

STATUS OF BIRDS IN THE RICHMOND RIVER DISTRICT, NEW SOUTH WALES, 1973–2000

DENNIS GOSPER¹ and GLENN HOLMES²

¹1309 Nimbin Road, Lismore, New South Wales 2480

²33 Twelfth Ave, Atherton, Queensland 4883

Received: 12 July 2001

The status of selected bird species in the Richmond River district, New South Wales, was analysed for the period 1973–2000. Several species clearly increased or decreased numerically. The White-winged Cough, Zebra Finch and White-backed Swallow are probably extinct locally; the Eastern Bristlebird and Coxen's Fig-Parrot are confirmed to be Critically Endangered in the state. The Little Corella, Galah, Cattle Egret and Bell Miner have increased greatly in abundance whilst populations of the Osprey, Magpie Goose and several rainforest pigeons (in particular Wompoo Fruit-Dove) appear to be recovering from earlier periods of decline. Recent arrivals, the Common Myna and Long-billed Corella, are likely to become established.

Open (dry) forests in the Bungawalbin Creek catchment in the southern part of the district have significant potential for conservation purposes, for they still support a diverse temperate woodland avifauna that is becoming threatened nationally. In coastal locations, the effects upon both resident and migratory shorebirds are relatively small, despite continuing human settlement. Certain seasonal and climatic influences that govern occurrence in the district of both aquatic and terrestrial species are enumerated.

INTRODUCTION

The annotated account presented here documents the authors' personal records of selected species in the Richmond River district over the last 28 years. Gosper (1986) summarized distributional information for 333 species recorded in the district for the period of eleven years commencing in 1973. By December 2000 the fieldwork of both authors had expanded this species list to 384.

Criteria for selection of species in this account were the following:

1. Species listed in the Schedules of the New South Wales *Threatened Species Conservation Act 1995* (1999 update) and three additional taxa listed by Garnett and Crowley (2000) as being 'Threatened' or 'Near Threatened' nationally.
2. Species categorized as uncommon on a State basis (i.e. estimated maximum state population in any given year <10 000) by Morris *et al.* (1981).
3. Species considered uncommon in the Richmond River district by one or more of the following criteria:
 - fewer than 50 records from 1973 to 2000;
 - estimated district population of less than 50 individuals at any given time;
 - localized distribution within the district (i.e. recorded from one or two 10' squares only);
 - species near limit of geographic range.
4. Species with altered abundance in the district during the reporting period (those declining and now uncommon, or increasing and now more common).

For less common species this account aims to document numbers, residency status, local distribution and use of habitat. It also reports changes in the local status of species and provides a measure to assess future changes.

The most significant aspect of this avifaunal inventory is its long-term nature. In particular, it improves greatly the monitoring of nomadic species, for which numbers fluctuate considerably in response to environmental conditions prevailing locally and elsewhere. Trends over two to three decades may also be identified in the status and abundance of resident species.

STUDY AREA

The Richmond River district is located in north-eastern New South Wales, east of the Great Dividing Range. It is defined here as the catchment of the Richmond River and its contiguous coastline, including nearshore waters to 500 metres from land. It also includes the minor coastal drainages of the Evans River and Jerusalem Creek (see Gosper 1983, 1986). The catchment area (7 000 sq. km) is bounded in the north by the Nightcap, Tweed and McPherson Ranges and in the west and south by the Richmond Range. More than three-quarters of the district is less than 200 metres above sea level, with higher elevations (>800 m) confined to small sections of the northern watershed. The entire area lies within 100 kilometres of the coast.

A useful overview of the study area, in particular the location of catchment ranges, drainage systems and public lands (national parks and state forests) can be obtained from the Forestry Commission New South Wales. (Casino State Forests 1:125 000 map 1985, update due 2001). A more detailed description, including landform, rainfall, major habitat types and environmental changes that followed settlement beginning in the 1840s, was given by Gosper (1986) and Holmes (1987).

The district was mostly forested before European settlement. Most of the present day pastoral and agricultural lands, particularly the floodplain and Alstonville plateau (including the Big Scrub), were cleared before 1900 and dairying became the main land use. Current major land uses include cattle grazing and cropping, sugar cane and tea-tree on the lower floodplain, and tropical fruit and macadamia production on the Alstonville plateau. Uncleared lands are concentrated about the periphery of the catchment, mainly on public lands. Significant rainforests and wet sclerophyll forests occur along the northern and western watershed ranges, and dry sclerophyll forests in the Bungawalbin Creek catchment south of Casino. Major tracts of coastal heath occur near Evans Head. Wetland remnants are scattered along the floodplain in mainly cleared country from about Kyogle to Woodburn and Broadwater.

Alteration of habitat since 1970 has been less tangible than in preceding periods. Clearing has been limited and has mainly involved relatively small areas in the lower reaches of the catchment including the Bungawalbin Creek and North Creek catchments for tea-tree plantations and sugar cane. However the communities most affected have been the remnant swamp sclerophyll forest associations and lower floodplain wetlands that were already depleted severely by clearing and drainage for sugar cane earlier in the century. Pressure on littoral and estuarine habitats continues from urban expansion and human activity along the coastal zone, particularly around the Richmond estuary at Ballina and the adjacent coastline.

Tenure of extensive areas of public lands changed during the reporting period, particularly former state forests of the catchment ranges. With the transfer of such areas to the national parks system during the past two decades all remaining large tracts of rainforest and most coastal heath communities in the district have been effectively reserved.

These tenure changes have altered land management practices. A more restrictive access policy and the cessation of logging have seen the overgrowth of many roads and former logging tracks. This has resulted in the recovery of some sensitive plant communities, an example being gallery rainforest (characterized by Bangalow Palm *Archontophoenix cunninghamiana*) along Terania Creek in Nightcap National Park. Fire regimes have also been affected, most importantly by a reduction in fire frequency in some areas. The ultimate combined effect upon vegetation is speculative, but in some areas sclerophyll associations are clearly being subsumed by rainforests.

With the decline of dairying (once the major agricultural land use) over the last 40 years, some previously cleared lands are returning to tree cover in several forms. In the absence of intensive grazing and weed control, particularly in the higher rainfall north-east of the district, woody species (notably Camphor Laurel *Cinnamomum camphora* and Large-leaved Privet *Ligustrum lucidum*) have grown largely unchecked. They now form dense stands on marginal lands, especially on steeper slopes where control is difficult. Many trees have reached maturity and contribute significant fruit supplies for frugivores. Some regeneration of rainforest communities (particularly dry rainforest) is occurring in conjunction, but regrowth tends to be retarded by competition from exotic plants. In the area formerly covered by the expansive subtropical rainforest of the Big Scrub, extensive plantations have been established. These include macadamia and tropical fruit trees with eucalypt windbreaks; with the attendant uncontrolled weed proliferation, the landscape has been transformed from one of open improved pastures, to one dominated by trees and shrubs again, albeit mainly non-indigenous species.

Drought can have a profound influence on the occurrence of inland birds in coastal districts. Wood (1994) used agricultural drought to measure possible effects upon bird movements. Accordingly, information available for 1977 to 1997 is presented here to help analyse movements within the Richmond River district. It was obtained from records of the New South Wales Department of Agriculture in the form of monthly declarations of drought in any of the 57 Rural Lands Protection Board (RLPB) pastoral districts.

The eastern part of the Richmond River district lies within the Tweed-Lismore RLPB district and experiences relatively high and reliable rainfall (mean annual rainfall Ballina 1 752 mm, Mt Nardi 2 822 mm), and is rarely drought affected (i.e. drought declared for a total of only 10 months over the 21 years). By contrast, the lower rainfall western sections (Casino 1 113 mm) that are included in the Casino RLPB district are prone to more frequent dry spells. Part or all of the Casino RLPB area was drought declared for a total of 58 months, the most prolonged periods of total declaration being May 1986 to March 1987, April 1991 to January 1992 and August 1994 to March 1995.

In the 21 years from 1977 to 1997, New South Wales experienced eight protracted droughts (>50% of State by area drought declared for a minimum of five consecutive months). The most severe occurred from March 1980 to August 1981, August 1982 to May 1983 (>87% of State drought declared September-April), April 1991 to December 1991 and August 1994 to November 1995 (>90% drought-declared October-February). Slightly shorter or less widespread droughts were experienced in 1978, 1986, 1992 and 1996.

Procedure

Compilation of the avifaunal inventory for the district involved both systematic and opportunistic methods. A programme of systematic surveys of birds inhabiting specific habitat types was commenced by the senior author in 1973 and has continued (see Gosper 1992 for published results). Survey sites were selected as representative samples of major types. Because of time constraints the selection of sites was influenced by proximity to places of residence (Casino 1973-92, Goolmangar near Lismore 1992-2000). Censuses were conducted monthly for periods averaging 2.5 years. Each involved transect counts, generally of two to four hours duration (e.g. Gosper 1981a, 1992).

Survey programme:

1973: estuarine wetlands (Gosper 1981a)

1973-77: floodplain wetlands (Gosper 1981a)

1976-79: beaches (patrols for beach-washed seabirds) (Gosper 1981b)

1977-79: coastline (littoral habitats) (Gosper 1983)

1977-82: dry sclerophyll forest: dry rainforest: subtropical rainforest (Gosper 1992)

1983-84: urban streets

1985-91: wet sclerophyll forest; floodplain swamp woodland (remnant/regrowth); estuarine swamp sclerophyll forest (mixed mangrove/melaleuca/casuarina/littoral rainforest); floodplain swamp sclerophyll forest (remnant/regrowth melaleuca/casuarina/mixed sclerophyll/dry rainforest complex)

1993-95: coastal heathland; wet sclerophyll forest/dry rainforest (regrowth)

1996-99: roads (diurnal raptor counts)

1997-99: rural road corridors; farmlands

The junior author conducted several commissioned surveys, mainly while residing in the district ('Glen Isle', Kilgra near Kyogle 1980-84, Wardell 1984-89), and to a much lesser extent after changing permanent residence to Queensland. Studies have encompassed Eastern Bristlebird *Dasyornis brachypterus*, Coxen's Fig-Parrot *Cyclopsitta diophthalma*, estuarine birds, and forest birds of Big Scrub remnants and Moore Park Nature Reserve (e.g. Holmes 1981b, 1987, 1989, 1990, 1997). Postgraduate studies of seabirds conducted from 1974 to 1977 (e.g. Holmes 1977, 1981a) extended north to Evans Head in the extreme south of the area.

Both authors have obtained extensive observations of a less systematic nature throughout the district. Certain sites were visited regularly (e.g. Casino wetlands). The junior author searched the district and recorded all observations on a 5' grid basis that ensured comprehensive coverage.

RESULTS

Records are summarized as an annotated list. Species excluded are the petrels (Procellariiformes), other seabirds found only as beach-washed specimens, and those considered to be aviary escapes (mainly Cacatuidae and Psittacidae) that are not yet established as viable local populations. Species listed in square brackets [] refer to records not submitted to state or national records appraisal committees. In all instances the observations were made by at least two experienced observers.

For species recorded on a few occasions only (<10 records in total), records are enumerated together with details of breeding if recorded. Where a species was encountered less than 30 times during the reporting period the number of occurrences is always given. Estimates of abundance are given for those species considered to occur

regularly in the district, including those few that occur mainly during drought periods inland (west of the Great Dividing Range). Terms used to indicate the magnitude of district populations in any given year are:

Scarce <10

Uncommon 10–50

Moderately common 50–250

Common 250–2500

Abundant >2500

Marked fluctuations in populations within or between years are indicated e.g. 'scarce to moderately common'. The term visitor means species that were not considered to breed within the district. Existence of local breeding records is indicated by an asterisk before the English name. Details of breeding are given for species classed as uncommon or scarce. Where the district status of species has been reviewed recently, only additional records are enumerated here. Records from other sources, in particular the New South Wales Annual Bird Reports 1973–98 (NSWBRs) published by the New South Wales Field Ornithologists Club, are incorporated where these assist in clarifying the local status of species.

Localities are identified by place name as depicted by the State 1:25 000 Topographic Map Series (Central Mapping Authority, Dept of Lands New South Wales 1975 *et seq.*). For accuracy, locations within large reserves are referred to by geographic name e.g. Brindle Ck (in Border Ranges NP) or Cambridge Plateau (in Richmond Range NP). The term 'Casino wetlands' refers collectively to swamps within the former Casino Municipality and includes Richmond Park (also known as Golf Course Swamp and Jabiru-Geneebeinga Wetland), Barling's Swamp and Round Swamp. Sewerage treatment works is abbreviated to STW.

