegetation Formations such as forests, woodlands, wetlands, or grasslands, are the most ecologically meaningful framework for broad-scale assessment and comparison across multiple IBRA subregions (Keith, 2004). Vegetation Formations provide a consistent representation of broad habitat types, integrating canopy structure, growth forms, and dominant species assemblages. While this broader scale inevitably obscures some local variation, it allows robust evaluation of how the NPWS Reserves and State Forests could contribute to each IBRA subregion. PCTs are mapped at a smaller, more detailed scale, allowing identification of missing or under-represented communities that may not be detected by Vegetation Formations.

The condition and configuration of all three classifications of vegetation will shape ecological outcomes: intact systems regulate microclimates, maintain soil moisture, and support complex food webs (Lindenmayer, Franklin and Fischer, 2006), whereas fragmented or degraded systems show reduced complexity and habitat quality (Hobbs and Yates, 2003). Strengthening protection of under-represented Forest Vegetation will enhance ecological integrity and landscape resilience across the Region.

5.1.1 Methodology

5.1.1.1 Historical Change

The NSW State Vegetation Type Map (C2.0.M2.1 Release) was accessed to map vegetation formations within the Study Area. IBRA subregions that intersected with the State Forests were included in the analysis, whilst subregions that intersected with only NPWS estate were excluded. To assess historical changes in vegetation, the NSW State Vegetation Type Map (Pre-Clearing) (C2.0.M2.1 Release) was compared with the NSW State Vegetation Type Map (Extant), enabling the identification of vegetation formations most impacted since European settlement. Vegetation formations that originally occupied less than 50 hectares within a subregion, as well as those classed as Not Classified, were excluded from this analysis to focus on ecologically significant changes.

5.1.1.2 Vegetation Formations

Comprehensiveness Assessment

The comprehensiveness assessment evaluated the extent to which vegetation formations are represented within the existing reserve system and how this changes with the inclusion of State Forests. The analysis was based on state-wide vegetation type mapping (SVTM), which was used to derive vegetation formation coverage across the Study Area, combined with tenure datasets for lands managed by the NSW National Parks and Wildlife Service (NPWS) and State Forests.

Vegetation formations derived from SVTM were intersected with NPWS reserve tenure and State Forest datasets to quantify the extent of each formation within the existing and proposed reserve network. For each formation, the total extent within the Study Area and the area currently protected within NPWS reserves was calculated, with additional areas captured within State Forest tenure used to assess potential increases in protection.

Absolute gains were calculated by adding the extent of each vegetation formation within State Forests to the existing NPWS reserve extent, with percentage increases used to identify formations where inclusion would result in substantial gains.

Proportional representation was assessed by comparing the extent of each vegetation formation within NPWS reserves alone and in combination with State Forest tenure against its total SVTM-derived extent. This enabled identification of where existing reserves meet the 30% benchmark and where the inclusion of State Forests contributes to meeting or exceeding this threshold. This step ensures that assessment of adequacy reflects both current protection and the potential contribution of State Forests.

Adequacy Assessment

Adequacy was assessed by evaluating whether the level of protection afforded to each vegetation formation is sufficient to support long-term ecological viability, resilience, and function. This assessment builds on the proportional representation analysis by applying a minimum threshold benchmark to determine whether protection levels are likely to be ecologically meaningful.

A benchmark of 30% protection was adopted, consistent with the targets set under the Global Biodiversity Framework (GBF) and Australia's national commitment to protect at least 30% of land and sea by 2030. This threshold reflects contemporary scientific consensus that significantly higher levels of protection are required to maintain ecosystem processes, biodiversity persistence, and resilience under accelerating climate change.

While earlier frameworks such as the JANIS criteria recommended lower targets (e.g. 15% for most ecosystems and 60% for old growth forests), these are now widely considered insufficient given current rates of biodiversity loss, habitat fragmentation, and climate-driven impacts. The 30% benchmark therefore provides a more precautionary and policy-relevant standard for assessing reserve adequacy in a modern context.

Using this threshold, vegetation formations were assessed according to whether they:

- Meet or exceed 30% protection within the existing NPWS reserve system
- Fall below the threshold but achieve it with the inclusion of State Forests
- Remain under-represented even after the inclusion of State Forest tenure

Importantly, these adequacy classifications were not treated as a standalone output, but were embedded within both the comprehensiveness and representativeness findings. This ensures that all reported gains and patterns of distribution are interpreted in the context of whether they contribute to achieving ecologically sufficient levels of protection.

Representativeness Assessment

The representativeness assessment evaluated how well vegetation formations are distributed across IBRA subregions and how the inclusion of State Forests improves spatial representation within the reserve network.

Vegetation formations derived from SVTM were intersected with IBRA subregional boundaries and then with NPWS reserve tenure and State Forest datasets to quantify the extent of each formation within each subregion under both existing and proposed scenarios.

Absolute gains were calculated by comparing the extent of vegetation formations within NPWS reserves to the combined extent of NPWS reserves and State Forests, with both hectare increases and percentage changes used to identify where protection would increase substantially.

Proportional representation at the subregional scale was assessed by comparing the extent of each vegetation formation within NPWS reserves and within the combined NPWS and State Forest tenure against its total SVTM-derived extent within each IBRA subregion. This enabled identification of where vegetation formations meet the 30% benchmark under the existing reserve system and where the inclusion of State Forests contributes to achieving or exceeding this threshold within each subregion.

This approach identifies spatial gaps in the reserve system and highlights where the inclusion of State Forests contributes to a more balanced and representative network.

5.1.1.3 Plant Community Types

PCTs were analysed across the Study Area to determine which would be protected by the State Forest and to identify any PCTs currently unreserved within the NPWS Reserves. The results, shown in Table 6, also highlight the PCTs that have the potential to receive the largest increases in protection.

An important limitation on the analysis of PCT mapping is that its accuracy is limited in areas that have not been ground truthed. The map has an approximate spatial precision of five metres, derived from computer-generated feature recognition and aerial photographic interpretation at scales of 1:10,000–1:20,000. Attribution accuracy varies: some PCTs are well-surveyed and reliably mapped, while others have insufficient survey data and cannot be confidently represented at regional scales. In such cases, modelled vegetation may misclassify communities or misrepresent their extent. Accordingly, statewide mapping is most reliable for broad-scale analyses and should be complemented by targeted, site-based surveys for fine-scale or conservation-critical assessments. SVTM mapping also only identifies complete clearing and doesn't account for other habitat modifications such as weed incursion and select clearing and logging; this is especially the case for the pre-1750 mapping.

5.1.2 Findings

5.1.2.1 Historical Change

The mapping and analysis of vegetation formations revealed several clear trends across the Region (Table 6 and Table 7). These include:

- Grasslands and grassy woodlands have been significantly cleared, with less than half remaining across all subregions. This reflects the intensive clearing for agriculture across the Region since European settlement (NSW EPA, 2025).
- Heathlands, wet sclerophyll forests, and rainforests have suffered less clearing across most subregions, except for Moss Vale, where over half of the wet sclerophyll forests and rainforests were cleared for grazing and urban expansion.
- Dry sclerophyll forests have remained relatively stable across most subregions, except in Moss Vale, Jervis, and Kybeyan Gourock, where notable declines have occurred from conversion to pastoral lands and urban development, particularly in the Jervis subregion.
- Wetlands have experienced varied outcomes, with freshwater wetlands remaining mostly intact, whereas forested wetlands have declined by around 20%, especially in the Bateman and South East Coastal Ranges subregions.
- Saline wetlands have declined by approximately 25%, largely due to small-scale residential development. Alpine complex vegetation is limited within the Study Area but has remained mostly intact where it is most abundant, the Kybeyan Gourock subregion.
- The Moss Vale subregion has experienced the greatest loss of native vegetation overall.
- The Ettrema subregion remains the most intact and has the highest proportion of NPWS reserves within the Study Area.

Table 6: The proportion of vegetation formations remaining per IBRA subregion since European settlement (1 of 2 related tables)[1]

	South East Corner								
	Bateman			East Gippsland Lowland			South East Coastal Ranges		
	1750 (ha)	Extant (ha)	Remaining (%)	1750 (ha)	Extant (ha)	Remaining (%)	1750 (ha)	Extant (ha)	Remaining (%)
Alpine Complex	-	-	-	-	-	-	-		-
Dry Sclerophyll Forests (Shrub/grass sub-formation)	129	126	98%	31,155	27,100	87%	70,661	63,461	90%
Dry Sclerophyll Forests (Shrubby sub-formation)	54,643	48,280	88%	27,556	25,598	93%	316,474	295,179	93%
Forested Wetlands	8,691	4,528	52%	133	125	94%	17,029	11,814	69%
Freshwater Wetlands	563	415	74%	1,920	1,870	97%	4,780	4,279	90%
Grasslands	454	183	40%	50	21	42%	24,631	4,854	20%
Grassy Woodlands	12,907	4,444	34%	68	35	51%	178,280	97,202	55%
Heathlands	2,089	1,673	80%	2,431	2,228	92%	7,202	6,619	92%
Rainforests	6,796	6,192	91%	547	522	95%	41,512	40,506	98%
Saline Wetlands	2,043	1,500	73%	129	99	77%	1,658	1,051	63%
Wet Sclerophyll Forests (Grassy sub-formation)	59,475	50,004	84%	-	-	-	30,940	29,149	94%
Wet Sclerophyll Forests (Shrubby sub-formation)	21,464	19,639	91%	24,960	22,630	91%	248,927	230,518	93%

[1] Red boxes indicate where more than 30% of the pre-European vegetation formation extent has been cleared.

Table 7: The proportion of vegetation formations remaining per IBRA subregion since European settlement (2 of 2 related tables)[2]

	Sydney Basin									South Eastern Highlands		
	Moss Vale			Jervis			Ettrema			Kybeyan Gourock		
	1750 (ha)	Extant (ha)	Remaining (%)	1750 (ha)	Extant (ha)	Remaining (%)	1750 (ha)	Extant (ha)	Remaining (%)	1750 (ha)	Extant (ha)	Remaining (%)
Alpine Complex	-	-	-	-	-	-	-	-	-	241	212	88%
Dry Sclerophyll Forests (Shrub/grass sub-formation)	-	-	-	-	-	-	9,358	8,839	94%	6,535	4,111	63%
Dry Sclerophyll Forests (Shrubby sub-formation)	20,465	16,383	80%	37,654	30,054	80%	61,303	59,712	97%	153,550	125,382	82%
Forested Wetlands	115	95	83%	13,173	10,250	78%	5,314	4,160	78%	905	773	85%
Freshwater Wetlands	4,426	3,485	79%	3,391	3,314	98%	3,774	3,736	99%	26,614	20,521	77%
Grasslands	-	-	-	432	149	34%	-	-	-	38,307	19,718	51%
Grassy Woodlands	204	136	67%	6,375	2,918	46%	163	112	69%	51,148	29,005	57%
Heathlands	774	741	96%	3,749	3,362	90%	41,453	41,302	100%	5,416	4,992	92%
Rainforests	7,925	3,978	50%	5,352	4,551	85%	7,876	7,429	94%	1,684	1,677	100%
Saline Wetlands	-	-	-	1,032	867	84%	-	-	-	-	-	-
Wet Sclerophyll Forests (Grassy sub-formation)	39,593	5,202	13%	44,567	38,696	87%	32,987	32,105	97%	53,539	46,651	87%

[2] Red boxes indicate where more than 30% of the pre-European vegetation formation extent has been cleared.

	Sydney Basin									South Eastern Highlands		
	Moss Vale			Jervis			Ettrema			Kybeyan Gourock		
	1750 (ha)	Extant (ha)	Remaining (%)	1750 (ha)	Extant (ha)	Remaining (%)	1750 (ha)	Extant (ha)	Remaining (%)	1750 (ha)	Extant (ha)	Remaining (%)
Wet Sclerophyll Forests (Shrubby sub-formation)	23,243	11,302	49%	7,072	6,120	87%	16,295	15,764	97%	71,422	63,953	90%

5.1.2.2 Vegetation Formations

Comprehensiveness Assessment

Absolute Gains

Vegetation formation mapping (Figure 7, Figure 8, and Figure 9) and analysis (Table 8) was conducted to compare the impact on floristic values of adding State Forests to the existing reserve network. The most important outcomes from a floristic and vegetation community perspective include:

- The conservation status of wet and dry sclerophyll forests would improve substantially, with each gaining over 150,000 hectares, an increase of over 60% wet and 37% dry sclerophyll forest.
- Grasslands would see a significant 53% increase—critical given their dramatic decline across the area.
- Grassy woodlands would expand by more than 6,500 hectares, an 11% increase.
- Rainforests would gain over 14,000 hectares of additional protection, a 37% increase.

Table 8: Vegetation formations in the Study Area[3]

Vegetation Formation	Total Area in Region (ha)	NPWS reserves (ha)	State Forests (ha)	Total (ha)	Increase (%)
Alpine Complex	1,030	149	26	175	17%
Dry Sclerophyll Forests (Shrub/grass sub-formation)	234,542	61,138	16,853	77,991	28%
Dry Sclerophyll Forests (Shrubby sub-formation)	1,098,921	313,861	136,837	450,698	44%
Forested Wetlands	57,532	11,429	1,088	12,517	10%
Freshwater Wetlands	63,600	16,491	3,623	20,114	22%
Grasslands	240,998	430	226	656	53%
Grassy Woodlands	353,697	32,731	6,566	39,297	20%
Heathlands	72,984	57,127	1,015	58,142	2%
Rainforests	86,527	38,368	14,372	52,740	37%
Saline Wetlands	4,507	950	78	1,028	8%
Wet Sclerophyll Forests (Grassy sub-formation)	276,241	83,216	46,292	129,508	56%
Wet Sclerophyll Forests (Shrubby sub-formation)	420,130	197,447	115,066	312,513	58%
Total	**4,023,838**	**813,188**	**342,016**	**1,155,204**	

[3] Dark green boxes indicate potential increases in area of more than 50% and light green boxes indicate increases in area of between 25-50%

Proportional Gains

Using the 30 by 30 target as a benchmark, the analysis shows that the current reserve network managed by the NSW National Parks and Wildlife Service already achieves at least 30% protection for 4 of the 12 vegetation formation types within the Study Area—heathlands, rainforests, and both wet sclerophyll forest sub-formations (Table 9). These well-represented systems provide a strong foundation for biodiversity conservation across the Region.

Incorporating State Forests further strengthens this position, lifting an additional three formations above the 30% threshold—dry sclerophyll forests (both sub-formations) and freshwater wetlands. This brings the total to 7 of 12 vegetation formations meeting the benchmark, reflecting the important role these areas play in complementing the existing reserve network, particularly for more extensive forest types.

While several formations remain below 30%, including grasslands, grassy woodlands, alpine complexes, and some wetland types, the overall pattern is one of substantial progress, with many of the larger and more intact ecosystems already meeting or approaching the target.

Taken together, the results demonstrate that the Region is well advanced toward achieving representative protection across vegetation formations, with clear opportunities to build on this foundation through targeted additions that address the remaining gaps.

Table 9: IBRA representation for vegetation formations across the Study Area and their contribution to 30 by 30 targets[4]

Vegetation Formation	NPWS reserves	State Forests	Total
Alpine Complex	14%	3%	17%
Dry Sclerophyll Forests (Shrub/grass sub-formation)	26%	7%	33%
Dry Sclerophyll Forests (Shrubby sub-formation)	29%	12%	41%
Forested Wetlands	20%	2%	22%
Freshwater Wetlands	26%	6%	32%
Grasslands	0.2%	0.1%	0.3%
Grassy Woodlands	9%	2%	11%
Heathlands	78%	1%	80%
Rainforests	44%	17%	61%
Saline Wetlands	21%	2%	23%
Wet Sclerophyll Forests (Grassy sub-formation)	30%	17%	47%
Wet Sclerophyll Forests (Shrubby sub-formation)	47%	27%	74%

[4] Green cells indicate where 30% protection has been achieved. Red cells indicate under-represented vegetation formations and yellow cells indicate where State Forest protection directly achieves the 30% goal

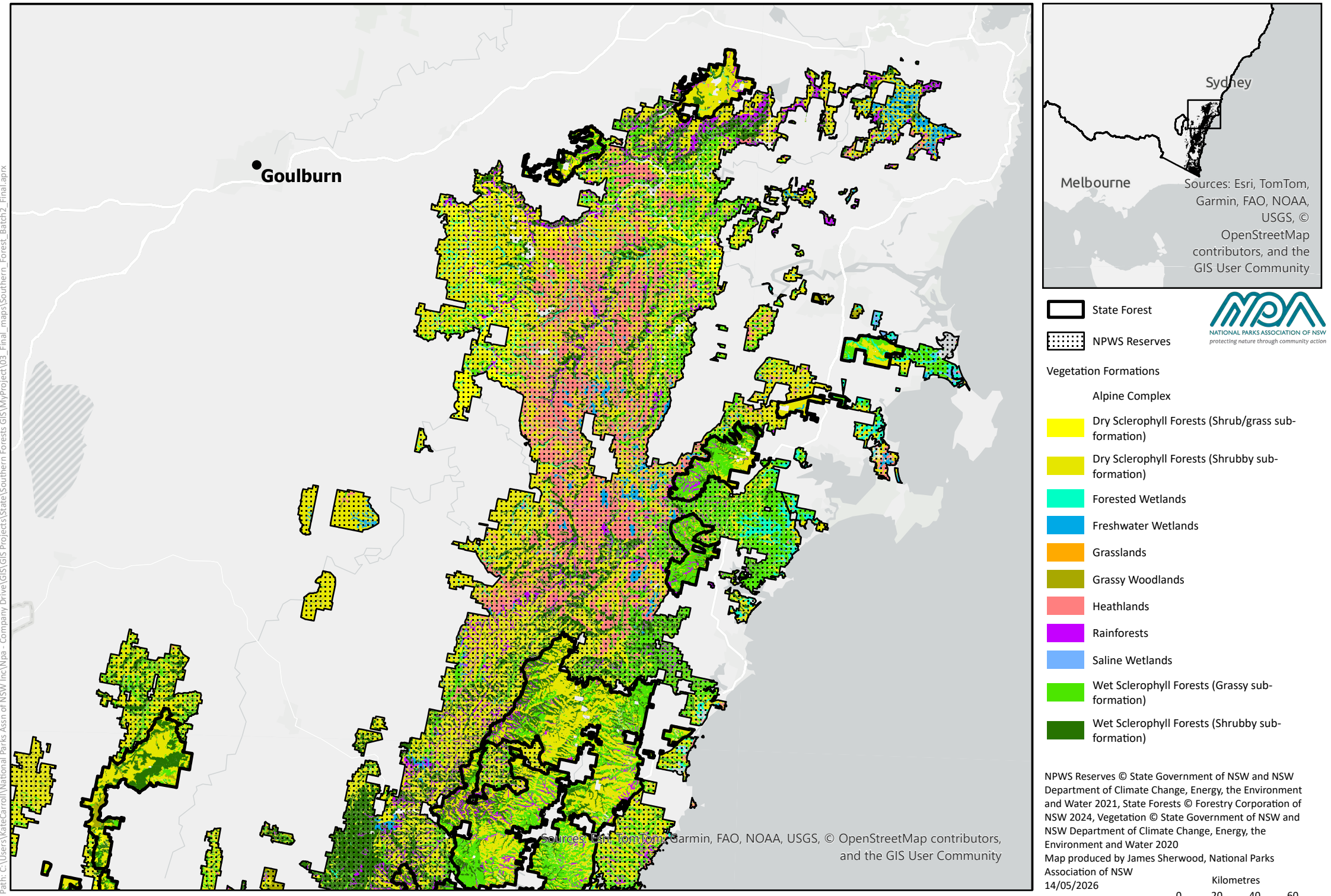


Figure 7: Vegetation formations in the northern section of the Study Area

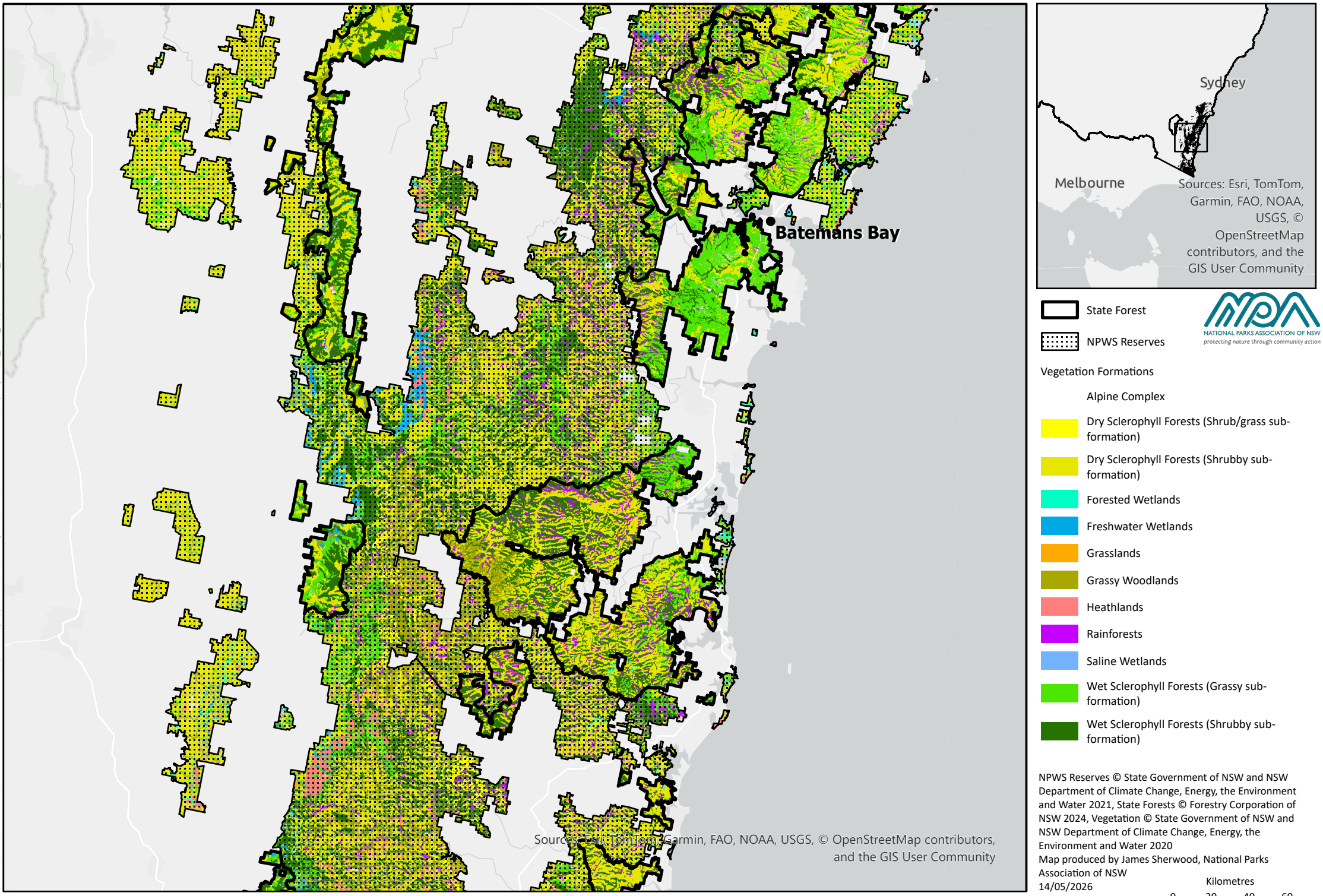


Figure 8: Vegetation formations in the central section of the Study Area

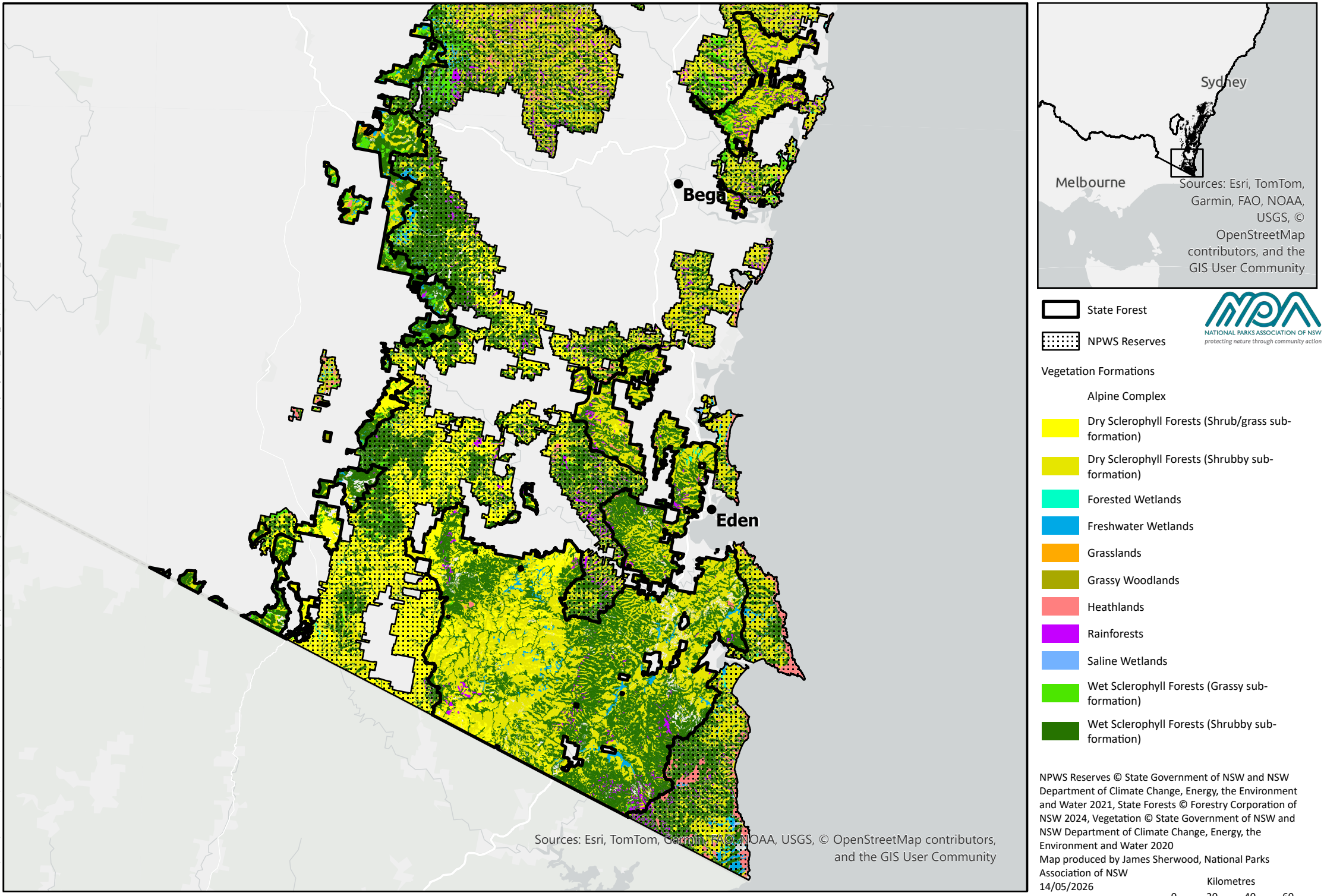


Figure 9: Vegetation formations in the southern section of the Study Area

Representativeness Assessment

Absolute Gains

A similar analysis was undertaken at the IBRA subregional scale to assess how the inclusion of State Forests would improve the representativeness of vegetation formations across the Region. This finer-scale assessment highlights how potential gains are distributed spatially, and the extent to which different subregions contribute to a more balanced and comprehensive reserve system (Table 10, Table 11 and Table 12).

Across the subregions, the addition of State Forests results in consistent increases in both the extent and proportional representation of vegetation formations, with particularly strong gains in areas that are currently less well represented in the reserve network.

In proportional terms, the Batemans and East Gippsland Lowland subregions show the most substantial relative improvements, with increases of 252% and 174%, respectively. These large proportional gains reflect the relatively limited existing reservation in these subregions and the significant contribution that State Forests could make in improving their representation.

In absolute terms, the South East Coastal Ranges subregion would deliver the largest increase in protected area, with an additional 159,511 hectares. This is followed by Batemans (66,131 hectares), Kybeyan–Gourock (48,637 hectares), and East Gippsland Lowland (46,793 hectares). These gains are particularly important given the ecological diversity and extent of vegetation formations within these subregions, many of which include large, contiguous forested landscapes.

Together, these results demonstrate that the inclusion of State Forests would not only increase overall protection but also improve the distribution of protected areas across IBRA subregions, strengthening the representativeness of the reserve system. While the magnitude of gains varies, all subregions benefit from increased coverage, reinforcing the role of State Forests in addressing spatial gaps and supporting a more comprehensive conservation network.

Table 10: Vegetation formations in the Study Area by IBRA Subregion (1 of 3 related tables)[5]

	SEC - Bateman subregion				SEC - East Gippsland Lowland subregion				SEC - South East Coastal Ranges subregion			
	NPWS reserves (ha)	State Forests (ha)	Total (ha)	Potential Increase (%)	NPWS reserves (ha)	State Forests (ha)	Total (ha)	Potential Increase (%)	NPWS reserves (ha)	State Forests (ha)	Total (ha)	Potential Increase (%)
Alpine Complex	-	-	-	-	1	-	1	0%	1	-	1	0%
Dry Sclerophyll Forests (Shrub/grass sub-formation)	4	120	124	3,000%	12,007	11,142	23,149	93%	31,138	3,772	34,910	12%
Dry Sclerophyll Forests (Shrubby sub-formation)	12,668	25,163	37,831	199%	5,339	19,464	24,803	365%	133,031	67,705	200,736	51%
Forested Wetlands	646	62	708	10%	114	1	115	1%	783	493	1,276	63%
Freshwater Wetlands	48	-	48	0%	769	1,018	1,787	132%	1,614	662	2,276	41%
Grasslands	79	-	79	0%	17	-	17	0%	45	-	45	0%
Grassy Woodlands	129	548	677	425%	3	29	32	967%	25,051	3,777	28,828	15%
Heathlands	1,101	82	1,183	7%	2,145	72	2,217	3%	4,776	566	5,342	12%
Rainforests	1,276	3,000	4,276	235%	113	358	471	317%	23,472	9,541	33,013	41%
Saline Wetlands	201	56	257	28%	75	-	75	0%	126	22	148	17%
Wet Sclerophyll Forests (Grassy sub-formation)	5,806	26,949	32,755	464%	4	33	37	825%	13,787	5,517	19,304	40%
Wet Sclerophyll Forests (Shrubby sub-formation)	4,244	10,151	14,395	239%	6,318	14,676	20,994	232%	123,061	67,456	190,517	55%
Total	**26,202**	**66,131**	**92,333**	**252%**	**26,905**	**46,793**	**73,698**	**174%**	**356,885**	**159,511**	**516,396**	**45%**

[5] Dark green boxes indicate vegetation formations where the area could more than double. Light green boxes indicate formations where the area could increase by 50–100%

Table 11: Vegetation formations in the Study Area by IBRA Subregion (2 of 3 related tables)[6]

	SYB - Moss Vale subregion				SYB - Jervis subregion			
	NPWS reserves (ha)	State Forests (ha)	Total (ha)	Potential Increase (%)	NPWS reserves (ha)	State Forests (ha)	Total (ha)	Potential Increase (%)
Alpine Complex	-	-	-	-	-	-	-	-
Dry Sclerophyll Forests (Shrub/grass sub-formation)	2	13	15	650%	-	-	-	-
Dry Sclerophyll Forests (Shrubby sub-formation)	8,394	3,196	11,590	38%	12,262	4,309	16,571	35%
Forested Wetlands	3	68	71	2,267%	4,187	377	4,564	9%
Freshwater Wetlands	2,582	25	2,607	1%	748	33	781	4%
Grasslands	-	-	-	-	62	-	62	0%
Grassy Woodlands	8	35	43	438%	671	248	919	37%
Heathlands	513	99	612	19%	1,305	27	1,332	2%
Rainforests	1,787	166	1,953	9%	1,276	903	2,179	71%
Saline Wetlands	-	-	-	-	398	-	398	0%
Wet Sclerophyll Forests (Grassy sub-formation)	285	42	327	15%	18,108	6,570	24,678	36%
Wet Sclerophyll Forests (Shrubby sub-formation)	2,487	575	3,062	23%	2,443	1,277	3,720	52%
Total	**16,061**	**4,219**	**20,280**	**26%**	**41,460**	**13,744**	**55,204**	**33%**

[6] Dark green boxes indicate vegetation formations where the area could more than double. Light green boxes indicate formations where the area could increase by 50–100%

Table 12: Vegetation formations in the Study Area by IBRA Subregion (3 of 3 related tables)[7]

	SYB - Ettrema subregion				SEH - Kybeyan Gourock subregion			
	NPWS reserves (ha)	State Forests (ha)	Total (ha)	Potential Increase (%)	NPWS reserves (ha)	State Forests (ha)	Total (ha)	Potential Increase (%)
Alpine Complex	-	-	-	-	145	26	171	18%
Dry Sclerophyll Forests (Shrub/grass sub-formation)	5,945	-	5,945	0%	1,786	1,631	3,417	91%
Dry Sclerophyll Forests (Shrubby sub-formation)	47,870	95	47,965	0%	46,527	15,819	62,346	34%
Forested Wetlands	2,900	3	2,903	0%	94	40	134	43%
Freshwater Wetlands	3,293	-	3,293	0%	6,641	1,865	8,506	28%
Grasslands	-	-	-	-	180	225	405	125%
Grassy Woodlands	85	-	85	0%	3,880	1,905	5,785	49%
Heathlands	39,459	13	39,472	0%	4,126	146	4,272	4%
Rainforests	5,472	154	5,626	3%	1,274	131	1,405	10%
Saline Wetlands	-	-	-	-	-	-	-	-
Wet Sclerophyll Forests (Grassy sub-formation)	19,582	224	19,806	1%	18,227	6,391	24,618	35%
Wet Sclerophyll Forests (Shrubby sub-formation)	14,118	94	14,212	1%	32,563	20,458	53,021	63%
Total	**138,724**	**583**	**139,307**	**0%**	**115,443**	**48,637**	**164,080**	**42%**

[7] Dark green boxes indicate vegetation formations where the area could more than double. Light green boxes indicate formations where the area could increase by 50–100%

Proportional Gains

Using the 30 by 30 target as a benchmark, subregional analysis shows that vegetation representation varies across IBRA subregions, with the inclusion of State Forests substantially improving outcomes in most cases (Table 13, Table 14 and Table 15).

In the South East Corner (SEC) subregions, the most pronounced potential gains occur in Batemans and East Gippsland Lowland. In Batemans, many vegetation formations could increase from low baseline levels to well above the 30% threshold, including dry and wet sclerophyll forests and rainforests, although some systems such as grassy woodlands and wetlands would remain below target. In East Gippsland Lowland, all vegetation formations could meet or exceed the 30% benchmark following inclusion in the protected area network, with particularly strong gains across several key systems: dry sclerophyll forests (shrub/grass sub-formation), grassy woodlands, rainforests, and both wet sclerophyll forest sub-formations, with each potentially increasing significantly. The South East Coastal Ranges subregion shows potential for more moderate gains, with most forested formations exceeding 30%, while wetlands and grasslands would remain under-represented.

In the Sydney Basin (SYB) subregions, Moss Vale shows potential for strong improvements across several formations, with dry sclerophyll forests, forested wetlands and grassy woodlands reaching or exceeding 30%. However, some formations, particularly both sub-formations of wet sclerophyll forest, would remain below the benchmark. In Jervis, potential gains are more incremental, with two formations moving above 30% (including grassy woodlands and rainforests), while freshwater wetlands remain just below the target.

The remaining subregions are comparatively well represented. Ettrema already exceeds the 30% benchmark across all mapped vegetation formations under the existing reserve system, and minor additional areas are in State Forests. In Kybeyan–Gourock, most forested formations meet or exceed 30% following potential inclusion, although gaps persist for grasslands, grassy woodlands, and forested wetlands.

Overall, the results demonstrate that State Forests have the potential to substantially improve subregional representativeness, particularly in subregions with lower initial reservation. Forested ecosystems would consistently meet or exceed the 30% benchmark across most subregions, while non-forested and wetland formations would remain the primary gaps. This pattern highlights both the progress made toward representative protection and the opportunity for more targeted additions to address remaining shortfalls at the subregional scale.

Table 13: IBRA representation for vegetation formations in three of the Study Area subregions and their contribution to 30 by 30 targets (Table 1 of 3 related tables)[8]

	SEC - Bateman subregion			SEC - East Gippsland Lowland subregion			SEC - South East Coastal Ranges subregion		
	NPWS reserves (ha)	Proposed additions (ha)	IBRA Representation (%)	NPWS reserves (ha)	Proposed additions (ha)	IBRA Representation (%)	NPWS reserves (ha)	Proposed additions (ha)	IBRA Representation (%)
Alpine Complex	-	-	-	33%	-	33%	3%	-	3%
Dry Sclerophyll Forests (Shrub/grass sub-formation)	3%	95%	98%	44%	41%	85%	49%	6%	55%
Dry Sclerophyll Forests (Shrubby sub-formation)	26%	52%	78%	21%	76%	97%	45%	23%	68%
Forested Wetlands	14%	1%	15%	91%	1%	92%	7%	4%	11%
Freshwater Wetlands	12%	-	12%	41%	55%	96%	38%	15%	53%
Grasslands	43%	-	43%	81%	-	81%	1%	-	1%
Grassy Woodlands	3%	12%	15%	9%	83%	92%	26%	4%	30%
Heathlands	66%	5%	71%	97%	3%	100%	72%	9%	81%
Rainforests	21%	48%	69%	22%	69%	91%	58%	24%	82%
Saline Wetlands	13%	4%	17%	76%	-	76%	12%	2%	14%
Wet Sclerophyll Forests (Grassy sub-formation)	12%	54%	66%	11%	89%	100%	47%	19%	66%
Wet Sclerophyll Forests (Shrubby sub-formation)	22%	52%	73%	28%	65%	93%	53%	29%	83%
Total	**16%**	**41%**	**57%**	**31%**	**56%**	**87%**	**38%**	**18%**	**56%**

[8] Green cells indicate where 30% protection can be achieved. Red cells indicate under-represented vegetation formations and yellow cells indicate where State Forest protection directly achieves the 30% goal

Table 14: IBRA representation for vegetation formations in two of the Study Area subregions and their contribution to 30 by 30 targets (Table 2 of 3 related tables)[9]

	SYB - Moss Vale subregion			SYB - Jervis subregion		
	NPWS reserves (ha)	Proposed additions (ha)	IBRA Representation (%)	NPWS reserves (ha)	Proposed additions (ha)	IBRA Representation (%)
Alpine Complex	-	-	-	-	-	-
Dry Sclerophyll Forests (Shrub/grass sub-formation)	11%	72%	83%	-	-	-
Dry Sclerophyll Forests (Shrubby sub-formation)	51%	19%	70%	41%	14%	55%
Forested Wetlands	3%	72%	75%	41%	4%	45%
Freshwater Wetlands	74%	1%	75%	23%	1%	24%
Grasslands	-	-	-	42%	-	42%
Grassy Woodlands	6%	26%	32%	23%	8%	31%
Heathlands	69%	13%	82%	39%	1%	40%
Rainforests	45%	4%	49%	28%	20%	48%
Saline Wetlands	-	-	-	46%	-	46%
Wet Sclerophyll Forests (Grassy sub-formation)	5%	1%	6%	47%	17%	64%
Wet Sclerophyll Forests (Shrubby sub-formation)	22%	5%	27%	40%	21%	61%
Total	**15%**	**4%**	**19%**	**34%**	**11%**	**45%**

[9] Green cells indicate where 30% protection can be achieved. Red cells indicate under-represented vegetation formations and yellow cells indicate where State Forest protection directly achieves the 30% goal

Table 15: IBRA representation for vegetation formations in two of the Study Area subregions and their contribution to 30 by 30 targets (Table 3of 3 related tables)[10]

	SYB - Ettrema subregion			SEH - Kybeyan Gourock subregion		
	NPWS reserves (ha)	Proposed additions (ha)	IBRA Representation (%)	NPWS reserves (ha)	Proposed additions (ha)	IBRA Representation (%)
Alpine Complex	-	-	-	68%	12%	80%
Dry Sclerophyll Forests (Shrub/grass sub-formation)	67%	-	67%	44%	40%	84%
Dry Sclerophyll Forests (Shrubby sub-formation)	80%	-	80%	37%	13%	50%
Forested Wetlands	70%	-	70%	12%	5%	17%
Freshwater Wetlands	88%	-	88%	32%	9%	41%
Grasslands	-	-	-	1%	1%	2%
Grassy Woodlands	76%	-	76%	13%	7%	20%
Heathlands	95%	-	95%	83%	3%	86%
Rainforests	74%	2%	76%	76%	8%	84%
Saline Wetlands	-	-	-	-	-	-
Wet Sclerophyll Forests (Grassy sub-formation)	61%	1%	62%	39%	14%	53%
Wet Sclerophyll Forests (Shrubby sub-formation)	89%	1%	90%	51%	32%	83%
Total	**78%**	**<1%**	**78%**	**29%**	**13%**	**41%**

[10] Green cells indicate where 30% protection can be achieved. Red cells indicate under-represented vegetation formations and yellow cells indicate where State Forest protection directly achieves the 30% goal

5.1.2.3 Plant Community Types

The analysis identified 199 PCTs whose conservation status would be significantly improved by the State Forest inclusions in the NRS. They include three PCTs that are currently entirely unprotected, namely:

- Blue Mountains Scribbly Gum Swamp Woodland (6 ha), restricted to Meryla State Forest
- Far South Sandflat Ribbon Gum Forest (7 ha), restricted to East Boyd State Forest / Nullica State Forest
- Western Blue Mountains Monkey Gum Gully Forest (13 ha), restricted to Meryla State Forest

Other PCTs whose protection would be substantially improved include:

- Far South Hinterland Silvertop Ash Forest (16,905ha or 3,915%) found across 9 State Forests
- Far South Hinterland Heath (340ha or 1,619%) found across 3 State Forests
- Far South Lowland Depressions Shrub Forest (4,411ha or 951%) found across 5 State Forests
- South Coast Spotted Gum Cycad Dry Forest (7,038ha or 577%) found across 17 State Forests
- South Coast Spotted Gum Moist Forest (6,359ha or 568%) found across 16 State Forests
- Southeast Hinterland Monkey Gum Moist Shrub Forest would benefit the most with an increase of 19,476ha and South Coast Stringybark-Monkey Gum Wet Forest with an increase of 17,640ha

The list of results and associated State Forest occurrence can be viewed in Table 16.

