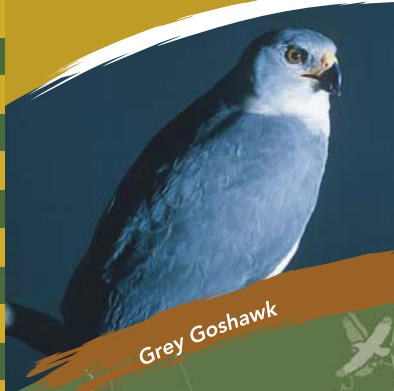


WOODLAND RAPTORS



Grey Goshawk



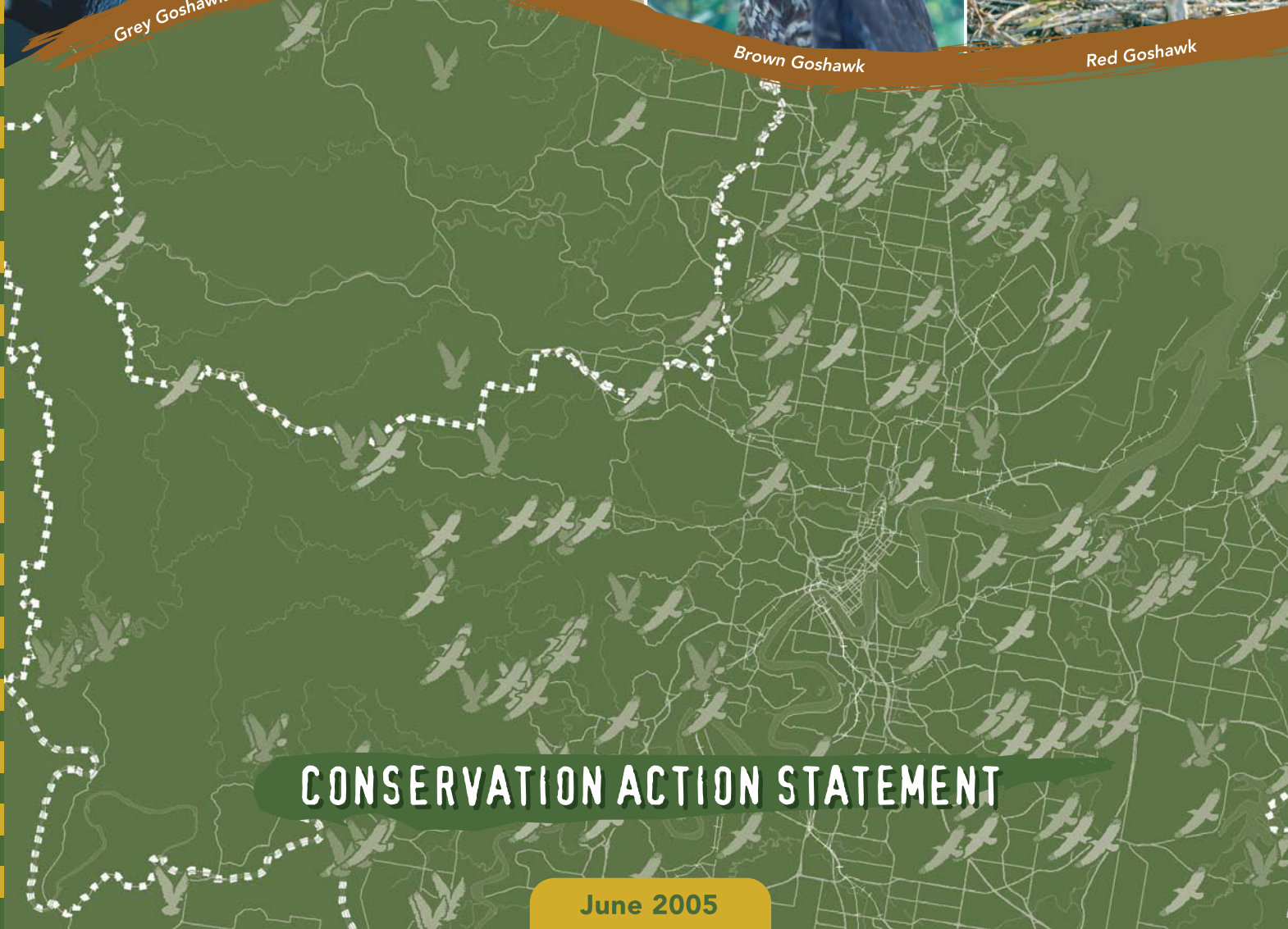
Wedge-tailed Eagle



Brown Goshawk



Red Goshawk



CONSERVATION ACTION STATEMENT

June 2005



Dedicated to a better Brisbane

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WOODLAND RAPTORS



1.0 Introduction

Brisbane is recognised as one of the most biologically diverse capital cities in Australia, supporting some 1500 plant species, 523 vertebrate animal species and innumerable invertebrate species.