ANNOTATED LIST

* *Emu Dromaius novaehollandiae*

Scarce (declining?); resident; small population south of Evans and Richmond Rivers; 10 records (1–3 birds) Bundjalung National Park (NP) 1977–93; in adjacent Bungawalbin Creek (Ck) catchment singles Bungawalbin State Forest (SF) 1981 and 'Warringah' near Carters Bridge 1985; up to 11 birds (including young) Ellangowan 1970s-early 1980s but not since (J. Fleming); periodically reported by general public and forestry staff mainly along the Summerland Way and areas east (see also McGrath and Bass 1999); 1–2 Bentley-Spring Grove area 1997–99 outside previously known local range; heathlands, sclerophyll forests, semi-cleared country and tea-tree plantations.

King Quail *Coturnix chinensis*

Uncommon to moderately common (?); resident (?); numbers apparently fluctuating; 32 records (mostly 1–10), all seasons but mainly summer; coastal heathlands, wet grasslands and croplands; at times locally abundant in crops (e.g. 35+ in 2–3 ha cultivated area Codrington 12/12/82).

* *Magpie Goose Anseranus semipalmata*

Scarce (increasing); visitor; up to 28 Casino wetlands 4/90, six 2/91 (on river), twelve 9/96 (K. Kind), up to eleven 3–12/99, 9–12/00 and 5–6/01, one Lennox Head 10/91; bred Casino 1999 fledging one young; not recorded during intensive surveys of district wetlands during 1970s (Gosper 1981a) and regular monitoring of sites at Casino in 1980s; floodplain wetlands.

Plumed Whistling-Duck *Dendrocygna eytoni*

Uncommon; irregular visitor (1975, 77, 78–79, 81–84, 87, 92, 99–01), mainly Mar-May; mostly small flocks (<25) but in 99–00 up to 115 in Casino area; floodplain wetlands and dams.

* *Wandering Whistling-Duck D. arcuata*

Uncommon; irregular visitor (1974, 76, 78, 89, 92, 94, 96, 97, 99–00); 32 records (1–76); recorded all months and tending to remain at sites for extended periods (i.e. 2–6 months); adult with six downy young 2–3 weeks old Casino 29/2/92; floodplain wetlands.

* *Blue-billed Duck Oxyura australis*

Scarce; visitor; up to five Casino Sewerage Treatment Works (STW) 12/6–29/7/89, singles same site 15/6/91, 27/1/92; up to 11 adults on Casino wetlands at least from 4/99–3/00 and four 5–6/01; eight newly hatched downy young Richmond Park 25/5/99, also 3 young about half grown Round Swamp 11/3/00; extends documented breeding range on east coast (see Marchant and Higgins 1990); STWs, floodplain wetlands.

Musk Duck *Biziura lobata*

Uncommon; visitor (?); small numbers (1–9), numerous records; few birds in district most times and continuously present some sites over many years but no evidence of breeding; semi-permanent floodplain wetlands, occasionally STWs.

Freckled Duck *Stictonetta naevosa*

Uncommon; irregular visitor; up to 6 Casino STW 9/1–15/2/81, also 6/6–22/8/81 (max. 38); small numbers (1–4) several sites Casino-Lismore area 22/8/82–13/2/83 and 27/9–15/11/85; up to 7 Casino STW 25/5–16/6/92; three Stratheden 25/5/99 and one Tatham 27/7/99; not recorded during intensive surveys of wetlands in 1970s; STWs and floodplain wetlands.

Australian Shelduck *Tadorna tadornoides*

Vagrant (?); two (pair) Swan Bay 19/9/99.

Green Pygmy-goose *Nettapus pulchellus*

Vagrant; one Swan Bay 1975 (Gosper 1976b).

Mallard *Anas platyrhynchos*

Scarce; visitor (?); 24 records (Mallards or hybrid types) 1973–77, 79, 81, 94, 97; singles or pairs; floodplain wetlands.

Chestnut Teal *A. castanea*

Uncommon; visitor(?); recorded all months, mostly low numbers (1–12, many records); occasionally larger

aggregations in estuarine areas e.g. 22 Ballina STW 4/79, 13 7/86; floodplain and estuarine wetlands, STWs.

* **Hoary-headed Grebe *Poliiocephalus poliocephalus***

Scarce (or absent) to locally moderately common; visitor; many records, appears to irrupt into district irregularly, remaining for extended periods; not recorded before 3/75, thereafter present continuously 1975–92 but no records 1993–98, reappearing 1999; highest numbers Casino STW where 20–36 birds continuously present 1978–81; unsuccessful breeding attempt on seasonal fresh swamp Casino (three nests/eggs 7/4/87); mainly STWs, sometimes floodplain wetlands.

Great Crested Grebe *Podiceps cristatus*

Vagrant; one Round Swamp, Casino, 27/2/00; only one previous personal North Coast record, single bird Clarence River at Southgate May 1966 (D. Gosper).

Red-tailed Tropicbird *Phaethon rubricauda*

Vagrant (?); one East Ballina, 4/3/87; a further three reports NSWBRs (Jan–Apr) including one at Casino during tropical storm 24–26/4/89.

White-tailed Tropicbird *P. lepturus*

Irregular transient visitor; recorded during strong onshore winds only, East Ballina 4/3/87 (8), 26/4/89 (8), Patches Beach 5/3/87 (1); one beach-washed Patches Beach 1976 (Gosper 1981b); a further seven records NSWBRs with maximum 18 birds Ballina 14–16/2/95; all records Jan–Apr except four beach-washed Jul 73.

Masked Booby *Sula dactylatra*

One East Ballina, 21/5/85; also two South Ballina Apr 99 (per A. Morris).

Brown Booby *S. leucogaster*

Scarce; irregular visitor; singles East Ballina 10–11/4/84, 1/5/86, 4/2/87, 26/11/88, Robin's Beach 22/6/85; one beach-washed Patches Beach 1978 (Gosper 1981b); a further seven records NSWBRs (Jan–May).

[Great Frigatebird *Fregata minor*

Vagrant; ten East Ballina during tropical storm 24–26/4/89, accompanied by Lesser Frigatebirds (G. Holmes, J. Izzard); also a further four reports (singles) NSWBRs (Feb–May).]

Lesser Frigatebird *F. ariel*

Irregular transient visitor; recorded mainly during strong onshore winds, East Ballina 1976 (2, Gosper 1981a), 25/1/88 (1), 25/4/89 (2), 26/4/89 (83); a further six reports NSWBRs (Jan–May), mostly singles/pairs but 12 Ballina 3–4/5/96 (Izzard 1997).

Eastern Reef Egret *Egretta sacra*

Scarce (increasing?); visitor; recorded all months; singles or pairs (grey morph only) in Broken Head-Flat Rock area, occasionally Evans Head; no records before 1981 despite frequent visits to coastal sites but becoming fairly regular late 1990s; coastal rock platforms and estuaries.

* **Cattle Egret *Ardea ibis***

Common to abundant (increasing); partial nomad; mostly flocks (<100) throughout district, congregating in larger numbers (up to 1000) at roosts around wetlands outside breeding season; populations become concentrated in proximity of heronries while nesting; heronries recorded 4/81 at Newrybar (above Emigrant Creek Dam) on farm dam (15 nests in two dead trees), in mangroves adjoining Ballina STW 12/82 (500+ nests), in paperbacks Gundurimba, south of Lismore, 2/84 (c. 300 nests) and new colony (100+ nests) commenced Casino 1/00 (in exotic Chinese Tallow *Celtis sinensis*); of older colonies only Ballina site still in use in 1990s; foraging mainly pastoral lands (pastures, improved pastures and wetlands), sometimes other open habitats where cattle absent (e.g. playing fields, freshly ploughed lands, heathlands).

Note: nesting sites at Newrybar, Gundurimba and just outside study area at Vallance's Swamp, Mullumbimby (c. 600 nests January 1981) were not identified by Baxter (1994) who underestimated the expansion of Cattle Egret heronries on the far north coast of New South Wales in the early 1980s.

* **Striated Heron *Butorides striatus***

Uncommon; resident; numerous records; estuaries and upstream on tidal reaches of Richmond River and Bungawalbin Creek, and occasionally billabongs and gullies immediately adjacent; also recorded regularly (1–2, all months over many years) on freshwater sections of river in Casino.

* **Little Bittern *Ixobrychus minutus***

Scarce (?), irregular (?) visitor; singles Ballina 1973 and Coraki 1976 (Gosper 1981a); two Casino STW 1/82, singles same site 1/99, 10/99, at nearby Richmond Park 1/00 and Lismore STW 11/00; young calling Casino STW 1/82, young just fledged Richmond Park 2/00; probably occurs more regularly than records suggest; STWs, floodplain and estuarine wetlands with rank sedges or rushes, especially *Typha*.

* **Black Bittern *I. flavicollis***

Very uncommon (scarce?); resident; regular at 'Glen Isle', Kilgra 1980–84; also recorded at five other sites on south arm of Richmond River and tributaries between Casino and Old Grevillia; at three sites on tributaries of north arm between Tuncester and Goolmangar; Bungawalbin Ck catchment upstream to edge of Main Camp (Blackbutt Lagoon) and seven sites on lower Richmond (downstream from Bungawalbin Ck); singles or pairs; nests 'Glen Isle' 1982, 83, Bungawalbin Ck 89 and Ballina 91; rivers, creeks, mangroves, swamp sclerophyll (paperbark) forests, occasionally small wetlands with fringing trees.

Australasian Bittern *Botaurus poiciloptilus*

Scarce; irregular visitor (?); one Stratheden 1976 (Gosper 1981a); singles also Broadwater NP 4/10/76, 18/12/94, 5/7/95; frequently heard calling this site in 1970s (M. Goddard); wet heaths, semi-permanent swamps.

Glossy Ibis *Plegadis falcinellus*

Uncommon (moderately common some years); regular visitor; present Casino wetlands all years except 1984, 91,

95; recorded all months but arriving mainly Mar-Jul with numbers peaking Apr-Sep (also 12/82); mostly small numbers (<25) but larger flocks (50–80) 1978, 82, 87, 88, 92, 96; floodplain wetlands.

Yellow-billed Spoonbill *Platalea flavipes*

Uncommon; regular visitor; numerous records (all months); recorded most years usually appearing Apr-Jul and remaining 3–10 months); sometimes absent for longer periods (e.g. 2/74–4/75, a wet period across inland Australia); mostly singles or small groups (1–3) but larger parties (up to 12) in spring-early summer 1978, 80–82, 94 (periods of inland drought); no local breeding but coastal nesting recorded near Grafton 1962 (D. Gosper); widely distributed, tending to appear simultaneously at sites throughout district following a period of absence; floodplain wetlands.

*** Black-necked Stork *Ephippiorhynchus asiaticus***

Scarce; resident; numerous records of one to five birds (family group of 2 adults and 3 juveniles) (cf. Gosper 1981a) but total numbers low; seven nesting sites recorded on floodplain between Coraki and Kyogle; estimated breeding population 3–4 pairs (pairs nested in 2000 at Coraki, Mongogarie and south of Cedar Point); incomplete record of breeding years includes 1971, 73–74, 76–77, 82, 86–91, 96–00; adults attending nests from as early as mid-Mar, in most years young fledging late Sep-Oct; small to large wetlands throughout district.

*** Osprey *Pandion haliaetus***

Uncommon (increasing); resident; many records (singles or pairs, all months); formerly scarce (cf. Gosper 1981a, 1983, unpubl. data) but recording rate increased steadily during latter half of reporting period consistent with that occurring in coastal New South Wales generally (cf. Morris 2000); now breeding annually (e.g. central Ballina) using artificial nest platforms provided by NSW NPWS recovery programme; regularly present on estuaries and coastline and in recent years along river upstream to Casino and above Lismore (5 records since 1990).

*** Pacific Baza *Aviceda subcristata***

Uncommon to moderately common; migrant or resident but locally nomadic; numerous records (all years 1975–00), singles or pairs, occasionally small groups (up to 8) in spring; all months but more records late winter-summer (Jul-Jan/Mar) than other times; appeared annually in spring (1993–00) at Goolmangar with nesting confirmed in 1993, 99 (suspected in the other years); also nests Leeville, Casino, Namoon, Alstonvale, Meerchaum Vale, Eltham, Repentance Ck and Kyogle, often in semi-cleared pastoral and urban habitats (sometimes in exotic trees); young fledge Dec-Jan; widespread in forested and open habitats including towns (Casino, Kyogle, Lismore, Ballina) where confiding (e.g. perching on clothes lines, fences, powerlines).

