Conservation Assessment of the black-breasted button-quail, *Turnix melanogaster* (Gould, 1837) (Turnicidae) in Australia

NSW Threatened Species Scientific Committee, 21/05/26

Turnix melanogaster (Gould, 1837) (Turnicidae)

Distribution: Queensland and New South Wales
Current EPBC Act Status: Vulnerable
Current NSW BC Act Status: Critically Endangered
Current QLD NC Act Status: Vulnerable
Proposed listing on NSW BC Act: Vulnerable

Reason for change: not genuine. The previous listing was on the basis of extinction risk in NSW. This assessment is on the basis of extinction risk in Australia. Most information on the status of the species is from Queensland and there is little recent information for the species' occurrence in NSW.

Summary of Conservation Assessment

The black-breasted button-quail (*Turnix melanogaster*) was found to be eligible for listing as Vulnerable under IUCN Criteria B2ab(ii,iii,v) and C2a(ii). The main reasons for this species being eligible are (1) it has a low total number of mature individuals (estimated at 3,000 in Australia); (2) all mature individuals occur within one subpopulation; (3) the population occurs in one threat-defined location; and (4) there is an inferred continuing decline in the number of mature individuals, the area of occupancy, and the area, extent, and quality of habitat.

Female black-breasted button-quail (*Turnix melanogaster*). Credit: Patrick Webster.

Description and Taxonomy

The black-breasted button-quail *Turnix melanogaster* is a conventionally accepted species (ABRS 2022) in the family Turnicidae (Paton *et al*. 2003). The species is described as "*c*. 18 cm; wingspan male 32–35 cm; weight: male 65 g, female 100 g. Large plump pale-eyed button-quail; similar in size to painted button-quail *Turnix varius*. Sexes differ in plumage and size; female slightly larger. No seasonal variation. Juveniles separable. Immatures not separable" (Marchant and Higgins 2006). The adult male has "forehead, and sides of head and neck, white, finely speckled blackish, heaviest on sides of neck; darker patch on ear-coverts; crown and nape, brownish grey, with black stripe each side, scalloped rufous-brown. Hindneck and upper mantle, rufous, mottled brownish grey and boldly spotted white. Mantle, upper back and all but outermost scapulars, brownish grey, barred rufous-brown and black, with narrow grey-brown fringes and bold white streaks; subscapulars and outermost scapulars, brownish grey, forming uniform pale stripe above folded wing. Lower back, rump, upper tail-coverts and tail, similar to rest of upperparts but more uniform brownish grey, with finer barring and inconspicuous white streaks. Central inner wing-coverts, rufous-brown with black submarginal streak and prominent white edges and elongate spots; form brownish panel (streaked and spotted white) that contrasts with dark grey-brown rest of upperwing. Chin and centre of throat, white. Foreneck and breast coarsely spotted and barred black and white; mottled rufous-brown on sides of foreneck and breast. Rest of underbody, ashy grey with indistinct fine dark barring. Underwing, ashy grey. Bill, mid-grey with dark-grey culmen. Iris, cream-white. Legs and feet, dull yellow". The adult female is "as male except whole head, black, washed chestnut on rear-crown and nape, with fine white spots forming supercilium and weak moustachial stripe. Hindneck and sides of neck, black, boldly spotted white. Foreneck and breast, black, with profuse white spotting on sides of foreneck changing to broader barring on sides of breast, white markings becoming more sparse toward midline of breast. Rest of underbody as male except darker ashy grey. Central inner wing-coverts tend to appear spotted rather than streaked white. Juvenile at first, much smaller, without tail, and with downy head. When older, similar to adult male but inner wing-coverts, duller brown, with broader white streaks and thicker hook-shaped black submarginal streak extending round tip; upperparts also duller brownish-grey, with bolder black blotches on outer back and central scapulars and pale streaking less prominent generally; iris, duller, light bluish-grey" (Marchant and Higgins 2006).

Male and juvenile *Turnix melanogaster* are often confused with the painted button-quail *Turnix varius* (Smyth *et al*. 2001). They can be distinguished from *Turnix varius* by their dark breast and white eyes (Commonwealth DCCEEW 2022).

Distribution and Abundance

Turnix melanogaster is a cryptic, shy species restricted to dry rainforest habitat and has been recorded in northern New South Wales (NSW) and southern Queensland (Qld) (Hamley *et al*. 1997; Milledge and McKinley 1998). This conservation assessment is based on its entire Australian distribution. In NSW, sightings range from the Border Ranges National Park (NP) (NSW) in the north, and south into the Nightcap Range at Rocky Creek in Whian Whian State Conservation Area (SCA) (NSW) (Milledge and McKinley 1998).

Turnix melanogaster has been recorded further south and west into NSW, from around Dorrigo and Walcha (Smyth and Young 1996). However, these areas have

subsequently been cleared for agriculture (Milledge 1999). Some records are likely to be that of the sympatric *Turnix varius*, which may be confused with male, juvenile, and immature, *Turnix melanogaster* (Marchant and Higgins 1993) throughout the drier parts of its range (Flower *et al*. 1995). Some older sightings based only on platelets (large circular scrapings on the ground made by button-quails while scratching through the leaf litter (pivot feeding) in search of prey) are not reliable as similar scrapings are made by *Turnix varius* (M. Andren pers. comm. May 2024).

The majority of *Turnix melanogaster* records (93%) in NSW were made in the 1990s (NSW Government 2025a). Extensive searches in 1999 and 2000 at 44 sites, including many where the species had previously been recorded, resulted in no definitive evidence of the species in NSW (Milledge 2000). It has been suggested that *Turnix melanogaster* may now be restricted to Queensland (Milledge 2000; BirdLife International 2022; Commonwealth DCCEEW 2022). However, there is a possibility that *Turnix melanogaster* could still be extant in NSW as the species has not been the target of extensive searches using the latest survey methods *(e.g*. song meters and camera traps), and there is suitable habitat that is relatively inaccessible and not frequented by birdwatchers, particularly for the length of time it might take to observe this cryptic species (M. Andren pers. comm. February 2025).

The current distribution of *Turnix melanogaster* in Queensland ranges from Byfield north of Rockhampton in central Queensland, west to Palmgrove NP (Qld), south to the Bunya Mountains and the New South Wales border and east onto K'gari (Fraser Island) (Milledge and McKinley 1998; BirdLife International 2022; Webster *et al*. 2022; Appendix 2). The species occurs across varying land tenures in Queensland, and one survey recorded 60% of known sites in state forests, 16% in national parks, and 24% on either private or council land (Flower *et al*. 1995).

In 2021, the total population of *Turnix melanogaster* was estimated to be approximately 4,800 mature individuals (range 3,000–6,500) (Webster *et al.* 2021), updating an earlier estimate of 5,000 ± 1,700 mature individuals in 2011 (BirdLife International 2022). However, the reliability of both estimates is low due to a lack of baseline data (Webster *et al*. 2022; Commonwealth DCCEEW 2022).

It is probable that individuals of *Turnix melanogaster* move significant distances in response to variation in environmental and habitat conditions, evidenced by its periodic absence in areas of south-east Queensland from January to March and later in wetter years, along with its presence on small islands (Webster *et al*. 2021). It was previously thought that there could be up to 14 subpopulations of *Turnix melanogaster* (Hamley *et al*. 1997). However, as the species can travel large distances, including through suboptimal habitat, it is now considered likely that there is a single subpopulation (Webster *et al*. 2021), in accordance with the IUCN (2024) definition of a subpopulation.

Extent of occurrence and area of occupancy

The extent of occurrence (EOO) for *Turnix melanogaster* is estimated at 163,969 km^2 based on a minimum convex polygon enclosing all mapped occurrences of the species, the method of assessment recommended by the IUCN (2024). The estimated area of occupancy (AOO) is 1,644 km^2 based on 2 x 2 km grid cells, the scale recommended for AOO by the IUCN (2024). EOO and AOO were calculated in ArcGIS Pro (ESRI 2023) from a cleaned dataset of 1,519 records sourced from NSW BioNet (NSW Government 2025a), QLD WildNet (Queensland Government 2024), Atlas of

Living Australia (2025) and Birdata (BirdLife Australia 2025). Forty records were removed due to inaccurate georeferencing or habitat loss from land clearing (Milledge 1999). A further 25 records were removed where *Turnix melanogaster* were only identified as present at a site from the presence of platelets, which cannot be distinguished with certainty from those of the *Turnix varius* (P. Webster pers. comm. February 2025).

