

Cassowary Habitat Linkages:
Mission Beach to Kurrimine

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Table of Contents

1.0	INTRODUCTION	1
2.0	METHODOLOGY.....	1
2.1	GROUND SURVEY	2
2.2	STUDY AREA DESCRIPTION	3
3.0	HABITAT LINKAGES	5
3.1	NORTHERN SECTION	5
3.1.1	PRIMARY LINKAGE 1 (PL1)	6
3.1.2	PRIMARY LINKAGE 2 (PL2)	8
3.2	SOUTHERN SECTION.....	8
3.2.1	PRIMARY LINKAGE 3 (PL3)	8
3.2.2	PRIMARY LINKAGE 4 (PL4)	9
4.0	TENURE	9
5.0	SUMMARY.....	10
	APPENDIX 1: MAPS.....	11

List of Plates

PLATE 1: HABITAT RESTORATION AT MUFF CREEK.	6
PLATE 2: GUINEA GRASS INFESTATION - BINGIL BAY ROAD.....	7

List of Tables

TABLE 1: DATASETS.....	2
TABLE 2: REGIONAL ECOSYSTEMS WITHIN THE STUDY AREA.....	3
TABLE 3: KEY FREEHOLD LOTS.....	10

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1.0 INTRODUCTION

Biotropica Australia has been commissioned by Mission Beach Cassowaries (MBC) to complete the mapping of cassowary habitat linkages in the area between Mission Beach township and Midgeree Bar Road, near Kurrimine. This mapping is designed to identify important cassowary movement corridors in the context of, (1) existing statutory habitat protection measures, and (2), the existing habitat matrix on public and private lands. Its purpose is to provide landholders, managers and the community with an understanding of landscape function, as it relates to the role of various parcels of land in supporting long-term cassowary persistence in the area. Previous habitat linkage and suitability mapping has been undertaken for the Smiths Gap and Wongaling-South Mission Beach areas, and this report adopts a similar methodology to those previous analyses.

As with previous reports, no formal survey of local cassowary populations has been undertaken for the current project, and it is reasonably assumed that birds are using all habitats within the study area that meet their ecological needs, including unfettered access to fresh water. It should not be assumed that birds are necessarily following indicative routes shown on the accompanying maps. Nor should it be assumed that all areas are used at all times; seasonality and social structures will dictate differential utilisation. However, it is likely that where resources are available and accessible, they will be utilised at some time. The focus of this report is therefore to identify where suitable habitats exist, their tenure, and their spatial relationship to significant adjacent habitats. It should be noted that cassowaries may utilise open / cleared areas as well as habitat linkages to travel between habitat patches.

In the context of this report, a habitat linkage can be defined as ‘an area of linear native vegetation that provides continuous and connected wildlife habitat in a fragmented landscape’. A connectivity bottle-neck can be defined as ‘a narrow point in a linkage where bird-human interaction is more likely to result in negative impact’.

2.0 METHODOLOGY

Preparation of this report entailed an analysis of desktop material comprising datasets outlined in Table 1 below, in-house data gleaned from previous habitat linkage mapping and cassowary sighting / crossing data provided by MBC.

Indicative movement corridor locations were drafted, based on a review of relevant and current spatial datasets (see Table 1), such as historical and current cassowary sighting, road crossing and fatality records, historical and current cassowary conservation mapping, registered and gazetted land parcel protections (e.g. public land, local government protective property agreements, nature refuges, national park and covenant tenure, world heritage area). These projected movement corridors were then ground-truthed and ranked against water availability, food resource availability, watercourse / riparian / drainage quality, and overall habitat matrix and quality.

Table 1: Datasets

Wet Tropics of Queensland World Heritage Area
Protected areas of Queensland
Nature refuges - Queensland
Queensland Digital Cadastral Database (Dec 2019)
Wet Tropics Biodiversity Planning Assessment V1.1
Vegetation management essential habitat map V8.05
Cassowary Coast Regional Council – Planning Scheme 2015 – Cassowary corridors & Areas of Environmental Significance
<i>Casuarius casuarius johnsonii</i> (Southern Cassowary (southern population)) Habitat Suitability Model V2.1 – based on 2017 CSIRO cassowary habitat mapping
<i>Casuarius casuarius johnsonii</i> (Southern Cassowary (southern population)) Occurrence Records: Atlas of Living Australia & QLD DES Surveys
Modelled potential habitat for selected threatened species in Queensland
Watercourse lines - North East Coast drainage division - northern section
Queensland wetland data V4
Directory of Important Wetlands in Australia (DIWA) Spatial Database