Square-tailed Kite *Lophoictinia isura*

Scarce; visitor; singles Myrtle Ck 3/7/83, Bora Ridge 2/8/86, pair Esk R. (Bundjalung NP) 17–18/10/87 (nest?), one Myrtle SF 7/8/99, later same morning 4 birds (moving as two pairs and at times interacting) over western edge

of Bungawalbin SF, 10 km north-east; possibly regular at Myrtle-Braemar SFs where also recorded 1972 (W. Watson) and 1987 (Debus 1992); dry sclerophyll forests.

Black Kite *Milvus migrans*

Scarce; irregular visitor (mainly autumn?); influx Casino-Kyogle-Lismore area 3–9/78 with maximum 35 at Casino rubbish tip Apr-May; singles Casino 4/80, 10/89, and near Kyogle Feb-mid Apr 82–83, 85; open country, towns.

*** Brahminy Kite *Haliastur indus***

Uncommon; resident; singles or pairs, occasionally up to 4 adults in close proximity, but present in low numbers (numerous records) on estuaries, coastline and lower reaches of river; also periodically (all months) upstream to Casino and Lismore where occasionally over paddocks several kilometres from river.

*** White-bellied Sea-Eagle *Haliaeetus leucogaster***

Uncommon; resident (?); present in low numbers (numerous records), singles or pairs, sometimes accompanied by up to 2 juveniles; nests recorded South Ballina, near Woodburn, Swan Bay, Clovass and Stratheden, also suspected (courtship displays) at other non-coastal locations near semi-permanent water; coastline, estuaries and away from coast on rivers, creeks, dams and wetlands throughout district.

Spotted Harrier *Circus assimilis*

Uncommon; visitor; greater than 45 records (mostly singles), recorded all months but mainly Apr-Aug; breeding suspected Tatham (2–3 juveniles 1994, 98); croplands, pastures, rank grasslands and heathlands.

*** Swamp Harrier *C. approximans***

Uncommon to moderately common; visitor and breeding resident (?); singles or pairs Mar-Oct (numerous records, all years), few over summer some years; nested Broadwater NP 1994 (D. Gosper 1994) and South Ballina 1998; floodplain and estuarine wetlands, coastal heathlands and wet grasslands.

*** Grey Goshawk *Accipiter novaehollandiae***

Moderately common; resident; many records (recorded from c. 30 5' grids); singles or pairs (all grey morph except Toonumbar SF 2/81 and Casino 4/83); nests Boomerang Falls, Sawpit Ck; rainforests and wet sclerophyll forests in catchment ranges in north and west, and Blackwall Ra (Mar-Jun only); also recorded in mainly cleared country in wetter parts of district, especially along streams, sometimes over a period of several months (e.g. urban Casino 1978, 83, 87; Goolmangar 95–98).

Red Goshawk *Erythrotriorchis radiatus*

Scarce; resident (?); singles Boatharbour NR 15/2/84, Coolgardie near Wardell 17/10/86, Sawpit Creek 14/10/94; subtropical and dry rainforests and semi-cleared farmlands.

*** Wedge-tailed Eagle *Aquila audax***

Uncommon (?), difficult to estimate population because of large territories; resident; numerous records; mainly singles or pairs, occasionally trios; Harder (2000) reports ten nesting territories in the Richmond Valley; present

throughout district (recorded almost all 5' grids) but least often in former Big Scrub; all habitats.

* **Little Eagle** *Hieraaetus morphnoides*

Scarce; visitor (?); greater than 50 records (mostly singles), all months but mainly Mar-Aug; throughout district but particularly near coast; nest in pastoral lands north of Kyogle 9–10/79; all habitats except rainforests.

Australian Hobby *Falco longipennis*

Uncommon; resident (?); many records (all months); mostly singles but up to three together; present throughout district in open country including towns, and particularly around wetlands when waterbird populations high.

Black Falcon *F. subniger*

Scarce; irregular visitor; singles Casino 12/9/76, Byrnes Point (hunting shorebirds) 20/8/86, Coolgardie 1/2/87; mainly wetlands ?

* **Peregrine Falcon** *F. peregrinus*

Uncommon; resident (?); many records (singles, all months); recording ratio about 1:5 that of Australian Hobby (Gosper, unpubl. data); mostly about steep areas (nest sites Sep-Apr) or coastal lowlands (Apr-Aug); nested Minyon Falls 1981-00 (annually?); probably nests Bar Mountain, The Pinnacle and Koonyum Rge; all habitats.

* **Brolga** *Grus rubicunda*

Uncommon; resident (?); greater than 60 records (all months); mainly pairs but occasionally larger groups (e.g. up to 20 Coraki 5/88 in harvested maize crop); nests Tuckean Swamp 4/87, north of Lennox Head 9/97 (J. Morante), near Emigrant Ck 9/99 and suspected Broadwater NP 9/94; mainly coastal, especially heathlands Broadwater and Bundjalung NP, periodically lower floodplain wetlands and croplands west to Casino.

Lewin's Rail *Rallus pectoralis*

Uncommon(?); resident; most records Huonbrook and Coolgardie; other records Upper Wilson's Creek 12/83, Toonumbar SF near fire tower 6/84, Little Brindle Ck 10/84, Tuckean Swamp 12/84, Lennox Head STW 5–6/85, Blakebrook 5/85, Little Pimlico Is. 8/85, Nightcap Track 4/87, Esk R. 12/87, Jerusalem Ck 7/85, 12/87, 9/89; rank shrubberies near water, including *Lantana*.

Bush-hen *Amaurornis olivaceus*

Uncommon (?); resident or partial nomad (?); district population concentrated in high rainfall north-eastern catchment of Richmond River (Stewart and Stewart 1994; Muranyi and Baverstock 1996); records additional to Muranyi and Baverstock (1996): one Cox's Rd near Toonumbar SF 1/88; up to three on Goolmangar Ck 1/98 and 11–12/98 (only records this site during 8 years residence); rank vegetation including grass, weeds and *Lantana*, with varying density of tree cover, fringing streams and semi-permanent water.

Baillon's Crake *Porzana pusilla*

Uncommon; irregular (?) spring-summer visitor (1974–77, 80, 82, 86, 91, 94, 99, 00); 29 records (1–7) mid-Aug-early Apr, once Jul (Gosper 1981a); floodplain wetlands, STWs.

Australian Spotted Crake *P. fluminea*

Scarce (?); resident (?); recorded Byrnes Point 13/8/86, 29/8/87, 22/4/89, Tuckean Swamp 14/9/87, Casino STW 7/12/91 and Namoonna 7/11/99; salt marshes and wetlands, particularly with *Typha*.

Spotless Crake *P. tabuensis*

Scarce (?); resident (?); recorded Cedar Point 18–20/2/83, Lennox Head STW 11/10/87, Chickiba Estate (Ballina) 2/2/87, Casino 29/11/91, Casino STW 2/4/87, 19/12/91, Byrnes Pt 23/10/88, Evans Head 4/11/89, Namoonna 15/10/99, Lismore STW 21/10–21/12/00; wetlands, dams, STWs with *Typha* beds.

Australian Bustard *Ardeotis australis*

Vagrant; one Backmede-Cedar Point (between Casino and Kyogle) 6–7/93 (S. Kennedy, P. Carlill; see also Morris and Burton 1995); remained for at least a month; single bird same area on a previous occasion (P. Carlill); pastoral land.

Red-backed Button-quail *Turnix maculosa*

Scarce (?); resident (?); many records Wardell 1987–89; other records: Kyogle 9/3/77, 28/11/82, 14/12/82; 'Glen Isle' (north of Kyogle) 29/9/82, 8/12/82; Codrington 12/12/82 (with numerous quail species); Casino 29/11/82, 14/12/82, 31/1/83; dead female Ballina 29/12/84; Macauley's Lead (Bundjalung NP) 16/10/88; heathlands, croplands and wet grasslands.

Little Button-quail *T. velox*

Vagrant (?); one dead, Kilgra, 1/12/82; cropland.

Red-chested Button-quail *T. pyrrhotorax*

Scarce to uncommon (?); irregular visitor; apparent influx 11/82–1/83 to croplands throughout district when locally abundant with other quail spp. (max. 35+ Codrington 12/12/82); male (road kill) Goolmangar 4/11/84, Wardell 8 and 15/10/86, Evans Head 16/11/97; croplands and heathlands.

Black-breasted Button-quail *T. melanogaster*

Probable record Sandy Hill Rd below Mt Glennie 800 metres S of border fence 30/3/80 (G. Holmes); *Lantana* in sclerophyll forest adjoining subtropical rainforest; recorded just north of state border in contiguous Pallen Creek catchment (G. Holmes).

Latham's Snipe *Gallinago hardwickii*

Moderately common; visitor; annually in small to moderate numbers (mostly <20, but occasionally loose aggregations up to 55) mid-Aug-early Apr; small to large fresh and brackish wetlands throughout district, especially where rank vegetation provides cover.

Black-tailed Godwit *Limosa limosa*

Scarce; visitor (mainly southward passage?); less than 40 records (1–6), mostly during 1980s; all months Sep-Apr, once Jun; usually remaining less than three weeks; floodplain and estuarine wetlands, beaches.

Little Curlew *Numenius minutus*

Scarce; irregular visitor; five Casino 6/11/76 (Gosper 1981a), singles Casino 25/10–6/11/81, East Ballina

18–28/11/83; two Stratheden 10–13/2/83; floodplain and estuarine wetlands.

Whimbrel *N. phaeopus*

Uncommon to moderately common; visitor; present all months, mainly Sep–Apr; population 35–45 birds Richmond estuary (up to 10 overwintering), usually fewer on Evans estuary (but 45 present 7/3/98); estuarine wetlands, adjacent beaches and rock platforms.

Eastern Curlew *N. madagascariensis*

Moderately common; visitor; present all months Richmond estuary, mainly Sep–Apr; population 70–80 birds (up to 30 overwintering) 1972–74 counts, similar numbers 1999, maximum 31 Evans estuary 1/84; estuarine wetlands and adjacent beaches.

Marsh Sandpiper *Tringa stagnatalis*

Uncommon (increasing); visitor; formerly scarce (recorded only twice 1973–80 despite intensive surveying of wetlands and littoral habitats (*cf.* Gosper 1981a, 1983); since 1981 recorded almost annually (18 of 20 years), Aug–May, mainly Sep–Jan; mostly small flocks (1–15) but at least 22 birds in district 12/91; floodplain wetlands, estuarine marshes.

Common Greenshank *T. nebularia*

Uncommon; visitor; annually in small numbers; all months, mainly late Aug–Apr; maximum counts Richmond estuary 48 1–2/88 (Holmes 1988) and 38 1/99; estuarine wetlands, nearby flooded paddocks; occasionally (eight records, 1–4) floodplain wetlands; once on river at Casino.

Wood Sandpiper *T. glareola*

Scarce; visitor; recorded 1975, 76, 81, 82, 83, 85, 87, 99, Aug–Apr, mainly Sep–Dec; 1–2 birds only, individuals tending to remain at sites for several months; floodplain wetlands.

Terek Sandpiper *Xenus cinereus*

Moderately common; visitor; recorded Aug–May, mainly Oct–Apr; regular Richmond estuary, population 65–80 birds (1972–74 counts, Gosper 1981a), maximum 60 during 1985–87; recent counts (see Harris 1997) consistent with earlier periods; estuarine tidal flats, mangroves, occasionally adjacent coastline.

Common Sandpiper *Actitis hypoleucos*

Scarce; visitor; present in low numbers late Aug–Apr; population estimated 4–8 birds Richmond estuary, 1–2 Evans estuary; four records (singles) on rocky sections of river (above tidal influence) at Casino, once Casino STW; mainly upper reaches of estuaries (e.g. to Pimlico); steep unvegetated shores, either rocky or eroded, even in narrow mangrove channels.

Grey-tailed Tattler *Heteroscelus brevipes*

Moderately common; visitor; present all months, mainly Sep–Apr; population Richmond estuary 100–130 birds (up to 45 overwintering) in 1972–74, 77–79 (Gosper 1981a, 1983); maximum counts 157 3/73, 160 2/88 (Holmes 1988); no recent counts; 30 Evans estuary 1/84; estuarine tidal flats, mangroves, coastal rock platforms.

Wandering Tattler *H. incanus*

Scarce; visitor; recorded all months except Jul, mainly late Aug–Feb; 1–2 birds Flat Rock–Skennar's Head 1974–78, 82–83, 87–91, 99; may occur annually (*cf.* Gosper 1983); coastal rock platforms.

