

THREATENED SPECIES SCIENTIFIC COMMITTEE

Established under the *Environment Protection and Biodiversity Conservation Act 1999*

The Minister approved this conservation advice and retained this species in the Endangered category, effective from 07/12/2016

Conservation Advice

Erythrura gouldiae

Gouldian finch

Taxonomy

Conventionally accepted as *Erythrura gouldiae* (Gould 1844).

Summary of assessment

Conservation status

Endangered

The Gouldian finch was transferred from the *Endangered Species Protection Act 1992* to the list of threatened species under the *Environment Protection and Biodiversity Conservation Act (1999)* (EPBC Act) when the latter came into force in July 2000.

Following a formal review of the listing status of the Gouldian finch, the Threatened Species Scientific Committee (the Committee) has determined that there is insufficient evidence to support a change of status of the species under the EPBC Act. Therefore, the Committee concluded that the Gouldian finch should remain listed as Endangered under the EPBC Act.

Species can be listed as threatened under state and territory legislation. For information on the listing status of this species under relevant state or territory legislation, see <http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl>

Reason for conservation assessment by the Threatened Species Scientific Committee

This advice follows assessment of information provided to the Committee to help in the review of the listing status of *Erythrura gouldiae*.

Relevant part of the EPBC Act for amending the list of threatened native species

Section 186 of the EPBC Act states that:

“(2A) The Minister must not delete (whether as a result of a transfer or otherwise) a native species from a particular category unless satisfied that:

- (a) the native species is no longer eligible to be included in that category; or
- (b) the inclusion of the native species in that category is not contributing, or will not contribute, to the survival of the native species.”

Public Consultation

Notice of the proposed amendment and a consultation document was made available for public comment for greater than 30 business days between 17 November 2014 and 9 January 2015. Any comments received that were relevant to the survival of the species were considered by the Committee as part of the assessment process.

Species Information

Description

The Gouldian finch is about 12 to 15 cm in length and weighs about 14 to 15 g. The adults are vividly multi-coloured, and exhibit three different facial colour-morphs: black-headed (most common), red-headed and yellow-headed (rare). The adult male is mainly emerald green above, with a light-blue upper tail, and a large black, red or yellow-orange mask (depending on the morph) that is bordered behind by a light-blue band; and yellow below with a purple breast and cream under tail. The adult female is similar to the adult male, but is duller and paler overall, and has a shorter tail. Adults of both sexes have black-brown irises, a ring of pale bluish-grey skin around each eye, pinkish-orange legs and feet, and a beak that varies in colour from white with a red or (rarely) yellow tip in the non-breeding season to pearl (in males) or dark grey (in females) in the breeding season. Juveniles are easily distinguished from the adults by their relatively drab and nondescript olive-brown-grey plumage.

Distribution

The species is found in northern Australia from Cape York Peninsula through north-west Queensland and the north of the Northern Territory to the Kimberley Region of Western Australia (Higgins et al., 2006; O'Malley 2006). Genetic analyses of mitochondrial markers provides no evidence for population structuring across the species range and indicates that there is one continuous genetic population in the west, while nuclear markers indicate contemporary gene flow from the Kimberley to the Northern Territory (Esparza-Salas 2008; Bolton et al., 2015). In Queensland there are no recent breeding records. However, since 2005 birds have been sighted on at least three sites on Cape York Peninsula, on the Atherton Tablelands, and at several sites in and around Boodjamulla National Park (Garnett et al., 2011). In the Northern Territory there are recent breeding records at well-known sites in the Yinberrie Hills and Newry, as well as at Wologorang (Baker-Gabb, cited in Garnett et al., 2011) and near Maningrida (Noske, cited in Garnett et al., 2011). In the Kimberley, small breeding populations of up to 120 adults each are known from the east (Pryke, cited in Garnett et al., 2011), the centre (Mornington Sanctuary; Legge et al., 2015), and west to Dampierland (WWF, 2012).

Cultural Significance

Gouldian finch distribution extends over lands of many different Traditional Owner groups in Queensland, the Northern Territory and Western Australia represented by various Land Trusts, Indigenous pastoral leases, and Aboriginal corporations. Many of these groups have used the Gouldian Finch as a flagship for seeking community support and government funds to deliver improved fire management and control of introduced species (e.g. livestock, pigs) on their lands.

