

Threatened Raptors of Australia's Tropical Forests

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INTRODUCTION

The continental island of Australia is about 7.7 million km² and about equal in area to the USA, excluding Alaska. It is about 4,000 km from east to west and 3,700 km from Cape York in the tropical north to the south of temperate Tasmania.

Man has occupied Australia for more than 40,000 years. Aboriginal man has very likely played a prominent role in shaping tropical forests through the use of fire (Nix 1972). However, the start of major new disturbance and destruction of the environment coincided with the arrival and occupation of Australia by Europeans 200 years ago. Greatest disturbance in the form of urban development, dryland cash cropping and deforestation has occurred in the temperate south and east, where most of the present human population of 15 million is concentrated.

The human distribution is readily explained by the fact that Australia is the driest continent, excluding Antarctica. Desert and semi-arid areas occupy 70% of Australia (Williams & Lazarides 1985), mainly in the centre and west of the continent. The Australian landscape is subdued, with low mountain ranges in the centre, north-west and one extending for 2,500 km in the east. Forest and woodland occur only in the coastal and subcoastal north, east and south-west. Tropical forest and woodland covers less than 15% of Australia. The climate is predictable in these forested regions but it is irregular throughout most of Australia. Prolonged droughts lasting 3-10 years may be broken by flooding rains. For this reason raptor species of arid and semi-arid regions have had to adapt to an environment that can be vastly different from year to year. Consequently many are resilient to present man-made changes and there is only one threatened raptor from inland Australia. Conversely, those raptor species whose survival is tightly linked with the historically stable forests have not fared so well.

AUSTRALIA'S STABLE ENVIRONMENTS: FORESTS AND ISLANDS

Amongst threatened species world-wide, there is a great predominance of species inhabiting forests and islands (Halliday 1980; King 1981). Whilst this trend does not hold for threatened Australian birds in general (Ford 1989), it certainly does for threatened Australian raptors.

Australia has four species and 11 subspecies of raptor which have been classified as threatened using IUCN definitions (Gamett 1992). Three threatened species are endemic diurnal raptors and one is a large owl, while all but two of the 11 threatened subspecies are owls. Only one of the 15 threatened taxa occurs outside subcoastal, coastal or island forests. The majority (60%) of these

forest raptors occur exclusively or partly in the tropics.

The rare Grey Falcon *Falco hypoleucos* is the only threatened raptor from inland Australia. Other taxa which do not occur in the tropics include the Australian subspecies of the rare Sooty Owl *Tyto tenebricosa tenebricosa* and the rare Powerful Owl *Ninox strenua*. The endangered subspecies of the Southern Boobook *Ninox novaeseelandiae undulata* and Wedge-tailed Eagle *Aquila audax fleayi* occur on temperate Norfolk Island and Tasmania respectively. The extinct Southern Boobook *N. n. albaria* occurred on temperate Lord Howe Island.

THE TWO THREATENED DIURNAL SPECIES OF MAINLAND AUSTRALIA'S TROPICAL FORESTS

The Red Goshawk *Erythrotriorchis radiatus* (vulnerable) is restricted to the forests and savannah woodlands of the tropical north, while the Square-tailed Kite *Lophoictinia isura* (rare) is migratory and has a much wider distribution which largely accounts for the different status of the two species. Both raptors are from monotypic genera, have always been considered uncommon, breed at low to very low densities, have low to moderate recruitment rates, and feed mainly on birds (Debus & Czechura 1989; Aumann & Baker-Gabb 1991).

Destruction of forest and woodlands, particularly in eastern Australia, is now the main threat to both species. Illegal egg-collecting and shooting are problems for a few pairs whose nest location has been advertised or those which breed close to human settlement (Debus & Czechura 1989; Aumann & Baker-Gabb 1991). Pesticides are not inhibiting breeding success in remote locations, but they may be a problem in north-east Australia where cropping and the use of pesticides is widespread. Current fire and grazing regimes do not limit the density of prey and the availability of suitable nest trees, but their long-term effects are unknown.