Brisbane is also part of one of the fastest growing urban regions in Australia. This growth is placing significant pressure on the ecosystems and wildlife of the city. Population pressures and urban development, resulting in the loss and fragmentation of habitat, continue to be the greatest threats to the protection of biodiversity (Brisbane SOE 2001). Since 1990 the rate of clearing has decreased markedly. However, even with no further loss of habitat, some existing flora populations within the city are at risk of local extinction because the small, isolated, remaining habitat areas cannot support them. Other significant threats include pest animals and plants and inappropriate fire regimes. The challenge is to maintain and restore the city's biodiversity while accommodating urban growth.

Brisbane City Council has responded to this challenge with the Brisbane City Biodiversity Strategy, an important part of Council's *Living in Brisbane 2010* vision for a clean and green city. The strategy outlines a range of initiatives designed to secure the long-term conservation of the city's outstanding biodiversity values using available public, community and industry resources. Conservation Action Statements are among these initiatives.

Conservation Action Statements clearly state Council's management intent for the city's most threatened species, and outline key strategies and actions for their management in Brisbane.

This Conservation Action Statement addresses the following diurnal raptor species, collectively referred to as woodland raptors, which are identified as significant species within Brisbane, as per Council's Natural Assets Planning Scheme Policy (Brisbane City Council 2000, *Brisbane City Plan*, vol 2, schedule 4):

- ① wedge-tailed eagle (*Aquila audax*)
- ② grey goshawk (*Accipiter novaehollandiae*)
- ③ brown goshawk (*Accipiter fasciatus*)
- ④ red goshawk (*Erythrotriorchis radiatus*).

This Conservation Action Statement will be updated every two to five years to reflect new information and progress on conservation actions. For more information about this or any other Conservation Action Statement, visit Council's website at www.brisbane.qld.gov.au or phone Council on 3403 8888.

1.0 Introduction continued...

Aims

This Conservation Action Statement details Council's management intent for long-term protection and conservation of significant woodland raptors within Brisbane by:

- collating **existing information** on the distribution, ecology and management requirements of these species within Brisbane and surrounds
- identifying **key threats** that significantly impact upon these species within Brisbane
- identifying **gaps in existing knowledge** of the habitat and management requirements of these species and research priorities
- detailing **practical and affordable strategies and actions** that support the long-term protection and conservation of these species within Brisbane.

2.0 Conservation Status

The conservation status of a species will influence how it is managed. 'Threatened' species are typically accorded a more stringent management regime than 'common' species. Various conservation registers identify the status of fauna species at local, state and national levels. The current conservation status of the woodland raptors is provided in **Table 1**.

Table 1: Official Conservation Status of Brisbane City's Woodland Raptors

Species	Brisbane City ¹	Queensland ²	National ³
Wedge-tailed Eagle	Significant	Common	Not listed
Grey Goshawk	Significant	Rare	Not listed
Brown Goshawk	Significant	Common	Not listed
Red Goshawk	Significant	Endangered	Vulnerable/Migratory

¹ Brisbane City Council 2000, *Brisbane City Plan 2000*, Natural Assets Planning Scheme Policy, vol. 2

² Queensland Nature Conservation (Wildlife) Regulations 1994 under the Nature Conservation Act 1992

³ Environment Protection Biodiversity Conservation Act 1999

3.0 Distribution¹

National/State

Wedge-tailed Eagle

- Found throughout Australia including Tasmania; also southern New Guinea.

Grey Goshawk

- Found in northern, eastern and southern Australia including Tasmania (from the Kimberley Division in the north across to Cape York and through to Tasmania).

Brown Goshawk

- Occurs throughout mainland Australia and offshore territories such as Tasmania and Christmas Island.
- Also found from Lesser Sundas (Indonesia) through New Guinea to New Caledonia.

Red Goshawk

- Endemic to Australia.
- Found in northern and eastern Australia from the Kimberley Division north of 33° S in the east, and 19° S in the west.
- Possibly extinct as a breeding species in New South Wales.

Local

The little information available indicates that Brisbane's woodland raptor populations have declined in numbers and retreated to the larger remnants of vegetation in the city's western, southern and eastern suburbs. Both resident and migratory species have decreased in numbers, a trend that has been noted in woodland raptor species across the continent (Olsen 1998; Garnett and Crowley 2000). The population distributions of woodland raptor species within Brisbane city depend on their habitat requirements.

