Sunshine Coast COUNCIL

Mount Ninderry Environment Reserve

Management Plan - Vol I 2021

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Council wishes to thank all contributors and stakeholders involved in the development of this document.

Acknowledgement of Country

Sunshine Coast Regional Council acknowledges the traditional Country of the Kabi Kabi and Jinibara Peoples of the Sunshine Coast and recognise that these have always been places of cultural, spiritual, social and economic significance.

We wish to pay respect to their Elders – past, present and emerging – and acknowledge the important role Aboriginal and Torres Strait Islander people continue to play within the Sunshine Coast community.

Cover photo *"Drone capture of Mount Ninderry view from the north facing south*" courtesy of Richard Newton.

View of Mount Ninderry from the western side *(photo Cameron Milne).*

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Executive Summary

The Mount Ninderry Environment Reserve Management Plan describes the reserve's ecological, cultural, and social values and how these will be managed over the next 10 years. The primary goal of reserve management will be to ensure native plants, animals and habitats are healthy, resilient and valued by the community, contributing to the biodiversity outcomes of Sunshine Coast Council's (council's) Environment and Liveability Strategy 2017.

Mount Ninderry Environment Reserve is within the lands of the Kabi Kabi First Nation. Mount Ninderry is important to Aboriginal people and many of the wider community and is a significant place within the South East Queensland songlines network. Characterised by its ancient geological landform rising 304 metres above sea level, Mount Ninderry is an iconic landscape feature of the Sunshine Coast coastal plain. The whole reserve and surrounding landscape have evidence of past activities of the Kabi Kabi Traditional Owners, making this area culturally and historically significant.

Located within walking distance of the surrounding peri-urban community and within proximity of many coastal villages, the reserve is a popular site for day visitors to enjoy a healthy hike and take in the beauty of our local area. A walking track leads to the summit, offering spectacular coastal and hinterland views.

Mount Ninderry Environment Reserve protects 199 hectares of core habitat including 60 hectares added in 2013 through council's Environment Levy Land Acquisition Program.

Within this large protected area there are eight different regional ecosystems (REs) including a large area of 'endangered' subtropical lowland rainforest (RE 12.3.1) and four other 'of concern' regional ecosystems (RE12.3.2, RE12.12.10, RE12.12.12 and RE12.12.14).

The whole site supports a diverse and unique wildlife assemblage including a pair of peregrine falcons (*Falco peregrinus*) nesting high on the cliffs of Mount Ninderry. It is estimated there are only 25–35 known breeding pairs of this bird in South East Queensland (DES 2016).

Mount Ninderry Environment Reserve protects an area of high biodiversity. Fauna surveys have identified 150 different types of mammals, frogs, reptiles, fish, and crustaceans within the reserve. This includes koalas (*Phascolarctos cinereus*) grey-headed flying-fox (*Pteropus poliocephalus);* tusked frog (*Adelotis brevis*) and glossy black-cockatoo (*Calyptorhynchus lathamii)* which are all listed as vulnerable under either or both the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999* and *Nature Conservation (NC) Act 1992*.

The rufous fantail *(Rhipidura rufifrons)* and the black faced monarch (*Monarcha melanopsis)* are listed migratory birds which rely on the habitats of Mount Ninderry.

Flora surveys identified 349 native plants including the 'endangered' *Plectranthus torrenticola* and *Triunia robusta,* 'vulnerable' *Macadamia ternifolia* and the 'near threatened' *Pararistolochia praevenosa*.

The Mount Ninderry Environment Reserve Management Plan is supported by council's Environmental Reserves Network Management Plan (ERNMP), an overarching guide to reserve management across the Sunshine Coast. From this, the Mount Ninderry Environment Reserve is in the "Bushland Reserve" category.

The management intent for a reserve in the bushland category is to "*protect and enhance the site's significant ecological values whilst also supporting unsupervised sustainable nature-based activities*". Further to this, the management plan for Mount Ninderry Environment Reserve aims to ensure the site's cultural values are also respected.

1 Introduction

This Management Plan supports Sunshine Coast Council's corporate vision "to be Australia's most sustainable region - healthy, smart and creative".

To achieve this, council's Environment and Liveability Strategy (ELS) sets the strategic directions for the preservation and enhancement of the natural environment and the liveability of the region. The Natural Environment's biodiversity outcome is to ensure native plants, animals and habitats are healthy, resilient and valued by the community.

A key policy position to delivering on this outcome is that priority habitat areas are protected, enhanced, connected and responsive to changing environmental conditions.

Mount Ninderry Environment Reserve covers 199 hectares (comprising 13 lots), including 60 hectares purchased in 2013 through the Environment Levy land acquisition program.

Koala at Mount Ninderry (*photo Joel Morris*)

1.1 Purpose of the Management Plan

The purpose of this Management Plan is to describe the reserve's ecological, cultural, social and economic values and express the associated management actions required to maintain or enhance these values.

This Management Plan provides an adaptive management framework which has been developed under nationally recognised guidelines and principles of protected area management (see Volume II **Appendix 1**).

1.2 Management Intent

The operational reserve management category for this site in accordance with the Environmental Reserves Network Management Plan is 'Bushland Reserve'. Under this category the management intent is to ensure the significant ecological values are protected and maintained, whilst allowing for sustainable public access that is managed through the development of a reserve landscape plan, associated signage and purpose-built infrastructure.

2 Description of the Reserve

2.1 Location and Property Description

Mount Ninderry Environment Reserve is in South East Queensland, approximately 120km north of Brisbane. The reserve is situated on the coastal plain approximately 6km east of Yandina and in close proximity to residential populations within urban and peri-urban areas (see **Figure 1**).

The reserve is made up of thirteen (13) lots, a combination of State owned with Sunshine Coast Council (SCC) as trustee and SCC owned (see **Table 1** below).

The first land parcels were secured for environmental park purposes in the 1980's and 90's with the recent Environment Levy land purchase, council endorsed land acquisition (off Ocean Vista Drive) and developer contributions increasing the total reserve area to 199 hectares (see **Table 1** below). The levy parcel (Lot 367 on CG286) is registered as a Nature Refuge.

Figure 1. Locality Map

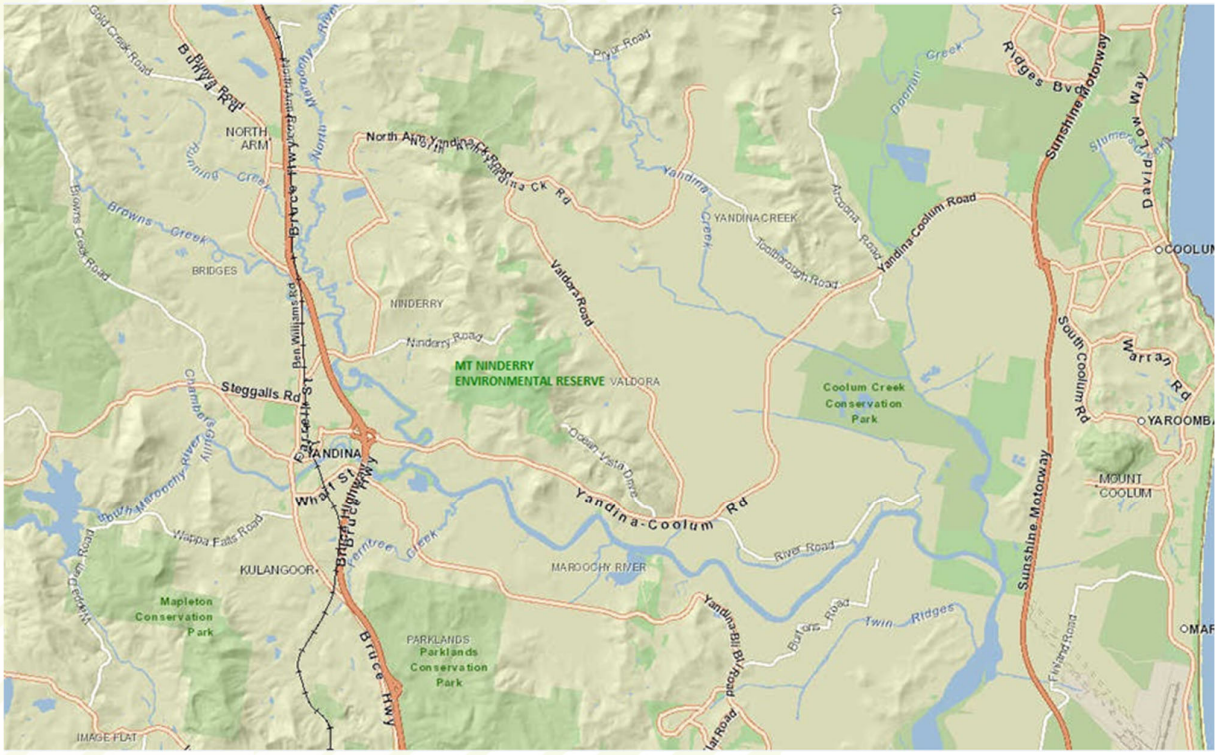


Table 1 Land Parcel Summary
(See **Appendix 3a** – land parcel map).

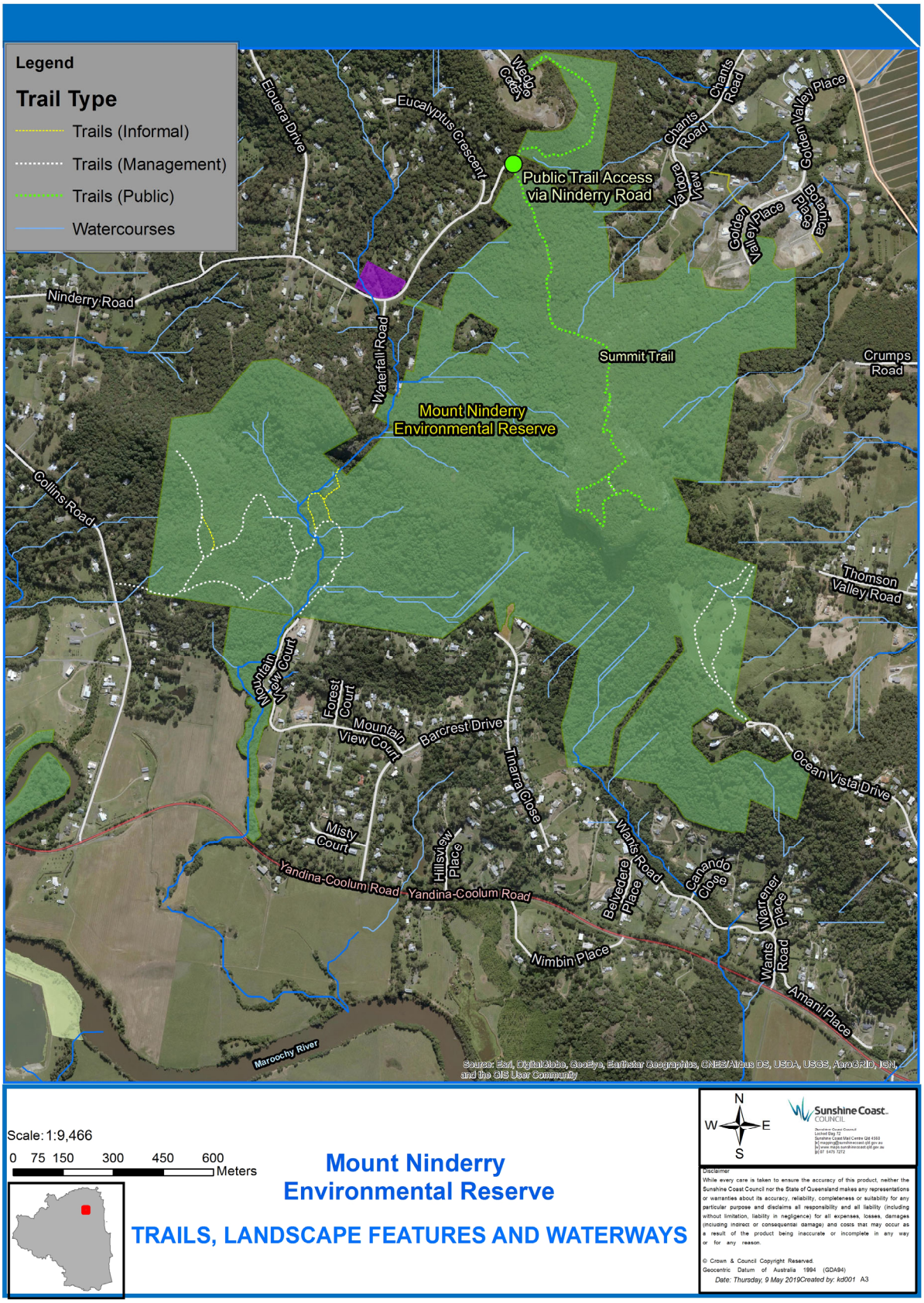
Parcel Description	Size (ha)
SCC owned environment levy purchase	
Lot 20 on SP124283	31.53
Lot 367 on CG286 *(Nature Refuge)*	60.27
State Reserve SCC trustee	
Lot 976 on CP889198	29.20
Lot 47 on CP889198	20.41
Lot 118 on RP912955	11.97
Lot 17 on RP817175	0.48
Lot 100 on SP277876	3.51
SCC under nomination of trust	
Lot 100 on SP202463	2.25
Lot 100 on SP274299	6.35
Lot 100 on SP246615	5.28
Lot 100 on SP297594	9.56
Lot 1 on SP258214	8.23
Lot 101 on SP294627	10.15
Total Land Size (ha)	199.19