2.1 Ground Survey

Ground surveys were undertaken by two experienced ecologists and included an examination of the level of connectivity within each linkage to determine:

- Spatial extent / configuration (wider, continuous vegetation vs. fragmented patches)
- Degree of legislative protection (habitat protected vs. unprotected)
- Number and location of connectivity bottle-necks (few points vs. many)
- Resource diversity (heterogeneous vs. homogeneous habitats)
- Quality of linkage habitat (intact vegetation vs. disturbed)
- Proximity to high density settlement (distant vs. directly adjacent)

Identified linkages were classified into primary and secondary linkages. Primary linkages are those that are considered main movement linkages into and out of National Parks which are considered the core conservation area for cassowaries. Secondary linkages are those which allow movement between Primary Linkages, providing both alternative pathways and habitat in their own right.

2.2 Study Area Description

The study area comprises two discrete sections. A northern section encompasses coastal lands between Djiru National Park and Bingil Bay / Brooks Beach and Garners Beach, bounded to the north by the estuarine portions of Muff Creek. The southern section encompasses the area to the north and west of Mission Beach township up to the end of Narragon Beach, and includes Wylies Creek and Mackness Creek, the latter abutting Clump Mountain National Park. Clump Mt. N.P is an aggregation of lowland rainforest patches, pieces of which occur in both sections, and variously abut the larger massif of Djiru National Park (see Maps 1 and 2).

An extensive coastal habitat block between Cairns and Cardwell includes the northern section of the study area. Continuity of this habitat block is disrupted by the township of Innisfail, larger rivers, some minor roads and the extensive clearing for agriculture/settlement between Kurrimine Beach and Bingil Bay. Habitat fragmentation between Bingil Bay and Kurrimine Beach affects the movement of all terrestrial wildlife, including cassowaries.

Fragmentation is a characteristic feature of the entire study area. Djiru N.P and Clump Mt. N.P are the largest areas of habitat, the latter comprising a number of separate blocks (see Map 1 and 2). In the northern section of the study area, these blocks are separated by minor roads and less intensive agriculture and are more ecologically connected. A southern section features two patches of Clump Mt. N.P that are isolated from adjacent habitats in a less permeable matrix, dominated by agriculture and dense human settlement.

There are a number of small watercourses traversing the study area, most emanating from the slopes of Djiru N.P and Clump Mt. N.P. In the southern section, Wylies Creek and Mackness Creek contain habitat that is continuous from the foothills of Clump Mountain to Narragon Beach. Muff Creek, Midgeree Bar Creek, Double Barrel Creek, Cedar and Stony Creeks form a complex network of streams in the northern section emanating from Clump Mt. N.P or Djiru N.P; most of these streams are at least partially vegetated and have ocean outfalls (see Map 1 and 2).

Native vegetation within the study area includes complex mesophyll vine forest, woodlands, mangroves, littoral zone and wetland environments in 24 regional ecosystems, as detailed below in Table 2 and on Maps 3 and 4. Vine forest habitats on foothills and the narrow coastal plain have been preferentially cleared and are more ecologically isolated, however this complexity of habitats (especially below the 40m contour) is concomitant to diverse feeding resources, and the relative abundance of fresh water provides more-or-less ideal cassowary habitat. Cassowary sighting data provided by MBC shows that where permanent water and suitable habitat occur in tandem, presence of the bird is likely.

Table 2: Regional Ecosystems within the study area.

RE	Description
RE7.1.1	Mangrove closed scrub to open forest of areas subject to regular tidal inundation
RE7.2.1a	Complex mesophyll or mesophyll vine forest. Lowlands on beach sands, of the very wet and wet rainfall zone. (BVG1M: 3a)
RE7.2.3b	<i>Corymbia tessellaris</i> and <i>Corymbia clarksoniana</i> (or <i>C. intermedia</i>), woodland to open forest. Beach ridges, predominantly of Holocene age. (BVG1M: 9e)
RE7.2.4d	<i>Eucalyptus pellita</i> and <i>Corymbia intermedia</i> , +/- <i>C. tessellaris</i> , <i>E. tereticornis</i> , <i>Lophostemon suaveolens</i> , <i>Acacia celsa</i> , <i>A. cincinnata</i> , <i>A. mangium</i> and <i>A. flavescens</i> open forest. Weathered relict beach ridges. Floodplain (other than floodplain wetlands). (BVG1M: 9e)
RE7.2.4e	<i>Eucalyptus pellita</i> and <i>Corymbia intermedia</i> , +/- <i>C. tessellaris</i> , <i>E. tereticornis</i> and <i>Lophostemon suaveolens</i> , woodland to open forest with a very well-developed vine forest understorey. Weathered relict beach ridges. Floodplain (other than floodplain wetlands). (BVG1M: 9e)