Wedge-tailed Eagle

- The wedge-tailed eagle is still recorded from the periphery of Brisbane and adjacent ranges. It is considered 'uncommon' in Brisbane.
- This raptor is associated mostly with larger forest and woodland remnants and rural areas. The size of prey and required hunting range tends to exclude it from urban areas. It is known to breed and hunt on the semi-rural verges of the city. As with the other raptors described in this statement, loss of suitable habitat to urbanisation will reduce numbers.
- Records are now rare in the eastern and southern suburbs; sightings are most likely dispersing individuals.

3.0 Distribution¹ continued...

Local continued...

Grey Goshawk

- Regarded as a 'seasonal' visitor to many lowland areas of Brisbane.
- Post-1984 records indicate that the grey goshawk is now associated with riverine corridors, larger forest/woodland remnants across the suburbs and continuous tracts of forest in western suburbs.
- Czechura and Olsen (2001) state '...loss of habitat has led to a contraction of the breeding range into areas such as Brisbane Forest Park and reduced the number of areas where transient and wintering birds are regularly observed, largely due to loss of forested linkages. It can be argued that the Tinchi Tamba Wetlands Reserve – Boondall – Fitzgibbon area remains one of the more important areas for such transients in the east of Brisbane' (p. 22).
- In the more heavily urbanised areas, it is likely single or paired birds are using all available habitat.
- Sightings have occurred within Brisbane, typically along riverine corridors in forest/woodland remnants and through continuous forests in the west.

