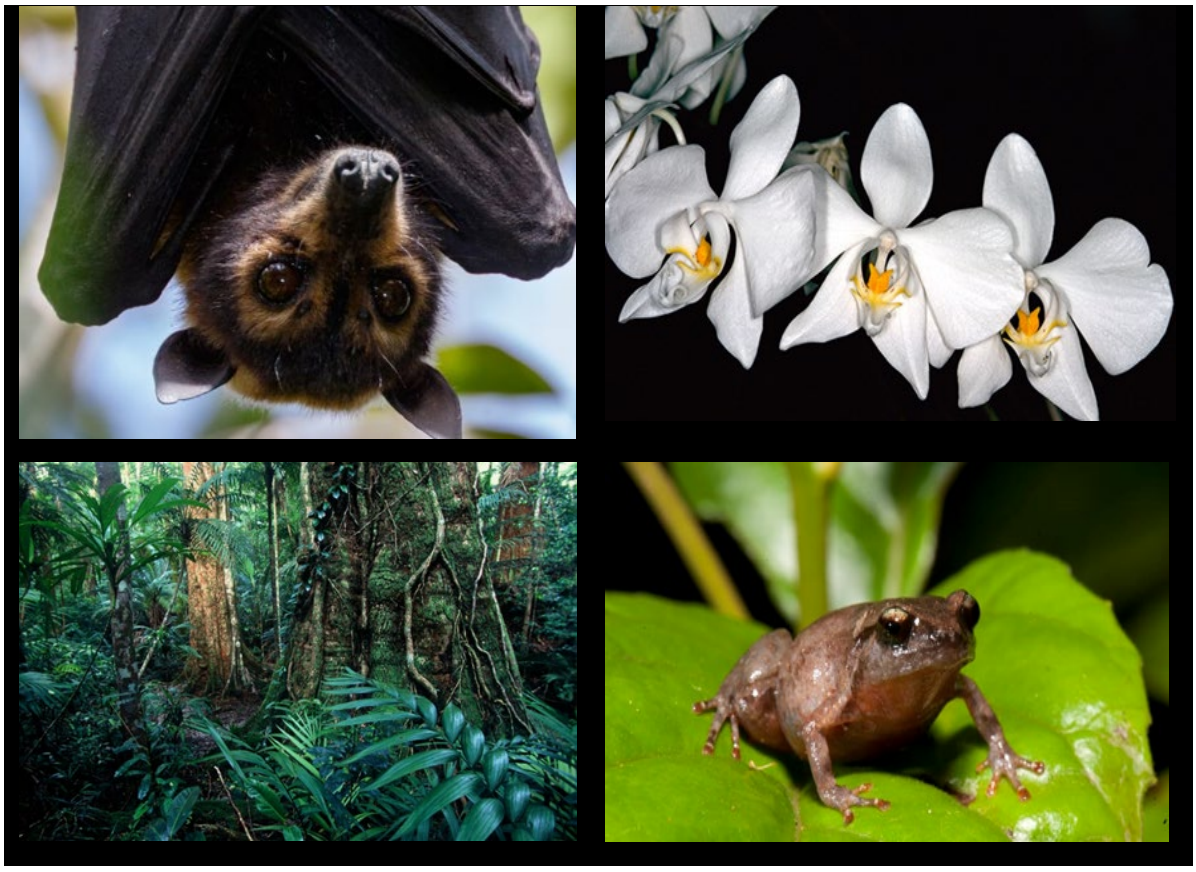
State of Wet Tropics 2022–23

Rescue and recovery of threatened Wet Tropics species and ecological communities



Front cover photo credits

Top left: Spectacled flying-fox (*Pteropus conspicillatus*)-Wet Tropics Images

Top right: Native moth orchid (*Phalaenopsis rosenstromii)*-MA Clements

Bottom left: Tropical lowland rainforest-Wet Tropics Images

Bottom right: Mountain-top nursery-frog (*Cophixalus monitola)*-Angus McNab

Purpose of the report

This State of Wet Tropics report satisfies the requirements of the Queensland's *Wet Tropics World Heritage Protection and Management Act 1993* and the Commonwealth's *Wet Tropics of Queensland World Heritage Area Conservation Act 1994*.

Acknowledgement of the Rainforest Aboriginal Peoples of the Wet Tropics

The Wet Tropics Management Authority acknowledges the spirit of Country of the Wet Tropics and recognises Rainforest Aboriginal Peoples as carrying custodial responsibility. We pay our respects to their ancestors and traditions.

Acknowledgements

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Feedback

This report is an important document representing communication and accountability. The Wet Tropics Management Authority values comments and welcomes feedback from readers.

Public availability

This publication can be accessed and downloaded from www.wettropics.gov.au/annual-reports. Alternatively, hard copies of this publication can be obtainedby emailing wettropics@wtma.qld.gov.au.

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WET TROPICS MANAGEMENT AUTHORITY

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Message from the Chair

In July 2022, The Hon Tanya Plibersek MP, Minister for Environment and Water, delivered a National Press Club address where she publicly released the 2021 State of the Environment Report. The document, prepared by a group of independent experts including respected scientists, was a confronting read.

Australia has lost more mammal species to extinction than any other continent. The number of threatened ecological communities have grown by 20% since 2016.

In the 2018–19 summer season in the Wet Tropics, heatwaves over a three-day period caused the rapid decline of 30% of the Australian population of the endangered spectacled flying-fox due to heat stress. In the catastrophic fires of the 2019–20 bushfire season, 80% of the Greater Blue Mountains World Heritage Area and 53% of the Gondwana Rainforests of Australia World Heritage Area burned.

The 2021 State of the Environment Report was a call for immediate action.

Similarly, this year's Wet Tropics Management Authority's State of Wet Tropics report on the *Rescue and recovery of threatened species and ecological communities* acknowledges that our threatened species are vulnerable to extinction in the wild due to low populations, highly restricted distributions and increasing threats including climate change, disease, invasive species, habitat loss and fragmentation.

It recognises the need to get to work, do some long-term planning, rethink our investments and prioritise landscape restoration as a way to limit and reverse the declines of wildlife.

In the Wet Tropics, we have an opportunity to become trailblazers in this space and set the standard for all the world to follow.

A commitment to saving our most vulnerable plants and animals is an investment in our future. Threatened species recovery won't just improve the health and wellbeing of our country, it will lift the hearts and minds of our communities as well.

We need to better manage our natural resources and acknowledge that this is something Rainforest Aboriginal Peoples having been doing for over sixty thousand years.

The emergence of nature repair and environmental markets create added incentives to invest. But this must not be our motivation—nature is not just an economic asset; it is the cornerstone of our existence.

Ms Christine Grant
Chair, Wet Tropics Management Authority Board

Terms and abbreviations used in this report

Area	Wet Tropics of Queensland World Heritage Area
Bama	In this report, Bama refers to Rainforest Aboriginal Peoples particularly from the Wet Tropics north of Russell River to Cooktown.
Critically Endangered	A threatened species conservation class under the *Nature Conservation Act 1992; the Environment Protection and Biodiversity Conservation Act 1999 or the* IUCN Red List of Threatened Species. A species is classed as critically endangered if the wildlife has undergone a large reduction in numbers; the wildlife has undergone or is suspected to have undergone a very large reduction in numbers; it is likely that a very large reduction in the wildlife's numbers is imminent; or the wildlife's geographic distribution is precarious for the survival of the wildlife and very restricted; or the estimated total number of mature individuals is very low and it is likely the number will continue to decline at a very high rate, or continue to decline, and its geographic distribution is precarious for the survival of the wildlife; or the estimated total number of mature individuals is extremely low; or the probability of the wildlife's extinction in the wild is at least 50% in the immediate future.
Cultural landscapes	Landscapes that have been affected, influenced, or shaped by human involvement.
DES	Queensland Department of Environment and Science
Dendroglyph	An artistic carving in the bark of a living tree.
Ecosystem	An assemblage of interacting living and non-living components—ecosystems may be natural, as in forest ecosystems, or comprised largely of introduced species, as in agricultural and urban ecosystems.
Endangered	A threatened species conservation class under the *Nature Conservation Act 1992*; the *Environment Protection and Biodiversity Conservation Act 1999* or the IUCN Red List of Threatened Species. A species is classed as endangered if the wildlife has undergone or is suspected to have undergone a large reduction in numbers; it is likely that a large reduction in the wildlife's numbers is imminent; the wildlife's geographical distribution is precarious for the survival of the wildlife and restricted; the estimated total number of mature individuals is low and it is likely the number will continue to decline at a high rate or continue to decline and its geographical distribution is precarious for the survival of the wildlife; and the estimated total

	number of mature individuals is very low; or the probability of the wildlife's extinction in the wild is at least 20% in the near future.
Endemic	Native and restricted to a particular area. For example, river red gum (*Eucalyptus camaldulensis*) is endemic to Australia and ribbonwood tree (*Idiospermum australiense*) is endemic to the Wet Tropics bioregion.
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
Ex situ	*'*Off site'. Often used to refer to conservation approaches involving translocation of plants to safe places outside their geographic range.
Extinct	A species is classed as extinct if there is no reasonable doubt the last member of the species has died.
Extinct in the wild	A species is classed as extinct in the wild if the wildlife is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or it is not known to survive in its known or expected habitat, in its past range, over a period appropriate to the life cycle or form of the wildlife.
IBRA	Interim Biogeographic Regionalisation for Australia
IUCN	International Union for Conservation of Nature
Least concern	Native wildlife may be prescribed as least concern wildlife if the wildlife is common or abundant and is likely to survive in the wild (*Nature Conservation Act 1992* only).
Nature refuges	A nature refuge is a voluntary agreement between a landholder and the Queensland Environment Minister to conserve the significant natural and cultural values of privately managed land. A nature refuge is a class of protected area under the *Nature Conservation Act 1992.*
NCA	*Nature Conservation Act 1992* (Qld)
OUV	Outstanding Universal Value
Priority places	A reference used in the Australian Government's Threatened Species Action Plan 2022-2023. Priority places is a new approach that recognises some threatened species share the same habitat, and that place-based action can support protection and recovery of more than one species.
Rainforest Aboriginal Peoples	Traditional Custodians of the Wet Tropics of Queensland World Heritage Area and wider Wet Tropics region—includes Peoples from at least 20 tribal groups, 120 clans and eight language groups.
Recovery Plan	Prepared under the *Environment Protection and Biodiversity Conservation Act 1999* on behalf of the Australian Government—

	refers to a protected ecological community, animal or plant species, describing its current state and the research and management actions necessary to stop its decline, support recovery, and enhance its chance of long-term survival in the wild.
Regional ecosystem	Regional ecosystems are vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil (see Sattler and Williams 1999, *Vegetation Management Act 1999)*.
RNTBC	Registered Native Title Body Corporate
Taxon	A scientifically classified group or unit, such as genus or species (plural: taxa)
Traditional Custodian/s	An Aboriginal person/Aboriginal persons of a local descent group having inherent rights and responsibilities in relation to a tract of land or area of water.
Vulnerable	A threatened species conservation class under the *Nature Conservation Act 1992; the Environment Protection and Biodiversity Conservation Act 1999 or the* IUCN Red List of Threatened Species. A species is classed as vulnerable if the wildlife has undergone or is suspected to have undergone a moderate reduction in numbers; it is likely a moderate reduction in the wildlife's numbers is imminent; the wildlife's geographical distribution is precarious for the survival of the wildlife and limited; the estimated total number of mature individuals is limited and it is likely the number will continue to decline at a substantial rate or continue to decline and its geographical distribution is precarious for the survival of the wildlife; the estimated total number of mature individuals is low; or the probability of the wildlife's extinction in the wild is at least 10% in the medium-term future.
Wet Tropics bioregion	Geographic region that encompasses the Wet Tropics of Queensland World Heritage Area and surrounding landscapes along Queensland's tropical east coast—there are 89 formally recognised bioregions in Australia that represent large geographically, distinct regions based on common climate, geology, landform, vegetation and species information.

Executive summary

The Wet Tropics of Queensland World Heritage Area (the Area) is a region of spectacular scenery and mountainous topography with fast flowing rivers, deep gorges and numerous waterfalls. With an elevational range extending from the coast to rugged peaks topping 1,620m, the Area supports varied and unique ecological communities, including some of the oldest continuously surviving tropical rainforests in the world. The Area is ranked one of the most irreplaceable natural World Heritage Areas on earth because of its unique concentration of endemic, rare and ancient species.

The Area stretches 450km along Australia's north-east coast and encompasses nearly 900,000 hectares of tropical rainforest, tall open forest, woodland, swamps and mangroves. One of the distinctive features of the region is the high rainfall (1,200mm–8,000mm per year); the wetter parts of the region are some of the wettest places in the world with the summit of Bellenden Ker recording up to 12,461mm annually.

In the Area, there are at least 20 Rainforest Aboriginal tribal groups, including 120 clans and eight language groups with ongoing traditional connections to the landscapes. Across these groups there is a huge body of rich and diverse traditional knowledge about the Wet Tropics environment.

For First Nations Peoples, threatened species are not contained within a list. Rainforest Aboriginal Peoples view all elements of the cultural landscape as interconnected and includes not just plants and animals, but people, story places, ancestors and protocols. Culturally significant species are considered cultural icons and feature prominently in Indigenous knowledge, including language, ceremonies, lore, identity and narratives.

More than 100 years of European colonisation has seen large areas of former forest logged, cleared, or converted to crops and pasture, further restricting species' distributions and reducing species' populations through habitat loss.

Threatened species listing under Australian and Queensland legislation gives legal standing and mandates actions to secure a species' population. Listing of a species should also guide allocation of conservation funding and investment.

The World Heritage listing of the Wet Tropics has provided a level of habitat protection and halted declines of some threatened species, whilst a multitude of additional species—notably endemic rainforest frogs, ringtail possums, high-altitude birds, and plants in the family Myrtaceae—considered secure at the time of listing now face significant challenges from accumulated and compounding threats.

Endemic species that are key elements of the Area's World Heritage values are at serious risk from the impacts of a suite of pervading and invasive threats including pest plants and animals, disease, more frequent and extensive natural disasters, and—potentially most critically—a changing climate.

Over the past two decades, climate change in the form of extreme weather events (e.g. heatwaves), fire and habitat modification has become a new driver for habitat change and species loss.

Targeted threatened species management is a central component of efforts to prevent species extinction. Despite the development of a range of conservation programs and actions over the past decade, threatened species management is still commonly characterised as ad hoc.

Although there are notable successes, many management programs and recovery plans are ineffective, with few species experiencing improvements in their conservation status.

What is needed is adequate resourcing, supporting legislation, monitoring systems that can report species declines and recovery in a timely manner, and strong regulation and management of threatening processes.

In the Wet Tropics, there is an opportunity for improvement in management practices, including consequential stakeholder engagement and communications, fostering strong leadership, particularly in Rainforest Aboriginal communities, stronger Indigenous engagement in on-ground action on Country, the development of long term goals, improving knowledge of target species ecology and threats, particularly focussing on filling knowledge gaps that impede development of effective management, setting objectives with measurable outcomes and greater accountability for species decline to ensure timely action and guard against complacency.

This report provides a snapshot of the extraordinary plant, animal and ecosystem biocultural diversity across the Wet Tropics, with a focus on threatened species. The report presents current evidence for recent declines in diversity and considers prospects for recovery. It reviews the pressures and threats to the communities and species of the Area, focussing on those that are currently recognised as threatened but also exploring those that may become threatened in the future.

How these threats may be addressed are examined using practical examples and case studies with recommendations for practical on-ground threatened species management effort and recovery actions.

Introduction

Australia is home to around 600,000 native species, with a very high proportion of these found nowhere else in the world[1]. Our plants and animals are central to the cultural identity of First Nations Peoples, who managed the environment for millennia.

But Australia's native flora and fauna are in decline.

Since European settlement, 36 plant species, 27 mammals, 22 birds, four frogs and one earthworm have been declared extinct in Australia, and more than 1,700 species and ecological communities are known to be threatened.

In June 2021, 533 animal and 1,385 plant species were listed under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act); 53% of the listed species are classified as either Endangered or Critically Endangered. The number of threatened species listed under this legislation has risen for almost all taxa over the past five years including 105 species that are now considered Extinct or Extinct in the wild[2].

Under the Queensland *Nature Conservation Act 1992* (the NCA) as of 30 June 2023, there were 1,049 species (257 animals and 792 plants) listed as threatened[3].Of these, more than 40% of the fauna and more than 70% of the flora are endemic to Queensland.

The number and trend of these lists are a simple indication of the health of our biodiversity. With one of the highest rates of mammal extinction in the modern world[4], the trajectory for many of Australia's native plants and animals must change. It is very clear that we need to get to work, do some long-term planning, rethink investments, better manage resources and prioritise landscape restoration as way to limit and reverse the declines of wildlife.

Biodiversity values of the Wet Tropics

The forests of eastern Australia are identified as a global biodiversity hotspot[5]. The rainforests are internationally recognised as mega-diverse and contain much of the endemic biodiversity[6].

Despite comprising a very small proportion of the Australian continent, the Wet Tropics of Queensland World Heritage Area (the Area) supports the highest biodiversity of any region in Australia[7]. More than a quarter of the region's animal species have significant conservation value (**Appendix 1**).

The region also supports over 4,300 vascular plant species of which 708 are endemic. These include species with restricted ranges and specialised habitat requirements, endemic and/or ancient species, considered relicts from the Gondwanan super continent, and highly specialised species or vulnerable and threatened species (**Appendices 2 and 3**).

These plants and animals are an important part of Australia's natural and cultural heritage and make a significant contribution to the Outstanding Universal Value (OUV) and Indigenous heritage values of the Area.

Every native plant and animal species is unique and a valuable part of our biodiversity, but there are numerous species declining in numbers and at risk of extinction due to a range of threatening processes.

World Heritage listing of the Wet Tropics has provided a level of habitat protection and halted declines of endangered species such as the southern cassowary (*Casuarius casuarius johnsonii*)[8].

The 2020 IUCN World Heritage Outlook report[9] acknowledges the Area is protected by a strong and updated legislative framework, a dedicated, independent management authority that enjoys broad community support, and a comprehensive suite of management strategies. However, the insidious and damaging threat posed by invasive species and diseases, and the impacts of climate change present real danger to the continuing integrity of the Area's biodiversity.

As such, whilst a number of additional species—notably endemic rainforest frogs, ringtail possums[10], high-altitude birds[11,12] and plants in the family Myrtaceae[13] considered secure at the time of listing, now face significant challenges from accumulated and compounding threats.

Outstanding Universal Value of the Wet Tropics

The Wet Tropics of Queensland World Heritage Area fulfills all four natural criteria for World Heritage listing. The Wet Tropics is considered to:

- contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance—*Criterion (vii)*
- be an outstanding example representing the major stages of Earth's history, including the record of life, and significant ongoing geological processes in the development of landforms, or significant geomorphic or physiographic features—*Criterion (viii)*
- be an outstanding example representing significant ongoing ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals—*Criterion (ix)*
- contain the most important significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation—*Criterion (x).*

First Nations perspectives on biodiversity and threatened species

The Area is culturally rich, comprising the lands of at least 20 Rainforest Aboriginal tribal groups, including 120 clans and eight language groups who have been an integral part of the land and seascape, living in and around the region for thousands of years and using traditional practices to manage Country.

In 2012, the Area's Indigenous heritage values were inscribed on the Australian National Heritage List. The listing recognises the Wet Tropics of Queensland as the only place in Australia where First Nations Peoples permanently inhabited a tropical rainforest environment, the specialised and unique material culture and technical achievements to

process toxic nuts and other plants, and oral history traditions from creation beings[14] that describe the process of toxic nut processing. National Heritage listing provides formal recognition of the rainforest as a First Nations' cultural landscape.

Rainforest Aboriginal Peoples view all elements of the cultural landscape as interconnected[15]. The cultural landscape includes not only plants and animals but people, story places, ancestors and protocols. Culturally significant species feature prominently in their knowledge, including language, ceremonies, lore, identity and narratives, and are considered cultural icons[16].

For First Nations Peoples, threatened species are not contained within a list. Springs, waterways and other significant cultural landscapes may be the highest priority. Animals and plants that hold important cultural values—such as totems, bush foods, medicines and indicators—might be prioritised by First Nations Peoples, and these might be different for each clan group. You cannot protect one species without protecting the environmental and cultural landscape it exists within. First Nations landscape management includes cultural and social interactions: the landscape is not just physical, but political, social and historical[17].

Spring is our Mother

In Bama lore, all waterways—underground aquifers, permanent waterholes, watercourses, lagoons—contain the highest cultural significance and special protocols are required in the visiting and study of these places. Springs, in particular, have special considerations as the mother of everything.

Springs have all the elements that a mother has: it gives birth (fish spawn in upper watercourses), is the gatekeeper of the rainbow serpent and only women can speak about these values. Waterfalls have power—they can vacuum (suck you away), rocks can let species pass, the rainbow serpent can make things disappear. These powers are important for scientists wanting to study waterways. They need to know how to approach, behave and manage information to ensure project success and their personal safety.

Peter Wallace, Yalanji Traditional Owner

How are threatened species defined?

Threatened species are defined as those listed as Critically Endangered, Endangered, or Vulnerable under the Commonwealth's EPBC Act, under Queensland's NCA, or (in the case of fauna), on the International Union for Conservation of Nature (IUCN) Red List of Threatened Species[18]. An additional category, Near Threatened, is defined by the IUCN Red List and the NCA for species that are in decline and/or at risk of becoming Vulnerable. The categories reflect a particular species' risk of extinction, based on expert assessment of decline in numbers, geographical distribution, estimates of actual numbers, and probability of extinction in the wild.

When determining extinction risks, a common assessment method is utilised across all Australian jurisdictions[19]. This provides a consistent approach to the assessment and listing

of nationally threatened species. It is based on the best practice standard developed by the IUCN, as used to create the IUCN Red List[20], with some amendments to suit the Australian context.

Species may differ in their classification under IUCN, EPBC and NCA lists partly because of the geographic extent relevant to each list. For example, a taxon classified as Near Threatened on the global IUCN Red List might be Critically Endangered within Australia or Queensland where numbers are very small or declining.

Not all species on the IUCN Red List are included in Commonwealth or state legislation.

Threatened species listing under EPBC or NCA legislation gives the conservation status legal standing and mandates actions to secure species populations, hopefully allowing eventual removal from the list.

Listing also triggers environmental laws. Proposed developments that might harm or otherwise impact nationally threatened species or their habitat should be referred for assessment under the EPBC Act. The development may be stopped entirely (although this rarely happens)[21], modified to reduce potential impacts, or offsets may be required to compensate by helping the species at another location[22]. Listing of a species should also guide allocation of conservation funding and investment[23].

Why are there so many threatened species in the Wet Tropics?

The number of threatened species seem disproportionately high given the bioregion's relatively small land area. This is due to the legacy of the region's biogeography and the evolutionary history of its flora and fauna[24, 25]. A major influence being the fluctuating size of rainforest refugia through the Pleistocene (2.58 million to 11,700 years ago)[26] and the region's high gradients in topographical, soil types and climate characteristics[27].

The breakup of Gondwana commenced in the early Jurassic (180 million years ago). For much of its subsequent history, Australian's vegetation was dominated by cool-adapted rainforest. Forests went through warmer (more tropical) and cooler (more temperate) phases but persisted until Australia's final separation from Antarctica. Australia's subsequent northward drift coincided with a gradual cooling in the southern hemisphere and expansion of the Antarctic ice sheet[28].

This resulted in a cooling and drying of the continent, leading to the contraction of rainforest[29] to small refugia along the eastern coast and ranges. This continental-scale change in vegetation patterns was exacerbated by several periodic expansions and contractions of these refugial rainforests during the glacial fluctuations of the last 2.5 million years[30].

Despite these conditions, Australia's remaining rainforest fragments have remained stable enough to allow patches of plants and animals to persist in stable refugia, protected from drought and fire.

Much of the Wet Tropics endemic fauna are restricted to upland communities, but there are also concentrations of narrow endemics (species with only one or two populations, localised distributions or associated with restricted ranges of environmental conditions) in humid, climatically stable, fireproof refuges in the lowlands[31].

The distinctive and diverse assemblages of species seen today in the Wet Tropics are also the result of these finely balanced conditions that, in turn, are due to the latitude and topography of the region and its proximity to moisture-laden air currents from the Pacific Ocean.

The Area's specialised rainforest fauna—mainly restricted to the cooler upland rainforests—can also be considered relicts of rainforest communities that were previously more widespread.

