

STATE OF WET TROPICS 2023–24

Outstanding Universal Value: now and for future generations



WET TROPICS
MANAGEMENT AUTHORITY



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.

We recognise the deep relationships, connections and responsibilities to lands, waters and skies integral to Rainforest Aboriginal Peoples' identity and culture, and we give regard to their connections as central to culture and being.

We acknowledge Rainforest Aboriginal Peoples' continuous living culture and the diverse knowledges held, and their traditional lore and customs.

We thank Rainforest Aboriginal Peoples for the enduring relationships connecting Country, ancestors and people, now and emerging. These relationships have safely stewarded and protected the Wet Tropics' lands, waters and skies, reaching back thousands of generations.

We accept that this Country is sacred, that everything in the land has meaning, and that all people are one with it.



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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*.

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.

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Further information

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Terms and abbreviations used in this report

Term	Definition
Area; World Heritage Area	Wet Tropics of Queensland World Heritage Area/Wet Tropics World Heritage Area
Biodiversity	The variety of life found in a place, measured by species richness, taxonomic distinctness, and genetic diversity
Biosecurity	Methods used to prevent exotic and invasive species from entering an area
Climate change	A global, long-term shift in the Earth's climate caused by human activities such as the combustion of fossil fuels
Endemic	Particular to an area; found nowhere else on Earth
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> —Australian legislation that provides a framework for protection of the environment, including its biodiversity and its natural and culturally significant places
Extinct	A species that can no longer exist because of natural or human-induced changes to its environment, such as habitat loss
Feral	A domesticated animal now living in the wild without human interaction
Gondwana	Large ancient landmass that incorporated present-day Australia, South America, Africa, the Middle East, Madagascar, India, and Antarctica
Habitat fragmentation	The division of areas of habitat into smaller parts, often by human activity such as roads and other built infrastructure
Integrity	A measure of the completeness or intactness of the attributes that convey Outstanding Universal Value
Invasive species	A species not indigenous or native to a particular area that can readily establish and spread in such an area and damage the ecosystem
IUCN	International Union for the Conservation of Nature. Composed of government and civil organisations, it harnesses the experience of its member organisations and the input of 16,000 experts to render advice and is the global authority on the status of the natural world
NCA	<i>Nature Conservation Act 1992</i> —Queensland legislation that provides the basis for the conservation of nature through the dedication, declaration and management of protected areas and the protection of native wildlife and its habitat
Outstanding Universal Value	Cultural and/or natural significance which is so exceptional as to transcend national boundaries and to be of common importance for present and future generations of all humanity. As such, the permanent protection of this heritage is of the highest importance to the international community as a whole

Term	Definition
Rainforest Aboriginal Peoples	Used by the Authority to refer specifically to Traditional Custodians of the Wet Tropics of Queensland World Heritage Area and includes at least 20 Rainforest Aboriginal groups. However, the Authority recognises that Rainforest Aboriginal Peoples may identify themselves at local, state, national and international scale using a diversity of terms. These include but are not limited to: clan groups, tribal groups, language groups, Bama, Traditional Custodians, Traditional Owners, First Nations Peoples, First Peoples, Native Title holders and common law holders
RNTBC	Registered Native Title Body Corporate. When a Native Title determination is made by the Federal Court, the <i>Native Title Act 1993</i> requires Traditional Owners to establish a corporation to represent them and their interests
Refugia	A location that supports an isolated or relict population of a previously more widespread species. Isolation can be caused by climatic or geological change, or human activities such as land clearing
Sclerophyll	A type of vegetation adapted to long periods of heat and low rainfall. In Australia sclerophyll forest is typically dominated by eucalypts
Taxon	A division of animal or plant species between kingdom and subspecies
UNESCO	United Nations Educational, Scientific and Cultural Organisation
Wet Tropics bioregion	The primary level of the biological classification, bioregions are geographically distinct areas of land with common characteristics such as geology, landform patterns, climate, ecological features and plant and animal communities. The Wet Tropics bioregion is one of 89 distinct bioregions within Australia.
WTWHA	Wet Tropics World Heritage Area

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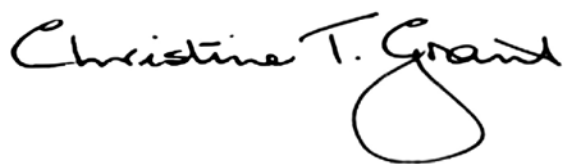
Message from the Chair

In July 2024, the Wentworth Group of Concerned Scientists released their Blueprint to Repair Australia's Landscapes. The report highlighted the fact that despite significant actions undertaken to improve the health of Australian landscapes, environmental conditions in many areas continue to decline. This is true in the Wet Tropics, where the International Union for the Conservation of Nature's (IUCN) Outlook reports have flagged the values that underpin its World Heritage listing as being of significant concern. Both organisations agree that urgent, coordinated investment and action is needed to build the landscape resilience required to prepare for unprecedented changes in climate that are already being felt.

The Wet Tropics World Heritage Area (the Area) is the second most irreplaceable World Heritage property on Earth, with globally significant cultural, scientific, conservation and economic value. Climate change is the most significant threat to the Area's values, exacerbated by a range of increasing pressures including invasive species, and these pressures continue to build. The IUCN Outlook Report 2020 for the Area identified a deteriorating trend in the state of three of the four criteria underpinning the Area's Outstanding Universal Value. Aligned with the recommendations of both the IUCN report and the Wentworth Group of Concerned Scientists report, investment and action commensurate with the threats posed to the Area are urgently needed. This includes a significant increase in on-ground management and restoration, as well as funded research to inform better management practice. Without urgent action, declines in the values the Area is listed for, both internationally and nationally, are imminent, and more extinctions of endangered species are becoming highly likely.

On 13 December 2023, Tropical Cyclone Jasper crossed the far north Queensland coast in the northern part of the Area near the township of Wujal Wujal. The system's persistent heavy rainfall soaked already saturated catchments, resulting in devastating and widespread flooding. The social, environmental and economic impacts of this event are still being felt and are likely to be impacting the area for many years to come. This event brings into focus the predicted impacts of climate change on the region, and to the Area.

This State of Wet Tropics report describes the values that the area is World Heritage listed for and provides a summary of the current status drawn from recent information. The report specifically considers each of the main threats to the integrity of the Area, and provides a snapshot of the current management efforts underway by both the Wet Tropics Management Authority and its partners, including Rainforest Aboriginal Peoples, government agencies, NRM organisations, landowners and managers, community groups, the tourism, agriculture and conservation sectors, and research organisations. Despite these ongoing efforts, the growing risks continue to outpace conservation actions. A collaborative effort between government, First Nations Peoples, industry, property managers, researchers, and community is required to ensure that the Area's natural, cultural, economic, and scenic values are protected for future generations.



Ms Christine Grant

Chair, Wet Tropics Management Authority Board

Executive summary

The purpose of this State of Wet Tropics 2023–24 report is to provide a review of the condition of attributes that support the World Heritage values of the Wet Tropics of Queensland World Heritage Area (the Area)—a globally significant region, with enormous biological diversity, which is home to one of the world’s oldest living cultures and is also a significant economic resource.

This report is based on the pressure–state–response model developed by the Organisation for Economic Cooperation and Development. It presents the condition of the Area based on available data sources and assessments, outlines influencing factors, describes management responses to date, and offers priorities for action to reduce or mitigate pressures and maintain the integrity of the Area into the future.

World Heritage values

Since World Heritage listing of the Area in 1988, management actions have demonstrated many positive outcomes but threats to the Area’s long-term outlook are escalating. Several of the attributes that support its World Heritage values are deteriorating and at significant risk, particularly due to extrinsic or complex threats such as climate change. Further action to protect these values is urgently needed.

Rescue and recovery of the Area’s at-risk ecosystems, species, and ultimately its World Heritage values is still possible—it will require a targeted and appropriately resourced effort, immediate action on climate change impacts and other pressures, and strong collaboration at all levels.

State

The 2020 IUCN conservation outlook assessment of the Area rated it overall as of significant concern. Of the four criteria that describe the Area’s World Heritage values, only the attributes supporting one—superlative natural beauty—are assessed as stable.

The attributes supporting the other three—including the Area’s unique rainforest systems—are assessed as deteriorating and of high concern.

While the important lineages of plants and animals relevant to the Area’s Outstanding Universal Value are in many cases still preserved, the prognosis for some species and groups—particularly endemic and threatened species—is poor without urgent action.

These concerning findings corroborate the trends documented in past State of Wet Tropics reports and reflect the compounding and urgent pressures on the Area’s values.

Pressure

Pressures on the integrity of the Area and its World Heritage values include:

- climate change
- invasive species
- clearing, fragmentation and habitat degradation
- altered fire and hydrological regimes
- industry, infrastructure and development
- population increase and unsustainable use.

Of these, climate change is recognised as the greatest long-term threat to the Area’s integrity.

Response

For more than three decades, the Wet Tropics Management Authority (the Authority) has been responsible for delivering the protection, conservation, presentation, rehabilitation and transmission to future generations of the Wet Tropics of Queensland World Heritage Area, fulfilling the Australian Government's obligations under the World Heritage Convention.

The Authority operates through a partnership approach—working with Rainforest Aboriginal Peoples, a range of government agencies, land managers, including NRM groups, research organisations, community groups, and the tourism, agriculture and conservation sectors.

While the resulting work delivers outsized conservation achievements, the risks to the Area's World Heritage values and to its long-term integrity are outpacing efforts, mainly due to current resourcing not being commensurate with the level of threat. Improved resourcing, targeted at effective management, research and monitoring is urgently needed to continue to fulfil Australia's obligations under World Heritage legislation.

Future priority actions

The range and scale of current actions is not enough to address the significant and complex threats to the Area and its World Heritage values. This report identifies the following priority areas as critical:

- **A concerted collaborative response to climate change impacts.** Climate Change is the most significant threat to the Wet Tropics World Heritage Area, and the response needs to be multi-faceted and include targeted research, monitoring, investment in adaptation and innovative actions, as well as advocacy for mitigation. A coordinated and targeted response is required, with the active participation of government, First Nations Peoples, industry, property managers, researchers and community. This approach requires investment to support research, adaptation actions, and increase Indigenous participation in management and solution design.
- **First Nations-led management.** Advocacy for and support of partners to secure long-term funding for Indigenous ranger programs to care for Country within the Area, including the expansion of ranger programs. The involvement of Rainforest Aboriginal Peoples and the application of traditional ecological knowledge in the management of this culturally significant landscape is crucial.
- **Biosecurity response.** Review and prioritisation of critical biosecurity threats for local and regional action, and continuation of the Authority's work to eradicate invasive yellow crazy ants in the Area.
- **Upland rainforest resilience.** Planning and support for the resilience of ecological communities through immediate on-ground actions that address the pressures on species dependent on cool upland habitats threatened by climate change—rapid action is necessary to protect refugia, enhance landscape connectivity, and avoid extinctions.
- **Rehabilitation and restoration.** Proactive restoration efforts to restore and enhance critical habitat and improve condition of degraded landscapes across the diverse Wet Tropics bioregion, with a priority focus on climate refugia. This work is needed to connect fragmented habitats, support regional climate resilience, and underpin a wide range of broader benefits including reef water quality.

1. Introduction and **profile** of the Wet Tropics



1. Introduction and profile of the Wet Tropics

About this report

The Wet Tropics World Heritage Area (the Area) features many attributes that support the four criteria it was World Heritage-listed for. Some of these attributes relate to more than one criterion.¹

Based on the pressure–state–response model developed by the Organisation for Economic Cooperation and Development, this report examines the condition of the attributes of the Area’s World Heritage-listed natural values—while considering other values, which are intrinsically connected to the natural values—and the pressures that impact their integrity.² It describes management responses to date, and outlines opportunities for action to mitigate pressures and reduce impacts into the future.

The report draws on existing datasets—primary sources include the Wet Tropics of Queensland 2020 Conservation Outlook Assessment, data provided by the Wet Tropics Management Authority for the UNESCO Periodic Reporting process, and a range of key publications referenced throughout this report. It is limited in scope in some areas as information gaps were not able to be addressed.

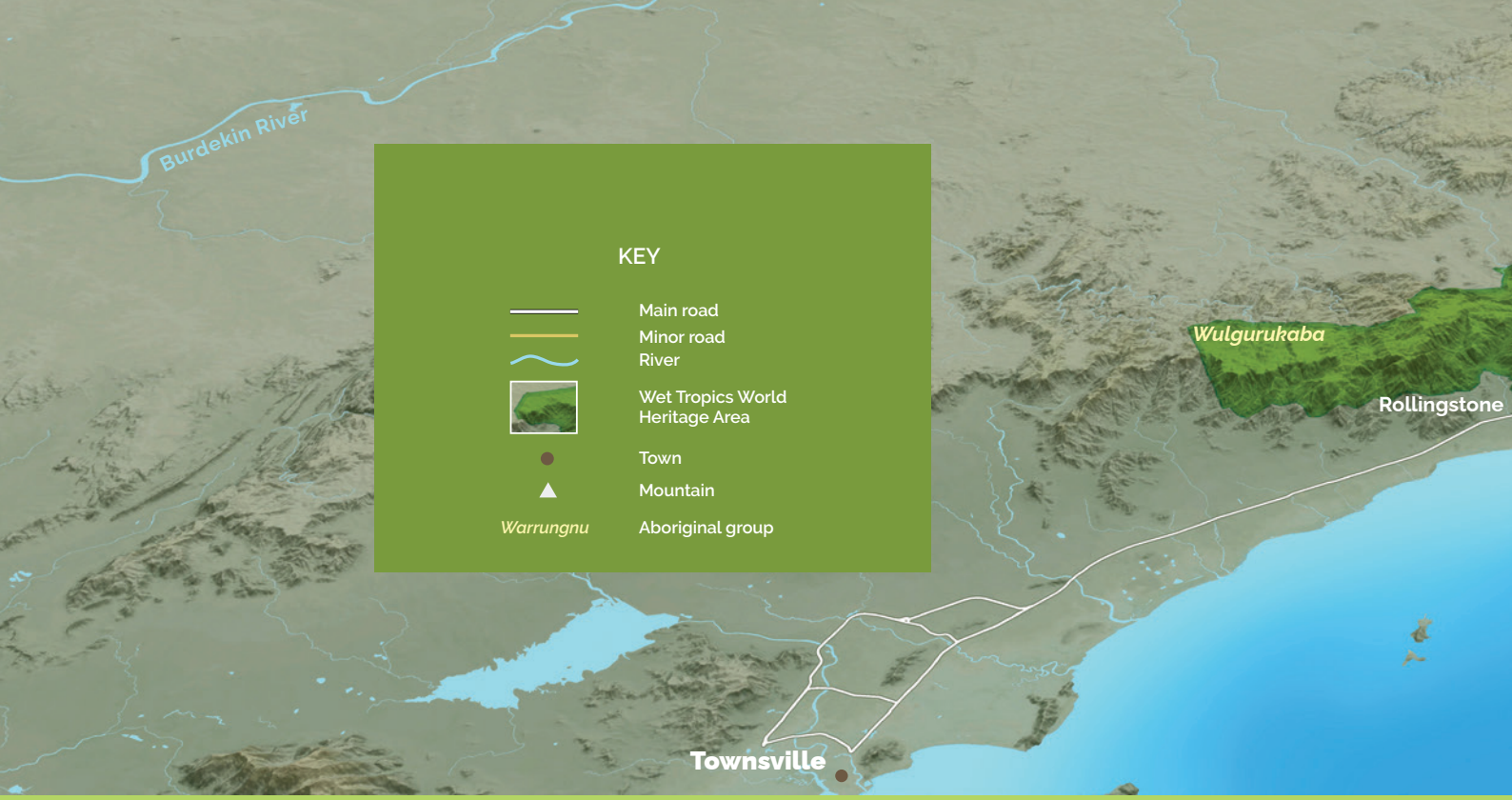
Significance and importance of the Wet Tropics

The Area is globally renowned for its biological diversity and spectacular scenery, and is World Heritage listed for its natural values.³ But there is much more that makes it special, including its remarkable Indigenous heritage.⁴ Its proximity to the Great Barrier Reef makes the Wet Tropics region incredibly rich in recreational opportunities and together the rainforest and reef support the more than \$4.7 billion-dollar tourism industry of Tropical North Queensland.⁵ The region is seen as a desirable place to live, visit and invest in.⁶

Natural values

The Wet Tropics of Queensland was inscribed on the World Heritage List on 9 December 1988, having met all four natural criteria for inclusion on the World Heritage List:

- ***Criterion (vii)—contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance***
- ***Criterion (viii)—be an outstanding example representing major stages of earth’s history, including the record of life***
- ***Criterion (ix)—be an outstanding example representing significant on-going evolution and development of ecosystems and communities of plants and animals***
- ***Criterion (x)—contain the most important and significant natural habitats for conservation of biodiversity, including threatened species of Outstanding Universal Value.***



Outstanding Universal Value

Outstanding Universal Value means that a place is exceptionally important for the whole world—this is the central concept of listing under the World Heritage Convention.

The Area's Statement of Outstanding Universal Value—adopted by the World Heritage Committee in 2012—summarises the significance of the Wet Tropics:

The Wet Tropics of Queensland stretches along the northeast coast of Australia for some 450 kilometres. Encompassing some 894,420 hectares of mostly tropical rainforest, this stunningly beautiful area is extremely important for its rich and unique biodiversity. It presents an unparalleled record of the ecological and evolutionary processes that shaped the flora and fauna of Australia, containing the relicts of the great Gondwanan forest that covered Australia and part of Antarctica 50 to 100 million years ago. All of Australia's unique marsupials and most of its other animals originated in rainforest ecosystems, and their closest surviving relatives occur in the Wet Tropics. These living relicts of the Gondwanan era and their subsequent diversification provide unique insights to the process of evolution. They also provide important information for the interpretation of plants and animal fossils of plants and animals found elsewhere in Australia, and about the evolution of Australia's sclerophyll flora and marsupial fauna in particular.

The property supports tropical rainforests at their latitudinal and climatic limits, and unlike most other seasonal tropical evergreen equatorial forests, is subject to a dry season and to frequent cyclonic events. Many of the distinct features of the Wet Tropics relate to its extremely high but seasonal rainfall, diverse terrain and steep environmental gradients. In addition to its complex array of species and life forms, the Wet Tropics is also recognised as an area possessing outstanding scenic features, natural beauty and magnificent sweeping landscapes.⁷

Cultural values

The Wet Tropics is Rainforest Aboriginal Country

Rainforest Aboriginal Peoples have lived continuously in the rainforests of the Wet Tropics for many thousands of years, and this is the only place in Australia where Aboriginal people permanently inhabited a tropical rainforest environment.⁸ As one of the world's oldest living and evolving cultures—with inherent rights regarding their cultural values, lores and customs, and traditional knowledge and practices—Rainforest Aboriginal Peoples have unique traditions that are deeply entwined with the Area's



natural values. The Area is a profound biocultural landscape that Rainforest Aboriginal Peoples hold various custodial responsibilities for and rights to.⁹

For Rainforest Aboriginal Peoples, connection to Country means ongoing responsibility for caring for Country in all its different dynamics—a responsibility for, and involvement in, the maintenance of its cultural significance, sacred sites, and cultural heritage both now and for all future generations of Rainforest Aboriginal Peoples.¹⁰

Today, there are more than 20 Rainforest Aboriginal groups in the Area, and they continue to embed traditional knowledge with contemporary management practices. Equitable and culturally appropriate processes for including Rainforest Aboriginal Peoples' traditional ecological knowledge are vital to ensure successful cooperative management of the Wet Tropics.¹¹

Map 1 . Rainforest Aboriginal groups of the Wet Tropics





Heritage listing

Although a 1986 report funded by the Australian Heritage Commission on the potential for World Heritage listing of the Area (which ultimately formed the basis of the nomination) stated that ‘the oral pre-history of this surviving Aboriginal rainforest culture is the oldest known for any non-literate indigenous people’, it was decided that Indigenous cultural values were not to be included in the World Heritage nomination.¹² This was partially due to the fact that, at the time, Rainforest Aboriginal groups were divided between those who supported the listing because of the strong links between cultural maintenance and rainforest protection, and those who opposed it as a limitation on their rights.¹³

While Wet Tropics’ World Heritage listing does not include its Indigenous cultural values, the Area’s National Heritage listing was expanded in 2012 to incorporate them.¹⁴ This recognises that Rainforest Aboriginal heritage is unique to the Wet Tropics and is a remarkable and continuous Indigenous connection with a tropical rainforest environment. The distinctiveness of the traditions and technical innovation and expertise needed to process and prepare toxic plants as food and the use of fire were also recognised as an outstanding heritage value to the nation.¹⁵

The national listing is significant, but there are growing calls to ensure recognition, respect and protection for the rights of Indigenous Peoples, their heritage, and their traditional role as custodians in many World Heritage sites currently listed only for natural values, such as the Wet Tropics.

The Authority’s Chair Ms Christine Grant provided a verbal report to UNESCO’s World Heritage Committee in July 2024 about an expert workshop (organised by the International Indigenous Peoples Forum on World Heritage) on ‘Recognising and Respecting Indigenous Peoples’ Heritage Values in World Heritage Sites’:

We know that the majority of World Heritage sites in Indigenous Peoples’ territories are designated as purely “natural sites,” without any recognition of Indigenous Peoples’ heritage values and their relationship to the land in the justification for inscription in the Statement of OUV, and in disregard of the fact that “for Indigenous Peoples, cultural and natural values are inseparably interwoven and should be managed and protected in a holistic manner.”

It is well documented that where Indigenous Peoples’ perspectives, cultural values and customary roles are not recognised and reflected when the OUV of a site is defined, their role in site management and decision-making is diminished. In this way, their customary rights to their ancestral lands, territories, and resources are being violated’.



Participants at the 2023 Rainforest Aboriginal Peoples' Regional Forum in Cairns endorsed exploring means of recognising Rainforest Aboriginal Peoples' heritage values in the Wet Tropics Statement of Outstanding Universal Value.¹⁶

Social connection

Article 5(a) of the World Heritage Convention requires signatory countries to give their cultural and natural heritage a function in the life of the community. In addition to its intrinsic connection to Rainforest Aboriginal culture, the Area is important for the broader community, whether through culture, recreation, employment, education or simply the quality of life that comes from living in such an environmentally significant and aesthetically enjoyable place.¹⁷

Almost 500,000 people live in or within 50km of the Area, and the Area has tremendous importance to those residents as well as the visitor community through intrinsic cultural and spiritual values, and recreational, educational, and physical wellbeing benefits.