An existing walking trail is a prominent feature of the reserve with the main entrance located off Ninderry Road, near Eucalyptus Crescent (see **Figure 2** below).

The 1.4km walking track ascends through open forest and woodland reaching two viewing platforms overlooking spectacular panoramic views across the coast and hinterland.

Existing trail within the reserve (*photo Converge Heritage + Community)*

Figure 2 Trails, Landscape Features and Waterways Map



2.1.1 Catchment and Landscape Context

Located in the Maroochy River Catchment (Upper Maroochy Estuary and the Yandina Creek sub-catchments), Mount Ninderry has a network of permanent and seasonal drainage lines running from the southern slopes into the Maroochy River (**Figure 2**).

Due to surrounding land use, historic vegetation clearing and road construction—Mount Ninderry is isolated from the Upper Maroochy River with water flowing via a narrow drainage line under Yandina-Coolum Road and across privately owned rural land.

The least fragmented ecological connections are north to Eumundi Conservation Park via a mosaic of private lands and smaller conservation areas.

The Environment and Liveability Strategy (ELS) identifies Mount Ninderry as a core habitat area. (See Volume II **Appendix 3d** – Core and Connecting Habitat).

2.1.2 Land Zones

The exposed rocky cliffs, platforms and outcrops are impressive geological features.

Regional Ecosystem mapping identifies two dominant land zones.

Land Zone 3 - Alluvial river and creek flats

Recent Quaternary alluvial systems associated with freshwater rivers and creeks. Land Zone 3 vegetation communities provide a greater level of habitat connectivity compared to surrounding landscapes. This can provide important habitat linkages and wildlife movement opportunities

Land Zone 12 - Hills and lowlands on granitic rocks.

Mesozoic to Proterozoic igneous rocks, forming ridgelines and hills. Habitat remnants provide refuge for a range of wildlife including hollow dependent birds and arboreal mammals.

Waterfall entering the reserve through state land - Photo Joel Morris

2.2 History and Land Use

2.2.1 Historical Land Use

The Ninderry area is the traditional land of the Kabi Kabi people. Land use prior to European settlement can be inferred from historical account of the local Aboriginal people and includes fire management and other cultural practices which maintained the pre-European extent of biodiversity, productivity for food, medicine, clothing, tools, housing and other cultural resources (Connors, 2015, Gammage, 2013).

In 1853 Mount Ninderry was part of the large "Canando Cattle Run" applied for by Daniel and Zacharias Skyring, (SCC Historical Collections 2016). By 1870, timber felling was also occurring in the area and in 1874 the Mount Ninderry Range was declared a timber reserve and progressively open to selection from 1876 – 1923.

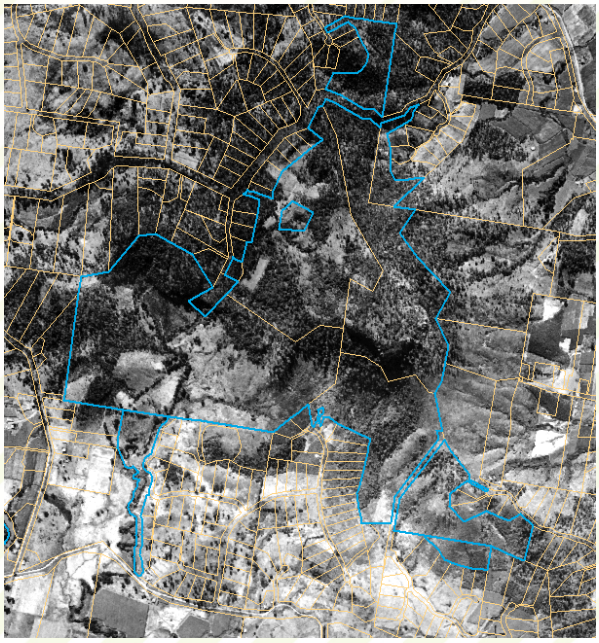
From 1888 – 1895, Lot 367 (identified as part of land parcel Selection 24v and 25v) was partially cleared and cropped with maize, potatoes, bananas and other vegetables. Later the land was used for sugar cane production when the Moreton Mill was opened.

Review of historical aerial photographs reveals the north-west slopes of Mount Ninderry and much of Lot 367 in the south were cleared for grazing and cropping prior to and during the 1950's. Since this time, regrowth throughout the reserve has been significant, with the majority of the reserve now covered by tree canopy (see **Figure 3**). **Figure 4** also shows significant regrowth on the south west slope between 1989 and 2014.

2.2.2 Surrounding Land Use

Today, the site is surrounded by rural residential land parcels and "lifestyle" blocks (**Figure 3** below). Residential housing and hobby farm use surround much of the northern, western and southern sides of the reserve. Some larger properties on the eastern side continue to support grazing uses.

Figure 3 Aerial images showing land use history



a) 1958

b) 2015

Figure 4. Land Use History Photos

a) 1989

b) 2002

c) 2007

d) 2014

3 Bioregional and Landscape Context

The bioregional landscape descriptions which have been included here support the nature refuge portion which is now part of the national reserve system[12].

3.1 IBRA

Under the latest Interim Biogeographic Regionalisation for Australia (IBRA 7), Mount Ninderry Environment Reserve is within the South East Queensland bioregion (SEQ bioregion) which has a total area of 6,149,604 hectares, with 855,175 protected (13.91%). The IBRA is endorsed by all levels of government as a key tool for identifying land for conservation. Australia's landscapes have been classified into 89 large geographically distinct bioregions based on common climate, geology, landform, native vegetation and species information.

3.2 Catchment

Mount Ninderry Environment Reserve is located centrally within the Maroochy River Catchment (Upper Maroochy Estuary and the Yandina Creek sub-catchments) and drains directly into the Maroochy River (**Figure 2**).

Occupying much of the highest country in the surrounding area, the reserve mostly discharges surface waters to properties outside the reserve. The exception to this is properties adjacent to Waterfall Road, which mostly discharge into the reserve.

3.3 Local Planning Context

The reserve is within the Sunshine Coast Council Planning Area. Under the Sunshine Coast Planning Scheme 2014, the reserve is zoned 'environmental management and conservation zone' with values identified and protected. Lot 100 SP277876, lot 100 SP297594, lot 1 SP258214 and lot 101 SP294627 are zoned 'limited development' pending a scheduled amendment to the Planning Scheme.

3.4 CAR Contribution

***Comprehensive**:* There are eight (8) regional ecosystems represented in the reserve which are included in the SEQ bioregion and SEQ04-Sunshine Coast - Gold Coast Lowlands sub-province.

***Adequate**:* Mount Ninderry Environment Reserve comprises 199 ha of mostly 'good' to 'very good' condition remnant and regrowth vegetation. This indicates that the remnant habitats within the reserve have a high level of resilience.

As shown in **Figure 1**, the reserve is within 2 - 10km of surrounding protected areas (Eumundi Conservation Park, Coolum Creek Conservation Park, Parklands Conservation Park and Mapleton National Park) and is an important landscape link across the surrounding rural residential properties.

The reserve contributes to the ecological viability of local fauna and flora populations, threatened species and diverse ecological communities.

***Representative**:* The reserve provides a representation of pre-clearing vegetation

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Australian Government, 2009, *Australia's Strategy for the National Reserve System, 2009 – 2030,* endorsed by the Natural Resource Management Ministerial Council (NRMMC), ACT.[1]

mosaics and habitats in the Yandina to Coolum district. Mount Ninderry represents a unique collection of ecological features and habitat niches. A number of these habitats are poorly conserved in the SEQ component of the National Reserve System.

4 Reserve Values

4.1 Site Geology

Formed through volcanic activity 212 million years ago, Mount Ninderry is the result of hardened remnant rocks formed through the 'North Arm Volcanics' episodes (Willmott 2007). These ancient events involved exploding volcanoes, lava and pyroclastic rocks forming layers of material being hardened and welded together. Over time, erosion has exposed the prominent Mountain peak seen today.

The summit is described as a horizontal layer of welded tuff sitting on a base of flow-banded rhyolite. The site is mapped by Geoscience Australia as "9444_r: Ninderry Rhyolite". This rock type is defined as: Felsites (lavas, clastics & high-level intrusives), (Natura Consulting 2011).

4.2 Ecological Values

Mount Ninderry Environment Reserve provides an important refuge for a range of local and endemic species while facilitating movements by migratory species across the landscape.

Natural values described below have been compiled from fauna and flora surveys, condition assessments and historic records (refer to References).

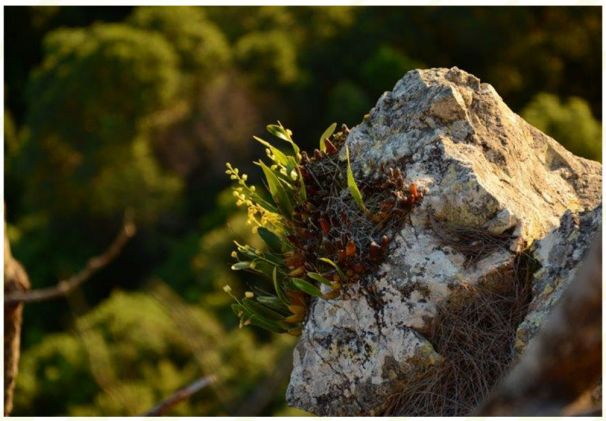
4.2.1 Vegetation Communities and Ecosystems

There are eight (8) regional ecosystems (RE) represented across the entire Reserve. These are described in **Table 2** below. Included are the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act 1999) listed 'endangered' gallery rainforest (RE12.3.1), and four (4) others listed as "of concern" under the *Queensland Vegetation Management Act* (VM Act 2009), (RE12.3.2, 12.12.12, 12.12.10 and 12.12.14).

Low lying parts of the reserve support large areas of the "critically endangered" (EPBC Act 1999) lowland rainforest of sub-tropical Australia (RE 12.12.16) and one 'least concern' (RE 12.12.15) (Thomas 2013).

There are several sections mapped as non-remnant which support high value regrowth (Thomas 2013).

