# The Whistler

Number 5
2011

Raptors
Pelicans
Seabirds
Jacky Winter
Cattle Egrets
Pied Currawongs
Rufous Scrub-bird
Chestnut Teal count
Blackbutt, Bolwarra & Morpeth birds

An occasional publication of the
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- ***To encourage bird observing as a leisure-time activity***

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*Front cover:* Cattle Egret *Ardea ibis* - Photo: Chris Herbert
*Back cover:* Yellow-nosed Albatross *Thalassarche chlororhynchos* - Photo: Phil Hansbro

# The *Whistler* – Editorial

The sudden disappearance of the House Sparrow *Passer domesticus* from areas of Britain in which it had previously seemed entrenched came as a shock to many residents, and it should serve as a warning to us all that even species that may seem to be abundant may soon face unexpected threats. The Regent Honeyeater *Anthochaera phrygia* used once to be abundant in south-east Australia, but it is now officially 'Critically Endangered' in NSW, the state in which it is strongest. A lack of evidence for successful breeding may be the first sign of problems. Accordingly, we commence this issue with a paper that documents the decline of the Cattle Egret *Ardea ibis* as a breeding species in the Hunter Region, not necessarily because there is cause for immediate alarm, but rather because it reminds us of the remarkable fragility of some species that we have come to regard as abundant and perhaps even as unimportant. In order to balance the picture we have also been able to include a study of a new breeding site for Cattle Egrets in the Gloucester area. Hopefully our experiences in this region will prompt wider discussion and data collection that can build up a better picture nationally of what has been happening to this species.

The fortunes of the Cattle Egret may relate in a variety of ways to those of heron and ibis species more widely, and there is a further paper that deals with the numbers of all such species recorded at Morpeth Wastewater Treatment Works. Like the paper on Cattle Egrets the paper has become possible because of the collection of many years of data, in this case involving monthly surveys.

Hopefully long-term data will eventually become available for the elusive Rufous Scrub-bird *Atrichornis rufescens*, and we are pleased to offer a preliminary study of the status of this species on the Barrington and Gloucester Tops. This area has been nominated recently as an Important Bird Area (IBA) because of the relatively high number of this vulnerable high-country species. While it is difficult at this stage to be sure of the benefits to the birds of the IBA designation, it can at least be pointed to as a sign of high conservation status. It is, therefore, most welcome that a short study of Chestnut Teal *Anas castanea* shows, perhaps somewhat surprisingly, that this species can be sufficiently numerous around the Hunter Estuary to qualify the area for IBA status. We would urge members to continue to ponder whether other species might be present at any site in sufficient numbers to merit this designation.

Our off-shore seabirds, which face a rather different set of threats from the Rufous Scrub-bird, have also lacked the desired regular monitoring because of their inaccessibility. It is pleasing that the resumption of pelagic trips has been able to contribute further data for a paper on this topic.

Many sites close to residential areas are well known as places where birds can be watched, but the keeping of regular records is necessary if their conservation value is to be understood. Two papers in the current issue examine the total bird-populations of specific sites: Blackbutt Reserve within Newcastle and the suburb of Bolwarra near Maitland. A gradual accumulation of local knowledge at these sites now permits observations to be made regarding species that are in decline or are increasing. Changes are likely to reflect wider changes in the immediate area or across the Hunter Region. Monitoring and understanding these fluctuations may assist us to initiate conservation measures for the species involved.

We are particularly pleased to offer several short notes, the majority in some way connected with birds' diets. Most of these notes concern larger species whose prey items and hunting tactics can be observed easily. The Editors would naturally encourage submission of notes on the diet and foraging techniques of smaller species, but it may require keener observation perhaps aided by photographic techniques. Smaller species, the Jacky Winter *Microeca fascinans* and the Willie Wagtail *Rhipidura leucophrys*, do feature prominently in the notes — two species which have developed a variety of tactics for repelling or avoiding potential predators. We hope the reader will benefit from reading about their behaviours here.

This is now the fifth issue of *The Whistler* to have been published, and the journal has so far been

able to be produced annually. It is our belief that these issues provide a valuable record for future bird observers and ornithologists, of contemporary, and in some cases historical distribution, abundance and behaviour of avian species in the Hunter Region. Hopefully this can provide a snapshot in time for future generations to draw on.

It is important that *The Whistler* is not simply read by bird enthusiasts and specialists, but that its information also reaches those empowered with the management of the environment. It is encouraging that knowledge contained in *The Whistler* has already been used to provide solid evidence to inform the decisions of local and state governments. This is particularly important with regard to the pressures for development upon Kooragang Island, where numerous birds and industry have so far managed to coexist uneasily. The article on Deep Pond in *The Whistler* Number **3** is central to obtaining the best possible outcomes for birds threatened by a development proposal presently under review. Furthermore, even before this issue is printed, it is anticipated that its leading article on egrets will already have been used for a submission opposing a development application.

While mindful that much has so far been achieved, we believe that there is still an enormous volume of knowledge that has potentially been generated by Hunter Bird Observers Club members as a result of their systematic studies, that yet remains undocumented. We stress that information in notebooks is not yet knowledge, and always needs to be widely shared to ensure that it lives on. Even in the Hunter Region Annual Bird Report series, which is a valuable repository of members' observations, the information remains fragmented. The seabirds paper in this volume demonstrates how it can be integrated to provide an overview of the status of a guild of birds. Similar synthesis is required for other groups and equally importantly for single species. Here is an opportunity for new authors lacking a personal database to make an important contribution to the understanding of the Hunter Region's birds. Hopefully, further systematic studies will be encouraged by the awareness that there are avenues for the publication and dissemination of their outcomes. And we would urge all those observing birds in the Hunter Region to make notes on all incidental sightings of special interest. It is surprising how often such notes can result in greater awareness of bird behaviours, whether locally or nationally. Your perceptive observations may even be the catalyst for professional research.

Mike Newman and Harold Tarrant
Joint Editors

# Breeding population decline in Cattle Egrets nesting at Seaham Swamp Nature Reserve and Hunter Wetlands Centre Australia

Max Maddock

Project Egret Watch, Hunter Wetlands Centre Australia

A long-term research study by the Hunter Wetlands Centre Australia (HWCA) Project Egret Watch investigated the number of Cattle Egret *Ardea ibis* breeding in the nesting seasons 1987/88–2010/11 at HWCA and Seaham Swamp Nature Reserve (SSNR). A general trend of major decline in numbers was identified for each colony and for the total number of nests for the two colonies combined. The combined total represents almost the entire nesting population of the species in the Hunter (the very small contribution of Toronto Wetland being excluded because of discontinuous records). No nesting was recorded at SSNR in 2008/09-2010/11. The 235 nests at HWCA in 2008/09 represented the entire population in a crash of 87% from the 1,900 pairs, which comprised the all-time peak breeding stock in 1987/88. The decline continued to 155 in 2009/10 and 158 in 2010/11**.** This is a recipe for total extinction of the Hunter nesting population and a warning that the point of no return may have been passed already. A progressive history of degradation in ecological characteristics since 1987/88, at both sites, as well as other habitats locally and along the migration routes, may have created cumulative conditions detrimental to Cattle Egret survival. Further studies are needed to investigate factors operating locally and along migration routes, in both the nesting and non-nesting seasons. Results of preliminary studies reveal declines in the numbers of both local Hunter populations leaving the district in winter. Similar declines are inferred in the number of migrating birds originating from colonies in northern NSW and southern Queensland passing through the Hunter to join them, both along the migration routes and at wintering locations in south-eastern New South Wales, Victoria, Tasmania and New Zealand.

## INTRODUCTION

Maddock and Geering (1994: 191) summarised the historical range expansion of the Cattle Egret *Ardea ibis* after its arrival in Australia, now generally recognized as self-introduction via Asia and Papua New Guinea early in the 1900s. Since the 1940s, its population rapidly increased and its range expanded from the Northern Territory and Western Australia to South Australia, Victoria, New South Wales, Tasmania and Queensland, and subsequently New Zealand**.** It began to breed in NSW in the Grafton area in the 1950s and was first recorded as a visitor in the Hunter in the 1970s. It commenced nesting at Seaham in 1978 and at Shortland in 1980.

I began research into the breeding biology and winter migration patterns of the species in 1981 when the small first colony on what is now known as the Newcastle Wetlands Reserve was abandoned and a new colony established in 1981 at what is now known as the Hunter Wetlands Centre Australia (HWCA). The research was formalised as Project Egret Watch under the auspices of the Hunter Wetlands Trust in 1984; subsequently it came under the umbrella of HWCA (after it officially came into existence in 1985) and expanded the scope of its studies to include Seaham Swamp Nature Reserve (SSNR) from 1985 onwards.

I have previously drawn attention to the ongoing decline in Cattle Egret nesting in articles published in the Wetlands Centre newsletter *The Wetlander*: 'In 2003 I observed that although the number of Cattle Egrets nesting at Seaham was about the same as in the previous season, Shortland nest numbers for all species were down, with Cattle Egrets down by 43%' (Maddock 2003). Later I drew attention to the fact that, by 2005–06, there were only 98 egret nests, 95% less than the peak in 1987/88 (26 Eastern Great Egret *Ardea modesta*, nine Intermediate Egret *Ardea intermedia*, two Little Egret *Egretta garzetta* and 61 Cattle Egret, the number of Cattle Egret nests being the lowest on record). I further stated that the 'decline is likely to be a reaction to significant degradation of the habitat on which the egrets depend locally for foraging and roosting habitat along the migration

routes during the non-breeding season.' I explained this is terms of (a) wetlands being under threat from development and prolonged drought, and (b) the disappearance of pastures along the migration routes of the Cattle Egret associated with urban development. I noted that Cattle Egret nest numbers at Seaham had also decreased, from 700 nests in 1991/92 to 306 (a 44% decline) in 2005/06 (Maddock 2006).

The most recent detailed historical reports on the status of egret nesting and other colonial waterbirds at both HWCA and Seaham are provided by Maddock (2008a, 2009a, 2009b). The reports identified serious long-term decline in the nesting populations of all four egret species (Great, Intermediate, Little and Cattle Egrets).

Maddock (2000: 131, 134, 135) had highlighted the decline of the Great, Intermediate and Little Egrets, calling for them to be at least classified as vulnerable under threatened species legislation. Moves have been initiated, under the umbrella of the Ramsar Managers Network in NSW, to nominate them as Endangered or Critically Endangered. Because Cattle Egret numbers had been consistently higher than for the other species and the degree of decline at that time had not been considered as catastrophic, the need to also protect this species was overlooked. Results in the 2007/08 to 2010/11 seasons have raised a sharp warning concerning the future viability of the species, which now appears equally threatened.

The NSW Bird Atlassers column graph of the Cattle Egret Annual Reporting Rate 1997-2006 (R.M. Cooper & B.R. Curtis, NSW Bird Atlas, pers. comm.) shows a very similar profile of a steep rise from 1977 to 1987 and then a steady decline to very low rates in 2006, a similar profile to **Figures 2** and **3**, suggesting that the species may be in trouble state wide.

This paper provides updates on the status of Cattle Egrets nesting at Seaham and HWCA for the 2007/08 to the 2010/11 seasons and reviews changes that have taken place up to the 2008/09 nesting season in the combined breeding population of Cattle Egrets at HWCA and Seaham after the initial period of expansion from the 1981/82 season to 1987/88. The HWCA population had increased from 108 to 1,393 in that time. No records were available for the period between first nesting at the Seaham colony in 1978 until the 1984/85 season when 150 nests were counted. The numbers continued to rise to 507 in the 1987/88 season and ultimately reached a peak of 700 in 1991/92 (Maddock 2008a: Appendix 2, Table 1). This report recognizes the need to consider that the two colonies are part of a much wider ecosystem and they should be considered as an integrated entity rather than as separate local sites existing in isolation.

The majority of Hunter Cattle Egrets migrate out of the local area after nesting and are joined by birds originating from nesting colonies in north coastal NSW and southern Queensland, which winter in south-eastern NSW, Victoria, Tasmania and New Zealand. This paper further presents a preliminary exploration of, and a case for future study into, negative ecological impacts arising from loss and degradation of night-roosting and foraging habitat along migration routes and at wintering locations.

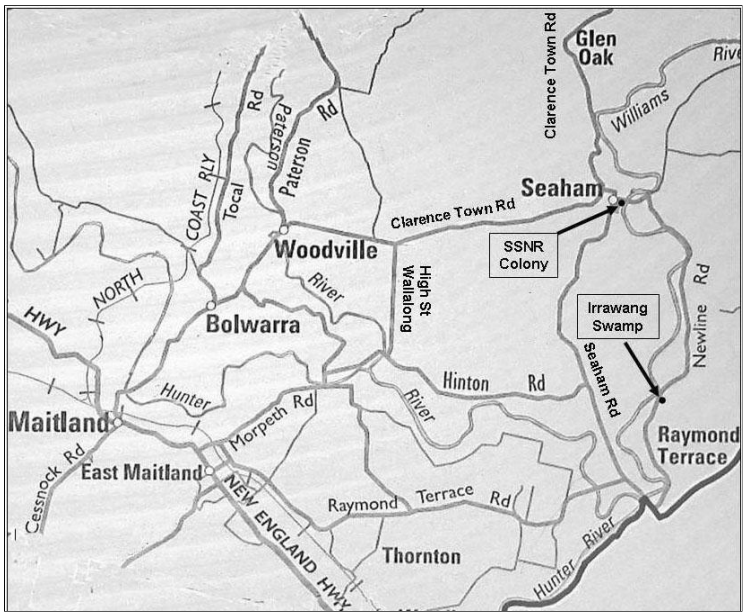


**Figure 1.** Map of the Maitland–Raymond Terrace–Seaham area traditionally used by Cattle Egrets for foraging and night roosting since the 1980s. The following areas have been subject to continuous study by Project Egret Watch in the period 1987 – 2009: Newline Road from Raymond Terrace to Seaham; High Street, Wallalong – Hinton Road from Morpeth Road to Seaham Road; Seaham Road from Seaham to Raymond Terrace; the SSNR colony and night roost at Seaham; and the night roost at Irrawang Swamp.

## METHODS

The status of the breeding population has been monitored by regular nest counts for each species taken in late November or early December at a time when nest owners are easily identified, because at least one parent bird is on duty. These counts have been recorded annually in 24 of the 28 years the HWCA colony has been active and in 24 of the 25 years since the study began at Seaham.

The discussion also draws on observations made during surveys conducted at Cattle Egret night roosts and locations where Cattle Egrets forage in the general vicinity of SSNR at locations shown in **Figure 1**.

## RESULTS

The long-term trends in the number of Cattle Egret breeding at SSNR and HWCA presented in **Figures 2** and **3** are derived from the data in Maddock (2008a: Appendix 2, Table 1) and Maddock (2009: Appendix 1, Table). The starting point was chosen as 1984/85 to show the last stages of the original expansion in nesting population of the species.

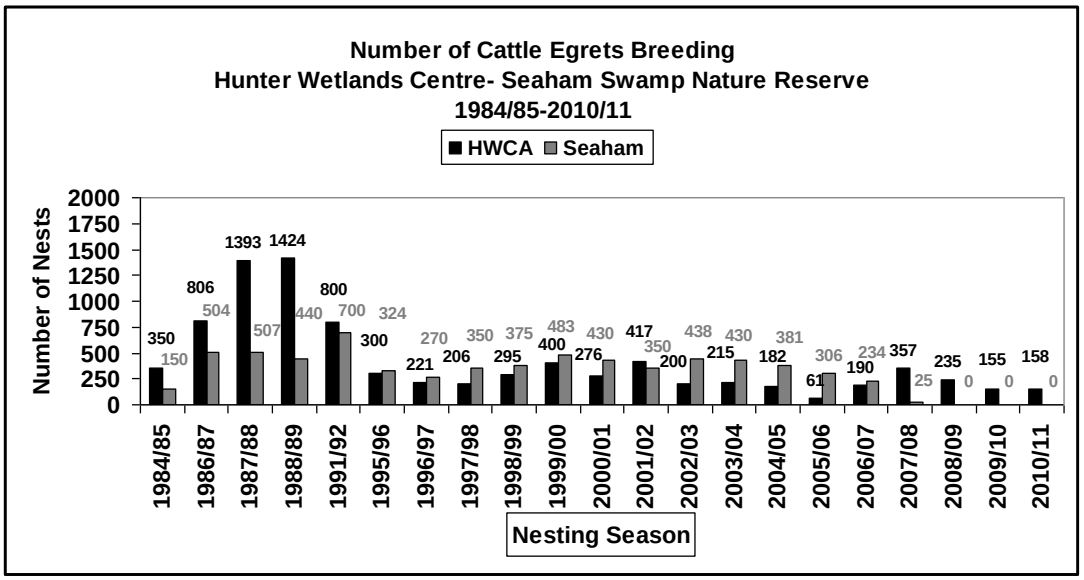


**Figure 2.** The history of decline in Cattle Egret nesting numbers at the HWCA and SSNR colonies 1984/85 – 2010/11 also showing the reversal of relative importance of the two colonies over time.

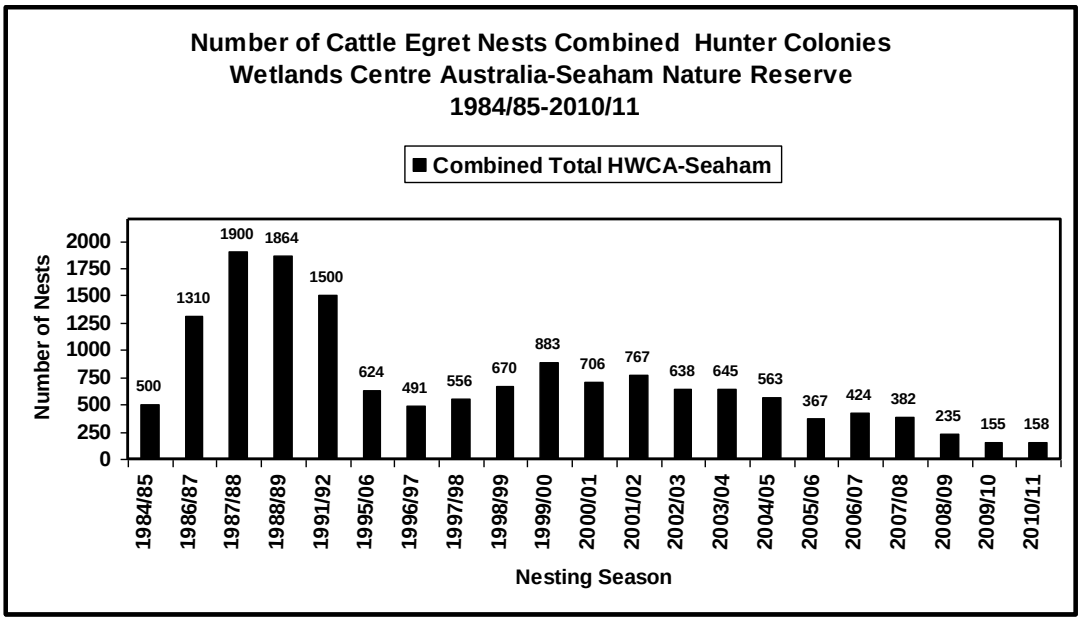


**Figure 3.** Decline in the combined population of nesting Cattle Egrets breeding at HWCA and SSNR colonies 1984/85 – 2010/11.

## Seaham Swamp Nature Reserve: 2006/07–2008/09 Seasons

In 2006/07, only 284 nests were located at Seaham, the lowest number since 1986/87 and the Warren Street trees, which had been the mainstay of nesting pairs since 1985, remained empty for the whole season (Maddock 2007: 3). During the following nesting season 2007/2008, on 12 November 2007 only 46 Cattle Egret nests had been established but by 10 December only 25 had survived. By the end of January 2008 all nest activity had ceased – the earliest termination in the history of the colony (Maddock 2008a: Appendix 1, p. 3).

Maddock (2009b: 3–4) reported the following events for the 2008/09 nesting season:

- From the beginning of September 2008 until mid January 2009 no Cattle Egret nests were found at Seaham. Three Cattle Egret individuals were recorded loafing on the south-eastern shore on 11 November and 39 were in a dead tree at 1640hr on 8 January. Some of the birds were in dull breeding colour.

- When it became evident that nesting would be unlikely, searches were carried out for Cattle Egrets foraging in the areas in the surrounding Nelsons Plains, Hinton, Wallalong, Seaham, Glen Oak and Newline Road, historically used by large flocks feeding with grazing stock during the nesting seasons, as well as in non-breeding seasons. Most of the searches found no Cattle Egrets. Of the 30 positive records, 11 were of single birds, 11 were flocks of 2–5, 5 flocks were 6–10 and 3 flocks were greater than 10.

- 67 Cattle Egrets loafing in trees at the south-eastern corner of Seaham Swamp were recorded on 12 January 2009 at 0950hr. Some wore bright–coloured breeding plumes, suggesting the potential for nesting.

- Later in the day at 1220hr, most of the loafing birds had vacated the trees, but some were still loafing on the southern shore. A flock of 20 was located south on Newline Road at Eagleton and further south at Irrawang Swamp, 10 were feeding with cattle. Neither had been present at the sites earlier in the morning. It was assumed that they were from the group that had been recorded loafing at Seaham Swamp earlier in the morning.

- Two days later, between 1750 and 1800hr on 14 January, no Cattle Egrets were located along Newline Road, none were present at the Seaham colony site and no nests were located.

- During evening counts between 1700 and 1900hr at the ibis night roost at Irrawang Swamp, on Newline Road south of the SSNR colony, on 21 November, 3 and 12 December 2008, and 8 January 2009, flocks of Cattle Egrets were noted flying down the Williams River Valley, originating from unknown locations well north of Irrawang Swamp, and heading south to beyond Raymond Terrace. In past nesting seasons, all evening Cattle Egret movements along Newline Road had been south to north as parent birds returned to the SSNR colony from foraging grounds south of the colony.

- In past years, nesting had usually commenced in October, although a small number of tagged first-year birds were occasionally recorded arriving back and commencing nesting as late as early December. Nesting usually ceased and the colony was vacated by late February–early March. Subsequent to the end of the season, the swamp was regularly used as a night roost by Seaham fledglings and adults that had not yet departed on the annual migration. Birds migrating southwards from breeding colonies in Queensland and northern NSW arrived and largely replaced local birds as they too departed on their migration.

- Subsequent continuous regular monitoring confirmed the initial statement (Maddock 2009a) that no nesting had taken place at Seaham for 2008/09. The first resumption of night roosting was identified by the presence of 68 Cattle Egrets in the traditional roost trees on the night of 23 April 2009 (Maddock 2009b).

- After April, regular monitoring of the night-roosting population at Seaham was maintained without finding any evidence of late nesting, confirming that nesting had failed.

## Hunter Wetlands Centre Australia Colony at Shortland Reserve: 2006/07–2008/09 Seasons

In 2006/07, 190 pairs of Cattle Egret nested at HWCA, an increase of 129 on the previous season, compared with the decrease at Seaham referred to above (Maddock 2007). Inspection of **Figure 2** shows that this was the first season that Shortland had more nests than Seaham since 1991/92. In 2008/09 255 Cattle Egrets nests were recorded at HWCA, a decrease of 122 from the previous season (Maddock 2009b: 4).

## DISCUSSION

Both the HWCA and SSNR colonies have supported significant populations of nesting Cattle Egrets since the colony at HWCA became established in 1981. However, in addition to their separate contributions, it is important to consider their combined contributions to a total Lower Hunter population, as the combined total represents almost the entire breeding population in the Hunter. The contributions of the small Toronto Wetland colony have not been included in this paper as the records are not continuous and represent only a very small proportion of the total population (Maddock 2008a: Appendix 2, Table 2, p. 5). However, it should be noted that a similar pattern of decline is evident. The 5 records available for the period 1987/88–2000/01 ranged from 14–40 nests, the 40 being recorded for 2000/01. In the 5 records 2002/03–2007/08, the range was 3–10, the 10 recorded in both 2005/06 and 2007/08.

In 1987/88, the peak year with a total of 1,900 Cattle Egret nests, HWCA contributed 1,393 and Seaham 507 nests. In 1988/89 HWCA increased again to 1,424 nests but Seaham fell to 440 resulting in a small drop in the combined total to 1,864. However Seaham recovered with 542 in 1989/90 and 700 in 1991/92, but HWCA had already started what became a downward trend, falling to 800 nests in 1991/92 and then 300 in 1995/96. After achieving its all-time peak of 700 nests in 1991/92, SSNR also embarked on a similar scale of decline, with numbers falling to 322 in 1994/95 (Maddock 2008a).

Despite fluctuations, a declining trend has prevailed for both colonies, with HWCA providing significantly smaller numbers of nesting pairs than SSNR until 2007/08 (**Figure 2**). The trend is mirrored in the combined colony number of nests (**Figure 3**) with the lowest nest count on record for the 2008/09 season involving a fall of 1,665 nests, which is 87% lower than the peak in 1987/88. After a very minor peak of 357 nests in 2007/08 HWCA resumed the slide to 155 in 2009/10 and recorded only 158 in 2010/11, while SSNR failed to make any contribution with zero nesting for the three seasons 2009/10-2010/11.

In the early stages of the historical expansion of the range and nesting populations of the Cattle Egret, the HWCA colony held precedence over SSNR in numbers of nests. It is interesting to note that SSNR became dominant in 1995/96 (**Figure 2**) and remained that way until the situation reversed again in 2007/08, with HWCA regaining ascendancy for the first season since 1991/92.

Ecological processes are highly complex and interactive, making it difficult to pin down underlying causes. The progressive decline in nesting at both colonies has been taking place at the same time as negative changes to ecological characteristics of the sites, with both colonies suffering similar degrees of habitat degradation. Habitat has deteriorated or been destroyed in the surrounding region and along migration routes. It is likely that both sets of degradation processes have produced interactive cumulative negative impacts contributing to the decline in the nesting population. Follow-up studies are needed to try to identify links between these ecological factors. Preliminary results from the beginnings of such a study ring warning bells.

At the breeding colonies there has been damage to nest trees, major detrimental changes in hydrology and nutrient levels, toxic algal blooms and loss of important native surface vegetation and invasion of noxious aquatic weeds (Water Hyacinth *Eichhornia crassipes* at SSNR and Alligator Weed *Alternanthera philoxeroides* at HWCA) requiring spraying with consequent negative impacts on other aquatic life. These impacts have been dealt with in some detail, accompanied by photographic records, in Maddock (2008a, 2008b).

Evidence of changes with consequent negative impacts on the habitat along the migration routes has been emerging since at least 1995 and work is currently in progress on a study of the situation along the traditional migration routes. This is still incomplete and is too large a topic to deal with here. However, a few examples illustrate the kinds of impacts found to date and foreshadow the need for more extensive investigations.