Ecosystem goods and services

Ecosystem services contribute to human wellbeing and quality of life, through the provision of benefits that are often taken for granted such as clean air, clean water, and heat and flood mitigation. The forests and ecosystems of the Area provide these and many other benefits that support surrounding local communities. Ecosystems also 'provide cultural services through the facilitation of cultural opportunities and experiences, which in turn provide human and community well-being and cultural benefits' such as belonging, inspiration, and attachment to place.^{18, 19}

Tools to measure and value these often non-market-integrated processes are limited, but these 'non-market ecosystem services' are fundamental to our social and economic survival and wellbeing.²⁰



Figure 1. Examples of some environmental values and services provided by the Wet Tropics World Heritage Area, as they apply to human and community wellbeing

Environmental values and services

Supporting/Processes

- biodiversity
- habitats and refugia
- soil formation and fertility
- pollination
- nutrient recycling
- genetic resources
- fire regimes
- water cycles
- biomass production

Social/Economic/Cultural

- aesthetics
- regional identity
- social value to community
- economic value to community
- traditional connection to country and rights

Provisioning

- energy (hydro/solar/wind)
- water
- clean air
- carbon sequestration
- cloud stripping
- food

Regulating

- regional and micro climates
- flood mitigation
- water purification
- erosion control
- groundwater recharge
- waste treatment
- energy conversion
- pest control

Human and community wellbeing

Quality of Life/Health

- recreation
- exercise in natural settings
- water quality
- access to clean air
- historic values
- art and craft materials
- human-wildlife interaction
- pharmaceutical and biological products

Social Cooperation/Cohesion/Identity

- sense of place
- formation of new groups/networks
- types of cooperation
- governance arrangements
- collective pride

Security

- secure resource access
- security from disasters
- maintaining options for the future
- shade and shelter

Tourism

- attraction to area
- economic revenues
- generation of employment
- employment for Traditional Owners

Education/Research

- living laboratory
- scientific discovery
- knowledge generation
- environmental awareness
- and education

Spiritual/Customary

- cultural values
- customary practices
- spiritual significance
- conservation and management of important traditional areas



Economic contribution

Natural resources and a healthy environment are the foundation of the region's livelihoods. Agriculture—including sugar cane cropping, tropical fruit production, dairying and grazing—generates more than \$1.62 billion annually in the region.²¹

World Heritage-related tourism also generates significant economic value. Synergies between the Wet Tropics and adjacent Great Barrier Reef make Tropical North Queensland one of Australia's premier international and domestic tourism destinations.

Tourism and visitation

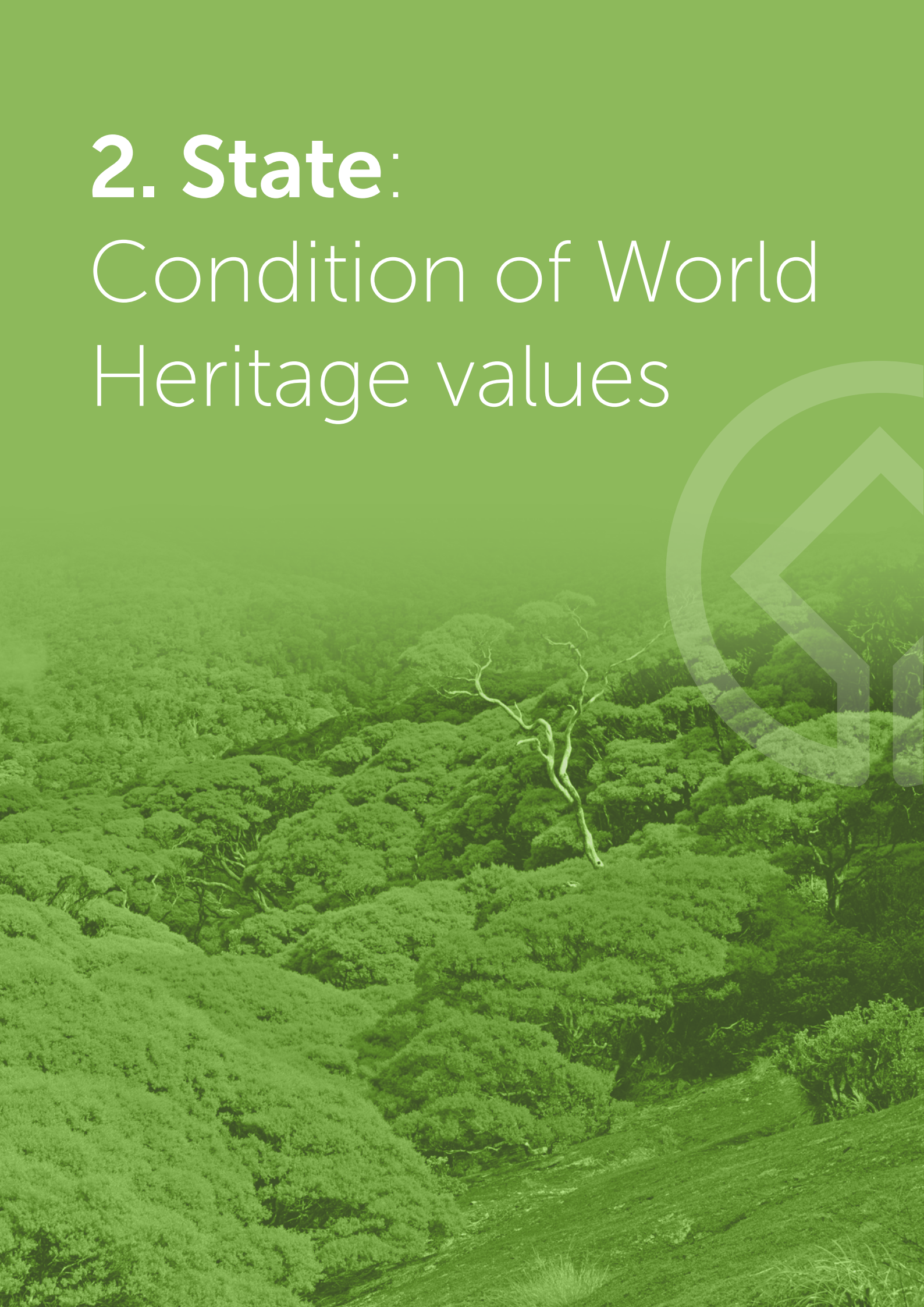
As predicted by many supporters for World Heritage listing, since 1988 the growth in tourism has more than offset the economic impacts incurred by the cessation of logging, though, it must be acknowledged that tourism was not an alternative for some individuals and communities previously dependent on the timber industry, and for these people the transition was extremely difficult.^{22, 23}

Today, more than 90% of tropical north Queensland residents regard tourism positively, and the region is one of Australia's most popular holiday destinations with more than six million tourist visits annually—80% of visitors are domestic travellers and 20% are international, which is Australia's highest proportion of international visitors.^{6, 24} Due to its heavy reliance on interstate and international tourism, the Wet Tropics economy was one of Australia's most severely affected by the global COVID-19 pandemic.²⁵ More recently Tropical Cyclone Jasper and associated flooding events restricted tourism again in December 2023, mainly in the region's north.

In the year ending in March 2024, there was an overall decrease of 11% in domestic visitor expenditure from the previous year's totals, to \$3.8 billion—still the third highest economic contribution due to tourism of Queensland's regions.²⁴ During the same period, international visitation continued post-COVID recovery, with overnight expenditure reaching around \$900 million, or 87% of the 2019 total.

2. State:

Condition of World
Heritage values



2. State: Condition of World Heritage values

The Wet Tropics World Heritage Area (the Area) was World Heritage listed for its natural values, and there are numerous attributes that support these, many of which relate to more than one of the four listing criteria. For the purpose of this report, the condition of key ecological and aesthetic attributes has been examined (partially aligned with the IUCN's 2020 Conservation Outlook Assessment) while considering past, present and potential pressures on their integrity.

Integrity is defined by UNESCO as 'a measure of the completeness or intactness of the attributes that convey Outstanding Universal Value', with specific conditions of integrity related to each World Heritage criterion. This report considers the integrity of the attributes that support World Heritage values rather than the broader integrity of the property as a whole.

World Heritage outlook

The IUCN's World Heritage Outlook reporting indicates whether a natural World Heritage site is likely to conserve its Outstanding Universal Value over time. In 2014, 2017 and most recently 2020, the Wet Tropics of Queensland World Heritage Area was assessed as being of 'significant concern'.²⁶

If a property's conservation outlook is of significant concern, its values are considered threatened by a number of current or potential pressures, and significant additional conservation measures are required to preserve these values over the medium to long term.

In the IUCN's 2020 report, of the Area's World Heritage values, three of the four World Heritage Criteria were assessed to be in decline and of high concern (see Table 1).

Table 1. IUCN 2020 Conservation Outlook Assessment—State and trend of values

World Heritage Criteria	Status	Conservation Outlook
Superlative natural beauty	Good	Stable
Living examples of ancient and primitive rainforest species	High concern	Deteriorating
Unique rainforest ecosystems	High concern	Deteriorating
Exceptional biodiversity	High concern	Deteriorating

The IUCN's next Outlook report is expected in 2025. However, the Authority's annual State of Wet Tropics reports, evidence cited in this report and long-term monitoring of a range of species have confirmed that these declining trends are expected to continue.²⁷

Broadly, while many of the attributes that support the Area's World Heritage values remain preserved, they are under pressure from a range of compounding and often synergistic threats, and several are deteriorating quickly.^{11, 26} Escalation of management interventions is needed to preserve these values for future generations.

Historical context

At the time of its inscription in 1988, the Wet Tropics of Queensland World Heritage Area was identified as ‘an essentially intact ecosystem exhibiting a low level of human impact, despite past clearing and logging and pressures from infrastructure and invasive species’.³

From European settlement until World Heritage listing, logging was widespread across the Wet Tropics. However, much of the Area’s steep terrain made it inaccessible, so a large proportion of forest cover remained.

While only accounting for a small proportion of the Area, several disturbances detracting from its natural integrity were scattered throughout the property, including transmission lines, access roads, mine sites and more extensive selectively-logged areas.³

Clearings totalled 7,538 hectares, mostly associated with community infrastructure and the timber and mining industries, and also associated with artificial dams or edge clearings included in Area bounds for logistical reasons.²⁸ These clearings affected the Area’s natural integrity through internal fragmentation and edge effects.

Other disturbances to integrity included incursions by exotic plants, animals and diseases. At the time of listing, invasive pests such as feral pigs (*Sus scrofa*) were well established and more than 300 weed species were known to be present in the Area.^{29, 30}

Attributes that support World Heritage values

Superlative natural beauty

Criterion (vii)

Status

The Wet Tropics region is renowned worldwide for exceptional natural beauty. Its landscapes are highlighted by sweeping forest vistas, mountain peaks, wild rivers, waterfalls, rugged gorges, and coastal views.

Despite the fragmented nature of the Area and increased internal and external pressures on its scenic values, it still presents aesthetics of international renown.

KEY PRESSURES:

- Climate change
- Industry, infrastructure and development

Aesthetic value is the least explicitly defined component of the Area’s Outstanding Universal Value, due to the complexity of the many philosophical concepts of cultural and natural beauty. It is almost always associated with appreciation of the large-scale grandeur of a landscape. But other characteristics—such as species diversity and abundance; the contrast of plants, animals, shapes, colours and features; even the impression of solitude—can influence the perception of aesthetic values.³¹

Forest vistas and mountain peaks

The Area’s aesthetic values are exemplified by its rainforest-cloaked mountain scenery with extensive vistas of undisturbed forest.

In some areas, conspicuous infrastructure features such as telecommunications towers interrupt the Area’s sweeping landscapes. Currently, 29 communication tower sites are maintained (by several service providers) within the Area, with associated infrastructure such as access tracks. These can have a visual impact on the Area’s aesthetic values, whether viewed from in or outside the Area.³²

Wild rivers, waterfalls, rugged gorges

Spectacular waterfalls abound in the Wet Tropics landscape due to the region's high rainfall and rugged topography. While the aesthetic values of the Area's waterways are largely preserved, there has been a loss of native bank-stabilising vegetation in some areas due to the invasion of introduced weeds and plant pathogens which contributes to reduced water quality and clarity.^{33, 34}

In late 2023, intense flooding following Tropical Cyclone Jasper caused significant scouring along waterways in the northern part of the Area, heavily damaging vegetation.



With a 278m drop, Wallaman Falls is the longest single drop waterfall in Australia.
Wallaman Falls, Warrgamay Country—Wet Tropics Images

Coastal scenery

Along most of the region's coastline, exceptional coastal scenery combines tropical rainforest, mangrove forests and sandy beaches.

The region's mangrove forests provide a continuum between the terrestrial rainforest and the Great Barrier Reef. In the Wet Tropics, mangrove habitat has maintained more of its original extent than many other plant communities because mangroves are not as easily converted to agricultural or residential use.³⁴

The magnificent coastline, particularly between the Daintree River and Cedar Bay, was scarred by several landslips caused by post-Tropical Cyclone Jasper flooding in late 2023. Significant work is underway to repair damaged infrastructure and this may further impact on visual amenity.



Cyclone Jasper damage. Coastal cyclone damage at Gap Creek, Eastern Kuku Yalanji Country in the aftermath of Tropical Cyclone Jasper-associated flooding in late 2023—Wet Tropics Images/Paul Curtis

High biodiversity and biological evolution

Criteria (vii), (viii), (ix), (x)

Status

World Heritage listing and subsequent management has contributed to protection and, in some instances, enhancement of critical aspects of the Area's biodiversity. Certain pressures have proven beyond management capacity to effectively address—particularly complex, global threats such as climate change.¹¹

A number of species considered secure at the time of World Heritage listing—notably endemic rainforest frogs, ringtail possums, high-altitude birds, and plants in the family Myrtaceae—have declined and continue to face significant and compounding threats.^{27, 35} A number of Wet Tropics species are already classified as extinct in the wild under both the NCA and EPBC Act.¹¹

Detailed information regarding the conservation status for Wet Tropics ancient, endemic and threatened species can be found under Table 2 ('Ancient and endemic plants') and Table 3 ('Ancient and endemic animals').

Significant external pressures are impacting, and will continue to affect, the Area's biodiversity. While the attributes that support the Area's World Heritage values are still present, they are under serious threat from accumulating and synergistic threats. Proactive, coordinated and broad management actions are needed to preserve the Area's biodiversity.

KEY PRESSURES:

- Climate change
- Invasive species
- Clearing, fragmentation and habitat degradation
- Altered fire and hydrological regimes

Despite comprising just 0.12% of the continent, the Area contains a large proportion of Australia's biodiversity.³⁶ The major influences on this diversity and these species' distributions were the fluctuating size of rainforest refugia during the last 2.5 million years and the region's diversity of geology, elevation and topography, rainfall, fire, and disturbance history.¹ Together these factors have shaped a diverse array of habitats and ecological communities that support outstanding biodiversity.

The Area provides the most important or only habitat for numerous species of global significance.¹¹ These plants, animals and ecosystems are an important part of both the Area's and Australia's natural and cultural heritage. Generally, the species and ecosystems that contribute most to the Area's Outstanding Universal Value are ancient, endemic, threatened and/or rare.¹ The Wet Tropics contains high proportions of these vulnerable species and communities, and protection of the Area has contributed to preservation and regeneration of some of them. For example, the World Heritage listing has provided a level of habitat protection and recovery within the Area for the southern cassowary (*Casuarius casuarius johnsonii*)—a culturally, ecologically and economically significant keystone species. The protected habitat, as well as a range of other concerted management actions, has appeared to have halted declines in populations.^{11a}

Research over preceding decades has contributed to a rich, regional-scale body of biodiversity knowledge—adding even more value to the Area and supporting policy and management decisions. More Rainforest Aboriginal Peoples' traditional knowledge is slowly being integrated into biodiversity and land management programs with strong and positive results, particularly in the face of the challenges of drought, fire and climate change.¹¹



Southern cassowary—Wet Tropics Images/Steven Nowakowski

Exceptional high levels of diversity

The Area is recognised as one of Earth's 36 biodiversity hotspots.³⁷ While the flora and fauna of the Area exhibit high species diversity, they also display very high phylogenetic (evolutionary) diversity, particularly in the plants.³⁸



**The Wet Tropics
World Heritage
Area Covers**

0.12%
of Australia

3,300+ plant species including **700+** endemic species

700+ vertebrate species including **88** endemic species

30% of Australia's marsupial species and **48%** of bat species

45% of Australia's bird species and **60%** of Australia's butterfly species

25% of Australia's frog species

41% of Australia's freshwater fish species

65% of Australia's fern species and **30%** of Australia's orchids

16% of Queensland's critically endangered plant species

15 of the world's **26** ancient lineages of flowering plants, the highest concentration in a single protected area on Earth.

Habitat for rare and threatened species

The diversity of the Wet Tropics is characterised by a very high proportion of species exhibiting small population size and restricted distributions, and a high proportion of restricted-range regional ecosystems of small spatial extent, relative to the rest of Queensland.

These traits—a result of the unique biogeographical processes that shaped the region's biodiversity and the legacy of past clearing in the region—render these species and communities naturally rare and inherently vulnerable, despite legislative protection.¹

The Wet Tropics is home to 31% of Queensland's plant species of conservation significance—including 16% of Queensland's critically endangered plants—and 25% of its vertebrate fauna have conservation significance.³⁹ Of the Wet Tropics region's 210 regional ecosystems, 153 (73%) are considered of concern or endangered.

Unique biogeographical processes

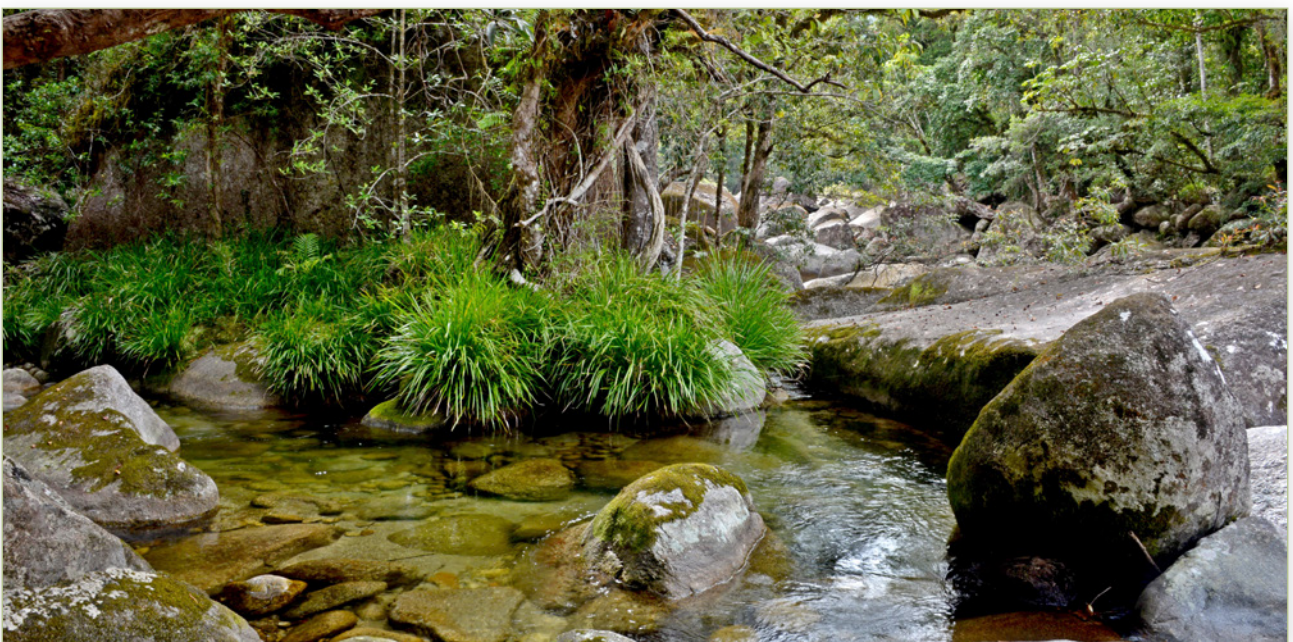
Before Australia separated from Antarctica some 30 million years ago, its vegetation was dominated by cool-adapted rainforest. Australia's subsequent northward drift coincided with drying of the Australian continent, causing the contraction of rainforest into refugia along the eastern coast and ranges.⁴⁰

These refugial rainforests then expanded and contracted during glacial fluctuations, remaining stable only in the cool uplands and a handful of ever-wet gorges and valleys. Australia's remaining rainforest fragments have persisted to today, maintaining populations of plants and animals that represent the ancient Gondwanan flora and fauna in isolated locations.¹

Because of this history, many of the region's endemic species—formerly common in widespread rainforests of the ancient past—are now restricted to upland rainforest refugia and a few humid, fireproof lowland refugia.¹

The Wet Tropics contains a unique record of the mixing of Asian and Australian animals and plants when continental plates collided (but did not form land bridges) 15 million years ago. Many species from these lineages are now found only in the Wet Tropics (and also Cape York Peninsula in some cases), and they form another component of the region's rare and endemic flora and fauna.

The open, wet sclerophyll forests on the western margins of the Area are significant as part of an evolutionary continuum of rainforest and drier, fire-prone sclerophyll communities that now characterise much of Australia.³² While these wet sclerophyll forests occupy only a small proportion of the Area, they protect significant numbers of ancient, threatened, and endemic species.¹



Upper Mossman Gorge, Eastern Kuku Yalanji Country—Terry Carmichael

Ancient and endemic plants

Criteria (vii), (viii), (ix) and (x)

Status

Many of the Area’s plant species—particularly endemics—are naturally rare or otherwise of conservation concern. For some, there is insufficient data to conclusively demonstrate if these species’ condition or conservation status has changed since World Heritage listing.⁴¹

Because so little is known of the environmental requirements for many of the Area’s ancient and endemic plant species, their responses to current and future pressures are difficult to predict.⁹ However, in 2014, 13 of 19 montane endemic plants in the Area with sufficient monitoring data to assess were projected to be extinct by 2080. All the Area’s montane endemic plants were deemed likely to qualify as critically endangered under the IUCN Red List Criteria due to climate-driven habitat loss.⁴²

As of 2023, of the Area’s vascular plants alone, 314 species were classified under the NCA or EPBC Act as vulnerable, endangered or critically endangered, with a further 98 species listed as near threatened.

Serious impacts of diseases including myrtle rust (*Austropuccinia psidii*) and cinnamon fungus (*Phytophthora cinnamomi*) are already being documented, and more than 500 exotic weed species are established within the Area.^{30, 43, 44, 45, 46}

Overall, evidence demonstrates degradation of the elements necessary to maintain the integrity of values associated with the Area’s ancient and endemic plants.