RE	Description
RE7.2.7a	Complex of open shrubland to closed shrubland, grassland, low woodland and open forest. Includes pure stands of <i>Casuarina equisetifolia</i> , and <i>Acacia crassicaarpa</i> , <i>Syzygium forte</i> subsp. <i>forte</i> , <i>Calophyllum inophyllum</i> and <i>Pandanus</i> spp. woodland to open forest. Beach strand and foredune. (BVG1M: 28a)
RE7.2.8	<i>Melaleuca leucadendra</i> open forest to woodland on sands of beach origin
RE7.2.9a	<i>Melaleuca quinquenervia</i> open forest to woodland and shrubland. Dune swales and swampy sandplains of beach origin. Palustrine wetland (e.g. vegetated swamp). (BVG1M: 22a)
RE7.3.10a	Mesophyll vine forest. Moderately to poorly-drained alluvial plains, of moderate fertility. Lowlands of the very wet and wet zone. (BVG1M: 1a)
RE7.3.20a	<i>Eucalyptus pellita</i> , <i>Corymbia intermedia</i> , <i>C. tessellaris</i> , open forest often with <i>Acacia celsa</i> , <i>A. cincinnata</i> , <i>A. mangium</i> and <i>A. flavescens</i> . Includes small areas dominated by <i>A. crassicaarpa</i> . Alluvial fans of the very wet and wet rainfall zones, of the lowlands and foothills. (BVG1M: 9d)
RE7.3.20b	<i>Eucalyptus pellita</i> , <i>Corymbia intermedia</i> , <i>C. tessellaris</i> , open forest often with <i>Acacia celsa</i> , <i>A. cincinnata</i> , <i>A. mangium</i> and <i>A. flavescens</i> , with a very well-developed vine forest understorey. Alluvial fans of the very wet and wet rainfall zones, of the lowlands and foothills. (BVG1M: 9d)
RE7.3.5a	<i>Melaleuca quinquenervia</i> open forest, woodland and shrubland. Lowlands of the very wet and wet rainfall zone, on poorly drained peaty humic gley soils where the water table is near or above the ground for most of the year. Palustrine wetland (e.g. vegetated swamp). (BVG1M: 22a)
RE7.3.7a	<i>Eucalyptus pellita</i> and <i>Corymbia intermedia</i> open forest and woodland. Poorly drained alluvium, including seasonal swamps. Contains palustrine wetland (e.g. in swales). (BVG1M: 9e)
RE7.8.1a	Complex mesophyll vine forest. Lowlands and foothills on basalt, of the very wet and wet rainfall zone. (BVG1M: 1a)
RE7.8.1d	Simple mesophyll vine forest with <i>Castanospermum australe</i> , <i>Dysoxylum pettigrewianum</i> , <i>Dysoxylum alliaceum</i> , <i>Ficus variegata</i> , <i>Chisocheton longistipitatus</i> , <i>Ailanthus integrifolia</i> , <i>Aleurites rockinghamensis</i> , <i>Wrightia laevis</i> , <i>Lindera queenslandica</i> and <i>Alstonia scholaris</i> . Small trees and shrubs are sparse and include <i>Myristica globosa</i> , <i>Gomphandra australiana</i> , <i>Acmenosperma claviflorum</i> , <i>Synima cordierorum</i> , <i>Brombya platynema</i> and <i>Wilkiea longipes</i> . <i>Calamus</i> spp. very uncommon. <i>Arenga australasica</i> , <i>Ptychosperma elegans</i> and <i>Archontophoenix alexandrae</i> are uncommon. Ground layer very sparse with ground ferns and gingers rare. <i>Benstonea monticola</i> can be locally common. Large vines prominent, epiphytes uncommon. Lowlands on krasnozem soils derived from basalts and basic volcanic parent material. (BVG1M: 1a)
RE7.8.7b	<i>Themeda triandra</i> tussock grassland. Basalt uplands and highlands, and minor areas on coastal headlands. (BVG1M: 32b)
RE7.11.1a	Mesophyll vine forest. Lowlands and foothills on metamorphics. Very wet and wet rainfall zones. (BVG1M: 2a)
RE7.12.1a	Mesophyll to notophyll vine forest. Lowlands and foothills of the very wet and wet rainfall zones. Granite and rhyolite. (BVG1M: 2a)
RE7.12.5a	<i>Eucalyptus pellita</i> , <i>Corymbia intermedia</i> and <i>C. tessellaris</i> open forest with <i>Acacia celsa</i> , <i>A. cincinnata</i> , <i>A. mangium</i> and <i>A. flavescens</i> . Very wet and wet rainfall zones, on granite and rhyolite. (BVG1M: 9d)
RE7.12.5b	<i>Eucalyptus pellita</i> , <i>Corymbia intermedia</i> and <i>C. tessellaris</i> open forest with <i>Acacia celsa</i> , <i>A. cincinnata</i> , <i>A. mangium</i> and <i>A. flavescens</i> , with a very well-developed vine forest understorey. Very wet and wet rainfall zones. Granite and rhyolite. (BVG1M: 9d)
RE7.12.12a	<i>Acacia mangium</i> and <i>A. celsa</i> open to closed forest. Lowlands and foothills, of the very wet and wet rainfall zone, on granite and rhyolite. (BVG1M: 5d)