The Biodiversity Report 2016 for the Sunshine Coast Local Government Area provides an assessment of the current status of Regional Ecosystems found within the region. This shows three (3) of the RE types found at Mount Ninderry (12.3.1, 12.3.2 and 12.12.12) are among the most poorly conserved Regional Ecosystems found on the Sunshine Coast (see Volume II **Appendix 2** and **Appendix 3b** - regional ecosystems map).



Dendrobium monophyllum on Ninderry Rhyolite (Photo Cameron Milne)

Table 2: Regional Ecosystems of Mount Ninderry Environment Reserve (Qld Government V10)

Vegetation Community	RE	VMA Class / BD Status	Description	Distribution in the reserve
Rainforest/ Vine Forest	12.3.1	Endangered / Endangered	Gallery rainforest (notophyll vine forest) on alluvial plains	Approx. 1.15Ha located in the southern part of the site located in Lot 100 SP246615
	12.3.2	Of concern / Of concern	*Eucalyptus grandis* tall open forest on alluvial plains with vine forest understorey ('wet sclerophyll').	Located in the south western part of the site in Lots 367 CG286 and 100 SP246615.
	12.12.16	Least concern / No concern at present Critically endangered EPBC Act 1999	Notophyll vine forest on Mesozoic to Proterozoic igneous rocks	Significant portions of the southern part of the reserve including much of Lot 367 CG286
Eucalypt Woodland	12.12.12	Of concern / Of concern	*Eucalyptus tereticornis*, *Corymbia intermedia, E. crebra* +/- *Lophostemon suaveolens* woodland on Mesozoic to Proterozoic igneous rocks	Located in the south eastern part of the site in Lots 118 RP9122955 and 47 CP889198
	12.12.14	Of concern / Of concern	*Eucalyptus racemosa* subsp. *racemosa* +/- *Lophostemon confertus*, *Syncarpia glomulifera, Eucalyptus acmeniodes* woodland usually on rocky near coastal areas on Mesozoic to Proterozoic igneous rocks	Occurs at the very top of Mount Ninderry on Lot 976 CP889198
	12.12.15	Least concern / No concern at present	*Corymbia intermedia* +/- *Eucalyptus propinqua, E. siderophloia, E. microcorys, Lophostemon confertus* open forest on Mesozoic to Proterozoic igneous rocks	Most of the escarpment of Mount Ninderry and western parts of Lot 367
	12.12.23	Least Concern / No concern at present	*Eucalyptus tereticornis* +/- *E. eugenioides* woodland on crests, upper slopes and elevated valleys and plains on Mesozoic to Proterozoic igneous rocks	A small area adjacent to Wedgetail Court in the northern part of the reserve
Shrubland/Heath	12.12.10	Of concern / Of concern	Shrubland or heath sometimes with emergent *Eucalyptus acmeniodes.* Associated with rocky soils derived from Mesozoic to Proterozoic igneous rocks	Located on Lot 367 CG286 (Thomas 2013).

4.2.2 Flora

349 native plant species have been identified at Mount Ninderry Environment Reserve during flora assessments – including the 'endangered' *Plectranthus torrenticola* and *Triunia robusta*.

A total of 389 plant species were recorded during the flora assessments—comprising 349 native and 40 exotic species (Thomas 2013 and 2004). Volume II **Appendix 4** lists all flora species found at this site.

The reserve supports four observed 'threatened' plant species. Details of these are listed in **Table 3**.

Four (4) other locally significant native plants have been identified. These plants are considered significant as they have limited range or known occurrence in the local government area. (Thomas 2013):

The 'endangered' Buderim holly (*Graptophyllum reticulatum)* occurs on private property south of Lot 367 (Forest Court). Preliminary searches have not located the plant within the reserve, with further field investigations required. This plant occurs nowhere else in Australia, and is restricted to a small number of known sites on the Sunshine Coast.

The 'endangered' *Plectranthus torrenticola* occurs on exposed rocky outcrops and is noteworthy due to the species limited distribution within the reserve, growth requirements and known susceptibility to visitor impacts.

The glossy spice bush (*Triunia robusta)*, and Richmond birdwing butterfly vine (*Pararistolochia praevenosa)* are classified as 'priority species in South East Queensland for conservation management and recovery actions. This is addressed further in section 7.3. Restoration Goals.

In addition to the above, there is an undescribed plant, *Platysace sp. (Mt Ninderry P.R.Sharpe+ 2092)* that only occurs on the top of the mountain and has not been recorded elsewhere. Currently, this plant is not listed as a threatened species under State or Commonwealth legislation, but this may change in the future as the population is considered by some to be at risk (E Bowerman 2021, personal communication, 7 October).

Management Actions

- Untertake additional flora surveys, including searches for the 'endangered' *Graptophyllum reticulatum* which is known to occur on nearby private property.

Plectranthus torrenticola at Mount Ninderry *(Photo Bradley McDonald)*

Table 3: Significant plant species found at Mount Ninderry Environment Reserve

Common Name	Scientific Name	Status	Threats and Management Considerations	Local Conservation Significance
Bunya pine	*Araucaria bidwillii*	Least Concern (NC Act 1992)		Culturally Significant.
glossy spice bush	*Triunia robusta*	Endangered (NC Act 1992 & EPBC Act 1999)	Threats include weed invasion (lantana, camphor laurel and mist flower), habitat destruction and collection of seeds and cuttings for horticultural purposes.	
northern guioa	*Guioa acutifolia*	Least Concern (NC Act 1992)		Near southern limit of its range.
plectranthus	*Plectranthus torrenticola*	Endangered (NC Act 1992 & EPBC Act 1999)	Prone to trampling by visitors accessing the rocky ledges of the escarpment and waterfall areas. There are also impacts from weeds including lantana *(Lantana camara)* and molasses grass (*Melinis minutiflora)* competing for its restricted habitat.	
Richmond birdwing butterfly vine	*Pararistolochia praevenosa*	Near Threatened (NC Act 1992)	Loss of larger populations to widespread clearing of vine forest along lowland creeks and rivers and lowland rainforest away from creeks in SEQ for agriculture and coastal urban development. Fragmentation also make it more difficult for pollination of isolated populations to occur (by midges).	
shiny leaf ebony	*Diospyros yandina (syn) Diospyros ellipticifolia v ebenus*			Uncommon species with limited distribution. Occurs Tweed Range, Clarence River (NSW) and Nambour to Gympie only. Main population is on the Sunshine Coast.
small-fruited Queensland nut	*Macadamia ternifolia*	Vulnerable (NC Act 1992 & EPBC Act 1999)	Refer to the southern macadamia species recovery plan. See section 7.3.1.	
white yiel	*Grevillea hilliana*	'Endangered' in NSW		Uncommon species spread by wind only.

4.2.3 Fauna

Fauna surveys have identified 150 different species of mammals, frogs, reptiles, birds, fish, and crustaceans. This does not include a comprehensive bird or freshwater fauna survey. All Fauna data records are listed in volume II **Appendix 6**.

A comprehensive field survey conducted within the levy land acquisition parcel (Lot 367) and Lot 976 (Future-Plus Environmental 2015), identified 52 species of mammals and reptiles. This and previous surveys comprising of (Fauna watch 2010) and (Austecology 2008 - conducted as part of historical development proposals), show the following total results:

- 6 Arboreal Mammals
- 9 Ground dwelling Mammals
- 2 Macropods
- 1 Monotreme
- 1 Mega bat species
- 21 Micro bat species
- 18 Reptiles
- 75 Bird Species
- 9 Freshwater Fish and Crustaceans
- 8 Frogs

Tusked Frog- *Adelotis brevis* (*K. Alland*)

Details of the status of listed 'threatened' species recorded at Mount Ninderry Environment Reserve are shown in **Table 4**

The eastern chestnut mouse (*Pseudomys gracilicaudatus)* a native mouse infrequently encountered in South East Queensland (SEQ) was a distinctive record in the fauna survey.

The cliffs of Mount Ninderry provide habitat for a pair of nesting peregrine falcons—the fastest bird in the world—flying at speeds up to 180km per hour. It is estimated there are only 25–35 known breeding pairs in South-east Queensland (DES 2016).

The 'vulnerable' grey-headed flying-fox (*Pteropus poliocephalus)* (EPBC 1999), ornate rainbowfish (*Rhadinocentrus ornatus)*, greater broad-nosed bat (*Scoteanax rueppellii)* and elf skink (*Eroticoscincus graciloides)* are species identified with specific threats and recovery actions within SEQ region (refer to **section 7.3 Restoration Goals).**

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Management Actions

- Progress gazettal or local law recognition of reserve as a dog on-leash zone.
- Control roaming domestic dogs and cats through restrictions on pet dog access to on-leash only, increased signage and community education.
- Engage adjoining landholders in community conservation partnership programs.
- Review prescribed burning regimes in the 2014 FMP for Eucalyptus dominated communities, to protect viable eastern chestnut mouse population.
- Install signage to advise rock climbers on peregrine falcon breeding seasons and areas to avoid during this time.
- Foster relationships with the local climbing community to protect vegetation and habitat on the cliff face.

Table 4: Significant fauna species known to occur at Mount Ninderry Environment Reserve

Common Name	Scientific Name	Status	Management Considerations
black faced Monarch	*Monarcha melanopsis*	EPBC Migratory (Bonn) Special Least Concern (NC Act 1992)	Breeds in rainforest habitat. Movements are poorly known, exhibit migratory behaviour spending spring, summer and autumn in Eastern Australia and wintering in southern and eastern Papua New Guinea. Some *Monarcha melanopsis* are thought to be non-migrating.
echidna	*Tachyglossus aculeatus*	Special Least Concern (NC Act 1992)	A dense understory made up of fallen timber, ground hollows, broken branches, ground cover plants and leaf litter all help create a complex habitat structure required for echidnas to survive.
elf skink	*Eroticoscincus graciloides*	Least Concern (NC Act 1992)	Occurs in rainforest and wet sclerophyll forest. Clearing and fragmentation of this vegetation has contributed to a loss of habitat in the Sunshine Coast hinterland. Predation by cats is a threat. A hot fire may damage habitat through loss of the dense leaf litter and fallen timber that it commonly shelters within. Timing of fire may also be a threat in that when the elf skink is in torpor.
glossy black cockatoo	*Calyptorhynchus lathami*	Vulnerable (NC Act 1992)	Loss of habitat clearing trees in woodland areas (*Allocasuarina sp)*, and the loss of mature eucalypts for nest hollows. Casuarina trees are very fire-sensitive, and are easily killed in an intense fire. Threatened by feral cats and possums, which raid the birds' nests. They also suffer from competition for nests from galahs and introduced honeybees. Very restrictive and selective diet.
greater broad-nosed bat	*Scoteanax rueppellii*	Least Concern (NC Act 1992)	Extensive clearing and fragmentation of forests in coastal and lowland areas, forest harvesting and associated activities are considered to be impacting this species. Loss of roosting sites and foraging sites is also identified as a concern in the SEQ region.
grey-headed flying-fox	*Pteropus poliocephalus*	Vulnerable (EPBC Act 1999)	Loss of habitat through vegetation clearing for agriculture and urban development - including removal of preferred roosting habitat resources and maternal roosting sites.
koala	*Phascolarctos cinereus*	Vulnerable (NC Act 1992)	See Section 7.3.1
ornate rainbowfish	*Rhadinocentrus ornatus*	Least Concern (NC Act 1992)	Loss of habitat through vegetation clearing including drainage of wetlands and urbanisation. The species have been adversely affected by pollution of water from residential stormwater run-off, competition with feral fish (i.e. gambusia), and the physical release of exotic aquarium species to waterways.
rufous fantail	*Rhipidura rufifrons*	EPBC Migratory (Bonn) Special Least Concern (NC Act 1992	Arrives in September to October, migrating from northern Australia to breed and spend their Summer. In Winter they return to Northern Australia to as far as New Guinea.
tusked frog	*Adelotus brevis*	Vulnerable (NC Act 1992)	The eggs are laid in a foam nest at the water's edge and concealed under leaf-litter or vegetation. Amphibian chytrid fungus is a threat. Surveys should be undertaken during warmer months (Spring).