Cultural Significance

Turnix melanogaster occurs on the lands of the Bailai, Balun, Bunda, Bundjalung, Butchulla, Danggan, Darumbal, Gooreng Gooreng, Gubbi Gubbi, Gurang, Guwinmal, Jagera, Quandamoka, Taribelang Ugarapul, Waka Waka, and Yuggera people (Horton 1996; Webster *et al*. 2021). The Butchulla Traditional Owners of K'gari and the adjacent south-east Queensland mainland know *Turnix melanogaster* as mur'rindum (Queensland Government 2025a).

Box 1. Conway Burns – Chair, of the Butchulla Aboriginal Corporation shared this traditional ecological knowledge of mur'rindum.

One story is "The Teaching" where Yindinjie took each animal and the people (women and men separately) into his circle and taught them lore, duty of care and their role of responsibilities to look after country, to move seasonally within the country that was given, to protect, preserve, harvest and to be sustainable. That was the lore given, mur'rindum has a duty of care for the land, same as the people did and still do, and this footprint involves traveling seasonally to harvest what is available and to return when the land replenishes. The mur'rindum undertake their feeding ceremonies where they dig in patterns in and out of the ground forming platelets like the way Butchulla people made their ceremonial rings. Their little circles will be replenished. K'gari is our mother who provides food, water, and shelter, and in return we protect and preserve her. The three main pillar messages of the Butchulla Lore are: What is good for country must come first, do not touch or take anything that does not belong to you, and if you have plenty, you must share – not just food, but knowledge etc.

This assessment is not intended to be comprehensive of the Traditional Ecological Knowledge that exists for *Turnix melanogaster*, or to speak for Aboriginal people. Aboriginal people have a long history of biocultural knowledge, which comes from observing and being on Country, and evolves as it is tested, validated, and passed through generations (Woodward *et al.* 2020). Aboriginal peoples have cared for Country for tens of thousands of years (Bowler *et al.* 2003; Clarkson *et al.* 2017). There is traditional ecological knowledge for all plants, animals and fungi connected within the kinship system (Woodward *et al.* 2020). Traditional ecological knowledge referenced in this assessment belongs to the relevant knowledge custodian and has been referenced in line with the principals of the NSW *Indigenous Cultural and Intellectual Property* (ICIP) protocol (Janke and Company 2023).

Ecology

Habitat

Turnix melanogaster inhabits low, closed, dry rainforest, including notophyll vine forest, microphyll vine forest, semi evergreen thicket, littoral vine forest, Brigalow vine scrub or Brigalow-Belah closed forest (Bennet 1985; Smith *et al*. 1998; Smyth *et al*. 2001; Houston *et al*. 2011; Garnett *et al*. 2011; Webster *et al*. 2022), bottle scrub (Hamley *et al*. 1997). *Turnix melanogaster* is restricted to rainforests primarily in areas where the annual rainfall is around 770–1,400 mm and there is a distinct dry season (Bennet 1985; Milledge and McKinley 1988; Marchant and Higgins 2006). These forest types are typically nutrient dense on rich, deep alluvial soils, which are also highly prized for agriculture (Flower *et al*. 1995).

The defining features of these forest types is their closed canopies (>70%), sparse shrub layers, and deep consistent litter layers, which are requisite for *Turnix melanogaster* (Hughes and Hughes 1991; Hamley *et al*. 1997; Smyth *et al*. 2001; Houston *et al*. 2011). The species can also be found in *Araucaria cunninghamii* plantations and lantana (*Lantana camara*) thickets (Smyth *et al*. 2001) connected to, or within dry rainforest or vine thicket (Bennet 1985; Houston *et al*. 2011). *Turnix melanogaster* will forage diurnally and roost nocturnally in these environments (Smyth *et al*. 2001) but retreat to closely connected vine forest at other times (Houston *et al*. 2011). The species has also been found in *Acacia* regrowth associated with beach ridges (Houston *et al*. 2011) but only in suitable habitat on sandy soils in high rainfall areas (Flower *et al*. 1995).

In north-eastern NSW the habitat differs from that found in Queensland (Milledge and McKinley 1998). Valid records from NSW include those from wet closed forests (notably subtropical rainforest), and from wet eucalypt forest (Flower *et al*. 1995). Dry deciduous closed forest or vine scrub patches still exist in northern NSW, west of the Great Dividing Range in the Bingara-Yallaroi area, but have been degraded by cattle, and the habitat is unlikely to be suitable for *Turnix melanogaster* due to lack of a deep litter layer which is essential for the species (Milledge 1999).

By 1960, 90% of the dry rainforest habitat across the range of *Turnix melanogaster* had been cleared, including through the Brigalow Belt bottletree scrub (Houston *et al*. 2011), with the remainder fragmented, disturbed, and of small patch sizes (Hamley *et al*. 1997). In south-east Queensland, only 25% of vine forest remains in large patches within national parks and reserves, with much of the habitat extending onto private land or within timber reserves (Smyth and Pavey 2001). Flower *et al*. (1995) report that of the suitable *Turnix melanogaster* habitat in Queensland state forests and national parks, most is fragmented and of small patch size, with 22 sites on less than 25 ha, 14 sites on 25–100 ha, and 11 sites on >100 ha. On the Ravensbourne Plateau (Qld), *Turnix melanogaster* appeared to avoid small patches of habitat <7 ha (Smyth and Pavey 2001). Due to land clearing in south-east Queensland, remnant large (around 60 ha), undisturbed patches of dry rainforest are rare. The remaining undisturbed patches are around 10 ha, surrounded by agricultural land, and are unlikely to support *Turnix melanogaster* when patch size is a limiting factor (Smyth and Pavey 2001).

Within these forest types, canopy species include *Flindersia collina*, *Flindersia xanthoxyla*, *Owenia venosa*, *Araucaria cunninghamii* and *Araucaria bidwillii* (Smith *et al*. 1998). In coastal littoral forest on K'gari, *Eucalyptus* spp., *Corymbia* spp., and

Acacia spp., are dominant along with vine forest species including *Cyclophyllum coprosmoides*, *Cupaniopsis anacardioides*, and *Polyscias elegans* (Webster *et al*. 2022).

Behaviour

Turnix melanogaster is a cryptic, ground dwelling bird, that flies reluctantly over short distances and is more likely to run away or be still when startled (Hughes and Hughes 1991; Smyth and Pavey 2001). However, their presence on islands, *e.g*., K'gari, and isolated habitat patches, *e.g*., throughout the Lockyer Valley suggest that they are competent flyers (P. Webster pers. comm. May 2024).

Females are polyandrous and there is conflicting information relating to territory defence. It has been noted that females defend their territory from other females (Bennett 1985; Hughes and Hughes 1991). Territory size has been reported to vary from *c.* 1.5 ha (Hughes and Hughes 1991) to 2.2–6.1 ha (Smith *et al*. 1998). In a radio-tracking study of 10 adult birds (7M, 3F), Smith *et al*. (1998) reported that territories overlapped within and between sexes and were not exclusive. It is possible that territory defence is controlled subtly through female vocalisation (Smith *et al*. 1998), or that territories are transient as in some other bird species (Recher 1988). Females of *Turnix melanogaster* are often seen alone or with one to multiple males, and up to eight young, whereas males are seldomly observed alone (Flower *et al*. 1995).

Reproduction

Records of *Turnix melanogaster* reproductive habits are rare. Females use their booming or drumming call to attract males and advertise their breeding territory (Hughes and Hughes 1991). Females lay 3–4 eggs, and breeding occurs between October and April (Bennett 1985; Hughes and Hughes 1991), and is known to be associated with wet periods of >100 mm of rain (Flower *et al*. 1995). It has been suggested that *Turnix melanogaster* opportunistically breeds in wetter times to ensure the availability of adequate food resources (Flower *et al*. 1995). Nest preparation is a joint effort between the male and female and after the eggs have been laid, the male incubates the eggs (~12–16 days) and provides care to the hatchlings (Bennett 1985; Flower *et al*. 1995; Smith *et al*. 1998). Hughes and Hughes (1991) have also observed females tending their young. The nidifugous young can feed independently at two weeks of age and become sexually mature in less than six months (Flower *et al*. 1995).