Table 16: Plant Community Types (PCTs) that would benefit from inclusion in the NRS and their occurring State Forests[11]

PCT Name	NPWS reserves (ha)	State Forests (ha)	Total (ha)	Potential Increase (%)	State Forests where the PCT occurs
Far South Hinterland Silvertop Ash Forest	421	16,484	16,905	3,915%	Nungatta, Yambulla, Timbillica, Towamba, East Boyd, Nadgee, Bruces Creek, Nullica, Gnupa
Far South Hinterland Heath	21	340	361	1,619%	Yambulla, East Boyd, Timbillica
Far South Lowland Depressions Shrub Forest	464	4,411	4,875	951%	Yambulla, Timbillica, Nadgee, Bruces Creek, East Boyd
South Coast Spotted Gum Cycad Dry Forest	1,219	7,038	8,257	577%	Corunna, Bodalla, Moruya, Wandera, Mogo, Buckenbowra, Bolaro, Currowan, Benandarah, Shallow Crossing, Boyne, South Brooman, Clyde, Bermagui, Dampier, Yadboro, Tomerong
South Coast Spotted Gum Moist Forest	1,120	6,359	7,479	568%	Corunna, Bodalla, Moruya, Dampier, Wandera, Mogo, Bolaro, Buckenbowra, Currowan, Benandarah, Shallow Crossing, Boyne, Clyde, Bermagui, Tanja, Murrah
Burragorang Gorges Felsic Stringybark Forest	2	8	10	400%	Wingello
Far South Lowland Creekflat Forest	639	2,248	2,887	352%	Yambulla, Nungatta, Nadgee, Bruces Creek, Timbillica, Nalbaugh, East Boyd, Yurammie, Nullica
Sydney Hinterland Apple-Blackbutt Gully Forest	181	512	693	283%	McDonald, Jerrawangala, Yerriyong
South Coast Stringybark Cycad Exposed Forest	4,148	10,643	14,791	257%	Corunna, Bodalla, Dampier, Moruya, Wandera, Mogo, Buckenbowra, Currowan, Shallow Crossing, Yadboro, Benandarah, Boyne, Clyde, South Brooman, North Brooman, Flat Rock, Yerriyong
Far South Riverflat Wet Forest	2,094	5,326	7,420	254%	Yambulla, Nungatta, Towamba, Nadgee, Timbillica, Bruces Creek, East Boyd, Broadwater, Yurammie, Nullica, Gnupa, Mumbulla, Murrah, Bodalla
Southeast Hinterland Intermediate Shrub Forest	6,916	16,644	23,560	241%	Yambulla, Nungatta, Towamba, Nadgee, Bruces Creek, Timbillica, East Boyd, Broadwater, Yurammie, Nullica, Gnupa, Dampier, Bodalla
Far Southeast Shrubby Swamp Woodland	163	386	549	237%	Nungatta, Yambulla, Towamba, East Boyd, Timbillica
South Coast Red Gum-Fig Sheltered Forest	4	9	13	225%	Buckenbowra
Southern Tableland Granites Ribbon Gum Grassy Forest	165	325	490	197%	Tallaganda
South Coast Lowland Creekflat Forest	499	928	1,427	186%	Bodalla, Mogo, Benandarah, Boyne, South Brooman, Kioloa, North Brooman, Murrah, Mumbulla

[11] Only PCTs with an increase of more than 100% are shown

PCT Name	NPWS reserves (ha)	State Forests (ha)	Total (ha)	Potential Increase (%)	State Forests where the PCT occurs
South Coast Hinterland Yertchuk Forest	9,420	16,734	26,154	178%	Bodalla, Dampier, Moruya, Wandera, Mogo, Buckenbowra, Bolaro, Currowan, Benandarah, Shallow Crossing, Yadboro, Boyne, South Brooman, Clyde, North Brooman, Flat Rock, Bermagui, Murrah, Dampier
Wingecarribee Sandstone Shrub Forest	92	145	237	158%	Meryla, Wingello
Far South Coastal Ranges Silvertop Ash Forest	8,070	12,074	20,144	150%	Yambulla, Timbillica, East Boyd, Nadgee, Broadwater, Nullica
South Coast Riverflat Peppermint Forest	3,593	5,353	8,946	149%	Corunna, Bodalla, Dampier, Moruya, Wandera, Mogo, Bolaro, Buckenbowra, Currowan, Benandarah, Shallow Crossing, Yadboro, Boyne, Kioloa, South Brooman, Clyde, North Brooman, Flat Rock, Bermagui, Wandella, Murrah, Mumbulla, Termeil, McDonald, Yerriyong
Sydney Coastal Enriched Sandstone Forest	160	238	398	149%	McDonald, Jerrawangala, Yerriyong
Southeast Hinterland Monkey Gum Moist Shrub Forest	13,845	19,476	33,321	141%	Yambulla, Nungatta, Towamba, Nadgee, Bruces Creek, Timbillica, East Boyd, Broadwater, Yurammie, Nullica, Gnupa, Dampier, Bodalla
Southern Highlands Shale Margins Moist Forest	65	82	147	126%	Meryla
South Coast Stringybark-Monkey Gum Wet Forest	15,716	17,640	33,356	112%	Bodalla, Dampier, Moruya, Wandera, Mogo, Buckenbowra, Bolaro, Currowan, Shallow Crossing, Yadboro, Clyde, Yambulla, Yurammie, Bermagui, Wandella, Towamba, Nullica, Tanja, Mumbulla, Murrah, Wandera
South Coast Temperate Gully Rainforest	5,847	6,553	12,400	112%	Tallaganda, Corunna, Bodalla, Dampier, Moruya, Wandera, Mogo, Bolaro, Buckenbowra, Currowan, Shallow Crossing, Yadboro, Benandarah, Boyne, South Brooman, Kioloa, Clyde, North Brooman, Flat Rock, Broadwater, Yurammie, Bermagui, Wandella, Nullica, Tanja, Mumbulla, Murrah, Termeil, McDonald, Jerrawangala, Yerriyong, Nowra, Shoalhaven
Far South Hinterland Riparian Scrub	75	84	159	112%	Yambulla, Nullica
South Coast Lowland Woollybutt Grassy Forest	72	78	150	108%	Wandera, Mogo, Buckenbowra, Bolaro, Currowan, Boyne, North Brooman
Monaro Kangaroo Grass Woodland-Grassland Complex	210	220	430	105%	Nalbaugh, Glen Allen, Badja, Tallaganda, Tantawangalo, Glenbog, Cathcart

5.2 Threatened ecological communities (TECs)

Threatened ecological communities (TECs) are mapped assemblages of biota, usually flora species, that may or may not overlap with Vegetation Classes or PCTs. While often based on an assemblage of flora species, each TEC is individually defined by a listing under State or Commonwealth legislation. In some cases, such as the Taren Point Shorebird TEC, there is no relationship to standard vegetation classifications at all. For this reason they have been assessed as a separate aspect of the vegetation related values of the Region.

Threatened Ecological Communities are listed under the NSW *Biodiversity Conservation Act 2016* (BC Act) or Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) following assessment by independent scientific committees. Listings are based on severe decline in extent, condition, or ecological function, placing them at risk of collapse. Their conservation is critical not only for the species they directly support, but also for maintaining ecosystem processes such as pollination, nutrient cycling, hydrological regulation, and carbon storage.

In south-eastern NSW, many TECs occur within forested landscapes that remain under-represented in the formal reserve system and continue to face fragmentation, logging, altered fire regimes, and other pressures. Assessing the extent to which the State Forests improve the protection, representativeness, and connectivity of TECs is therefore central to evaluating the conservation merit of this proposal and its contribution to long-term ecological resilience.

5.2.1 Methodology

5.2.1.1 Coastal Integrated Forestry Operations Approval (IFOA) – Protocols mapping

The *Coastal Integrated Forestry Operations Approval (IFOA) – Protocols* include two spatial datasets—TEC (certified) and TEC (indicative)—that map the location of TECs within State Forests. The TEC (certified) dataset contains 15 TECs that have been mapped at high resolution, while the TEC (indicative) dataset includes a further 3 TECs identified through modelling but not yet mapped in detail. Together, these datasets identify 18 TECs under the IFOA – Protocols.

However, this represents only a small proportion of the 104 TECs listed under the BC Act. With only 18 of these 104 TECs included in the IFOA spatial datasets, their application is inherently limited and does not provide a comprehensive representation of TECs across the State Forests. This limitation highlights the need for additional analysis using PCT to TEC association mapping to derive indicative TEC mapping and infer the likely distribution of TECs not represented in the IFOA datasets.

5.2.1.2 PCT – TEC Association Mapping – Indicative TECs.

To address the limitations of the IFOA – Protocols datasets, additional spatial analysis was undertaken to identify the potential occurrence of TECs not represented in the certified and indicative TEC mapping. PCT to TEC association data were obtained from the NSW DCCEEW Integrated BioNet Vegetation Data program and intersected with State Forest boundaries and PCT mapping from the State Vegetation Type Map (SVTM) to derive indicative TEC mapping. This approach identifies areas where TECs may potentially occur based on established associations between TECs and PCTs, noting that multiple TECs may be associated with a single PCT and vice versa.

As PCT–TEC association data indicate potential presence only, and confirmation of a TEC requires the relevant condition, size and assemblage criteria to be met under applicable legislation, the results were treated as indicative. Accordingly, TEC occurrence was recorded on a presence–absence basis for each State Forest, and area calculations were not undertaken.

5.2.2 Findings

5.2.2.1 Coastal Integrated Forestry Operations Approval (IFOA) – Protocols mapping

Analysis of the IFOA datasets resulted in nine Certified TECs and 1 Indicative TEC being identified in the State Forests (Table 17). These included 10,312 hectares of Endangered (BC Act) and Critically Endangered (EPBC Act) Ecological Communities across 34 State Forests. The most abundant TEC identified within State Forests is River-Flat Eucalypt Forest, which accounted for just over 50% of the total area of TECs found within the State Forests. River-Flat Eucalypt Forest is also the most widespread TEC and was found in 34 of the State Forests within the Study Area. The next most widespread TEC in the State Forests is Lowland Grassy Woodland with an indicative area of 2,327 ha across 16 State Forests. Both TECs are listed as Endangered under the BC Act and Critically Endangered under the EPBC Act, indicating that the State Forests would be critical to safeguarding these TECs.

The State Forests identified as having the highest number of mapped TECs from the IFOA datasets were Bodalla (five TECs), followed by Benandarah, Boyne, Currowan and Mogo (four TECs). See Table 17 below for all TECs contained within the IFOA datasets and Figure 10 for an occurrence map of TECs per State Forest.

5.2.2.2 PCT – TEC Association Mapping – Indicative TECs

The PCT–TEC association analysis identified 66 TECs within the Southern Rivers CMA, of which 30 were associated with 53 unique PCTs mapped within State Forests of the Study Area using the SVTM dataset (Table 17). The presence of these PCTs indicates the potential for these 30 TECs to occur within State Forests, including TECs not represented in the IFOA – Protocols datasets. As this analysis is based on vegetation associations, TEC occurrence was recorded on a presence–absence basis only, and area estimates were not calculated.

State Forests with the highest number of PCT–TEC associations were predominantly located in coastal areas, particularly in the southern part of the Region near the Victorian border, where several forests demonstrated high counts of potential TEC occurrence. State Forests such as Bodalla, Mogo and Nullica displayed the highest levels of association, with over 16 potential TECs identified in each. Detailed results, including PCT–TEC associations, potential State Forest occurrence, and conservation status, are presented in Table 18 and illustrated in Figure 11.

Table 17: Area, location and conservation status of Threatened Ecological Communities (TECs) within State Forests, derived from IFOA datasets

TEC Name	State Forests	Area (Ha)	BC Act	EPBC Act	Certified or Indicative
Brogo Wet Vine Forest	Bodalla	23	Endangered		Certified
Coastal Saltmarsh	Benandarah, Bermagui, Bodalla, Boyne, East Boyd, Mogo, Murrah, Nullica, Tanja	177	Endangered		Certified
Dry Rainforest of the South East Forests	Towamba	1	Endangered		Certified

TEC Name	State Forests	Area (Ha)	BC Act	EPBC Act	Certified or Indicative
Lowland Rainforest	Currowan, Yadboro	827	Endangered		Certified
Montane Peatlands and Swamps	Badja, Cathcart, Coolangubra, Glen Allen, Glenbog, Meryla, Tallaganda, Tantawangalo, Wingello	1,099	Endangered		Certified
River-Flat Eucalypt Forest	Benandarah, Bermagui, Bodalla, Bolaro, Boyne, Bruces Creek, Buckenbowra, Clyde, Corunna, Currambene, Currowan, Dampier, East Boyd, Flat Rock, Kioloa, McDonald, Mogo, Moruya, Mumbulla, Murrah, Nadgee, North Brooman, Nullica, Shallow Crossing, South Brooman, Termeil, Timbillica, Wallagaraugh, Wandella, Wandera, Yadboro, Yambulla, Yerriyong, Yurammie	5,521	Endangered	Critically Endangered	Certified
Swamp Oak Floodplain Forest	Benandarah, Bermagui, Bodalla, Bolaro, Boyne, Currowan, East Boyd, Mogo, Moruya, Murrah, Nullica, Tanja	78	Endangered		Certified
Swamp Sclerophyll Forest	Benandarah, Bermagui, Bodalla, Bolaro, Boyne, Currambene, Currowan, East Boyd, Mogo, Moruya, Murrah, Nowra, Nullica, Tanja, Termeil	159	Endangered		Certified
Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland	Tallaganda	100	Endangered		Certified
Lowland Grassy Woodland	Benandarah, Bodalla, Bolaro, Bondi, Boyne, Buckenbowra, Currowan, Dampier, Mogo, Moruya, Mumbulla, North Brooman, Shallow Crossing, Wandella, Wandera, Yurammie	2327	Endangered	Critically Endangered	Indicative
TOTAL		**10,312**			

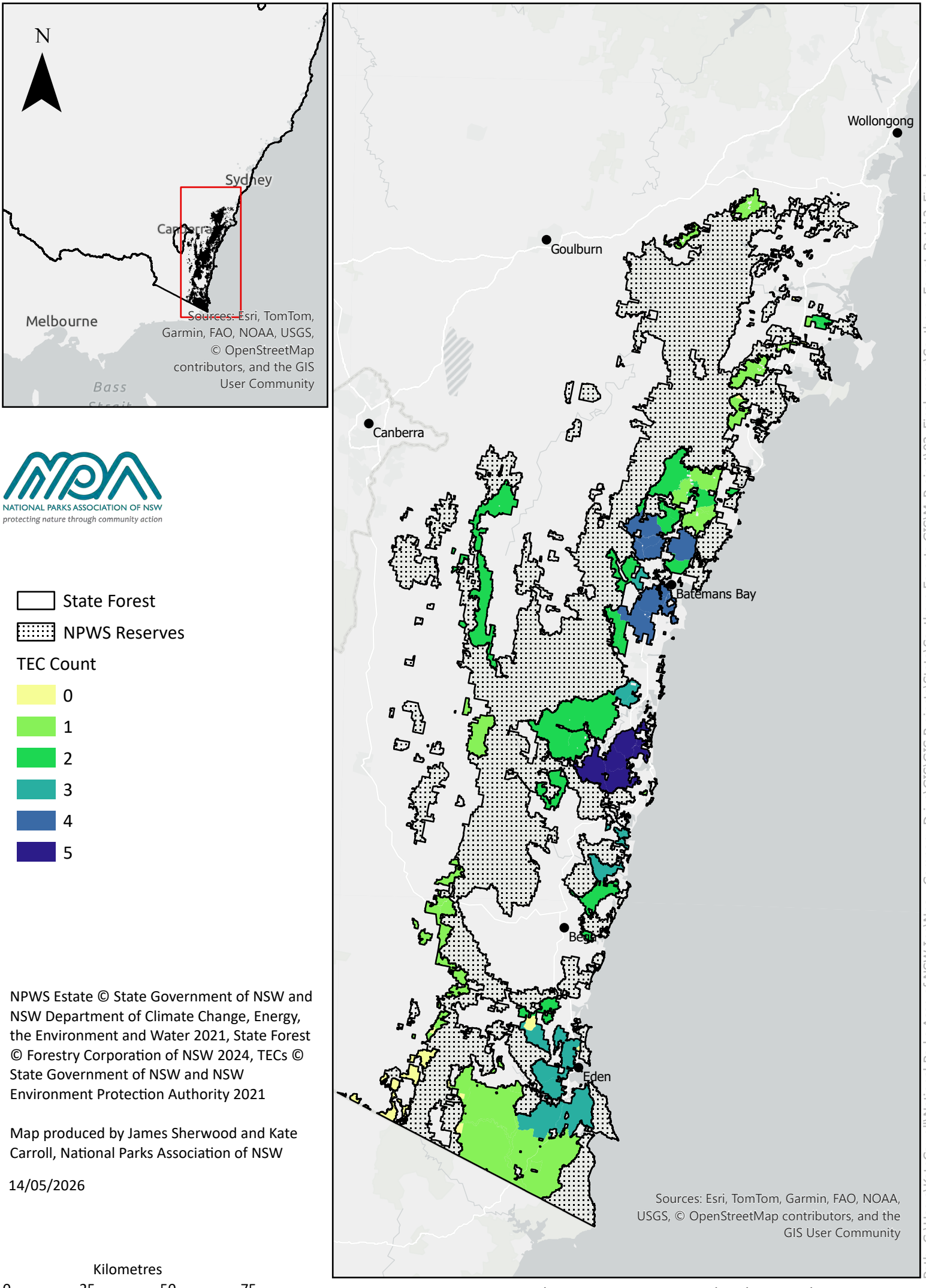


Figure 10: TEC occurrence in the State Forests mapped in the IFOA dataset

Table 18: TECs associated with PCTs known to occur in the State Forests

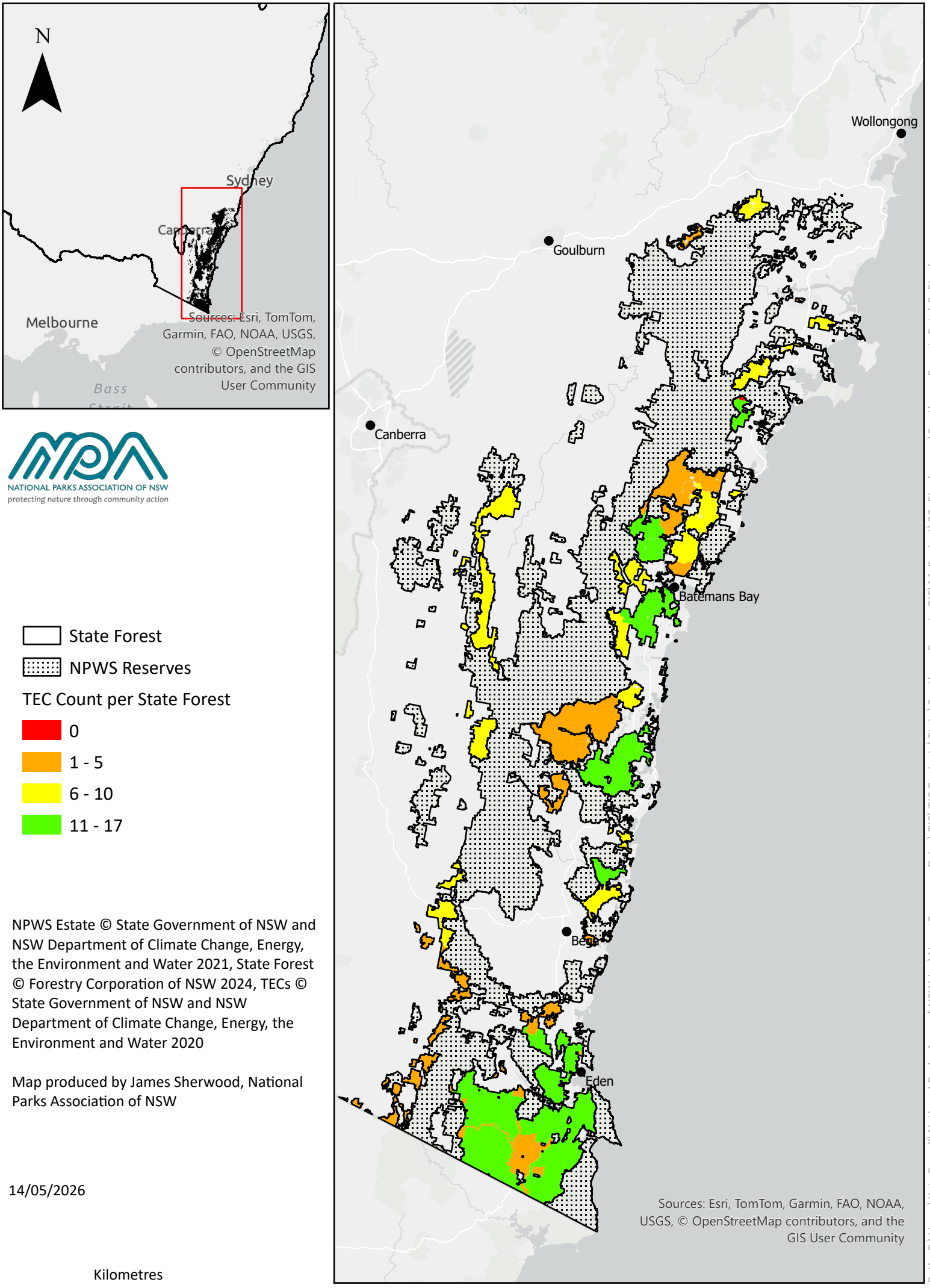
TEC Name	Associated PCTs	State Forests	BC Act	EPBC Act
Alpine Sphagnum Bogs and Associated Fens	Alpine Short Herbfield / Monaro Creekflat Peat Swamp	Badja, Bondi, Coolangubra, Glenbog, Tantawangalo		Endangered
Araluen Scarp Grassy Forest in the South East Corner Bioregion	Araluen Scarp Grassy Forest	Bolaro, Buckenbowra, Currowan, Mogo, Wandera, Yadboro	Endangered	Endangered
Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions	Coastal Sands Littoral Scrub-Forest / South Coast Sands Bangalay Forest	Bodalla, Bruces Creek, Dampier, East Boyd, Mogo, Nadgee, Nullica, Termeil, Wallagaraugh, Yambulla	Endangered	
Blue Mountains Shale Cap Forest in the Sydney Basin Bioregion	Sydney Sandstone Plateau Shale Forest	Yerriyong	Critically Endangered	
Blue Mountains Swamps in the Sydney Basin Bioregion	Sydney Sandstone Button Grass Sedgeland	Yambulla	Vulnerable	
Brogo Vine Forest of the South East Corner Bioregion	South Coast Scarp Wet Vine Forest	Bodalla, East Boyd, Mumbulla, Murrah, Nullica, Towamba, Yurammie	Endangered	Endangered
Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	Estuarine Club Rush-Arrowgrass Wetland / Samphire Saltmarsh / South Coast Selliera-Sea Rush Swamp Oak Saltmarsh / South Coast Spear-grass Saltmarsh / Sporobolus virginicus Saltmarsh	Bermagui, Bodalla, Bolaro, East Boyd, Mogo, Moruya, Murrah, Nullica	Endangered	
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Coastal Floodplain Swamp Paperbark Scrub / Estuarine Sea Rush Swamp Oak Forest / Estuarine Swamp Oak Twig-rush Forest / Estuarine Swamp Oak-Mangrove Forest / South Coast Floodplain Grassy Swamp Forest / South Coast Selliera-Sea Rush Swamp Oak Saltmarsh	Bermagui, Bodalla, Bolaro, Corunna, Currambene, Currowan, Dampier, East Boyd, McDonald, Mogo, Moruya, Mumbulla, Murrah, Nadgee, Nowra, Nullica, Tanja, Tomerong		Endangered
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	Coastal Floodplain Swamp Paperbark Scrub / Coastal Sands Swamp Mahogany Rush Forest	Currambene, Murrah, Nowra		Endangered
Coastal Upland Swamp in the Sydney Basin Bioregion	Budderoo-Morton Damp Swamp Heath / Southern Highlands Sand Swamp Sedgeland / Sydney Sandstone Button Grass Sedgeland	Badja, Meryla, Yambulla, Yerriyong	Endangered	Endangered

TEC Name	Associated PCTs	State Forests	BC Act	EPBC Act
Dry Rainforest of the South East Forests in the South East Corner Bioregion	South Coast Red Gum-Fig Sheltered Forest / Southeast Dry Rainforest	Bermagui, Bodalla, Buckenbowra, Corunna, Gnupa, Murrah, Nullica, Nungatta, Towamba, Wandella, Yambulla, Yurammie	Endangered	
Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	Southern Lower Floodplain Freshwater Wetland	East Boyd	Endangered	
Illawarra Lowlands Grassy Woodland in the Sydney Basin Bioregion	Shoalhaven Lowland Spotted Gum-Paperbark Forest / South Coast Low Hills Red Gum Grassy Forest / South Coast Lowland Woollybutt Grassy Forest	Benandarah, Bermagui, Bodalla, Bolaro, Boyne, Buckenbowra, Corunna, Currambene, Currowan, McDonald, Mogo, Murrah, North Brooman, Shoalhaven, South Brooman, Termeil, Wandera, Yambulla		Critically Endangered
Illawarra and south coast lowland forest and woodland ecological community	Shoalhaven Lowland Spotted Gum-Paperbark Forest / South Coast Low Hills Red Gum Grassy Forest / South Coast Lowland Woollybutt Grassy Forest	Benandarah, Bermagui, Bodalla, Bolaro, Boyne, Buckenbowra, Corunna, Currambene, Currowan, McDonald, Mogo, Murrah, North Brooman, Shoalhaven, South Brooman, Termeil, Wandera, Yambulla	Endangered	
Illawarra-Shoalhaven Subtropical Rainforest of the Sydney Basin Bioregion	Illawarra Complex Dry Rainforest / Illawarra Lowland Subtropical Rainforest / South Coast Warm Temperate-Subtropical Rainforest (not EPBC listed)	Bodalla, Boyne, Buckenbowra, Currowan, McDonald, Meryla, Mogo, Nadgee, North Brooman, Nullica, South Brooman, Termeil, Wandera, Yadboro, Yerriyong	Endangered	Critically Endangered
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	Coastal Sands Littoral Scrub-Forest / Far Southeast Littoral Rainforest	Bruces Creek, Corunna, East Boyd, Nadgee, Nullica, Wallagaraugh, Yambulla		Critically Endangered
Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	Far Southeast Littoral Rainforest	Corunna, East Boyd	Endangered	
Lowland Grassy Woodland in the South East Corner Bioregion	South Coast Low Hills Red Gum Grassy Forest / South Coast Lowland Woollybutt Grassy Forest / Southeast Lowland Grassy Woodland	Benandarah, Bermagui, Bodalla, Bolaro, Boyne, Buckenbowra, Corunna, Currowan, East Boyd, McDonald, Mogo, Mumbulla, Murrah, Nadgee, North Brooman, Nullica, South Brooman, Tanja, Termeil, Towamba, Wandella, Wandera, Yambulla, Yurammie	Endangered	Critically Endangered
Lowland Rainforest of Subtropical Australia	Northern Escarpment Sassafras-Booyong-Corkwood Rainforest	Glenbog		Critically Endangered

TEC Name	Associated PCTs	State Forests	BC Act	EPBC Act
Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions	Central Eastern Ranges Riparian Dry Rainforest / Greater Sydney Enriched Grey Myrtle Dry Rainforest / Illawarra Complex Dry Rainforest / Illawarra Lowland Subtropical Rainforest / Northern Escarpment Sassafras-Booyong-Corkwood Rainforest / South Coast Warm Temperate-Subtropical Rainforest	Bodalla, Boyne, Buckenbowra, Currowan, Glenbog, McDonald, Meryla, Mogo, Nadgee, North Brooman, Nullica, South Brooman, Termeil, Wandera, Wingello, Yadboro, Yerriyong	Endangered	
Milton Ulladulla Subtropical Rainforest in the Sydney Basin Bioregion	Illawarra Complex Dry Rainforest / Illawarra Lowland Subtropical Rainforest	Bodalla, Currowan, McDonald, Mogo, Nadgee, North Brooman, Nullica, South Brooman, Termeil, Wandera, Yerriyong	Endangered	
Monaro Tableland Cool Temperate Grassy Woodland in the South Eastern Highlands Bioregion	Monaro Kangaroo Grass Woodland-Grassland Complex / Monaro-Gourock Frost Hollow Grassy Woodland	Badja, Bondi, Cathcart, Coolangubra, Glen Allen, Glenbog, Nalbaugh, Tallaganda, Tantawangalo	Critically Endangered	
Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions	Central and Southern Tableland Swamp Meadow Complex / Monaro Creekflat Peat Swamp / Southeast Subalpine Bog / Southern Highlands Wet Swamp Heath / Southern Tableland Ranges Boggy Open Woodland	Badja, Bombala, Bondi, Cathcart, Coolangubra, Glen Allen, Glenbog, Meryla, Nalbaugh, Tallaganda, Tantawangalo, Wallagaraugh, Wingello, Yambulla	Endangered	
Mount Gibraltar Forest in the Sydney Basin Bioregion	Southern Highlands Shale Margins Moist Forest / Southern Highlands Shale-Basalt Wet Forest	Meryla	Endangered	
Mt Canobolas Xanthoparmelia Lichen Community	Central Tableland Ribbon Gum Sheltered Forest	Tallaganda	Endangered	
Natural Temperate Grassland of the South Eastern Highlands	Monaro Kangaroo Grass Woodland-Grassland Complex / Monaro Snowgrass-Kangaroo Grass Grassland / Southern Tableland Valley Flats Damp Grassland	Badja, Cathcart, Glen Allen, Glenbog, Nalbaugh, Tallaganda, Tantawangalo		Critically Endangered
O'Hares Creek Shale Forest	Sydney Sandstone Plateau Shale Forest	Yerriyong	Endangered	
River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	Bega Wet Shrub Forest / Coastal Alluvial Bangalay Forest / Far South Riverflat Wet Forest / South Coast Lowland Creekflat Forest / South Coast Riverflat Peppermint Forest / South Coast Riverflat Ribbon	Badja, Benandarah, Bermagui, Bodalla, Bolaro, Boyne, Broadwater, Bruces Creek, Buckenbowra, Cathcart, Clyde, Coolangubra, Corunna, Currambene, Currowan, Dampier, East Boyd, Flat Rock, Glenbog, Gnupa, Kioloa, McDonald, Mogo, Moruya, Mumbulla, Murrah, Nadgee, North Brooman, Nowra, Nullica, Nungatta, Shallow Crossing, Shoalhaven, South Brooman, Tallaganda, Tanja, Termeil, Timbillica, Towamba,	Endangered	Critically Endangered

TEC Name	Associated PCTs	State Forests	BC Act	EPBC Act
	Gum Forest / Sydney Basin Creekflat Blue Gum-Apple Forest	Wallagaraugh, Wandella, Wandera, Yadboro, Yambulla, Yerriyong, Yurammie		
Robertson Basalt Tall Open-forest in the Sydney Basin and South Eastern Highlands Bioregions	Southern Highlands Shale-Basalt Wet Forest	Meryla	Critically Endangered	
Robertson Rainforest in the Sydney Basin Bioregion	South Coast Warm Temperate-Subtropical Rainforest / Sydney Montane Basalt Rainforest	Bodalla, Boyne, Buckenbowra, Currowan, Dampier, McDonald, Meryla, Mogo, Nadgee, Nullica, Timbillica, Yadboro, Yambulla, Yerriyong	Endangered	Critically Endangered
Snowpatch Herbfield in the Australian Alps Bioregion	Alpine Snowpatch Herbfield	Glenbog	Critically Endangered	
Southern Highlands Shale Forest and Woodland in the Sydney Basin Bioregion	Southern Highlands Shale Margins Moist Forest / Southern Highlands Shale-Basalt Dry Forest	Meryla	Endangered	Critically Endangered
Subtropical and Temperate Coastal Saltmarsh	Estuarine Club Rush-Arrowgrass Wetland / Samphire Saltmarsh / South Coast Selliera-Sea Rush Swamp Oak Saltmarsh / South Coast Spear-grass Saltmarsh / Sporobolus virginicus Saltmarsh	Bermagui, Bodalla, Bolaro, East Boyd, Mogo, Moruya, Murrah, Nullica		Vulnerable
Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions	Coastal Creekflat Layered Grass-Sedge Swamp Forest / Coastal Creekline Dry Shrubby Swamp Forest	Currambene, McDonald, Nowra		Endangered
Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	Coastal Floodplain Swamp Paperbark Scrub / Estuarine Sea Rush Swamp Oak Forest / Estuarine Swamp Oak Twig-rush Forest / Estuarine Swamp Oak-Mangrove Forest / Far South Floodplain Wetland Paperbark Scrub / South Coast Floodplain Grassy Swamp Forest / South Coast Floodplain Wetland Paperbark Scrub / South Coast Selliera-Sea Rush Swamp Oak Saltmarsh	Bermagui, Bodalla, Bolaro, Corunna, Currambene, Currowan, Dampier, East Boyd, McDonald, Mogo, Moruya, Mumbulla, Murrah, Nadgee, Nowra, Nullica, Tanja, Tomerong	Endangered	
Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney	Coastal Alluvial Bangalay Forest / Coastal Creekflat Layered Grass-Sedge Swamp Forest / Coastal Creekline Dry Shrubby Swamp Forest / Coastal Floodplain Swamp Paperbark Scrub / Shoalhaven	Benandarah, Bermagui, Bodalla, Boyne, Currambene, Currowan, Kioloa, McDonald, Mogo, Moruya, Mumbulla,	Endangered	

TEC Name	Associated PCTs	State Forests	BC Act	EPBC Act
Basin and South East Corner Bioregions	Lowland Flats Wet Swamp Forest / South Coast Lowland Creekflat Forest	Murrah, North Brooman, Nowra, Nullica, Shoalhaven, South Brooman, Termeil, Tomerong, Wandera, Yerriyong		
Temperate Highland Peat Swamps on Sandstone	Central and Southern Tableland Swamp Meadow Complex / Monaro Creekflat Peat Swamp / Southeast Subalpine Bog / Southern Highlands Sand Swamp Sedgeland / Southern Highlands Wet Swamp Heath / Southern Tableland Ranges Boggy Open Woodland / Monaro Creekflat Peat Swamp	Badja, Bombala, Bondi, Cathcart, Coolangubra, Glen Allen, Glenbog, Meryla, Nalbaugh, Tallaganda, Tantawangalo, Wallagaraugh, Wingello, Yambulla		Endangered
Turpentine-Ironbark Forest of the Sydney Basin Bioregion	Sydney Sandstone Plateau Shale Forest	Yerriyong	Critically Endangered	
Upland Basalt Eucalypt Forests of the Sydney Basin Bioregion	Southern Highlands Red Gum Forest / Southern Highlands Shale-Basalt Wet Forest	Meryla, Wingello	Endangered	
Western Sydney Dry Rainforest and Moist Woodland on Shale	Greater Sydney Enriched Grey Myrtle Dry Rainforest	Wingello	Endangered	Critically Endangered



NATIONAL PARKS ASSOCIATION OF NSW
protecting nature through community action

State Forest

NPWS Reserves

TEC Count per State Forest

- 0
- 1 - 5
- 6 - 10
- 11 - 17

Map produced by James Sherwood, National Parks Association of NSW

14/05/2026

Kilometres

0 25 50 75

Figure 11: Potential TEC counts in the State Forests using the PCT-TEC association analysis

5.3 Rainforests

Rainforests in south-eastern NSW are a distinct and ecologically significant part of the Region's forested landscapes. They occur as scattered patches across the Study Area, typically in moist, sheltered environments such as coastal escarpments, gullies, and upland slopes where fire is less frequent. Within the NSW vegetation classification system, rainforest communities are represented across a range of Vegetation Classes and Plant Community Types (PCTs), reflecting differences in climate and geology. For this reason, rainforest vegetation is assessed here as a separate component of the Region's forest values.

Rainforests support high biodiversity, including many specialised and threatened species, and provide important ecosystem functions such as climate regulation, moisture retention, carbon storage, and habitat connectivity. They are sensitive to disturbance, including fire, forestry, and other past land uses, with impacts often long-lasting. In south-eastern NSW, they are limited in extent and often fragmented within broader forested landscapes that remain under-represented in the reserve system. Assessing their distribution, condition, and protection within State Forests is therefore important for evaluating the conservation value of this proposal and its contribution to long-term ecological resilience.

5.3.1 Methodology

Vegetation composition within State Forests of the Study Area was analysed using the State Vegetation Type Mapping (SVTM) dataset to identify the distribution, extent, and composition of rainforest vegetation classes.

This analysis builds on the earlier use of Vegetation Formations, which provide a broad, landscape-scale overview of vegetation patterns across the Study Area. To enable a more detailed assessment of rainforest distribution, Vegetation Classes were adopted as an intermediate classification that differentiates rainforest types while remaining suitable for regional-scale mapping and comparison. While Plant Community Types (PCTs) offer finer ecological resolution, their high level of detail makes them impractical to apply consistently across a Study Area of this size and difficult to clearly present in mapped outputs. Vegetation Classes therefore provide a more refined and interpretable assessment of rainforest composition while maintaining alignment with the broader vegetation framework used in the report.

State Forest tenure boundaries were intersected with the SVTM dataset to extract vegetation attributes within State Forest areas. Rainforest vegetation was defined using SVTM classes classified as rainforest, including subtropical, warm temperate (northern and southern), cool temperate, dry, and littoral rainforest types.

For each State Forest, the following metrics were calculated:

- Total rainforest area (ha)
- Proportion of rainforest relative to total forest area (%)
- Area by rainforest vegetation class

These metrics were used to compare the extent, representation, and diversity of rainforest vegetation across State Forests.

5.3.2 Limitations

This analysis relies on the State Vegetation Type Mapping (SVTM), a modelled dataset derived from remote sensing, existing mapping, and predictive modelling. While appropriate for regional-scale assessment, it may not accurately capture fine-scale vegetation patterns or small and fragmented rainforest patches.

Vegetation classes are simplified representations and may not fully reflect on-ground ecological variability, particularly in transitional areas.

No field-based ground-truthing was undertaken; therefore, mapped rainforest extent and classification should be considered indicative rather than site-specific.

5.3.3 Findings

The distribution of rainforest vegetation within State Forests of the Study Area is summarised in Table 19 and mapped in Figure 12, Figure 13 and Figure 14, with a total mapped extent of approximately 14,372 hectares. Rainforest vegetation occurs in most State Forests with a total of 51 State Forests containing the various rainforest vegetation classes (Appendix C).

Southern Warm Temperate Rainforest is the dominant class, comprising approximately 10,060 hectares (70%) of total rainforest area. It is widely distributed across the Study Area, from Jervis Bay to the Victorian border, with the greatest extent occurring in coastal and near-coastal forests, particularly between Batemans Bay and Tathra. This vegetation type forms the primary component of rainforest ecosystems within State Forest tenure.

Dry Rainforest accounts for approximately 1,966 hectares (13.7%) and is more prevalent in the southern portion of the Study Area, particularly south of Moruya, where it occurs in more sheltered and lower rainfall environments.

Northern Warm Temperate Rainforest contributes approximately 1,188 hectares (8.3%), occurring primarily in the northern part of the Study Area, including forests north of Batemans Bay, reflecting broader climatic gradients.

Subtropical Rainforest comprises approximately 1,120 hectares (7.8%) and occurs in scattered, typically sheltered locations where localised conditions support higher moisture availability.

Cool Temperate Rainforest and Littoral Rainforest are minimally represented within State Forest tenure, comprising approximately 35 hectares (<0.3%) and 3 hectares (<0.1%) respectively. Despite their limited extent, these rainforest types are of high conservation significance. Littoral Rainforest is a listed Threatened Ecological Community and is naturally restricted in distribution, meaning even small areas are disproportionately important for its conservation.

Rainforest distribution is not uniform and is highly concentrated within a subset of State Forests. Cool Temperate Rainforest is primarily confined to Bondi (31%) and Dampier (39%), while Dry Rainforest is most concentrated in Bodalla (32%) and Dampier (24%). Littoral Rainforest is overwhelmingly represented in Corunna (82%), indicating an extremely localised distribution. Northern Warm Temperate Rainforest shows its highest concentration in Yerriyong (29%), while Subtropical Rainforest is strongly concentrated in Yadboro (43%) and Currowan (36%). Southern

Warm Temperate Rainforest, although widespread, also shows notable concentration, with 21% of records occurring within a limited subset of forests.

These patterns demonstrate that a relatively small number of State Forests contain a disproportionate share of rainforest extent and diversity, particularly for less common and spatially restricted rainforest types. Forests including Bondi, Dampier, Bodalla, Corunna, Yerriyong, Yadboro, and Currowan therefore represent priority areas where protection would deliver the greatest gains in rainforest representation.

