

National recovery plan for the buff-breasted button-quail *Turnix olivii*



Australian Government



**Queensland
Government**

National recovery plan for the buff-breasted button-quail *Turnix olivii*

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Cover photo (by Eda Addicott): Habitat of the buff-breasted button-quail, Mt Molloy area, north Queensland.

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Executive Summary

Species status

The buff-breasted button-quail is currently listed as 'Endangered' under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). It is listed as 'Vulnerable' under the Queensland *Nature Conservation Act 1992* (NCA).

Habitat and distribution summary

The buff-breasted button-quail is known to occur in the rocky, grassy savannah woodlands and stringybark forests of north-eastern Queensland from the Coen area south to Chillagoe. They are also reported from grassland areas within rainforest patches within this range. There has been a recent, unsubstantiated report of the species from south-east of Charters Towers.

Threat summary

- Habitat loss or degradation due to cattle and pig grazing and inappropriate fire regimes that encourage extensive fires but promote woody weed invasion.
- Habitat clearing
- Predation by native and feral animals

Objectives of recovery plan

Facilitate improvement of knowledge of buff-breasted button-quail thus allowing a better understanding of threats to the species, allowing protection and management of habitat for extant populations to secure survival of existing birds, increasing availability and condition of habitat to provide opportunity for population increase and pursuit of actions to minimise threats to protect existing and expanding populations and prevent further loss.

Summary of actions

- Existing buff-breasted button-quail records and site data to be collated in WildNet database
- Map existing data on buff-breasted button-quail distribution and habitat requirements yielding a 'essential habitat' GIS layer and develop a predictive model of the species' distribution.
- Conduct scientific research program(s) to undertake habitat assessment, radio-tracking experiments and collect observational data.
- Determine the role of storm burning with respect to buff-breasted button-quail breeding ecology.
- Document a useful methodology of finding and recording buff-breasted button-quail for observers.
- Survey habitat where buff-breasted button-quail occurrence is predicted by the model developed.
- Develop management options and protocols for fire management in identified buff-breasted button-quail habitat within protected areas.
- Establish extension activities with Traditional Owners, land managers and private landholders, develop a community network with these stakeholders leading to property planning and ensure their participation in the recovery process.
- Determine the nature, extent and impact of cattle and pigs on the grassland and grassy woodland habitats of the buff-breasted button-quail.
- Develop and implement strategies to ameliorate adverse effects of domestic stock on buff-breasted button-quail and its habitat if determined necessary.
- Develop and implement strategies to ameliorate adverse effects of pigs on buff-breasted button-quail and its habitat if determined necessary.

1. General information

1.1 Conservation status

The buff-breasted button-quail *Turnix olivii* Robinson (Family Turnicidae) is endemic to north-eastern Queensland and is one of the country's least known avian species (Garnett and Crowley 2000). It has been reported from scattered localities in eastern areas of the Cape York and Wet Tropics biogeographic regions as well as the very eastern fringe of the Einasleigh Uplands biogeographic region. This species is currently listed as 'Endangered' under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). It is listed as 'Vulnerable' under the Queensland *Nature Conservation Act 1992* (NCA).

Existing suitable habitat is considered under threat due to grazing and burning regimes that promote extensive fires, and encourages invasion by woody weeds. Despite considerable search effort, the lack of knowledge regarding the buff-breasted button-quail is substantial (e.g. there are no photographs of living specimens). The area of occupancy of the species has been estimated at 50 km² within an estimated extent of occurrence of 2000 km² (Garnett and Crowley 2000). There is some evidence of a decline in the area of occupancy, quality of known habitat, number of locations at which the species is currently found and, possibly, the number of individuals (Garnett and Crowley 2000). Garnett and Crowley (2000) estimated a population size of 500 mature individuals.

1.2 International obligations

Actions in this plan are consistent with Australia's international obligations.

1.3 Affected interests

Affected interests may include the following persons/organisations:

Australian Government

- Australian Government Department of the Environment, Water, Heritage and the Arts (DEWHA)

Queensland Government

- Department of Environment and Resource Management (DERM)
- Department of Employment, Economic Development and Innovation (DEEDI)

NRM bodies

- Cape York Community Engagement Group
- Northern Gulf Resource Management Group
- Terrain NRM
- North Queensland Dry Tropics NRM

Local councils

- Cook Shire
- Lockhart River Shire
- Tablelands Regional
- Cairns Regional
- Hinchinbrook Shire
- Hope Vale Shire (possible)
- Charters Towers Regional (possible)

Non-government organisations and others

- Wildlife Conservancy of Tropical Queensland (WCTQ)
- Australian Wildlife Conservancy (AWC)
- Bush care groups
- Naturalist groups e.g. Birds Australia, North Queensland Naturalists' Club
- Universities
- WWF - Australia
- Mining companies
- Meat and Livestock Australia
- Agforce
- Indigenous landowners

- Private landholders

These persons/organisations are potentially responsible for and/or involved in the protection, rehabilitation and management of buff-breasted button-quail habitat, education of the public and land managers, raising awareness of buff-breasted button-quail, habitat assessment, surveys and monitoring.

1.4 Consultation with Indigenous people

The population range and habitat of buff-breasted button-quail potentially occurs across areas of cultural significance to numerous Indigenous groups ranging from the Charters Towers area to Iron Range and Coen on Cape York.