In terms of numbers of regional ecosystems per unit area, the Wet Tropics is the richest bioregion in Queensland[32.] Lowland vegetation types range from mangroves, beach scrub and palm forest to mesophyll rainforest, melaleuca swamp/woodlands and eucalypt woodlands. In the upland areas various forms of rainforest and wet sclerophyll forest dominate with some eucalypt forest along the drier western margins. Communities such as cloud forests are restricted to the highest elevations above 1,000m. Another distinct habitat comprises boulder fields and rock pavements. Each of these communities provide suitable habitat for threatened plants and animals.

Wet Tropics flora

The Wet Tropics bioregion contains 26% of the nation's vascular plant species. Some 314 of these are classified under the NCA or EPBC Act as Vulnerable, Endangered or Critically Endangered, with a further 98 species listed as Near Threatened. It's a similar story for vertebrates, with at least 25% of the Area's fish, amphibians, birds and mammals having some level of conservation significance.

Floristically, the Area is considered a living museum of land plants, containing one of the most complete and diverse living records of the major stages in the evolution of land plants in the world. It contains the highest concentration of ancient flowering plant lineages in the world, as well as 60% of Australia's ferns and fern allies, and a large proportion of the nation's mosses and liverworts. It also provides the only habitat for a greater number of locally endemic, threatened and ancient plants than anywhere else in Australia (refer **Appendix 2** and **Appendix 3**).

Localities notable for their floristic richness include the Daintree lowlands and low to mid elevations around the peaks of Bellenden Ker and Bartle Frere. The Wet Tropics bioregion sustains 45.6% of all Queensland's vascular plant species[33, 34] in slightly over 1% of the state's land area.

The forests of the Area are far from uniform. Factors such as topography, elevation, soil, rainfall, fire and disturbance history create an array of ecological communities that provide critical habitat for a diverse range of vascular plant species. Many these are of conservation concern (Table 1). As of June 2023, Queensland's Nature Conservation (Plants) Regulation 2020 listed 314 Wet Tropics species that are Critically Endangered, Endangered, Vulnerable or Near Threatened. The Commonwealth EPBC Act lists include 26 Wet tropics species that are Endangered and 39 that are Vulnerable.

Eight percent of the flora of the Wet Tropics is considered threatened, of which 81% are rainforest species, the remaining 19% occur in sclerophyll communities. Considering

habitat alone, 13% of the total Wet Tropics rainforest flora is threatened whereas 3% of the non-rainforest flora is threatened.

The families with the most threatened species are:

- Orchidaceae (49 species)
- Myrtaceae (26 species)
- Proteaceae (15 species)
- Fabaceae (12 species)
- Lauraceae (11 species)
- Sapindaceae (10 species)

Most species listed as threatened are either endemic to the Wet Tropics or to Queensland or to Australia. There are, however, a number of species that occur elsewhere in the tropics (e.g., New Guinea and Southeast Asia), but which their Australian distribution is confined to small and scarcely viable populations in the Wet Tropics. These extra-Australian species are mostly ferns and lycophytes, and predominantly occur on the wet coastal lowlands and foothills in rainforest communities.

Because so little is known of the environmental requirements of many of these species, their responses to current and future threats are difficult to predict. However recent predictions for the future of the mountaintop (above 900m elevation) habitats of the Area indicates that the more than 30 plant species that are restricted to these habitats are gravely threatened by climate-driven habitat loss[35].

Conservation management of threatened species and communities requires an understanding of the pressures they face, including the interactions between different threats.

Table 1 Numbers of plant species of conservation significance within the Wet Tropics bioregion, and under the State of Queensland *Nature Conservation Act 1992*, current as of 30 June 2023, and the EPBC Act List of Threatened Flora.

Conservation status	NCA Wet Tropics (% of Qld total)	NCA (Qld)	EPBC Act Wet Tropics (% of QLD total)	EPBC Act (Qld)
Extinct in the wild	10 (59%)	17	10 (83%)	12
Critically Endangered	23 (24%)	94	6 (30%)	20
Endangered	53 (25%)	209	26 (31%)	83
Vulnerable	140 (29%)	481	39 (21%)	182
Near Threatened	98 (41%)	241	NA	NA

Ecologically threatened communities (including regional ecosystems)

Threatened ecological communities are ecosystems in danger of being lost due to some threatening process, and that have been identified and listed under the EPBC Act. As of June 2023, there were 87 recognised threatened ecological communities listed across the continent. Four of these occur in the Wet Tropics region. Most listed threatened ecological communities occur in areas that have been heavily modified for agriculture or urban development.

Mabi forest is a threatened ecological community found almost exclusively on the Atherton Tablelands. It is listed as critically endangered. Less than 4%[36] of the original extent of Mabi forest remains, and this is mostly in small, isolated remnants of less than 5ha in size.

Broad leaf tea-tree woodlands ecological community is found mainly within 20km of the coast, from Mossman in the north to Yeppoon in the south. Past clearing and disturbance from grazing and weed incursion has significantly reduced the extent and condition of this community and it is now listed as endangered under the EPBC Act[37].

Littoral rainforest and coastal vine thickets of eastern Australia is critically endangered ecological community found along the eastern coastline of Australia, occurring within 2km of the coast. It provides an important buffer to coastal erosion and wind damage, however significant clearing and fragmentation has occurred for coastal development, agriculture and sand mining[38].

Lowland tropical rainforest of the Wet Tropics was listed in 2021 as an Endangered ecological community. It typically comprises structurally complex, evergreen tall forest with a relatively high species diversity, and a predominance of large-leaved tree species with vines, lianas and epiphytes, being relatively common. Clearing for urban development and agriculture, and the risk of inundation from rising sea levels are the key ongoing threats to this ecosystem[39].

In Queensland, the regional ecosystem framework was developed to provide a systematic means of describing biodiversity across variable environments, based on native vegetation[40] and it continues to be used as surrogate for biodiversity[41]. The biodiversity status of a regional ecosystem is based on an assessment of the condition of remnant vegetation in addition to the criteria used to determine the class under the *Vegetation Management Act* 1999 and how vegetation clearing is regulated.

Of the 1,459 regional ecosystems that occur in Queensland[42] 210 are in the Wet Tropics bioregion; with 23 considered ‘Endangered’ (where less than 10% of their pre-clearing extent remains) and over 130 ‘Of Concern’ (where 10% and 30% of their pre-clearing extent remains).

Wet Tropics fauna

The vertebrate fauna of the Wet Tropics has outstanding and exceptionally high levels of endemism and diversity. Many of these species have very restricted ranges and specialised habitat requirements as well as ancient species considered to be relicts from the time of the Gondwanan supercontinent.

The same characteristics that make the Wet Tropics fauna unique have also resulted in a propensity for many species to be vulnerable to extinction. Additionally, many of these populations are already highly fragmented and becoming more so[43,44,45].

The Wet Tropics is home to over 670 species of vertebrate animals, half of which are birds. This represents approximately 45% of the total vertebrate diversity across the entire Australian continent (Table 2). Some 38% of the Wet Tropics species commonly use rainforest and one in five are rainforest specialists. For its size, the region is especially rich in regional endemic species, with 90 species found nowhere else in the world.

The vast majority of regional endemics (83%) are strongly associated with rainforest; however, there are some notable exceptions including three vertebrate species endemics to the mesic boulder habitats of Black Mountain (near Cooktown), as well as rock wallabies, the mahogany glider (*Petaurus gracilis*) and the northern bettong (*Bettongia tropica*). Endemism is highest for taxa with low dispersal potential such as reptiles (20%) and frogs (50%) and for rainforest specialists.

In the Wet Tropics, vertebrate diversity in the rainforests is concentrated in the mountains. The highest biodiversity levels are found in the mountainous parts of the Mount Windsor, Mount Carbine, Atherton, Mount Bartle Frere, Mount Bellenden Ker, Kirrama and Mount Spec uplands. The central uplands around the Atherton Tableland are generally the most diverse although the more unique species are in the higher elevations of the Mount Carbine, Bartle Frere/Bellenden Ker and Thornton Peak uplands.

Diversity increases from lowlands to uplands, peaks at mid-upper elevation (~800-1200m) and declines towards the tops of the highest mountains. Scattered small areas of high diversity also occur in the north of the region (the Thornton and Finnegan uplands).Unlike plants, there is no peak of richness in the coastal lowlands adjacent to the Thornton or Mount Bellenden Ker- Bartle Frere massifs.

The region's short, steep coastal streams support unique aquatic fauna, including the amphidromous cling gobies, several of which are listed as threatened[46]. Wet Tropics streams also support several species of rainbowfish, with similarly restricted distributions. In contrast to the amphidromous (fishes that regularly migrate between freshwater and the sea (in both directions), but not for the purpose of breeding) cling gobies, rainbowfish occupy freshwater streams throughout their life cycle and distinct species are at risk from hybridisation[47].

Information about the region's invertebrate taxa is patchy. The *Euastacus* crayfish of upland streams are vulnerable with restricted distributions. Robert's crayfish (*Euastacus robertsi*) and one butterfly, the Apollo jewel (*Hypochrysops apollo apollo*), are the only Wet Tropics invertebrates listed as Threatened.

Table 2. Numbers of vertebrate species and sub-species in the Wet Tropics bioregion, listed as threatened (Critically Endangered CR, Endangered EN, Vulnerable VU) or near threatened on the IUCN Red List of Threatened Fauna (I), the EPBC Act List of Threatened Fauna (E), and/or the Queensland NCA Nature Conservation (Animals) Regulation 2020 (N).

For details of all species refer to Appendix 1. Data is based on a 2023 revised and updated version[48, 49] with a revision of taxonomy, updated species distributions, updated field monitoring data, current threat status and recalculated diversity mapping, except for fish for which data were compiled from searches of IUCN, EPBC Act and NCA threatened species lists. For this table, the Wet Tropics bioregion includes the Mt Elliot and Bakers Blue/Hann Tableland outliers plus a 30km buffer, except for fish for which these outliers and buffer are not included.

Conservation status	Mammals			Birds			Reptiles			Frogs			Fish		
	I	E	N	I	E	N	I	E	N	I	E	N	I	E	N
Extinct in the wild	0	0	0	0	0	0	0	0	0	2	1	1	0	0	0
Critically Endangered	0	0	1	1	0	1	2	1	4	7	9	8	2	2	1
Endangered	3	6	9	2	5	3	1	0	0	4	2	4	4	1	0
Vulnerable	5	9	6	6	1	5	2	2	9	1	2	5	1	0	3
Near Threatened	15	0	4	5	0	1	1	0	2	0	0	0	0	0	0
Total threatened /near threatened taxa	**23**	**15**	**20**	**14**	**6**	**10**	**6**	**3**	**15**	**12**	**13**	**17**	**7**	**3**	**4**

How are threatened species and ecological communities managed?

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is Australia's primary national environmental legislation. It provides for the protection of Australia's environment, especially aspects of the environment that are matters of national environmental significance

The EPBC Act provides for the listing, classification and recovery planning of threatened species and ecological communities. The Australian Government Minister for the Environment may make or adopt and implement recovery plans for threatened fauna, threatened flora (other than conservation dependent species) and threatened ecological communities listed under the EPBC Act. They are responsible for coordinating and prioritising threatened species recovery across states and territories.

In Queensland, the state government has responsibility for managing and conserving threatened species through the *Nature Conservation Act 1992* (NCA), which defines threatened wildlife (commonly referred to as threatened species) as native wildlife (both flora and fauna) that is Extinct in the wild, Endangered or Vulnerable. The Department of Environment and Science is responsible for assessing nominations for listing threated species.

Other legislation influencing the protection of threatened species and their habitats includes but is not limited to the *Vegetation Management Act 1999* and the *Environmental Protection Act 1994*.

Threatened species recovery planning in the Wet Tropics

Recovery plans set out the research and management actions necessary to stop the decline of a species and support its recovery. The aim of a recovery plan is to maximise the long-term survival in the wild of a threatened species or ecological community.

Recovery plans state what must be done to protect and restore important populations of threatened species and habitat, as well as how to manage and reduce threatening processes. They achieve this aim by providing a planned and logical framework for key interest groups and responsible government agencies to coordinate their work to improve the plight of threatened species and/or ecological communities. They may cover single or multiple species or ecological communities.

Although there many threatened species across the Wet Tropics only a handful have had a recovery plan or conservation advice approved. Not all are current. They include:

- Mabi forest or complex notophyll vine forest Type 5b (Tracey 1982)
- Magnificent brood frog (*Pseudophryne covacevichae*) (2000-2004)
- Mahogany glider (*Petaurus gracilis*)
- Mountain-top nursery frog (*Cophixalus monticola*) (Conservation Advice)
- Lowland tropical rainforests of the Wet Tropics (Conservation Advice)
- Northern bettong (*Bettongia tropica)* (2000-2004)
- Stream-dwelling rainforest frogs of the Wet Tropics
- Southern cassowary (*Casuarius casuarius johnsonii*)
- Spectacled flying-fox (*Pteropus conspicillatus*)
- Spotted-tailed quoll (*Dasyurus maculatus gracilis*)
- Yellow-bellied glider (*Petaurus australis brevirostrum)*
- Cave-dwelling bats (*Rhinolophus philippinensis*, *Hipposideros semoni and Taphozous troughton*i) (2001-2005)
- A fern (*Chingia australis*).

In 2022, the Australian Government released the Threatened Species Action Plan[50].This plan sets out a number of objectives to prevent new extinctions, to protect 30% of Australia's land and 30% of oceans, and targets to increase recovery activities led by First Nations Peoples.

The plan recognises that while all threatened species and natural environments are important, focusing on a limited number of priority species and priority places targets effort and resources so that tangible outcomes can be achieved.

The plan provides a focus for 110 priority species and 20 priority places. The Wet Tropics has four priority species, including the Eastern curlew (*Numenius madagascariensis*), northern quoll (*Dasyurus hallucatus),* spectacled flying-fox (*Pteropus conspicillatus)* and mountain-top nursery-frog (*Cophixalus monticola).*

The eastern forests of far north Queensland is identified as one of the priority places in the Plan. The intent being that improving the condition of priority places will benefit not just threatened species, but many other native plants and animals[51].

The EPBC Act provides for conservation plans to be developed for listed threatened species, threatened ecological communities and key threatening processes, in accordance with statutory timeframes and requirements. The three types of conservation plan include:

1. *Conservation advice* — must be produced for most listed threatened species and ecological communities to establish why they were listed and what can be done to stop their decline or support their recovery.
2. *Recovery plans* — are optional for listed species and communities. Commonwealth Environment Minister must determine whether they are required and provide for the actions necessary to stop their decline and support their recovery.
3. *Threat abatement plans* — are optional for listed key threatening processes. The Commonwealth Environment Minister determines whether they are required and provide for the actions necessary to reduce the process to an acceptable level.

Threats and key threatening processes

Identifying and mitigating threats is essential for recovery of threatened species and the restoration of species and their habitats.

Ecosystems and species seldom respond to pressures in isolation, and the most abrupt changes in ecological systems frequently arise from interactions among multiple pressures rather than changes in a single pressure[52].

Similarly, most threatened species and ecosystems cannot be recovered by managing a single threat. However, many threatening processes affect species by similar mechanisms, such as through the removal or degradation of habitat.

For example, 86% of Australia's threatened species are subject to multiple threats that amount to habitat destruction and degradation for which the key conservation response is habitat retention and restoration[53]. All species require multiple integrated management responses to address their threats.

The consequences of many threats are manifested through similar mechanisms. Habitat loss and degradation are the primary mechanism through which species are affected by various threats, be it vegetation destruction, urbanisation, transport corridors, energy production or agricultural activity.

As at June 2023, 22 key threatening processes are listed under the EPBC Act. Thirteen of these relate to pressures from invasive species, three relate to pressures from pathogens or disease, four relate to population pressures, one relates to fire, and one relates to climate change. There are additional threatening processes not listed under the EPBC Act, for example, the pathogen myrtle rust.

Climate change

Climate change projections for the Wet Tropics are well-documented[54], while historic changes also give insight into the future climate of the region. More than 15 years ago, catastrophic impacts on the endemic vertebrate fauna of the region were predicted over the coming decades with a potential for more than 50% of these species to go extinct[55].

The Area's distinctive upland flora and fauna are particularly affected as the envelope of suitable climate for cool-adapted species is decreasing, but their ability to adapt by moving is hampered by natural geographic barriers and modified landscapes. Species already restricted to the highest elevations have nowhere further to go and face an 'elevator to extinction'[56].

Nine species and sub-species of endemic Wet Tropics birds are now considered threatened according to the IUCN criteria, with five more regarded as 'Near Threatened'. Climate change is implicated in all these population declines[57], with increasing temperatures and changes in rainfall patterns negatively affecting these and other upland populations, and heatwaves impacting lowland populations[58].

The region's iconic ringtail possum species have also undergone rapid and severe declines, with some species most affected by increasing average temperatures and others impacted by increasingly frequent heatwaves. The lemuroid ringtail possum

(*Hemibelideus lemuroides)*, now Critically Endangered, has been most affected, losing nearly 70% of its population in little more than a decade[59].

Climate change may alter water flows placing freshwater species at risk. Reduced runoff in headwater streams, for example, threatens the upland spiny crayfish (*Euastacus* spp.) that depend on clear, cool, fast-flowing water[60].

In addition to the direct physiological effects of increasing temperatures and altered water regimes, climate change can have indirect effects on species' food supply, predator-prey relationships, and competitor distribution. For instance, nutritional stress may be contributing to ringtail possum declines as detoxifying plant toxins is more physiologically demanding at higher temperatures[61]. Spotted-tail quoll (*Dasyurus maculatus gracilis*) numbers may in turn be affected by the decline in ringtail possums, a favoured food item[62].

Although climate change is threatening many of the Area's species, the mechanisms by which it is impacting them are poorly understood. Beyond the physiological effects of increased temperature, there are likely inter-related and synergistic effects of climate change particular to each species that affect their sensitivity, capacity to adapt, and the range of measures that may assist them.

Climate change is increasingly recognised in threatened species recovery planning as a current and future risk. However, only a relatively small proportion of recovery plans that list climate change as a threat identify any specific actions to mitigate the threat, other than monitoring change[63]. Managing and reducing other threats that decrease the resilience of threatened species populations to climate change is often prioritised but rarely linked to the specific threats of climate change.

Cloud forest islands in the sky

Above 900m in elevation and cloaked in cloud forest, the Wet Tropics mountaintops are constantly cool, wet 'sky islands' separated by warmer, drier, forest. These sky islands contain a number of highly restricted, cool-adapted, endemic plant and animal species, many of which are vulnerable to extinction.

Globally, tropical mountain cloud forests are recognised as critically threatened by climate change. In Australia, tropical mountain cloud forests are restricted to the Wet Tropics World Heritage Area of northeast Queensland and contains over 70 endemic species.

Despite relatively few studies compared to temperate regions, tropical mountains are recognised as highly threatened by even marginal increases in temperature associated with climate change due to their steep environmental gradients, reportedly narrow thermal tolerances of species and the anticipated reduction in cloud cover that will lead to decreased water input[64].

Modelling studies of 37 of the Area's montane endemics predict that, by 2085, suitable tropical mountain cloud forests habitat will decline by at least 60% and will be eliminated altogether for seven[65].

The seven species: *Acrotriche baileyana, Gynochthodes constipata, Hymenophyllum whitei, Syzygium fratris, Tasmannia* sp. *Mt Bellenden Ker, Cinnamomum propinquum, and Styphelia malayanus*, are mostly found on just one or two peaks in the Area. *Hymenophyllum whitei*, a tiny fern, was thought extinct until its rediscovery on Thornton's Peak in 2017[66], but climate change may yet push it to extinction. Other threatening processes may be acting on two of these species – myrtle rust on *Syzygium fratris* and *Phytophthora*-related dieback on *Cinnamomum propinquum*, compounding the threats.

The mountain-top nursery-frog (*Cophixalus monticola*)is a cloud forest inhabitant and is found only above 1,100m in the vicinity of Mount Lewis. Like all Wet Tropics' rainforest microhylids, the mountaintop nursery-frog is a terrestrial breeder with males guarding the clutch as development takes place inside the egg. They need high levels of soil and litter moisture to prevent their eggs drying out during development[67].

Patchily distributed within its extremely restricted range, the mountain-top nursery-frog is highly susceptible to climate change, is Critically Endangered, and a priority species under the Australian Government's Threatened Species Action Plan 2022 - 2032[68]. Nursery-frog species restricted to other high elevation sites in the Wet Tropics face the same threats and are also vulnerable to extinction.

Once more widely distributed, the Wet Tropics sub-species of the spotted-tailed quoll (D*. maculatus gracilis*) the largest marsupial carnivore remaining on mainland Australia, is now largely restricted to high elevation, simple vine forests above 1,100m[69]. The sub-species' total population numbers only a couple of hundred individuals, with key threats thought to include poisoning by cane toads, competition with cats, and climate change[70]. Listed as endangered under the EPBC Act, recent surveys suggest the spotted-tailed quoll is now Critically Endangered.

Conserving the sky islands' unique flora and fauna in the face of climate change requires action to minimise other threats, such as damage to habitat by feral pigs, predation by feral cats and unregulated visitation, to ensure species' populations are as resilient as possible.

Changing fire regimes

Approximately two-thirds of species listed under the EPBC Act are threatened by changing fire regimes (usually in concert with other pressures)[71]. "Fire regimes that cause biodiversity decline" has recently been listed as a key threatening process under the EPBC Act, although a threat abatement plan has not been developed.

Evidence suggests that climate change is causing, and will continue to cause, increases in the severity and duration of fire weather. This is likely to lead to significant changes in fire regimes, but there are not yet any specific projections about fire risk on threatened species in or around the Wet Tropics forests due to the complexity of climate-fire-vegetation interactions[72]. Such forecasts are urgently needed so that we can plan and secure the capability to manage this threat to natural ecosystems and communities.

Rainforest, previously considered a natural fire barrier, is now vulnerable to fire[73]. The Wet Tropics region can expect more frequent and more intense fires due to hotter

temperatures, more droughts, longer periods of low humidity, carbon dioxide-induced increases in vegetation biomass and smaller windows of opportunity for prescribed burns. The capacity of the Area's endemic rainforest species to regenerate after fire is poorly studied. Although many woody Australian rainforest species have the capacity to resprout after fire[74], fire in a closed-canopy environment would have significant impacts on canopy epiphytes, long-lived seedling populations and allow for the ingress of weeds.

Until the susceptibility to fire of rainforest species can be determined, active protection from fire, particularly in refugial areas, is highly desirable. While the increasing threat of fire may mean that, in places, fighting fire is warranted, aerial application of fire retardants and salt water can be detrimental to water quality. Indigenous cultural burning was a common activity once carried out by the Rainforest Aboriginal Peoples across the Wet Tropics to manage landscapes and achieve specific cultural objectives[75]. Many Rainforest Aboriginal communities are working with non-Indigenous land managers to reinstate cultural burning.

Extreme events

Many of the most significant impacts of climate change on biodiversity occur through extreme climate events[76]. Scientists consider that trends in climate extremes may be more likely to trigger abrupt changes in ecological systems than trends in mean climate[77].

Heatwaves have intensified in Australia since 1950, with a consistent increase in peak temperature, number of events, frequency and duration. A major heatwave that affected the Wet Tropics coast in November 2018 resulted in the mass mortality of about 23,000 spectacled flying-foxes (Pte*ropus conspicullatus*) over a three-day period, an estimated one-third of the Wet Tropics population. In response, the Australian Government upgraded the spectacled flying-foxes' threatened status, from Vulnerable to Endangered, reflecting the heightened concerns for its future[78].

2019 was Australia's hottest and driest year on record[79], and bushfires that occurred through the 'Black Summer' of 2019-20 were unprecedented in their extent and severity. It is estimated that the fires affected 53% of the Gondwana World Heritage rainforests and 80% of the Greater Blue Mountains World Heritage Area[80]. The full impact of these bushfires on the threatened species and ecological communities will not be known for many years, and the conservation status of many species thought to be secure will need to be reassessed[81].

Severe tropical cyclones can impact threatened ecological communities and threatened species' habitat, causing structural damage and reducing food resources. Tropical Cyclone Larry, for example, caused a broad-scale redistribution of spectacled flying-foxes seeking alternative supplies of blossom and fruit[82], and delayed and reduced tooth-billed bowerbird (*Scenopoeetes dentirostris*) bower residence and display, presumably because the cyclone caused direct mortality and severely reduced the fruit supply[83]. Cassowary recovery was enabled with assisted feeding to address limited food resources after cyclone Yasi. Cyclones may become more intense with climate change[84], increasing the risk for threatened species and communities.