Table 19: Distribution and extent (hectares) of rainforest vegetation classes within State Forests of the Study Area, including total area by class and associated State Forest tenure.

Rainforest Type (Vegetation Class)	State Forest (ha)	Total (ha)
Cool Temperate Rainforests	Bondi (10.8), Cathcart (0.002), Coolangubra (0.2), Dampier (13.5), Gnupa (1.3), Nalbaugh (5.2), Nullica (2.5), Yadboro (0.8), Yambulla (0.5)	35
Dry Rainforests	Bermagui (29.4), Bodalla (630.7), Bolaro (1.3), Boyne (1.0), Buckenbowra (16.1), Corunna (4.2), Currowan (38.8), Dampier (479.0), Gnupa (31.5), Kioloa (12.3), McDonald (1.0), Mogo (10.9), Moruya (14.1), Mumbulla (225.3), Murrah (60.0), Nullica (26.9), Nungatta (1.0), Shallow Crossing (0.9), South Brooman (100.5), Tanja (45.8), Termeil (0.3), Towamba (20.1), Wandella (128.2), Wandera (2.9), Wingello (0.3), Yadboro (1.0), Yambulla (25.5), Yerriyong (1.7), Yurammie (55.1)	1,966
Littoral Rainforests	Corunna (2.2), East Boyd (0.5)	2.7
Northern Warm Temperate Rainforests	Boyne (0.2), Clyde (0.3), Currowan (79.3), East Boyd (1.2), Flat Rock (6.0), Glenbog (3.3), Jerrawangala (1.8), McDonald (150.8), Meryla (169.3), Mogo (0.2), Moruya (3.7), Mumbulla (0.1), Murrah (0.6), North Brooman (33.0), Nullica (0.9), Shallow Crossing (15.6), South Brooman (101.7), Wandera (0.7), Wingello (122.7), Yadboro (152.6), Yambulla (0.3), Yerriyong (343.4), Yurammie (0.8)	1,188
Southern Warm Temperate Rainforests	Badja (39.8), Benandarah (65.6), Bermagui (71.6), Bodalla (1638.6), Bolaro (11.4), Bondi (2.3), Boyne (174.8), Broadwater (0.9), Bruces Creek (38.3), Buckenbowra (223.2), Clyde (53.2), Corunna (5.1), Currowan (537.0), Dampier (2131.8), East Boyd (107.1), Flat Rock (44.7), Glenbog (4.6), Gnupa (72.9), Jerrawangala (17.9), Kioloa (9.2), McDonald (157.4), Mogo (120.3), Moruya (314.7), Mumbulla (237.8), Murrah (179.8), Nadgee (725.7), North Brooman (90.3), Nowra (2.1), Nullica (494.1), Nungatta (0.6), Shallow Crossing (340.3), Shoalhaven (0.01), South Brooman (75.5), Tallaganda (37.0), Tanja (66.5), Tantawangalo (36.8), Termeil (5.9), Timbillica (183.2), Towamba (43.8), Wallagaraugh Flora Reserve (3.2), Wandella (427.4), Wandera (555.7), Yadboro (84.8), Yambulla (331.3), Yerriyong (227.2), Yurammie (69.3)	10,060
Subtropical Rainforests	Bodalla (3.1), Boyne (12.6), Buckenbowra (113.4), Currowan (408.5), McDonald (18.1), Meryla (0.1), Mogo (11.3), Nadgee (3.5), North Brooman (0.4), Nullica (2.0), Wandera (3.3), Yadboro (480.9), Yerriyong (62.8)	1,120
Total		**14,372**

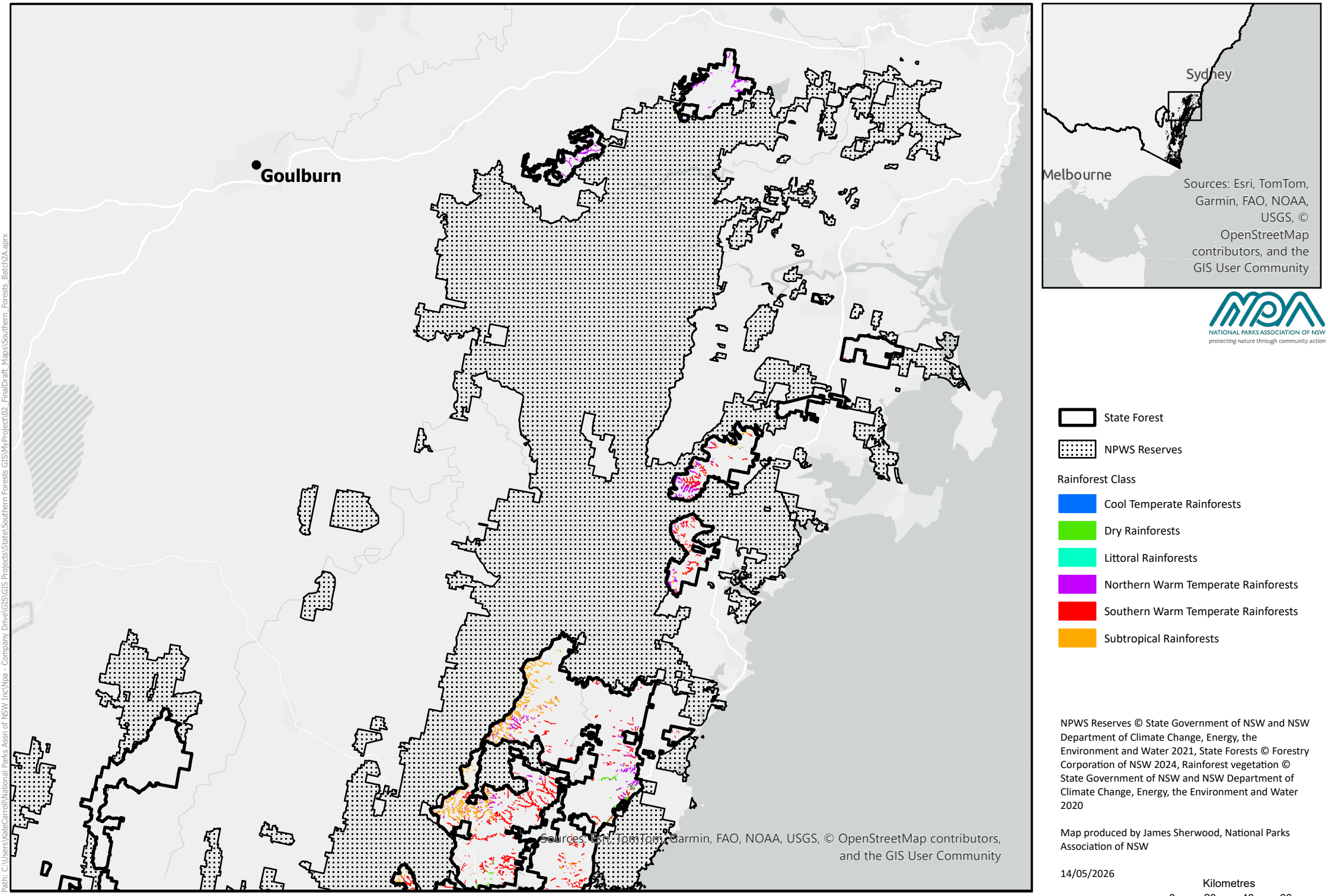


Figure 12: Spatial distribution of rainforest vegetation classes across State Forests – northern section

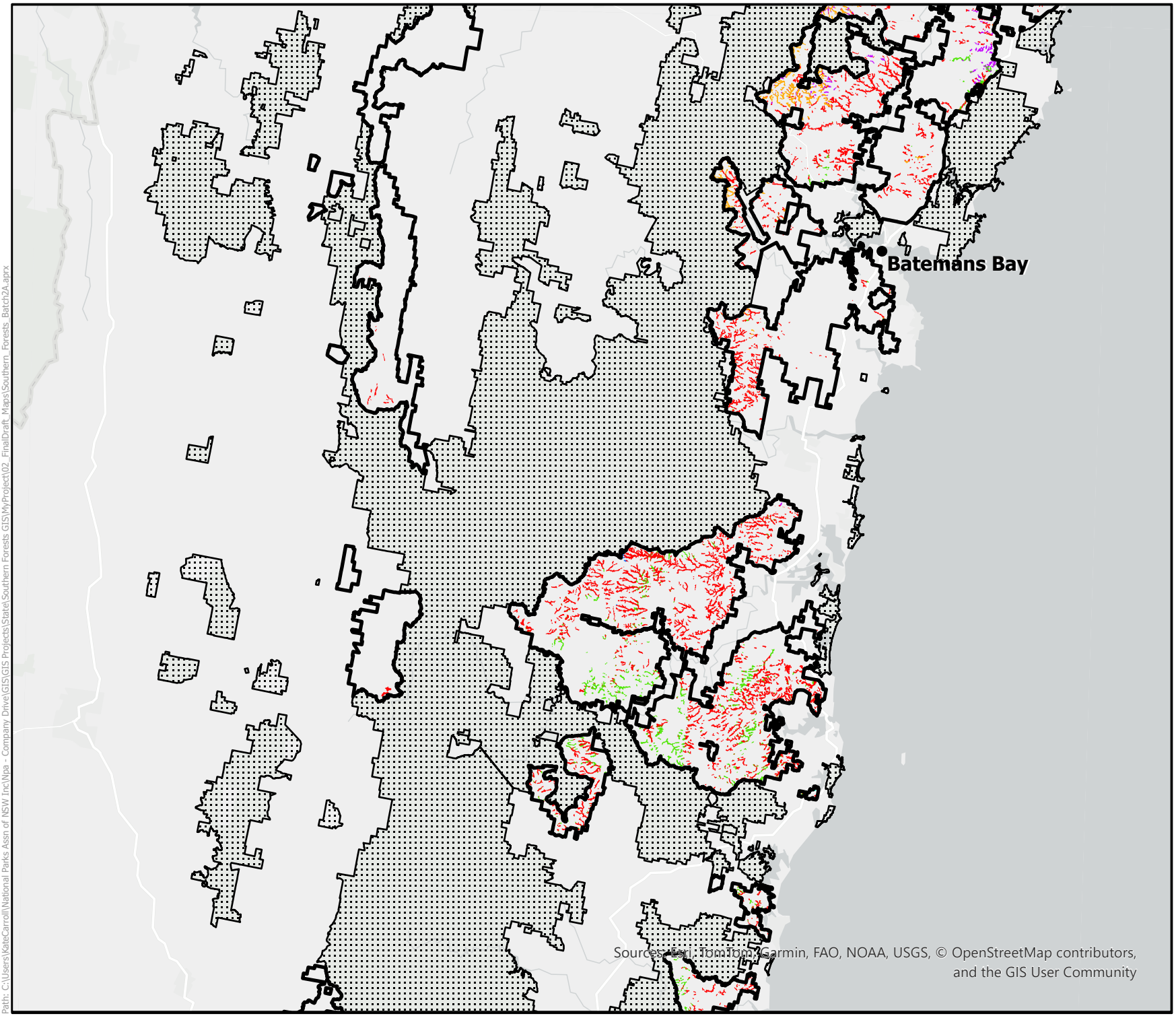


Figure 13: Spatial distribution of rainforest vegetation classes across State Forests – central section

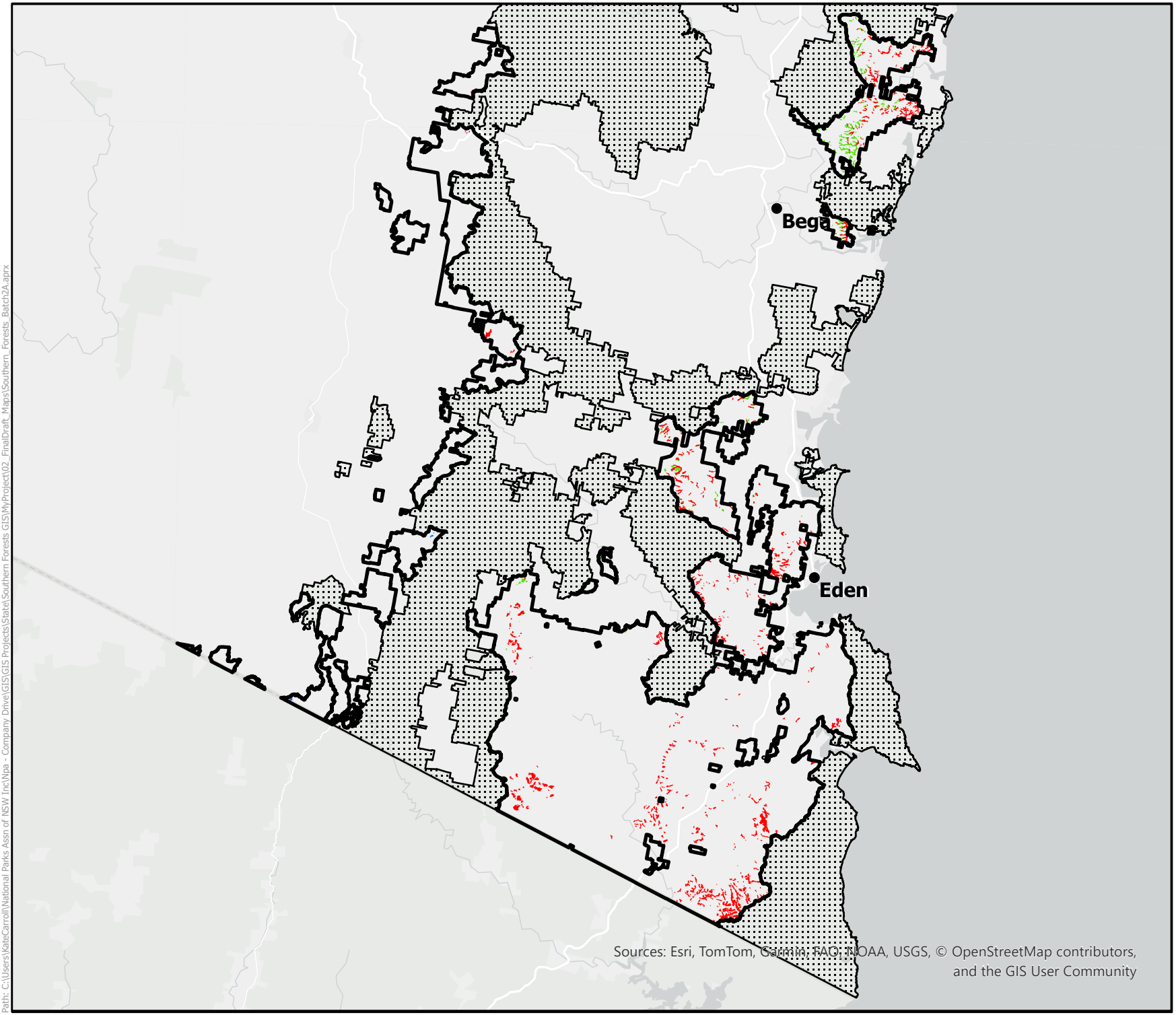


Figure 14: Spatial distribution of rainforest vegetation classes across State Forests – southern section

5.4 Old growth forest mapping

5.4.1 Methodology

An analysis of structural growth form data from the CRAFTI Comprehensive Regional Assessment (CRA) (State Government of NSW and NSW Department of Climate Change, Energy, the Environment and Water, 2014) was undertaken. Growth stage classes that are candidate old growth were used. These included growth stages with 10-30% senescence or more than 30% senescence and less than 30% regrowth. Two datasets were analysed: the Eden CRA and South Coast CRA. The Study Area sits entirely within both combined datasets. The results should be taken as indicative of old growth only, as there are many limitations and inaccuracies in the datasets (see Chapter 5.4.2 below).

Old growth data was used to analyse proportions of old growth 'protected' and 'proposed for protection', including within IBRA subregions. IBRA subregional analysis was used to assess against the Joint ANZECC/MCFFA13 National Forest Policy Statement Implementation Sub-Committee (JANIS) targets for protected areas (Commonwealth of Australia, 1997). The JANIS targets include one specific to old growth which is: 60 per cent of the existing old-growth forest in each IBRA subregion. Old growth in each State Forest of the Study Area was also summarised.

5.4.2 Limitations

The data is relatively old, with the Eden CRA dataset last updated 2001 and South Coast CRA in 1999. With over 20 years of growth since, there would likely be forest now meeting threshold for old growth that were not mapped at the time (Commonwealth of Australia, 1997). Conversely, some old growth forest may have been logged since, such that it would no longer meet old growth thresholds. In the case of extreme bushfire severity events, characteristics that make the forest old growth can be altered whereby it no longer meets old growth forest classification requirements (2rog Consulting and Natural Resources Commission, 2020). Bushfire can also alter the forest such that it enables mature forests to be subsequently reclassified as old growth. The Natural Resources Commission confirmed in 2018 that existing old growth mapping in State Forests has inaccuracies (NSW Natural Resources Commission, 2020).

Analysis was limited to IBRA subregions that are within the South East Region boundary. The Monaro subregion was excluded from analysis as the area proposed for inclusion is very small.

5.4.3 Findings

The State Forests contain 152,593 hectares of mapped old growth forest (Table 20). This is about 16% of old growth forest in the Region. When combining the existing protected old growth in NPWS Reserves (about 51%), the Study Area would reach 67% of the Region old growth mapping. As discussed above, old growth mapping areas are indicative only.

Table 20: Areas of old growth forest in the Study Area and the Region

	Area (ha)	Proportion of the Region
South East Region	959,014	
NPWS Reserves	492,674	51%
State Forests	152,593	16%
Total Study Area	**645,267**	**67%**

Table 21 outlines the areas and proportions of old growth forest mapped in the State Forests and NPWS Reserves. It also includes consideration of the JANIS target of protecting 60% of old growth within each IBRA subregion. For the most part, existing NPWS Reserves do not meet the JANIS target, with only Moss Vale and South East Coastal Ranges over 60%.

With the inclusion of the State Forests into the protected area network, the JANIS target for old growth protection would be met for every IBRA subregion. Though there are limitations with the data, it is indicating that there would be substantial increases in protection of old growth forest if all State Forests were included in the NRS and that these are likely to meet CAR targets. Protecting old growth forest is critical for habitat value, carbon sequestration, and forest resilience.

Table 21: Old growth forest areas and proportions across IBRA subregions of the Study Area

IBRA subregion	Old Growth Forest in State Forests (ha)	Proportion of Old Growth in IBRA subregion			Meets JANIS targets?
		State Forests	NPWS Reserves	Total proposed (NPWS Reserves + State Forests)	
Bateman	36,785	54%	22%	**76%**	**Yes**
East Gippsland Lowlands	14,574	59%	37%	**96%**	**Yes**
Ettrema	345	0%	79%	**79%**	**Yes**
Jervis	8,288	17%	53%	**70%**	**Yes**
Kybeyan-Gourock	23,090	16%	49%	**65%**	**Yes**
Moss Vale	3,370	25%	63%	**88%**	**Yes**
South East Coastal Ranges	64,727	21%	67%	**88%**	**Yes**

The indicative area of old growth in each State Forest is listed in Table 22 along with the proportional area of the State Forest. Fifty-five of the 56 State Forests contain old growth forest. Shoalhaven is the only one without and it is a small State Forest of only 109 hectares. The largest by area are in Dampier, Tallaganda, Yambulla and Nadgee. Most of Bruces Creek and Woodburn State Forests are old growth, however it should be noted that these are small State Forests. In larger State Forests, including Moruya, Meryla, Yadboro, Flat Rock and Badja, there are high proportions of old growth (>70%). Large portions of these forests were burnt in the 2019-20 fires, and in the case of Badja, 100% was burnt (see Chapter 10.1.3). Impacts of fire on old growth forest can vary as discussed in Chapter 5.3.2, such that some old growth areas will no longer be classified as old growth or conversely, new areas would meet old growth definitions. Thirsty-six State Forests are identified as the most valuable for old growth with either large areas of old growth (>1,000 hectares) and/or more than 60% of the State Forest old growth (Appendix C).

Table 22: Old growth forest areas of the State Forests

State Forest	Area (ha)	Proportion of State Forest
Badja	5,393	70%
Benandarah	1,048	38%
Bermagui	255	14%
Bodalla	9,772	41%

State Forest	Area (ha)	Proportion of State Forest
Bolaro	781	44%
Bombala	127	38%
Bondi	1,648	24%
Boyne	3,659	59%
Broadwater	75	45%
Bruces Creek	728	92%
Buckenbowra	3,007	58%
Cathcart	180	10%
Clyde	2,216	63%
Coolangubra	1,278	58%
Corunna	76	42%
Currambene	547	32%
Currowan	4,383	37%
Dampier	15,517	46%
East Boyd	5,459	26%
Flat rock	3,486	71%
Glen Allen	381	26%
Glenbog	1,926	22%
Gnupa	123	9%
Jerrawangala	180	67%
Kioloa	111	64%
McDonald	1,944	53%
Meryla	3,402	78%
Mogo	5,068	33%
Moruya	3,368	83%
Mumbulla	538	9%
Murrah	1,013	24%
Nadgee	11,753	58%
Nalbaugh	888	39%
North Brooman	1,896	52%
Nowra	331	64%
Nullica	3,194	17%
Nungatta	294	34%
Shallow Crossing	2,366	61%
Shoalhaven	0	0%
South Brooman	3,127	56%
Tallaganda	13,719	57%
Tanja	158	18%
Tantawangalo	313	9%
Termeil	322	47%
Timbillica	1,989	23%
Tomerong	8	4%

State Forest	Area (ha)	Proportion of State Forest
Towamba	250	16%
Wallagaraugh	870	28%
Wandella	2,621	48%
Wandera	3,578	69%
Wingello	1,421	58%
Woodburn	11	92%
Yadboro	7,785	73%
Yambulla	12,789	29%
Yerriyong	4,484	68%
Yurammie	737	18%
Grand Total	**152,593**	**42%**

6 FLORA AND FAUNA SPECIES

This chapter considers the biodiversity values of the Region through an analysis of species occurrence and occupancy. The analysis is largely restricted to taxa of terrestrial flora and fauna, including vascular plants, mammals, birds, reptiles, and amphibians. This concentration reflects the absence of readily accessible, systematic data on the conservation status of non-vascular plants and invertebrate fauna species.

The analysis is largely focused on listed threatened species, though some protected species (non-threatened native species) have been included where relevant. Threatened species are those listed under the NSW *Biodiversity Conservation Act 2016* (BC Act) and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Listings on the BC Act and EPBC Act are based on nominations and assessment by Threatened Species Scientific Committees against standard criteria. Those criteria include:

- A reduction in population size
- Restricted geographic distribution
- Decline or limited mature individuals
- Risk of extinction meeting certain thresholds of probability

Threatened species listings relate to a trajectory of decline, contraction of range, low ability to reproduce and vulnerability to risk of extinction. A species can be locally common or widespread, and still at risk of extinction.

6.1 Methodology

Flora and fauna records for the Region were obtained from the NSW Bionet Wildlife Atlas and analysed. The objective of the analysis was to understand the adequacy of existing protection within NPWS Reserves and the potential contribution of State Forests to species resilience and survival.

Threatened flora and fauna records, including Endangered Populations, listed under the EPBC Act and/or BC Act, were downloaded from Bionet on 2 May 2025. Additional flora and fauna species of interest (protected species) were downloaded on 22 and 23 May 2025.

Species records were then subject to an assessment of their:

- Occurrence/occupancy of NPWS Reserves in the Study Area
- Occurrence/occupancy of State Forests in the Study Area
- Vulnerability to the effects of logging
- Climate change landscape capacity modelling in State Forests of the Study Area (fauna only)

Flora and fauna species were then identified and selected as “focal species”. They were identified as such if the analysis suggests that their future survival is dependent on conserving State Forests. They were classified as focal species if they meet one or more of the following criteria:

- Less than 30% occurrence/occupancy in NPWS Reserves
- More than 20% occurrence/occupancy in State Forest
- Scientific literature indicates the species is highly vulnerable to logging
- State Forests contain the top 25% climate change refugia in the Region for a species (fauna only) (see Chapter 6.1.3)

This report presents detailed analysis of the species identified as 'focal species'.

Many other threatened and non-threatened flora and fauna depend upon the Region's ecosystems. The broader ecological and biodiverse importance of the forests is far from insignificant, however concentrating upon species that are most at risk offers a powerful insight into the irreplaceable values of the forests.

6.1.1 Analysis of area of occupancy (occupied habitat)

The concept of Area of Occupancy (AOO) was developed by the IUCN to define the total area of suitable habitat that for which there is evidence of occupation by a species: occupied habitat. The IUCN defines AOO as: "*the area within its 'extent of occurrence' which is occupied by a taxon, excluding cases of vagrancy*" (IUCN Species Survival Commission, 2012). It provides a measure of extinction risk and is used to justify threatened species listings.

The IUCN recommend using a two x two kilometre grid when calculating AOO. A two kilometre square grid was placed over all species occurrences (Bionet records) in the Region and an AOO was determined for each species. The AOO figures were then used to compare proportions of species distributions between NPWS Reserves and State Forests.

The species occurrence records used in our AOO calculations were restricted to 1990 onwards. This cut-off was selected to focus on the contemporary distribution of species and is around the time broad adoption of GPS technology commenced resulting in more reliable, georeferenced and systematically collected biodiversity data in NSW.

6.1.2 Analysis of occurrence

Species counts from Bionet records were tallied in the Region, NPWS Reserves and the State Forests. Each Bionet record can show one individual or multiple individuals. The counts in Chapter 6.2 account for multiple individuals (if recorded in the database) and is the cumulative number of individuals for all records. Bionet records were restricted to those dated 1990 onwards.

6.1.3 Analysis of climate refugia

NSW DCCEEW has conducted climate-informed species modelling under the Persistence in Landscapes Project (PLP). The PLP model utilises several datasets to extrapolate and forecast the amount of suitable habitat for species populations, measured as "landscape capacity". High landscape capacity means a location is of suitable habitat type, condition, structure, and has sufficient connectivity with other local and proximal habitats and landscapes to support a viable population (State of New South Wales and Department of Planning and Environment, 2022).

The modelling predicts species persistence and aids in identifying critical areas of habitat for threatened fauna species on a species-by-species basis and more generally with a climate refugia map combining modelling for a range of species. Landscape capacity is also informed by temporal changes in species habitat availability within a range of dates from Pre1750 (pre-industrial) to 2070 using NSW NARCliM climate projections. We assessed the 2070 models. Within the context of the overarching proposal, these models have been used to better understand the key refugia and corridors within the Region for a range of fauna under climate projections.

The modelled data is limited to threatened species that are identified as landscape species in the NSW DEECCW *"Saving our Species"* (SoS) program. Plants, invertebrates, highly localised species, species with

separate projects outside of PLP, and species that could not be modelled satisfactorily within the constraints of the PLP were excluded.

Where available, species models were analysed for high landscape capacity in the State Forests. State Forests with high quality refugia for each species were identified. They were identified through an analysis of the climate refugia model zonal statistics to determine the 75th percentile raster values within each State Forest, where the raster values represent refugia quality (top 25% values). This was compared to the 75th percentile values for each species across the Region. Forests with 75th percentile values equal to or exceeding the Region 75th percentile values were classified as containing high quality refugia for the species.

6.1.4 Limitations

Area of occupancy

AOO analysis is limited by the adequacy of Bionet data and is therefore subject to limitations discussed below. This includes low sampling where a species may be present and has not yet been detected. AOO is a grid-based application and is used as an indicative, systematic measure. True species occupancies do not follow precise boundaries and fluctuate over time based on different biological and environmental values. There may be differences at boundaries used for analysis, where the AOO could over or under-estimate true occupancy as the location of the species may only occur in a portion of the grid square. AOO is a measure of indicative distribution but doesn't account for abundance or habitat quality, and subsequent value to a species. Species records are from 1990, and over that time, some species occupancies have shrunk.

Analysis of occurrence

The results in Table 24 and Table 26 are not population counts and reflect indicative, not comprehensive, values. Limitations to accuracy and comprehensiveness of data include survey gaps, lack of access for survey and the cryptic nature of some species/difficulties with detection. Bionet records can also be relatively high where the same areas are surveyed repeatedly and/or species are easy to detect. This can mean that counts can be higher than actual population size in some cases. Counts in these tables are from 1990 to 2025. Conversely, species may be present but not detected, or detected in low or sparse abundances, and therefore analysis shows them absent from an area or low in relative number. For example, gully bottoms and escarpments can be critical habitats for a range of species, but these are difficult to access and survey and species data may not reflect their importance.

High severity bushfires lead to natural succession of vegetation structure changes over time. This means there are varying regrowth rates of flora species and recovery of fauna species and counts in recently burnt areas, particularly following the 2019-20 bushfires. Very few flora species in Australia fail to respond to fire (NSW Biodiversity Conservation Trust, 2024) so it expected most of the species have resprouted or will in future (are in the seedbank), and pre-fire records are a good indication of the species presence. In the case of fauna, the recovery is variable among species and unknown for many species.

Climate refugia

Not all threatened species have been modelled for landscape capacity. Therefore, the analysis was limited to the species listed in Table 27. The modelling is based on climate projections or forecasts only. It is also too coarse to fully account for the habitat interactions of some species that respond to fine-grained habitat features (e.g. creeks) or have very localised movements. Additionally, environmental drivers of species distributions were not necessarily represented (e.g. hollow-bearing trees), neither were life histories. Species records are included in the modelling, however it accounts for sampling biases, including by considering distances that individuals of a species may be expected to access from known locations.

6.2 Results

6.2.1 Flora results

Bionet searches of the Region identified 133 flora species listed as threatened under the BC Act and/or EPBC Act. Thirty-one of these species are found in the State Forests, 104 in the Study Area. Our analysis of records identified 14 threatened focal species and two rare (not threatened) focal species from the 31 species. The two rare flora species have been included because they are endemic to the Region, and a high proportion of their populations occur in the State Forests, namely *Eucalyptus badjensis* and *Myoporum bateae*.

Table 23 outlines the AOO, or occupied habitats, for each of the focal species in the Region, State Forests, Flora Reserves and NPWS Reserves. The proportions of the State Forests of the total AOO in the Region is also included along with the combined proportion of the AOO in the State Forests and NPWS Reserves. The State Forests account for only 16% of the Region in land mass, yet contain a relatively higher proportion of the occupied habitats of focal flora species in the South East (39%: being 6% in Flora Reserves, 33% in other areas of State Forest). NPWS Reserves account for 33% of the occupancies for these species, highlighting the need for greater conservation of these species' habitats. Focal species occupancies (AOO) are mapped in Figure 15, where overlapping species occupancies are shaded darker. High concentrations of these species are in the State Forests, particularly around Glenbog, the Eurobodalla area in forests such as Bodalla and Currowan, and the forests northwest of Eden, such as Nullica. Table 24 summarises the Bionet occurrences and proportions of occurrences for the same areas. Notes on endemism to the South East are included. Most species (12 species) discussed in Table 23 and Table 24 are endemic to the Region and areas just outside. Species with occupied habitats and occurrences of 30% or greater in NPWS Reserves and State Forests (combined) are coloured green in Table 23 and Table 24. NPWS Reserves and State Forests hold 30% of occupied habitats for all species but one. NPWS Reserves and State Forests hold more than 30% of occurrences for all species, and for most species, entire or near entire occurrences (10 species, >90%). For those species, six are endemic to the Region.

Of note, some focal species have a high proportion of their population in the Flora Reserves of the State Forests and are protected. These species are noted in Table 23 and Table 24.

Significant numbers of *Acacia constablei* (Narrabarba Wattle), *Acacia lanigera* var. *gracilipes,* and *Correa baeuerlenii* (Chef's Cap Correa) are in the State Forests. All three species have restricted distributions. This accounts for 98% of *A. constablei*, 100% of *A. lanigera* var. *gracilipes,* and 66% of *C. baeuerlenii* of known occurrences in the Region. Most of the records are within Flora Reserves and have existing protections, however, their occupied habitats (AOO) extend well outside. Though records show minimal occurrences outside the Flora Reserves, these areas could still be important for the protection of the species, not only in the case that they occur there, but also to act as a buffer of protection around the Flora Reserve.

In the case of *A. constablei*, as shown in Appendix D, approximately 32% of the distribution of *A. constablei* overlaps with areas that were logged between 2000 and 2022, indicating a significant impact from logging on this species' habitat (Ward *et al.*, 2023). The distribution of the species in Ward *et al.* was determined by the Maxent model (retrieved from the Commonwealth Department of the Environment and Energy, 2022). Maxent (or maximum entropy modelling) predicts species occurrences by considering the limits of environmental variables of known locations and uses information from government, industry, and non-government organisations with expert opinion and reference to published information. It is inferred that the Maxent model for *A. constablei* extends significantly outside the Narrabarba Hill Flora Reserve. Similarly, our

analysis shows 55% of the AOO of the species is in State Forests, the majority of which is outside Flora Reserves.

Three species of Pomaderris, *Pomaderris bodalla* (Bodalla Pomaderris), *Pomaderris elachophylla* (Lacy Pomaderris) and *Pomaderris parrisiae* (Parris' Pomaderris), and *Euphrasia scabra* (Rough Eyebright) have very high occurrences in the State Forests, are endemic to the NSW South East Region and are not protected in Flora Reserves. They occur in the forests of Eurobodalla and Snowy regions. Protecting the State Forests would be particularly important for securing the conservation of these four species.

Astrotricha sp. Wallagaraugh (Merimbula Star-hair), *Eucalyptus badjensis, P. parrisiae* and *P. elachophylla* were all identified in field surveys undertaken for this assessment.

Astrotricha sp. Wallagaraugh (Merimbula Star-hair) has a severely fragmented distribution, only known from three localities. The State Forests contains the whole of the known NSW portion of the Wallagaraugh River population, mostly within the Wallagaraugh, which is 19% of occurrences in NSW since 1990 and 40% of occupancy. It has a low level of protection in NPWS Reserves (12%).

Genoplesium rhyoliticum occurs at six sites, where one third of its occurrences and 55% of AOO are in the State Forests. Another *Genoplesium* species, *G. vernale* also occurs in the State Forests in high occupancy (56%) and 38% of occurrences recorded. These two species and *A.* sp. Wallagaraugh are threatened by inappropriate fire regimes, habitat loss, and forestry activities (see Appendix D). Inclusion of the State Forests would allow for appropriate conservation planning and safeguard substantial portions of the three species distributions.

Leionema ralstonii (Ralston's Leionema) and *Westringia davidii* (David's Westringia) occur in rocky wooded habitats and shrublands. Thirty-nine percent of occurrences and 50% of the AOO of *L. ralstonii* are in the State Forests. Whilst 46% of known occurrences and 39% of AOO of *W. davidii* are present, including two SoS priority management sites in Nullica State Forest and South East Forest National Park (NSW Department of Planning and Environment, n.d.e).

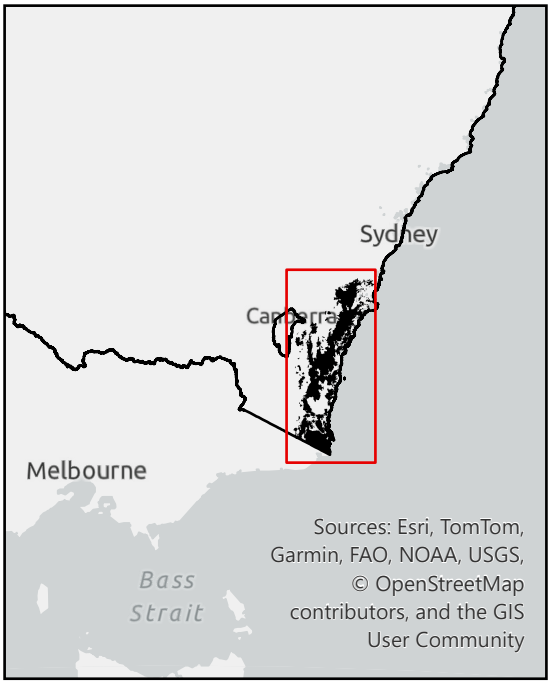
Rhodamnia rubescens (Scrub Turpentine) is widely distributed but has very poor protections in the Region with only 8% of known occurrences in NPWS Reserves. The State Forests contain another 27% of its known occurrences and 22% of its AOO, which are essential to protect for its persistence in the Region, especially given its Critically Endangered status.

Thelymitra atronitida (Black-hooded Sun Orchid) is Critically Endangered with a highly restricted range, only known from the South East Region and Sydney Basin, and is very rare with only 10 known records in NSW. Two of the five records in the Region are in Sidlings Swamp Flora Reserve which is in the State Forests.

Eucalyptus badjensis and *Myoporum bateae* are of importance within the State Forests, which contains 46% and 58% of their AOO, respectively (Table 23). Sixty-two percent of *E. badjensis* occurrences and 68% of *M. bateae* records are within the State Forests (Table 24). They are not currently listed as threatened but are endemic to the Region and, with such high proportions of their occurrences and AOO in State Forest are at high risk from logging.

Detailed discussion on each focal flora species is provided in Appendix D.

Of particular importance is the presence of flora species listed Critically Endangered under the BC Act and/or EPBC Act. These species are extremely rare or suffering severe declines with the highest risk of extinction, warranting strong protections. *A. constablei*, *R. rubescens* and *T. atronitida* are Critically Endangered species found in State Forest. *Prasophyllum canaliculatum* is also a Critically Endangered species found in Glenbog State Forest, where since 1990, there were 12 occurrences recorded in Bionet.