RE	Description
RE7.12.40a	Open areas in vine forests, dominated by sprawling vines, commonly <i>Decalobanthus peltatus</i> and a number of other vine species, presumed to mostly originate from cyclone damaged Type 2a forests (where the entire canopy has been destroyed.). Generally, foothills of coastal ranges below 400 metres. (BVG1M: 5d)
RE7.12.40b	Mesophyll to notophyll vine forest suffering from extreme wind damage where at least half the canopy has been destroyed. Granite and rhyolite. (BVG1M: 5d)
RE7.12.54a	Woodland, low woodland, low forest and shrubland with <i>Corymbia tessellaris</i> , <i>C. intermedia</i> , <i>Lophostemon suaveolens</i> , <i>Eucalyptus platyphylla</i> , <i>Melaleuca viridiflora</i> , <i>Acacia crassicaarpa</i> , <i>A. flavescens</i> , <i>A. celsa</i> , <i>A. polystachya</i> , <i>Dillenia alata</i> , <i>Atractocarpus sessilis</i> and <i>Cyclophyllum coprosmoides</i> . Includes a small area of <i>Eucalyptus portuensis</i> low woodland and open forest on Great Palm Island. Steep exposed coastal headlands and hillslopes, on granite and rhyolite. (BVG1M: 9c)

3.0 HABITAT LINKAGES

3.1 Northern Section

There are two primary linkages within the northern section centred on Cedar Creek and Bingil Bay village (see Map 1 and 2). These two linkages provide continuity of habitat between Djiru / Clump Mt. N.P to the south and the forests of Clump Mt. NP at Garners Beach and Muff Creek to the north. Associated with both these primary linkages is a number of secondary linkages (see Map 1), the majority consisting of riparian vegetation along tributaries of Cedar Creek. Some of these are perennial and named, e.g., Double Barrel Creek, Stony Creek: others are unnamed and flow only during the wet season.

3.1.1 Primary Linkage 1 (PL1)

This linkage is based around Cedar Creek and provides continuous habitat between Djiru N.P, the Muff Creek complex, and forests around Garners Beach. A wide range of habitat types is present - from woodland to rainforest - and the presence of abundant water enhances the value of the linkage. There are many properties important to the long-term persistence of this linkage, all supporting branches of Muff Creek or Cedar Creek (see Table 3), and many contain areas that would benefit from habitat restoration. Mangroves of the Muff Creek area are sub-optimal cassowary habitat so fringing habitats, including the woodlands on Fig Tree Beach Road, perform an important linkage function. Plate 1 below shows habitat restoration works currently underway in the Muff Creek area. Such plantings replace highly degraded Guinea grass habitats with resources that will support future cassowary movement and persistence.



Plate 1: Habitat restoration at Muff Creek.

There are ten secondary linkages that form a matrix of habitats inter-connected with PL1 (see Map 1). Secondary linkages south and west of the Bingil Bay Road are mostly associated with tributaries of Cedar Creek; those north and east are part of the Garners Beach and Brooks Beach block and separated from secondary linkages to the west by the Muff Creek estuary. Secondary linkages traverse more fragmented forest indicative of denser settlement. However, some secondary linkages contain intact habitats that are protected under voluntary conservation mechanisms, increasing their value. Despite this, negative interactions are more likely within and adjacent to many secondary linkages.

