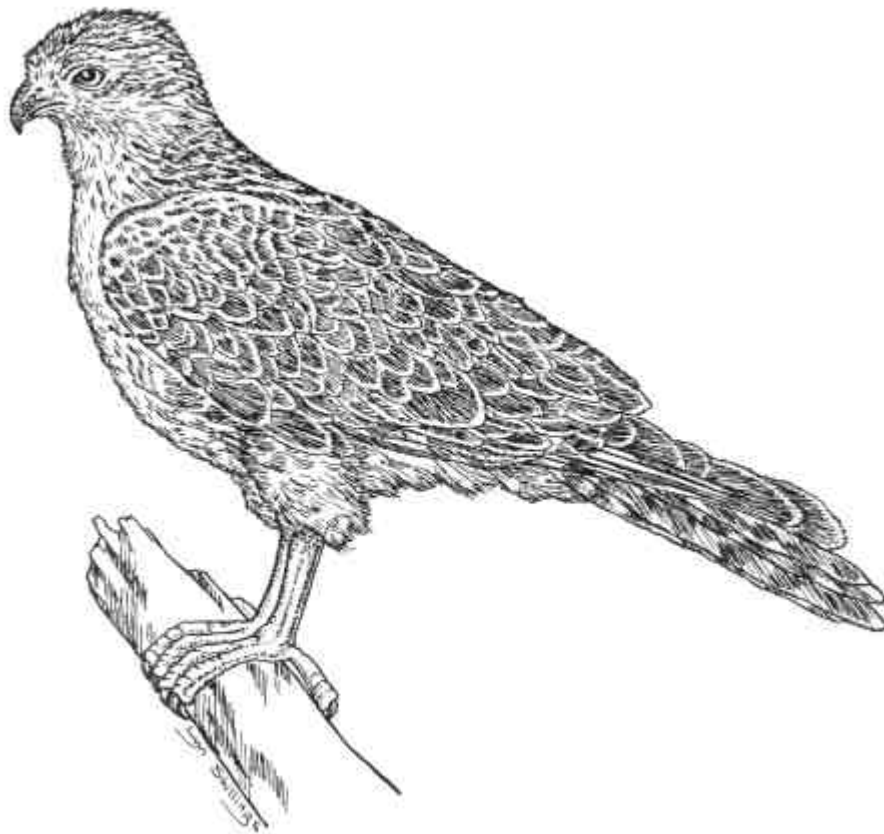


Recovery Plan for the Red Goshawk (*Erythrotriorchis radiatus*)



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Recovery Plan for the Red Goshawk

Erythrotriorchis radiatus

Foreword

The conservation of threatened species, populations and ecological communities is crucial for the maintenance of this State's unique biodiversity. In NSW, the *Threatened Species Conservation Act 1995* provides the framework to conserve and recover threatened species, populations and ecological communities through the preparation and implementation of Recovery Plans.

The preparation and implementation of Recovery Plans is identified by both the National Strategy for the Conservation of Australia's Biological Diversity and the NSW Biodiversity Strategy as a key strategy for the conservation of threatened flora and fauna. The object of a Recovery Plan is to document the research and management actions required to promote the recovery of a threatened species, population or ecological community and to ensure its ongoing viability in nature.

The *Threatened Species Conservation Act 1995* (NSW) requires that the Director-General of National Parks and Wildlife prepare Recovery Plans for all species, populations and ecological communities listed as Endangered or Vulnerable on the *Threatened Species Conservation Act 1995* (NSW) schedules. This includes specific requirements for both the matters to be addressed by Recovery Plans and the process for preparing Recovery Plans. This plan satisfies these provisions.

This plan describes our current understanding of the Endangered Red Goshawk *Erythrotriorchis radiatus*, documents the research and management actions undertaken to date, and identifies the actions required and parties responsible to maximise the opportunity for the species' ongoing viability in the wild.



BRIAN GILLIGAN

Director-General



BOB DEBUS MP

Minister for the Environment

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Contents

Foreword	i
Acknowledgments	ii
1 Introduction	1
2 Description	1
3 Distribution	1
4 Current Conservation Status	2
5 Ecology	2
6 Habitat	2
7 Legal Status	3
Recovery Plan Preparation.....	3
Recovery Plan Implementation	3
Critical Habitat	3
Environmental Assessment.....	4
8 Management Issues	4
Threats and Reasons for Decline	4
9 Social and Economic Consequences	5
10 Biodiversity Benefits	5
11 Previous Actions Undertaken	5
Surveys	5
Nest Protection	5
Habitat Protection.....	5
Community Education	5
NSW Wildlife Atlas	5
12 Species' Ability to Recover	6
13 Recovery Objectives and Performance Criteria	6
14 Recovery Actions	6
Objective 1: To improve the co-operation and co-ordination of recovery efforts between NSW and Qld.....	6
Objective 2: Review the legal status of the species at the National level.	6
Objective 3: Standardize survey method for the species.	6
Objective 4: Increase awareness of the conservation status and threats affecting the Red Goshawk.	6
Objective 5: Identify and protect any known habitat or nest sites for the Red Goshawk that occur in NSW. .	7
15 Implementation	7
16 Preparation details	8
17 Review Date	8
18 References	8
19 Acronyms Used in this Document	9