Ruddy Turnstone *Arenaria interpres*

Moderately common (decreasing?); visitor; present all months, mainly Aug–Mar; population Richmond estuary and adjacent coastline 100+ (up to 20 overwintering) 1977–79 (Gosper 1983), fewer in 1980s (max. 50 1–2/88 see Holmes 1988) but no recent counts; coastal rock platforms, beaches and estuarine tidal flats.

Great Knot *Calidris tenuirostris*

Uncommon; visitor; recorded all months, mainly Oct–Mar, incomplete record of years present includes 1971–75, 81–90, 93, 98; only on Richmond estuary where probably regular population 10–30 birds (highest counts 33 2/84, 32 1/93, 24 4/89); estuarine tidal flats and adjacent beaches.

Red Knot *C. canutus*

Uncommon; visitor; present Aug–Jun, mainly Sep–Dec (apparently in passage); annual in small numbers (1–18) on Richmond estuary; one Stratheden 10/81; estuarine wetlands, beaches and rock platforms.

Sanderling *C. alba*

Uncommon (increasing?); visitor; present Aug–Jun, mainly Sep–Apr; regular on beaches south of Richmond River mouth where recorded annually (Gosper 1983); counts up to 27 birds 1976–81 but may be increasing (e.g. 63 12/84, 70 2/98); beaches, estuarine sand islets (roosting), occasionally rock platforms, tidal flats and salt marshes.

[Long-toed Stint *C. subminuta*

Vagrant (?); singles Byrnes Pt 22/10/80–15/3/81, 23/10–27/12/88 (G. Holmes, J. Izzard, D. Gosper and others); estuarine marsh.]

Pectoral Sandpiper *C. melanotos*

Scarce; visitor; recorded Sep–Apr; one Emigrant Ck 1975, up to three Stratheden 1978 (Gosper 1981a); two Stratheden 31/10–29/12/81, one 26/1–26/3/83; singles Tatham 13/2/83, Casino 30/9–20/10/85, 2/4/87, 30/9–20/10/94, 10/10–12/12/99, Coraki 7/2/83, 4/2/85, Tatham 5/2/83, Byrnes Pt 13–21/4/87; floodplain wetlands, occasionally estuarine marshes.

Broad-billed Sandpiper *Limicola falcinellus*

Scarce; visitor; recorded Nov–Mar; singles Chickiba Ck, East Ballina 18/11/83–1/3/84, 22/1/85, 20/10/86, 7/11/93, two 12/11/84, 2/2/92; estuarine wetlands.

Ruff *Philomachus pugnax*

Scarce; irregular visitor; two Casino 11–14/12/82; singles Tatham 31/1–13/2/83, Chickiba Ck 26/3/84; floodplain and estuarine wetlands.

Painted Snipe *Rostratula benghalensis*

Scarce; visitor; up to three Coraki 1976 and Tatham 1977 (Gosper 1981a); 1–2 Casino 15/11–6/12/87; one Casino 5/1/99; one Namoon 12/12/99; floodplain wetlands.

* **Comb-crested Jacana** *Irediparra gallinacea*

Moderately common to common (declining?); partial nomad; district numbers fluctuate apparently in response to habitat conditions both locally and beyond the area e.g. abundant early-mid 1970s when greater than 100 birds on some seasonal wetlands at Casino over several years (max. 270+ Richmond Park 6/76, Gosper 1981a), but declining thereafter (drying out of seasonal wetlands in 1980s droughts?) with counts on same wetlands not exceeding 30 during last two decades; further monitoring required to assess population changes in response refilling of district wetlands in late 1990s; mainly floodplain wetlands, also dams with floating vegetation.

* **Pied Oystercatcher** *Haematopus longirostris*

Uncommon; resident; pairs, parties (mostly <15 birds); tends to form larger roosting assemblages in late summer-autumn; in 1970s and early 1980s such groups to 25 birds (Gosper 1981a, 1983) but in late 1990s assemblages up to 70 recorded between South Ballina and Broadwater Beach; beaches south of Evans Head not investigated but note 91 adults and 10 juveniles counted during surveys from Shark Bay north to South Ballina Nov 98 (R. Moffatt in Morris 2001); recent poor local breeding success caused primarily by Red Fox predation has been reversed in a programme conducted by NPWS; long open beaches backed by low frontal dunes (mainly south of Richmond estuary) and adjacent estuaries.

South Island Pied Oystercatcher *H. finschi*

Scarce; vagrant or recent colonist (?); one (or more) in area from 11/98 (Totterman *et al.* 1999) to at least 11/00; recorded periodically from South Ballina-Broadwater Beach to Flat Rock, in company of Pied or alone; beaches and rock platforms.

Sooty Oystercatcher *H. fuliginosus*

Scarce (increasing ?); visitor; recorded all months except Oct (highest numbers Jan-Mar); singles, pairs, small parties (1-8); more frequent in recent years and apparently increasing (e.g. average group size 1.6 recorded 1973-89, compared with 3.6 for 1990-98); coastal rock platforms, also roosting on breakwaters and estuarine sand islets at high tide.

Red-necked Avocet *Recurvirostra novaehollandiae*

Vagrant (?); four flying south over ocean off Jerusalem Ck, 15/5/75.

Pacific Golden Plover *Pluvialis fulva*

Moderately common; visitor; present all months, mainly Oct-Apr; on Richmond estuary maximum counts at high tide roost Chickiba Ck 158 3/90, 140 2/98, 165 12/98; Evans estuary-Salty Lakes maximum count 48 1/84; also fairly regular in lesser numbers on drying wetlands Sep-Apr, mainly Oct-Jan (27 records, usually 1-12, but up to 41 Stratheden 10-11/89); floodplain and estuarine wetlands.

[**American Golden Plover** *P. dominica*

Vagrant; single birds Chickiba Ck, Ballina 19/11/83, 22/11/85 (G. Holmes and J. Izzard), also reported at nearby Byron Bay Nov 84 and Nov 94 (NSWBRs)].

Grey Plover *P. squatarola*

Vagrant (?); two East Ballina 13-14/12/91, one 22/12/92; estuarine wetlands and adjacent grassy areas.

* **Red-capped Plover** *Charadrius ruficapillus*

Moderately common to uncommon (declining?); resident and visitor; pairs, small parties (usually <10, mainly late summer to winter, see Gosper 1981a, 1983); larger aggregations recorded in 1970s and early 1980s e.g. 28 Shaws Bay (Ballina) 2/73, 52 Salty Lakes (Broadwater NP) 2/84; no recent breeding records from previously used sites such as Flat Rock, presumably resulting from human disturbance; beaches, adjacent estuaries and coastal lakes, rarely floodplain wetlands.

Double-banded Plover *C. bicinctus*

Uncommon; visitor; present Feb-Sep, mainly Apr-Jun; regular in small numbers (mostly 1-16) on coastline, but larger counts some years (max. 32 4/73, 46 6/78 on South Ballina-Patches Beach); beaches and estuaries.

Lesser Sand Plover *C. mongolus*

Moderately common to uncommon (declining?); visitor; recorded all months, mainly Oct-Apr with few (1-16) May-Sep; population Richmond estuary 80-110 birds 1972-74, but fewer late 1980s and early 1990s when maximum counts less than 25 birds (18 1-2/88, 23 3/90, 2/92, see Holmes 1988, 1992); recent counts (Harris 1997, 1999) continue to be low; not recorded from Evans estuary; estuarine sand flats, roosting adjacent salt marshes and coastline.

Greater Sand Plover *C. leschenaultii*

Uncommon to moderately common; visitor; recorded all months, mainly Sep-Mar with few (1-10) Apr-Aug; population Richmond estuary 35-50 birds during 1970s; maximum counts 57 11/77 (Gosper 1983) and 69 1-2/88 (Holmes 1988); recent counts (Harris 1997, 1999) consistent with earlier periods; one Evans estuary 1/84; estuarine sand flats, roosting adjacent salt marshes and coastline.

* **Red-kneed Dotterel** *Erythrogonys cinctus*

Uncommon to moderately common; irregular visitor; numerous records, all months but more frequent Jul-Dec on drying swamps; birds sometimes continuously present in district for up to eight months, at other times absent for periods of more than two years; some birds visited the district in 20 out of 28 years covered by this report; mostly small numbers (1-10) but larger influxes in 1975, 80, 82, 83, 86, 92, 94 when up to 25 birds on some wetlands; nested Casino 80, 86, 97 and Byrnes Pt 87; mainly floodplain wetlands, occasionally coastal lakes.

Banded Lapwing *Vanellus tricolor*

Scarce (declining?); irregular visitor; in Casino-Fairy Hill-Stratheden area two 17-25/7/75, up to twelve 3/8-5/9/76 and five 15/8/77; also three Edenville 17/9/82; note lack of recent records; overgrazed paddocks and fallow cultivation areas.

Australian Pratincole *Stiltia isabella*

Vagrant (?); two Cedar Point 19/9-5/10/80; one Casino 13/2/83; margins of drying swamps.

Great Skua *Catharacta skua*

Vagrant (?); singles East Ballina, 9/8/86, 21/8/87.

[South Polar Skua *C. maccormicki*

Vagrant (?); singles East Ballina, 2/12/86, 5/12/86 (G. Holmes, J. Izzard).]

Pomarine Jaeger *Stercorarius pomarinus*

Scarce; visitor; recorded Aug-Jun, mainly Nov-April; usually singly, East Ballina, but total 20+ recorded by extended watch 2/12/86 (southward passage?); nearshore waters, kleptoparasitising shearwaters, terns and gulls.

Arctic Jaeger *S. parasiticus*

Uncommon; visitor; recorded Aug-Jun, mainly Nov-May; usually small numbers, East Ballina, Evans Head (i.e. adjoining estuaries where terns more numerous), but totals recorded 4/11/87 (15), 4/2/87 (20+), 24/4/89 (>100) indicate passage; nearshore waters, kleptoparasitising shearwaters, terns and gulls.

Long-tailed Jaeger *S. longicaudus*

Scarce; irregular visitor (?); singles East Ballina 9/2/85, 22/2/85, 24/2/85, four 4/3/87.

Kelp Gull *Larus dominicanus*

Vagrant; two South Ballina-Patches Beach 1977, one 1978 (Gosper 1983).

Gull-billed Tern *Sterna nilotica*

Uncommon to moderately common; visitor; recorded all months with some birds present most times but periodically absent (*cf.* Gosper 1981a, 1983); generally small numbers with some larger aggregations (e.g. 37 following tractor ploughing canefields Woodburn 9/80); beaches, estuaries; occasionally floodplain wetlands and cultivated areas.

Caspian Tern *S. caspia*

Scarce; visitor; records all months except Jun; occurs in low numbers (usually singles) most years (*cf.* Gosper 1981a); estuaries and adjacent coastline.

Roseate Tern *S. dougallii*

Vagrant; only recorded Flat Rock 1976 (Gosper *et al.* 1978).

White-fronted Tern *S. striata*

Scarce to uncommon; irregular (?) winter visitor; small numbers (1–5) late May-early Sep all years 1975–80, 83–87; minor influx 6/75 when up to 50 briefly about Richmond River entrance (Gosper 1983); absence of recent records may result from inadequate winter coverage of this habitat; nearshore waters and beaches.

Common Tern *S. hirundo*

Moderately common to common; visitor; recorded all months, mainly Oct-Apr, once Jun-Jul; regular summer assemblages greater than 175 birds Flat Rock, larger aggregations include 700+ 11/79, 500 3/80, 730 2/99; coastline, estuaries, rarely floodplain wetlands.

*** Little Tern *S. albifrons***

Moderately common; visitor and migrant; mainly Oct-Apr but few May-Sep some years (Gosper 1981a, 1983);

regular summer assemblages to 140 birds Flat Rock, comprising all or mainly non-breeding Asian population; nesting (3 pairs with young) mouth of Jerusalem Ck 12/82, site not revisited; formerly nested Richmond estuary (Campion 1963); coastline, estuaries, occasionally upriver to Swan Bay and adjacent floodplain wetlands.

Sooty Tern *S. fuscata*

Scarce (?); transient visitor; nearshore waters late Nov-late Apr; recorded almost annually, mainly small numbers on coastline during rough weather (Gosper 1983), when often beach-washed (Gosper 1981b); occasionally exceptional aggregations (e.g. 550 East Ballina 26/4/89).