Invasive species and diseases

Invasive species are the most common pressure on species listed under the EPBC Act, affecting 82% of threatened taxa[85]. In total 207 invasive plants, 57 invasive animals and three pathogens are listed as affecting Australian threatened taxa. Invasive species are recognised as one of five major causes of change to nature globally[86].

Human pressure and changing climate are expected to increase both the impact and the distribution of invasive species and introduced plant and animal diseases[87]. This is exceptionally concerning for Australia, and specifically for Queensland, one of the world regions with the highest number of naturalised plant species[88].

Invasive species can outcompete and displace native species, and severely disrupt the ecological interaction networks that sustain the habitats that provide essential ecosystem services[89], including changes in the behaviour of native fauna[90]. Habitat disturbance is often the main pathway of entry for invasives[91,92]; particularly so for the establishment of community services infrastructure such as roads or powerlines[93]. Hence, minimising anthropogenic disturbance is the single most effective method to prevent the introduction and spread of invasives.

Invasive plants

Some invasive species can expand into relatively undisturbed habitats. For the Wet Tropics, these are typically able to tolerate shade, allowing them to proliferate under intact canopies while taking advantage of native dispersal vectors[94]. For instance, species of Miconia (especially *M. calvescens*) have devasted tropical forests in parts of the Pacific thanks to this ability[95]. In Australia, extensive targeted research and on-ground activities have largely contained outbreaks of Miconia to date, but ongoing surveillance and active management will be required to contain it.

Lianas (woody vines) are pioneer species in the rainforest and tend to benefit by the increased temperatures associated with climate change[96]. Invasive lianas may smother trees and shrubs, particularly after major canopy disturbance, for example, as caused by cyclones, and their weight can cause catastrophic structural failure of the host[97].

Some habitats are particularly vulnerable to the threat of invasive plants. For instance, riparian zones have specific vegetation that is vulnerable to displacement by invasives, which often germinate earlier and grow faster after natural disturbances such as floods[98]. Many threatened and vulnerable endemic species are found only on a handful of small locations with very specific environmental conditions not found elsewhere (e.g., mountain tops). This makes them particularly vulnerable to displacement by invasives, as endemics might not be able to complete their life cycle elsewhere. Climate change both threatens the continuity of these conditions and increases the potential of invasives to increase their distribution.

Invasive plants may hybridise with native species, for example, *Hymenachne* x *calamitosa*[99],which may lead to genetic change to native species, or displacement by the newly created hybrids[100].

Some invasive plants can alter natural fire patterns, for example, guinea grass encourages fire and threatens dry rainforest patches that are habitat for highly restricted and threatened reptiles[101].

Invasive animals

Invasive animals in the Wet Tropics impact threatened species and ecosystems through predation and poisoning, competition for resources, and habitat disturbance. These impacts may be increasing as the warming climate allows invasive species to expand their range, particularly into high-altitude forests.

Feral cats pose a global threat to endangered birds, mammals, and reptiles[102]. Although feral cats prefer lowland rainforest in the Wet Tropics[103], they are widespread in all vegetation types throughout the region and occur at all elevations, including the highest mountains[104]. Roads and tracks facilitate cats' access to remote areas where they come into contact with a number of threatened species. Species at most risk of cat predation are those in the critical weight range, including the newly described Wet Tropics white-footed dunnart (*Sminthopsis leucopus janetzkiae*)[105], whilst cats may be a direct threat to spotted-tailed quolls through competition and potential disease transfer[106]. However, the impacts of cats on the Wet Tropics' endemic and threatened fauna are largely unknown, and research is needed[107].

Feral pigs (*Sus scrofa*) prey on and compete with native plant and animal species and contribute to the spread of invasive plants and diseases. Their digging disturbs wetlands[108], stream and forest ecosystems[109, 110] posing a risk to threatened species including nursery frogs (e.g., *Cophixalus monitola*) and spiny crayfish (*Euastacus* spp)[111]. Feral pigs may also spread the root fungus *Phytophthora cinnamomii*[112], which is responsible for dieback disease in native vegetation.

Cane toads (*Bufo marinus*) which excrete toxin, pose significant threats to quolls and monitor lizards that prey on them[113] and may compete with native fauna for food and shelter. Once absent from much of the spotted-tailed quoll's upland range, cane toads now occur along roads in the rainforest uplands of the Lamb Range and Windsor Tableland, in core quoll areas[114]. Spotted-tailed quolls are therefore now at greater risk of eating toads and being poisoned by them.

Exotic fish introductions, translocations of native fish, and collecting for the aquarium trade[115,116]. threaten native fish species in the region, including the endangered rainbowfish (*Melanotaenia eachamensis*) and the Critically Endangered opal cling goby (*Stiphodon semoni*).

The yellow crazy ant (*Anoplolepis gracillipes*) is listed as one of the top 100 worst invasive species by the IUCN and Global Invasive Species Database[117] and is of grave concern for Wet Tropics species and ecosystems[118]. The pest has already invaded habitat of one endangered species, the Kuranda tree frog (*Litoria myola*)[119]. Though the Wet Tropics Management Authority has had significant success against the yellow crazy ant infestations they continue to pose a serious threat to Wet Topics fauna until eradication is accomplished.

Pathogens and diseases

To date, the amphibian chytrid fungus has been the primary cause of extinctions and declines in Wet Tropics frogs. Three of the region's stream-dwelling upland frog species are presumed extinct, while others remain at risk, particularly species and populations occurring at high elevation where the disease-causing fungus *Batrachochytrium dendrobatidis* grows best[120].

While some upland populations have recovered to varying degrees, despite the pathogen's presence[121], chytrid fungus has resulted in niche contractions for affected species[122] and remains a threat for several of the Area's frogs[123].

The main current disease threats to plants include myrtle rust and phytophthora dieback (*Phytophthora cinnamoni*). However other pathogens have been recently detected in the Area which may pose significant threats such as phytoplasmas that infect palm species and basidiomycete fungi that cause basal stem rot[124].

Golden death

Myrtle rust is a disease of plants affecting young growing tissues of a wide range of species in the family Myrtaceae which is caused by the introduced pathogen *Austropuccinia psidii*[125].

Over the last decade, myrtle rust has established in forest ecosystems across eastern Australia, and today, several Myrtaceae species in Australia's subtropics are in dramatic decline and forest systems are changing[126, 127].

Sixteen plant species are predicted to become extinct nationwide within a generation, with many more in severe decline. It is expected that impacts in the Wet Tropics will dramatically increase as the pathogen further establishes and spreads.

Extensive dieback from myrtle rust is already occurring in lowland ecosystems in the Wet Tropics, particularly in areas of high humidity such as the Daintree lowlands and in the vicinity of watercourses. It is becoming necessary to proactively manage for myrtle rust mortality by removing severely affected trees near public sites.

About 130 species of Myrtaceae occur in the Wet Tropics and of these the NCA lists two as Critically Endangered, eight Endangered, and eight as Vulnerable (under the EPBC Act, one is listed as Endangered and four Vulnerable). Myrtle rust is a potent additional threat to these listed species, some of which have been recently observed to have signs of infection and is likely to become a serious threat to many Myrtaceae that are currently unlisted.

Moribund Backhousia hughesii trees, impacted by Myrtle rust, in Mossman Gorge, Daintree National Park. These trees have been removed by Queensland Parks and Wildlife Service as they posed a public safety threat to a major tourist attraction. Photo credit: Stuart Worboys

Clearing, fragmentation and habitat loss

Clearing and habitat loss are a significant threat to Australian biodiversity, and the impact of tree clearing has been a key threatening process under the EPBC Act since April 2001. More than 60% of Australia's nationally listed threatened species are recorded as being seriously affected by habitat loss[128].

Since European colonisation 13.2% of Australia's native vegetation has been replaced for urban, production and extractive uses of the land. Between 2000 and 2017, 7.7 million hectares of potential habitat for terrestrial threatened species was lost; 64,000ha of potential habitat for terrestrial migratory species was lost; and 370,000ha of threatened ecological communities was lost[129].

The World Wildlife Fund for Nature reported land is still being cleared in Queensland at an alarming rate, with 418,656ha bulldozed in 2019-2020[130]. More than 50% was older than 15 years, with more mature forest often rich with wildlife, providing homes for threatened species (not to mention acting as a major carbon store).

The most dramatic changes in the Wet Tropics vegetation were associated with settlement. Historically, there was extensive clearing and fragmentation of the lowlands and Atherton Tableland for agriculture (e.g., maize, sugar, diary, tea and cotton)[131]. This continued, up until the late 1960s, when there were significant changes in rainforest management, from timber extraction to rainforest preservation and conservation[132].

Approximately 48% of the Wet Tropics bioregion is now within protected areas (e.g., national parks, conservation parks, Cape York Peninsula Aboriginal Land), with the Wet

Tropics World Heritage Area covering 45% of the bioregion. This has safeguarded the Area from logging and broadscale clearing. While the Area has not suffered any major forest loss since 1991[133], there are multiple and sometimes conflicting demands for use of natural resources outside of the Area.

Land use change and pressures

Urban growth across the Wet Tropics bioregion is expected increase to around 700,000 by 2050[134]. The impacts from roads, recreation (including tourism), industry, production systems and other disturbances can permeate into even the most remote protected areas.

Growing populations put pressure on land. Human disturbance restricts the movement of some species where they encounter barriers or cannot move as efficiently through modified habitats. The consequences of altered movement can be profound, leading to declines in survival and reproductive rates, genetic isolation, and local extinction[135].

Roads are barriers for dispersing wildlife, cutting off access to resources and impeding gene flow between populations. They pose a risk to dispersing wildlife that attempt to cross them, including southern cassowaries (*Casuarius casuarius johnsonii*) for which roads are the greatest observable cause of death, and for species, such as arboreal ringtail possums, that are reluctant to cross open spaces.

The region's growing human population will increase demand for water, potentially placing pressure on in-stream flows for threatened aquatic species[136]. Population growth may also contribute to a decline in river and stream water quality resulting from increased sedimentation and pollution and recreational use.

Although developments are well regulated inside of the Area[137], demand for resources; improved community service infrastructure adjacent to the World Heritage site and fragmentation of intact native vegetation reduces ecological connectivity—the critical connection between ecosystems and habitats that allows wildlife to cross the landscape in search of food, shelter and breeding sites.

Management responses

Targeted threatened species management is a central component of efforts to prevent species extinction. Governments at local, regional, state, national and international levels, in collaboration with partners, implement a broad range of policies and programs designed to arrest the decline in threatened species and ecological communities and promote their longer-term recovery.

Threatened species management on the ground is also undertaken by thousands of landholders, Indigenous communities, non-government organisations, industry and volunteers.

Despite the development of a range of conservation programs over the past decade, threatened species management is still commonly characterised as ad hoc[138]. Although there are notable successes such as the southern cassowary, many management programs and recovery plans are ineffective, with few species experiencing improvements in their conservation status.

There are several reasons for the worsening conservation status of many threatened species, such as a failure to address major threats[139], poor enforcement of existing legal protections[140,141], increasing ignorance of scientific evidence[142], and a culture of apathy[143]. In combination, these issues contribute to inaction or inefficient last-minute attempts to rescue species on the brink of extinction[144].

More needs to be done to enhance the resilience of threatened species by protecting and improving habitat and minimising the impacts of weeds, feral animals, and diseases. Recovery actions for priority species will also benefit other threatened species that share their habitat.

The complex, urgent challenges, faced by threatened species, demands innovative, holistic strategies, extensive exchange of diverse knowledge systems – and collaboration across multiple partners, including Rainforest Aboriginal Peoples, land managers, researchers, industry, landholders and the broader regional community.

Governance and institutional frameworks

Commonwealth laws

The EPBC Act is Australia's primary national environmental legislation. It provides for the protection of Australia's environment, especially aspects of the environment of national environment significance, including World Heritage properties, National Heritage places and nationally threatened species and communities.

The EPBC Act has undergone considerable scrutiny in the recent past. In 2020 an independent review by Professor Samuel[145] found that the Act was "ineffective and does not enable the Commonwealth to effectively protect environmental matters important to the nation and that fundamental reform of national environmental laws is required". When read alongside the 2021 State of Environment Report, the independent review presents a story of environmental decline.

Collaborative partnerships: Benefits and challenges of integrating a First Nations voice into threatened species land management

Indigenous knowledge and sustainable cultural practices provide a valuable approach for better environmental protection and management. The benefit of respectful and reciprocal collaborations between Rainforest Aboriginal land managers and non-indigenous land management extends far beyond better environmental protection.

For Rainforest Aboriginal custodians, building relationships with land managers provides access to Country and increased participation in decision making, while landholders benefit from learning cultural ways of managing land and access to the extensive cultural knowledge bank**.**

The challenge for non-indigenous land managers is in recognising that First Nations governance systems are holistic, diverse, dynamic and often sit at the grassroots level. Genuine engagement is complex, takes time and requires non-Indigenous decision makers to have high levels of cultural competency, even to understand who needs to be seated at the table. In recent years advances have been made, particularly through establishing Indigenous-identified positions in management agencies.

However, these individuals often face unreasonable expectations of what they can achieve as a single voice, from both their own communities and their workplace. Future management of Country must be premised on Indigenous-led approaches to strengthening and sharing our knowledge of caring for Country.

Management practices should be about revitalising and strengthening cultural practice and enable reconnecting to Country and kin, which delivers healing and rehabilitation of Country.

Support for intergenerational transfer of customary knowledge and practices, and respect for cultural authority and customary law, are vital. Self-determination is a key focus, having First Nations Peoples employed in and leading data collection and monitoring projects as well as providing evidence of how to heal Country.

Michael Morta, Indigenous Liaison Officer, Terrain Natural Resource Management

In response to the review, the Australian Government has made a number of commitments through the Nature Positive Plan[146] and the Threatened Species Action Plan 2022-2023[147].

Components of the Nature Positive Plan are currently being discussed with relevant stakeholders[148]. If done well, there is an opportunity to improve threatened species management outcomes for the Wet Tropics bioregion. This includes, for example, the development of:

1. *Stronger national environmental standards* for Matters of National Environment Significance; working towards zero new extinctions, and the establishment of an independent Environment Protection Agency to assess developments.
2. *Statutory bioregional plans*. A regional plan that pre-identifies key conservation and heritage areas and priorities for protection and restoration to support consistent project

assessment and decision making, for example, from cumulative impact of development.

3. *Agile conservation planning.* Moving away from recovery plans and towards conservation advice and recovery strategies for nationally listed threatened species and ecological communities. This approach, based on better science, will include a strong regulatory standing for all conservation planning documents in environment impact assessment and approval processes; prioritise threats and be more responsive as new threats emerge.
4. *Meaningful First Nations partnerships,* including the development of standalone cultural heritage legislation. Increase Indigenous Protected Areas and improve their management capacity by doubling the numbers of Indigenous rangers.
5. *Embedding climate considerations in all roles and function of government*. Improved planning and landscape-scale approaches to facilitate adaptation to climate change. This objective directly aligns to a key goal in the 2020-2030 Wet Tropics Climate Adaptation Plan for the Wet Tropics[149] and will implement transformative actions in the management of natural systems and actively support decisions that achieve transition to ecologically, culturally, socially and financially sustainable systems under new and unstable climatic conditions.

Independent Review of the *Environment Protection Biodiversity Act 1999*

The overall finding of the 2020 review was that the EPBC Act does not enable the Australian Government to effectively protect significant and important environmental matters. Some of the conclusions of the review include:

- Significant efforts are made to assess and list threatened species; however, once listed, not enough is done to deliver improved outcomes for them.
- Decisions that determine environmental outcomes are usually made on a project by-project basis, and only when impacts exceed a certain size. This means that cumulative impacts on the environment are not systematically considered, and the overall result is net environmental decline, rather than protection and conservation measures.
- The EPBC Act does not facilitate the restoration of the environment and needs to shift from permitting gradual decline to halting decline and restoring the environment; this would allow development to continue in a sustainable way.
- Key threats to the environment are not effectively addressed under the EPBC Act.
- There is very limited use of comprehensive plans to adaptively manage the environment on a landscape or regional scale. Coordinated national action to address key threats – such as feral animals are ad hoc, rather than a key national priority. Addressing the challenge of adapting to climate change is an implied, rather than a central consideration.
- Western science is heavily prioritised in the way the EPBC Act operates. Indigenous knowledge and views are diluted in the formal provision of advice to decision-makers. This reflects an overall culture of tokenism and symbolism, rather than one of genuine inclusion of Indigenous Australians.

Managing a priority place – the Eastern Forests of Far North Queensland

The Eastern Forests of Far North Queensland is one of 20 priority places in the 2022-2023 Threatened Species Action Plan and the Wet Tropics World Heritage Area (the Area) is the centrepiece of this priority place[150].

While the number of threatened and near threatened species are disproportionately high compared to other regions, there is enormous opportunity to target management actions that will benefit multiple species at landscape scales, rather than focusing on single species. The involvement of Rainforest Aboriginal Peoples and the application of traditional ecological knowledge in the management of this culturally significant landscape is crucial.

"Many threatened species are our totems, whose stories connect us to the Dreaming"[151].

The rescue and recovery of Wet Tropics wildlife and habitat requires a collaborative, and participatory approach involving expert scientists, Rainforest Aboriginal Peoples, land managers and decision makers. In August 2023, the Wet Tropics Management Authority's Scientific Advisory Committee met to discuss the priority place and recommended the following steps to support more effective management of threatened species across the Area:

Step 1. Convene a workshop to develop a profile for the Eastern Forests of Far North Queensland that describes the key natural and cultural values.

Step 2. Summarise the state of current knowledge on species, communities and ecosystems, assessing species recovery and key threats impeding recovery. Quantify the potential threats taxonomically and spatially. Produce explicit maps of these analyses.

Step 3. Brainstorm, develop and evaluate short, medium and long term management strategies and adaptation actions that aim to maximise resilience of the priority place (considering efficiency, effectiveness and feasibility of actions).

Step 4. Identify the knowledge gaps impeding effective management, and subsequent priorities for habitat restoration and /or augmentation, on-ground management, research, innovation and partnerships.

Step 5. Work in partnerships with government, Rainforest Aboriginal Peoples, natural resource managers, land and sea managers, and community groups and apply for targeted funding for those key management actions that benefit the most threatened species.

Queensland threatened species program

In 2018, the Queensland Audit Office (QAO)[152] made seven recommendations to the Department of Environment and Science (DES) to improve its governance, processes, and systems to better protect animals and plants at risk of extinction. The independent QAO report found DES response to conserving threatened species lacked cross program

coordination and was unlikely to conserve and recover threatened species. The report, as other reviews in other jurisdictions of threatened species management have done, noted a largely ad hoc approach that focused on a few individual species.

DES accepted these recommendations. In 2020, the Queensland Government launched a Threatened Species Program[153] to meet their responsibilities and obligations to manage and conserve threatened species including those under Queensland and Commonwealth legislation and international agreements.

In addition, the Queensland Government has a range of other programs and initiatives to help conserve threatened species. Key initiatives include the Land Restoration Fund; Indigenous Land and Sea Ranger program; the development of a research prospectus; a Protected Area Strategy and Private Protected Area Program; and a Biodiversity Strategy for Queensland[154-156].

In 2023, the QAO[157] publicly released a report looking at DES's progress against the seven recommendations made five years earlier. Encouragingly, the report found DES is more proactively nominating species for listing as threatened and is quicker to list them when needed. Amending the NCA has significantly reduced the time taken to list threatened species, from an average of 506 business days in 2018 to only 56 in 2022.

The report also found DES was yet to reassess the conservation status of 366 species to ensure state and national conservation statuses are consistent; and that there is still no comprehensive system for prioritising animals and plants according to their level of risk.

Indigenous land management

Over 20 First Nations groups hold custodianship and cultural responsibilities for the Area. They have voiced their aspirations for respectful and practical engagement with management since listing. In 1998, Rainforest Aboriginal Peoples produced 'Which Way Our Cultural Survival'[158] in response to the World Heritage declaration. The report asserted that Rainforest Aboriginal Peoples cultural connections, rights and responsibilities to the rainforest and included 163 recommendations to improve their involvement in World Heritage management.

In 2005, the Wet Tropics Regional Agreement[159] between 18 Rainforest Aboriginal groups outlined a framework of principles, guidelines and protocols to outline their expectations for engagement and aspirations for management of the Area.

Rainforest Aboriginal Peoples hold detailed knowledge on past and current environment trends that is increasingly informing ecological understanding and conservation management[160]. Work is ongoing to improve Indigenous participation in land management and biodiversity conservation. Successful programs rely on opportunities to provide ongoing employment, as well as knowledge exchange and cultural learning, particularly with young Indigenous peoples who may not have previously spent time on their Country. More traditional knowledge is slowly being integrated into biodiversity and land management programs, and with strong and positive results, particularly in the face of the challenges of drought, fire and climate change.

Rainforest Aboriginal Peoples are actively engaged in threatened species management across the Wet Tropics through the work of Indigenous Land and Sea Ranger groups, through representative bodies, family and clan groups at property level, as well as employees of government, community organisation or research institutions.

Increasingly, they are taking the lead in the development and implementation of management frameworks informed by their perspectives on Country health and healing Country[161].

At least six Traditional Owner groups within the Wet Tropics region are developing plans for the management of biodiversity and threatened species[162]. This includes having a clear understanding of biodiversity values and any threatened species within their traditional estate. The plans involves developing First Nations principles and protocols for engagement with researchers and research institutions.

Some of this work is being supported by the World Wildlife Fund and coordinated through the Djabugay Aboriginal Corporation. The outcomes of the work will include understanding the biodiversity values on different First Nations Country within the Wet Tropics, developing actions for management and applying cultural fire knowledge.

Indigenous Ranger programs are important catalysts for increased First Nations participation and leadership in land and sea management while providing significant economic and social outcomes that benefit the nation. The Australian and Queensland governments have both committed to increasing the number of rangers supported through their respective Indigenous Ranger programs. Indigenous-led threatened species management, supported by working groups or alliances, is a new way of working that needs investing in because it not only produces major conservation benefits for minimal cost, but empowers and gives rightful respect to Indigenous land management and stewardship of Country, traditional knowledge and culture (refer Figure 1).

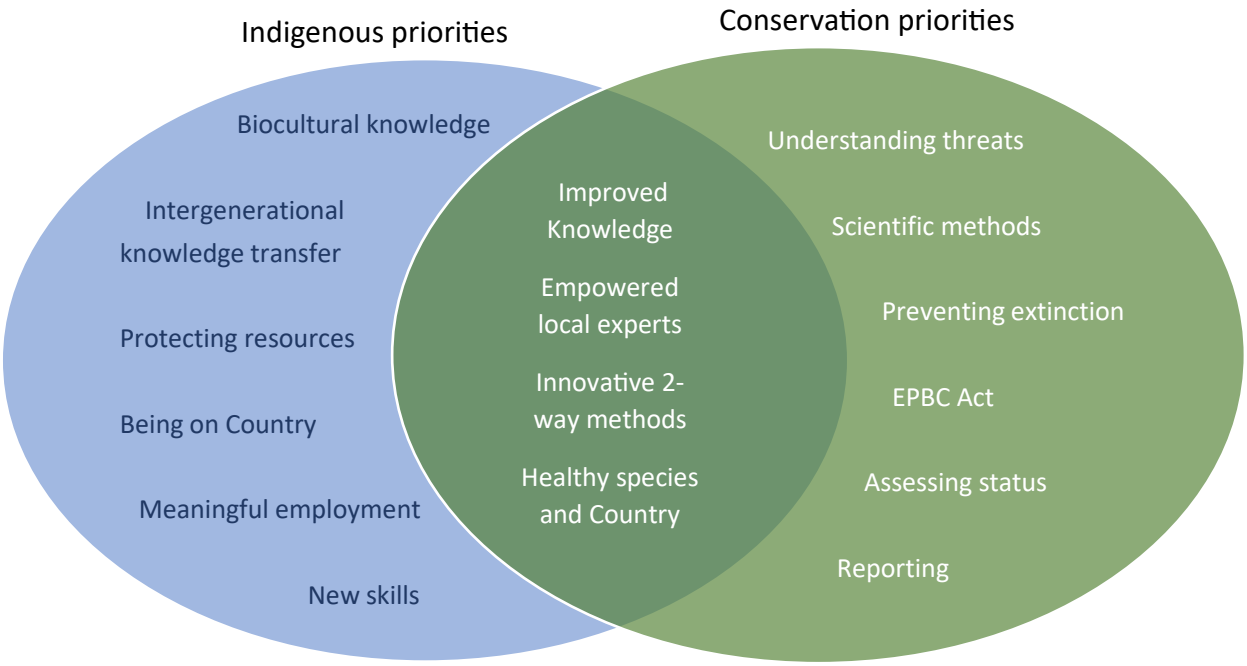

Figure 1. Outcomes from two-way monitoring of threatened species[163]

Management approaches

To reduce species declines and extinctions, the Australian Government has set a target of protecting 30% of Australia's land and 30% of oceans by 2030[164]. However, in the Wet Tropics bioregion, over 45% of the land lies within protected areas reserves such as the Area, national parks, Indigenous Protected Areas and nature refuges on private land. As such, many ecosystems are already well-represented in the Australian Strategy for the National Reserve System 2009-2030 which states priority (for expansion) will be given to underrepresented bioregions with less than 10% in the National Reserve System[165].