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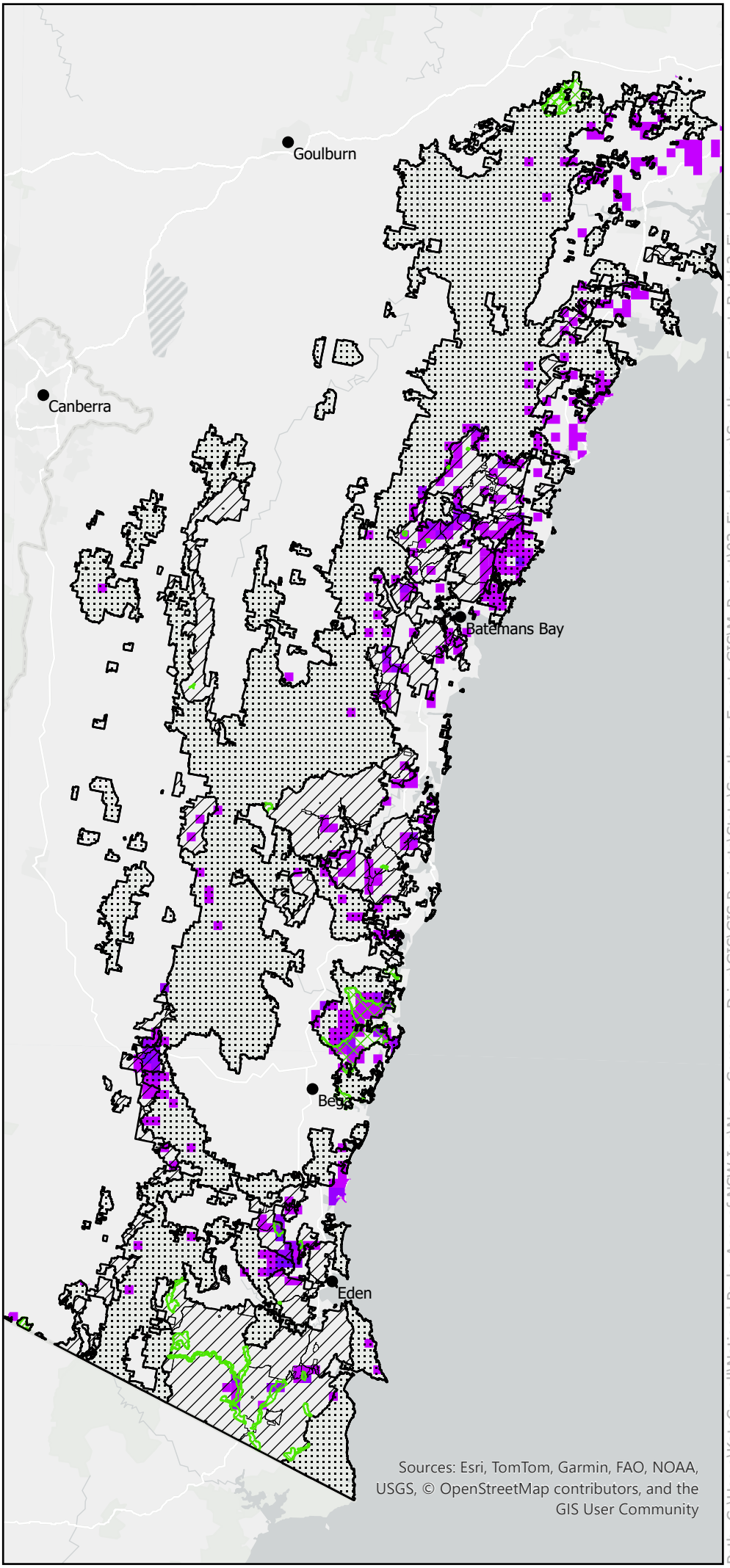

- Study Area
- Flora Reserves
- State Forest
- NPWS Reserves
- Flora species AOO

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Map produced by Kate Carroll, National Parks Association of NSW

14/05/2026

Kilometres
0 20 40 60

Figure 15: Area of occupancy analysis of focal flora species

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Table 23: AOO analysis for focal flora species

Species name	BC Act listing	EPBC Act listing	Total AOO in Region[12] (ha)	Total AOO NPWS Reserves (ha)[13]	Total AOO Flora Reserves (ha)	Total AOO State Forests (ha)	% AOO State Forests	% AOO NPWS Reserves + State Forests[14]	State Forest occurrence	Endemic to South East Region?
Acacia constablei Narrabarba Wattle	Critically Endangered	Critically Endangered	1,933	333	125	1,065	55%	98%	East Boyd, Nadgee, Timbillica	Yes
Acacia lanigera var. *gracilipes*	Endangered	Endangered	1,200	0	434	1,200	100%	100%	Timbillica, Wallagaraugh, Yambulla	No. However, only known occurrence in NSW is in South East. Also occurs in Victoria.
Astrotricha sp. Wallagaraugh Merimbula Star-hair	Endangered	Not listed	4,017	478	710	1,600	40%	19%	Timbillica, Wallagaraugh, Yambulla	Mostly. Some records in Victoria, contiguous with the Wallagaraugh population
Correa baeuerlenii Chef's Cap Correa	Vulnerable	Vulnerable	18,535	6,873	6,352	9,288	50%	66%	Buckenbowra, Currowan, Mogo, Mumbulla, Murrah, Wandera	Yes
Eucalyptus badjensis	Not listed	Not listed	7,200	2,508	0	4,106	57%	62%	Badja, Cathcart,	Yes

[12] Also accounts for additional NPWS Reserves outside the Region boundary that form part of the Study Area
[13] Red indicates less than 30% of AOO is within the State Forests
[14] Green indicates 30% or more AOO is within the State Forests + NPWS Reserves

Species name	BC Act listing	EPBC Act listing	Total AOO in Region[12] (ha)	Total AOO NPWS Reserves (ha)[13]	Total AOO Flora Reserves (ha)	Total AOO State Forests (ha)	% AOO State Forests	% AOO NPWS Reserves + State Forests[14]	State Forest occurrence	Endemic to South East Region?
									Glenbog, Tantawangalo	
Euphrasia scabra Rough Eyebright	Endangered	Not listed	2,953	2,051	0	498	17%	32%	Bondi, Glenbog, Tantawangalo	No. Also in Snowy regions and Bathurst area.
Genoplesium rhyoliticum Rhyolite Midge Orchid	Endangered	Endangered	5,200	1,265	1,149	2,763	53%	33%	East Boyd, Nadgee, Nullica, Timbillica	Yes
Genoplesium vernale East Lynne Midge Orchid	Vulnerable	Vulnerable	19,600	5,936	89	10,879	56%	38%	Boyne, Clyde, Currowan, Flat Rock, Kioloa, Mogo, North Brooman, Shallow Crossing, South Brooman, Wandera, Yadboro	No. Mostly in Region. Only a few records outside the area which are in the Snowy region in State Forest.
Leionema ralstonii Ralston's Leionema	Vulnerable	Vulnerable	9,200	2,632	603	4,615	50%	39%	Gnupa, Mogo, Nullica, Wandera, Yurammie	Yes
Myoporum bateae	Not listed	Not listed	20,456	6,576	1,766	9,535	47%	68%	Bodalla, Boyne, Buckenbowra, Clyde, Dampier, Mogo, Murrah, Mumbulla,	Yes

Species name	BC Act listing	EPBC Act listing	Total AOO in Region[12] (ha)	Total AOO NPWS Reserves (ha)[13]	Total AOO Flora Reserves (ha)	Total AOO State Forests (ha)	% AOO State Forests	% AOO NPWS Reserves + State Forests[14]	State Forest occurrence	Endemic to South East Region?
									Shallow Crossing, Wandella, Wandera, Yadboro, Yerriyong	
Pomaderris bodalla Bodalla Pomaderris	Vulnerable	Not listed	13,859	2,073	291	7,825	56%	75%	Bodalla, Dampier, Gnupa, Mogo, Moruya, Murrah, Nullica, Yurammie	Yes
Pomaderris elachophylla Lacy Pomaderris	Endangered	Not listed	4,000	2,023	0	1,444	36%	67%	Glenbog, Tantawangalo	Yes
Pomaderris parrisiae Parris' Pomaderris	Vulnerable	Vulnerable	5,200	3,298	0	1,581	30%	46%	Badja, Glenbog, Nadgee	Yes
Rhodamnia rubescens Scrub Turpentine	Critically Endangered	Critically Endangered	52,644	16,759	4	11,732	22%	27%	Benandarah, Boyne, Clyde, Currowan, Flat Rock, Kioloa, McDonald, Mogo, North Brooman, Shallow Crossing, South Brooman, Termeil, Tomerong,	No. Occurs along the NSW coast up to QLD border. Study Area is at southern limit of its range.

Species name	BC Act listing	EPBC Act listing	Total AOO in Region[12] (ha)	Total AOO NPWS Reserves (ha)[13]	Total AOO Flora Reserves (ha)	Total AOO State Forests (ha)	% AOO State Forests	% AOO NPWS Reserves + State Forests[14]	State Forest occurrence	Endemic to South East Region?
									Yadboro, Yerriyong	
Thelymitra atronitida Black-hooded Sun Orchid	Critically Endangered	Not listed	1,996	755	429	1,134	57%	40%	East Boyd, Nadgee, Timbillica, Yadboro	No. Found in South East and Sydney Basin. Only 10 records in NSW.
Westringia davidii David's Westringia	Vulnerable	Vulnerable	2,800	1,264	98	1,091	39%	46%	Nullica, Yurammie	Yes
Total			**148,399**	**48,411**	**8,898**	**57,895**	**39%**	**72%**		

Table 24: Bionet record analysis of focal flora species

Species name	BC Act listing	EPBC Act listing	Total count[15] in Region	Total count[15] NPWS	% in NPWS[16]	Total count[15] in Flora Reserves	Total count[15] in State Forests	% in State Forests	% in State Forests + NPWS Reserves[17]	State Forest occurrence	Endemic to South East Region?
Acacia constablei Narrabarba Wattle	Critically Endangered	Critically Endangered	12,419	1	<1%	12,341	12,178	98%	98%	Nadgee	Yes
Acacia lanigera var. *gracilipes* Woolly Wattle	Endangered	Endangered	601	0	0%	481	601	100%	100%	Yambulla, Yambulla Flora Reserve, Wallagaraugh	No. However, only known occurrence in NSW is in South East. Also occurs in Victoria.
Astrotricha sp. Wallagaraugh Merimbula Star-hair	Endangered	Not listed	26,137	3,045	12%	4,055	5,089	19%	31%	Yambulla, Wallagaraugh	Yes
Correa baeuerlenii Chef's Cap Correa	Vulnerable	Vulnerable	8,202	2,739	33%	4,190	5,389	66%	99%	Buckenbowra, Currowan, Mogo, Mumbulla, Murrah, Wandera	Yes
Eucalyptus badjensis Big Badja Gum	Not listed	Not listed	84	30	36%	0	52	62%	98%	Badja, Glenbog	Yes

[15] Count is the cumulative Number of Individuals of each Bionet record

[16] Red indicates less than 30% of occurrences of the species is within NPWS Reserves

[17] Green indicates 30% or more occurrences of the species are within State Forests + NPWS Reserves

Species name	BC Act listing	EPBC Act listing	Total count[15] in Region	Total count[15] NPWS	% in NPWS[16]	Total count[15] in Flora Reserves	Total count[15] in State Forests	% in State Forests	% in State Forests + NPWS Reserves[17]	State Forest occurrence	Endemic to South East Region?
Euphrasia scabra Rough Eyebright	Endangered	Not listed	26,759[18]	18,029	67%	0	8,561	32%	99%	Bondi, Glenbog	No. Also in Snowy regions and Bathurst area.
Genoplesium rhyoliticum Rhyolite Midge Orchid	Endangered	Endangered	857	556	65%	64	283	33%	98%	Nadgee, Nullica, Timbillica	Yes
Genoplesium vernale East Lynne Midge Orchid	Vulnerable	Vulnerable	2,734	1,018	37%	0	1,050	38%	76%	Boyne, Clyde, Currowan, Flat Rock, Mogo, North Brooman, Shallow Crossing, South Brooman, Wandera, Yadboro	No. Mostly in Region. Only a few records outside the area which are in the Snowy region in State Forest.
Leionema ralstonii Ralston's Leionema	Vulnerable	Vulnerable	522	314	60%	150	201	39%	99%	Gnupa, Nullica, Wandera	Yes

[18] Count adjusted to include records in State Forests that are outside Region

Species name	BC Act listing	EPBC Act listing	Total count[15] in Region	Total count[15] NPWS	% in NPWS[16]	Total count[15] in Flora Reserves	Total count[15] in State Forests	% in State Forests	% in State Forests + NPWS Reserves[17]	State Forest occurrence	Endemic to South East Region?
Myoporum bateae	Not listed	Not listed	1,025	283	28%	10	701	68%	96%	Bodalla, Boyne, Buckenbowra, Dampier, Mogo, Mumbulla Flora Reserve, Murrah Flora Reserve, Shallow Crossing, Wandella, Wandera, Yadboro, Yerriyong	Yes
Pomaderris bodalla Bodalla Pomaderris	Vulnerable	Not listed	2,484	34	1%	0	1,868	75%	77%	Bodalla, Dampier, Gnupa, Mogo, Moruya	Yes
Pomaderris elachophylla Lacy Pomaderris	Endangered	Not listed	392	115	29%	0	262	67%	96%	Glenbog, Tantawangalo	Yes
Pomaderris parrisiae Parris' Pomaderris	Vulnerable	Vulnerable	981	404	41%	0	455	46%	88%	Badja, Glenbog	Yes

Species name	BC Act listing	EPBC Act listing	Total count[15] in Region	Total count[15] NPWS	% in NPWS[16]	Total count[15] in Flora Reserves	Total count[15] in State Forests	% in State Forests	% in State Forests + NPWS Reserves[17]	State Forest occurrence	Endemic to South East Region?
Rhodamnia rubescens Scrub Turpentine	Critically Endangered	Critically Endangered	2,383	193	8%	0	654	27%	36%	Benandarah, Boyne, Clyde, Currowan, Flat Rock, McDonald, North Brooman, Shallow Crossing, South Brooman, Yadboro, Yerriyong	No. Occurs along the NSW coast up to QLD border. Study Area is at southern limit of its range.
Thelymitra atronitida Black-hooded Sun Orchid	Critically Endangered	Not listed	5	2	40%	2	2	40%	80%	Timbillica	No. Found in South East and Sydney Basin. Only 10 records in NSW.
Westringia davidii David's Westringia	Vulnerable	Vulnerable	489	265	54%	0	223	46%	100%	Nullica	Yes
Total			**77,525**	**27028**	**35%**	**21,052**	**37,569**	**48%**	**83%**		

6.2.2 Fauna results

Bionet searches of the Region identified 129 fauna species listed as threatened under the BC Act and/or EPBC Act. Sixty-one of these species are found in the State Forests, 99 in the Study Area. Our analysis identified 26 threatened focal species and two protected (not threatened) focal species The two protected fauna are Feathertail Glider (*Acrobates pygmaeus*) which was included because of high dependence on forest habitats, old growth, and hollow and the Platypus (*Ornithorhynchus anatinus*) which was included because of its need for water high quality and catchment integrity.

Figure 16 outlines the AOO, or occupied habitats, for each focal species in the Region along with the area of the AOO in State Forests and NPWS Reserves (also see Table 25). Key fauna species have low occurrences in the Flora Reserves of the State Forests and as such, an analysis of Flora Reserves is not included unlike the flora species analysis in Chapter 6.2.1. The proportion of the State Forests of the total AOO in the Region is also included along with the combined proportion of the AOO in the State Forests and NPWS Reserves. The State Forests account for only 16% of the Region yet contain a relatively higher proportion of the occupancies of focal fauna species in the South East (26%). This demonstrates that the ecosystems that these species rely upon, or their habitat features, are most prevalent in the State Forests. Either the occupied habitat or occurrences within NPWS Reserves and State Forests is at least 30% for each species, in many cases occurrences are over 90% (e.g. small mammals and ground mammals, Watson's Tree Frog (*Litoria watsoni*), Pilotbird (*Pycnoptilus floccosus*)).

NPWS Reserves account for 31% of the occupancies for these species, highlighting the need for greater conservation of these species' habitats. The inclusion of all State Forests in the NRS would protect more than half of focal species' habitats. All focal species' AOOs, or occupied habitats, are shown in Figure 16, where overlapping species' AOOs are shaded darker. High concentrations of these species are in the State Forests, particularly around Glenbog, the Eurobodalla area in forests such as Bodalla and Currowan, and the forests northwest of Eden, such as Nullica. Species analysis was grouped by taxa in some cases, and the AOO of each taxonomic group/species are mapped in Figure 17 and Figure 18. Table 26 summarises the Bionet occurrences and proportions of occurrences for the same areas. The findings of AOO and Bionet analysis for focal species are outlined below and include general species information from literature review. More detailed information on each fauna species is provided in Appendix E.

Diurnal Birds

Diurnal birds are widely distributed across the Study Area, with high occupancy in coastal forests and tableland State Forests such as Bondi, Tallaganda, Glenbog and Badja. This includes threatened cockatoos, robins and species that inhabit wet forests such as Pilotbird and Olive Whistler (*Pachycephala olivacea*). Most species are under-protected in the reserve system with less than 30% of their occupied habitats within NPWS Reserves. For the Swift Parrot (*Lathamus discolor*), this is as low as 16%. The addition of State Forests to the NRS would greatly increase the protections for diurnal birds by 20-55%, particularly for Pilotbird, South-eastern Glossy Black-Cockatoo (*Calyptorhynchus lathami lathami*), Swift Parrot, Olive Whistler and Pink Robin (*Petroica rodinogaster*).

Frogs

Two focal species of frog have been identified in the Study Area: Watson's Tree Fog and Stuttering Frog (*Mixophyes balbus*). Both are Endangered under the BC Act and listed under the EPBC Act as Endangered and Vulnerable respectively. Watson's Tree Frog is only found in Southern NSW and addition of State Forests to the NRS would protect 66% of its known occurrences including security of the surrounding catchments of

known populations. The Stuttering Frog is very rare, with its southernmost range occurring in south-eastern NSW. It has low levels of protection, with 4% of known locations in NPWS Reserves. The addition of State Forests to the NRS would protect the species habitat and large portions of the catchments surrounding known records including Towamba and Tuross River, with 12% of occurrences and 56% of occupied habitat in the State Forests.

Grey-headed Flying-fox

Grey-headed Flying-fox (*Pteropus poliocephalus*) is listed Vulnerable under the EPBC Act and BC Act. They occur in a range of habitats including rainforest, tall sclerophyll forest, woodland, heathland, swamp, urban gardens and cultivated fruit crops where they feed on the nectar and pollen of native trees and urban trees and crops (NSW Department of Planning and Environment, 2020). The species is the most frequently observed of all threatened species with over 1 million occurrences recorded in the Region since 1990. There are two known camps in Bodalla and South Brooman State Forests, and habitat within the typical foraging proximity (20 kilometres) of 25 camps. Very little of its known habitat is protected in NPWS Reserves (14%). The addition of State Forests to the NRS would add 14% of its occupied habitat containing 52% of known occurrences, to the protected area network.

Gliders

Four species of glider are identified as focal species: Feathertail Glider, the Endangered Southern Greater Glider (*Petauroides volans*), the Vulnerable Yellow-bellied Glider (*Petaurus australis*) and the Vulnerable Squirrel Glider (*Petaurus norfolcensis*). All species are hollow-dependent and threatened by habitat loss. Yellow-bellied Gliders and Greater Gliders are particularly vulnerable to logging (Kavanagh and Webb, 1998). These two species are widespread throughout the State Forests, occurring in 49 and 43 State Forests, respectively. Though both are widespread, Southern Greater Gliders are found in highest densities in the tableland forests, conversely Yellow-bellied Gliders in the coastal forests. The addition of all State Forests to the NRS would increase protection for about half of known Yellow-bellied Glider habitat of the South East to a total of 76% when considering existing protections. Similarly, the addition of State Forests to the NRS would result in 74% of Greater Glider habitat protected, an increase of 41%. This protects 87% of known records of the Southern Greater Glider.

Less than one quarter of Squirrel and Feathertail Glider occupied habitat is protected in the reserve system in southern NSW and the addition of State Forests to the NRS would bring that protection up to 40% and 48%, respectively. For species that are particularly vulnerable to logging (Kavanagh and Webb, 1998) and require old growth for hollows, the addition of State Forests to the NRS is particularly important to ensure existing old growth is protected and forest is allowed to mature and recover from logging, allowing new hollows to form. This would subsequently assist in conserving these glider species, particularly in areas affected by bushfire.

Ground Mammals

Four species of ground mammals are identified as focal species: the Endangered Southern Brown Bandicoot (eastern) (*Isoodon obesulus obesulus*), rare Long-footed Potoroo (*Potorous longipes*) (Critically Endangered BC Act, Endangered EPBC Act), Vulnerable Southern Long-nosed Potoroo (*Potorous tridactylus tridactylus*) and Spotted-tailed Quoll (*Dasyurus maculatus*) (Vulnerable BC Act, Endangered EPBC Act).

Recent logging (2000-2022) has been found to overlap with relatively high proportions of the known habitats of the Potoroos and Bandicoot. These species are found in the far south coast forests where most of the vegetation was burnt in the 2019-20 Fires.

The State Forests and NPWS Reserves of the Region hold >90% of all known locations of all four species, including the majority of known locations of the Southern Brown Bandicoot (95%) and Long-footed Potoroo (96%). Their conservation is important for species dependent on forests recovering from widespread bushfires and logging. The Spotted-tailed Quoll is widespread across the South East and requires big areas of connected habitat to support large home ranges (up to 5,000 hectares). The protection of State Forests in the South East are critical to filling gaps in the conservation network to support the species, and allow forests to regenerate to restore the structural complexity and habitat features required by the species.

Koala

The Koala is listed as Endangered under the BC Act and EPBC Act. It occurs in eucalypt forests and woodlands, where it feeds on the foliage of more than 70 eucalypt species and 30 non-eucalypt species (NSW DCCEEW, 2025c). In NSW, the species is found in coastal forests, southern and northern tablelands, the Blue Mountains and some locations on the plains west of the Great Dividing Range. The species is more prevalent north of Sydney, however, a few strongholds for the species occur in the south coast including a key population in Mumbulla and Murrah Flora Reserves and Bermagui, Bodalla and Dampier State Forests which is critical to protect. The addition of these State Forests to the NRS would ensure the forests are secured to provide connectivity to the adjacent Kooraban National Park where the population extends into. By combining existing records in NPWS Reserves and State forests, 89% of known records would be protected.

Microbats

The Golden-tipped Bat (*Phoniscus papuensis*) is listed Vulnerable under the BC Act. It is a rare species, found on the east coast of Australia in scattered locations from Cape York Peninsula in Queensland to south of Eden in NSW, and within the Victorian border (NSW DCCEEW, 2022b). The species occurs in rainforest and adjacent wet and dry sclerophyll forest up to 1,000m and has also been found in tall open forest, Casuarina-dominated riparian forest and coastal Melaleuca forests. They roost mainly in rainforest gullies on small first- and second-order streams. The species is threatened by loss of habitat and fragmentation, including unlawful forestry operations. The Golden-tipped Bat has been recorded in 13 State Forests including several around Batemans Bay and the far south coast, also Bodalla and Dampier State Forests. These records account for 74% of all occurrences in the South East, indicating the importance of the State Forests to this species. The addition of State Forests to the NRS would protect 54% of the AOO of the species which is significant for this rarely detected species.

Forest Owls

Three species of forest owl are key for the Study Area: Powerful Owl (*Ninox strenua*), Masked Owl (*Tyto novaehollandiae*) and Sooty Owl (*Tyto tenebricosa*). All species are listed as Vulnerable under the BC Act. These owl species are found throughout the Study Area, but are particularly prevalent in the coastal forests. The Powerful Owl is also common in the tableland forests. State Forests in the Clyde-Jervis catchment are an important stronghold for the Masked Owl. The State Forests are particularly important for the Sooty Owl, comprising more than half of its occupied habitat in the NSW South East. All three species rely on hollows for nesting and abundant prey. Logging, loss of old growth forest and habitat fragmentation are threats. NPWS Reserves and State Forests combined would secure between 67-79% of occupied habitats of the species. It is critical for maintaining habitat corridors for forest owls in Southern NSW, and ensuring existing old growth is protected and forest allowed to mature and recover from logging, allowing new hollows to form.

Platypus

The Platypus is endemic to Australia and Protected in NSW. The IUCN classes the Platypus as a Near Threatened species (Divljan, 2025). It is dependent on rivers, streams and bodies of freshwater. It is present in eastern Queensland and New South Wales, eastern, central and southwestern Victoria and throughout Tasmania. The Platypus is threatened by predation, ectoparasites, and amphibian fungal infections. The species is inadequately protected in the South East with only 13% of occurrences and 19% of AOO in NPWS Reserves. The addition of State Forests to the NRS would increase the protection of known occurrences in State Forest by 6% and, as discussed in Chapter 7.5, would protect State Forests within catchments of importance to the species.

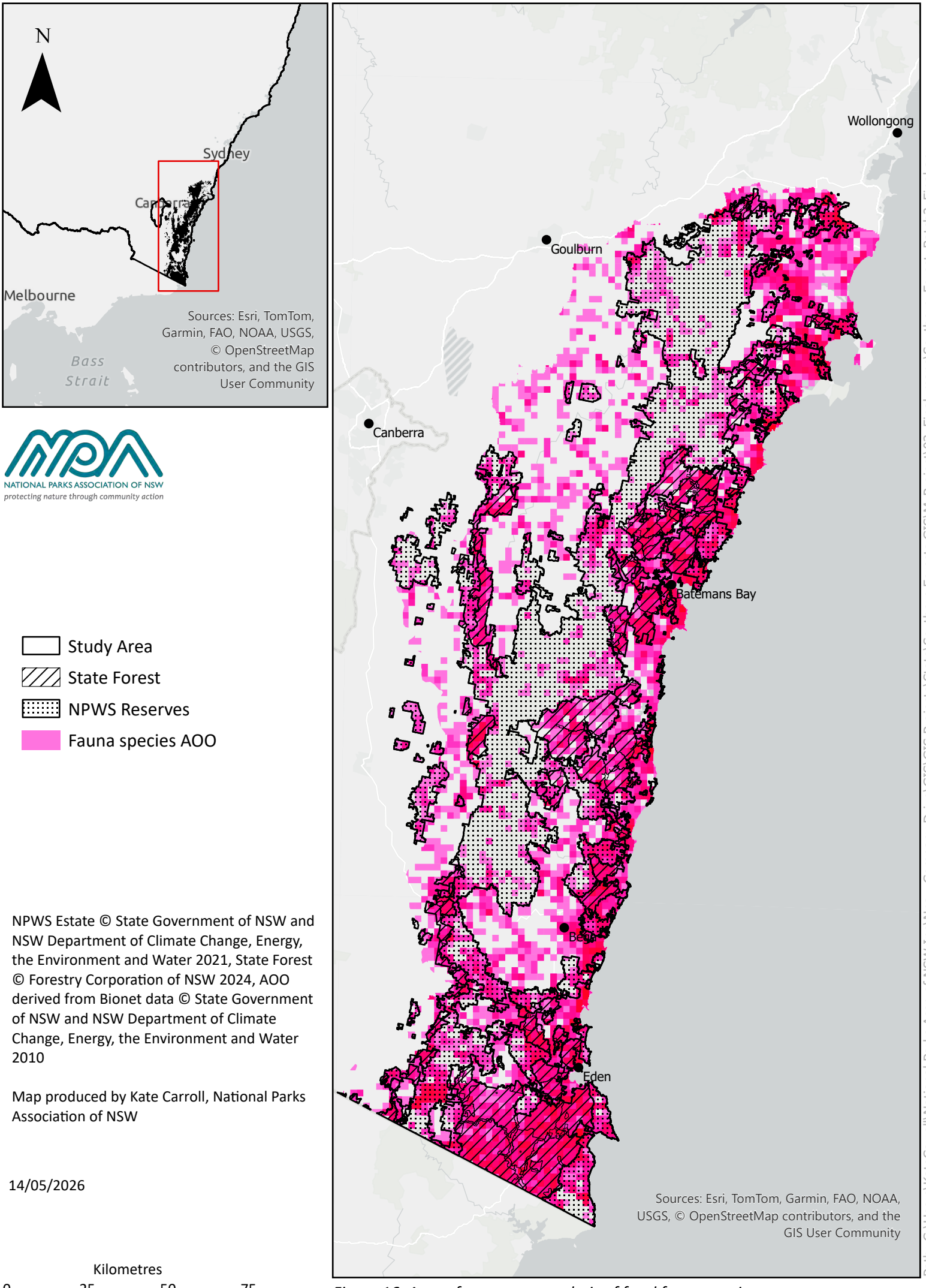
Small Mammals

The Eastern Pygmy-possum (*Cercartetus nanus*) and White-footed Dunnart (*Sminthopsis leucopus*) are listed as Vulnerable under the BC Act. The Smoky Mouse (*Pseudomys fumeus*) is listed as Critically Endangered under the BC Act and Endangered under the EPBC Act. All three small mammals are identified as focal species. The far south coastal forests are particularly important for these species, the Smoky Mouse only found in Yambulla, Gnupa and Nullica State Forests and the adjoining South East Forests National Park. Eastern Pygmy-possum and White-footed Dunnart are also found in the tablelands and coastal forests further north. They are all threatened by habitat loss and fragmentation and the addition of State Forests to the NRS would remove this threat from most of their habitat, aiding the recovery of all three species. Potential protections would be significant: 83% of known records and 70% of occupied habitat of the Eastern Pygmy-possum, 96% of occupied habitat and 99% of known records of the Smoky Mouse, and 89% of occupied habitat and 92% of known records of White-footed Dunnart.

Conclusion of Fauna Findings

Of particular importance is the presence of fauna species listed as Critically Endangered under the BC Act and/or EPBC Act. These species are extremely rare or suffering severe declines with the highest risk of extinction, warranting strong protections. Long-footed Potoroo, Smoky Mouse and Swift Parrot are Critically Endangered species found in State Forest. Eastern Curlew (*Numenius madagascariensis*), Regent Honeyeater (*Anthochaera phrygia*) and Eastern Hooded Dotterel (*Thinornis cucullatus cucullatus*) are also Critically Endangered species found in various State Forests. Eastern Curlew has been recorded in Bodalla State Forest, Regent Honeyeater in Bodalla, Boyne, Dampier, Mogo, Mumbulla, Wandera State Forests and Eastern Hooded Dotterel in Nullica State Forest. Additionally of note, there are two focal species endemic to the Region and just outside: Watson's Tree Frog and Long-footed Potoroo.

Many threatened fauna species were recorded during the recent field surveys. All threatened species observed during field trips are listed in Appendix F. They include numerous Southern Greater Gliders in Badja State Forest, Dampier State Forest, Glenbog State Forest, Mogo State Forest, South Brooman State Forest, and Tallaganda State Forest; Glossy Black-Cockatoos in Mogo State Forest; Masked Owls in Bodalla State Forest and Tanja State Forest; Gang-gang Cockatoos and Yellow-bellied Gliders in East Boyd State Forest, Glenbog State Forest, Mogo State Forest, and Tanja State Forest.; Little Lorikeets in Mogo State Forest; Sooty Owls in East Boyd State Forest and Broadwater State Forest; and Flame Robins in Tallaganda State Forest. Many chewed cones of *Allocasuarina* sp. were identified, indicating Glossy Black-Cockatoo feeding.



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- Study Area
- State Forest
- NPWS Reserves
- Fauna species AOO

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Map produced by Kate Carroll, National Parks Association of NSW

14/05/2026

Kilometres
0 25 50 75

Figure 16: Area of occupancy analysis of focal fauna species

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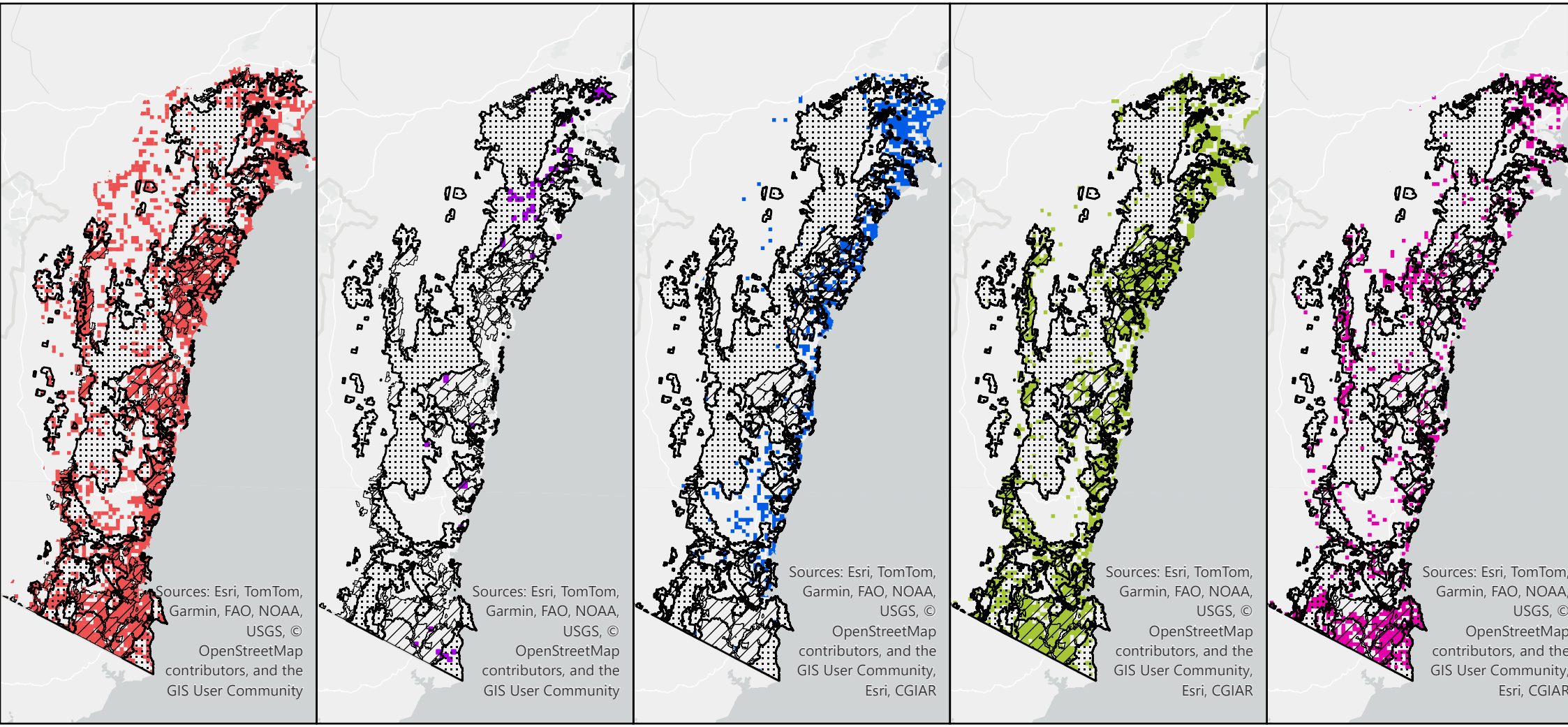

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Diurnal birds

Frogs

Grey-headed Flying-fox

Gliders

Ground mammals

State Forest

NPWS Reserves

Kilometres

0 20 40 60

N

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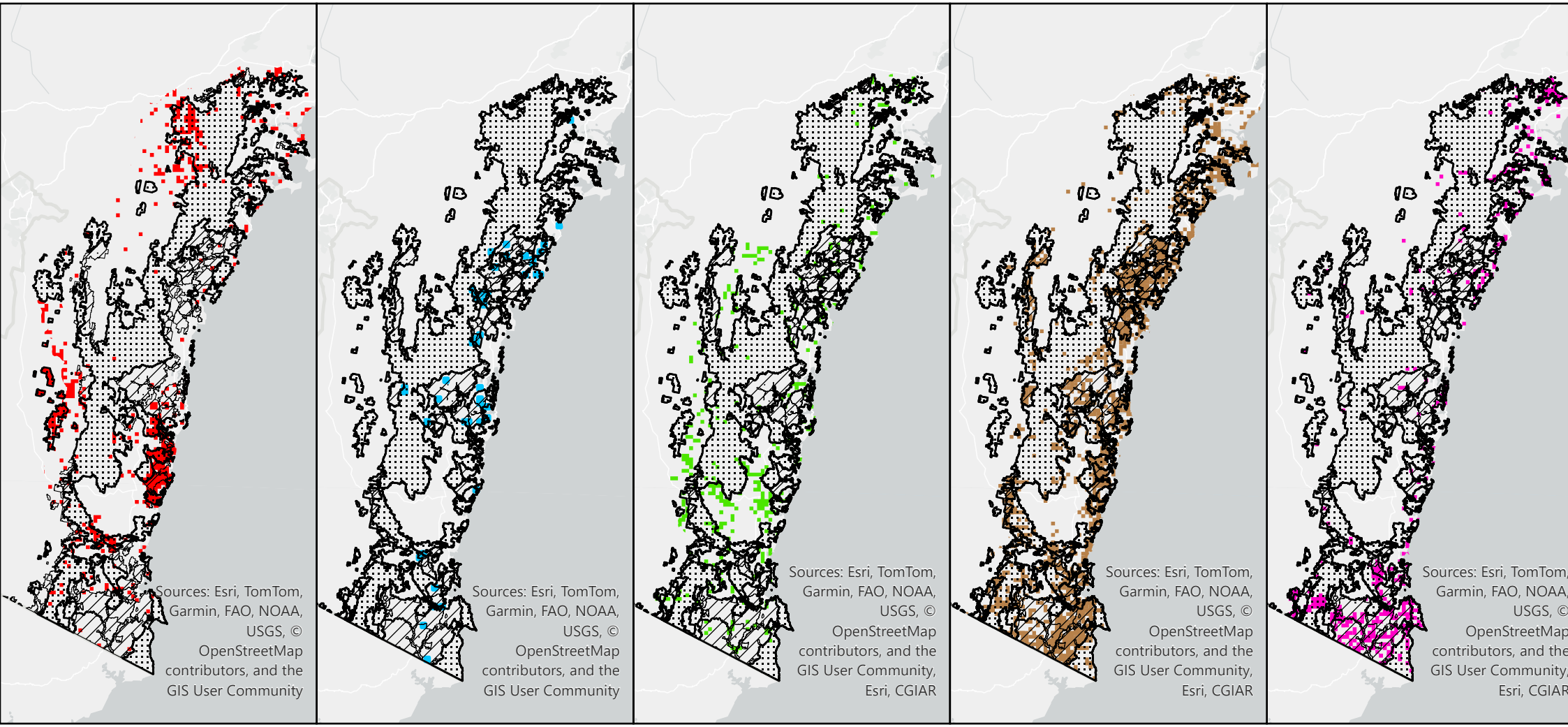
Figure 17: Area of occupancy analysis of focal fauna species – taxonomic group A



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Koala

Microbats

Platypus

Owls

Small mammals

State Forest

NPWS Reserves

Kilometres

0 20 40 60

N

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Map produced by Kate Carroll, National Parks Association of NSW

19/05/2026

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Figure 18: Area of occupancy analysis of focal fauna species – taxonomic group B

Table 25: AOO analysis in South East Region for focal fauna species

Species name	BC Act listing	EPBC Act listing	Total AOO in Region (ha)	Total AOO NPWS Reserves (ha)[19]	Total AOO State Forests (ha)	% AOO State Forests	% AOO NPWS Reserves + State Forests[20]	State Forest occurrence
Eastern Pygmy-possum *Cercartetus nanus*	Vulnerable	Not listed	94,778	38,313	28,748	30%	71%	Bermagui, Bodalla, Bondi, Broadwater, Buckenbowra, Currowan, East Boyd, Gnupa, Kioloa, McDonald, Mumbulla, Nadgee, Nullica, Shallow Crossing, South Brooman, Tallaganda, Termeil, Timbillica, Wallagaraugh, Woodburn, Yadboro, Yambulla, Yerriyong
Feathertail Glider *Acrobates pygmaeus*	Not listed	Not listed	147,205	33,679	37,488	25%	48%	Badja, Benandarah, Bermagui, Bodalla, Bolaro, Bondi, Boyne, Bruces Creek, Buckenbowra, Cathcart, Clyde, Coolangubra, Corunna, Currambene, Currowan, Dampier, East Boyd, Flat Rock, Glenbog, Gnupa, Kioloa, McDonald, Meryla, Mogo, Mumbulla, Nadgee, Nalbaugh, North Brooman, Nowra, Nullica, Shallow Crossing, South Brooman, Tallaganda, Tanja, Tantawangalo, Termeil, Timbillica, Tomerong, Towamba, Wallagaraugh, Wandella, Wandera, Woodburn, Yadboro, Yambulla, Yerriyong, Yurammie
Gang-gang Cockatoo *Callocephalon fimbriatum*	Endangered	Endangered	486,652	131,232	155,092	32%	59%	Badja, Benandarah, Bermagui, Bodalla, Bolaro, Bombala, Bondi, Boyne, Broadwater, Bruces Creek, Buckenbowra, Cathcart, Clyde, Coolangubra, Corunna, Currambene, Currowan, Dampier, East Boyd, Flat Rock, Glenbog, Gnupa, Jerrawangala, Kioloa, McDonald, Meryla, Mogo, Moruya, Mumbulla, Murrah, Nadgee, Nalbaugh, North Brooman, Nowra, Nullica, Nungatta, Shallow Crossing, South Brooman, Tallaganda, Tanja, Tantawangalo, Termeil,

[19] Red indicates less than 30% of AOO is within NPWS Reserves

[20] Green indicates 30% or more AOO is within the State Forests + NPWS Reserves

Species name	BC Act listing	EPBC Act listing	Total AOO in Region (ha)	Total AOO NPWS Reserves (ha)[19]	Total AOO State Forests (ha)	% AOO State Forests	% AOO NPWS Reserves + State Forests[20]	State Forest occurrence
								Timbillica, Tomerong, Towamba, Wallagaraugh, Wandella, Wandera, Woodburn, Yadboro, Yambulla, Yerriyong, Yurammie
Golden-tipped Bat *Phoniscus papuensis*	Vulnerable	Not listed	18,366	3,594	9,992	54%	74%	Badja, Bodalla, Bolaro, Buckenbowra, Clyde, Currowan, Dampier, East Boyd, Kioloa, Nadgee, North Brooman, Nullica, South Brooman, Termeil, Timbillica, Wandella, Wandera, Yadboro, Yurammie
Grey-headed Flying-fox *Pteropus poliocephalus*	Vulnerable	Vulnerable	211,436	29,744	29,175	14%	28%	Badja, Benandarah, Bermagui, Bodalla, Bondi, Cathcart, Coolangubra, Corunna, Dampier, Easy Boyd, Flat Rock, Glen Allen, Glenbog, Gnupa, Meryla, Mogo, Mumbulla, Murrah, Nadgee, North Brooman, Nullica, Shallow Crossing, South Brooman, Tanja, Tantawangalo, Towamba, Wandella, Yambulla, Yerriyong, Yurammie
Koala *Phascolarctos cinereus*	Endangered	Endangered (QLD, NSW, ACT populations)	196,568	81,664	27,485	14%	56%	Badja, Benandarah, Bermagui, Bodalla, Bondi, Cathcart, Coolangubra, Corunna, Dampier, East Boyd, Flat Rock, Glen Allen, Glenbog, Gnupa, Meryla, Mogo, Mumbulla, Murrah, Nadgee, Nullica, Shallow Crossing, South Brooman, Tanja, Tantawangalo, Towamba, Wandella, Yambulla, Yerriyong, Yurammie
Long-footed Potoroo *Potorous longipes*	Critically Endangered	Endangered	9,674	4,561	2,564	27%	74%	Bondi, Yambulla
Masked Owl *Tyto novaehollandiae*	Vulnerable	Not listed	153,359	42,718	60,356	39%	67%	Badja, Benandarah, Bermagui, Bodalla, Bolaro, Boyne, Broadwater, Buckenbowra, Clyde, Coolangubra, Corunna, Currambene, Currowan, Dampier, East Boyd, Flat Rock, Glenbog, Kioloa, McDonald, Mogo, Moruya, Mumbulla, Murrah, Nadgee, Nalbaugh, North Brooman, Nullica, Shallow Crossing, South Brooman, Tallaganda,

Species name	BC Act listing	EPBC Act listing	Total AOO in Region (ha)	Total AOO NPWS Reserves (ha)[19]	Total AOO State Forests (ha)	% AOO State Forests	% AOO NPWS Reserves + State Forests[20]	State Forest occurrence
								Tanja, Tantawangalo, Termeil, Timbillica, Tomerong, Towamba, Wallagaraugh, Wandella, Wandera, Yadboro, Yambulla, Yerriyong
Olive Whistler *Pachycephala olivacea*	Vulnerable	Not listed	64,258	23,107	25,312	39%	75%	Badja, Bodalla, Bondi, Cathcart, Coolangubra, Dampier, East Boyd, Glenbog, Gnupa, McDonald, Mogo, Mumbulla, Nadgee, Nalbaugh, Nullica, Nungatta, Tallaganda, Tanja, Tantawangalo, Wallagaraugh, Wandella, Yambulla, Yurammie
Pilotbird *Pycnoptilus floccosus*	Vulnerable	Vulnerable	158,728	49,740	88,075	55%	87%	Badja, Bermagui, Bodalla, Bolaro, Bondi, Broadwater, Bruces Creek, Buckenbowra, Cathcart, Currowan, Dampier, East Boyd, Flat Rock, Glenbog, Gnupa, Jerrawangala, Kioloa, McDonald, Meryla, Mogo, Moruya, Mumbulla, Murrah, Nadgee, Nalbaugh, North Brooman, Nullica, Nungatta, Shallow Crossing, South Brooman, Tallaganda, Tanja, Tantawangalo, Timbillica, Towamba, Wallagaraugh, Wandella, Yadboro, Yambulla, Yerriyong, Yurammie
Pink Robin *Petroica rodinogaster*	Vulnerable	Not listed	11,553	4,208	4,362	38%	74%	Badja, Bodalla, Bombala, Clyde, Coolangubra, East Boyd, Flat Rock, Mumbulla, Nalbaugh, Nullica, Shallow Crossing, Tallaganda, Towamba, Wandella, Yambulla, Yurammie
Platypus *Ornithorhynchus anatinus*	Not listed	Not listed	124,653	23,412	16,583	13%	32%	Badja, Bermagui, Bodalla, Bondi, Boyne, Broadwater, Bruces Creek, Buckenbowra, Clyde, Coolangubra, Currowan, Dampier, East Boyd, Flat Rock, Glenbog, McDonald, Meryla, Mogo, Mumbulla, Nadgee, North Brooman, Nullica, Nungatta, Shallow Crossing, Shoalhaven, South Brooman, Tallaganda, Tanja, Tantawangalo, Timbillica, Towamba, Wallagaraugh, Wandella, Wandera, Yadboro, Yambulla, Yurammie

