

NSW SCIENTIFIC COMMITTEE

Grey Falcon *Falco hypoleucos*

Review of Current Information in NSW

July 2009

Current status:

The Grey Falcon *Falco hypoleucos* (Gould 1841) is currently listed as Rare in Queensland under the *Nature Conservation Act 1992*, as Threatened in Victoria under the *Flora and Fauna Guarantee Act 1998* (Endangered on the Advisory List), and as Rare in South Australia under the *National Parks and Wildlife Act 1972*. Although the species is not listed as threatened under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), it is considered nationally near-threatened (Garnett & Crowley 2000). The NSW Scientific Committee recently determined that the Grey Falcon meets criteria for listing as Endangered under the *NSW Threatened Species Conservation Act 1995* (TSC Act), based on information contained in this report and other information available for the species.

Species description:

The Grey Falcon is a medium-sized (30-45 cm in length), pale grey falcon with prominent yellow cere (enclosing the nostrils), eye-rings (around dark eyes) and feet. The upperparts are light grey with a faint black streak below the eyes, black tips to the long pointed wings, and barred wings and tail. The underparts are pale grey to white, with faintly barred underwings and tail. The juvenile is slightly darker and more heavily marked, with blue-grey cere and eye-rings and fine streaks on the underparts. The Grey Goshawk *Accipiter novaehollandiae* is similarly coloured with yellow cere and feet, but has red eyes without yellow eye-rings, short rounded wings, and fine barring on the chest. The Black-shouldered Kite *Elanus axillaris* has red eyes under black eyebrows, black patches on the wings (above and below), a white head and tail, and no barring. Other pale falcons that may be confused with the Grey Falcon include: (i) adult male Peregrine Falcons *Falco peregrinus*, which have a full black 'helmet' and ventral barring; (ii) pale inland Australian Hobbies *Falco longipennis* which are smaller and finer with blacker head markings and pale rufous underparts; (iii) pale inland Brown Falcons *Falco berigora* which have rusty plumage, long legs and slow flight; and (iv) male Nankeen Kestrels *Falco cenchroides* which in front view in flight, from below, have pale underparts and a grey head, but are smaller and finer than the Grey Falcon with rufous upperparts. Other grey-backed hawks may also be confused with the Grey Falcon such as adult Collared Sparrowhawks *Accipiter cirrocephalus* and Brown Goshawks *Accipiter fasciatus*, however both but have fine rufous ventral barring, long legs, and shorter rounded wings.

Taxonomy:

Species: *Falco hypoleucos* Gould 1841 (Falconidae), monotypic (*i.e.* no subspecies); an essentially endemic Australian species occurring as a rare vagrant to southern New Guinea savannas.

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Distribution and number of populations:

The Grey Falcon is widely but sparsely distributed in western NSW, and is assumed to be a single population because falcons (including the Grey) are highly mobile, commonly travelling over hundreds of kilometres (Marchant & Higgins 1993). It occurs on the plains of the Murray-Darling Basin, and particularly west of the Darling River. Most reports of 'Grey Falcons' on the tablelands and coast of NSW are almost certainly Grey Goshawks (notably the north-easterly cluster on the escarpment, Figure 1). Easterly inland records of Grey Falcons to the foothills of the western slopes are valid (Martin & Royal 2000), but most validated records (including subsequent ones) are from farther inland in the arid and semi-arid zones (Barrett *et al.* 2003; NSW Field Ornithologists Club data). Furthermore, even inland records, historical and recent, may be inflated by misidentified raptors of other species.

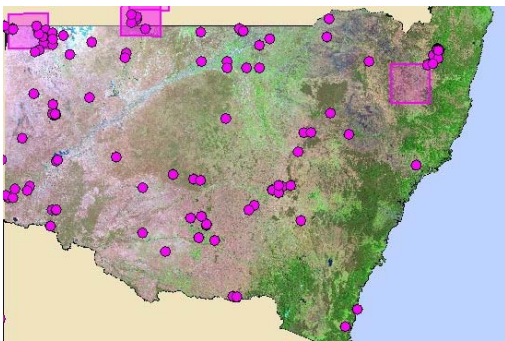


Figure 1. Records since 1980 of the Grey Falcon in NSW (NSW Wildlife Atlas). Easterly records, for the tablelands and coast (e.g. the north-easterly cluster near Washpool National Park), are probably invalid (misidentified Grey Goshawks).

Ecology:

The level of knowledge of the Grey Falcon is regarded as moderate on basic biology, though few studies have been conducted on populations in NSW. The breeding biology of the Grey Falcon is not well known (Marchant & Higgins 1993; Olsen 1995; Debus & Rose 2000; Harrison 2000; Martin & Royal 2000; Aumann 2001a,b,c) and available information on aspects of population size and trend, and specific ecological requirements (e.g. home-range size and habitat use), is poor. The Grey Falcon's biology is inferred to be similar to that of the Black Falcon *Falco subniger* in NSW (Debus *et al.* 2005).