Appendix 1 Predicted distribution of the Red Goshawk within the upper north-east east of NSW
.....11

1 Introduction

The Red Goshawk (*Erythrotriorchis radiatus*) is a large, bird-eating raptor. Various threatening processes, including widespread deforestation and widespread application of persistent pesticides, have caused a 500 km northward contraction in the range of the Red Goshawk in New South Wales (NSW). The NSW population of the Red Goshawk is thought to have declined from that of a scarce breeding resident (similar to all other range States), to possible extinction as a breeding species (Debus 1993).

The Red Goshawk has been listed as Endangered under the *Threatened Species Conservation Act 1995* (NSW) (TSC Act). The aim of this Recovery Plan is to assist in returning this species to a position of viability in nature.

This document constitutes the formal State Recovery Plan for the Red Goshawk and, as such, considers the requirements of the species in NSW. It identifies the actions to be taken to ensure the long-term viability of the Red Goshawk in nature and the parties who will undertake these actions. The attainment of this Recovery Plan's objectives is subject to available funding. The information in this Recovery Plan is accurate to February 2002.

2 Description

The Red Goshawk is a large, swift and powerful rufous-brown hawk. It is one of the most sexually dimorphic raptors in the world (Baker-Gabb 1984). The female (1.1 kg) is similar in size to a Little Eagle (*Hieraaetus morphnoides*), but with longer legs and massive feet that are capable of killing birds the size of a Red-tailed Black-Cockatoo (*Calyptorhynchus banksii*). The male Red Goshawk (0.63 kg) is similar in size to a Brown Falcon (*Falco berigora*), and is capable of bursts of high speed (Baker-Gabb pers. obs).

Red Goshawks are heavily streaked below; adult males and juveniles have rich rufous underparts, whereas adult females are much paler. Adults, with their grey, darkly-streaked heads can be distinguished in the field from juveniles which have rufous heads.

The Red Goshawk can be distinguished in flight from other reddish-brown raptors as follows: wings are 'six-fingered' and considerably longer than the 'five-fingered' wings of *Accipiter* goshawks; wings are held in a shallow dihedral when soaring; like the *Accipiter* goshawks, both its soaring and direct flight are often characterised by alternate bursts of flapping and gliding, but Red Goshawks use deeper wing-beats; the head and breast are heavily and

darkly streaked; the tail is relatively long and only slightly rounded at the tip; and the legs and toes are long, heavy and yellow (Debus & Czechura 1988a). Perched Red Goshawks are most likely to be confused with Brown Falcons, but the Falcon has a more rotund body shape, relatively larger head and grey bare parts. Despite these differences, Red Goshawks are notoriously difficult birds to identify (Debus 1993; Debus & Czechura 1988b; Czechura 1996; Marchant & Higgins 1993).

The Red Goshawk is a solitary and secretive bird that is generally silent (Marchant & Higgins 1993). Even when nesting, Red Goshawks are inconspicuous because they do not reveal themselves by flying off in alarm when approached. For example, three of the 14 nests located by Aumann and Baker-Gabb (1991) in northern Australia were within clear view of major highways, one at a popular wayside stop. Despite many hundreds of birdwatchers and naturalists driving or walking 25 m below them, the Red Goshawks perched on or near their nests were never sighted and reported.

The Red Goshawk has long been placed in an endemic, monotypic genus (Christidis & Boles 1994), but an increasing body of opinion supports a broadening of *Erythrotriorchis* to include the Chestnut-shouldered Goshawk *E. buergersi* of New Guinea (Debus & Czechura 1988b; del Hoyo *et al.* 1994). Hence, the Red Goshawk belongs to a regionally endemic genus and is part of an Australasian 'old endemic' group (Debus & Czechura 1988b).

3 Distribution

The Red Goshawk is very sparsely dispersed across approximately 15% of coastal and sub-coastal Australia from the Kimberley in Western Australia to north-east NSW (Blakers *et al.* 1984; Aumann & Baker-Gabb 1991). Some records have been made from southern and northern central NSW (Peter Christie pers. comm. 2001). This distribution has changed little since European settlement with the exception of a coastward contraction in the east (Debus & Czechura 1988b) and a northward contraction of about 500 km in NSW (Blakers *et al.* 1984; Debus 1991).

The first Red Goshawk specimen was collected near Sydney around 1790, with another being collected from there sometime prior to 1810 (Debus *et al.* 1993). Other NSW specimens were obtained from the Richmond and Clarence Rivers in the mid 1800s. The species was breeding in the Richmond Valley between 1910 and 1920 when two clutches were taken (Debus 1993).