4.2.3 Ecosystem and Habitat

The reserve is identified as primary Core Habitat in the council's Environmental and Liveability Strategy and provides important refuge for a range of regionally significant and uncommon species.

The reserve is unique in the broad range of topographic features represented across a relatively small area. These include a steep mountain with rugged cliffs, exposed rock faces, and steep rocky scree slopes. These areas provide a unique habitat for many species including microbats, the peregrine falcon and rare plants.

Surrounding plateaus and valleys support tall forest and shrubby woodland habitat merging into wet sclerophyll ecotones, gallery rainforest, and notophyll vine forest in the creek valley and gullies. The permanent creek and wetland associations also provides freshwater habitat for many species, including the 'vulnerable' tusked frog (*Adelotis brevis*), stream insects, fish and crustaceans.

Wildlife dependent on habitat trees have been recorded during the fauna surveys. Sugar gliders (*Petaurus breviceps*), squirrel gliders (*Petaurus norfolcensis*) and the 'vulnerable' glossy black-cockatoo are some of the many species requiring hollow bearing trees for shelter and nesting.

A dense understory made up of fallen timber, ground hollows, broken branches, ground cover plants and leaf litter all help create a complex habitat structure required for bandicoots, echidnas and other fauna to survive.

The reserve contains koala food and habitat trees including tallowwood (*Eucalyptus microcorys),* small-fruited grey gum (*Eucalyptus propinqua),* grey ironbark (*Eucalyptus siderophloia) and* pink bloodwood (*Corymbia intermedia)*.

Management Actions

- Investigate options to retain, enhance and create habitat hollows for fauna dependent species.
- Identify and protect remaining habitat trees and hollow logs from fire damage during prescribed burns as per (FMP 2014).

Sugar glider in a tree hollow

4.3 Cultural and Social Values

4.3.1 Indigenous

The Mount Ninderry Environment Reserve is located within a native title claim area of the Kabi Kabi First Nation people. Landscape features such as rivers, mountains, open plains and other notable features are associated with spiritual meaning and cultural practice by local Kabi Kabi people on the Sunshine Coast.[3]

Kabi Kabi people are noted to utilise food and material resources provided by the coastal and hinterland environments—further supporting the living cultural heritage of this reserve.

The Kabi Kabi People have primary lore, customary and cultural rights and obligations to their "Country". The management of "Country" and significant cultural values within it ("Caring for Country") is a traditional responsibility for them. This management system is critical to continuing and preserving cultural values for past, present and future generations. Connection to spiritually significant places continues to be important for the Kabi Kabi People, who consider the Mount Ninderry area to be part of a culturally significant landscape.

Searches were conducted of the Aboriginal Cultural Heritage Database and Register maintained by the Queensland Department of Aboriginal and Torres Strait Islander Partnerships (DATSIP) on the 29th June 2020. A large proportion of the Mount Ninderry Environment Reserve, including the main hiking trail and the summit, is covered by a DATSIP registered site/place polygon (**Figure 5**) described as an Aboriginal Intangible Place and an Aboriginal Historic Place (see **Table 5**). KC:D56 on the summit is a Story Place and KC:D81 and KC-0224 are artefact scatters (**Table 5**).

The Bunya pine (*Araucaria bidwilli*) is a sacred tree for Aboriginal people from this area and the edible seeds (Bunya nuts) are a ceremonial food of great significance. Bunya pines are still found within the Mount Ninderry Environment Reserve.

The absence of a recorded cultural heritage survey result for other land parcels does not necessarily mean heritage values are not present, however may be reflective of the absence of a cultural heritage survey for the area.

All significant Aboriginal cultural heritage in Queensland is protected under the *Aboriginal Cultural Heritage Act 2003*, and penalties can apply for any harm caused. The legislation applies a cultural heritage duty of care whereby any person carrying out an activity must take all reasonable and practical measures to ensure the activity does not harm Aboriginal cultural heritage[4]. To assist in meeting this duty of care, there are Aboriginal Cultural Heritage Act 2003 2 QC13.03 – QUD280/2013, Kabi Kabi First Nation, Queensland South native Title Services Limited, Level 10, 307 Queens St, Brisbane, Q 4000. Duty of Care Guidelines that should be followed. It is a requirement under these guidelines for the relevant aboriginal party to be consulted prior to any works that will cause ground disturbance in a previously undisturbed area.

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[3] Refer to "The Story of Maroochy" by Yvonne McBurney 1978 – Sunshine Coast Library 398.209943

[4] For details refer to the "*Aboriginal Cultural Heritage Act 2003, Duty of Care Guidelines, (2004*)"—available on the Queensland Governments Department of Aboriginal and Torres Strait Islander and Multicultural Affairs (DATSIMA) web page.

Figure 5: DATSIP registered sites and places at Mount Ninderry (base map Google Earth Pro 2020).

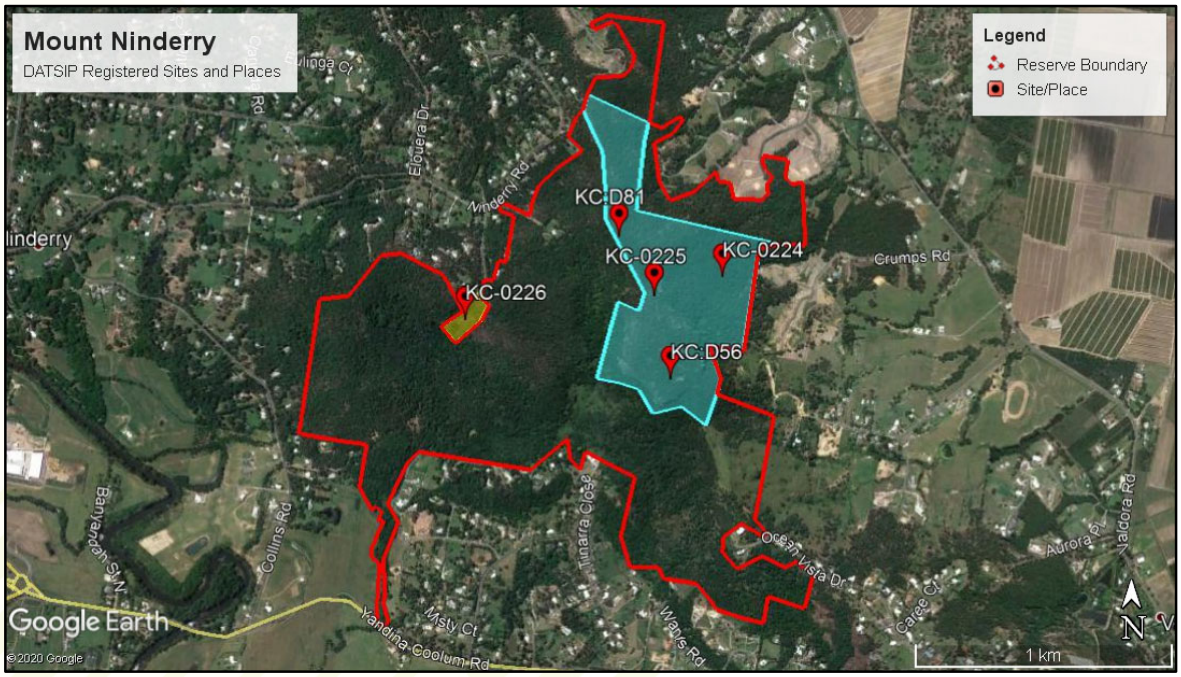

Table 5: Registered sites/places at Mount Ninderry.

Site ID	Latitude	Longitude	Attribute
KC:D56	-26.552419	152.99403	Story Place
KC:D81	-26.547454	152.992022	Artefact Scatter
KC-0224	-26.548842	152.996071	Artefact Scatter Aboriginal Intangible Place Aboriginal Historical Place
KC-0225	-26.54951	152.993413	Artefact Scatter Aboriginal Intangible Place Aboriginal Historical Place
KC-0226	-26.550325	152.986037	Aboriginal Intangible Place Aboriginal Historical Place

THE STORY OF NINDERRY

Mount Ninderry is part of an important Dreaming story. The following is a version of the Ninderry and Maroochy story (Figure 16; see Heap 1866b:15, who details the story as told by the local Aborigines to early settlers; see Heap 1868,Kerkhove 2016, Steele 1984 for other versions of the Dreaming story).

Many years ago a beautiful Aboriginal girl named Maroochy was loved by a member of her tribal group named Coolum. Their union had the sanction of the tribal elders. One day a mighty Aboriginal warrior named Ninderry, who belonged to a fierce and warlike tribal group which lived some miles away, stole Maroochy while Coolum was out hunting. Infuriated, Coolum and his henchmen set off in pursuit. They overtook Ninderry and his followers - and the captive Maroochy — before sundown; but fearing to remonstrate with such fierce warriors and demand the return of the stolen Maroochy, as custom decreed, Coolum decided to use a trick. During the night he crept up to the camp where Ninderry lay sleeping, and, freeing Maroochy from her bonds, fled with her towards his home territory. On the following day, greatly angered by Coolum's cowardly trick, Ninderry and his followers were soon in hot pursuit. Catching up with the fleeing lovers the giant Aborigine threw a huge club, knocking off Coolum's head; which rolled into the sea and is represented today as Mudjimba Island.

Incensed by Ninderry's foul and treacherous deed, the Spirit God struck down at Ninderry from the sky, and turned him into stone. Filled with sorrow at the loss of both her suitors, Maroochy fled to the Blackall Range, where she wept so copiously that her tears flowed down the mountain to form the Maroochy River. As time passed, she decided to try and find Coolum's spirit that had gone from his body. To aid her quest, she transformed herself into a black swan (Muru-kutchi) and to this day, journeys up and down the river, flying to the swamps and lakes, searching for the spirit of her treasured Coolum.

Management Actions

- Establish a formal engagement process with the Kabi Kabi people for any significant management issues that may impact cultural values.
- Establish a management response procedure should further artefacts be uncovered on site.
- Consult Kabi Kabi First nation prior to any works that will cauise ground disturbance in a previously undisturbed area.

4.3.2 Non-indigenous

At the summit of Mount Ninderry there are several memorials marked by recently placed headstones and memorial stone markers, reflecting the significance of the site to many people of the area.

The Tinarra Close 2/14th Australian Infantry Battalion reserve is a small area within Lot 47CP889198 that provides a memorial to the battalion that undertook training in and around Mount Ninderry during the WWII. It is understood troops were camped in this vicinity while they underwent special training prior to deployment to Papua New Guinea in 1942 (Australian War Memorial, 2016).

Management Actions

- Any proposed changes to memorials in or on the boundaries of the reserve, engagement will be undertaken with local interest groups and identified families with memorials.

View from Mount Ninderry showing surrounding landscape to the east *(Photo Greg Strain)*

4.3.3 Eco-recreation

The reserve is identified as a category 'Bushland Reserve'. Under this category the site will continue to have unsupervised public access which will be further enhanced and managed through the elements of a landscape design. The design elements aim to improve visitor experience while also ensuring public access does not impact the significant ecological and cultural values of the reserve.

Volume II **Appendix 8** provides details of how the reserve category was assessed for this site.

At present, reserve users enjoy a range of formal access tracks, trails and informal access for bushwalking, climbing and nature-based passive recreational activities. The main entrance off Ninderry Road contains a small carpark area, picnic shelter, directional signage and walking track to the summit. Remains of an old ad hoc hang glider take off ramp are located on the summit, detailing historical recreational activity, but this has long been abandoned.

The future recreational use demands for the reserve is anticipated to increase with local population growth and council's Environment and Liveability Strategy (ELS) identifies Mount Ninderry as a strategic recreation trail where the provision of a trail head/park at Mount Ninderry will be investigated.

A Landscape Plan being developed for the reserve captures opportunities and issues relating to existing and potential future park users. Some engagement with user groups has commenced in relation to rock climbing.

