

## Conservation Advice

### *Cryptoblepharus egeriae*

#### 1. Name

*Cryptoblepharus egeriae*

The species is commonly known as the blue-tailed skink. It is in the Family Scincidae.

#### 2. Reason for Conservation Assessment by the Committee

This advice follows assessment of information provided by a public nomination to list the blue-tailed skink. The nominator suggested listing in the critically endangered category of the list.

This is the Committee's first consideration of the species under the EPBC Act.

#### 3. Summary of Conclusion

The Committee judges that the species has been demonstrated to have met sufficient elements of Criteria 1, 2 and 3 to make it eligible for listing as **critically endangered**.

The Committee judges that the species has been demonstrated to have met sufficient elements of Criterion 4 to make it eligible for listing as **endangered**.

The highest category for which the species is eligible to be listed is **critically endangered**.

#### 4. Taxonomy

The species is conventionally accepted as *Cryptoblepharus egeriae* (Boulenger, 1889).

#### 5. Description

The blue-tailed skink is a small, slender skink which grows to approximately 4-5 cm from head to vent. The species has a brown-black coloured body. The most conspicuous feature of the blue-tailed skink is its bright, light blue tail colouration. The blue-tailed skink has the ability to lose its tail to evade predators. It is thought that the bright colouring on the tail directs a predator's attention to the tail instead of the body (Director of National Parks, 2012a).

#### 6. National Context

The blue-tailed skink is endemic to Christmas Island. This 135km<sup>2</sup> island is situated in the Indian Ocean, approximately 360km south of the western end of Java, Indonesia.

According to historic records, the species was once common and widespread throughout Christmas Island (Andrews, 1901; Gibson-Hill, 1947). The blue-tailed skink is reported to have once flourished in the disturbed urban habitats of the island's town. As recently as 1979 the species was considered to be extremely common and was often found on walls, fences and buildings in urban areas (Cogger et al., 1983; Smith et al., 2012). The species was less common in tall primary rainforest, being recorded more frequently at their edges and in canopy gaps (Cogger and Sadlier, 2000). However, from approximately the late 1980s the species' extent of occurrence began to decline in a westerly direction across the island. By 2008, the species was known to occur in only two locations including Egeria Point and North West Point (Schulz and Barker, 2008). The species is reported to have disappeared from North West Point by mid-2008 and from Egeria Point by mid-2010 (Director of National Parks, 2012a). Despite ongoing, extensive surveying across Christmas Island, no wild populations are currently known to occur. However, as Christmas Island has areas of rugged

landscapes that are difficult to access it is possible that undiscovered populations still exist (Smith et al., 2012).

If the species persists in the wild, its extent of occurrence is likely to be less than 1km<sup>2</sup> and its area of occupancy is likely to be less than 0.01km<sup>2</sup> (Director of National Parks, 2012a). The total population size of individuals in the wild is estimated to be fewer than 200. It is possible that it is zero (Director of National Parks, 2012a).

Since 2009, a captive breeding population of the blue-tailed skink has been maintained on Christmas Island. In 2011, an additional captive breeding population was established from this stock and is being maintained at Taronga Zoo, Sydney. As at November 2011, the number of individuals in both captive breeding populations was over 160 (Director of National Parks, 2012a).

The blue-tailed skink is not listed as threatened under state or territory legislation. If it persists in the wild, the last known population occurs at Egeria Point within Christmas Island National Park (Director of National Parks, 2012a).

## **7. Relevant Biology/Ecology**

The blue-tailed skink previously occurred across all habitats on Christmas Island, including tall primary rainforest, deciduous thickets, coastal thickets and settlement areas, including areas left unrehabilitated by mining (Cogger et al., 1983).

The blue-tailed skink is likely to live for approximately 5-7 years and the age of first breeding is approximately one year. Breeding is likely to occur throughout the year. Generally two eggs are laid at a time, with a hatching period of approximately 75 days. The generation length of the species is estimated to be approximately 3-4 years (Director of National Parks, 2012a).

The blue-tailed skink is diurnal. It actively forages and basks between 10am and 2pm, with activity far reduced outside these times. The species is a generalist predator of small invertebrates. The blue-tailed skink forages on the ground, on exposed rocks, in low vegetation and in the tree canopy, and may be exposed to predation attempts while foraging. The species occurs both singly and in groups. While the size of individual home ranges is unknown, it is likely to be substantially less than one hectare (Director of National Parks, 2012a).