Roosting

Turnix melanogaster roost on the ground in leaf litter, on fallen logs, and in lantana thickets, and have been observed in the open and under the cover of shrubs (McConnell and Hobson 1995; Smyth *et al*. 2001). The species does not roost on branches or in trees as it does not have a hind toe and therefore has no ability to perch (Fulgenhauer 1980).

Diet

Turnix melanogaster feed on invertebrates, seeds, and fruit (Hughes and Hughes 1991; Marchant *et al*. 2006). Observations and faecal analysis show that *Turnix melanogaster* are primarily insectivorous, feeding preferentially on beetles, ants, earwigs, and pseudoscorpions (McConnell and Hobson 1995; Webster *et al*. 2019).

Turnix melanogaster has been observed foraging in closed vine forest, into the transition zone between vine forest and open forest, and in lantana thickets

(McConnell and Hobson 1995). *Turnix melanogaster* pivot feeds by standing on one leg while scratching and scraping the leaf litter in search of invertebrates in a circular motion forming an oval depression (*i.e*., platelet) through the litter which can extend into the uppermost topsoil (Milledge and McKinley 1998). Ten to 40 platelets are typical per site but can number over 100 (Smyth and Pavey 2001).

Lifespan and generation length

The generation time of *Turnix melanogaster* is estimated to be 3.2 years, age at first reproduction is 1.12 years, maximum longevity is 8.9 years, and average annual adult survival is 69% (Bird *et al*. 2020; Webster *et al*. 2021).

Threats

Turnix melanogaster faces concurrent threatening processes including the inferred adverse effects of prolonged drought, adverse fire regimes and habitat loss, exacerbated by weed encroachment, predation by feral cats and foxes, and the effects of herbivory and grazing by cattle and feral pigs.

Drought

Prolonged drought is a threat to *Turnix melanogaster*. *Turnix melanogaster* are known to breed in areas, and at times, of high rainfall (Hughes and Hughes 1991). Prolonged droughts are inferred to negatively affect breeding in this species with subsequent reductions in population size and the vacation of affected habitats (Flower *et al*. 1995).

Drought results in a reduction in canopy cover, the desiccation of leaf litter (affecting sheltering and foraging), and an increased risk of fire (Webster *et al*. 2021). Altered leaf litter dynamics (*i.e*., the amount of litter fall, depth, and moisture), affects the composition and abundance of leaf litter invertebrates (Grimbacher *et al*. 2018), which in turn could affect prey availability for *Turnix melanogaster*. Watson (2015) recorded significant declines in ground foraging birds during drought when leaf litter was experimentally removed due to the reduction in foraging substrate and invertebrate abundance, and Bessell Koprek *et al*. (2023) reported declines in invertebrate abundance under drought conditions.

Several historical droughts have affected most of the distribution of *Turnix melanogaster* in NSW and Queensland, including the 1965–1968 drought, the 1982–1983 drought, the 1997–2009 Millennium drought, and the 2017–2020 drought (BOM 2024; Devanand *et al*. 2024). The 2017–2020 drought encompassed the entire Murray-Darling basin and the vast majority of *Turnix melanogaster* habitat in south-east Queensland and northern NSW (Devanand *et al*. 2024). It was the most severe drought in over 120 years in NSW and was critical in the Border Rivers region where unprecedented rainfall deficits were experienced (Steffen *et al*. 2019; NSW Government 2025b) in areas with suitable habitat for *Turnix melanogaster*.

Droughts are expected to increase in frequency and duration throughout Australia, and modelling shows that areas of northern NSW and south-east Queensland are predicted to experience higher temperatures and lower rainfall in the coming years (Steffen *et al*. 2019). In northern NSW, by 2050 under a low emissions scenario, temperatures are predicted to rise by 1.1°C, and hot days (≥ 35°C) will increase by 5.9 days per year (NSW DCCEEW 2024). Under high emission scenarios, temperatures are predicted to increase by 1.7°C, and hot days will increase by 8.6 days (NSW DCCEEW 2024). Rainfall by 2050 is predicted to decrease by 6% under low emission

scenarios, and by 11.5% under high emission scenarios (NSW DCCEEW 2024). Climate models predict hotter days in south-east Qld with reduced rainfall, and more time in drought (Queensland Government 2025b). By 2070, temperatures are predicted to rise in Queensland by 1.2°C under low emission scenarios, and by 3.9°C under high emission scenarios (Queensland Government 2025b). Rainfall is predicted to decrease in winter and spring in south-east Qld under low and high emission scenarios (Queensland Government 2025b).

'Anthropogenic Climate Change' is listed as a Key Threatening Process under the NSW *Biodiversity Conservation Act 2016*. 'Loss of climatic habitat caused by anthropogenic emissions of greenhouse gases' is listed as a Key Threatening Process under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Adverse fire regimes

Adverse fire regimes, including high intensity fire and high frequency fire, are a threat to *Turnix melanogaster*. The 2019–20 wildfires burnt at least 49,275 ha of potential habitat for *Turnix melanogaster* (DPIE 2021; A. Meiklejohn *in litt.* February 2025; Queensland Government 2025a; Appendix 2). Large areas of dry rainforest were burnt in these fires and up to 20% of complex notophyll vine forest was affected (DAWE 2020). The inferred adverse effects of these fires on *Turnix melanogaster* include loss of foraging and roosting sites, possible direct loss of individuals, reduced food availability due to burnt leaf litter and subsequent invertebrate prey losses.

Large areas within the NSW and QLD distribution of *Turnix melanogaster* were burnt in the 2019–20 fires including 767 ha (31%) of Whian Whian State Conservation area (NSW), 609 ha (1.9%) of Borders Ranges NP (NSW), and 3,035 ha (37%) of Nightcap NP (NSW) (DPIE 2021; Appendix 2). In 2020 wildfire burnt 46% of K'gari (Qld), affecting 16,543 ha (2%) of potential *Turnix melanogaster* habitat (Meiklejohn *et al*. 2023). South-west of Brisbane, Main Range NP (Qld) and Mt Barney NP (Qld) were severely affected by the 2019–20 fires with 19,592 ha and 8,729 ha burnt respectively (Hines *et al*. 2021; Appendix 2). Lamington NP (Qld) south of Brisbane was also affected, with 1,532 ha burnt (Queensland Government 2025a; Appendix 2) including 1515 ha within the Lamington NP Gondwana Rainforests World Heritage Area (Hines *et al*. 2020). In Bulburin NP north-west of Bundaberg (Qld) 26% (2,116 ha) of rainforest was burnt in the 2019-2020 fires (Melzer *et al*. 2020).

Under changing climate scenarios, fires are projected to increase in frequency and intensity (Steffen *et al*. 2019) and dry rainforests including Gondwana rainforests are projected to be impacted by higher average temperatures across all seasons, with more hot days, and less winter rainfall, thereby heightening fire risk (DAWE 2020).

It has been suggested that frequent prescribed burning negatively affects *Turnix melanogaster* habitat as it reduces the available leaf litter rendering the habitat unsuitable for foraging (Hughes and Hughes 1991). On cessation of burning, as occurred in Widgee, Queensland in the late 1960s, *Turnix melanogaster* numbers increased, and leaf litter depths stabilised at 25–35 mm (Hughes and Hughes 1991).

'High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition', is listed as a Key Threatening Processes under the NSW *Biodiversity Conservation Act 2016*. 'Fire regimes that cause declines in biodiversity' is listed as a Key Threatening Processes

under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Anthropogenic habitat loss

Estimates suggest that ~90% of habitat of *Turnix melanogaster* has been cleared since European colonisation (Hamley *et al*. 1997). Extensive clearing of low closed forests occurred prior to 1970 for agriculture, pine plantations, and on private land (Flower *et al*. 1995, Hamley *et al*. 1997). The habitat that remains is fragmented, and dry rainforests are not well represented in conservation reserves (Flower *et al*. 1995; Smyth and Pavey 2001).