Management Actions

- Finalise development of Landscape Plan, to address recreational opportunities.

4.4 Economic Values

Tourism and hospitality are key industries on the Sunshine Coast, contributing $2.7 billion per year to the local economy (direct and indirect) (ERNMP 2017-2027). Food and wine, nature-based activities and cultural heritage experiences are the top three reasons why people visit the area (ERNMP 2017-2027).

Conservation of natural values at Mount Ninderry Environment Reserve may contribute to the local and broader economy. Sunshine Coast natural areas can provide a major drawcard for tourism—including unique opportunities for nature-based recreation and eco-tourism. Habitats preserving biodiversity can also attract wildlife enthusiasts and birdwatchers from within the region and beyond.

Management Actions

- Investigate further opportunities for the reserve to be promoted for eco-tourism, nature-based recreation and educational purposes.

4.5 Reserve Condition

Most of the reserve is vegetated and includes remnant and native regrowth in varying stages of recovery from previous land use. Two Bushland Operational Assessments (BOAs) have been completed for different sections of the reserve **(**Volume II **Appendix 3f)** in 2007 and 2013 (**Figure 6 combined BOA**). The BOA is a vegetation condition assessment tool which guides bush restoration activities and provides a monitoring baseline for future assessments.

A review of the BOA mapping reveals a majority of the reserve was classified to be in 'good' to 'very good' condition with approximately 80% in these categories. Forty (40) weed species are recorded in the reserve (Thomas 2013 and 2004).

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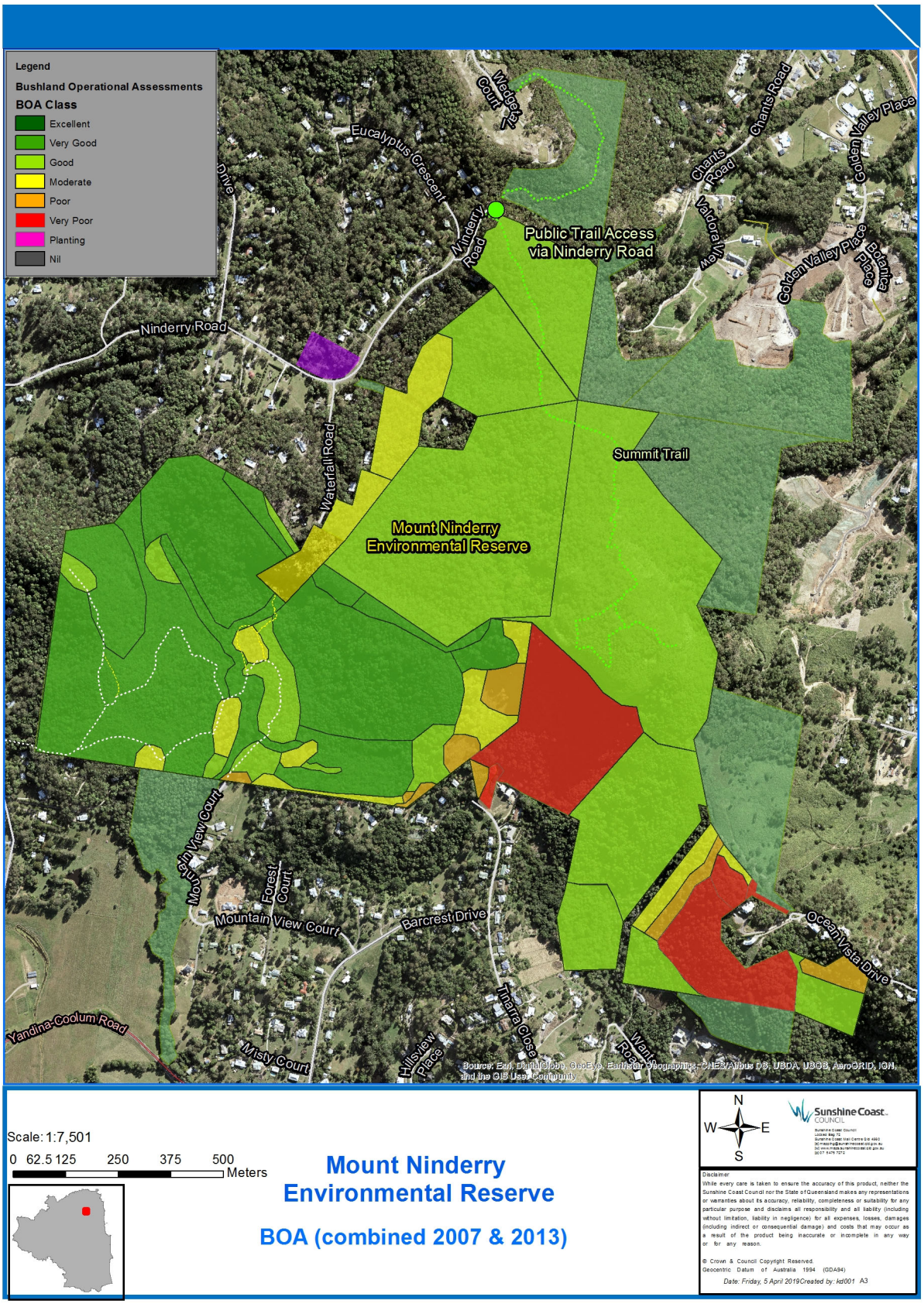
Figure 6 Vegetation Condition Assessment – Bushland Operational Assessments



5 Establishment Works

Lot 367 was acquired in November 2013 and has been managed through an environment levy funded program to coordinate establishment works (Refer to **Table 6**).

Once finalised the levy acquired portion will be managed under the operational program guided by this Management Plan.

Lots which were added to the reserve via developer contributions, have been established through council's Development Services branch. Works included ecological restoration, building walking trails, fire trails, fences, gates and nest boxes.

In 2016 the main trail leading to the top of Mount Ninderry was realigned and supporting infrastructure included designated viewing points.

5.1 Planning and Maintenance

The on-going planning and maintenance requirements of Mount Ninderry are guided by council's Service Level Reserve Score and associated planning reports and works plans.

Scores are based on a range of values including size, linkages, significant species, biodiversity and community values. The biodiversity and recreation score for Mount Ninderry Environment Reserve is B1/R2. **Table 7** lists service level requirements under this category.

Management Actions

- Undertake an updated BOA and RWP to incorporate all land parcels to better inform management decisions
- Undertake repeat BOA and RWP every five years to determine changes in vegetation condition and to measure success of restoration works. This also provides an opportunity for future land parcels to be included as they are added to the reserve.
- Collaborate with adjacent property owners to facilitate coordinated weed management.

Table 6: Status of establishment and maintenance works at Mount Ninderry Environment Reserve.

Activity	Description	Status
Condition Assessment	Commission the preparation of a resilience-based condition assessment Bushland Operational Assessment (BOA) to guide management planning.	BOA for Lot 367 CG286 completed **2013**. BOA for Northern, central and southern sections completed **2007**.
Restoration Works Plan	Commission the preparation of a Bush Regeneration Works Plan (RWP) to guide restoration works.	RWP completed May **2014** (for Lot 367 CG286 only)
Weed Management	According to the RWP all high priority areas are targeted for weed removal.	Ongoing assisted bush regeneration works implemented in line with allocated service levels
Trail Maintenance	Maintenance of access and management trails.	Trails upgraded and mapped for management and maintenance scheduling. Summit trail realignment commenced 2016. Summit trail requires ongoing trail surface, drainage and erosion protection maintenance. Trail consolidation and upgrading assessment to be reviewed in Landscape Plan
Sediment and Erosion Control	Installation of diversion berms and erosion control measures Mountain View Ct entrance	Works Completed **2015**
Access Gate and Fencing	Install access gates and fencing at entrances.	Vandalism resistant access gates and fence installed **2014** - Collins Road and Mountain View Ct access points.
Revegetation	Long term strategic planting within weed dominated areas (Lot 367) is likely to be required	Ongoing weed management works underway. Reconstruction and intervention to some areas may be required pending success of long-term strategy.
Bushfire Management	Fire Management Plan (FMP), ongoing site access and assessment for fuel management	FMP **completed 2014**. Prescribed mosaic burns and fuel management assessments ongoing.
Signage	Install reserve signage at access points	Naming and regulatory signage installed **2014** (367CG286). Corporate signage upgrade required. Regulatory, advisory and interpretive signage requires assessment.
Tenure Protection	Progress perpetual protection.	Nature Refuge Status awarded to Lot 367 **2018**.
Values assessment	Flora and fauna assessment, cultural heritage protected matters search, cultural heritage assessment.	Flora survey completed **2013,** fauna surveys completed **2015**, cultural heritage protected matters search completed **2016,** cultural heritage assessment **to be scheduled 2019.**
Hazards removed	Hard rubbish and old shed removed. Removal of historical fencing as required.	Ongoing

Table 7*:* Planning Service Levels

Category	MP	BOA	Flora Assessment.	Fauna Assessment.	FMP	Regeneration Works Plan (RWP)
*B1/R2	✓	✓	✓	✓	✓	✓
Frequency	10 yr	5 yr	10 yr	10 yr	10 yr	5 yr
Current Status	Complete 2021	Complete 2007 (north, central and southern) & 2013 (367CG286 only)	Complete 2004 (118RP912955, 20SP124283, 976CP889198) & 2013 (367CG286)	Complete 2004 & 2008 (367CG286), 2010 (Eucalyptus Cres) & 2015 (367CG286)	Complete 2014	Complete for Lot 367CG286 only.

*B# = Biodiversity Class.

Note: The above table provides an overview of the required planning documentation required.

SMI: Statement of Management Intent, BOA: Bushland Operational Assessment; FMP: Fire Management Plan.

Maintenance Service Levels

Category	B1
Trail Inspections	monthly
Weed management	monthly
Reconstruction/planting	as required
Prescribed burning	refer FMP
Management trail drainage / surface maintenance	as required
Fire trail slashing	1-6/yr
Fuel reduced zones vegetation management	1-6/yr
Tree management	as required
Urgent & hazardous matter arising	24-48hrs

6 Management Issues

6.1 Regional Background

The South East Queensland (SEQ) region is the most densely populated part of Queensland, experiencing rapid growth. In 2007 Brisbane City was the second fastest growing urban centre in the developed world and the resident population of the region is projected to increase by 44 per cent, to 4.4 million, by 2031 (Office of Economic and Statistical Research, 2010).

The issue of biodiversity loss is a pertinent one for this region. The restoration and recovery of significant habitat corridors, catchments and remnant vegetation—as occurs at Mount Ninderry Environment Reserve—will play an important role in protecting ecological function and associated biodiversity for SEQ.

6.2 Preliminary Threat Analysis

Reserve management works have identified a range of risks which may affect council's capacity to protect and restore biodiversity values, if not addressed.

Table 8 highlights corresponding opportunities proposed to address each of the identified risks.