## **8. Description of Threats**

A number of threatening processes have been identified as possibly contributing to the decline of the blue-tailed skink. However, no single factor has been explicitly linked to the species' decline, and there is a lack of evidence to apportion the relative impacts of potential threatening processes to the species decline (Director of National Parks, 2012a; Smith et al., 2012).

The most likely driver of decline in the blue-tailed skink is increased predation by exotic species (Smith et al., 2012). A number of species known, or suspected, to predate on reptiles have been introduced to Christmas Island including: the cat (*Felis catus*); black rat (*Rattus rattus*); Asian wolf snake (*Lycodon aulicus capucinus*); giant centipede (*Scolopendra subspinipes*); nankeen kestrel (*Falco cenchroides*); and yellow crazy ant (*Anoplolepis gracilipes*) (Donnellan et al., 2011; Smith et al., 2012). Most of these species have been on the island since the early 1900s. However, the Asian wolf snake was first recorded on the island in 1979 and the yellow crazy ant (O'Dowd et al., 2003) and giant centipede (Director of National Parks, 2012a) increased in abundance and range in the 1990s, approximately coinciding with the time the blue-tailed skink began to decline. The cat, rat, giant centipede and Asian wolf snake are common around Egeria Point, the last known area of occupancy of the blue-tailed skink. Within weeks of the last blue-tailed skink being recorded at Egeria

Point, three out of five Asian wolf snakes captured at this site were found to have blue-tailed skinks in their stomachs (Smith et al., 2012).

The spread and formation of high density yellow crazy ant colonies has resulted in considerable ecological changes across Christmas Island (O'Dowd et al., 2003). As a result of these environmental changes, the blue-tailed skink may have suffered a reduction in habitat suitability and/or food availability (O'Dowd et al., 2003). In 2008, a negative correlation between persistence of the blue-tailed skink and occurrence of yellow crazy ant colonies was reported (Director of National Parks, 2008). Baiting has led to substantial, although temporary, reductions in yellow crazy ant densities on Christmas Island. It is possible that control mechanisms for yellow crazy ants could have poisoned blue-tailed skinks through bio-accumulation. However, at North West Point blue-tailed skinks persisted for at least one year following hand application of Fipronil ant bait (despite yellow crazy ants being successfully controlled at the site), suggesting there was no short-term detrimental impact of baiting on the blue-tailed skink (Director of National Parks, 2008). Independent scientific research has confirmed that Fipronil has not accumulated in the environment (Weeks and McColl, 2011).

Inter-specific competition between the blue-tailed skink and exotic reptile populations is possible, but is considered unlikely to be the primary cause of decline in the blue-tailed skink (Smith et al., 2012). To date, one exotic skink, the grass skink (*Lygosoma bowringii*), has been introduced to Christmas Island. The grass skink was first recorded on the island around 1979, and increased in abundance at approximately the time the blue-tailed skink began to decline. The grass skink is likely to have co-occurred with the blue-tailed skink (Cogger et al., 1983), however there is no evidence of competitive exclusion between these two species as the blue-tailed skink has also disappeared from areas that the grass skink is unlikely to have occupied (Smith et al., 2012).

Another potential threat to the blue-tailed skink is disease associated with the introduction and spread of exotic reptile species. However, a preliminary study of the disease status of exotic reptile species on Christmas Island found no evidence of a disease, pathogen or parasite that could explain the observed decline in the blue-tailed skink (Hall et al., 2011).

Since the 1890s, land clearing for activities such as phosphate mining, development and road construction has caused the incremental loss of approximately 25 per cent of forest cover on Christmas Island. Therefore, habitat loss has been identified as a potential past threat to the blue-tailed skink. However, in 2000 Cogger and Sadlier reported that the blue-tailed skink was present in habitat which had been cleared for activities such as phosphate mining, noting the species "appears to thrive in those old mined areas ... Such areas, since the extirpation of this species from the settlement area, contain some of the highest density populations of this species". At present, there is no mining of areas containing undisturbed native vegetation on Christmas Island. Also, the fact that the blue-tailed skink has declined in areas undisturbed by phosphate mining indicates that habitat clearance is not a primary cause of decline (Smith et al., 2012).

## **9. Public Consultation**

In accordance with the statutory obligation, the nomination was made available for public comment for at least 30 business days between December 2012 and January 2013. Any comments received that are relevant to the survival of the species have been considered by the Committee.