The bridge crossing of Cedar Creek on the Bingil Bay Road is the main connectivity bottle-neck point within PL1 (see Map 1). Birds are regularly sighted on Bingil Bay Road between this point and Garners Beach Road. Road signage is present to alert drivers to the increased risk of impact. Throughout this area, tall Guinea grass (*Megathyrus maximus* var. *maximus**) fringes parts of the road margin, decreasing visibility and increasing the likelihood of traffic collisions. Bingil Bay Road and Garners Beach Road, and to a lesser extent Holt Road, bisect secondary linkages. However, there are no significant connectivity bottle-necks at these points.

The majority of forest cover in PL1 and its secondary linkages is in relatively good condition. Vine forests are generally resistant to weed invasion although the majority of edges are colonised by giant bramble (*Rubus alceifolius**) and Guinea grass. Secondary linkages, especially those associated with Cedar Creek have been invaded by pond apple (*Annona glabra**) and Siam weed (*Chromolaena odorata**). Melaleuca-dominated communities around Garners Beach are increasingly invaded by traveller's palm (*Ravenala madagascariensis**). These weeds are competitive and persistent; they represent a potential risk to the ongoing utility and integrity of most secondary linkages. Plate 2 below shows the extent of the barriers that can be caused by Guinea grass, in this case beneath powerlines.



Plate 2: Guinea grass infestation - Bingil Bay Road.

Djiru NP and Clump Mt N.P represent State protected habitats associated with PL1 and its secondary linkages (see Map 1). There are also a number of properties protected by covenant within the forest matrix around PL1 (see Map 1). Such protection adds significantly to the long-term integrity of PL1 and its associated secondary linkages.

3.1.2 Primary Linkage 2 (PL2)

Centred around the more developed area of Bingil Bay, Primary Linkage 2 facilitates north-south movement between Djiru N.P and forests on the slopes flanking beaches around Bingil Bay, Brooks Beach and Garners Beach. There are regular sightings of birds just behind the Bingil Bay littoral zone where forests are closer to the road, topography is flatter and fresh water is close by. This linkage is compromised by the built-up nature of the surrounds, however persistent sightings confirm the importance of the area between the littoral zone and Butler Road. The linkage follows the course of an unnamed watercourse which appears to be perennial and supports well-developed vine forest vegetation.

There are two secondary linkages associated with PL2 and both are located to the immediate south and west of Pioneer Street. These secondary linkages are dominated by vine forest and coalesce at the base of the slope between the littoral zone and Butler Road.

The crossing of Bingil Bay Road is the only constraint to connectivity, and does not represent a bottle-neck point. More or less continuous forest cover reaches the edge of Bingil Bay Road for a distance of ca.500m from both sides, offering birds a range of crossing opportunities. Signage reflects regular cassowary utilisation of this wide crossing area.

The majority of forest cover in PL2 and its secondary linkages is in relatively good condition. Weeds are uncommon, although garden escapees including Singapore daisy (*Sphagneticola trilobata**) and parrot's-beak heliconia (*Heliconia psittacorum**) are more prominent. The native vine *Merremia peltata* is very conspicuous in the area around PL2 and its dominance reflects historical disturbance, both natural and anthropogenic.

3.2 Southern Section

There are two primary linkages in the southern portion. They are associated with Mackness Creek (PL3) and Wylies Creek (PL4) and the riparian vegetation present on these watercourses. Both linkages represent extensions of Clump Mt. N.P and both terminate on the foreshore at Narragon Beach (see Map 2). Habitat continuity to the littoral zone also facilitates cassowary access to food plants occurring along the strand vegetation of Narragon Beach.

3.2.1 Primary Linkage 3 (PL3)

Mackness Creek is a perennial stream which flows from Clump Mt. N.P to the littoral zone and outfall on Narragon Beach. On its northern side, the creek is part of the Clump Mt. forest massif and supports intact vegetation that is of high value to cassowaries. Its southern flank interfaces with cleared land that is subject to ongoing housing development. The riparian zone of Mackness Creek supports mesophyll vine forest that is contiguous from the littoral zone to the high slopes of Djiru N.P and Clump Mt. N.P.

Entry to the Narragon Beach littoral zone also facilitates northward movement back into Clump Mt. N.P via secondary linkage (see Map 2).

The Mackness Creek crossing of Alexander Drive is a connectivity bottle-neck point; topographical variation and steep slopes limits foreshore access elsewhere.

3.2.2 Primary Linkage 4 (PL4)

Within the southern section, the Wylies Creek linkage is the product of a number of smaller watercourses, but primary movement is most likely along the main channel shown on Map 2. Wylies Creek is a perennial watercourse sited within a matrix of disturbed lands and residual native forest. The linkage facilitates cassowary movement from Clump Mt. N.P to the littoral zone along Narragon Beach where there are a number of cassowary food plants. The Narragon Beach littoral zone also includes the fresh water outfall of Wylies Creek.