White-winged Black Tern *Chlidonias leucopterus*

Scarce; irregular visitor; 21 records (1–8 birds) Oct-May; coastline, estuaries and floodplain wetlands.

Common Noddy *Anous stolidus*

Scarce; irregular visitor; ten records (singles) Dec-Apr: 1973 (Gosper 1981a), 75 (Gosper 1983), 82, 84, 85, 89; also reported 81, 95 (NSWBRs); mostly Flat Rock-East Ballina; coastline.

Black Noddy *A. minutus*

Scarce; irregular visitor; eight records (singles) Jan-May: 1977 (Gosper 1983), 82, 83, 84, 85; also reported 87 (Jul), 95 (NSWBRs); Flat Rock-East Ballina; coastline.

Grey Ternlet *Procelsterna cerulea*

Vagrant (?); singles East Ballina 25/1/85, South Ballina Beach 11/2/85; 59 Ballina 4–8/3/95 during tropical storm (J. Izzard, NSWBRs).

White Tern *Gygis alba*

Vagrant (?); singles East Ballina, 8/3/85, 21/5/85, three 26/4/89; a further three reports NSWBRs (Feb-Mar).

Diamond Dove *Geopelia cuneata*

Vagrant; two Bundjalung NP, south of Jerusalem Creek, 27/6/94, feeding on ground in area of burnt heathland.

*** Wompoo Fruit-Dove *Ptilinopus magnificus***

Moderately common (becoming common?); resident; recorded regularly (*cf.* Gosper 1992) in larger tracts of forest associated with the northern and western watershed ranges; mostly in small aggregations dispersed through suitable habitat; present all months at least to 800 metres above sea level (1 000 m in summer); apparently increasing in abundance, now present consistently at many locations (notably in the Nightcap Rge) where found infrequently in early years of study; mainly subtropical rainforests and to a lesser extent contiguous wet sclerophyll forests; recorded increasingly in more isolated remnants, solitary figs and regrowth in open country.

Superb Fruit-Dove *P. superbus*

Scarce (increasing?); visitor; recorded Nov-Feb only, at few sites: Coolgardie 20/2/86, Murray Scrub (Toonumbar NP) 23/1/88 (2–3 birds); Terania Ck 14–15/1/95 (2+), 10/11/96 (3), 16/1/97 (3+), 28/12/97 (3+) and Wanganui (Upper Coopers Ck) 7/2/98 (4+); also Nullum SF (just

north of study area) 2/1/97 (2); absence of records in earlier years from sites such as Terania Creek (visited since 1980) suggests species increasing; subtropical rainforests, usually gallery forests typified by abundant Bangalow Palm, between ridges covered by sclerophyll forest.

* **Rose-crowned Fruit-Dove** *P. regina*

Moderately common to common; resident or partial migrant/nomad; recorded regularly in summer, mainly Oct-Mar/Apr, when distributed widely in larger tracts of subtropical rainforest at elevations to 500 metres, less frequent to 900 metres (e.g. Forest Tops, Border Ranges NP); absent from these forests outside this period, not recorded above 250 metres May-Sep; present throughout year (mainly below 150 m) in remnant patches of subtropical rainforest and coastal wet sclerophyll forest of the former Big Scrub (e.g. Booyong NR, Victoria Park NR, Johnston's Scrub); also regrowth dominated by Camphor Laurel-Privet in mainly cleared country (cf C. Gosper 1994) e.g. recorded calling all months except Nov Goolmangar; nests Feb (1), April (1), May (2) and Sep (1) at Booyong NR and Goolmangar.

* **Glossy Black-Cockatoo** *Calyptorhynchus lathami*

Moderately common (perhaps uncommon?); resident; pairs, family groups, sometimes aggregations to ten birds, numerous records but total numbers probably less than 100; distributed widely in sclerophyll forests, including remnants with casuarinas in mainly cleared pastoral lands (traditional localities? e.g. ridges in the Blakebrook-Tuncester-Koonorigan area near Lismore).

* **Galah** *Cacatua roseicapilla*

Common; resident; numbers increasing throughout study period; initially uncommon (present in low numbers but well distributed), then steadily increasing in abundance e.g. maximum flock sizes recorded 1973–75 (6 birds), 1976–85 (46), 1986–93 (90); currently widespread with flocks of 20–40 birds common, larger assemblages encountered periodically in towns of Casino, Lismore and Ballina; now breeding regularly; flock of 43 foraging for several days in grounds of Goolmangar School 4/96 contained 30 juveniles; pattern of expansion repeated throughout North Coast since appearance of first birds in early 1960s (unpubl. data); rural and other modified habitats.

Long-billed Corella *C. tenuirostris*

Potential colonist (?); two Goolmangar-Jiggi area 28/8–17/10/97, 15/5/99; two Ballina 2/12/00 in flock of *C. sanguinea*; farmlands, urban areas.

Little Corella *C. sanguinea*

Uncommon but increasing; visitor (now resident Casino?); recorded all months, numbers increasingly rapidly in recent years; one Mt Lion 16/4/83, two Alstonville 25/7/85, first recorded Casino 4/90 with another 13 records (1–2 birds) 1990–95, mainly Casino-Lismore; in 1996 an apparent influx occurred round Cedar Point (Casino-Kyogle) where flocks of 100–200 present annually Sep-Jan over three consecutive years, declining to about 40 in 1999 (B. Reineker); in 2000 numbers concentrated east of Casino in Tomki-Tatham area, flock subsequently

appearing in Ballina by Dec; senior author commuted twice daily between Casino and Kyogle during 1974–79 without recording corellas, their advent at Cedar Point in 1990s confirmed by resident farmer P. Carlill; pair attending hole in tree in TSR at Baraimal 11/10/97 (where remnant stand of Forest Red Gums a favoured flock roost site); croplands (especially barley crops), pastoral lands and urban areas.

Cockatiel *Nymphicus hollandicus*

Scarce; irregular visitor; two Stratheden 8/2/74; two Cedar Point 27/10/97, one same location 11/12/97 (B. Reineker); croplands and pastoral lands.

Musk Lorikeet *Glossopsitta concinna*

Scarce to uncommon; irregular visitor; two Doubleduke SF 29/5/83, one Cherry Tree North SF 1/4/86, several parties up to 6 birds Myrtle and Braemar SFs 9/8/98 suggesting minor influx (possibly from upper Clarence catchment where moderately common, G. Holmes unpubl. data); sclerophyll forests.

Double-eyed Fig-Parrot *Cyclopsitta diophthalma*

Near extinct; one record only, Cambridge Plateau 7/11/87 (see historical and ecological reviews for district and beyond by Holmes 1990); also reported Huonbrook Apr 92 (D. Secomb, NSWBRs).

Pale-headed Rosella *Platycercus adscitus*

Scarce; irregular visitor (?); few records northern edges of district: several (hybrids) Sawpit Ck 21/2/80, one (hybrid) 15/3/81; one Cougal 17/1/83 (with female Eastern Rosella *P. eximius*), up to three Grady's Ck 26–27/3/85; one (hybrid) edge Mt Lindesay SF 2/4/97; farmlands with sclerophyll forests adjacent.

Swift Parrot *Lathamus discolor*

Scarce; irregular visitor (?); one Ellangowan SF 3/7/83.

Turquoise Parrot *Neophema pulchella*

Scarce; irregular visitor (?); pair Myrtle SF 6/6/94, male Broadwater NP 27/9–10/10/94; dry sclerophyll forests and coastal heathlands.

Ground Parrot *Pezoporus wallicus*

Uncommon to (?) moderately common; resident; recorded in low numbers (typically 1–4 birds flushed per km) during transects, sometimes aggregated, probably at food sources (e.g. up to 12 birds along a 1 kilometre transect, see Gosper 1995); populations mainly within or near Bundjalung and Broadwater NPs; also recorded just NW of Wardell on temporary airstrip clearing 26/4/87–1/3/89; moist coastal heathlands.

Oriental Cuckoo *Cuculus saturatus*

Scarce; visitor; 21 records Dec-Apr 1979–81, 83–85, 87–88, 90–91, 99; mostly singles but sometimes several in loose association; mainly swamp sclerophyll forests and woodlands, or edges of wet sclerophyll forests and rainforests; also dry sclerophyll forests and gardens.

Black-eared Cuckoo *C. osculans*

Vagrant (?); one 'Glen Isle', Kilgarr, 18/11/80.

* **Little Bronze-Cuckoo** *Chrysococcyx minutillus*

Uncommon; visitor; many records (mostly singles, occasionally two together); late Sep to mid-Feb; not readily detected unless calling, apparently regular to at least some sites near Casino and Kyogle; observed carrying an egg Clovass 3/10/85; mainly semi-cleared country in the vicinity of water (i.e. swamp sclerophyll woodland and forest remnants, creeks), also sclerophyll forests (including Border Ranges, Bundjalung NPs).

* **Channel-billed Cuckoo** *Scythrops novaehollandiae*

Moderately common; visitor; distributed widely Sep-early Mar, most numerous in hilly, less intensively settled western half of district; woodlands and farmlands, often foraging at fruiting figs and aggregating in their vicinity.

Powerful Owl *Ninox strenua*

Scarce (?); resident; recorded Sheepstation Ck 6/6/82, Grevillia Gorge 17-18/3/83, Sawpit Creek (Border Ranges NP) 9/4/83, Mt Belmore SF 29-30/8/83, Mt Lindesay SF 18/4/89, Terania Creek (Nightcap NP) 28/3/98 and Richmond Range SF 24/1/99; sclerophyll forests.

Barking Owl *N. connivens*

Uncommon (?); resident; pair on Myall Ck, Gibberagee periodically 1981-99, singles on Sandy Ck near Yorklea 30/4/83, 28/5/83, edge Bundjalung NP south of Evans River 23/10/83, 'Serendipity' near Tabbimobile 7-8/12/87; pairs Sandy Ck Royal Camp SF 5/2/92 (C. Gosper, J. Izzard), Busby's Flat 13/1-23/4/98 and Blackbutt Lagoon, edge Ellangowan SF 20/5/00; all additional to records listed by Debus (1997); dense riparian vegetation with emergent eucalypts, in semi-cleared woodlands.

Sooty Owl *Tyto tenebricosa*

Uncommon; resident; occurs in arc from Richmond Rge (Cambridge Plateau) east to Koonyum Rge, including Dome Mt, Murray Scrub, Sawpit Ck, Lever's Plateau, Tweed Rge, Nightcap Rge and Huonbrook; recorded periodically over many years (1981-98) at regularly visited sites such as Brindle Ck and Terania Ck; singles or pairs; rainforests and contiguous wet sclerophyll forests.

Masked Owl *T. novaehollandiae*

Scarce; resident; singles Mt Pikapene SF 1-2/9/83, 8/4/85, Unungar SF 25/10/92, Mt Lindesay SF 5/10/93; woodlands and sclerophyll forests.

Grass Owl *T. capensis*

Uncommon(?); resident (?); one Broadwater NP 10/10/76 and feathers found on occasions this area in 1990s; three near present site of Ballina Airport 10/1/83; singles Ballina STW 1/5/86, 10/11/88; two Wardell (Bagotville Rd) 18/7-21/8/86, 16/8/87; five road kills Pacific Hwy at Uralba and lower Emigrant Ck 12-20/9/86; since about 1995 flushed regularly during barley harvesting on Runnymede Flats near Cedar Point by P. Carlill who has been growing these crops there for about 25 years; when disturbed by machinery the owls flush and fly low for a short distance before taking refuge in the windrows left by the header; during the 2000 harvest (late Sep-mid-Oct) an estimated 7 owls were flushed in fields adjacent to a 4 kilometre

section of the interstate railway line; includes records additional to Debus *et al.* (1998); swampy tall grasslands, heathlands and croplands.

Marbled Frogmouth *Podargus ocellatus*

Scarce; resident; 1-5 recorded periodically at Brindle Ck (Border Ranges NP) and Terania Ck (Nightcap NP) 1980-98; also Leycester Ck (Tweed Rge) 1/83, Quandong Falls and Boomerang Falls (Whian Whian SF) 12/86, Richmond Rge (Dome Mt area) 10/92; a single bird in Wilson NR (an isolated dry rainforest remnant on edge of Lismore) 1985, still present (same bird?) 1999; subtropical and dry rainforests, especially near watercourses with Bangalow Palms.

Fork-tailed Swift *Apus pacificus*

Scarce; transient visitor; recorded in flocks to 35+, late Nov-mid-Apr, associated typically with westerly winds; recorded usually once per season 1976, 77, 82, 85, 86, 87, 90, 91; all records from coastal strip except once Casino 2/90.