## **10. How judged by the Committee in relation to the criteria of the EPBC Act and Regulations**

The Committee judges that the species is **eligible** for listing as **critically endangered** under the EPBC Act. The assessment against the criteria is as follows:

**Criterion 1: It has undergone, is suspected to have undergone or is likely to undergo in the immediate future a very severe, severe or substantial reduction in numbers**

According to historic records, the blue-tailed skink was once common and widespread throughout Christmas Island (Andrews, 1901; Gibson-Hill, 1947). In 1979, reptile surveys recorded it as “one of the most conspicuous and abundant reptiles on Christmas Island” (Cogger and Sadlier, 1981; Cogger et al., 1983). However, the species has dramatically declined over the past few decades, most likely as a result of the potential threatening processes outlined under the threats section. By 1992, the blue-tailed skink was reported to have declined considerably in settled areas (Rumpff, 1992) and in 1998 Cogger and Sadlier (2000) noted the blue-tailed skink had “suffered a significant contraction in range”. By 2004, the blue-tailed skink was found to have “declined severely” (Director of National Parks, 2008). In 2008, extensive surveys by Schulz and Barker found the species occurred in only two locations on Christmas Island: Egeria Point and North West Point (Schulz and Barker, 2008). Subsequent surveys by Parks Australia staff confirmed its disappearance from the North West Point site in mid-2008 and disappearance from Egeria Point in mid-2010 (Director of National Parks, 2012a). Following the disappearance of the blue-tailed skinks from Egeria Point, no populations are known to occur in the wild. However, as Christmas Island has areas of rugged landscapes that are difficult to access it is possible that undiscovered populations still exist on the island (Smith et al., 2012).

Parks Australia staff estimate the species’ range has declined by 95-100% over a period of approximately two decades. The rate of decline is likely to have been constant or to have accelerated, and the decline over the time period relevant to this assessment (three generations = 9-12 years, or approximately 10 years) is at least 50% of the species’ original distribution, or 95-100% of its 2001 distribution (Director of National Parks, 2012a). The Committee considers this decline to be very severe.

In the abovementioned surveys, density and abundance were expressed as a search success rate, not absolute numbers present. Although it has not been feasible to obtain definitive population size data, results of survey work concerning the species presence and distribution indicate there has been a decline in the species’ population size. Given the blue-tailed skink was considered to be ‘common’ up to the early 1980s (Cogger and Sadlier, 2000) and today no populations are known to occur in the wild, it is reasonable to estimate that there has been a decline in the species’ population size matching the decline in its distribution. Currently, Parks Australia staff responsible for managing the species estimate the total population size of individuals in the wild to be fewer than 200. It is possible that it is zero (Director of National Parks, 2012a).

Given the above, the Committee considers that the blue-tailed skink is likely to have undergone a very severe reduction in numbers and the species has been demonstrated to have met the relevant elements of Criterion one to make it **eligible** for listing as **critically endangered**.

**Criterion 2: Its geographic distribution is precarious for the survival of the species and is very restricted, restricted or limited**

As outlined under criterion 1, the blue-tailed skink was once considered to be common throughout Christmas Island, however the species’ extent of occurrence, area of occupancy and the number of locations in which the species occurs have continuously declined since the late 1980s. The species was last recorded in the wild in mid-2010 (Director of National Parks, 2012a). Currently, there are no known populations occurring in the wild, however it is possible that populations still exist in areas of the island that are difficult to access and survey (Smith et al., 2012).

As outlined under the threats section, a number of potential threats to the species including increased predation by exotic species and the ecological consequences of yellow crazy ant

outbreaks may have contributed to the species' decline. If populations of the blue-tailed skink still exist on Christmas Island these would occur at extremely limited locations. The species' current extent of occurrence and area of occupancy is uncertain, but are most likely to be less than 1km<sup>2</sup>. Parks Australia staff suggest that if the species persists in the wild its extent of occurrence may be as low as 0.01km<sup>2</sup> (Director of National Parks, 2012a). If the species still persists on Christmas Island, the ongoing impacts of the abovementioned threats are likely to lead to a future reduction in the species' extent of occurrence and area of occupancy. Given the above, the Committee considers the geographic distribution of the species to be precarious for its survival.

As the Committee considers that the blue-tailed skink has a very restricted geographic distribution, which is precarious for the survival of the species, the species has been demonstrated to have met the relevant elements of Criterion two to make it **eligible** for listing as **critically endangered**.

