

**Advice to the Minister for the Environment, Heritage and the Arts
from the Threatened Species Scientific Committee (the Committee)
on Amendment to the list of Threatened Species
under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)**

1. Scientific name (common name)

Calyptorhynchus banksii naso (Forest Red-tailed Black Cockatoo)

2. Reason for Conservation Assessment by the Committee

This advice follows assessment of information gathered through the Commonwealth's Species Information Partnership with the Western Australian Department of Environment and Conservation which is aimed at systematically reviewing species that are inconsistently listed under the EPBC Act and Western Australian legislation.

The Forest Red-tailed Black Cockatoo is listed as fauna that is rare or likely to become extinct under Schedule 1 of the Western Australian *Wildlife Conservation Act 1950* and is managed as 'vulnerable' (according to IUCN criteria) by the Western Australian Government. The Committee provides the following assessment of the appropriateness of the subspecies' inclusion in the EPBC Act list of threatened species.

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

3. Summary of Conclusion

The Committee judges that the subspecies has been demonstrated to have met sufficient elements of Criterion 1 to make it **eligible** for listing as **vulnerable**.

The highest category for which the subspecies is eligible to be listed is **vulnerable**.

4. Taxonomy

The subspecies is conventionally accepted as *Calyptorhynchus banksii naso* (Forest Red-tailed Black Cockatoo) (Gould, 1837).

5. Description

The Forest Red-tailed Black Cockatoo is 55 to 60 cm in length and 570 to 870 g in weight. Males and females are mostly glossy black with a pair of black central tail feathers, a crest, robust bill and bright red, orange or yellow barring in the tail (Higgins, 1999).

Males of the subspecies are distinguished by broad red tail panels that are only visible when alighting. They have a dark brown iris, dark grey eye-ring and blackish legs. Females are distinguished by yellow or whitish spots on the feathers of the head and upper wing. Their tail feathers are bright red and orange, grading to yellow on the inner margins, and have variable black horizontal barring. Females have yellow or orange barring on the tips of the feathers of the throat, breast, belly and under-tail coverts and a light grey bill with a dark grey tip. The juvenile is similar to the adult female but has a white eye-ring (Johnstone and Storr, 1998; Higgins, 1999). The Forest Red-tailed Black Cockatoo has a loud cry of 'Karee' or 'Krar-raak' (Johnstone and Storr, 1998).

6. National Context

The Forest Red-tailed Black Cockatoo is endemic to the south-west humid and sub-humid zones of Western Australia (Mawson and Johnstone, 1997).

The current distribution is north of Perth and east to Mount Helena, Christmas Tree Well, North Banister, Mt Saddleback, Rocky Gully and the upper King River (Johnstone, 1997).

The Forest Red-tailed Black Cockatoo is listed as fauna that is rare or likely to become extinct under Schedule 1 of the Western Australian *Wildlife Conservation Act 1950*.

7. Relevant Biology/Ecology

In 2006, the population of Forest Red-tailed Black Cockatoos was estimated to be approximately 15,000 birds (CALM, 2006). This estimate was derived through surveys and observations. The subspecies occurs in one population.

The Forest Red-tailed Black Cockatoo inhabits the dense *Eucalyptus marginata* (Jarrah), *E. diversicolor* (Karri) and *Corymbia calophylla* (Marri) forests of south-west Australia. These forests receive more than 600 mm of annual average rainfall (Saunders et al., 1985; Saunders and Ingram, 1995).

Similar to *C. baudinii* (Baudin's Cockatoo), the Forest Red-tailed Black Cockatoo nests in the large hollows of Marri, Jarrah and Karri (Johnstone and Kirkby, 1999). The subspecies has also been sighted nesting in *E. wandoo* (Wandoo) and *E. megacarpa* (Bullich) (CALM, 2006). The habitat in which the subspecies occurs at Bungendore Park and Jarrahdale, has an understorey of *Banksia grandis* (Bull Banksia), *Persoonia longifolia* (Snottygobble), *Allocasuarina fraseriana* (Western Sheoak) and *Dryandra* spp. with scattered *E. patens* (Blackbutt) and Wandoo (Johnstone and Kirkby, 1999).