Land clearing across the range of *Turnix melanogaster* is an ongoing threat. In NSW and Queensland, the Brigalow Belt bioregion, which contains prime habitat for *Turnix melanogaster*, has been extensively cleared, accounting for 44% of Queensland's total cleared woody vegetation (Reside *et al*. 2017). In and around Pialba (Qld) *Turnix melanogaster* sites abutting agricultural land were developed for housing (Flower *et al*. 1995) and clearing for housing is also occurring within this species' habitat in areas such as Hervey Bay (Qld) (Commonwealth DCCEEW 2022).

Clearing has contributed to the loss of habitat, loss of mature individuals, fragmentation of populations, thus reducing their viability and persistence, and reduction of EOO and AOO. Fragmented habitat increases edge effects including invasion by weeds, drying of leaf litter and a concomitant reduction in invertebrate prey, as well as increased fire and drought (Commonwealth DCCEEW 2022).

'Clearing of native vegetation' is listed as a Key Threatening Process under the NSW *Biodiversity and Conservation Act 2016*. 'Land clearance' is listed as a Key Threatening Process under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Weed encroachment

The invasive scrambling vine *Dolichandra unguis-cati* (cat's claw creeper) is a major threat to *Turnix melanogaster* as it forms dense carpets across the litter smothering access to the forest floor, while simultaneously covering and smothering shrubs and trees (Webster *et al*. 2021). This vine can grow to 30 m in height, overtaking most of the vegetation in its path, decreasing available feeding and roosting habitat for *Turnix melanogaster* (Webster et al. 2021; DPI 2024).

Turnix melanogaster are no longer found in areas infested by cat's claw creeper causing localised extinctions in previously occupied sites, such as a remnant patch within the Birdwood Scrub, Gowrie (Qld) (BirdLife International 2022). In the 1990s and early 2000s, *Turnix melanogaster* were regularly encountered at this site; however, no evidence of them was found at the Gowrie site in 2020 and 2021, despite repeat surveying (BirdLife International 2022). Similar disappearances of *Turnix melanogaster* have been recorded at other cat's claw creeper-infested sites, including Redwood Park (Qld) and Sharron Gorge Nature Park (Qld) (BirdLife International 2022).

Other weeds negatively impacting habitat of *Turnix melanogaster* include *Anredera cordifolia*, *Megathyrsus maximus*, *Asparagus plumosus*, and *Rivina humilis* (Commonwealth DCCEEW 2022). *Anredera cordifolia* behaves similarly to cat's claw

creeper, forming dense climbing blankets that smother vegetation beneath them (Commonwealth DCCEEW 2022).

While *Turnix melanogaster* uses lantana for shelter and roosting, the plant itself is extremely invasive, and thrives on disturbances such as fire or herbivory from cattle, resulting in rapid expansion into thickets, which can detrimentally alter the dry rainforest community structure (Gentle and Duggin 1997). Lantana infestations can increase the impacts of fire, facilitating spread in dry rainforest, which usually has an open understorey, by providing horizontal and vertical ladder fuels that reach into the canopy increasing the risk of crown fires (Berry *et al*. 2011).

'Invasion and establishment of exotic vines and scramblers', 'Invasion, establishment and spread of Lantana, *Lantana camara*', 'Invasion of native plant communities by exotic perennial grasses', and 'Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants', are listed as Key Threatening Processes under the NSW *Biodiversity and Conservation Act 2016*.

'Novel biota and their impact on biodiversity', and 'Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants', are listed as Key Threatening Processes under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Predation by feral cats and foxes

As small, ground-dwelling birds, *Turnix melanogaster* is easy prey for cats and foxes; however, these threats are not well quantified (Mathieson and Smith 2009). Of 40 bird species modelled in a review of papers where bird mortality attributed to cats was listed, three button-quail species were identified as second (chestnut-backed button-quail, *Turnix castanotus*), third (painted button-quail *Turnix varius*), and fourth (buff-breasted button-quail, *Turnix olivii*) most at risk from cat predation (Woinarski *et al*. 2017). Few studies have been conducted on *Turnix melanogaster*, and only one that directly attributes cause of mortality (Smyth and Pavey 2001). Cats are known to inhabit black-breasted button-quail habitat (Meiklejohn *et al*. 2023), and it is likely that *Turnix melanogaster* are as highly susceptible to being preyed upon by cats as their congeners listed in Wonarski *et al*. (2017). Smyth and Pavey (2001) note two separate instances of depredation of black-breasted button-quail: one in their unpublished study, where two out of nine tracked *Turnix melanogaster* were killed by cats, and the second in their radio-tracking study where one of three depredated birds not killed by raptors, was either killed by a feral cat (*Felis catus*) or a dingo (*Canis familiaris*), as both species were seen within the study area. While the prevalence of cats in rainforest habitat is thought to be low (Doherty *et al*. 2015; Legge *et al.* 2017), cats are regularly seen in northern NSW dry rainforest (M. Andren and B. Hawkins pers. comm. February 2025).

After fire, foxes and cats have been shown to be particularly active in recently burnt areas (Hradsky 2020), resulting in enhanced risk of predation of ground-dwelling species like *Turnix melanogaster*.

'Predation by the European Red Fox *Vulpes vulpes* (Linnaeus, 1758)', and 'Predation by the Feral Cat *Felis catus* (Linnaeus, 1758)', are listed as Key Threatening Processes under the NSW *Biodiversity and Conservation Act 2016*. 'Predation by European red fox', and 'Predation by feral cats', are listed as Key Threatening

Processes under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Herbivory and grazing by cattle and feral pigs

Much of the habitat of *Turnix melanogaster* abuts agricultural land and weed incursion into dry rainforest may be exacerbated by grazing of cattle and feral pigs (*Sus scrofa*) as they reduce the native vegetation allowing weeds to encroach and flourish (Gentle and Duggin 1997). Trampling by livestock also compacts soils and damages litter beds and native vegetation (BirdLife International 2022). Cattle are known to take refuge in habitat of *Turnix melanogaster* and remnant vegetation is often readily accessible (Flower *et al*. 1995).

'Predation, habitat degradation, competition and disease transmission by Feral Pigs, *Sus scrofa* (Linnaeus 1758'), is listed as a Key Threatening Processes under the NSW *Biodiversity and Conservation Act 2016*. 'Predation, habitat degradation, competition and disease transmission by feral pigs', is listed as a Key Threatening Process under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Threat-defined locations

Turnix melanogaster is considered to occur in one threat-defined location. Drought is the most serious plausible threat that results in the lowest number of threat-defined locations (in accordance with the IUCN 2024 definition) for this species. Almost the entire *Turnix melanogaster* range has been affected by the last four prolonged droughts, including those from 2017–2019, the Millennium drought from 1997–2009, 1982–1983 drought, and the 1965–1968 drought (BOM 2024). Island habitats (*i.e*. K'gari) were also affected by the 2017–2019 drought (Devanand *et al*. 2024) and are projected to be affected by future droughts (Collett *et al*. 2023).

Assessment against IUCN Red List criteria

For this assessment it is considered that the survey of *Turnix melanogaster* has been adequate and there is sufficient scientific evidence to support the listing outcome.

Overall assessment outcome

Turnix melanogaster was found to be eligible for listing as Vulnerable under IUCN Criteria B2ab(ii,iii,v) and C2a(ii).

Criterion A Population size reduction

A. Population size reduction. Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4			
	Critically Endangered	Endangered	Vulnerable
A1	≥ 90%	≥ 70%	≥ 50%
A2, A3 & A4	≥ 80%	≥ 50%	≥ 30%

A1 Population reduction observed, estimated, inferred, or suspected in the past where the causes of the reduction are clearly reversible AND understood AND have ceased.

A2 Population reduction observed, estimated, inferred, or suspected in the past where the causes of reduction may not have ceased OR may not be understood OR may not be reversible.

A3 Population reduction projected, inferred or suspected to be met in the future (up to a maximum of 100 years) *[(a) cannot be used for A3]*.

A4 An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a max. of 100 years in future), and where the causes of reduction may not have ceased OR may not be understood OR may not be reversible.

based on any of the following:

(a) direct observation *[except A3]*

(b) an index of abundance appropriate to the taxon

(c) a decline in area of occupancy (AOO), extent of occurrence (EOO) and/or habitat quality

(d) actual or potential levels of exploitation

(e) effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.

Outcome

Turnix melanogaster is not met under Criterion A.