Protected areas

Protected areas have historically been considered the most effective way to protect threatened species and ecological communities[166]. Tropical protected areas have significantly reduced levels of threats from burning, hunting, logging and livestock, in comparison with unprotected areas immediately adjacent[167]. However, protected areas are not immune to the impact of climate change, and other pressures such as invasive species and inappropriate fire cannot be excluded from most protected areas.

Protected areas are critical to the conservation of threatened species. A recent scientific assessment report noted that conservation actions including protected areas have been successful in preventing the extinction of some species globally[168]. More than 72% of threatened species listed under the *Nature Conservation Act 1992* are found in national parks and other public protected areas, with about 26% of Queensland's threatened species either highly or entirely reliant on these areas for their survival. Significantly, 149 threatened species are found only in Queensland's protected areas[169].

The frogs and the fungus

The story of the Wet Tropics stream-dwelling frogs is a stark reminder that living within a protected area with a strong framework of management and protection is not an adequate defence against disease[170].

In the 1980s and 1990s, chytrid fungus caused several species of frog to decline or disappear throughout the region, particularly at cool, high-elevation sites despite them being largely protected within the World Heritage Area.

Chytrid fungus causes the disease chytridiomycosis in frogs. It infects a frog's skin, damaging their ability to breathe and regulate body fluids, and can kill them. Spores of the chytrid fungus are transported via water and wet soil, so the region's stream-dwelling frogs were hardest hit. The sharp-snouted dayfrog (*Taudactylus acutirostris)* is presumed extinct and the northern tinkerfrog (*T. rheophilus*) and mountain mistfrog (*Litoria nyakalensis*) are too, however there is a small chance that remnant populations still survive[171].

The armoured mistfrog (*Litoria lorica*) had not been seen since the early 1990s but was rediscovered in 2008, surviving in one stream on the western edge of the Wet Tropics where conditions kept the frogs warmer and stopped chytrid fungus proliferating. Translocating some adults to a nearby site has successfully established a second wild 'insurance' population[172].

Private protected areas

Individuals, non-government organisations and businesses are increasingly purchasing and managing significant tracts of land for conservation. In Queensland, private protected areas are recognised as an important part of protected area systems and are formally represented by special wildlife reserves and nature refuges[173]. Queensland has the largest private protected area network in Australia with nature refuges accounting for almost a third of Queensland's total protected area system.

Across the Wet Tropics, a number of private (not-for-profit) land conservation trusts including South Endeavour Trust, Bush Heritage, Australian Wildlife Conservancy, Rainforest 4, Rainforest Rescue and Queensland Trust for Nature work to protect threatened ecosystems and wildlife.

Restoring habitat and connectivity

The overriding goal of conservation should be to protect, in situ, wherever possible, existing biodiversity and the processes that allow adaptation.

Buffering the Area and extending habitat with revegetation adjacent to existing forest and improving connectivity with wide habitat corridors remain the best conservation tools for creating a network that conserves biodiversity and threatened species. Without connectivity, private and protected areas function as isolated islands, limiting the movement of individuals and preventing the interactions that are critical for species persistence.

There have been several observations of threatened and near threatened Wet Tropics species using restored habitat, demonstrating the value of revegetation in providing additional habitat and enhancing landscape connectivity. Rainforest revegetation at Donaghy's Corridor, for example, is utilised by the bare-rump sheathtail bat (*Saccolaimus saccolaimus nudicluniatus*) and the diadem leaf-nosed bat (*Hipposideros diadema*)[174]. Donaghy's Corridor, along with the Lakes Corridor and Peterson Creek Corridor, also supports most of the Wet Tropics' IUCN-listed bird species in sites that are now in their third decade of growth[175]. Peterson Creek Corridor also supports green ringtail possums and Lumholtz's tree-kangaroo[176, 177].

Assisted adaptation

The low genetic diversity of many threatened species with small, fragmented populations makes them especially vulnerable to environmental change. Managed movement of carefully selected individuals between populations, and/or reintroductions to parts of a species' former range where threats have abated, may improve genetic diversity, enhancing capacity to adapt more rapidly to the changing climate. For example, translocations may, in some circumstances, be both feasible and beneficial for some frogs threatened by chytrid fungus[178] and plants threatened by habitat conversion and inappropriate fire regimes[179].

Where options to conserve threatened species in the wild become constrained, ex situ (off site) conservation may be necessary to prevent extinction of some of the most at-risk species. This may include establishing 'insurance' or 'ark' populations in zoos and botanic gardens and maintaining germplasm in gene banks, culture collections and seed banks

While ex situ actions are often seen as the last resort for species on the brink of extinction, precautionary ex situ conservation may have an important role to play for many other species. Several tropical rainforest species face threats that are increasing in range and severity, particularly in the upland areas.

For these species, the potential synergistic effects of these threats cannot be accurately predicted in part because the biology and ecology of the impacted species, and therefore their response, is poorly known. It is logical therefore to adopt a 'no regrets' approach– to take a course of action (such as ex situ conservation) that, regardless of the ultimate, unknowable fate of wild populations, increases the capacity of species to adapt to change and has a positive net impact[180, 181].

Saving cloud forest plants

The Tropical Mountain Plant Science collaboration aims to secure the future of Australia's climate-threatened tropical montane cloud forest plants. This is achieved by building a multi-strategy, ex situ conservation reserve to 'backup' at-risk wild populations and support research, display and education. Through novel research into seed storage and germination requirements, propagation methods, genetic diversity in wild and ex situ populations, and the effect of extreme climates on recruitment and growth, the project aims to ensure that the reserve collections, distributed across multiple botanic gardens and seed banks along Australia's east coast, are genetically and physiologically diverse, and climatically matched to wild habitat.

The project has already established more than 35 species ex situ in partner gardens, banked seed of 14 species and assessed germination, dormancy and storage potential of many more[182, 183], discovered species new to science in the wild and rediscovered some thought extinct[184], and investigated how plants may respond to warming and changed moisture availability[185]. The success of this multidisciplinary partnership offers a potential model for ex situ conservation of other tropical threatened plants.

Actions to assist adaptation are not without risk. For many threatened fauna species, not enough is known of their ecology to be confident of success with translocation, captive rearing or breeding. The Australian public prefers in-situ management of wild populations to captive breeding or assisted colonisation[186] and interventionist action in response to climate change associated threats has rarely been recommended in recovery plans for Australian threatened species[187].

Managers and decision makers are understandably nervous of implementing interventionist actions with uncertain outcomes and without social licence. Active management has often been characterised as 'too little, too late' and the occurrence of extinctions that might otherwise have been prevented. However, interventions such as assisted colonisation, captive breeding, and environmental engineering solutions may be accepted if essential[188, 189].

Active management programs take time to develop so, for the most threatened species, planning and research need to be undertaken immediately. This should include developing triggers for active intervention, refinement of policy around genetic manipulation and

selective breeding, translocation, captive management and, where possible, commencing trials with less-threatened analogy species.

Involving the community

The need to involve a wide range of decision makers and stakeholders in threatened species management has long been recognised[190]. It is also increasingly recognised that the community has a crucial role to play in threatened species recovery. Rather than being a minor component of species recovery, community involvement can potentially provide the broadest and longest lasting outcomes for the survival of a species. The community should be involved in threatened species recovery for the following reasons[191, 192]:

- *land tenure*. Many threatened species are found on or surrounded by private, or council owned or managed, land.
- *species protection*. Many actions to protect threatened species must occur on private land.
- *threat abatement.* Much of what threatens species is driven by human activity.
- *knowledge and expertise*. Local and historical knowledge held by community members is a valuable resource for species recovery.
- *community backing.* The community can come to love and 'own' a species or project, allowing species recovery to be carried out beyond the life of a plan or project.
- *spreading awareness*. Engagement in the recovery process helps to raise awareness of threatened species issues and pressures in the region—people listen more to their friends and peers than to educators, non-government organisations, government agencies or councils.
- *increased resources*. The time and energy that individuals provide voluntarily to implementing recovery actions can multiply the effort being put into the recovery process—many recovery activities can be initiated that would otherwise be either impossible or impractically time-consuming and expensive.
- *improved capacity*. Involving and supporting the community in threatened species projects and supporting their voluntary actions by providing training, skills and motivation can significantly help to increase their ability to engage in future conservation activities.
- *changing political will*. Engaging volunteers and the community in a project often result in those people applying local pressure to protect the species and, generally, for environmental change.
- *local identity*. Working with a locally known species often results in that species being 'adopted' by locals and becoming a part of a community's identity, thus increasing a species survival chances.
- *improved relationships*. Working with volunteers and the local community helps to build relationships and networks between the community, local government and government agencies, industry, education providers and other stakeholders.
- *Increasing effectiveness*. Engaging the community and volunteers in the recovery process helps to ensure that their concerns, needs and desires are considered and included in the management process and provides them with an opportunity to provide input—resulting actions are more likely to be practical and successful.

- *integration with other natural resource management activities*. Volunteer and community knowledge of species, issues and threats supports the inclusion of recovery actions in other management forums in which these people may be involved.
- *improved natural resource management*. Landholder and community knowledge of a species needs and threats facing them assists in threatened species becoming a focal point for overall land management and sustainable land use issues.
- *continuity of leadership*. Local community members can provide important stability and continuity to a project and can help maintain recovery actions long after the project is finalised.
- *voluntary compliance*. In many cases the community has legal obligations under threatened species legislation – experience shows that conservation outcomes flow more freely when people are involved because they want to be, not because they are legally obliged to be.

The Wet Tropics Restoration Alliance, an example of successful adaptive management of the Wet Tropics to protect and connect priority species and habitat

Many organisations and individuals currently work across the Wet Tropics region to protect and restore our unique forest areas, doing fantastic work to connect and restore land and protect threatened species outside of existing protected areas.

The Wet Tropics Restoration Alliance (the Alliance) is a coalition of organisations working together to ensure the survival of Wet Tropics forests under a changing and unstable climate. The scale of restoration required to save Wet Tropics forests is significant. Areas of climate refugia need to be made resilient, such as by expanding areas of habitat and establishing new connectivity corridors throughout thousands of hectares of land across different tenures.

World-leading research supports members to coordinate and scale up on-ground action and investment, coordination and knowledge sharing. The Alliance takes a strategic and scientific approach to landscape conservation by supporting new and existing biodiversity corridors, creating protective buffers around reserves, and protecting critical habitat for threatened species across the landscape.

The Alliance are realistic, and all acknowledge that the effort required is hampered by limited short-term funding, as well as inconsistent access to information on best practice and emerging environmental markets. It is also noted that the region is home to a committed and enthusiastic restoration community whose efforts are under-recognised in terms of the immense contribution they make to the region’s economy and environment.

Investment and resources

Investment in threatened species conservation and research is undertaken through a range of efforts, at national, state and local government level, and through non-government, not for profit and philanthropic organisations, community groups and industry, Rainforest Aboriginal organisations, Indigenous rangers and land managers.

Over the past decade, overall investment in biodiversity programs has declined[193, 194].

The overall message is that there is a significant shortfall in the investment required to secure threatened species. This is borne out of the declining trajectories of many species and in the increasing extent and magnitude of threatening process and pressures[195].

Funding

Relative to the scale of biodiversity loss, it has been asserted that Australia underspends on biodiversity conservation relative to other developed countries of comparable wealth, and that failure to protect threatened species can, in part, be attributed to a severe lack of resources[196, 197,198].

Further, there has been a continued reduction in funding for threatened species management, with less than five cents for every $100 of government spending directed to biodiversity conservation[199].

Experts[(e.g. 200, 201)] suggest that the shortfall in funding across the nation is $10 billion annually. Samuel[202] noted that while it is unrealistic to expect government and taxpayers to fund this level of investment, attracting private sector or blended investment in natural capital and restoration of the environment requires national leadership.

Research, information and monitoring

The Australian Government funds terrestrial biodiversity and environmental research programs through the Terrestrial Ecosystem Research Network (TERN), the Atlas of Living Australia and the National Environment Science Program (NESP) to provide evidence for policy and on-ground management of the environment. They also fund natural resource management and biodiversity programs through the National Landcare Programs and Indigenous Protected Area and ranger programs.

In Queensland, the Department of Environment and Science has invested through their Research Prospectus and through Australian Research Council (ARC) Linkage Grants.

Researchers[(e.g. 203, 204, 205)] have recently published comprehensive assessments of monitoring extent and adequacy of threatened vertebrate species threatened plant species and threatened ecological communities in Australia.

The assessments demonstrate that monitoring of threatened species and communities is mostly inadequate, and that 21–46% of threatened vertebrates, 69% of threatened plants and 70% of threatened ecological communities are not monitored at all. Where monitoring does occur, quality in terms of national extent and adequacy is poor.

Citizen science programs like Birdata, eBird and iNaturalist harness data on species distributions, including threatened species, collected by volunteers. There is a trend to support volunteers and volunteer organisations to conduct adequate monitoring but, while

such citizen science data can certainly support threatened species monitoring, it requires adequate resourcing and may not be sufficient in itself.

Fundamental research on threatened species ecology is a necessary step in any assisted adaptation or active management.

The work of the NESP has greatly improved knowledge about key threats to the state and trend of threatened species and ecosystems, and the actions needed to support their recovery. However, there are still very large gaps in our understanding, including those that are at most risk of extinction.

First Nations Peoples play an important role in environmental monitoring, particularly for threatened species that occur on their lands and in remote areas. In the Wet Tropics, a number of respectful, collaborative approaches that incorporate local skills and interests are currently underway, including for the northern bettong.

A safer bet for the northern bettong

The endangered northern bettong's (*Bettongia tropica*) range in sclerophyll forest on the Wet Tropics' western margin has declined so dramatically in recent years it is among the 20 Australian mammals most at risk of extinction[206]. Their total effective population now numbers under 1,000 individuals consisting of an isolated Mt Spurgeon population (with an estimated effective population size of just 31) and three connected Lamb Range populations[207]. Within the last 20 years two other populations have gone extinct, one at Mount Windsor and a second on the Coane Range, adjacent to and including Mount Zero-Taravale.

The main cause of the bettong's decline is thought to be loss of their sclerophyll habitat through inappropriate fire regimes, unmanaged cattle, and interactions between fire and feral cats[208], and declines in the bettong's favoured food, truffles, of which they are an important disperser[209]. Climate change may also impact truffle availability and therefore northern bettong populations[210].

In light of the two lost populations and an urgent need to secure a third, the Australian Wildlife Conservancy (AWC) in close collaboration with Traditional Owners, Department of Environment and Science (DES) and members of the Northern Bettong Recovery Team, translocated 49 adult and independent sub-adult northern bettongs.

In May 2023, following intensive vegetation management to restore habitat quality, and study of source population genetics to select genetically diverse individuals for reintroduction, 49 northern bettongs were translocated to a 950ha predator-proof fenced area at the AWC Mount Zero-Taravale Wildlife Sanctuary. Establishing a secure population of northern bettongs at this sanctuary will help safeguard the species and potentially provide a source of individuals for further reintroductions across the species' former range.

Rainforest Aboriginal Peoples are seeking the recognition of plants and animals which are of cultural significance (cultural keystone species) which encompass both species and ecological communities[211-215].

As the relationship between nature and the economy becomes more closely linked, so too does our need to work together — calling upon the traditional knowledge of more than 20 Rainforest Aboriginal groups within the Wet Tropics doesn't just make sense, it is vital to its very success. We must better manage our natural resources, which is something Rainforest Aboriginal Peoples having been doing for over 60,000 thousand years. By doing so, we can revitalise communities and landscapes while protecting the many threatened species that make this one of the most precious places on Earth[216].

Close links between Rainforest Aboriginal Peoples and the southern cassowary

Stephen (Steve) Purcell is senior member of the Dugulbarra clan, who are represented by the Mamu Native Title Representative Body and his language group is Dyirrbal. Steve also identifies with the Cassowary People, the Jordan Creek mob.

Images of a cassowary and cassowary print carved into living trees (dendroglyphs) in the Jordan Creek area (inland from Innisfail) signifies the extent of the cassowary people and their travels.

For Steve, the cassowary is survival.

Keeping the species alive is important for the social well-being of the Jordan Creek families. "Cassowaries are spiritually linked to us. When we see a healthy cassowary, we know it is a good environment, plenty of food. Sometimes when a cassowary visits, we know it is linked to the Old People."

Steve works with many agencies on cultural and land management activities, but he prioritises cassowary protection work because of his cultural links. He is passionate about protecting and improving the environment for cassowary habitat through partnerships with the Mamu Rangers, the Queensland Parks and Wildlife Service and Partnerships (QPWS&P) Cassowary Protection Unit, landowners and revegetation groups, through the Registered Native Title Body Corporate.

He has seen cassowaries return to Country in revegetated areas where "the food source brings them back". He helps the QPWS&P rangers decide where to relocate cassowaries that have been injured and need to return to the forest. "When we move them, we think about where the food sources and whether a male cassowary is already there. There are more cassowaries around now, but it might be that they are getting less shy and so we are seeing them more."

Mamu Traditional custodians work on Country to protect and manage cultural resources including important dendrogylphs. The carving shows the footprint of the southern cassowary. *Photo credit: Wet Tropics Images/Steven Nowakowski*

What makes threatened species management so difficult?

Threatened species management can directly conflict with competing social and economic priorities. This is especially the case when threats to species are human driven[217, 218].

Species can experience major declines resulting from unknown threats. For example, from the 1970s there was a huge decline in frog species, both in Australia and globally. Disappearance of several rainforest frog species was first documented in 1979. Further declines were observed across eastern Australia in the 1980s and 1990s, but it was not until 1998 that chytrid fungus was identified and demonstrated to be the cause[219]. Following identification of the threat, it took a further decade to develop management actions, which remain only partially effective. In total it took over three decades from threat emergence and documentation of initial species declines to the development of conservation actions. In the intervening years, several species of frogs likely went extinct and further species declined severely[220].

While there is no single, easy method for identifying novel threats, and developing effective responses, long term investment in ecological research and monitoring will build capacity and develop better management responses.

Coordinating and implementing conservation, for migratory, highly mobile or nomadic species, across large scales covering multiple land tenures and jurisdictions is

challenging. In addition, other traits common to threatened species, such as highly cryptic behaviour and extreme rarity can make management challenging.

Finally, for management of threatened species to succeed it is important to continually evaluate which on-ground actions work and which fail. Adaptive management is important when there is uncertainty surrounding effectiveness of different approaches, providing opportunities for learning to be integrated.

Outlook – a way forward

This report provides a snapshot of the extraordinary plant, animal, ecosystem and biocultural diversity across the Wet Tropics, with a focus on threatened species. It presents current evidence for recent declines in diversity and considers prospects for recovery. It also reviews the pressures and threats to the communities and species of the Wet Tropics World Heritage Area (the Area), and focused on those species that are currently recognised as threatened while also exploring those that may become threatened in the future.

Threatened species conservation is a cornerstone of efforts to curb global biodiversity loss. A universal challenge to this effort remains limited resources. It is therefore imperative that managers and scientists clearly demonstrate the benefits of current investment and better communicate that the risk of under-investment is species extinction.

The Area is an internationally recognised biodiversity hotspot and important cultural landscape. It is critical that threatened species recovery and management practices improve. As this report demonstrates, this will take a concerted effort and will require:

- inclusive stakeholder engagement and communications
- strong leadership and the development of long-term goals
- increasing knowledge of target species ecology and threats, with a focus on filling knowledge gaps to inform effective management
- setting objectives with measurable outcomes
- greater accountability for species declines to ensure timely action and to guard against complacency.

This report identifies that a more efficient, effective and strategic approach to threatened species management is required, and that a key to planning and delivering this is through development and implementation of the priority place framework.

This must be implemented in tandem with legislative reforms, as well as increased funding for research and management. What must also be fostered is the extensive exchange of diverse knowledge systems – and collaboration across multiple partners, including Rainforest Aboriginal Peoples, land managers, researchers, industry, landholders and the broader regional community.

Legislation, policy and governance to support the recovery and protection of threatened species

The Australian Government has committed to reform the EPBC Act, with a view to achieving stronger action on climate and cultural heritage protection. The reforms will also deliver legally enforceable national standards on a range of issues including matters of national environmental significance, community participation, biodiversity offsetting, regional planning, data, and compliance and enforcement.

The Australian Government's Nature Positive Plan and Threatened Species Action Plan 2022-2032 provide an opportunity to improve threatened species management outcomes for the Wet Tropics bioregion.

The eastern forests of far north Queensland is one of the top 20 priority places in the Threatened Species Action Plan and the Area is the centrepiece of this priority place. A collaborative, and participatory approach involving expert scientists, Rainforest Aboriginal Peoples, land managers and decisionmakers to inform a multipronged, tenure-blind, nature positive recovery action plan will support the protection of a number of threatened and near threatened species.

What is needed:

- proactive and widespread engagement in the policy reform process for key legislation, including the EPBC Act and NCA to strengthen standards and actions for threatened species management
- the development and implementation of the Australian Government Nature Positive Plan and Threatened Species Action Plan to include First Nations Peoples, community, practitioners and scientists' input
- a framework and management actions for the Eastern Forests of Far North Queensland priority place developed through a collaborative and participatory approach involving expert scientists, Rainforest Aboriginal Peoples, land managers and decision-makers.

Integrated, adaptive management and planning

In the Wet Tropics, there is a need for more strategic planning to ensure development does not impact upon threatened species recovery. Importantly, the Australian Government has already commenced the implementation of regional plans to guide sustainable development. Referred to as bioregional plans in Queensland, these plans are strategic assessments that seek to deliver nature positive outcomes at a landscape scale and provide clear guidance on areas for protection, which areas are appropriate for development and which areas need caution. The plans will provide information and support decisions about where projects should and should not happen.

What is needed:

- active engagement of the Wet Tropics Management Authority (the Authority) and other experts in the planning process to promote opportunities for improving outcomes for threatened species
- improved coordination and integration of information across the range of recovery plans, conservation advice and threat abatement plans
- strategies to include conservation actions outside current protected areas and take advantage of landscape design features such as corridor revegetation.

Climate change and connectivity

Climate change compounds ongoing and past damage to our environment and threatens many ecosystems across the country. It cannot be separated from nature protection and should be integrated in environmental decision making at every level.

Many management responses to climate change, such as pest and weed management and creating wildlife corridors are already being undertaken to enhance threatened species management.

Such conservation activities will become more urgent as extreme climate events (e.g., heatwaves) become more commonplace. It is important to conserve existing landscape and create greater connectivity between areas rich in biodiversity, in conjunction with refugia (for example in the upland where there are many Wet Tropics threatened and endemic species) to provide opportunities for species to recover, re-establish, relocate or to adapt and evolve.

What is needed:

- integrated area-based pest and weed programs in critical habitat areas such as mountain tops in the Area
- increased connectivity between forested areas including important species refugia by supporting restoration inside and outside the Area, on all tenures in partnership with the community and landholders
- increase research and management investment to develop adaption options for species with known trajectories that are heading towards localised extinctions (such as engineering habitat or translocations of mountain top species of possums and some endemic mountain top plants)
- develop distribution maps and profiles for species most at risk from extreme weather events to find potential areas of suitable habitat.

Involvement of Rainforest Aboriginal Peoples, the broader community and collaborative partnerships

Work across the Wet Tropics should include stronger partnerships with Rainforest Aboriginal Peoples to be able to care for land and sea Country. The joint management of protected areas and programs such as the Indigenous Land and Sea Ranger program, help conserve important ecosystems through a wide range of conservation activities.

The Australian and Queensland governments have both committed to increasing the number of rangers supported through their respective Indigenous Ranger programs. Indigenous Ranger programs are important catalysts for increased First Nations participation and leadership in land and sea management while providing significant economic and social outcomes that benefit the nation.

Targeted education and engagement activities will be vital to help raise community awareness and encourage community action to support threatened species protection, recovery and threat mitigation actions. We need to continue to collaborate and co-design projects with key stewards, partners and stakeholders to help protect and recover threatened species.