- Criterion 3: The estimated total number of mature individuals is limited to a particular degree; and either**
- (a) evidence suggests that the number will continue to decline at a particular rate; or**
  - (b) the number is likely to continue to decline and its geographic distribution is precarious for its survival**

The total number of mature, individual blue-tailed skinks in the wild is estimated to be between 0-200 (Director of National Parks, 2012a), which the Committee considers to be very low.

A continued decline in the species' area of occupancy, quality of habitat and number of populations has been observed over approximately the last two decades. This decline has most likely occurred as a result of the potential threatening processes outlined under the threats section. The blue-tailed skink's original extent of occurrence was approximately 135 km<sup>2</sup> (the whole of Christmas Island). The species began to decline from the late 1980s or early 1990s, to the point that currently, if it still occurs on the island, the species' extent of occurrence is estimated to be <0.01km<sup>2</sup> (Director of National Parks, 2012a), which the Committee considers to be extremely limited. This equates to a decline in the species' extent of occurrence of 95-100% over a period of approximately two decades. Given the continuing presence of the numerous potential threats outlined under the threats section, it can be inferred that any existing wild populations of the blue-tailed skink will continue to decline in the future.

The Committee judges that, if the species still occurs on Christmas Island, the estimated number of mature individuals is very low and the species only occurs in extremely limited location(s). Given the continued existence of numerous potential threats to the species, the Committee considers it likely that any existing populations of the blue-tailed skink will continue to decline and the species' geographic distribution is precarious for its survival. Therefore, the species has been demonstrated to have met the required elements of Criterion three to make it **eligible** for listing as **critically endangered**.

- Criterion 4: The estimated total number of mature individuals is extremely low, very low or low**

The blue-tailed skink has been the subject of a substantial amount of surveying and monitoring. This species has been included in Christmas Island's Biodiversity Monitoring Program (2003-06) (James 2004) and 'Island-wide Survey' (2009-11). In all surveys, density and abundance were expressed as a search success rate, not absolute numbers present. Therefore, it has not been possible to obtain definitive population size data. However, based on results of survey work concerning the species presence and distribution, Parks Australia staff responsible for managing the species estimate there are fewer than 200 mature

individuals in the wild. It is also possible that no mature individuals occur in the wild (Director of National Parks, 2012a).

As the Committee considers the estimated total number of mature individuals is very low, the species has been demonstrated to have met the required elements of Criterion 4 to make it **eligible** for listing as **endangered**.

**Criterion 5: Probability of extinction in the wild that is at least**

- (a) 50% in the immediate future; or**
- (b) 20% in the near future; or**
- (c) 10% in the medium-term future**

There are insufficient data available to estimate a probability of extinction of the species in the wild over a relevant timeframe. Therefore, as the species has not been demonstrated to have met the required elements of Criterion 5, it is **ineligible** for listing in any category under this criterion.

## **11. Conservation Status Conclusion**

*Cryptoblepharus egeriae* (blue-tailed skink) was nominated for inclusion in the list of threatened species referred to in section 178 of the EPBC Act. The nominator suggested listing in the critically endangered category of the list.

The Committee considers the species' area of occupancy and extent of occurrence to be very restricted. The Committee also considers the estimated number of mature individuals to be very low. If the species still occurs on the island, it is likely to occur only at extremely limited location(s). Given the ongoing presence of numerous potential threatening processes, the Committee considers it likely that any existing populations of the blue-tailed skink will continue to decline and the species' geographic distribution is precarious for its survival. Therefore, the species has been demonstrated to have met the relevant elements of Criteria 1, 2 and 3 to make it **eligible** for listing as **critically endangered** and met the relevant elements of Criterion 4 to make it **eligible** for listing as **endangered**.

The highest category for which the species is **eligible** to be listed is **critically endangered**.

## **12. Recovery Plan**

There should be a recovery plan for this species as stopping decline and supporting recovery will involve a complex set of recovery actions requiring a high level of planning and coordination. Parks Australia, on behalf of the Department of Sustainability, Environment, Water, Population and Communities, is in the process of finalising a whole-of-island recovery plan.

## **13. Priority Conservation Actions**

### **Research Priorities**

Research priorities that would inform future priority actions include:

- Support and enhance existing survey and monitoring programs to locate any additional populations/occurrences/remnants. In particular, undertake survey work in areas where the species was previously known to occur and in suitable habitat / potential habitat. Undertake further surveys to determine the extent of any populations that may be found.
- Investigate options for establishing additional populations from captive-bred stock. Undertake adaptive release trials, such as through the use on enclosures, to trial the reintroduction of captive-bred individuals into the wild. Monitor the status of reintroduced individuals.