Species name	BC Act listing	EPBC Act listing	Total AOO in Region (ha)	Total AOO NPWS Reserves (ha)[19]	Total AOO State Forests (ha)	% AOO State Forests	% AOO NPWS Reserves + State Forests[20]	State Forest occurrence
Powerful Owl *Ninox connivens*	Vulnerable	Not listed	304,937	85,625	123,488	40%	69%	Badja, Benandarah, Bermagui, Bodalla, Bolaro, Bondi, Boyne, Broadwater, Bruces Creek, Buckenbowra, Cathcart, Clyde, Coolangubra, Corunna, Currambene, Currowan, Dampier, East Boyd, Flat Rock, Glenbog, Gnupa, Kioloa, McDonald, Meryla, Mogo, Moruya, Mumbulla, Murrah, Nadgee, Nalbaugh, North Brooman, Nowra, Nullica, Nungatta, Shallow Crossing, South Brooman, Tallaganda, Tanja, Tantawangalo, Termeil, Timbillica, Wallagaraugh, Wandella, Wandera, Yadboro, Yambulla, Yerriyong, Yurammie
Scarlet Robin *Petroica boodang*	Vulnerable	Not listed	218,520	59,538	53,878	25%	52%	Badja, Benandarah, Bermagui, Bodalla, Bolaro, Bondi, Boyne, Bruces Creek, Buckenbowra, Cathcart, Clyde, Coolangubra, Currowan, Dampier, East Boyd, Glen Allen, Glenbog, Gnupa, Kioloa, McDonald, Meryla, Mogo, Moruya, Mumbulla, Murrah, Nadgee, Nalbaugh, North Brooman, Nullica, Shallow Crossing, South Brooman, Tallaganda, Tanja, Tantawangalo, Timbillica, Tomerong, Towamba, Wallagaraugh, Wandella, Wandera, Yadboro, Yambulla, Yerriyong, Yurammie
Smoky Mouse *Pseudomys fumeus*	Critically Endangered	Endangered	8,400	3,363	4,687	56%	96%	Gnupa, Nullica, Nungatta, Wallagaraugh, Yambulla
Sooty Owl *Tyto tenebricosa*	Vulnerable	Not listed	251,086	61,739	134,445	54%	78%	Badja, Benandarah, Bermagui, Bodalla, Bolaro, Bondi, Boyne, Broadwater, Bruces Creek, Buckenbowra, Cathcart, Clyde, Coolangubra, Corunna, Currambene, Currowan, Dampier, East Boyd, Flat Rock, Glenbog, Gnupa, Jerrawangala, Kioloa, McDonald, Merlya, Mogo, Moruya, Mumbulla, Murrah, Nadgee,

Species name	BC Act listing	EPBC Act listing	Total AOO in Region (ha)	Total AOO NPWS Reserves (ha)[19]	Total AOO State Forests (ha)	% AOO State Forests	% AOO NPWS Reserves + State Forests[20]	State Forest occurrence
								Nalbaugh, North Brooman, Nullica, Nungatta, Shallow Crossing, South Brooman, Tallaganda, Tanja, Badja, Benandarah, Bermagui, Bodalla, Bolaro, Bondi, Boyne, Broadwater, Bruces Creek, Buckenbowra, Cathcart, Clyde, Coolangubra, Corunna, Currambene, Currowan, Dampier, East Boyd, Flat Rock, Glenbog, Gnupa, Jerrawangala, Kioloa, McDonald, Merlya, Mogo, Moruya, Mumbulla, Murrah, Nadgee, Nalbaugh, North Brooman, Nullica, Nungatta, Shallow Crossing, South Brooman, Tallaganda, Tanja, Tantawangalo, Termeil, Timbillica, Towamba, Wallagaraugh, Wandella, Wandera, Woodburn, Yadboro, Yambulla, Yerriyong, Yurammie
South-eastern Glossy Black-Cockatoo *Calyptorhynchus lathami lathami*	Vulnerable	Vulnerable	408,764	92,252	153,696	38%	60%	Badja, Benandarah, Bermagui, Bodalla, Bolaro, Boyne, Broadwater, Bruces Creek, Buckenbowra, Clyde, Corunna, Currambene, Currowan, Dampier, East Boyd, Flat Rock, Glenbog, Gnupa, Kioloa, Mogo, Moruya, Mumbulla, Murrah, Nadgee, Nalbaugh, North Brooman, Nowra, Nullica, Shallow Crossing, Shoalhaven, South Brooman, Tanja, Termeil, Timbillica, Tomerong, Wallagaraugh, Wandella, Wandera, Woodburn, Yadboro, Yambulla, Yerriyong, Yurammie
Southern Brown Bandicoot (eastern) *Isoodon obesulus obesulus*	Endangered	Endangered	96,061	27,764	54,668	57%	86%	Bodalla, Bondi, Bruces Creek, Corunna, East Boyd, Glenbog, Gnupa, Mogo, Mumbulla, Nadgee, Nullica, Nungatta, Tanja, Timbillica, Wallagaraugh, Yambulla, Yerriyong, Yurammie
Southern Greater Glider	Endangered	Endangered	316,099	102,872	129,394	41%	73%	Badja, Benandarah, Bermagui, Bodalla, Bolaro, Bombala, Bondi, Boyne, Buckenbowra,

Species name	BC Act listing	EPBC Act listing	Total AOO in Region (ha)	Total AOO NPWS Reserves (ha)[19]	Total AOO State Forests (ha)	% AOO State Forests	% AOO NPWS Reserves + State Forests[20]	State Forest occurrence
Petauroides volans								Cathcart, Clyde, Coolangubra, Corunna, Currambene, Currowan, Dampier, East Boyd, Flat Rock, Glen Allen, Glenbog, Gnupa, Jerrawangala, Kioloa, McDonald, Meryla, Mogo, Moruya, Mumbulla, Murrah, Nadgee, Nalbaugh, North Brooman, Nowra, Nullica, Shallow Crossing, Shoalhaven, South Brooman, Tallaganda, Tanja, Tantawangalo, Termeil, Timbillica, Tomerong, Wallagaraugh, Wandella, Wandera, Woodburn, Yadboro, Yambulla, Yerriyong, Yurammie
Southern Long-nosed Potoroo *Potorous tridactylus trisulcatus*	Vulnerable	Vulnerable	83,633	31,079	35,804	43%	80%	Badja, Bermagui, Bodalla, Bruces Creek, Currowan, East Boyd, Gnupa, Mumbulla, Murrah, Nadgee, Nullica, Tanja, Timbillica, Wallagaraugh, Wandella, Yadboro, Yambulla, Yurammie
Spotted-tailed Quoll *Dasyurus maculatus maculatus*	Vulnerable	Endangered	189,346	67,233	36,250	19%	55%	Badja, Benandarah, Bodalla, Bolaro, Bondi, Boyne, Buckenbowra, Cathcart, Corunna, Currowan, Dampier, East Boyd, Flat Rock, Glen Allen, Glenbog, Jerrawangala, Kioloa, McDonald, Meryla, Mogo, Moruya, Nadgee, North Brooman, Nungatta, Shallow Crossing, Shoalhaven, South Brooman, Tallaganda, Tanja, Tantawangalo, Termeil, Timbillica, Tomerong, Wallagaraugh, Wandella, Wandera, Yadboro, Yambulla, Yerriyong, Yurammie
Squirrel Glider *Petaurus norfolcensis*	Vulnerable	Not listed	15,642	3,048	3,348	21%	41%	Badja, Benandarah, Bodalla, Boyne, Dampier, Flat Rock, Mogo, North Brooman, Nullica, South Brooman, Termeil
Stuttering Frog *Mixophyes balbus*	Endangered	Vulnerable	4,634	702	2,614	56%	72%	Dampier, East Boyd, Mumbulla, Timbillica, Wallagaraugh
Swift Parrot *Lathamus discolor*	Endangered	Critically Endangered	60,638	9,856	18,162	30%	46%	Benandarah, Bermagui, Bodalla, Bondi, Boyne, Broadwater, Corunna, Currambene, East Boyd,

Species name	BC Act listing	EPBC Act listing	Total AOO in Region (ha)	Total AOO NPWS Reserves (ha)[19]	Total AOO State Forests (ha)	% AOO State Forests	% AOO NPWS Reserves + State Forests[20]	State Forest occurrence
								Flat Rock, Kioloa, McDonald, Mogo, Moruya, Benandarah, Bermagui, Bodalla, Bondi, Boyne, Broadwater, Corunna, Currambene, East Boyd, Flat Rock, Kioloa, McDonald, Mogo, Moruya, Mumbulla, Murrah, Nadgee, North Brooman, Nullica, South Brooman, Tanja, Towamba, Wandera, Yambulla
Varied Sittella *Daphoenositta chrysoptera*	Vulnerable	Not listed	132,331	34,792	27,939	21%	47%	Badja, Benandarah, Bermagui, Bodalla, Bondi, Boyne, Buckenbowra, Cathcart, Clyde, Coolangubra, Currambene, Currowan, Dampier, East Boyd, Glen Allen, Glenbog, Gnupa, McDonald, Meryla, Mogo, Moruya, Mumbulla, Murrah, Nadgee, Nowra, Nullica, Shallow Crossing, Shoalhaven, South Brooman, Tallaganda, Tanja, Tantawangalo, Termeil, Timbillica, Tomerong, Towamba, Wallagaraugh, Wandella, Wandera, Yambulla, Yerriyong, Yurammie
Watson's Tree Frog *Litoria watsoni*	Endangered	Endangered	18,624	13,633	2,115	11%	85%	Bodalla, Nadgee, North Brooman, Termeil, Yadboro, Yerriyong
White-footed Dunnart *Sminthopsis leucopus*	Vulnerable	Not listed	69,854	17,822	43,721	63%	88%	Bodalla, Bondi, Boyne, Broadwater, Bruces Creek, Coolangubra, Dampier, East Boyd, Glenbog, Gnupa, Mumbulla, Murrah, Nadgee, Nalbaugh, Nullica, Nungatta, Shallow Crossing, South Brooman, Tallaganda, Tanja, Tantawangalo, Timbillica, Towamba, Wallagaraugh, Yadboro, Yambulla, Yerriyong

Species name	BC Act listing	EPBC Act listing	Total AOO in Region (ha)	Total AOO NPWS Reserves (ha)[19]	Total AOO State Forests (ha)	% AOO State Forests	% AOO NPWS Reserves + State Forests[20]	State Forest occurrence
Yellow-bellied Glider *Petaurus australis*	Vulnerable	Vulnerable	397,174	100,429	181,991	46%	71%	Badja, Benandarah, Bermagui, Bodalla, Bolaro, Bombala, Bondi, Boyne, Broadwater, Bruces Creek, Buckenbowra, Cathcart, Clyde, Coolangubra, Corunna, Currambene, Currowan, Dampier, East Boyd, Flat Rock, Glenbog, Gnupa, Jerrawangala, Kioloa, McDonald, Meryla, Mogo, Moruya, Mumbulla, Murrah, Nadgee, Nalbaugh, North Brooman, Nowra, Nullica, Nungatta, Shallow Crossing, Shoalhaven, South Brooman, Tallaganda, Tanja, Tantawangalo, Termeil, Timbillica, Tomerong, Towamba, Wallagaraugh, Wandella, Wandera, Wingello, Yadboro, Yambulla, Yerriyong, Yurammie
Total			**1,314,072**	**411,469**	**338,885**	**26%**	**57%**	

Table 26: Bionet record analysis of focal fauna species

Species name	BC Act listing	EPBC Act listing	Total count[1] in Region	Total count NPWS	% in NPWS[21]	Total count in State Forests	% in State Forests	% in NPWS Reserves + State Forests[22]	State forest occurrence
Eastern Pygmy-possum *Cercartetus nanus*	Vulnerable	Not listed	1,061	746	70%	136	13%	83%	Bodalla, Broadwater, Buckenbowra, Currowan, East Boyd, Nadgee, Nullica, South Brooman, Tallaganda, Termeil, Timbillica, Yadboro, Yambulla
Feathertail Glider *Acrobates pygmaeus*	Not listed	Not listed	1,054	167	16%	152	14%	30%	Badja, Benandarah, Bermagui, Bodalla, Bolaro, Boyne, Cathcart, Clyde, Coolangubra, Currambene, Currowan, Dampier, East Boyd, Flat Rock, Glenbog, Gnupa, McDonald, Mogo, Mumbulla, Nadgee, Nalbaugh, Nowra, Nullica, Shallow Crossing, South Brooman, Tantawangalo, Termeil, Timbillica, Towamba, Wandella, Wandera, Wingello, Yadboro, Yambulla, Yerriyong
Gang-gang Cockatoo *Callocephalon fimbriatum*	Endangered	Endangered	11,141	2,440	22%	1,922	17%	39%	Badja, Benandarah, Bermagui, Bodalla, Bolaro, Bombala, Bondi, Boyne, Broadwater, Buckenbowra, Cathcart, Clyde, Coolangubra, Corunna, Currambene, Currowan, Dampier, East Boyd, Flat Rock, Glenbog, Gnupa, Kioloa, McDonald, Meryla, Mogo, Moruya, Mumbulla, Murrah, Nadgee, Nalbaugh, North Brooman, Nullica, Nungatta, Shallow Crossing, South Brooman, Tallaganda, Tantawangalo, Termeil, Timbillica, Towamba, Wandella, Wandera,

[21] Red indicates less than 30% of occurrences of the species is within NPWS Reserves
[22] Green indicates 30% or more occurrences are within the State Forests + NPWS Reserves

Species name	BC Act listing	EPBC Act listing	Total count[1] in Region	Total count NPWS	% in NPWS[21]	Total count in State Forests	% in State Forests	% in NPWS Reserves + State Forests[22]	State forest occurrence
									Yadboro, Yambulla, Yerriyong, Yurammie
Golden-tipped Bat *Phoniscus papuensis*	Vulnerable	Not listed	110	11	10%	81	74%	84%	Bodalla, Buckenbowra, Currowan, Dampier, Nadgee, North Brooman, Nullica, South Brooman, Termeil, Timbillica, Wandera, Yadboro, Yurammie
Grey-headed Flying-fox *Pteropus poliocephalus*	Vulnerable	Vulnerable	1,000,733	142,720	14%	518,599	52%	66%	Badja, Benandarah, Bermagui, Bodalla, Boyne, Buckenbowra, Clyde, Currambene, Currowan, Flat Rock, Meryla, Mogo, Moruya, Murrah, North Brooman, Nullica, Shallow Crossing, South Brooman, Termeil, Timbillica, Tomerong, Wandera, Yadboro, Yerriyong
Koala *Phascolarctos cinereus*	Endangered	Endangered (QLD, NSW, ACT populations)	6,312	2,764	44%	2,825	45%	89%	Badja, Bermagui, Bodalla, Corunna, Dampier, East Boyd, Glen Allen, Meryla, Mumbulla, Murrah, Nadgee, Nullica, Shallow Crossing, South Brooman, Tanja, Tantawangalo, Towamba, Wandella, Yambulla, Yurammie
Long-footed Potoroo *Potorous longipes*	Critically Endangered	Endangered	74	50	68%	21	28%	96%	Bondi, Yambulla
Masked Owl *Tyto novaehollandiae*	Vulnerable	Not listed	995	434	44%	372	37%	81%	Badja, Benandarah, Bermagui, Bodalla, Bolaro, Boyne, Broadwater, Buckenbowra, Clyde, Coolangubra, Corunna, Currambene, Currowan, Dampier, East Boyd, Flat Rock, McDonald, Mogo, Moruya, Mumbulla, Murrah, Nadgee, Nalbaugh, North Brooman, Nullica, Shallow Crossing, South Brooman,

Species name	BC Act listing	EPBC Act listing	Total count[1] in Region	Total count NPWS	% in NPWS[21]	Total count in State Forests	% in State Forests	% in NPWS Reserves + State Forests[22]	State forest occurrence
									Tallaganda, Tanja, Tantawangalo, Termeil, Timbillica, Tomerong, Towamba, Wandella, Wandera, Yadboro, Yambulla, Yerriyong
Olive Whistler *Pachycephala olivacea*	Vulnerable	Not listed	454	176	39%	226	50%	85%	Badja, Bodalla, Bondi, Cathcart, Coolangubra, Dampier, East Boyd, Glenbog, Gnupa, Mogo, Nullica, Tallaganda, Tantawangalo, Yambulla, Yurammie
Pilotbird *Pycnoptilus floccosus*	Vulnerable	Vulnerable	1,169	274	23%	802	69%	92%	Badja, Bodalla, Bolaro, Bondi, Bruces Creek, Buckenbowra, Cathcart, Currowan, Dampier, East Boyd, Flat Rock, Glenbog, Gnupa, McDonald, Meryla, Mogo, Moruya, Mumbulla, Murrah, Nadgee, Nalbaugh, North Brooman, Nullica, Shallow Crossing, South Brooman, Tallaganda, Tantawangalo, Timbillica, Towamba, Wandella, Yadboro, Yambulla, Yerriyong, Yurammie
Pink Robin *Petroica rodinogaster*	Vulnerable	Not listed	43	13	30%	12	28%	58%	Badja, Bodalla, Bombala, Flat Rock, Nalbaugh, Nullica, Shallow Crossing, Tallaganda, Towamba, Wandella, Yambulla
Platypus *Ornithorhynchus anatinus*	Not listed	Not listed	982	123	13%	56 (87) [23]	6% (9%)[24]	18%	Badja, Bodalla, Buckenbowra, Currowan, East Boyd, Flat Rock, Mogo, Nadgee, Nullica, Shallow Crossing, South Brooman, Tallaganda, Wandera, Yadboro, Yambulla
Powerful Owl *Ninox connivens*	Vulnerable	Not listed	2,269	652	29%	860	38%	67%	Badja, Benandarah, Bermagui, Bodalla, Bolaro, Bondi, Boyne, Bruces

[23] Counts within 150m of the boundary of State Forests

[24] Percentage within 150m of the boundary of State Forests

Species name	BC Act listing	EPBC Act listing	Total count[1] in Region	Total count NPWS	% in NPWS[21]	Total count in State Forests	% in State Forests	% in NPWS Reserves + State Forests[22]	State forest occurrence
									Creek, Buckenbowra, Cathcart, Clyde, Coolangubra, Currambene, Currowan, Dampier, East Boyd, Flat Rock, Glenbog, Gnupa, McDonald, Mogo, Moruya, Mumbulla, Murrah, Nadgee, Nalbaugh, North Brooman, Nowra, Nullica, Shallow Crossing, South Brooman, Tallaganda, Tanja, Tantawangalo, Termeil, Timbillica, Wandella, Wandera, Yadboro, Yambulla, Yerriyong, Yurammie
Scarlet Robin *Petroica boodang*	Vulnerable	Not listed	1,823	328	18%	364	20%	38%	Badja, Benandarah, Bodalla, Bolaro, Bondi, Boyne, Bruces Creek, Buckenbowra, Cathcart, Clyde, Coolangubra, Dampier, East Boyd, Glenbog, Gnupa, Meryla, Mogo, Nadgee, Nalbaugh, Nullica, Shallow Crossing, South Brooman, Tallaganda, Tantawangalo, Timbillica, Tomerong, Yadboro, Yambulla, Yurammie
Smoky Mouse *Pseudomys fumeus*	Critically Endangered	Endangered	322	168	52%	151	47%	99%	Gnupa, Nullica, Yambulla
Sooty Owl *Tyto tenebricosa*	Vulnerable	Not listed	1,708	353	21%	1,086	64%	84%	Badja, Benandarah, Bermagui, Bodalla, Bolaro, Bondi, Boyne, Broadwater, Bruces Creek, Buckenbowra, Cathcart, Clyde, Corunna, Currambene, Currowan, Dampier, East Boyd, Flat Rock, Glenbog, Gnupa, McDonald, Mogo, Moruya, Mumbulla, Murrah, Nadgee, Nalbaugh, North Brooman, Nullica, Shallow Crossing, South Brooman, Tallaganda, Tanja, Tantawangalo,

Species name	BC Act listing	EPBC Act listing	Total count[1] in Region	Total count NPWS	% in NPWS[21]	Total count in State Forests	% in State Forests	% in NPWS Reserves + State Forests[22]	State forest occurrence
									Timbillica, Towamba, Wandella, Wandera, Yadboro, Yambulla, Yerriyong, Yurammie
South-eastern Glossy Black-Cockatoo *Calyptorhynchus lathami lathami*	Vulnerable	Vulnerable	10,565	1,688	16%	3,850	36%	52%	Badja, Benandarah, Bermagui, Bodalla, Bolaro, Boyne, Bruces Creek, Buckenbowra, Clyde, Currambene, Currowan, Dampier, East Boyd, Flat Rock, Glenbog, Gnupa, Kioloa, Mogo, Moruya, Mumbulla, Murrah, Nadgee, Nalbaugh, North Brooman, Nowra, Nullica, Shallow Crossing, Shoalhaven, South Brooman, Tanja, Termeil, Timbillica, Tomerong, Wandella, Wandera, Yadboro, Yambulla, Yerriyong, Yurammie
Southern Brown Bandicoot (eastern) *Isoodon obesulus obesulus*	Endangered	Endangered	2,258	1,419	63%	719	32%	95%	Bondi, East Boyd, Glenbog, Mogo, Nadgee, Nullica, Timbillica, Yambulla, Yurammie
Southern Greater Glider *Petauroides volans*	Endangered	Endangered	10,364	1,366	13%	7,627	74%	87%	Badja, Benandarah, Bermagui, Bodalla, Bolaro, Bombala, Bondi, Boyne, Buckenbowra, Cathcart, Clyde, Coolangubra, Currambene, Currowan, Dampier, East Boyd, Flat Rock, Glen Allen, Glenbog, McDonald, Meryla, Mogo, Moruya, Mumbulla, Murrah, Nadgee, Nalbaugh, North Brooman, Nullica, Shallow Crossing, South Brooman, Tallaganda, Tanja, Tantawangalo, Termeil, Timbillica, Tomerong, Wandella, Wandera, Yadboro, Yambulla, Yerriyong, Yurammie

Species name	BC Act listing	EPBC Act listing	Total count[1] in Region	Total count NPWS	% in NPWS[21]	Total count in State Forests	% in State Forests	% in NPWS Reserves + State Forests[22]	State forest occurrence
Southern Long-nosed Potoroo *Potorous tridactylus trisulcatus*	Vulnerable	Vulnerable	11,595	10,424	90%	777	7%	97%	Badja, Bermagui, Bodalla, East Boyd, Gnupa, Mumbulla, Murrah, Nadgee, Nullica, Timbillica, Wandella, Yadboro, Yambulla, Yurammie
Spotted-tailed Quoll *Dasyurus maculatus maculatus*	Vulnerable	Endangered	3,335	2,652	80%	337	10%	90%	Badja, Bodalla, Bolaro, Boyne, Buckenbowra, Currowan, Dampier, East Boyd, Flat Rock, McDonald, Meryla, Mogo, Nadgee, North Brooman, South Brooman, Tallaganda, Timbillica, Tomerong, Wandella, Wandera, Yadboro, Yambulla, Yurammie
Squirrel Glider *Petaurus norfolcensis*	Vulnerable	Not listed	70	16	23%	16	23%	46%	Badja, Bodalla, Boyne, Dampier, Flat Rock, North Brooman, Termeil
Stuttering Frog *Mixophyes balbus*	Endangered	Vulnerable	148	6	4%	18	12%	16%	Dampier, Mumbulla, Timbillica
Swift Parrot *Lathamus discolor*	Endangered	Critically Endangered	12,640	1,439	11%	6,736	53%	65%	Benandarah, Bermagui, Bodalla, Bondi, Boyne, Broadwater, Corunna, Flat Rock, Mogo, Moruya, North Brooman, South Brooman, Wandera, Yambulla
Varied Sittella *Daphoenositta chrysoptera*	Vulnerable	Not listed	2,150	539	25%	358	17%	42%	Badja, Bodalla, Bondi, Boyne, Cathcart, Coolangubra, Currambene, Currowan, Dampier, East Boyd, Glenbog, Gnupa, Mogo, Moruya, Mumbulla, Murrah, Nadgee, Nullica, Shallow Crossing, Tallaganda, Termeil, Timbillica, Towamba, Wandella, Wandera, Yambulla
Watson's Tree Frog *Litoria watsoni*	Endangered	Endangered	5,202	1,631	31%	3,441	66%	98%	Bodalla, Nadgee, North Brooman, Yadboro

Species name	BC Act listing	EPBC Act listing	Total count[1] in Region	Total count NPWS	% in NPWS[21]	Total count in State Forests	% in State Forests	% in NPWS Reserves + State Forests[22]	State forest occurrence
White-footed Dunnart *Sminthopsis leucopus*	Vulnerable	Not listed	557	262	47%	249	45%	92%	Bondi, Boyne, Broadwater, Coolangubra, Dampier, East Boyd, Glenbog, Gnupa, Murrah, Nadgee, Nullica, Nungatta, Shallow Crossing, South Brooman, Tallaganda, Timbillica, Towamba, Yadboro, Yambulla
Yellow-bellied Glider *Petaurus australis*	Vulnerable	Vulnerable	8,240	2,116	26%	4,150	50%	76%	Badja, Benandarah, Bermagui, Bodalla, Bolaro, Bombala, Bondi, Boyne, Broadwater, Bruces Creek, Buckenbowra, Cathcart, Clyde, Coolangubra, Corunna, Currambene, Currowan, Dampier, East Boyd, Flat Rock, Glenbog, Gnupa, McDonald, Mogo, Moruya, Mumbulla, Murrah, Nadgee, Nalbaugh, North Brooman, Nowra, Nullica, Nungatta, Shallow Crossing, South Brooman, Tallaganda, Tanja, Tantawangalo, Termeil, Timbillica, Tomerong, Towamba, Wandella, Wandera, Yadboro, Yambulla, Yerriyong, Yurammie
Total			**1,097,394**	**174,977**	**16%**	**555,943**	**51%**	**67%**	

6.2.2.1 Climate refugia

Climate refugia in the Region are mapped in Figure 19. These predict landscape capacity for forest dependant species over the next 50 years. The most important refugia for fauna are within a 30km-60km band of the coast. Climate refugia index value typically increases with proximity to the coast. The highest values are mapped yellow, red and white. Forty-five of the 56 State Forests have these higher values (Appendix C). Most of these State Forests are in the near-coastal areas. They will be critical for the future persistence of fauna as the climate changes. Conservation of these areas is important for species that move across the landscape, and permanent protection is necessary to ensure connectivity to existing reserves.

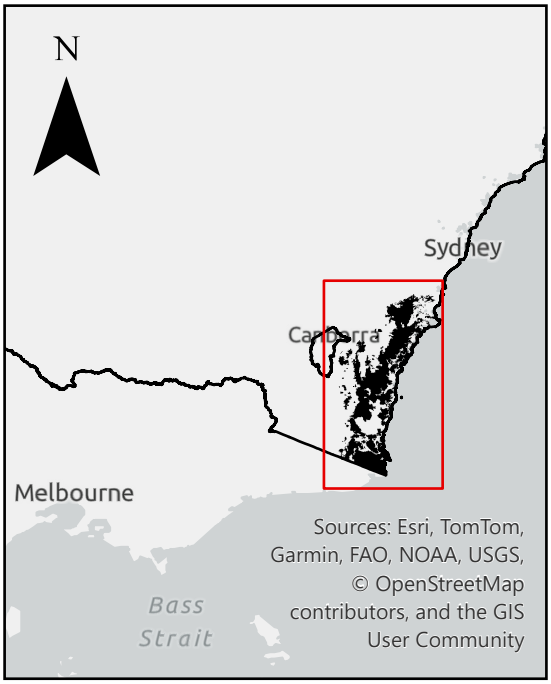
Additional analysis of climate refugia modelling for 14 species was undertaken. State Forests were identified where the high quality refugia is present (Table 27). The most important State Forests for these species are highlighted in Appendix C, where 50% or more species (seven or more) have high quality refugia - a total of 26 State Forests. Most of the Region's State Forests are important for Southern Greater Glider, Sooty Owl, Spotted-tailed Quoll, Swift Parrot and Glossy Black-Cockatoo. Climate refugia mapping for the Southern Greater Glider, Spotted-tailed Quoll and Eastern Pygmy-possum is shown in Figure 20. For some species, the State Forests identified do not necessarily align with known locations of records, but are in proximity to them. This is because although records inform the climate refugia modelling, sampling biases are also accounted for.

The most important State Forests for climate refugia are Nadgee, Flat Rock, North Brooman, South Brooman, Termeil, Timbillica and Bruces Creek.

Table 27: Important climate refugia by species

Species name	State Forests of importance	State Forest count
Scarlet Robin	Badja, Bermagui, Bombala, Bondi, Broadwater, Bruces Creek, Cathcart, Coolangubra, Currambene, East Boyd, Glenbog, Meryla, Nadgee, Nalbaugh, Nungatta, Tallaganda, Tantawangalo, Timbillica, Yambulla	19
Swift Parrot	Benandarah, Bermagui, Bondi, Boyne, Broadwater, Bruces Creek, Clyde, Corunna, Currambene, East Boyd, Flat Rock, Jerrawangala, McDonald, Meryla, Mogo, Nadgee, Nalbaugh, North Brooman, Nowra, Nungatta, Shoalhaven, South Brooman, Termeil, Timbillica, Tomerong, Wallagaraugh Flora Reserve, Wingello, Woodburn, Yambulla, Yerriyong	30
Gang-gang Cockatoo	Benandarah, Bombala, Bondi, Boyne, Bruces Creek, Cathcart, Clyde, Coolangubra, East Boyd, Flat Rock, Jerrawangala, McDonald, Nadgee, Nalbaugh, North Brooman, Nungatta, South Brooman, Termeil, Timbillica, Towamba, Wallagaraugh Flora Reserve, Woodburn, Yadboro, Yambulla, Yerriyong	25
South-eastern Glossy Black-Cockatoo	Benandarah, Bermagui, Bodalla, Bolaro, Boyne, Bruces Creek, Buckenbowra, Clyde, Currowan, East Boyd, Flat Rock, Jerrawangala, Meryla, Mogo, Moruya, Mumbulla, Murrah, Nadgee, North Brooman, Shallow Crossing, South Brooman, Tanja, Termeil, Timbillica, Wallagaraugh Flora Reserve, Wandera, Wingello, Yadboro, Yambulla	29
Varied Sittella	Broadwater, Meryla, Nadgee, Termeil, Woodburn	5
Olive Whistler	Benandarah, Boyne, Bruces Creek, Currambene, East Boyd, Flat Rock, Jerrawangala, McDonald, Meryla, Nadgee, North Brooman, Nowra, South Brooman, Termeil, Timbillica, Tomerong, Wallagaraugh Flora Reserve, Woodburn, Yambulla, Yerriyong	20

Species name	State Forests of importance	State Forest count
Stuttering Frog	Bermagui, Bodalla, Broadwater, Bruces Creek, Dampier, East Boyd, Flat Rock, Gnupa, Jerrawangala, McDonald, Meryla, Mumbulla, Murrah, Nadgee, North Brooman, Nullica, South Brooman, Tanja, Timbillica, Towamba, Wallagaraugh Flora Reserve, Wandella, Wingello, Yambulla, Yerriyong, Yurammie	26
Southern Greater Glider	Benandarah, Bermagui, Bodalla, Bolaro, Bombala, Bondi, Boyne, Broadwater, Bruces Creek, Buckenbowra, Cathcart, Clyde, Coolangubra, Currowan, Dampier, East Boyd, Flat Rock, Gnupa, Jerrawangala, McDonald, Meryla, Mogo, Moruya, Mumbulla, Murrah, Nadgee, Nalbaugh, North Brooman, Nullica, Nungatta, Shallow Crossing, South Brooman, Tanja, Tantawangalo, Termeil, Timbillica, Towamba, Wallagaraugh Flora Reserve, Wandella, Wandera, Yadboro, Yambulla, Yurammie	43
Squirrel Glider	Benandarah, Bolaro, Boyne, Buckenbowra, Clyde, Currambene, Currowan, Flat Rock, Jerrawangala, McDonald, Meryla, Mogo, North Brooman, Nowra, Shallow Crossing, Shoalhaven, South Brooman, Termeil, Tomerong, Wingello, Woodburn, Yadboro, Yerriyong	23
Spotted-tailed Quoll	Benandarah, Bermagui, Bodalla, Bombala, Boyne, Broadwater, Bruces Creek, Cathcart, Clyde, Corunna, Currambene, East Boyd, Flat Rock, Jerrawangala, McDonald, Meryla, Mogo, Moruya, Mumbulla, Murrah, Nadgee, Nalbaugh, North Brooman, Nowra, Nungatta, Shallow Crossing, South Brooman, Tallaganda, Tantawangalo, Termeil, Timbillica, Tomerong, Wallagaraugh Flora Reserve, Woodburn, Yambulla	35
Golden-tipped Bat	Benandarah, Bermagui, Bodalla, Boyne, Broadwater, Bruces Creek, Clyde, Dampier, East Boyd, Flat Rock, Mogo, Moruya, Mumbulla, Murrah, Nadgee, North Brooman, Nullica, Shallow Crossing, South Brooman, Tanja, Termeil, Timbillica, Towamba, Wallagaraugh Flora Reserve, Wandella, Wandera, Yurammie	27
Sooty Owl	Benandarah, Bermagui, Bodalla, Bolaro, Bombala, Boyne, Broadwater, Bruces Creek, Clyde, Corunna, Dampier, East Boyd, Flat Rock, Gnupa, Jerrawangala, McDonald, Mogo, Moruya, Mumbulla, Murrah, Nadgee, North Brooman, Nullica, Nungatta, Shallow Crossing, South Brooman, Tanja, Termeil, Timbillica, Towamba, Wallagaraugh Flora Reserve, Wandella, Wandera, Yambulla, Yerriyong, Yurammie	36
Powerful Owl	Bermagui, Bombala, Boyne, Broadwater, Bruces Creek, East Boyd, Flat Rock, Gnupa, Jerrawangala, Meryla, Mumbulla, Murrah, Nadgee, North Brooman, Nullica, Nungatta, South Brooman, Termeil, Timbillica, Towamba, Wallagaraugh Flora Reserve, Yambulla, Yurammie	23
Eastern Pygmy-possum	Benandarah, Bermagui, Bombala, Boyne, Bruces Creek, Clyde, Corunna, Currambene, Flat Rock, Jerrawangala, McDonald, Meryla, Nadgee, North Brooman, Nowra, Nungatta, Shoalhaven, South Brooman, Tallaganda, Termeil, Timbillica, Tomerong, Wallagaraugh Flora Reserve, Woodburn, Yambulla, Yerriyong	26



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State Forest

Climate Refugia Index

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Climate refugia © State Government of NSW and NSW Department of Climate Change, Energy, the Environment and Water 2022, State Forest © Forestry Corporation of NSW 2024

Map produced by Kate Carroll, National Parks Association of NSW

14/05/2026

Kilometres

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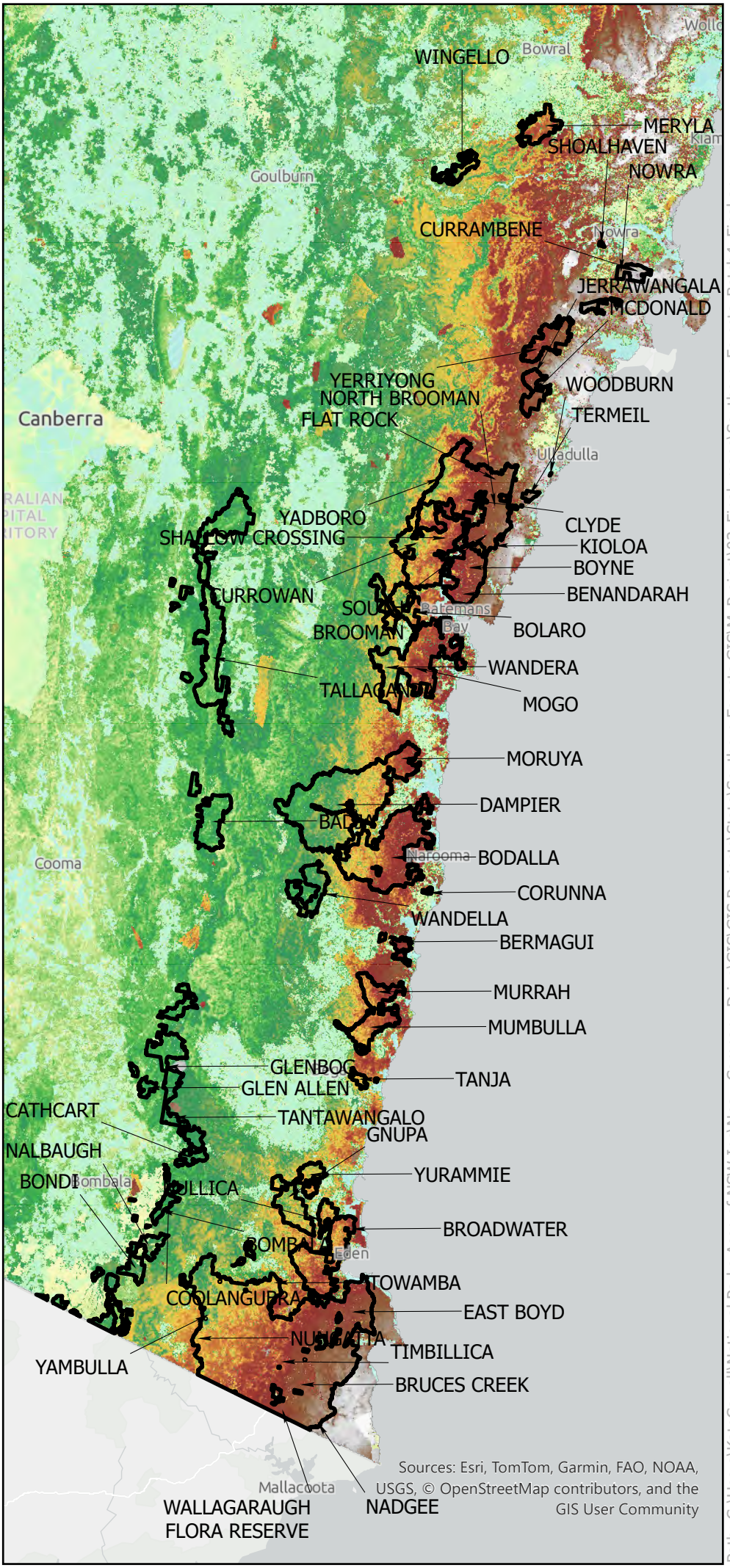

Figure 19: Climate refugia in the Region modelled to 2070

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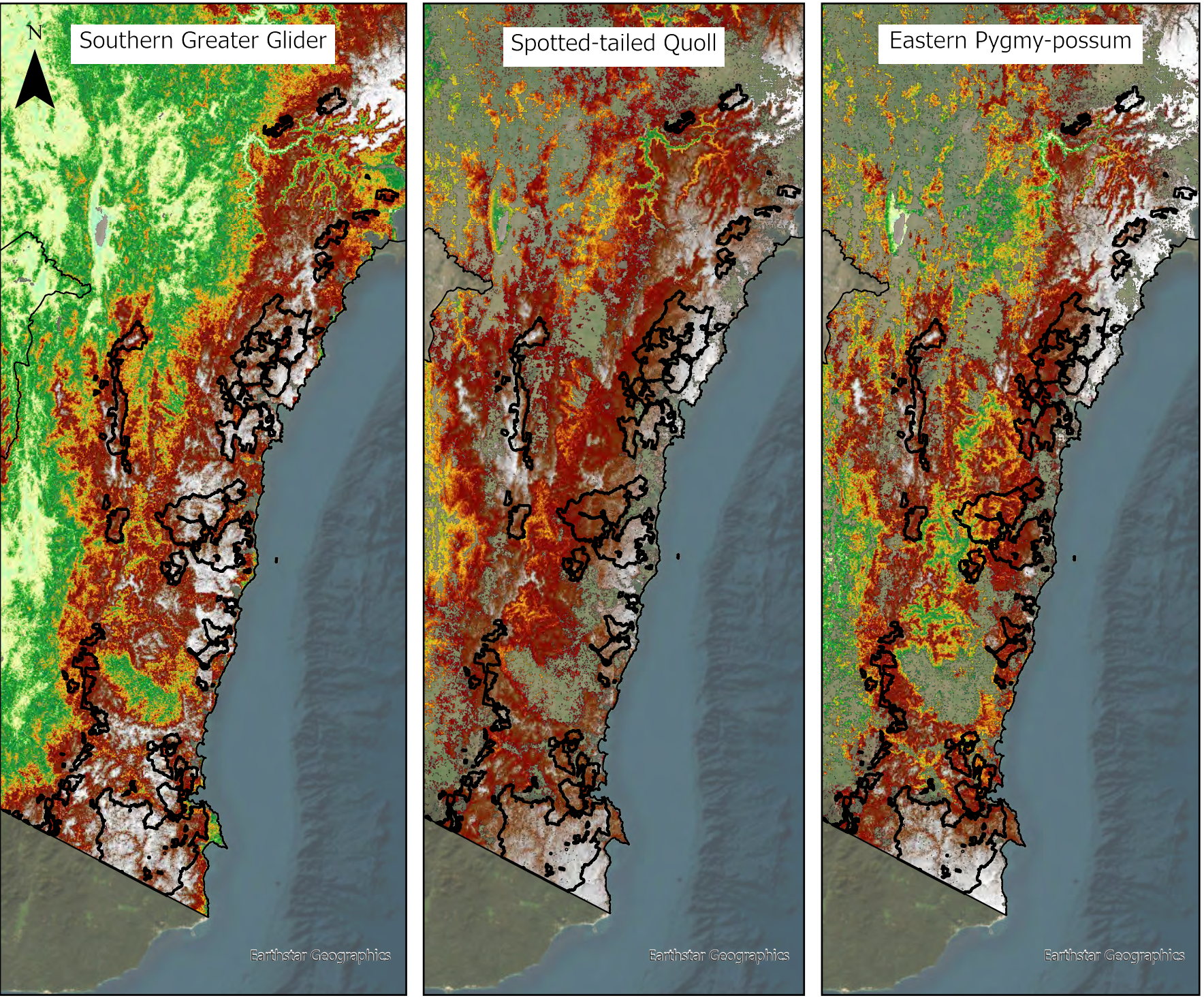

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Species Climate Refugia Value

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State Forest

Climate Refugia Modelling © State Government of NSW and NSW Department of Climate Change, Energy, the Environment and Water 2022, State Forest © Forestry Corporation of NSW 2024, Aerial imagery © ESRI

Map produced by Kate Carroll, National Parks Association of NSW

15/05/2026

Kilometres

0 25 50 75

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Figure 20: Climate informed modelling of threatened species refugia (2070) – three species examples

6.3 Migratory species

6.3.1 Migratory birds (terrestrial)

Several migratory terrestrial bird species listed under the EPBC Act are known to occur in 36 State Forests within the Study Area. These include the Black-faced Monarch (*Monarcha melanopsis)*, Eastern Osprey (*Pandion cristatus*), Fork-tailed Swift (*Apus pacificus*), Swift Parrot and White-throated Needletail (*Hirundapus caudacutus*) and their occurrence in State Forests are listed in Table 28 and ecology detailed in Appendix E.