Significant early regional records from southern Qld and north-eastern NSW have been summarised by Debus *et al.* (1993) and Czechura (1996). These reports indicate that the Red Goshawk has always been rare with one observer (Barnard 1925) noting local declines even at this early stage of European settlement.

Recent records of pairs of Red Goshawks in NSW are confined to the Northern Rivers region north of the Clarence River. Around 90% of reports of Red Goshawks in NSW in the past 30 years have come from the Northern Rivers and Northern Tableland regions (Debus 1993; NPWS Atlas of NSW Wildlife). Nearly half of sightings over the past 15 years have come from State Forest of NSW (SFNSW) or NPWS estate. Based on recent analysis during 2001, the distribution of the Red Goshawk in south-east Qld has been recorded from areas of different land tenure. Six pairs are centred in National Park lands and four pairs are recorded from either private land or other crown land (e.g. State Forests) (Stewart & Hobson 2002).

4 Current Conservation Status

Garnett and Crowley (2000) estimate that there may be fewer than 1000 mature individuals of the species remaining in Australia. The NSW population of the Red Goshawk is thought to have declined from that of a scarce breeding resident (similar to all other range States), to possible extinction as a breeding species (Debus 1993). Debus (1993) collated 40 verified records between 1960 and 1993, and since then there have been fewer than ten records accepted by the NSW Field Ornithologists Club Records Appraisal Committee or listed in otherwise acceptable documentation (S. Debus *in litt.*).

Absence of sighting and breeding records of the species should not be taken to indicate extinction, given that the birds are difficult to see and identify, and nests are exceptionally hard to find in rugged terrain. Hence, searches from forested hill tops (Debus 1993; Czechura 1996) or the general fauna surveys at more than 2000 sites in north-east NSW forests in the past decade (NPWS 1995), had a low chance of locating nesting Red Goshawks.

The viability of the Red Goshawk in NSW must also be considered in conjunction with birds in neighbouring south-east Qld. Population estimates derived from recent surveys in south-east Qld during 2001 (Stewart & Hobson 2002) indicate that ten or 11 pairs of Red Goshawks may occur in that area. Surveys planned for late 2002 may locate further pairs of the species (D. Stewart pers. comm. 2002).

5 Ecology

In northern Australia adult Red Goshawks are year-round residents and population turnover is probably low (Aumann & Baker-Gabb 1991). In the south-east of their range adults may migrate from the ranges to lowland winter territories (Czechura 1996, 1997), as do some other raptors such as the Pacific Baza *Aviceda subcristata* (Marchant & Higgins 1993). Juveniles can disperse widely and are probably responsible for the bulk of the sightings outside the core breeding areas (Debus & Czechura 1988b).

Red Goshawks are probably monogamous and the same territories may be occupied year after year (Hollands 1984; Aumann & Baker-Gabb 1991). Breeding generally occurs in spring, with eggs laid between August and October in the south-east (Debus & Czechura 1988b), and between May and October in the north. Breeding activities are spread over many months with courtship beginning in April and young not leaving the natal territory until the end of December (Aumann & Baker-Gabb 1991).

The male does most of the nest building and provision of food. The female lays 1 or 2 eggs that she incubates for 39–43 days. The nestling period is 51–53+ days. The fledged young are totally dependent on their parents for food for 25–30 days and at least partially dependent on them for another 40–50 days (Aumann & Baker-Gabb 1991).

Red Goshawks usually hunt from a concealed perch, although they may also soar and prospect for prey over woodlands and wetland areas.

As is common among large bird-eating raptors (Newton 1979), Red Goshawks nest at very low densities. In northern Australia, nests were 6.5, 8 and 23 km from their nearest neighbour (Aumann & Baker-Gabb 1991), and two nests were 6.5 km apart in south-east Qld (Debus & Czechura 1988b). Two adults with radio-transmitters flew 5–7 km (female) and 7–10 km (male) from their nests and had home ranges of 120 km² and 200 km² respectively (Aumann & Baker-Gabb 1991). Five pairs formerly breeding in south-east Qld had home ranges estimated at 50–220 km² per pair (Barnard 1925; Debus & Czechura 1988b).

6 Habitat

Red Goshawks prefer woodlands and forests with a mosaic of vegetation types that are open enough for fast manoeuvring flight (Marchant & Higgins 1993). These favoured areas contain permanent water and have large populations of birds of other species. Red Goshawks generally avoid very dense or very open habitats, preferring to hunt along their ecotones.

In NSW, Red Goshawks frequent mixed subtropical rainforest, *Melaleuca* swamp forest and open eucalypt forest along coastal rivers (Debus 1993). In south-east Qld, *Araucaria* vine forests and open forests are a significant component of the vegetation mosaics frequented by Red Goshawks (Czechura 1997). In north-east NSW and south-east Qld, Red Goshawks are mainly found in rugged terrain (Debus 1993; Czechura 1996) as most suitable lowland forest has been cleared or modified. In northern Australia they nest in both rugged terrain and lowland sites (Aumann & Baker-Gabb 1991).