Relevant Biology/Ecology

The Gouldian finch may be seen singly, in twos and in flocks that vary in size from small parties (including family groups) of less than 10 birds to large flocks of hundreds of birds. Gouldian finches may congregate around waterholes when coming to drink, although groups may arrive at waterholes independently. They are regularly observed in mixed flocks with other species of finches, particularly the long-tailed finch (*Poephila acuticauda*).

Gouldian finches feed almost exclusively on grass seed and depend on a relatively small number of grass species which seed at different times throughout the year (Dostine & Franklin 2002; O'Malley 2006). In the wet season, they rely on a small number of perennial grass species, consuming the seeds directly off plants as they ripen. In the dry season, they depend on the large volume of annual grass seed that is produced towards the end of the previous wet season and lies dormant on the ground (Dostine et al., 2001)

They nest in tree hollows between April-July (although this period is extended in some years), lay an average clutch of five eggs, and may raise several clutches in a season, with productivity averaging 1.5 fledglings per adult per season (Tidemann et al., 1999). When breeding they use small patches of open woodland, usually on ridges dominated by cavity bearing trees such as white northern gum (*Eucalyptus brevifolia*) in the west and Territory salmon gum (*E. tintinnans*)

in the east (Tidemann et al., 1992a), with an understory of grasses such as sorghum (*Sarga spp.*), *Schizachyrium* spp. and spinifex (*Trodia* spp.), and usually within 2-4 km of perennial waterholes or springs (Dostine et al., 2001; O'Malley 2006). After breeding they tend to flock and move across the broader landscape, following grass seed resources (O'Malley 2006).

The lifespan of wild Gouldian finches may be relatively short; high adult mortality following breeding is suggested by the very small number of adults (but much higher numbers of juveniles) present towards the end of the year (Legge, pers comm., 2016), and by banding studies that consistently note very low recapture rates (e.g. Woinarski & Tidemann 1992; Legge, pers comm., 2016). A generation time of 2.7 years is derived from an age at first breeding of 1.0 years and maximum longevity in the wild of 4.4 years (Garnett et al., 2011).

Threats

Vegetation change through altered fire regimes and grazing by introduced herbivores are the factors most likely to have caused past declines, and to be preventing recovery, in Gouldian finch populations (O'Malley 2006; Legge et al., 2015). A regime of regular extensive and intense fires have been related to poorer body condition indices (as measured by haematocrit, body fat, body muscle, and stress hormone concentrations) from the late dry season through to the late wet season, indicating prolonged nutritional stress for about half of the year (Legge et al., 2015). Regular intense fires are likely to reduce the availability of both dry season feeding grasses (by directly burning seed lying on the ground; Watkinson et al., 1989), as well as wet season feeding grasses (by reducing seed yields, and plant survival; Craig 1992; Crowley & Garnett 2001). In addition, fire interacts with rainfall to cause staggered grass seeding events across the landscape; and regular extensive fires homogenise vegetation age and thus reduce the spatial-temporal complexity of seed availability that Gouldian finches rely on (Legge et al., 2015). Regular intense fires may also reduce hollow availability at local scales (Brazill-Boast et al., 2010, 2011), although nest hollow availability and productivity of juveniles appears not to be limiting at most sites (Tidemann et al., 1999; Legge, pers comm., 2016).

Heavy grazing by cattle is known to reduce seed yields in grasses important to the finches (Crowley and Garnett 2001). Key Gouldian finch wet season grasses, such as cockatoo grass (*Alloteropsis semialata*) and golden beard grass (*Chrysopogon fallax*), are selectively grazed by cattle and horses leading to their seed production and extent being reduced (Crowley & Garnett 2001). Routing by feral pigs can also cause significant damage to patches of cockatoo grass, and introduced herbivores can reduce or degrade waterholes used by Gouldian finches in the dry season by trampling and eating surrounding vegetation (O'Malley 2006).

Historically an air-sac mite (*Sternostoma tracheacolum*) (Tidemann et al., 1992b; Bell 1996) was investigated for its role in causing population declines, but although the mite was often identified in sick birds, its role in causing the poor condition (rather than being a secondary consequence of birds being in poor condition because of other factors) remained unclear. Trapping for aviculture was substantial in the past but has not occurred to any extent for about 30 years (Franklin et al., 1999). There may be ongoing localised threats to some breeding habitat from developments such as mining.