Population reductions

There are insufficient data to estimate, infer or project the magnitude of past or future reductions in the population size of *Turnix melanogaster* over 10 years. The three-generation timeframe is 9.6 years, so the 10-year time frame has been used as it is longer.

Criterion B Geographic range

B. Geographic range in the form of either B1 (extent of occurrence) AND/OR B2 (area of occupancy)			
	Critically Endangered	Endangered	Vulnerable
B1. Extent of occurrence (EOO)	< 100 km²	< 5,000 km²	< 20,000 km²
B2. Area of occupancy (AOO)	< 10 km²	< 500 km²	< 2,000 km²
AND at least 2 of the following 3 conditions:			
(a) Severely fragmented OR Number of locations	= 1	≤ 5	≤ 10
(b) Continuing decline observed, estimated, inferred or projected in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent and/or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals			
(c) Extreme fluctuations in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (iv) number of mature individuals			

Outcome

Turnix melanogaster is eligible for listing as Vulnerable under criteria B2ab(ii,iii,v).

EOO and AOO

The estimated EOO for *Turnix melanogaster* is 163,969 km^2 and the estimated AOO is 1,644 km^2.

Number of threat-defined locations

Turnix melanogaster is found at one threat-defined location.

Severely fragmented

Turnix melanogaster does not meet the IUCN (2024) definition of severely fragmented as the species is considered to occur in one subpopulation that supports a viable population.

Continuing decline

Continuing decline of *Turnix melanogaster* is inferred in the area of occupancy (AOO), and in the area, extent and quality of habitat, due to the effects of drought, adverse fire regimes, habitat loss, encroachment by weeds, and predation from feral cats and foxes.

Increasing drought occurrence and severity is an inferred threat to *Turnix melanogaster*. Direct impacts of drought include reduced invertebrate prey due to drying of leaf litter that can lead to reduction of habitat and population decline (Flower *et al*. 1995).

Adverse fire regimes are an inferred threat to *Turnix melanogaster*. In the 2019–20 wildfires, almost 50,000 ha of potential habitat for *Turnix melanogaster* was burnt, including large areas of dry rainforest and complex notophyll vine forest (DPIE 2021; A. Meiklejohn *in litt.* February 2025; Queensland Government 2025a; Appendix 2). Fire adversely affects the species through direct loss of individuals, loss of habitat and loss of invertebrate prey.

Continuing decline in the number of mature *Turnix melanogaster* is inferred due to habitat loss and invasion by the climbing cat's claw creeper that is decimating habitat forcing *Turnix melanogaster* to vacate known strongholds for the species (BirdLife International 2022). The species then must relocate to intact habitat patches, which often entails traversing large areas of cleared land, increasing predation risk.

It can be inferred that the ground-dwelling *Turnix melanogaster* is highly susceptible to predation from feral cats (Woinarski *et al*. 2017). In a south-east Queensland study on *Turnix melanogaster*, a cached button-quail provided evidence of predation by a cat (or possibly a fox), while in a further study, two of nine tracked *Turnix melanogaster* were killed by feral cats (Smyth and Pavey 2001).

In addition, grazing by domestic stock and feral pigs is contributing to the inferred continuing decline of the species' habitat quality (Webster *et al*. 2021; BirdLife International 2022).

Extreme fluctuations

Turnix melanogaster is not known to undergo extreme fluctuations in geographic distribution, number of locations or subpopulations, or population size.

Conclusion

Turnix melanogaster is eligible to be listed as Vulnerable under Criterion B as it has an AOO estimated at 1,644 km^2, occurs in 1 threat-defined location, and is undergoing continuing decline in the area of occupancy, area, extent, and/or quality of habitat, and number of mature individuals.

Criterion C Small population size and decline

C. Small population size and decline				
		Critically Endangered	Endangered	Vulnerable
Number of mature individuals		< 250	< 2,500	< 10,000
AND at least one of C1 or C2				
C1. An observed, estimated or projected continuing decline of at least (up to a max. of 100 years in future):		25% in 3 years or 1 generation (whichever is longer)	20% in 5 years or 2 generations (whichever is longer)	10% in 10 years or 3 generations (whichever is longer)
C2. An observed, estimated, projected or inferred continuing decline AND at least 1 of the following 3 conditions:				
(a)	(i) Number of mature individuals in each subpopulation	≤ 50	≤ 250	≤ 1,000
	(ii) % of mature individuals in one subpopulation =	90–100%	95–100%	100%
(b) Extreme fluctuations in the number of mature individuals				

Outcome

Turnix melanogaster is eligible for listing as Vulnerable under criteria C2a(ii).

Number of mature individuals

The minimum estimated number of mature *Turnix melanogaster* individuals is 3,000 (plausible range 3,000–6,500).

Continuing decline

There is an inferred decline in the number of mature individuals due to the effects of drought, adverse fire regimes, weed encroachment affecting habitat quality and availability, and predation by feral cats and red foxes (see details above).

Mature individuals in each subpopulation

The entire population of *Turnix melanogaster* is likely within one subpopulation (BirdLife International 2022; P. Webster pers. comm. February 2025). The minimum number of mature individuals within this subpopulation is estimated to be 3,000 (range 3,000–6,500).

% of mature individuals in a single subpopulation

All (100%) of the known mature *Turnix melanogaster* individuals are within a single subpopulation (BirdLife International 2022; P. Webster pers. comm. February 2025).

Extreme fluctuations

The *Turnix melanogaster* population does not undergo extreme fluctuations.

Conclusion

Turnix melanogaster is eligible to be listed as Vulnerable under C2a(ii) because there are <10,000 mature individuals in the total population, of which 100% are within one subpopulation, and there is an inferred continuing decline in the number of mature individuals.

Criterion D Very small or restricted population

D. Very small or restricted population			
	Critically Endangered	Endangered	Vulnerable
D. Number of mature individuals	< 50	< 250	D1. < 1,000
D2. *Only applies to the VU category* Restricted area of occupancy or number of locations with a plausible future threat that could drive the taxon to CR or EX in a very short time.	-	-	D2. typically: AOO < 20 km^2 or number of locations ≤ 5

Outcome

Turnix melanogaster is ineligible for listing under Criterion D.

Number of mature individuals

The minimum estimated population for *Turnix melanogaster* is 3,000 mature individuals, exceeding the threshold for listing under this criterion.

Risk of future extinction in a very short amount of time (D2)

Turnix melanogaster occurs at 1-4 threat-defined locations and has an estimated AOO of 1,644 km^2. There are no foreseeable current or future threats that could drive the species to Critically Endangered or Extinct in a short period of time.

Criterion E Quantitative Analysis

E. Quantitative Analysis			
	Critically Endangered	Endangered	Vulnerable
Indicating the probability of extinction in the wild to be:	≥ 50% in 10 years or 3 generations, whichever is longer (100 years max.)	≥ 20% in 20 years or 5 generations, whichever is longer (100 years max.)	≥ 10% in 100 years

Outcome

Turnix melanogaster is considered to be data deficient under Criterion E.

Probability of extinction

There has been no quantitative analysis conducted on *Turnix melanogaster* and there are insufficient data available on this species to be able to conduct them.

Conservation and Management Actions

Turnix melanogaster is currently listed on the NSW *Biodiversity Conservation Act 2016* and a conservation strategy has been developed by the NSW Department of Climate Change, Energy, the Environment and Water under the Saving our Species (SoS) program. The conservation strategy identifies priority locations, critical threats and required management actions to ensure the species is extant in the wild in 100 years. *Turnix melanogaster* sits within the Partnership (widespread) species stream of the SoS program, and the conservation strategy can be viewed here. Management actions to assist the species include weed control, reducing the frequency or excluding fire in areas of known habitat, fencing out livestock from remnant habitat patches, establishing corridors between habitat patches and working with landholders to preserve habitat for *Turnix melanogaster* on private land. Further searches for the species in mapped habitat will also be undertaken.

References

ABRS (2022). *Australian Faunal Directory*. Australian Biological Resources Study, Canberra. Available at https://biodiversity.org.au/afd/home [Accessed 10 March 2025].

Atlas of Living Australia (2025) Black-breasted Button-quail. Available at https://bie.ala.org.au/species/https://biodiversity.org.au/afd/taxa/e728bc3c-6c80-42ac-b2d8-9ee66e82fe85 [Accessed 9 January 2025]

Bennett S (1985) The distribution and status of the Black-breasted Button-quail *Turnix melanogaster*. *Emu – Austral Ornithology* **85**(3), 157–162.