* **Forest Kingfisher** *Todiramphus macleayii*

Uncommon to (?) moderately common; resident or partial nomad/ migrant (Gosper and Gosper 1996); swamp sclerophyll forests and woodlands, adjacent open areas, margins of wetlands in semi-cleared country, also edges of moist forests on creeks in foothills of high rainfall north-east of district; open wetlands in winter.

Red-backed Kingfisher *T. pyrrhopygia*

Scarce; irregular winter visitor; one Pimlico 17/3/85 only record additional to Gosper and Gosper (1996); pastoral lands and croplands.

* **Noisy Pitta** *Pitta versicolor*

Moderately common to common; partial migrant or nomad (?); is present all months throughout continuous tracts of rainforest (most remaining habitat situated above 200 metres on catchment ranges in north and west of district, *cf.* Gosper 1986); possibly fewer at higher elevations in winter, but during specific searches in 1998 some birds were found at high altitude sites through winter (Bar Mountain 1 100 m, Mt Nardi 800 m) but not at others (Brindle Ck 750 m); breeding probably occurs regularly at least down to 150 metres (e.g. Terania Ck and Boundary Ck where adults and juveniles noted through summer); observation of two adults at Moore Park NR (gallery rainforest remnant, 100 m) 10/79 and a juvenile in 1/84 suggests breeding at this site, as does an adult recorded at the same elevation in Victoria Park NR 14/11/86; has nested Boatharbour NR (50 m) (R. Brown); regular post-breeding movement also occurs into pockets of dense, moist habitat in mainly cleared lowlands (*cf.* Totterman 1999), where birds occur regularly Mar-Sep (e.g. extreme dates Blackwall Rge 13/3-23/9, Goolmangar 18/3-29/9); during this period pittas inhabit isolated rainforest remnants, weedy regrowth (including *Lantana*, Camphor Laurel), riparian vegetation in otherwise cleared farmlands and sheltered patches and gullies in wet and dry sclerophyll forests; appearance of birds in homestead gardens and injury from collisions with fences on farms, especially

Mar-Apr, indicates that dispersal across open country includes largely treeless pastoral and croplands.

Albert's Lyrebird *Menura alberti*

Uncommon (moderately common?); resident; recorded frequently Nightcap, Tweed and McPherson Ranges; also recorded Richmond Rge in Dome Mt area and Murray Scrub (Toonumbar NP), along McKellar Rge south to Boundary Ck (1983) and an isolated population in the Blackwall Rge from Uralba NR to Bagotville; rainforests and wet sclerophyll forests.

Rufous Scrub-bird *Atrichornis rufescens*

Uncommon; resident; many records along Tweed Ra from Brindle Ck (e.g. regularly 1982–98) and Forest Tops south to Bar Mountain, above 750 metres; temperate and subtropical rainforests and contiguous wet sclerophyll forests, where groundcover dense beneath light gaps in broken tree canopies.

*** Red-browed Treecreeper *Climacteris erythroptera***

Uncommon; resident; pairs, small parties (up to 5); distributed sparsely along watershed ranges from Whian Whian SF (Nightcap Rge) to upper Myrtle Ck (Richmond Rge); feeding young Cherry Tree SF 12/90, Richmond Range NP 10/97; mainly wet sclerophyll forests above 200 metres.

*** Brown Treecreeper *C. picumnus***

Moderately common (common?); resident; pairs or small parties, encountered regularly and distributed widely south and west of Richmond River. (cf. Gosper 1986, 1992), north to Dairy Flat and east to Tabbimoble (east of Pacific Highway); dry sclerophyll forests including remnants, particularly where Spotted Gums *Corymbia henryi* f. *variegata* dominant.

Eastern Bristlebird *Dasyornis brachypterus*

Uncommon (but declining rapidly); resident; formerly west to Bald Knob and Long Creek (Findon Creek catchment), east to Mt Burrell (Nightcap Rge); decline noted during last decade and now restricted to few sites in or near Border Ranges NP (between Richmond Gap near Cougal and The Pinnacle); mainly grassy sclerophyll forests or woodlands, adjacent to rainforests (see historical and ecological reviews by Holmes 1989, 1997).

*** Speckled Warbler *Chthonicola sagittata***

Uncommon; resident; distributed sparsely south and west of Richmond River, north to Unumgar SF, east to Bundock's Crossing and eastern edge of Ellangowan SF (cf. Gosper 1986); recorded from 21 locations only; 37 records in total (includes 14 from one site, see Gosper 1992); mostly pairs, rarely parties (up to 4); building nest Royal Camp SF 10/79; dry sclerophyll forests including remnants in semi-cleared country, particularly where shrubby thickets and logs present.

*** Weebill *Smicronis brevirostris***

Moderately common (increasing?); resident; mostly pairs or small parties (many records); widespread south and west of Richmond River east to New Italy; considered uncommon

during earlier years (cf. Gosper 1992) but recording rates have risen since mid-1980s suggesting increased abundance; dry sclerophyll forests and woodlands.

*** Mangrove Gerygone *G. levigaster***

Uncommon (perhaps moderately common?); resident; localized populations associated with mangrove communities on Richmond (upstream to Woodburn) and Evans estuaries.

Western Gerygone *Gerygone fusca*

Vagrant; one 'Glen Isle', 10/4/80; remnant trees in farmland.

Red Wattlebird *Anthochaera carunculata*

Uncommon; irregular (?) winter visitor; 23 records (1–6 birds), extreme dates 27/5–8/9, recorded 1980–81, 83–85, 89, 95, 98, 00; south-western parts of district north to Bentley, east to Wardell and Bundjalung NP; sclerophyll forests, woodlands and heathlands.

*** Regent Honeyeater *Xanthomyza phrygia***

Scarce; irregular (?) winter visitor; one Royal Camp SF 3/6/78, three Gibberagee 12/7/81, one Ellangowan 21/4/92, up to three Myrtle SF 6/7–1/9/94; two attending nest this site on last date disappeared by 30/9/94; dry sclerophyll forests.

*** Bell Miner *Manorina melanophrys***

Common (increasing); resident; catchment ranges and foothills, until early 1980s restricted to north-west headwaters of Richmond River on north end Richmond Range (south to Mt Brown ?) and McPherson Range east to upper Terrace Creek; apparent expansion south along Richmond Rge suggested by small populations found Cherry Tree SF 1983, Gibberagee SF 1992, Mt Marsh SF 1998; expansion east along McPherson Range and to Tweed Range evidenced by subsequent appearance of colonies at several sites visited periodically over many years, including areas north of Cougal, at Razorback Mt (1993) and north of Barkers Vale at Tweed/McKellar Ranges junction (1996); wet sclerophyll forests.

Mangrove Honeyeater *Lichenostomus fasciogularis*

Scarce (?); resident; localized population Richmond estuary only, first located 5/83 on North Creek upstream from Old North Creek Road; mangroves (with *Bruguiera gymnorhiza* patches).

*** Yellow-tufted Honeyeater *L. melanops***

Uncommon; resident; two apparently isolated colonies located, Box Spur north of Grevillia (1982) and Mt Marsh SF (1983–98); one bird Mongogarie 17/4/83; sclerophyll forests.

*** Black-chinned Honeyeater *Melithreptus gularis***

Moderately common; resident; mostly small groups, encountered regularly and distributed widely south and west of Richmond River (Gosper 1986, 1992); dry sclerophyll forests, particularly areas dominated by Large-leaved Spotted Gum *Corymbia henryi*.

New Holland Honeyeater *Phylidonyris novaehollandiae*

Uncommon; resident; small populations in north-west of district above 250 metres at Border Ranges NP (Mt Glennie, upper Findon Ck, Bald Knob); wet sclerophyll forests with *Banksia* patches.

*** Tawny-crowned Honeyeater *P. melanops***

Uncommon to moderately common; resident; local distribution restricted usually to Bundjalung NP, Evans Head area and Broadwater NP; only records north of Richmond River at Lake Ainsworth 17/6/86 (J. Izzard) and Wardell 21/10/86 after fires in Broadwater NP; also reported Lake Ainsworth area in 1960s (Benham 1965); low coastal heathlands.

Scarlet Robin *Petroica multicolor*

Scarce; irregular visitor (?); single males Dyraba Creek 6/7/80, Wiangaree Range (east of Kilgra) 15/7/80; also two sites Mt Marsh SF 6/4/85, Ettrick 27/6/89 and Braemar SF 6/7/94; birds singing at Mt Marsh SF indicate possible nesting (upland habitat east of Mt Neville similar to breeding areas on Great Dividing Range farther west); dry sclerophyll forests and woodlands.

Red-capped Robin *P. goodenovii*

Vagrant (?); one immature near Gay's Hill (Casino) 19–27/7/86; garden and adjacent paddocks around abandoned farmhouse.

Flame Robin *P. phoenicea*

Scarce; irregular winter visitor; 8 brown-plumaged birds at 'Daalkool', Myall Creek east of Whiporie 13/5/80, single males Casino 26/6–27/7/86, 6/6–10/7/87; paddocks in semi-cleared country and parklands.

*** Hooded Robin *Melanodryas cucullata***

Very uncommon; resident; mostly pairs, family groups (1–4) (*cf.* Gosper 1992); localized within Bungawalbin Creek catchment where recorded mainly Myrtle SF (22 records 1977–2000); also Gibberagee SF (twice), Whiporie, Camira, Carwong and Braemar SFs (once); building nest Myrtle SF 9/79, 82; dry sclerophyll forests.

*** Grey-crowned Babbler *Pomatostomus temporalis***

Moderately common (common?); resident; encountered regularly and distributed widely (*cf.* Gosper 1986, 1992) in Bungawalbin Creek catchment and mid and lower Richmond River floodplain, north to Iron Pot Creek (upstream from Toonumbar Dam) and east to coast (Lennox Head STW, Broadwater NP); swamp and dry sclerophyll forests and woodland (especially low-lying areas) and remnant *Melaleuca* thickets in mainly cleared country.

*** Spotted Quail-thrush *Cinclosoma punctatum***

Uncommon; resident; occurs mainly along Richmond Range and adjacent stony ridges, south from Mummulgum-Hogarth Range area in an arc to Doubleduke SF; singles or pairs Royal Camp SF 21/7/79, west of Mummulgum 12/7/80, Hogarth Range 15/8/98, near Mt Pikapene 4/1/83, Doubleduke SF 29/5/83, 12/6/83, Mt Belmore SF 29–30/8/83 (4 sites), 13/7/00, Mt Marsh SF 7–8/4/85, 14/7/98, Fuller SF 14/7/87, Tabbimoble SF 18/1/97

(3 including juvenile); dry sclerophyll forests, especially with sandstone outcrops.

White-eared Monarch *Monarcha leucotis*

Moderately common (locally common?); resident or partial nomad (?); present all months, most conspicuous Oct-Jan; suspected movements (altitudinal ?) in winter e.g. 13 records Coolgardie, mainly Jul-Aug, but recorded Lennox Head STW Jun and summer; singles or pairs, probably most numerous in northern parts of Richmond Range (e.g. Simpkin's/Ryan's Creeks, recorded 5 sites 25–27/10/94), extending in an arc east to Nightcap Rge, then south to Blackwall Rge; mainly lowlands (<200 m), particularly foothills of catchment ranges, with few locations up to 600 metres; subtropical and dry rainforests, also isolated remnants and regrowth dominated by *Lantana*; near coast in littoral rainforests and adjoining communities (wet and swamp sclerophyll forests, mangroves).

Satin Flycatcher *Myiagra cyanoleuca*

Scarce; transient visitor; singles Myrtle SF 13/10/79, Cherry Tree North SF 16/2/80 and Rummary Park (Whian Whian SF) 13/4/86; sclerophyll forests.

*** Barred Cuckoo-shrike *Coracina lineata***

Uncommon; summer migrant; singles, pairs or small flocks (usually <10 birds); mainly Oct-Mar (extreme dates 12/10–5/4); greater than 50 records, distributed widely in northern half of district; apparently visiting some locations annually e.g. Cherry Tree North SF (*cf.* Gosper 1992), Moore Park NR (regularly Jan-Apr, up to 30 birds including juveniles); feeding dependent young Mallanganee NR and Moore Park suggests breeding at or near these sites; dry and subtropical rainforests (also isolated fruiting trees in cleared country), occasionally wet sclerophyll forests.