There have been reports of extreme fluctuations in regional population numbers, especially on the eastern side of the subspecies' range. These fluctuations occur in late summer, when large aggregations of the subspecies occur as a response to food availability. Population fluctuations have also occurred in response to devastating fires (CALM, 2006; Chapman, 2005).

The Forest Red-tailed Black Cockatoo is monogamous and pairs probably form a lifetime bond (Smith and Saunders, 1986). They begin to breed when they are four to six years old (Shephard, 1989; Sindel and Lynn, 1989). However, birds less than four years old have been recorded breeding by Western Australian Museum staff (Chapman, 2005). Breeding usually occurs in October and November, although in years with good autumn rainfall they may breed in March and April (Johnstone, 1997).

The generation length is likely to be somewhere between 6 and 25 years. Recent information suggests that less than 10% of the population is capable of breeding in any one year and most birds only breed every two to three years (Johnstone, pers. comm., 2008). The life expectancy of wild birds is unknown; however, it is predicted to be between 25 and 50 years (Johnstone, 1999).

The effective clutch size of the Forest Red-tailed Black Cockatoo is one, because although two eggs are sometimes laid, only one chick fledges (Johnstone and Storr, 1998). During the incubation period, the male feeds with the flock and flies back to the nest to feed the female once or twice a day (Johnstone and Kirkby, 1999). During the nestling stage the female forages for herself outside the nest (Johnstone and Kirkby, 1999). The young can be fed by the parents for up to a year after fledging (Johnstone and Kirkby, 1999).

While the Forest Red-tailed Black Cockatoo feeds on the seeds of multiple plant species, around 90% of its diet comes from the seeds from Marri and Jarrah fruits (Johnstone and Kirkby, 1999). The other species utilised for foraging include Blackbutt, *E. staeri* (Albany Blackbutt), Western Sheoak, Snottygobble and the non-indigenous native *E. maculata* (Spotted Gum) and *Melia azederach* (Cape Lilac) (Johnstone and Storr, 1998; Johnstone and Kirkby, 1999).

The subspecies feeds in selected Marri trees which carry nuts of greater seed number and total seed weight than trees not used for foraging, indicating that Forest Red-tailed Black Cockatoos selectively forage from trees that have fruits with a higher energy content (Cooper et al., 2002). However, the subspecies' method for determining which trees have the highest seed yield is unclear (Cooper et al., 2002). A feed tree with a high fruit yield in one year requires at least three years to replenish sufficient resources to fruit successfully again. Therefore, the cockatoos cannot feed from the same trees each year, so they must assess the energy yield of the fruits from individual trees each time they fruit (Cooper et al., 2002). In most years, only about 20% to 50% of Marri trees produce a large crop of fruits and a small proportion of the trees produce only male flowers, which fail to fruit (Mawson, 1995).

8. Description of Threats

Key threats to the Forest Red-tailed Black Cockatoo are illegal shooting, habitat loss, nest hollow shortage and competition from other species, and injury or death from *Apis mellifera* (European Honeybee) (Chapman, 2005). Climate change is an additional threat that is likely to exacerbate other threats as a result of changes to biodiversity and ecosystem function (Chambers et al., 2005).

Habitat loss is an historic, current and future threat to the subspecies. It appears to be the principal cause of the historic decline of the subspecies as a result of agriculture, timber harvesting, woodchipping and mining within the subspecies' range (Johnstone, 1997; Mawson and Johnstone, 1997). The long-term effects of this threat may not yet have been fully realised because of the subspecies' long life-span (Brouwer et al., 2000). In the remaining habitat suitable for the Forest Red-tailed Black Cockatoo, selective removal of Marri for timber, mining, woodchipping and agriculture has resulted in further declines in the subspecies (Garnett and Crowley, 2000). The impacts of previous forest management practices for timber and woodchipping on Forest Red-tailed Black Cockatoo populations have not yet been quantified. However, forestry practices such as clear felling and 80-year cut rotations may restrict the availability of nest hollows (Saunders and Ingram, 1995). Many forms of mining in south-west Western Australia also initially involve clear felling of forests (Chapman, 2005).