Risks	Opportunities
High costs associated with consolidating, installing/maintaining trail networks	Recreational partnerships. Proactive planning through landscape design process.
Invasive animals	Restricted matter, under the *Biosecurity Act 2014,* currently managed.
Invasive plant species	Restricted matter, under the *Biosecurity Act 2014*, currently managed.
Roaming domestic dogs and cats	Restrictions on pet dog access to on-leash only, increase signage for responsible use.
Long-term environmental weed management	Utilise best practice bush regeneration techniques to enhance reserve resilience, structure and ecological function. Target priority invasive weed species and promote natural recruitment to restore areas over time. Initial investment aims to reduce weeds significantly so the site is more resilient and can be maintained more efficiently and cost effectively in the long term.
Tenure does not guarantee long term environmental protection	Nature Refuge Status awarded to Lot 367 (2018). Investigate opportunity for remaining land parcels to attain higher level of long-term protection. Community involvement
Wildfire	Fire Management Plan is in place and can be updated as new land parcels are added to the reserve.
Unauthorised high risk recreational use (rock climbing)	Recreational partnerships to manage potential impacts through community education. Better accommodate appropriate reserve uses and access.
Water quality impacts from urban runoff and septic systems in the catchment	Community partnerships and information days to improve water quality of ground water entering the reserve and its stream. Also, to improve water quality in overland and instream flows.
Fragmentation and loss of surrounding bushland habitat associated with potential urban infill.	"Land for Wildlife" program partners, vegetation covenants, developer contributions, environment levy land acquisition program, install traffic calming signage and implement recommendations of the "Fauna crossing" (ELS action)

Table 8: Summary of Reserve Management Risks and Opportunities

Management Actions

- Investigate opportunities for additional land parcels be added to the Mount Ninderry Environment Reserve via land dedication as part of residential development proposals and through the Environment Levy Land Acquisition Program.
- Investigate opportunities to create and enhance habitat linkages including south to the Maroochy River and corridors to the north
- Investigate a program—"urban land for wildlife"—applicable to smaller block sizes in peri urban areas (current land for wildlife program would not generally apply to the Mount Ninderry area due to the smaller size of land parcels).

6.3 Visitor Use and Impacts

Bushwalking and hiking activities are currently not considered to be adversely impacting the reserve, however the 'endangered' plectranthus *torrenticola* occurs on exposed rocky outcrops and ledges and requires protection from bushwalkers to prevent trampling.

With increased dog walking use, an increase in litter and dog waste bags has been noted in recent years by operational staff.

There have also been reports of kangaroo collision risks in this area, due to increased traffic. This is supported by council's roadkill data records. Wildlife warning signs have been in place for several years along Ninderry Road.

Regarding potential impacts of rock climbers, the Australian Climbing Association (Qld) code of conduct (2009) notes climbers should take extra care to minimise disturbance to native fauna and flora. The CRAG website has track route closures at Mount Ninderry to minimise disturbance during the Peregrine falcon breeding season.

Management Action

- Signage, barriers and/or track closures to prevent potential trampling impacts on the 'endangered' *Plectranthus torrenticola* and other senstivie areas.
- Investigate if existing wildlife warning signage is sufficient on roads surrounding the reserve.
- Survey local community for suggestions on how to reduce kangaroo road kill risks in their neighbourhood adjoining Mount Ninderry Environment Reserve.
- Consider increasing wildlife signage (if required) to create awareness and slow traffic for wildlife (including kangaroos and koalas).
- Investigate strategies to reduce user impacts, encourage responsible use (dog walking) and reduce littering in the reserve.
- Trial use of bright pink dog waste bags to allow greater visibility for clean up and may raise public awareness.
- Provide bins for litter and dog waste bags.

Capital works project – viewing platform construction

The ELS Strategy (Open Space Network Blueprint), identified the potential to establish a trail head off Ocean Vista Drive (lot 1SP258214).

Investigation into future access points, carparks and infrastructure upgrades will be assessed through a Landscape Planning process.

Management Actions

- Prepare a Landcape Plan to guide future planning and evaulate public access points, carparks and trail networks.

6.4 Invasive plants and animals

6.4.1 Invasive Plants

Thomas (2013) identified 40 exotic plant species within Mount Ninderry (see Volume II **Appendix 5**). Seven (7) Restricted Invasive Plant species have been recorded onsite (Category 3)—listed under the *Biosecurity Act 2014*:

- African tulip tree *Spathodea campanulata*
- asparagus fern *Asparagus aethiopicus*
- groundsel *Baccharis halimifolia*
- Chinese celtis *Celtis sinense*
- camphor Laurel *Cinnamomum camphora*
- lantana *camara*
- small leaved privet *Ligustrum sinense*
- Singapore daisy *Sphagneticola trilobata*

The BOA and RWP guide bush regeneration and associated weed management and revegetation activities within the reserve. Reserve boundary areas adjacent to residential properties have increased potential for weed impacts due to disturbance. These areas will require ongoing monitoring and management.

Some larger areas of 20-year regrowth within the reserve continue to support populations of invasive weeds and pasture grasses. These areas are managed to encourage the native tree canopy to re-establish and ultimately shade out much of the undesirable species in this part of the reserve.

The areas mapped as red (very poor) on the BOA are dominated by exotic grasses, groundsel *Baccharis halimifolia*, and slash pine *Pinus elliottii* with some areas of native regrowth. These areas are also apparent from a distance and are shown in photos in **Figure 4**. An updated RWP to incorporate all land parcels would help inform reserve management for these weed infested areas.

6.4.2 Invasive Animals

Fauna surveys detected the following invasive animal species within the reserve (see Burnett et al 2010 and FPE 2015).

- cane toad *Rhinella marina*
- domestic dog *Canis familiaris*
- ship rat *Rattus rattus*
- house mouse *Mus musculus*
- red fox *Vulpes vulpes*

- cat *Felis catus*

The red fox *Vulpes vulpes* is listed as Restricted Matter Invasive Animal under the *Biosecurity Act 2014* and listed for management in the Sunshine Coast Council Local Government Area Biosecurity Plan 2017. Cane toads are allocated for "local control" under the Sunshine Coast Local Government Area Biosecurity Plan.

Foxes, cats, wild dogs and unrestrained domestic dogs are considered to pose a significant threat to terrestrial fauna and arboreal mammals. This includes bandicoots, macropods, the eastern chestnut mouse and other ground dwelling mammals, as well as koalas, gliders and possums.

Management Actions

- Implement invasive species management activities in line with Sunshine Coast Council Local Government Area Biosecurity Plan 2017, including ongoing management of Restricted Invasive Plant species.
- Control roaming domestic dogs and cats through restrictions on pet dog access to on-leash only, increased signage and community education.
- Continue with implementation of Regeneration Works Plan including prioritisation of weed management works.
- Ongoing management of wild dog and fox populations.

6.5 Fire

Fire management is guided by the Mount Ninderry Fire Management Plan (FMP, 2014). Ecologically appropriate fire regimes differ for each vegetation community. This includes the exclusion of fire from the riparian and vine forest associations (southern slopes)—with different burning intervals required for wet sclerophyll forests, tall open forest/woodland and low shrubby montane vegetation at the summit.

The FMP aims to maintain a mosaic of burnt and unburnt areas to provide a variety of habitat availability, protect sensitive vegetation communities and associated habitat and to sustain and encourage natural regeneration processes.

Recommendations for the conservation of the eastern chestnut mouse *Pseudomys gracilicaudatus* are to retain a network of trails that will facilitate patch burns for habitat management (Future Plus, 2015).

Not all parts of the reserve are accessible via management trails. Therefore, prescribed burning and property protection in some areas requires the cooperation of the neighbouring landholders.

Access is limited to authorised vehicles only through a series of locked gates. Fuel load hazard monitoring to manage risk associated with surrounding residential areas is ongoing and detailed in the Fire Management Plan.

6.5.1 Recent Fire history

- Since 2002, fire has been excluded from the southern slopes of Mount Ninderry. This has resulted in the regrowth of tree cover on the southern slopes.
- Bushfire hazard reduction has occurred on northern parts of the site.
- In 2012, a 10-hectare ecological burn was carried out in the open forest area on the northern portion of Lot 20 SP124183), (Ref 2014).

Management Actions

- Continue management of the reserve in accordance with the 2014 Fire Management Plan (FMP).
- Update the 2014 FMP to incorporate recommendations included in this report for fauna and flora protection (see section 4.2 management actions).
- Build relationships with neighbours and investigate trail management options.

6.6 Erosion & Water Quality

Dense vegetation covers most of the reserve limiting erosional processes. However, some scour impacts have been noted for existing trails. On-going monitoring with follow-up maintenance and/or erosion protection is required.

Lower sections of the creek line, which drain from the waterfall (through Lot 367), adjacent to Mountain View Court, have an upwardly migrating erosion gully between the creek and the dam. Regular monitoring is required at this point to ensure the access trail is not undermined. Some preliminary works such as installation of flow diversions and cutting berms to dissipate flows from the dam have been undertaken (Lot 367). This has assisted in mitigating some erosion impacts on the creek line adjacent to Mountain View Court.

Consideration of stormwater and potentially nutrient rich water flows from adjoining properties should be investigated further, including from road surfaces along Ocean Vista and Waterfall Road.

Management Action

- Further investigation into stormwater surface flows (erosion impacts) and potentially nutrient rich water flows into the reserve.
- Monitoring of existing dam overflow for potential erosion across track.
- Monitor potential wash out of trail caused by upward bed erosion in the creek channel (*caused by historic disturbance to the creek bed*).
- Implement erosion control measures where required in accordance with council's Erosion and Sediment Control Manual (version 1.2).
- Investigate partnerships and education with local residents to address stream health. See AUSRIVAS resources and toolkits. https://ausrivas.ewater.org.au/index.php/bio-assessment/macroinvertebrates

6.7 Historical Land Use

Historical land clearing for grazing, cropping and selective timber harvesting is understood to have occurred for over one hundred years on the site prior to the 1990's. Some parts of the site have only begun to re-establish canopy cover in the last 20 -25 years.

6.8 Climate Change

Research to date indicates that climate change will accelerate a decline in biodiversity through loss of plant and animal species, loss of habitat, proliferation of weed species, and increased bush fire risks. Waterway processes may also be impacted by increased flood events.

The ELS recognises that climate change is a significant long-term threat to the area's biodiversity. Strategies such as protecting habitat, rehabilitating areas, enhancing wildlife corridors and reducing pest species are suggested to help wildlife adapt to changing conditions and provide the potential to sequester carbon.

There is consensus that protecting and enhancing green infrastructure across the landscape will build resilience to climate change, so actions that achieve these goals are a major focus of the Environment Reserves Network Management Plan 2017-2027 (SCC, 2017a).

Management Action

- Build resilience in stream ecosystems by restoring riparian vegetation and controlling bank and bed erosion.
- Build resilience to change through habitat connectivity.
- Build resilience to hydrological changes through protecting natural surface and groundwater flows.

7 Implementation Plan

7.1 Purpose of the Protected Area

To protect and restore the biodiversity values associated with the reserve; to create, consolidate and protect future connectivity values to link the existing surrounding conservation estate; and to facilitate nature-based recreation and education

7.2 Management objectives

- Manage the area to perpetuate, in as natural state as possible, representative examples of regional ecosystems, biotic communities, genetic resources and unimpaired natural processes.
- Maintain viable and ecologically functional populations and assemblages of native species at densities sufficient to conserve ecosystem integrity and resilience in the long term.
- Contribute to the conservation of wide-ranging species, with a focus on regional ecological processes and migration routes.
- Manage visitor use for inspirational, educational, cultural, and recreational purposes, at a level which will not cause significant biological or ecological degradation to the natural resources.
- Contribute to local economies through ecological knowledge, habitat restoration and tourism.
- Consider the interests and aspirations of the Kabi Kabi People.

7.2.1 Protection Mechanism

Under the SCC Planning Scheme 2014 the whole reserve area is protected for the purpose of environmental management and conservation.

The Mount Ninderry Environment Reserve could qualify for perpetual protection through legally binding mechanisms such as a Nature Refuge Agreement with the Queensland Government. In 2018 the Lot 367 portion acquired through the Environment Levy in 2014 (60ha) was formally assigned Nature Refuge status.

With this approach Mount Ninderry Environment Reserve could be successfully added to the Commonwealth Government's National Reserve System and could be managed in accordance with IUCN Management Category II.

Category II protected areas are large natural or near natural areas set aside to protect large-scale ecological processes, along with the complement of species and ecosystems characteristic of the area. This also provides a foundation for environmentally, culturally compatible, spiritual, scientific, educational, and visitor opportunities.