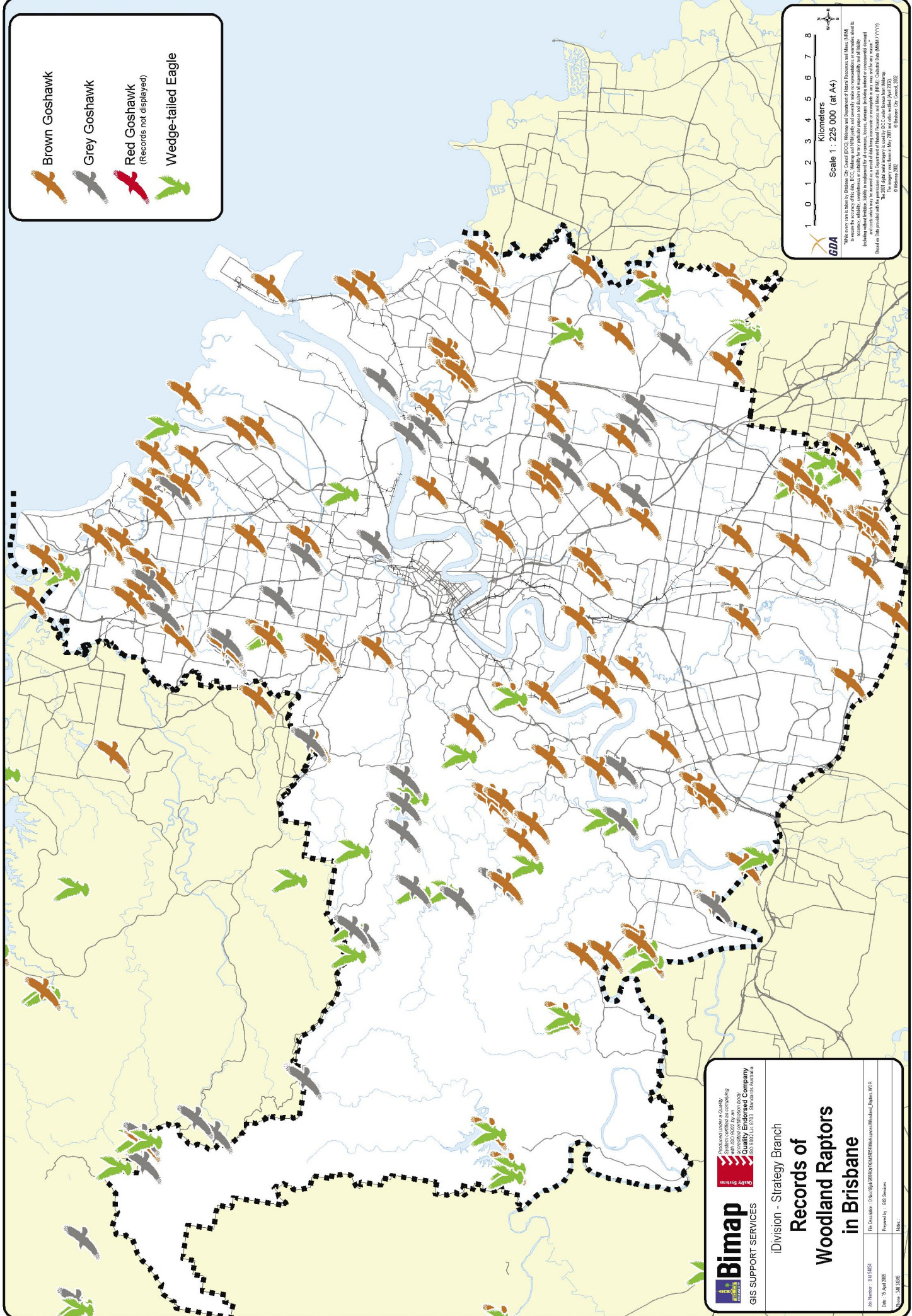
Brown Goshawk





- Formerly, widespread throughout Brisbane, including the inner city and suburbs. Now considered 'uncommon' to 'moderately common'.
- Typically associated with continuous or remnant forest/woodlands, vegetated corridors and extensive lightly timbered areas (eg. golf courses), as well as adjacent parks and gardens.
- Recorded regularly in most of Brisbane's larger natural areas and rural lands with relatively large tracts of intact forest/woodland.
- Some evidence exists that this species is being replaced by the collared sparrowhawk (*Accipiter cirrhocephalus*) in smaller, more isolated remnants within established suburbs.

Red Goshawk

- The red goshawk is not known from coastal or urban areas apart from occasional fly-overs.
- Considered 'rare' within Brisbane and is restricted to continuous forest and woodland and immediate environs.
- Evidence of population declines over the species' range in urbanised areas since European settlement.
- Recent records are infrequent, originating mostly from the western suburbs.
- Due to ongoing risk of egg collection, no specific details of sightings or breeding records can be provided. Such information held by Council may be made available for legitimate research and impact assessment activities.

Verified woodland raptor records for Brisbane City are shown on **Map 1**.



Brown Goshawk

Grey Goshawk

Red Goshawk
 (Records not displayed)

Wedge-tailed Eagle


GDA
 Scale 1 : 225 000 (at A4)
 Kilometers
 1 0 1 2 3 4 5 6 7 8

This map was prepared by Brisbane City Council (BCC) using data from Queensland Government and other sources. It is not a guarantee of accuracy. BCC, its employees and contractors accept no responsibility for any errors or omissions. This map is for information only and should not be used for any other purpose. All rights reserved. © Brisbane City Council 2012.

Bimap
 GIS SUPPORT SERVICES
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 ISO 9002:2004

iDivision - Strategy Branch
**Records of
 Woodland Raptors
 in Brisbane**

Job Number: BIA-0524
 Date: 19 April 2012
 File Location: B:\GIS\BIMAP\BIMAP\Woodland_Raptors_BWR
 Prepared by: GIS Services
 Page: 38/38

4.0 Ecology²

Habitat

Wedge-tailed Eagle

- Prefers woodlands, open forests, heath and shrublands as well as open or cleared country; may also use heavily timbered areas with adjacent open or cleared country.
- Height of nest trees varies according to local conditions but in forested habitats it is generally about 10-50 metres. Nests are located in medium-to-large trees or stags (standing dead trees) usually on sheltered slopes or in gullies and often surrounded by forest or woodland.
- Nests are typically a massive structure of sticks with a shallow cup lined with twigs and leaves and the height ranges from approximately 10-25 metres.

Grey Goshawk

- Prefers forests and woodlands in high rainfall areas. Specific habitats include closed forests (mangroves, rainforest), tall open forests, riverine forest and gallery forest along major watercourses.
- Often found in vegetation that has a well-developed grassy or shrubby understorey or with regrowth, including exotic species such as lantana (*Lantana camara*).
- Favours mature dense forest for nesting (tall trees approximately 8-40 metres), including rainforest species, *Eucalyptus* spp., *Corymbia* spp., *Lophostemon* spp.
- Nests are located approximately 10-20 metres high in the canopy of tall trees and typically take the form of large flat structures of thin dry sticks with a saucer-shaped bowl lined with leaves.

Brown Goshawk

- Prefers open forest and woodlands dominated by *Eucalyptus* and *Corymbia* spp., often with a well-developed understorey of native or exotic species.
- Favours medium to tall trees (approximately 6-50 metres) for nesting, often with water or open country nearby. Occasionally nests in isolated trees.
- Typical nest structures are rough and flattish, constructed of sticks and twigs lined with leaves. Nest heights range from approximately 2-36 metres.