Another historic threat to the subspecies is fatality from illegal shooting. Anecdotal evidence suggests that this may still occur. During the late 1800s and early 1900s, Forest Red-tailed Black Cockatoos were shot for food, for sport, and to obtain their tail feathers for ornamental and decorative purposes (Abbott, 2001). Records of Forest Red-tailed Black Cockatoos being illegally shot were also collected during a 1999-2000 survey (Abbott, 2001). These observations show that illegal shooting of Forest Red-tailed Black Cockatoos is likely to have had an impact on the population in the early 1990s and this impact continues to the present day. Reports of orchardists shooting Forest Red-tailed Black Cockatoos are received in Western Australia in most years. Prosecutions for these acts are undertaken whenever sufficient evidence is available.

Competition for nest hollows and injury or death by European Honeybees is a current and future threat to the subspecies. The honeybee can form long-term hives in tree hollows and kill nesting female Forest Red-tailed Black Cockatoos and their chicks through multiple stinging. European Honeybees pose a significant threat to the ability of the Forest Red-tailed Black Cockatoo to survive and breed, and this is likely to increase with the southward movement of bees in response to change to a warmer climate in southern Western Australia (Chapman, 2005).

Nest hollow shortage is an historic, current and future threat to the subspecies, though the extent of the impact of nest hollow shortages is unknown. The number of nest sites available may be limiting the subspecies' ability to breed (Garnett and Crowley, 2000) as they nest in large hollows, 80 to 90cm in diameter (Johnstone, 1997). The landscape in the south-west of Western Australia is highly modified with only about 10% of the original vegetation remaining. Hollows suitable for use by Forest Red-tailed Black Cockatoos are considered scarce (Chapman, 2005). Analyses have shown that trees with hollows large enough for use by Forest Red-tailed Black Cockatoos may need to be at least 130 to 220 years of age (Abbott and Whitford, 2002; Johnstone, 1997). Competition for available nest hollows with other bird species is an additional threat. Observations of competition for nest sites between the subspecies and *Chenonetta jubatta* (Wood Ducks), *C. latirostris* (Carnaby's Cockatoo), *Cacatua roseicapilla* (Galahs) and *Cacatua* spp. (Corellas) are increasing within the range of the Forest Red-tailed Black Cockatoo (Chapman, 2005; CALM, 2006, Johnstone and Cassarchis, 2004).

Recent changes to silvicultural prescriptions ensure five primary habitat trees and six to eight secondary habitat trees are retained per hectare during timber harvesting. The establishment of designated fauna habitat zones (excluded from logging) within each logging coupe has also increased the number of tree hollows protected in State Forest reserves (EPA and Conservation Commission, 2003). However, it is important to note that the presence of large trees does not indicate that they are suitable for use by a particular subspecies. There are many factors that affect tree hollow usage, including the tree hollow's proximity to water and food and other competitors' requirements. While opposing views exist as to whether nest hollow shortage is a threat, the majority of evidence available suggests that it is likely to be a significant constraint on reproductive success of the Forest Red-tailed Black Cockatoo.

9. Public Consultation

The information used in this assessment was made available for public exhibition and comment for 30 business days. The Committee has had regard to all public comment that was relevant to the survival of the subspecies. Three submissions were received.

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

The Committee judges that the subspecies is **eligible** for listing as **vulnerable** 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

The Forest Red-tailed Black Cockatoo was once common in the south-west forests of Western Australia, but decline was observed following timber harvesting in the early 1900s (Carter, 1923). There is qualitative evidence to suggest that the subspecies has declined in range by 25 to 30% as a result of clearing of the margins of the forests for agriculture in the early 1900s (Mawson and Johnstone, 1997). The subspecies has also declined in density over a further 14% of its range that has been partially cleared (Garnett and Crowley, 2000). While there are insufficient data available to quantify an historic decline in population size, the Committee considers that the observed reduction in distribution and abundance of the Forest Red-tailed Black Cockatoo is likely to have resulted in a similar decline in population size. The Forest Red-tailed Black Cockatoo is subject to a number of ongoing threats including habitat loss, competition for nest hollows and injury/death by European Honeybees and nest hollow competition and shortage from other species. The available information suggests that these threats may be causing an ongoing reduction in the subspecies' numbers.