State Forests provide critical habitat for migratory birds, offering both connectivity and essential refuge along their migration routes. Many migratory birds rely on a network of intact forest habitats to forage and shelter along their migration route. The Critically Endangered Swift Parrot migrates from Tasmania to winter in south-eastern Australia, relying on blossoming eucalypts for food (NSW DCCEEW, 2022d). A study found that 94% of the flocks in NSW occurred outside conservation reserves (Saunders, 2019). The results of our analysis in Table 26 corroborate this with over half of the species occurrences in the South East in State Forest, with AOO 30%, demonstrating that the State Forests are extremely important for this species during its mainland migration. Habitats in NSW are also important to the Swift Parrot during consecutive years of drought in other Australian states (Saunders *et al.*, 2016), such that the conservation of State Forests will be particularly important for this species' resilience as the climate changes.

Many protected (non-threatened) bird species, namely honeyeaters, migrate north-south through southern NSW forests from the Great Dividing Range to the coast. This migration is known as the honeyeater migration and occurs northward around autumn. The most prolific species in the migration is Yellow-faced Honeyeaters (*Caligavis chrysops*) (Oliver, 2021). However, there are also mass movements of a broader range of species including White-naped Honeyeaters (*Melithreptus lunatus*), Red Wattlebirds (*Anthochaera carunculata*) and Silvereyes (*Zosterops lateralis*). The immense scale of these migrations is demonstrated by site counts exceeding 10,000 birds per hour during peak movement periods.

In addition to the large scale north-south migration of honeyeater species there is a similar movement of altitudinal migrants across the Region. Flame Robin (*Petroica phoenicea*) and Scarlet Robin (*Petroica boodang*) are the most conspicuous of several species that leave the high country for the coastal forests each winter.

When large forest tracts are maintained, they act as ecological corridors that link coastal and tableland regions enabling birds to move safely across landscapes in response to seasonal cycles and changing conditions. The loss or degradation of these habitats through logging or fragmentation undermines the ability of migratory species to complete their life cycles and increases the risk of population decline. Protecting State Forests therefore plays a vital role not only in supporting resident fauna but also in safeguarding the survival of species whose conservation depends on the availability of healthy, connected habitats across vast distances.

Table 28: Migratory-listed terrestrial birds known to occur in the State Forests

Species name	BC Act listing	EPBC Act listing	State Forest Occurrence
Black-faced Monarch *Monarcha melanopsis*	Not listed	Not listed	Badja, Benandarah, Bermagui, Bodalla, Bolaro, Bondi, Boyne, Buckenbowra, Cathcart, Clyde, Coolangubra, Corunna, Currowan, Dampier, East Boyd, Flat Rock, Glenbog, McDonald, Meryla, Mogo, Moruya, Mumbulla, Murrah, Nadgee, Nalbaugh, North Brooman, Nowra, Nullica, Shallow Crossing, South Brooman, Tallaganda, Termeil, Timbillica, Tomerong, Wandella, Wandera, Yadboro, Yambulla, Yerriyong, Yurammie
Eastern Osprey *Pandion cristatus*	Vulnerable	Not listed	Bodalla, East Boyd
Fork-tailed Swift *Apus pacificus*	Not listed	Migratory	East Boyd
Swift Parrot *Lathamus discolor*	Endangered	Critically Endangered	Benandarah, Bermagui, Bodalla, Bondi, Boyne, Broadwater, Corunna, Flat Rock, Mogo, Moruya, North Brooman, South Brooman, Wandera, Yambulla
White-throated Needletail *Hirundapus caudacutus*	Vulnerable	Vulnerable, Migratory	Badja, Bermagui, Bodalla, Clyde, Coolangubra, Corunna, Currowan, Currambene, East Boyd, Glenbog, Mogo, Moruya, Mumbulla, Nadgee, North Brooman, Nowra, Nullica, Shallow Crossing, Timbillica, Wallagaraugh, Wandera, Yadboro, Yambulla, Yerriyong, Yurammie

6.3.2 Migratory seabirds, waders and shorebirds

A number of migratory birds that are protected under the BONN, CAMBA, JAMBA, and/or ROKAMBA bilateral migratory bird agreements have been recorded in State Forests (Commonwealth of Australia, 2015). These include Common Sandpiper (*Actitis hypoleucos*), Crested Tern (*Thalasseus bergii*), Grey Plover (*Pluvialis squatarola*), Latham's Snipe (*Gallinago hardwickii*), Short-tailed Shearwater (*Ardenna tenuirostris*), Sooty Shearwater (*Ardenna grisea*) and Wedge-tailed Shearwater (*Ardenna pacifica*).

Shearwaters are typically pelagic, except when breeding, where they inhabit offshore islands. Whilst there are some aquatic habitats in the State Forests, there are no offshore islands with suitable habitat for shearwaters in the State Forests and it is therefore likely there are accuracy issues with the records. The remaining seabirds, waders and shorebirds inhabit freshwater and estuarine habitats and there is suitable habitat in some State Forests for the Common Sandpiper, Crested Tern, Grey Plover and Latham's Snipe. They are listed in Table 29 along with their occurrence in State Forests and ecology in Appendix E. The State Forests contain 20,114 hectares of Freshwater Wetlands and 1,028 hectares of Saline Wetlands which have the potential to provide habitat for these species (Table 8). There may also be suitable habitat for Latham's Snipe in the 12,517 hectares of Forested Wetlands.

Table 29: Migratory shorebirds and waders known to occur in the State Forests

Species name	BC Act listing	EPBC Act listing	State Forest Occurrence
Common Sandpiper *Actitis hypoleucos*	Not listed	Migratory	Moruya
Crested Tern *Thalasseus bergii*	Not listed	Migratory	Bermagui, East Boyd, Mogo, Nullica
Grey Plover *Pluvialis squatarola*	Not listed	Migratory	Bodalla, Nullica
Latham's Snipe *Gallinago hardwickii*	Vulnerable	Vulnerable, Migratory	Moruya

7 AQUATIC BIODIVERSITY AND HABITATS

7.1 Catchments

Catchments, hydrology, and aquatic habitats are integral components of forest ecosystems, and their condition is closely linked to how forests are managed. These systems support a wide range of species, including the Platypus (*Ornithorhynchus anatinus*), which depends on stable banks, clean water, and abundant aquatic invertebrates (Bino, Hawke and Kingsford, 2021), as well as diverse freshwater fish, amphibians, and invertebrates. They provide critical habitat for threatened native fish such as Australian Grayling (*Prototroctes maraena*) and Short-tail Galaxias (*Galaxias brevissimus*), which require cool, well-oxygenated, and unpolluted streams to persist (Backhouse, Jackson and O'Connor, 2008; NSW Department of Primary Industries, 2023). Wetlands, rivers, and streams play essential roles in nutrient cycling, water storage, and ecological connectivity. Protecting these aquatic values is fundamental to maintaining both biodiversity and the ecological integrity of forest ecosystems.

A catchment-based approach provides an effective framework for assessing aquatic habitats because it considers the full range of land-based processes that influence water quality and ecosystem health. Forested catchments regulate streamflow, stabilise soils, and filter sediments and nutrients, helping to maintain the high-quality aquatic and wetland habitats required by platypus and native freshwater fish (Bunn and Arthington, 2002; Townsend, Uhlmann and Matthaei, 2008). Wetlands within forested landscapes are particularly important, acting as natural filters and refuges for specialised species, while also moderating floods and sustaining flows during dry periods. In contrast, vegetation clearing and catchment disturbance can increase sedimentation, alter hydrology, and degrade aquatic and wetland habitats, contributing to documented declines in freshwater species (Pusey and Arthington, 2003; Hardwick *et al.*, 2015).

Protecting State Forests from logging would help maintain intact vegetation cover, minimise soil disturbance, and protect water quality within forested catchments (ABARES, n.d.). These benefits directly support freshwater species such as platypus and threatened native fish, while also maintaining the health of downstream wetlands and estuaries. Healthy catchments are essential for coastal fisheries, as many marine species rely on rivers, estuaries, and wetlands as nursery habitats, and their productivity is closely linked to upstream water quality and flow. Maintaining the integrity of forested catchments is therefore critical for conserving freshwater and wetland biodiversity and supporting the productivity and resilience of coastal ecosystems.

7.1.1 Methodology

To analyse aquatic habitats, the Study Area was divided into catchments using the Geoscience Australia National Catchment Boundaries v1.1.4 dataset. Level 2 Drainage Basin boundaries were used as they provide a consistent, regional-scale hydrological framework suitable for assessing catchment-level relationships between land tenure and downstream aquatic systems.

State Forest tenure and NPWS reserve boundaries were intersected with catchment mapping to identify their distribution within each catchment. This analysis enabled the State Forests contained within each catchment to be identified and the proportional extent of State Forest and NPWS tenure within each catchment to be calculated.

From this, the proportion of each catchment currently protected (NPWS reserves) and the total potential protection achievable with the inclusion of State Forests were derived and compared

across the Study Area. This approach reflects that hydrological processes such as runoff, sediment transport, and nutrient flows operate at a catchment scale.

7.1.2 Limitations

The use of Level 2 Drainage Basin boundaries provides a consistent regional framework but masks finer-scale variation within sub-catchments, particularly in headwater systems. As a result, localised disturbance, in-stream habitat condition, and hydrological dynamics are not fully captured, and connectivity is generalised.

State Forest tenure is intersected with catchment boundaries to identify forests within each catchment; however, this approach does not account for variation in the position or extent of forests within catchments. Forests located further from drainage lines or in less hydrologically connected areas may have a reduced influence on downstream systems.

The analysis should therefore be interpreted as a catchment-scale overview of potential relationships between State Forests and aquatic systems, rather than a detailed assessment of site-level condition or influence.

7.1.3 Findings

The protection of State Forests would result in substantial increases in catchment-level protected area coverage across the Study Area, with several coastal catchments exceeding 70% protection. These increases reflect the significant contribution of State Forest tenure to maintaining intact forest cover within key hydrological systems and highlight their importance in supporting downstream aquatic environments.

State Forest tenure within the Study Area intersects eleven Level 2 catchments in the South East Region. Of these, seven catchments—Bega River, Clyde River–Jervis Bay, East Gippsland, Moruya River, Shoalhaven River, Towamba River and Tuross River—have substantial overlap with the Study Area and were therefore included in the assessment. The remaining catchments (Darling River, Hawkesbury River, Snowy River, and Wollongong Coast) have only minor overlap and were excluded from further analysis.

Catchment boundaries for the Region are shown in Figure 21, and the relationship between catchment boundaries, State Forest tenure, and protected area coverage is summarised in Table 30.

These seven catchments were assessed to determine the contribution of State Forest protection to overall catchment protection and the extent of intact forest cover retained within these systems. State Forests are identified within each catchment based on spatial intersection and do not distinguish the proportion of each forest present; however, proportional analysis of land tenure accounts for these differences in area.

Of the assessed catchments, the NSW portion of the East Gippsland catchment would experience the greatest increase in protected area coverage, with the inclusion of State Forests increasing the area protected from 25% to 82%. This is followed by the Towamba River and Tuross River catchments, where protection of State Forests would increase protected area coverage by 33% in each catchment, resulting in more than 70% of their total catchment areas being protected.

The protection of State Forests would also increase protected area coverage within the Clyde River–Jervis Bay catchment by 27%, bringing total catchment protection to 69%, while the Moruya River catchment would increase from 60% to 64%.

These increases in protected area coverage indicate that larger areas of intact native vegetation would be maintained within these hydrological systems, supporting improved water quality, reduced sediment and nutrient runoff, and the protection of aquatic habitats. In turn, this would benefit freshwater ecosystems and contribute to the health of downstream wetlands, estuaries, and coastal waters that depend on clean, well-regulated catchment inflows.

NATIONAL PARKS ASSOCIATION OF NSW
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- South East Region
- State Forest
- NPWS Reserves
- Major Rivers

Catchment

- Bega River
- Clyde River-Jervis Bay
- Darling River
- East Gippsland
- Hawkesbury River
- Mitchell-Thomson Rivers
- Moruya River
- Shoalhaven River
- Snowy River
- Sydney Coast-Georges River
- Towamba River
- Tuross River
- Wollongong Coast

Map produced by James Sherwood, National Parks Association of NSW

15/05/2026

Kilometres

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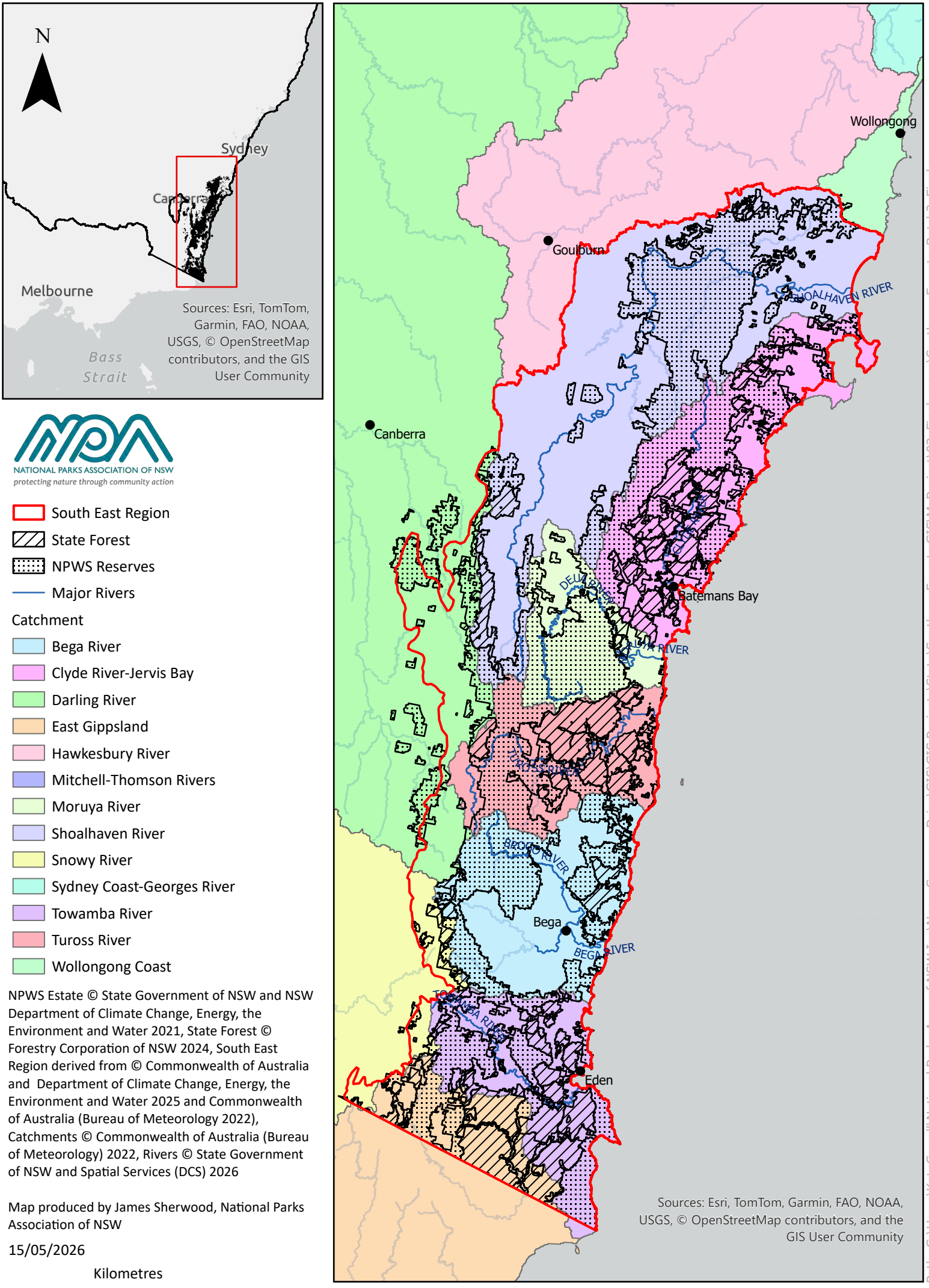


Figure 21: Catchments of the South East Region

Table 30: Existing and projected protected area extent within Level 2 catchments, based on the inclusion of State Forests in the reserve system[25]

Drainage Basins - Level 2	NSW area (ha)	Study Area (ha)	NPWS reserves (ha)	NPWS reserves %	State Forests (ha)	State Forests (%)	Total (%)	State Forests
Bega River	284,037	134,482	115,985	41%	18,497	7%	47%	Bermagui, Bodalla, Glenbog, Mumbulla, Murrah, Tanja, Tantawangalo
Clyde River-Jervis Bay	322,343	222,675	134,950	42%	87,725	27%	69%	Benandarah, Bolaro, Boyne, Buckenbowra, Clyde, Currambene, Currowan, Flat Rock, Jerrawangala, Kioloa, McDonald, Mogo, North Brooman, Nowra, Shallow Crossing, South Brooman, Termeil, Tomerong, Wandera, Woodburn, Yadboro, Yerriyong
Darling River	59,815,165	70,461	63,147	0%	7,314	0%	0%	Badja, Glenbog, Tallaganda
East Gippsland	114,038	93,954	28,402	25%	65,552	57%	82%	Bondi, Bruces Creek, Coolangubra, East Boyd, Nadgee, Nalbaugh, Nungatta, Timbillica, Towamba, Wallagaraugh Flora Reserve, Yambulla
Hawkesbury River	2,199,212	44	44	0%	0	0%	0%	n/a
Moruya River	149,697	95,794	89,212	60%	6,582	4%	64%	Dampier, Mogo, Moruya, Wandera
Shoalhaven River	717,756	247,268	22,0088	31%	27,180	4%	34%	Currambene, Meryla, Shoalhaven, Tallaganda, Wingello
Snowy River	893,274	14,250	5,090	1%	9,160	1%	2%	Bombala, Bondi, Cathcart, Coolangubra, Glen Allen, Glenbog, Nalbaugh, Tantawangalo
Towamba River	216,359	155,630	84,355	39%	71,275	33%	72%	Bombala, Bondi, Broadwater, Bruces Creek, Cathcart, Coolangubra, East Boyd, Gnupa, Nadgee, Nalbaugh, Nullica, Tantawangalo, Timbillica, Towamba, Yambulla, Yurammie
Tuross River	216,206	153,846	81,793	38%	72,053	33%	71%	Badja, Bodalla, Corunna, Dampier, Moruya, Wandella
Wollongong coast	79,171	639	639	1%	0	0%	1%	n/a

[25] Dark green cells indicate increases in protection of >50%, light green cells indicate increases of 25-50%

7.2 Coastal aquatic and wetland vegetation

Coastal aquatic and wetland vegetation forms a critical ecological link between forested catchments and the marine environment. Their condition is strongly influenced by upstream hydrology, sediment supply, and water quality, which are shaped by how forests are managed. Rivers and streams transport freshwater, nutrients, and organic matter from forested landscapes to estuaries and coastal waters, supporting highly productive systems including wetlands, saltmarsh, mangroves, and seagrass meadows. These environments perform key ecological functions such as nutrient cycling, shoreline stabilisation, carbon storage, and the provision of nursery and feeding grounds for fish, crustaceans, and other marine species. As a result, the health of coastal ecosystems is closely tied to the integrity of upstream catchments and natural hydrological processes.

Across the land–sea transition, wetlands, saltmarsh, mangroves, and seagrass occur along a natural hydrological and tidal gradient, forming a connected coastal system that supports high biodiversity and underpins estuarine and coastal fisheries. These habitats are widely recognised as priority conservation features within marine park networks, where they are often afforded enhanced protection through sanctuary zones and other management measures. Maintaining intact forested catchments supports these objectives by protecting the water quality and flow regimes that sustain downstream wetlands, estuaries, and coastal environments, particularly in the face of pressures such as coastal development, sedimentation, and climate change.

7.2.1 Methodology

To analyse coastal aquatic and wetland vegetation in the Study Area, a range of national and state spatial datasets were reviewed to identify mapped wetlands and areas of recognised ecological significance within and downstream of the Study Area. These included:

- the Directory of Important Wetlands in Australia (DIWA), a national inventory of wetlands recognised for their ecological significance
- NSW Wetlands mapping, identifying broad wetland groups including floodplain, freshwater, saline, reservoir, estuarine, and coastal lagoon systems
- Ramsar Wetlands of International Importance, representing wetlands listed under the Ramsar Convention on Wetlands
- NSW Estuarine Macrophytes 2023 dataset, which identifies the distribution of key estuarine macrophyte communities including saltmarsh, mangroves, and seagrass

Wetland datasets (DIWA, NSW wetlands and Ramsar) formed the primary basis for spatial analysis. These layers include many coastal wetland systems associated with estuarine environments. The NSW Estuarine Habitats dataset was used to provide additional spatial detail and a more complete representation of estuarine macrophyte communities, particularly to distinguish between saltmarsh, mangroves, and seagrass. This is important as seagrass meadows are generally not represented within terrestrial wetland mapping datasets but form a key component of coastal aquatic ecosystems.

A proximity analysis was undertaken to identify wetlands adjacent to State Forests. A 1km buffer was applied to mapped wetland layers and intersected with State Forest tenure within the South East Region to identify areas in close proximity to important aquatic and wetland vegetation.

To further quantify the distribution of estuarine macrophyte communities, the NSW Estuarine Macrophytes 2023 dataset was intersected with the National Catchment Boundaries (Level 2) to calculate the extent of seagrass, mangrove and saltmarsh within each catchment. This enabled a catchment-scale assessment of the relative abundance and distribution of key estuarine habitats.

To assess broader hydrological relationships, this analysis draws on the catchment framework presented in Chapter 7.1, which identifies the distribution of State Forests within coastal catchments. This provides the basis for understanding the connectivity between State Forests and downstream wetlands and coastal environments.

7.2.2 Limitations

The analysis relies on national and state spatial datasets that vary in resolution, accuracy and currency. The Directory of Important Wetlands in Australia (DIWA), in particular, has not been systematically updated since approximately 2005 and is used as a historical reference rather than a current or comprehensive inventory.

A uniform 1km buffer was applied to identify wetlands adjacent to State Forests. While this provides a consistent basis for analysis, it does not account for variation in local hydrology, topography or flow pathways, and may over- or under-represent ecological connectivity in some locations.

Hydrological relationships are assessed at a catchment scale and do not capture finer-scale processes such as local flow dynamics, groundwater interactions or site-specific disturbance. Mapped wetland layers represent broad vegetation types and may not reflect current condition, extent or recent change, and smaller or unmapped wetlands may not be captured.

The NSW Estuarine Macrophytes 2023 dataset improves representation of coastal aquatic vegetation, particularly seagrass, mangroves and saltmarsh; however, it is derived from remote sensing and interpretation and may vary in accuracy across estuaries, particularly in turbid or dynamic environments. Mapping resolution and classification may also influence boundary precision. The dataset represents a snapshot in time and does not capture temporal variability or recent changes in habitat extent, and does not include the East Gippsland catchment, which drains into Victoria.

Catchment-scale quantification of estuarine habitats does not capture within-catchment variability, habitat condition or ecological function, and does not explicitly represent connectivity pathways between State Forests and estuarine environments.

The analysis should therefore be interpreted as a regional-scale assessment of potential relationships between State Forests and coastal aquatic ecosystems, rather than a site-level evaluation.

7.2.3 Findings

The Study Area does not contain any Ramsar Wetlands of International Importance. However, it does include wetlands listed in the Directory of Important Wetlands in Australia (DIWA), as well as additional wetland areas identified in the NSW Wetlands spatial dataset. These are mapped in Figure 22, Figure 23 and Figure 24.

DIWA-listed wetlands represent sites of recognised ecological significance at a national scale. A total of 15 State Forests are located within 1 km of mapped DIWA sites, occurring across five catchments within the Study Area, indicating a strong spatial relationship between State Forest tenure and nationally significant wetland systems.

The proximity of State Forests to DIWA-listed wetlands indicates that land management within these forests has the potential to influence wetland condition, particularly through sediment transport, nutrient inputs, and hydrological processes. Protection of these forests would therefore support the maintenance of water quality and ecological function within these systems.

DIWA wetlands occur in six of the seven catchments assessed, indicating that most State Forests within the Study Area are likely to contribute to the ecological integrity of downstream wetland systems. The full results of the analysis are presented in Table 31.

Table 31: State forests and their associated catchments located within 1 km of Important Australian Wetlands (DIWA)

Catchment	State Forests within 1km of DIWA areas	State Forests Upstream of DIWA Areas
Bega River	Bermagui, Glenbog	Bodalla, Mumbulla, Murrah, Tanja, Tantawangalo
Clyde River-Jervis Bay	Benandarah, Bolaro, Boyne, Clyde, Currowan, Mogo, North Brooman, Shallow Crossing, South Brooman, Termeil	Buckenbowra, Currambene, Flat Rock, Jerrawangala, Kioloa, McDonald, Nowra, Tomerong, Wandera, Woodburn, Yadboro, Yerriyong
East Gippsland	n/a	n/a
Moruya River	Mogo	Dampier, Moruya, Wandera
Shoalhaven River	n/a	Currambene, Meryla, Shoalhaven, Tallaganda, Wingello
Towamba River	Nullica	Bombala, Bondi, Broadwater, Bruces Creek, Cathcart, Coolangubra, East Boyd, Gnupa, Nadgee, Nalbaugh, Tantawangalo, Timbillica, Towamba, Yambulla, Yurammie
Tuross River	Dampier, Moruya	Badja, Bodalla, Corunna, Wandella

The same analysis was then applied using the NSW Wetlands spatial dataset, which identifies a broader distribution of coastal and inland wetland vegetation, including smaller or less formally recognised systems that contribute to catchment-scale ecological function. A total of 28 State Forests are located within 1 km of mapped NSW wetlands across six catchments, demonstrating a widespread spatial relationship between forested landscapes and wetland systems.

This pattern highlights strong connectivity between State Forests and downstream wetland systems, indicating that land management within these forests has the potential to influence wetland condition. It also underscores the importance of maintaining intact vegetation cover to support water quality and hydrological processes. The full results of the analysis are presented in Table 32.

Table 32: State forests and their associated catchments located within 1 km of NSW Wetlands

Catchment	State Forests within 1km of NSW wetlands	State Forests Upstream of NSW wetlands
Bega River	Bermagui, Glenbog, Mumbulla, Murrah, Tanja	Bodalla, Tantawangalo
Clyde River-Jervis Bay	Benandarah, Bolaro, Boyne, Clyde, Currambene, Currowan, McDonald, Mogo, North Brooman, Shallow Crossing, South Brooman, Termeil, Woodburn	Buckenbowra, Flat Rock, Jerrawangala, Kioloa, Nowra, Tomerong, Wandera, Yadboro, Yerriyong
East Gippsland	n/a	n/a
Moruya River	Mogo, Wandera	Dampier, Moruya,
Shoalhaven River	Currambene, Meryla, Shoalhaven	Tallaganda, Wingello
Towamba River	East Boyd, Nadgee, Nullica	Bombala, Bondi, Broadwater, Bruces Creek, Cathcart, Coolangubra, Gnupa, Nalbaugh, Tantawangalo, Timbillica, Towamba, Yambulla, Yurammie
Tuross River	Bodalla, Corunna, Dampier, Moruya	Badja, Wandella

The NSW Estuarine Macrophytes 2023 dataset provides additional context by mapping the distribution of key estuarine macrophyte communities, including mangroves, saltmarsh, and seagrass. These habitats form the seaward extension of coastal wetland systems and are closely linked to upstream catchment processes, particularly water quality, sediment delivery, and hydrological regimes. The spatial distribution of these habitats is presented in Figure 22, Figure 23 and Figure 24.

Rather than focusing on proximity, the NSW Estuarine Macrophytes 2023 dataset was used to undertake a quantitative analysis of estuarine habitat extent within each catchment. By intersecting the dataset with National Catchment Boundaries (Level 2), the total area of seagrass, mangrove and saltmarsh was calculated for each catchment. This enables identification of catchment-scale hotspots for different habitat types and provides a clearer understanding of the distribution and relative importance of estuarine macrophyte communities across the Study Area.

Results show that estuarine macrophytes are widely distributed across the Study Area, with particularly high concentrations in the Clyde River–Jervis Bay and Shoalhaven River catchments. Seagrass dominates in most systems, reflecting the importance of these estuaries as nursery habitats, while mangroves and saltmarsh contribute substantially to habitat diversity and shoreline stability. The full results of the analysis are presented in Table 33.

Incorporating this dataset strengthens the interpretation of results by demonstrating how the protection and management of State Forests may support not only wetlands, but also downstream estuarine ecosystems that underpin coastal biodiversity and fisheries productivity.

Table 33: Extent of estuarine macrophyte communities by catchment

Catchment	Total (ha)	Mangrove (ha)	Mangrove / Saltmarsh (ha)	Saltmarsh (ha)	Seagrass (ha)
Bega River	731	163	3	214	351
Clyde River – Jervis Bay	2557	664	103	441	1349
Moruya River	272	55	4	82	131
Shoalhaven River	1207	404	54	206	543
Towamba River	672	93	25	197	358
Tuross River	678	59	9	165	446

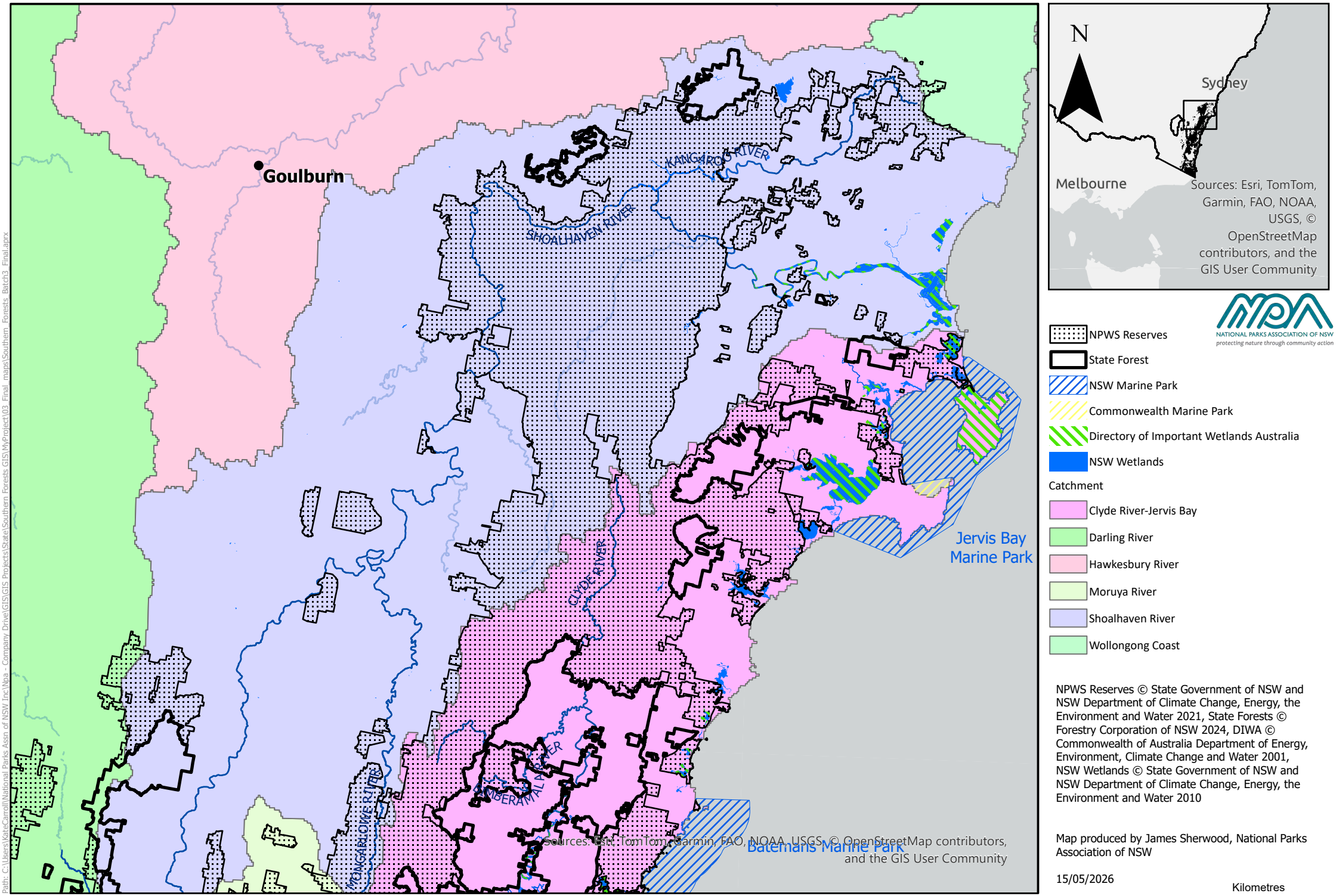
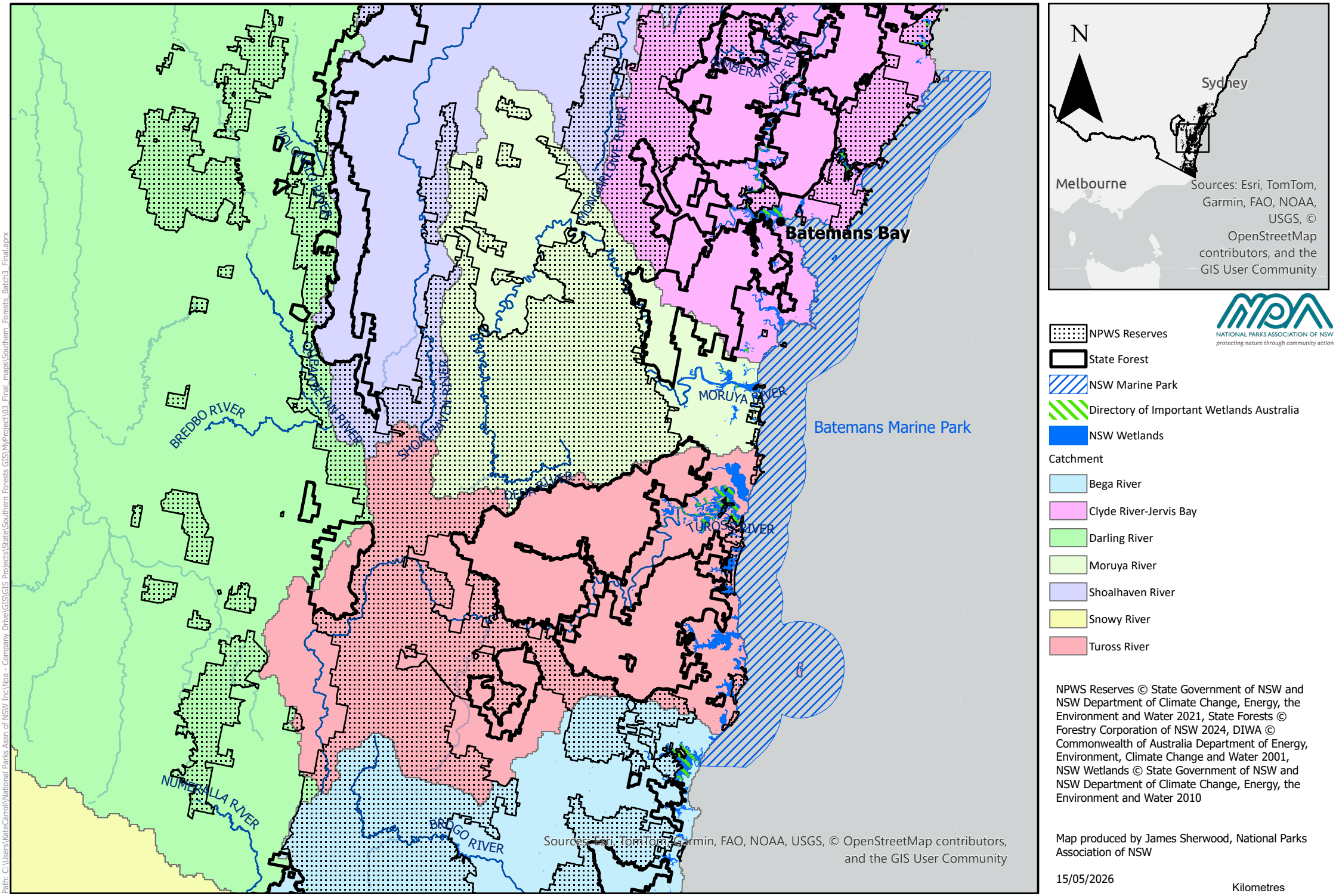


Figure 22: Spatial distribution of DIWA wetlands, NSW wetlands, and estuarine habitats within the Study Area in relation to State Forest tenure, illustrating catchment-to-coast connectivity – northern section



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Map produced by James Sherwood, National Parks Association of NSW

15/05/2026

Kilometres
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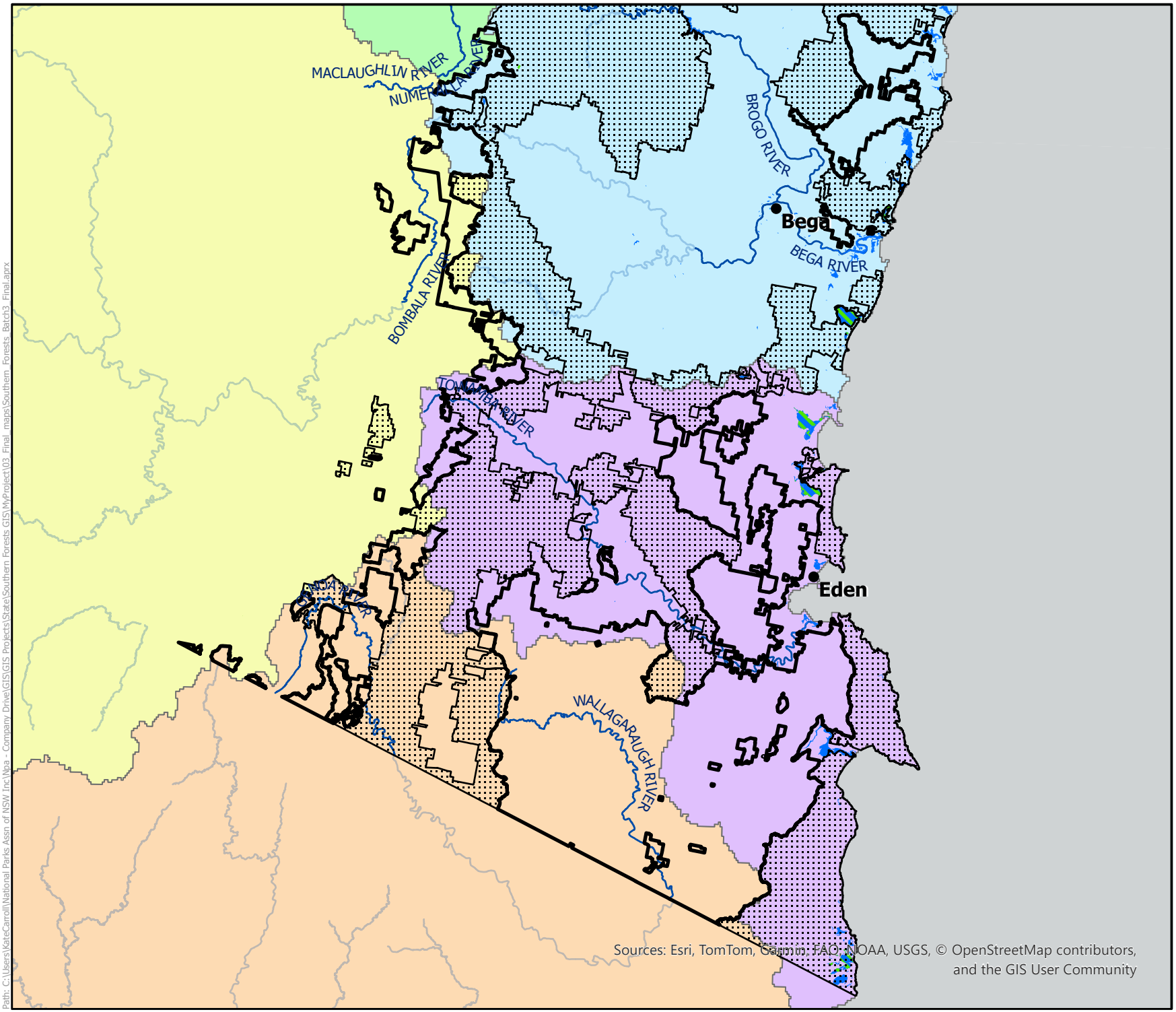
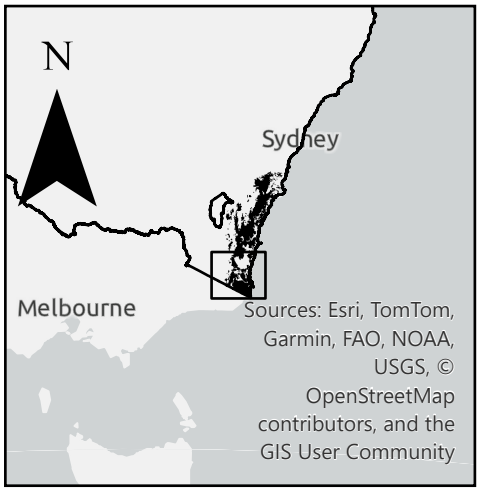
Figure 23: Spatial distribution of DIWA wetlands, NSW wetlands, and estuarine habitats within the Study Area in relation to State Forest tenure, illustrating catchment-to-coast connectivity – central section





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- NPWS Reserves
- State Forest
- Directory of Important Wetlands Australia
- NSW Wetlands

Catchment

- Bega River
- Darling River
- East Gippsland
- Snowy River
- Towamba River

Map produced by James Sherwood, National Parks Association of NSW

15/05/2026

Kilometres
0 20 40 60

Figure 24: Spatial distribution of DIWA wetlands, NSW wetlands, and estuarine habitats within the Study Area in relation to State Forest tenure, illustrating catchment-to-coast connectivity – southern section

7.3 Freshwater fish

Freshwater fish are a key component of aquatic biodiversity and play critical roles in food webs, nutrient cycling, and ecosystem functioning in rivers, lakes and wetlands. Their distribution and abundance are strongly influenced by hydrology, water quality, habitat structure and connectivity, making them sensitive indicators of aquatic ecosystem health (Humphries, King and Koehn, 1999). Because river systems integrate processes across entire catchments, freshwater fish communities provide important insights into how land use and catchment condition influences aquatic environments.