KEY PRESSURES

- Climate change
- Invasive species
- Clearing, fragmentation and habitat degradation
- Changing fire and hydrologic regimes



Bartle Frere summit, Ngadjon-Jii Country—Terry Carmichael

The Area contains one of the most complete and diverse living records of the major stages in the evolution of land plants, from the very first land plants to highly evolved flowering plants.³

The Area conserves a largely intact flora of more than 4,300 species, with hundreds of locally endemic species restricted within its boundaries. It provides the only habitat for the most locally endemic, threatened, and ancient plants in Australia.

Amongst the vascular plants, the Area contains almost 60% of Australia's ferns and lycophytes (276 species), 3 of Australia's 4 cycad genera, and 6 out of 13 conifer genera.¹

The Wet Tropics contains one of the highest concentrations of species of ancient lineages of flowering plants in the world—a principal attribute for its World Heritage listing. Of the world's 28 near-basal families of flowering plants, 16 are found in the rainforests of the Wet Tropics. These groups constitute a living record of the evolutionary history of flowering plants.⁴⁷

The Austrobaileyaceae family is one of the most ancient of all flowering plant lineages. A Wet Tropics endemic, it is represented by just one living species, *Austrobaileya scandens*.

The extraordinary diversity observed in the Wet Tropics' flowering flora is not restricted to ancient lineages—50 species in the ecologically and culturally important genus *Syzygium* (of the Myrtaceae family) are found in the Wet Tropics, 23 of them regionally endemic.



Austrobaileya scandens—
Terry Carmichael

Table 2. Numbers of Wet Tropics species, by major taxonomic group, that are classified as threatened, that is as ancient, regionally endemic, or named as extinct in the wild, critically endangered, endangered, vulnerable, or near threatened under the Nature Conservation (Plants) Regulation 2020 (Qld) (NCR); or listed as the first four of those categories or conservation dependent under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth). Subspecies are excluded. Data current at 8 December 2023 when the Nature Conservation (Plants) Regulation 2020 was amended.

Group	Species representing ancient groups	Wet Tropics endemic species	Threatened (NCR)	Threatened (EPBC Act)
Ferns and lycophytes	326 (12 spp from primitive families, and 39 ancient true fern spp)+	45	50	16
Cycads and conifers	17 (All)	7	2	0
Angiosperms	183 (89 of these Wet Tropics endemics)	688	262	55
Total species	526+	740	314	71

The extraordinary richness and uniqueness of the Wet Tropics flora contributes not only to the natural values of the area, but also to the cultural and economic values. For Rainforest Aboriginal Peoples, rainforest plants provide food, fibre, medicine and shelter, and there are abundant records of the use (both historical and current) of the region's rare, ancient and endemic plants.³⁸ The threatened, ancient and endemic flora give the Area a unique identity that contributes to a thriving regional tourism industry. Future economic benefits may be also derived from horticultural or biodiscovery industries based on components of the Wet Tropics' floral biodiversity.

Connectivity of diverse landscapes

Lowland and upland refugia are both important for long-term conservation of ancient, endemic and threatened rainforest flora. Between these is a series of ‘notophyll vine forest’ rainforest communities—mostly occurring at mid-elevations and on the Atherton Tableland—which also support irreplaceable assemblages of ancient, endemic and threatened plant species. Additionally, several endemics are found only in woodlands and heathlands on the western edge of the bioregion.

Upland refugia have maintained populations of ancient Gondwanan rainforest flora through cycles of rainforest range expansion and contraction. Conversely, many current lowland rainforest refugia were colonised from a mixture of Gondwanan stock and South-east Asian lineages. Due to this biogeographic history, current refugial communities differ phylogenetically from one another—even those of the same habitat type.

Conservation of the integrity of the Wet Tropics’ unique and ancient flora is therefore contingent on protecting not just areas of high species diversity, but the entire network of these distinct assemblages across the Area and region.

Ancient and endemic animals

Criteria (vii), (viii), (ix) and (x)

Status

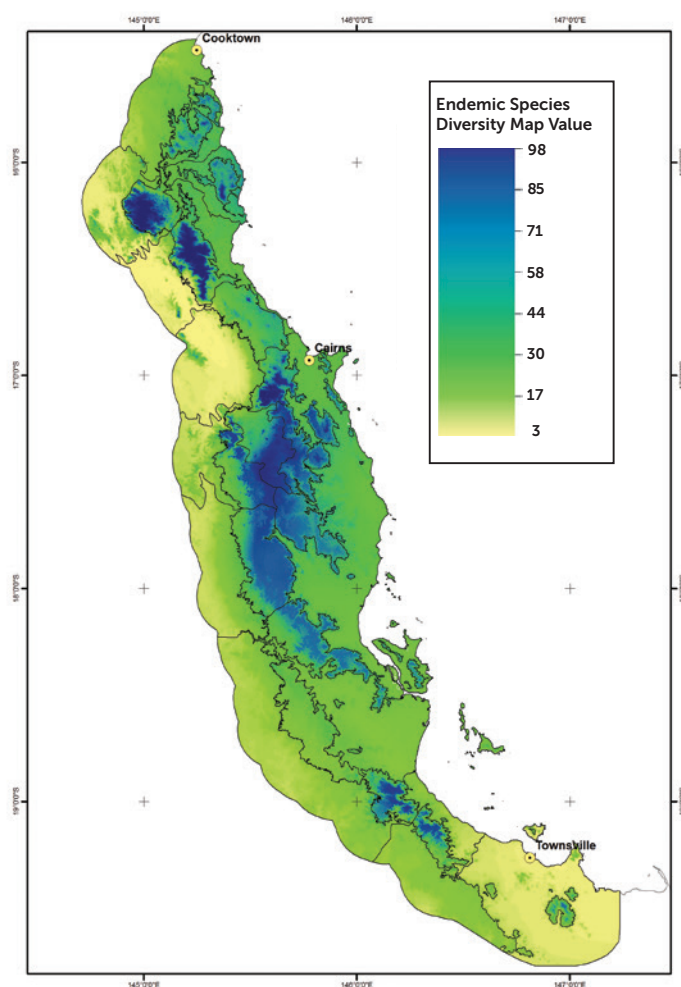
The fauna of the Wet Tropics displays outstanding levels of diversity and endemism, with species representing relics of evolutionary history and some of the world’s most rare and threatened species living only within the Area. Rainforest Aboriginal Peoples have special connections to species (some now extinct) through stories connecting the shaping of the landscapes to totemic significance that defines their lores and identity.

Due to historic, recent, and continuing pressures, habitats of many Wet Tropics animals are already fragmented and becoming more so. Steep declines in some species and groups have been documented since World Heritage listing.

The reduced ranges and specialised habitat requirements that characterise many rare, ancient and endemic animals of the region contribute to their vulnerability and (for some) current threatened status. Pressures are driven or exacerbated by a warming climate.^{1, 27, 35, 39, 48}

Overall, many of the Area’s ancient and endemic animal species supporting Outstanding Universal Value are declining and in serious and urgent danger.

Map 2. Endemic species diversity³⁹



KEY PRESSURES

- Climate change
- Invasive species
- Clearing, fragmentation and habitat degradation
- Changing fire and hydrologic regimes

As with Wet Tropics plants, many of the notable animal species have restricted ranges and specialised habitat requirements, and/or represent ancient Gondwanan lineages. Endemism is highest for taxa with low dispersal ability and for rainforest specialists, reflecting the history of the Wet Tropics' cool rainforest refugia.^{1, 49}

The Wet Tropics rainforests and their fauna provide one of the best examples globally to answer fundamental questions about the ecological processes driving the evolution of rainforest diversity because of the well-documented history of late Pleistocene rainforest contraction, the linear nature of separate refugia, and the many detailed genetic studies of the region's fauna.³⁹

Table 3. Numbers of Wet Tropics species, by major taxonomic group, that are classified as ancient, regionally endemic, or named as critically endangered, endangered, vulnerable, or near threatened under the Nature Conservation (Animals) Regulation 2020 (Qld) (NCR), under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth), or the IUCN Red List of Threatened Species. A code of 'D' denotes data-deficient groups for which assessment could not be completed. Data current at 8 December 2023 when the Nature Conservation (Animals) Regulation 2020 was amended.

Group	Ancient species	Endemic species	Threatened (NCR)	Threatened (EPBC Act)	Threatened (IUCN)
Invertebrates	D	D	2	1	D (36+)
Fish	D	12	4	3	7
Amphibians	5	31	18	14	14
Reptiles	51	32	16	3	6
Birds	47	12	10	6	15
Mammals	26	15	20	15	23
Total species	129+	102+	70	42+	98+

Climate change projections for the region are well-documented. More than 15 years ago, catastrophic impacts on Wet Tropics endemic vertebrates were predicted with the potential for nearly 50% of these species to lose the entire extent of their habitat over the coming decades.^{50, 51} Of the Area's endemic vertebrate species, the golden bowerbird and green ringtail possum are among those most vulnerable to climate change.^{52, 53}

High-elevation specialists, particularly those with low dispersal ability, have been the most impacted by climate-driven habitat loss. As temperatures and clouds rise and areas of suitable habitat contract, these species' ability to adapt by migrating is hampered by modified landscapes and natural geographic barriers.⁵⁴ Species already confined to the highest elevations have nowhere further to go and face an 'elevator to extinction', starkly illustrated by recent declines and range shifts among rainforest fauna.²⁷

The synergistic effects of warming and greater frequency of extreme heatwaves—both driven by climate change—are particularly dangerous to species with narrow thermal tolerances, such as the cool-adapted tropical ringtail possums.⁵³

These observations accord with trends predicted by past modelling of climate change and substantiate the grim predictions of catastrophic biodiversity loss by the end of the century.^{27, 50, 53}

Vertebrates

The Wet Tropics is home to ancient lineages of vertebrates representing important periods in the history of the evolution of Earth's vertebrate diversity after the break-up of the Gondwana supercontinent. Major Gondwanan groups of Australian vertebrates include songbirds, marsupials, myobatrachid frogs and pygopodoid lizards (legless geckoes).¹

Among the region's vertebrates are 33 species which are among the highest 10% most evolutionarily distinct taxa on Earth, including 18 species found only in the Wet Tropics.³⁹

Evolutionarily distinct species include the musky rat-kangaroo and green ringtail possum; the golden and tooth-billed bowerbirds, the southern cassowary, chowchilla and grey-headed robin; and the chameleon gecko and the Bartle Frere skink.



The Wet Tropics endemic green ringtail possum (*Pseudocheirops archeri*) does not have a den like other possums, and instead curls into a ball to sleep perched among tree branches—Wet Tropics Images/Steven Nowakowski



The golden bowerbird (*Amblyornis newtonianus*) lives only in upland Wet Tropics rainforests—Wet Tropics Images/Mike Trenerry



The chameleon gecko (*Carphodactylus laevis*) is the only representative of its genus and one of the world's most phylogenetically distinct vertebrates—Conrad Hoskin

Mammals

The Wet Tropics bioregion is home to 108 mammal species, 15 of which are endemic.³⁹

The ancestors of all of Australia's unique marsupials originated in rainforest ecosystems. Substantiating this, the Riversleigh fossil deposits—part of the Australian Fossil Mammal Sites World Heritage Area—are rich in marsupial fossils closely related to endemic marsupials living in the rainforests of the Wet Tropics today. These ancient mammal species are a living record of mammal evolution and the closest surviving equivalent of the prehistoric Oligo-Miocene epoch's rainforest marsupial fauna.¹

All four endemic Wet Tropics ringtail possums have experienced rapid population declines since 2010. The lemuroid ringtail possum (*Hemibelideus lemuroides*), now critically endangered, has lost nearly 70% of its population in little more than a decade.¹¹

Birds

The Wet Tropics contains 45% of Australia's total avian biodiversity, including ancient and relict lineages and many endemic species. Some Wet Tropics birds represent the sharing of groups between Asia and Australia when those continental plates collided in the distant past.

Nuclear DNA analysis has confirmed that the evolutionary origin of songbirds was in the parts of eastern Gondwana that are now Australia and New Guinea. The Area is the most important place for several lineages of songbirds, including the unusual bowerbirds—the only birds known to decorate their courting grounds.⁵⁵

The birds of the Wet Tropics have exhibited climate-driven declines and range shifts. In montane habitats, they respond to warming temperatures by shifting their geographical distributions upslope—an inherently limited strategy as suitable climatic envelopes contract. Such climate-driven changes are extensively documented: between 2000 and 2016, populations of upland bird species declined in abundance as their ranges contracted to higher elevations. Lowland birds expanded into upland habitat (although they remained vulnerable to heatwaves), homogenising formerly biodiverse communities. Concerningly, upland specialists and regionally endemic birds experienced 'dramatic population declines of almost 50%' over those 16 years.

Amphibians

Approximately 54 of Australia's 212 frog species are found in the Wet Tropics. The region is rich in ancient lineages and regional endemics, many of which rely on cool, upland rainforest habitat. Overall, a remarkable 50% of the region's frogs are endemic, and 4 recorded Wet Tropics frogs are among the top 5% most phylogenetically unique species on Earth. Several frog groups also demonstrate recent and ongoing evolutionary processes.

The critically endangered beautiful nursery-frog (*Cophixalus concinnus*)—this genus is a living example of ongoing evolutionary radiation, and this species is restricted to a single mountaintop in the Area¹.⁵⁶



The critically endangered beautiful nursery-frog (*Cophixalus concinnus*): this genus is a living example of ongoing evolutionary radiation—Conrad Hoskin

Frogs are one of the most vulnerable of all Wet Tropics vertebrate groups. At least eight species of frogs in the Area have suffered massive declines in recent decades and current evidence indicates that at least one third of the Wet Tropics endemic frog species are endangered.¹¹

The amphibian chytrid fungus (*Batrachochytrium dendrobatidis*) is implicated as the primary cause of recent extinctions and declines in Wet Tropics frogs.^{11, 39, 57, 58} Two of the most globally significant Wet Tropics frogs—the sharp snouted dayfrog (*Taudactylus acutirostris*) and the northern tinkerfrog (*Taudactylus rheophilus*)—are now both presumed extinct after the chytrid fungus ravaged their populations.^{11, 39}

Reptiles

The Wet Tropics is home to 23% percent of Australia’s reptiles (113 species). Approximately 20% (32 species) of the region’s reptiles are endemic—the highest endemism for reptiles in Australia. Two of the Wet Tropics’ reptile species are among the 10% most evolutionarily distinct taxa on Earth. Although many taxa in the region are Gondwanan-derived species, there is also evidence demonstrating recent and ongoing evolutionary processes—another important component of the Area’s Outstanding Universal Value.³⁹

Fish

The Area’s freshwater ecosystems support more than 130 native fish species and numerous aquatic invertebrates.^{34, 59, 60} While complete knowledge of the region’s freshwater biota is still developing, of the Area’s 12 (at least) endemic fish species, seven are considered threatened.³⁴

Nine exotic fish have become naturalised in the Wet Tropics, and replacement of native riparian vegetation by weeds continues to create barriers to fish passage and reduce and degrade habitat.^{34, 61, 62}

Invertebrates

The Wet Tropics is home to some of Australia’s most remarkable invertebrate diversity, including entire groups representing ancient Gondwanan invertebrate fauna.^{1, 63} The region’s vast and diverse invertebrate fauna remains not well known—new species are being described every year.

Ecosystems, communities and habitats

Criteria (ix) and (x)

Status

While World Heritage listing brought many of the diverse Wet Tropics ecosystems within the Area under stronger protection and recovery of disturbed areas has occurred, many ecosystems are under ongoing and increasing threats that in many cases are outside current management capacity to address.

The status of ecosystems is of high concern, and due to the impacts of climate change, invasive species, and habitat degradation, the trend continues to decline for a number of ecosystems including upland rainforest, wet sclerophyll and freshwater ecosystems.

KEY PRESSURES:

- Climate change
- Invasive species
- Changing fire regimes



Mountain tea tree 1,300 metres above sea level: Carbine Tableland, Western Yalanji Country—Terry Carmichael

The diversity of rainfall, terrain and geology in the Wet Tropics has contributed to equally diverse ecosystems, communities and habitats. While much of the Area is rainforest—which varies enormously in structure and appearance—the Area also contains significant sclerophyll forests, paperbark forests, wetlands, mangroves, heathlands, sedgeland, grasslands and rocky pavements.³

The Queensland Government has a classification system which identifies 1,459 ‘regional ecosystems’ across the State. Of the 210 regional ecosystems found within the Wet Tropics bioregion, 23 are considered endangered (having lost more than 90% of their pre-clearing extent) and 130 are considered of-concern. This is in part due to agricultural land clearing outside the Area’s boundary, a pressure compounded by the naturally restricted distributions of some vegetation communities.

The Australian Government’s EPBC Act identifies ‘threatened ecological communities’. Four of these occur in the Wet Tropics bioregion (see Table 4) and all four harbor species of conservation, scientific, and cultural significance, including threatened species.

Map 3: Richness mapping of regional ecosystem diversity—
Department of Environment
and Science, Queensland
Government 2019

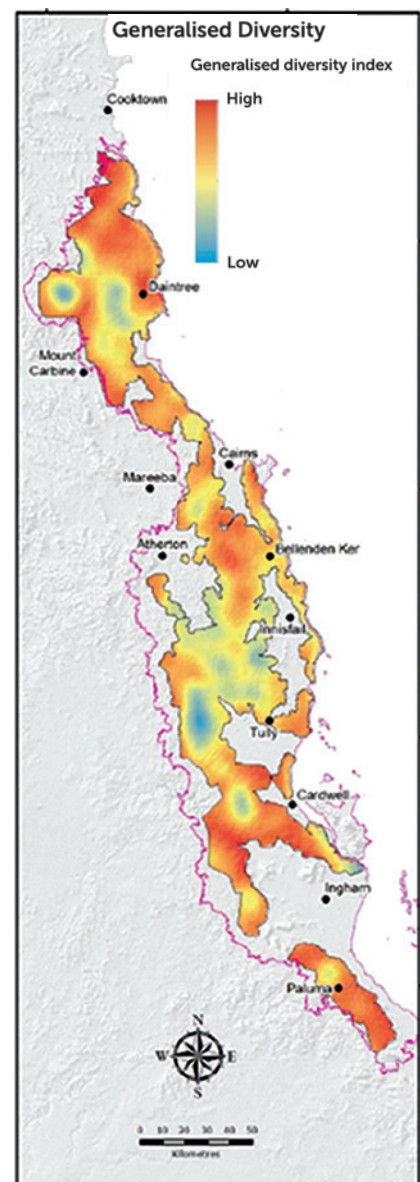


Table 4. Current (as of 2024) status and threats impacting the Wet Tropics bioregion's four threatened ecological communities listed under the EPBC Act

Community	Status	Threats
Broadleaf tea-tree woodlands in high-rainfall coastal north Queensland	Endangered	History of past clearing, disturbance from grazing, invasive weed incursion
Littoral rainforest and coastal vine thickets of eastern Australia	Critically endangered	Clearing and fragmentation due to development, agriculture and sand mining, weed invasion, grazing, recreational disturbance and fire
Lowland tropical rainforest of the Wet Tropics	Endangered: 29% of pre-colonisation extent remains	History of past clearing, clearing for development and agriculture, and rising sea levels
Mabi forest	Critically endangered: less than 4% of pre-colonisation extent remains, mostly in small, isolated remnants less than 5ha in size.	History of logging and clearing, fragmentation, edge effects, weeds, feral animals, hydrologic changes, cyclones and drought

In 2022, the Australian Government released their Threatened Species Action Plan 2022–2032 which sets out the concept of a 'priority place' which supports a landscape-scale approach to threatened species recovery. The plan recognises that some species share the same habitat, and place-based action can help more species and threatened ecological communities. Through a priority place approach, there is opportunity to target management actions that will benefit multiple species at landscape scales, rather than focusing on single species.

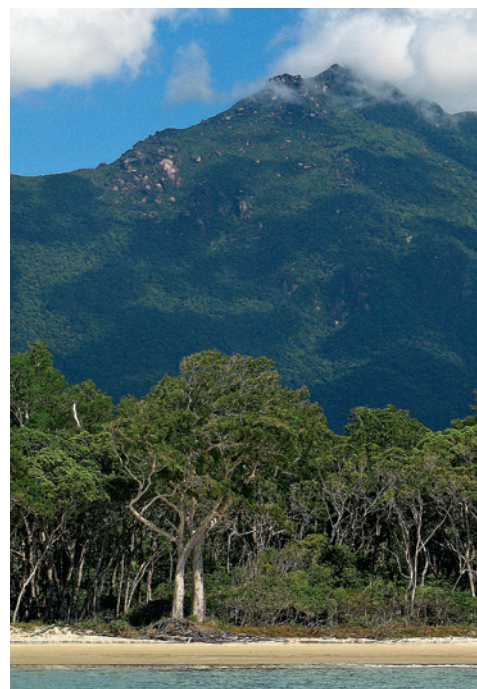
One of the priority places identified is the Eastern Forests of Far North Queensland, which has the Area at its core (see Map 4).

In response to the identification of the Eastern Forests of Far North Queensland priority place, the Authority's Scientific Advisory Committee held the 'Landscape resilience and recovery for the tropical northeastern forests of Queensland' expert workshop (the expert workshop) in June 2024.

