

# NSW SCIENTIFIC COMMITTEE

## Red Goshawk *Erythrotriorchis radiatus*

Review of Current Information in NSW

April 2008

### Current status:

The Red Goshawk *Erythrotriorchis radiatus* is currently listed as Vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act), Endangered in Queensland under the *Nature Conservation Act* 1992 (NC Act), Vulnerable in the Northern Territory under the *Territory Parks and Wildlife Conservation Act* 1980 (TPWC Act), and as Rare or Likely to Become Extinct in Western Australia under the *Wildlife Conservation Act* 1950 (WC Act). The NSW Scientific Committee recently determined that the Red Goshawk meets criteria for listing as Critically Endangered in NSW under the *Threatened Species Conservation Act* 1995 (TSC Act), based on information contained in this report and other information available for the species.

### Species description:

The Red Goshawk is a large, reddish-brown hawk with strongly streaked and barred plumage, massive yellow legs and feet, and a slight crest. The male is 50 cm in length and weighs about 640 g, and the female is 60 cm in length and weighs about 1 200 g; the wingspan is 111-136 cm. Many other raptors are likely to be misidentified as the Red Goshawk, notably the Square-tailed Kite *Lophoictinia isura* which is more slender with very long wings and small bill and feet, and the female Swamp Harrier *Circus approximans* which is more uniform brown dorsally with a white rump.

### Taxonomy:

*Erythrotriorchis radiatus* (Latham 1801), Accipitridae is an 'old endemic' Australian species. It is one of two species in an endemic Australasian genus extending to New Guinea, whose relationships are uncertain (Christidis & Boles 2008). The Red Goshawk is not closely related to true goshawks *Accipiter*; it is regarded as possibly related to the other 'old endemic' Australian raptor genera *Hamirostra* and *Lophoictinia*.

### Ecology:

The ecology of the Red Goshawk is generally well understood for the Wet-Dry Tropics (NT, northern WA), moderately understood for north Queensland, but poorly understood for south-east Queensland and northern NSW.

### Key habitat requirements

The Red Goshawk inhabits rainforest edges, gallery forest, swamp sclerophyll forest, open forest, tall woodland and wetland fringes, with abundant avian prey. The species requires large areas of open forest or woodland, but its habitat has been cleared and fragmented as a consequence of

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logging of large trees (leaving mainly dense young regrowth) in forests on gentle lowland terrain, and draining of wetlands.

## Breeding biology

The Red Goshawk builds a large stick nest in an emergent mature eucalypt or paperbark, in open forest or tall woodland, often riparian. A clutch of one or two eggs is laid in spring, with one clutch and brood per year. The incubation period is six weeks, the nestling period eight weeks, and the post-fledging dependence period lasts at least two to three months. One or two young fledge, but average fledging success is 0.9 young per female per year (northern Australian data). Large riparian trees on fertile lowlands and floodplains have been targeted for logging and clearing. The Red Goshawk has a low reproductive rate. The generation length for the Red Goshawk is estimated as 10 years (Garnett & Crowley 2000). The species occurs solitarily, in pairs, or in family groups of adult(s) with one to two young during the post-fledging period.

## Diet

The Red Goshawk is a bird specialist, feeding on forest, woodland and wetland species. Rarely mammals (*e.g.* flying-foxes, gliders) and reptiles are eaten. This species hunts in riparian woodland, or on the edge of forest. Many of its key prey species are hollow-dependent (*e.g.* parrots), or are nectar-feeders that depend on the profuse blossom of large mature eucalypts (*e.g.* lorikeets, large honeyeaters). The Goshawk's food supply is likely to be adversely affected by clearing of forest and woodland, logging of mature trees, and drainage of wetlands.

## Territoriality/home range

The Red Goshawk is territorial, defending the nesting territory against other raptors. This species requires a large foraging area: a home range of 120 km<sup>2</sup> for a breeding female and 200 km<sup>2</sup> for a breeding male.

## Ability to disperse/susceptibility to population fragmentation

The Red Goshawk is a strong-flying, mobile and dispersive species that is unlikely to be affected by population fragmentation over tens of kilometres.