Berry ZC, Wevill K, Curran TJ (2011) The invasive weed *Lantana camara* increases fire risk in dry rainforest by altering fuel beds. *Weed Research* **51**(5), 525–533.

Bessell-Koprek M, Andrews O, Hibbert E, Jaugietis B, Walker T, Miller P, Mueller I, Pay L, Thomas A, McEachern A (2023) The effects of drought on the leaf-litter invertebrates of an Australian Wet Tropics ecosystem: the Daintree Rainforest: Effects of drought on tropical leaf-litter invertebrates. *Field Studies in Ecology*. **4**(1) 1–11.

Bird JP, Martin R, Akçakaya HR, Gilroy J, Burfield IJ, Garnett ST, Symes A, Taylor J, Şekercioğlu ÇH, Butchart SHM (2020) Generation lengths of the world's birds and their implications for extinction risk. *Conservation Biology* **34**, 1252–1261.

BirdLife Australia (2025a) Spotted quail-thrush. https://birdlife.org.au/bird-profiles/spotted-quail-thrush/?srsltid=AfmBOooXoZY2KrqJiypqAVeCyyOzHPrh-Z319B0og8i39IIsfGL5eKGK [Accessed 9 January 2025]

BirdLife Australia (2025b) Birdata. Available at https://birdata.birdlife.org.au/survey-import-data-specification [Accessed 4.02.2025]

BirdLife International (2022) *Turnix melanogaster*. *The IUCN Red List of Threatened Species* 2022: e.T22680556A211931315. https://dx.doi.org/10.2305/IUCN.UK.2022-1.RLTS.T22680556A211931315.en [Accessed 29 May 2024]

BOM (Bureau of Meteorology) (2024) Drought. Available at Previous droughts [Accessed 10 March 2025]

Bowler JM, Johnston, H Olley JM, Prescott JR, Roberts RG, Shawcross W and Spooner N A (2003) New ages for human occupation and climatic change at Lake Mungo, Australia. *Nature* **421**(6925), 837–840.

Clarkson C, Jacobs Z, Marwick B, Fullagar R, Wallis L, Smith M, Roberts RG, Hayes E, Lowe K, Carah X, Florin SA, McNeil J, Cox D, Arnold LJ, Hua Q, Huntley J, Brand HEA, Manne T, Fairbairn A, Shulmeister J, Lyle L, Salinas M, Page M, Connell K, Park G, Norman K, Murphy T, Pardoe C (2017) 'Human occupation of

northern Australia by 65,000 years ago' *Nature* **547**, 306–310. doi:10.1038/nature22968

Collett S, Carpenter-Bundhoo L, Ford E, Butchulla Aboriginal Corporation, Behrendorff L, Blake J, Kennard M (2023). Post-fire monitoring of wetlands threatened species and threatened ecological communities on K'gari (Fraser Island) and Great Sandy Strait Ramsar site. Burnett Mary Regional Group, Bargara.

Commonwealth DCCEEW (2022) National recovery plan for the black-breasted button-quail (*Turnix melanogaster*), Commonwealth of Australia 2022. Department of Climate Change, Energy, the Environment, and Water, Canberra.

DAWE (Department of Agriculture, Water and the Environment) (Commonwealth) (2020) Gondwana Rainforests of Australia State of Conservation update - April 2020 Available at: https://www.dcceew.gov.au/sites/default/files/documents/gondwana-rainforests-state-conservation-update-april-2020.pdf [Accessed 13 March 2025]

Devanand A, Falster GM, Gillett ZE, Hobeichi S, Holgate CM, Jin C, Mu M, Parker T, Rifai S, Ukkola AM *et al*. (2024) Australia's tinderbox drought: An extreme natural event likely worsened by human-caused climate change. *Science Advances* **10**(10), eadj3460.

Doherty TS, Davis RA, van Etten EJB, Algar D, Collier N, Dickman CR, Edwards G, Masters P, Palmer R, Robinson S (2015), A continental-scale analysis of feral cat diet in Australia. *Journal of Biogeography* **42**, 964–975.

DPI (2024) NSW Department of Primary Industries. NSW Weedwise Cat's Claw Creeper (Dolichandra unguis-cati). Available at https://weeds.dpi.nsw.gov.au/Weeds/Details/33 [Accessed 22 January 2025]

DPIE (2021) NSW Department of Planning, Industry and Environment. Fire extent and severity mapping results for the 2019–20 fire year. Available at Fire extent and severity mapping: Annual report for 2019–20, 2018–19 and 2017–18 | Environment and Heritage [Accessed 11 March 2025]

ESRI (2023) ArcGIS Pro 3.1.0 Redlands, CA.

Flower P, Hamley T, Smith GC, Corben C, Hobcroft D, Kehl J (1995) The Black-breasted Button-quail *Turnix melanogaster* (Gould) in Queensland. QFRI Unpublished Report.

Fulgenhauer J (1980) Behaviour of Button Quail. *The Sunbird* **11**(2), 25–39.

Garnett ST, Crowley GM (2000) *The Action Plan for Australian Birds 2000*. Canberra, ACT: Environment Australia and Birds Australia. Available at: https://webarchive.nla.gov.au/awa/20180506211727/http://www.environment.gov.au/resource/action-plan-australian-birds-2000 [Accessed 22 January 2025]

Garnett ST, Szabo, JK, and Dutson G. (2011). 'The Action Plan for Australian Birds 2010.' (CSIRO Publishing:Victoria.).

Gentle CB, Duggin JA (1997) *Lantana camara* L. invasions in dry rainforest – open forest ecotones: The role of disturbances associated with fire and cattle grazing. *Australian Journal of Ecology* **22**, 298–306.

Grimbacher PS, Edwards W, Liddell MJ, Nelson PN, Nichols C, Wardhaugh CW, Stork NE (2018) Temporal variation in abundance of leaf litter beetles and ants in an Australian lowland tropical rainforest is driven by climate and litter fall. *Biodiversity and Conservation* **27**,2625–2640.

Hamley T, Flower P, Smith GC (1997) Present and past distribution of the Black-breasted Button-quail *Turnix melanogaster* (Gould) in Queensland. *The Sunbird* **27**(1), 1–21.

Hines HB, Laidlaw MJ, Buch W, Olyott L, Levy S, Melzer R, Meiklejohn A (2020) Post-fire Assessment Report – Natural Values: 2019 bushfire, Lamington National Park, South East Queensland Region. Brisbane: Department of Environment and Science, Queensland Government.

Hines HB, Levy S, Laidlaw MJ, Midtaune, K, Finlayson S, Meiklejohn A (2021) Post-fire Assessment Report – Natural Values: 2019 bushfire complex, Main Range National Park and adjacent QPWS estate, South West Queensland Region. Brisbane: Department of Environment and Science, Queensland Government

Horton, DR (1996) 'The AIATSIS Map of Indigenous Australia.' (Australian Institute of Aboriginal and Torres Strait Islander Studies). Available at https://aiatsis.gov.au/explore/map-indigenous-australia [Accessed 18 March 2025]

Houston W, Black R, Black L (2011) Distribution of Black-breasted Button-quail in the Fitzroy Basin, and extent and condition of remnant dry rainforest habitat. Terrestrial Ecology Programme, Centre for Environmental Management, Central Queensland University, Rockhampton.

Hradsky BA (2020) Conserving Australia's threatened native mammals in predator-invaded, fire-prone landscapes. *Wildlife Research* **47**, 1–15.

Hughes P, Hughes B (1991) Notes on the Black-breasted Button-quail at Widgee, Queensland. *Australian Bird Watcher* **14**, 113–118.

IUCN Standards and Petitions Committee (2024) Guidelines for using the IUCN Red List categories and criteria. Version 16. Prepared by the Standards and Petitions Committee. Available at https://www.iucnredlist.org/documents/RedListGuidelines.pdf. [Verified 10 May 2024]

Janke T and Company (2023) 'Aboriginal Cultural and Intellectual Property protocol', Aboriginal Affairs NSW.