Native vegetation is present along the edge of Wylies Creek, but occurs in conjunction with a number of exotic species, particularly Guinea grass. There are patches of native vegetation along the other arms of Wylies Creek, some in better condition and more extensive than vegetation along the main channel. However, the presence of permanent water in the main channel suggests this arm of Wylies Creek may be most favoured by cassowaries.

The degree of forest fragmentation and the proximity of settlement surrounding PL4 reduces its value. There are significant opportunities for habitat restoration works along PL4.

Associated with Wylies Creek is a number of secondary linkages. This includes the two northern arms of Wylies Creek, and another secondary linkage allowing southward movement into mesophyll vine forest fragments that are part of Clump Mt. N.P. Map 2 shows the likely location of secondary linkages associated with PL4. These linkages are tenuous at best however they are generally comprised of well-developed vegetation that is restricted in its distribution and extent, having been largely cleared for agriculture.

Recorded sightings on Clump Point confirm that cassowaries are crossing Porter Promenade / Alexander Drive from Clump Mt. N.P, possibly in the Perrier Walk area where there are seasonal watercourses associated with remnant habitat in the Webb Court/Pioneer Street area. This is a connectivity bottle-neck point, with warning signage alerting drivers to potential impact. However, littoral zone forests between Clump Point and the Clump Point jetty contain high-value foraging resources above the high tide mark, and access to these resources is possible by crossing at any point along Alexander Drive between Clump Point and the jetty. The crossing of Boyett Road between two blocks of Clump Mt. N.P is the second connectivity bottle-neck point in this portion of the study area.

4.0 TENURE

All habitat linkages surveyed traverse private freehold tenure. Whilst protected areas and covenanted vegetation provide the highest quality and most extensive habitats, the matrix of intervening freehold land is critical to the unfettered movement of cassowaries into and through those protected habitats. Protected areas and covenanted vegetation parcels are shown on Maps 1 and 2. Freehold lots that are important to the long-term functionality of particular linkages are highlighted and Lot numbers shown on Maps 1 and 2. Table 3 below lists freehold properties that are important in maintaining linkage functionality. Habitat restoration works on these Lots, especially riparian zone restoration, would further enhance their connectivity value. In many cases this applies to aquatic connectivity as well as terrestrial connectivity.

Table 3: Key Freehold Lots

Linkage	Properties
Cedar Creek (PL1)	Lot 3 RP736765
	Lot 2 RP740673
	Lot A SP149852
	Lot B SP166149
	Lot 10 SP166149
	Lot 24 RP893447
	Lot 22 RP893447
	Lot 5 SP191791
	Lot 6 SP224403
	Lot 7 SP191783
	Lot 4 SP224403
	Lot 162 N157350
	Lot 2 RP749476
Bingil Bay (PL2)	Lot 4 RP747211
	Lot 6 RP898586
	Lot 4 RP709316
Wylies Creek (PL4)	Lot 41 SP169219
	Lot 2 RP723477

5.0 SUMMARY

The area between Mission Beach township and Midgeree Bar Road contains four primary linkages and a number of inter-connected secondary linkages.

