Threatened Species Assessment

Falco subniger
Black Falcon

Taxonomy

Falco subniger G.R. Gray, 1843

Current conservation status

Listed as threatened under the *Flora and Fauna Guarantee Act 1988* (SAC 2017).

Categorised as Vulnerable in the 2013 Advisory list of threatened vertebrate fauna in Victoria (DSE 2013).

Proposed conservation status

Critically Endangered in Victoria

Criterion C2a(ii)

Species Information

Description and Life History

The following description is adapted from Debus (2012, p. 54):

The Black Falcon is Australia's largest falcon, similar in size to the Peregrine Falcon (*Falco peregrinus*) but with longer broader wings and longer tail. The body is 45-56 cm (tail about half), wingspan 97-115 cm. Males are 582 g in weight, and females 833 g. The adult is variably dark brown to sooty-black, darkest in freshly replaced plumage, with two-toned underwings (flight feathers slightly paler). The bird has variable pale highlights to plumage can be limited or absent: white chin, buff forehead and cheeks, white speckling on breast, spots on underwing coverts and bars on undertail coverts; faint narrow bars on underwings and undertail. The cere and eye-ring is pale grey, eyes brown, and feet pale grey. Juveniles are usually darker, noticeably so against faded parents, with narrowly rufous-fringed dorsal feathers, pale tail tip. Pale markings (white chin, buff streaks on forehead, faint barring on flight and tail feathers) are variably present. In fledglings, the cere is brown to pale blue-grey, the eye-ring pale blue to pale blue-grey, eyes brown, feet pale olive-grey to pale blue-grey. Chicks have white down. It is important to note that some Black Falcon records are possibly actually Brown Falcon due to some observers inability to identify the taxon. Debus and Zuccon (2013) noted that 'it is evident that laypeople, and some birders, still confuse dark Brown Falcons with Black Falcons: partly from inaccurate information and/or illustrations in the older, superseded field guides, but also through insufficient knowledge of identification feature'. The taxon is one of Australia's few endemic falcons.

The Black Falcon occurs as solitary individuals, in pairs, or in family groups of parents and offspring. Individuals may congregate at food sources, for example, after fires which expose prey, when there are irruptions of quail or button-quail, or during locust plagues (adapted from NSW Scientific Committee 2013).

Breeding pairs of Black Falcons defend their nesting territories against other predators and competitors, and use the same breeding territories in successive years. The Black Falcon's home range is undetermined, but is likely to be larger than that of the comparable Peregrine Falcon in the temperate zone (i.e. more than 100 km²) (Marchant and Higgins 1993). Nesting densities are variously one pair per 15 km² (four pairs in 60 km², with 4-5 km between nests) in arid-zone floodplain woodland during good seasons, and one pair in 134 km² during average to dry years in the sheep-wheat belt (Marchant and Higgins 1993). Black Falcons nest in old stick nests, typically built by corvids or sometimes other raptor species, in the top of emergent trees in woodland, particularly riparian woodland. A clutch of three or four eggs is laid between winter and late spring. The incubation period is five weeks, the

nestling period six to seven weeks, and the post-fledging dependence period lasts at least three weeks (NSW Scientific Committee 2013).

Generation Length

The generation length of the Black Falcon is estimated to be 6 to 7 years. This is based on longevity for congeners (Peregrines) (Garnett et al. 2011, Garnett and Crowley 2000) and information in the IUCN global RedList assessment (BirdLife International 2016). The little that is known about life expectancy suggests that it is up to 12 years in the wild and 20 years in captivity (Marchant and Higgins 1993). The birds are unlikely to breed in the wild before 3-4 years, by analogy with the better-known Peregrine Falcon.

At a workshop in July 2018 to review the Bird Action Plan, unpublished modelled data suggested a generation length of 4.5.

Distribution

Black Falcons are thinly distributed over most of the Australian mainland except the eastern humid coastal and escarpment forests. The taxon is least common in the coastal south east of Victoria. The only comprehensive avifauna surveys have been the national bird atlases in 1977-81 and 1998-2001 (Barrett et al. 2003, Blakers et al. 1984) and the two national 'Bird of Prey Watch' schemes in 1986-1990 and 1996-2000. There is a high likelihood that the Black Falcon's current known distribution is its actual distribution (although as noted earlier records may be inflated by misidentified dark Brown Falcons).

The Black Falcon is widely but sparsely distributed in Victoria, mostly occurring in inland regions. In Victoria, it is assumed to be a single population that is continuous with a broader continental population, given that falcons are highly mobile, commonly travelling hundreds of kilometres (Marchant and Higgins 1993).