Key biological and ecological characteristics (see Section 7) of the Forest Red-tailed Black Cockatoo combined with the historic and ongoing threats (see Section 8) suggest that the Forest Red-tailed Black Cockatoo has undergone a substantial reduction in numbers and that the decline may be ongoing. Recent information suggests that less than 10% of the population is capable of breeding in any one year and most birds only breed every two to three years. Additionally, data collected in 2007 suggests that breeding success for the subspecies is low. From the 60 nests that were monitored in 2007, only one pair raised a chick successfully (Johnstone, pers. comm., 2008). Therefore, the subspecies has been demonstrated to have met the relevant elements of Criterion 1 to make it **eligible** for listing as **vulnerable**.

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

In 2006, the extent of occurrence of the Forest Red-tailed Black Cockatoo was estimated to be approximately 66 500 km² (CALM, 2006). This estimate suggests that the geographic distribution is not precarious for the survival of the subspecies.

The Committee does not consider that the subspecies' geographic distribution is either precarious for the survival of the subspecies or limited. Therefore, as the subspecies has not been demonstrated to have met the required elements of Criterion 2, it is **not eligible** for listing in any category under this criterion.

- 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**

In 2006, the estimated total number of mature individuals of the Forest Red-tailed Black Cockatoo was 15,000 (CALM, 2006) which the Committee does not consider to be limited to a particular degree. Its geographic distribution is not precarious for its survival. Although there is evidence suggesting that the number of individuals will decline, there are no data available to suggest that this will occur at a very high, high, or substantial rate. Therefore, as the subspecies has not been demonstrated to have met the required elements of Criterion 3, it is **not eligible** for listing in any category under this criterion.

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

In 2006, the estimated total number of mature individuals of the Forest Red-tailed Black Cockatoo was 15,000 (CALM, 2006). The Committee does not consider that the estimated total number of mature individuals of the subspecies is extremely low, very low or low. Therefore, as the subspecies has not been demonstrated to have met any required element of Criterion 4, it is **not eligible** for listing in any category under this criterion.

- 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 no data available to estimate a probability of extinction of the Forest Red-tailed Black Cockatoo in the wild over a relevant timeframe. Therefore, as the subspecies has not been demonstrated to have met the required elements of Criterion 5, it is **not eligible** for listing in any category under this criterion.

11. CONCLUSION

Conservation Status

This advice follows assessment of information gathered through the Commonwealth's Species Information Partnership with the Western Australian Department of Environment and Conservation which is aimed at systematically reviewing species that are inconsistently listed under the EPBC Act and Western Australian legislation.

The Committee accepts that key biological and ecological characteristics of the Forest Red-tailed Black Cockatoo combined with the historic and ongoing threats of habitat loss, competition for nest hollows and injury/death by European Honeybees and nest hollow shortage and competition from other species suggest that the subspecies has undergone a substantial reduction in numbers. Therefore, the subspecies has been demonstrated to have met sufficient elements of Criterion 1 to make it **eligible** for listing as **vulnerable**.

The highest category for which the subspecies is **eligible** to be listed is **vulnerable**.

Recovery Plan

The Committee considers that there should be a recovery plan for this subspecies. Key biological and ecological characteristics of Forest Red-tailed Black Cockatoo combined with the ongoing threats of habitat loss, competition for nest hollows and injury/death by European Honeybees and nest hollow shortage and competition from other species indicate that the species can be better managed with a recovery plan in place.

12. 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 **vulnerable** category:

***Calyptorhynchus banksii naso* (Forest Red-tailed Black Cockatoo)**

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

Associate Professor Robert J.S. Beeton *AM FEIANZ*

Chair

Threatened Species Scientific Committee

13. References cited in the advice

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