The State of Australia's Birds 2008

Birds Australia
CONSERVATION THROUGH KNOWLEDGE

Compiled by Penny Olsen

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The wildlife and its habitat cannot speak. So we must and we will.

President Theodore Roosevelt, c. 1908

The State of Australia's Birds reports are overviews of the status of Australia's birds, the threats they face and the conservation actions taken. This 2008 report focuses on trends in bird populations revealed by about 50 long-term monitoring programs running for up to 40 years. Thousands of volunteers, coordinated by a handful of individuals and groups, collected much of the data. This is an extraordinary expression of concern for Australia's birds and their habitats. Without such long-term commitment, how are we to understand which bird species and communities are truly in trouble, where to focus conservation efforts, what environmental management works and whether our management of the land is sustainable? Although the report deals with birds, the findings have much broader implications for nature and society—birds are indicators of national quality of life. The latest results show that populations of many common bird species are in decline, evidence that the natural environment is continuing to be eroded through over-use, underinvestment in its care and restoration, and undervaluing of its importance.

Key Points

This year's *The State of Australia's Birds* (SOAB) is an overview of the status of Australia's birds, revisiting the long-term monitoring studies presented in the SOAB 2003, plus a few a more. Trends in bird populations are mixed, but more species are in decline than in 2003. The encouraging news is that where active management is undertaken success in improving the state of bird populations is more prevalent than failure.

Favourable news

- A concerted effort by dedicated individuals, recovery teams, landholders and governments has improved the prospects of several threatened species.
- Knowledge of long-term patterns and trends in bird populations is improving. As more monitoring projects start and continue, a firmer picture is emerging of the state of Australia's birds, especially in the better-surveyed south and east.
- The report presents the results of about 50 continuous monitoring studies of birds undertaken from as early as 1967.
- Most of the species that are thought to be highly threatened have been recognised as such and listed federally and/or by the appropriate State.
- For several listed threatened taxa (species or subspecies), data are available for whole populations (see Table 1, p. 4). Of the 18 threatened taxa with long-term monitoring programs, the populations of four have increased, two are more or less stable and 12 have decreased. Given the odds, this strongly demonstrates that recovery is possible when the effort and resources are applied.
- We report good news for a suite of threatened species—numbers of Gould's Petrel, Glossy Black-Cockatoo, Superb Parrot and Tasman Parrot have all increased since their monitoring programs and management commenced. While populations of the Orange-bellied Parrot and Lord Howe Island Woodhen have stayed about the same.
- Improvement in the status of threatened and non-threatened species is being achieved through interventions that include management of livestock and fire, habitat plantings, awareness programs, translocations, predator control, captive breeding and release and provision of carefully managed nest boxes.
- Between 2002 and 2006, the national reserve system has expanded to nearly 12% of Australia's landmass and is increasingly representative of the range of Australia's ecosystems.
- Over the last two years alone, private conservation organisations have more than doubled their ownership and management of land for conservation to about six million hectares and protected more under conservation covenants.
- In the five years since SOAB 2003, the Canada Goose, an exotic species with high pest potential, arrived in Australia and was rapidly removed.

Unfavourable news

- Since SOAB 2003, common and widespread birds have sharply declined, most notably across the Murray-Darling Basin.
- Studies point to major change in Australia's bird communities, with many species declining (woodland/forest/grassland/heathland/wetland) and a very few increasing (e.g. larger more aggressive honeyeaters).
- The Jacky Winter and Hooded Robin are decreasing in all of the areas at which they were monitored in Victoria, New South Wales, the ACT and Queensland (Jacky Winter).
- The Rufous Scrub-bird and Fairy Tern, recently listed as globally threatened, and Painted Honeyeater, require EPBC assessment and implementation of management action.
- A number of other robins, thornbills, fantails, shrike-thrush, treecreepers and other small insectivores, particularly those that feed on or near the ground, are decreasing in various south-east woodlands.

The Painted Finch may be among the birds on the move in response to climate change. Normally a bird of arid zone spinifex and scrubs, a pair have settled north of Jerilderie, New South Wales, and were breeding in September 2008. This is only one of a handful of records of this species for New South Wales and the most eastern record by approximately 550 km. Photo by **Dean Ingwersen**