How judged by the Committee in relation to the EPBC Act Criteria and Regulations

Criterion 1. Population size reduction (reduction in total numbers)			
Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4			
	Critically Endangered Very severe reduction	Endangered Severe reduction	Vulnerable Substantial reduction
A1	≥ 90%	≥ 70%	≥ 50%
A2, A3, A4	≥ 80%	≥ 50%	≥ 30%
<p>A1 Population reduction observed, estimated, inferred or suspected in the past and the causes of the reduction are clearly reversible AND understood AND ceased.</p> <p>A2 Population reduction observed, estimated, inferred or suspected in the past where the causes of the reduction may not have ceased OR may not be understood OR may not be reversible.</p> <p>A3 Population reduction, projected or suspected to be met in the future (up to a maximum of 100 years) [(a) cannot be used for A3]</p> <p>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.</p>	<p><i>based on any of the following:</i></p> <ul style="list-style-type: none"> (a) direct observation [except A3] (b) an index of abundance appropriate to the taxon (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat (d) actual or potential levels of exploitation (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites 		

Evidence:

Not eligible

The population size of the Gouldian finch is extremely difficult to estimate as the species is highly mobile, and birds can move extensively across the landscape. Monitoring effort for the species has varied: long-term monitoring based on waterhole counts in the late dry season was implemented (for varying durations) at Yinberrie Hills, Limmen Gate National Park and Newry Station in the Top End by the Northern Territory government up until 2013, and is still being undertaken at Mornington Sanctuary in the central Kimberley by The Australian Wildlife Conservancy, and near Wyndham in the east Kimberley by Save the Gouldian Fund and University of NSW researchers. The latter group have also conducted censuses of the annual breeding population at the Wyndham site. The trends for all data sources indicate populations are either stable or declining (Griffiths et al., 2015; Legge, pers. comm., 2016; Price 2004; Garnett et al., 2011), however, given that Gouldian finches may move over much larger areas than are sampled, these trends are difficult to interpret. On the other hand, since 2004, large flocks of birds (mostly juveniles, and male-biased) have been seen during the dry season by birdwatchers at multiple, well-separated sites from western Queensland through the Northern Territory (Garnett et al., 2011). These sightings could be interpreted as evidence of an increasing distribution, however there may be issues of double-counting large flocks of finches as they move across the landscape (Griffith et al., 2015).

In 2015 BirdLife Australia analysed population data collected from 1999-2013 and concluded there had been no statistically significant trend in population size during this period (Ehmke, pers comm., 2015). Population trends were calculated using data from 2459 searches at 308 sites across the species range, with modelled presence/absence data used to construct trend profiles (Ehmke, pers comm., 2015). The raw data showed high variability over time, however this was largely attributed to seasonal variation in survey effort (Ehmke, pers comm., 2015).

There is strong evidence for historical decline: anecdotal records indicate that the Gouldian finch was once more widespread and abundant (O'Malley 2006), and records from finch trappers for the avicultural trade show a marked decline in the late 1970s (Franklin et al., 1999). In comparison, the contemporary data on population trends are poor in terms of both accuracy and precision. However, there is no strong evidence to support an ongoing decline of greater than 30%.

Following assessment of the data the Committee has determined that the species is not eligible for listing in any category under this criterion as the past, current or future population declines are thought unlikely to exceed 30 percent in any 3-generation period.

Criterion 2. Geographic distribution as indicators for either extent of occurrence AND/OR area of occupancy			
	Critically Endangered Very restricted	Endangered Restricted	Vulnerable Limited
B1. Extent of occurrence (EOO)	< 100 km ²	< 5,000 km ²	< 20,000 km ²
B2. Area of occupancy (AOO)	< 10 km ²	< 500 km ²	< 2,000 km ²
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			

Evidence:

Insufficient data to determine eligibility

The extent of occurrence for Gouldian finches is estimated to be 1 228 800 km² (IUCN convex hull method), which is not considered limited, restricted or very restricted under this criterion; however, the species' area of occupancy is estimated to be 1 896 km² (IUCN 2 x 2 km grid cell method) (DotE 2015), which is considered limited (B2). However, due to the highly mobile nature of the species and the significant variability in survey effort and methodology, the available records are not judged to be sufficient to accurately assess distribution.

Based on genetic evidence, the species is not severely fragmented (Esparza-Salas 2008; Bolton et al., 2015), and it occurs at a large number of locations (Garnett et al., 2011). Long-term monitoring and incidental sightings by birdwatchers confirm fluctuations in population size and distribution over time (Griffiths et al., 2015; Legge, pers. comm., 2016; Price 2004). For example, the number of birds counted at waterholes in the Yinberrie Hills has fluctuated between 52 and 1189 adults over the period 1996-2003 (Price 2004).