What is needed:

- support local Rainforest Aboriginal Peoples' groups to lead and partner in management programs on Country that support positive outcomes for multiple threatened species
- engage Rainforest Aboriginal groups for the monitoring of threatened species populations, and management action effectiveness
- promote and support Land and Sea Ranger programs involvement in threatened species management actions on Country, and target investment in areas of high biocultural diversity and elevated threats
- undertake targeted education and engagement to empower the community and increase community participation to support threatened species protection, recovery and threat mitigation actions
- foster stronger partnerships between Australian Government and state managing agencies, environmental NGOs, Indigenous and other community groups and researchers concerned with the conservation of the threatened species.

On-ground work to improve forest resilience

In the Wet Tropics, historic habitat loss, altered fire regimes, introduced predators and pathogens threaten many species.

Much more needs to be done to enhance the resilience of threatened species by protecting and improving habitat and minimising the impacts of weeds, feral animals, and diseases. Recovery actions for priority species will also benefit other threatened species that share their habitat.

What is needed:

- expand invasive species management programs to ensure a coordinated, area-based response to key threatening process and invasive species and pests such as pigs, invasive ants, myrtle rust and phytophthora
- ensure agreed actions that are articulated in recovery plans or conservation advices are resourced and executed in a co-ordinated and timely manner as agreed by all partners
- support land managers to implement adaptive, culturally appropriate fire management regimes in response to a variable climate
- identify threat abatement hotspots and develop threat mitigation strategies for priority threats to guide targeted on-ground delivery
- support specific interventions to help at risk species and ecosystems to adapt, based on monitoring and best available information. Examples could include approaches such as habitat engineering, enrichment and direct interventions
- on-ground restoration of highly modified and fragmented forests across the landscape, including connecting current and future threatened species hotspots.

Good science, knowledge and long-term monitoring is important

Maintaining and significantly improving a regional-scale, long-term environmental monitoring program is essential to track status and trends of biodiversity in the wet tropical regions of Australia. Such a program provides biodiversity and environmental data that has a demonstrated value to a wide range of users including the research community, regional/state/national management agencies and conservation policy development.

Data collected and maintained over the last 25 years under a variety of government initiatives has been critical to our current understanding of the Wet Tropics Outstanding Universal Value. Through the National Environment Science Program (NESP) there is an opportunity to develop and implement threatened species conservation policy and programs. Science and knowledge activities help advance understanding of threatened species, improve management and support evidence-based decision-making, particularly around climate threats (e.g., extreme weather events, priorities for habitat restoration and threatened species population trends).

What is needed:

- coordination of collaborative research opportunities, as well as long-term funding and resources to ensure ongoing monitoring programs are in place to track the status and trends in biodiversity of the region
- ensure research is targeted to support decision makers and managers engaged in the management of the Area and threatened species
- support research and monitoring led by Rainforest Aboriginal Peoples, including approaches based on traditional ecological knowledge and experiences.

Formal prioritisation of focal species, threats and no-regrets action

Some recent extinctions in Australia have been predicted, yet occurred nonetheless because management responses were enacted too slowly, ineffectively, or not at all. We need to develop an updated threatened species prioritisation framework, with the input of good research and monitoring programs, to identify priorities for investment in threat mitigation to guide targeted on-ground delivery.

Whilst there are several no regrets actions (those that are likely to have few downsides), interventions may also be needed to support at-risk species using innovative approaches such as the creation of artificial habitat, genetic engineering and establishment of ex-situ populations.

A last resort is the consideration of assisted colonisation and ex-situ colonisation. These solutions are expensive, present ethical dilemmas and are not guaranteed to succeed, particularly for fauna. Research is therefore required now on the methodology and efficacy of more radical actions.

What is needed:

- explore potential for science-based interventions such as gene banking, assisted gene flow, captive populations, assisted migration, translocation and genetic editing

- investigate and implement activities such as ex-situ population establishment to ensure species survival
- develop an updated threatened species prioritisation framework to identify priorities for investment and actions.

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Appendix 1.

Threatened (listed) vertebrate species and sub-species in the Wet Tropics bioregion

Vertebrate species and sub-species in the Wet Tropics bioregion listed as threatened (Critically Endangered CR, Endangered EN, Vulnerable VU) or near threatened on the IUCN Red List of Threatened Fauna (**I**), the *Environment Protection and Biodiversity Conservation Act* 1999 (**E**), and/or the Queensland NCA Nature Conservation (Animals) Regulation 2020 (**N**).

Species	Common name	I	E	N
Fish				
Cairnsichthys bitaeniatus	Daintree rainbowfish	CR		
Cairnsichthys rhombosomoides	Cairns rainbowfish	EN		
Glossogobius bellendenensis	Mulgrave goby	EN		
Macquaria wujalwujalensis	Bloomfield River cod	VU		
Melanotaenia eachamensis	Lake Eacham rainbowfish	EN	EN	
Melanotaenia sp. nov. 'Malanda'	Malanda rainbowfish	CR	CR	CR
Melanotaenia utcheensis	Utchee Creek rainbowfish	EN		
Stiphodon pelewensis	Daintree cling goby			VU
Stiphodon rutilaureus	Golden-red stiphodon			VU
Stiphodon semoni	Opal cling goby		CR	
Stiphodon surrufus	Emerald cling goby			VU
Frogs				
Cophixalus aenigma	Tapping nursery-frog	VU	EN	EN
Cophixalus concinnus	Beautiful nursery-frog	CR	CR	CR
Cophixalus exiguus	Northern tapping nursery-frog			VU
Cophixalus hosmeri	Rattling nursery-frog	EN	CR	CR
Cophixalus mcdonaldi	Mt Elliot nursery-frog	CR	CR	CR
Cophixalus monticola	Mountaintop nursery-frog	CR	CR	CR
Cophixalus neglectus	Bellenden Ker nursery-frog	CR	CR	CR
Cophixalus saxatilis	Black Mountain nursery-frog			VU
Litoria dayi	Australian lace-lid	EN	VU	VU
Litoria lorica	Armoured mistfrog	CR	CR	CR
Litoria myola	Kuranda treefrog	CR	CR	CR
Litoria nannotis	Waterfall frog		EN	EN
Litoria nyakalensis	Mountain mistfrog	EX	CR	CR
Litoria rheocola	Common mistfrog	EN		EN
Litoria serrata	Green-eyed treefrog			VU
Pseudophryne covacevichae	Magnificent broodfog	EN	VU	VU
Taudactylus acutirostris	Sharp-snouted dayfrog	EX	EX	EX
Taudactylus rheophilus	Northern tinkerfrog	CR	CR	EN
Reptiles				
Acanthophis antarcticus	Common death adder			VU
Calyptotis thorntonensis	Thornton Peak skink			VU
Conncinia frerei	Bartle Frere bar-sided skink			EN
Crocodylus porosus	Estuarine crocodile			VU
Ctenotus monticola	Atherton ctenotus			VU
Delma labialis	Striped-tailed delma	VU		
Delma mitella	Atherton delma		VU	NT

Species	Common name	I	E	N
Egernia rugosa	Yakka skink		VU	VU
Lampropholis mirabilis	Saxicoline sunskink			NT
Liburnascincus scirtetis	Black Mountain skink			VU
Lygisaurus tanneri	Endeavour litter-skink			VU
Nactus galgajuga	Black Mountain gecko			VU
Phyllurus amnicola	Mt. Elliot leaf-tailed gecko	NT		
Phyllurus gulbaru	Gulbaru gecko	EN	CR	CR
Phyllurus kabikabi	Oakview leaf-tailed gecko	CR		CR
Phyllurus pinnaclensis	Pinnacles leaf-tailed gecko	CR		CR
Pygmaeascincus sadlieri	Magnetic Island skink			VU
Techmarscincus jigurru	Bartle Frere skink	VU		CR
Birds				
Acanthiza katherina	Mountain thornbill	VU		
Amblyornis newtonianus	Golden bowerbird	NT		
Antigone antigone	Sarus crane	VU		
Calyptorhynchus lathami	Glossy black cockatoo	VU		VU
Casuarius casuarius johnsonii	Southern cassowary		EN	VU
Colluricincla boweri	Bowers shrike-thrush	VU		
Cyclopsitta diophthalma macleayana	Double-eyed fig-parrot			VU
Ephippiorhynchus asiaticus	Black-necked stork	NT		
Erythrotriorchis radiatus	Red goshawk	EN	EN	EN
Erythrura trichroa sigillifer	Blue-faced parrot-finch			NT
Esacus magnirostris	Beach stone-curlew	NT		VU
Falco hypoleucos	Grey falcon	VU	VU	VU
Heteromyias albispecularis	Grey-headed robin	NT		
Lophorina victoriae	Victoria's riflebird	VU		
Neochmia ruficauda ruficauda	Star finch		EN	EN
Oreoscopus gutturalis	Fernwren	EN		
Poephila cincta cincta	Black-throated finch		EN	EN
Scenopoeetes dentirostris	Tooth-billed bowerbird	NT		
Sericornis keri	Atherton scrubwren	VU		
Turnix olivii	Buff-breasted button-quail	CR	EN	CR
Mammals				
Antechinus godmani	Atherton antechinus	NT		
Bettongia tropica	Northern bettong	EN	EN	EN
Dasyurus hallucatus	Northern quoll	EN	EN	
Dasyurus maculatus gracilis	Spotted-tailed quoll	NT	EN	EN
Dendrolagus bennettianus	Bennett's tree-kangaroo	NT		NT
Dendrolagus lumholtzi	Lumholtz's tree-kangaroo	NT		NT
Hemibelideus lemuroides	Lemuroid ring-tailed possum	NT		CR
Hipposideros cervinus cervinus	Fawn leaf-nosed bat			VU
Hipposideros diadema reginae	Diadem leaf-nosed bat			NT
Hipposideros semoni	Semon's leaf-nosed bat		VU	EN
Macroderma gigas gigas	Ghost bat	VU	VU	EN
Mesembriomys gouldii rattoides	Black-footed tree-rat	NT	VU	
Miniopterus orianae oceanensis	Large bent-winged bat	NT		
Murina florium	Flute-nosed bat			VU

Species	Common name	I	E	N
Ornithorhynchus anatinus	Platypus	NT		
Petauroides minor minor	Northern greater glider		VU	VU
Petaurus australis brevirostrum	Yellow-bellied glider	NT	EN	EN
Petaurus gracilis	Mahogany glider	EN	EN	EN
Petrogale mareeba	Mareeba rock-wallaby	NT		
Petrogale sharmani	Sharman's rock-wallaby	NT	VU	VU
Phascogale tapoatafa	Brush-tailed phascogale	NT		
Phascolarctos cinereus	Koala	VU	EN	EN
Pseudochirops archeri	Green ring-tailed possum	NT		
Pseudochirulus cinereus	Daintree River ring-tailed possum	NT		
Pteropus conspicillatus	Spectacled flying-fox		VU	EN
Rhinolophus robertsi maros	Large-eared horseshoe bat		VU	
Saccolaimus saccolaimus nudicluniatus	Bare-rumped sheath-tailed bat		VU	EN
Sminthopsis leucopus	White-footed dunnart	VU		VU
Taphozous australis	Coastal sheath-tailed bat	NT		NT
Uromys hadrourus	Pygmy white-tailed rat	VU		
Xeromys myoides	Water mouse	VU	VU	VU

Appendix 2.

List of threatened vascular plant species found in the Wet Tropics Bioregion

KEY TO SYMBOLS

[a] Undescribed species

[b] Conservation status under the Queensland *Nature Conservation Act* 1992: N = Near Threatened, V = Vulnerable, E = Endangered, X = Presumed Extinct.

[c] Conservation status under the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999. V = Vulnerable, E = Endangered, CE = Critically Endangered, X = Presumed Extinct.

Taxon	Conservation Status, Queensland [b]	Conservation Status, Commonwealth [c]	Habitat
Ferns and lycophytes			
Amphineuron immersum (Blume) Holttum	E		Rainforest
Antrophyum plantagineum (Cav.) Kaulf.	N		Rainforest
Antrophyum subfalcatum Brack.	N		Rainforest
Asplenium pellucidum Lam.	V	V	Rainforest
Asplenium unilaterale Lam.	V		Rainforest
Asplenium wildii F.M.Bailey	V	V	Rainforest
Calochlaena villosa (C.Chr.) M.D.Turner & R.A.White	N		Rainforest
Chingia australis Holttum	E	E	Rainforest
Crepidomanes aphlebioides (Christ) Bostock	E		Rainforest
Crepidomanes majoriae (Watts) N.A.Wakef.	V		Rainforest
Ctenopteris walleri (Maiden & Betche) S.B.Andrews	V	V	Rainforest
Cyathea celebica Blume	N		Rainforest
Didymoglossum exiguum (Bedd.) Copel.	X		Rainforest
Didymoglossum mindorense (Christ) Ebihara & K.Iwats.	N		Rainforest
Diplazium cordifolium Blume	V	V	Rainforest
Diplazium pallidum (Blume) T.Moore	E	E	Rainforest
Dipteris conjugata Reinw.	N		Rainforest
Dryopteris hasseltii (Blume) C.Chr.	N		Rainforest
Dryopteris sparsa (Buch.-Ham. ex D.Don) Kuntze	V		Rainforest
Dryopteris wattsii M.McKeown, Sundue & Barrington	V		Rainforest
Elaphoglossum callifolium (Blume) T.Moore	N		Rainforest
Grammitis albosetosa (F.M.Bailey) Parris	N		Rainforest

Taxon	Conservation Status, Queensland [b]	Conservation Status, Commonwealth [c]	Habitat
Grammitis leonardii Parris	N		Rainforest
Grammitis reinwardtii Blume	V	V	Rainforest
Huperzia serrata (Thunb. ex Murray) Trevis.	X	X	Rainforest
Hymenophyllum digitatum (Sw.) Fosberg	V		Rainforest
Hymenophyllum gracilescens Domin	V		Rainforest
Hymenophyllum kerianum Watts	V		Rainforest
Hymenophyllum lobbii T.Moore	X	X	Rainforest
Hymenophyllum pallidum (Blume) Ebihara & K.Iwats.	N		Rainforest
Hymenophyllum whitei Goy	X	X	Rainforest
Lastreopsis grayi D.L.Jones	V		Rainforest
Lastreopsis tinarooensis Tindale	V		Rainforest
Lastreopsis walleri Tindale	V	V	Rainforest
Lemmaphyllum accedens (Blume) Donk	X	X	Sclerophyll
Lindsaea terrae-reginae K.U.Kramer	V		Rainforest
Lindsaea walkerae Hook.	N		Sclerophyll
Lycopodium volubile G.Forst.	X	X	Sclerophyll
Microsorum membranifolium (R.Br.) Ching	N		Rainforest
Monogramma dareicarpa Hook.	X	X	Rainforest
Oenotrichia dissecta (C.T.White & Goy) S.B.Andrews	N		Rainforest
Phlegmariurus dalhousieanus (Spring) A.R.Field & Bostock	E	E	Rainforest
Phlegmariurus filiformis (Sw.) W.H.Wagner	E	E	Rainforest
Phlegmariurus lockyeri (D.L.Jones & B.Gray) A.R.Field & Bostock	V	V	Rainforest
Phlegmar*iurus marsupiiformis* (D.L.Jones & B.Gray) A.R.Field & Bostock	V	V	Rainforest
Phlegmariurus phlegmaria (L.) T.Sen & U.Sen	N		Rainforest
Phlegmariurus phlegmarioides (Gaudich.) A.R.Field & Bostock	V		Rainforest
Phlegmariurus squarrosus (G.Forst.) A.Love & D.Love	E	CE	Rainforest
Phlegmariurus tetrastichoides (A.R.Field & Bostock) A.R.Field & Bostock	V	V	Rainforest
Plesioneuron tuberculatum (Ces.) Holttum	E	E	Rainforest
Pneumatopteris costata (Brack.) Holttum	N		Rainforest
Polyphlebium endlicherianum (C.Presl) Ebihara & K.Iwats.	V		Rainforest

Taxon	Conservation Status, Queensland [b]	Conservation Status, Commonwealth [c]	Habitat
Pteridoblechnum acuminatum (C.T.White & Goy) Hennipman	N		Rainforest
Tmesipteris lanceolata P.A.Dang.	X	X	Rainforest
Conifers and cycads			
Agathis microstachya J.F.Bailey & C.T.White	N		Rainforest
Prumnopitys ladei (F.M.Bailey) de Laub.	N		Rainforest
Flowering plants			
Acacia homaloclada F.Muell.	V		Sclerophyll
Acacia hylonoma Pedley	V		Rainforest
Acacia longipedunculata Pedley	N		Sclerophyll
Acacia lumholtzii Pedley	V		Sclerophyll
Acacia purpureopetala F.M.Bailey	V	CE	Sclerophyll
Acalypha lyonsii P.I.Forst.	V		Rainforest
Aceratium ferrugineum C.T.White	N		Rainforest
Aceratium sericoleopsis Balgooy	N		Rainforest
Acianthus sublestus Dockrill	N		Rainforest
Acriopsis emarginata D.L.Jones & M.A.Clem.	V	V	Rainforest
Acronychia acuminata T.G.Hartley	N		Rainforest
Acrotriche baileyana (Domin) J.M.Powell	N		Rainforest
Actephila foetida Domin	V	V	Rainforest
Actephila sessilifolia Benth.	N		Rainforest
Aglaia brassii Merr. & L.M.Perry	N		Rainforest
Albizia sp. (Windsor Tableland B.Gray 2181) [a]	V		Rainforest
Alectryon semicinereus (F.Muell.) Radlk.	N		Rainforest
Alloxylon flammeum P.H.Weston & Crisp	V	V	Rainforest
Alpinia hylandii R.M.Sm.	N		Rainforest
Aphyllorchis anomala Dockrill	N		Rainforest
Aphyllorchis queenslandica Dockrill	N		Rainforest
Aponogeton bullosus H.Bruggen	E	E	Aquatic
Aponogeton prolifer Hellq. & S.W.L.Jacobs	E	E	Aquatic
Archidendron kanisii R.S.Cowan	E		Rainforest
Archidendropsis xanthoxylon (C.T.White & W.D.Francis) I.C.Nielsen	N		Rainforest
Archontophoenix myolensis Dowe	E	E	Rainforest
Ardisia fasciculata C.T.White	N		Rainforest

Taxon	Conservation Status, Queensland [b]	Conservation Status, Commonwealth [c]	Habitat
Arenga australasica (H.Wendl. & Drude) S.T.Blake ex H.E. Moore	V		Rainforest
Argophyllum cryptophlebum Zemann	N		Rainforest
Argyrodendron sp. (Boonjie B.P.Hyland RFK2139) [a]	N		Rainforest
Arthraxon hispidus (Thunb.) Makino	V	V	Sclerophyll
Arytera dictyoneura S.T.Reynolds	N		Rainforest
Austrobuxus megacarpus P.I.Forst.	N		Rainforest
Austromuellera trinervia C.T.White	N		Rainforest
Austromuellera valida B.Hyland	V		Rainforest
Banksia plagiocarpa A.S.George	V		Sclerophyll
Barongia lophandra Peter G.Wilson & B.Hyland	V		Rainforest
Beilschmiedia castrisinensis B.Hyland	N		Rainforest
Boea kinnearii (F.Muell.) B.L.Burtt	E		Rainforest
Bubbia queenslandiana subsp. australis Vink	N		Rainforest
Bubbia queenslandiana Vink subsp. queenslandiana	N		Rainforest
Bubbia whiteana A.C.Sm.	V		Rainforest
Buchanania mangoides F.Muell.	V		Rainforest
Buckinghamia ferruginiflora Foreman & B.Hyland	N		Rainforest
Bulbophyllum boonjee B.Gray & D.L.Jones	N		Rainforest
Bulbophyllum grandimesense B.Gray & D.L.Jones	N		Rainforest
Bulbophyllum windsorense B.Gray & D.L.Jones	N		Rainforest
Bulbophyllum wolfei B.Gray & D.L.Jones	N		Rainforest
Caesalpinia robusta (C.T.White) Pedley	N		Rainforest
Callerya pilipes (F.M.Bailey) Schot	N		Rainforest
Calochilus psednus D.L.Jones & Lavarack	E	E	Sclerophyll
Canarium acutifolium (DC.) Merr. var. *acutifolium*	V	V	Rainforest
Carex breviscapa C.B.Clarke	N		Sclerophyll
Carex rafflesiana Boott	N		Sclerophyll
Carronia pedicellata Forman	E	E	Rainforest
Cassia sp. (Paluma Range G.Sankowsky+ 450) [a]	N		Rainforest
Centotheca philippinensis (Merr.) C.Monod	N		Rainforest

Taxon	Conservation Status, Queensland [b]	Conservation Status, Commonwealth [c]	Habitat
Ceratopetalum corymbosum C.T.White	V		Rainforest
Ceratopetalum macrophyllum Hoogland	N		Rainforest
Cheilocostus potierae (F.Muell.) M.G.Harr. & Zich	E		Rainforest
Chiloglottis longiclavata D.L.Jones	N		Rainforest
Cinnamomum propinquum F.M.Bailey	V		Rainforest
Citrus inodora F.M.Bailey	V		Rainforest
Cladopus queenslandicus (Domin) C.D.K.Cook & Rutish.	N		Aquatic
Cleistanthus discolor Summerh.	N		Rainforest
Cleistanthus myrianthus (Hassk.) Kurz	N		Rainforest
Comesperma praecelsum F.Muell.	N		Sclerophyll
Corsia dispar D.L.Jones & B.Gray	N		Rainforest
Corybas abellianus Dockrill	N		Rainforest
Corybas cerasinus D.L.Jones & B.Gray	N		Sclerophyll
Corymbia rhodops (D.J.Carr & S.G.M.Carr) K.D.Hill & L.A.S.Johnson	V	V	Sclerophyll
Crepidium flavovirens D.L.Jones & M.A.Clem.	N		Rainforest
Crepidium lawleri (Lavarack & B.Gray) Szlach.	E	E	Sclerophyll
Croton densivestitus C.T.White & W.D.Francis	N		Rainforest
Cucumis costatus I.Telford	N		Sclerophyll
Cupaniopsis cooperorum P.I.Forst.	V		Rainforest
Cyclophyllum costatum (C.T.White) S.T.Reynolds & R.J.F.Hend.	V	V	Rainforest
Cyperus cephalotes Vahl	E	E	Sclerophyll
Dansiea elliptica Byrnes	N		Rainforest
Demorchis queenslandica (Dockrill) D.L.Jones & M.A.Clem.	N		Rainforest
Dendrobium bigibbum Lindl.	V	V	Rainforest
Dendrobium callitrophilum B.Gray & D.L.Jones	V	V	Sclerophyll
Dendrobium fellowsii F.Muell.	N		Rainforest
Dendrobium johannis Rchb.f.	V	V	Sclerophyll
Dendrobium mirbelianum Gaudich.	E	E	Sclerophyll
Dendrobium nindii W.Hill	E	E	Rainforest
Didymoplexis pallens Griff.	N		Sclerophyll
Dinghoua globularis (Ding Hou) R.H.Archer	N		Rainforest

Taxon	Conservation Status, Queensland [b]	Conservation Status, Commonwealth [c]	Habitat
Dinosperma longifolium T.G.Hartley	E		Rainforest
Dioclea hexandra (Ralph) Mabb.	V		Rainforest
Diospyros sp. (Mt Spurgeon C.T.White 10677) [a]	N		Rainforest
Diploglottis harpullioides S.T.Reynolds	N		Rainforest
Diploglottis pedleyi S.T.Reynolds	N		Rainforest
Dissiliaria tuckeri P.I.Forst.	V		Rainforest
Diuris oporina D.L.Jones	N		Sclerophyll
Dodonaea uncinata J.G.West	N		Sclerophyll
Dracophyllum sayeri F.Muell.	V		Rainforest
Drosera adelae F.Muell.	N		Sclerophyll
Drosera prolifera C.T.White	V	V	Rainforest
Drosera schizandra Diels	V	V	Rainforest
Eidothea zoexylocarya A.W.Douglas & B.Hyland	V		Rainforest
Elaeocarpus coorangooloo J.F.Bailey & C.T.White	N		Rainforest
Elaeocarpus stellaris L.S.Sm.	N		Rainforest
Elaeocarpus thelmae B.Hyland & Coode	N		Rainforest
Eleocharis retroflexa (Poir.) Urb.	V	V	Sclerophyll
Endiandra anthropophagorum Domin	N		Rainforest
Endiandra bellendenkerana B.Hyland	N		Rainforest
Endiandra cooperana B.Hyland	E	E	Rainforest
Endiandra dichrophylla F.Muell.	N		Rainforest
Endiandra globosa Maiden & Betche	N		Rainforest
Endiandra grayi B.Hyland	V		Rainforest
Endiandra jonesii B.Hyland	V		Rainforest
Endiandra microneura C.T.White	N		Rainforest
Endiandra phaeocarpa B.Hyland	V		Rainforest
Endiandra sideroxylon B.Hyland	N		Rainforest
Endressia wardellii (F.Muell.) Whiffin	N		Rainforest
Eria dischorensis Schltr.	N		Rainforest
Eria irukandjiana St.Cloud	N		Rainforest
Eucryphia wilkiei B.Hyland	V	V	Rainforest
Eulophia bicallosa (D.Don) P.Hunt & Summerh.	N		Sclerophyll
Euodia hylandii T.G.Hartley	N		Rainforest
Euodia pubifolia T.G.Hartley	V		Rainforest