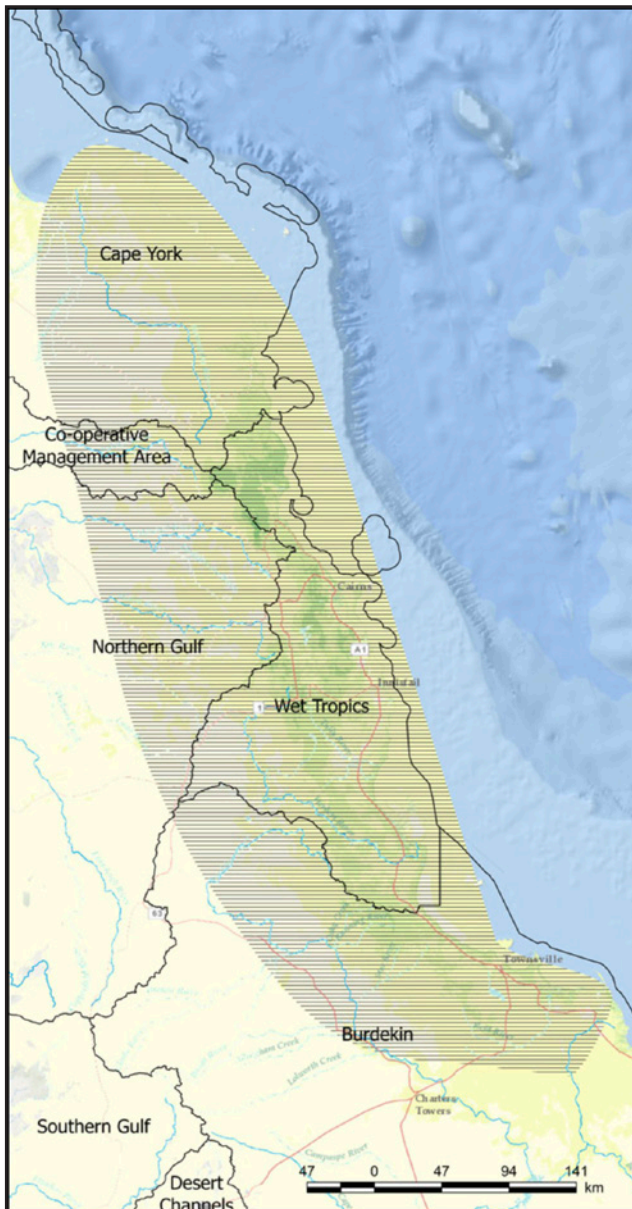
The expert workshop—which involved key scientists and regional natural resource management organisations—examined historical and current research to assess and rank key ecological communities within the area in order of priority. The collective opinion of the expert workshop listed the top 3 as:

1. Wet Tropics rainforest uplands (> 800m)
2. Wet sclerophyll/tall open forest (*Eucalyptus grandis*, *E. resinifera*)
3. Freshwater ecosystems

Assessment of the threats to these communities—including the species they are home to—and planning for on-ground and management actions is underway (anticipated to be complete by the end of 2024).



Coral Sea to Thornton Peak,
Eastern Kuku Yalanji Country—
Terry Carmichael



Map 4: Eastern Forests of Far North Queensland Priority Place. Australian Government and Department of Climate Change, Energy, Environment and Water.

Wet tropical forests

Rainforest ecosystems comprise the majority of the Area's forested extent and include three of its four threatened ecological communities (under the EPBC Act): Mabi forest, lowland tropical rainforest, and littoral rainforest.^{11, 64}

Mabi forest—a type of notophyll forest—grows on highly fertile basalt-derived soils and previously covered the Atherton Tableland north and west of Malanda—over 95% was cleared last century, primarily for agriculture. While significant restoration works are taking place, the fragmentation of mabi forest has left it vulnerable to invasive species.⁶⁵

Lowland tropical rainforest occurs up to 100m above sea level (predominantly around 40m) and to within 100m of the coastline. Historically, these forests have been extensively cleared for urban development and agriculture and this, along with the risk of inundation from rising sea levels and invasive species, remains the key ongoing threat to this ecosystem.^{11, 64}

Littoral (seaside or near an estuary) rainforest is characterised by the adaptations of its vegetation to harsh coastal conditions, such as salt-laden winds and occasional inundation. It has been significantly reduced and fragmented by clearing for agriculture and coastal development, which remains a key threat along with invasive species.⁶⁶

Upland rainforest

While other wet tropical forest types are classified as threatened ecological communities under the EPBC Act, the expert workshop identified upland rainforest above 800m elevation as the ecological community with the greatest conservation significance (restricted ancient and endemic species) and simultaneously the greatest risk of extinction, making it a target for urgent management action.

As upland habitats shrink in response to increasing temperatures, they become more fragmented and isolated, elevating extinction risk for all species they contain. Invasive species—including myrtle rust—put pressure on already dwindling populations of cool upland rainforest specialists, which are vulnerable to heatwaves, drought and changing rainfall patterns.

The expert workshop identified the key threats to upland rainforest as being the impacts of invasive species (particularly myrtle rust) and climate change.

Sclerophyll forests

Open wet sclerophyll forests on the western margins of the Wet Tropics are home to ancient, endemic and threatened flora and fauna including specialist species such as the endangered northern bettong (*Bettongia tropica*) and yellow-bellied glider (*Petaurus australis reginae*), which require open forest to thrive.

These forests have cultural value as part of the living cultural landscape and have been historically sustained through a traditional fire regime applied by Rainforest Aboriginal Peoples.^{67, 68} Regular burning limits the invasion of rainforest species and favours species such as flooded gum (*Eucalyptus grandis*) which need open, well-lit conditions to germinate and grow. The absence of regular burning has precipitated the loss of half of these forests since the 1950s to rainforest encroachment.^{67, 68, 69}

Reinstatement of traditional burning practices is one facet of current restoration and management efforts in the Wet Tropics' western sclerophyll forests. In 2018, an extensive mapping effort found that since 1994, more than 1,000ha of formerly degraded forest had transitioned to healthy open wet sclerophyll forest; this was considered a reflection of successful local fire management. Unfortunately, most other areas had been subsumed by rainforest, with only 18% of wet eucalypt forest in the Mount Windsor Tableland and Daintree retaining a healthy open understory.⁷⁰

While not considered a threatened ecological community under the EPBC Act, six of the Wet Tropics' nine wet sclerophyll regional ecosystems are listed as endangered under Queensland legislation, and wet sclerophyll forests were ranked as the second-highest priority by the expert workshop. The expert workshop identified the key threats to wet sclerophyll forest—both inside and outside the Area—as habitat loss and degradation, invasive species, and fire.

Freshwater ecosystems

The Area has a huge variety of freshwater ecosystems, and they are extremely rich in biodiversity. For instance, 131 native fish species have been recorded from freshwater habitats in the Wet Tropics—this is the highest freshwater fish diversity of any region in Australia.³⁴ Freshwater systems are a preferred habitat for 30 frog species, 16 reptile species and 73 bird species.

Many wetland types—from Melaleuca swamps to wet sedgeland—s—are found within the Area and in the wider bioregion, and 30 of the region's wetland sites were listed on the Directory of Important Wetlands in Australia. Unfortunately, up to 80% of the region's coastal wetlands have been drained and cleared (mostly for agricultural development) and the altered hydrology has degraded much of the remainder, with other areas lost to salinisation.³⁴

In December 2023, severe flooding associated with Tropical Cyclone Jasper caused significant damage to a number of freshwater systems in the northern part of the Area. Landslides and scouring caused widespread damage, and are likely to have caused substantial impacts that are, as yet, not quantified. Surveys and monitoring of freshwater habitats are required to determine the impacts of this event on the OUV of the Area.

Freshwater ecosystems were identified through the expert workshop as the third highest priority threatened ecosystem, with the key threats being climate change and habitat loss and degradation.

3. Pressure:

Threats to World
Heritage values



3. Pressure: Threats to World Heritage values

Prior to European settlement, the Wet Tropics of Queensland was the only rainforest in Australia permanently inhabited by Aboriginal People, and they had sustainably managed Country for thousands of generations. The displacement of Rainforest Aboriginal Peoples following the arrival of Europeans disrupted traditional land management practices, including the use of fire in the landscape. From the late 1800s, large tracts of land were cleared for timber and agricultural industries, and exotic plants and animals were introduced. The gradual establishment of national parks and eventual listing of the Wet Tropics of Queensland World Heritage Area (the Area) in 1988 brought large areas, particularly those that had been subjected to logging, under a higher level of protection.²²

The forests' natural recovery and regeneration has led to widespread improvements in the condition and integrity of the Area's natural values since listing. However, many biodiversity assets—such as species that are endemic, rare, ancient and/or of biocultural significance—had already been damaged and are continuing to decline today.^{11, 33} The Outstanding Universal Value of the region is being eroded, despite being within a well-managed and protected World Heritage Area.

Invasive species—some well-established for decades, others recent invaders—have serious short and long-term impacts, with pathogens an increasing problem, and many threats act synergistically, magnifying impacts.⁷¹ But the greatest long-term threat to the Area's World Heritage values and their integrity is climate change. Urgent climate action, strategic establishment of wildlife corridors to promote climate adaptation, integration of Indigenous land management knowledge, habitat protection through planning and permitting, and targeted invasive species control are needed to protect the Area's Outstanding Universal Value.^{9, 11}

Climate change

Threat rating: High to very high^a

Climate change is the greatest threat to the Outstanding Universal Value and long-term integrity of the Area ^{9, 27, 33, 35, 53}

Climate refers to long-term patterns of temperature, precipitation and weather. The impacts of climate change are experienced through alterations in weather patterns and an extensive suite of flow-on effects, many of which have synergies with each other and with other threatening processes.⁷²

The extent to which the climate will change in coming decades depends on current and future greenhouse gas emissions.^{73, 74}

Landslides due to Tropical Cyclone Jasper left deep scars in parts of the landscape, Eastern Kuku Yalanji Country—Wet Tropics Images/Paul Curtis



^a IUCN 2020 Wet Tropics of Queensland Conservation Outlook Assessment (Threat rating for: Climate Change/Cyclones/Droughts) Weber et al. Managing a World Heritage Site in the Face of Climate Change: A Case Study of the Wet Tropics in Northern Queensland.

At current rates of warming, global mean temperature will reach 1.5°C above pre-industrial averages between 2030 and 2052. There is also a very high risk of this increase exceeding 1.5°C and approaching 2°C by 2065.⁷³

Warming of 1.5°C would have serious implications for many ecosystems. Warming of 2°C would result in a completely new climate regime under which many ecosystems would undergo irreversible change.⁷³

In 2019, Rainforest Aboriginal Peoples from more than 20 tribal groups across the Wet Tropics biocultural region of Queensland collaborated to send a message to the inaugural First Nations Climate Summit (June 2019). The message stated: *“Our lands, seas and waters are under imminent threat from climate change, with escalating decline in our plants and animals already being observed due to increasing temperatures, changed fire patterns and extreme weather events.”*

The Wet Tropics Management Authority (the Authority) is active in a number of areas to improve scientific understanding of the changing climate and its impacts on World Heritage values and to undertake and support actions to improve resilience of the landscape. Further to this, in 2019 the Authority released its Accept, Act, Adapt: Climate Adaptation Plan for the Wet Tropics 2020–2030.⁷⁵ However, the ability of the Authority to implement the identified actions in this plan are restricted by limited resources due to reductions, in real terms, in its base funding since 2004.

Notably, the Authority’s Board has long recognised the primary importance of reducing emissions, which is outside the scope of the Authority’s adaptation planning, in mitigating future climate change.⁷⁶

Changes in temperature

Climate change-induced increases in mean and extreme temperatures impact on ecosystem processes such as dispersal, pollination and migration and on individual species.

High-elevation specialists, particularly those with low dispersal ability, are most threatened by climate change. As areas of suitable habitat contract, these species’ ability to adapt by moving to suitable habitat elsewhere is hampered by fragmented, modified landscapes and natural geographic barriers including warm, inhospitable lowland zones. Species already confined to the highest elevations have nowhere further to go and face an ‘elevator to extinction’.^{35, 53}

Species at risk include many fundamental to the Area’s World Heritage listing as well as culturally and economically important species.

For the region’s cool-adapted ringtail possums (comprising four endemic species, all of which are already declining), climate and population modelling suggests that continuing increases in temperature and heatwaves will precipitate ‘the collapse of these species by 2050, with populations falling below viability thresholds within three decades’.⁵³ Prognoses for Wet Tropics regionally endemic rainforest birds are similarly dire, and recent evidence extensively documents climate-driven declines and range shifts.^{27, 35}

The enormous wealth of recognised and unrecognised invertebrate diversity in the Wet Tropics—which evidence suggests follows similar patterns of exceptional diversity and endemism as seen in other taxa—is also under pressure from climate change (among other threats).⁶³ Without prompt and effective protections, species may be lost before they are ever known.

Modelling predicts that by 2085, suitable cloud forest habitat, will be eliminated for 7 of the Area’s montane endemic animal species, and will decline by at least 60% for another 37 species.¹¹

Plants are similarly affected by increasing temperatures and recent predictions indicate that the more than 30 plant species restricted to upland cloud forest habitats are gravely threatened by climate-driven habitat loss.⁴²

There is still time to save many of these species. This will require a concerted effort of government, industry, researchers, land and property managers and Traditional Owners to investigate the local conditions driving these impacts and identify potential adaptation pathways, including engineering solutions and possible translocations. Simultaneously, a collaborative advocacy calling for direct action to mitigate global climate is required now to halt declines and avert extinctions.



A heatwave in 2018 had fatal consequences for the Wet Tropics' spectacled flying-fox (*Pteropus conspicillatus*) population—Wet Tropics Images/Mike Trenerry

Heat events

Globally, heat is the 'silent killer', incurring greater loss of human life than all other weather-related causes and exacerbating underlying health risks and climate change is intensifying this threat.^{77, 78, 79} Plants, animals, and ecosystems are similarly affected.

While the forests of the Wet Tropics may not display the stark white bleaching that famously evidences heat's lethal effects on the nearby Great Barrier Reef World Heritage Area, they share these deadly impacts. Extreme heat can stress and kill trees—even large, old, robust trees—with the potential to change the composition of rainforests by removing these foundational sources of food, shade, and shelter.^{80, 81} Many animal species suffer severe physiological impacts due to extreme heat.

Many of the most significant impacts of climate change on biodiversity occur through extreme events. Heatwaves have intensified in Australia since 1950, with a consistent increase in peak temperature, number of events, frequency, and duration.⁸² This trend is expected to continue.

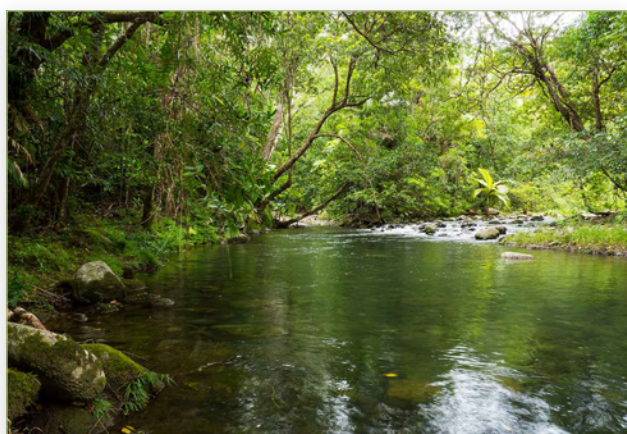
The dramatic mass mortality of one-third (an estimated 23,000) of the total Wet Tropics spectacled flying-fox (*Pteropus conspicillatus*) population in a summer 2018 heatwave highlights the immediate threat of extreme heat. This decline in this keystone species' population saw its conservation status change from vulnerable to endangered. Their numbers have steeply declined in the Area since inscription—less than 10% remain.

Cyclones, rainfall, floods and landslides

The intensity of tropical cyclones is likely to increase, while overall cyclone frequency may decrease.^{83, 84} Cyclones are a natural feature of the regional climate and vegetation community structure, composition and diversity are driven by such stochastic events.³⁸ However, greater cyclone severity will promote more rapid and extensive vegetation change, potentially exceeding the tolerance and regenerative capacity of native vegetation communities. Cyclone-disturbed forest is more vulnerable to high-intensity fires and weed invasion than intact forest, and flood-scoured riparian systems are more readily invaded by aquatic weeds than intact systems.^{85, 86, 34, 38}

Extreme rain events are also predicted to increase in intensity. Heavy rainfall will cause more frequent and extreme flood events; it will also cause greater soil erosion and agricultural chemical runoff, degrading aquatic habitats as well as coastal, tidal and reef habitats through the freshwater pulses associated with flooding.⁷⁴

The potential regional impacts of cyclones and flooding to the Area's most at-risk values, discussed in the State of Wet Tropics 2022–23, were realised in December 2023 following Tropical Cyclone Jasper's landfall between Wujal Wujal and Cooktown. The ex-tropical cyclone system stalled, creating a significant surface trough that resulted in historic and unprecedented flooding and significant damage across the region. Widespread landslides—particularly north of Mossman through to Cooktown—caused significant damage with the full impacts not yet known.



Gap Creek before (left) and after (right) Tropical Cyclone Jasper and associated flooding, Eastern Kuku Yalanji Country—Wet Tropics Images/Paul Curtis

Cloud raising

Up to 50% of annual water input into the Area's upland rainforests comes through cloud stripping—cloud forests capture water from clouds and release it throughout the year, sustaining streams and river flows even in the dry season.³⁴ In addition to wildlife, many cities and towns in the region are 100% dependent upon the Area for clean water supply. A temperature increase of 3°C would cause clouds to rise from 600 to 900 metres above sea level, resulting in a loss of up to 40% of effective cloud stripping area and severe impacts to these cloud forests' dependent species, along with reduced water yields.⁹

Fire weather and seasonal cycles

While rainforest was previously considered a natural fire barrier, it is now known to be vulnerable to fire. 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.

Changes to climate alter seasonal patterns that were previously a stable part of the biocultural landscape for thousands of years, disrupting natural cycles.

Changes are predicted to cause increased seasonality: longer, hotter dry seasons and more intense wet seasons with unpredictable, flooding rain. Changes in ecosystem services may also impact on regional agriculture.⁸⁷

Sea level rise

Sea levels will continue to rise globally. Inundation with sea water threatens the valuable carbon stores and biocultural values of coastal habitats including mangrove forests. Inundation may induce loss of coastal habitats as they transition to saline systems, causing an upstream shift in the distribution of tidal species.^{87, 88}

Drought

Longer fire seasons and periods of drought are predicted under a changing climate.⁸² Prolonged dry conditions weaken plants, leaving them vulnerable to disease, herbivory, and other stressors.⁸⁹ Drought-induced dieback can contribute to fuel build-up, fuelling more severe fires.

Droughts will decrease the extent and connectivity of wetlands, potentially inducing permanent transition to other vegetation types if dry periods are long enough to permit terrestrial plants' invasion. Through death of food or habitat plants, drought can also cause declines in animal populations.

Drought puts species already threatened by invasive competitors and habitat loss and fragmentation under greater pressure.



Climate change and changing fire regimes will likely impact the endangered northern bettong (*Bettongia tropica*)—Wet Tropics Images/Scott Burnett

Invasive species

Threat rating: High to very high^b

The rate of introduction and spread of invasive pests throughout the Wet Tropics bioregion is increasing more rapidly than can be managed through existing programs, resulting in biodiversity loss.

An invasive species is one that:

- has been introduced into an area in which it did not previously occur
- is capable of establishing self-sustaining populations
- can spread into and establish in native communities and significantly alter native species richness, abundance or ecosystem function.

Invasive species include introduced weeds, feral animals, insects and other invertebrates, pathogens and parasites. They may be exotic (from overseas) or translocated native (within Australia) species. The impacts of invasive species on natural ecosystems include reduction of productivity, direct and indirect impacts on native species, land and soil degradation, biodiversity loss, habitat loss and fragmentation.⁹⁰

Disruption of ecosystems due to other pressures often renders them more susceptible to invasion. The Wet Tropics bioregion is especially susceptible to invasion due to:

- its close geographical and climatic links to Papua New Guinea, Southeast Asia and some Pacific Islands—these areas have been the source of a range of exotic invasive pests
- the tropical climate offering favourable growing conditions for exotic tropical plants and animals
- the broad range of habitats offering varied temperatures and rainfall
- frequent cyclones, floods and droughts which can disrupt ecosystems and help spread weeds, diseases and, occasionally, invasive species such as tramp ants—for instance, cyclones can move weed seeds great distances via wind and water and destroy the rainforest canopy, allowing weeds to flourish
- development and population growth that creates increased pressure on environmental resources and increases ecosystem disturbance
- people increasingly moving machinery, plants and soil across the landscape.⁹¹

Many threatened and at-risk endemic species are found only on a handful of small locations with very specific environmental conditions, making them particularly vulnerable to displacement by invasive species. As climate change threatens the extent of these restricted habitats, the potential for invasives to expand into them increases.

The full impacts of invasive species that are already established in the Wet Tropics are yet to be documented, as it will take many years for some of these species to achieve their full potential distribution, which for many is expected to increase, under climate change.^{90, 92} Meanwhile, new invasive species are continually arriving in the region.

Invasive animals

Invasive animals in the Wet Tropics impact the integrity of the Area's natural values and ecosystems in many ways, including through predation of native species, competition for resources, the spread of weeds and disease, and habitat and landscape disturbance.⁹³

Accidental introductions have led to the establishment of some invasive animal populations, while others were directly caused by deliberate releases or dumping of pets.^{39, 90} Human disturbance aids their spread—roads and tracks can facilitate movement, while some species are inadvertently transported by vehicles and machinery.

^b IUCN 2020 Wet Tropics of Queensland Conservation Outlook Assessment (Threats: Terrestrial and freshwater invasive species and disease / Yellow Crazy Ants)

Impacts are becoming more widespread as the warming climate allows some invasive species to expand their ranges, particularly into high-altitude forests.⁹⁴

There are currently 28 known vertebrate and numerous known invertebrate invasive animal species in the Area. These include cats (*Felis catus*), pigs (*Sus scrofa*), cane toads (*Rhinella marina*), fish (at least nine species) and invertebrates (including several species of ants). For many, knowledge of population distributions and density and ecological impacts is incomplete, complicating management.⁹⁹

Control initiatives to reduce population numbers of most of these species have not been feasible to date across the region, although some local control measures have been very effective. Over the past decade, the Authority's highly successful Yellow Crazy Ant Eradication Program has removed the invasive yellow crazy ant (*Anoplolepis gracilipes*) from 480 hectares in and adjacent to the Area including rainforest, farmland and suburban areas.



Yellow crazy ants (*Anoplolepis gracilipes*) are a serious threat to Wet Tropics ecosystems—
Wet Tropics Images/Alan Henderson

Yellow crazy ants—recognised by the IUCN as one of the world's 100 most consequential invasive species—are a serious threat to Wet Tropics ecosystems and tourism and agriculture industries, as well as land values, culture and outdoor lifestyle. Yellow crazy ants:

- outcompete, extirpate or kill native invertebrates and small vertebrates, denuding native forest of its wildlife and altering ecosystem processes
- rapidly monopolise food resources
- small populations readily grow into supercolonies (extensive networks of collaborative, interconnected nests) containing very high densities of ants
- formic acid sprayed to subdue prey can incapacitate wildlife such as frogs, skinks and nestling birds



Animals in a certain weight range, like the endemic musky rat-kangaroo (*Hypsiprymnodon moschatus*), are most vulnerable to predation from feral cats⁹⁵—Wet Tropics Images/Mike Trenerry



The rate of population increase in invasive species can be rapid: three years after five *Tilapia mariae* were released into a Port Douglas resort pond (in 1989), more than 1 million fish (18 tonnes) were removed and destroyed—Wet Tropics Images

Invasive plants

Invasive plants (weeds) disrupt ecosystem processes, reduce food and shelter for native species, change fire regimes, cause soil erosion, compete with, smother, and replace native plants, and permanently alter ecosystems.⁹⁰ They establish more quickly than native species after events such as floods, cyclones, or clearing, and often reproduce rapidly through large amounts of seeds.