Red Goshawk nests may be located up to 1 km away from a permanent freshwater body (Debus & Czechura 1998a; Aumann & Baker-Gabb 1991). Nests are usually in the tallest and most massive tree in a tall stand. Nests are large (c. 1.0 x 0.7 m), flat and untidy structures that are sufficiently different from those of most other raptors in north-east NSW to be a useful indicator of the species presence. The nest is most like those of the Square-tailed Kite (*Lophoictinia isura*), being placed close to the top of a tall tree on a substantial, horizontal fork.

7 Legal Status

The Red Goshawk is listed as Vulnerable on the *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) (Commonwealth) and Endangered on the *TSC Act*. Under the *Nature Conservation (Wildlife) Regulation* 1994 (Qld) the Red Goshawk is listed as Endangered. Using IUCN criteria, Bird Life International has classified the Red Goshawk as Endangered (Collar *et al.* 1994).

Among the consequences of listing as a threatened species on the TSC Act are:

- a Recovery Plan must be prepared;
- consideration be given to the species in assessing the impacts of developments and activities with the aim of minimising adverse impacts; and
- other actions that are likely to result in the harming or picking of that species or damage its habitat are licensed.

Recovery Plan Preparation

The TSC Act provides a legislative framework to protect and encourage the recovery of Vulnerable and Endangered Species, Endangered Populations and Endangered Ecological Communities in NSW. Under this legislation the Director-General of National Parks and Wildlife has a responsibility to prepare Recovery Plans for all species, populations

and ecological communities listed as Endangered or Vulnerable on the TSC Act schedules. Similarly, the EPBC Act requires the Commonwealth Minister for the Environment to ensure the preparation of a Recovery Plan for Nationally listed species and communities or adopt plans prepared by others including those developed by State agencies. Both Acts include specific requirements for the matters to be addressed by Recovery Plans and the administrative process for preparing Recovery Plans.

This Recovery Plan has been prepared to satisfy the requirements of the TSC Act, but since it does not cover the full range of the species within Australia it may not meet all the requirements of the EPBC Act.

Recovery Plan Implementation

The TSC Act requires that a public authority must take any appropriate measures available to implement actions included in a Recovery Plan for which they have agreed to be responsible. Public authorities and councils identified as responsible for the implementation of Recovery Plan actions are required by the TSC Act to report on measures taken to implement those actions. In addition, the Act specifies that public authorities must not make decisions that are inconsistent with the provisions of the plan. The government agency relevant to this plan is the NPWS. Consequently, the actions outlined for this agency must be implemented as described in the plan.

The EPBC Act specifies that a Commonwealth agency must not take any action that contravenes a Recovery Plan.

Critical Habitat

The TSC Act makes provision for the identification and declaration of Critical Habitat. Under the TSC Act, Critical Habitat may be identified for any Endangered Species, Population or Ecological Community occurring on NSW lands. Once declared, it becomes an offence to damage Critical Habitat (unless the action is exempted under the provisions of the TSC Act) and a Species Impact Statement is mandatory for all developments and activities proposed within declared Critical Habitat.

To date, Critical Habitat has not been declared for the Red Goshawk under the TSC Act. The declaration of Critical Habitat in NSW is not considered to be a priority for the species during the period of this plan, as other mechanisms provide for its protection.

Under the EPBC Act, Critical Habitat may be registered for any Nationally listed threatened species or ecological community. When adopting a Recovery Plan the Commonwealth Minister for the

Environment must consider whether to list habitat identified in the Recovery Plan as being critical to the survival of the species or ecological community. It is an offence under the EPBC Act for a person to knowingly take an action on a Commonwealth area that will significantly damage Critical Habitat (unless the EPBC Act specifically exempts the action). Although this offence only applies to a Commonwealth area, any action that is likely to have a significant impact on a listed species occurring within registered Critical Habitat on other areas is still subject to referral and approval under the EPBC Act. Proposed actions within registered Critical Habitat on non-Commonwealth areas are likely to receive additional scrutiny by the Commonwealth Minister.

This Recovery Plan identifies those habitat features and the locations (sections 3 and 5) currently known to be critical to the survival of the Red Goshawk as required by the EPBC Act.

Environmental Assessment

Under the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act) decision-makers must consider known and potential habitat, biological and ecological factors and the regional significance of threatened species.

Activities not requiring development consent under the EP&A Act, and which are likely to have an impact on the Red Goshawk, requires a licence from the NPWS issued under Section 91 of the TSC Act (Section 91 Licence). Such a licence can be issued with or without conditions, or can be refused.