Taxon	Conservation Status, Queensland [b]	Conservation Status, Commonwealth [c]	Habitat
Fimbristylis adjuncta S.T.Blake	E	E	Sclerophyll
Firmiana papuana Mildbr.	N		Rainforest
Flindersia oppositifolia (F.Muell.) T.G.Hartley & Jessup	N		Rainforest
Freycinetia marginata Blume	V		Rainforest
Freycinetia percostata Merr. & L.M.Perry	V		Rainforest
Gahnia insignis S.T.Blake	N		Sclerophyll
Garcinia brassii C.T.White	N		Rainforest
Gardenia actinocarpa Puttock	E	E	Rainforest
Garnotia stricta var. longiseta Hack.	N		Rainforest
Gastrodia urceolata D.L.Jones	V		Rainforest
Genoplesium alticola D.L.Jones & B.Gray	N		Sclerophyll
Genoplesium tectum D.L.Jones	E	E	Sclerophyll
Glochidion pruinosum Airy Shaw	N		Rainforest
Glochidion pungens Airy Shaw	N		Rainforest
Goodyera grandis (Blume) Blume	N		Rainforest
Goodyera viridiflora (Blume) Blume	N		Rainforest
Grevillea glossadenia McGill.	V	V	Sclerophyll
Gymnostoma australianum L.A.S.Johnson	V		Rainforest
Habenaria rumphii (Brongn.) Lindl.	N		Sclerophyll
Haplostichanthus submontanus Jessup subsp. *submontanus*	N		Rainforest
Haplostichanthus submontanus subsp. sessiliflorus Jessup	N		Rainforest
Harpullia ramiflora Radlk.	N		Rainforest
Hedyotis novoguineensis Merr. & L.M.Perry	E		Sclerophyll
Helicia grayi Foreman	N		Rainforest
Helicia lamingtoniana (F.M.Bailey) C.T.White ex L.S.Sm.	N		Rainforest
Helicia lewisensis Foreman	V		Rainforest
Helicia recurva Foreman	N		Rainforest
Hemmantia webbii Whiffin	N		Rainforest
Hexaspora pubescens C.T.White	V	V	Rainforest
Hollandaea riparia B.Hyland	V		Rainforest
Hollandaea sayeriana (F.Muell.) L.S.Sm.	N		Rainforest
Homoranthus porteri (C.T.White) Craven & S.R.Jones	V	V	Sclerophyll
Hypserpa smilacifolia Diels	N		Rainforest

Taxon	Conservation Status, Queensland [b]	Conservation Status, Commonwealth [c]	Habitat
Ichnanthus pallens var. *major* (Nees) Stieber	N		Rainforest
Ilex sp. (Gadgarra B.P.Hyland RFK2011) [a]	N		Rainforest
Kunzea sp. (Herbert River R.J.Cumming 11309) [a]	N		Sclerophyll
Lasjia grandis (C.L.Gross & B.Hyland) P.H.Weston & A.R.Mast	V		Rainforest
Leionema ellipticum Paul G.Wilson	V		Rainforest
Lenbrassia australiana (C.T.White) G.W.Gillett var. *australiana*	N		Rainforest
Lenbrassia australiana var. *glabrescens* B.D.Morley	N		Rainforest
Lepiderema hirsuta S.T.Reynolds	N		Rainforest
Lepiderema largiflorens S.T.Reynolds	N		Rainforest
Leucopogon malayanus subsp. *novoguineensis* (Sleumer) Pedley	V		Rainforest
Linospadix microcaryus (Domin) Burret	N		Rainforest
Linospadix palmerianus (F.M.Bailey) Burret	N		Rainforest
Liparis simmondsii F.M.Bailey	N		Rainforest
Litsea granitica B.Hyland	V		Rainforest
Livistona drudei F.Muell. ex Drude	V		Sclerophyll
Lobelia membranacea R.Br.	N		Sclerophyll
Lysiana filifolia Barlow	N		Sclerophyll
Mammea touriga (C.T.White & W.D.Francis) L.S.Sm.	N		Rainforest
Marsdenia araujacea F.Muell.	X	X	Rainforest
Marsdenia brevifolia (Benth.) P.I.Forst.	V	V	Sclerophyll
Marsdenia hemiptera Rchb.	N		Rainforest
Marsdenia rara P.I.Forst.	V		Sclerophyll
Marsdenia straminea P.I.Forst.	V		Rainforest
Medicosma glandulosa T.G.Hartley	N		Rainforest
Megahertzia amplexicaulis A.S.George & B.Hyland	N		Rainforest
Meiogyne hirsuta (Jessup) Jessup	N		Rainforest
Melaleuca sylvana Craven & A.J.Ford	E		Sclerophyll
Melaleuca uxorum Craven G.Holmes & Sankowsky	E		Sclerophyll
Mesua larnachiana (F.Muell.) Kosterm.	V		Rainforest
Micromyrtus delicata A.R.Bean	E		Sclerophyll
Mischocarpus albescens S.T.Reynolds	N		Rainforest

Taxon	Conservation Status, Queensland [b]	Conservation Status, Commonwealth [c]	Habitat
Mitrantia bilocularis Peter G.Wilson & B.Hyland	V		Rainforest
Musa fitzalanii F.Muell.	X	X	Rainforest
Musa jackeyi W.Hill	E		Rainforest
Myrmecodia beccarii Hook.f.	V	V	Rainforest
Neololeba atra (Lindl.) Widjaja	N		Rainforest
Neostrearia fleckeri L.S.Sm.	N		Rainforest
Nepenthes mirabilis (Lour.) Druce (Bramston Beach population)	E		Sclerophyll
Nicotiana wuttkei J.R.Clarkson & Symon	E		Sclerophyll
Noahdendron nicholasii P.K.Endress B.Hyland & Tracey	E		Rainforest
Oenanthe javanica DC.	N		Sclerophyll
Oldenlandia polyclada (F.Muell.) F.Muell.	N		Sclerophyll
Oldenlandia tenelliflora var. *papuana* Valeton	X		Rainforest
Pandanus gemmifer H.St.John	N		Rainforest
Paramapania parvibractea (C.B.Clarke) Uittien	N		Rainforest
Pararistolochia praevenosa (F.Muell.) Michael J.Parsons	N		Rainforest
Parsonsia bartlensis J.B.Williams	V		Rainforest
Parsonsia largiflorens (F.Muell. ex Benth.) S.T.Blake	E		Rainforest
Parsonsia wildensis J.B.Williams	V		Sclerophyll
Parsonsia wongabelensis J.B.Williams	E		Rainforest
Paspalidium scabrifolium S.T.Blake	N		Sclerophyll
Peperomia bellendenkerensis Domin	N		Rainforest
Peripentadenia mearsii (C.T.White) L.S.Sm.	N		Rainforest
Peripentadenia phelpsii B.Hyland & Coode	V		Rainforest
Peripleura scabra (DC.) G.L.Nesom	N		Sclerophyll
Peristylus banfieldii (F.M.Bailey) Lavarack	N		Sclerophyll
Phaius australis F.Muell.	E	E	Sclerophyll
Phaius pictus T.E.Hunt	V	V	Rainforest
Phalaenopsis amabilis subsp. rosenstromii (F.M.Bailey) Christenson	E	E	Rainforest
Phaleria biflora (C.T.White) Herber	V	V	Rainforest
Phyllanthera grayi (P.I.Forst.) Venter	V		Rainforest
Phyllanthus brassii C.T.White	V		Rainforest

Taxon	Conservation Status, Queensland [b]	Conservation Status, Commonwealth [c]	Habitat
Piper mestonii F.M.Bailey	N		Rainforest
Plectranthus amoenus P.I.Forst.	V		Sclerophyll
Plectranthus gratus S.T.Blake	V	V	Sclerophyll
Plectranthus spectabilis S.T.Blake	N		Sclerophyll
Polyalthia xanthocarpa B.Xue & R.M.K.Saunders	N		Rainforest
Polyosma rigidiuscula F.Muell. & F.M.Bailey ex F.M.Bailey	N		Rainforest
Polyscias bellendenkerensis (F.M.Bailey) Philipson	V	V	Rainforest
Pothos brassii B.L.Burtt	N		Rainforest
Prostanthera albohirta C.T.White	X	X	Sclerophyll
Prostanthera clotteniana (F.M.Bailey) A.R.Bean	E	CE	Sclerophyll
Prostanthera sp. (Dinden P.I.Forster+ PIF17342) [a]	E		Sclerophyll
Pseuduvaria froggattii (F.Muell.) Jessup	N		Rainforest
Pseuduvaria hylandii Jessup	N		Rainforest
Pseuduvaria mulgraveana Jessup var. *mulgraveana*	N		Rainforest
Pseuduvaria mulgraveana var. *glabrescens* Jessup	N		Rainforest
Pseuduvaria villosa Jessup	N		Rainforest
Randia audasii C.T.White	N		Rainforest
Remusatia vivipara (Roxb.) Schott	N		Rainforest
Rhamphicarpa australiensis Steenis	N		Sclerophyll
Rhaphidospora cavernarum (F.Muell.) R.M.Barker	V		Rainforest
Rhodamnia longisepala N.Snow & A.J.Ford	E		Rainforest
Ristantia gouldii Peter G.Wilson & B.Hyland	V	V	Rainforest
Romnalda ophiopogonoides Conran P.I.Forst. & Donnon	V		Rainforest
Rourea brachyandra F.Muell.	N		Rainforest
Ryparosa kurrangii B.L.Webber	N		Rainforest
Samadera baileyana Oliv.	N		Rainforest
Sankowskya stipularis P.I.Forst.	E	E	Rainforest
Sarcopteryx acuminata S.T.Reynolds	N		Rainforest
Sarcopteryx montana S.T.Reynolds	N		Rainforest
Sauropus macranthus Hassk.	V	V	Rainforest
Schizomeria whitei Mattf.	N		Rainforest

Taxon	Conservation Status, Queensland [b]	Conservation Status, Commonwealth [c]	Habitat
Senegalia albizioides (Pedley) Pedley	N		Rainforest
Solanum hamulosum C.T.White	E		Rainforest
Spathoglottis paulinae F.Muell.	N		Rainforest
Sphaerantia chartacea Peter G.Wilson & B.Hyland	N		Rainforest
Sphaerantia discolor Peter G.Wilson & B.Hyland	V		Rainforest
Steganthera australiana C.T.White	N		Rainforest
Steganthera laxiflora subsp. *lewisensis* Whiffin	N		Rainforest
Stenocarpus cryptocarpus Foreman & B.Hyland	N		Rainforest
Stenocarpus davallioides Foreman & B.Hyland	V		Rainforest
Stockwellia quadrifida D.J.Carr S.G.M.Carr & B.Hyland	N		Rainforest
Strongylodon lucidus (G.Forst.) Seem.	N		Rainforest
Symplocos ampulliformis C.T.White	N		Rainforest
Symplocos crassiramifera Noot.	V		Rainforest
Symplocos graniticola Jessup	V		Rainforest
Symplocos oresbia Jessup	N		Rainforest
Symplocos wooroonooran Jessup	N		Rainforest
Syzygium glenum Craven	E		Rainforest
Syzygium malaccense (L.) Merr. & L.M.Perry	N		Rainforest
Syzygium mulgraveanum (B.Hyland) Craven & Biffin	N		Rainforest
Taeniophyllum confertum B.Gray & D.L.Jones	N		Rainforest
Taeniophyllum lobatum Dockrill	N		Rainforest
Tetramolopium sp. (Mt Bowen D.G.Fell+ DGF1224) [a]	V		Sclerophyll
Thaleropia queenslandica (L.S.Sm.) Peter G.Wilson	N		Rainforest
Toechima pterocarpum S.T.Reynolds	E	E	Rainforest
Trachymene geraniifolia F.M.Bailey	N		Sclerophyll
Triplarina nitchaga A.R.Bean	V	V	Sclerophyll
Tristellateia australasiae A.Rich.	N		Rainforest
Tylophora rupicola P.I.Forst.	E	E	Sclerophyll
Uncaria cordata (Lour.) Merr. var. *cordata*	N		Rainforest

Taxon	Conservation Status, Queensland [b]	Conservation Status, Commonwealth [c]	Habitat
Vrydagzynea grayi D.L.Jones & M.A.Clem.	E	E	Rainforest
Wendlandia basistaminea F.Muell.	N		Rainforest
Wendlandia connata C.T.White	N		Rainforest
Wendlandia psychotrioides (F.Muell.) F.Muell.	X		Rainforest
Wetria australiensis P.I.Forst.	V		Rainforest
Whyanbeelia terrae-reginae Airy Shaw & B.Hyland	N		Rainforest
Wilkiea sp. (McDowall Range J.G.Tracey 14552) [a]	N		Rainforest
Xanthophyllum fragrans C.T.White	N		Rainforest
Xanthostemon formosus Peter G.Wilson	E	E	Rainforest
Xanthostemon graniticus Peter G.Wilson	N		Rainforest
Xanthostemon verticillatus (C.T.White & W.D.Francis) L.S.Sm.	V		Rainforest
Xylosma sp. (Mt Lewis G.Sankowsky+ 1108) [a]	V		Rainforest
Zeuxine polygonoides (F.Muell.) P.J.Cribb	V	V	Rainforest
Zieria obovata (C.T.White) J.A.Armstr.	V	V	Sclerophyll
Zieria rimulosa C.T.White	V	V	Sclerophyll

Appendix 3.

Endemic plants of the Wet Tropics

A. List of vascular plant genera which are endemic to the Wet Tropics Bioregion.

Monotypic genera (i.e. genera comprising just one species) are indicated.

Family	Genus	Monotypic?
Ferns		
Blechnaceae	*Pteridoblechnum*	
Flowering plants		
Achariaceae	*Baileyoxylon*	Monotypic
Alseuosmiaceae	*Crispiloba*	Monotypic
Araliaceae	*Motherwellia*	Monotypic
Arecaceae	*Laccospadix*	Monotypic
Arecaceae	*Normanbya*	Monotypic
Arecaceae	*Oraniopsis*	Monotypic
Austrobaileyaceae	*Austrobaileya*	Monotypic
Calycanthaceae	*Idiospermum*	Monotypic
Celastraceae	*Dinghoua*	Monotypic
Celastraceae	*Hexaspora*	Monotypic
Celastraceae	*Hypsophila*	
Colchicaceae	*Kuntheria*	Monotypic
Elaeocarpaceae	*Peripentadenia*	
Euphorbiaceae	*Hylandia*	Monotypic
Gesneriaceae	*Lenbrassia*	Monotypic
Hamamelidaceae	*Neostrearia*	Monotypic
Hamamelidaceae	*Noahdendron*	Monotypic
Hamamelidaceae	*Ostrearia*	Monotypic
Malvaceae	*Franciscodendron*	Monotypic
Monimiaceae	*Austromatthaea*	Monotypic
Monimiaceae	*Hemmantia*	Monotypic
Myrtaceae	*Barongia*	Monotypic
Myrtaceae	*Mitrantia*	Monotypic
Myrtaceae	*Sphaerantia*	
Myrtaceae	*Stockwellia*	Monotypic
Orchidaceae	*Drymoanthus*	
Orchidaceae	*Mobilabium*	Monotypic
Picrodendraceae	*Sankowskya*	Monotypic
Picrodendraceae	*Whyanbeelia*	Monotypic

Family	Genus	Monotypic?
Proteaceae	*Athertonia*	Monotypic
Proteaceae	*Austromuellera*	
Proteaceae	*Buckinghamia*	
Proteaceae	*Cardwellia*	Monotypic
Proteaceae	*Carnarvonia*	
Proteaceae	*Catalepidia*	Monotypic
Proteaceae	*Darlingia*	
Proteaceae	*Hollandaea*	
Proteaceae	*Megahertzia*	Monotypic
Proteaceae	*Musgravea*	
Proteaceae	*Neorites*	Monotypic
Proteaceae	*Nothorites*	Monotypic
Proteaceae	*Opisthiolepis*	Monotypic
Proteaceae	*Placospermum*	Monotypic
Proteaceae	*Sphalmium*	Monotypic
Rhamnaceae	*Schistocarpaea*	Monotypic
Rutaceae	*Brombya*	
Stemonuraceae	*Irvingbaileya*	Monotypic

B. List of vascular plant taxa that are endemic to the Wet Tropics Bioregion.

Includes subspecies and varieties which are restricted to the Wet Tropics – other subspecies or varieties of the species may occur outside the bioregion.

KEY TO SYMBOLS

[a] = Undescribed species.

Family	Taxon
Ferns and lycophytes	
Aspleniaceae	*Asplenium athertonense* S.B.Andrews
Aspleniaceae	*Asplenium baileyanum* (Domin) Watts
Aspleniaceae	*Asplenium bicentenniale* D.L.Jones
Aspleniaceae	*Asplenium wildii* F.M.Bailey
Athyriaceae	*Diplazium bostockii* D.L.Jones
Blechnaceae	*Blechnum articulatum* (F.Muell.) S.B.Andrews
Blechnaceae	*Blechnum wurunuran* Parris
Blechnaceae	*Pteridoblechnum acuminatum* (C.T.White & Goy) Hennipman
Blechnaceae	*Pteridoblechnum neglectum* (F.M.Bailey) Hennipman
Cyatheaceae	*Cyathea baileyana* (Domin) Domin
Cyatheaceae	*Cyathea woollsiana* (F.Muell.) Domin
Dennstaedtiaceae	*Oenotrichia dissecta* (C.T.White & Goy) S.B.Andrews
Dennstaedtiaceae	*Oenotrichia tripinnata* (F.Muell. ex Benth.) Copel.
Dryopteridaceae	*Dryopteris wattsii* M.McKeown, Sundue & Barrington
Dryopteridaceae	*Lastreopsis grayi* D.L.Jones
Dryopteridaceae	*Lastreopsis tinarooensis* Tindale
Dryopteridaceae	*Lastreopsis walleri* Tindale
Dryopteridaceae	*Lastreopsis windsorensis* D.L.Jones & B.Gray
Dryopteridaceae	*Lastreopsis wurunuran* (Domin) Tindale
Grammitidaceae	*Calymmodon luerssenianus* (Domin) Copel.
Grammitidaceae	*Ctenopteris walleri* (Maiden & Betche) S.B.Andrews
Grammitidaceae	*Grammitis albosetosa* F.M.Bailey
Grammitidaceae	*Grammitis leonardii* Parris
Grammitidaceae	*Grammitis queenslandica* Parris
Grammitidaceae	*Prosaptia fuscopilosa* (F.Muell. & Baker) Parris
Grammitidaceae	*Scleroglossum wooroonooran* (F.M.Bailey) C.Chr.
Hymenophyllaceae	*Crepidomanes majoriae* (Watts) N.A.Wakef.
Hymenophyllaceae	*Hymenophyllum gracilescens* Domin
Hymenophyllaceae	*Hymenophyllum kerianum* Watts
Hymenophyllaceae	*Hymenophyllum whitei* Goy
Lindsaeaceae	*Lindsaea terrae-reginae* K.U.Kramer
Lycopodiaceae	*Phlegmariurus lockyeri* (D.L.Jones & B.Gray) A.R.Field & Bostock

Family	Taxon
Lycopodiaceae	*Phlegmariurus marsupiiformis* (D.L.Jones & B.Gray) A.R.Field & Bostock
Nephrolepidaceae	*Arthropteris* sp. (Mt Carbine L.W.Jessup+ GJM1135) [a]
Nephrolepidaceae	*Arthropteris submarginalis* Domin
Polypodiaceae	*Crypsinus simplicissimus* (F.Muell.) S.B.Andrews
Polypodiaceae	*Microsorum australiense* (F.M.Bailey) Bostock
Polypodiaceae	*Pyrrosia confluens* var. *dielsii* (C.Chr.) Hovenkamp
Selaginellaceae	*Selaginella australiensis* Baker
Selaginellaceae	*Selaginella longipinna* Warb.
Thelypteridaceae	*Amphineuron queenslandicum* Holttum
Thelypteridaceae	*Chingia australis* Holttum
Vittariaceae	*Antrophyum jagoanum* D.L.Jones & Bostock
Conifers and cycads	
Araucariaceae	*Agathis atropurpurea* B.Hyland
Araucariaceae	*Agathis microstachya* J.F.Bailey & C.T.White
Cycadaceae	*Cycas candida* K.D.Hill
Zamiaceae	*Lepidozamia hopei* (W.Hill) Regel
Podocarpaceae	*Podocarpus dispermus* C.T.White
Podocarpaceae	*Podocarpus smithii* de Laub.
Podocarpaceae	*Prumnopitys ladei* (F.M.Bailey) de Laub.
Flowering plants	
Achariaceae	*Baileyoxylon lanceolatum* C.T.White
Achariaceae	*Ryparosa kurrangii* B.L.Webber
Actinidiaceae	*Saurauia andreana* (F.Muell.) Oliv.
Alseuosmiaceae	*Crispiloba disperma* (S.Moore) Steenis
Anacardiaceae	*Buchanania mangoides* F.Muell.
Annonaceae	*Desmos goezeanus* (F.Muell.) Jessup
Annonaceae	*Goniothalamus australis* Jessup
Annonaceae	*Haplostichanthus johnsonii* F.Muell.
Annonaceae	*Haplostichanthus rufescens* Jessup
Annonaceae	*Haplostichanthus submontanus* Jessup subsp. *submontanus*
Annonaceae	*Haplostichanthus submontanus* subsp. *sessiliflorus* Jessup
Annonaceae	*Meiogyne hirsuta* Jessup
Annonaceae	*Meiogyne verrucosa* Jessup
Annonaceae	*Melodorum topazensis* Jessup
Annonaceae	*Polyalthia michaelii* C.T.White
Annonaceae	*Polyalthia patinata* Jessup
Annonaceae	*Polyalthia xanthocarpa* B.Xue & R.M.K.Saunders

Family	Taxon
Annonaceae	*Pseuduvaria froggattii* (F.Muell.) Jessup
Annonaceae	*Pseuduvaria hylandii* Jessup
Annonaceae	*Pseuduvaria mulgraveana* Jessup var*. mulgraveana*
Annonaceae	*Pseuduvaria mulgraveana* var. *glabrescens* Jessup
Annonaceae	*Pseuduvaria villosa* Jessup
Apiaceae	*Hydrocotyle miranda* A.R.Bean & Henwood
Apocynaceae	*Alyxia grandis* P.I.Forst.
Apocynaceae	*Alyxia ilicifolia* F.Muell.
Apocynaceae	*Alyxia orophila* Domin
Apocynaceae	*Marsdenia araujacea* F.Muell.
Apocynaceae	*Marsdenia jensenii* P.I.Forst.
Apocynaceae	*Marsdenia longipedicellata* P.I.Forst.
Apocynaceae	*Marsdenia rara* P.I.Forst.
Apocynaceae	*Marsdenia straminea* P.I.Forst.
Apocynaceae	*Melodinus bacellianus* (F.Muell.) S.T.Blake
Apocynaceae	*Parsonsia bartlensis* J.B.Williams
Apocynaceae	*Parsonsia densivestita* C.T.White
Apocynaceae	*Parsonsia grayana* J.B.Williams
Apocynaceae	*Parsonsia langiana* F.Muell.
Apocynaceae	*Parsonsia wongabelensis* J.B.Williams
Apocynaceae	*Tylophora colorata* C.T.White
Apocynaceae	*Tylophora sp*. (Wongabel) [a]
Aponogetonaceae	*Aponogeton bullosus* H.Bruggen
Aponogetonaceae	*Aponogeton lancesmithii* Hellq. & S.W.L.Jacobs
Aponogetonaceae	*Aponogeton proliferus* Hellq. & S.W.L.Jacobs
Aquifoliaceae	*Ilex* sp. (Gadgarra B.P.Hyland RFK2011) [a]
Araceae	*Pothos brassii* B.L.Burtt
Araceae	*Rhaphidophora hayi* P.C. Boyce & Bogner
Araceae	*Rhaphidophora petrieana* A.Hay
Araliaceae	*Motherwellia haplosciadea* F.Muell.
Araliaceae	*Polyscias bellendenkerensis* (F.M.Bailey) Philipson
Araliaceae	*Polyscias mollis* (Benth.) Harms
Araliaceae	*Polyscias willmottii* (F.Muell.) Philipson
Araliaceae	*Trachymene geraniifolia* F.M.Bailey
Arecaceae	*Archontophoenix maxima* Dowe
Arecaceae	*Archontophoenix myolensis* Dowe
Arecaceae	*Archontophoenix purpurea* Hodel & Dowe
Arecaceae	*Laccospadix australasica* H.Wendl. & Drude