- At least two intercontinental migrants, the Eastern Curlew, in particular, and Curlew Sandpiper, show steeply declining trends at all sites reported on. Apparently reducing numbers of Latham's Snipe also give cause for concern.
- Numbers of eastern Australian waterbirds in general, and some resident shorebirds in particular, have fallen significantly.
- Gaps in monitoring include forest birds and island birds, groups suspected or predicted to be suffering declines. Studies are only just beginning to track changes in birds (particularly seed-eaters) of the tropical savannas and uplands. The arid and semi-arid zones are also poorly covered.
- Monitoring is generally piecemeal and, with the exception of the studies in this report and a few others, too short-term to detect meaningful trends in bird populations.
- Monitoring is detecting trends in bird populations but is too rarely used to isolate the underlying causes.
- Monitoring to assess whether or not management interventions work is either lacking or unstrategic; targeted bird monitoring could fill this need.
- Fire is proving an increasing threat to birds of isolated forests and heathlands, such as the northern Eastern Bristlebird, Noisy Scrub-bird, Western Whipbird and Mallee Emu-wren.
- Inappropriate burning regimes potentially threaten birds such as the south-eastern Red-tailed Black-Cockatoo and many birds of northern savannas, such as the Gouldian Finch and White-throated Grasswren.
- Since 2003, broadscale clearing has slowed in New South Wales and Queensland, which is a great advance, but clearing of northern woodlands and forests is an emerging threat.
- Continuing clearing of old growth native forest in Tasmania, nesting habitat of the Endangered Swift Parrot and other threatened species, is a national disgrace, particularly in the face of climate change.
- Habitat loss is the single greatest threat to birds, both because of the legacy of past clearing and the continuing overall loss and degradation of what remains. Other major threats include overgrazing, predation by foxes and cats, over-extraction of and barriers to water flows (e.g., by small and large-scale dams), increasing human pressure and climate change.
- The development and implementation of recovery plans for most threatened species are poorly supported by governments.
- While the support of governments has helped several threatened species to persist, investment in the environment remains inadequate for the larger task at hand.

Uncertain news

- Bird populations are dynamic, variously fluctuating seasonally, annually and sometimes cyclically over periods of decades, hence monitoring needs to be long term to allow meaningful interpretation of trends. (The exception is at the fine scale, where individual birds of some threatened species are tracked over time, and these show less variation.)
- On land, populations of many Australian birds are driven by rainfall; at sea, many are driven by weather-related oceanic events.
- Populations of several species, notably invasive species, show a pattern of decline in the north-east and increase in the south-east: the Rainbow Lorikeet and Long-billed Corella, both native; and the introduced Common Starling, Common Blackbird, Common Myna and Spotted Dove. This is circumstantial evidence of the impact of climate change and suggests that these species are adapting more readily than many native, non-invasive species.
- Not surprisingly, for some species the changes are regional, for example since 1998 the White-throated Treecreeper has increased in two New South Wales catchment management areas and declined or remained unchanged in six. The Near Threatened Grey-crowned Babbler shows evidence of an increase in Victoria, from a much reduced historical population (where there has been targeted recovery action), and is decreasing in parts of New South Wales but not others.

- Australia is such a large, diverse country that the monitoring and conservation of our 866 plus bird species is a complex and demanding task.
- Biodiversity management needs to continue to move to a landscape-based model with adaptive management (informed by appropriate monitoring) applied equally to productive and protected lands.
- Biodiversity gains could be made by the inclusion of green carbon (biocarbon) in carbon accounting and markets. Properly designed, carbon trading is capable of creating a self-funding mechanism to repair degraded landscapes.
- The Swift Parrot could become an emblem of positive change for biodiversity conservation and climate change mitigation if the disappearing natural forests that it returns to each year to breed are preserved for their carbon and biodiversity values rather than cleared.
- Reforms to the EPBC Act (including triggers for carbon emissions and land clearing) and inclusion of biocarbon in trading schemes could bring great benefits to birds and to the biodiversity which sustains us all.

Birds to watch

Birds to watch, identified by the declining population trends in this report, include: migratory waders such as the Eastern Curlew, Curlew Sandpiper and Latham's Snipe; resident waders such as Black-winged Stilt, Red-necked Avocet, and Banded and Masked Lapwings; resident coastal species such as the Fairy Tern and Hooded Plover; woodland insectivores such as the Hooded Robin and Jacky Winter; specialised forest and heathland species such as the Western Ground Parrot, whipbirds, bristlebirds and scrub-birds; mallee species such as the Major Mitchell's Cockatoo and Malleefowl (also the Black-eared Miner); and forest birds such as the Swift Parrot. Pelagic species of concern include the Wandering Albatross and Flesh-footed Shearwater. In addition, upland species (reported on in SOAB 2007 as disappearing from lower parts of their ranges) may be at most immediate risk from climate change; they include the Red-browed Treecreeper, Golden Bowerbird, Mountain Thornbill, Grey-headed Robin and Chowchilla. Data are lacking on other species of concern including the Australasian Bittern and several northern ground-feeders. While the numbers of some of these species are still good nationally, they are falling. For threatened endemic species, such as the heathland birds and Swift Parrot, the declining trends are cause for alarm.