*** White-winged Triller *Lalage sueurii***

Scarce (or absent) to moderately common; irregular summer migrant; occurs Sep-early Feb (one 17/5/80 Bundjalung NP only winter record), but mainly Oct-Nov suggesting most birds in passage only; many records some years (e.g. 1980–82, 94) when widespread in district, but few or none in others; breeding recorded 1976, 82, 87, 91 in swamp woodland remnants (especially *Melaleuca*) near water; open habitats (semi-cleared country, farmlands, urban areas), heathlands, dry sclerophyll forests and woodlands.

Masked Woodswallow *Artamus personatus*

Vagrant; small parties (<14) associated with influx White-browed Woodswallow 9–10/94.

White-browed Woodswallow *A. superciliosus*

Uncommon; irregular transient visitor; small numbers 12/82 south of Casino (also Cape Byron just beyond district limits); major influx 9–10/94 when widespread in district; thousands in areas south of Casino (B. Reineker); mainly dry sclerophyll forests, woodlands and semi-cleared pastoral lands but foraging over all habitats and reaching coastline.

Little Woodswallow *A. minor*

Vagrant (?); up to six Toonumbar SF, 12/4–7/6/80; top of precipitous woodland slope with tall dead trees, surrounded by wet sclerophyll forest.

Paradise Riflebird *Ptiloris paradiseus*

Uncommon to moderately common; resident; distributed widely in larger tracts of forest along the watershed ranges (most remaining habitat is above 200 m) and recorded regularly (*cf.* Gosper 1992); rainforests, occasionally isolated remnants (e.g. 2 Moore Park NR 1/7/79) and contiguous wet or dry sclerophyll forests.

Australian Raven *Corvus coronoides*

Uncommon; resident (?); recorded all months; continuous but sparse (recorded about 15 sites) along the Richmond Range at headwaters of western tributaries of Richmond River from Sawpit Ck and Mt Lindesay SF south to Mount Marsh SF; sclerophyll forests and woodlands.

White-winged Chough *Corcorax melanorhamphos*

Extinct (?); parties up to seven Coombell 1/10/77, Myrtle SF 4/9/78, Amarina (near Leeville) 18/2/79, 'Camira' 25/9/82 and Whiporie SF 21/10/83; lack of recent records suggests species has disappeared from district (still present adjacent upper Clarence catchment); dry sclerophyll forests and woodlands.

*** Singing Bushlark *Mirafra javanica***

Uncommon; irregular(?) summer visitor; recorded 1980 (one), but locally numerous and breeding 1982, 94, 98; early Oct-early Feb; croplands, rarely grazing paddocks.

Zebra Finch *Taeniopygia guttata*

Extinct (?); recorded for a one year period Dobies Bight, 1/5/76 (8), 5/9/76 (2), 1/5/77 (15); also Namoon 23/7/79 (15+); absence of records since 1970s suggests species has disappeared from district; croplands.

*** Plum-headed Finch *Neochmia modesta***

Scarce; visitor (?); three Tatham 12/12/82; up to three Casino STW 27/1–4/3/92, pair 16/12/92; nest located 15/2/92. fledging young early Mar; rank grasslands near wetlands.

*** Diamond Firetail *Stagonopleura guttata***

Very uncommon; resident; present in low numbers (18 records 1977–2000, 1–7 birds) in Bungawalbin Creek catchment; recorded from Myrtle (Gosper 1992), Braemar, Carwong, Ellangowan and Bungawalbin SFs; immatures Braemar SF 6/7/94, Carwong SF 4/6/00; dry sclerophyll forests and woodlands.

*** Nutmeg Mannikin *Lonchura punctulata***

Uncommon (declining?); resident; small flocks (mostly <15, but up to 39) often in association with Chestnut-breasted Mannikin *L. castaneothorax* and occasionally other finch species; numbers and local distribution documented by Gosper (1976a); unchanged at least to 1990 but not monitored subsequently; could not be located during searches in 1999–00; nest building Nov-Apr in urban parkland, especially in Bunya Pine *Araucaria*

bidwillii; juveniles noted regularly from Feb; Casino and Lismore urban areas and fringes, particularly riverbanks and other rank grassy sites.

European Goldfinch *Carduelis carduelis*

Vagrant (?); four, edge Moore Park NR, Old Grevillia 1/7/79, one Doubtful Creek 6/7/80; weedy areas in farmlands.

White-backed Swallow *Cheramoeca leucosternus*

Extinct (?); periodic resident or visitor; 33 records 1972–87 (some records most years) but none since; small numbers (1–5), all months except Dec and Feb; local breeding not confirmed but coastal nesting recorded near Grafton in late 1950s-early 1970s (D. Gosper, E. Wheeler); usually about creek and river banks in mainly cleared pastoral lands in western parts of district.

Rufous Songlark *Cincloramphus mathewsi*

Scarce (or absent) generally to moderately common (conspicuous) for brief periods in some years; irregular summer migrant and/or visitor; extreme dates 14/8–5/2 (mostly late Sep-Dec); singles or pairs, apparently widespread in district in spring-early summer 1980, 82, 94, also recorded 1977, 78, 81, 91 (45+ records); sclerophyll forests (edges), woodlands and farmlands.

Brown Songlark *C. cruralis*

Scarce (or absent) to moderately common; fairly regular migrant (summer) or partial nomad, occurring mainly Sep-Jan but recorded all months and occasionally present for periods up to 16 months (Gosper 1981a); present in more than half the years covered by this study and widespread in district in some years (e.g. 1975, 80, 82, 91, 94) when it probably bred; singles, pairs or loose aggregations up to 6 birds; pastures, croplands, wet meadows and edges of seasonal swamps.

Bassian Thrush *Zoothera lunulata*

Moderately common (?); resident; recorded all months at higher elevations on Nightcap, Tweed and Richmond Ranges from 550 metres to 1 100 metres (Holmes 1984); mainly temperate and subtropical rainforests and contiguous wet sclerophyll forests.

Russet-tailed Thrush *Z. heinei*

Moderately common (?); partial nomad (?); recorded from intermediate and lower altitudes in Nightcap, McPherson and Richmond Ranges between 250 and 750 metres (mostly below 600 m, see Holmes 1984); in winter some birds appear in lowland rainforest remnants (*cf.* Totterman 1999) and occasionally other moist pockets of vegetation in mainly cleared country (e.g. one remained for 6 weeks 7–8/86 in backyard on riverbank in Casino); mainly subtropical and dry rainforests; both thrush species recorded together regularly at Cambridge Plateau (550 m) and Brindle Creek (750 m) in summer.

Common Myna *Acridotheres tristis*

Recent colonist (?); one Fairy Hill 21/2/97 (B. Reineker), two south of Cedar Point 24–27/10/97 where carrying nest material to hole in dead tree; also one same area 10–11/00; roadsides and farmlands.

DISCUSSION

Avifaunal change

Declines in abundance and local distribution were detected in only a small number of bird species. Four have not been located during the last decade. The White-winged Cough was not recorded after 1983 suggesting it may have disappeared from east of the Richmond Range. The Banded Lapwing (last recorded 1983) was listed as 'Rare' on an earlier list of the birds of the Richmond Valley (Anon 1973) and may never have occurred regularly in the district. Two others, the Zebra Finch (last observed 1979) and White-backed Swallow (1987) may simply have been irruptive colonists during inland drought periods. However, their disappearance should be noted and may reflect declines elsewhere. It is noteworthy that the Zebra Finch and White-backed Swallow were formerly regularly recorded and bred around Grafton (in the adjoining Clarence Valley) during the late 1950s to the early 1970s (Anon. 1961; D. Gosper, E. Wheeler, pers. comm.) but had also disappeared from that district by the mid-1980s (E. Wheeler, G. Clancy, pers. comm.). Both species have been identified as declining in parts of the NSW sheep-wheat belt (Robinson 1994; N. Schrader in Reid 1999).

Local populations of the Eastern Bristlebird have declined rapidly and the species is now Critically Endangered in northern New South Wales (see Holmes 1997), as is the Double-eyed Fig-Parrot (race *coxeni* see Holmes 1990). Both are the subject of Recovery Plans.

Further investigation of the state forests of the Bungawalbin Creek catchment (particularly Myrtle, Royal Camp, Carwong, Braemar, Ellangowan, Gibberagee and Camira) may be warranted for conservation purposes, given the presence of coastal populations of an array of nationally declining bird species. Observations reported here and those of Johnson-Walker (2001) indicate the regular autumn-winter occurrence of Regent Honeyeaters in this catchment. Populations of the Hooded Robin, Diamond Firetail, Speckled Warbler, Black-chinned Honeyeater, Brown Treecreeper and probably the Emu and Grey-crowned Babbler appear to have sustained their numbers throughout the period covered by this report. However, like many birds of woodlands and open forests in southern Australia (see Garnett and Crowley 2000), they remain at risk of local extinction. The Hooded Robin and Diamond Firetail appear particularly susceptible as their populations are the most localized and none of their known sites is currently reserved. The open forests of this area, a coastal outlier of the temperate woodlands of south-eastern Australia, would appear to be critical for these species in the Richmond catchment and may be significant for some on a state basis (*cf* Traill and Duncan 2000).

As in other coastal locations, habitat loss and increased human activity on the coastline and estuary have affected the breeding success of local populations of the Osprey, Pied Oystercatcher, Little Tern and Red-capped Plover. The first two are the subject of current local Recovery Plans.

Although no recent counts were obtained for the total numbers of migratory shorebirds using the Richmond estuary, incomplete data (i.e. counts of some less common

species only) suggest that combined numbers are similar to those recorded in the 1970s (Gosper 1981a, 1983). By contrast, numbers of the Lesser Sand Plover during the late 1980s and 1990s diminished to less than 30 birds compared with 80–110 birds in the early 1970s. Declining numbers of this species have been reported for New South Wales generally (A. Morris NSWBRs). The Ruddy Turnstone may also have declined slightly. Conversely, numbers of the Sanderling may be increasing with counts of less than 30 birds in the 1970s increasing to at least 70 by the late 1990s, with a report of up to 100 birds at Ballina in the 1997–98 summer (J. Izzard).

During the reporting period only one species has become newly established. The sudden upsurge in Little Corella numbers during the late 1990s suggests that its arrival has occurred naturally and not as a result of gradual breeding from aviary escapes. Expansion by this inland species into coastal areas parallels that by the Crested Pigeon *Ocyphaps lophotes* in the Richmond River district, being established by the late 1940s (Frith 1982), and the Galah by the early 1970s as documented in this study. The Long-billed Corella, recently recorded for the first time, also has the potential to become established.

Several other species have increased markedly in abundance since the 1970s. Habitat changes are probably responsible in all instances. Even so, these may be difficult to quantify.

Cattle Egret numbers and breeding colonies have continued to expand throughout the reporting period. Although numerous in the district by the early 1970s (Gosper 1981a) no local breeding colonies had been established and its local distribution was restricted to the river floodplain. By the early 1980s local breeding had commenced and it progressively exploited other open habitats. It is now common to abundant.

The reappearance of the Magpie Goose during the 1990s and successful nesting at Casino in 1999 suggests the species is recolonising the district after an absence of decades. Its recent occurrence in the district is apparently part of a broader movement into parts of its former range in New South Wales (Clancy 1985).

The Bell Miner appears to have extended its range recently toward the coast in far north-eastern New South Wales. Up to the early 1970s it was regarded as 'rare' in the Richmond River district (Anon. 1973) and was probably confined to the junction of the McPherson and Richmond Ranges, north-west of Grevillia. It has subsequently spread east along the McPherson Range to the headwaters of the Tweed River catchment.

Although not quantified, observations over the reporting period suggest that populations of most pigeons associated with rainforest are increasing. This is particularly evident from the numbers and local distribution of the Wompoo Fruit-Dove (and some common species including the Wonga Pigeon *Leucosarcia melanoleuca* and White-headed Pigeon *Columba leucomela*). It may apply also to the Superb Fruit-Dove and at least to portions of the population of the Rose-crowned Fruit-Dove. It is plausible that this process is attributable to a significant decline in shooting,

the gradual recovery of habitat disturbed by past logging, and the increasing availability and maturation of regrowth forest, including that dominated by Camphor Laurel, in the lowlands. Regrowth is especially important to such species as the Rose-crowned Fruit-Dove and Noisy Pitta, and is aiding the local expansion of some more common species such as the Australian Brush-turkey *Alectura lathami* into places where they have no doubt been absent since these areas were cleared.