Family	Taxon
Arecaceae	*Linospadix apetiolata* Dowe & A.K.Irvine
Arecaceae	*Linospadix microcarya* (Domin) Burret
Arecaceae	*Linospadix palmeriana* (F.M.Bailey) Burret
Arecaceae	*Normanbya normanbyi* (W.Hill) L.H.Bailey
Arecaceae	*Oraniopsis appendiculata* (F.M.Bailey) J.Dransf., A.K.Irvine & N.W.Uhl
Argophyllaceae	*Argophyllum cryptophlebum* Zemann
Argophyllaceae	*Argophyllum* sp. (Babinda L.S.Smith 10213) [a]
Argophyllaceae	*Argophyllum* sp. (Koolmoon Creek B.Gray 1040) [a]
Aristolochiaceae	*Pararistolochia australopithecurus* Michael J.Parsons
Aristolochiaceae	*Pararistolochia sparusifolia* Michael J.Parsons
Asteraceae	*Tetramolopium* sp. (Mt Bowen D.G.Fell+ DGF1224) [a]
Atherospermataceae	*Daphnandra repandula* (F.Muell.) F.Muell.
Atherospermataceae	*Doryphora aromatica* (F.M.Bailey) L.S.Sm.
Atherospermataceae	*Dryadodaphne trachyphloia* Schodde
Austrobaileyaceae	*Austrobaileya scandens* C.T.White
Bignoniaceae	*Tecomanthe* sp. (Roaring Meg L.J.Brass 20326) [a]
Burmanniaceae	*Thismia* sp. [a]
Calycanthaceae	*Idiospermum australiense* (Diels) S.T.Blake
Casuarinaceae	*Gymnostoma australianum* L.A.S.Johnson
Celastraceae	*Brassiantha hedraiantheroides* A.J.Ford
Celastraceae	*Denhamia viridissima* F.M.Bailey & F.Muell. ex F.M.Bailey
Celastraceae	*Dinghoua globularis* (Ding Hou) R.H. Archer
Celastraceae	*Elaeodendron australe* var. (Windsor Tableland B.P.Hyland 5574)
Celastraceae	*Hexaspora pubescens* C.T.White
Celastraceae	*Hypsophila dielsiana* Loes.
Celastraceae	*Hypsophila halleyana* F.Muell.
Celastraceae	*Siphonodon membranaceus* F.M.Bailey
Clusiaceae	*Calophyllum costatum* F.M.Bailey
Clusiaceae	*Garcinia brassii* C.T.White
Clusiaceae	*Garcinia gibbsiae* S.Moore
Clusiaceae	*Garcinia mestonii* F.M.Bailey
Clusiaceae	*Garcinia zichii* W.E.Cooper
Clusiaceae	*Mammea touriga* (C.T.White & W.D.Francis) L.S.Sm.
Clusiaceae	*Mesua larnachiana* (F.Muell.) Kosterm.
Clusiaceae	*Mesua* sp. (Boonjie A.K.Irvine 1218) [a]
Colchicaceae	*Kuntheria pedunculata* (F.Muell.) Conran & Clifford
Convolvulaceae	*Argyreia soutteri* (F.M.Bailey) Domin
Corsiaceae	*Corsia dispar* D.L.Jones et B.Gray

Family	Taxon
Cucurbitaceae	*Trichosanthes odontosperma* W.E.Cooper & A.J.Ford
Cunoniaceae	*Caldcluvia* sp. (Bellenden Ker W.Sayer 45) [a]
Cunoniaceae	*Ceratopetalum corymbosum* C.T.White
Cunoniaceae	*Ceratopetalum hylandii* Rozefelds & R.W.Barnes
Cunoniaceae	*Ceratopetalum iugumensis* Rozefelds & R.W.Barnes
Cunoniaceae	*Ceratopetalum macrophyllum* Hoogland
Cunoniaceae	*Ceratopetalum succirubrum* C.T.White
Cunoniaceae	*Ceratopetalum virchowii* F.Muell.
Cunoniaceae	*Davidsonia pruriens* F.Muell.
Cunoniaceae	*Eucryphia wilkiei* B.Hyland
Cunoniaceae	*Gillbeea adenopetala* F.Muell.
Cunoniaceae	*Gillbeea whypallana* Rozefelds & Pellow
Cunoniaceae	*Karrabina biagiana* (F.Muell.) Rozefelds & H.C.Hopkins
Cunoniaceae	*Pseudoweinmannia apetala* (F.M.Bailey) Engl.
Cunoniaceae	*Pullea stutzeri* (F.Muell.) Gibbs
Cunoniaceae	*Schizomeria whitei* Mattf.
Cunoniaceae	*Spiraeanthemum davidsonii* F.Muell.
Cyperaceae	*Fimbristylis adjuncta* S.T.Blake
Dilleniaceae	*Hibbertia concinna* F.M.Bailey
Dilleniaceae	*Hibbertia melhanioides* var*. baileyana* Domin
Dilleniaceae	*Hibbertia pholidota* S.T.Reynolds
Dipentodontaceae	*Perrottetia arborescens* (F.Muell.) Loes.
Droseraceae	*Drosera adelae* F.Muell.
Droseraceae	*Drosera prolifera* C.T.White
Droseraceae	*Drosera schizandra* Diels
Ebenaceae	*Diospyros* sp. (Baird LA B.P.Hyland 9374) [a]
Ebenaceae	*Diospyros* sp. (Millaa Millaa L.W.Jessup 515) [a]
Ebenaceae	*Diospyros* sp. (Mt Lewis L.S.Smith 10107) [a]
Ebenaceae	*Diospyros* sp. (Mt Spurgeon C.T.White 10677) [a]
Ebenaceae	*Diospyros* sp. (Swipers LA BH 1984RFK) [a]
Elaeocarpaceae	*Aceratium concinnum* (S.Moore) C.T.White
Elaeocarpaceae	*Aceratium doggrellii* C.T.White
Elaeocarpaceae	*Aceratium ferrugineum* C.T.White
Elaeocarpaceae	*Aceratium megalospermum* (F.Muell.) Balgooy
Elaeocarpaceae	*Aceratium sericoleopsis* Balgooy
Elaeocarpaceae	*Elaeocarpus bancroftii* F.Muell. & F.M.Bailey
Elaeocarpaceae	*Elaeocarpus carolinae* B.Hyland & Coode
Elaeocarpaceae	*Elaeocarpus coorangooloo* J.F.Bailey & C.T.White

Family	Taxon
Elaeocarpaceae	*Elaeocarpus elliffii* B.Hyland & Coode
Elaeocarpaceae	*Elaeocarpus ferruginiflorus* C.T.White
Elaeocarpaceae	*Elaeocarpus grahamii* F.Muell.
Elaeocarpaceae	*Elaeocarpus hylobroma* Y. Baba & Crayn
Elaeocarpaceae	*Elaeocarpus johnsonii* F.Muell.
Elaeocarpaceae	*Elaeocarpus largiflorens* subsp. *retinervis* B.Hyland & Coode
Elaeocarpaceae	*Elaeocarpus linsmithii* Guymer
Elaeocarpaceae	*Elaeocarpus* sp. (Mt Bellenden Ker L.J.Brass 18336) [a]
Elaeocarpaceae	*Elaeocarpus* sp. (Mt Lewis B.P.Hyland 2907) [a]
Elaeocarpaceae	*Elaeocarpus stellaris* L.S.Sm.
Elaeocarpaceae	*Elaeocarpus thelmae* B.Hyland & Coode
Elaeocarpaceae	*Peripentadenia mearsii* (C.T.White) L.S.Sm.
Elaeocarpaceae	*Peripentadenia phelpsii* B.Hyland & Coode
Elaeocarpaceae	*Sloanea australis* subsp. *parviflora* Coode
Ericaceae	*Acrotriche baileyana* (Domin) J.M.Powell
Ericaceae	*Dracophyllum sayeri* F.Muell.
Ericaceae	*Paphia meiniana* (F.Muell.) Schltr.
Ericaceae	*Rhododendron lochiae* F.Muell.
Ericaceae	*Trochocarpa bellendenkerensis* Domin
Erythroxylaceae	*Erythroxylum* sp. (Brewer LA B.Hyland 13373) [a]
Euphorbiaceae	*Acalypha lyonsii* P.I.Forst.
Euphorbiaceae	*Baloghia parviflora* C.T.White
Euphorbiaceae	*Bertya polystigma* Gruening
Euphorbiaceae	*Claoxylon tenerifolium* (Baill.) F.Muell. subsp. boreale P.I.Forst.
Euphorbiaceae	*Croton densivestitus* C.T.White & W.D.Francis
Euphorbiaceae	*Fontainea picrosperma* C.T.White
Euphorbiaceae	*Hylandia dockrillii* Airy Shaw
Euphorbiaceae	*Macaranga dallachyana* (Baill.) Airy Shaw
Euphorbiaceae	*Macaranga inamoena* F.Muell. ex Benth.
Euphorbiaceae	*Omphalea queenslandiae* F.M.Bailey
Euphorbiaceae	*Rockinghamia brevipes* Airy Shaw
Euphorbiaceae	*Shonia tristigma* (F.Muell.) Halford & R.J.F.Hend. subsp. *tristigma*
Euphorbiaceae	*Wetria australiensis* P.I.Forst.
Eupomatiaceae	*Eupomatia barbata* Jessup
Fabaceae	*Acacia hylonoma* Pedley
Fabaceae	*Acacia lumholtzii* Pedley
Fabaceae	*Albizia* sp. (Windsor Tableland BG 2181) [a]
Fabaceae	*Archidendron kanisii* R.S.Cowan

Family	Taxon
Fabaceae	*Archidendron ramiflorum* (F.Muell.) Kosterm.
Fabaceae	*Archidendron vaillantii* (F.Muell.) F.Muell.
Fabaceae	*Archidendron whitei* I.C.Nielsen
Fabaceae	*Archidendropsis xanthoxylon* (C.T.White & W.D.Francis) I.C.Nielsen
Fabaceae	*Austrosteenisia stipularis* (C.T.White) Jessup
Fabaceae	*Caesalpinia robusta* (C.T.White) Pedley
Fabaceae	*Callerya pilipes* (F.M.Bailey) Schot
Fabaceae	*Callerya* sp. (Barratt Creek GS 428) [a]
Fabaceae	*Callerya* sp. (Beatrice River L.S.Smith 10487) [a]
Fabaceae	*Cassia queenslandica* C.T.White
Fabaceae	*Storckiella australiensis* J.H.Ross & B.Hyland
Gentianaceae	*Fagraea fagraeacea* (F.Muell.) Druce
Gesneriaceae	*Boea kinnearii* (F.Muell.) B.L.Burtt
Gesneriaceae	*Cyrtandra baileyi* F.Muell.
Gesneriaceae	*Lenbrassia australiana* (C.T.White) G.W.Gillett var. australiana
Gesneriaceae	*Lenbrassia australiana* var. glabrescens B.D.Morley
Haloragaceae	*Gonocarpus* sp. (Thornton Peak L.J.Brass+ 249) [a]
Hamamelidaceae	*Neostrearia fleckeri* L.S.Sm.
Hamamelidaceae	*Noahdendron nicholasii* P.K.Endress, B.Hyland & Tracey
Hamamelidaceae	*Ostrearia australiana* Baill.
Hemerocallidaceae	*Dianella longifolia* var. *fragrans* R.J.F.Hend.
Hernandiaceae	*Hernandia albiflora* (C.T.White) Kubitzki
Icacinaceae	*Apodytes brachystylis* F.Muell.
Lamiaceae	*Clerodendrum grayi* Munir
Lamiaceae	*Gmelina fasciculiflora* Benth.
Lamiaceae	*Plectranthus amicorum* S.T.Blake
Lamiaceae	*Plectranthus amoenus* P.I.Forst.
Lamiaceae	*Plectranthus apreptus* S.T.Blake
Lamiaceae	*Plectranthus foetidus* Benth.
Lamiaceae	*Plectranthus gratus* S.T.Blake
Lamiaceae	*Plectranthus spectabilis* S.T.Blake
Lamiaceae	*Plectranthus thalassoscopicus* P.I.Forst.
Lamiaceae	*Prostanthera albohirta* C.T.White
Lamiaceae	*Prostanthera* sp. (Kalpahlim Rock) [a]
Lauraceae	*Beilschmiedia bancroftii* (F.M.Bailey) C.T.White
Lauraceae	*Beilschmiedia brunnea* B.Hyland
Lauraceae	*Beilschmiedia castrisinensis* B.Hyland
Lauraceae	*Beilschmiedia oligandra* L.S.Sm.

Family	Taxon
Lauraceae	*Beilschmiedia recurva* B.Hyland
Lauraceae	*Beilschmiedia tooram* (F.M.Bailey) B.Hyland
Lauraceae	*Beilschmiedia tooram* (F.M.Bailey) B.Hyland vel aff.
Lauraceae	*Beilschmiedia volckii* B.Hyland
Lauraceae	*Cinnamomum propinquum* F.M.Bailey
Lauraceae	*Cryptocarya bellendenkerana* B.Hyland
Lauraceae	*Cryptocarya clarksoniana* B.Hyland
Lauraceae	*Cryptocarya cocosoides* B.Hyland
Lauraceae	*Cryptocarya leucophylla* B.Hyland
Lauraceae	*Cryptocarya lividula* B.Hyland
Lauraceae	*Cryptocarya melanocarpa* B.Hyland
Lauraceae	*Cryptocarya oblata* F.M.Bailey
Lauraceae	*Cryptocarya pleurosperma* C.T.White & W.D.Francis
Lauraceae	*Cryptocarya putida* B.Hyland
Lauraceae	*Cryptocarya saccharata* B.Hyland
Lauraceae	*Cryptocarya smaragdina* B.Hyland
Lauraceae	*Cryptocarya cercophylla* W.E.Cooper
Lauraceae	*Cryptocarya whiffiniana* Le Cussan & Hyland
Lauraceae	*Endiandra anthropophagorum* Domin
Lauraceae	*Endiandra bellendenkerana* B.Hyland
Lauraceae	*Endiandra bessaphila* B.Hyland
Lauraceae	*Endiandra cooperana* B.Hyland
Lauraceae	*Endiandra dichrophylla* F.Muell.
Lauraceae	*Endiandra grayi* B.Hyland
Lauraceae	*Endiandra insignis* (F.M.Bailey) F.M.Bailey
Lauraceae	*Endiandra jonesii* B.Hyland
Lauraceae	*Endiandra leptodendron* B.Hyland
Lauraceae	*Endiandra microneura* C.T.White
Lauraceae	*Endiandra monothyra* B.Hyland subsp. *monothyra*
Lauraceae	*Endiandra monothyra* subsp. *trichophylla* B.Hyland
Lauraceae	*Endiandra palmerstonii* (F.M.Bailey) C.T.White & W.D.Francis
Lauraceae	*Endiandra phaeocarpa* B.Hyland
Lauraceae	*Endiandra sankeyana* F.M.Bailey
Lauraceae	*Endiandra sideroxylon* B.Hyland
Lauraceae	*Endiandra xanthocarpa* B.Hyland
Lauraceae	*Litsea bennettii* B.Hyland
Lauraceae	*Litsea connorsii* B.Hyland
Lauraceae	*Litsea granitica* B.Hyland

Family	Taxon
Laxmanniaceae	*Romnalda grallata* R.J.F.Hend.
Laxmanniaceae	*Romnalda ophiopogonoides* Conran, P.I.Forst. & Donnon
Loranthaceae	*Amyema glabrum* (Domin) Danser
Loranthaceae	*Amyema quaternifolium* Barlow
Loranthaceae	*Amyema whitei* (Blakely) Danser
Loranthaceae	*Decaisnina congesta* Barlow
Maesaceae	*Maesa dependens* F.Muell. var*. dependens*
Malvaceae	*Argyrodendron peralatum* (F.M.Bailey) Edlin ex Boas
Malvaceae	*Argyrodendron* sp. (Boonjie B.P.Hyland RFK2139) [a]
Malvaceae	*Argyrodendron* sp. (Karnak P.I.Forster+ PIF10711) [a]
Malvaceae	*Argyrodendron* sp. (Mt Haig L.S.Smith+ 14307) [a]
Malvaceae	*Argyrodendron* sp. (Whyanbeel B.P.Hyland RFK1106) [a]
Malvaceae	*Franciscodendron laurifolium* (F.Muell.) B.Hyland & Steenis
Meliaceae	*Aglaia australiensis* Pannell
Meliaceae	*Aglaia brassii* Merr. & L.M.Perry
Meliaceae	*Aglaia ferruginea* C.T.White & W.D.Francis
Meliaceae	*Aglaia meridionalis* Pannell
Meliaceae	*Dysoxylum pumilum* Mabb.
Menispermaceae	*Carronia pedicellata* Forman
Menispermaceae	*Hypserpa smilacifolia* Diels
Menispermaceae	*Parapachygone longifolia* (F.M.Bailey) Forman
Monimiaceae	*Austromatthaea elegans* L.S.Sm.
Monimiaceae	*Endressia wardellii* (F.Muell.) Whiffin
Monimiaceae	*Hedycarya loxocarya* (Benth.) W.D.Francis
Monimiaceae	*Hemmantia webbii* Whiffin
Monimiaceae	*Palmeria coriacea* C.T.White
Monimiaceae	*Steganthera australiana* C.T.White
Monimiaceae	*Steganthera cooperorum* Whiffin
Monimiaceae	*Steganthera laxiflora subsp. lewisensis* Whiffin
Monimiaceae	*Steganthera macooraia* (F.M.Bailey) P.K.Endress
Monimiaceae	*Wilkiea angustifolia* (F.M.Bailey) J.R.Perkins
Monimiaceae	*Wilkiea cordata* Whiffin
Monimiaceae	*Wilkiea kaarruana* Zich & A.J.Ford
Monimiaceae	*Wilkiea smithii* Whiffin
Monimiaceae	*Wilkiea sp*. (McDowall Range J.G.Tracey 14552) [a]
Monimiaceae	*Wilkiea sp*. (Mt Lewis L.J.Webb+ 10501) [a]
Moraceae	*Ficus crassipes* F.M.Bailey
Moraceae	*Ficus pleurocarpa* F.Muell.

Family	Taxon
Moraceae	*Ficus triradiata* Corner
Moraceae	*Streblus glaber* var. *australianus* (C.T.White) Corner
Musaceae	*Musa fitzalanii* F.Muell.
Musaceae	*Musa jackeyi* W.Hill
Myodocarpaceae	*Delarbrea michieana* (F.Muell.) F.Muell.
Myrsinaceae	*Ardisia brevipedata* F.Muell.
Myrsinaceae	*Ardisia fasciculata* C.T.White
Myrsinaceae	*Ardisia hylandii* Jackes
Myrsinaceae	*Ardisia pachyrrhachis* (F.Muell.) F.M.Bailey
Myrsinaceae	*Embelia grayi* S.T.Reynolds
Myrsinaceae	*Myrsine achradifolia* F.Muell.
Myrsinaceae	*Myrsine elata* Jackes
Myrsinaceae	*Myrsine maculata* Jackes
Myrsinaceae	*Myrsine oreophila* Jackes
Myrsinaceae	*Myrsine rubiginosa* Jackes
Myrsinaceae	*Myrsine smithii* Jackes
Myrsinaceae	*Tapeinosperma pallidum* Jackes
Myrsinaceae	*Tetrardisia bifaria* (C.T.White & W.D.Francis) C.T.White
Myrtaceae	*Backhousia bancroftii* F.M.Bailey & F.Muell. ex F.M.Bailey
Myrtaceae	*Backhousia enata* A.J.Ford, Craven & J.Holmes
Myrtaceae	*Backhousia hughesii* C.T.White
Myrtaceae	*Barongia lophandra* Peter G.Wilson & B.Hyland
Myrtaceae	*Corymbia leptoloma* (Brooker & A.R.Bean) K.D.Hill & L.A.S.Johnson
Myrtaceae	*Corymbia torelliana* (F.Muell.) K.D.Hill & L.A.S.Johnson
Myrtaceae	*Gossia lewisensis* N.Snow & Guymer
Myrtaceae	*Gossia shepherdii* (F.Muell.) N.Snow & Guymer
Myrtaceae	*Kunzea graniticola* Byrnes
Myrtaceae	*Kunzea* sp. (Herbert River R.J.Cumming 11309) [a]
Myrtaceae	*Leptospermum wooroonooran* F.M.Bailey
Myrtaceae	*Melaleuca lophocoracorum* A.J.Ford, Craven & Brophy
Myrtaceae	*Melaleuca pyramidalis* Craven
Myrtaceae	*Melaleuca uxorum* Craven
Myrtaceae	*Mitrantia bilocularis* Peter G.Wilson & B.Hyland
Myrtaceae	*Pilidiostigma sessile* N.Snow
Myrtaceae	*Pilidiostigma tetramerum* L.S.Sm.
Myrtaceae	*Pilidiostigma tropicum* L.S.Sm.
Myrtaceae	*Rhodamnia blairiana* F.Muell.
Myrtaceae	*Rhodamnia longisepala* N.Snow & A.J.Ford

Family	Taxon
Myrtaceae	*Rhodamnia sessiliflora* Benth.
Myrtaceae	*Rhodomyrtus canescens* C.T.White & W.D.Francis
Myrtaceae	*Rhodomyrtus effusa* Guymer
Myrtaceae	*Rhodomyrtus pervagata* Guymer
Myrtaceae	*Rhodomyrtus sericea* Burret
Myrtaceae	*Ristantia gouldii* Peter G.Wilson & B.Hyland
Myrtaceae	*Ristantia pachysperma* (F.Muell. & F.M.Bailey) Peter G.Wilson & J.T.Waterh.
Myrtaceae	*Sphaerantia chartacea* Peter G.Wilson & B.Hyland
Myrtaceae	*Sphaerantia discolor* Peter G.Wilson & B.Hyland
Myrtaceae	*Stockwellia quadrifida* D.J.Carr, S.G.M.Carr & B.Hyland
Myrtaceae	*Syzygium alatoramulum* B.Hyland
Myrtaceae	*Syzygium alliiligneum* B.Hyland
Myrtaceae	*Syzygium boonjee* B.Hyland
Myrtaceae	*Syzygium canicortex* B.Hyland
Myrtaceae	*Syzygium dansiei* B.Hyland
Myrtaceae	*Syzygium divaricatum* (Merr. & L.M.Perry) Craven & Biffin
Myrtaceae	*Syzygium erythrocalyx* (C.T.White) B.Hyland
Myrtaceae	*Syzygium fratris* Craven
Myrtaceae	*Syzygium glenum* Craven
Myrtaceae	*Syzygium graveolens* (F.M.Bailey) Craven & Biffin
Myrtaceae	*Syzygium gustavioides* (F.M.Bailey) B.Hyland
Myrtaceae	*Syzygium hedraiophyllum* (F.Muell.) Craven & Biffin
Myrtaceae	*Syzygium kuranda* (F.M.Bailey) B.Hyland
Myrtaceae	*Syzygium maraca* Craven & Biffin
Myrtaceae	*Syzygium monimioides* Craven
Myrtaceae	*Syzygium monospermum* Craven
Myrtaceae	*Syzygium mulgraveanum* (B.Hyland) Craven & Biffin
Myrtaceae	*Syzygium sayeri* (F.Muell.) B.Hyland
Myrtaceae	*Syzygium sharoniae* B.Hyland
Myrtaceae	*Syzygium trachyphloium* (C.T.White) B.Hyland
Myrtaceae	*Syzygium unipunctatum* (B.Hyland) Craven & Biffin
Myrtaceae	*Syzygium wilsonii* (F.Muell.) B.Hyland subsp. *wilsonii*
Myrtaceae	*Syzygium wilsonii* subsp. *epigaeum* Craven & Biffin
Myrtaceae	*Syzygium xerampelinum* B.Hyland
Myrtaceae	*Thaleropia queenslandica* (L.S.Sm.) Peter G.Wilson
Myrtaceae	*Uromyrtus metrosideros* (F.M.Bailey) A.J.Scott
Myrtaceae	*Uromyrtus tenellus* N.Snow & Guymer
Myrtaceae	*Xanthostemon formosus* Peter G.Wilson