The Hopevale Community Council and the Lockhart River Aboriginal Council are identified as community councils with a possible interest in the recovery plan for buff-breasted button-quail and its habitat. Aboriginal Land Management Facilitators of the relevant Natural Resource Management Groups (i.e. Terrain, Cape York, North Queensland Dry Tropics and Northern Gulf) also represent the interests of Traditional Owners in natural resource management of the area encompassing the buff-breasted button-quail's distribution.

The advice of the Indigenous Engagement Unit (Qld Department of Environment and Resource Management) has been sought regarding a strategy for engaging Indigenous groups and claimants in the buff-breasted button-quail recovery process. We recognise that an indigenous engagement protocol is in place for the Wet Tropics (The Wet Tropics of Queensland World Heritage Area Regional Agreement 2005) and will be used to guide interactions between the Recovery Team and Traditional Owners.

1.5 Benefits to other species or communities

Buff-breasted button-quail typically inhabit stoney and/or grassy woodlands and forests and, as a consequence, protection and management of this species may contribute to the conservation of regional ecosystems and communities listed as 'Of Concern' or 'Endangered' under the Queensland *Vegetation Management Act 1999*, for example, the regional ecosystems 7.3.14 and 7.3.43, both 'Of Concern' grassy woodlands, and 7.3.23, an 'Endangered' simple-complex semi-deciduous riverine vine forest community sometimes found adjacent to grassy woodlands preferred by the buff-breasted button-quail (EPA 2005).

The presence of viable populations of buff-breasted button-quail may indicate the conservation value of forest remnants as refugia for the survival of other ground-dwelling fauna. The implementation of the plan will contribute to the conservation of other fauna and flora using similar habitats (Table 1). No adverse impacts from the implementation of actions are anticipated.

Table 1: Species utilizing similar habitat to the buff breasted button quail

	EPBC Act	NCA
Reptiles		
pygopid lizard <i>Delma mitella</i>	V	
yakka skink <i>Egernia rugosa</i>	V	V
Birds		
black-throated finch <i>Poephila cincta cincta</i>	E	V
Gouldian finch <i>Erythrura gouldiae</i>	E	E
crimson finch (white-bellied) <i>Neochmia phaeton evangelinae</i>	V	V
star finch (northern) <i>Neochmia ruficauda clarescens</i> ,		
golden-shouldered parrot <i>Psephotus chrysopterypius</i>	E	E
red goshawk <i>Erythrotriorchis radiatus</i>	V	E
brown tree creeper <i>Climacteris picumnus</i>		
black-faced woodswallow <i>Artamus cinereus normani</i>		
Mammals		
northern bettong <i>Bettongia tropica</i>	E	E
Plants		
<i>Coix gasteenii</i>		

<i>Centotheca philippinensis</i>	V	
<i>Teucrium ajugaceum</i>		
<i>Cajanus mareebensis</i>	E	

1.6 Social and economic impacts

This plan should have no significant, deleterious economic or social impacts. Any proposed or future works or developments that are likely to have an impact on buff-breasted button-quail should consider this plan when applying for State and Australian Government approvals.

Recovery actions that improve the condition and extent of habitat for buff-breasted button-quail, may produce social and economic benefits. For example, landholders who place a voluntary conservation agreement, such as a nature refuge, on all or part of their property may be eligible for land tax rebates. They may also apply through a competitive tender process for NatureAssist funding or Caring for our Country grants to assist with management of conservation significant land.

2. Biological information

2.1 Species description

The buff-breasted button-quail is a large, plump, pale-eyed button-quail. Plumages are plain with few black markings in the upperparts. Male buff-breasted button-quail are about 18 cm long. Females are slightly larger at 19-22 cm long (Marchant and Higgins 1993). The sexes differ slightly in plumage. It is unknown if there is seasonal plumage variation. Males (Figure 1) are grey on the forehead and between the eye and lower part of bill. The face and throat are whitish. Sides of head and neck are off-white with fine black freckling. The breast and foreneck are a uniform olive-buff, paling to off-white at the undertail coverts and flanks. The upper to mid-back consists of black and rufous-banded panels. The lower back, rump and tail are a uniform light rufous-brown. Wings are light rufous-brown, showing bold white spots and barring. Outer wing tips in flight are uniform grey. The female is similar in all respects except for having darker grey forehead contrasting with paler grey crown and nape of neck, brighter rufous-brown upperparts with fewer dark markings, sides of head and neck uniformly dark grey, and chestnut head stripes. The bill is grey, heavier than in other button-quail species, and the legs are pale yellow. Juveniles are unknown (Marchant and Higgins 1993), so their appearance has not been described.

This species may be confused with painted button-quail *Turnix varia* which sometimes occur in the same environment as occupied by buff-breasted button-quail (Marchant and Higgins 1993, L. Nielsen *pers. comm.*, L. Collins *pers. comm.*, W. Goulding *pers. comm.*).