Geering and Maddock (1995: 9) reported that fewer Cattle Egrets had passed through the Shoalhaven area that year (an important staging area not only for SSNR and HWCA adults and offspring but also for egrets from Queensland and northern NSW) and that a grazing land feeding area had been "greatly modified". Maddock (1998: 4) reported that Cattle Egret habitat at Werribee, an important wintering site used in Victoria at that time by Hunter, north coastal NSW and south-eastern Queensland birds, was rapidly disappearing: "no birds, not even starlings have returned". The area was also being badly affected by El Nino drought.

Current work in progress on the issue of problems along migration routes is already producing evidence of decline in numbers of Cattle Egrets and negative changes to habitat. Night-roosting sites for wintering birds in the Hunter have also suffered ecological degradation and have been abandoned or are being used by fewer Cattle Egrets than in the past. Historically favoured foraging areas at High Street, Wallalong to Hinton Road, and Clarence Town Road to Newline Road (**Figure 1**) where long-term data is available, have progressively been used by fewer birds since the 1980s (Maddock unpublished data).

In the 1990s, Jesmond and Wallsend Parks and grassy areas on road margins and in small pockets from the Blue Gum Road–Newcastle Road junction at Jesmond to the Thomas Street Link Road roundabout was favoured regular winter foraging habitat for flocks of 30 or more Cattle Egrets, which also used the Newcastle Wetlands Reserve for night roosting. Birds tagged by Project Egret Watch at Shortland and at the Clarence Valley colonies were regularly identified in the flocks (Project Egret Watch records). Road works and vastly increased traffic have since destroyed the suitability of the habitat, the night roost has become severely degraded, and the area has been abandoned by the birds.

There have been major changes to habitat and decline in Cattle Egret usage in the Wyong area, once a favoured wintering location for winter migrants originating from SSNR, HWCA and the north coast colonies in the Clarence area (D. Rogers pers. comm.). Information to hand from parts of NSW and from Tasmania and New Zealand, at the limits of the migration routes, also provides examples of declining bird numbers and habitat changes resulting in negative impacts.

The Maddock and Geering (1994: 194) study involving marked birds found that 64% of the birds originating from the Hunter nesting colonies (including both adults and offspring) undertake southerly migration. In 1988/89 this would have involved well over 2000 individual adults, as well as about the same number of fledglings migrating southwards. The numbers would have declined progressively since. Assuming that the same percentage still holds true today, the migrating number for the 2008/09 season would have been only 500–600 adults and fledglings. Project Egret Watch recoveries show that many birds die during migration, hence fewer birds would return to nest than had originally embarked. It is feasible that substantial cumulative negative changes to roosting and foraging habitat on the migration routes over time could increase the numbers lost. Follow-up investigation of the long-term data along the lines of the McKilligan (2001) 20-year study of the Cattle Egret population dynamics in south-east Queensland is needed to determine whether density-dependent and density-independent factors could have been at work to regulate or control the Hunter nesting population.

## CONCLUSIONS

The continuous trend of decline in the numbers of Cattle Egrets nesting at HWCA and SSNR, discussed previously in a number of reports and articles, plummeted critically to a lowest level on record in the period 2007/08–2010/11. For the first time in the recorded history of the colonies, no Cattle Egret nesting occurred at SSNR in the 2008/09-2010/11 seasons and only very small numbers and low frequency of occurrence of foraging egrets had been recorded in the historically high-density daylight foraging catchment areas surrounding the nesting colony. Evening movements of a few foraging birds in the area, traditionally directed towards the SSNR breeding colony, were in the opposite direction travelling south towards Raymond Terrace. The long history of steady degradation of the ecological characteristics of the two colony sites and the other Hunter Region wetlands, combined with loss and degradation of foraging and night-roosting habitat locally and along the migration routes, are the most likely factors contributing to the decimation of breeding population. Further research into the issues involved is needed to clarify this conclusion.

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# A new Cattle Egret breeding colony at Gloucester, NSW

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Cattle Egrets *Ardea ibis* successfully established a new breeding colony during the first half of 2011 at Gloucester in the Hunter Region of NSW. Around 130 active nests appeared to be involved based on the observation of 300 advanced chicks out of the nest. The breeding event, spanning the months January to April, was unusually late for eastern Australia.

## INTRODUCTION

On the 4 February 2011 when checking Cattle Egret *Ardea ibis* flocks in the Gloucester area for Project Egret Watch, which is coordinated by Max Maddock, I was surprised to find a large flock nesting opposite the Gloucester Golf Club on Bucketts Way south (32°01'52"S 151°57'10"E), in a small cluster of willow trees overhanging a drainage dam at the back of the industrial estate. This dam is usually half empty, but owing to recent heavy rain was well filled.

This is the first time since I moved to Gloucester in 2002 that I have found Cattle Egret nesting in the area and they appeared to have been at this site for over a month as a few very young chicks were present. They are a common bird locally foraging in the Avon, Gloucester and Barrington River valleys, and have been observed roosting locally with nesting Little Pied Cormorants *Microcarbo melanoleucos* and Australasian Darters *Anhinga novaehollandiae*.

As it was midday with the temperature hitting 35° Celsius I returned early next morning to make a proper count, and continued observations over the next two months. Temperatures in early 2011 were hot, frequently reaching the high 30s midday, with torrential rain and local flooding mid February.

## METHODS

Periodic visits were made to the colony to monitor breeding success from the time it was found in February 2011 until August when the birds had dispersed from the breeding site. There was a break in the continuity of observations in the second half of February due to my absence.

Records were also kept of all flocks of Cattle Egret foraging in the Gloucester area to monitor foraging in the vicinity of the breeding colony.

## FIELD OBSERVATIONS

**5 February 2011, 0545-0635 hours**
130+ birds were present, mostly in full breeding plumage. This was a rough count as the egrets were very nervous, flying off at my approach. 35 nests were counted with sitting birds. Three chicks were in view, one well developed and two just showing heads above the nest. Some nests looked old and bedraggled. Adults started flying from the site at 0615 with about 40 flying north and 25 south-east.

**9 February 2011, 1400 hours**
I returned to attempt a better count. At least 50 active nests with some not occupied. 130-150 adults present. As before the birds were very nervous at my approach.

**7 March 2011, 1605 hours**
Many nests contained young chicks, with well-developed chicks perched nearby – clutches of 1, 2 or 3 chicks per nest were noted and older ones had formed groups out of nest. One dead chick was hanging by its neck from a branch, however no dead birds were noted floating in water under the willows. All the egrets were very agitated. Five Little Black Cormorants *Phalacrocorax sulcirostris* were perched low in willows.

**24 March 2011, 1510-1530 hours**
Over 300 chicks were counted out of nest with a few chicks remaining in nests. 20 adults were also present. The birds were very easily disturbed, many exercising vigorously with much wing flapping.

**28 March 2011, 0830-0840 hours**
Most chicks were perched away from nests, but two nests still contained very small chicks and few adults retained the characteristic orange-headed breeding plumage. Juveniles were exercising with some flying on my arrival to tops of nearby tall gum trees.

**8 April 2011, 1045 hours**
Many juveniles flying well. Few adults present. One Royal Spoonbill *Platalea flavipes* was roosting amongst the egrets.

**17 April 2011, 0730 hours**
Eighty-two juvenile birds were present with 2 adults; conditions involved drizzling rain, but no wind.

Subsequently the Avon and Gloucester valleys were searched for foraging birds between 0800 and 1000 hours and 450 Cattle Egrets were located:

100+ adults opposite Sale Yards in small dam with willows;
132 Avon Valley with dairy cows;
45 Showground Road;
60 Thunderbolts Way;
38 Bucketts Road;
15 Faulkland Road;
60 Wellards Lane.

**19 April 2011, 1250 hours**
Seventy-five juveniles remained at the breeding site, but no adults were present.

**22 April 2011, 1145-1150 hours**
Thirty-three juveniles remained at the breeding site, but again no adults were present. Twelve Australian White Ibis *Threskiornis molucca*, two of which were picking up sticks and inserting them in old egret nests.

**29 April 2011, 1440 hours**
Six juveniles remained at the breeding site, one with yellow, five with grey bills. In addition one Pacific Black Duck *Anas superciliosa* and a Dusky Moorhen *Gallinula tenebrosa* were present.

**11 May 2011, late afternoon**
No Cattle Egret at the breeding colony site. 332 were counted during a search of Gloucester/Avon valleys. I later learned that large flocks were foraging in the Barrington River valley.

No Cattle Egrets have been seen at the breeding site during irregular visits from May to August, and numbers in foraging flocks have declined throughout the area.

## DISCUSSION

In eastern Australia the Cattle Egret's nesting season typically spans five months, from October to March and most successful nests fledge two or three young (McKilligan 2005). As the incubation period is about 24 days, my observations suggest eggs were laid about the beginning of January with some juveniles remaining at the colony until the end of April. Thus breeding appears unusually late for eastern Australia.

The 300+ chicks observed out of the nest on 24 March suggest around 130 nests were involved, assuming about 2.3 chicks/nest (Max Maddock pers. comm.) This higher estimate of the colony size is considered more reliable than the 50 active nests estimated on 9 February, when care was taken not to disturb the nesting birds, presumably resulting in a low count of the nests.

It is extremely pleasing to report the establishment of a successful new Cattle Egret breeding colony at Gloucester at a time when the breeding colonies in the lower Hunter have been declining (Maddock 2011).

## ACKNOWLEDGEMENTS

I wish to thank Max Maddock and Mike Newman for their help in the preparation of this paper.

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# A ten-year study of herons, spoonbills and ibis at the Morpeth Wastewater Treatment Works near Maitland, NSW

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The Morpeth Wastewater Treatment Works (MWTW) and adjacent ephemeral wetlands near Maitland in NSW provide valuable habitat for waterbirds. During a ten-year study between 2001 and 2010, involving monthly surveys, six heron, three ibis and two spoonbill species were recorded. A decommissioned holding pond and pasture adjacent to the MWTW site provided foraging habitat when flooded. Waterbird species diversity and abundance decreased when these areas intermittently dried out. White-faced Heron *Egretta novaehollandiae* and Cattle Egret *Ardea ibis*, the two most frequently recorded species, were less dependent on shallow water for foraging.

There was considerable variation between species in the monthly and annual occurrence of the waterbirds. This was associated with differences in the foraging styles of the species, as well as the conditions at MWTW. Some species breed locally, while others use the MWTW and the Hunter Region as non-breeding habitat and as a drought refuge when conditions are unsuitable inland. Waterbird numbers and diversity increased during a period of prolonged drought before falling to minimum level in 2010, a La Nina year with exceptionally high rainfall in inland areas.

## INTRODUCTION

Morpeth Wastewater Treatment Works (MWTW) owned by the Hunter Water Corporation (HWC) (32°44'31"S, 151°37'24"E) is located about 10 km north-east of Maitland in NSW and covers an area of 72 ha. The original plant, decommissioned in 2000, was a biological filtration works constructed in 1936.

It was recognised that the maturation pond system associated with the original MWTW constitutes an important wetland habitat of local, regional and state significance. As a condition of the Minister's Approval for decommissioning the plant, HWC was required to manage the ponds so as "to provide enhancement of wetland and riparian habitats and encourage their use by indigenous and migratory species." (Anon. 2000).

The MWTW site (**Figure 1**) is comprised of four ponds where water is permanently present (A), a sludge pond which occasionally dries out (B) and a larger ephemeral wetland, which although bunded, is subject to a wetting and drying regime (C). On the southern and western sides of MWTW, privately owned ephemeral wetlands are immediately adjacent (D). The southern wetland on occasions receives top-up water from the permanent ponds (A). To the east is an ephemeral wetland, again privately owned, which is wet only after heavy rain. This wetland was modified in 2008, and a channel on the southern side now exists which often contains water (E).

HWC invited Hunter Bird Observers Club (HBOC) to take part in developing the management plan and as a result, members commenced monthly surveys of the avian population in February 2001. Ten years of surveys have been completed. This paper deals only with the heron, spoonbill and ibis species. A previous paper (Lindsey & Newman 2002) reported the results of surveys in 2001, the first year of the study, and a recent paper discusses the occurrence of shorebirds during the ten-year period 2001 to 2010 (Newman & Lindsey 2011).

As will be discussed in this paper the importance of MWTW to heron, spoonbill and ibis species, collectively termed waterbirds, varies between species. Some species breed locally, but not at MWTW, one species uses the area as a night roost, others pass through on migration and many breed inland, with MWTW serving as non-breeding habitat and as a drought refuge.

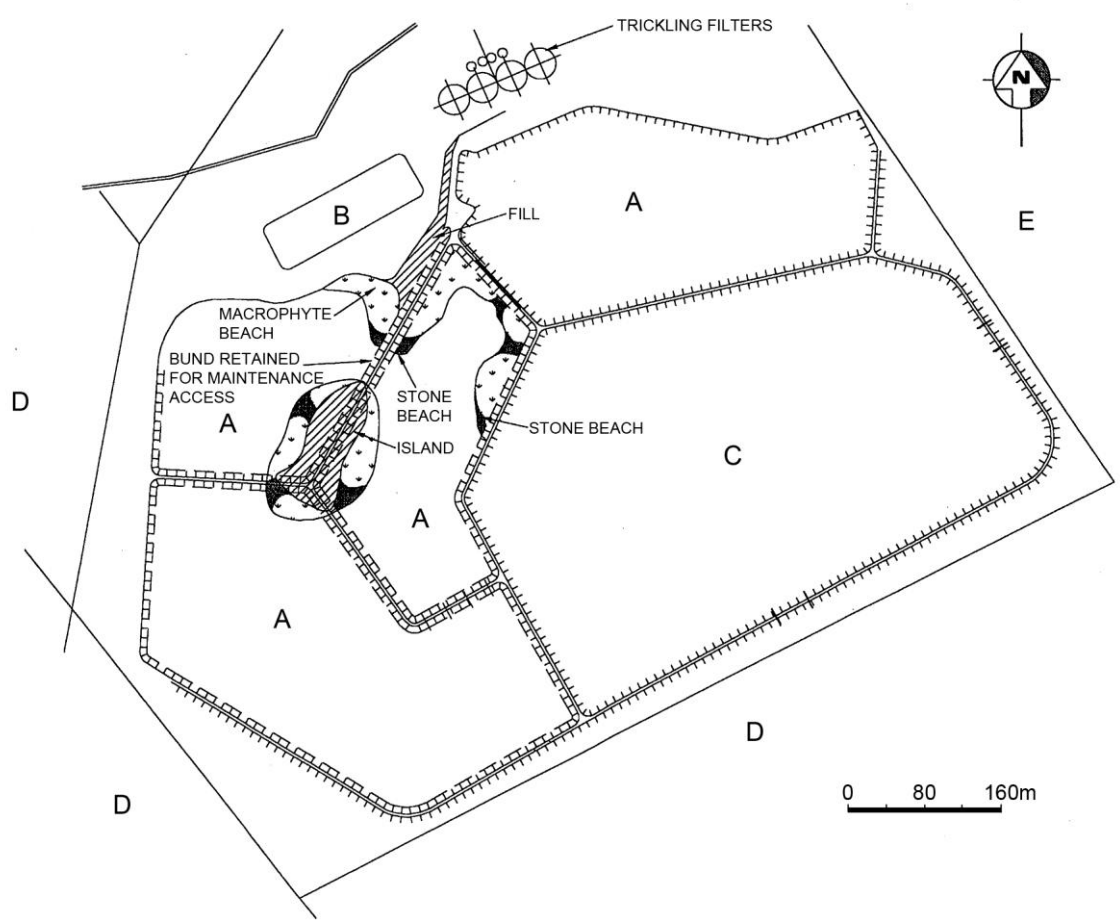


**Figure 1.** Morpeth Wastewater Treatment Works.
(A - Ponds with permanent water; B - Sludge pond which occasionally dries out; C - Ephemeral wetland in bunded area which intermittently floods; D & E - Privately owned ephemeral wetlands.)

## METHODS

Surveys were conducted monthly commencing in February 2001. **Figure 1** provides details of the features of the area. Over a ten-year period 120 surveys were completed including two in November 2001, the second of which was carried out immediately after heavy rain, which caused flooding on area D. As will be discussed, areas B, C and D are important waterbird habitat. These are often flooded during the winter months and dry out in spring creating water meadow conditions and, during the drying-out period, muddy edges. These conditions provide ideal foraging habitat for waterbirds.

Surveys typically took three hours and involved two observers following a route around the maturation ponds, commencing between one and two hours after sunrise. All species within observable distance at all of the areas shown in **Figure 1**, including birds flying over the area, were observed using binoculars and a telescope and recorded. On occasions the flooded areas extended beyond observable distance and birds in these areas were not counted.

To minimise the risk of double counting, birds that moved between the different areas were noted and an estimate was made of the total number of the more numerous species in the MWTW area. These numbers were used as a check against the sum of the numbers of individual species counted in the separate areas.

Because there were large fluctuations in both the seasonal and annual occurrence and abundance of different species, it was difficult to identify and compare the trends. Variations in the timing of periods of both peak and abnormally low occurrence are important to understanding the fluctuations of waterbirds frequenting MWTW. Periods of high and low occurrence were defined by numbers of a species exceeding the mean numbers by 100% or being 50% or

less than the mean respectively. In the following analysis seasonal and annual trends were evaluated as variations in mean monthly (i.e. comparing monthly occurrence over ten years) and mean annual occurrence (i.e. comparing annual occurrence over ten years). Reporting rates (RR%) were used to summarise variations in the frequency of the presence of individual species. However, variations in the abundance of birds are more informative for species which are regularly present. Species abundance was calculated as mean numbers of species/survey for those surveys when the species was present (i.e. in calculating mean numbers surveys were ignored when no birds were present). For November 2001 the mean of the two surveys conducted in that month was used for the evaluation of the monthly and annual trends. The same species of waterbird were present during both the November surveys.

## RESULTS

During the surveys 13 waterbird species were recorded, including eight heron, three ibis and two spoonbill species. The results are summarised in **Table 1** which shows the RR, the mean numbers recorded/survey and the maximum number observed. Monthly count statistics are contained in the Hunter Region Annual Bird Report Series (Stuart 2001 to 2010).

### Abundance and Reporting Rates

Only two species were regularly present, the White-faced Heron *Egretta novaehollandiae* and Cattle Egret *Ardea ibis* with RRs of 95.8 and 90.8% respectively. They were, other than two species of ibis, the most numerous species frequenting MWTW, with mean numbers of 40.6 and 10.5 respectively.

Five species, Eastern Great Egret *Ardea modesta*, Straw-necked Ibis *Threskiornis spinicollis*, Australian White Ibis *Threskiornis molucca*, Intermediate Egret *Ardea intermedia* and Royal Spoonbill *Platalea regia* occurred frequently, with RRs in the range 50 to 80%. When present, the Straw-necked Ibis was the most numerous species with a mean flock size of 63.8 and a peak count of 620. The less numerous species tended to have lower RRs. The Eastern Great Egret was an exception, which while usually present as five or less birds, had a high RR (75.6%) and was occasionally quite numerous with a peak count of 38.

Four species, the White-necked Heron *Ardea pacifica*, Little Egret *Egretta garzetta*, Yellow-billed Spoonbill *Platalea flavipes* and Glossy Ibis *Plegadis falcinellus* were irregular visitors, with RRs in the range of 5 to 25%. With the exception of the Glossy Ibis (maximum count 23), they were always recorded in small numbers.

Two species, the Nankeen Night-Heron *Nycticorax caledonicus* and Australasian Bittern *Botaurus poiciloptilus*, were reported on a single occasion. However, while apparently vagrants to MWTW, both predominantly feed at night and are skulking, secretive species which may be under reported.

### Monthly Variations

At MWTW the waterbirds primarily feed in shallow water, water meadow and pasture. Consequently, the deep water of the main MWTW ponds is of little importance to these species, which were mainly observed in the decommissioned pond C and the surrounding ephemeral wetlands D and E (**Figure 1**). These areas vary from the extreme conditions of flooded to dry. Hence, it is not surprising that the diversity and numbers of waterbirds varied considerably between surveys. However, it was also found that there were considerable differences in the timing of periods when numbers peaked, or species were absent, or scarce as summarised in **Table 2**. More detailed information on the monthly variations in waterbird numbers and reporting rates is contained in the **Appendix**, **Tables A1** and **A2**.

As indicated by **Table 2**, the fluctuations in abundance of the White-faced Heron, the most frequently observed species (RR 95.8%), were less extreme than most of the other waterbird species. However, White-faced Herons were less numerous between July and November (range 3.8 to 7.4 birds/survey) than from December to June (range 12.3 to 17.4 birds/survey). This difference was statistically significant ($U=0$; $P<0.05$, Mann-Whitney U-test). In contrast, numbers of the Cattle Egret, the other very frequently observed species, peaked between February and April and were low between June and January. Eastern Great and Intermediate Egrets also had peak numbers in March and low numbers between June and September, particularly in July. The monthly trends for the above four species are compared in **Figure 2**. Little Egret numbers appeared to show yet another trend, tending to be higher in September and lower in December and January, but this species was not present sufficiently

**Table 1**. Summary of waterbird occurrence at MWTW 2001 – 2010.

| Species | Scientific Name | Reporting Rate (%) | Mean Number When Present | Maximum Number |
|---|---|---|---|---|
| Australasian Bittern | *Botaurus poiciloptilus* | 0.8 | | 1 |
| White-necked Heron | *Ardea pacifica* | 24.4 | 3.2 | 11 |
| Eastern Great Egret | *Ardea modesta* | 75.6 | 4.2 | 38 |
| Intermediate Egret | *Ardea intermedia* | 52.1 | 7.5 | 25 |
| Cattle Egret | *Ardea ibis* | 90.8 | 40.6 | 378 |
| White-faced Heron | *Egretta novaehollandiae* | 95.8 | 10.5 | 56 |
| Little Egret | *Egretta garzetta* | 19.3 | 2.0 | 6 |
| Nankeen Night-Heron | *Nycticorax caledonicus* | 0.8 | | 2 |
| Glossy Ibis | *Plegadis falcinellus* | 8.4 | 6.2 | 23 |
| Australian White Ibis | *Threskiornis molucca* | 62.2 | 12.7 | 107 |
| Straw-necked Ibis | *Threskiornis spinicollis* | 66.4 | 63.8 | 620 |
| Royal Spoonbill | *Platalea regia* | 51.3 | 3.4 | 31 |
| Yellow-billed Spoonbill | *Platalea flavipes* | 12.6 | 2 | 5 |

**Table 2.** Monthly variations in waterbird numbers at MWTW between 2001 and 2010.

| Species | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| White-necked Heron | Low[1] | Low | Low | | | | Low | | | | High[2] | Low |
| Eastern Great Egret | | | High | | | Low | Low | | Low | | | |
| Intermediate Egret | | | High | | | | Low | | | Low | | |
| Cattle Egret | Low | High | High | High | | Low | Low | Low | Low | Low | Low | Low |
| White-faced Heron | | | | | | | | Low | | | | |
| Little Egret | Low | | | | | | | | High | | | Low |
| Glossy Ibis | High | | | | | | | | | | | High |
| Australian White Ibis | | | High | | | | | Low | | | | |
| Straw-necked Ibis | Low | | | | | | | | High | Low | Low | Low |
| Royal Spoonbill | | | | | | Low | Low | | Low | | High | |

[1] Months in which mean numbers were abnormally low, being equal to or less than 50% of the mean for all months.
[2] Months in which mean numbers were abnormally high, being equal to or more than double the mean for all months.

**Table 3.** Years in which either abnormally high or low numbers were experienced.

| Species | 2001 | 2002 | 2003 | 2004 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| White-necked Heron | Low[1] | | High[2] | Low | Low | | | High | | Low | Low |
| Eastern Great Egret | Low | Low | | | | | | | High | Low | Low |
| Intermediate Egret | | | Low | | | | | Low | | High | Low |
| Cattle Egret | Low | | | | | | | | | | |
| White-faced Heron | | | | | | | | | | | |
| Little Egret | | Low | Low | | | | | | High | | |
| Glossy Ibis | Low | Low | Low | | | | High | High | | Low | Low |
| Australian White Ibis | | | Low | | | | | | | | |
| Straw-necked Ibis | High | Low | Low | Low | | High | | Low | | | Low |
| Royal Spoonbill | Low | Low | | | | | | | High | Low | Low |
| Yellow-billed Spoonbill | | | | | | Low | | High | | Low | Low |

[1] Years in which mean annual numbers were abnormally low, being equal to or less than 50% of the ten-year mean.
[2] Years in which mean annual numbers were abnormally high being equal to or more than double the ten-year mean.

frequently for any conclusion to be reached concerning the significance of this trend. The occurrence of the White-necked Heron was irregular and no seasonal trend was apparent, other than it was extremely scarce between December and March, with just three records involving a single bird.

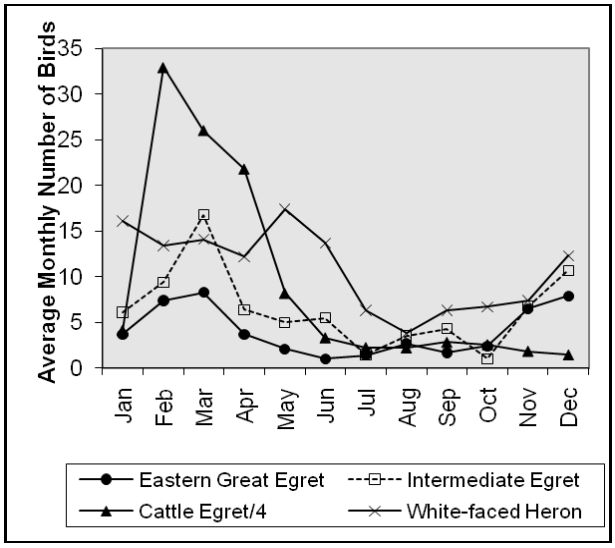


**Figure 2.** Monthly variations in the numbers of White-faced Heron and three species of egret at MWTW between 2001 and 2010 (Cattle Egret numbers divided by 4).

Variations in Australian White Ibis numbers were generally similar to those of the White-faced Heron. Mean monthly numbers were lower between June and November (range 1.8 to 10.7 birds/survey) than between December and May (range 10.2 to 19.3 birds/survey), which was statistically significant ($U=1$; $P<0.05$, Mann Whitney U-test), with abnormally low and high numbers in August and March respectively. In contrast Straw-necked Ibis numbers were high between February and September, when they peaked, and low between October and January, being exceptionally scarce in November. Glossy Ibis primarily occurred in December and January, but occurrences were insufficient for any clear trend to be established.

Royal Spoonbills tended to be less frequently observed and less numerous between June and September with numbers peaking in November.

The remaining three species, the Australasian Bittern, Nankeen Night-Heron and Yellow-billed Spoonbill were either vagrant, or observed too infrequently for any trend to be established.