The EPBC Act regulates actions that may result in a significant impact on Nationally listed threatened species and ecological communities. It is an offence to undertake any such actions in areas under State or Territory jurisdiction, as well as on Commonwealth owned areas, without obtaining prior approval from the Commonwealth Minister for the Environment. As the Red Goshawk is listed Nationally under the EPBC Act, any person proposing to undertake actions likely to have a significant impact on this species should refer the action to the Commonwealth Minister for the Environment for consideration. The Minister will then decide whether the action requires EPBC Act approval.

Administrative guidelines are available from Environment Australia to assist proponents in determining whether their action is likely to have a significant impact. In cases where the action does not require EPBC Act approval, but will result in the death or injury of a Red Goshawk and it is in or on a Commonwealth area, a permit issued by the

Commonwealth Minister under the EPBC Act, will be required.

The Commonwealth Minister for the Environment can also delegate the role of assessment and approval to other Commonwealth Ministers under a Ministerial Declaration, and to the States and Territories under bilateral agreements. The development of a bilateral agreement between NSW and the Commonwealth is not yet complete, but when in place will avoid the need for duplication of environmental assessment.

8 Management Issues

Threats and Reasons for Decline

The main cause of the decline of the Red Goshawk as a breeding species in north-east NSW and south-east Qld is widespread deforestation, particularly of lowland riverine forests (Hollands 1984; Debus & Czechura 1988b; Debus 1993).

Other possible threats include:

- widespread application of persistent pesticides such as DDT. Levels of pesticide contamination sufficient to cause eggshell thinning and breeding failure have been detected in several species of raptor, especially in the south-east of the Red Goshawk's range (Olsen *et al.* 1993). The past impact of pesticides on breeding Red Goshawks remains speculative (Garnett 1993; Czechura 1996). In Australia, widespread organochlorine use ceased in 1989 and most affected species have now recovered;
- illegal robbing of nests for eggs, young and adults (Debus & Czechura 1988b; Aumann & Baker-Gabb 1991; Czechura 1996);
- shooting of Red Goshawks in rural areas, particularly by owners of poultry and pigeons;
- disease;
- stochastic events, such as drought and fire, which may have exaggerated impacts upon an already depleted population;
- genetic 'bottlenecks' which may have restricted gene flow resulting in lethal or unfavourable genes being recruited into an already low population; and
- burning and management regimes that may have altered the prey base and availability of prey (Aumann & Baker-Gabb 1991).

9 Social and Economic Consequences

Funding for implementation of the Recovery Plan would need to be allocated. Estimated costing for the implementation of the recovery actions is provided in Table 1. Implementation is largely dependent on finding breeding pairs and their nests. If no Red Goshawks are found then the cost of the plan is \$22,600. Costs increase if birds and/or nests are sighted and recovery actions implemented.

This Recovery Plan requires consideration of potential impacts on the Red Goshawk by consent and determining authorities considering activities in areas of known or potential habitat of the species. Given that there are likely to be very few pairs of Red Goshawk in NSW, the potential statewide impacts are very small.

10 Biodiversity Benefits

Red Goshawks occur in areas of high biodiversity and they have large territories (Debus & Czechura 1988b; Aumann & Baker-Gabb 1991; Czechura 1997). Hence, the conservation of any areas for Red Goshawks will have a substantial biodiversity benefit for a wide range of woodland and forest flora and fauna. The extinction of the Red Goshawk would be a significant loss because it is an Australian endemic, and one of only two species in a genus that occurs only in Australasia.

11 Previous Actions Undertaken

Surveys

A six-month survey of the Red Goshawk was undertaken in north-east NSW in 1987–88 (Debus 1993).

Surveys have also been undertaken in Northern Qld (Czechura 2001), Western Cape York Peninsula and Gulf Region (Czechura & Hobson 2000), and Southern Qld (Stewart & Hobson 2002).

Nest Protection

Prescriptions apply under the Integrated Forestry Operations Approval (IFOA) for the Upper and Lower North East Regions. Areas proposed to be logged which have a Red Goshawk record within 5 km, are required to be surveyed by SFNSW and any raptor nests located must be protected with a 400 m exclusion zone until the identity of the nest is determined. Should a Red Goshawk be recorded during these surveys within 5 km of the area to be logged, then all operations must cease until a prescription for that compartment is developed.

Habitat Protection

As part of the Comprehensive Regional Assessment (CRA) of public forests in north-east NSW, approximately 65 000 ha of habitat potentially suitable for Red Goshawks has been identified in the formal reserve system. This represents about 22% of the total area of predicted suitable habitat of approximately 296 000 ha (Appendix 1).