Habitat

The Black Falcon inhabits woodland, shrubland and grassland in the arid and semi-arid zones, especially wooded (eucalypt-dominated) watercourses. It also uses agricultural land with scattered remnant trees. The falcon is often associated with streams or wetlands, visiting them in search of prey. It uses standing dead trees as lookout posts. Specific aspects of habitat floristics or quality are probably more relevant to prey densities than to structural habitat selection by the falcon. For instance, in agricultural landscapes the falcon nests in healthy, bird-rich riparian woodland remnants. The breeding habitat and nest sites consist of vacant stick nests in the tallest living trees available, typically in emergent eucalypts in the lower parts of open, flat to undulating landscapes, such as riparian woodland and the lower slopes of valleys. Nest trees typically have dead or dead-topped tree(s) within ~100 m, used by the adults and fledglings as perches and food-transfer sites.

In Victoria, Black Falcon sightings have been mainly associated with cleared, non-native vegetation, eucalypt woodlands, and mallee woodlands and shrublands (Birdlife Australia 2015). The habitat quality and prey base for Black Falcons are suspected to be declining, and a further decline in population size and habitat quality is predicted. Breeding productivity and recruitment are low in the sheep-wheat belt (D. Whelan pers. comm. 2017).

Threats

The main threats and hazards to the Black Falcon in the agricultural zone of south-eastern Australia are human-related. These include the loss of tall riparian/floodplain eucalypts, loss of nests and nest trees to storms (through exposure of isolated trees in cleared landscapes), competition for and interference at nests (over-abundant corvids and cockatoos), and collisions with wires, fences, vehicles etc. (D. Whelan pers. comm. 2018). The decline reported in the national and NSW atlases was particularly attributed to drought and loss of grassland and grassy woodland habitat to agricultural intensification (Debus 2009).

The Black Falcon feeds mostly on birds, especially flocking, ground-feeding granivores (pigeons, doves and parrots) but also on some small mammals, large insects and occasionally carrion (e.g. roadkill) (Charley et al. 2014, Debus et al. 2005, Marchant and Higgins 1993). They have been recorded taking Common Starlings in agricultural areas, which may be a vector for pesticides, and feral Rock Doves, which are a vector for disease (trichomoniasis, which infects raptors via their prey) and possibly for pesticides. Rabbits were formerly a high proportion of the Falcon's diet by biomass in arid areas, but following the spread of rabbit calicivirus disease, and consequent decline in rabbit numbers, the taxon is now likely to be increasingly dependent on native prey, especially birds (Debus et al. 2005, Marchant and Higgins 1993). Most of its former native mammalian prey

species are extinct, including 'critical weight range' terrestrial mammals of rabbit size or smaller (e.g. large rodents). Key avian prey species including terrestrial grassland birds (e.g. quail, button-quail, pipits, larks and songlarks) require ground cover, often of native grasses, and are sensitive to livestock grazing pressure (Marchant and Higgins 1993), or are hollow-dependent (e.g. parrots). Locusts can be important, particularly in summer and early autumn and perhaps especially for juvenile falcons, but during plagues are sprayed with insecticides such as fenitrothion which potentially harm Black Falcons.

The recent release of a new strain of calicivirus (RHDV1 K5) and the occurrence of an unreleased strain (RHDV2) means that rabbit numbers will remain at lower levels than occurred prior to the first release of calicivirus. Charley et al. (2014) observed an increased reliance on mammalian prey in the post-fledging period, therefore, the supply of small mammals may be important in determining the survival of fledglings.

A major threat to the Black Falcon is suspected to be clearing, conversion from grazing to cropping and degradation of habitat by overgrazing, with likely effects on the Falcon's foraging habitat, nest sites and food supply. The main effect of clearing, and degradation of riparian woodlands, may be the loss of nest trees from key Falcon breeding areas. The loss of breeding populations of Black Falcons, after destruction of their riparian nest trees, has been documented in South Australia (Olsen 1994). Altered flow regimes of key river systems in the species range may also cause significant loss of riparian or floodplain nest trees, given the scale of such changes. Other threats include loss of nests and nest trees to storms (through exposure of isolated trees in cleared landscapes), competition for and interference at nests by corvids and Sulphur-crested Cockatoos (*Cacatua galerita*), and collisions with wires, fences, vehicles etc. (Charley et al. 2014).

Several key habitats for the Black Falcon are listed as threatened communities under the EPBC Act. These include the Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions, Grassy Eucalypt Woodland of the Victorian Volcanic Plain, Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia, Natural Grasslands of the Murray Valley Plains, Natural Temperate Grassland of the Victorian Volcanic Plain, White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.