## Annual Variations

Years in which species were either exceptionally numerous or sparse are shown in **Table 3,** based on numbers being either more than double, or less than half the ten-year monthly mean. The years in which peak numbers occurred varied considerably between species. However, many species were either present in low numbers, or absent during the initial (2001, 2002 and 2003) and final years of the study (2009 and 2010) as indicated in **Figure 3**, which shows the cumulative number of waterbirds recorded annually (i.e. the monthly counts for all species have been combined). Waterbird abundance peaked between 2004 and 2008. Waterbird species diversity, as indicated by the cumulative annual number of all waterbird species recorded monthly (see Species Diversity Index in **Figure 3**; e.g. a species recorded in five months of the year has an annual score of 5) showed a similar trend to that of waterbird abundance (**Figure 3**), except that diversity was low in 2006 and 2007. 2010 was the year in which both waterbird abundance and diversity were lowest, although the ephemeral wetlands, which are an important area of MWTW to most of the waterbird species, were flooded for much of the year.

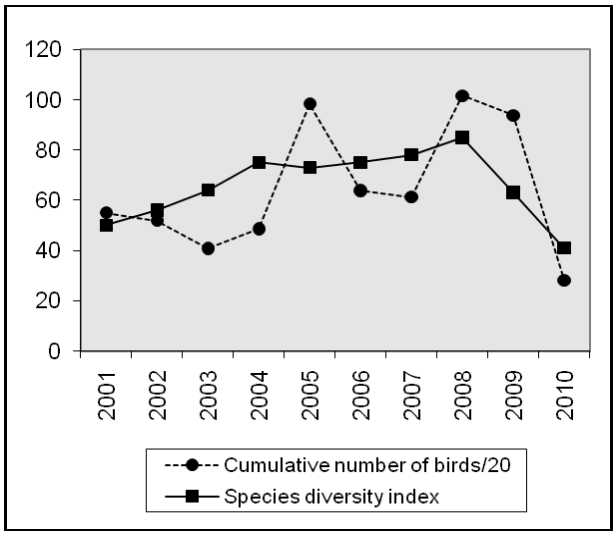


**Figure 3.** Variations in cumulative annual numbers and annual diversity of waterbirds.

Variation in the White-faced Heron and Cattle Egret numbers, the two species most frequently present, were less extreme than for the other species with no peak in which annual numbers were double the mean monthly annual number. However, Cattle Egrets were abnormally scarce in 2001, being 46% of the annual monthly mean.

There was a strong correspondence between the occurrence and trends in numbers of Eastern Great Egret and Royal Spoonbill (**Figure 4**), which is in marked contrast to the differences between the timing of extreme fluctuations in annual occurrence of the other species. Interestingly the trends for these two species resemble those for overall waterbird diversity in **Figure 3**.

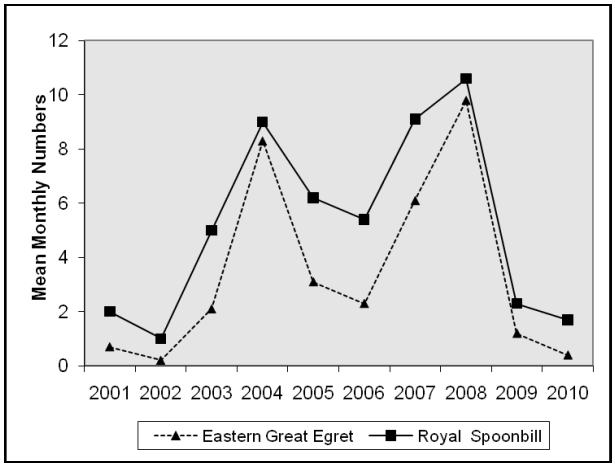


**Figure 4.** Correspondence of variations in the annual mean monthly numbers of the Eastern Great Egret and Royal Spoonbill.

More detailed information on the annual variations in waterbird numbers and reporting rates is contained in the **Appendix, Tables A3** and **A4**. There was no obvious evidence of continuous long-term decline in the numbers of any species.

## DISCUSSION

A number of factors influence the frequency and abundance of the waterbirds occurring at MWTW including:

- whether species breed locally;
- the proximity of breeding colonies to MWTW;
- the suitability of foraging conditions at MWTW;
- whether species breed inland and move to the coastal region after breeding; and
- use of the Hunter Region as a drought refuge.

The approach taken in this paper of evaluating the fluctuations in waterbird occurrence and abundance against independent monthly and annual variables fails to fully represent the complexity of the observed variations. However, the simplified approach adopted provides valuable insights and the following discussion is limited accordingly.

The Cattle, Eastern Great, Intermediate and Little Egrets all nest colonially, breeding between October and January in the Hunter Region. All four species breed at the Hunter Wetlands Centre and until 2009 there was a large breeding colony of Cattle Egret at Seaham Swamp. It is anticipated that birds from these colonies, which are approximately 18 and 13 km from MWTW respectively, frequent MWTW. None of these species breeds at MWTW. Increased numbers of Eastern Great and Intermediate Egrets occurred between November and April (**Figure 2**), the period during and immediately after the breeding season. In contrast, numbers of Cattle and Little Egret peaked between February and April, after the breeding season. This suggests that the foraging ranges of the Eastern Great and Intermediate Egrets around the breeding colonies are greater than for the Cattle and Little Egrets. Numbers of all four species were low in winter consistent with the dispersal of birds away from the breeding colonies. Sightings of flagged birds have demonstrated extensive southward migration (McKilligan 2005). The peak numbers of Cattle Egret in autumn may include birds from colonies north of the Hunter Region migrating south (Max Maddock pers. comm.).

The above four species are further differentiated by the nature of their use of the area. The Cattle Egret, the most numerous species, forages at the water's edge, but more often well away from the water, usually in association with cattle which graze both within the MWTW complex and in the surrounding ephemeral wetlands. Cattle Egret often congregated on the banks of the ponds, either when loafing, or as a prelude to feeding. As indicated previously, at least at the end of the study in 2010, Cattle Egret used MWTW as a night roost. In contrast the Eastern Great and Intermediate Egrets tended to forage in shallow water, while the Little Egret had a tendency to feed actively in shallow water pools and at the overflow weir from the ponds. The preference of these species for foraging in shallow water makes MWTW unsuitable when the ephemeral wetlands dry out and their occurrence in late summer is more erratic than for the Cattle Egret, which is not similarly constrained. These differences are consistent with the comparative foraging behaviour described by McKilligan (2005).

Eastern Great Egrets usually feed alone, but sometimes in association with Royal Spoonbills

and White-faced Herons (McKilligan 2005), associations which have been noted at MWTW. The correspondence between the annual trends in abundance of the Eastern Great Egret and Royal Spoonbill is consistent with these species having similar foraging requirements. However, the higher RR of the Eastern Great Egret (75.6%) compared with the Royal Spoonbill (51.3%) reflects its greater foraging flexibility, such as its ability to feed away from water.

White-faced Herons usually build a solitary nest, sometimes well away from water, but occasionally breed at heronries (McKilligan 2005). White-faced Heron start breeding in July, earlier than the egret species. White-faced Heron numbers between December and June were approximately double those between July and November, the main breeding season. Superficially, this variation in abundance suggests that some breeding pairs move to MWTW outside the breeding season, but that there is also a non-breeding population present throughout the year. Although relatively long-legged, the White-faced Heron predominantly feeds in shallow water and in wet paddocks away from the water. Consequently, like the Cattle Egret, it is less impacted by the drying out of the ephemeral wetlands, hence its high reporting rate (90.8%). This species may also benefit from the presence of cattle which graze both within the MWTW site and on the adjacent ephemeral wetlands.

The three species of ibis differed in their monthly occurrence. The most numerous species, Straw-necked Ibis, predominantly occurred between February and September, foraging in the adjacent ephemeral wetlands, particularly when there were water meadow conditions. This species does not breed in the Hunter Region and most birds left during summer. Australian White Ibis numbers peaked between March and May and were very low between July and November. The Australian White Ibis breeds at the Hunter Wetlands Centre during the period when numbers are low at MWTW suggesting that the foraging range of breeding birds is restricted. Glossy Ibis, which do not breed in the Hunter Region, visited almost exclusively during the summer between December and February, foraging in shallow water in areas C and D as they were drying out.

Royal Spoonbills, a locally-breeding species, were recorded occasionally throughout the year, but more regularly recorded during November and December, when peak numbers occurred. Royal Spoonbills feed in shallow water as discussed previously. Dependent young have been observed at MWTW in March and it is possible that the peak occurrence in the preceding months reflects the presence of a breeding colony within foraging range.

An Australasian Bittern was flushed from an extensive bed of dense dead weed in area C (**Figure 1**) during the May 2004 survey. The weeds grow prolifically during summer and die off during autumn.

Waterbird abundance and diversity both increased during the middle of this study between 2004 and 2008. This increase is attributed to a period of prolonged drought in inland Australia and perhaps more importantly in areas of NSW such as the Macquarie Marshes and Gwydir Wetlands where many waterbirds breed. Straw-necked Ibis would be affected by the drought, using the Hunter Region wetlands including MWTW as a drought refuge. When present the Straw-necked Ibis is often the most numerous waterbird in the Hunter Region, congregating at large nocturnal roosts. Trends in the numbers recorded at MWTW can be skewed by large numbers dispersing from the nearest roost, which is approximately 10 km away at Irrawang Swamp. The Glossy Ibis, another inland-breeding species, was only recorded during the drought period.

The La Nina conditions of 2010 resulted in the lowest waterbird abundance and diversity at MWTW over the ten-year period (**Figure 3**). The absence of the Intermediate Egret throughout most of 2010 and the minimum numbers or absence of White-necked Heron, Glossy Ibis, Straw-necked Ibis and Yellow-billed Spoonbill suggest that all of these species predominantly use the Hunter Region as a drought refuge.

## CONCLUSIONS

The MWTW and surrounding areas provide important foraging habitat for waterbird species. Seven species including four heron, two ibis and one spoonbill species were regular visitors with RRs ranging from 51.3 to 95.8%. A further six species occurred infrequently and in two instances were vagrants recorded on a single occasion.

Waterbirds predominantly fed in shallow water or flooded pasture land and were mainly observed in the decommissioned pond C and the ephemeral wetlands adjacent to the MWTW site when flooded. The two most frequently recorded species,

the White-faced Heron and the Cattle Egret are less dependent on wet conditions for feeding, and are able to forage in the pastures when the flooded areas have dried out.

The numbers and diversity of waterbird species present at MWTW fluctuated widely, both on a monthly and annual basis. These variations are attributed to a combination of factors, including whether species breed locally or inland, the extent to which the study area was flooded providing waterbird foraging habitat and whether inland NSW was experiencing drought conditions. For most species this combination of factors resulted in differences in the monthly and annual patterns of occurrence at MWTW. However, there were similarities in the patterns of occurrence of the Eastern Great Egret and the Royal Spoonbill, species which often forage together.

## ACKNOWLEDGEMENTS

We are grateful to Hunter Water Corporation for encouraging us to undertake these surveys and allowing access to MWTW. The enthusiastic support and cooperation we have received from site manager, Shaun Clewes, and his team at MWTW has been outstanding and is deeply appreciated.

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## APPENDIX

**Table A1**. Monthly variations in waterbird mean numbers/survey when present.

| Species | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| White-necked Heron | 1.0 | 1.0 | 0.0 | 2.3 | 2.0 | 4.3 | 1.0 | 1.7 | 2.7 | 3.5 | 10.0 | 1.0 |
| Eastern Great Egret | 3.7 | 7.4 | 8.3 | 3.7 | 2.1 | 1.0 | 1.4 | 2.7 | 1.7 | 2.4 | 6.5 | 7.9 |
| Intermediate Egret | 6.1 | 9.4 | 16.8 | 6.4 | 5.0 | 5.5 | 1.5 | 3.5 | 4.3 | 1.0 | 6.8 | 10.7 |
| Cattle Egret | 16.6 | 131.8 | 104.2 | 87.3 | 32.8 | 13.3 | 9.0 | 8.9 | 11.3 | 10.3 | 7.4 | 5.8 |
| White-faced Heron | 16.1 | 13.4 | 14.1 | 12.2 | 17.4 | 13.7 | 6.3 | 3.8 | 6.3 | 6.7 | 7.4 | 12.3 |
| Little Egret | 1.0 | 1.5 | 2.3 | 2.7 | 1.3 | 1.0 | 2.0 | 2.0 | 6.0 | 1.5 | 2.0 | 1.0 |
| Glossy Ibis | 12.0 | 5.0 | 0.0 | 0.0 | 4.5 | 0.0 | 1.0 | 0.0 | 0.0 | 0.0 | 1.0 | 11.0 |
| Australian White Ibis | 10.2 | 13.9 | 25.8 | 13.6 | 19.3 | 6.2 | 10.7 | 1.8 | 6.5 | 9.0 | 3.6 | 17.1 |
| Straw-necked Ibis | 28.0 | 54.3 | 107.7 | 83.4 | 114.8 | 47.2 | 41.7 | 35.9 | 197.5 | 16.0 | 3.0 | 10.9 |
| Royal Spoonbill | 6.8 | 8.3 | 3.9 | 10.8 | 3.7 | 3.2 | 2.3 | 5.7 | 3.0 | 4.2 | 14.1 | 10.9 |
| Yellow-billed Spoonbill | 1.0 | 3.0 | 1.0 | 5.0 | 1.0 | 1.0 | 0.0 | 1.0 | 0.0 | 0.0 | 1.3 | 1.0 |

**Table A2**. Monthly variations in waterbird Reporting Rates (%).

| Species | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| White-necked Heron | 11 | 10 | 0 | 40 | 40 | 30 | 20 | 30 | 30 | 40 | 30 | 10 |
| Eastern Great Egret | 70 | 80 | 70 | 90 | 70 | 60 | 80 | 70 | 60 | 90 | 60 | 100 |
| Intermediate Egret | 80 | 70 | 80 | 80 | 50 | 20 | 20 | 20 | 40 | 50 | 50 | 60 |
| Cattle Egret | 80 | 100 | 100 | 100 | 100 | 80 | 60 | 90 | 100 | 80 | 70 | 80 |
| White-faced Heron | 80 | 100 | 100 | 100 | 100 | 90 | 100 | 90 | 90 | 100 | 90 | 100 |
| Little Egret | 10 | 20 | 30 | 30 | 30 | 20 | 10 | 20 | 10 | 20 | 20 | 10 |
| Glossy Ibis | 10 | 10 | 0 | 0 | 20 | 0 | 10 | 0 | 0 | 0 | 20 | 30 |
| Australian White Ibis | 60 | 70 | 90 | 100 | 70 | 90 | 30 | 60 | 20 | 30 | 50 | 70 |
| Straw-necked Ibis | 40 | 80 | 70 | 90 | 90 | 90 | 70 | 80 | 40 | 50 | 20 | 70 |
| Royal Spoonbill | 50 | 30 | 80 | 40 | 60 | 50 | 30 | 30 | 40 | 60 | 70 | 70 |
| Yellow-billed Spoonbill | 10 | 10 | 10 | 10 | 20 | 20 | 0 | 30 | 0 | 0 | 30 | 10 |

**Table A3**. Annual variations in mean numbers/survey when present.

| Year | Royal Spoon-bill | Yellow-billed Spoon-bill | Eastern Great Egret | Inter-mediate Egret | Cattle Egret | Little Egret | White-faced Heron | White-necked Heron | Glossy Ibis | Aust-ralian White Ibis | Straw-necked Ibis |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2001 | 2.0 | 1.0 | 0.7 | 7.5 | 19.9 | 1.0 | 6.9 | 1.0 | 0.0 | 16.6 | 177.0 |
| 2002 | 1.0 | 1.0 | 0.2 | 10.7 | 70.9 | 0.0 | 7.4 | 1.5 | 0.0 | 8.6 | 17.6 |
| 2003 | 5.0 | 1.3 | 2.1 | 3.7 | 26.8 | 0.0 | 17.1 | 7.0 | 0.0 | 5.3 | 20.9 |
| 2004 | 9.0 | 2.0 | 8.3 | 6.9 | 42.2 | 1.0 | 8.7 | 1.0 | 2.3 | 7.9 | 10.6 |
| 2005 | 6.2 | 0.0 | 3.1 | 7.1 | 26.5 | 1.0 | 14.5 | 1.2 | 5.0 | 14.7 | 153.6 |
| 2006 | 5.4 | 1.0 | 2.3 | 7.3 | 25.5 | 1.0 | 12.6 | 3.3 | 23.0 | 8.4 | 49.8 |
| 2007 | 9.1 | 3.0 | 6.1 | 2.7 | 35.7 | 1.0 | 15.9 | 6.0 | 9.5 | 8.0 | 32.9 |
| 2008 | 10.6 | 1.0 | 9.8 | 8.8 | 56.3 | 2.8 | 8.2 | 3.0 | 2.7 | 20.2 | 109.4 |
| 2009 | 2.3 | 0.0 | 1.2 | 24.3 | 68.2 | 1.9 | 7.6 | 1.0 | 0.0 | 25.2 | 116.0 |
| 2010 | 1.7 | 0.0 | 0.4 | 3.0 | 41.3 | 1.0 | 8.3 | 0.0 | 0.0 | 15.7 | 12.0 |

**Table A4**. Annual variations in waterbird Reporting Rates (%).

| Year | Royal Spoon-bill | Yellow-billed Spoon-bill | Eastern Great Egret | Inter-mediate Egret | Cattle Egret | Little Egret | White-faced Heron | White-necked Heron | Glossy Ibis | Aust-ralian White Ibis | Straw-necked Ibis |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2001 | 36.4 | 16.7 | 66.7 | 50.0 | 75.0 | 8.3 | 83.3 | 16.7 | 0.0 | 41.7 | 33.3 |
| 2002 | 16.7 | 25.0 | 66.7 | 25.0 | 83.3 | 0.0 | 83.3 | 33.3 | 0.0 | 66.7 | 66.7 |
| 2003 | 41.7 | 25.0 | 75.0 | 50.0 | 100.0 | 0.0 | 100.0 | 16.7 | 0.0 | 58.3 | 66.7 |
| 2004 | 91.7 | 16.7 | 75.0 | 66.7 | 91.7 | 8.3 | 100.0 | 8.3 | 25.0 | 58.3 | 83.3 |
| 2005 | 50.0 | 0.0 | 91.7 | 83.3 | 91.7 | 8.3 | 91.7 | 41.7 | 8.3 | 75.0 | 66.7 |
| 2006 | 41.7 | 16.7 | 50.0 | 66.7 | 100.0 | 8.3 | 100.0 | 58.3 | 8.3 | 75.0 | 100.0 |
| 2007 | 66.7 | 16.7 | 83.3 | 58.3 | 91.7 | 8.3 | 100.0 | 50.0 | 16.7 | 66.7 | 91.7 |
| 2008 | 91.7 | 8.3 | 91.7 | 83.3 | 91.7 | 66.7 | 100.0 | 8.3 | 25.0 | 83.3 | 58.3 |
| 2009 | 50.0 | 0.0 | 83.3 | 25.0 | 75.0 | 75.0 | 100.0 | 8.3 | 0.0 | 41.7 | 66.7 |
| 2010 | 25.0 | 0.0 | 66.7 | 8.3 | 66.7 | 8.3 | 91.7 | 0.0 | 0.0 | 50.0 | 25.0 |

# Monitoring the Rufous Scrub-bird in the Barrington Tops and Gloucester Tops IBA – a pilot study

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The Rufous Scrub-bird *Atrichornis rufescens* is a skulking, cryptically plumaged species which is seldom seen. Fortunately territorial males have loud characteristic calls which were used to locate territories during surveys between August 2010 and January 2011 in the Gloucester Tops area of the Barrington Tops and Gloucester Tops Important Bird Area (IBA).

Twenty-two territories were confirmed based on repeat records at least 3 weeks apart during surveys along 20 km of track. A further 5 probable territories were located based on multiple records less than 3 weeks apart. Assuming territories are located within 150 m either side of the track the estimated density of breeding pairs is in the range 3.6 to 4.5 territories/km$^2$. This range is considered to be conservative because there were a number of possible additional territories based on single records.

In 1980/81 Ferrier found 21 territories in 18 km of transects with an implied density of 3.8/km$^2$. As the surveys in this study covered approximately 80% of the same transects as Ferrier it is concluded that the Rufous Scrub-bird population has not declined in its core habitat at altitudes >1,150m during the past 30 years, although its size may have fluctuated during that time.

In both studies, the territories were predominantly in eucalypt forest with dense ground cover, mostly adjacent to Antarctic Beech *Nothofagus moorei* forest.

## INTRODUCTION

The Rufous Scrub-bird *Atrichornis rufescens* is classified as Vulnerable under the New South Wales *Threatened Species Conservation Act 1995*. Since European settlement its distribution has contracted and is currently restricted to five locations, all at high altitude, extending from the Queensland/New South Wales Border Ranges south to the Barrington/Gloucester Tops area. The Rufous Scrub-bird has disappeared from lowland areas of its former range and it is now either extinct or very rare at altitudes below 600m (Ferrier 1984).

Two sub-species of the Rufous Scrub-bird are recognised; the southern sub-species *A. r. ferrieri* is confined to Werrikimbe, Carrai, Oxley Wild Rivers, New England, and Barrington Tops National Parks (particularly Gloucester Tops at the latter location) although in the past it was more widespread (Gole & Newman 2010).

The Rufous Scrub-bird was the trigger species for the nomination of the Barrington Tops and Gloucester Tops Important Bird Area (IBA) (Dutson *et al.* 2009; Newman & Stuart 2011). It is a requirement of the IBA process that the trigger and other supporting species (namely, for this IBA, Australian Logrunner *Orthonyx temminckii*, Green Catbird *Ailuroedus crassirostris,* Regent Bowerbird *Sericulus chrysocephalus,* Flame Robin *Petroica phoenicea*, Pale-yellow Robin *Tregellasia capito,* Paradise Riflebird *Ptiloris paradiseus*) are monitored to determine trends in their status.

In this paper, we summarise the results of a pilot scheme for sustainable monitoring of Rufous Scrub-birds using volunteers, that potentially can be used in all five IBAs for which the Rufous Scrub-bird is the trigger species.

The Rufous Scrub-bird is a cryptically marked skulking species, which is seldom seen. Fortunately male Rufous Scrub-birds have loud penetrating calls which are used to advertise and defend territories, particularly during the breeding season. This attribute has been used in two previous studies of the Rufous Scrub-bird in the Barrington Tops and Gloucester Tops area (Ferrier 1984; Ekert 2002).

The approach taken in the earlier of these studies by Simon Ferrier in 1980/81 in his PhD study (Ferrier 1984) was to conduct surveys along 18 km of transects in the Gloucester Tops area. Transects were established in habitat known from pilot surveys to contain Rufous Scrub-birds. Ferrier made 18 surveys along these transects throughout the year determining the location of calling scrub-birds. Birds heard on multiple occasions spanning a breeding season were assumed to be territorial males. Calling birds were most easily detected between September and December under conditions of high humidity, low wind and low mist. Time of day did not appear to be a critical parameter. Ferrier estimated there to be 20.29 (SD 1.11) singing males within an area 150m either side of his transects at Barrington Tops & Gloucester Tops, which corresponds to a density of 3.8 territories/km$^2$. However, under optimal conditions, Ferrier suggested this density may be as high as 6 male territories/km$^2$ (Ferrier 1985).

In Ferrier's work in the Gloucester Tops area, most Rufous Scrub-bird territories were found in eucalypt forest with dense understorey adjacent to Antarctic Beech *Nothofagus moorei* forest. Territories were on average 1.13 ha in area, often circular in shape, with the male predominantly singing from an area of approximately 50m diameter. On occasions when clusters of calling birds were encountered it was possible to assign territories to individual males.

A more recent study conducted by Birds Australia (BA) using volunteers (Ekert 2002) also involved monitoring calling males during the breeding season. In this case a number of fixed point locations were established which were monitored annually using a standard protocol to determine the presence or absence of calling scrub-birds. The intent was to use annual variations in the reporting rates of scrub-birds to determine trends in their relative abundance. The BA study sampled a larger area of potential habitat, particularly areas at lower altitude than those surveyed by Ferrier, which were above 1,150m.

The possibility of using call playback to stimulate scrub-birds to call was investigated in both of the above studies, but in each case was found to be ineffective and its use was discontinued.

For the present study we elected to use transect surveys similar to those conducted by Ferrier, allowing a comparison with his baseline data of scrub-bird territory densities. The choice of method also fitted well with our intent to conduct an intensive set of BA Atlas surveys for all bird species, including all species listed to support the IBA nomination. In both Ferrier's and our studies, the results were broken down and reported against transect segments involving 1km linear lengths of track (i.e. taking into account curves and undulations).

The 2010 surveys described in this report were viewed as a pilot study to test the suitability of the transect approach using volunteers to identify scrub-bird territories and fine tune the approach. Four other IBAs involving the Rufous Scrub-bird as the trigger species have also been nominated. Ideally similar approaches to monitoring Rufous Scrub-birds should be used across the five IBAs.

The pilot study was conducted at altitudes above 1,150m in the Gloucester Tops, which were expected to remain core habitat for the Rufous Scrub-bird following any contraction in range. Ferrier had surveyed much of the same area that was selected, and therefore baseline data existed which would allow comparisons to be drawn between the two studies.

## METHODS

### Survey Transects

Transects were established along roads and walking tracks in the Gloucester Tops area of the Barrington Tops and Gloucester Tops IBA as show in **Figure 1** (the general location is S32$^0$ 5±2', E151$^0$ 35±2'). One kilometre segments were measured, either by odometer readings where car access was possible (transects along Gloucester Tops Road, Kerripit Road extended), or by measurement on Google maps to determine end-point map coordinates (transects along Careys Peak Track, Mt Nelson Track, Glowang Track). These points were found using GPS units set to WGS84 coordinate system. All transect segments were marked at their extremities using yellow tape. The selected transects corresponded with approximately 80% of the area surveyed by Ferrier and also coincided with a number of the fixed survey sites used in the previous BA study. The impenetrable nature of the bush made it impractical to conduct surveys away from existing tracks.

### Detection of Rufous Scrub-birds

The ability to reliably recognise calling Rufous Scrub-birds is central to locating their territories. Fortunately, in the breeding season from September to December the probability of detecting males having territories within 150m of a track usually exceeds 50% and can be as high as 80% for an experienced surveyor (Ferrier 1984). This previous study found detectability to peak between October and November. High humidity, low wind and low mist conditions enhanced detection rates.