Figure 1. Male *Turnix olivii* specimen. H.L. White Collection, Museum of Victoria. Photo: G. C. Smith

2.2 Life history and ecology

The buff-breasted button-quail is one of the least known avian species in the country (Garnett and Crowley 2000). There are seven specimens in museum collections, the majority being housed in the H.L. White collection at the Museum of Victoria in Melbourne. There are a handful of sightings at few localities. The species was reported only four times for *The New Atlas of Australian Birds* (Barrett *et al.* 2003; A. Silcocks *pers. comm.*) between 1998 and 2002 and not at all during the survey period for the inaugural *Atlas of Australian Birds* (Blakers *et al.* 1984) between 1977 and 1981. It is a ground-dweller and ground-nester, usually producing 3-4 eggs per clutch (White 1922a and b, McLennan 1923, L. Nielsen *pers. comm.*) during the wet season, and have so far recorded from mid-January to late March (Marchant and Higgins 1993, L. Nielsen *pers. comm.*). The nest is an ovoid or spherical structure of woven dry grasses sometimes placed in a shallow depression in the ground and often at the base of a grass clump or shrub so as to camouflage it almost completely (White 1922a). The species is assumed to be polyandrous (female breeds with several males in any given season, with the male assuming all parental responsibilities) as with all other button-quail species; however this has yet to be confirmed. Buff-breasted button-quails have been seen in pairs or occasionally in small groups (Marchant and Higgins 1993). The dispersion patterns of this species are not known. It has been reported that birds may appear in the Mareeba area in the late dry season and remain until the grass becomes very dense (L. Nielsen *pers. comm.*). If the wet season arrives late or is weak, the grasses do not become particularly dense and the birds seem to remain and breed.

Buff-breasted button-quail are most frequently reported from stoney and / or grassy woodlands and forests (White 1922, Storr 1984, Squire 1990, M. Mathieson *pers. obs.*, G.C. Smith *pers. obs.*, S. Garnett *pers. comm.*, L. Nielsen *pers. comm.*). *Melaleuca viridiflora* and/or *M. minutifolia* are often common mid-storey species (L. Nielsen *pers. comm.*). Debatably, they have also been noted from grassy clearings within rainforest patches (Squire 1990, Marchant and Higgins 1993).

The diet of the buff-breasted button-quail is virtually unknown. The gut contents of four birds collected near Coen consisted of insects, seeds and coarse sand (McLennan 1923, Marchant and Higgins 1993).

The calls of the buff-breasted button-quail have been described at length by William McLennan in his diaries as disclosed in White (1922b) and by Squires (1990). Much of this is convoluted and ambiguous but a common theme is a repeated boom-like sound, indeed a style of noise made by most *Turnix* species.

2.3 Distribution

The buff-breasted button-quail is endemic to north-eastern Queensland and scattered records exist from the eastern parts of Cape York Peninsula biogeographic region, the Wet Tropics biogeographic region and the eastern fringe of the Einasleigh Uplands biogeographic region (White 1922a and b, Storr 1984, Squire 1990, Barrett *et al.* 2003, EPA 2007, W. Goulding *pers. comm.*, L. Nielsen *pers. comm.*, L. Collins *pers. comm.*, P. McConnell *pers. comm.* and T. Reis *pers. comm.*) – Figure 2. A credible record exists from the Chillagoe area (R. Hobson *pers. comm.*) and a record from southeast of Charters Towers (A. Silcocks *pers. comm.*) requires confirmation. Unconfirmed dry season records from the Karumba area exist (L. Nielsen *pers. comm.*).