Key habitat requirements

The Grey Falcon inhabits woodland, shrubland and grassland in the arid and semi-arid zones, especially wooded watercourses. Grey Falcons use standing dead trees as lookout posts. Woodland has been cleared extensively in the sheep-wheat belt of NSW, and much of the Grey Falcon's habitat has been degraded by overgrazing.

Breeding biology

The Grey Falcon uses old stick nests, typically built by crows or ravens or sometimes another raptor species, in the top of an emergent live tree in riparian woodland. Occasionally, Grey

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Falcons will nest on an artificial structure such as a telecommunications tower (expert advice). A clutch of usually two or three 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 several months.

Diet

The Grey Falcon feeds mostly on birds, especially flocking, ground-feeding granivores (pigeons and parrots), and also on some small mammals, reptiles and large insects. In agricultural areas Grey Falcons also take the introduced Common Starling *Sturnus vulgaris*, which function as a transfer path for pesticide contamination in the falcons. Although a few of its prey species are common in agricultural or pastoral land with stock watering points, food supply of the Grey Falcon is likely to be adversely affected by habitat clearing and degradation. In NSW the Grey Falcon consumes smaller average prey size and fewer rabbits than the biologically similar Black Falcon (Debus *et al.* 2005).

Social biology

The Grey Falcon occurs solitarily, in pairs, or in family groups of parents and offspring.

Territoriality/home range

Breeding pairs of Grey Falcons defend a nesting territory against other predators and competitors. Breeding territories are used in successive years, but are abandoned during periods of drought. The Grey Falcon's home range is undetermined, but likely to be larger than that of the Peregrine Falcon in the temperate zone (*i.e.* more than 100 km²).

Generation length

The generation length of the Grey Falcon is estimated as 10 years (Garnett & Crowley 2000).

Ability to disperse/susceptibility to population fragmentation

The Grey Falcon is a highly mobile and dispersive or migratory species, with wintering (suspected to be mainly immature birds) in northern Australia and dispersal towards the coast during droughts (Marchant & Higgins 1993). Population fragmentation is therefore considered unlikely.

Number of mature individuals:

The number of breeding Grey Falcons has been previously estimated, with low reliability, as 2 000 globally (NSW, Queensland, Victoria, South Australia, Northern Territory, Western Australia: Garnett & Crowley 2000), of which fewer than one-quarter would occur in NSW; or fewer than 500 mature individuals on the basis of geographic range. The highest densities for the species in Australia occur in inland and northern Australia (*e.g.* Barrett *et al.* 2003). The current population estimate in NSW is between 50 and 200 mature individuals, based on recent field research (expert advice).

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Threats:

The main threats to the Grey Falcon are thought to be clearing of habitat in the semi-arid zone, and degradation of habitat in the arid and semi-arid zones by overgrazing, with likely effects on the Falcon's foraging habitat, nest sites and food supply (Marchant & Higgins 1993; Ayers *et al.* 1999; Garnett & Crowley 2000). 'Clearing of native vegetation', and 'Removal of dead wood and dead trees' are listed as Key Threatening Processes in NSW under the TSC Act. Some inland bioregions (e.g. Brigalow Belt South, NSW Southwestern Slopes, Darling Riverine Plains, Riverina) are 40-84% cleared and moderately to highly stressed (landscape stress factor 2-5, mostly 3-5, out of a maximum of 6: Barrett *et al.* 2007). Even little-cleared bioregions farther west are moderately stressed (e.g. Mulga Lands, Murray-Darling Depression and Broken Hill Complex have a stress rating of 4; Cobar Penepplain, Channel Country and Simpson-Strzelecki Dunefields all have a stress rating of 3: Barrett *et al.* 2007).

Another threat or potential threat is the limited supply of suitable nest trees. Grey Falcons compete for nest sites with other falcon species such as the Nankeen Kestrel and possibly the Brown Falcon (expert advice), and death of nest trees or failure of crows to breed (and therefore build nests), during prolonged periods of drought can also limit the availability of suitable nest sites for the Grey Falcon. Possible, but low-level, threats also include human disturbance to nest sites (including possible robbery of eggs or chicks), pesticides (Olsen *et al.* 1993; Debus & Rose 2000), and collisions with human hazards such as powerlines, fences and wind farms. There have been no recent documented cases of poaching in NSW, and DDT has been banned, so the effect on the Grey Falcon's eggshell thickness has presumably been reversed (as for the Peregrine Falcon), but the effect of other pesticides (including locust sprays) is unknown.