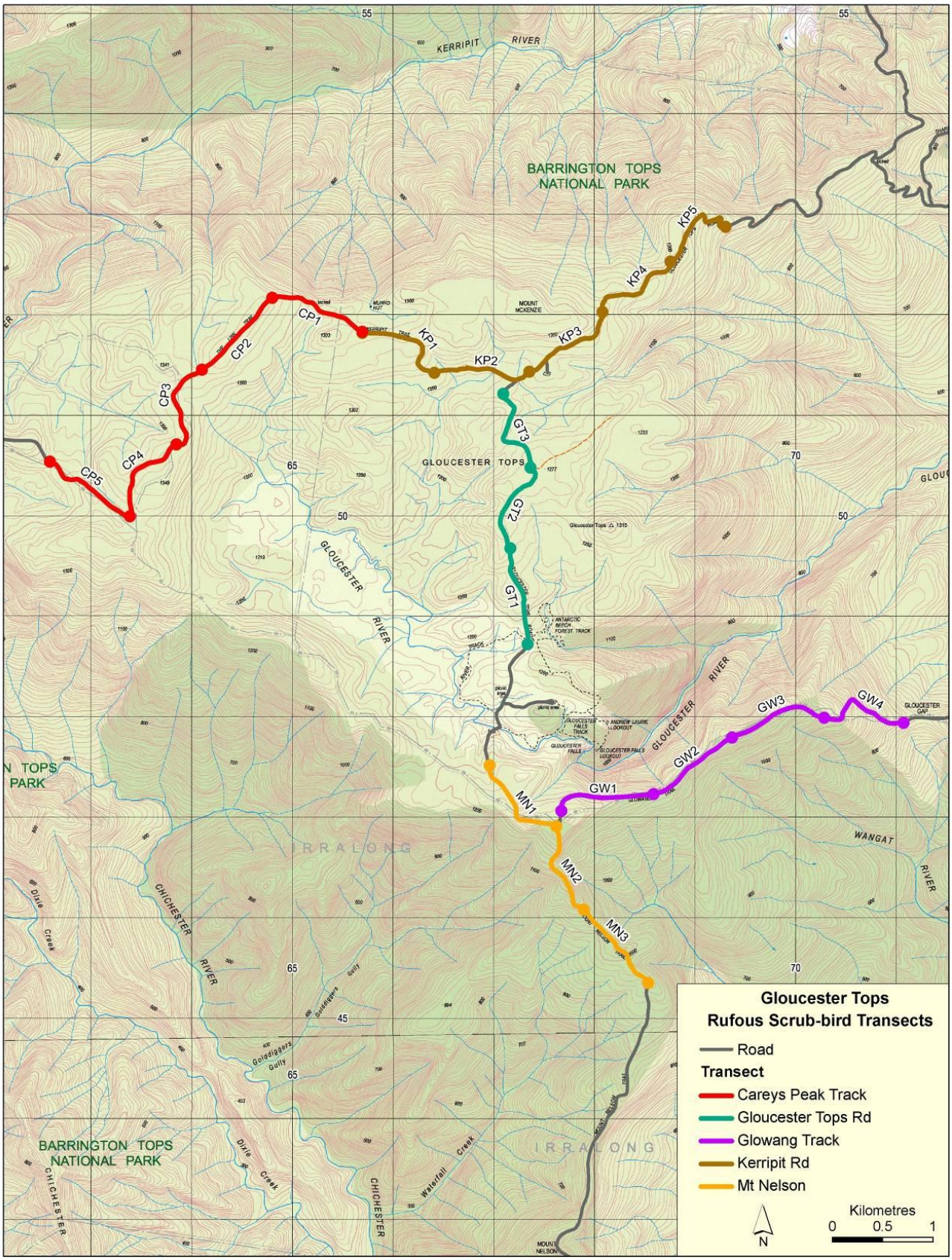


**Figure 1**. Survey transects at Gloucester Tops.

The main song of the Rufous Scrub-birds has been described as a "chipping" call. It consists of repeated phrases, each involving severable syllables. Males often sing persistently, as exemplified by the bird used for training purposes. Once heard in the field the call is readily recognised, having a resonant metallic quality, easily distinguished from other species by experienced surveyors. Consequently, a high reliability was placed on any records by trained surveyors involving scrub-birds persistently using the chipping call.

Rufous Scrub-birds have a wide repertoire of calls and are renowned mimics. Less reliance was placed on records where the "chipping" call was not heard and particularly when only one or two contact calls were reported. Over 95% of the records were based on the detection of calls and the bird was seldom seen.

## Data Collection and Management

Most of the survey work was conducted around two camps, each of 3 days duration, held in September and October 2010. Each camp involved nine volunteers, with five people attending on both occasions. The first day of each camp was used to train the survey team. This involved ensuring that all participants could recognise the calls of Rufous Scrub-birds. After playing tapes of scrub-bird calls, participants were taken to a known Rufous Scrub-bird territory where the resident male bird called persistently, mostly using its chipping song. Volunteers were asked to determine the point on the track nearest to the calling bird and estimate the distance of the calling bird, this being the approach used to identify the location of territories in subsequent surveys. In-the-field training was very important because the taped calls involved the northern sub-species of the Rufous Scrub-bird, which has a slightly different repertoire of songs and calls to the southern sub-species found at Gloucester Tops.

Five teams were established involving at least one person previously experienced in locating Rufous Scrub-birds and familiar with the survey techniques. Each team was asked to survey between three and five transect segments, each 1 km in length. The following information was recorded:

1. GPS coordinates, side and distance from track of any Rufous Scrub-birds, either heard or seen.
2. Type and duration of calls heard.
3. Information relating to the detectability of scrub-birds (e.g. humidity, wind strength, cloud cover, time of day).
4. An indication of the habitat type where scrub-birds were calling (e.g. eucalypt forest with dense understorey or beech forest with bare ground).
5. Record all other bird species observed during the survey.

Weather conditions on the Gloucester Tops are unpredictable. An added complication was the need to cross the Gloucester River to reach some of the survey transects. Because of high river levels, the Glowang and Mt Nelson Tracks were only surveyed once in October.

Surveys typically commenced about 8.00 am and took between four and six hours to complete. Typically one hour was spent in each 1 km transect segment; the actual amount of time varied, depending on whether any scrub-birds were located. When scrub-birds were found, up to 10 minutes additional time was spent at the location to determine the types of calls used and the duration of calling. In instances where clusters of calling birds occurred it was necessary to spend extra time, ideally establishing that more than one bird was calling simultaneously. It was considered more important to be certain that scrub-birds had been correctly identified and assigned as precisely as possible to accurately measured territory locations, than to standardise the time spent surveying each transect segment. In instances where observers had to return along a walking track through a set of transect segments they were asked to record all scrub-birds on both the outward and inward walk, because this provided confirmation of records, and additional information on the size of territories and the persistence with which scrub-birds call. Observers were encouraged to spend more time surveying on the outward journey, when the birds were more active and to return more rapidly unless scrub-birds were heard or seen. Observers were discouraged from attempting to attract scrub-birds by call playback or "pishing" and leaving the track to seek out calling birds.

Surveyors were asked to record all species within each 1km transect, and the resulting data were submitted to the BA Atlas as 500m radius area surveys and also recorded in a database established specifically for the pilot study. The overall results of these surveys including the occurrence of the other species listed in the IBA nomination will be presented in a future paper.

## Territories and Calling Sites

Rufous Scrub-bird observations were deemed to involve a confirmed territory when two records were obtained at the same location (to within approximately ±100m) separated by an interval of least three weeks. This definition was used to indicate permanent occupation of a Rufous Scrub-bird territory. It is a less stringent criterion than that used by Ferrier which deemed a territory to be confirmed when scrub-birds were recorded before and after the breeding season. The three-week criterion was necessary to enable interpretation of results from the short term 2010 pilot study.

The simplest type of Rufous Scrub-bird territory is approximately 1.0-1.2 ha in size, 100m in diameter and the bird predominantly calls from a core area of about 50m in diameter in the centre of the territory (Ferrier 1984). The territory used for training purposes fitted this description. The GPS coordinates describing the position on the transect track of this, the most measured territory, varied by 2 to 3 seconds of latitude/longitude. Irregularly shaped territories can resemble a lozenge up to 250m long with more than one node used for calling (Ferrier 1984). This type of territory could result in

variations in GPS coordinates as large as 5 to 6 seconds if the territory was aligned parallel to the transect. For this type of territory it might be difficult to determine whether clusters of GPS coordinates involved a single or multiple territories in close proximity. There were few instances where this difficulty arose. Whenever any ambiguity occurred, the conservative position was taken and only one confirmed territory was assigned.

Rufous Scrub-bird records were assigned to three categories as defined below:

1. Confirmed Territories based on at least one repeat record at a location, three weeks or more after the initial record.
2. Calling Sites based on two or more records involving either persistent use of the "chipping" call or a sight observation, but lacking confirmation of continued occupancy over a period of at least three weeks.
3. Tentative Sites involving single records (unless seen) and multiple records which did not involve the "chipping" call.

During the first camp in September, all of the surveys were repeated on consecutive days by different survey teams. Teams on the second day were unaware of the locations of Rufous Scrub-birds recorded on the previous day. During the second camp in October the primary objective was to confirm as many locations as possible so that they could be assigned "territory status". Survey teams were provided with "mud-maps" identifying the locations of all previous observations to facilitate this objective and were asked to report locations of all scrub-birds on similar sketches. **Figure 2** shows an example of a mud-map in which the transect is shown for convenience as a straight line although in reality each transect trail bends and undulates. This was found to be an effective method of communicating results unambiguously. During follow-up visits we have encouraged members of our core survey team to make opportunistic point surveys at locations where scrub-birds had been reported but not confirmed.

## RESULTS

The summary provided in **Table 1** shows the distribution of Rufous Scrub-bird records between the five sets of transects which were surveyed. Rufous Scrub-birds were distributed fairly evenly throughout the study area. There were records from all but one of the 20 transect segments, but not all of these records were confirmed as territories.

22 territories were confirmed in the 20km of core transects, which equates to a density of 3.6 territories/km$^2$, assuming that all territories within 150m either side of surveyed transects were detected. This estimate is considered conservative because it is anticipated that more records may be upgraded to confirmed territory status with further survey effort in 2011. For instance, if all the calling sites involving multiple records were upgraded to confirmed status the number of territories would increase to 27 at a density of 4.5/km$^2$. The density of 3.8 territories/km$^2$ found by Ferrier in 1981 (Ferrier 1984) lies within the indicative range of 3.6 to 4.5 territories/km$^2$ found in this study. On this basis it can be concluded that, in the Gloucester Tops study area, Rufous Scrub-bird numbers have remained reasonably stable over a period of 30 years although population size may have fluctuated during that time.

Rufous Scrub-birds were recorded during 49 of the 91 "500m radius" surveys for the BA Atlas. The reporting rate of 54% is exceptionally high for a rare species, reflecting the extent to which the study area is core Rufous Scrub-bird habitat.

Of the 21 transects surveyed, 18 consisted mainly of eucalypt woodland with dense understorey vegetation, usually bordering beech forest. Rufous Scrub-birds were recorded in all of these transect segments. Vegetation varied considerably between the sites at which Rufous Scrub-birds were found. In all instances there was ground cover with extensive leaf litter. There were considerable variations in the extent of mid-storey vegetation which ranged from one to three metres in height. These observations are consistent with Ferrier's (1985) description of the preferred habitat of the Rufous Scrub-bird in the Gloucester Tops area. There was a tendency for Rufous Scrub-bird sites to be located near creeks and in dense gullies, but this was not an exclusive requirement. In some areas there was considerable evidence of the regrowth of beech forest as indicated by the presence of many *Nothofagus moorei* saplings. Only two of the 20 transect segments were located in areas dominated by beech forest, habitat characterised by a lack of understorey and ground-cover vegetation. The absence of Rufous Scrub-bird records from one of those transect segments is consistent with Ferrier's conclusion that, in rainforest, scrub-birds are only found where there is dense ground cover along creek edges and where fallen trees have opened up the forest canopy.

In view of the variability of the habitat along transects and variation in the distance between adjacent territories, the 2010 pilot survey results are consistent with Ferrier's conclusion that under optimal conditions the density of male territories may be as high as 6/km$^2$.

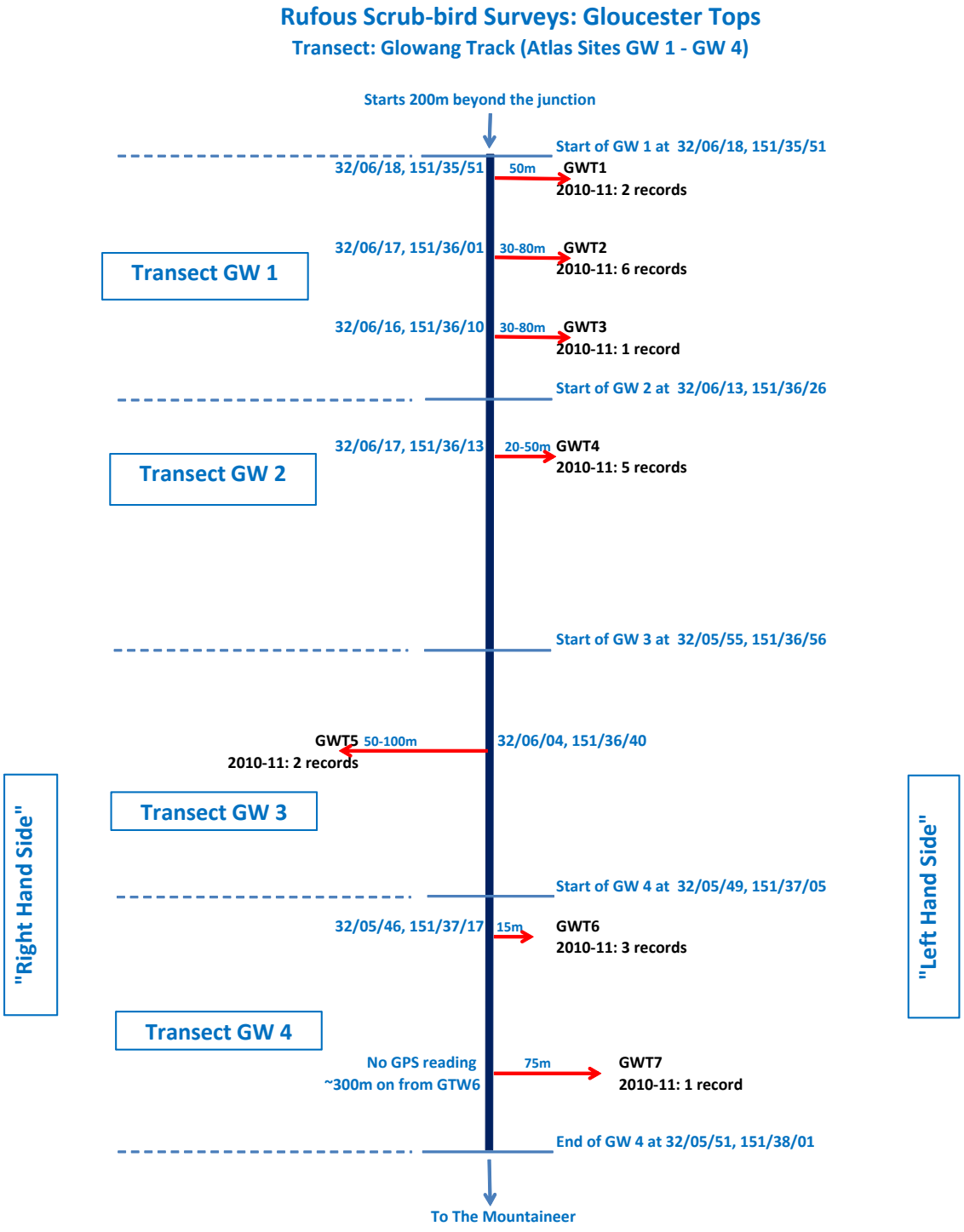


**Figure 2**. Example of mud-map (linear representation of transects)

**Table 1**. Summary of Rufous Scrub-bird survey results

| Area | Length (km) | Days Surveyed | Confirmed Territories | Calling Sites | Tentative Sites | Sites All Categories |
|---|---|---|---|---|---|---|
| **Careys Peak Track** | 5 | 5 | 8 | 2 | 2 | 12 |
| **Kerripit Road Extended** | 5 | 5 | 4 | 0 | 5 | 9 |
| **Gloucester Tops Road** | 3 | 4 | 3 | 0 | 2 | 5 |
| **Mount Nelson Track** | 3 | 3 | 3 | 2 | 1 | 6 |
| **Glowang Track** | 4 | 3 | 4 | 1 | 2 | 7 |
| **Total For Repeat Surveys** | 20 | | 22 | 5 | 12 | 39 |

## DISCUSSION

### Detectability of Rufous Scrub-birds

An objective of Ferrier's work (1984) was to establish a single survey method which would provide an absolute measure of Rufous Scrub-bird territory densities. This was achieved by establishing a set of detection factors which could be applied to transect survey results. Ferrier's detection factors varied with humidity, wind strength, day of the year and habitat type. They are available as a look-up table for the Gloucester Tops area (Ferrier 1984). Under the most favourable conditions involving high humidity, still conditions and no mist during October and November the probability of detecting a Rufous Scrub-bird calling within 150m either side of a track was found to slightly exceed 80% for an observer walking at 2.5 km/hr.

Preliminary attempts to validate Ferrier's detection factors against our 2010 transect surveys were unsuccessful. For instance, when the number of scrub-birds recorded by observers during our surveys for one transect of 5km length was compared with the total number of birds found throughout 2010 (**Table 1**) for that transect, the numbers detected were lower than predicted by the model. The discrepancy may be associated with difficulties in measuring humidity and the small transect length of 5 km used in the evaluation (Ferrier sampled 18 km/day). Other factors could contribute to this situation, including differences in the field experience of personnel with detecting calling scrub-birds and a lack of prior knowledge of the location of their territories.

In both Ferrier's study and this work, a number of scrub-birds were heard on a single occasion or for a short period of time and could not be assigned territorial status. Possible explanations for these records include that the birds did not have established territories and were roaming in search of a mate, or that scrub-birds with territories spanning or bordering the 150m detection zone were only able to be heard under the most favourable conditions.

An intriguing possibility is that Rufous Scrub-bird breeding behaviour may vary with climatic conditions and that the spring of 2010 may have been anomalous as it involved above-average rainfall associated with La Nina conditions. Ferrier's studies were conducted during a period of "normal" rainfall and he suggested that climatic conditions could impact on the vocal behaviour of scrub-birds (e.g. by determining the timing of the breeding season when calling is at a peak).

Ferrier's goal of achieving a single survey technique which generates reliable estimates of Rufous Scrub-bird territory densities is compelling and attempts to validate his model will continue.

### Variations of Individual Birds in Seasonal Calling Patterns

Ferrier showed that the frequency at which a group of 19 territorial males called increased during the breeding season, which is thought to be between September and December, peaking in October and November. However, it is possible that individual birds show short-term departures from the group behaviour. For instance, Jackson (1920) indicated that the male called less when the female was incubating. This is consistent with Ferrier's findings provided that the timing of breeding is not highly synchronised across all transects.

During the 2010 surveys the scrub-bird used for training purposes was heard on every occasion up to October 12, after which it was heard to call infrequently. It was subsequently heard calling on

several occasions in December and January 2011. These observations are consistent with the hypothesis that it may have bred in October and called less consistently at that time as claimed by Jackson.

Unfortunately very little detail is known about the breeding behaviour of individual Rufous Scrub-birds and its impact on song and their detectability.

During the less comprehensive survey effort in November under difficult conditions (e.g. high wind, showers and the noise of cicadas), Rufous Scrub-birds were calling less frequently than expected. However, in December when some additional surveys were conducted, many of the scrub-birds were calling.

## Duetting

Female Rufous Scrub-birds seldom sing. Ferrier (1984) describes 12 instances of the male and female performing a duet. This possibility must be taken into account when assigning records of calling birds to territories. On several occasions in the present study, observers reported the probable presence of two birds based on contact calls as opposed to song. In January 2011 two birds in close proximity (within what has been assigned as a single territory) were performing a song duet. The duetting birds may have been a pair or else an adult and a juvenile male (photographic evidence indicates that the second bird was not an adult male).

## Future Directions

The approach used in the 2010 pilot study concentrates on what is thought to be core habitat of the Rufous Scrub-bird in the Barrington Tops and Gloucester Tops IBA. It is the area where the species is expected to be present at its highest density and to be most secure in the short term. Indeed, in the event of climate change and global warming impacting on the species, it has been suggested that the species' range would contract to areas, in essence habitat islands (Watson 2010), adjacent to remnant rainforest at high altitude like the Gloucester Tops, as part of a process termed "altitudinal retreat" (Ferrier 1984). Hence evidence of a long-term decline in the Rufous Scrub-bird in core habitat like the Gloucester Tops would be of serious concern.

In the future monitoring effort, it is intended that surveying of the transects established in 2010 will continue, in order to locate all territories within 150m of the transect lines and thus measure the density and distribution of male territories for that particular breeding season. Ferrier (1984) found that at Gloucester Tops, Rufous Scrub-bird territories were separated by greater than 250m and suggested that this distance reflected the optimal separation of territories, effectively limiting social interaction between neighbouring pairs. A future aim will be to test whether this minimum separation rule continues to apply or whether there has been an increased tendency for the formation of clusters of territories as found by Ferrier (1984 & 1985) in the Wiangarie study area in the Queensland/New South Wales Border Ranges National Park. Ekert (2002) suggested that clustering may be occurring in the Gloucester Tops area and that this could be a consequence of the upward migration of Rufous Scrub-birds as part of the ongoing altitudinal retreat of the species. Possible explanations of any increased clustering of territories at Gloucester Tops include an increase in the Rufous Scrub-bird population and changes in the suitability of the habitat, resulting from forest succession following logging and fires, limiting the amount of suitable habitat adjacent to the transect trails.

Ongoing monitoring will also include establishing an inventory of Rufous Scrub-bird territories and determining the continuity of occupation of these territories. As Rufous Scrub-birds are faithful to territories and are expected to have longevity of the order of 10 years (Ferrier 1984), this measure will provide a valuable indication of both the health of the population and the suitability of the habitat.

Assuming the process of altitudinal retreat is ongoing, any long-term decline in the Rufous Scrub-bird population would be expected to be more apparent at lower altitudes. It is therefore intended to extend the monitoring to lower altitude locations where the species has been recorded recently, for instance in the studies coordinated by Ekert. As resources are expected to be limited for these studies, maintaining an inventory of active territories and determining the continuity of occupation may be the most practical measure of population stability.

## CONCLUSIONS

The 2010 pilot studies have established a transect survey method which successfully locates Rufous Scrub-bird territories. The method has been found to be suitable for volunteers undergoing only a small amount of training.

The 2010 surveys suggest that the Rufous Scrub-bird continues to exist in its core habitat on the Gloucester Tops at population levels similar to those found in 1981/82. This is a most important result because it indicates that passive management through reservation of the core habitat has been successful. However, ongoing monitoring is essential to ensure that changes in habitat driven by variations in climatic conditions and forest succession, following changes in forest management, do not result in future decline. In addition, it is important to initiate monitoring at lower altitudes where the impact of population decline through altitudinal retreat will be amplified.

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# Changes in the bird population of Bolwarra, 1994-2011

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Greener garden suburbs, particularly when adjacent to other habitat-types, can provide a permanent or temporary home to a great variety of avian species. This paper looks at one such area close to Maitland, NSW and compares the current situation that is easily observed with that which prevailed in 2000-01. It has become possible thanks to the rediscovery of two years of annotated monthly records that provide a clear record of the situation that prevailed at that time. An individual's impression of the changes over time may easily become distorted, unbalanced or incomplete unless the past situation is adequately documented. The paper is able to draw the conclusion (one mildly surprising to its author) that a great many more species are experiencing local increases than decreases. While these species may not usually be of particular interest to enthusiasts of rarities, they are an important part of a healthy bird population in the Hunter Region.

## INTRODUCTION

Bolwarra is a suburb of Maitland to the north-west of the Hunter River crossing at Belmore Bridge, Lorn. The bird population is influenced by the presence of the river (upstream of Maitland) on its western side, and the riverside vegetation provides a corridor by which species that depend on trees may find their way to established suburban properties and their relatively leafy gardens with significant trees. A little new housing in Bolwarra itself has not significantly changed the village's environment in the past seventeen years, while tree-planting by a Landcare group active in the 1990s and by those associated with Bolwarra Public School has certainly improved the habitat for many species. Bolwarra lagoon, covering a substantial area east of the river and to the north-west of the sporting complex, used to be the site of a sewage treatment plant, though this has now closed, resulting in fluctuating water levels and a variety of waterside vegetation. It can dry out in times of exceptional drought, offering short-term foraging opportunities for a number of species as it does so. Hands Lagoon, between Paterson Road and Maitland Road (see **Figure 1**), in fact consists of three ponds that separate the main road to Tocal and Woodville from the village proper; one pond dries out quite quickly, another will do so in times of drought, and the third has almost done so during the drought of 2006-07. Open country in the vicinity of the northern lagoon is now grazed only by kangaroos, and bird life there is limited, while the Hunter Flats to the south and east may attract a variety of species depending on land use, and are particularly valuable at times when crops need irrigation. The river is again present just beyond the flats to the south-east, after curling between Maitland and Lorn, though here it provides only limited cover for shy species.

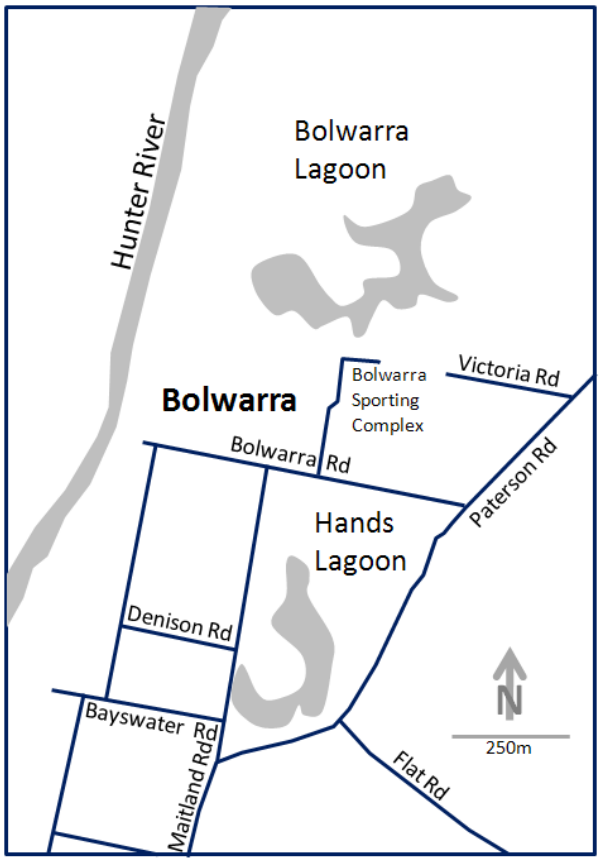


**Figure 1**: Map of area concerned

The variety of habitats offered by the suburb attracts many bird species, whether as residents, seasonal visitors, or migrants, and gives an indication of the potential significance of habitat created by low-density housing areas. Of particular interest is the growing ability of many species to adapt to the garden environment together with surrounding wetlands and agricultural land. In 2000 there were 122 species recorded, with monthly counts between 64 and 95; in 2001 there were 135 species recorded, with monthly counts always between 70 and 77.