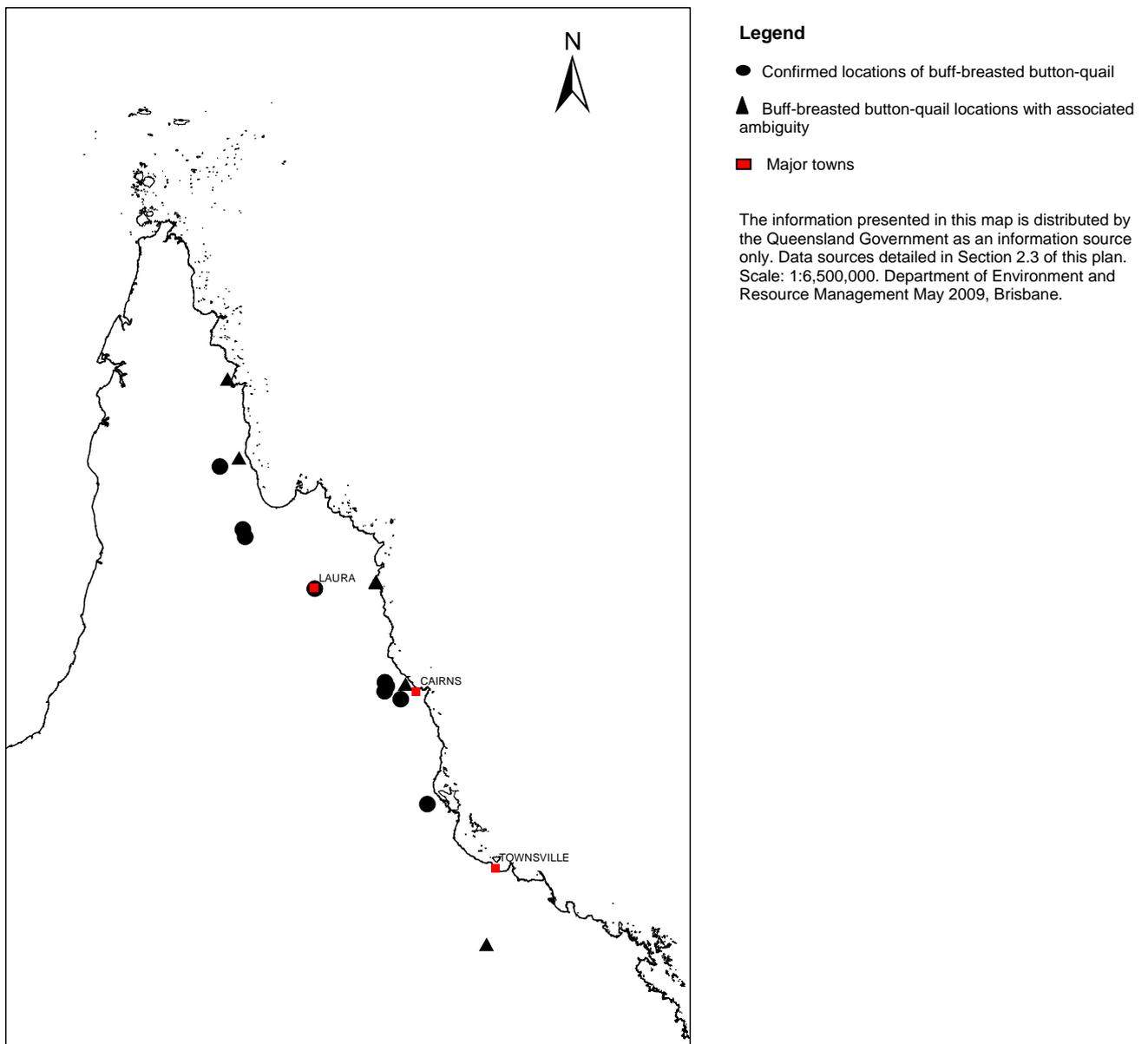


Figure 2. Buff-breasted button-quail distribution.

2.4 Habitat critical to the survival of the species

Habitat considered critical to the survival of the buff-breasted button-quail, with present knowledge, can be broadly defined as stoney and / or grassy woodlands and forests on plains and slopes. Melaleuca species (*M. viridiflora* and *M. minutifolia*) often dominate the mid storey. The sparsely wooded, well-drained, slight-sloping bases of hills that support this vegetation appear critical during the breeding season (L. Nielsen *pers. comm.*).

This plan does not provide spatial information on habitat critical to survival of the species but Actions 1.1 and 1.2 identify a process for this to occur within the early stages of implementation of this plan.



Figure 3. Grassy woodland habitat of the buff-breasted button-quail near Mt Molloy
(Photo: M. Mathieson)

2.5 Important populations

Due to the lack of any detailed information, it is not known if discrete populations of buff-breasted button-quail exist. The apparent high mobility of the species prompted Garnett and Crowley (2000) to consider that there is only a single population of this species throughout the entire known range. Therefore it should be considered that any location supporting buff-breasted button-quail is important to the long-term survival of the species. This recovery plan will aim to further investigate the population of buff-breasted button-quail, and, in so doing, perhaps identify discrete population units or locations of regular use through time.

3. Threats

3.1 Biology and ecology relevant to threats

The buff-breasted button-quail displays a number of biological and ecological characteristics that, by inference, make it vulnerable. From a habitat perspective the species occupies habitat used widely for grazing. In conjunction with burning regimes that encourage extensive burning and consequently the possible promotion of woody weed invasion, the potential for further habitat loss is high. The species may be susceptible to fire during the breeding season.

The buff-breasted button-quail is known to nest, roost and feed on the ground. Because of these ecological attributes, it is vulnerable to ground predators, particularly nocturnal predators which might predate sleeping birds, and nest predators such as monitors and pigs (White 1922b).

3.2 Identification of threats

Known and potential threats to the buff-breasted button-quail have been outlined by Garnett and Crowley (2000). All are likely to be equally important.

- **Habitat degradation**
The specific habitat of the species is prone to degradation from grazing and burning regimes that encourage extensive fires but promote woody weed invasion (Harrington and Sanderson 1994; Crowley and Garnett 1998, Crowley *et al.* 2004). Extensive dry season fires may eliminate large areas of habitat.
- **Habitat clearing**
Some areas in the southern part of the range of the buff-breasted button-quail are at risk of being cleared for agriculture (Garnett and Crowley 2000).
- **Predation by native and feral animals (i.e. monitors, pigs).**
In his diary, McLennan noted a propensity for monitors (*Varanus spp.*) to take numbers of eggs (White 1922b). Although the impact of feral predation on the species is not well known, it is likely that the significance of predation as a threat is linked to loss and degradation of habitat. Animals under stress may be subjected to increased levels of predation and this may be heightened for animals forced to disperse through unsuitable habitat.

3.3 Areas under threat

All areas where the species occurs, may be considered under threat. Any areas that turn up new or confirmed populations would be highly significant and should also be treated as threatened as per 3.2 above.

3.4 Populations under threat

Due to the species' high mobility and its limited range, Garnett and Crowley (2000) consider there is a single population of buff-breasted button-quail and, consequently, the entire population is subject to the listed threats.

4. Objectives and criteria

4.1 Overall objective

To improve the status of the buff-breasted button-quail through:

- the protection and management of habitat for extant populations (to secure survival of existing birds);
- increasing availability and condition of habitat (to provide opportunity for population increase); and
- pursuit of actions to minimise threats (to protect existing and expanding populations and prevent further loss).