Legge S, Murphy BP, McGregor H, Woinarski JCZ, Augusteyn J, Ballard G, Baseler M, Buckmaster T, Dickman CR, Doherty T, Edwards G, Eyre T, Fancourt BA, Ferguson D, Forsyth DM, Geary WL, Gentle M, Gillespie G, Greenwood L, Hohnen R, Hume S, Johnson CN, Maxwell M, McDonald PJ, Morris K, Moseby K, Newsome T, Nimmo D, Paltridge R, Ramsey D, Read J, Rendall A, Rich M, Ritchie E, Rowland J, Short J, Stokeld D, Sutherland DR, Wayne AF, Woodford L, Zewe F (2017) Enumerating a continental-scale threat: How many feral cats are in Australia? *Biological Conservation* **206**, 293-303.

Marchant S, Higgins PJ (eds) (2006) Turnix melanogaster Black-breasted button-quail 'Handbook of Australian, New Zealand and Antarctic Birds. Volume 2. Raptors to Lapwings' (Oxford University Press: Melbourne).

Mathieson MT, Smith GC (2009) National recovery plan for the black-breasted button-quail Turnix melanogaster. Report to Department of the Environment, Water, Heritage and the Arts, Canberra. Department of Environment and Resource Management, Brisbane.

McConnell P, Hobson R (1995) The diet and behaviour of the Black-breasted Button-quail *Turnix melanogaster*. *Sunbird*, **25**(1), 18–23.

Meiklejohn AR, Melzer, RI, Hines HB, Laidlaw MJ, Toyne M, McPherson K, Behrendorff L, MacDonald S (2023) Post-fire Assessment Report – Natural Values: 2020 Duling bushfire, K'gari (Fraser Island), Great Sandy National Park, South East Queensland Bioregion with addendum. Brisbane: Department of Environment and Science, Queensland Government.

Melzer RI, Clifton D, Emmert L, Hines HB, Horton P, Laidlaw MJ, Levy S, McDonald WJ, Midtaune K (2020) Post-fire Assessment Report – Natural Values: 2019/2020 bushfire, Bulburin National Park, South East Queensland Region. Department of Environment and Science, Queensland Government.

Milledge DR, McKinley AL (1998) The distribution, status and habitat of the black-breasted button-quail *Turnix melanogaster* in north-eastern NSW. Landmark Ecological Services P/L. Suffolk Park.

Milledge DR (1999) The distribution, status and habitat of the black-breasted button-quail *Turnix melanogaster* in north-eastern NSW. Landmark Ecological Services P/L. Suffolk Park.

Milledge DR (2000) The distribution, status and habitat of the black-breasted button-quail *Turnix melanogaster* in northern NSW. Landmark Ecological Services P/L. Suffolk Park.

NSW DCCEEW (2024) NARCliM2.0 NSW North Coast regional climate snapshot. Available at

https://www.climatechange.environment.nsw.gov.au/sites/default/files/2024-08/NARCliM2-Snapshot-NorthCoast.pdf [Accessed 10 March 2025]

NSW Government (2025a) BioNet Available at https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/nsw-bionet [Accessed 1 March 2025]

NSW Government (2025b) The 2017-20 drought. Available at https://water.dpie.nsw.gov.au/our-work/allocations-availability/drought-and-floods/drought-recovery/2017-20-drought [Accessed 10 March 2025].

Paton TA, Baker AJ, Groth JG, Barrowclough GF (2003) RAG-1 sequences resolve phylogenetic relationships within Charadriiform birds. *Molecular Phylogenetics and Evolution*, **29**, 268–278.

Queensland Government (2024) Wildnet. Available at https://www.qld.gov.au/environment/plants-animals/species-information/wildnet [Accessed 20 November 2024]

Queensland Government (2025a) Butchulla Rangers conserving Mur'rindum (black-breasted button-quail). Available at https://www.qld.gov.au/environment/plants-animals/conservation/community/land-sea-rangers/rangers-make-a-difference/butchulla-rangers [Accessed 9 January 2025]

Queensland Government (2025b) Climate change in Queensland. Available at https://www.qld.gov.au/__data/assets/pdf_file/0023/68126/queensland-climate-change-impact-summary.pdf [Accessed 10 March 2025]

Recher (1988) Counting terrestrial birds. Use and application of census procedures in Australia. *Australian Zoological Reviews* **1**, 25–45.

Reside AE, Beher J, Cosgrove AJ, Evans MC, Seabrook L, Silcock JL, Wenger AS, Maron M (2017) Ecological consequences of land clearing and policy reform in Queensland. *Pacific Conservation Biology* **23**, 219 – 230.

Smith GC, Aridis J, Lees N (1998) Radio-tracking revealed home ranges of Black-breasted Button-quail Turnix melanogaster in remnant vine scrub between Hoop Pine plantation and agriculture. *Emu – Austral Ornithology* **98**, 171–177.

Smyth AK, Young J (1996) Observations on the endangered black-breasted button-quail Turnix melanogaster breeding in the wild. *Emu – Austral Ornithology*, **96**(3), 202 – 207.

Smyth AK, Noble D, Wiley C (2001) Black-breasted button-quail in Open Eucalypt Forest in South-eastern Queensland. *Australian Bird Watcher* **19(**1), 45–47.

Smyth AK, Pavey CR (2001) Foraging by the endangered black-breasted button-quail (Turnix melanogaster) within fragmented rainforest of an agricultural landscape. *Biological Conservation* **98**, 149 – 157.

Steffen W, Hughes L, Mullins G, Bambrick H, Dean A, Rice M (2019) Dangerous Summer: Escalating bushfire, heat and drought risk. Climate Council of Australia Ltd.

Watson DM (2015) Disproportionate Declines in Ground-Foraging Insectivorous Birds after Mistletoe Removal. *PLoS ONE* **10**(12), e0142992.

Webster P, Lisle A, Murray P (2019) Faecal analysis reveals the insectivorous diet of the Black-breasted Buttonquail *Turnix melanogaster. Corella* **43**, 19–25.

Webster P, Mathieson MT, Smith GC, Jaensch RP, Garnett ST (2021) Black-breasted Button-quail *Turnix melanogaster*. In 'The Action Plan for Australian Birds 2020'. (Eds ST Garnett and GB Baker) pp. 308–310. CSIRO Publishing, Melbourne.

Webster PTD, Shimomura R, Rush ER, Leung LK-P, Murray PJ (2022) Distribution of Black-breasted button-quail *Turnix melanogaster* in the Great Sandy Region, Queensland and associations with vegetation communities. *Emu – Austral Ornithology*, **122**(1), 71–76.

Woinarski JCZ, Woolley LA, Garnett ST, Legge SM, Murphy BP, Lawes MJ, Comer S, Dickman CR, Doherty, G. Edwards, A. Nankivill, R. Palmer, D. Paton (2017) Compilation and traits of Australian bird species killed by cats. *Biological Conservation* **216**, 1–9.

Woodward E, Hill R, Harkness P and R Archer (eds.) (2020) 'Our Knowledge Our Way in caring for Country: Indigenous-led approaches to strengthening and sharing our knowledge for land and sea management, best practice guidelines from Australian experiences', NAILSMA and CSIRO, Cairns, Australia. Available at https://www.csiro.au/en/research/indigenous-science/indigenous-knowledge/our-knowledge-our-way [Accessed 18 March 2025]

Expert Communications

Mick Andren, Conservation Assessment Officer, Conservation Programs Heritage and Regs, NSW Government.

Conway Burns, Chair, Butchulla Aboriginal Corporation.

Brian Hawkins, Senior Threatened Species Officer, Conservation Programs, Heritage and Regs, NSW Government.

Andrew Meiklejohn, Principal Conservation Officer, Ecological Services, Queensland Parks and Wildlife Services

Patrick Webster, Ecologist and Button-quail specialist, University of Queensland.

Conservation Assessment drafted by

Tracey Russell, NSW Department of Climate Change, Energy, the Environment and Water.

APPENDIX 1

Assessment against *Biodiversity Conservation Regulation 2017* criteria

The Clauses used for assessment are listed below for reference.