The *Native Vegetation Conservation Act 1997* (NSW) (NVC Act) provides a system for managing and controlling further clearing of native vegetation in NSW. The purpose of the NVC Act is the conservation and sustainable management of native vegetation and in particular the protection of native vegetation of high conservation significance. Under this Act, approval from the Department of Land and Water Conservation (DLWC) is a prerequisite for vegetation clearance unless a Vegetation Management Plan has been approved or unless the clearance is exempt. The Act requires that the Director-General of National Parks and Wildlife be consulted in the matter of threatened species and their habitat. Landholders may enter into voluntary Property Agreements with DLWC whereby government assistance can be provided to protect native vegetation. No Regional Vegetation Management Plan or Property Agreements relating to the habitat of the Red Goshawk has yet been prepared.

Community Education

As part of a community education and awareness program, a Red Goshawk information pamphlet and nest identification guide have been produced. The information pamphlet describes how to identify the Red Goshawk, and outlines details such as its habitat and dietary requirements. Also included in this pamphlet, is a brief outline of conservation measures that are currently in place for this species. The nest identification guide provides a comprehensive description of nesting behaviour; and information intended to assist both researchers and members of the general public in identification of Red Goshawk nests; and details on how people can help in the conservation of Red Goshawks and their nests. The brochure and the guide have been distributed to NSW local councils, visitor centres, the offices of NSW public authorities and Qld Environment Protection Authority (Qld EPA) offices.

NSW Wildlife Atlas

A review of the existing atlas database records for the Red Goshawk has been carried out. The atlas database records have been updated, with any inaccurate or incorrect records amended or deleted.

12 Species' Ability to Recover

Large predators are among the more difficult animals to recover (Soulé 1987; Quammen 1996). Although there are very few records in NSW, they exist in areas where there are large tracts of forest. Several pairs of Red Goshawks exist in National Parks or State Forests in southern Qld, juveniles disperse widely, widespread use of organochlorine pesticides has ceased, and there are legislative procedures in place to ensure the protection of Red Goshawks and their habitat in both States. Without expansion of the south-east Qld population into NSW, the rate at which the Red Goshawk population could increase is very low. As such, co-ordination with actions undertaken in south-east Qld is considered essential to the recovery of the species in NSW.

13 Recovery Objectives and Performance Criteria

Recovery of the Red Goshawk to a position of viability in nature is the overall objective of the recovery program for the species in the long term. The more immediate objective of this plan for the next five years is to encourage the long-term persistence of the Red Goshawk in NSW in coordination with recovery actions undertaken in south-east Qld.

The specific objectives of this Recovery Plan are to:

1. improve the co-operation and co-ordination of recovery efforts between NSW and Qld;
2. review the legal status of the species at the National level;
3. standardise survey method;
4. increase awareness of the conservation status and threats affecting the Red Goshawk; and
5. identify and protect any known habitat or nest sites that occur in NSW.

14 Recovery Actions

Objective 1: To improve the co-operation and co-ordination of recovery efforts between NSW and Qld.

Action 1.1

The NPWS will co-ordinate the establishment of a Red Goshawk working group to concentrate on the recovery of the declining population in south-eastern Australia. A member from both the NPWS and the Qld EPA should be included on this working group.

Performance Criterion: Co-ordinated action is being applied across the Red Goshawk's range, resulting in an improved recovery effort in both NSW and Qld.

Objective 2: Review the legal status of the species at the National level.

Action 2.1

The Red Goshawk working group will assess the current conservation status of the species throughout its range.

Performance Criterion: The formal status of the species reflects its true conservation status throughout its range.

Objective 3: Standardize survey method for the species.

Action 3.1

The working group will review survey method utilised during previous surveys for Red Goshawks and subsequently formulate standardized survey methods for the species. These methods will be promoted for use during future surveys for the species (see Action 4.2).

Performance Criterion: Standardized survey method has been developed for utilisation when undertaking surveys for the species.

Objective 4: Increase awareness of the conservation status and threats affecting the Red Goshawk.

Action 4.1

The NPWS will develop Environmental Impact Assessment Survey Guidelines for the Red Goshawk that will be distributed to relevant public authorities, including local government.

Action 4.2

The NPWS will develop an education package with details on the identification, distribution and habitat requirements, conservation status and threats affecting the Red Goshawk. This package will be distributed to relevant land management agencies, approval authorities and management committees and boards.

Performance Criteria 4

1. The NPWS has provided relevant public authorities with Environmental Impact Assessment Survey Guidelines for use when undertaking Environmental Assessments.
2. An education package has been developed and distributed to relevant land management agencies,

approval authorities, and management committees and boards.

Objective 5: Identify and protect any known habitat or nest sites for the Red Goshawk that occur in NSW.

Actions 5.1

The NPWS will develop and implement a procedure through which any reports of potential sightings of Red Goshawks in NSW are referred to the Red Goshawk working group in order to determine the accuracy of the record.

Action 5.2

The NPWS, in conjunction with the Red Goshawk working group, will develop and implement appropriate nest site monitoring and security measures in order to minimise or eliminate human interference at nests, and to monitor the outcome of breeding attempts.