4.2 Specific objectives

Specific objectives during the life of this recovery plan are to:

- Increase understanding of the distribution, life history and ecology of buff-breasted button-quail.
- Develop and apply appropriate assessment and monitoring strategies for buff-breasted button-quail;
- Protect key ecosystems/habitat known to support populations of buff-breasted button-quail from human-induced threatening processes, and thus maintain current populations.;
- Determine the impacts of cattle and pigs on the habitat of the buff-breasted button-quail and ameliorate any adverse effects;
- Support the recovery process.

4.3 Performance criteria

- Knowledge of buff-breasted button-quail conservation status, current distribution (including an increase in area of known occurrence based on increased survey effort), habitat requirements and life history is significantly increased;
- An assessment and monitoring guide for buff-breasted button-quail is produced and tested by conducting a survey to consolidate knowledge;
- Habitat management objectives and codes are devised and adopted by the Queensland Government;
- A community awareness strategy is implemented, resulting in active community participation, including that of Traditional Owners, in buff-breasted button-quail recovery;
- Threats to the species by grazing and feral animals are determined, areas of high impact identified and threats ameliorated;

4.4 Evaluation of recovery plan

A review of the plan will be undertaken within five years from adoption as a national recovery plan. Any changes to the recovery actions/management practices will be documented accordingly and the evaluation will be provided to the Department of the Environment, Water, Heritage and the Arts.

5. Recovery actions

The costs associated with and parties involved in implementing the various actions detailed in this recovery plan are provided in Section 7. The strategy for recovery is clearly outlined in Section 5.2, Table 1.

5.1 Details of recovery actions

Specific Objective 1. Increase understanding of the distribution, life history and ecology of buff-breasted button-quail

Action 1.1: Survey all known buff-breasted button-quail sites

Justification

Information on species numbers and habitat usage in areas where buff-breasted button-quails are known to occur will help in understanding the status of the species in these areas and their habitat requirements.

Methods

Survey all known sites of buff-breasted button-quail after or in conjunction with the development of survey guidelines.

Outcomes

Better understanding of the status and habitat requirements of buff-breasted button-quail in areas where the species is known to occur. Probability of achievement: High.

Potential contributors

DERM, research institutions, bird enthusiast groups e.g. Birds Australia

Action 1.2: Existing buff-breasted button-quail records (historic and current) and site data to be collated in WildNet database

Justification

An accurate, complete knowledge of buff-breasted button-quail distribution is required for reassessing conservation status, prioritising sites for active management and determining suitable research sites. Currently this is lacking.

Methods

Collaborate with the WildNet team (DERM) to maintain an up-to-date, accurate and verified database of all buff-breasted button-quail records for use by organisations and researchers involved in recovery of the buff-breasted button-quail. Supply all known buff-breasted button-quail records to WildNet and provide input to essential habitat mapping associated with the Queensland *Vegetation Management Act 1999* (see Action 1.3).

Outcomes

One database containing accurate historical and contemporary records for use in planning processes. Probability of achievement: High.

Potential contributors

DERM, bird enthusiast groups e.g. Birds Australia

Action 1.3: Map existing data on buff-breasted button-quail distribution and habitat requirements yielding a 'essential habitat' GIS layer and develop a predictive model of the species' distribution

Justification

Predictive modelling of the distribution of the buff-breasted button-quail will focus future survey effort and assist definition of essential habitat for the species.

Methods

DERM will support the development of an 'essential habitat' GIS layer, using the data gained from Action 1.2.

Outcomes

Accurate distributional mapping and up-to-date predictive distribution model available as a planning tool and a GIS layer of 'essential habitat' for the species. Probability of achievement: High.

Potential contributors

DERM, research institutions

Action 1.4: Conduct scientific research program(s) to undertake habitat assessment, radio-tracking experiments and collect observational data

Justification

Knowledge of the buff-breasted button-quail is relatively sparse compared with that of other button-quails, owing to the remote location of birds, the species' apparent rarity and the relatively low number of observations of birds in the wild. Understanding of buff-breasted button-quail ecology is still poor. Therefore the factors which affect occurrence of the species in the landscape, the extent of movement at local and landscape scales, the size and survivorship/mortality of the population and their response to fire and catastrophic events such as floods, are largely unknown.

Methods

Develop and implement a comprehensive program of habitat assessment, tracking and field observations which will improve knowledge of the key characteristics of habitat where buff-breasted button-quail occur, the spatial use of habitat by the species through time, nesting, calling behaviour, fecundity, survivorship, diet and food resources available to the species through time. Response to catastrophic events such as fire and floods should be determined.

Outcomes

These studies would supplement our currently meagre knowledge of the species and lead to more informed management guidelines aimed at reducing the impact of threats. Probability of achievement: Low.

Potential contributors

DERM, Wildlife Conservancy of Tropical Queensland, Australian Wildlife Conservancy, Traditional Owners, leaseholders, landholders, research institutions, birding and natural history organisations e.g. Birds Australia.

Action 1.4: Determine the role of storm burning with respect to buff-breasted button-quail breeding ecology

Justification

There are some observations suggesting buff-breasted button-quail nesting occurs only where grass is sparse in the wet season. Sparse grass occurs naturally only on gravel or rocky habitats or where fire has occurred after the first storms have caused seed germination.

