

NSW SCIENTIFIC COMMITTEE

Powerful Owl *Ninox strenua*

Review of Current Information in NSW

September 2008

Current status:

The Powerful Owl *Ninox strenua* is currently listed as Vulnerable in Queensland under the *Nature Conservation Act 1992* (NC Act), Threatened in Victoria under the *Flora & Fauna Guarantee Act 1988* (FFG Act; Vulnerable on Advisory List), and Endangered in South Australia under the *National Parks and Wildlife Act 1972* (NPW Act). The species is not listed under Commonwealth legislation. The NSW Scientific Committee recently determined that the Powerful Owl meets criteria for listing as Vulnerable 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 Powerful Owl is a very large (50-60 cm in length) brown hawk-like owl, with (for an owl) a rather small head and a long tail. It is brown dorsally, with narrow white barring, and white ventrally, with coarse V-shaped bars (chevrons). It has prominent yellow-orange eyes in a flat face and fully feathered legs with large yellow feet. Juveniles are initially much whiter and downier on the head and underparts. The smaller Barking Owl *Ninox connivens* is spotted rather than barred dorsally and has vertical streaks rather than bars on the underparts. The Powerful Owl has many call types, but its most typical double hooting call is 'big' and mournful, often inflected upwards, and is slower than the leisurely hooting call of the Southern Boobook *Ninox novaeseelandiae* and much slower than the Barking Owl's rapid dog-like hoots.

Taxonomy:

Ninox strenua (Gould 1838) (Strigidae) is monotypic (*i.e.* no subspecies) and an endemic Australian species.

Distribution and number of populations:

The Powerful Owl occurs in the eastern quarter of NSW, from the coast to the inland slopes, as a single population contiguous with that in Queensland and Victoria (*e.g.* Barrett *et al.* 2003).

Ecology:

The level of knowledge on the on general biology and ecology of the Powerful Owl is considered to be good (Higgins 1999; Webster *et al.* 1999; Cann *et al.* 2002; Cooke *et al.* 2002a;b; 2006; Kavanagh 2002a;b; Kavanagh & Stanton 2002; Loyn *et al.* 2001; 2002; Soderquist *et al.* 2002; McAllan & Larkins 2005; Menkhorst *et al.* 2005; Bilney *et al.* 2006; McNabb *et al.* 2007; Soderquist & Gibbons 2007; Hollands 2008).

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Key habitat requirements

The Powerful Owl inhabits eucalypt forests and woodlands, gallery rainforest and inland riverine woodland. It often roosts and nests in dense gully eucalypt forest. Common roost sites are sheltered groves of mid-storey trees, *e.g.* sheoaks, turpentine, acacias, paperbarks, and rainforest trees. The Powerful Owl requires hollows for nesting, and many of its prey species are also hollow-dependent.

Breeding biology

Powerful Owls nest in large hollows up to 1 m wide and 2 m deep in big old trees (usually alive but sometimes dead). A clutch of usually two eggs is laid in autumn to winter, with a single attempt per year. The incubation period is 38 days, the nestling period two months, and the post-fledging dependence period lasts several months, sometimes up to the start of the next breeding season. Breeding productivity is 0.4-1.4 young per pair per year, depending on habitat quality (low in dry, fragmented inland forest, high in productive coastal forest).

Diet

The Powerful Owl feeds mostly on arboreal mammals, especially possums and gliders, some flying-foxes, birds, and large insects. Most of the prey biomass for the species is from mammals (Higgins 1999; Kavanagh 2002a).

Social biology

The Powerful Owl occurs solitarily, in pairs, or in family groups of parents and offspring.

Territoriality/home range

Resident breeding pairs of Powerful Owls defend exclusive nesting territories within larger, defended home ranges of 400-4 000 ha, depending on habitat quality and prey densities.

Generation length

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

Ability to disperse/susceptibility to population fragmentation

Powerful Owls are known to disperse up to 18 km, including across sparsely wooded areas (Higgins 1999; Cooke & Hogan 2008), so population fragmentation is unlikely. However, dispersal may be somewhat inhibited in urbanised areas, with consequent inbreeding (Hogan *et al.* 2008).

Number of mature individuals:

The number of mature individuals of the Powerful Owls has been estimated as 7 000 globally (Garnett & Crowley 2000), of which over half would occur in NSW on the basis of geographic range, or more than 3 500 birds. This estimate is assigned a medium level of reliability (Garnett & Crowley 2000). Other estimates suggest a minimum population in NSW of 2 000 pairs, or 10 000 birds (DEC 2006).