## **Distribution and number of populations:**

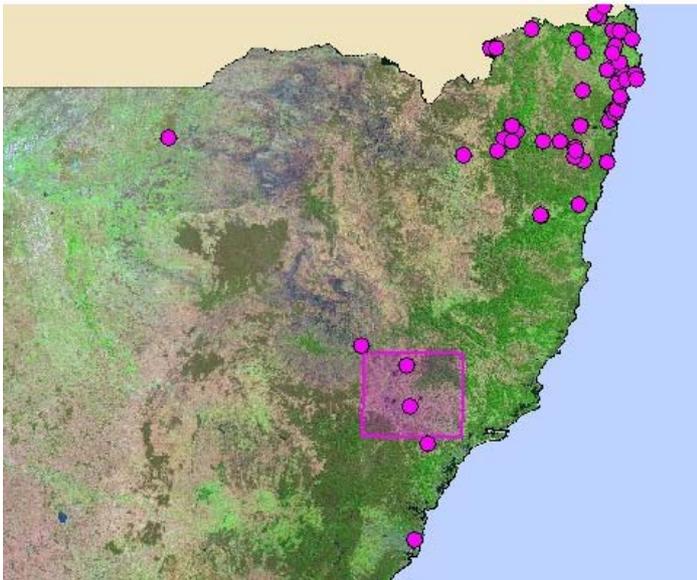
In NSW, the Red Goshawk is restricted to the north-east of the state, mostly on, or near, the coast (Figures 1 & 2). Verified historical records extend south to Sydney. Historically, the species bred in the lower Richmond Valley and probably in the Clarence Valley, where an adult male was collected. Verified records in the last few decades have contracted to northern parts of the North Coast, being confined to the Mann, Clarence, Richmond and Tweed Valleys (Table 1; Debus 1991, 1993; Debus *et al.* 1993a,b). An adult pair was observed in the lower Richmond Valley until the late 1980s, with circumstantial evidence of breeding (an adult was seen with an apparently dependent juvenile). This species occurs as a single, sparse population in NSW. The Red Goshawk's mobility and dispersal ability mean that disjunct populations are not likely or applicable. There are no currently known nest sites in NSW. The nearest known recent breeding

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record was in south-east Queensland, just over the border from Border Loop, in 2003 (expert advice, 2004). This is the nest referred to as being in NSW in the Eco Logical (2007) review of the Red Goshawk Recovery Plan (NSW NPWS 2002). Of the literature records discussed by Debus (1991) and NSW NPWS (2002), the identifications for the southern and some north-central records are thought to be inaccurate and the acceptable north-central records date from before 1980.

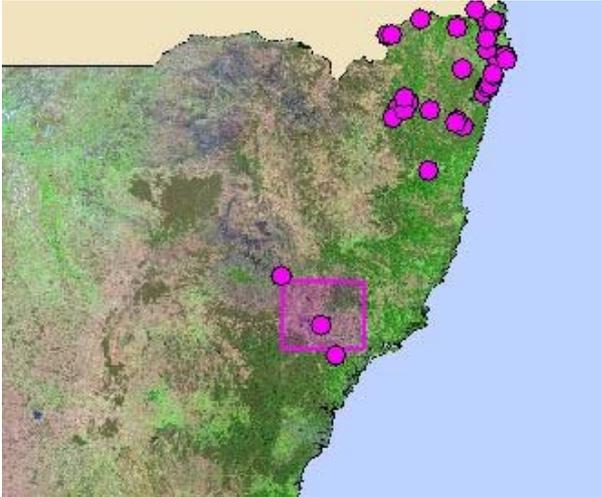
## Number of mature individuals:

The Red Goshawk's NSW population is now extremely low. There have been very few records in NSW in the past two decades and there are probably fewer than 10 birds in NSW (Table 1; Debus 1991, 1993; Debus *et al.* 1993b). Most of these records may be of vagrants; however, the species may still breed near the Queensland border. Although raptors are difficult to identify, and the Red Goshawk is secretive and cryptic, the level of confidence in survey records is high because birdwatchers are numerous and very active in the species' NSW range. False positive records (misidentifications of other raptors as Red Goshawk) are more likely to occur than Red Goshawks being mistaken for other species. The total global population of the species is estimated at 350 pairs, having declined from a historical population of an estimated 440 pairs. Most pairs are currently in tropical northern Australia (Kimberley of WA, Top End of the NT; northern and eastern Queensland), with about 180 pairs estimated in Queensland (Aumann & Baker-Gabb 1991). However, a more recent estimate is about 100 pairs and a 40% decline in Queensland (Czechura & Hobson 2000; Czechura 2001). There are 10-15 pairs in south-eastern Queensland (Stewart & Hobson 2001).



**Figure 1:** All Red Goshawk records (NSW Wildlife Atlas). Note: John Gould's 1800s specimen record for the Manning River (mid-north coast) is omitted from the database, but would close the apparent gap between the southern outliers and the north coast cluster.

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**Figure 2:** Red Goshawk records since 1980 (NSW Wildlife Atlas).

## **Threats:**

The main historical threat to the Red Goshawk was deforestation, particularly of coastal lowlands, foothills, riparian flats and floodplains, and also possibly pesticides (DDT) in the avian food chain, as for other bird-eating raptors (Debus *et al.* 1993b). Deforestation and other habitat disturbance or degradation are still occurring throughout coastal and subcoastal parts of the North Coast Bioregion, as a result of continuing development on the coast and hinterland (which includes, resort development, urban expansion, rural-residential subdivisions, and road or highway upgrades). DDT has been banned from use for two decades and its effects appear to have been reversed.