Methods

Using satellite imagery and local information, identify sites near historically known habitat where no dry season fire has occurred and where fire is permitted and manageable. Burn small patches of woodland a week after seed-germinating rains (nominally, a cumulative total of >50 mm after October 15, ensuring a patchy burn and the best chance of follow-up rains). Monitor sites fortnightly through the wet season. This process would need to be repeated over a number of years.

Outcomes

Potentially a means for locating buff-breasted button-quail, and of supplementing suitable breeding habitat. Probability of achievement: Low.

Potential contributors

DERM, Wildlife Conservancy of Tropical Queensland, Australian Wildlife Conservancy.

Specific Objective 2. Define assessment and monitoring strategies for buff-breasted button-quail

Action 2.1: Document a useful methodology of finding and recording buff-breasted button-quail for observers

Justification

There are currently no standardised methods or appropriate effort timeframes for surveying buff-breasted button-quail or recording relevant habitat details and descriptions. Such methodology would permit a coordinated and targeted assessment of population size.

Methods

Prepare a detailed methodology in order for observers to conduct a thorough survey for the presence of the species and record appropriate details of habitat. The use of recordings of the vocalisations (currently there are no recordings known and these must be obtained) may be part of this methodology.

Outcomes

An effective survey and assessment tool that can lead to coordinated approaches to estimating population size, habitat requirements, current and potential threats and distribution. Probability of achievement: Medium.

Potential contributors

Qld DERM.

Action 2.2: Survey habitat where buff-breasted button-quail occurrence is predicted by the model developed in Action 1.3

Justification

Records of the buff-breasted button-quail are sparse (<50) and a comprehensive survey for the species is required to determine simply how widespread or habitat-limited, common or uncommon the species actually is.

Methods

Using methodology devised in Action 2.1 and modelled potential distribution as per Action 1.3, survey for buff-breasted button-quail in suitable areas where data are deficient.

Outcomes

An improved and broader understanding of the distribution and habitat requirements of the buff-breasted button-quail. Probability of achievement: Medium.

Potential contributors

DERM, Wildlife Conservancy of Tropical Queensland, birding groups, naturalist clubs, Traditional Owners, leaseholders and landholders, catchment management and NRM groups (viz. Cape York Community Engagement Group, Northern Gulf Resource Management Group, Terrain NRM and North Queensland Dry Tropics NRM).

Specific Objective 3. Protect key ecosystems/habitat that support populations of buff-breasted button-quail from human-induced threatening processes, thus maintaining current populations and habitat

Action 3.1: Develop management options and protocols for fire management in identified buff-breasted button-quail habitat within protected areas

Justification

There are currently no targeted prescriptions for State land managers to assist them in reducing the impacts of fire management on buff-breasted button-quail.

Methods

Fire management plans for national parks where buff-breasted button-quail may be present will be reviewed, in consultation with DERM staff, Traditional Owners, leaseholders adjacent to the national parks, and relevant experts on various other fauna and flora species (e.g. Gouldian finch, crimson finch, star finch, golden-shouldered parrot), so that conservation benefit can be maximised for all stakeholders and species possible.

Outcomes

A code of practice/guidelines for DERM staff to follow where buff-breasted button-quail may be disturbed or have their habitat impacted upon. Fire management plans for protected area estate that integrates burning requirements for buff-breasted button-quail and other species occurring in this habitat. Probability of achievement: Medium.

Potential contributors

DERM, Traditional Owners, leaseholders, agencies responsible for management of rural fires (viz. Queensland Fire and Rescue Service, Queensland Rural Fire Service).

Action 3.2: Establish extension activities with Traditional Owners, land managers and private landholders, develop a community network with these stakeholders leading to property planning and ensure their participation in the recovery process

Justification

Currently, a significant area of buff-breasted button-quail habitat is contained within private land holdings, lease holdings and council land on Cape York Peninsula. Strong and coordinated extension activities are needed to ensure the success of the recovery process.

Methods

Potential for participation in property planning should be investigated. Property planning may involve leaseholders, Traditional Owners, State government and Local government. Plans produced would provide guidelines for land management consistent with recovery objectives, including use of fire, and land manager needs and response to trends from monitoring. This action is long-term and will extend beyond the term of the current plan.

Outcomes

Long-term property management, including the use of fire, for the benefit of buff-breasted button-quail (and other threatened species such as the golden-shouldered parrot) on private land.
Probability of achievement: Medium.

Potential contributors

DEEDI, Traditional Owners, Local government, leaseholders and land managers.

Specific Objective 4. Determine the impacts of cattle and pigs on the habitat of buff-breasted button-quail and ameliorate any adverse effects.

Action 4.1: Determine the nature, extent and impact of cattle and pigs on the grassland and grassy woodland habitats of the buff-breasted button-quail

Justification

Cattle and pigs have been identified as a threat to golden-shouldered parrot, a species with which the buff-breasted button-quail shares certain habitats. It is not known whether cattle and pigs have a detrimental effect, either long or short term, on the buff-breasted button-quail and its habitat.

Methods

1. Erect trial plots at suitable locations as per the standards outlined in the Golden-shouldered Parrot Recovery Plan and other suitable properties to exclude cattle and/or pigs in buff-breasted button-quail habitat. These plots must be monitored throughout the seasons to determine the impact of cattle and pigs. In particular, monitoring must include sampling at the end of the dry season when fuel load is at its highest, mid-wet season when breeding has been recorded and at the end of the wet season when grasses are thickest. Monitoring at all these times is biennial for golden-shouldered parrots and should be the same for buff-breasted button-quail.
2. Survey and assess known and potential button-quail habitat for evidence of cattle/pig damage. Quantify percentage area of extent and severity of damage across the range of the buff-breasted button-quail.