However, the trends in change for area of occupancy and/or population size are unclear, as long-term monitoring data indicate either a stable or declining population (Griffiths et al., 2015; Legge, pers comm., 2016; Emke per comm., 2015), but bird watching data may indicate an expanding population (Garnett et al. 2011).

Thus the assessment indicates that the Gouldian finch meets the sub-criteria of having a limited area of occupancy and having a fluctuating population and/or distribution. The species is not fragmented, and nor does it occur at a limited number of locations. However, the information on trends in area of occupancy and/or population size is unclear and cannot be assessed. The Committee considers that there is insufficient information to determine the eligibility of the species for listing in any category under this criterion.

Criterion 3. Population size and decline			
	Critically Endangered Very low	Endangered Low	Vulnerable Limited
Estimated number of mature individuals	< 250	< 2,500	< 10,000
AND either (C1) or (C2) is true			
C1 An observed, estimated or projected continuing decline of at least (up to a max. of 100 years in future)	Very high rate 25% in 3 years or 1 generation (whichever is longer)	High rate 20% in 5 years or 2 generation (whichever is longer)	Substantial rate 10% in 10 years or 3 generations (whichever is longer)
C2 An observed, estimated, projected or inferred continuing decline AND its geographic distribution is precarious for its survival based on at least 1 of the following 3 conditions:			
(a) (i) Number of mature individuals in each subpopulation	≤ 50	≤ 250	≤ 1,000
(a) (ii) % of mature individuals in one subpopulation =	90 – 100%	95 – 100%	100%
(b) Extreme fluctuations in the number of mature individuals			

Evidence:

Insufficient data to determine eligibility

The population size of the Gouldian finch is extremely difficult to estimate because of its wide distribution and the highly mobile ranging of individuals. Garnett et al. (2011) used a structured elicitation process engaging an expert panel and utilising a two-stage Delphi technique to estimate the total number of mature Gouldian finches at approximately 2400 mature birds. However, the *Action Plan for Australian Birds 2010* also concluded that the population size may decrease to as low as 1000 mature birds when finch numbers reach their annual minimum during the late dry/early wet season (Garnett et al., 2011). Both of these estimates are classified as low under this criterion. Bolton et al. (2016) used genetic techniques to estimate the effective population size of Gouldian finches to be around 1600 (i.e. Low), however, this estimate has wide lower and upper 95 percent confidence intervals of 611 – 20,000. Nevertheless, taken together, these two very different approaches do support the classification of the Gouldian finch population size as Low.

All Gouldian finches are considered to be in a single sub-population, based on genetic evidence (Esparza-Salas 2008; Bolton et al., 2015), and evidence suggests extreme fluctuations in the number of mature individuals. For example, the number of adult birds counted at waterholes in the Yinberrie Hills fluctuated between 52 and 1189 over the period 1996-2003 (Price 2004).

However, the available data make it difficult to determine whether continuing declines in numbers can be observed, estimated, projected or inferred. Long-term monitoring data from the Yinberrie Hills between 1996 and 2004, from Mornington Sanctuary between 2005 and 2015, and from Wyndham between 2008 and 2014 suggest that the number of birds could be declining (Garnett et al., 2011; Griffiths et al., 2015; Legge, pers comm., 2016; Price 2004). However, population trends derived from a dataset of 2459 searches for presence/absence of the species, at 308 sites across the species range, indicated a stable population (Ehmke, pers comm., 2015).

The total number of mature individuals is Low, all birds are found in one sub-population, and the population size fluctuates. However there is limited information available regarding population trends. The Committee therefore considers that there is insufficient information to determine the eligibility of the species for listing in any category under this criterion.

Criterion 4. Number of mature individuals			
	Critically Endangered Extremely low	Endangered Very Low	Vulnerable Low
Number of mature individuals	< 50	< 250	< 1,000

Evidence:

Not eligible

The population size of the Gouldian finch is extremely difficult to estimate because of its wide distribution and the highly mobile ranging of individuals. Garnett et al. (2011) used a structured elicitation process engaging an expert panel and utilising a two-stage Delphi technique to estimate the total number of mature Gouldian finches at approximately 2400 mature birds. However, the *Action Plan for Australian Birds 2010* also concluded that the population size may decrease to as low as 1000 mature birds when finch numbers reach their annual minimum during the late dry/early wet season (Garnett et al., 2011). Bolton et al. (2016) used genetic techniques to estimate the effective population size of Gouldian finches to be around 1600 (i.e. Low), however, this estimate has wide lower and upper 95 percent confidence limits of 611-20,000. Nevertheless, taken together, these two very different approaches do not provide convincing evidence that the population size is less than 1000 mature individuals.