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Threats:

The main threats to the Powerful Owl are inferred to be clearing of habitat, including loss of hollow-bearing trees (*e.g.* Higgins 1999; DEC 2006). Over 50% of forest and woodland in NSW has been cleared and the process is continuing (Lunney 2004; Johnson *et al.* 2007). Moreover, prime habitat for the Powerful Owl; on richer soils and gentle terrain; has been targeted for agricultural clearing, logging, conversion to pine plantations, firewood harvesting, and urbanisation. Loss of old-growth elements is inferred to affect the native prey of the Powerful Owl; some of which require tree-hollows. Bioregions in the Powerful Owl's NSW range (NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South East Corner, South Eastern Highlands, NSW Southwestern Slopes) are 16-84% cleared (Barrett *et al.* 2007). 'Clearing of native vegetation' and 'Loss of hollow-bearing trees' are listed as Key Threatening Processes under the TSC Act in NSW.

The Powerful Owl persists throughout the logging mosaic in state forests and its population apparently recovers after logging and wildfire, provided that gully reserves and other harvesting protocols protect nest trees and prey habitat trees; some of its key prey species (*e.g.* Common Ringtail Possum *Pseudocheirus peregrinus*) are abundant in regrowth forests (Cann *et al.* 2002; Kavanagh 2002b).

Other threats, or potential threats, include competition for hollows (owl nests and prey nest sites) by feral honeybees, predation on fledgling owls by foxes, too-frequent fire in coastal forests, and human hazards such as road kill, interaction with overhead wires, and barbed-wire fences. 'Competition from feral honey bees, *Apis mellifera*', 'Predation by the European Red Fox *Vulpes vulpes*', and 'High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition' are listed as Key Threatening Processes under the TSC Act in NSW.

Extreme fluctuations:

There is no evidence of extreme fluctuations in population size or habitat of the Powerful Owl.

Population reduction and continuing declines:

The Powerful Owl is inferred to have declined as a result of clearing of forest (Higgins 1999; DEC 2006). While there is no evidence that it is continuing to decline in public forest lands (DEC 2006) and the species is considered by some to now be stable (Garnett & Crowley 2000), a comprehensive assessment of trend has not occurred across NSW. The species is increasing in some suburban bushland areas, apparently as a result of increasing prey populations (Kavanagh 2004; McAllan & Larkins 2005). Conversely, it is declining in fragmented inland forest (Hollands 2008). Its NSW distribution has remained essentially unchanged over 20 years between 1977-1981 and 1998-2002 (Barrett *et al.* 2003), and its reporting rate in NSW over this period (two generations) has shown no significant change (-15%, $P = 0.535$: Barrett *et al.* 2007). However, the sample size for this assessment is small (26 atlas units), and for raptors or owls

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with a larger sample size a similar degree of change has been found to be significant (e.g. Wedge-tailed Eagle *Aquila audax* -15%, 284 atlas units, $P < 0.001$). As the overall trend is uncertain, population viability analysis is sensitive to small changes in adult mortality (McCarthy *et al.* 1999), and the historical baseline for the reported increase around urban centres is uncertain, the species is data deficient for the purpose of assessing population recovery. The species is also conservation dependent with respect to security of nest sites and nesting patches, notably protocols that protect roost sites, nest sites and prey habitat in state forests.

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

The Powerful Owl's estimated global EOO is 450 000 km², with high reliability, and its estimated global AOO is 50 000 km², with low reliability (Garnett & Crowley 2000). As over half of the species' distribution falls in NSW, EOO is thus about 250 000 km² and AOO is about 30 000 km².

Severe fragmentation:

There is no evidence of population fragmentation in this species, although forest and woodland habitat is increasingly fragmented on the coast, tablelands and slopes. For example, coastal bioregions have been cleared by 16-39%, tablelands by 53-58%, and slopes by 60-84% (Barrett *et al.* 2007). The Powerful Owl prefers large forest or woodland blocks of more than 200 ha and avoids small patches and strips (Kavanagh & Stanton 2002), and is thus inferred to be adversely affected by habitat fragmentation.

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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.

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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 (2008) Powerful Owl *Ninox strenua*. Review of current information in NSW. September 2008. Unpublished report arising from the Review of the Schedules of the Threatened Species Conservation Act 1995. NSW Scientific Committee, Hurstville.