Outcomes

Identification of the nature of the impact caused by cattle and pigs and prioritisation of action based on severity of impact and suitability for impact amelioration. Probability of achievement: Low.

Potential contributors

DERM, NRM bodies, Wildlife Conservancy of Tropical Queensland, Traditional Owners, landholders, land managers and leaseholders, DEEDI.

Action 4.2: Develop and implement strategies to ameliorate adverse effects of domestic stock on buff-breasted button-quail and its habitat if determined necessary under 4.1.

Justification

If cattle exclusion improves the quality of habitat and/or increases habitat use by buff-breasted button-quail, methods should be devised to exclude cattle from key areas within the landscape. Buff-breasted button-quail may variably access aspects of the landscape temporally and, in conjunction with storm-burning, various methods such as stock rotation, spell-grazing and fencing may be used either exclusively or in combination to enhance habitat quality and habitat use.

Methods

Assess effectiveness of exclusion plots with respect to habitat enhancement and use by buff-breasted button-quail. If necessary, investigate the use of stock manipulation methods to exclude cattle from key areas at key times.

Outcomes

Reduction in damage of buff-breasted button-quail habitat leading to an increase in habitat area available for use by the species and a greater understanding of how the species utilises habitat. Probability of achievement: Low.

Potential contributors

DEEDI, NRM bodies, Wildlife Conservancy of Tropical Queensland, Traditional Owners, landholders, land managers, leaseholders and DERM.

Action 4.3: Develop and implement strategies to ameliorate adverse effects of pigs on buff-breasted button-quail and its habitat if determined necessary under 4.1.

Justification

If the impact of pigs is shown to be sufficiently adverse to buff-breasted button-quail under Action 4.1, control of this feral animal may be necessary.

Methods

Implement baiting, shooting and/or exclusion as appropriate at key sites, e.g. those occupied by the bird or identified as potential habitat. Undertake when necessary; e.g., after periods of high rainfall when pig numbers are often greatest.

Outcomes

Reduction in damage of buff-breasted button-quail habitat leading to an increase in habitat area available for use by the species and a greater understanding of how the species utilises habitat. Probability of achievement: Low.

Potential contributors

DERM, DEEDI, NRM bodies, Wildlife Conservancy of Tropical Queensland, Traditional Owners, landholders, land managers and leaseholders.

Action 4.4: Support appropriate land managers (e.g. DERM staff) in identifying and establishing strategies for maintaining appropriate levels of pig control.

Justification

Pig control may be necessary on protected areas to reduce degradation of habitat used by buff-breasted button-quail.

Methods

An estimate of the impact of pigs in protected areas may be made as part of Action 4.1. Advice to land managers will be made on the basis of this estimation. Action would occur where and when necessary to supplement DERM core business.

Outcomes

Reduction in damage of buff-breasted button-quail habitat leading to an increase in habitat area available for use by the species and a greater understanding of how the species utilises habitat. Probability of achievement: Low.

Potential contributors

DERM, Traditional Owners, and land managers

Specific Objective 5. Support the recovery process

Action 5.1: Review of the recovery process

Justification

A review is necessary for any recovery process to assess the progress toward meeting the recovery plan objectives. It should include input from people not involved in the development of the recovery plan and may require contracting a consultant(s).

Methods

Conduct a full review of the recovery process within 5 years from adoption as a national recovery plan. Progress on actions will be regularly monitored (particularly 1.2 and 2.1).

Outcomes

An objective view of the success of the recovery process throughout the life of the plan and added insight into how a further species management plans may be updated, adapting to new knowledge gained. Probability of achievement: High

5.2 Summary

Table 1. Summary of relationship between specific objectives, performance criteria and actions.

Priority categories 1, 2 and 3 (in terms of significance to the recovery process) Note: ALL actions are considered important.

Specific objective	Performance criteria	Action	Priority
1: Increase understanding of the distribution, life history and ecology of buff-breasted button-quail	1.1: Knowledge of buff-breasted button-quail conservation status, current distribution, life history and other ecological aspects is significantly increased.	1.1: Survey all known buff-breasted button-quail sites.	1
		1.2: Existing buff-breasted button-quail records (historic and current) and site data to be collated in WildNet database	1
		1.3: Map existing data on buff-breasted button-quail distribution and habitat requirements yielding a 'essential habitat' GIS layer and develop a predictive model of the species' distribution	1
		1.4: Conduct scientific research program(s) to undertake habitat assessment, radio-tracking experiments and collect observational data	1
		1.5: Determine the role of storm burning with respect to buff-breasted button-quail breeding ecology	1
2: Define assessment and monitoring strategies for buff-breasted button-quail	2.1: Assessment and monitoring guide for buff-breasted button-quail produced and tested by conducting survey to consolidate knowledge.	2.1: Document a useful methodology of finding and recording buff-breasted button-quail for observers	1
		2.2: Survey habitat where buff-breasted button-quail occurrence is predicted by the model developed in Action 1.3.	1
3: Protect key ecosystems and habitat that support populations of buff-breasted button-quail from human-induced threatening processes, thus maintaining current populations and	3.1: Habitat management objectives and codes are devised and adopted	3.1: Develop management options and protocols for fire management in identified buff-breasted button-quail habitat within protected areas	2