Extreme fluctuations:

There is no direct evidence of extreme fluctuations in this species. However, the number of birds reported in NSW each year varies by a factor of 3-4 (NSW Field Ornithologists Club data), and breeding pairs abandon nesting territories during drought (Marchant & Higgins 1993; Aumann 2001a). Drought refuges are not permanent in Australia, sometimes located around coastal areas, and sometimes in areas such as the Murray-Darling confluence (Marchant & Higgins 1993). The size of the NSW Grey Falcon population is therefore likely to respond to seasonal conditions.

Population reduction and continuing declines:

The Grey Falcon has declined in NSW, and its breeding range has contracted from within the 500 mm rainfall isohyet to within the 250 mm isohyet (i.e. a contraction to the arid zone; Marchant & Higgins 1993; Garnett & Crowley 2000). Although generally sparse in NSW, the Grey Falcon was formerly said to be numerous in the far south-west of NSW, but is now rarer there (Marchant & Higgins 1993). However, following the ban on the use of DDT several breeding records were reported from the semi-arid zone during the 1990s (Debus & Rose 2000; Martin & Royal 2000), although this does not represent a recovery and there is no evidence that Grey Falcons have persisted into the drought years since 2000 (NSW Field Ornithologists Club data).

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The species was reported in 21 one-degree grids in NSW in the first national bird atlas in 1977-1981, at mostly low reporting rates (less than 11% of surveys per grid), with five grids in the moderate category (reporting rate 11-40% of surveys per grid in the Murray-Darling Basin, with three breeding records in the far north-west of NSW: Blakers *et al.* 1984). The species was reported in 19 one-degree grids in the second national bird atlas in 1998-2002, at mostly low reporting rates (less than 10% of surveys per grid), with one grid in the moderate category (10-20% of surveys per grid), and no breeding records in NSW (Barrett *et al.* 2003). The index of abundance for the Grey Falcon has thus apparently declined over 20 years. However, there were too few records per grid to statistically compare its reporting rate between the two atlases over 20 years (*i.e.* two generations) (Barrett *et al.* 2003, 2007). In NSW the decline of the Grey Falcon in the sheep-wheat belt has been attributed to declining habitat cover and deteriorating habitat quality (Marchant & Higgins 1993; Garnett & Crowley 2000). In the five years since the second national bird atlas (*i.e.* during 2002-2007), the Grey Falcon was recorded once in each of two inland NSW grids: once in 100 surveys, and once in 22 surveys (Birds Australia Atlas data). While these latest figures suggest continued decline the recent atlas surveys have continued at a lower level than between 1998-2002, making direct comparisons impossible.

Extent of Occurrence (EOO) & Area of Occupancy (AOO):

The Grey Falcon's estimated global EOO is 4 000 000 km², with high reliability, and its estimated global AOO is 10 000 km², with low reliability (Garnett & Crowley 2000). As about one-fifth of the species' distribution falls in NSW, EOO is thus estimated as 200 000 km², and AOO is likely to be about 2 000 km². NSW bird atlas records allow some refinement of this estimate to 170 000 km² (based on recorded occurrence in 17 one-degree grids of *c.* 100 x 100 km: Barrett *et al.* 2003). Cumulative AOO (including historical records) is about 5 900 km² on the basis of presence in 39 ten-minute grids of *c.* 10 x 15 km (Cooper & McAllan 1995), but may now be much less given the species' decline in the NSW sheep-wheat belt.

Severe fragmentation:

There is no evidence of population fragmentation, although woodland habitat is increasingly fragmented on the inland slopes and plains. For example, eastern bioregions within the Grey Falcon's range have been cleared by up to 84% and contain highly stressed landscapes (*e.g.* NSW Southwestern Slopes, stress rating 5 out of 6: Barrett *et al.* 2007).

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Unpublished and expert advice:

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Birds Australia Ongoing Atlas 2002-2007: NSW Grey Falcon data accessed 06/09

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Explanatory note

Between 2007 and 2009 the NSW Scientific Committee undertook a systematic review of the conservation status of a selection of plant and animal species listed under the Threatened Species Conservation Act. This species summary report provides a review of the information gathered on this species at the time the Review was undertaken.

The Scientific Committee's report on the Review of Schedules project and final determinations relating to species that were either delisted or had a change in conservation status can be found on the following website: www.environment.nsw.gov.au .

The Committee gratefully acknowledges the past and present Committee members and project officers who ably assisted the Committee in undertaking the Review of Schedules Project. Information on the people involved in the project can be found in the Acknowledgement section of the project report entitled "Review of the Schedules of the Threatened Species Conservation Act 1995. A summary report on the review of selected species" which is available on the abovementioned website.

This species summary report may be cited as:

NSW Scientific Committee (2009) Grey Falcon *Falco hypoleucos*. Review of current information in NSW. July 2009. Unpublished report arising from the Review of the Schedules of the Threatened Species Conservation Act 1995. NSW Scientific Committee, Hurstville.