Weeds are generally associated with disturbed areas, like roads, but some invade intact ecosystems and are so competitive that the ecosystem services underpinning the survival of native plants and animals are disrupted or lost.⁹⁶ These 'transformer weeds' pose significant threats to the Area's biodiversity.

Weed invasion is a synergistic threat and risk may be exacerbated by drought or intense fire—dense infestations of weeds destabilise soil (leading to greater flood impacts) or fuel more intense fires, inducing a positive feedback loop that promotes further invasion.^{39, 90}

There are more than 500 exotic weed species found in the Area with at least 200 identified in the last two decades.^{30, 43, 44, 45, 46, 97} The majority have been intentionally introduced for agricultural, horticultural or domestic purposes before escaping containment. Some are so well-established they are no longer considered able to be eradicated.

The Queensland Government's current National Tropical Weeds Eradication Program—managed by Biosecurity Queensland—currently targets five species in the Wet Tropics: limnocharis (*Limnocharis flava*), miconia (*Miconia calvenscens*, *M. nervosa*, *M. racemosa*) and mikania vine (*Mikania micrantha*).



Pond apple (*Annona glabra*) is a major environmental weed in the Wet Tropics, especially in wetland ecosystems—Wet Tropics Images

Invasive pathogens

Diseases caused by pathogens have the potential to devastate individual species, or suites of species, particularly when first introduced. Initial catastrophic declines may be followed by chronic population depression or local extinction. Compared to the more visible weeds and feral animals, little is known about introduced pathogens which may affect the Area's World Heritage values. It is generally difficult to detect pathogenic microorganisms and to learn how they spread disease.

There is a real possibility that diseases of agricultural and horticultural crops may spread to related rainforest species. Similarly, diseases of domestic and feral animals can easily be transmitted to native species with potentially devastating impacts.

To date, the disease-causing frog chytrid fungus (*Batrachochytrium dendrobatidis*) has been the primary cause of extinctions and declines in Wet Tropics frogs—a reminder that being inside a protected area may not be enough to shield species from extrinsic threats.^{11, 33} Three of the region's stream-dwelling upland frog species are presumed extinct while other species and populations remain at risk, particularly those occurring at high elevation where this fungus grows best.¹¹

Threats to Wet Tropics plants include myrtle rust (*Puccinia psidii*) and phytophthora dieback (*Phytophthora cinnamomi*).^{44, 98} Both of these devastating fungal diseases threaten hundreds of native plant species. The myrtle rust-susceptible Myrtaceae family is a foundational group for many of the region's threatened species and ecological communities, and itself contains critically endangered plants in addition to species that host endangered symbionts, such as rare orchids.

Biodiversity as well as structural (loss of bank-stabilising riparian vegetation) impacts of these fungi are already being documented. Impacts are expected to dramatically escalate as these pathogens spread further throughout the region. With only one of the world's seven myrtle rust strains detected in the Wet Tropics so far, the opportunities for effective prevention—and the risks of even greater future impacts should prevention fail—are substantial.

Other pathogens which may pose significant threats have been recently detected in the Area, such as phytoplasmas that infect palm species and basidiomycete fungi that cause basal stem rot.¹¹

Clearing, fragmentation and habitat degradation

Threat rating: Low^c

Clearing

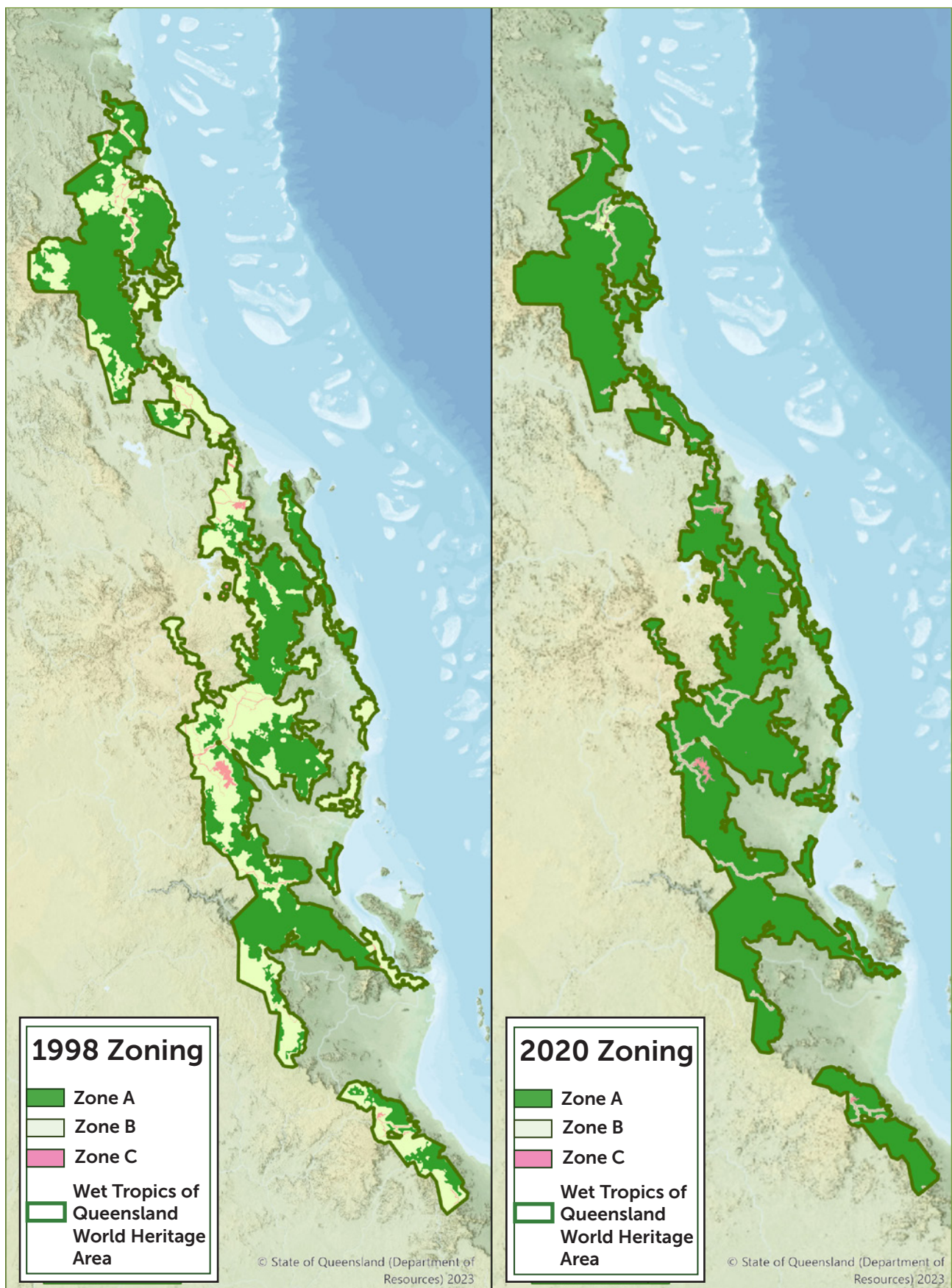
In the Wet Tropics bioregion, forests in the lowlands between Townsville and Mossman and in the upland basalt tableland areas of the central Wet Tropics were heavily cleared in the early to mid-1900s primarily for agriculture and residential settlement. Of the forests that remained, extensive areas were subject to logging of varying intensity, although steep and inaccessible areas were largely protected.³

World Heritage listing has since protected the Area from logging and broadscale clearing, and there has not been any significant forest clearing inside the World Heritage Area since listing.

The Wet Tropics Management Plan 1988, administered by the Authority, regulates land use activities in the Area through a zoning and permit system. The degradation of historically logged areas was reflected in the zoning first applied under the original iteration of the Wet Tropics Management Plan in 1988 (see Map 5). These areas were classified as Zone B, reflecting the intention to promote vegetation recovery. The substantial recovery of these areas, affirmed by their reclassification to Zone A in 2020, has been one of the great successes of World Heritage management, and has vastly improved habitat condition, connectivity, and the Area's overall integrity.

^c IUCN 2020 Wet Tropics of Queensland Conservation Outlook Assessment (Threats: Fragmentation from pre-listing extractive forestry operations)

Map 5. Increase in forest area specified as rehabilitated within the Wet Tropics World Heritage Area between 1998 and 2020



While the Area itself is protected by its World Heritage listing, the surrounding Wet Tropics bioregion has been affected by clearing due to population growth, agricultural intensification, and development. There are multiple and sometimes conflicting demands for use of natural resources outside of the Area which can exert pressure on habitats and communities within Area bounds.

In the bioregion, clearing activity over 2021–2022 covered 1,630h, including 101ha in endangered and of concern regional ecosystems. The majority of woody vegetation clearing in the bioregion in recent years (2018–2021) has been associated with timber harvesting or agricultural land conversion. Losses to timber harvest are recouped by regrowth, largely also in timber plantations or state forest reserve. Other increases in clearing for infrastructure and settlement, and the broad increase in pasture clearing, represent ongoing pressures on regional ecological connectivity, and some cleared areas are directly on the Area’s boundary, potentially pushing edge effects into the Area’s interior.⁹⁹

Fragmentation

World Heritage listing, and the controls under the Wet Tropics Management Plan 1998, have largely halted development that would further fragment the landscapes within the World Heritage Area. However, the Area’s shape—long and thin, fragmented into several sections, and with a very large edge length to interior area ratio—predisposes it to landscape-scale impacts of fragmentation, even when fragmentation happens outside the Area.

Fragmentation—the splitting of large intact areas of habitat into smaller, often disjunct, pieces—alters ecosystem characteristics through edge effects.¹⁰⁰ These include changes to habitat properties, such as forest microclimates (especially closer to cleared edges), and increases in pioneer, generalist or ‘edge’ species accompanied by declines of specialist ‘deep forest’ species. Edge effects can result in changes to community structure and biodiversity loss, even when due to small or linear clearings such as roads.^{101, 102}

Fragmentation also reduces the overall landscape-scale connectivity that is crucial for many species to complete life cycles, respond to seasonal environmental change, and adapt to a warming climate. Additionally, gene flow between populations is critical for species persistence. Fragmentation reduces genetic diversity within isolated populations, elevating local extinction risk.¹⁰³

Many of the highly valued endemic species of the Area are confined to high, cool mountaintops, often within Area bounds.¹ Intervening warmer, drier habitat—already a barrier to emigration—may be outside the Area and subject to clearing and development, making it unnavigable for these species. Lowland and generalist species, meanwhile, need to move through the landscape to access food and resources, but face barriers such as agricultural paddocks and patches of degraded habitat. These inhospitable areas expose fauna to predation, desiccation or other risks, limiting their ability to migrate in response to environmental change.¹⁰⁴ Improving ecological connectivity across this landscape is critical for long-term climate resilience.⁹

In the region, primary management interventions addressing habitat fragmentation and patch isolation are:

- reduction or removal of the barriers dividing habitat (i.e. decommissioning roads)
- improvement of connectivity through habitat corridors.

Habitat corridors are broad strips of revegetated or restored habitat, often implemented along waterways, that allow animals (and plants, dispersed by animals) to move between areas of habitat. Flow-on ecosystem services benefits of riparian corridors can include reduced runoff, bank stabilisation, and windbreaks, incentivising agricultural landholders to implement corridor restoration.



Donaghys Corridor, connecting Crater Lakes National Park to Wooroonooran National Park, was a successful riparian corridor project between 1995 and 1998, with 119 native plant species regenerated within monitored transects in the corridor, mainly through vertebrate-mediated dispersal—Biotropica Australia

Some narrow parts of the Area—such as the Black Mountain corridor in Kuranda—are the most important faunal corridors in the entire Area and the only locations in which species can move between northern and southern forests protected within the Area bounds. Unfortunately, these ‘pinch points’ remain under pressure from surrounding land use change, including land conversion, roads and vehicles, and other threats.²² Continued effort is required to maintain the ecological function of these critical corridors, including effective planning and development regulation.

Degradation

In addition to clearing and fragmentation, Wet Tropics habitats—even where intact—are subject to a number of degrading processes. These include incursion by invasive species, pollution from sources upstream or elsewhere in the landscape, overuse, drought, changes in rainfall and fire patterns, and long-term changes in community structure, whether due to historic clearing or the loss of keystone dispersal agents.³³ These

processes can render habitat unsuitable for species of conservation significance or undermine ecosystem processes entirely.

In the coming years, pressures on remaining rainforest refugia and their inhabitants will only increase as climate and other threats escalate.⁸⁷ Restoring and increasing connectivity across the region—both in and outside the World Heritage Area—is urgent and crucial for species to adapt and persist under climate change. But the increasing regional population will continue to drive pressure to develop community service infrastructure corridors that may exacerbate habitat fragmentation.

The continued and scaled-up restoration of degraded forests and fragmented landscapes is a priority action.^{11, 9} Continued implementation of a strong and sound planning and permitting framework, and a regionally coordinated effort to improve connectivity by establishing habitat corridors, will be required to protect vulnerable species and ecological communities into the future.

Altered fire and hydrological regimes

Threat rating: High^d

Altered fire regimes

Fire is a major factor in determining the distribution of rainforests. In wet sclerophyll forests on the western margins of the Wet Tropics, fire regimes play a highly significant role in the expansion or contraction of various rainforest edge vegetation types. While this area has been historically maintained by a traditional fire regime applied by Rainforest Aboriginal Peoples, over the more than 100 years following colonisation many of these practices were suppressed. For this and other reasons, the extent and health of wet sclerophyll woodlands has been vastly reduced, despite some localised recent successes in fire application.⁷⁰

Fire management of these wet sclerophyll forests is a high and urgent priority.

Fire weather and fire severity may shift with climate change. In turn, future intense or unseasonal fires may alter the vegetation communities of the Wet Tropics in unexpected ways, due to unprecedented impacts on canopy epiphytes, long-lived seedling populations, and the rate and success of invasive weed establishment. The management of these landscapes into an uncertain climate future will require an adaptive approach and integration of Indigenous knowledge into existing and new land management policy and procedures. Many Rainforest Aboriginal communities are working with non-Indigenous land managers to reinstate cultural burning.

Altered hydrological regimes

Altered hydrological regimes threaten riparian and wetland ecosystems such as sedgeland, grasslands and melaleuca swamps. These systems often rely on permanent moisture or a regular seasonal flow cycle, and changes to their hydrology can have catastrophic impacts on their dependant species.¹⁰⁵ Impacts of altered flows in riparian and wetland areas include increased waterlogging, loss of seasonal flow cycles, and changes to drainage patterns. All of these can cause vegetation community changes or loss.¹⁰⁵

Altered hydrology can also promote more frequent or intense fires, changing the fire regime. Fire is an important part of maintaining many wetland systems and is required by native fire-adapted wetland grasses, sedges and paperbarks. Low-intensity fires also help control invasive species. But high-intensity fires, fuelled by changes in vegetation or drying out of wetland systems, can kill even fire-adapted native plants and risk igniting wetlands' peat soils, which can burn for weeks.

Clearing and channelisation can reduce wetlands' ability to mitigate flow irregularity. For example, the removal of sedgeland communities can lead to increased concentration of flood flows (and consequent streambank erosion) and heightened flood events. Wetlands also provide habitat for a broad range of species, including threatened and bioculturally significant species, and can act as important regulators of

^d IUCN 2020 Wet Tropics of Queensland Conservation Outlook Assessment (Threat rating for: Fire/Fire suppression)

nutrient loads in flood plain systems. Impacts to wetland hydrology are often compounded with invasions of aquatic weeds, further degrading ecosystem function.

Disruption of hydrological regimes can occur through impoundments, channelisation, draining of wetlands and swamps for agriculture, and alteration of wetland and riparian vegetative communities. Many of the intentional changes to hydrology, such as the construction of dams and impoundments in the Area, occurred prior to World Heritage listing. Other impacts outside the Area, such as those associated with agriculture in the surrounding landscape, have continued. Overall, the majority of the 80% of the region's coastal wetlands have been drained and cleared, mostly for agricultural development, and much of the remainder is degraded.³⁴

Industry, infrastructure and development

Threat rating: Low to medium^e

The ecological impacts of linear infrastructure such as roads, transmission lines and pipelines and their associated cleared areas for access and maintenance on tropical forest are well documented and can be extensive.^{101, 102} While logging infrastructure within the Area was phased out after World Heritage listing, other infrastructure features have remained or have been constructed since. The details of infrastructure within the Area is outlined in Table 5.

Table 5. Infrastructure within the Wet Tropics World Heritage Area^f

Item	Quantification from Wet Tropics Zoning Plan 3.0 review
Road (length)	729.15km
Transmission lines (length)	237.48km
Tower sites (#)	29
Pipelines (length)	70.75km
Water impoundments (area)	2,056.53ha
Mine sites/quarries (#)	8 quarries
Railways (length)	24.36km
Cableways (length)	11.95km

The management of impacts of linear infrastructure is a key function of the Authority. Infrastructure construction, or exploitative use of natural resources such as water, within the Area requires assessment and a permit from the Authority. If the undertaking is likely to have a significant impact, additional approval may be required under the EPBC Act. The Authority assesses activities and issues permits on a case-by-case

e IUCN 2020 Wet Tropics of Queensland Conservation Outlook Assessment (Threat rating for: Growing regional population inside Wet Tropics region putting a strain on resources and infrastructure/Road maintenance/Grazing by cattle/Potential threats)

f Measured from the 2024 internal review of the Wet Tropics Plan Zoning Map Edition 3.0 (<https://www.wettropics.gov.au/ZoningMap>) Notes on these figures: All linear features were clipped to the extent of the WTWHA, then measured to obtain these totals. Geodesic length was the measurement utilised, with WGS84 Web Mercator used as coordinate system (as published in the publicly available map). For 'water impoundments' the 'water bodies' layer was used. This was clipped to the WTWHA, then Lake Eacham and Lake Barrine were removed (these are not artificial impoundments). Geodesic area was calculated with WGS84 Web Mercator as coord system (As published). No "mines" as such could be found to exist within the WTWHA, but several quarries do.

basis, leveraging ecological and management expertise to weigh the balance of community benefit versus impact to the Area's Outstanding Universal Value.

Population growth and development pressures since World Heritage listing have resulted in increased demands for new or upgraded community infrastructure within the Area. Significant environmental impacts are associated with such infrastructure, particularly where the establishment or maintenance of cleared corridors are required through rainforests. Maintenance activities associated with the provision of community infrastructure are now regulated under a statutory management plan and guided by environmental codes of practice.

Transportation infrastructure

Within the Wet Tropics, demonstrated impacts of roads include fragmentation and loss of habitat connectivity, edge effects and degradation in habitat fragments, and the direct threat of vehicle strikes to wildlife.¹⁰⁶ All roads have impacts. Little-used roads may be just metres wide and infrequently maintained, but to some species they represent impassable barriers, and their construction and upkeep facilitate invasive species introduction and incur edge effects.¹⁰⁶

Roads also influence hydrology. Road construction may be associated with soil fill (often contaminated with weed seeds) or excavation, potentially disrupting local flow regimes. Roads are a source of stream pollution and increased sediment load, and road culverts fragment aquatic habitats and divert stream flows.³⁴ The fragmentary impacts of a road are amplified by vehicular activity, which interferes with wildlife movement and behaviour. Vehicle-associated disruptions include noise, vibration, movement, dust, emissions, and light pollution.



A sub-adult southern cassowary on a road verge—Wet Tropics Images/Deb Pople

Services infrastructure

Dams, weirs and culverts reduce and alter flow due to water extraction, impacting aquatic ecosystems. Construction of these features also requires direct modification or destruction of aquatic habitats. Furthermore, dams and weirs act as barriers to the movement of plants and animals within waterways, and between waterways and wetland and floodplain habitat.³⁴ Environmental flow regimes include both the overall volume of water and the natural variations in water flow that are needed for aquatic plants and animals to survive. Not enough water, or water at the wrong time, can result in loss of habitat, breeding failure or even death for some species.

Water infrastructure features are also frequently associated with degraded water quality and increased colonisation by introduced animal and plant species. Increases in nutrients, eroded sediments and pollutants can combine with restricted overall flow to reduce surface and groundwater quality.¹⁰⁷

A number of water supply dams currently exist within the Area including Copperlode and Paluma. Eight local governments maintain 22 water intakes with associated infrastructure at various locations.

However, demands for water use continue to increase due to the diversification and intensification of agriculture, regional population growth and expansion of urban areas. Use of groundwater resources on the Atherton Tableland is increasing as surface water resources become fully allocated. Studies and preliminary works are underway for extracting groundwater resources to supplement the Cairns urban water supply. Groundwater extraction can have impacts on stream recharge, wetlands and other groundwater-dependant ecosystems are still uncertain.

Energy infrastructure (renewable and non-renewable)

Although power transmission lines are less prevalent within the Area than roads, the clearings associated with transmission lines are typically wider, and fragmentation impacts and edge effects are therefore greater. Transmission corridor clearings facilitate weed invasion, particularly tall exotic grasses and shrubs. These cleared pathways also act as conduits for feral animals, wind and fire into the interior of the forest, particularly where high-biomass invasive grasses establish as they fuel hot and intense fires.

Technological advancement can lead to improvements in best-practice World Heritage management. For example, decreases in the costs of minimal-impact horizontal drilling are allowing for many transmission lines to be placed underground and rerouted outside of the Area.

Local governments have acknowledged, and are planning for, increases in services infrastructure to meet escalating demand as regional population growth and development continue.¹⁰⁸

Future energy infrastructure interacting with the Area will comprise not just currently active transmission lines, but also proposed future energy generation projects—such as wind farms—in the Area's proximity. Besides the environmental impacts associated with construction and maintenance of the service road network required by such facilities, wind turbines have significant visual impact. In recent years, proposals to expand wind power operations near the Area have attracted attention and controversy.¹⁰⁹

The Wet Tropics Management Authority acknowledges energy transition is key to addressing drivers of climate change and achieving a sustainable future. However, the Authority also recognises that without proper strategic planning, large-scale renewable energy developments in the Area's proximity pose serious risks to the region's natural and cultural heritage values. The Authority is committed to working with the Queensland Government and the renewable energy sector to advise on the scoping and development process for renewable energy projects.¹¹⁰

Population increase and unsustainable use

Threat rating: Low^g

The demands of an increasing population of residents and visitors, as well as associated industry developments, underlie many of the direct environmental pressures on the integrity of the Area.