habitat	3.2: Implementation of a community awareness strategy resulting in active community participation, including Traditional Owners	3.2: Establish extension activities with Traditional Owners, land managers and private landholders, develop a community network with these stakeholders leading to property planning and ensure their participation in the recovery process	2
4: Determine the impacts of introduced predators and competitors, including grazing animals and ameliorate any effects	4.1: Threats to the species by grazing and feral animals are determined, areas of high impact identified and ameliorate effects	4.1: Determine the nature, extent and impact of cattle and pigs on grassy woodland habitats of the buff-breasted button-quail	1
		4.2: Develop and implement strategies to ameliorate adverse effects of domestic stock on buff-breasted button-quail and its habitat if determined necessary by Action 4.1.	1
		4.3: Develop and implement strategies to ameliorate adverse effects of pigs on buff-breasted button-quail and its habitat if determined necessary by Action 4.1.	1
		4.4: Support appropriate land managers (e.g. DERM staff) in identifying and establishing strategies for maintaining appropriate levels of pig control.	2
5: Support recovery process	5.1: Establishment and continued functioning of a recovery team to direct the recovery process, a major review and a new Recovery Plan at the end of year 5.	5.1: Review of the recovery process	3

6. Management practices

Conservation and management of buff-breasted button-quail will occur primarily through:

- Identification of and education about preferred habitat;
- Effective adaptive management of habitat and the ecological processes affecting viability of the population(s);

6.1 Identification of habitat and education

Populations of this species cannot be managed unless habitat and populations are identified.

Graziers, landholders, Traditional Owners and the public are to be made aware of the distribution and habitat of the buff-breasted button-quail and are encouraged to undertake suitable actions for protecting and enhancing populations and habitat of the species, while undertaking sustainable human activity, through information fact sheets, extension and liaison with the grazing industry.

6.2 Effective management of habitat and processes within habitat

Management of habitat will require:

- Appropriate fire management in preferred habitat;
- Control of feral animals and stock within and adjacent to suitable core habitat;
- Control of weeds, where these can impact on the ecology of the species.

6.3 Management of human activities

Management of human activities, particularly associated with grazing and burning:

- Management of activities as stipulated by the *Nature Conservation Act 1992* (Queensland)
- Matters of National Environmental Significance, including any activity that will have a significant impact on threatened species, as defined by the Australian Government *Environment Protection and Biodiversity Protection Act 1999*.
- Management of activities in accordance with *Fire and Rescue Service Act 1990*
- Burning on parks to comply with Fire Management System.
- Following codes under the *Vegetation Management Act 1999 (VMA)*;
- Control of pests under *Land Protection (Pest and Stock Route Management) Act 2002* on protected and private land.

7. Costs of recovery

Table 2: Estimated cost of recovery per annum

Action No.	Action description	Year 1	Year 2	Year 3	Year 4	Year 5	Total
1.1	Survey all known buff-breasted button-quail sites	?	?	0	0	0	
1.2	Existing buff-breasted button-quail records (historic and current) and site data to be collated in WildNet database	7,500	2,000	2,000	2,000	2,000	15,500
1.3	Map existing data on buff-breasted button-quail distribution and habitat requirements yielding an 'essential habitat' GIS layer and develop a predictive model of the species' distribution	10,000	1,000	1,000	1,000	1,000	14,000
1.4	Conduct scientific research program(s) to undertake habitat assessment, radio-tracking experiments and collect observational data	20,000	150,000	50,000	25,000	25,000	270,000
1.5	Determine the role of storm burning with respect to buff-breasted button-quail breeding ecology	50,000	30,000	30,000	20,000	20,000	150,000
2.1	Document a useful methodology of finding and recording buff-breasted button-quail for observers	15,000	5,000	1,000	1,000	1,000	23,000
2.2	Survey habitat where buff-breasted button-quail occurrence is predicted by the model developed in Action 1.3	80,000	40,000	20,000	5,000	5,000	150,000
3.1	Develop management options and protocols for fire management in identified buff-breasted button-quail habitat within protected areas	10,000	10,000	2,000	2,000	2,000	26,000
3.2	Establish extension activities with Traditional Owners, land managers and private landholders, develop a community network with these stakeholders and ensure their participation in the recovery process	5,000	5,000	5,000	5,000	5,000	25,000
4.1	Determine the nature, extent and impact of cattle and pigs on the grassland and grassy woodland habitats of the buff-breasted button-quail	0	10,000	5,000	4,000	2,000	21,000
4.2	Develop and implement strategies to ameliorate adverse effects of domestic stock on buff-breasted button-quail and its habitat if determined necessary by Action 4.1	1,000	20,000	20,000	5,000	5,000	51,000
4.3	Develop and implement strategies to ameliorate adverse effects of pigs on buff-breasted button-quail and its habitat if determined necessary by Action 4.1	1,000	20,000	20,000	5,000	5,000	51,000
4.4	Support appropriate land managers (e.g. DERM staff) in identifying and establishing strategies for maintaining appropriate levels of pig control.	1,000	2,000	2,000	1,000	1,000	7,000
5.1	Review of the recovery process	2,000	2,000	2,000	2,000	4,500	22,500
TOTALS		216,500	292,000	157,000	76,000	78,500	\$816,000

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