## METHODS

Regular walks along publicly accessible routes during the period 1994-2011, supplemented by continuous interest in the species around my garden (close to the intersection of Bolwarra and Paterson Roads), have enabled the development not only of an increasingly accurate picture of the bird-life of the suburb, but also of a sense of the way in which it is changing. The survival of a monthly list of species for the years 2000 and 2001 makes comparison relatively easy. These records cover 23 months, since I was away during August 2001. The fact that rainfall in these two years was neither particularly wet nor particularly dry gives greater validity to its use as a base line for the comparison. According to the figures for Tocal, 1998-99 was a particularly wet period, while 2002-03 was quite dry; average years are required if a balanced picture is to be achieved, since the Maitland area's climate has more in common with the Upper Hunter in dry years and with the coast in wet years, with corresponding fluctuations in bird populations.

During other years many significant records, whether from myself or from others, have been reported to the Hunter Bird Observers Club (HBOC) and recorded in their Annual Bird Reports (ABRs), providing a supplementary source of data. Further supplementary observations, based once again on monthly records, have been made available to me by local resident Keith Howard. It is important to note that he was based on the western side of Bolwarra (just north of Denison Road) while I was based on the eastern side, and that one is inevitably spending more time in and around one's home. As a consequence, his records give greater prominence to the birds that prefer a damper or more thickly vegetated situation, while my records give better coverage of the eastern side. For recent times I lack the previous rigour of monthly records, but I continue to watch the same areas of the suburb, keeping notable records in diaries; naturally these records have been particularly likely to take note of any species that has previously been unusual for the area, and of numbers that had hitherto seemed exceptional.

Particular emphasis has been paid in this study to species other than passing rarities, since the value of the habitat is primarily determined by its ability to support a species on a permanent or regularly recurring basis. Birds have been treated in families. Results have been tabled in an **Appendix**, giving the number of months that I recorded the species for the period 2000-01 (out of 23), with notes on its local status then and now.

## RESULTS

### Non-Passerines

#### Quail

Both Brown Quail *Coturnix ypsilophora* and Stubble Quail *Coturnix pectoralis* have been recorded intermittently, usually as species heard only. The latter has become much more common since I first puzzled over the source of its then unfamiliar but distinctive call in January 2000. Stubble Quail has been more widely reported in the Hunter Region since that time, with fewer than four records annually in the years 1995-2000 and none reported in 1997 or 1998 (Stuart 1996-2010), but increased records thereafter spiking in the drought year 2006. Since calls have often been audible from my front garden since that time, it is unlikely that I had overlooked the species to any considerable extent beforehand, and it is therefore safe to conclude that it is now much commoner locally than it could have been before. However, it is liable to arrive in spring in dry years, but otherwise not until summer. The six months in 2000 and 2001 when I recorded it locally are all from the December-March period.

#### Ducks and Swans

In 2000-01 Black Swan *Cygnus atratus*, Australian Wood Duck *Chenonetta jubata*, Pacific Black Duck *Anas superciliosa*, and Grey Teal *Anas gracilis* were present in all months, though Chestnut Teal *Anas castanea* was much less abundant and, like Hardhead *Aythya australis*, occasionally absent in 2000. Wandering Whistling-Duck *Dendrocygna arcuata* and Australasian Shoveler *Anas rhynchotis* were occasionally recorded. A Mallard-type was also recorded for a while. Apart from the disappearance of this last species and an increase in the numbers of Chestnut Teal relative to Grey Teal, no on-going changes have been noted. There have of course been habitat changes relating to water levels in and external to the study area, such as the suitability of breeding conditions west of the Great Dividing Range. Throughout the study other duck species have occasionally been recorded for brief periods.

## Cormorants and Pelicans

The Little Black Cormorant *Phalacrocorax sulcirostris* and Little Pied Cormorant *Microcarbo melanoleucos*, like the Australian Pelican *Pelecanus conspicillatus*, were recorded throughout 2000-01, with Great Cormorants *Phalacrocorax carbo* present less often. Unusually, there were stray Pied Cormorant *Phalacrocorax varius* records for a period of two months. Darter *Anhinga novaehollandiae* was recorded fairly often. It is not felt that the situation has changed greatly, except after the drying out of lagoons has resulted in the killing off of fish stocks, though pelicans may be absent when there is flooding inland.

## Grebes

The Australasian Grebe *Tachybaptus novae-hollandiae* was recorded in all months, while the Hoary-headed Grebe *Poliocephalus poliocephalus* was recorded only in three, a pattern still considered normal.

## Pigeons and Doves

Apart from feral species, only the Crested Pigeon *Ocyphaps lophotes* was constantly present. The Bar-shouldered Dove *Geopelia humeralis* and the White-headed Pigeon *Columba leucomela* were occasionally recorded, though the latter species was present for thirteen consecutive months, visiting Keith Howard's property (pers. comm.). Hence, while my records do not indicate any noticeable change, there may have been a decline in White-headed Pigeon.

## Herons and their allies

In 2000-01 the White-faced Heron *Egretta novaehollandiae* was recorded in all months, with a maximum count of 60, while the White-necked Heron *Ardea pacifica* was intermittent. The Intermediate Egret *Ardea intermedia* and Cattle Egret *Ardea ibis* were also recorded in all months, while the Little Egret *Egretta garzetta* and the Eastern Great Egret *Ardea modesta* were less common. Bitterns were not recorded, though both Australasian Bittern *Botaurus poiciloptilus* and Australian Little Bittern *Ixobrychus dubius* have been known to visit (Stuart 2000 & 2007), as well as a Black Bittern *Ixobrychus flavicollis* in 2007 (Keith Howard, pers. comm.). I did not see the locally rare Nankeen Night-Heron *Nycticorax caledonicus* during that period, though it visited at least twice (K. Howard, pers. comm.). My current impression is of an increase in Little Egrets relative to Intermediate Egrets. Nest numbers at the Hunter Wetlands Centre Australia confirm a fluctuating decline of Intermediate Egret as a Hunter Region breeding species between 1999-2000 and 2009-10, but offer no evidence that Little Egret has increased (Stuart 1996-2010). The Australian White Ibis *Threskiornis molucca* was usually recorded, as was the Straw-necked Ibis *Threskiornis spinicollis*; the former remains common near the lagoons, the latter abundant in the fields. The Royal Spoonbill *Platalea regia* was recorded in all months with a maximum count of 20, and the Yellow-billed Spoonbill *Platalea flavipes* occasionally (maximum 3 birds). Considerable variation is expected in these species according to conditions, but no long-term trends have yet been established.

## Diurnal Raptors

Of the 21 species currently on the local Hunter Region list 15 were recorded in 2000-01, the most frequent being Australian Hobby *Falco longipennis*, then Nankeen Kestrel *Falco cenchroides*, Black-shouldered Kite *Elanus axillaris*, Collared Sparrowhawk *Accipiter cirrocephalus* and Peregrine Falcon *Falco peregrinus*. Somewhat less usual were White-bellied Sea-Eagle *Haliaeetus leucogaster*, Brown Goshawk *Accipiter fasciatus*, Wedge-tailed Eagle *Aquila audax*, Swamp Harrier *Circus approximans* and Spotted Harrier *Circus assimilis*. The Square-tailed Kite *Lophoictinia isura* was securely recorded for the first time in 2001, and occasional sightings continued for a while thereafter, but the species has not been recorded in recent years.

It was in the records for 2000 that I had downgraded the status of Little Eagle *Hieraaetus morphnoides* to 'Now uncommon'; after being a familiar bird since 1994, it was recorded only 5 times that year and 3 times in 2001. Records had dropped further, but seem to have risen again recently, perhaps to 2000-01 levels but no more. The extent to which this species has suffered a decline in the Hunter Region is uncertain (Roderick & Stuart 2010), but the Bolwarra results agree well with trends that began to be published in 2005 in the ACT (Olsen & Fuentes 2005, Olsen & Osgood 2006), culminating in the nomination of the species for threatened species status in the ACT (Bounds 2008) and NSW (Debus & Soderquist 2008) and its eventual listing as vulnerable both there (2008) and here (2010). If vanishing rabbits, dying from calicivirus (*Lagovirus* spp.), had been partly responsible for

its decline (cf. Roderick & Stuart 2010: 3), it may be that the subsequent recovery of rabbits has by now assisted an incremental local recovery, matching a slight improvement already felt in the 2007 season in the ACT (Olsen *et al.* 2008).

The Peregrine Falcon is certainly not recorded as often in recent years, but it had usually been sighted attacking flocks of Rock Doves *Columba livia*, which have now been successfully expelled from some local barns. The Black Falcon *Falco subniger*, which was not recorded until 2002, has been sighted occasionally since then. While I feel confident that I recorded the Grey Falcon *Falco hypoleucos* in May 2001 the record was deemed to lack sufficient detail to be accepted as the first confirmed record of the species in the Hunter Region. Brown Falcon *Falco berigora*, was then uncommon locally, as was Grey Goshawk *Accipiter novaehollandiae*, and neither position has changed.

## Crakes and Rails

Purple Swamphen *Porphyrio porphyrio*, Dusky Moorhen *Gallinula tenebrosa*, and Eurasian Coot *Fulica atra* were always to be found. Hands Lagoon could be home to very large numbers of coot in particular, though they are now much reduced. No other members of the family were recorded, though Bolwarra Lagoon has more recently been visited by most Hunter Region crakes and rails, a sign perhaps of improved hydrology.

## Snipe, Stilts, Plovers and Lapwings

Surprisingly, Latham's Snipe *Gallinago hardwickii* was not recorded in 2000-01, though it had been seen most years previously, but changes in hydrology at Bolwarra Lagoon have since increased the chances of this species being present in reasonable numbers (to a maximum of 17 in December 2009 [Stuart 2010]). Species recorded were Black-winged Stilt *Himantopus himantopus*, Masked Lapwing *Vanellus miles*, Black-fronted Dotterel *Elseyornis melanops*, and three Red-necked Avocet *Recurvirostra novaehollandiae* that once appeared on Bolwarra Lagoon, while about 15 Banded Lapwing *Vanellus tricolor* were once recorded along Flat Road. Of these species the Black-fronted Dotterel, then classed as 'common', is suspected of being in long-term decline locally, and Keith Howard's records show that Black-winged Stilt have failed to use the lagoons regularly since the 2006-07 drought (pers. comm.). Other migratory and non-migratory waders have been present occasionally in response to favourable conditions.

## Cockatoos, Lorikeets and Parrots

The description 'now common' in records for 2000 suggests that the Yellow-tailed Black-Cockatoo *Calyptorhynchus funereus* had been increasing. It was present in eight months that year and all months the following year. It is still seen or heard very regularly, but usually in small numbers. It was then marginally more often recorded than the Sulphur-crested Cockatoo *Cacatua galerita*, but the latter has increased more noticeably since. Little Corella *Cacatua sanguinea*, then described as 'uncommon' locally, was nevertheless recorded quite often, to a maximum of six birds, but Long-billed Corella *Cacatua tenuirostris* was absent in one month only, with up to 80 birds present. The latter species is now even more common than before, and during the period of writing I have regularly witnessed flocks of 150 birds or more. Galahs *Eolophus roseicapillus*, first recorded locally by Keith Howard in 1980 (pers. comm.), were, and still are, always present, often in very large numbers.

Rainbow Lorikeets *Trichoglossus haematodus* were the only lorikeet species present, being recorded in five months in 2000, resulting in my revising its local status from 'uncommon' to 'common', and seven months in 2001. It was usually absent here when I moved into the area in 1994, but now it seems to be permanently present. Musk Lorikeets *Glossopsitta concinna* are now recorded in several months each year, especially in autumn, while Little Lorikeets *Glossopsitta pusilla* are seen somewhat less frequently, mostly overflying. Both species typically appear in numbers between six and twenty. Scaly-breasted Lorikeets *Trichoglossus chlorolepidotus*, however, are still only occasionally found locally. The obvious conclusion is that lorikeets are adapting rapidly to the nectar resources of garden areas with an increasing range of flowering trees.

Australian King-Parrot *Alisterus scapularis*, Red-rumped Parrot *Psephotus haematonotus*, and Eastern Rosella *Platycercus eximius* were also common in 2000. Crimson Rosella *Platycercus elegans*, which subsequently has occasionally strayed into the area, was not recorded. Very little has changed since, and apart from the lorikeets and an occasional vagrant or escapee, no new parrot species has arrived.

### Cuckoos

The presence of cuckoos is hard to overlook in the spring months, with Eastern Koels *Eudynamys orientalis* (present Oct.–Feb. both years) and Channel-billed Cuckoos *Scythrops novae-hollandiae* (present in three of these months both years) making the most impact. For Horsfield's Bronze-Cuckoo *Chalcites basalis* there were three end-of-year records, and Shining Bronze-Cuckoo *Chalcites lucidus* appeared in September 2001. Pallid Cuckoo *Cacomantis pallidus* appeared in only one spring month both years, while Fan-tailed Cuckoo *Cacomantis flabelliformis* was present in three widely separated months. While there are variations from year to year attributed to changing weather patterns, there has not been much overall change.

### Night Birds

Unless targeted searches are made night birds are usually under-recorded. Even so, Southern Boobooks *Ninox novaeseelandiae* were often recorded up until October 2000, and thereafter only in February 2001. It has never been a 'regular' since. Barking Owl *Ninox connivens* has not been heard clearly since 1994. What was believed to have been a Powerful Owl *Ninox strenua* was heard in the distance in March 2000, and an Eastern Barn Owl *Tyto javanica* was heard in April 2001, but neither species appears to stay in the area. There were Australian Owlet-nightjar *Aegotheles cristatus* records in November of both 2000 and 2001, but it has not been heard in recent years. I did not record Tawny Frogmouths *Podargus strigoides* during those years, but a White-throated Nightjar *Eurostopodus mystacalis* was present in December 2001. It is difficult to escape the conclusion that the fortunes of nocturnal birds have declined since that time, and the clearing of degraded bushland for housing at Bolwarra Heights may be related. At the time of the environmental impact assessment for this development it became clear that the area hosted an unexpectedly large population of gliders, as well as being an important home for insect-eating bats, and such bats are seldom seen in the area now.

### Kingfishers, Dollarbirds and Bee-eaters

In 2000-01 Laughing Kookaburras *Dacelo novaeguineae* were always present; Sacred Kingfisher *Todiramphus sanctus* and Dollarbird *Eurystomus orientalis* were recorded, neither of them between April and September; there was one December record for Rainbow Bee-eater *Merops ornatus*. This pattern is similar to the present position. Azure Kingfisher *Ceyx azureus*, though occasionally recorded outside these years, has never been a regular.

### Other Non-Passerines

A Caspian Tern *Hydroprogne caspia* was present in October 2000. The species has appeared in other years, but no tern or gull species has in any year been recorded regularly. While Silver Gulls *Chroicocephalus novaehollandiae* may be found in large numbers at Maitland Waste Management Facility at East Maitland, I can recall only two Bolwarra sightings of single birds, while Keith Howard (pers. comm.) has recorded it just once but in greater numbers. White-throated Needletail *Hirundapus caudacutus* was recorded occas-ionally, from November to February; at no stage has it been more regular.

## Passerines

### Bowerbirds

The Satin Bowerbird *Ptilonorhynchus violaceus* is now a familiar species locally, seen at any time of year. It was a surprise, therefore, to discover that it was often difficult to find in 2000-01, in spite of the fact that a nest was discovered in November 2001. An active bower has often been present, and young have frequently been raised in recent years. Given the increased habitat provided by maturing tree-plantings, it is not surprising that the species is increasing. Of two reports of the Regent Bowerbird *Sericulus chrysocephalus* appearing locally, one was in 2000 (Keith Howard, pers. comm.).

### Fairy-wrens, Scrubwrens, Pardalotes, Thornbills and Gerygones

The constantly present Superb Fairy-wren *Malurus cyaneus* has alone represented this family, while White-browed Scrubwren *Sericornis frontalis* were occasional. The Striated Pardalote *Pardalotus striatus* was much commoner than the Spotted Pardalote *Pardalotus punctatus*, and has almost always been present. The Spotted Pardalote has been heard more frequently of late, though it remains uncommon locally. Of the thornbills, I could find only Yellow Thornbill *Acanthiza nana* and Yellow-rumped Thornbill *Acanthiza chrysorrhoa* in 1994, and both were recorded each month in 2000-01; Brown Thornbill *Acanthiza*

*pusilla* was recorded, but once only. White-throated Gerygone *Gerygone albogularis* visited from September to March. Recently there has been a considerable increase in records of the Brown Thornbill, and a suspicion of a decline in the White-throated Gerygone.

## Honeyeaters

Many nectar-feeders move in search of suitable blossom, so that only with caution can trends be postulated. Of the larger honeyeaters Red Wattlebird *Anthochaera carunculata* and Blue-faced Honeyeater *Entomyzon cyanotis* were continuously present in 2000-01, while the irruptive Noisy Friarbird *Philemon corniculatus* was commoner in 2000 than in 2001. There were near-continuous winter records for Yellow-faced Honeyeater *Lichenostomus chrysops* in both years, but the bird did not (and still does not) regard the suburb as suitable breeding territory. There were just two records in April and August for White-naped Honeyeater *Melithreptus lunatus*, and a single October record for Brown-headed Honeyeater *Melithreptus brevirostris*, as also for Scarlet Honeyeater *Myzomela sanguinolenta*. Keith Howard (pers. comm.) once recorded Lewin's Honeyeater *Meliphaga lewinii* in 2000-01. Eastern Spinebill *Acanthorhynchus tenuirostris*, then regarded as locally 'uncommon', was nevertheless regularly recorded, and I should now class it as 'common'. I now see both the Eastern Spinebill and the Scarlet Honeyeater with some regularity, though in the latter case Keith Howard (pers. comm.) has been recording them less, probably illustrating different trends in different parts of the suburb. However, the more striking increases have been in the Striped Honeyeater *Plectorhyncha lanceolata*, absent in 2000-01 but quite often present over the last three to four years, and White-plumed Honeyeater *Lichenostomus penicillatus*, originally absent, 'uncommon' in 2000-01, and now permanently present. Both these species have nested in recent years. The fact that Bolwarra itself has not been colonized by Noisy Miners *Manorina melanocephala*, common in Bolwarra Heights, has no doubt been to the advantage of the smaller honeyeaters.

## Whistlers, Flycatchers and Fantails

I had formerly been aware of visits from both Rufous Whistler *Pachycephala rufiventris* and Golden Whistler *Pachycephala pectoralis* during the winter months. Though the normal status of Rufous Whistler is that of a summer visitor to the Hunter Region, the Bolwarra winter records suggest that for some birds it may be enough to move nearer to the coast and to a lower altitude. In 2000, however, I continued to record it into spring, and it now appears to breed regularly. A Restless Flycatcher *Myiagra inquieta* had wintered in Bolwarra regularly, and during 2000 was found in all months April to August. The bird did not reappear in 2001, and none now visits us at any time of year. Since I suspect that we are talking about a single bird it is impossible to deduce any trends from this. Related species such as Leaden Flycatcher *Myiagra rubecula* and Black-faced Monarch *Monarcha melanopsis* have occasionally been seen on migration before and since, but none was recorded during 2000-01; there was, however, a single 2001 record for Rufous Fantail *Rhipidura rufifrons*, while K. Howard (pers. comm.) recorded Rose Robin *Petroica rosea* in the winter of 2000. In 2001 the Grey Fantail *Rhipidura albiscapa* was recorded in all months for the first time, but not in February or September 2000. The species has been becoming more prolific locally, and can now be found in my garden most days. Hence it is now probably commoner in the leafy parts of Bolwarra than the Willie Wagtail *Rhipidura leucophrys*, which has always been in residence. This increase in the Grey Fantail came over a period when it was becoming noticeably less common in surveys of Hunter woodlands. For instance, regular surveys of a site at Vacy (32°30'55"S, 151°32'20"E) between 2003 and 2009 saw the reporting rate drop to below 50% in 2005-08, and when it was recorded it was listed later in my surveys, suggesting decreased visibility. The reporting rate for the species also decreased on my upper Hunter surveys (Tarrant 2008: 25), and aspects of the decline have been of concern in other studies (M. Newman, pers. comm.).

## Cuckoo-shrikes

Only the Black-faced Cuckoo-shrike *Coracina novaehollandiae* is resident, and its absence has never been observed. On the other hand the White-winger Triller *Lalage sueurii* is a summer migrant whose presence cannot be guaranteed, but it is hard to overlook when it is there. At least eight birds had arrived in October 2000. It bred locally in the 1999-2000 and 2000-01 seasons, with young fledging in both cases, but moved on after appearing in October 2001. In 2010-11 it did not appear at all, but almost certainly this reflects conditions locally and elsewhere, not any long-term trend. It was absent from other Hunter sites where I generally record it, and indeed unrecorded across the Hunter Region from March to December 2010 (Stuart 2011).

## Orioles and Figbirds

Both the Australasian Figbird *Sphecotheres vieilloti* and the Olive-backed Oriole *Oriolus sagittatus* were usually present, and the position is still much the same. Their temporary absences are probably due to the lack of preferred food, for the only months when the figbird was not recorded (March-April 2000) fell in the middle of a 6-month absence (February-July) of the oriole. No trends can be ascertained, though an increase in trees and shrubs has probably assisted both species.

## Butcherbirds, Magpies and Currawongs

Both the Pied Butcherbird *Cracticus nigrogularis* and the Grey Butcherbird *Cracticus torquatus* breed locally, and were usually recorded. The Australian Magpie *Cracticus tibicen* has always been common as is to be expected. Only the Pied Currawong *Strepera graculina* has had a change in status, for in 1994 it had been a hard bird to find at all, and was regarded as an uncommon winter visitor in 2000-01, appearing only between April and August. It has become commoner and at least one pair has been present all through the spring and summer for two consecutive years.

## Crows and Ravens

Only Australian Raven *Corvus coronoides* had been recorded up to and including 2000-01. The only new species reliably recorded has been the Torresian Crow *Corvus orru*, which is occasionally seen and heard overflying.

## Pipits

Australasian Pipit *Anthus novaeseelandiae* was still classed as common in 2000-01, and, though it was seldom seen, one acknowledged that its natural home was in the surrounding fields. Though a few birds may still be seen in the area of Flat Road, it has disappeared from some areas where it used to be seen and where habitat would still appear suitable.

## Australian Finches

It was the Zebra Finch *Taeniopygia guttata* that was most recorded in 2000-01 (maximum eight), rather than the Red-browed Finch *Neochmia temporalis* or the locally rare Double-barred Finch *Taeniopygia bichenovii*. Though the Zebra Finch may still be found in greater numbers (though at a decreasing number of sites), the Red-browed Finch now breeds in my garden and elsewhere, and it would certainly be recorded most months. Only in the case of the Red-browed Finch would I postulate any change in status.

## Swallows and Martins

The Welcome Swallow *Hirundo neoxena* has always been a common bird, readily recorded, and the White-backed Swallow *Cheromoeca leucosterna* an occasional vagrant. Of the martins, the Tree Martin *Petrochelidon nigricans* was often recorded in 2000-01 throughout the year, and the Fairy Martin *Petrochelidon ariel* was recorded only once (Sept. 2000). However, there is a favourite nesting site for this species just across the river, and as a result the birds regularly stray across at the western side of the suburb (K. Howard, pers. comm.).

## Old World Warblers

In 2000-01 this family was represented by four regular species: Little Grassbird *Megalurus gramineus*, Tawny Grassbird *Megalurus timoriensis*, Australian Reed-Warbler *Acrocephalus australis*, and Golden-headed Cisticola *Cisticola exilis*. Only the last would appear easier to find now, the reed-warbler seems to over-winter less frequently, and both grassbirds may be in local decline. The picture has been balanced by the addition of Rufous Songlark *Cincloramphus mathewsi* and Brown Songlark *Cincloramphus cruralis* to the list as spring and summer visitors in drier years since 2006.

## Other Native Passerine Species

The Silvereye *Zosterops lateralis* was always present in 2000-01, and no change has been noted. Mistletoebird *Dicaeum hirundinaceum* did not appear in 2000-01, but has occasionally done so both before and after. Horsfield's Bushlark *Mirafra javanica* has occasionally appeared since late 2006, having been absent up until then. White-winged Choughs *Corcorax melanorhamphos* occasionally stray into the area from adjacent suburbs, but were not recorded in 2000-01.

## Feral Species

Though all the widespread feral species are present, it is worth mentioning that the European Goldfinch *Carduelis carduelis* was almost always recorded in 2000-01, in numbers up to 30, but has since become much harder to find. Keith Howard (pers. comm.) relates this to the clearing of thistles from Water Board land in 2002. The Common

Blackbird *Turdus merula* was not present during that period, but can now be heard singing every spring and summer, mainly at the Maitland end of Bolwarra.

## DISCUSSION

While the status of much of the bird life of the area has remained constant over the last decade, there are some striking exceptions, sometimes indicative of wider trends.

- The Restless Flycatcher that was once regular has disappeared, or nearly so.
- The following species have undergone a noticeable decline (whether numerically or by months present), or are contracting their range: Intermediate Egret, Peregrine Falcon, Black-winged Stilt, Black-fronted Dotterel, Southern Boobook, Australasian Pipit, Little Grassbird, Tawny Grassbird, Australian Reed-Warbler, European Goldfinch.
- The following species have undergone a noticeable increase in observations (whether numerically or by months present), or expansion of range: Stubble Quail, Little Egret, Latham's Snipe, Yellow-tailed Black Cockatoo, Sulphur-crested Cockatoo, Little Corella, Rainbow Lorikeet, Musk Lorikeet, Spotted Pardalote, Brown Thornbill, White-plumed Honeyeater, Eastern Spinebill, Grey Fantail, Rufous Whistler, Pied Currawong, Satin Bowerbird, Red-browed Finch.
- The following species are new to the list and could be regarded as normal now, given the right season or right conditions: Black Falcon, Striped Honeyeater, Torresian Crow, Singing Bushlark, Rufous and Brown Songlarks, Common Blackbird.

The list of birds that are new or increasing their presence is far more impressive than the list of those that are declining. None of those in decline could naturally be described as 'garden birds'; rather, it contains birds of the lagoons and fields: but by no means all of them. No doubt land use affects the population of the fields, and water levels here and elsewhere affect what is found around the lagoons.