The Red Goshawk and Square-tailed Kite occur in several conservation reserves. Additional conservation measures required for both species include: surveys in north-east Australia to locate and protect nest sites outside reserves, not revealing the location of nest sites in order to protect pairs from egg-collectors, and education of landowners with poultry near known pairs of raptors so that they are not illegally shot. The biology of the Red Goshawk is well known (Debus & Czechura 1988; Aumann & Baker-Gabb 1991), but a comprehensive study of the Square-tailed Kite's status, biology and ecology is required (Garnett 1992).

FIVE THREATENED SUBSPECIES OF LARGE OWL FROM AUSTRALIA'S TROPICAL FORESTS

There are four subspecies of the Masked Owl *Tyto novaehollandiae*. The Tasmanian subspecies *T. n. castanops* is secure, the widespread mainland subspecies *T. n. novaehollandiae* is rare, while *T. n. kimberli* from the north of mainland Australia and *T. n. melvillensis* from Melville and Bathurst Islands are insufficiently known (Garnett 1992). On the mainland *T. n. novaehollandiae* and *T. n. kimberli* appear to occur at low densities (Schodde & Mason 1980; Hollands 1991), though this impression may be deceptive because the Masked Owl is usually silent and may be confused with the more common Barn Owl *Tyto alba*. In the absence of competitors, *T. n. melvillensis* appears to attain higher population densities on Melville and Bathurst Island than do either of the mainland subspecies (Garnett 1992).

All Masked Owl subspecies will use altered habitats and forest margins, particularly for foraging (Schodde & Mason 1980). However, they favour the forest interior for roosting and nest in large hollows in tall, old trees. Such trees can be destroyed by high intensity fires late in the dry season in the tropical north (Garnett 1992). Current forestry management practices may also limit nest site availability in some areas. Conservation measures proposed for threatened subspecies of the Masked Owl include: studies of basic ecology, particularly home range, diet and nest requirements and the effect of current fire, forestry and agricultural practices on nest site availability (Garnett 1992).

There are three subspecies of the Rufous Owl *Ninox rufa*. In north-west Australia *N. r. rufa* is

secure, *N. r. queenslandica* of the north-east is rare and *N. r. meesi* of Cape York is insufficiently known (Garnett 1992). All subspecies of Rufous Owl occur at low densities (Schodde & Mason 1980). They roost and nest in rainforest, but often forage in nearby woodlands and wetlands.

Though many pairs of Rufous Owl occur in conservation reserves, some habitat outside reserves is still being cleared for agriculture. Hot fires late in the dry season are the greatest threat because they burn the fringes of rainforest and can destroy nest trees (Garnett 1992). Weed invasion is also a problem in some Rufous Owl habitat. Conservation measures proposed include surveys to obtain a more accurate assessment of the abundance and status of nest sites. Particular attention should be paid to the effects of habitat clearance, invasion of habitat by weeds and the effects of current fire management practices (Garnett 1992).

TWO THREATENED SUBSPECIES FROM TROPICAL CHRISTMAS ISLAND

On Christmas Island the Brown Goshawk *Accipiter fasciatus natalis* and Indonesian Hawk-Owl *Ninox squamipila natalis* occur as vulnerable subspecies of widespread, secure species. There are about 100 pairs of each subspecies (Stokes 1988; Olsen & Stokes 1989). Clearance of forest was the main threat, but this has ceased and much of the island is now national park. Conservation measures proposed include collecting information on the effective population sizes, productivity and recruitment to confirm whether the small populations are viable in the long term.

SUMMARY

Despite the fact that less than 30% of Australia is covered in forest, all but one of its 15 threatened raptors is a forest dweller, and most (73%) are owls. While clearance of forests for agriculture was formerly a major threat, this is no longer the main threat for any taxa. In tropical Australia the main threat now is the loss of large hollow-bearing nesting trees and those which might eventually replace them due to inappropriate fire and forestry management practices. Studies need to be undertaken to provide alternative management strategies and to elucidate the biology of several taxa which are not well known. The most important area for this work to be undertaken is in north-east Australia.

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