Red Goshawk

- Prefers open forests and woodlands of tropical and temperate Australia, in particular, riverine forests, margins of rainforest, vine forest and forest edges near open country; understorey conditions vary from moderately dense to sparse.
- Favours areas with extensive vegetation mosaics and permanent freshwater.
- Requires access to lowland freshwater wetlands during winter.
- Now largely confined to extensive forest and woodland associated with ranges, escarpments and forest reserves.
- Nests are located in large trees usually along streams surrounded by forest or woodland (*Eucalyptus* spp., *Corymbia* spp., and *Angophora* spp. preferred). Typically nests are a solid flattish structure of sticks with a substantial but untidy base lined with twigs and leaves.
- Nests are usually located in tall trees (approximately 9-40 metres), often the tallest tree within a stand of tall trees, within one kilometre of permanent water.

4.0 Ecology² continued...

Diet

Wedge-tailed Eagle

- Primary prey includes mammals (macropods, bandicoots, rabbits, cats, dogs and livestock) greater than 500 grams in weight. Secondary prey includes birds (parrots, cockatoos, pigeons, crows) and arboreal marsupials greater than 100 grams in size, carrion and large reptiles.

Grey Goshawk

- Maximum prey size is 1500-2000 grams for females and approximately 460 grams for males.
- Primary prey consists of mammals (rodents, bandicoots and rabbits) and birds (mostly non-passerines or non-perching birds less than 250 grams eg. quail, parrots and pigeons). Secondary prey consists of reptiles (especially large dragon lizards), frogs, insects and occasionally carrion or freshly killed animals such as road-kill.

Brown Goshawk

- Primary prey consists of birds, including non-passerines and passerines less than 250 grams (eg. pigeons, doves, honeyeaters, flycatchers, thornbills and finches). Maximum prey size is two kilograms for females and 750 grams for males. Secondary prey consists of small mammals, reptiles, frogs, insects and occasionally carrion.

Red Goshawk

- Primary diet consists of birds up to 2.3 kilograms (most are greater than 250 grams), mostly non-passerines (eg. lorikeets, parrots and pigeons) and larger passerines (eg. honeyeaters and kookaburras). Lorikeets and large honeyeaters are favoured prey. Secondary prey includes mammals, reptiles and insects.

4.0 Ecology² continued...

Reproduction

Wedge-tailed Eagle

- Monogamous and territorial.
- Breeding season ranges from June to early March (**Table 2**).
- Breeds in extensively timbered areas that are usually remote from settlement and roads.
- Clutch size 1-3 eggs; incubation by both sexes; incubation about 45 days.
- Usually only the oldest and strongest chick survives (Morcombe 2000).

Grey Goshawk

- Monogamous and territorial.
- Breeding season ranges from August to December (**Table 2**).
- Breeds in or near larger remnants or intact areas of bushland in foothills and adjacent ranges, especially within Brisbane Forest Park (Mt Nebo, Mt Glorious) and north of a line between Mt Crosby and Chapel Hill. Some breeding may also occur in the Upper Brookfield area.
- Clutch size 2-3 eggs; incubation mainly by female.
- Chicks leave nest at 40-45 days (Morcombe 2000).

Brown Goshawk

- Monogamous and territorial.
- Breeding season ranges from July to March (**Table 2**).
- Breeds in or near larger remnants or intact areas of bushland throughout Brisbane.
- Brown goshawks have been reported to defend their nests up to 300 metres in distance (Marchant and Higgins 1993).
- Clutch size 2-4 eggs; incubation mainly by female. (Morcombe 2000).

Red Goshawk

- Monogamous and territorial.
- Breeding season ranges from July to December (**Table 2**).
- Clutch size 1-2 eggs; incubation by female with male guarding the nest while female away.
- Chicks stay in nest around 50 days (Morcombe 2000).

4.0 Ecology² continued...

Reproduction continued...

Table 2: Breeding Seasons (green shading indicates breeding months)

Species	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Wedge-tailed Eagle												
Grey Goshawk												
Brown Goshawk												
Red Goshawk												

Movement Patterns

Wedge-tailed Eagle

- Largely sedentary. Some evidence of local movements due to post-breeding dispersion and local, non-breeding season nomadism.
- Home range varies according to habitat conditions and prey availability.
- Range records vary from 28-35km² in eastern New South Wales, to 53km² in arid New South Wales, to 32-108km², but are as low as 9-18km² in some areas of arid Western Australia.
- Recorded spacings between pairs vary. In the Australian Capital Territory spacing is reported as 5-6 kilometres. In New South Wales spacing can be less than 0.8 kilometres. In Victoria spacing is reported as 2.5-4.3 kilometres (or six pairs per 64km²). In Tasmania spacing can be 2-10 kilometres (or one pair per 31km²). On the Strzelecki Track, a pair has been recorded as close as 700 metres apart.