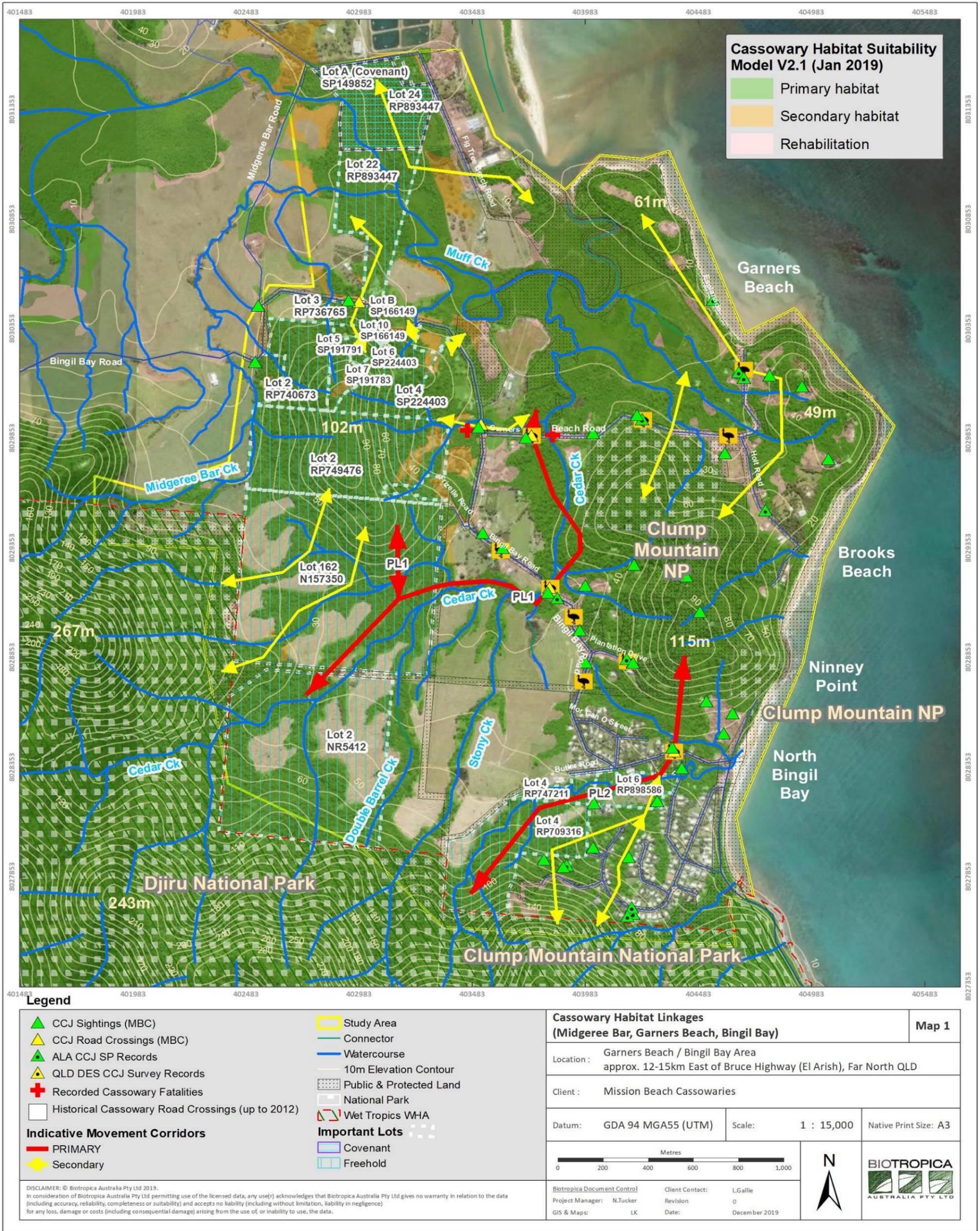
Primary linkages are considered essential in maintaining habitat connectivity across the study area whilst secondary linkages provide connections in more fragmented areas, and between smaller patches of regrowth.

The majority of primary and secondary linkages are associated with watercourses. The restoration of wide riparian zones, with a focus on high-value cassowary food plants, is likely to make a significant contribution to the quality of cassowary habitat in the study area.

Weeds are seen as the main threat to existing linkage integrity, particularly Guinea grass which is invasive along watercourses, offers no habitat resources and is very resistant to woody native succession.

Clump Mt. N.P and Djiru N.P. contain the highest value habitat resources, but intervening freehold tenures are the key to maintaining connected cassowary populations. Key freehold Lots are identified and owners of these Lots can make important contributions to cassowary conservation through habitat restoration and protection.

APPENDIX 1: MAPS







Legend

- Study Area
- Connector
- Watercourse
- 10m Elevation Contour
- National Park
- Wet Tropics WHA

Regional Ecosystems V11 - VMA Status

- Cat A or B containing endangered
- Cat A or B containing of concern
- Cat A or B that is least concern
- Cat C or R containing endangered
- Cat C or R containing of concern
- Cat C or R that is of least concern
- Non-remnant
- Water

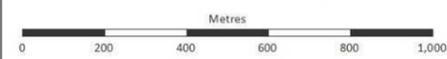
Cassowary Habitat Linkages (Midgeree Bar, Garners Beach, Bingil Bay)

Map 3

Location: Garners Beach / Bingil Bay Area
approx. 12-15km East of Bruce Highway (El Arish), Far North QLD