Residues of many anticoagulants have been found in birds of prey worldwide. As well as the possibility of mortality, sub-lethal doses may impact on the wellbeing of Black Falcons and affect their survival and breeding success. Perceptions that pindone always has lower non-target risk than 1080 need to be assessed by addressing the identified information gaps for pindone.

The Black Falcon may also be threatened by human disturbance to nest sites, pesticide accumulation, and collisions with power lines and wind turbines. A potential threat to the falcon's breeding productivity in the agricultural zone is competition for, and interference at nests by overabundant ravens and cockatoos. A new potential threat is an outbreak of Newcastle disease (paramyxovirus) in domestic and feral pigeons, which is killing some bird-eating raptors in Victoria, and is likely to spread through the native pigeon and raptor population.

Climate change, increasing temperature and potentially continuing declines in rainfall in northern Victoria are likely to magnify existing threats.

IUCN Criteria

Criterion A. Population size reduction.
Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4

	Critically Endangered	Endangered	Vulnerable
A1	≥ 90%	≥ 70%	≥ 50%
A2, A3, A4	≥ 80%	≥ 50%	≥ 30%

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

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.

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*]

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

based on any of the following:

(a) direct observation [*except A3*]

(b) an index of abundance appropriate to the taxon

(c) a decline in area of occupancy, 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:

Eligible under Criterion A2 as Endangered

The population reduction over the past 18 to 21 years is estimated to be 30 to 50%, based on (b) and (c) above.

These figures are based on those known for the taxon elsewhere in Australia. Declines in Victoria are not known with any precision, but the Black Falcon's national index of abundance declined significantly by 38% in 20 years 1981-2001, with declines greatest (30-50%) in south-eastern Australia (Barrett et al. 2003) i.e. the eastern sheep-wheat belt and Murray-Darling Basin. Its index of abundance also declined by almost 50% in NSW over 20 years to 2006 (Cooper et al. 2014), and is believed to be in sufficient decline in South Australia to warrant Endangered listing there. With the expected loss of breeding and hunting territory due to urban and rural development, the Victorian population could be expected to suffer similar declines as in NSW and SA. Barrett et al. (2003) flagged the Black Falcon as among those grassland bird species showing a 30-50% national decline. Barrett et al. (2007) reported a 38% decline between data separated by 2 decades presented in 2 atlases (1977-1981 and 1998-2001).

Eligible under Criterion A3 as Endangered

The population reduction over the next 18 to 21 years is estimated to be 10 to 50%, based on (b) and (c) above.

This figure was derived from the historical decline of 30-50% and uncertainty about changes in threat intensity (and emergence of new threats). Over the next 20 years some threats may be reduced, and others may intensify or emerge. Drought and agricultural intensification are likely key threats (Debus 2009): both of these will likely intensify in the future.

The taxon's 'index of abundance' also declined by almost 50% in NSW over three generations. A similar, if not more severe, scenario can logically be expected for the species in Victoria (M.O'Brien pers. comm. 2018).

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

Evidence:

Ineligible under Criterion B

The Extent of Occurrence (EoO) across the taxon's range is estimated to be 216,011 km² and the Area of Occupancy (AoO) is estimated to be 2,540 km², both of which exceed the thresholds for criterion B.

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

Evidence:

Eligible under Criterion C2 as Critically Endangered

It is estimated that there are 150 to 200 mature individuals. In 2009, the national population for Black Falcons was estimated to number 1,000-10,000 individuals (roughly equating to 670-6,700 mature individuals), although the data quality is listed as "poor" (Birdlife International 2017). Estimates of the Victorian population of mature individuals (taking into account the somewhat nomadic behaviour of parts of the falcon population) are up to 200 birds (D. Whelan pers. comm. June 2018).

The number of mature individuals is projected to continue to decline. An ongoing decline in numbers is inferred but there is limited survey or monitoring data to quantify the size of any decline. The past decline is based on documented rates. The known and ongoing threats and small population size in nearby states are used as bases to estimate future decline (M. O'Brien pers. comm. 2018).

The percentage of mature individuals in one subpopulation is 90-100%.

Criterion D. Very small or restricted population			
	Critically Endangered	Endangered	Vulnerable
Number of mature individuals (observed or estimated)	< 50	< 250	< 1,000
D2 Only applies to the VU category Restricted area of occupancy or number of locations with a plausible future threat that could drive the species to critically endangered or Extinct in a very short time.	-	-	D2. Typically: AoO < 20 km2 or number of locations ≤ 5

Evidence:

Eligible under Criterion D as Endangered

It is estimated that there are 150 to 200 mature individuals.

Criterion E (Quantitative Analysis) was not addressed as the taxon does not have a detailed Population Viability Analysis.

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