Grey Goshawk

- Largely sedentary raptor. Some evidence of local movements during the non-breeding season, as well as altitudinal migration in winter.
- Presence in Brisbane's lowlands is now largely transitory and seasonal, primarily due to post-breeding season dispersion and unattached or wintering adults.
- In Tasmania the grey goshawk's home range is 2-3 pairs per 100km², with individual pairs concentrating their activity within patches (about 10km²) of particularly favourable habitat within the wider area.
- In north-east Queensland, a radio-tracked pair of grey goshawks ranged over 80 hectares when breeding. That pair and another male concentrated their activities within 50-587 hectares in the non-breeding season.

4.0 Ecology² continued...

Movement Patterns continued...

Brown Goshawk

- Largely sedentary. Some evidence exists of local movements due to post-breeding season dispersion, non-breeding season nomadism and possible altitudinal migration in winter.
- Reported breeding densities are 20-31 active nests per 100km² with average spacing between pairs varying between 2.3-3.4 kilometres in successive breeding seasons (Victoria).
- Reported spacings between pairs is 0.9-1.1 kilometres within NSW, at least 1.6 kilometres in Victoria, 1.5 kilometres in Tasmania and 1.5-2 kilometres for the Kimberleys, Western Australia.
- In north-east Queensland, radio-tracked birds had a home range of up to 326 hectares when breeding and 155-752 hectares in the non-breeding season.

Red Goshawk

- Largely sedentary, but engages in some movement due to post-breeding dispersion and non-breeding (winter) season movements.
- Home range is estimated to be approximately 120km² for females and approximately 200km² for males on the basis of radio-telemetry studies in the Top End.
- Recorded spacings between pairs include 11.1 kilometres and 7.3 kilometres (Cape York Peninsula), and approximately 6.5 kilometres, 7.8 kilometres and 23 kilometres (Top End).
- Within south-east Queensland, records indicate five pairs with home ranges of 50-222km² per pair. Two nests were recorded 6.5 kilometres apart.

5.0 Threats³

Habitat Loss, Fragmentation and Simplification

- Since European settlement, an estimated 67,000 hectares, or two-thirds of the original woody vegetation in Brisbane, has been cleared. This includes approximately 90% of lowland forests and more than 80% of all lowland vegetation (below 100 metres elevation). Habitat fragmentation is extensive; around 80% of the bushland remnants in the city are less than 20 hectares (BCC 2001).
- Smaller remnants of habitat typically present sub-optimal breeding habitat conditions and potentially lead to increased nesting failures, reduced recruitment rates and possible population collapse.
- Increasing fragmentation and loss of connectivity between habitat remnants may effectively reduce foraging and breeding habitat. Loss of connectivity has dispersal implications for latitudinal and altitudinal (those moving between lowland and highlands) migratory species (square-tailed kite), post-breeding dispersal and recruitment.
- Nest site disturbance by human-related activities are more likely in smaller disturbed habitats.

Fire Regimes

- Smaller habitat patches, especially in urban landscapes are more prone to inappropriate fire regimes, weed invasion and subsequent changes to structural and floristic diversity. These changes create sub-optimal breeding and foraging conditions. However, some weed species such as lantana (*Lantana camara*) often provide important structural components for both raptors and their prey.

Predation and Competition

- Competition and predation by social, adaptable species such as the Torresian crow (*Corvus orru*).
- The smaller size of remaining habitat remnants may lead to changes in prey species composition. Typically, smaller remnants support fewer species and smaller sized prey. This will favour smaller, more adaptable raptor species such as the Australian hobby (*Falco longipennis*) and collared sparrowhawk (*Accipiter cirrhocephalus*).

6.0 Conservation

Several Brisbane City Council biodiversity initiatives are contributing to the protection and management of woodland raptors and their habitat across the city. Key initiatives include:

- Bushland Acquisition Program: Through this program more than 1900 hectares of the city's most significant lowland habitats have been purchased and protected to date.
- Conservation Partnerships: More than 240 private properties have established conservation partnerships with Council, covering some 750 hectares of principally lowland habitats in significant raptor habitat areas.
- Conservation Reserve Estate: More than 12,500 hectares of parkland including 7000 hectares of bushland and wetland reserves are managed and protected. This reserve network provides habitat for Brisbane's significant species.
- Natural Assets Local Law: Under the Natural Assets Local Law 42% of the city area is now better protected from pre-emptive clearing.
- Brisbane City Council City Plan: The City Plan designates a green space system throughout the city to recognise and protect the contribution of open space areas to ecological functions. The City Plan's Biodiversity Code and supporting Ecological Assessment Guidelines provide performance criteria and acceptable solutions to protect significant biodiversity values on, or adjacent to, proposed development. The City Plan also includes statutory schedules of flora and fauna species considered significant in Brisbane recognising species significant at a city-wide or regional level.