The Committee has determined that the species is not eligible for listing in this category.

Criterion 5. Quantitative Analysis			
	Critically Endangered Immediate future	Endangered Near future	Vulnerable Medium-term future
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

Evidence:

Insufficient data to determine eligibility

Population viability analysis has not been undertaken for the Gouldian finch.

Consideration for delisting

As there is no evidence to support a recovery since listing under the EPBC Act in July 2000 and insufficient data to adequately assess the species against all the EPBC eligibility criteria, this assessment concludes that the Gouldian finch should remain on the List of Threatened Species in the Endangered category.

The inclusion of the Gouldian finch in the Endangered category may also be contributing to the survival of the species, as the species is a flagship and funding driver for improved land management programs across northern Australia. In addition, the EPBC Act requires project proponents to refer a proposal for assessment if it may have a significant impact on a threatened species.

Conservation Actions

Recovery Plan

There is currently a *National Recovery Plan for the Gouldian Finch (Erythrura gouldiae) (2006)*. This recovery plan identifies conservation actions to minimise the probability of extinction of Gouldian finches in the wild, and to increase the probability of important populations becoming self-sustaining in the long-term. This recovery plan and the associated Legislative Instrument will sunset under the *Legislation Act 2003* on 1 October 2017.

Conservation and Management Actions

Fire

- Reduce the frequency, extent and intensity of fires across the entire distribution of the species, in order to increase the overall extent of long-unburnt vegetation, and to increase post-fire vegetation age heterogeneity.
- Incorporate adaptive burning strategies for Gouldian finch habitat into management plans for appropriate National Parks, Defence Lands, Indigenous Protected Areas and reserved lands.
- Develop and disseminate best practice guidelines for fire management in preferred Gouldian finch habitat for pastoral properties across the entire distribution of the species.

Impacts of introduced herbivores

- Reduce the densities of introduced herbivores in National Parks, Indigenous Protected Areas, Defence lands and reserved lands.
- Develop and disseminate best practice guidelines for grazing management, especially in preferred Gouldian finch wet season habitat, for pastoral properties across the distribution of the species. These guidelines are likely to include restricting livestock access to Gouldian finch wet season foraging habitats, during the wet season.

Stakeholder Engagement

- Work collaboratively with IPAs, Indigenous pastoral leases, and Aboriginal corporations to get greater participation in burning and introduced herbivore control actions on lands for which they are responsible, particularly those lands holding key Gouldian finch populations.
- Promote the Gouldian finch as an indicator of sustainable cattle and fire management.
- Work with Birdlife Australia to develop ways of engaging the bird watching communities in a rigorous monitoring program that is implemented across the species' distribution.

Survey and monitoring priorities

- Improve knowledge of population trends at key sites across the entire range of the Gouldian finch.
- Refine techniques to develop a standardised population monitoring method for assessing trends at key sites.
- Develop a rigorous monitoring program over a large number of sites spread across the species distribution that can be implemented by the bird watching community.
- Refine techniques to develop an effective method for rapid assessment of Gouldian finch population health.
- Establish a network of monitoring sites in key habitat areas in the Northern Territory and the Kimberley and implement annual population and/or health indicator monitoring at these sites.
- Integrate population trend and health monitoring actions into management plans for land managed for conservation.

Information and research priorities

- Design and carry out research to describe the movement patterns of Gouldian finches across the landscape, and what determines those movements.
- Investigate the causes of variation in the sizes of feeding flocks, including the relationship between food dispersion/abundance and flocking behaviour, and therefore whether particular flocking behaviours signify increased population vulnerability.
- Investigate causes of mortality in adult birds, and whether reduced life-spans are contributing to population decline/vulnerability.
- Investigate causes of variation in the extent of juvenile recruitment between years.
- Develop indicators for optimal Gouldian finch habitat health based on an assessment of grazing and fire impacts on both dry season and wet season habitat.

Recommendations

- (i) The Committee recommends that *Erythrura gouldiae* be retained in the Endangered category of the list referred to in section 178 of the EPBC Act as there is insufficient evidence to support transferring it to a different category and inclusion of the species in that category may be having a beneficial impact on the continued survival of the species.
- (ii) The Committee recommends that there should not be a recovery plan for this species.

Threatened Species Scientific Committee

09/06/2016

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