A word should be said about the number of species listed in NSW under the *Threatened Species Conservation Act* 1995 which have been recorded locally at some time. These include Australasian Bittern, Black Bittern, Square-tailed Kite, Spotted Harrier, Little Eagle, Grey Falcon (unconfirmed) and Barking Owl. While not recorded in 2000-2001, Freckled Duck *Stictonetta naevosa* have occasionally been recorded since. Keith Howard (pers. comm.) has also twice recorded Black-necked Stork *Ephippiorhynchus asiaticus*. It is not claimed that the area has ever provided critical habitat for threatened species, merely that it is an area that they have been able to use at times.

## CONCLUSIONS

The increase in the birds using garden areas of Bolwarra, and tree-plantings in public areas such as the sports field and Bolwarra Lagoon, confirms the considerable importance of 'green suburbs' for adaptable species, in the Hunter Region and no doubt elsewhere. It is one of the few habitat types of which it can generally be said that its avian species are thriving. Efforts should therefore be made to ensure that greener, low-density housing areas, particularly those that are adjacent to other environmental assets, such as creeks, lagoons, and vegetation corridors, remain low density into the future.

Monitoring of such areas on an on-going basis is not only a rewarding experience, but could provide an early indication of trends affecting the wider region and even the state as a whole. Greater alertness to the significance of the local decline of Little Eagles, as documented above, might have enabled an earlier appreciation of its vulnerability. If one takes the regional position as documented by reports to HBOC, one gets no hint of a decline until 2005, for until then the annual reporting rate of the species was considered too high to justify the listing of all records in the ABRs for 2001, 2003, and 2004. Since 2005 the reporting rate has dropped below the threshold of 12 annual observations and all records have been noted (Stuart 1996-2010).

Naturally local records can also alert one to regional population increases. In this case I note that the recent appearance of Striped Honeyeater in the Bolwarra area agrees well with the fact that it has in recent years been recorded at 9% more surveys at one of my Doyles Creek (Upper Hunter) sites and 43% more at the other (Tarrant 2008), while it has come to be regularly recorded after an initial absence at both my Martindale sites during the dozen years that I have surveyed them. Again, the arrival of Torresian Crows in Bolwarra and surrounding area, and into the Vacy area where I also conduct regular surveys, is paralleled by its

spread along the coast to south of the Hunter River (Stuart 1996-2011).

One must emphasise here that while it is easy to notice an influx of a new species into the area, the only guarantee that local decline will be noticed quickly is the keeping of systematic records, and their regular review.

## ACKNOWLEDGEMENTS

Particular thanks are due to Keith Howard, who was able to comment on this paper from the perspective of monthly records for a slightly more limited area of Bolwarra, but over a far longer period.

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## APPENDIX: List of common species at Bolwarra

This list includes species recorded by the author for at least three months during 2000-01, plus those that could now be recorded for three months in a period of two years. The list is not intended to cover all species that can be found in Bolwarra. For species found that could only be recorded in summer or in winter months at that time an S or W has been added to their status.

| **Species Name** | **Months, 2000-01** | **Status as on 2001 list*** | **Changes, 2009-11** |
|---|---|---|---|
| Stubble Quail | 6 | Uncommon S | irruptive summer |
| Wandering Whistling-Duck | 4 | Rare | |
| Black Swan | 23 | Common | |
| Australian Wood Duck | 23 | Common | |
| Australasian Shoveler | 2 | Uncommon | |
| Grey Teal | 23 | Common | possible decrease |
| Chestnut Teal | 19 | Common | increased |
| Mallard-type | 12 | Uncommon | disappeared |
| Pacific Black Duck | 23 | Common | |
| Hardhead | 17 | Common | |
| Australasian Grebe | 23 | Common | |
| Hoary-headed Grebe | 3 | Uncommon W | |
| White-headed Pigeon | 4 | Uncommon | possible decrease |
| Crested Pigeon | 23 | Common | |
| Bar-shouldered Dove | 3 | Uncommon | |
| White-throated Needletail | 3 | Uncommon | |
| Darter | 9 | Common | |
| Little Pied Cormorant | 23 | Common | |
| Great Cormorant | 8 | Common | |
| Little Black Cormorant | 23 | Common | |

## Appendix: List of common species at Bolwarra (cont.)

| Species Name | Months, 2000-01 | Status as on 2001 list* | Changes, 2009-11 |
|---|---|---|---|
| Australian Pelican | 23 | Common | often absent |
| White-necked Heron | 7 | Uncommon | fluctuates |
| Eastern Great Egret | 11 | Common | |
| Intermediate Egret | 23 | Common | decreased |
| Cattle Egret | 23 | Common | winter roost established |
| White-faced Heron | 23 | Common | |
| Little Egret | 14 | Uncommon | possible increase |
| Australian White Ibis | 18 | Common | |
| Straw-necked Ibis | 22 | Common | |
| Royal Spoonbill | 23 | Common | |
| Yellow-billed Spoonbill | 7 | Uncommon | fluctuates |
| Black-shouldered Kite | 19 | Common | decreased |
| Square-tailed Kite | 3 | Uncommon | no recent records |
| White-bellied Sea-Eagle | 9 | Common | |
| Whistling Kite | 7 | Common | possible decrease |
| Brown Goshawk | 7 | Common | |
| Collared Sparrowhawk | 14 | Common | |
| Spotted Harrier | 4 | Uncommon | no recent records |
| Swamp Harrier | 5 | Uncommon | |
| Wedge-tailed Eagle | 6 | Common | |
| Little Eagle | 8 | 2000: 'Now uncommon'* | records scarce |
| Nankeen Kestrel | 19 | Common | possible increase |
| Brown Falcon | 3 | Uncommon | |
| Australian Hobby | 20 | Common | |
| Peregrine Falcon | 13 | Common* | slight decrease |
| Purple Swamphen | 23 | Common | |
| Dusky Moorhen | 23 | Common | |
| Eurasian Coot | 23 | Common | decreased |
| Black-winged Stilt | 23 | Common | sharp decline |
| Black-fronted Dotterel | 10 | Common | decline |
| Masked Lapwing | 23 | Common | |
| Latham's Snipe | 0 | Uncommon S* | increasing |
| Yellow-tailed Black-Cockatoo | 8 | Becoming common | more common |
| Galah | 23 | Common | |
| Long-billed Corella | 22 | Common | still increasing |
| Little Corella | 8 | Common | increasing |
| Sulphur-crested Cockatoo | 15 | Common | increasing |
| Rainbow Lorikeet | 12 | Common | increasing |
| Musk Lorikeet | 0 | Absent | usual, irruptive |
| Australian King-Parrot | 21 | Common* | |
| Eastern Rosella | 23 | Common | |
| Red-rumped Parrot | 17 | Common | |
| Eastern Koel | 10 | Common S | increasing |
| Channel-billed Cuckoo | 6 | Common S | |
| Fan-tailed Cuckoo | 3 | Uncommon | |
| Southern Boobook | 8 | Common | sharp decrease |
| Laughing Kookaburra | 23 | Common | |
| Sacred Kingfisher | 6 | Common S | |
| Dollarbird | 9 | Common S | |
| Satin Bowerbird | 13 | Common | increased |
| Superb Fairy-wren | 23 | Common | |
| White-browed Scrubwren | 4 | Uncommon | |
| White-throated Gerygone | 6 | Common S | decreased |
| Yellow Thornbill | 23 | Common | |

## Appendix: List of common species at Bolwarra (cont.)

| Species Name | Months, 2000-01 | Status as on 2001 list* | Changes, 2009-11 |
|---|---|---|---|
| Yellow-rumped Thornbill | 23 | Common | |
| Brown Thornbill | 1 | Uncommon | now usual |
| Spotted Pardalote | 2 | Uncommon | increased |
| Striated Pardalote | 20 | Common | |
| Eastern Spinebill | 7 | Uncommon | now common |
| Yellow-faced Honeyeater | 11 | Common W | |
| White-plumed Honeyeater | 2 | Uncommon W | now common resident |
| Red Wattlebird | 23 | Common | |
| Scarlet Honeyeater | 1 | Uncommon | now more usual? |
| Blue-faced Honeyeater | 23 | Common | more widespread |
| Noisy Friarbird | 8 | Common | |
| Striped Honeyeater | 0 | Absent | uncommon, but has nested |
| Black-faced Cuckoo-shrike | 23 | Common | |
| White-winged Triller | 6 | Uncommon S | irruptive |
| Golden Whistler | 4 | Common W | |
| Rufous Whistler | 6 | Common | |
| Australasian Figbird | 21 | Common | |
| Olive-backed Oriole | 14 | Common | |
| Grey Butcherbird | 21 | Common | |
| Pied Butcherbird | 21 | Common | |
| Australian Magpie | 23 | Common | |
| Pied Currawong | 8 | Uncommon W | now common, found in summer |
| Grey Fantail | 21 | Common | |
| Willie Wagtail | 23 | Common | |
| Australian Raven | 23 | Common | |
| Torresian Crow | 0 | Absent | now uncommon |
| Restless Flycatcher | 5 | Uncommon W | disappeared |
| Magpie-lark | 23 | Common | |
| Golden-headed Cisticola | 17 | Common | |
| Australian Reed-Warbler | 20 | Common | |
| Tawny Grassbird | 11 | Uncommon | decreased |
| Little Grassbird | 12 | Common S* | decreased |
| Silvereye | 23 | Common | |
| Welcome Swallow | 23 | Common | |
| Tree Martin | 13 | Common | |
| Zebra Finch | 11 | Common | less widespread |
| Red-browed Finch | 9 | Common | increased |
| Australasian Pipit | 6 | Common | decreased |

* An asterisk marks corrections made to 2001 list, where an oversight could be established

# Changes in the bird populations of Blackbutt Reserve, 1973–2011

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This paper examines changes in species diversity and qualitative measures of their frequency of occurrence, for birds recorded in Blackbutt Reserve, New Lambton, New South Wales over a 38-year period. The paper draws on the 1973 records of A.J. Bailey, which were reviewed by W. Barden *et al.* in 1982 and again by G. Winning in 1985. These records are compared with the most recent listing for Blackbutt Reserve covering the period 2009–2011 which was compiled by Joy Nicholls with the assistance of Paddy Lightfoot and Judith Thomas of the Hunter Bird Observers Club and the Staff of Blackbutt Reserve. The 1982 list involves 106 species compared with 125 species in 2009–2011.

## INTRODUCTION

Blackbutt Reserve is an intra-urban Nature Reserve managed by Newcastle City Council. It was established in the 1930s on degraded land considered uneconomical for farmlets. With land prices as low as 10 pounds per acre, the New Lambton Progress Association and New Lambton Council purchased the land for a public reserve. 144 acres was gazetted as a Public Recreational Reserve in 1948. In 1949 another 70 acres were added. Richley Reserve, formerly the Borehole Colliery, was developed by the determined effort of a few committed individuals, notably Joe Richley after whom it is named, and the area slowly rehabilitated (Gilligan 1982).

With additional land parcels the Reserve today is over 200 ha in size (**Figure 1**). It is vigorously managed with a permanent service staff of nine supplemented by around 35 volunteer staff. There is an ongoing effort to remove lantana and other weeds, regenerate rainforest and establish suitable fire regimes. Richley Reserve is now renovated to picnic grounds and ponds, which sustain a number of waterbirds and animals. A similar site has been established off Carnley Avenue on the southern side of Blackbutt Reserve. There are three other smaller, less popular picnic / barbecue areas. Well-maintained tracks traverse the Reserve for the use of walkers. The major area of Blackbutt Reserve, other than the picnic areas, remains thick bush involving both rainforest areas and less thick, dry sclerophyll forest.

At the Carnley Avenue picnic grounds large aviaries have been established. These contain bird species from all over Australia, some of which are being bred and released back into the wild through conservation programs. The Bush Stone-curlew *Burhinus grallarius*, which is endangered in NSW is an example. These captive birds are not discussed here.

This paper considers the changes in species diversity and qualitative measures of their frequency of occurrence and abundance. The 1982 list revised by W. Barden *et al.* from the 1973 list compiled by A.J. Bailey (Winning 1985) contained 106 species, 15 of which have not been recorded for many years. In contrast the recent list just compiled (Nicholls *et al.* 2011) involves 125 species, of which 34 are new to the area. Birds in both lists that were vagrants or may have been recorded only once or twice are not discussed further.

## METHODS

Using available past records of bird species collated by experienced bird watchers, between 1973 and 1982, I have compared the changes with a current 2011 species list; looking specifically at the presence, absence and frequency of occurrence of species found in Blackbutt Reserve over a span of 38 years. I have also drawn on the records provided by Geoffrey Winning (Winning 1985) and the Hunter Region Annual Bird Report series (Stuart 1994-2010). Records from the Annual Bird Reports are subsequently attributed to Hunter Bird Observers Club (HBOC).

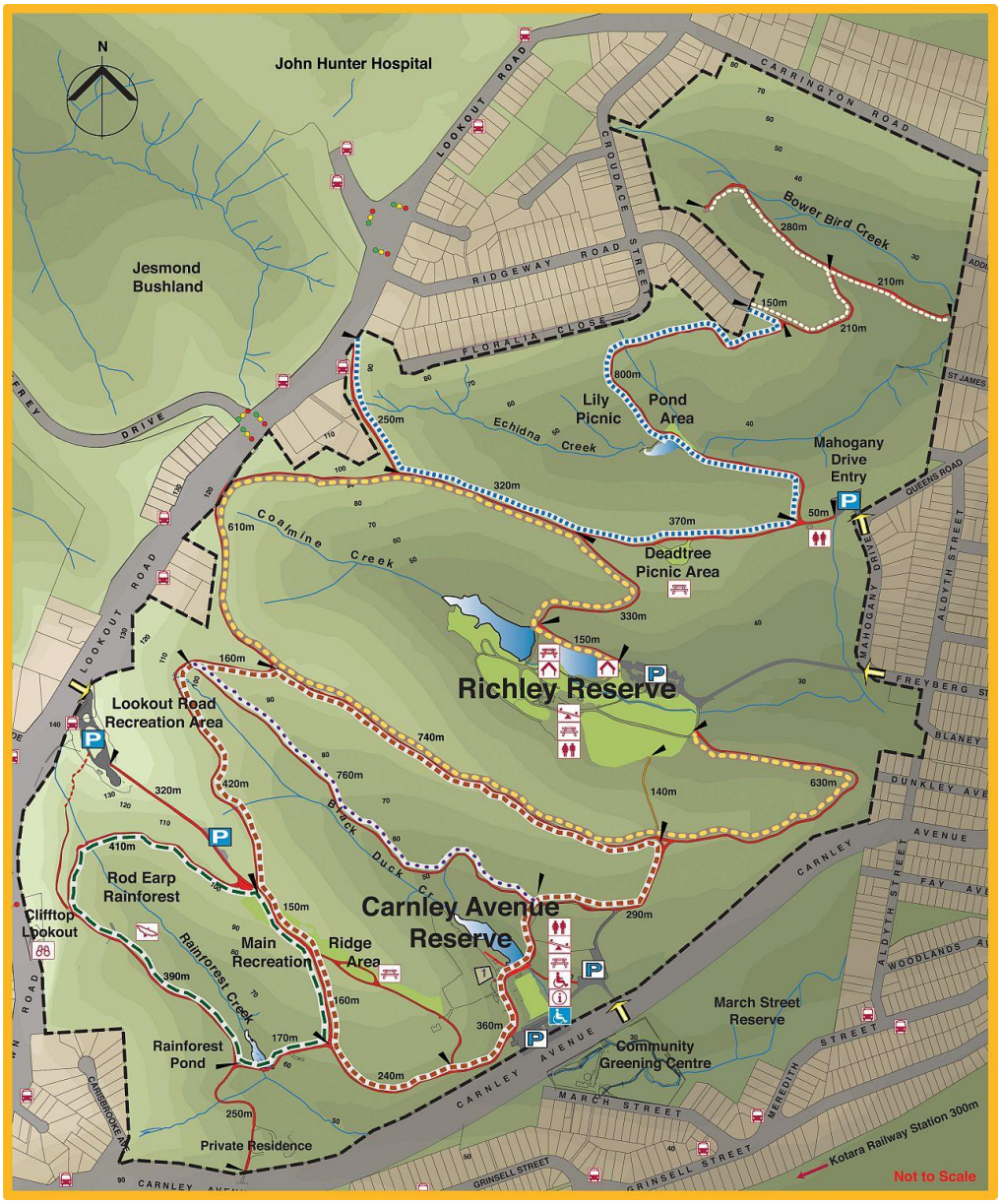


**Figure 1**. Blackbutt Reserve

Exact numbers have not been recorded, only a subjective estimate of the frequency of occurrence and where appropriate abundance of species, recorded as broad classes such as common or uncommon (see **Table 1**).

This paper looks at those species which over a 38-year period have:

- newly arrived at the Reserve;
- increased in numbers or in their use of the Reserve;
- ceased to be recorded in the Reserve;
- decreased in numbers or in their use of the Reserve;
- acquired an at-risk conservation status as classified by the NSW *Threatened Species Conservation Act 1995* (Roderick & Stuart 2010).

## RESULTS

### Introduced Species

Two species, Australian Brush Turkey *Alectura lathami* and Black Swan *Cygnus atratus* stand out as having been introduced into Blackbutt Reserve from released aviary stock, approximately 10 years ago. While Black Swans are still present in small numbers, the Brush Turkeys have become well established, breeding up into large numbers and now expanding their range into surrounding suburbs.

Corellas were first recorded by Geoffrey Winning in 1985 as escapees (Winning 1985). Both Little *Cacatua sanguinea* and Long-billed *Cacatua tenuirostris* Corellas are now seen; from single birds to large groups visiting the Reserve.

## Waterbirds

There has been limited change in the variety of duck species and their abundance. Chestnut Teal *Anas castanea,* while considered unusual in 1982, currently are frequent visitors in larger numbers. Hardheads *Aythya australis*, now regular visitors, were not recorded in 1982. The only ducks breeding in the Reserve are Pacific Black Ducks *Anas superciliosa* and Australian Wood Ducks *Chenonetta jubata*. Several other duck species are less common visitors, which increase during drought conditions.

While the Australasian Grebe *Tachybaptus novaehollandiae* was recorded in 1982 as an uncommon resident, it is now present in increased numbers and breeding.
Straw-necked Ibis *Threskiornis spinicollis* were not mentioned in 1982 records. Winning (1985) records them as uncommon visitors. Today they are a small but persistent population.

Eurasian Coot *Fulica atra* and Dusky Moorhen *Gallinula tenebrosa* were not recorded in the earlier records, but are now common and known to breed in the water habitats. Purple Swamphens *Porphyrio porphyrio* are occasional visitors.

A factor contributing to the increase of waterbird species is the upgraded habitat with larger ponds, improved water flow, as well as better reed and plant coverage.

## Raptors

Only five raptors were recorded as present in 1982 and all were classed as uncommon. Of the five 1982 species, Black-shouldered Kite *Elanus axillaris* have not been recorded in recent years.
Winning (1985) recorded for the first time Pacific Baza *Aviceda subcristata*, Grey Goshawk *Accipiter novaehollandiae* and Australian Hobby *Falco longipennis*, all classed as uncommon visitors.

In the 2011 surveys, Pacific Baza, Grey Goshawk and Brown Goshawk *Accipiter fasciatus* were frequently recorded and all are known to breed in the Reserve. A lone White-bellied Sea-Eagle *Haliaeetus leucogaster* has frequented the Reserve for a number of years. Australian Hobbies and Peregrine Falcons *Falco peregrinus* are less common residents.

## Pigeons

There has been considerable change in the pigeon species. Rose-crowned Fruit-Dove *Ptilinopus regina*, Wompoo Fruit-Dove *Ptilinopus magnificus*, Wonga Pigeon *Leucosarcia melanoleuca* (now *picata*) and Topknot Pigeons *Lopholaimus antarcticus* were all recorded as uncommon visitors in the 1982 records and again by Winning in 1985. Emerald Doves *Chalcophaps indica* were classed as common winter migrants. Crested Pigeons *Ocyphaps lophotes* were absent from the 1982 list, but were listed as common residents by Winning (1985), as they are today.

Current surveys show Topknot Pigeons are still a rare visitor. The first Emerald Dove since 1998 was present this winter (i.e. 2011). Wonga Pigeons and Rose-crowned and Wompoo Fruit-Doves have not been reported since 1985. Recent records show Brown Cuckoo-Doves *Macropygia amboinensis*, formerly a rare visitor, are now one of the more common pigeons seen in the Reserve. White-headed Pigeons *Columba leucomela* are another common visitor whose presence was not recorded in former years.

## Parrots

Although not mentioned in the 1982–1985 records, Yellow-tailed Black-Cockatoos *Calyptorhynchus funereus* are now frequently seen in flocks of four to twenty birds and feed in the Reserve. Long-billed and Short-billed (now Little) Corellas initially recorded by Winning (1985) as escapees, are now frequently seen, from single birds to large groups. This begs the question whether they originate from the escapee birds. Galahs *Cacatua roseicapilla* are recorded more frequently, though they are still not one of the more common species. Rainbow Lorikeets *Trichoglossus haematodus*, Eastern Rosellas *Platycercus eximius* and Crimson Rosellas *Platycercus elegans* formerly recorded as unusual visitors are now all resident and breeding within Blackbutt Reserve. Rainbow Lorikeets, in particular, are in large numbers.

## Cuckoos

Seven species of cuckoo were recorded as summer migrants in the 1982 list. The biggest change to this group is in the larger numbers of Channel-billed Cuckoo *Scythrops novaehollandiae* and Eastern Koel *Eudynamys orientalis*, which breed parasitically in the area. Brush Cuckoos *Cacomantis variolosus,* considered uncommon in 1982, have not been recorded in recent years.

## Owls

Two species of owl, both having a conservation status of "Vulnerable" occur. The Powerful Owl *Ninox strenua* was considered an occasional visitor in 1982. In 2011 it is frequently recorded both by sight and by call, with several breeding records over the past 15 years. This increase may be influenced by the plentiful supply of Grey-headed Flying Foxes *Pteropus poliocephalus* on which these owls feed.

The other vulnerable owl species, the Masked Owl *Tyto novaehollandiae*, is a rare visitor to Blackbutt. Because this owl feeds on smaller mammals, of which Blackbutt Reserve has relatively few, it is unlikely to establish a territory.

## Thornbills

Both Yellow Thornbills *Acanthiza nana* and Buff-rumped Thornbills *Acanthiza reguloides* were recorded as common in the early surveys. Less than five Yellow Thornbills were recorded by HBOC in 2005 and there have been no reports since. Buff-rumped Thornbills have not been recorded since the 1985 review. Weebills *Smicrornis brevirostris*, considered uncommon in the early lists, are absent from subsequent reports.

## Honeyeaters

The White-eared Honeyeaters *Lichenostomos leucotis* and White-cheeked Honeyeaters *Phylidonyris nigra* (now *niger*), listed in 1982 and 1985, are no longer recorded in Blackbutt Reserve. Uncommon visitors on that early list, Yellow-tufted Honeyeaters *Lichenostomos melanops* are no longer seen in Blackbutt Reserve although HBOC recorded a sighting of less than five birds in 2007.

Bell Miners *Manorina melanophrys* and Noisy Miners *Manorina melanocephala* were both considered uncommon visitors in 1982. These species are now dominant, resident and breeding in large numbers with recent increases in Bell Miner colonies causing displacement of less aggressive species.

## Finches

Early studies showed House Sparrows *Passer domesticus* to be resident in small numbers in Blackbutt Reserve, but they are no longer present.

## Other Species

White-throated Gerygones *Gerygone albogularis* have not been noted since recorded by HBOC in 1995.

Varied Sittella *Daphoenositta chrysoptera*, a vulnerable species, was last recorded by HBOC in 1995.

Rufous Whistler *Pachycephala rufiventris*, once a common visitor in summer, was last seen in 1997.

White-throated Treecreeper *Cormobates leucophaea*, previously considered an uncommon visitor, is now a common and breeding resident in Blackbutt Reserve.

Pied Currawongs *Strepera graculina*, formerly considered to be common only in winter, are now present all year round, brooding not only their own young, but Channel-billed Cuckoo's chicks as well.

Welcome Swallow *Hirundo neoxena* was listed in 1982 as an uncommon visitor. Today it is ubiquitous at any water site in the region including Blackbutt Reserve where it is present in good numbers.

Common Myna *Sturnus tristis* has only recently been recorded and its presence is restricted to the eastern boundary of the Reserve adjacent to a residential street. Its absence from open picnic areas may be due to the dominance of the more aggressive Noisy Miner in those areas. In future years it is likely this species will intrude into the Reserve.

Two species that might be expected to be found in Blackbutt Reserve are absent. The Mistletoebird *Dicaeum hirundinaceum*, recorded as a rare vagrant in 1982, has been surprisingly absent from all records since, which may be a consequence of a lack of mistletoe growing on trees in the Reserve.

Australian Owlet-nightjar *Aegotheles cristatus* is another species one would expect to be present. A recent targeted survey failed to locate this species which has never been recorded in the Reserve.

## DISCUSSION

### Habitat Upgrades

Wooded areas have increased over the sixty years since Blackbutt was gazetted as a Reserve. Water habitats have also been upgraded over the past two years with better water flows, reed plantings and increased cover for waterbirds. It is likely that more waterbird species will utilise these areas in the future, particularly in drier years.

The demise of open grass areas probably accounts for the loss of Black-shouldered Kites, while the increase in forested areas appears to favour a number of other raptor species.

### Vegetation

Weed control is practised throughout the Reserve, but this is a massive job. Lantana, privet, exotic garden plants, introduced palms and banana trees are targeted along with multiple weeds. For many of the smaller species of bush birds weeds provide a safe habitat and food source.

### Fire

Major bushfires in Blackbutt have been few, the last occurring in 1994. A fire-control strategy, which involves small controlled burns for fuel reduction, usually conducted in late winter, commenced in 2009.

### Flying Foxes

Since the early 1990s Grey-headed Flying Foxes have colonised one of the pockets of rainforest in Blackbutt Reserve. Averaging 15,000 (counts range from 5,000 to 30,000), they have altered the dynamics affecting birds in two ways:

- providing a major food source for owls and raptors; and
- possibly displacing fruit-eating birds such as doves which feed on rainforest fruits and nuts.

### Climate Change / Weather

The effects of climate change are yet to be recognised. At this time there is no data to suggest that any changes in bird populations within Blackbutt Reserve in recent years are due to climate change other than the usual variations resulting from drought or wet cycles. Bird species certainly vary during periods of drought.

### Surprising Records

Historical records of Weebill and White-eared Honeyeater at Blackbutt are surprising in that they lie well outside the usual range and habitat of these species within the Hunter Region.

## CONCLUSIONS

Since 1973–1982 some 20 species have ceased to be recorded at Blackbutt Reserve, while 34 new species are included on the 2011 list. With few records from the interim years it is difficult to know when changes occurred. Those on the recent list which have been seen only infrequently for a short period, are considered to be vagrant and for that reason are not discussed here.