7.0 Research

There have been few detailed studies relating to raptors in Brisbane city or south-east Queensland. Contemporary investigations relevant to Brisbane's woodland raptors include:

- a survey of red goshawks in south-east Queensland commissioned by Queensland Parks and Wildlife Service (Stewart and Hobson 2003)
- a city-wide survey of significant raptor species and associated habitat assessments undertaken by the Queensland Museum and Australian National University (Czechura and Olsen 2001)
- community-based surveys in the city's natural areas (Bayside Parklands, Anstead Bushland, Karawatha-Greenbank)
- 'Review of raptor habitat conservation significance of Fitzgibbon', a report to Environment and Parks Branch, Urban Management Division, Brisbane City Council (Czechura 2000)
- 'Comparative feeding ecology of the grey goshawk *Accipiter novaehollandiae* and brown goshawk *Accipiter fasciatus*' (Olsen PD, Debus SJS, Czechura GV and Mooney NJ 1990)
- 'Notes on the diet of the wedge-tailed eagle *Aquila audax*' (Debus SJS and Rose AB 1999).

8.0 Management Intent

Strategies

Brisbane City Council intends to contribute to the long-term conservation of significant woodland raptors in the city by:

- adopting and encouraging innovative voluntary and statutory mechanisms that protect important habitats and movement corridors
- ensuring appropriate ecological assessment, reporting and survey procedures are adopted in development, planning and management activities
- encouraging land management practices that avoid, or minimise, direct and in-direct impacts on woodland raptors and their habitats on both public and private lands
- ensuring the timely availability of accurate, adequate and contemporary information for policy, planning and management decisions and actions
- facilitating research that targets priority information gaps and contributes positively to the conservation of Brisbane's woodland raptors and their habitats
- providing the Brisbane community with appropriate information and opportunities to contribute in a practical way to better understanding and protecting Brisbane's woodland raptors.

Actions

Table 3 describes priority conservation actions that Brisbane City Council will pursue with its partners to address the stated strategies. These priority actions have been drawn from studies undertaken for Council by recognised raptor experts and from consultation with a range of stakeholders. Actions will be undertaken as funds become available through Council's budgetary process. It should be recognised that Council must consider the timing of these actions against other priorities across the whole of the city.

8.0 Management Intent continued...

Actions continued...

Table 3: Management Actions

Management Aspect	Action	Timing	Lead Agent and Key stakeholders
Habitat Protection	Conserve and protect important woodland raptor habitat on privately owned land within Brisbane, through Council acquisition of significant habitat (Bushland Acquisition Program) and conservation partnerships (Voluntary Conservation Agreements and Land for Wildlife).	Ongoing	Brisbane City Council (BCC)
Habitat Management	Undertake pilot project at Bayside Parklands to monitor and refine nest site and habitat management guidelines.	Commence 2006	BCC; Birds Australia; Universities
Information Management	Establish nest site register for monitoring woodland raptor population trends and habitat preferences.	Establish 2005	BCC
	Develop cost-effective method for monitoring the distribution and abundance of woodland raptors.	Commence 2005	BCC; Birds Australia; Queensland Parks and Wildlife Service (QPWS)
	Investigate options for monitoring impact of fuel reduction burns on raptor nesting habits.	Commence 2005	BCC; Birds Australia; SEQ Fire and Biodiversity Consortium (FABC)
Community Involvement	Support one raptor ID workshop/field day each year in Brisbane's conservation reserve network.	Commence 2005	BCC; Queensland Museum
	Support two community-based raptor surveys each year.	Ongoing	BCC; Queensland Museum; Community groups

Guidelines

The habitat protection and management guidelines detailed in **Table 4** are provided to better assist land owners, land managers, the development industry and the broader community in planning and undertaking land use activities that may otherwise potentially disturb woodland raptors or their habitat. These guidelines are preliminary and will be refined as more information about these species and their habitat requirements becomes available.

8.0 Management Intent continued...

Guidelines continued...