Population increase

The Wet Tropics region is the most populous in northern Australia. The Queensland Government population projections (2023 update) for Cairns and Townsville, which covers almost all of the Wet Tropics World Heritage Area and surrounding population areas, provides a medium projected population change from 494,448 people in 2021 to 603,007 in 2046.¹¹¹

The rapidly increasing residential population in the region will increase demands related to urban and agricultural development, transmission and road corridor construction, increased recreational pressure and use of resources such as fresh water. Of particular concern is the continued conversion of land for residential development, such as ongoing development in the south of Cairns area.¹¹²

Increasing visitation

The Wet Tropics is an internationally significant destination, and tourism plays a key role in presenting the Area's values to six million visitors each year. While most tourism in the area is managed sustainably, increased visitation to ecologically sensitive locations can have negative impacts if not managed effectively. Landscape degradation, biodiversity loss and pollution are some of the consequences of inadequate visitor management practices in protected areas across the globe.^{6, 113}

The tourism landscape is changing as technology and social media continue to shape visitor behaviour. In some cases, overuse can occur through rapid increases in visitor volume driven by the sharing of content across social media platforms and online travel blogs. Enticed by photos of sites and the desire to have the experience themselves, travellers can find locations easily using tools such as Google Maps and Strava. This reduces barriers to access and increases visitor numbers, creating additional challenges for site management, sustainable and culturally appropriate visitation, and visitor safety.

One such example is Windin Falls (Ngadjon-Jii Country) with local rangers observing an increase in visitors to the site of more than 300% in 2021, due to word of mouth and inspirational images posted on social media.⁶

Such a rapid increase puts immediate pressure on a site and its assets, impacting natural and cultural values (e.g. hardening/creation of paths, damage to vegetation, interactions with wildlife, accessing culturally sensitive areas, weed and pathogen incursion) and management effort and public safety (e.g. traffic/car parking, walkers getting lost, toileting). This increased pressure then often flows on to organisations such as emergency services. Overuse of sites may lead to degradation of the aesthetic values that underpin both the Area's World Heritage values and the region's attractiveness to the tourism market—it is a serious risk that warrants attentive and responsive management.

Inappropriate access and use

Walking, horseback riding and mountain-biking trails are regionally important recreation opportunities through which visitors access and enjoy the Area. Camping, boating and swimming are popular recreational pursuits. These activities, if not managed effectively, can pose significant risks.

Walking and biking trails can be sources for weed and pathogen incursion into sensitive areas as weed seeds, fungal spores and bacteria are easily carried on hiking boots and other gear.^{113, 114} In areas of sensitive or significant vegetation, this is a particularly serious threat. A best-practice approach includes managing

^g IUCN 2020 Wet Tropics of Queensland Conservation Outlook Assessment (Threat rating for: Growing regional population inside Wet Tropics region putting a strain on resources and infrastructure/Large tourism numbers putting pressure on visitor sites/Potential threats/Continued high levels of tourism)

this risk at all levels: from initial planning (appropriate locations, quantity and types of trails), to community education (on the importance of boot and vehicle hygiene), to installing footwear-cleaning stations at key entry areas.

Overuse, inappropriate or unlawful use can quickly damage a site and impact the natural and cultural values of the Area. Continued population growth will increase demand for recreational activities in the region. To protect the Area's natural assets, monitoring and management to maintain sustainable levels of use will remain essential to reduce risks, such as the degradation of remote and high-value sites.

Unsustainable and illegal use of resources

While assessed as a relatively low threat, illegal collection has been identified as a significant concern for populations of some plants and animals.³⁸ Data on the impacts of plant and animal theft are lacking. For example, the pendulous foliage of tassel ferns makes them popular in cultivation—the survival of one species, *Phlegmariurus dalhousieanus*, is threatened by illegal collecting from the wild. Rare ground orchid species and many other plants and animals are also threatened by illegal collection.^{38, 39} Unfortunately, raising awareness on this issue may only serve to magnify it, as the increased notoriety drives desirability of the harvested animal or plant.

4. Response:

Snapshot of current management and protection



4. Response: Snapshot of current management and protection

The Wet Tropics of Queensland World Heritage Area is one of the most effectively regulated and managed protected areas on Earth, as befits its rank in the top 0.1% of most important protected areas globally.⁹

The Wet Tropics Management Authority (the Authority) was established in 1992, soon after World Heritage listing, to fulfil Australia's international obligations to protect, conserve, present, rehabilitate and transmit to future generations the Wet Tropics World Heritage Area.

Since the establishment of the Area, new national parks have been declared, bringing more and more of the area under the day-to-day management of Queensland Parks and Wildlife Service and Partnerships. Rainforest Aboriginal Peoples' interests in the area through Native Title, dedicated Indigenous Protected Areas, and Indigenous Land Use Agreements have also expanded.

These multiple layers of protection combined with a range of land tenures (including freehold private property), NRM bodies, numerous local governments, tourism and community services, and an engaged community create a complex but effective management landscape. Through partnership and collaboration, the Authority's management of the Area has been assessed as mostly effective in the IUCN Outlook Assessment 2020 (see Appendices 1 and 2).

Regulatory, policy, planning and management framework

As a signatory to the World Heritage Convention, the Australian Government is bound to protect the Area for future generations. At the establishment of the World Heritage Area, to ensure both the Australian and Queensland governments worked together to meet these obligations, the Management Scheme Intergovernmental Agreement (the Agreement) commenced, outlining broad structural and funding arrangements. The primary goal of the Agreement and resulting legislation was to provide for the implementation of Australia's international duty under the World Heritage Convention.

To support elements of the Agreement, three primary pieces of legislation were developed:

- The *Wet Tropics World Heritage Protection and Management Act 1993* (the Queensland Act)—sets out the role of the Wet Tropics Management Authority in managing the Area and includes provisions to ensure that effective, active measures are taken to meet Australia's obligation. It operates from a foundation of prohibiting the damage to, or destruction of, native vegetation.
- The *Wet Tropics of Queensland World Heritage Area Conservation Act 1994* (the Commonwealth Act)—gives effect to the Intergovernmental Agreement between the Commonwealth and Queensland, and supports Aboriginal representation on the Authority's Board and advisory committees.
- The *Wet Tropics Management Plan 1988* (the Plan)—this is subordinate to the Queensland Act and regulates land use activities within the Area through a zoning and permit system. It is the primary instrument for ensuring activities in the Area are managed appropriately and the Outstanding Universal Value and integrity of the Area are protected.

Other components of planning and legislative framework

Environmental Protection and Biodiversity Conservation Act

The *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) prevents actions that are likely to impact on a matter of national environmental significance without a permit, and these matters include World Heritage values. Approvals required under this Act are in addition to those required under Queensland laws.

Nature Conservation Act

The *Nature Conservation Act 1992* (Qld) provides for the conservation and ecologically sustainable use of biological diversity on national parks and other protected areas. It applies to the 87% of the Area that is within national parks and other protected areas.

Under this Act, the Nature Conservation (Wildlife) Regulation 1994 regulates protected wildlife, including conservation of rare and threatened plants and animals, throughout Queensland. Significantly, the Wet Tropics legislation (the Queensland Act and the Commonwealth Act) does not regulate animal wildlife and relies on Nature Conservation Regulations for the management of wildlife on and off protected areas.

Legislation related to Rainforest Aboriginal Peoples' interests

Conservation and land management must also consider Aboriginal rights and interests as defined in the *Native Title Act 1993* (Cwlth), the *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* (Cwlth), the *Aboriginal Cultural Heritage Act 2003* (Qld), Section 10(5) of the *Wet Tropics World Heritage Protection and Management Act 1993* (Qld), and Section 60 of the *Wet Tropics Management Plan 1998* (Qld).

Queensland's land use planning system

The Wet Tropics region is growing and changing. Chapter 3 of this report outlines the growing pressures that an increasing population, and its infrastructure needs, places on the Area and surrounding ecosystems. Good planning can manage how this growth and change occurs, so that impacts can be avoided where possible and minimised where necessary. Planning is also important for achieving outside-of-Area environmental outcomes such as biodiversity corridor protection, which in turn supports connectivity of the Area's disparate segments and climate change refugia, increasing overall climate resilience.

The key component of the planning framework for the Wet Tropics region is the *Planning Act 2016*. This Act provides state planning policies, regional plans and local government planning schemes along with an integrated process for the assessment of development. The Authority ensures that the values and outcomes sought for the Area are embedded in these documents and other Queensland and local government plans and policies.

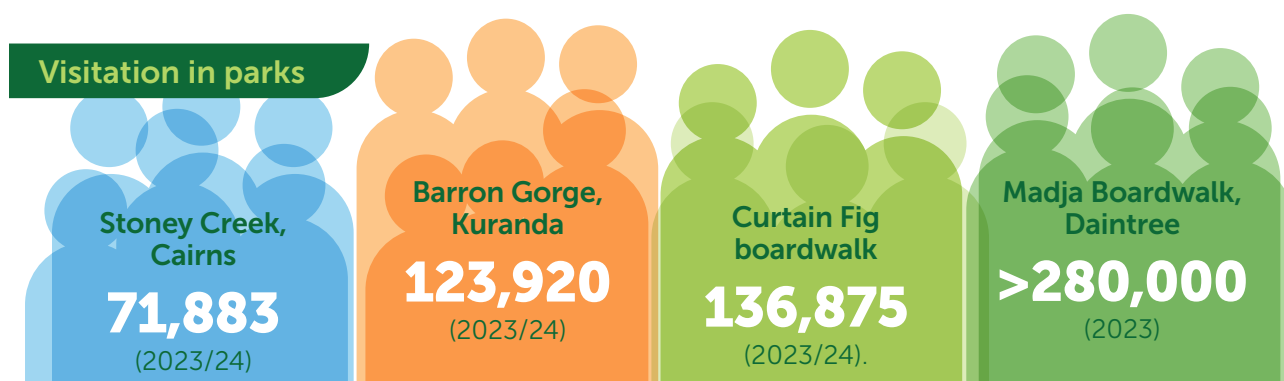
National parks and protected area estate

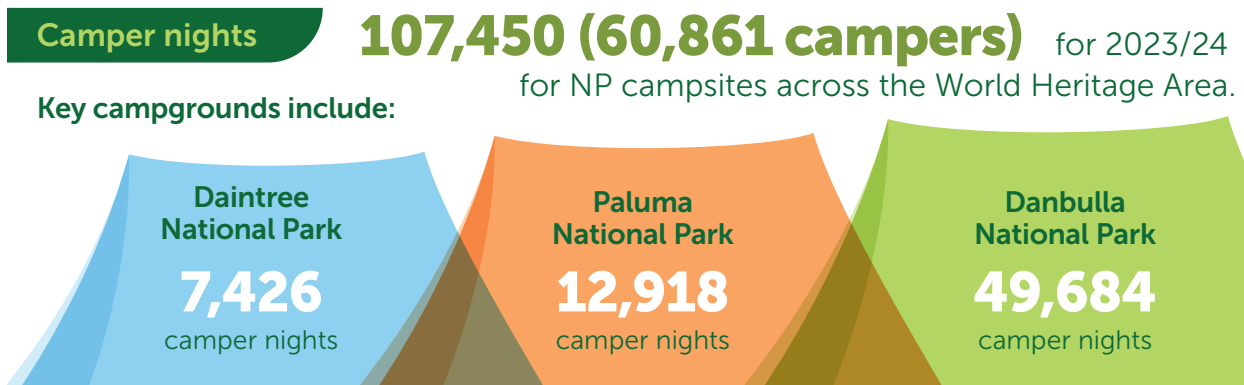
Since World Heritage listing in 1988, additional national parks have been declared or existing ones expanded over much of the Area. Presently, around 87% of the Area's extent is classified as national park, protected area, or another tenure managed by Queensland Parks and Wildlife Service and Partnerships (QPWS&P).

There are 65 separate protected areas and forest estates within the Area including national parks, conservation parks, state forests, forest reserves and timber reserves. These offer more than 150 managed walks and 200 managed visitor sites.

Guided by strategic and operational plans, QPWS&P undertakes on-ground management and planning in these areas, implementing actions that include:

- fire management, including ecological and hazard reduction burning, and the annual planned burn program
- compliance activities to ensure people are following laws and regulations
- permitting of commercial tourism operators (there are over 90 commercial activity permits current for the Area)
- ecological monitoring, and natural and social (visitor) health checks
- management of cultural heritage
- maintenance of roads, walking trails, visitor sites and other infrastructure.





Partnership agreement

The Wet Tropics Management Authority works in partnership with QPWS&P to manage the Area's World Heritage values in the protected area estate to the highest possible standard with the resources available, and in a way that is respectful of the cultural traditions and aspirations of Rainforest Aboriginal Peoples. This is formalised through a partnership agreement that outlines collaborations in the areas of compliance and permitting, embedding World Heritage natural values in management planning processes, delivering on commitments with Rainforest Aboriginal Peoples for the management of Country, and coordinating the development of tourism infrastructure and appropriate signage.

Indigenous land interests and management

Rainforest Aboriginal Peoples have enduring connections with the Wet Tropics land and sea Country embedded in customary lore and custodial responsibility. Tangible and intangible heritage—such as story places, totemic species, artefacts, walking trails, stories, dances, language and spirituality—support Rainforest Aboriginal values and cultural wellbeing. The protection and preservation of this heritage is integral to cultural survival.

The involvement of Rainforest Aboriginal Peoples and the application of traditional ecological knowledge in the management of this culturally significant landscape is crucial.¹¹



Indigenous ranger programs: Rangers talk with the Wet Tropics Management Authority's Reef Assist Project Officer in Wooroonooran National Park, Dulabed Malanbarra Yidinji Country—Wet Tropics Images

Indigenous land interests in the Wet Tropics

Native Title and other Rainforest Aboriginal land interests cover 87.5% of the Area. Currently, eighteen Registered Native Title Bodies Corporate (RNTBCs) operate within and adjacent to the Area, and a number of other Native Title applicant groups are still working through their application processes. As of 30 June 2024, there were 130 ILUAs in place across the Area. Overlapping Rainforest Aboriginal land interests in the Area are provided in Table 8.

Table 8. Percentage coverage of Rainforest Aboriginal land interests within the Area—exclusive and non-exclusive areas overlap in some locations

Right	Area (ha)	Coverage of Area (%)
Native Title exists (exclusive)	563,882.79	63.04
Native Title exists (non-exclusive)	679,436.13	75.95
Indigenous Land Use Agreement (ILUA)	437,786.44	48.94
Indigenous Protected Area	261,156.62	29.11

Rainforest Aboriginal Peoples’ history of involvement in World Heritage management

In 1998, in response to World Heritage listing and management, a Review Steering Committee produced ‘Which Way Our Cultural Survival’. This report asserted Rainforest Aboriginal Peoples’ cultural connections, rights and responsibilities to Country, and defined 163 recommendations for how Rainforest Aboriginal Peoples should be involved in the management of the Wet Tropics World Heritage Area.

Many years of further recommendations and negotiations yielded the historic Wet Tropics of Queensland World Heritage Area Regional Agreement, signed on 29 April 2005. The Regional Agreement provided a framework for cooperative management of the Area by Rainforest Aboriginal Peoples and the Australian and Queensland governments into the future. The Aboriginal Natural and Cultural Resource Management Plan (Bama Plan) was also launched at this time to promote natural and cultural resource management considerations and define the aspirations that Rainforest Aboriginal Peoples have for country and culture.

As of 2023, at least six Traditional Owner groups in the Wet Tropics region are developing plans to manage biodiversity and threatened species which include developing a clear understanding of biodiversity values and threatened species in their environment.¹¹ Indigenous-led threatened species management, supported by working groups or alliances, is an approach of working that can produce major conservation benefits, and empowers and gives rightful respect to Indigenous land management and stewardship of Country, traditional knowledge and culture.¹¹ Additionally, Rainforest Aboriginal Peoples are developing their own principles and protocols for engaging with researchers and research institutions.

While the number and scale of natural resource management projects leveraging the skills and experience of Rainforest Aboriginal Peoples have broadly increased since World Heritage listing, many opportunities remain for continued improvement in project planning and delivery. For example, projects have included threatened species monitoring, but the determination of which species should be targeted for funded monitoring activities has not always incorporated Rainforest Aboriginal Peoples’ perspectives.¹¹⁵ For First Nations Peoples, threatened species are not contained in a list: springs, waterways and other significant landscape elements may be of a higher priority. First Nations Peoples might prioritise animals and plants that hold important cultural values—such as totems, bush foods, medicines and indicators—and these are likely to be different for each group.¹¹

Community-based Indigenous ranger programs

It is becoming increasingly recognised that traditional knowledge and cultural practice is critical to effective land management. Indigenous ranger programs now operate throughout and adjacent to the Area and

are taking a lead role in managing Country, often with limited and short-term funding. With threats to the Area increasing—particularly through the impacts of climate change and invasive species—there is a great opportunity for a step change in sustainable funding, resourcing, and support for Indigenous ranger programs.

While there are a range of supporting organisations and funding providers, the primary supporting programs are the Queensland Government’s Indigenous Land and Sea Ranger Program, and the Australian Government’s National Indigenous Australians Agency’s Indigenous Ranger Program. Indigenous ranger groups are also supported through a range of grants including the Queensland Government’s Looking after Country Grant Program, the Reef Authority’s Traditional Use of Marine Resources Agreements, other State and Commonwealth grant schemes, and grants from non-government organisations such as the Great Barrier Reef Foundation and philanthropic organisations. QPWS&P also engages Indigenous rangers throughout the Area through employment and training opportunities.

Indigenous ranger programs currently active in the Wet Tropics include:

- Abriculture Rangers
- Bulmba Rangers
- Buluwai Rangers
- Dabu Jajikal Rangers
- Djunbunji Land and Sea Rangers
- Eastern Kuku Yalanji (EKY) Rangers
- Girringun Rangers
- Goondoi Rangers and Junior Ranger Program
- Gunggandji Land and Sea Rangers
- Gunggandji-Mandingalbay Yidinji Land and Sea Rangers
- Jaragun Rangers
- Jawajawa Rangers
- Madjaybana Rangers
- Mamu Rangers
- Mandubarra Land and Sea Rangers
- Yirrganydji Land and Sea Rangers.

On Country activities conducted by Indigenous ranger programs include:

- engagement and Country management planning
- fire management—cultural burning and bushfire mitigation
- species conservation and monitoring
- cultural heritage protection
- ecotourism
- biosecurity actions such as invasive species management.^{116, 117}

Indigenous ranger programs provide benefits well beyond the environmental and natural resource management outcomes that come from working on Country. Participation in ranger programs is significantly associated with improved family wellbeing and supports increased cultural participation.¹¹⁸ Previous studies have shown Indigenous ranger programs to have high staff retention rates, and in addition to direct employment for rangers, wider social and economic benefits extend to the broader Indigenous community.¹¹⁹

Research and monitoring

The Area is one of the most effectively regulated and managed protected areas in the world.⁹ Management is based upon a comprehensive body of scientific knowledge produced by decades of leading-edge and innovative research and dedicated monitoring activities. Rainforest Aboriginal Peoples hold detailed knowledge on past and current environment trends that is increasingly informing ecological understanding and conservation management.¹²⁰ More traditional knowledge is being integrated into biodiversity and land management programs, with strong and positive results—particularly in the face of pressures like drought, fire and climate change.¹¹

With climate change emerging as a key threat to the Area’s natural values, it is imperative that our understanding of how past climatic change has influenced evolution and biodiversity in the region is improved. Such research will provide significant insight into the vulnerability of species, improving the capacity to prioritise species and places for adaptive management in the future.



Genetic analyses suggest that frogs in the genus *Mixophyes* have been highly sensitive to historical climate change, identifying these species as priority management targets—Conrad Hoskin

Overall, investigations into rare and threatened species' distributions and climatic requirements broadly indicate that protecting high-priority 'evolutionary' refugia and identifying the most effective corridors and restoration sites to maximise connectivity to these refugia will be the most important management actions to facilitate populations' adaptation to climate change.

One of the Authority's key legislative functions is to gather, research, analyse and disseminate information on the Wet Tropics. While not a research institution, the Authority plays a key role promoting, coordinating, and communicating research priorities for the Area and broader region through activities that include:

- organising, supporting, and seeking advice from the Authority's Scientific Advisory Committee and Community Consultative Committee on matters of regional significance in World Heritage conservation
- partnering with, and influencing the activities of, research organisations and universities
- identifying research priorities and supporting research institutions and partners to collaborate and to seek funding
- promoting and communicating findings to the research and broader community
- encouraging research priorities that align with the needs of World Heritage management.

Data collected and maintained over the last 25 years under a variety of government initiatives has been critical to building the current understanding of the Area's Outstanding Universal Value. Maintaining and significantly improving a regional-scale, long-term environmental monitoring program is essential to track status and trends of biodiversity in the Area. Such a program would provide biodiversity and environmental data of high demonstrated value to a wide range of users, including the research community, regional/state/national management agencies and conservation policy development. As has been acknowledged with the Great Barrier Reef, monitoring and research is critical to long-term management of World Heritage values.

Through the Australian Government's ongoing National Environment Science Program there is an opportunity to develop and implement biodiversity conservation policy and programs. Research 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).

The Authority's State of Wet Tropics 2022–2023 report highlighted the key role of research and monitoring activities, which yield actionable recommendations to guide management to avoid catastrophic species declines and extinctions. The Authority continues to advocate for sustained, adequate funding for these activities. Future activities will be especially important in the context of climate change and invasive species impacts, which are rapidly escalating in the region. As these pressures exceed historic ranges of variability, ongoing monitoring of impacts—and of the success or failure of management interventions—will be critical for effective management planning.

Some previous and ongoing research collaborations

Frogs

Terrain NRM, Western Yalanji Traditional Owners, JCU researchers, Gulf Savannah NRM and QPWS&P are partnering on a project to protect the critically endangered mountain-top nursery frog (*Cophixalus monticola*).¹²¹ The mountain-top nursery frog has been monitored throughout different altitudes in the Wet Tropics for three years. With feral pigs identified as one of the major threats to its survival (along with climate change and other invasive species), an Australian Government Saving Native Species Grant will support fencing sections of habitat to keep pigs out. Teams will survey the pig population and set up satellite-monitored traps.

Mountaintop plants

There are at least 87 species of plants that are found only on cool mountaintops in the Wet Tropics. These species are at serious risk of climate-driven habitat loss and potential extinction.