Overall Assessment Outcome:

Turnix melanogaster was found to be Vulnerable under Clause 4.3(c)(d)(e i,ii,iii) and 4.4(c)(e)(i,ii)(B)

Clause 4.2 – Reduction in population size of species
(Equivalent to IUCN criterion A)
Assessment Outcome: Not met

(1) - The species has undergone or is likely to undergo within a time frame appropriate to the life cycle and habitat characteristics of the taxon:			
	(a)	for critically endangered species	a very large reduction in population size, or
	(b)	for endangered species	a large reduction in population size, or
	(c)	for vulnerable species	a moderate reduction in population size.
(2) - The determination of that criteria is to be based on any of the following:			
	(a)	direct observation,	
	(b)	an index of abundance appropriate to the taxon,	
	(c)	a decline in the geographic distribution or habitat quality,	
	(d)	the actual or potential levels of exploitation of the species,	
	(e)	the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites.	

Clause 4.3 - Restricted geographic distribution of species and other conditions
(Equivalent to IUCN criterion B)
Assessment Outcome: Vulnerable under Clause 4.3(c)(d)(e i,ii,iii)

The geographic distribution of the species is:			
	(a)	for critically endangered species	very highly restricted, or
	(b)	for endangered species	highly restricted, or
	(c)	for vulnerable species	moderately restricted,
and at least 2 of the following 3 conditions apply:			
	(d)	the population or habitat of the species is severely fragmented or nearly all the mature individuals of the species occur within a small number of locations,	
	(e)	there is a projected or continuing decline in any of the following:	
		(i)	an index of abundance appropriate to the taxon,

		(ii)	the geographic distribution of the species,
		(iii)	habitat area, extent or quality,
		(iv)	the number of locations in which the species occurs or of populations of the species,
	(f)	extreme fluctuations occur in any of the following:	
		(i)	an index of abundance appropriate to the taxon,
		(ii)	the geographic distribution of the species,
		(iii)	the number of locations in which the species occur or of populations of the species.

Clause 4.4 - Low numbers of mature individuals of species and other conditions
(Equivalent to IUCN criterion C)
Assessment Outcome: Vulnerable under Clause 4.4(c)(e i,ii B)

The estimated total number of mature individuals of the species is:						
	(a)	for critically endangered species			very low, or	
	(b)	for endangered species			low, or	
	(c)	for vulnerable species			moderately low,	
and either of the following 2 conditions apply:						
	(d)	a continuing decline in the number of mature individuals that is (according to an index of abundance appropriate to the species):				
		(i)	for critically endangered species		very large, or	
		(ii)	for endangered species		large, or	
		(iii)	for vulnerable species		moderate,	
	(e)	both of the following apply:				
		(i)	a continuing decline in the number of mature individuals (according to an index of abundance appropriate to the species), and			
		(ii)	at least one of the following applies:			
			(A)	the number of individuals in each population of the species is:		
				(I)	for critically endangered species	extremely low, or
				(II)	for endangered species	very low, or
				(III)	for vulnerable species	low,
			(B)	all or nearly all mature individuals of the species occur within one population,		
			(C)	extreme fluctuations occur in an index of abundance appropriate to the species.		

Clause 4.5 - Low total numbers of mature individuals of species
(Equivalent to IUCN criterion D)
Assessment Outcome: Not met

The total number of mature individuals of the species is:			
	(a)	for critically endangered species	extremely low, or
	(b)	for endangered species	very low, or
	(c)	for vulnerable species	low.

Clause 4.6 - Quantitative analysis of extinction probability
Assessment Outcome: Data Deficient

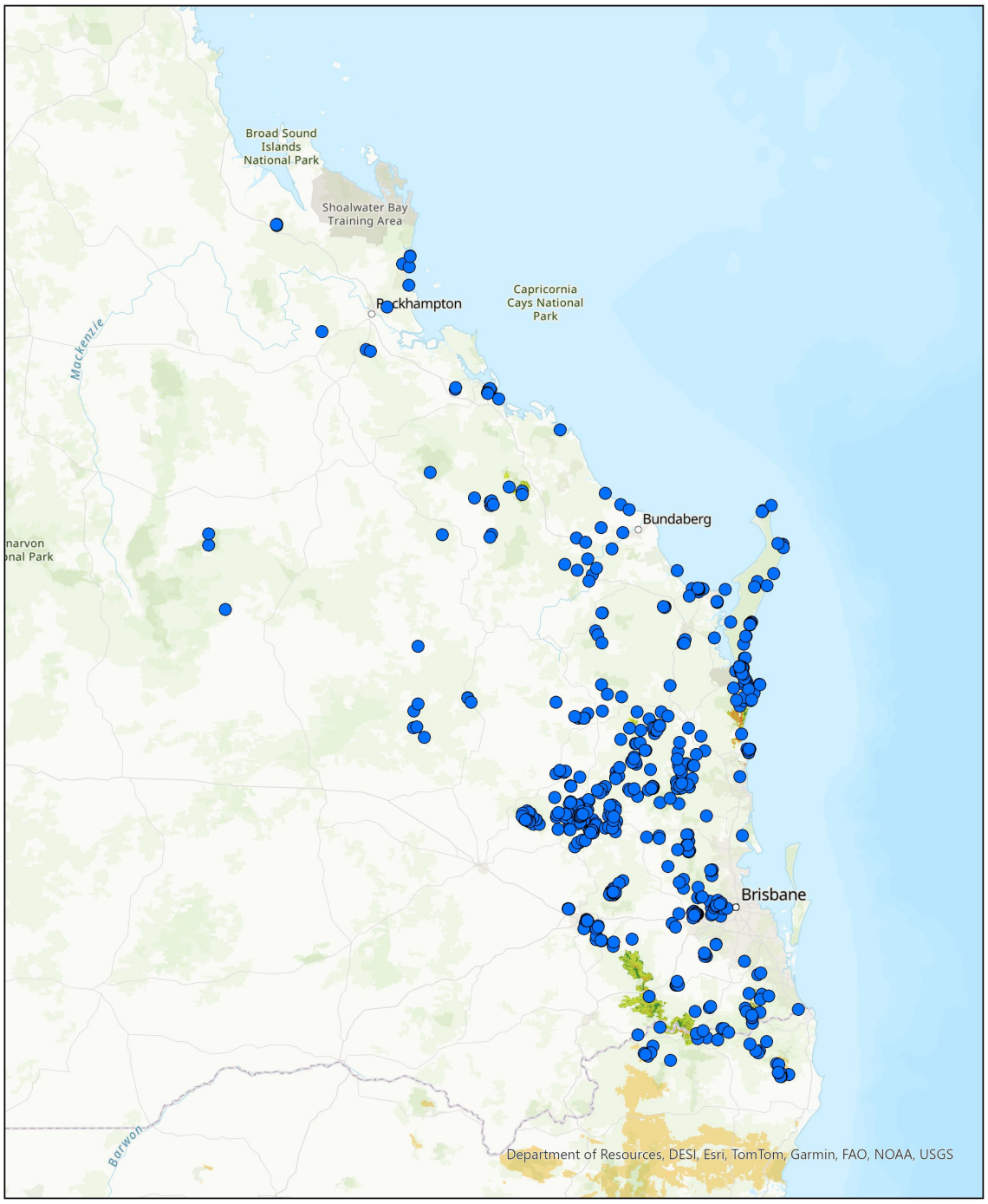
The probability of extinction of the species is estimated to be:			
	(a)	for critically endangered species	extremely high, or
	(b)	for endangered species	very high, or
	(c)	for vulnerable species	high.

Clause 4.7 - Very highly restricted geographic distribution of species– vulnerable species
(Equivalent to IUCN criterion D2)
Assessment Outcome: Not met

For vulnerable species,	the geographic distribution of the species or the number of locations of the species is very highly restricted such that the species is prone to the effects of human activities or stochastic events within a very short time period.

Professor Angela Moles, FRSN
Chairperson
NSW Threatened Species Scientific Committee

APPENDIX 2


Broad Sound Islands National Park
Shoalwater Bay Training Area
Rockhampton
Capricornia Cays National Park
Mackenzie
Bundaberg
Brisbane
Barwon
Department of Resources, DESI, Esri, TomTom, Garmin, FAO, NOAA, USGS
BBBQ
SE Qld bushfires 2019-20
Severity
Unburnt
Moderate
Low
High
Extreme
NSW Bushfires 2019-20
Black-breasted Button-quail distribution
Datum/Projection: GCS GDA 1994
N