No new introduced species has become established in the district since 1970 although the Common Myna was first recorded in 1997 and is likely to become resident. Nutmeg Mannikin numbers may have declined, both in the Richmond and Clarence districts (G. Clancy, pers. comm.). The species has not expanded its range (*cf* Gosper 1976a) during the reporting period and has been infrequently noted in recent years. It is noteworthy that the European Goldfinch, recorded only in winter 1979 and 1980, has not become established. Goldfinches were formerly locally common around Grafton in the late 1950s and 1960s, dispersing into surrounding farmland in winter (Anon. 1961; D. Gosper). However, numbers had declined by the late 1970s and the species last recorded in the mid-1980s (G. Clancy, pers. comm.).

Seasonal and climatic influences

Occurrence of some land birds in the Richmond River district was most likely related to drought conditions, since their appearance or increased numbers coincided with periods of protracted drought in inland New South Wales. Significant influxes by a suite of typically inland spring migrants comprising White-winged Triller, Rufous Songlark, Brown Songlark, Singing Bushlark, and in some years White-browed and Masked Woodswallows, together with higher than usual numbers of more common species such as Pallid Cuckoo *Cuculus pallidus* occurred in spring of 1980, 1982, 1991 and 1994. Drought periods in each of these years included the spring months of August-October and affected neighbouring tableland and western slopes pastoral districts. However, in spring and summer of 1982 local conditions were relatively equable and the district experienced an irruption of quail *Coturnix* spp. and *Turnix* spp. as well, perhaps in response to widespread drought elsewhere.

Several non-migratory (nomadic ?) species typical of inland northern New South Wales (including the tablelands and western slopes) were recorded in the district in small numbers during autumn-winter (April-August) of some years, notably 1980 and 1994. Occurrences of the Turquoise Parrot, Diamond Dove, Western Gerygone and Little Woodswallow coincided with severe and widespread autumn-winter drought. The presence of Flame Robin, Red-capped Robin and Scarlet Robin at lowland sites correlated with dry conditions locally and in adjoining Rural Lands districts of Tenterfield, Inverell and Glen Innes.

The Richmond River floodplain continues to be an important refuge for waterbirds dispersing from inland south-eastern Australia, despite the dramatic reduction in the extent of wetlands during the 1950s and 1960s, mostly by drainage for flood mitigation (Goodrick 1970).

Gosper *et al.* (1983) concluded that maximum numbers of waterbirds, particularly ducks, are present on the coast from autumn to late winter, with minimum numbers during spring and summer. This is coincident with the period of maximum habitat availability in north-eastern New South Wales (see Gosper 1981a). The patterns of occurrence reported here for waterbirds that breed primarily in inland Australia generally support those findings. Similar trends were also observed for other more common species such as Grey Teal *Anas gracilis*, Australasian Shoveler *A. rhynchotis*, Pink-eared Duck *Malalacorhynchus membranaceus*, Straw-necked Ibis *Threskiornis spinicollis* and Black-winged Stilt *Himantopus himantopus* (D. Gosper, unpubl. data).

However, there is not a clear relation to local rainfall and flooding alone. In some years waterbird numbers were low during periods when district wetland habitat was extensive. It was also apparent that increased numbers of waterbirds appeared locally in one or more years following periods of major flooding (and associated waterbird breeding events) in inland Australia, such as occurred in 1973–74. During periods of widespread inland drought larger than usual numbers of some species appeared and when local conditions remained favourable (e.g. 1982, 1994), remained in the district into spring and early summer.

The fundamental value of long-term studies in establishing local status is shown quite clearly by records of the Freckled Duck, Blue-billed Duck and Magpie Goose. All were unrecorded during the 1970s despite intensive surveying of wetlands (Gosper 1981a) but subsequently appeared periodically, with the last two also found to breed locally.

ACKNOWLEDGMENTS

Over the years many people in the district, some mentioned in the text, have shared their observations with us. In particular we wish to record the companionship of John Izzard with whom we shared numerous field trips and spend many a long hour in lively discussion. Had it not been for his untimely passing in 1998, John would have contributed much to this paper. Assistance with the preparation of the paper was received from Tony Tadros of New South Wales Agriculture who provided drought declaration information, Eric Wheeler and Greg Clancy who responded to requests regarding the status of birds in the Grafton area and Carl Gosper who assisted with references and commented on a draft. We are grateful to all these people.

REFERENCES

- Anon. (1961). 'Checklist of the Birds of the Clarence Valley.' (Clarence Valley Field Naturalists' Club: Grafton.)
- Anon. (1973). 'Birds of the Richmond Valley.' (Richmond Valley Naturalists' Club: Lismore.)
- Baxter, G. S. (1994). The location and status of egret colonies in coastal New South Wales. *Emu* **94**: 255–262.
- Benham, J. H. (1965). The Lennox Head Camp, 1964. *Gould League Notes* **31**: 32–34.
- Campion, C. B. (1963). Banding the Little Tern. *Bird Bander* **1**: 125–132.
- Clancy, G. P. (1985). Recent records of Magpie Geese in New South Wales. *Aust. Birds* **19**: 41–45.
- Debus, S. J. S. (1992). A survey of diurnal raptors in north-east New South Wales, 1987–1990. *Aust. Birds* **25**: 67–77.
- Debus, S. J. S. (1997). The Barking Owl in New South Wales. *Aust. Birds* **30**: 53–80.
- Debus, S. J. S., Maciejewski, S. E. and McAllan, I. A. W. (1998). The Grass Owl in New South Wales. *Aust. Birds* **31**: 29–45.
- Frith, H. J. (1982). 'Pigeons and Doves of Australia.' (Rigby: Adelaide.)
- Garnett, S. T. and Crowley, G. (2000). 'The Action Plan for Australian Birds 2000.' (Environment Australia: Canberra.)

- Goodrick, G. N. (1970) 'A survey of wetlands of coastal New South Wales.' CSIRO Div. Wildl. Res. Tech. Memo. No. 5. (CSIRO, Canberra.)
- Gosper, C. R. (1994). 'Comparison of the avifauna of rainforest remnants with regrowth dominated by the exotic tree *Cinnamomum camphora*.' B. Nat. Res. Thesis. (University of New England: Armidale.)
- Gosper, D. G. (1976a). The Nutmeg Mannikin on the north coast of New South Wales. *Aust. Birds* 11: 8–11.
- Gosper, D. G. (1976b). A third occurrence of the Green Pygmy-goose in New South Wales. *Aust. Birds* 11: 39–40.
- Gosper, D. G. (1981a). Survey of birds on floodplain-estuarine wetlands on the Hunter and Richmond Rivers in northern New South Wales. *Corella* 5: 1–18.
- Gosper, D. G. (1981b). A survey of beach-washed seabirds near Ballina, New South Wales. *Corella* 5: 110–113.
- Gosper, D. G. (1983). Forest bird communities of the Richmond River district, New South Wales. *Corella* 7: 7–13.
- Gosper, D. G. (1986). Birds in the Richmond River district, NSW. 1973–83. I. Distribution *Corella* 10: 1–16.
- Gosper, D. G. (1992). An avifaunal survey of littoral habitats near Ballina, New South Wales. *Corella* 7: 7–13.
- Gosper, D. G. (1994). Breeding of the Swamp Harrier on the NSW north coast. *Aust. Birds* 27: 151.
- Gosper, D. G. (1995). Notes on the activities of Ground Parrots in northern NSW. *Aust. Birds* 28: 57–64.
- Gosper, D. G., Briggs, S. V. and Carpenter, S. M. (1983). Waterbird dynamics in the Richmond Valley, New South Wales, 1974–77. *Aust. Wildl. Res.* 10: 319–327.
- Gosper, D. G. and Gosper, C. R. (1996). Seasonal status of kingfishers *Todiramphus* spp. in northern New South Wales. *Aust. Birds* 29: 33–39.
- Gosper, D. G., Watson, W. D. and Fraser, G. C. (1978). Sightings of the Roscate Tern on the north coast of New South Wales. *Aust. Birds* 13: 36–38.
- Harder, M. (2000). Diet and breeding biology of the Wedge-tailed Eagle *Aquila audax* at three nests in north-eastern New South Wales. *Corella* 24: 1–5.
- Harris, K. (1997) Report on population monitoring counts 1996 and 1997. *The Stilt* 31: 56–62.
- Harris, K. (1999) Report on population monitoring counts 1998. *The Stilt* 34: 1–64.
- Holmes, G. (1977). Ecology of petrels in mid-northern New South Wales. *Asian Seabird Gp Newsl.* 8: 20–35.
- Holmes, G. (1981a). Unequal sex ratios among seabirds found beach-washed. *Emu* 81: 44–47.
- Holmes, G. (1981b). 'Management plan for Moore Park, Richmond River, New South Wales.' (Report to NPWS NSW, Sydney.)
- Holmes, G. (1984). Ecological evidence for distinguishing two species of ground-thrushes in central eastern Australia. *Aust. Bird Watcher* 10: 164–166.
- Holmes, G. (1987). 'Avifauna of the Big Scrub Region.' (ANPWS, Canberra/NPWS NSW, Sydney.)
- Holmes, G. (1988). 'Shorebirds of the Richmond River estuary.' (Glenn Holmes and Associates, Report to Ballina Shire Council.)
- Holmes, G. (1989). 'Eastern Bristlebird: draft species management plan for northern populations.' (NPWS, Brisbane/ NPWS, Sydney.)
- Holmes, G. (1990). 'The biology and ecology of Coxen's Fig-Parrot.' (R.A.O.U. Monograph No. 65, Melbourne.)
- Holmes, G. (1992). 'A survey of migratory shorebirds and endangered aquatic birds of North Creek.' (Glenn Holmes and Associates, Report to Ballina Shire Council.)
- Holmes, G. (1997). 'Conservation status of Eastern Bristlebird in south-east Queensland and north-east New South Wales.' (DoE, Brisbane, unpublished report.)
- Izzard, J. (1997). Ballina NSW seabird report 1996. *The Petrel* 1996.
- Johnson-Walker, C. (2001). Regent Honeyeater spotting at Whiporie. *ABSA Newsl.* 62: 7–8.
- McGrath, R. J. and Bass, D. (1999). Seed dispersal by Emus on the New South Wales north-east coast. *Emu* 99: 248–252.
- Marchant, S. and Higgins, P. J. (1990). 'The Handbook of Australian, New Zealand and Antarctic Birds.' (OUP, Melbourne.)
- Morris, A. K. (2000). New South Wales Annual Bird Report 1997. *Aust. Birds* 32: 1–64.
- Morris, A. K. (2001). New South Wales Annual Bird Report 1998. *Aust. Birds* 32: 101–167.
- Morris, A. K. and Burton, A. (1995). 1993 New South Wales Annual Bird Report. *Aust. Birds* 28: 81–128.
- Morris, A. K., McGill, A. R. and Holmes, G. (1981). 'Handlist of Birds in New South Wales.' (NSW Field Ornithologists Club: Sydney.)
- Muranyi, M. and Baverstock, P. (1996). The distribution and habitat preference of the Bush-hen *Amaurornis olivacea* in north-eastern New South Wales. *Emu* 96: 285–287.
- Reid, J. R. W. (1999). 'Threatened and declining birds in the New South Wales Sheep-Wheat Belt 1. Diagnosis, characteristics and management.' Consultancy report to NSW National Parks and Wildlife Service. (CSIRO Wildlife and Ecology: Canberra.)
- Robinson, D. (1994). Research plan for threatened woodland birds of south-eastern Australia. Arthur Rylah Institute of Environmental Research Tech. Report Ser. 133. (Dept of Conservation and Natural Resources, Melbourne.)
- Stewart, D. A. and Stewart, A. S. (1994). Notes on the Bush-hen breeding in New South Wales. *Sunbird* 24: 1–5.
- Totterman, B. G. (1999). Seasonal dispersion of Noisy Pittas in northern New South Wales. *Aust. Bird Watcher* 18: 19–25.
- Totterman, B., Clancy, G. and Moffatt, R. (1999). First record of a South Island Pied Oystercatcher in Australia. *Aust. Bird Watcher* 18: 153–159.
- Traill, B. J. and Duncan, S. (2000). 'Status of birds in the New South Wales temperate woodlands region.' (Consultancy report to the NSW National Parks & Wildlife Service, Australian Woodlands Conservancy, Chiltern, Victoria.)
- Wood, K. A. (1994). Drought-related movements of White-browed Woodswallows in New South Wales. *Aust. Birds* 28: 42–53.

This paper is dedicated to the memory of my wife Joan Gosper (1947–2001). Her love, loyalty and support of 32 years enabled me to pursue my passion for birds and wild places, and to share these experiences with my family.

Dennis Gosper