Family	Taxon
Myrtaceae	*Xanthostemon graniticus* Peter G.Wilson
Myrtaceae	*Xanthostemon verticillatus* (C.T.White & W.D.Francis) L.S.Sm.
Myrtaceae	*Xanthostemon whitei* Gugerli
Ochnaceae	*Brackenridgea australiana* F.Muell.
Oleaceae	*Jasminum kajewskii* C.T.White
Orchidaceae	*Acianthus borealis* D.L.Jones
Orchidaceae	*Anoectochilus yatesiae* F.M.Bailey
Orchidaceae	*Bulbophyllum boonjee* B.Gray & D.L.Jones
Orchidaceae	*Bulbophyllum evasum* T.E.Hunt & Rupp
Orchidaceae	*Bulbophyllum gadgarrense* Rupp
Orchidaceae	*Bulbophyllum grandimesense* B.Gray & D.L.Jones
Orchidaceae	*Bulbophyllum johnsonii* T.E.Hunt
Orchidaceae	*Bulbophyllum lageniforme* F.M.Bailey
Orchidaceae	*Bulbophyllum lewisense* B.Gray & D.L.Jones
Orchidaceae	*Bulbophyllum lilianae* Rendle
Orchidaceae	*Bulbophyllum nematopodum* F.Muell.
Orchidaceae	*Bulbophyllum sladeanum* A.D.Hawkes
Orchidaceae	*Bulbophyllum wadsworthii* Dockrill
Orchidaceae	*Bulbophyllum wilkianum* T.E.Hunt
Orchidaceae	*Bulbophyllum windsorense* B.Gray & D.L.Jones
Orchidaceae	*Bulbophyllum wolfei* B.Gray & D.L.Jones
Orchidaceae	*Cadetia uniflos* (F.M.Bailey) M.T.Mathieson
Orchidaceae	*Calochilus psednus* D.L.Jones & Lavarack
Orchidaceae	*Chiloglottis longiclavata* D.L.Jones
Orchidaceae	*Cooktownia robertsii* D.L.Jones
Orchidaceae	*Crepidium flavovirens* D.L.Jones & M.A.Clem.
Orchidaceae	*Crepidium lawleri* (Lavarack & B.Gray) Szlach.
Orchidaceae	*Dendrobium adae* F.M.Bailey
Orchidaceae	*Dendrobium agrostophyllum* F.Muell.
Orchidaceae	*Dendrobium callitrophilum* B.Gray & D.L.Jones
Orchidaceae	*Dendrobium carrii* Rupp & C.T.White
Orchidaceae	*Dendrobium finniganense* D.L.Jones
Orchidaceae	*Dendrobium fleckeri* Rupp & C.T.White
Orchidaceae	*Dendrobium toressae* (F.M.Bailey) Dockrill
Orchidaceae	*Dockrillia brevicauda* (D.L.Jones & M.A.Clem.) M.A.Clem. & D.L.Jones
Orchidaceae	*Dockrillia racemosa* (Nicholls) Rauschert
Orchidaceae	*Drymoanthus minutus* Nicholls
Orchidaceae	*Gastrodia queenslandica* Dockrill

Family	Taxon
Orchidaceae	*Gastrodia urceolata* D.L.Jones
Orchidaceae	*Genoplesium tectum* D.L.Jones
Orchidaceae	*Habenaria divaricata* R.S.Rogers & C.T.White
Orchidaceae	*Liparis angustilabris* (F.Muell.) Blaxell
Orchidaceae	*Liparis bracteata* T.E.Hunt
Orchidaceae	*Mobilabium hamatum* Rupp
Orchidaceae	*Oberonia attenuata* Dockrill
Orchidaceae	*Octarrhena pusilla* (F.M.Bailey) M.A.Clem. & D.L.Jones
Orchidaceae	*Pterostylis anatona* D.L.Jones
Orchidaceae	*Pterostylis caligna* M.T. Mathieson
Orchidaceae	*Pterostylis depauperata* F.M.Bailey
Orchidaceae	*Saccolabiopsis rectifolia* (Dockrill) Garay
Orchidaceae	*Sarcochilus borealis* (Nicholls) M.A.Clem. & D.L.Jones
Orchidaceae	*Sarcochilus serrulatus* D.L.Jones
Orchidaceae	*Taeniophyllum confertum* B.Gray & D.L.Jones
Orchidaceae	*Vrydagzynea grayi* D.L.Jones & M.A.Clem.
Passifloraceae	*Passiflora kuranda* Krosnick & A.J.Ford
Philydraceae	*Helmholtzia acorifolia* F.Muell.
Phyllanthaceae	*Actephila flavescens* P.I.Forst.
Phyllanthaceae	*Actephila foetida* Domin
Phyllanthaceae	*Actephila petiolaris* subsp*. jagonis* P.I.Forst.
Phyllanthaceae	*Actephila petiolaris* Benth. subsp*. petiolaris*
Phyllanthaceae	*Actephila vernicosa* P.I.Forst.
Phyllanthaceae	*Cleistanthus discolor* Summerh.
Phyllanthaceae	*Cleistanthus myrianthus* (Hassk.) Kurz
Phyllanthaceae	*Glochidion barronense* Airy Shaw
Phyllanthaceae	*Glochidion harveyanum* var*. pubescens* Airy Shaw
Phyllanthaceae	*Glochidion hylandii* Airy Shaw
Phyllanthaceae	*Glochidion pruinosum* Airy Shaw
Phyllanthaceae	*Glochidion pungens* Airy Shaw
Phyllanthaceae	*Glochidion sessiliflorum* var*. stylosum* Airy Shaw
Phyllanthaceae	*Phyllanthus hypospodius* F.Muell.
Picrodendraceae	*Austrobuxus megacarpus* P.I.Forst.
Picrodendraceae	*Choriceras majus* Airy Shaw
Picrodendraceae	*Dissiliaria tuckeri* P.I.Forst.
Picrodendraceae	*Sankowskya stipularis* P.I.Forst.
Picrodendraceae	*Whyanbeelia terrae*-reginae Airy Shaw & B.Hyland
Piperaceae	*Peperomia bellendenkerensis* Domin

Family	Taxon
Piperaceae	*Peperomia hunteriana* P.I.Forst.
Piperaceae	*Piper hederaceum* var. *longiorispicum* Spokes
Pittosporaceae	*Auranticarpa papyracea* L.Cayzer, Crisp & I.Telford
Pittosporaceae	*Pittosporum trilobum* L.Cayzer, Crisp & I.Telford
Poaceae	*Isachne sharpii* B.K.Simon
Poaceae	*Mullerochloa moreheadiana* (F.M.Bailey) K.M.Wong
Polygalaceae	*Comesperma praecelsum* F.Muell.
Polygalaceae	*Comesperma* sp. (Mt Emerald) [a]
Polygalaceae	*Xanthophyllum fragrans* C.T.White
Polyosmaceae	*Polyosma hirsuta* C.T.White
Polyosmaceae	*Polyosma reducta* F.Muell.
Polyosmaceae	*Polyosma rigidiuscula* F.Muell. & F.M.Bailey ex F.M.Bailey
Polyosmaceae	*Polyosma* sp. (Mt Lewis B.P.Hyland RFK25241) [a]
Polyosmaceae	*Polyosma* sp. (Mt Windsor Tableland L.W.Jessup+ GJM1374) [a]
Proteaceae	*Alloxylon flammeum* P.H.Weston & Crisp
Proteaceae	*Alloxylon wickhamii* (W.Hill ex F.Muell.) P.H.Weston & Crisp
Proteaceae	*Athertonia diversifolia* (C.T.White) L.A.S.Johnson & B.G.Briggs
Proteaceae	*Austromuellera trinervia* C.T.White
Proteaceae	*Austromuellera valida* B.Hyland
Proteaceae	*Banksia aquilonia* (A.S.George) A.S.George
Proteaceae	*Banksia plagiocarpa* A.S.George
Proteaceae	*Buckinghamia celsissima* F.Muell.
Proteaceae	*Buckinghamia ferruginiflora* Foreman & B.Hyland
Proteaceae	*Cardwellia sublimis* F.Muell.
Proteaceae	*Carnarvonia araliifolia* F.Muell. var. *araliifolia*
Proteaceae	*Carnarvonia araliifolia* var. *montana* B.Hyland
Proteaceae	*Catalepidia heyana* (F.M.Bailey) P.H.Weston
Proteaceae	*Darlingia darlingiana* (F.Muell.) L.A.S.Johnson
Proteaceae	*Darlingia ferruginea* J.F.Bailey
Proteaceae	*Eidothea zoexylocarya* A.W.Douglas & B.Hyland
Proteaceae	*Helicia blakei* Foreman
Proteaceae	*Helicia grayi* Foreman
Proteaceae	*Helicia lamingtoniana* (F.M.Bailey) C.T.White ex L.S.Sm.
Proteaceae	*Helicia lewisensis* Foreman
Proteaceae	*Helicia nortoniana* (F.M.Bailey) F.M.Bailey
Proteaceae	*Helicia recurva* Foreman
Proteaceae	*Hicksbeachia pilosa* P.H.Weston
Proteaceae	*Hollandaea diabolica* A.J.Ford & P.H.Weston

Family	Taxon
Proteaceae	*Hollandaea porphyrocarpa* A.J.Ford & P.H.Weston
Proteaceae	*Hollandaea riparia* B.Hyland
Proteaceae	*Hollandaea sayeriana* (F.Muell.) L.S.Sm.
Proteaceae	*Lasjia grandis* (C.L.Gross & B.Hyland) P.H.Weston & A.R.Mast
Proteaceae	*Lasjia whelanii* (F.M.Bailey) P.H.Weston & A.R.Mast
Proteaceae	*Lomatia fraxinifolia* F.Muell. ex Benth.
Proteaceae	*Megahertzia amplexicaulis* A.S.George & B.Hyland
Proteaceae	*Musgravea heterophylla* L.S.Sm.
Proteaceae	*Musgravea stenostachya* F.Muell.
Proteaceae	*Neorites kevediana* L.S.Sm.
Proteaceae	*Nothorites megacarpus* (A.S.George & B.Hyland) P.H.Weston & A.R.Mast
Proteaceae	*Opisthiolepis heterophylla* L.S.Sm.
Proteaceae	*Orites fragrans* F.M.Bailey
Proteaceae	*Persoonia tropica* P.H.Weston & L.A.S.Johnson
Proteaceae	*Placospermum coriaceum* C.T.White & W.D.Francis
Proteaceae	*Sphalmium racemosum* (C.T.White) B.G.Briggs, B.Hyland & L.A.S.Johnson
Proteaceae	*Stenocarpus cryptocarpus* Foreman & B.Hyland
Proteaceae	*Stenocarpus davallioides* Foreman & B.Hyland
Proteaceae	*Stenocarpus reticulatus* C.T.White
Proteaceae	*Stenocarpus* sp. (Hinchinbrook Island F.D.Hockings AQ229860) [a]
Proteaceae	*Triunia erythrocarpa* Foreman
Proteaceae	*Triunia montana* (C.T.White) Foreman
Putranjivaceae	*Drypetes acuminata* P.I.Forst.
Putranjivaceae	*Drypetes iodoformis* L.S.Sm. ex P.I.Forst.
Quintiniaceae	*Quintinia fawkneri* F.Muell.
Rhamnaceae	*Gouania australiana* F.Muell.
Rhamnaceae	*Sageretia hamosa* (Wall.) Brongn.
Rhamnaceae	*Schistocarpaea johnsonii* F.Muell.
Rousseaceae	*Abrophyllum* sp. (East Mulgrave RJ 486) [a]
Rubiaceae	*Aidia* sp. (Mt Lewis) [a]
Rubiaceae	*Antirhea sp*. (Mt Lewis BG 5733) [a]
Rubiaceae	*Atractocarpus fitzalanii* subsp*. tenuipes* Puttock
Rubiaceae	*Atractocarpus hirtus* (F.Muell.) Puttock
Rubiaceae	*Atractocarpus merikin* (F.M.Bailey) Puttock
Rubiaceae	*Bobea myrtoides* (F.Muell.) Valeton
Rubiaceae	*Coelospermum dasylobum* Halford & A.J.Ford
Rubiaceae	*Coelospermum purpureum* Halford & A.J.Ford
Rubiaceae	*Cyclophyllum costatum* (C.T.White) S.T.Reynolds & R.F.J.Hend.

Family	Taxon
Rubiaceae	*Cyclophyllum multiflorum* S.T.Reynolds & R.F.J.Hend.
Rubiaceae	*Cyclophyllum protractum* S.T.Reynolds & R.F.J.Hend.
Rubiaceae	*Gardenia actinocarpa* Puttock
Rubiaceae	*Gardenia ovularis* F.M.Bailey
Rubiaceae	*Gynochthodes oresbia* Halford & A.J.Ford
Rubiaceae	*Ixora baileyana* Bridson & L.G.Adams
Rubiaceae	*Ixora biflora* Fosberg
Rubiaceae	*Ixora oreogena* S.T.Reynolds & P.I.Forst.
Rubiaceae	*Morinda constipata* Halford & A.J.Ford
Rubiaceae	*Morinda podistra* Halford & A.J.Ford
Rubiaceae	*Morinda retropila* Halford & A.J.Ford
Rubiaceae	*Myrmecodia beccarii* Hook.f.
Rubiaceae	*Ophiorrhiza australiana* Benth. subsp. australiana
Rubiaceae	*Psychotria dallachiana* Benth.
Rubiaceae	*Psychotria* sp. (Daintree NP P.I.Forster+ PIF21974) [a]
Rubiaceae	*Psychotria* sp. (Mt Finnigan L.J.Brass 20044) [a]
Rubiaceae	*Psychotria* sp. (Mt Lewis V.K.Moriarty 2445) [a]
Rubiaceae	*Psychotria* sp. (Utchee Creek H.Flecker NQNC5313) [a]
Rubiaceae	*Psychotria submontana* Domin
Rubiaceae	*Psydrax laxiflorens* S.T.Reynolds & R.F.J.Hend.
Rubiaceae	*Psydrax montigena* S.T.Reynolds & R.F.J.Hend.
Rubiaceae	*Psydrax tropica* S.T.Reynolds & R.F.J.Hend.
Rubiaceae	*Randia audasii* C.T.White
Rubiaceae	*Tarenna monticola* S.T.Reynolds & P.I.Forst.
Rubiaceae	*Wendlandia basistaminea* F.Muell.
Rubiaceae	*Wendlandia connata* C.T.White
Rubiaceae	*Wendlandia inclusa* C.T.White
Rubiaceae	*Wendlandia urceolata* C.T.White
Rubiaceae	*Wendlandia psychotrioides* (F.Muell.) F.Muell.
Rutaceae	*Acronychia aberrans* T.G.Hartley
Rutaceae	*Acronychia acuminata* T.G.Hartley
Rutaceae	*Acronychia chooreechillum* (F.M.Bailey) C.T.White
Rutaceae	*Acronychia crassipetala* T.G.Hartley
Rutaceae	*Acronychia parviflora* C.T.White
Rutaceae	*Acronychia vestita* F.Muell.
Rutaceae	*Boronia excelsa* Duretto
Rutaceae	*Boronia jensziae* Duretto
Rutaceae	*Brombya platynema* F.Muell.

Family	Taxon
Rutaceae	*Brombya smithii* T.G.Hartley
Rutaceae	*Citrus inodora* F.M.Bailey
Rutaceae	*Dinosperma longifolium* T.G.Hartley
Rutaceae	*Dinosperma stipitatum* (C.T.White & W.D.Francis) T.G.Hartley
Rutaceae	*Euodia hylandii* T.G.Hartley
Rutaceae	*Euodia pubifolia* T.G.Hartley
Rutaceae	*Flindersia acuminata* C.T.White
Rutaceae	*Flindersia bourjotiana* F.Muell.
Rutaceae	*Flindersia brayleyana* F.Muell.
Rutaceae	*Flindersia laevicarpa* C.T.White & W.D.Francis
Rutaceae	*Flindersia oppositifolia* (F.Muell.) T.G.Hartley & Jessup
Rutaceae	*Leionema ellipticum* Paul G.Wilson
Rutaceae	*Medicosma fareana* (F.Muell.) T.G.Hartley
Rutaceae	*Medicosma glandulosa* T.G.Hartley
Rutaceae	*Medicosma heterophylla* T.G.Hartley
Rutaceae	*Medicosma mulgraveana* T.G.Hartley
Rutaceae	*Medicosma sessiliflora* (C.T.White) T.G.Hartley
Rutaceae	*Melicope broadbentiana* F.M.Bailey
Rutaceae	*Melicope jonesii* T.G.Hartley
Rutaceae	*Zanthoxylum veneficum* F.M.Bailey
Rutaceae	*Zieria alata* Duretto & P.I.Forst.
Rutaceae	*Zieria insularis* Duretto & P.I.Forst.
Rutaceae	*Zieria madida* Duretto & P.I.Forst.
Rutaceae	*Zieria robertsiorum* J.A.Armstr.
Rutaceae	*Zieria whitei* J.A.Armstr. ex Duretto & P.I.Forst.
Salicaceae	*Casearia costulata* Jessup
Salicaceae	*Casearia grayi* Jessup
Salicaceae	*Casearia* sp. (Mission Beach B.P.Hyland 773) [a]
Salicaceae	*Xylosma* sp. (Mt Lewis G.Sankowsky+ 1108) [a]
Santalaceae	*Korthalsella japonica* forma *grayi* (Barlow) Molvray
Sapindaceae	*Arytera pauciflora* S.T.Reynolds
Sapindaceae	*Cupaniopsis cooperorum* P.I.Forst.
Sapindaceae	*Cupaniopsis dallachyi* S.T.Reynolds
Sapindaceae	*Cupaniopsis diploglottoides* Adema
Sapindaceae	*Cupaniopsis papillosa* P.I.Forst.
Sapindaceae	*Diploglottis* sp.(Palmerston) [a]
Sapindaceae	*Diploglottis bernieana* S.T.Reynolds
Sapindaceae	*Diploglottis bracteata* Leenh.

Family	Taxon
Sapindaceae	*Diploglottis harpullioides* S.T.Reynolds
Sapindaceae	*Diploglottis pedleyi* S.T.Reynolds
Sapindaceae	*Diploglottis smithii* S.T.Reynolds
Sapindaceae	*Guioa montana* C.T.White
Sapindaceae	*Guioa sarcopterifructa* Welzen
Sapindaceae	*Harpullia frutescens* F.M.Bailey
Sapindaceae	*Harpullia rhyticarpa* C.T.White & W.D.Francis
Sapindaceae	*Jagera madida* P.I.Forst.
Sapindaceae	*Jagera pseudorhus* (A.Rich.) Radlk. var. integerrima S.T.Reynolds
Sapindaceae	*Lepiderema hirsuta* S.T.Reynolds
Sapindaceae	*Lepiderema ixiocarpa* S.T.Reynolds
Sapindaceae	*Lepiderema largiflorens* S.T.Reynolds
Sapindaceae	*Lepiderema sericolignis* (F.M.Bailey) Radlk.
Sapindaceae	*Mischarytera megaphylla* P.I.Forst.
Sapindaceae	*Mischocarpus albescens* S.T.Reynolds
Sapindaceae	*Mischocarpus grandissimus* (F.Muell.) Radlk.
Sapindaceae	*Mischocarpus montanus* C.T.White
Sapindaceae	*Rhysotoechia flavescens* Radlk.
Sapindaceae	*Rhysotoechia florulenta* S.T.Reynolds
Sapindaceae	*Rhysotoechia mortoniana* (F.Muell.) Radlk.
Sapindaceae	*Rhysotoechia robertsonii* (F.Muell.) Radlk.
Sapindaceae	*Sarcopteryx acuminata* S.T.Reynolds
Sapindaceae	*Sarcopteryx montana* S.T.Reynolds
Sapindaceae	*Sarcopteryx reticulata* S.T.Reynolds
Sapindaceae	*Sarcotoechia cuneata* Radlk.
Sapindaceae	*Sarcotoechia lanceolata* (C.T.White) S.T.Reynolds
Sapindaceae	*Sarcotoechia protracta* Radlk.
Sapindaceae	*Sarcotoechia serrata* S.T.Reynolds
Sapindaceae	*Sarcotoechia villosa* S.T.Reynolds
Sapindaceae	*Synima macrophylla* S.T.Reynolds
Sapindaceae	*Synima reynoldsiae* P.I.Forst.
Sapindaceae	*Toechima monticola* S.T.Reynolds
Sapindaceae	*Toechima pterocarpum* S.T.Reynolds
Sapotaceae	*Niemeyera* sp. (Mt Lewis A.K.Irvine 1402) [a]
Sapotaceae	*Planchonella asterocarpon* (P.Royen) Swenson, Bartish & Munzinger
Sapotaceae	*Planchonella euphlebia* (F.Muell.) W.D.Francis
Sapotaceae	*Pleioluma* sp. (Towalla)
Sapotaceae	*Pouteria brownlessiana* (F.Muell.) Baehni

Family	Taxon
Sapotaceae	*Pouteria pearsoniorum* Jessup
Sapotaceae	*Pouteria singuliflora* (C.T.White & W.D.Francis) Baehni
Sapotaceae	*Pouteria* sp. (Mt Lewis B.P.Hyland 579) [a]
Sapotaceae	*Sersalisia sessiliflora* (C.T.White) Aubrev.
Sapotaceae	*Sersalisia* sp. (Barong M.Tucker 22)
Sapotaceae	*Vanroyena castanosperma* (C.T.White) Aubrev.
Simaroubaceae	*Samadera baileyana* Oliv.
Simaroubaceae	*Samadera* sp. (Barong B.Gray 742) [a]
Solanaceae	*Solanum dimorphispinum* C.T.White
Solanaceae	*Solanum eminens* A.R.Bean
Solanaceae	*Solanum hamulosum* C.T.White
Solanaceae	*Solanum macoorai* F.M.Bailey
Solanaceae	*Solanum magnifolium* F.Muell.
Stemonuraceae	*Irvingbaileya australis* (C.T.White) R.A.Howard
Stylidiaceae	*Stylidium confertum* A.R.Bean
Stylidiaceae	*Stylidium elachophyllum* A.R.Bean & M.T.Mathieson
Symplocaceae	*Symplocos ampulliformis* C.T.White
Symplocaceae	*Symplocos boonjee* Jessup
Symplocaceae	*Symplocos bullata* Jessup
Symplocaceae	*Symplocos crassiramifera* Noot.
Symplocaceae	*Symplocos cyanocarpa* C.T.White var. *cyanocarpa*
Symplocaceae	*Symplocos cyanocarpa* var. *pilosa* Jessup
Symplocaceae	*Symplocos glabra* Jessup
Symplocaceae	*Symplocos graniticola* Jessup
Symplocaceae	*Symplocos hayesii* C.T.White & W.D.Francis
Symplocaceae	*Symplocos hylandii* Noot.
Symplocaceae	*Symplocos oresbia* Jessup
Symplocaceae	*Symplocos wooroonooran* Jessup
Thymelaeaceae	*Lethedon setosa* (C.T.White) Kosterm.
Thymelaeaceae	*Phaleria biflorum* (C.T.White) Herber
Urticaceae	*Dendrocnide cordifolia* (L.S.Sm.) Jackes & M.Hurley
Vitaceae	*Cissus vinosa* Jackes
Vitaceae	*Tetrastigma crenatum* Jackes
Winteraceae	*Bubbia queenslandiana* subsp. *australis* Vink
Winteraceae	*Bubbia queenslandiana* Vink subsp. *queenslandiana*
Winteraceae	*Bubbia whiteana* A.C.Sm.
Winteraceae	*Tasmannia membranea* (F.Muell.) A.C.Sm.
Winteraceae	*Tasmannia* sp. (Mt Bellenden Ker J.R.Clarkson 6571) [a]

Family	Taxon
Zingiberaceae	*Alpinia arctiflora* (F.Muell.) Benth.
Zingiberaceae	*Alpinia hylandii* R.M.Sm.
Zingiberaceae	*Alpinia modesta* F.Muell. ex K.Schum.
Zingiberaceae	*Pleuranthodium racemigerum* (F.Muell.) R.M.Sm.

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The Wet Tropics Management Authority is able to undertake its work in the Wet Tropics of Queensland World Heritage Area with the assistance of the Australian Government and Queensland Government.