Client: Mission Beach Cassowaries

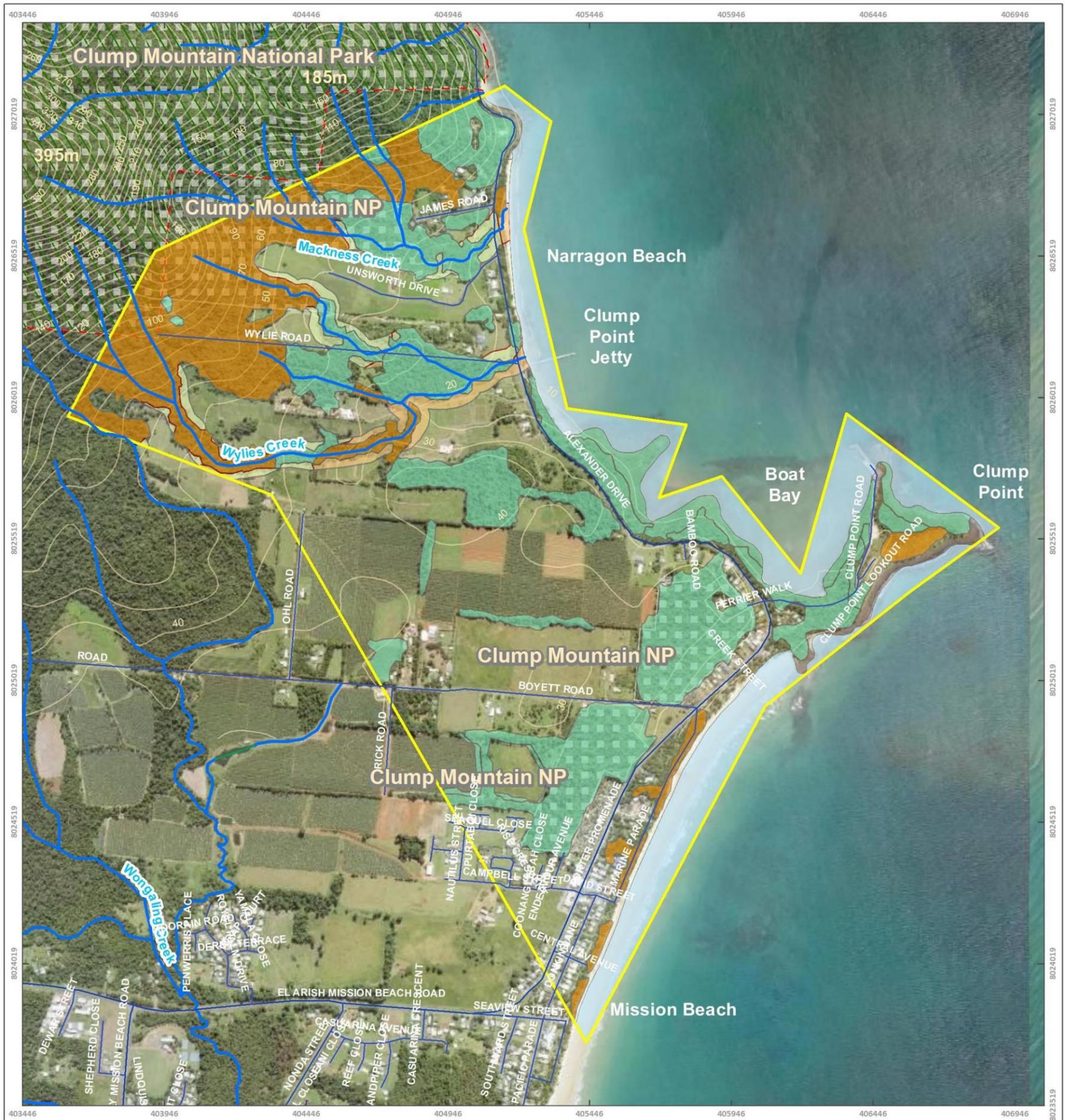
Datum: GDA 94 MGA55 (UTM) Scale: 1 : 15,000 Native Print Size: A3



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Date: December 2019



Legend

- Study Area
- 10m Elevation Contour
- Connector
- Watercourse
- Wet Tropics WHA

Regional Ecosystems V11 - VMA Status

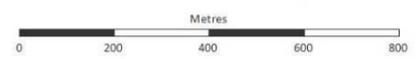
- Cat A or B containing of concern
- Cat A or B that is least concern
- Cat C or R containing of concern
- Cat C or R that is of least concern
- Non-remnant
- Water
- National Park

Cassowary Habitat Linkages (North Mission Beach) Map 4

Location : Northern Mission Beach Area (approx. 16km SE of Bruce Highway (El Arish), Far North QLD)

Client : Mission Beach Cassowaries

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