Management Action

- Consider increased tenure protection for the remaining parcels at Mount Ninderry Environment Reserve - through a legally binding mechanism such as a Nature Refuge under the *Nature Conservation Act 1992.*

7.3 Restoration Goals

Restoration activities aim to maintain and enhance existing biodiversity values and improve overall resilience of the vegetation. The Mount Ninderry Regeneration Works Plan (RWP) outlines priorities for restoration activities based on the Bushland Operation Assessment (BOA) condition mapping. All restoration activities undertaken onsite are guided by this works plan. The works plan will be reviewed every five years. See management

Management Actions

- Continue to promote natural regeneration on the site with appropriate fire regimes and weed management actions as per the FMP and the Regeneration Works Plan.
- Consider planting with *Lauraceae sp* to add aditional food source for birds, e.g native pigeons migrating – *J Birbeck pers. comm*

Bush regeneration contractors tackling invasive weeds at Mount Ninderry (*Photo Joel Morris*)

7.3.1 Significant Fauna and Flora

Eleven (11) 'threatened' flora and fauna species of State and Federal conservation significance have been found at Mount Ninderry Environment Reserve. A range of management responses included here are based on survey recommendations, species recovery frameworks and Commonwealth and State guidelines.

Recovery plans for listed 'threatened' species and ecological communities have been made or adopted under the *EPBC Act 1999*. Once a recovery plan is in place, Australian Government agencies must act in accordance with that plan.

The following plans are available for listed 'threatened' species relevant to Mount Ninderry Environment Reserve:

1. Draft National Recovery Plan for the Grey-headed Flying-fox *Pteropus poliocephalus* (2009).
2. Southern Macadamia Species Recovery Plan. Costello, G., Gregory, M. and Donatiu, P. (2009).
3. Threat abatement plan for predation by feral cats (DOE 2015).
4. Threat abatement plan for the biological effects, including lethal toxic ingestion, caused by cane toads (DSEWPC 2011).
5. Threat abatement plan for predation by European fox (DEWHA 2008).

Management Actions

Ensure management actions are in accordance with recovery plans available for listed 'threatened', 'near threatened' and conservation significant species. https://www.ehp.qld.gov.au/wildlife/prioritisation-framework/bot-biodiversity-documents.html#document_availability and https://www.ehp.qld.gov.au/wildlife/threatened-species/recovery_conservation_plans.html

The Southern Macadamia Species Recovery Plan which also includes the small - fruited Queensland nut *Macadamia ternifolia* identifies the following significant threats to wild macadamia nut populations:

- Vegetation clearing
- Habitat fragmentation
- Altered fire regimes

- Small population sizes (genetic integrity) and genetic pollution from commercial plantations
- Impacts from weed species
- Climate change (in the form of variable rainfall and higher temperatures)
- Lack of public awareness of wild macadamias

The Southern Macadamia Species Recovery Plan recommends the following management actions to address these threats:

- Identify and evaluate the extent and quality of southern macadamia species populations and their habitat.
- Reduce and manage the major threatening processes affecting southern macadamia species habitat.
- Increase knowledge of southern macadamia species and their ecology to affect their conservation and management.
- Improve awareness and understanding of southern macadamia species, especially the management requirements of these species and their major threats.
- Manage, monitor and evaluate the Southern Macadamia Species Recovery Plan.

Management Actions

- Undertake mapping and monitoring of existing populations of Macadamia ternifolia on site and ensure project managers are aware of their location and reflected in Mount Ninderry FMP.

Fauna surveys confirmed the presence of koala's onsite. Recommendations for ecological restoration include:

- Maintaining or planting (as required), with suitable koala food trees (e.g. *Eucalyptus microcorys, Eucalyptus propinqua, Eucalyptus tereticornis and Corymbia intermedia*).

The Sunshine Coast Council Koala Conservation Plan aims to:

- Determine where koalas exist on the Sunshine Coast and understand local threats.
- Collect robust scientific data, including koala habitat mapping to inform management decisions.
- Identify priority locations to enhance the quality of core koala habitat and improve connectivity.
- Ensure development assessment processes support the protection of koalas and their habitat.
- Highlight where mitigation measures are most required.
- Guide community involvement in programs and partnerships that increase koala habitat availability, connectivity, build understanding and mitigate threats.

Management Actions

- Ensure existing and future koala survey location data and identified habitat areas within Mount Ninderry Environment Reserve are provided to the Koala Conservation Plan project.
- Ensure that planned burns on the Mount Ninderry site consider koala population impacts and include mitigation measures prior to conducting burns.
- Pursue partnerships with adjoining landholders to increase awareness of koalas and strengthen landholder engagement with protection of broader landscape corridors and links.
- Ensure that planting where required, includes suitable koala food trees *(e.g. Eucalyptus microcorys, Eucalyptus propinqua, Eucalyptus teriticornis, and Corymbia intermedia).*

The Back on Track (BoT) Species Prioritisation Framework is a Queensland Government initiative that uses multiple criteria to prioritise native species and guide conservation management and recovery.

The framework incorporates the Species Recovery Information Gateway (SPRING), an online application that provides information about the conservation and recovery of Queensland's 'species of significance'. **Table 9** summarises the species which are identified and prioritised for recovery actions in the SEQ Catchment NRM region (DES 2017)[5].

Specific actions identified within the Back on Track (BoT) framework relating to Mount Ninderry Environment Reserve are detailed in volume II **Appendix 7.**

Table 9: Back on Track Framework - 'species of significance' at Mount Ninderry Environment Reserve

Species	BoT Status	EPBC Status	NCA Status
elf skink *Eroticoscincus graciloides*	Medium		Least Concern
Richmond birdwing vine *Pararistolochia praevenosa*	High		Near Threatened
glossy spice bush *Triunia robusta*	High	Endangered	Endangered
grey-headed flying-fox *Pteropus poliocephalus*	Critical	Vulnerable	Least Concern
ornate rainbowfish *Rhadinocentrus ornatus*	High		Least Concern
greater broad-nosed bat *Scoteanax rueppellii*	Medium		Least Concern

Management Actions

- Provide survey records to WildNet.
- Planting within the reserve should include plants that are known habitat (including food plants) for BoT priority species.
- Investigate improved awareness of BoT species populations and threats for reserve managers and adjoining landholders including providing information, for relevant BoT priority species and ways to minimise their impact.

[5] https://www.ehp.qld.gov.au/wildlife/prioritisation-framework/bot-biodiversity-documents.html#document_availability

Requirements for other significant fauna and flora include:

- Maintaining or planting she-oaks *Allocasuarina sp*. as a potential future food source for the glossy black-cockatoo *Calyptorhynchus lathami* (DEC 2004).
- The endangered plectranthus *Plectranthus torrenticola* requires habitat maintenance to reduce displacement impacts caused by lantana *Lantana camara* and molasses grass *Melinis minutiflora*.

Management Action

- Consider planting glossy black-cockatoo food trees including *Allocasuarina littoralis* and *Allocasuarina torulosa.*
- Habitat maintenance to reduce displacement impacts caused by lantana and molasses grass.

7.4 Management Actions

The following section provides a table showing all management actions reported in this document and shows the associated work plan linked to the service level category for the reserve (refer **Table 10**).

Mount Ninderry sunrise *(Photo Joel Morris)*

Table 10: Management Implementation Plan for Mount Ninderry Environment Reserve.

Management Actions	Relevant documentation[6]	Status[7]	Priority
Ecological Values – fauna flora and habitat			
1.01 Undertake additional flora surveys to include new land parcels, including searches for the 'endangered' *Graptophyllum reticulatum* which is known to occur on nearby private property.	**Section 4.2.2.**	Underway	Ongoing
1.02 Progress gazettal or local law recognition of reserve as a dog on-leash zone.	**Section 4.2.3.**	To be assessed	Medium
1.03 Control roaming domestic dogs and cats through restrictions on pet dog access to on-leash only, increased signage and community education.	**Section 4.2.3, 6.4.2.**	To be assessed	Medium
1.04 Engage adjoining landholders in community conservation partnership programs.	**Section 4.2.3,** CNCP.	Underway	Ongoing
1.05 Review prescribed burning regimes in the 2014 FMP for Eucalyptus dominated communities, to protect viable eastern chestnut mouse population.	**Section 4.2.3, 6.5;** FMP 2014; Mammal and reptile fauna survey (Future Plus, 2015).	Scheduled	Medium

[6] ERNMP: Environmental Reserves Network Management Plan 2017-2027; SMI: Statement of Management Intent; BOA: Bushland Operational Assessment; FMP: Fire Management Plan; NRS: National Reserve System; RWP: Restoration Works Plan, SCC Biosecurity Plan 2017: Sunshine Coast Council Local Government Area Biosecurity Plan 2017, CNCP – Community Nature Conservation (BushCare); LFW: Land for Wildlife.

[7] Priority: Ongoing = Actions that will continue to be undertaken in the life of the MP; High = Actions that will commence within the next 12 months; Medium = Actions that will commence within the next two years; Low = Actions that will continue within the next five years

1.06 Install signage to advise rock climbers on peregrine falcon breeding seasons and areas to avoid during this time.	**Section 4.2.3.**	To be assessed	High
1.07 Foster relationships with the local climbing community to protect vegetation and habitat on the cliff face.	**Section 4.2.3.**	To be assessed	High
1.08 Investigate options to retain, enhance and create habitat hollows for fauna dependent species.	**Section 4.2.3.**	Underway	Ongoing
1.09 Identify and protect remaining habitat trees and hollow logs from fire damage during prescribed burns.	**Section 4.2.3, 6.5;** FMP; Mammal and reptile fauna survey (Future Plus, 2015).	Underway	Ongoing
Cultural, Social and Economic Values			
1.10 Undertake a cultural heritage survey.	**Section 4.3.1**.	Completed	High
1.11 Create Cultural Heritage Management Plan for site.	**Section 4.3.1**. SCC Reconciliation Action Plan.	Completed	High
1.12 Establish a formal engagement process with the Kabi Kabi people for any significant management issues that may impact cultural values.	**Section 4.3.1;** *Aboriginal Cultural Heritage Act 2003* Duty of Care Guidelines.	Underway	Ongoing
1.13 Establish a management response procedure should further artefacts be uncovered on site.	**Section 4.3.1;** *Aboriginal Cultural Heritage Act 2003* Duty of Care Guidelines.	Underway	Ongoing
1.14 Any proposed changes to memorials in or on the boundaries of the reserve, engagement will be undertaken with local interest groups and identified families with memorials.	**Section 4.3 2.**	To be assessed	High