Across Australia, many freshwater fish populations have declined due to river regulation, barriers to movement, altered flow regimes, sedimentation and reduced water quality (Lintermans, 2009). Riparian clearing and catchment disturbance increase turbidity, elevate water temperatures and reduce instream habitat complexity, while invasive species such as carp further degrade habitats by disturbing sediments and competing with native fish (Koehn, 2004). Climate change is expected to intensify these pressures through more frequent droughts, altered hydrological regimes and warming waters (Bond *et al*., 2011).

Maintaining intact forested catchments plays an important role in supporting freshwater fish populations by stabilising soils, protecting riparian vegetation and maintaining water quality in rivers and streams.

7.3.1 Methodology

To assess freshwater fish habitats and community condition in relation to the Study Area, spatial datasets describing aquatic habitat distribution, fish community status and downstream estuarine environments were reviewed. The analysis focused on identifying waterways within and downstream of the Study Area that support important fish habitat and assessing how catchment condition and upstream land management within State Forests may influence freshwater fish communities and connected estuarine ecosystems.

The following spatial datasets were obtained from the NSW DPIRD Fisheries Spatial Data Portal (NSW DPI, n.d.):

- Key Fish Habitat (KFH) – mapping of aquatic environments important for sustaining fish populations, including rivers, creeks, lakes, lagoons, billabongs, impoundments and estuarine systems
- NSW Freshwater Fish Community Status – classification of river and stream reaches using the Fish Community Index (FCI), indicating ecological condition (Very Good to Very Poor)
- NSW Estuarine Macrophytes 2023 – mapping of seagrass, mangrove and saltmarsh communities
- NSW Marine Parks – spatial boundaries of marine parks managed to conserve biodiversity and ecosystem integrity

These datasets were analysed together to assess the spatial relationship between State Forest tenure, Key Fish Habitat, freshwater fish community condition and downstream estuarine and marine environments. The analysis was qualitative and undertaken at a regional scale.

To assess broader hydrological relationships, the analysis draws on the catchment framework presented in Chapter 7.1, which identifies the distribution of State Forests within coastal catchments and their connectivity to downstream aquatic systems.

7.3.2 Limitations

The analysis relies on spatial datasets that vary in resolution, accuracy and currency and represents a broad-scale assessment of freshwater fish habitats and community condition.

Key Fish Habitat mapping identifies important aquatic environments but does not distinguish habitat quality or current condition at a site scale. Similarly, the Fish Community Index provides a standardised indicator of ecological condition but may not capture localised pressures, recent disturbances or temporal variability.

The analysis is based on spatial relationships and does not quantify the magnitude of impacts from specific land-use activities. Hydrological connectivity is assessed at a catchment scale and does not capture finer-scale processes such as local flow dynamics, barriers to fish passage or site-specific habitat condition.

The NSW Estuarine Macrophytes 2023 dataset improves representation of coastal aquatic vegetation but is derived from remote sensing and interpretation and may vary in accuracy across estuaries, particularly in turbid or dynamic environments. Mapping resolution and classification may also influence boundary precision. The dataset represents a snapshot in time and does not capture temporal variability or recent changes in habitat extent, and does not include the East Gippsland catchment, which drains into Victoria.

The analysis should therefore be interpreted as a regional-scale assessment of relationships between State Forests, freshwater fish habitats and downstream ecosystems, rather than a site-level evaluation.

7.3.3 Findings

Key Fish Habitat (KFH) is widespread across the Region and occurs in 54 of the 56 State Forests (Figure 25, Figure 26 and Figure 27). These habitats include rivers, creeks, lakes, lagoons, billabongs, impoundments and estuarine environments that provide spawning, feeding and refuge areas for fish species. Their extensive distribution within forested catchments highlights the importance of upstream land management in maintaining aquatic ecosystem health.

Catchment processes strongly influence habitat condition. Increased erosion, sediment delivery and nutrient inputs degrade stream environments, reduce water quality and alter aquatic vegetation communities. Logging and other land-use disturbances can contribute to these pressures through sedimentation, nutrient runoff, carbon transport, chemical inputs and changes to water temperature and acidity (Shah *et al*., 2022). In contrast, waterways within intact forested catchments typically exhibit higher water quality and more stable ecological conditions.

Freshwater fish community condition varies across the Region. Lower catchment and estuarine reaches generally achieve Very Good or Good condition, with high-scoring systems including the Moruya River, Tuross River, Conjola Creek and Bega River. In contrast, upper reaches of the Shoalhaven, Darling and Snowy River catchments show poorer condition, reflecting cumulative impacts associated with habitat degradation, flow regulation and reduced connectivity.

These patterns reflect the influence of catchment-scale processes on freshwater ecosystems. Barriers to movement, altered flow regimes, riparian clearing and reduced habitat complexity limit recruitment and favour disturbance-tolerant or non-native species, while more connected and structurally complex systems support higher diversity fish communities and improved ecological condition.

Mapping of estuarine macrophyte habitats indicates that many rivers draining State Forests flow into estuaries containing seagrass, mangrove and saltmarsh communities. These habitats provide critical

nursery, feeding and refuge areas for fish species and form a key ecological link between freshwater and marine environments. The presence of these habitats downstream of forested catchments reinforces the role of catchment condition in supporting fisheries' productivity and coastal ecosystem health.

The condition of these downstream ecosystems is strongly influenced by upstream processes. Sediment and nutrient inputs can degrade estuarine habitats, reduce water clarity and impact seagrass and benthic communities, while intact forested catchments help maintain water quality, stabilise soils and protect riparian zones.

Overall, the distribution of Key Fish Habitat, freshwater fish community condition and downstream estuarine environments demonstrates strong ecological connectivity between forested catchments, river systems and the marine environment. Given the extent of Key Fish Habitat within and downstream of State Forests, land management in these areas has a direct influence on water quality, habitat condition and fish community outcomes at a regional scale. Maintaining intact forested catchments is therefore fundamental to sustaining freshwater fish populations and the ecological integrity of connected estuarine and coastal ecosystems.

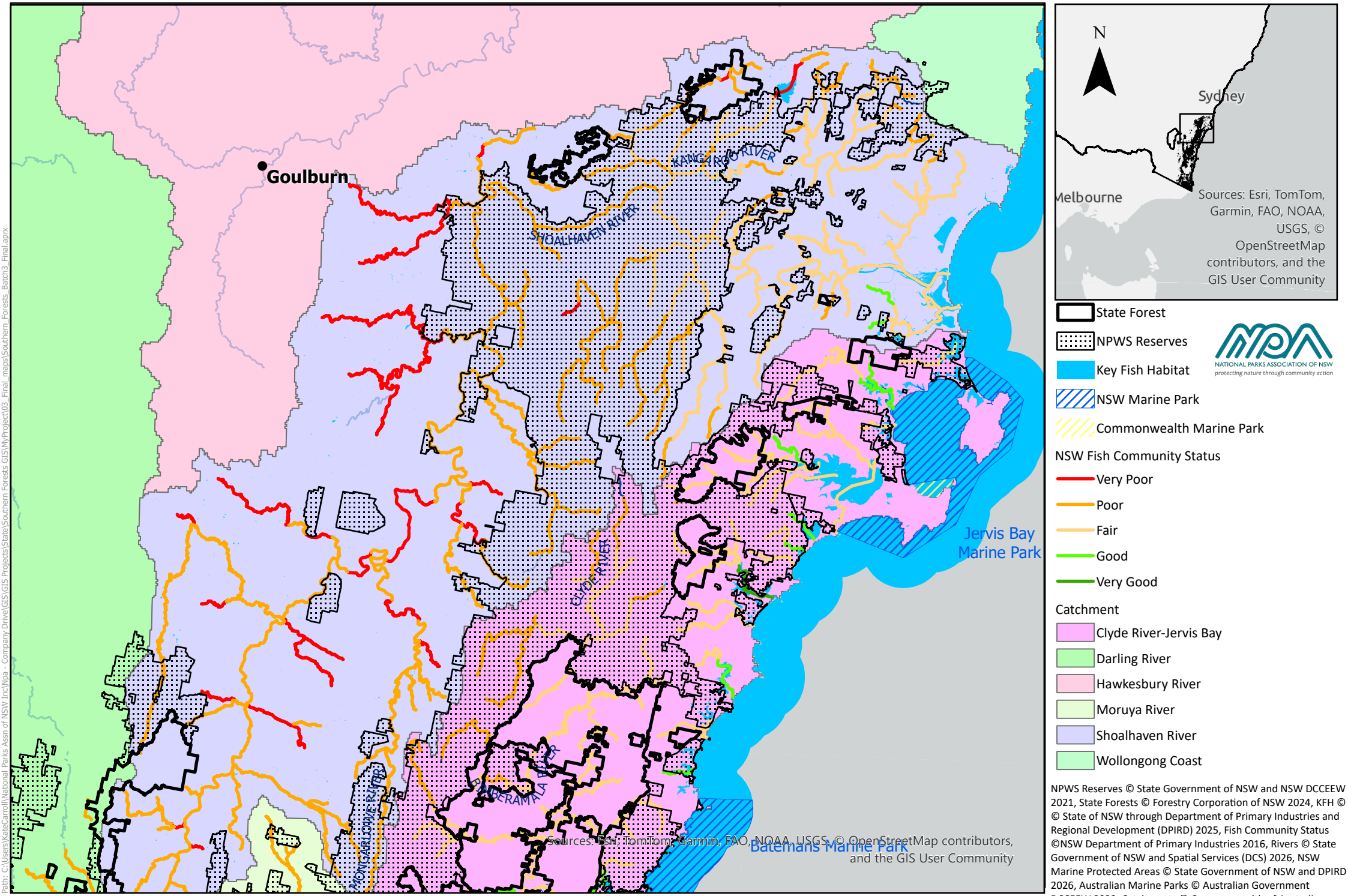
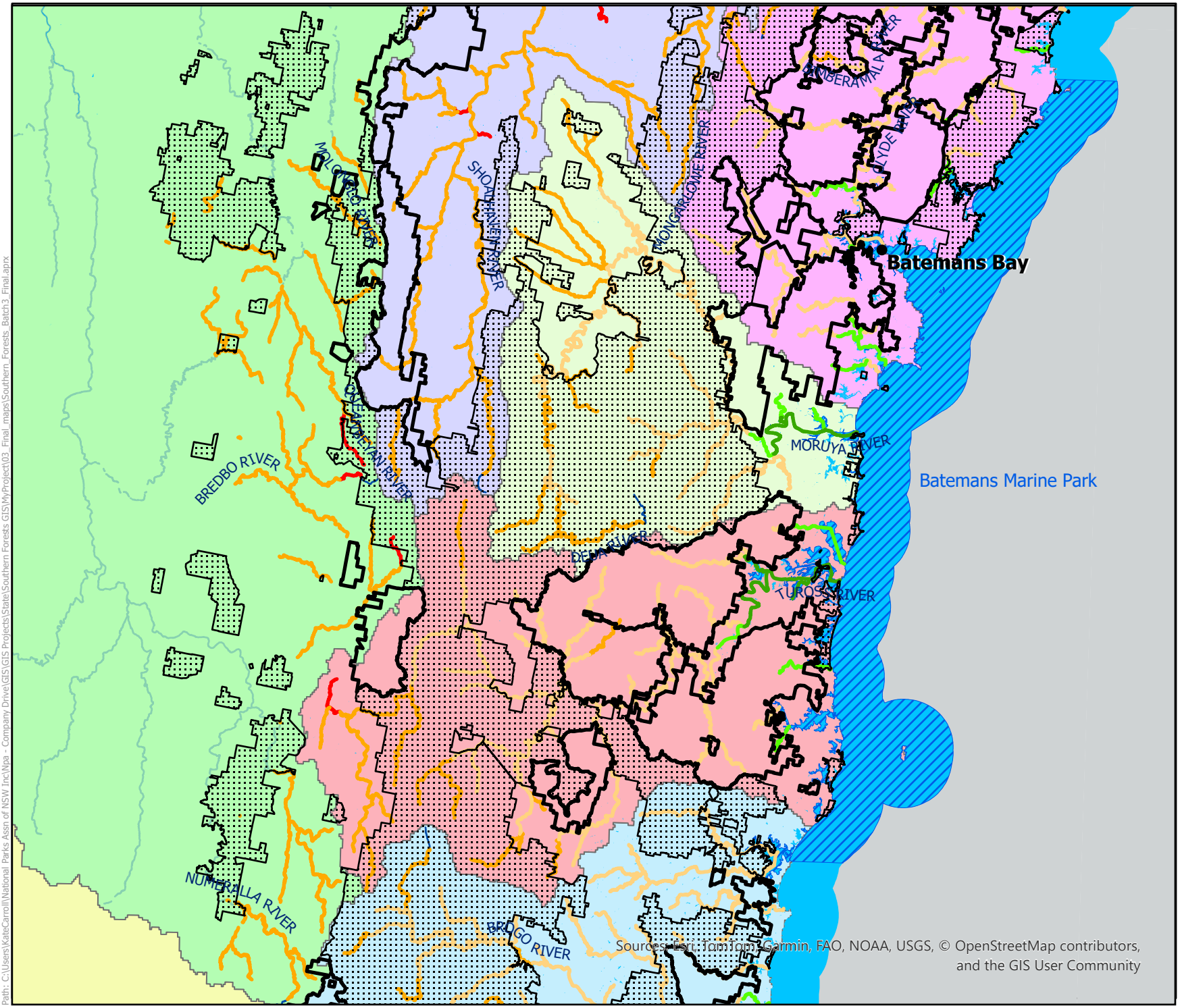
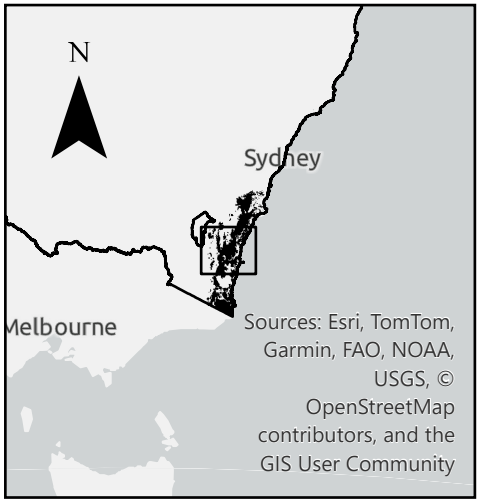


Figure 25: Key Fish Habitat and freshwater fish communities - northern section

Map produced by James Sherwood, National Parks Association of NSW 15/05/2026





State Forest
NPWS Reserves
Key Fish Habitat
NSW Marine Park

NSW Fish Community Status
- Very Poor
- Poor
- Fair
- Good
- Very Good

Catchment
- Bega River
- Clyde River-Jervis Bay
- Darling River
- Moruya River
- Shoalhaven River
- Snowy River
- Tuross River

Kilometres
0 20 40 60

Map produced by James Sherwood, National Parks Association of NSW 15/05/2026

Figure 26: Key Fish Habitat and freshwater fish communities - central section

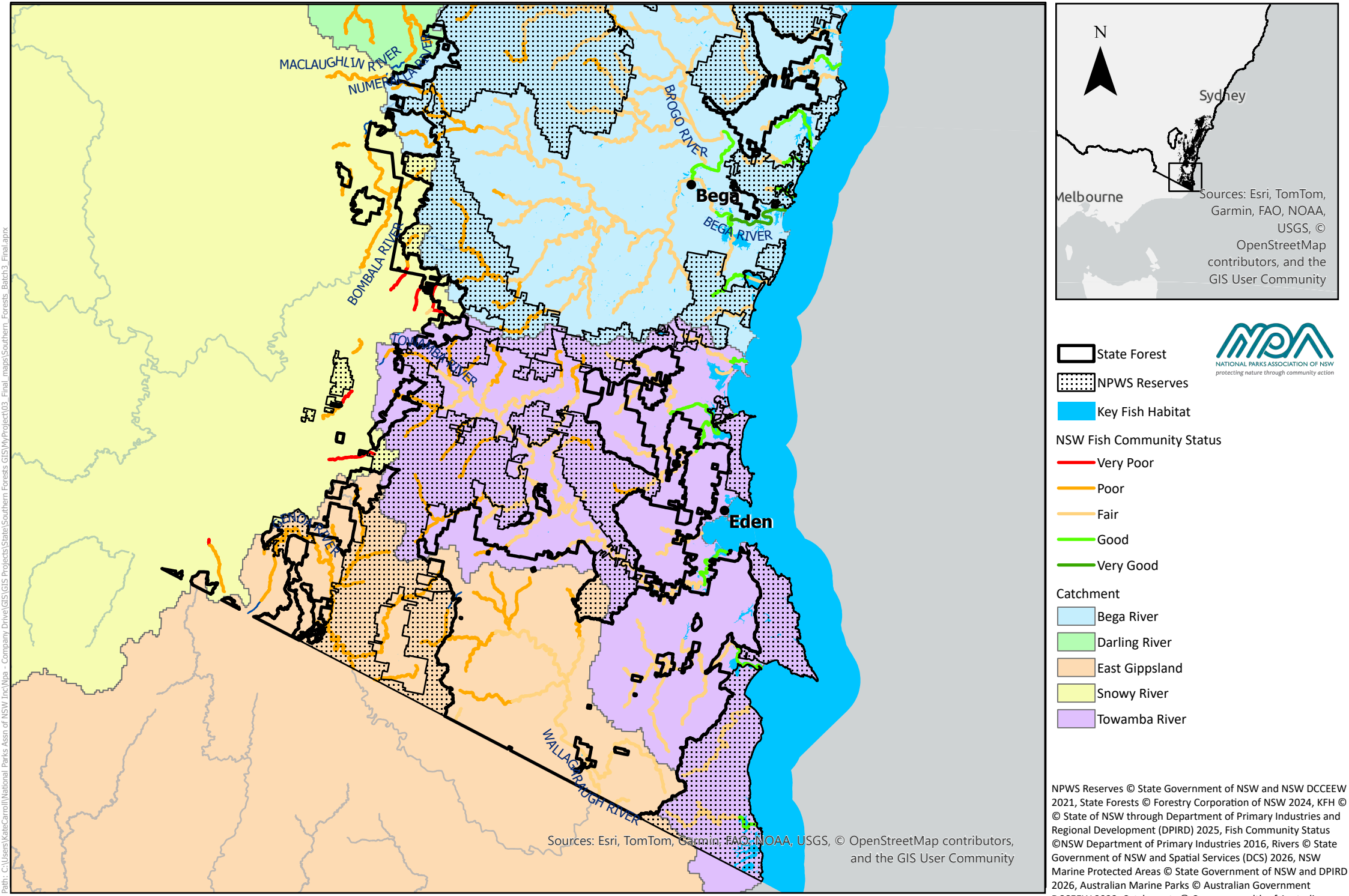


Figure 27: Key Fish Habitat and freshwater fish communities - southern section

Map produced by James Sherwood, National Parks Association of NSW 15/05/2026

7.4 Threatened fish and freshwater invertebrates

A number of threatened aquatic fauna species occur within the Region, including freshwater fish and invertebrates such as freshwater crayfish. These species often have highly specific habitat requirements and restricted distributions, making them particularly sensitive to changes in water quality, sediment loads, and hydrological connectivity. As a result, threatened aquatic species provide an important indicator of the ecological condition of river systems and the broader catchments that support them.

Freshwater fish communities occur throughout waterways associated with State Forests in varying condition states, reflecting differences in habitat quality, catchment disturbance, and river connectivity. Protecting vegetation upslope of waterways, particularly within upper catchments, is critical for maintaining habitat quality for these species by reducing sedimentation, protecting water quality, and maintaining natural hydrological processes.

7.4.1 Methodology

To identify the potential occurrence of threatened freshwater fish and freshwater invertebrates within the Study Area, spatial datasets describing the indicative distribution of threatened aquatic species were reviewed.

The primary dataset used was the Indicative Distribution of Threatened Freshwater Fish spatial layer, which maps stream segments where there is a high probability that a species will occur. These segments are identified based on confirmed species records or where environmental conditions closely match locations where the species has previously been recorded.

Indicative distribution mapping was overlaid with State Forest tenure to identify stream segments intersecting or adjacent to forested areas. This enabled identification of waterways where threatened species may occur within, or downstream of, State Forest catchments.

To assess broader ecological relationships, the analysis draws on the catchment framework presented in Chapter 7.1, recognising that upstream land management can influence aquatic habitat condition through sediment delivery, water quality, and hydrological processes. This approach supports identification of river systems where maintaining intact forested catchments is important for sustaining habitat for threatened aquatic fauna.

Spatial data were obtained from the NSW DPIRD Fisheries Spatial Data Portal (NSW DPI, n.d.).

7.4.2 Limitations

The analysis relies on indicative distribution mapping, which identifies areas of potential habitat rather than confirmed species presence. As a result, mapped stream segments represent the likelihood of occurrence based on available records and environmental similarity, and may not reflect current distribution or population status.

The analysis is based on spatial intersection with State Forest tenure and does not quantify the extent to which individual forests contribute to habitat condition. Hydrological connectivity is assessed at a catchment scale and does not capture finer-scale processes such as local habitat condition, barriers to movement, or site-specific disturbances.

In addition, the analysis does not account for temporal variability, recent disturbances such as bushfire or drought, or the influence of non-forestry land uses within catchments. The results should therefore be interpreted as a regional-scale assessment of potential relationships between State Forests and threatened aquatic species, rather than a detailed, site-level evaluation.

7.4.3 Findings

Mapping of indicative distribution identifies several river systems within the Region that may support threatened freshwater fish and invertebrate species (Figure 28, Figure 29 and Figure 30). Four threatened aquatic fauna species are known or likely to occur within the Region, including three freshwater fish species and one freshwater crayfish.

Two of these species occur in waterways that pass through or border State Forest tenure, highlighting the importance of upstream catchment management in maintaining habitat quality. While forestry operations generally avoid direct disturbance to waterways and riparian zones, indirect impacts such as sedimentation, nutrient runoff, and reduced water quality can degrade aquatic habitats and affect the viability of sensitive species. Maintaining intact vegetation within upper catchments plays a key role in supporting suitable habitat conditions.

The Short-tail Galaxias (*Galaxias brevissimus*) has an extremely restricted distribution, occurring only in the upper Tuross River catchment. Known populations occur at a small number of sites, including within Badja State Forest and adjacent protected areas. The species is highly vulnerable to disturbance, with key threats including bushfire, drought, introduced species, and catchment disturbance. Activities within upstream forested areas therefore have the potential to influence both local habitat and downstream river systems supporting this species.

The Australian Grayling (*Prototroctes maraena*) occurs across several coastal river systems within the Region, including the Shoalhaven, Bega, and Clyde River catchments. Indicative distribution mapping shows that habitat for this species intersects or lies adjacent to 23 State Forests. The species has experienced significant historical decline and is particularly sensitive to barriers to movement, altered flow regimes, and habitat fragmentation. Maintaining connectivity and water quality within catchments containing State Forests is therefore important for supporting its migratory life cycle and long-term viability.

In contrast, the Macquarie Perch (*Macquaria australasica*) and Fitzroy Falls Spiny Crayfish (*Euastacus dharawalus*) do not occur within, or upstream of, State Forest tenure in the Study Area. Their distributions are limited to highly localised or isolated systems, and current State Forest management is unlikely to directly influence habitat conditions for these species within the Region.

Overall, the distribution of threatened aquatic fauna highlights the importance of intact catchments in supporting species with limited distributions and specialised habitat requirements. State Forests play a key role in maintaining upstream vegetation cover, which supports water quality, reduces sedimentation, and helps maintain hydrological processes critical for threatened freshwater species. Protecting these forested catchments would therefore contribute to the conservation of threatened aquatic fauna and the ecological integrity of connected river systems.

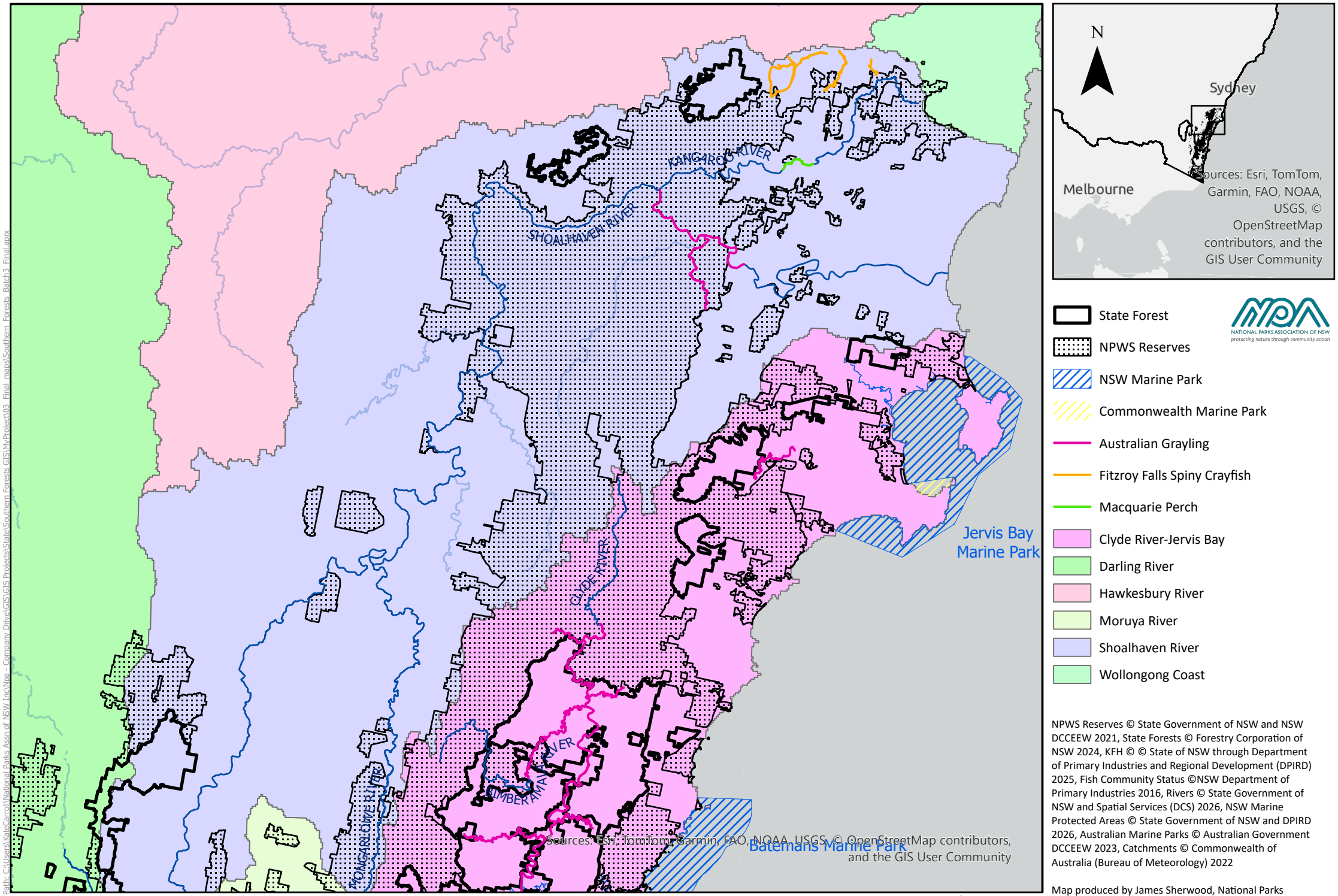


Figure 28: Threatened fish species – northern region

NPWS Reserves © State Government of NSW and NSW DCCEEW 2021, State Forests © Forestry Corporation of NSW 2024, KFH © © State of NSW through Department of Primary Industries and Regional Development (DPIRD) 2025, Fish Community Status ©NSW Department of Primary Industries 2016, Rivers © State Government of NSW and Spatial Services (DCS) 2026, NSW Marine Protected Areas © State Government of NSW and DPIRD 2026, Australian Marine Parks © Australian Government DCCEEW 2023, Catchments © Commonwealth of Australia (Bureau of Meteorology) 2022

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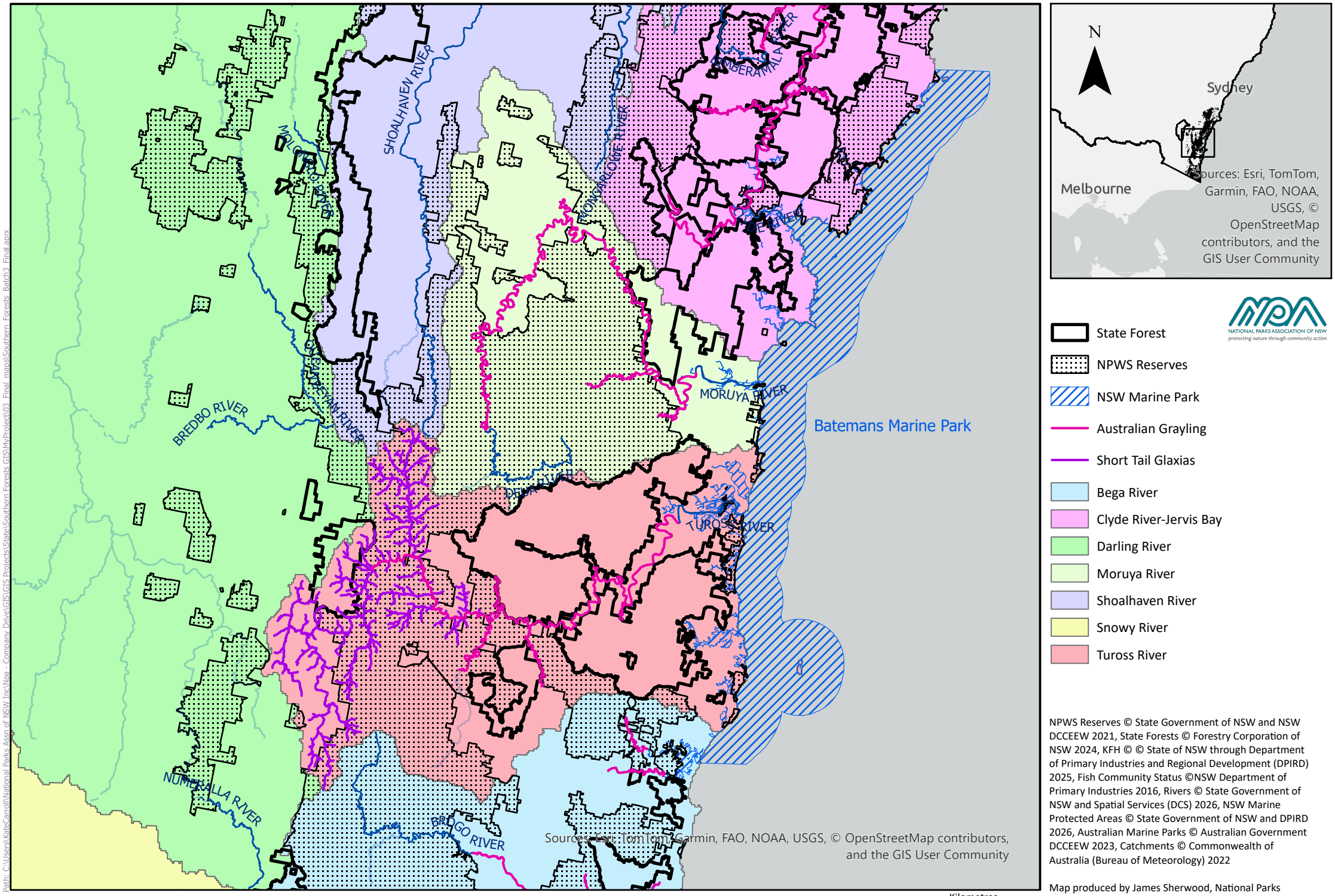

Figure 29: Threatened fish species – central region

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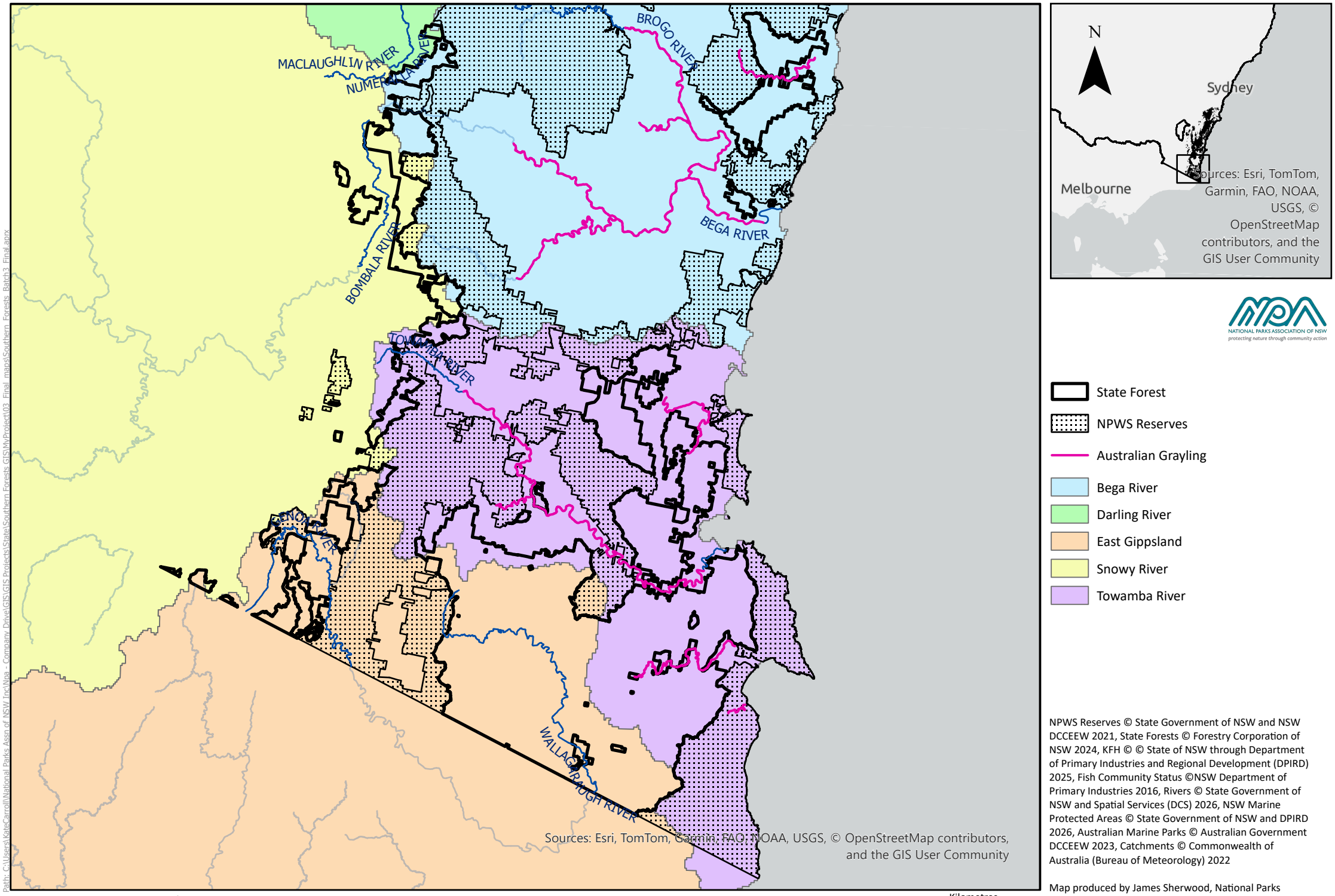

NPWS Reserves © State Government of NSW and NSW DCCEEW 2021, State Forests © Forestry Corporation of NSW 2024, KFH © © State of NSW through Department of Primary Industries and Regional Development (DPIRD) 2025, Fish Community Status ©NSW Department of Primary Industries 2016, Rivers © State Government of NSW and Spatial Services (DCS) 2026, NSW Marine Protected Areas © State Government of NSW and DPIRD 2026, Australian Marine Parks © Australian Government DCCEEW 2023, Catchments © Commonwealth of Australia (Bureau of Meteorology) 2022

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Figure 30: Threatened fish species – southern region

7.5 Platypus

The Platypus (*Ornithorhynchus anatinus*) is an iconic Australian monotreme that plays a unique ecological role in freshwater ecosystems. As a semi-aquatic mammal, the species depends on permanent waterways with stable banks, intact riparian vegetation, and abundant macroinvertebrate prey for foraging, shelter, and breeding (Grant & Dawson, 2020; Hawke *et al*., 2022). Because platypus populations are closely associated with healthy riverine habitats and well-functioning catchments, their presence provides valuable insights into the ecological integrity of freshwater systems.

However, platypus populations are increasingly vulnerable to threats including habitat fragmentation, altered flow regimes, sedimentation, bank erosion, and declining water quality (Kingsford *et al*., 2016; Hawke *et al*., 2022). Land clearing and degradation of riparian vegetation reduce bank stability and diminish food resources, while drought and climate change are expected to exacerbate pressures on populations, particularly in inland areas (Bino *et al*., 2019). Protecting intact forested catchments and riparian environments therefore plays an important role in maintaining suitable habitat conditions for platypus and supporting the resilience of freshwater ecosystems.

7.5.1 Methodology

Platypus records were sourced from the NSW BioNet database and spatially clipped to the South Coast Region boundary to retain only relevant observations. Records were temporally stratified into two classes—'pre-1990' and '1990 to present'—to enable assessment of historical and contemporary distribution patterns.

To account for potential movement and habitat use beyond point observations, a 1 km buffer was applied to all records. This buffer was used as a conservative proxy for local habitat use and to support a proximity-based analysis of potential overlap with NSW National Parks and Wildlife Service (NPWS) reserves and State Forest tenure within each catchment of the Study Area.

While platypus home ranges are typically reported to extend <> 1–7 km and may increase under conditions such as reduced food availability or drought (Pasitschniak-Arts and Marinelli, 1998), the application of a 1 km buffer provides a precautionary and spatially consistent approach for identifying likely areas of occupancy, while minimising overestimation of range extent.

Buffered records were then intersected with State Forest and NPWS tenure to identify potential areas of occurrence within NPWS reserves and State Forests.

7.5.2 Limitations

Platypus records from the NSW BioNet database are presence-only and influenced by survey effort, accessibility, and observer distribution. This introduces survey bias, with records more likely in accessible or well-surveyed areas, while remote or less-studied locations may be under-represented. As a result, absence of records does not indicate absence. Temporal grouping (pre-1990 and post-1990) provides only a coarse indication of change and does not account for variation in survey intensity between periods.