Raptors and waterbirds are among those increasing in numbers and species diversity due to improved food sources and, for waterbirds, the development of their habitat has provided safer nesting sites.

Bush birds, including some of the smaller honeyeaters, fruit-doves and birds of the drier forests such as Varied Sittellas and Rufous Whistlers have been lost. Increases in the more aggressive species such as the Bell and Noisy Miners, currawongs, and raptors are displacing the more placid species.

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**Table 1.** Bird species changes in Blackbutt Reserve 1973 to 2011
(C : Common; U : Uncommon; V : Visitor; R : Resident; M : Migratory; B : Breeding; E : Escapee; I : Introduced to Reserve.)

| **Species** | **Scientific Names** | **1973 - 82** | **1985** | **2011** |
|---|---|---|---|---|
| Australian Brush-turkey | *Alectura lathami* | - | - | C R B I |
| Black Swan | *Cygnus atratus* | - | - | C R B I |
| Australian Wood Duck | *Chenonetta jubata* | C V | C V | C R B |
| Chestnut Teal | *Anas castanea* | U V | U V | C M |
| Hardhead | *Aythya australis* | - | - | C V |
| Australasian Grebe | *Tachybaptus novaehollandiae* | U R | U R | C R |
| White-headed Pigeon | *Columba leucomela* | - | - | C M |
| Brown Cuckoo-Dove | *Macropygia amboinensis* | U M | U M | C R |
| Emerald Dove | *Chalcophaps indica* | C M | C M | U V |
| Crested Pigeon | *Ocyphaps lophotes* | - | C R | C R |
| Wonga Pigeon | *Leucosarcia picata* | U V | U V | - |
| Wompoo Fruit-Dove | *Ptilinopus magnificus* | U V | U V | - |
| Rose-crowned Fruit-Dove | *Ptilinopus regina* | U V | U V | - |
| Straw-necked Ibis | *Threskiornis spinicollis* | - | U V | C R |
| Black-shouldered Kite | *Elanus axillaris* | U V | U V | - |
| Pacific Baza | *Aviceda subcristata* | - | U V | C M B |
| Grey Goshawk | *Accipiter novaehollandiae* | - | U V | R B |
| Australian Hobby | *Falco longipennis* | U V | U V | R B |
| Peregrine Falcon | *Falco peregrinus* | - | - | U V |
| Purple Swamphen | *Porphyrio porphyrio* | - | - | U V |
| Dusky Moorhen | *Gallinula tenebrosa* | - | - | C R B |
| Eurasian Coot | *Fulica atra* | - | - | C R |
| Yellow-tailed Black-Cockatoo | *Calyptorhynchus funereus* | - | - | C V |
| Galah | *Eolophus roseicapillus* | U V | C R | C R |
| Long-billed Corella | *Cacatua tenuirostris* | - | C E | C V |
| Little Corella | *Cacatua sanguinea* | - | C E | C V |
| Rainbow Lorikeet | *Trichoglossus haematodus* | U V | U V | C R B |
| Crimson Rosella | *Platycercus elegans* | U V | U V | C R B |
| Eastern Rosella | *Platycercus eximius* | U R | U V | C R B |
| Eastern Koel | *Eudynamys orientalis* | U M | U M | C M |
| Channel-billed Cuckoo | *Scythrops novaehollandiae* | U V | U V | U M B |
| Brush Cuckoo | *Cacomantis variolosus* | U M | U M | - |
| Powerful Owl | *Ninox strenua* | U R B | - | U V |
| White-throated Treecreeper | *Cormobates leucophaea* | C R B | U V | U V |
| Weebill | *Smicrornis brevirostris* | U V | U V | - |
| White-throated Gerygone | *Gerygone albogularis* | C M | C M | - |
| Yellow Thornbill | *Acanthiza nana* | C R | U V | U V |
| Buff-rumped Thornbill | *Acanthiza reguloides* | U V | U V | - |
| White-eared Honeyeater | *Lichenostomus leucotis* | U R | U R | - |
| Yellow-tufted Honeyeater | *Lichenostomus melanops* | U R | U R | - |
| Bell Miner | *Manorina melanophrys* | U V | U V | C R B |
| Noisy Miner | *Manorina melanocephala* | U V | U V | C R B |
| White-cheeked Honeyeater | *Phylidonyris niger* | U V | U R | - |
| Varied Sittella | *Daphoenositta chrysoptera* | U R | U R | - |
| Rufous Whistler | *Pachycephala rufiventris* | C M | C M | - |
| Pied Currawong | *Strepera graculina* | C M | - | C R B |
| Common Myna | *Sturnus tristis* | - | - | U R |
| House Sparrow | *Passer domesticus* | U R | U R | - |

# Seabirds of the Hunter Region

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Thirty-nine species of pelagic birds (Order Procellariiformes) are confirmed to have been recorded in the Hunter Region in the past 4 decades, together with an additional 19 oceanic/coastal species. The majority of records stem from surveys out to and beyond the continental shelf, departing variously from Swansea, Newcastle and Port Stephens. Those surveys commenced in August 2000; since then there have been more than 50 surveys up to March 2011. Of the total 58 species, some are reasonably common, present either all year or seasonally, whereas others are recorded much less frequently. The paper summarises the status of all 58 pelagic and oceanic/coastal species recorded in the Region. Where appropriate, the local breeding status is also discussed.

## INTRODUCTION

Since late 2000, there have been many surveys to the continental shelf of the Hunter Region to record pelagic seabirds in the vicinity of the continental shelf and to record coastal/oceanic seabirds closer to shore. Some years, only a few surveys have taken place, other years they have occurred quite frequently (≥ 10 surveys in a calendar year). There were none in 2004 and relatively few in 2005-2008. The frequency has depended largely on the availability of suitable boats. The author participated in approximately 75% of the > 50 seabird surveys which have occurred in the past 11 years up to March 2011.

The highlights (with more detail sometimes) from most of those surveys have been published (Stuart 1994-2010, Stuart 2010b) and reported to on-line forums such as birding-aus and, more recently, hunterbirding. Such *ad hoc* reporting leaves a significant gap in terms of interpreting what the records tell us about which species are common, which are rare or vagrant, what months/seasons they are likely to be present, and their relative abundance. This paper attempts to rectify that gap by providing an overview.

Hunter Region records of seabirds prior to 2000 are scant and mainly involved either beach-washed or rescued birds; where such records are known (Stuart 1994-2010a), they have been used to aid the interpretations presented in this paper.

## METHODS

Initially starting late 2000, survey boats departed from Swansea, then subsequently from Newcastle and now from Port Stephens (these changes were mainly governed by the availability of suitable boats). In some years, surveys departed from more than one of these ports. Most surveys involved 10-15 observers; a small number of them had only 2-3 observers on board.

The species and numbers of coastal/oceanic seabirds are recorded on the way out to and returning from the shelf in trips requiring 2-4 hours each way depending on the sea conditions, distance to the shelf (i.e. which port of departure), and cruising speed of the boat. Occasional stops are made to allow positive identification of uncommon birds. Upon clearing the shelf (occasionally proceeding 5-10 km further), the boat is allowed to drift for about 3 hours, while all species in the vicinity are recorded. Lures, such as chicken mince laced with fish oil and a cod liver oil soaked cloth, are used on most of the surveys; these attract many of the pelagic species to the boat for a time thus facilitating sometimes difficult identifications. Photographic images are used to help confirm the identifications.

Whilst the land boundaries of the Hunter Region are very precisely defined, the sea boundaries are a more arbitrary matter. One plausible definition for the southern limit is latitude $33^0$ 11', which corresponds to Flat Rocks (also called Flat Island), the southernmost headland in the Region. With this definition, some of the birds in the surveys from Swansea were recorded marginally south of the Region, depending on how far to the south-east the boat went. All results from those surveys are included in the analysis, since for much of the time they were conducted within the Region and never very far out of it. In any event, the surveys ex Swansea have not produced separate lists for species

recorded within and just outside the Region and so it is not easy to exclude any records.

Seabird identification can be difficult. All local reports are reviewed by a panel of HBOC experts; only those records accepted by that panel have been included in the analysis below.

## RESULTS AND DISCUSSION

A series of seven categories has been used to describe qualitatively the status of seabirds in the Region: Accidental, Rare, Uncommon, Irregular, Regular, Common, Very Common. This series progressively reflects the increasing presence and abundance of birds during the seasons that they are present.

### Pelagic Birds

Thirty-nine pelagic species (Order Procellariiformes, comprising the storm-petrels, albatrosses, prions, shearwaters and petrels) have been recorded in the Hunter Region (summarised in **Table 1**). Nine species are considered Accidental, compared with 17 species which are Common or Regular. The other 13 species range from Rare to Irregular in their occurrence.

### Coastal/Oceanic Birds

Nineteen species have been recorded (excluding species which are mostly only found very close to shore e.g. gulls and some terns) (summarised in **Table 2**). Eight species are considered to be Accidental, compared with just six species which are Common or Regular.

### Breeding

Of the 58 species in **Tables 1** and **2**, only seven are known to breed locally (Lane 1976, BirdLife International 2007, Stuart 1994-2010a). The main locations are islands within Port Stephens-Great Lakes Marine Park (in particular, Broughton, Little Broughton, Boondelbah, and Cabbage Tree Islands). Some species also breed on Moon Island near Swansea and Stasis Island near Seal Rocks.

**White-faced Storm-Petrel** *Pelagodroma marina:* ~140 pairs regularly breed on Boondelbah Island, and a breeding population was recently found on Little Broughton Island. Historically, there was a large breeding population on Broughton Island.

**Wedge-tailed Shearwater** *Ardenna pacificus:* ~13,000 pairs breed each year on Boondelbah Island and ~1,050 pairs on Cabbage Tree Island.

**Sooty Shearwater** *Ardenna grisea:* ~2,500 pairs breed each year on Boondelbah Island and ~45 pairs on Cabbage Tree Island).

**Short-tailed Shearwater** *Ardenna tenuirostris:* A breeding population was recently found on Little Broughton Island, and there are historical records.

**Gould's Petrel** *Pterodroma leucoptera:* ~ 1,000 pairs breed regularly on Cabbage Tree Island and 30 pairs on Boondelbah Island. Very recently, breeding populations have been discovered on Broughton and Little Broughton Islands (numbers of pairs not known).

**Little Penguin** *Eudyptula minor:* ~100 pairs breed each year on Boondelbah Island and ~140 pairs on Cabbage Tree Island, as well as many pairs on Broughton Island, Little Broughton Island, and some on Stasis and Moon Islands.

**Crested Tern** *Thalasseus bergii:* There are breeding colonies on most offshore islands, some being quite large (1000+ pairs). Also breeds on sand islands in Swansea Channel and Wallis Lake.

## CONCLUSIONS

The oceans of the Hunter Region host a rich variety of seabird life, occupying both pelagic and oceanic/coastal habitats. Many of these species are present regularly, usually seasonally, whilst other species are uncommon or vagrants to the area.

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**Table 1**. Pelagic birds (Order Procellariiformes) recorded in the Hunter Region.

| Common Name | Scientific Name | Status | Comments |
|---|---|---|---|
| Wilson's Storm-Petrel | *Oceanites oceanicus* | Regular, all year | Present unpredictably at the shelf. |
| White-faced Storm-Petrel | *Pelagodroma marina* | Regular, all year | Often present at the shelf. |
| Black-bellied Storm-Petrel | *Fregetta tropica* | Uncommon | Seven records at the shelf since 2002 – three in October, also April, July and August. |
| White-bellied Storm-Petrel | *Fregetta grallaria* | Rare | Records of single birds at the shelf in March 2006, January 2007 and March 2010. |
| New Zealand Storm-Petrel | *Pealeornis maoriana* | Accidental | A single bird was recorded at the shelf in March 2010 (the first Australian record). |
| Wandering Albatross | *Diomedea exulans* | Regular, in winter | 60-70% of records are Gibson's Albatross *D. e. gibsoni*; 30-40% Antipodean Albatross *D. e. antipodensis;* Snowy Albatross *D. e. exulans* is rarely confirmed. |
| Black-browed Albatross | *Thalassarche melanophris* | Common, in winter | Regularly recorded during May-November, including from land. Sub-species *T. m. impavida* and *T. m. melanophrys* both recorded; the former is marginally more common. |
| Shy Albatross | *Thalassarche cauta* | Regular, in winter | Almost always recorded when >5 km offshore during April-October (mainly *T. c. cauta* and *T. c. steadi*, the latter marginally more common; single *T. c. salvini* occasionally). |
| Yellow-nosed Albatross | *Thalassarche chlororhynchos* | Very Common, in winter | Regularly recorded (sometimes >30 birds) during May-November, including from land. |
| Buller's Albatross | *Thalassarche bulleri* | Accidental | Two birds at the shelf in August 2003 and a single bird there in January 2007. |
| Southern Giant-Petrel | *Macronectes giganteus* | Regular, in winter | Small numbers of immature birds recorded June-October each year, including from land. A white phase bird (age therefore uncertain) was present off Swansea in August 2002. |
| Northern Giant-Petrel | *Macronectes halli* | Regular, in winter | Small numbers of immature birds between June and October each year, including from land. |
| Cape Petrel | *Daption capense* | Regular, in winter | Small to moderate numbers of birds between July and October in most years. |
| Broad-billed Prion | *Pachyptila vittata* | Accidental | The only record is of a beach-cast bird in July 1973. |
| Antarctic Prion | *Pachyptila desolata* | Accidental | The only record is of a single bird at the shelf in August 2000. |
| Slender-billed Prion | *Pachyptila belcheri* | Accidental | The only records are from August-October 2002. |
| Fairy Prion | *Pachyptila turtur* | Regular, in winter | Birds often recorded over June-September, but are absent in some years. Several hundred birds sometimes present, although numbers vary considerably from year to year. |
| White-chinned Petrel | *Procellaria aequinoctialis* | Accidental | Only records are a beach-cast bird December 1968 and a bird at the shelf August 2003. |
| Black Petrel | *Procellaria parkinsoni* | Rare, in summer | Five records of single birds at the shelf: November 2000, March and October 2006, January 2007, October 2010. |
| Wedge-tailed Shearwater | *Ardenna pacifica* | Very Common, in summer | Around 20,000 birds present September to mid April, with birds arriving mid August. |
| Buller's Shearwater | *Ardenna bulleri* | Accidental | The only records from at sea are single birds January 2000 and 2001. Single birds were on Cabbage Tree Island April and December 1995. |

**Table 1**. Pelagic birds (Order Procellariiformes) recorded in the Hunter Region (cont.).

| Common Name | Scientific Name | Status | Comments |
|---|---|---|---|
| Flesh-footed Shearwater | *Ardenna carneipes* | Common, in summer | 100+ birds are present offshore from October, departing late March – early April. |
| Sooty Shearwater | *Ardenna grisea* | Irregular, in summer | Birds are present over September-February; most reports are of single birds. |
| Short-tailed Shearwater | *Ardenna tenuirostris* | Very Common in spring | Tens of thousands pass through during the September-November migration period. Some are recorded from July/August, and small numbers throughout summer/early autumn. |
| Streaked Shearwater | *Calonectris leucomelas* | Rare, in summer | All records are from within ~5km from shore, and only in March (2000, 2006, 2010 and 2011; 2 birds were present in 2010). |
| Fluttering Shearwater | *Puffinus gavia* | Common in winter/spring; Regular remainder of year | Many thousands sometimes present; all the very high counts (up to 10,000 birds) occur July to September, and many hundreds of birds recorded during October and November. |
| Hutton's Shearwater | *Puffinus huttoni* | Irregular, all year | Several hundreds of birds sometimes present late August to October; much lesser numbers in other months. Probably sometimes overlooked. |
| Little Shearwater | *Puffinus assimilis* | Accidental | A single bird was at the shelf January 2007. Beach-cast birds February and March 2002. |
| Tahiti Petrel | *Pseudobulweria rostrata* | Rare, in summer | Two birds in January 2001 and single birds in February 1997, February 2001 and March 2010, all from the shelf. |
| Juan Fernandez Petrel | *Pterodroma externa* | Accidental | The only record is of a bird rescued ashore in October 1988. |
| Kermadec Petrel | *Pterodroma neglecta* | Rare, in summer | Birds were at the shelf in February 2001, April 2005 (3 birds) and March 2006 (5 birds). |
| White-headed Petrel | *Pterodroma lessonii* | Rare, in winter/spring | The only records are from the shelf – several birds in August 2003 and single birds in September 2002, July 2003 and June 2010. |
| Great-winged Petrel | *Pterodroma macroptera* | Regular, in summer | Birds often recorded at the shelf over mid August - early April. Most records are <10 birds; however, much higher counts are common in October. |
| Providence Petrel | *Pterodroma solandri* | Common, in autumn to spring | Birds are commonly recorded at the shelf between March and October. Most counts are of 10-30 birds although the numbers sometimes are higher (up to 200 birds). |
| Gould's Petrel | *Pterodroma leucoptera* | Regular, in summer | Single birds are moderately often recorded at the shelf over October–April. |
| Cook's Petrel | *Pterodroma cookii* | Accidental | Only two records – a beach-cast bird December 1971 and a bird at the shelf October 2006. |
| White-necked Petrel | *Pterodroma cervicalis* | Rare, in summer | Six records since 2001 of birds at the shelf – three January records, two from February and one from March. |
| Black-winged Petrel | *Pterodroma nigripennis* | Accidental | The only record is of a single bird at the shelf in January 2007. |
| Pycroft's Petrel | *Pterodroma pycrofti* | Accidental | The only record is of a single bird at the shelf in October 2002. |

**Table 2**. Coastal/oceanic birds recorded in the Hunter Region.

| **Common Name** | **Scientific Name** | **Status** | **Comments** |
|---|---|---|---|
| Red-tailed Tropicbird | *Phaethon rubricauda* | Accidental | Occasional records of beach-cast or rescued birds. |
| White-tailed Tropicbird | *Phaethon lepturus* | Accidental | Occasional records of beach-cast or rescued birds. |
| Little Penguin | *Eudyptula minor* | Resident | Small numbers are often recorded close to the coast and the offshore islands. |
| Lesser Frigatebird | *Fregata ariel* | Accidental | Six records (including 3 individuals in 1957), all except 2 of them are of beach-cast birds. |
| Australasian Gannet | *Morus serrator* | Very Common, in winter | Many hundreds are present within ~10 km of shore during March-October. Young birds often forage close to shore including in sheltered waters such as Port Stephens. |
| Red-footed Booby | *Sula sula* | Accidental | Three records – single birds taken into care in August 1985 and March 2008, and ~15km offshore in March 2010. |
| Masked Booby | *Sula dactylatra* | Accidental | The only record is of a beach-cast bird in September 1979. |
| Brown Booby | *Sula leucogaster* | Rare, in summer | Four records – of small numbers in December 1984, October 1986, May 1991, March 2010. |
| Brown Skua | *Stercorarius antarcticus* | Irregular, all year | 1-2 birds occasionally recorded – mostly over July-September but there are two recent February records. |
| Pomarine Jaeger | *Stercorarius pomarinus* | Regular, in summer | Up to 10 birds regularly from October to early April, including sometimes from land. |
| Arctic Jaeger | *Stercorarius parasiticus* | Regular, in summer | Small numbers regularly between September and early April, mostly from inshore and around harbours and estuaries but occasionally from further offshore. |
| Long-tailed Jaeger | *Stercorarius longicaudus* | Irregular, in summer | 1-2 are occasionally recorded from September to early April, inshore and at the shelf. |
| Common Noddy | *Anous stolidus* | Rare, in summer | Several records of single birds in 2008-2010, all in March; prior to that there are only two known occurrences (November 1977, January 1999). Most sightings were from land. |
| Black Noddy | *Anous minutus* | Accidental | The only records are of single birds at the shelf in January 2004 and January 2007. |
| White Tern | *Gygis alba* | Accidental | The only record is of a single bird at the shelf in March 2003. |
| Grey Ternlet | *Procelsterna cerulea* | Accidental | Single birds at the shelf March 2002 and off Booti Booti NP February 1995 (after storms). |
| Sooty Tern | *Onychoprion fuscata* | Uncommon, in summer | Many records in January 2007 (some of multiple birds) and in early 2010; prior to that were only occasional records but including one record of 7+ birds. |
| White-fronted Tern | *Sterna striata* | Regular, in winter | 1-2 birds are often at the shelf as well as inshore in winter (greater numbers are known to roost at some favoured sites). |
| Crested Tern | *Thalasseus bergii* | Common, all year | Most records are from near the coast; however, a few birds are often at the shelf. |

# Chestnut Teal count – March 2011

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In March 2011, 4,497 Chestnut Teal *Anas castanea* were counted during a comprehensive survey of the Hunter Estuary and other wetlands in the Lower Hunter and Lake Macquarie areas. 4,117 Chestnut Teal, which is >4% of the Australian population, occurred in the estuary. The importance of the Hunter Estuary Important Bird Area (IBA) to Chestnut Teal was confirmed.

On 18 March 2011 during a regular monthly survey as part of the Hunter Shorebird Surveys, Mick Roderick counted 1,637 Chestnut Teal *Anas castanea* at Deep Pond on Kooragang Island. Subsequently, on 26 March 2011, Ann Lindsey visited the eastern side of Hexham Swamp and counted 1,200 Chestnut Teal. The question arose as to whether these counts involved the same birds or whether they were in fact separate flocks.

Much of the 8,453ha Hunter Estuary (32° 52' / 151° 45') is designated as an Important Bird Area (IBA) as it meets several of the necessary criteria. The IBA Program, initiated by BirdLife International, aims to identify, monitor and protect a global network of IBAs for the conservation of the world's birds and other biodiversity. Birds Australia is coordinating the IBA program in Australia through regional networks of bird groups and conservation organisations. IBA designation is entirely non-governmental and has no legal implications (Dutson *et al.* 2009).

Under the IBA 'congregatory waterbirds' criterion (specifically criterion A4i), any area containing 1% or more of the total estimated biogeographic population is recognised as an IBA. In the case of Chestnut Teal this threshold is 1,000 birds, the estimated population in South-eastern Australia being 100,000 birds (Wetlands International 2006: 89). In 2004 an estimated 3,500 Chestnut Teal were regularly counted in Fullerton Cove (Allan Richardson pers. comm.) and several records of over 1,000 birds exist elsewhere in the estuary (Stuart 1995-2010).

A one-off survey was organised for 1300 hours on 9 April 2011 to count the number of Chestnut Teal in the Hunter Estuary and at other sites in the Lower Hunter and Lake Macquarie. The number of sites surveyed was limited by the number of participants. The time chosen coincided approximately with the high tide at Stockton Bridge, consistent with the protocols of the monthly Hunter Shorebird Surveys. It also coincided with a time (early afternoon) when waterfowl are least active.

Nineteen sites were surveyed by eleven people between 1230 and 1520 hours on the day (**Table 1**). Most surveys occurred between 1300 and 1400 hours. Counts were considered to be accurate at those sites with fewer birds. Counts on Deep Pond and Ash Island were made by counting groups of birds sitting on the water or roosting on banks and are likely to have an estimated error of between 10 and 20% due mainly to birds moving about during the count period. The count on Hexham Swamp was difficult as the birds were huddled together on the edge of an open area, but partly obscured by vegetation, at a distance of approximately 150 metres. However, they were put to flight by a low-flying ultra-light aircraft. The flock split into two groups and 800 landed on open water close to the observer, where they were accurately counted. An estimated 1,000 birds wheeled around landing back in the original area. The error in the Hexham Swamp count was estimated to be 10-20%.

At the time of the count only small numbers of Grey Teal *Anas gracilis* were present in the general area as they had largely abandoned coastal sites most likely as a result of inland rainfall. This meant that there was little room for error in the identification of teal species at the time of the count.

A total of 4,497 Chestnut Teal was counted, with 4,177 birds being present in the immediate vicinity of the Hunter Estuary. Morpeth Wastewater Treatment Works was the next most important area with 220 Chestnut Teal counted.

**Table 1** – Survey locations and number of Chestnut Teal counted

| SITES SURVEYED | COUNTS |
|---|---|
| **Hunter Estuary** | |
| Hexham Swamp (eastern and western sides) | 1,800 |
| Pambalong Nature Reserve, Minmi | 43 |
| Hunter Wetlands Centre, Shortland | 36 |
| Newcastle Wetlands Reserve, Sandgate | 2 |
| Ash Island, Hexham | 908 |
| Deep Pond, Kooragang Island | 1,388 |
| **HUNTER ESTUARY TOTAL** | **4,177** |
| **Other Sites in Lower Hunter / Lake Macquarie** | |
| Tarro and Woodberry Wetlands | 33 |
| Morpeth Wastewater Treatment Works | 220 |
| Morpeth Common | 10 |
| Morpeth Cemetery Wetland | 30 |
| Morpeth Manor Wetland | 4 |
| Irrawang Swamp, Raymond Terrace | 1 |
| Newline Road Wetland, Raymond Terrace | 11 |
| Walka Waterworks, Maitland | 7 |
| Stockton Borehole Wetland, Boolaroo | 0 |
| Toronto Wetland, Toronto | 0 |
| Stoney Creek, Toronto | 4 |
| **OVERALL AREA TOTAL** | **4,497** |

The presence of 4,177 Chestnut Teal in the Hunter Estuary is the highest counted number on record and confirms the status of this location as an Important Bird Area for this species.

It is known that, unlike most other species of Australian waterfowl, Chestnut Teal tolerate high-salinity habitats (Marchant & Higgins 1990). The distribution of this species at the time of the count is interesting in that only 401 birds (8.9%) were recorded on freshwater wetlands. 2,708 birds (60.2%) were counted in saline areas (on the eastern side of Hexham Swamp and on Ash Island). 1,388 birds (30.9%) were on Deep Pond, the salinity of which is unknown but, as it is adjacent to Ash Island and the Hunter River, both of which are saline habitats, it is reasonable to postulate that Deep Pond may be slightly saline. If this were so, then 4,096 Chestnut Teal (91.1%) were counted in saline-influenced habitats. The maximum known count of this species on a freshwater wetland in the Hunter Region is 836 birds in October 2006 at Morpeth Wastewater Treatment Works (Stuart 2007).