Following successful completion in 2017 of extensive surveys for additional wild populations, the Tropical Mountain Plant Science Collaboration, led by the Australian Tropical Herbarium, were successful in obtaining funds from the Ian Potter Foundation and from the Authority to commence a more substantial project in late 2018. This project's aims were to secure the future of these plants through ex-situ conservation to 'backup' at-risk wild populations and support research, display and education. This included innovative approaches to seed banking, researching genetics and plant tolerances. A number of plant species have been relocated in facilities around Australia, ensuring a secure bank of specimens and seedbanks. Seed was sourced from thirteen target species, with successful banking of five. Nine target species have been tested for drying tolerance, and freezing tolerance to inform their capacity to survive long-term storage.

More than 1,000 samples representing fourteen species are being processed for genetic analyses and experimental work has analysed the physiological tolerance of mountain top species. The outcomes of this work will improve understanding of these plant species and hopefully help build future resilience.

Quolls

Teams from JCU have been camera monitoring spotted-tailed quoll (*Dasyurus maculatus gracilis*) populations, which generally have a low density. Given the low population estimates from the monitoring, as well as unresolved threats, researchers recommended elevating the species from endangered to critically endangered under the EPBC Act.

The observed trends in species populations reported will, if continued as predicted, negatively affect the Outstanding Universal Value of the Wet Tropics. Dedicated funding to continue this monitoring is needed urgently.

Upland species

Wet Tropics upland cloud forest ecosystems, plants and animals are at extreme risk due to climate-driven habitat loss, fragmentation, and biological invasions. Long-term monitoring projects conducted by James Cook University (JCU) and supported by national programs (that have now halted) delivered important results demonstrating severe climate change impacts—they also made management recommendations including monitoring of rainforest bird and possum populations.^{27, 53} With these long-term programs and projects no longer in place, QPWS&P and the Authority have supported opportunistic monitoring to maintain this important data collection, but a fully resourced model is yet to be realised.

Yellow crazy ants

The Authority delivers a Yellow Crazy Ant Eradication Program with the aim of locally eradicating the invasive yellow crazy ant (*Anoplolepis gracilipes*) from the Area and surrounds. The operational procedures and management actions taken as part of this world-leading biosecurity response have been informed by targeted research activities undertaken by JCU's Insect Ecology research team under contract with the Authority and in partnership with Authority staff.

Activities have included:

- monitoring of the off-target impacts of insecticide bait on invertebrate biodiversity
- research on foraging distance of yellow crazy ants, to enhance surveillance effectiveness
- research into the optimal formulation of lure, to enhance surveillance effectiveness
- development of a 'confidence in absence' assessment giving measurable, robust values of confidence in declarations of yellow crazy ant absence from managed areas after treatment.

The findings have contributed to several peer-reviewed publications, and the Authority maintains relationships with other invasive ant control programs in Australia and globally, sharing knowledge to advancing biosecurity capacity worldwide.



The Authority's monitoring staff undertaking data collection for yellow crazy ant research projects, Gimuy Walubara Yidinji Country—Wet Tropics Images/Rhys Sharry

Threatened species recovery teams

There are dedicated threatened species recovery teams working for the protection and recovery of threatened species of high significance in the Wet Tropics. These recovery teams are a collaboration of partners including subject matter experts, government representatives, researchers, landholders, Traditional Owner groups, and conservation and wildlife organisations. The Authority participates in and supports a number of threatened species recovery teams including the Cassowary Recovery Team, Spectacled Flying-fox Recovery Team, Mahogany Glider Recovery Team, and the Northern Bettong Recovery Team.

Local government, NRMs, community groups and private protected areas

Local government

Eleven local governments manage land within the Area, and they are key partners in the landscape. Actions taken by local governments in the Area include:

- developing and implementing regulations
- implementing biosecurity and invasive species control programs
- supporting sustainability programs both directly and through support to other organisations such as Landcare groups, community groups, schools and landowners
- Controlling domestic animals that are also declared as undesirable species for the Area.



Tablelands Regional Council's Community Revegetation Nursery, Ngadjon-Jii Country—Kylie Freebody

The Tablelands Regional Council's Community Revegetation Nursery grows over 270 native tree species for revegetation projects, from large scale restoration efforts and smaller replanting areas. The vast majority of plants grown are locally native and sourced rainforest species. The nursery opened on its current site in 1989 with the redeployment and retraining of logging industry personnel to the then-named Wet Tropics Tree Planting Scheme. The dedication of staff and volunteers over the past 35 years has seen more than 1 million trees grown, with close to 300ha planted for revegetation projects between Ravenshoe, Millaa Millaa and Tolga.^{122, 123}

Natural resource management organisations

The Department of Climate Change, Energy, the Environment and Water works with the Department of Agriculture, Fisheries and Forestry to support a network of natural resource management bodies across Australia. The bodies work with local communities to deliver environmental outcomes and the sustainable use of natural resources. Three bodies work in and around the Area—Terrain NRM, NQ Dry Tropics and Cape York NRM. These agencies work with Wet Tropics communities to deliver a range of projects related to:

- land management, sustainable farming and soil management
- nature conservation
- healthy waterways and water quality outcomes
- catchment repair
- weed and pest management
- climate resilience.

Partnership approach: Terrain NRM and the Wet Tropics Management Authority

Conservation of the Area's natural values in the face of multiple threats is challenging, and requires effective collaboration between organisations working on similar issues across the region. Terrain NRM, a natural resource management organisation working across the Wet Tropics bioregion, develops sustainable solutions that increase the resilience of the rainforests, reefs, landscapes and local communities—objectives that closely align with the Authority's. Terrain NRM and the Authority both independently and collaboratively support processes to protect threatened species and ecological communities such as workshops to identify values, threats and management actions to take urgent action. The organisations have worked closely on initiatives and ongoing projects over a number of years to magnify outcomes. Current collaborative initiatives include:

- the Wet Tropics Restoration Alliance, which was established in 2022 with support from James Cook University—this coalition of organisations (currently 28) are working together to ensure the survival of Wet Tropics forests under a changing and unstable climate
- the Indigenous Advisory Committee—a skills-based committee of Rainforest Aboriginal Peoples that was established by the Boards of both organisations to ensure that the views, interests, and aspirations of Rainforest Aboriginal Peoples are included in the delivery of strategic plans and programs specific to the Authority and Terrain NRM.

Non-government organisations and community groups

The Wet Tropics is privileged to have a large and strongly engaged network of non-government organisations and community groups involved in conservation action in and around the Area. These conservation programs deliver broad range of actions, including on-ground conservation work, mobilising the community and raising awareness, and successfully advocating to government for the policy changes and resourcing required to protect the values of the Area. The Cairns and Far North Environment Centre (CAFNEC) and the North Queensland Conservation Council are the peak regional non-government environmental organisation that cover the Area, and for over 40 years have supported the community and community groups to make their voices heard and to take action.

Private protected areas and nature refuges

Individuals, non-government organisations and businesses purchase and manage significant tracts of land for conservation, with areas in and around the Area increasingly enjoying this category of protection. 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.¹²⁴ 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, Gondwana Rainforest Trust, Rainforest Rescue and Queensland Trust for Nature work to protect threatened ecosystems and wildlife.

Biosecurity response

Strong prevention measures, early detection, and rapid, well-resourced and correctly prioritised response remain the gold standard for managing the region's biosecurity threats.

In the Wet Tropics, biosecurity is managed at the Commonwealth (*Biosecurity Act 2015*), State (*Biosecurity Act 2014*), and local (through local government biosecurity plans) level, as well as under additional threat-specific management and action plans.

Under the *Biosecurity Act 2014*, all Queenslanders have a 'general biosecurity obligation' to prevent or minimise biosecurity risk. The Authority works with local governments, Traditional Owners, QPWS&P, landholders and other land managers to take practical steps to prevent or minimise biosecurity risks in the areas they manage.

In addition to its Yellow Crazy Ant Eradication Program, the Authority performs a number of roles in terms of biosecurity. These include collaboration with other biosecurity programs (such as Biosecurity Queensland's National Electric Ant Eradication Program), providing expert advice to planners and agencies undertaking biosecurity responses across Queensland, as well as advocating for support to Indigenous ranger groups to carry out specific pest control programs (for example, the Mamu Rangers' response to Koster's curse).

Yellow Crazy Ant Eradication Program

Yellow crazy ants (*Anoplolepis gracilipes*) were first detected in the Wet Tropics in 2001. By 2014 the ant had spread extensively in agricultural and residential areas, with infestations also extending into the Area. At that time, the species had been declared ineradicable statewide, and state support for control measures had decreased. But agricultural and environmental impacts were rapidly escalating, including environmental impacts within the Area. The ants had also invaded one of the last remaining breeding sites of the critically endangered and locally endemic Kuranda treefrog (*Litoria myola*).

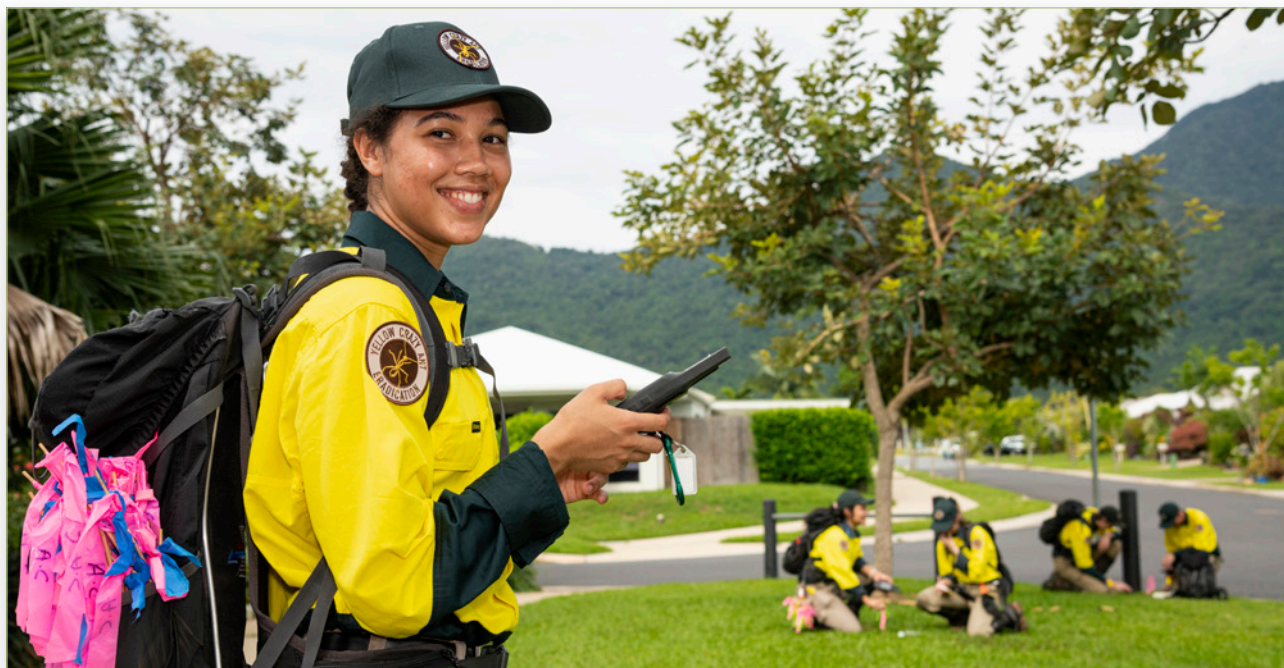


Kuranda treefrog (*Litoria myola*)—Wet Tropics Images/
Mikhaila Jacoby

In response, the Authority initiated the Yellow Crazy Ant Eradication Program, with the goal of eradicating yellow crazy ants from the Area and immediate surrounds. Through strong community collaborations and relationships, the project demonstrated progress and secured additional funding and research support.

With funding support from the Australian and Queensland governments, the program has since grown into the world's most successful yellow crazy ant eradication project and an oft-cited example of a successful and integrated pest management program.

The Authority has now made significant progress towards local eradication, recently announcing the largest single-site eradication of yellow crazy ants in history. Funding dedicated for the Authority's Eradication Program is committed through 2026.¹¹



Authority staff performing yellow crazy ant surveillance, Gimuy Walubara Yidinji Country—Wet Tropics Images/Kerry Trapnell

Biosecurity Queensland and other programs

Enforcing state biosecurity legislation and protecting Queensland's primary industries and environment by preventing the entry, spread, or establishment of exotic pests and diseases are the responsibility of Biosecurity Queensland. The Australian Government also provides support on pest species of national significance.

Current programs active within the Area include:

- **National Electric Ant Eradication Program.** Managed by Biosecurity Queensland and funded by the Australian, state and territory governments, this program aims to control, reduce, and eradicate electric ants, which are a category 1 (highest priority) restricted matter under *Queensland's Biosecurity Act 2014*. Electric ants were detected in the Wet Tropics region in 2006 and several infestations have occurred within the Area.
- **National Tropical Weeds Eradication Program.** Managed by Biosecurity Queensland and funded by the Australian, state and territory governments, this program surveys and removes invasive weeds from World Heritage rainforest to preserve biodiversity in the wettest parts of Australia. There are 5 species targeted in the Wet Tropics: *limnocharis* (*Limnocharis flava*), *miconia* (*Miconia calvenscens*, *M. nervosa*, *M. racemosa*) and *mikania* vine (*Mikania micrantha*).
- **Numerous strategies, plans and on-ground programs** across the Wet Tropics bioregion are conducted by the Far North Queensland Regional Organisation of Councils (FNQROC), local governments and NRM organisations. Examples include coordinated efforts to monitor and control invasive plant species such as pond apple (*Annona glabra*), *Hiptage* sp., and cat's claw creeper (*Dolichandra unguis-cati*).

Restoration

Prior to the Area's World Heritage listing, large areas of forest were logged, cleared or converted to crops and pasture. Landscape restoration is practical, on-ground action that can repair past damage and improve the resilience of natural ecosystems and human communities. By expanding and connecting habitat, successful reforestation can bolster species populations and enable their movement. It can store carbon, help regulate local climate and rainfall, regulate stream flows and water quality, and reduce streambank and coastal erosion. It can also improve crop production through pollination and pest control, and contribute to community income, employment, and wellbeing.

Many reforestation and restoration actions rely on community groups and other organisations to undertake voluntary and funded restoration activities. Local landowners, Rainforest Aboriginal Peoples, residents, volunteers, and non-government organisations have been working together on restoration projects across the Area. There have been many successful projects, and techniques have been refined over 30 years of practice. However, there have also been setbacks and barriers to scaling successes to larger areas and other locations within the Wet Tropics. These include issues of limited resourcing, limited available land, inadequate funds for ongoing maintenance, and limited capacity to monitor and share outcomes. A review of the issues limiting scale-up of restoration in the Wet Tropics was undertaken through the State of Wet Tropics 2020–21: *Growing Opportunities—landscape restoration for biodiversity and ecosystem recovery*. One key recommendation from the report is increased commitment and collaboration between government, business, researchers and community—a recommendation that is partially being delivered through the Wet Tropics Restoration Alliance.

The Wet Tropics Restoration Alliance, in which the Authority is a partner, is a coalition of organisations working together to help secure the future of some of the world's oldest continuously surviving tropical rainforests and to build the ecological, social, cultural and financial resilience of the Wet Tropics region. The Alliance—still in its formative stage—brings together a network of community, landholders, Rainforest Aboriginal Peoples, industry, individuals, government, non-government organisations, academic institutions and investors who have common goals and aspirations for landscape restoration of the Wet Tropics. Supporting and encouraging Restoration Alliance partners to work collaboratively with a broad range of local private landowners, residents and tourists is hoped to lead to much greater long-term impact on advocacy and protection of the Wet Tropics.



Restoration Alliance partners

The Daintree lowlands (coastal lands and foothills north of the Daintree River to Cape Tribulation) is identified as a priority climate refuge and biodiversity hotspot with significant wildlife corridor complexes. Some is within the Area and protected under World Heritage legislation while other parts are freehold and leasehold. An active program from various private land conservation trusts is buying land in the Daintree lowlands and handing it back to Eastern Kuku Yalanji (EKY) Traditional Owners under a variety of arrangements including jointly managed national parks, nature refugia managed by EKY People, and other parcels of land that will provide economic and social benefits to EKY People.

The Authority is supporting planning that will help Daintree restoration stakeholders to progress upscaled restoration in the Daintree, and also to better meet EKY People's economic, cultural and social aspirations. Examples of some areas identified for collaboration include better coordination with nurseries, seed collection and joint funding submissions.



Tree planting in the Daintree, Eastern Kuku Yalanji Country—Wet Tropics Images

Tourism, education and awareness

Sustainable tourism and visitation management

One of the Authority's obligations under the World Heritage Convention is to present the values of the Area and for the Area to have a function in the life of the community. The Area's World Heritage status warrants concerted efforts to provide the highest quality standards in presentation, including a diversity of experiences to allow residents and visitors the ability to enjoy and appreciate the Area. This needs to be balanced with ensuring that activities are ecologically sustainable, maintaining World Heritage values and integrity.

The Authority recognises that the best way to achieve excellence in World Heritage presentation is by working with our partners in government, the tourism industry, Rainforest Aboriginal Peoples and the conservation sector to stimulate sustainable tourism solutions in our communities. This approach allows the tourism industry to:

- identify new ways to provide opportunities for people to better appreciate and understand the World Heritage values of the Area
- motivate and inspire the community to make a deeper connection with the Area and take an ongoing interest in its care and protection
- strengthen relationships to create opportunities for Rainforest Aboriginal Peoples to deliver distinctive Indigenous experiences across the Wet Tropics
- ensure there are complementary facilities and experiences across the different Wet Tropics regions, encouraging broader visitor dispersal and a deeper Wet Tropics experience.

The Wet Tropics tourism community strives to be a leader in ecotourism and sustainable visitation management. Examples demonstrating this commitment include:

- **Skyrail Rainforest Cableway**

In 2018, Skyrail Rainforest Cableway—an EarthCheck Master Certified operator, Green Travel Leader and Climate Action Innovator—collaborated with the Authority to develop innovative displays for the Rainforest Discovery Zone at Red Peak Station and content for their interpretive app and audio guide. Staff training was also elevated to provide a holistic and informative visitor experience, using educational opportunities to raise awareness about the rainforest's importance and unique biodiversity. The level of visitor engagement, understanding and awareness of the Area has significantly increased as a result. In 2005, Skyrail demonstrated their commitment to contribute and make a difference with the establishment of the Skyrail Rainforest Foundation. The foundation's objective is 'the protection of tropical rainforests worldwide through sound management, understanding and appreciation through research and education'. To date, the foundation has distributed more than half a million dollars in funding to support research projects. Contributing positively and creating awareness of this fragile environment brings a sense of purpose and connection, encouraging visitors to travel for good.



Skyrail Rainforest Cableway, Djabugay Country—
Skyrail Rainforest Cableway

- **Wet Tropics World Heritage Guides**

In partnership with the Department of Environment, Science and Innovation, and Tourism and Events Queensland, the Authority is developing a new tour guide training program for the Wet Tropics, which will enhance World Heritage presentation, interpretation and experience delivery. The Wet Tropics World Heritage Guides (WTWHG) will provide an exemplar model for tour guide training on Queensland's terrestrial World Heritage Areas, enhancing the presentation of natural and cultural values through transformational experience delivery. WTWHG is led by a series of principles:

- promote World Heritage and National Heritage values
- respect Rainforest Aboriginal Peoples, Country and culture
- enhance capacity of Wet Tropics advocates
- support ongoing professional practice of trainees.

The Wet Tropics World Heritage Guides will help position the Wet Tropics as a unique global tourism destination, leveraging the internationally recognised World Heritage brand.



- **ECO Destination Certification**

The ECO Destination Certification program is available to nature-based destinations, including local government, to demonstrate a regional commitment to ecotourism and sustainable and responsible tourism practice. In 2019, the Douglas Shire became the first destination in the world to achieve Ecotourism Australia's Eco Destination certification—more than 80% of the shire sits in the Area. Townsville became the third destination in Queensland to achieve the certification, and the Cassowary Coast Regional Council has recently received funding to undertake the certification process. By achieving this certification, these Wet Tropics local governments are demonstrating to travellers that their destinations are backed by a strong, well-managed commitment to sustainable practices and provide high-quality nature-based tourism experiences.

Active education and awareness-building programs

Education and awareness underpin community engagement in the Area. Awareness of the unique values of the Area and their considerable environmental, social, cultural and economic benefits build support for ongoing protection and conservation. Recognising this, the third strategy in the Authority's Strategic Plan 2020–2030 ('Involve the Community') seeks to 'Optimise community participation and connection with the Area through innovative interpretation, with a focus on education, volunteering and social inclusion.' This strategy and supporting actions also allow the Authority to fulfil its obligation to protect and present the World Heritage values of the Area.

The Authority demonstrates its commitment to ensuring the Area plays a role in the life of the community through targeted engagement including:

- **Cassowary Awards**

First held in 1999, the Wet Tropics Management Authority's Cassowary Awards are the only awards program in Australia to recognise community contributions to World Heritage conservation and management. They celebrate the efforts of organisations and individuals who participate in conserving, protecting and raising awareness about the Wet Tropics World Heritage Area.

The Authority has long recognised that effective and successful caring for the Area is a challenging and long-term task, with community participation and engagement vital. To this end, the Cassowary Awards seek to acknowledge the efforts of a diverse range of individuals, groups and organisations. Previous recipients have included stalwarts of the Wet Tropics community, as well as up and coming leaders. Conservation trailblazers, tourism innovators, schools and youth, and cultural leaders have been recognised alongside philanthropists, farmers, artists, educators, scientists and students.



20th Cassowary Awards recipients, Djabugay Country—Wet Tropics Images

- **EcoFiesta (Cairns and Townsville)**

Both Cairns Regional Council and Townsville City Council hold annual EcoFiesta events—sustainability events for community members that offer free entry. The events are a collaboration of many community groups and organisations taking part. The events are highly effective for community engagement and awareness raising. For example, four out of five attendees who attended the Cairns event in June 2024 indicated that the event changed the way they thought about their role in protecting the environment. Further, while many of the 400 people surveyed had already made lifestyle changes to be sustainable, almost half indicated they wanted to do more to reduce their waste, a similar percentage said supporting biodiversity was key, and more than a third wanted to further limit reliance on non-renewable energy and fuel.¹²⁵

Cairns Ecofiesta, Gimuy Walubara Yidinji
Country—The Photo Room



5. **Future** priority actions



5. Future priority actions

This State of Wet Tropics report has provided a review of the condition of the attributes that support the World Heritage values of the Wet Tropics of Queensland World Heritage Area (the Area) based on available data sources and assessments. It has outlined influencing factors and pressures on the integrity of the Area and provides a snapshot of current management responses.