Once the population of a raptor species reaches a low density, the Allee effect (the positive relationship between population growth rate and population size) may decrease reproduction (Penteriani *et al.* 2008).

## **Extreme fluctuations:**

There is no evidence of extreme fluctuations in population size or habitat of the Red Goshawk.

## **Population reduction and continuing declines:**

In recent decades, the Red Goshawk is believed to have undergone a large reduction in population size in NSW, based on comparative evidence from broadscale surveys and sighting data. This species was recorded in three 10-minute grids in far north-eastern NSW during the first national bird atlas in 1977-1981, at a low reporting rate (Blakers *et al.* 1984). There were no records for NSW in the second national bird atlas in 1998-2002 (Barrett *et al.* 2003). There were at least 25 records for NSW in 1980-1990, but only six for 1990-2000, and three since 2000 (details in Table 1). The geographic spread of NSW records has contracted steadily northwards (Debus 1991, 1993; Debus *et al.* 1993b). There has been an observed or inferred decline in its index of abundance (atlas and other reporting rates) and its geographic distribution, and an inferred decline in coastal habitat quality, in NSW over the last three decades. These figures

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represent a greater than 90% decline in index of abundance in three generations, and are matched by an approximately 80% decline in extent of occurrence (EOO) over the same period (see below).

**Table 1:** NSW records of Red Goshawk in last three decades: 1980s, 1990s and 2000-2008

1980s	1990s	Since 2000
25+ records, south to Cessnock (details in Debus 1991, 1993)	Evans R (Evans Head), Sept. 1990 (NSW Wildlife Atlas)	Mann River NR, Feb. 2003 (NSW Wildlife Atlas)
	Alstonville area, Aug. 1991 (Debus <i>et al.</i> 1993b; Morris 1994; Morris & Burton 1994)	Koreelah NP, Sept. 2005 (Birds Qld sighting reports)
	Burringbar Ra, Sept. 1993 (Morris 1995; Morris & Burton 1995)	Border Ranges NP, Dec. 2007 (NSW DECC)
	Big Scrub FR, May 1995 (State Forests EIS: W. Braithwaite/Wildlife Atlas)	
	Braemar SF, July 1998 (State Forests record: Wildlife Atlas)	
	Mt Warning, Dec. 1999 (Morris 2002)	

Some of the records for the 1990s and 2000s in Table 1 are unverified. Eco Logical (2007) states: ‘current confirmed, but confidential, sightings and at least one known nest’. These records may include those in Table 1 for post-2000, but the sources and precise details of the Eco Logical records could not be verified (expert advice 2008). No further information on the south-east Queensland or northern NSW situation is readily available, except that the ‘known nest’ was in Queensland (expert advice 2008). . A nest was reported on the NSW side of the border in recent years, but there is some confusion over whether it was a Grey Goshawk *Accipiter novaehollandiae* nest instead (expert advice 2008).

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

The Red Goshawk’s historical EOO in NSW (calculated as about 140 000 km<sup>2</sup>) was essentially the North Coast and Sydney Basin Bioregions south to the vicinity of Sydney, with a few inland records. By 1978, this distribution had contracted northwards and towards the coast by 45% to about 77 000 km<sup>2</sup> (Table 1; Figures 1, 2). During the past 30 years, or three generations, the EOO of the species has contracted by at least a further 79% to about 16 000 km<sup>2</sup> in the northern one-third of the North Coast Bioregion (Table 1; Debus 1991, 1993; Debus *et al.* 1993b), or 11% of its former NSW distribution. This contraction represents an 89% reduction of its historical range. The consequence is that risk factors for the species are now more concentrated geographically.

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The Red Goshawk's AOO is not known precisely, but is inferred to be a narrow subset of forest or woodland habitat within its current EOO (about 20% of EOO in northern Australia, from Figures 1 & 2 of Aumann & Baker-Gabb 1991). The level of confidence for this assumption is high, in part due to a radio-tracking study in the NT (Aumann & Baker-Gabb 1991; Marchant & Higgins 1993). Recent NSW records are of single birds seen once at given locations, but which are likely to range widely over 120-200 km<sup>2</sup> per individual if they are resident. The Red Goshawk's AOO is inferred to have declined commensurate with the loss of mature, lowland and riparian/floodplain forest and woodland in the NSW North Coast Bioregion.

## Severe fragmentation:

Although habitat has been severely fragmented in eastern NSW, this species is capable of dispersing tens to hundreds of kilometres and can soar or glide high over open areas. Therefore, segregation of its population (at the scale of habitat fragmentation) is unlikely.

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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](http://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 (2008) Red Goshawk *Erythrotriorchis radiatus*. Review of current information in NSW. April 2008. Unpublished report arising from the Review of the Schedules of the Threatened Species Conservation Act 1995. NSW Scientific Committee, Hurstville.