Security measures are essential as the potential exists for any nest found in the wild to be disturbed. In addition to losses through poaching, undue disturbance can result in nest desertion by the parent birds and so negate valuable opportunities for either re-clutching later that season or re-use of the nest tree in future breeding seasons.

Action 5.3

Should Red Goshawks be located on NPWS estate, the NPWS will develop and implement site-specific management guidelines. These guidelines will include nest protection measures developed through Action 5.2.

Action 5.4

In the case that a population is identified on private land or on public lands other than NPWS estate the NPWS will conduct a consultation process with the relevant landholders or land managers.

This consultation will ensure they are aware that the species occurs on their land, and to explore the option of developing an appropriate site-specific plan of management.

Action 5.5

The NPWS will ensure that the relevant landholders, land managers and management committees are aware of the long-term protection measures available, such as retention of habitat patches and habitat corridors.

Options available for facilitating long-term protection include:

- the development of a Voluntary Conservation Agreement (VCA) under the NSW *National Parks and Wildlife Act 1974* (NPW Act);
- Joint Management Agreements (JMAs) under the TSC Act;
- consideration of the identification and nomination of Critical Habitat under the TSC Act; and
- development of a Property Agreement under the NVC Act.

Action 5.6

The NPWS will provide advice and information to assist in the implementation of appropriate management options.

Action 5.7

The NPWS, relevant public authorities and landholders and land managers will maintain strict security concerning the location of nest sites.

Action 5.8

The NPWS will coordinate a research program under which birds that have either been trapped or rehabilitated are opportunistically radio-tracked.

This research program will be undertaken in order to gain information about home range, behaviour and nest sites.

Performance Criteria 5

1. Sightings of the species considered reliable are followed up with an intensive search by an experienced ornithologist within two months of the NPWS becoming aware of each sighting.
2. Appropriate nest monitoring and security measures are in place.
3. Breeding sites and territories are conserved.
4. Nests are provided the appropriate level of protection to minimise nest failure due to human interference.
5. There is improved knowledge of habitat requirements, life history and ecology of the species including breeding success and identification of threats.

15 Implementation

Allocation of responsibility for the implementation of recovery actions specified in this plan to relevant government agencies is presented in Table 1. These actions are to be implemented for a period of five years from the time this Recovery Plan is adopted.

Evaluation and performance of the Recovery Plan after five years will be the responsibility of the

NPWS with assistance from the Red Goshawk working group.

16 Preparation details

David Baker-Gabb of Elanus Pty Ltd prepared the preliminary draft of this Recovery Plan for the NPWS. This draft Recovery Plan has been finalised by Pamela Gray, Threatened Species Officer, NPWS.

17 Review Date

This Recovery Plan will be reviewed within five years of the date of publication.

18 References

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JMA Joint Management Agreement

LEP Local Environmental Plan

NPW Act *National Parks and Wildlife Act 1974* (NSW)

NPWS NSW National Parks and Wildlife Service

NVC Act *Native Vegetation Conservation Act 1997* (NSW)

Qld EPA Queensland Environment Protection Authority

RVMP Regional Vegetation Management Plan

SFNSW State Forests of NSW

TSC Act *Threatened Species Conservation Act 1995* (NSW)

VCA Voluntary Conservation Agreement

19 Acronyms Used in this Document

CRA	Comprehensive Assessment	Regional
DLWC	Department of Land and Water Conservation	
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i> (NSW)	
EPBC Act	Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>	
IFOA	Integrated Forestry Operations Approval	
IUCN	International Union for the Conservation of Nature and Natural Resources	

Table 1. Estimated costs of implementing the actions identified in the Red Goshawk Recovery Plan are provided below.