- More precisely assess the ecological requirements of the blue-tailed skink as well as the relative impacts of potential threatening processes on the species. For example, conduct research to more closely determine the distribution, diets and predation rates of introduced predators including feral cats, rats, giant centipedes, Asian wolf snakes and introduced ants. Investigate the feasibility of reducing the impacts of exotic predators and adaptively trial management programs.
- Undertake field research to further define and locate habitat that may be critical to the survival of the blue-tailed skink.
- Further investigate possible disease agents/fungi/parasites which may have impacted upon the blue-tailed skink. In particular, further investigate disease agents/fungi/parasites which could have been introduced to Christmas Island by exotic reptiles.
- Further investigate methods to control the yellow crazy ants (e.g. biological control) as an alternative to baiting with Fipronil ant bait to avoid any potential negative impacts that Fipronil ant bait may have on native reptile species (i.e. to reduce off-target baiting impacts).
- Further investigate the distribution, diet and habitat requirements of introduced reptiles (including the Asian House Gecko, Barking House Gecko, Grass Skink, Flowerpot Blind Snake and the Asian wolf snake) to further ascertain the potential for competition between introduced species and the blue-tailed skink.

### **Priority Actions**

The following priority recovery and threat abatement actions can be done to support the recovery of the blue-tailed skink.

#### Habitat Loss, Disturbance and Modification

- Monitor areas where the blue-tailed skink was last known to occur to help identify key threats and determine the relative impacts of potential threats.
- Ensure there is no disturbance in areas where the blue-tailed skink was last known to occur, excluding necessary actions to manage the conservation of the species.
- Effectively manage any known, potential or emerging threats to the blue-tailed skink, such as introduced predators (e.g. cats and black rats) and diseases, particularly in areas where the species was last known to occur/potential habitat of the blue-tailed skink.

#### Animal Predation or Competition

- Control and reduce the impacts of introduced pests including the feral cat, rat, yellow crazy ant, Asian wolf snake and giant centipede on Christmas Island, particularly at sites where the blue-tailed skink is known to have previously occurred, by developing or implementing existing management plans to control these species on the island.
- Monitor the effectiveness of management programs to control population numbers of feral animals.
- Improve biosecurity on Christmas Island to maintain effective quarantine against the introduction of diseases, parasites, pathogens and invasive species. This includes rapidly controlling pests that may enter the island and assessing the risk of threat.

#### Diseases, Fungi and Parasites

- If a disease, fungi and/or parasite is found to be impacting upon, or may potentially impact upon, the blue-tailed skink, implement appropriate management actions to minimise the adverse impacts of the disease, fungi and/or parasite.

## Conservation Information

- Continue to support and enhance the captive breeding program for the species with the aim of breeding enough genetically diverse individuals to enable future re-establishment of wild populations.
- Develop educational and awareness raising programs regarding the blue-tailed skinks' status, threats and recovery activities. Raise awareness of the species within the local community and other relevant stakeholders through the production of fact sheets, information brochures, field days in conjunction with known community industry groups. Information products could outline useful information about conserving the species such as rules regarding cat ownership on Christmas Island, and ways that local people could become involved in recovery activities.

This list does not necessarily encompass all actions that may be of benefit to the blue-tailed skink, but highlights those that are considered to be of highest priority at the time of preparing the Approved Conservation Advice.

## **Existing Plans/Management Prescriptions that are Relevant to the Species**

- Christmas Island National Park Management Plan (Director of National Parks, 2012b)
- Threat abatement plan to reduce the impacts of tramp ants on biodiversity in Australia and its territories (DEH, 2006)
- Threat abatement plan for predation by feral cats (DEWHA, 2008)
- Proposed management plan for cats and rats on Christmas Island (Algar and Johnson, 2010)
- Threat abatement plan to reduce the impacts of exotic rodents on biodiversity on Australian offshore islands of less than 100 000 hectares (DEWHA, 2009)

These prescriptions were current at the time of publishing; please refer to the relevant agency's website for any updated versions.

## **14. Recommendations**

- (i) The Committee recommends that the list referred to in section 178 of the EPBC Act be amended by **including** in the list in the **critically endangered** category:

*Cryptoblepharus egeriae*

- (ii) The Committee recommends that there should be a recovery plan for this species.

Threatened Species Scientific Committee

6 March 2013



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