Table 4: Habitat Management Guidelines

Issue	Guideline	Explanatory Notes
Nest Site Disturbance	An active nest is to be protected by a 300-metre radius nest site buffer.	Nest site buffers are an established management tool designed to protect breeding birds and nest trees from unnecessary disturbance, especially during the breeding season. A nest site buffer should be maintained in, or restored to, its natural (pre-clearing) state. Where predation by introduced predators is considered a significant threat, additional exclusion measures may need to be adopted. Nest site buffers should be clearly identified on any relevant management or operational plans.
	Pre-start surveys of existing nest site buffers to be undertaken before work starts.	Before works commence within a known or suspected nest site buffer, regardless of season, the buffer and nest tree should be inspected by a suitably experienced professional. This will establish whether the nest tree is still active and whether any specific work design or scheduling considerations are needed to avoid or mitigate significant impacts.
	Works within a nest site buffer are to occur outside the breeding season (refer to Table 2).	Many woodland raptor species are highly sensitive to any disturbance within several hundred metres of an active nest site during the breeding season. Maintenance of existing infrastructure or new works should be scheduled to avoid the breeding season. Where this is not possible, works should be timed to occur after nestlings have fledged.
Fire Management	Adopt controlled burn regimes that minimise threat to raptor nests and breeding birds where possible.	Planned or unplanned fires place an active nest and breeding birds at risk. The presence of a fire and associated smoke and noise may cause adult birds to abandon eggs or chicks, or simply abandon a potential nest site. Depending upon fuel loads, weather and other factors, fire may destroy a nest tree or render the tree and surrounding vegetation unsuitable (eg. removal of protective foliage). After fire, eggs or nestlings may be at greater risk of predation from opportunistic species (eg. crows) attracted to the area by the fire event.
	Reduce fuel loads around active nest trees prior to planned burns.	To minimise the chance of a nest tree being damaged or destroyed by fire, fuel around the tree should be reduced before any planned fire. This may involve simply raking fuel away from around the tree, up to a distance equivalent to the canopy drip line.
Habitat Retention/ Recruitment	Live habitat trees and recruitment trees are to be retained for nesting purposes.	The Department of Natural Resources (1999) recommends that six live habitat trees and two recruitment trees per hectare are retained where timber harvesting and other activities are being carried out.

9.0 Further Information

Agencies

- Australian Raptor Association (www.ausraptor.org.au)
- Birds Australia (www.birdsaustralia.com.au)
- Birds Queensland (www.birdsqueensland.org.au)
- Brisbane City Council (www.brisbane.qld.gov.au)
- Department of Environment and Heritage (www.deh.gov.au)
- Environmental Protection Agency/Queensland Parks and Wildlife Service (www.epa.qld.gov.au)
- Handbook of Australian, New Zealand and Antarctic Birds (www.birdsaustralia.com.au/hanzab)
- Queensland Museum (www.qmuseum.qld.gov.au)

Bibliography

Birds Australia 2002, viewed 16/12/02, www.birdsaustralia.com.au/birds/redgoshawk.html

Brisbane City Council 2001, *Brisbane State of the Environment Report 2001*, BCC, Brisbane

Brisbane City Council 2000, *Brisbane City Plan 2000, Natural Assets Planning Scheme Policy*, vol. 2, pp. 140-144, BCC, Brisbane

Czechura GV 2000, *Review of raptor habitat conservation significance of Fitzgibbon*, Unpublished, Report to Environment and Parks Branch, Urban Management Division, Brisbane City Council

Czechura G and Olsen P 2001, *An investigation of the presence, distribution and habitat conservation requirements for selected diurnal raptor species in the Brisbane area. Stage 1: Species accounts and site assessments*, Queensland Museum, Brisbane

Department of Natural Resources 1999, *Species management profiles for square-tailed kite, red goshawk and grey goshawk*, Environmental Management, Forest Resources, DNR

Garnett ST and Crowley GM 2000, *The Action Plan for Australian birds 2000*, Environment Australia, Canberra

Marchant S and Higgins PJ (eds) 1993, *Handbook of Australian, New Zealand and Antarctic birds, Volume 2: raptors to lapwings*, Oxford University Press, Melbourne

Morcombe M 2000, *Field guide to Australian birds*, Steve Parish Publishing Pty Ltd, Queensland

Olsen P 1998, *Birds Australia conservation statement No. 2 Australia's raptors: Diurnal birds of prey and owls*, supplement to Wingspan, volume 8, no. 3, September 1998

Queensland Museum 1995, *Wildlife of Greater Brisbane*, Queensland Museum, Queensland

Queensland Museum 1998, *Wild Guide to Moreton Bay*, Queensland Museum, Queensland

Stewart D and Hobson R 2003, *Status of red goshawks in south-eastern Queensland*, Report for Queensland Parks and Wildlife Service, Moggill

9.0 Further Information continued...

Photography Acknowledgement

- ① Wedge-tailed Eagle, *Aquila audax*, www.birdphotos.com.au
- ② Grey Goshawk, *Accipiter novaehollandiae*, Queensland Museum
- ③ Brown Goshawk, *Accipiter fasciatus*, Queensland Museum
- ④ Red Goshawk, *Erythrotriorchis radiatus*, Lindsay Cupper