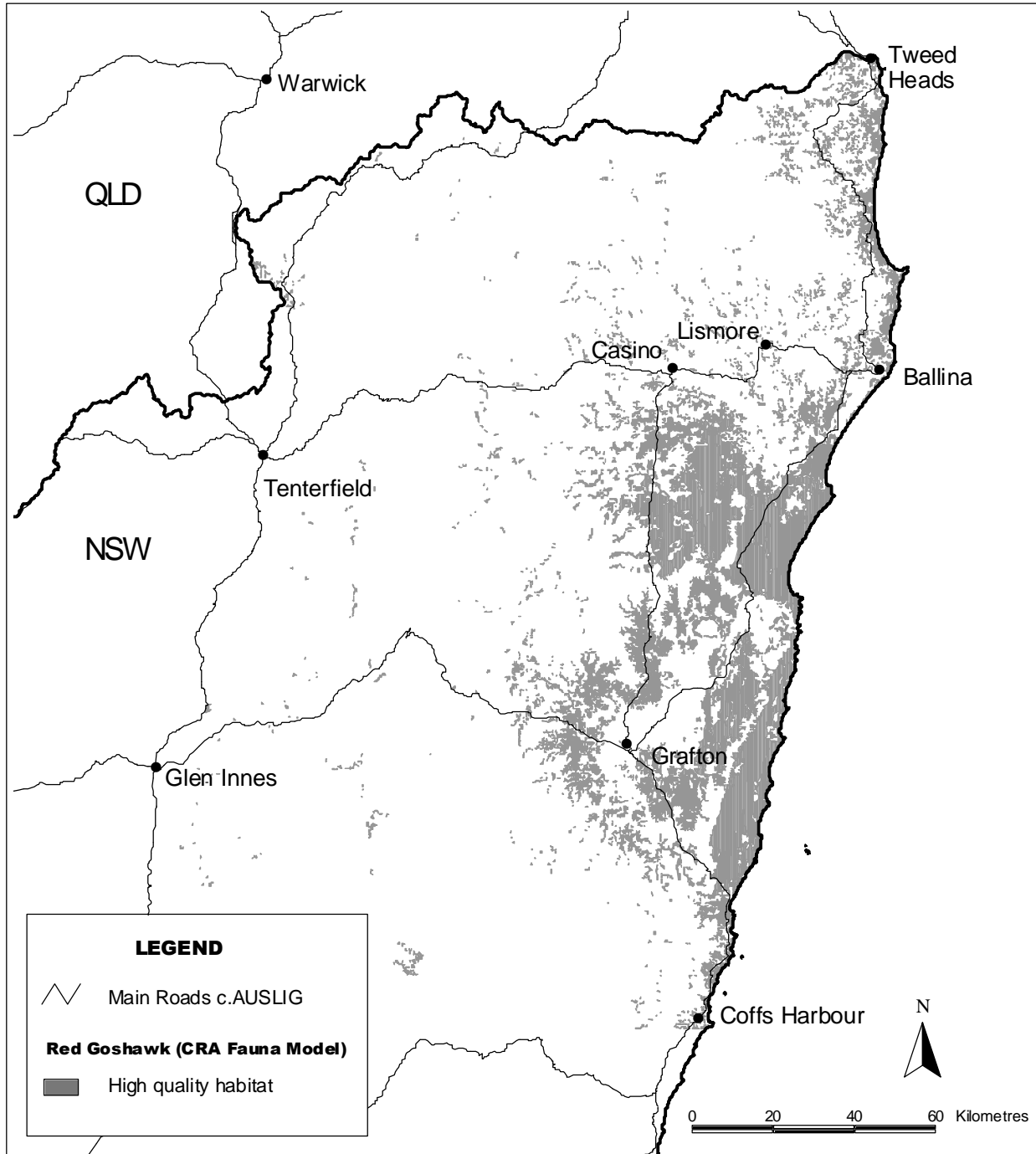
Action	Action Title	Priority	Estimated Cost/yr					Total Cost	Responsible party/Funding Source	In-Kind	Cash
			Year 1 (\$)	Year 2 (\$)	Year 3 (\$)	Year 4 (\$)	Year 5 (\$)				
A: Cost of actions assuming individuals/nests not recorded											
1.1	Establishment of working group	1	700	700	700	700	700	3500	NPWS	3500	
2.1	Assessment of conservation status	2	3500					3500	NPWS	3500	
3.1	Review, develop and promote standard survey methodology	1	700	1400	1050			3150	NPWS	3150	
4.1	EIA guidelines	1	5250					5250	NPWS	5250	
4.2	Education package	2	10000					10000	NPWS	1050	8950
Total cost if individuals/nests not recorded			20150	2100	1750	700	700	25400		16450	8950
B: Additional costs of actions if individuals/ nests are found (per individual/nest)											
5.1	Sightings procedure	1	700					700	NPWS	700	
5.2	Nest monitoring and security	1				700		700	NPWS	700	
5.3	NPWS plans of management	1	5250	1050	1050	1050	1050	9450	NPWS	9450	
5.4	Species awareness	1	700	700	700	700	700	3500	NPWS	3500	
5.5	Landowner/ manager consultation	1	700	700	700	700	700	3500	NPWS	3500	
5.6	Long-term protection measures	1	700	700	700	700	700	3500	NPWS	3500	
5.7	Advice and information	1	350	350	350	350	350	1750	NPWS	1750	
5.8	Site security	1	-	-	-	-	-	-	NPWS	-	
5.9	Radio tracking research	2	5000					5000	NPWS		5000
Total cost of actions if individuals/ nests are found (per individual/ nest)			13400	3500	3500	4200	3500	28100		23100	5000
TOTAL COST OF PLAN (A + B)			33550	5600	5250	4900	4200	53500		39550	13950

Priority ratings are: 1- action critical to meeting plan objectives, 2 -action contributing to meeting plan objectives, 3 -desirable but not essential actions

'In-Kind' Funds represent salary component of permanent staff and current resources

'Cash' Funds represent the salary component for temporary staff and other costs such as the purchasing of survey and laboratory equipment

Appendix 1 Predicted distribution of the Red Goshawk within the upper north-east east of NSW





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