## ACKNOWLEDGEMENTS

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# Notes on human cover for raptors and their potential prey

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One November, about 1990, I observed a Willie Wagtail *Rhipidura leucophrys* fledgling, begging for food in the back yard of my Wingen, NSW property 31°53'50"S 150°52'41"E. I then heard what I identified as a goshawk species calling from trees along the nearby creek, and went to investigate. There is a laneway that contributes to about 50 metres of open ground between our yard and the creek, and, when I reached the fence line on the opposite side of the laneway, I was joined by an adult Willie Wagtail carrying a bill full of food. As I moved along the fence, it followed me, calling constantly with its 'twitchy twitchy' call. Being unable to locate the goshawk, I headed back across the laneway, accompanied by the Willie Wagtail, which flew along beside me at about waist height. When we reached our yard, my new friend gave me a parting 'twitchy twitchy', and promptly flew off across the yard to its hungry dependent. I concluded that the Willie Wagtail, aware of the goshawk's presence, had been employing me as cover to cross the open ground where it might otherwise have presented an easy target. The Handbook of Australian, New Zealand and Antarctic Birds (HANZAB) does not mention such tactics for the Willie Wagtail (Higgins *et al.* 2006: 235) under the heading of 'Parental anti-predator strategies', though it does record that the species 'associates with large mammals and sometimes people' (p. 230), but this is usually attributed to the disturbance of insects providing advantageous feeding conditions. For instance flocks of over 20 Willie Wagtails were observed feeding fearlessly at the feet of moving cattle at Bureen in June 2010 (M. Newman, A. Lindsey, pers.comm.). In the present instance it is suggested that humans, perhaps known humans in particular, are trusted and used to provide protection in an open space where a Willie Wagtail would be particularly vulnerable to predation by an *Accipiter* species. Indeed Willie Wagtails are regularly emboldened by human presence when dealing with threats to them, and will step up their attempts to dislodge perched raptors when humans appear (H. Tarrant, pers.comm.).

In about March of 1992, I was driving through Parkville 31°58'54"S 150°51'55"E when an Australian Hobby *Falco longipennis* appeared from a side street on my left, and flew beside my car for about 200 metres. It then peeled off and attacked a small flock of House Sparrows *Passer domesticus* that were dust bathing on the side of the highway, plucking one off the ground. I then deduced that the Hobby was using my car as cover to ambush the sparrows. Raptors are known to use other movement to distract potential prey and buy them valuable seconds when hunting. Olsen (1995: 98) offers as examples first the well-known case of Hobbies working in the vicinity of butcherbird species (in our region usually the Pied Butcherbird *Cracticus nigrogularis*), and that of Hobbies or Peregrine Falcons *Falco peregrinus* operating by trains.

However, Olsen adds that the use of trains as cover 'might be an example of the next category', namely the use of moving things that flush prey, while HANZAB (Marchant & Higgins 1993: 270-271) reports that Hobbies 'catch prey flushed by stock, farm machinery, trains, and cars'. However, in this case the prey had not actually flushed, and there is no reason to suppose that Hobbies, and indeed most falcon species, would not be able to flush dust-bathing sparrows and other unconcealed birds on the ground unassisted. It is thus more probable that the Hobby had joined the car for the purpose of concealing its presence until it was close enough to attack. Even in cases where a vehicle is followed in the expectation that it will flush prey, the element of concealment is likely to be a factor, since a flushed bird will give its attention to the flushing agent rather than to any opportunist predator that may be following it.

Finally, on 4 July 2010, as I was driving home from work, and just leaving Scone 32°01'45"S 150°51'48"E, a Peregrine Falcon did a similar thing. It suddenly appeared from the left, flew just above, and in front of the windscreen for about 300 metres, then peeled off to the left. I did not know

what was the subject of its attack, or whether it had caught its prey. I was travelling at about 75km/h, and it would have been unwise to accelerate in order to stay with a bird capable of around twice that speed. Clearly the Peregrine had not waited for my car to flush anything, and any advantage that it gained from keeping close to my car would have been an additional element of surprise.

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Note: Another story of a raptor using a vehicle either for cover or as a flushing device came to the Editors' attention after the acceptance of this note. An Australian Hobby was reported to have followed along with a stock lorry 10km north of Singleton (T. Jurd, pers.comm.). A further example of this behaviour involved an Australian Hobby flying alongside a tour bus travelling at about 50km/h along a scrub-lined track on the Newhaven property northwest of Alice Springs in July 2011. The Australian Hobby eventually accelerated ahead of the bus into the scrub, presumably in pursuit of prey (M. Newman, pers.comm.).

# Miscellaneous notes on the behaviour of Black and Brown Falcons and Nankeen Kestrels

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When driving along Jones Reserve Road, Bureen, NSW on 25 April 2011, there was (as often) a considerable falcon presence. Nankeen Kestrels *Falco cenchroides* were most common, but there was a group of two Black Falcons *Falco subniger* at one point, and three Brown Falcons *Falco berigora* at another. All larger falcons were occupying power poles, from which they get a good view of potential prey across surrounding open farmland, where insects, small mammals, and well-adapted bird species (particularly feral species and cockatoos) can reach plague proportions.

Power poles have multiple uses for Black Falcons, since they provide a safe position as well as a vantage point. On 25th April one Black Falcon, suspected to be an immature, allowed me to approach to an angle of about 45 degrees with no attempt to move, which I consider unusual for an adult of this species. The other bird did take off when I had approached to about 40 metres away, and was last seen circling without incident close to a Nankeen Kestrel. I had previously watched an adult Black Falcon perched on a power pole in order to eat a Galah *Eolophus roseicapillus* (again at Bureen, but in April 2010), while a recently fledged juvenile was constantly present on a pole for a few days (near Morpeth, October 2002). The juvenile's tail and wing feathers were still poorly developed, and if one approached too close it would take off, fly unconvincingly in a circle, and return to the same favoured pole.

It is well known that the Brown Falcon is a generalist compared with most raptors, with a wide range of hunting techniques and a variety of prey (Olsen 1995: 88). Unlike more typical falcons that concentrate on aerial prey, its feet are adapted for taking prey on the ground, as are those of the Nankeen Kestrel (Olsen 1995: 19), whereas its wingtips are slightly rounded. This enables them to be 'great opportunists and versatile hunters' (Olsen 1995: 95). My two encounters with the species that day illustrate this.

Three Brown Falcons and two Nankeen Kestrels had gathered along a stretch of less than a kilometre, clearly interested in the same ground-dwelling prey. As I approached the last of the Brown Falcons, which was separated from the other two by a slightly greater distance, it left its pole and dropped to the ground to a point where there was a Nankeen Kestrel, presumably in an attempted act of piracy. While piracy between raptor species is widespread (Olsen 1995: 96), in this case it meant that neither bird had a meal as a result. The two birds rose, and the Nankeen Kestrel made three aggressive approaches at the Brown Falcon. The larger bird did not return any aggression, and went quietly back to its pole. One might then have expected the kestrel to distance itself from this bird so that it could forage with less risk of further conflict, but instead it took up a position on the next pole along. I was inclined to interpret the incident as an indication by the kestrel that its larger neighbour had transgressed the expected rules of communal foraging. In circumstances where three Brown Falcons and two Nankeen Kestrels are all looking for prey within a short distance of one another, it would have been desirable to develop some more cooperative approach to hunting to ensure that prey is not lost altogether by squabbling between the competitors. On 29th May I returned to the area, and two Brown Falcons were occupying approximately the same area, with two kestrels fairly close. There was, however, no third Brown Falcon. As a result I suspect that a pair of Brown Falcons and a pair of kestrels had developed cooperative behaviours while foraging for the same prey, and that the third bird, seeing an opportunity, had temporarily intruded and taken advantage of a degree of mutual accommodation that had developed between the two species.

Returning to April 25th, about ninety minutes later on Martindale Road I encountered a light-phase Brown Falcon, with no signs of immature plumage, so positioned in the middle of the road

that I could not easily pass by on either side. I slowed expecting it to take off, and pulled up on the verge alongside it when it did not do so. I am used to Brown Falcons allowing one to approach somewhat closer than Black Falcons, but this was exceptional. The falcon was reluctant to move because it was in possession of a Crested Pigeon *Ocyphaps lophotes*, several of which were close at hand. The size of the pigeon was in sharp contrast to the size of prey likely to be won by an act of piracy on a kestrel. Presumably it had caught it there on the ground without disabling it, and was therefore about to attempt to eat it without moving. Attacking the bird on the ground would make a fast approach dangerous, and the Brown Falcon lacks the momentum and power of the aerial hunting falcons. Both factors would make a quick kill more difficult. I was reluctant to leave the bird in the middle of the road, so I wound down the driver's window to stare at it from two metres away, whereupon the falcon finally lifted its heavy prey and headed off, through the barbed wire fence on the other side of the road. The bird was unable to lift the pigeon through the same gap in the fence that it flew through itself, and when either its legs or its intended prey had hit the wire below it had to let go. It was last seen pursuing the escaped pigeon through a neighbouring garden. The pigeon was still able to fly, but not so well as to shake off its pursuer, and may ultimately have been recaptured.

I have seldom seen a Brown Falcon with avian prey, and never with a bird of this size. A study of Brown Falcons on the Victorian coast from 1999 to 2002 (McDonald *et al.* 2003) explains contrasts in the size and nature of prey. Different pairs of Brown Falcons were found to specialise in different prey, and were able to be classified according to a preference for lagomorphs (rabbits etc.), small ground prey, small birds, large birds, or reptiles. The conclusion states that this tendency to specialise is more likely to result from the availability and vulnerability of different types of prey within particular territories than from dietary preference. Though Figure 2 in that article shows that in terms of biomass, those specialising in large birds took more than 50% of their diet from this class, their individual prey items contained well under 50% large birds; large birds provided very little of the diet of the pairs with any of the other four specialisations. Moreover Table 3 shows that only 11 of 87 pairs specialised in taking large birds. It is therefore not surprising that one sees few Brown Falcons in possession of large birds, and it is not unlikely that the present raptor had encountered additional difficulties because it was not used to taking such large birds.

Even allowing that it might have been relatively inexperienced with such prey, I found this an adventurous experiment that might well have ended badly. However, though one may be used to such species as Australian Raven *Corvus coronoides* displaying a degree of road sense while they scavenge on roadkill, one ought not to think of the falcon's behaviour as a sign of incompetence. It is presumably its willingness to make attempts upon ambitious prey, to try out unaccustomed techniques of hunting, and to resist being intimidated by human activity that gives the species its reputation as one that thrives through versatility.

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# Swamp Harrier – unusual food?

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On 20 July 2010 the authors were returning from the monthly survey of the Hunter Wetlands National Park, Tomago site (32°50'24"S, 151°44'00"E), adjacent to the North Arm of the Hunter River.

We saw a Swamp Harrier *Circus approximans*, a common species in the lower Hunter Estuary, on the ground and Ray McLean approached the bird in order to see what it was eating. To our surprise, he found half an avocado and its seed. No flesh remained in the shell, but clear and obvious scratch marks were present on the inside of the skin. The harrier may have been eating the flesh of the fruit or possibly just investigating. It is a mystery as to how the avocado got to this site, but presumably there is a tree in the area or another bird – perhaps Australian Magpie *Cracticus tibicen* or Australian Raven *Corvus coronoides* – stole the avocado and dropped it. The incident took place on treeless land covered in grass and weeds, but recently mown.

The Handbook of Australian, New Zealand and Antarctic Birds (Marchant & Higgins 1993: 110) lists the prey items of this species and there is no reference to vegetable matter. Swamp Harriers will eat carrion, but it is not their preferred food.

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# Swamp Harrier attempting to take Pacific Black Duck

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At Morpeth Waste Water Treatment Works (32º44'S, 151º37'E) on 19 May 2002 I watched a Swamp Harrier *Circus approximans* harass two Pacific Black Ducks *Anas superciliosa*. Conditions were very windy and the harrier was able to hang almost stationary above one of the ducks, which submerged in defence. When the duck came up for air it would immediately submerge again and appeared very distressed. Pacific Black Ducks are dabbling rather than diving ducks and I presumed that its plumage was waterlogged. The duck's salvation was the presence of a second Pacific Black Duck, which was swimming nearby.

Occasionally the harrier had to reposition itself and as it executed this manoeuvre it switched its attention to the second duck, giving the other one time to "recover its breath". Eventually the harrier gave up and moved off to continue quartering the marsh in search of easier prey.

On consulting the Handbook of Australian, New Zealand and Antarctic Birds (Marchant & Higgins 1993: 110) to see if Pacific Black Duck were known prey of Swamp Harriers I found the exact behaviour I had observed described except that the prey was a Eurasian Coot *Fulica atra*. In this case the victim was less fortunate and was eventually taken and dragged to the shore of a pond at Werribee Sewage Farm in Victoria. There was no record of Swamp Harriers taking Pacific Black Duck.

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# Robbing behaviour by Australian Pelicans

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The Australian Pelican *Pelecanus conspicillatus* is widely and regularly recorded at medium to large waters throughout the Hunter Region, and with a small breeding colony present on an island within Wallis Lake (Stuart 2010). The main diet of the Australian Pelican is fish, but it is noted to be an eclectic carnivore and scavenger, taking anything from insects and small crustaceans to ducks and small dogs (Marchant & Higgins 1990). It is known occasionally to rob other birds, such as the Black-faced Cormorant *Phalacrocorax fuscescens,* Eastern Great Egret *Ardea modesta,* Australian White Ibis *Threskiornis molucca* and Caspian Tern *Hydroprogne caspia* (Marchant & Higgins 1990). The robbing of cormorants *Phalacrocorax spp* by Australian Pelican has also been noted (MacGillivray 1923); however the author did not make it clear which cormorant species was the victim.

In 2011, I observed two incidents of robbery by Australian Pelicans. Both incidents occurred at Harrington NSW (31°52'23'' 152°41'24''), where 30-50 pelicans are regularly present. In one incident, a Pied Cormorant *Phalacrocorax varius* was robbed; in the other, a pair of Whistling Kites *Haliastur sphenurus* was robbed. The robbing of birds of prey by pelicans is not mentioned in Marchant & Higgins (1990).

On 25 January 2011 I observed a Pied Cormorant swimming in the Manning River, a few metres from the Harrington breakwater. The bird surfaced with a large fish, which it began to try to reposition in its bill in order to swallow it. However, after about a minute the cormorant still had not managed to complete the task. Its endeavours attracted the attention of an Australian Pelican, which swam over to the struggling bird and gripped the Pied Cormorant's head firmly in its bill. Very quickly, the Pied Cormorant let go of the fish, at which point the pelican released the bird, then grabbed and swallowed the fish. After this, the pelican swam away sedately, and the deprived Pied Cormorant flew away, presumably to look for a safer place to fish.

On 18 April 2011, two Whistling Kites landed together on a sandbank in the mouth of the Manning River at Harrington. The birds began to share a fish – one of them had the main carcass while the other was picking at what appeared to be some entrails. After a short while, an Australian Pelican, one of a group of several which were roosting on the sandbank, walked unhesitatingly towards the pair of kites, which immediately backed away by 2-3 metres. The pelican promptly picked up and swallowed the fish carcass that they had left behind. The pelican then flew away, with the two kites staying put for several minutes before also departing.

Since I have never before witnessed Australian Pelicans robbing another bird, it is remarkable that I observed the behaviour twice at the same location in less than 3 months.

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# Pied Currawongs' larder

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A pair of Pied Currawongs *Strepera graculina* hunt in my backyard at Shortland, watching my gardening efforts and then, when I have left, proceeding to inspect the diggings for disturbed prey. They are unafraid of me and come quite close. This allowed me to observe their dining habits in October 2010 when they were feeding three chicks at a nest in a tall tree.

On 18th I noticed that one of the pair had a medium-sized rat wedged in the fork of a small shrub about 15cm from the ground. It tore at the fresh, red flesh swallowing small pieces. The tearing caused the rat to fall out of the fork whereupon the currawong repeatedly tried to put it back into the fork. Once successful, it continued its munchings.

On 20th I noticed the currawong again at the fork, and this time a fledged honeyeater was wedged in the fork. It was either a Brown or Yellow-faced Honeyeater *Lichmera indistincta* or *Lichenostomus chrysops*, but the carcass was too damaged to identify. Again the currawong tore off strips of flesh and ate them at the fork. It did not eat the carcass clean, but kept returning to chew off more pieces. Several adult Noisy Miners *Manorina melanocephala* were hassling the currawong, but it took no notice at all.

On 27th and 28th immature, but fledged, Spotted Doves *Streptopelia chinensis* became breakfast. On 27th one body was secured in the fork of the broken limb of a eucalypt about 3m from the ground. On 28th the body of a different Spotted Dove was wedged in the original fork 15cm from the ground. Higgins *et al*. (2007: 537) describe this behaviour as follows: 'Prey too large to be swallowed whole usually wedged into fork, crevice, gnarl or splinter in live or dead tree or shrub, then dismembered with bill'.

Not all prey was treated in this fashion. On 28th at 1pm the currawong caught the large skink which inhabited my open garage under the house. It flew off with the skink in its bill.

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# Unrecorded behaviour of Jacky Winter

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The following observations were made while conducting a bird survey in an area of grassland with a few shrubs in Curracabundi National Park (31°40'54"S,151°44'31"E) northwest of Gloucester in NSW on 23 May 2010. Three Jacky Winters *Microeca fascinans* were foraging nearby, occasionally perching on the tops of tussocks. When I started making "pishing" sounds to attract wrens, two of the Jacky Winters immediately responded by flying side by side directly at me with their wings outstretched and held horizontal to the ground making a pointed-tip wing profile. Both birds approached me at eye level, peeling off at the last minute. This was repeated at least twice, in each case in response to "pishing" noises. A second observer, Terry Hardwick, was approximately 25m away when the first attack occurred, but had come quite close when the two birds flew at me the final time. They did not attack Terry. Before the final attack all three Jacky Winters congregated and perched in one of the shrubs.

There is no mention of this behavior in the Handbook of Australian, New Zealand and Antarctic Birds (Higgins & Peter 2002: 582), although this source states "both members of a pair swooped at observer handling nestlings". The observation in this note was not made at a nest and was outside the normal breeding season (August to January) of the Jacky Winter (Higgins & Peter 2002). In May the third bird would not be expected to be a dependent juvenile, which are fed for only 10 to 15 days after fledging (Keast 1994). On this occasion the aggressive response to a human intruder does not appear to be related to the protection of a nest or fledglings and its purpose is unclear.

On 15 June 2010 there were 18 Jacky Winters foraging as four groups in open pasture on the *Yaraandoo* property at Duns Creek (32°38'04"S, 151°39'25"E). I "pished" all four of these groups and each one responded with some, up to three at one time, of the birds flying at me. There was considerable variation in the ferocity of the attack and it did not involve the synchronized approach by a pair of birds flying parallel to the ground at eye height as experienced at Curracabundi National Park. In several instances birds swooped down at me. Differences in the flight trajectory were probably associated with the elevation of the birds when disturbed, some from fence posts, others from trees. Again the birds making the most violent approach flew at my eyes peeling off at the last minute. Clearly I triggered a normal response of the Jacky Winter to disturbance, but probably seldom experienced by bird watchers because it is unusual to "pish" in open country. The interesting question is why "pishing" provokes this response? Is there a natural equivalent such as the begging calls of a young cuckoo which precipitates mobbing behaviour?

## REFERENCES

Higgins, P.J. and Peter, J.M. (Eds). (2002). 'Handbook of Australian, New Zealand and Antarctic Birds, Volume 6: Pardalotes to shrike-thrushes'. (Oxford University Press: Melbourne, pp. 577-590.)

Keast, A. (1994). The annual cycle in a vocalization context: a comparison of the Eastern Yellow Robin *Eopsaltria australis* and Jacky Winter *Microeca leucophaea*. *Emu* **94**: 230-238.

# Observations of White-throated Treecreeper behaviour

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On 15 July 2009 I observed a pair of White-throated Treecreepers *Cormobates leucophaea*, foraging in several *Melaleuca armillaris* in our back yard. While foraging in separate trees, they kept in contact with subdued 'pip' calls. Every few minutes the male would fly to the same tree as the female, and, with the crown feathers slightly raised and uttering a soft trilling call, approach her from below and offer food, which she accepted. The male would then fly to another tree and they would continue to forage independently. This behaviour has been recorded previously (Higgins *et al.* 2001: 204). The behaviour continued for another week, then both birds disappeared from the yard. A lone male bird reappeared in the yard the following year, in late January 2010.

The plumage of the female was interesting in that she had a rufous-coloured band about 10 mm wide at the tip of her tail, and rufous wing primaries (**Figure 1**). It is recorded that juvenile birds have 'upper tail coverts uniformly rufous, or, patchily rufous' (Higgins *et al.* 2001: 197), but there is no mention of rufous primaries or tip of the tail.

As this was mid July, and only about 2 weeks from the usual breeding season, August to January (Higgins *et al.* 2001: 205), one must ask if this was the beginning of a breeding event between a mature male and a female with some juvenile plumage present. The pair then left the area, possibly to breed.

## REFERENCE

Higgins, P.J., Peter, J.M. and Steele, W.K. (Eds) (2001). 'Handbook of Australian, New Zealand and Antarctic Birds Volume 5: Tyrant-flycatchers to Chats'. (Oxford University Press: Melbourne.)

**Figure 1**. Female White-throated Treecreeper with rufous wing primaries and rufous-coloured band at tail tip.

# The *Whistler* – Instructions to Authors

**The *Whistler*** is an occasional publication of the Hunter Bird Observers Club Inc. (HBOC), which is based in Newcastle. HBOC members are active in observing birds and monitoring bird populations in the Hunter Region. This journal-style publication is a venue for publishing these regionally significant observations and findings. The journal publishes three types of articles:

1. **Contributed Papers**
2. **Short Notes**
3. **Book Reviews**

Authors should consider the appropriateness of their study to this publication. The publication is suitable for studies either geographically limited to the Hunter Region or with obvious relevance to it. Papers attempting to address data and issues of a broader nature should be directed to other journals, such as *Corella*, *Australian Field Ornithology* and *Emu*. Contributed papers should include analyses of the results of detailed ecological or behavioural studies, or syntheses of the results of bird monitoring studies. These may include comprehensive annotated species lists of important bird areas and habitats. Such data would then be available for reference or further analysis in the many important issues of bird conservation facing the Hunter Region.

Communication of short notes on significant bird behaviour is also encouraged as a contribution to extending knowledge of bird habits and habitat requirements generally. Reviews of bird books are also solicited, with the intention of providing a guide for other readers on their usefulness regionally and more broadly.

## General Instructions for Submission

Manuscripts should be submitted electronically; please attach your manuscript to an email as a Microsoft Word document. Charts should be submitted as an Excel file. Authors should adhere to the instructions for each type of submission:

## Contributed Papers

- Manuscripts should be up to 12 pages in length (longer in exceptional circumstances) and of factual style.
- They should include a summary of approximately 250 words.
- An 'Introduction' or 'Background' section introduces the aims of and rationale for the study and cites any other work considered essential for comparison with the study.
- A section on 'Methods' describes the location of the study, citing map co-ordinates or including a map, and describing how observations were made and data were collected and analysed.
- A section on 'Results' includes description and/or analysis of data highlighting trends in the results; this may be divided into subsections if more than one body of data is presented; use of photos, drawings, graphs and tables to illustrate these is encouraged.
- A section headed 'Discussion' should attempt to set the results in a wider context, indicating their significance locally and/or regionally; comparison with national and international work is optional, as is the discussion of possible alternative conclusions and caveats; suggestions for future extension of the work are encouraged.
- A final section headed 'Conclusion[s]' gives a concise summary of findings, usually without introducing any new data or arguments.
- Appendices of raw data and annotated lists of bird species and habitats can be included in tabular form at the end of the article.
- References should be cited in brief within the text of the article, and full references should be listed at the end of the text after any Acknowledgements and before Appendices and Annotated Lists. References should be formatted as per the formatting instructions below.

## Short Notes

- Should be no more than 4 pages of descriptive or prosaic style.
- Should provide an adequate description of the location of observations, a brief rationale for documenting the observations, and a cogent description of observations; similar relevant observations should be cited with references if appropriate.
- References should be cited and listed as for contributed papers.

## Book Reviews

- Should be approximately 2 pages of critical assessment and/or appreciation.
- Should introduce the topics and aims of the book as the reviewer understands them, comment on the thoroughness and rigour of content, and conclude with comments on the effectiveness and originality of the book in meeting its aims, particularly for birdwatchers in the Hunter Region area if appropriate.
- References should be cited and listed as for contributed papers.

## Formatting Instructions

Although not necessary, it may assist if authors format their manuscripts as follows:

1. A4 size page, portrait layout except for large tables or figures;
2. Margins 2 cm top, bottom, left and right;
3. Title in bold 16pt Arial font, centred;
4. Authors names in 12pt Arial font, centred;
5. Affiliations or addresses of authors, including email addresses, in Arial font, 10 pt size, centred;
6. Section headings capitalized in bold Arial font, 12 pt size, left justified;
7. Sub-section headings not capitalized in bold Arial font, 12 pt size, left justified;
8. First line of each paragraph should not be indented and one line should be left between paragraphs;
9. Typescript should be Times New Roman, 11 pt, except methods, acknowledgements and references which are 10 pt;
10. Figures and Tables to be included at the end of the document in Times New Roman font, 10 pt minimum size, title left justified, below figures and above tables with "**Figure x.**" or "**Table y.**" heading the title;
11. Nomenclature and classification of bird species should follow Christidis, L. and Boles, W.E. (2008). 'Systematics and Taxonomy of Australian Birds'. (CSIRO Publishing: Collingwood, Victoria) or latest edition of this work; the scientific names of all bird species should be shown in italics after the first mention of their English name in the text. Scientific names should also be included after the first mention of the bird in the summary.
12. References to be cited in the text in parenthesis as close as possible to the information taken from the paper: for one author (Smith 2000), two authors (Smith & Jones 2001b) and more than two authors (Smith *et al*. 2002) with the authors listed in the order they are listed on the original paper;
13. References should be listed in alphabetical order and secondarily by year of publication; if published in the same year then in alphabetical order with an a, b, or c after the year to indicate which paper is being cited in the text (see below); each reference should form a separate paragraph.

## Reference Format

**Journal articles:**
Jones, D.N. and Wieneke, J. (2000a). The suburban bird community of Townsville revisited: changes over 16 years. *Corella* **24**: 53-60.

**Edited book Chapters:**

Lodge, D.M. (1993). Species invasions and deletions: community effects and responses to climate and habitat change. In 'Biotic interactions and Global change' (Eds. P.M. Karieva, J.G. Kingsolver and R.B. Huey) Pp. 367-387. (Sinauer Associates, Sutherland, MA.)

**Books:**

Caughley, G. and Sinclair, A.R.E. (1994). 'Wildlife Ecology and Management'. (Blackwell, Cambridge, MA.)

**Theses:**

Green, R. (1980). 'Ecology of native and exotic birds in the suburban habitat'. Ph.D. Thesis, Monash University, Victoria.

**Reports:**

Twyford, K.L., Humphrey, P.G., Nunn, R.P. and Willoughby, L. (2000). Investigations into the effects of introduced plants and animals on the nature conservation values of Gabo Island. (Dept. of Conservation & Natural Resources, Orbost Region, Orbost.)

**NB:**

If these examples are not sufficient, please refer to the references given in this issue or in earlier issues.

## Please submit all manuscripts to:

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