The application of a 1 km buffer provides a simplified and conservative proxy for habitat use. While this reduces overestimation, it likely under-represents true home range extent, particularly given the linear movement of platypus along waterways. Conversely, buffered areas may include habitat that is not actively used.

The analysis is based on point records rather than confirmed population boundaries, meaning results represent potential rather than verified areas of occurrence. Intersections with NPWS and State Forest tenure identify spatial overlap only and do not account for habitat condition, connectivity, or suitability.

Finally, hydrological connectivity and catchment-scale processes are not explicitly incorporated, despite being key drivers of platypus distribution.

Overall, results should be interpreted as indicative and precautionary, rather than definitive assessments of distribution or population status.

7.5.3 Findings

Analysis of platypus records indicates that State Forests and NPWS reserves play an important role in supporting platypus habitat across multiple catchments within the Region, particularly in upper and more forested parts of river systems. This aligns with earlier findings on land–sea connectivity, which highlight the importance of maintaining intact catchments to regulate sediment, nutrients, and water quality downstream.

Records located within 1 km of State Forest or NPWS tenure include both observations occurring within these tenures and those in close proximity, capturing areas likely to be influenced by protected or forested catchments (Table 34). Several catchments show a high proportion of records associated with these areas. The upper reaches of the East Gippsland catchment in NSW recorded the strongest association, with approximately 81% of platypus records occurring within, or within 1 km of, State Forests. Similarly, the Moruya River catchment showed 50% of records occurring within, or within 1 km of, State Forests, while the Tuross and Towamba River catchments recorded 47% and 46% respectively within, or within 1 km of, State Forest tenure. In the Clyde River–Jervis Bay catchment, 38% of records were located within, or within 1 km of, State Forest tenure. These patterns indicate that forested headwaters and upper catchments provide important habitat and supporting conditions for platypus populations.

The inclusion of NPWS reserves within this proximity analysis further highlights the role of protected and forested landscapes in maintaining suitable habitat conditions. Together, these tenures contribute to maintaining riparian integrity, reducing sedimentation, and supporting water quality, all of which are critical for platypus persistence.

As identified in earlier chapters, impacts originating in upper catchments can propagate downstream, affecting aquatic habitats and ecological processes. Maintaining intact forested catchments therefore plays a key role in sustaining both platypus populations and broader land–sea ecological connectivity.

Catchments with the highest number of recorded observations, including the Shoalhaven and Bega River systems, are likely influenced by survey bias. These areas are more accessible and have higher levels of land clearing and human presence, increasing the likelihood of detection and reporting. In contrast, more heavily forested catchments may support comparable or higher platypus populations that are under-represented in the dataset due to lower survey effort. The larger size of the Shoalhaven catchment may also contribute to its higher number of records relative to other systems.

The Darling and Snowy River catchments were largely excluded from the analysis due to the limited proportion of their extent within the Study Area. However, available records indicate relatively high occurrence in their upper reaches, suggesting these areas may also support important platypus populations.

Overall, the results reinforce the importance of intact, forested catchments and upstream habitat condition in supporting platypus populations. State Forests and NPWS reserves, particularly in upper catchments, are likely to play a key role in maintaining water quality, habitat connectivity, and ecosystem function across the Region.

Table 34: Platypus records per catchment of the Region with 1km buffer applied.

	Total Catchment BioNet Records	NPWS Reserves		State Forest	
		Records	%	Records	%
Bega River	238	79	33%	15	6%
Clyde River-Jervis Bay	78	57	73%	30	38%
Darling River	40	6	15%	8	20%
East Gippsland	52	14	27%	42	81%
Moruya River	14	10	71%	7	50%
Shoalhaven River	367	62	17%	8	2%
Snowy River	35	2	6%	6	17%
Towamba River	82	41	50%	38	46%
Tuross River	38	14	37%	18	47%
Total	**944**	**285**		**172**	

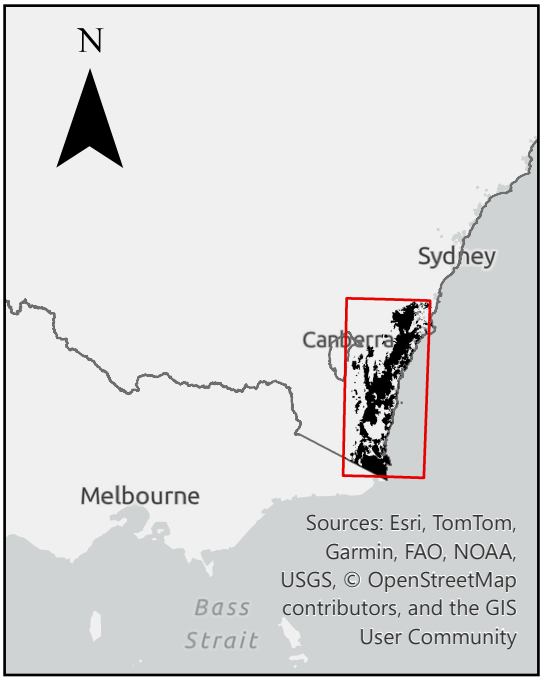
8 BIODIVERSITY FEATURES AND HABITATS

8.1 Biodiversity values

Important biodiversity and ecosystem values have been mapped across Australia, to help identify places which would benefit from protection or conservation. These are shown in the context of our Study Area in Figure 31. The biodiversity values are mapped considering the priorities outlined in the 30 by 30 National Roadmap (DCCEEW, 2024) and noted in Table 43. The biodiversity values dataset was generated from integrated species diversity, endemism, threatened species and ecosystems, habitat connectivity, and ecosystem services data and categorised into percentile-based thresholds that highlight areas of comparatively higher biodiversity importance. Flora Reserves are excluded from assessment as these are considered protected areas in the dataset. Figure 31 shows that areas of high biodiversity value (>90%) are present throughout the State Forests of the Region.

8.1.1 Limitations

The biodiversity values mapping is national and derived from models which have inherent uncertainty, and are variable in quality and level of accuracy. The Commonwealth advises that “Species distribution models were used to derive multiple input datasets used in this analysis (e.g. species density and regional endemism). These datasets represent different information and use different methodology to derive results.” Further, protected areas are those established prior to 30 June 2024.



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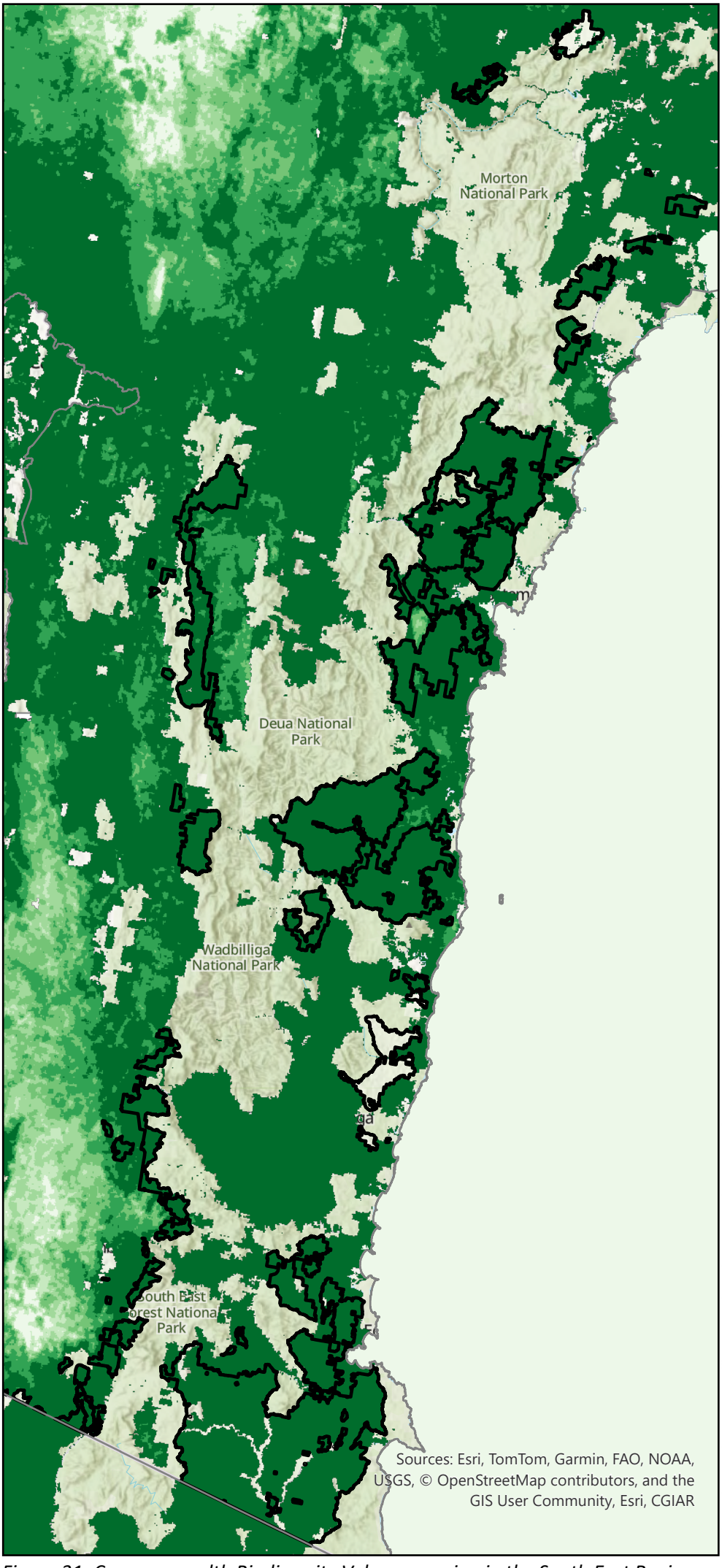

State Forest

Biodiversity value

- 0 to 49%
- 50 to 59%
- 60 to 69%
- 70 to 79%
- 80 to 89%
- Above 90%

Biodiversity Values © Commonwealth of Australia, Australian Government of Department of Climate Change, Energy, Environment and Water, 2025, State Forest © Forestry Corporation of NSW 2024

Map produced by Kate Carroll, National Parks Association of NSW

15/05/2026

Kilometres
0 25 50 75

Figure 31: Commonwealth Biodiversity Values mapping in the South East Region

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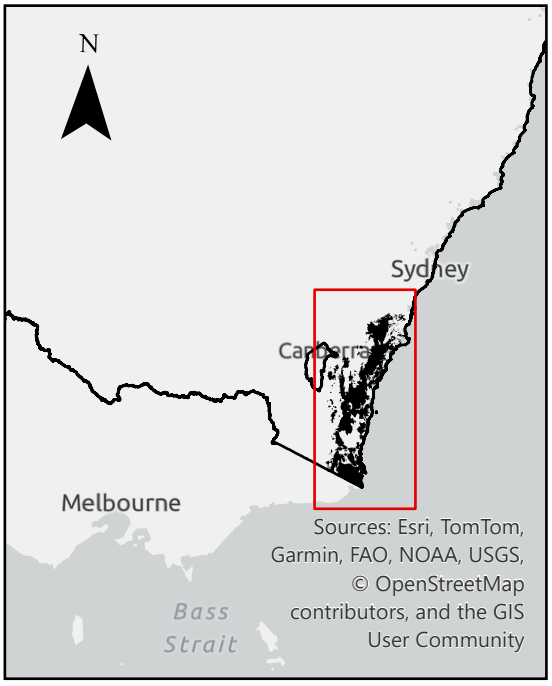
8.2 Key Biodiversity Areas (KBAs)

Key Biodiversity Areas (KBAs) are sites that make a significant contribution to the global persistence of biodiversity across terrestrial, freshwater, and marine ecosystems. They represent places that are especially important for the survival of species and habitats. The KBA program evolved directly from BirdLife International's Important Bird and Biodiversity Areas (IBAs) initiative, which originally focused on identifying and protecting critical areas for bird conservation (Birdlife Shoalhaven, n.d.a). In Australia, BirdLife Australia has played a central role in adapting and advancing this global framework. The organisation has led the transition from the IBA network to the KBA system, coordinating the identification, assessment, and long-term monitoring of KBAs across the country. Through this work, BirdLife Australia ensures the protection of Australia's unique biodiversity, ranging from threatened bird species to entire ecological communities (Birdlife Australia, 2025a). There are 13 organisations partnered to map KBAs and direct resources to their conservation. IUCN is one of the key partners and has developed the *Global Standard for the Identification of Key Biodiversity Areas.*

Five KBAs occur in the Region, and they are mainly distributed along the south coast. Some of these KBAs are partially or wholly within existing NPWS Reserves. At the northern end, near Meryla State Forest, lies the Budderoo and Barren Grounds KBA. Moving south, a cluster forms around Jervis Bay, which includes the Jerrawangala, Jervis Bay, and Lake Wollumboola KBAs. Further down the coast lies the Ulladulla to Merimbula KBA—the largest of all—extending southward to Broadwater State Forest. The southernmost KBA is located at the NSW–VIC border, along the coast and adjacent to Nadgee State Forest. These KBAs collectively hold significant ecological and conservation values at regional, national, and global levels. Among them, the Ulladulla to Merimbula KBA stands out as the largest, covering approximately 209,808 hectares. The next in scale is the Nadgee to Mallacoota Inlet KBA, with an area of about 38,171 hectares, followed by the Jervis Bay KBA at 15,833 hectares. The Budderoo and Barren Grounds KBA encompasses around 7,384 hectares, while Jerrawangala KBA accounts for about 4,024 hectares. By contrast, Lake Wollumboola represents the smallest of the five, occupying roughly 651 hectares.

Importantly, parts of the Ulladulla to Merimbula KBA fall within the State Forests, involving 20 State Forests such as Boyne, Mumbulla, Bodalla, and Mogo State Forest. It is also the only KBA among the five that is included in the State Forests and needs permanent protection. The KBA has high diversity of threatened plant and bird species underscoring the importance of incorporating these State Forests into the protected area network to safeguard biodiversity and maintain ecological resilience. As the only site in State Forests and the largest KBA in the South East, its protection carries particular weight in reducing further logging pressures.

Key information about each KBA is outlined in Appendix G and they are mapped in Figure 32.



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Key Biodiversity Area
South East Region
Proposed Additions
NPWS Reserves

NPWS Reserve © State Government of NSW and NSW Department of Climate Change, Energy, the Environment and Water 2021, State Forest © Forestry Corporation of NSW 2024, South East Region derived from © Commonwealth of Australia and Department of Climate Change, Energy, the Environment and Water 2025 and Commonwealth of Australia (Bureau of Meteorology 2022), Rivers © State Government of NSW and Spatial Services (DCS) 2026 KBAs © BirdLife International (2025). The World Database of Key Biodiversity Areas. Developed by the KBA Partnership: BirdLife International, International Union for the Conservation of Nature, Amphibian Survival Alliance, Conservation International, Critical Ecosystem Partnership Fund, Global Environment Facility, Re:wild, NatureServe, Rainforest Trust, Royal Society for the Protection of Birds, Wildlife Conservation Society and World Wildlife Fund. March 2025 Version. Available at www.keybiodiversityareas.org. [Accessed17/06/2025].

Map produced by Kate Carroll, National Parks Association of NSW

15/05/2026

Kilometres
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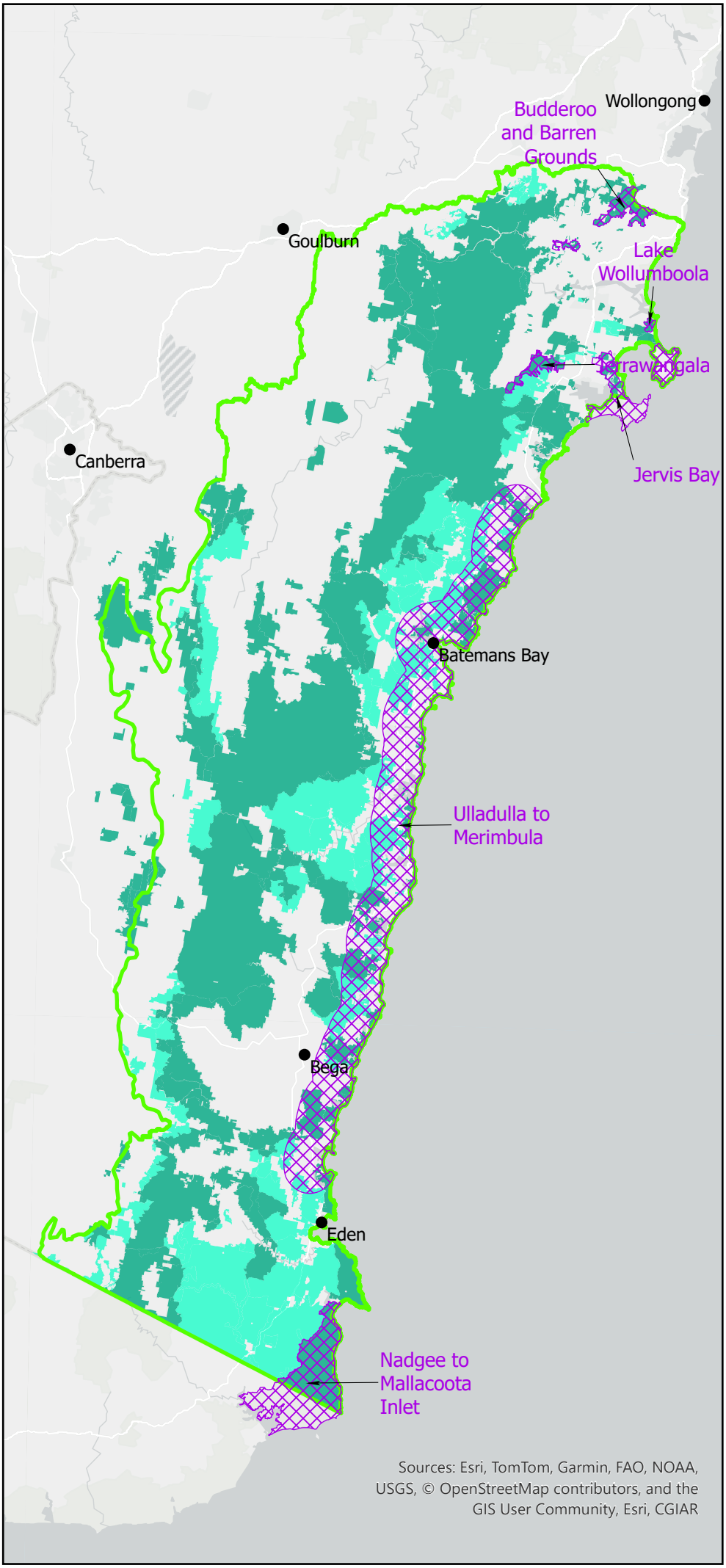

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Figure 32: Key Biodiversity Areas of the South East Region

9 HABITAT CONNECTIVITY

Interconnected landscapes are critical for a functioning ecosystem. They support healthy population sizes, facilitate gene flow, and allow species to move across the landscape in search of breeding partners and in response to resource availabilities such as food and shelter. They also support large-scale movements of migrating species. Isolated patches of habitat in the reserve system are insufficient to retain healthy ecosystems. Landscape-scale conservation strategies will allow for the protection of biodiverse, interconnected ecosystems and critical habitat corridors. This chapter describes and maps the known habitat corridors of the South East Region and outlines opportunities for their conservation within the State Forests.

9.1 Methodology

9.1.1 Great Eastern Ranges connectivity data

The Great Eastern Ranges connectivity dataset is a joint initiative between Great Eastern Ranges, Gondwana Link and Griffith University, to identify critical movement corridors and patches for species and species guilds throughout eastern and south-western Australia. The study utilised a least-cost paths and patch connectivity approach (Norman and Mackey, 2024). Three datasets were assessed for relevance to the assessment:

- Forest landscape connectivity pathways
- Forest landscape patch connectivity
- Gliding possums connectivity

These datasets were critiqued with respect to the Study Area.

9.1.2 Ecological connectivity of terrestrial habitat NSW

The NSW Government and NSW DCCEEW have mapped *Ecological connectivity of terrestrial habitat in NSW*. The dataset measures generalised quality of terrestrial habitats supporting biodiversity, habitat fragmentation and landscape position (e.g. as part of a habitat corridor, or a stepping stone) (NSW DCCEEW and CSIRO, 2019). The data was developed as part of a suite of indicators used to assess the performance of the BC Act and understand the status of biodiversity in NSW. The dataset was critiqued with respect to the Study Area.

9.2 Findings

9.2.1 Pathways

Forest landscape connectivity pathways are mapped in Figure 33 and visually demonstrate important corridors for species across the Region. The corridors mostly pass through NPWS Reserves and State Forests. The most significant pathways run north-south, with some links between these corridors across the landscape. The most westerly corridor includes State Forests on the tablelands such as Tallaganda, Badja and Glenbog and connects to the far southern Bondi and Yambulla State Forests and South East Forest National Park. This corridor links to north eastern Victoria to the south and the Southern Highlands and Greater Blue Mountains in the north.

Another major corridor that connects to the Greater Blue Mountains comes from the north at Wingello State Forest south through Morton National Park and is more coastal, connecting a series of

forests in the Clyde catchment including Yadboro, Currowan, Clyde, Shallow Crossing, Buckenbowra, Mogo, Moruya and Bodalla State Forests and Deua and Wadbilliga National Parks. Further south the corridor continues through the Murrah, Mumbulla and Tanja Flora Reserves and Yurammie, Gnupa, Nullica and Timbillica State Forests. The corridors (mapped green in Figure 33) pass through 40 State Forests (Appendix C). The State Forests form key links between existing NPWS Reserves.

9.2.2 Patches and ecological connectivity

Patch connectivity is mapped in Figure 34 and ecological connectivity of terrestrial habitat in Figure 35. Both datasets show that the State Forests are a critical part of the landscape for habitat connectivity. All but one small State Forest (Woodburn) are within a critical patch of habitat (Appendix C).

9.2.3 Optimum glider pathways

State Forests are particularly important in the coastal regions as a major arterial route for gliders (Figure 36). The mapped glider corridors are shown green, cream and red with the most optimum pathway highlighted red. Optimum glider pathways pass through most of the State Forests (Appendix C). There is a dense network of corridors around the Shoalhaven area, from Morton National Park feeding down to the Jervis Bay area and Batemans Bay. It also branches off from Morton National Park to the west, to Tallaganda State Forest.

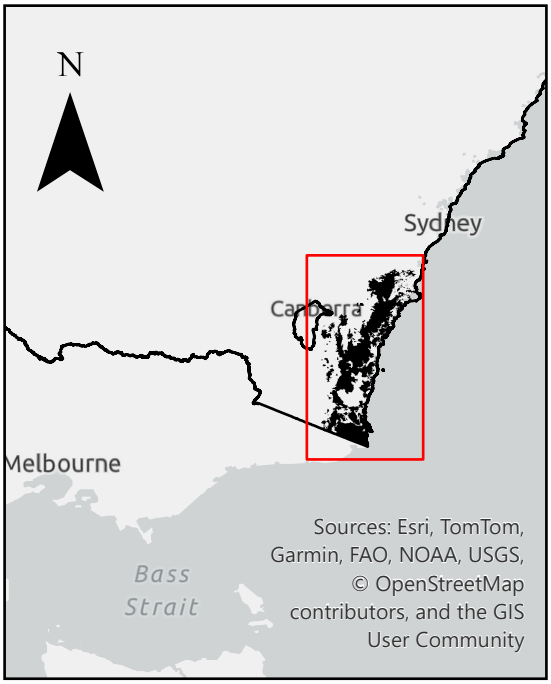
The main easterly glider pathway continues down the coast connecting the coastal State Forests through to Yambulla and Nadgee State Forests at the Victorian border. This arterial corridor splits west in several locations, connecting to the tableland forests including the southern Tallaganda and Badja State Forest, and further south to Glenbog, Tantawangalo, Coolangubra and Bondi.

9.2.4 Conclusion

The maps and analysis highlight the critical role of the State Forests in maintaining habitat connectivity in Southern NSW. Whilst some connectivity is provided through existing National Parks, several key corridors lie outside the protected area network – primarily within State Forests. These State Forests form the missing link in regional wildlife corridors, and their protection is essential to ensure the landscape continues to support ecologically healthy forests that are resilient against threats such as bushfires and other environmental pressures.

The State Forests contain key habitats in the north-south corridors, linking extensive tracts of NPWS Reserves. Protecting these areas is critical for maintaining connectivity across southern NSW and for facilitating fauna movement across the landscape into Victoria and the Sydney Basin.

The importance of State Forests for Glider movement is corroborated by the analysis in Chapter 6.2.2, where glider species such as Southern Greater Glider and Yellow-bellied Glider were found to be particularly prevalent in State Forests.



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NPWS Reserves
State Forest
Forest landscape connectivity pathway

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Map produced by Kate Carroll, National Parks Association of NSW

14/05/2026

Kilometres
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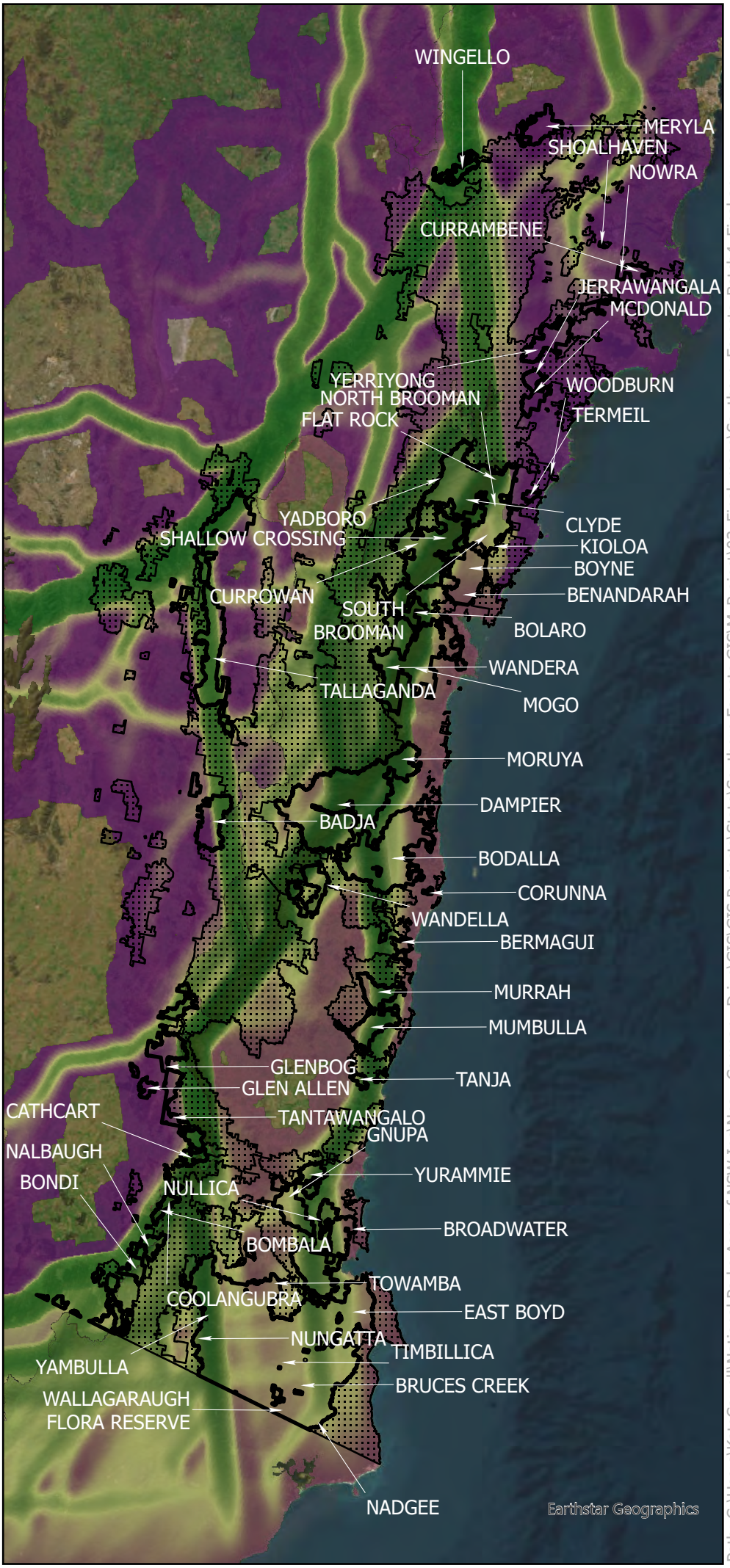

Figure 33: Forest landscape connectivity pathways

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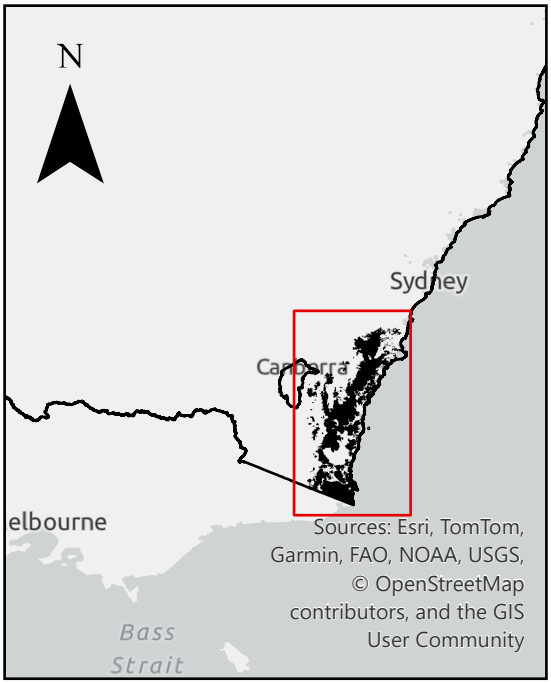

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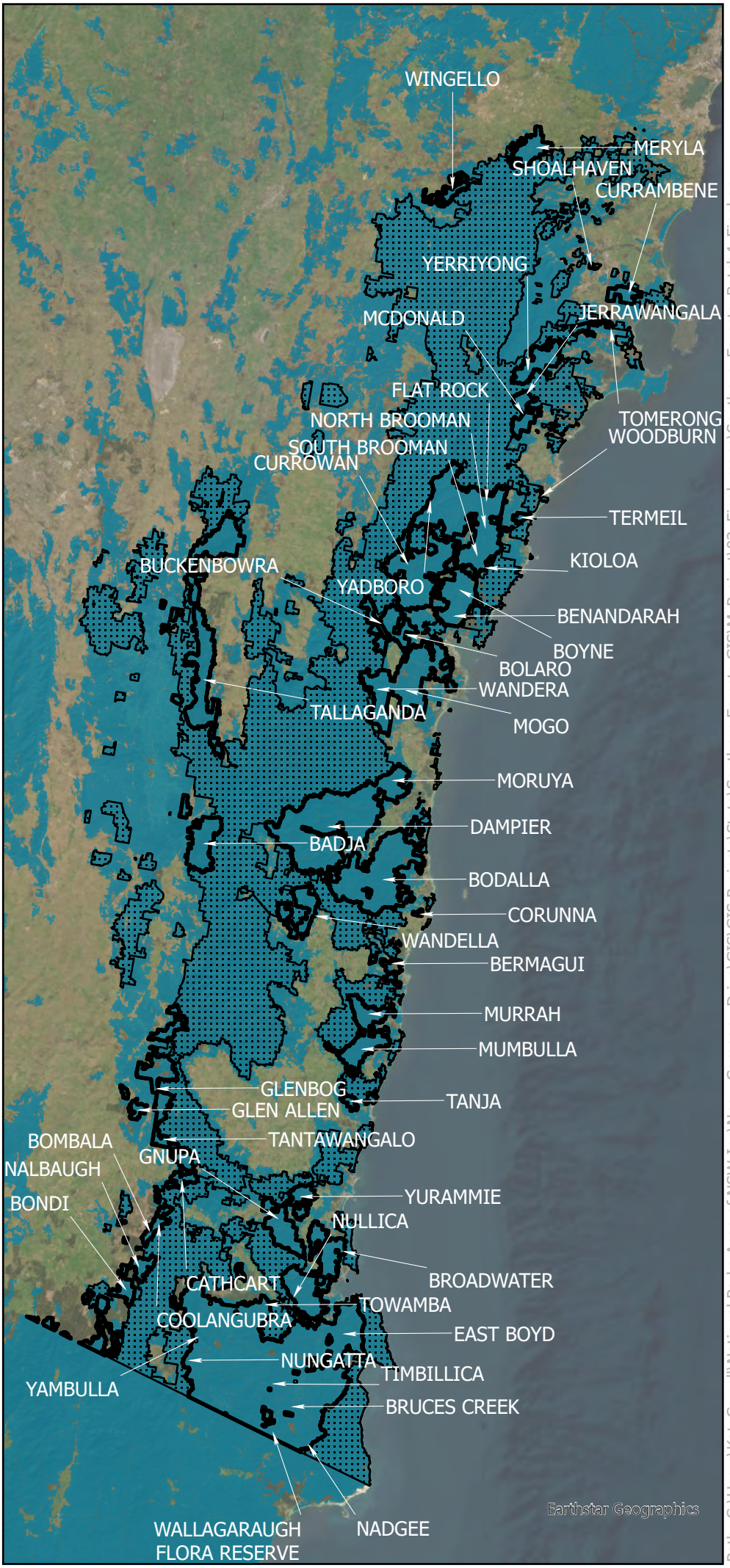
State Forest
NPWS Reserves
Forest landscape patch and terrestrial ecological



Map produced by Kate Carroll, National Parks Association of NSW

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Kilometres
0 25 50 75

Figure 34: Forest landscape patch connectivity

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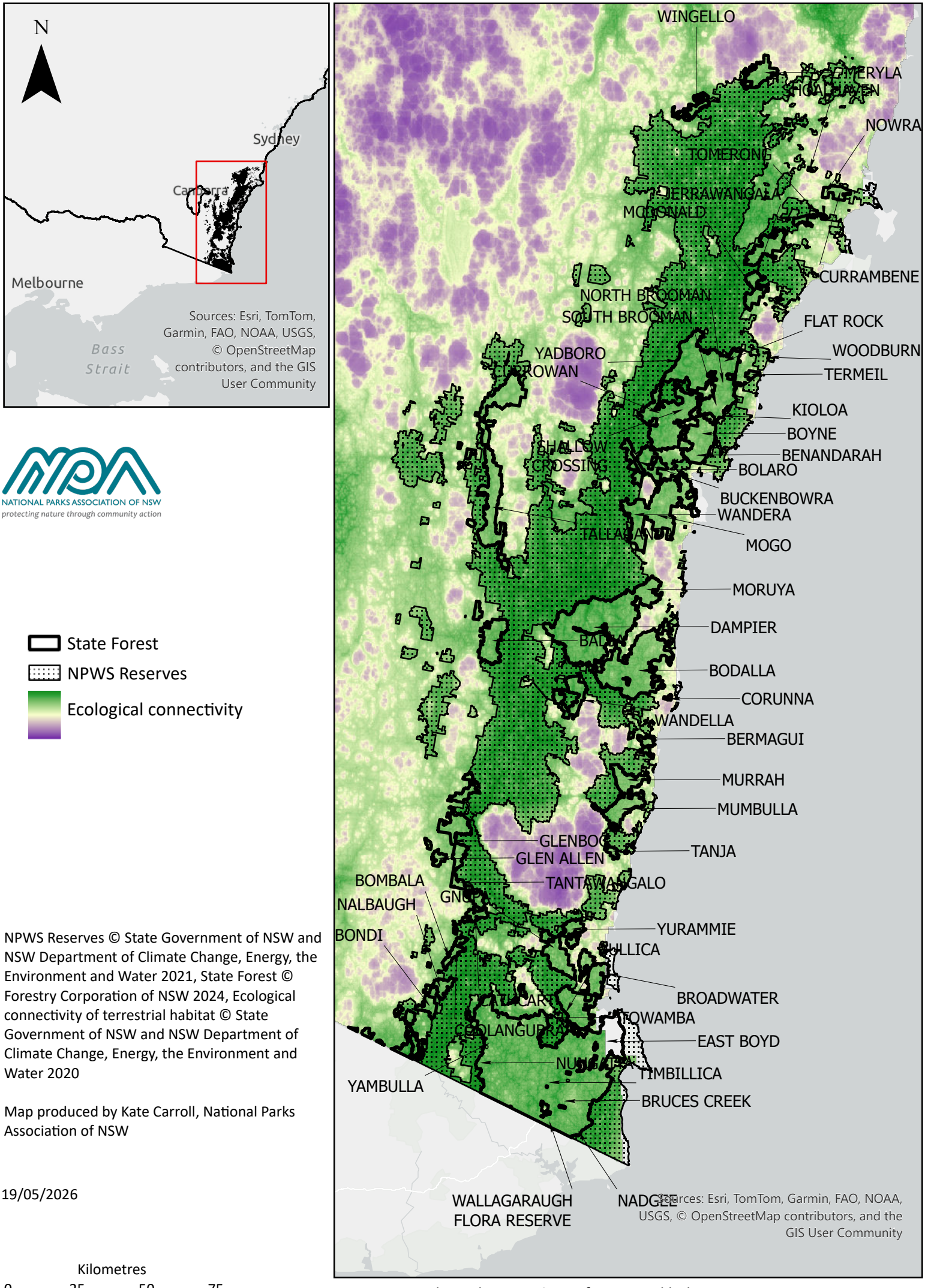

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State Forest
NPWS Reserves
Ecological connectivity

Map produced by Kate Carroll, National Parks Association of NSW

19/05/2026

Kilometres
0 25 50 75

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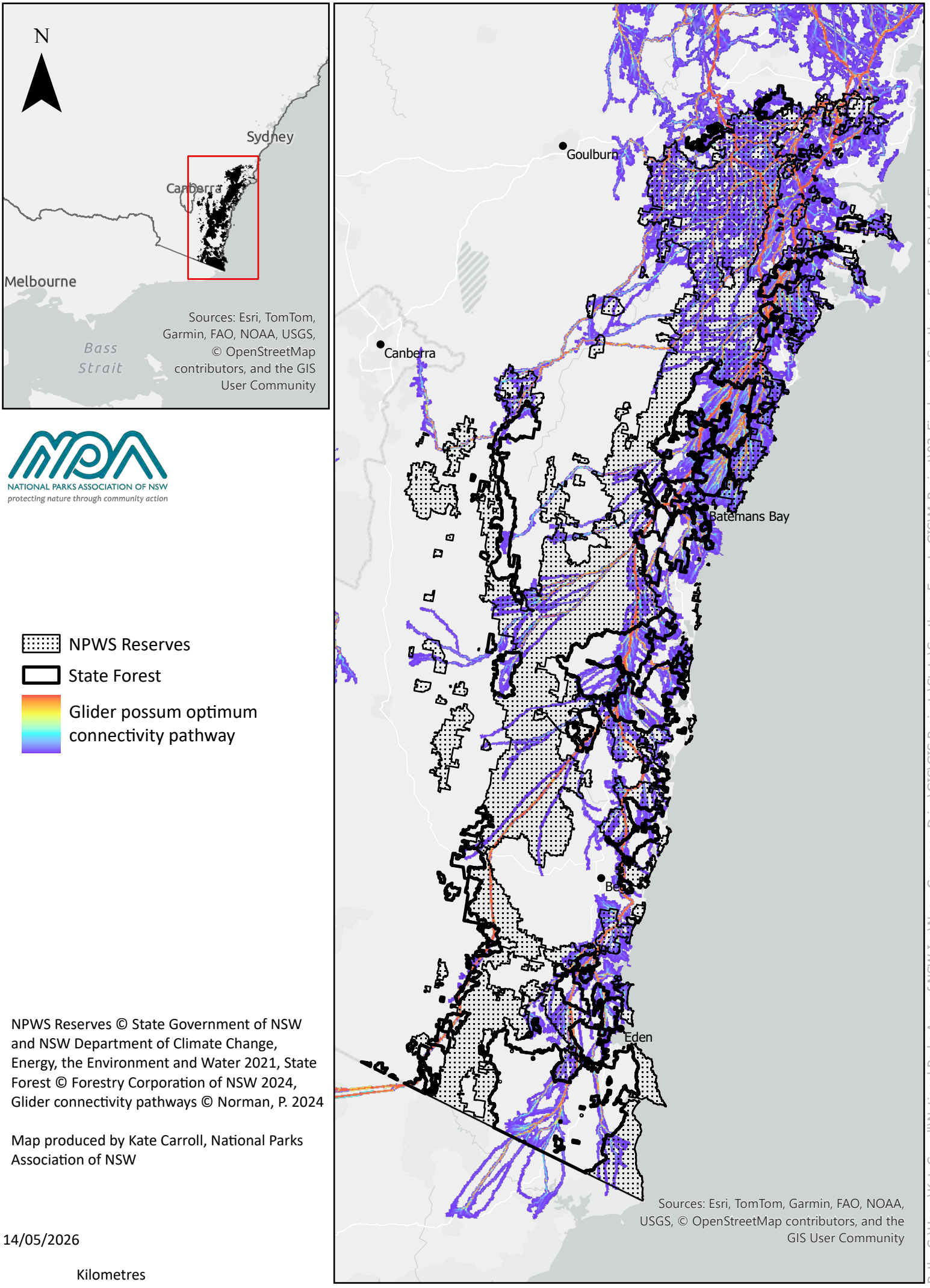
Figure 35: Ecological connectivity of terrestrial habitat NSW



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NPWS Reserves

State Forest

Glider possum optimum connectivity pathway

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14/05/2026

Kilometres

0 25 50 75

Figure 36: Glider connectivity pathways

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