1.15 Finalise development of Landscape Plan, to assess recreational opportunities.	**Section 4.3.3.**	Scheduled	High
1.16 Investigate potential for this reserve to be promoted for eco-tourism, nature-based recreation and educational purposes.	**Section 4.4.**	To be assessed	Medium
Condition of Values			
1.17 Undertake an updated BOA and RWP to incorporate all land parcels to better inform management decisions.	**Section 4.5, 7.3**. BOA'S 2007 & 2013.	Completed	High
1.18 Undertake repeat BOA and RWP every five years to determine changes in vegetation condition and to measure success of restoration works. This also provides opportunity for future land parcels to be included as they are added to the reserve.	**Section 4.5, 7.3**. BOA; RWP.	2025	Low
1.19 Collaborate with adjacent property owners to facilitate coordinated weed management.	**Section 4.5.**	To be assessed	Medium
Management Issues			
1.20 Investigate opportunities for additional land parcels to be added to the reserve via land dedication as part of residential development proposals and through the Environment Levy Land Acquisition Program.	**Section 6.2**; Environment and Liveability Strategy 2017; SCC Planning Scheme.	Underway	Ongoing
1.21 Investigate opportunities to create and enhance habitat linkages including south to the Maroochy River and corridors to the north.	**Section 6.2;** Environment and Liveability Strategy 2017; SCC Planning Scheme.	Underway	Ongoing
1.22 Investigate a program - "Urban Land for Wildlife"—applicable to smaller block sizes in peri urban areas (current Land for Wildlife	**Section 6.2.**	To be assessed	Medium

	program would not generally apply to the Mount Ninderry area due to the smaller size of land parcels).			
Visitor Use and Impacts				
1.23	Signage, barriers and or track closures to prevent potential trampling impacts on the 'endangered' *Plectranthus torrenticola*.	**Section 6.3**. RWP.	To be assessed	High
1.24	Investigate if existing wildlife warning signage is sufficient on roads surrounding the reserve to create awareness and slow traffic for wildlife (including kangaroos and koalas).	**Section 6.3.**	To be assessed	High
1.25	Survey local community for suggestions on how to reduce kangaroo roadkill risks in their neighbourhood adjoining Mount Ninderry Environment Reserve.	**Section 6.3;** SCC Kangaroo Management Strategy (in press).	To be assessed	Medium
1.26	Investigate strategies to reduce user impacts, encourage responsible use (dog walking) and reduce littering in the reserve	**Section 6.3.**	To be assessed	High
1.27	Trial use of bright pink dog waste bags to allow greater visibility for clean-up and may raise public awareness.	**Section 6.3.**	To be assessed	High
1.28	Provide bins for litter and dog waste bags.	**Section 6.3.**	To be assessed	High
1.29	Prepare Landscape Plan to guide future planning and evaluate public access points and trail networks.	**Section 6.3**. Existing GIS mapping; FMP; Landscape Plan; Environment and Liveability Strategy 2017.	Scheduled	High
Invasive Plants and Animals				
1.30	Implement invasive species management activities in line with Sunshine Coast Council Local Government Area Biosecurity	**Section 6.4.2**; SCC Biosecurity Plan 2017.	Underway	Ongoing

	Plan 2017, (or later versions), including ongoing management of Restricted Invasive Plant species.			
1.31	Continue with implementation of Regeneration Works Plan (RWP) including prioritisation of weed management works.	**Section 6.4.2**; BOA; RWP; SEQ Ecological Restoration Framework (2013).	Underway	Ongoing
1.32	Ongoing management of wild dog and fox populations.	**Section 4.5;** SCC Biosecurity Plan 2017.	Underway	Ongoing
Fire				
1.33	Continue management of the reserve in accordance with the 2014 Fire Management Plan FMP.	**Section; 6.5.** FMP; RWP.	Underway	Ongoing
1.34	Update the 2014 FMP to incorporate recommendations included in this report for fauna and flora protection (see ecological values management actions above and restoration goals below).	**Section 4.2, 6.5, 7.3.** FMP.	Scheduled 2019	Medium
1.35	Build relationships with neighbours and investigate trail management options.	**Section 6.5.** FMP.	Underway	Ongoing
Erosion & Water Quality				
1.36	Further investigation into stormwater surface flows (erosion impacts) and potentially nutrient rich water flows into the reserve.	**Section 6.6**. Annual Maintenance.	Ongoing	High
1.37	Monitoring of existing dam overflow for potential erosion across track.	**Section 6.6;** Erosion and Sediment Control Manual (version 1.2).	Underway	Ongoing
1.38	Monitor potential wash out of trail caused by upward bed erosion in the creek channel (caused by historic disturbance to the creek bed – lot 365).	**Section 6.6;** Erosion and Sediment Control Manual (version 1.2).	Underway	Ongoing

1.39	Implement erosion control measures where required in accordance with council's Erosion and Sediment Control Manual (version 1.2).	**Section 6.6;** Erosion and Sediment Control Manual (version 1.2).	Underway	
1.40	Investigate partnerships and education with local residents to address stream health. See AUSRIVAS resources and toolkits https://ausrivas.ewater.org.au/index.php/bio-assessment/macroinvertebrates.	**Section 6.6**. Not Scheduled.	To be assessed	Medium
Climate Change				
1.41	Build resilience in stream ecosystems by restoring riparian vegetation and controlling bank and bed erosion.	**Section 6.8**; SEQ Ecological Restoration Framework (2013).	Underway	Ongoing
1.42	Build resilience to change through habitat connectivity.	**Section 6.8**; Environment and Liveability Strategy 2017; SCC Planning Scheme.	Underway	Ongoing
1.43	Build resilience to hydrological changes through protecting natural surface and groundwater flows.	**Section 6.8**; SCC Planning Scheme.	Underway	Ongoing
Protection Mechanism				
1.44	Consider increased tenure protection for the remaining parcels at Mount Ninderry Environment Reserve - through a legally binding mechanism such as a Nature Refuge under the Nature Conservation Act 1992.	**Section 7.2.1**. ERNMP; SCC Planning Scheme.	To be assessed	Low
Restoration Goals for Significant Fauna and Flora				
1.45	Continue to promote natural regeneration on the site with appropriate fire regimes and weed management actions as per the FMP and the Regeneration Works Plan.	**Section 7.3**; FMP; RWP; SEQ Ecological Restoration Framework (2013).	Underway	Ongoing

1.46	Consider planting with Lauraceae sp to add additional food source for birds, e.g. native pigeons migrating – *J Birbeck pers. comm.*	**Section 7.3.**	To be assessed	Low
1.47	Ensure management actions are in accordance with recovery plans available for 'threatened', 'near threatened' and conservation significant species. https://www.ehp.qld.gov.au/wildlife/prioritisation-framework/bot-biodiversity-documents.html#document_availability https://www.ehp.qld.gov.au/wildlife/threatened-species/recovery_conservation_plans.html	**Section 7.3.1;** Southern Macadamia Species Recovery Plan; Draft National Recovery Plan Grey-headed Flying-fox; BOT Species Prioritisation Framework.	Underway	Ongoing
1.48	Undertake mapping and monitoring of existing populations of Macadamia ternifolia on site and ensure project managers are aware of their location and reflected in Mount Ninderry FMP.	**Section 7.3.1**; RWP; FMP; Flora Assessment Lot 367 (Thomas, 2013).	To be assessed	High
1.49	Ensure that planned burns consider Macadamia ternifolia impacts and include mitigation measures prior to conducting burns – (avoidance).	**Section 7.3.1**; RWP; FMP; Arc GIS natural areas basemap – management considerations.	Underway	Ongoing
1.50	Ensure existing and future koala survey location data and identified habitat areas within Mount Ninderry Environment Reserve is fed back into the Koala Conservation Plan project.	**Section 7.3.1**; RWP; FMP; SCC Koala Conservation Plan.	To be assessed	High
1.51	Ensure that planned burns on the Mount Ninderry site consider koala population impacts and include mitigation measures prior to conducting burns.	**Section 7.3.1**; RWP; FMP; SCC Koala Conservation Plan.	Underway	Ongoing
1.52	Pursue partnerships with adjoining landholders to increase awareness of koalas and strengthen landholder engagement with protection of broader landscape corridors and links.	**Section 7.3.1**; SCC Koala Conservation Plan; CNCP; LFW.	To be assessed	High

1.53	Ensure that planting, where required, includes suitable koala food trees (e.g. Eucalyptus microcorys, Eucalyptus propinqua, E. tereticornis, and Corymbia intermedia).	**Section 7.3.1**. RWP; FMP.	To be assessed	High
1.54	Provide survey records to WildNet.	**Section 7.3.1**.	Underway	Ongoing
1.55	Planting within the reserve should include plants that are known habitat (including food plants) for BoT priority species.	**Section 7.3.1**; RWP; BOT Species Prioritisation Framework.	To be assessed	Ongoing
1.56	Investigate improved awareness of BoT species populations and threats for reserve managers and adjoining landholders including providing information, for relevant BoT priority species and ways to minimise their impact.	**Section 7.3.1**. BOT Species Prioritisation Framework.	To be assessed	Low
1.57	Consider planting glossy black-cockatoo food trees including *Allocasuarina littoralis* and *Allocasuarina torulosa.*	**Section 7.3.1.**	To be assessed	Medium
1.58	Habitat maintenance to reduce displacement impacts upon the Plectranthus torrenticola caused by lantana and molasses grass.	**Section 7.3.1**; RWP.	Underway	Ongoing

7.5 Finance and Resourcing

The Natural Areas Management program delivers the restoration, maintenance and development of council's Environment Reserve Network.

7.5.1 Establishment

Establishment activities are funded under council's Environment Levy Establishment Program and applies to new reserve acquisitions for approximately three to five years (once all major planning reports and establishment works are implemented).

7.5.2 Operational

An annual operational and capital works budget is determined by the service level classification for each reserve, which is based on several factors including:

- biodiversity values and risk,
- reserve condition, function and size,
- recreation and educational opportunities,
- minimum community expectations.

7.5.3 Community Conservation Partnerships Unit

In March 2019 a volunteer BushCare group formed at Mount Ninderry Environment Reserve - meeting on the second Tuesday of each month. Council's BushCare Sunshine Coast Program engages and supports community volunteers to actively protect and rehabilitate the region's environmental assets on council managed public lands. Over 1,200 volunteers support council's environment reserve management and maintenance.

7.5.4 Healthy Places Unit

In conjunction with the Natural Areas team, the Healthy Places – Animal Education and Control team fulfill and deliver council's statutory responsibility to manage impacts on plants and animals within council reserves.

7.6 Communications Plan

Preliminary consultation for this management plan is based on input from stakeholders within council. This includes recreational, conservation, community partnerships, and cultural heritage sectors. The first draft version of the plan was developed following this consultation.

Public and external stakeholder groups are invited to comment on the first draft through the council web site and specific targeted notifications.

Council will continue to provide information to the public via reports, publications and newsletters.

7.7 Monitoring and Plan Review Schedule

The South East Queensland Natural Resource Management Plan 2009-2031 (SEQ NRM) uses the Monitoring, Evaluation, Reporting and Improvement (MERI) plan. **Table 11** shows the MERI program logic which provides timeframes and outcomes linked to the management plan objectives which can be assessed during monitoring and evaluation.

The MERI plan provides a framework to:

a) evaluate the contribution of the reserve to the overall Sunshine Coast reserve network,

b) evaluate the effectiveness of the methodology and approach used,

c) Incorporate lessons learned into future work in the area of land purchased for inclusion in council's reserve estate.

The Management Plan will be reviewed after five years in line with the MERI guidelines.

It is anticipated that this management plan will only be comprehensively evaluated after 10 years of implementation underpinned by the framework of actions; relevant monitoring and evaluation strategies, described in this plan.

Table 11: MERI Program Logic – based on the National Reserve System and SEQ NRM Plan

Outcomes	Council Owned/managed Environmental Reserve
Long-term outcomes (20 years)	This site will contribute to a well-managed, comprehensive reserve network protecting in perpetuity examples of at least 80% of the extant native ecosystems present in the Sunshine Coast Region.
Environment outcomes (5 years)	Reduced threat from invasive species Thematic Links GERI; Improved ecological connectivity Increased representativeness of regional ecosystems Increased protection of under-represented RE's Enhanced resilience of the protected areas to disturbance Protected native habitat Address Matters of National Environmental Significance
Protection and management outcomes (5 years)	Managers are effectively implementing management actions of the Management Plan
Engagement and capacity outcomes (5 years)	Managers have the capacity for effective management planning
Immediate outcomes (biophysical and non-biophysical outcomes)	High value areas (including those within under-represented bioregions) are prioritised for acquisition and managed for nature conservation
Proponent influence activities	Partnership purchases (Discretionary grants)

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GLOSSARY

BOA – Bushland Operational Assessment

CAR system

Comprehensive: examples of all types of regional-scale ecosystems in each IBRA region should be included in the National Reserve System.

Adequate: sufficient levels of each ecosystem should be included within the protected area network to provide ecological viability and to maintain the integrity of populations, species and communities.

Representative: the inclusion of areas at a finer scale, to encompass the variability of habitat within ecosystems.

DEHP – Department of Environment and Heritage Protection (QLD)

IBRA – Interim Biogeographic Regionalisation of Australia

IUCN – International Union for the Conservation of Nature

MERI – Monitoring, Evaluation, Reporting, and Improvement

NRS – National Reserve System

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