The results are sobering and support recent assessments: the Outstanding Universal Value of the region is being eroded—despite being within a well-managed and protected World Heritage Area—and climate change is the leading threat. Three of the four criteria for which the Area is listed for have been assessed by IUCN as of concern and deteriorating, and the overall conservation outlook is rated as being of ‘significant concern’.

If the Area is to avoid being rated as ‘critical’—which is only one step away—a significant concerted collaborative response is required of all levels of government, Rainforest Aboriginal Peoples, industry, property managers, researchers, and community. Without this immediate action, Australia also runs the risk of coming under the scrutiny of the World Heritage Committee and the Area being listed as a World Heritage site ‘in danger’.

The Wet Tropics Management Authority (the Authority) is currently progressing regional adaptation initiatives under the Climate Adaptation Plan for the Wet Tropics 2020–2030 to protect the Area, and will support the transition to renewable energy by providing materials to support engagement and policy development to reduce greenhouse gas emissions. To best protect the World Heritage values of the Area by building the resilience necessary to face the impacts of climate change and address synergistic threats, this report provides the following recommendations for future priority actions.

A concerted collaborative response to climate change impacts

Climate change is the most significant threat to the Area. The management response needs to be multi-faceted and include targeted research, monitoring, investment in adaptation and innovative actions, as well as, importantly, advocacy for mitigation. This approach requires an increase in current levels of investment to support research, adaptation actions, and expand Indigenous participation in management and solution design.

There is precedent for such a response for a World Heritage Area facing multiple challenges: the Reef 2050 Long-term Sustainability Plan (the Reef 2050 Plan)—Australia’s overarching strategy to improve the Great Barrier Reef’s health and resilience. Focussed on delivering coordinated local, national and global action across 5 priority areas for action, the plan framework has been assessed as ‘mostly effective’, and we are seeing its success in delivering exceptional research leading to improved management of the Great Barrier Reef.¹²⁶ This integrated and concerted effort to improve resilience through innovative partnerships and actionable research is demonstrating advances in, for example, crown-of-thorns starfish control.¹²⁷ It has also seen the delivery of the Reef 2050 Traditional Owner Implementation Plan, which empowers Traditional Owners to actively contribute to the sustainable management and protection of the Reef for its natural and cultural values.¹²⁸

Considering the multiple and overlapping pressures on the Area’s World Heritage values that this State of Wet Tropics report has highlighted, it is clear that a similar integrated, coordinated and targeted approach is required for the Wet Tropics. Such an approach will lead to increased resilience of the Area and decrease the risk of extinctions, which will have a positive impact on industries like tourism that rely on the natural assets of the region. It will grow the natural capital potential, increasing and diversifying economic benefits. It will deliver important economic and cultural benefits for Rainforest Aboriginal Peoples. Flow on benefits will include improving the quality of water entering the Great Barrier Reef (noting that the Wet Tropics contains 10 catchments of the Great Barrier Reef).

The Wet Tropics has a highly engaged and proactive community that has been working collaboratively for decades to safeguard the Area’s values and the environmental, social and economic benefits that it provides. We must harness this goodwill and passion and bring community together with all levels of government to meet the challenges faced. A purposeful approach to the delivery of collaborative action—as is working on the reef—will underpin success. For the Wet Tropics World Heritage Area this must include:

First Nations involvement—co-design of solutions and management responses, aligned with Rainforest Aboriginal Peoples’ plans and aspirations

- scaled up research—to better understand Wet Tropics species and ecosystems to inform more effective adaptive management strategies and conservation actions, the decline in research funding must be reversed
- adaptive management—actions that support protection of World Heritage values (such as fire management, biosecurity measures, and innovative and technological responses to species decline) must be implemented with urgency, and successes celebrated
- community and industry engagement—to educate on issues and publicise the hard work that is happening, and why it is important
- strong partnerships—there is appetite for more comprehensive and scaled up collaborative action that brings together key stakeholders.

First Nations-led management

While the State of Wet Tropics 2022–23 identified the need for stronger partnerships with Rainforest Aboriginal Peoples to care for Country specifically to help conserve important ecosystems and threatened species, this report has focussed more broadly on the full scope of the Area’s World Heritage values. As such, it recognises the opportunity and obligation to implement First Nations-led management to protect the full scope of attributes that support those values.

Empowered and coordinated Indigenous ranger groups—backed by long-term sustainable funding and resourcing—and working under Traditional Owner-led management plans for Country is a clear opportunity for exemplary World Heritage management for the Area, with benefits also flowing to the adjacent Great Barrier Reef World Heritage Area through improved water quality. The Australian and Queensland governments have both committed to increasing the number of rangers supported through their respective Indigenous ranger programs. However, more needs to be done in terms of sustainable long-term funding and coordination of actions through grants and resources. As outlined in this report, Indigenous ranger programs are important catalysts for increased First Nations participation and leadership in land and sea management and provide significant economic, social and health outcomes.

Biosecurity response

The assessments made in this report support the common understanding that biosecurity threats to the Area are highly serious and increasing. At the landscape and regional scale, responses to invasive species are often fragmented, reactive and non-strategic and may not take evidence-based prioritisation into account. Funding may be intermittent, making strategic planning difficult. Funding bodies often do not respond to invasive threats until significant public sentiment develops due to widespread impacts, at which point control efforts can be too late. Communication between relevant stakeholders regarding the state and progress of biosecurity threats in their managed areas is often ad hoc and sporadic rather than systematic.

The Wet Tropics Strategic Plan 2020–2030 refers to a coordinated whole-of-Wet Tropics response to current and emerging biosecurity threats, with the involvement of major land managers and relevant agencies. However, this work has been delayed due to resource restrictions. The need remains and the Authority will continue to advocate for appropriate investment into a strategic, coordinated, and pre-emptive approach to biosecurity for the region.

Upland rainforest resilience

An expert workshop—‘Landscape resilience and recovery for the tropical northeastern forests of Queensland’—held in June 2024 identified some of the critical contributions made by upland species to the Outstanding Universal Value of the Area. This expert workshop also prioritised threats to be addressed. The subsequent findings reiterated the importance of the Wet Tropics uplands, and supports the resourcing and immediate implementation of actions to reduce the pressures on, and increase the resilience of, species dependent on cool upland habitats threatened by climate change. Rapid action is necessary to avoid extinctions.

Rehabilitation and restoration

The long, thin shape of the Area and its fragmentation (particularly prominent in the coastal lowlands and Atherton and Evelyn tablelands) means promoting landscape connectivity between isolated sections of the Area is important for its future conservation and the survival of its unique plants and animals, many found nowhere else in the world.

To restore and protect climate refugia and corridors in the region, the Authority and partners must continue to conduct and support restoration efforts. The Wet Tropics Restoration Alliance (the Alliance) is an important example for future coordinated and collaborative management. Established by the Authority, Terrain NRM and James Cook University, the Alliance is designed to operate independently from its founding organisations—it currently consists of 28 organisations and independents including Traditional Custodians, landscape restoration practitioners, research organisations, conservation entities and investors. This coalition aims to identify key areas where upscaled investment and on-ground action is required. The scaled-up restoration work the Alliance can deliver will provide opportunities to grow and mature a natural capital market, which is anticipated to be a major source of funding to support this kind of work.¹²⁹

Key actions to scale up restoration across the Area include:

- increase knowledge, information sharing, and collaboration through an alliance approach to further develop the Wet Tropics restoration community
- develop and promote more cost effective and scalable approaches to remove financial and technical barriers to restoration actions
- pilot novel engagement approaches with industry and land holders to maximise benefits and conservation outcomes
- support crediting schemes that recognise the multiple benefits that accrue from carbon farming approaches—these benefits include biodiversity, economic outcomes for land holders, benefits for Traditional Owners
- engage and support Indigenous ranger groups where appropriate to conduct on-ground restoration actions, including support for appropriate restoration approaches and required infrastructure (nurseries, equipment for maintenance etc).



Carbine Tableland, Western Yalanji Country—Terry Carmichael

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Appendix 1.

Periodic reporting

data

UNESCO Periodic report – Data provided by the Authority regarding 'Factors affecting the property' as part of the UNESCO Periodic report regarding the attributes of Outstanding Universal Value (OUV), their current condition and the trend in that condition since the last cycle of Periodic Reporting.



Factor	Examples	Impact (positive or negative)	Impact (Current or potential)	Origin (Inside or outside)	Trend (decreasing, stable, increasing)	Spatial scale (restricted, localised, extensive, widespread)	Temporal scale (one off or rare, intermittent or sporadic, frequent, on-going)	Impact (in significant, minor, significant, major)	Management response (capacity: high, medium, low, no)	Trend (decreasing, static, increasing – last 6 years)
Major visitor accommodation and associated infrastructure	<ul style="list-style-type: none"> Major accommodation and associated infrastructure Major/permanent high cost tourism facilities 	positive	Potential	Inside and outside	stable	localised	One off or rare	minor	High capacity	static
		negative	potential	Inside and outside	stable					
Interpretative and visitation facilities	<ul style="list-style-type: none"> Location, design of visitor interpretive facilities (visitor centre, site museum) Signage Trail hardening (trail markers) Minor picnic facilities Minor camping areas 	positive	Potential	Inside	stable	localised	Intermittent or sporadic	minor	Medium capacity	static
		negative	potential	Inside	stable					
Effects arising from use of transportation infrastructure	<ul style="list-style-type: none"> Effects of vehicle traffic on roadways 	positive	current	outside	stable	restricted	One off or rare	insignificant	Medium capacity	static
		negative	current	Inside and outside	stable					
Water infrastructure	<ul style="list-style-type: none"> Dams Locks Water tanks Pumping stations Introduction of new systems/ Infrastructure Hydropower infrastructure 	negative	potential	Inside and outside	stable	restricted	One off or rare	insignificant	High capacity	static
Localised utilities	<ul style="list-style-type: none"> Incinerators Cell phone towers Sewerage works Microwave/TV/Radio towers 	negative	potential	inside	stable	restricted	One off or rare	insignificant	High capacity	static
Major linear utilities	<ul style="list-style-type: none"> Power lines/easements Pipelines 	negative	potential	Inside and outside	stable	localised	Intermittent or sporadic	minor	High capacity	static
Temperature		negative	current	Inside and outside	increasing	widespread	ongoing	major	Medium capacity	static
Pests	<ul style="list-style-type: none"> Animals Plants or fungus detrimental to environment, human or human activities 	negative	current	Inside and outside	stable	localised	frequent	significant	Medium capacity	static

Factor	Examples	Impact (positive or negative)	Impact (Current or potential)	Origin (Inside or outside)	Trend (decreasing, stable, increasing)	Spatial scale (restricted, localised, extensive, widespread)	Temporal scale (one off or rare, intermittent or sporadic, frequent, on-going)	Impact (in significant, minor, significant, major)	Management response (capacity: high, medium, low, no)	Trend (decreasing, static, increasing – last 6 years)
Society's valuing of heritage	<ul style="list-style-type: none"> Changes in values leading to new uses of heritage resources Expansions of/Additions to current uses of heritage resources Conflicting values Abandonment 	positive	current	Inside	stable	localised	Intermittent or sporadic	minor	Medium capacity	increasing
	<ul style="list-style-type: none"> Fishing Hunting Gathering and collecting 	negative	potential	–		restricted	One off or rare	insignificant	Medium capacity	static
Changes in traditional ways of life and knowledge system	<ul style="list-style-type: none"> Loss of traditional knowledge and practices linked to heritage 	positive	Current and potential	Inside and outside	stable	localised	Intermittent or sporadic	minor	Medium capacity	static
Identity, social cohesion, changes in local population and community	<ul style="list-style-type: none"> Changes to identity and social cohesion Changes in livelihoods Migration to or from site Changes in local population and community 	positive	current	Inside and outside	stable					
		negative	potential	inside	stable	localised	Intermittent or sporadic	insignificant	Medium capacity	static
Impacts of tourism/ Visitation / Recreation	<ul style="list-style-type: none"> Inappropriate/non-existent interpretation High levels of visitation Increase of vendors inside/outside site Building community support, sustainable livelihoods 	positive	current	Inside and outside	stable	localised	Intermittent or sporadic	insignificant	Medium capacity	static
	<ul style="list-style-type: none"> Illegal extraction of biological resources (i.e. poaching, illegal logging) Blast fishing, cyanide fishing Illegal extraction of geological resources (mining/fossils) Illegal trade 	negative	potential	–	increasing	-	One off or rare	insignificant	Medium capacity	static
Military training		negative	current	inside	-	restricted	One off or rare	insignificant	High capacity	static

Factor	Examples	Impact (positive or negative)	Impact (Current or potential)	Origin (Inside or outside)	Trend (decreasing, stable, increasing)	Spatial scale (restricted, localised, extensive, widespread)	Temporal scale (one off or rare, intermittent or sporadic, frequent, on-going)	Impact (in significant, minor, significant, major)	Management response (capacity: high, medium, low, no)	Trend (decreasing, static, increasing) – last 6 years
Storms	<ul style="list-style-type: none"> Hurricanes/Cyclones Gales Hail damage Lightning strikes River/Stream overflows 	negative	Current and potential	Inside and outside	increasing	extensive	Intermittent or sporadic	significant	Low capacity	increasing
Flooding		negative	Current and potential	Inside and outside	increasing	restricted	Intermittent or sporadic	significant	Low capacity	increasing
Drought		negative	Current and potential	Inside and outside	stable	localised	Intermittent or sporadic	significant	Low capacity	increasing
Temperature change		negative	Current and potential	Inside and outside	increasing	widespread	On-going	significant	Medium capacity	increasing
Other climate change impact	Impacts on ancient, endemic, rare and threatened vertebrates of the Wet Tropics / Biodiversity	negative	Current and potential	Inside and outside	increasing	localised	Intermittent or sporadic	significant	Medium capacity	static
Fire	<ul style="list-style-type: none"> Altered fire regimes High impact fire suppression activities Lightning strikes Wild fires 	negative	Current and potential	Inside and outside	increasing	localised	Intermittent or sporadic	significant	Low capacity	increasing
Translocated species	<ul style="list-style-type: none"> Fish stocking Inappropriate plantings Introduced soil etc. Dieback due to pathogenic agents 	negative	Current and potential	Inside and outside	stable	restricted	Intermittent or sporadic	minor	Medium capacity	static
Invasive / Alien terrestrial species	<ul style="list-style-type: none"> Weeds Feral animals Insect pests Diseases/Parasites Micro-organisms 	negative	Current and potential	Inside and outside	stable	localised	Intermittent or sporadic	significant	Medium capacity	static
Invasive/Alien freshwater species	<ul style="list-style-type: none"> Weeds Invertebrate pests Fish pests Diseases/Parasites Micro-organisms 	Negative	Current	Inside and outside	stable	restricted	One off or rare	insignificant	Medium capacity	static

Factor	Examples	Impact (positive or negative)	Impact (Current or potential)	Origin (Inside or outside)	Trend (decreasing, stable, increasing)	Spatial scale (restricted, localised, extensive, widespread)	Temporal scale (one off or rare, intermittent or sporadic, frequent, on-going)	Impact (in significant, minor, significant, major)	Management response (capacity: high, medium, low, no)	Trend (decreasing, static, increasing) – last 6 years
Hyper abundant species		Negative	current	Inside and outside	stable	restricted	One off or rare	significant	High capacity	decreasing
Management and institutional factors										
Management system/ Management plan	<ul style="list-style-type: none"> Management system/Plan Lack of Management system/plan Outdated/inadequate/incomplete management plan/system Management Plan/System not implemented Lack of boundaries; inadequate boundaries 	Positive	current	inside	increasing	widespread	On-going	significant	Medium capacity	increasing
Legal framework	Legal framework	positive	current	inside	increasing	widespread	On-going	major	Medium capacity	static
Governance	governance	positive	current	inside	increasing	widespread	On-going	significant	High capacity	static
Management activities	Protection and management	positive	current	Inside and outside	stable	widespread	On-going	significant	Medium capacity	static
Financial resources		negative	current	Inside and outside	increasing	widespread	frequent	significant	Medium capacity	static
Human resources	<ul style="list-style-type: none"> Visitor surveys Water sampling Non-extractive surveys In-situ surveys negative 	positive	current	inside	stable	widespread	On-going	significant	Medium capacity	static
		negative	current	outside	stable	widespread	On-going	significant	Medium capacity	static
Low impact research /monitoring activities	<ul style="list-style-type: none"> Visitor surveys Water sampling Non-extractive surveys In-situ surveys negative 	negative	current	Inside and outside	stable	widespread	Intermittent or sporadic	minor	Medium capacity	static
High impact research/ monitoring activities	<ul style="list-style-type: none"> Sampling using destructive techniques Research involving removal of features or species (i.e. extraction) 	positive	current	Inside and outside	stable	–	One off or rare	minor	High capacity	decreasing

The above table reports on only those factors considered relevant at the time of reporting. There were other factors, e.g. “marine pollution” that were marked as non-relevant i.e. not causing an impact on the property. This will be revised for future reports, for example, the factor avalanche/landslide was marked as non-relevant.

Appendix 2. Queensland IUCN Conservation Outlook Assessment 2014, 2017, and 2020



A. Summary

Outlook Assessment	2017		2017	2020
Conservation Outlook	Significant concern		Significant concern	Significant concern
Current state and trend of Values	High Concern Trend: Deteriorating		High Concern Trend: Deteriorating	High Concern Trend: Deteriorating

B. Values

Values	2014		2017		2020
Superlative natural beauty	Rating	Trend	Rating	Trend	Rating
	Good	Stable	Good	Stable	Low concern
Living examples of ancient and primitive rainforest species	High concern	Data deficient	High concern	Deteriorating	High concern
Unique rainforest ecosystems	High concern	Deteriorating	High concern	Deteriorating	High concern
Exceptional biodiversity	High concern	Deteriorating	High concern	Deteriorating	High concern
Summary of the Values			High concern	Deteriorating	
Assessment of the current state and trend of World Heritage values	High concern	Deteriorating	-	Deteriorating	High concern
Assessment of the current state and trend of other important biodiversity value	-	-	Low concern	Stable	Low concern
					Stable

C. Threats

Threat	2014		2017		2020	
	Rating	Trend	Rating	Trend	Rating	Trend
Current threats	Very high threat		Very high threat		Very high threat	
Habitat Shifting / Alteration, Temperature extremes, Storms / Flooding (Cyclones)	High Threat	Inside site, throughout (>50%) Outside site	High Threat	Inside site, throughout (>50%) Outside site	High Threat	Inside site, throughout (>50%) Outside site
Housing / Urban Areas (Growing regional population inside Wet Tropics region putting a strain on resources and infrastructure)	Low threat	Outside area	Low Threat	Outside site	Low threat	Outside site
Logging / Wood Harvesting (Fragmentation from pre-listing extractive forestry operations)	Low Threat	Inside site, scattered (5-15%)	Low Threat	Inside site, scattered (5-15%)	Low threat	Inside site, scattered (5-15%)
Roads / Railroads (Road maintenance)	Low Threat	Inside site, extent of threat not known. Outside site	Low Threat	Inside site, extent of threat not known. Outside site	Low threat	Inside site, extent of threat not known. Outside site
Invasive Non-Native/ Alien Species (Terrestrial and freshwater invasive species and disease)	Very High Threat	Inside site, throughout (>50%) Outside site	Very High Threat	Inside site, throughout (>50%) Outside site	Very High Threat	Inside site, throughout (>50%) Outside site
Livestock Farming / Grazing (Grazing by cattle)	Low Threat	Inside site, scattered (5-15%) Outside site	Low Threat	Inside site, scattered (5-15%) Outside site	Low Threat	Inside site, scattered (5-15%) Outside site
Tourism/ visitors/ recreation (Large tourist numbers putting pressure on visitor sites)	Low Threat	Inside site, scattered (5-15%) Outside site	Low Threat	Inside site, scattered (5-15%) Outside site	Low Threat	Inside site, scattered (5-15%) Outside site
Crops, Livestock Farming / Grazing, Marine/ Freshwater Aquaculture (Altered water flows and water quality run-off through the World Heritage site into coastal waters)	Low Threat	Inside site, extent of threat not known. Outside site	Low Threat	Inside site, extent of threat not known. Outside site	Low Threat	Inside site, extent of threat not known. Outside site
Habitat Shifting/ Alteration (Climate change)	Very High Threat	Inside site, throughout (>50%) Outside site	Very High Threat	Inside site, throughout (>50%) Outside site	Very High Threat	Inside site, throughout (>50%) Outside site
Invasive Non-Native/ Alien Species (Yellow crazy ants)	High Threat	Inside site, extent of threat not known. Outside site	Very High Threat	Inside site, extent of threat not known. Outside site	High Threat	Inside site, extent of threat not known. Outside site
Other (Insecticide application)	Low Threat	Inside site, localised (<5%)			Low Threat	Inside site, localised (<5%)
Potential threats	Low threat		Low threat		Low threat	
Tourism/ visitors/ recreation (Continuing high levels of tourism)	Low Threat	Inside site, widespread (15-50%)	Low Threat	Inside site, widespread (15-50%)	Low Threat	Inside site, widespread (15-50%)
Fire/ Fire Suppression (Fires)	High Threat	Inside site, extent of threat not known. Outside site	Data Deficient	Inside site, extent of threat not known. Outside site	High Threat	Inside site, extent of threat not known. Outside site
Droughts (Predicted longer, dryer dry seasons)	High Threat	Inside site, throughout (>50%) Outside site	High Threat	Inside site, throughout (>50%) Outside site	High Threat	Inside site, throughout (>50%) Outside site

D. Protection and Management

Indicator	2014	2020	2020
	Rating	Rating	Rating
Overall assessment of protection and Management (Assessment of the effectiveness of protection and management in addressing threats outside the area)	Mostly effective	Mostly effective	Mostly effective
Management system	Some concern	Some concern	Some concern
Effectiveness of management system	Mostly effective	Mostly effective	Mostly effective
Boundaries	Mostly effective	Mostly effective	Mostly effective
Integration into regional and national planning systems	Mostly effective	Some concern	Mostly effective
Relationships with local people	Mostly effective	Highly effective	Mostly effective
Legal framework	Highly effective	Highly effective	Highly effective
Law enforcement	Mostly effective	Data deficient	Mostly effective
Implementation of Committee decisions and recommendations	Highly effective	Highly effective	Highly effective
Sustainable use	Mostly effective	Highly effective	Mostly effective
Sustainable finance	Some concern	Some concern	Some concern
Staff capacity, training, and development	Mostly effective	Highly effective	Mostly effective
Education and interpretation program	Mostly effective	Highly effective	Mostly effective
Tourism and visitation management	Highly effective	Highly effective	Highly effective
Monitoring	Some concern	Highly effective	Some concern
Research	Some concern	Highly effective	Some concern