What is a threatened species?

The term 'threatened species' refers to the conservation status of the species as recognised under threatened species legislation. The status of a nominated species is assessed using a set of criteria, such as population size, trend and extent, and degree of threat. If warranted, it is assigned to a category of threat that ranges in severity from Near Threatened, to Vulnerable, Endangered and Critically Endangered. The categories and criteria vary somewhat between jurisdictions.

Throughout this report trends of populations that appear to be in decline are shown in red and those increasing are shown in green; species showing stable (no overall change in trend) are shown in neutral colours.

Table 1. Summary of long-term trends in populations of threatened species and the type of management actions taken (as reported on in Section IV). The column 'Entire Australian population' indicates whether the whole population was monitored, or a subset. Indirect management includes habitat retention, restoration and planting, awareness programs and fire management; direct management includes interventions such as nest boxes, captive breeding and release, and translocation.

Species	Location	Entire Australian population	Long-term trend	Indirect management	Direct management
Malleefowl	Victoria	No	Slight decline	Yes	No
Gould's Petrel	Cabbage Tree Island +, NSW	Yes	Increase	Yes	Yes
Wandering Albatross	Macquarie Island, Tas	Yes	Decline	Yes	No
Lord Howe Woodhen	Lord Howe Island, NSW	Yes	Stable	Yes	Yes
Hooded Plover (eastern subspecies)	Southern Victoria	No	Decline	Yes	Yes
Red-tailed Black-Cockatoo (south-eastern subspecies)	South-west Vic and south-east SA woodlands	Yes	Decrease?	Yes	Yes
Glossy Black-Cockatoo (Kangaroo Is subspecies)	Kangaroo Island, SA	Yes	Increase	Yes	Yes
Superb Parrot	Barmah-Millewa, NSW-Vic	No	Increase	Yes	No
Swift Parrot	South-east mainland	Yes	Decline	Yes	No
Tasman Parrot	Norfolk Island	Yes	Increase	Yes	Yes
Orange-bellied Parrot	Tasmania	Yes	Stable?	Yes	Yes
Western Ground Parrot	Waychinicup/Fitzgerald River National Park, WA	No	Extinct?/Decline	Yes	No
Noisy Scrub-bird	Albany Management Zone/Bald Island, WA	Yes	Decline/Increase (overall decline)	Yes	Yes
Mallee Emu-wren	Ngarkat National Park complex	No	Decline	Yes	No
Western Bristlebird	Two Peoples Bay – Mt Manypeaks, WA	No	Decline	Yes	No
Eastern Bristlebird	Queensland	No	Decline	Yes	Yes
Helmeted Honeyeater	Yellingbo/Tonimbuk, Vic	Yes	Slight decline	Yes	Yes
Western Whipbird	Two Peoples Bay – Mt Manypeaks, WA	No	Decline	Yes	No
Grey-crowned Babbler*	Victoria	No	Increase	Yes	No

*** Near Threatened**

Introduction

We never know the worth of water till the well is dry.
Thomas Fuller, Gnomologia, 1732

THIS IS THE SIXTH *The State of Australia's Birds* report. It brings together the latest results from long-term surveys undertaken for as long as 40 years and draws on many other sources of information to give an up-to-date overview of the health of bird populations in Australia and the main challenges to their sustainability. This 2008 report focuses on the five years since the last overview in 2003. All except four of the monitoring programs reported on in 2003 are revisited and some extra long-term studies have been unearthed.

There are several ways to monitor and assess the status of birds, including distributional changes—contractions or expansions in range. Here the focus is on trends in populations, in some cases the entire population, but mostly species trends at particular sites, generally representative of the wider population. To give greater confidence in the interpretation of trends, wherever possible multiple lines of evidence were considered.

To provide some context the next two sections (I and II) present brief reports on some of the threats to birds and the monitoring programs that are being used to inform better land management practices and better management of birds.

Section III reports on trends in common and widespread species and some of the drivers of change in bird populations. The section begins with some results from the nation-wide, volunteer-based Atlas of Australian Birds, coordinated by Birds Australia. The second part of the section covers regional monitoring programs for various bird groups: woodland and grassland birds, waterbirds and seabirds.

Short accounts of the results of all known monitoring programs for threatened bird species are presented in Section IV, with brief accounts of the management actions taken. The final section (Section V) addresses the commitment of governments and progress in the private conservation sector.

Our knowledge of the state of Australia's bird populations mainly results from the tremendous efforts of volunteers, working in collaboration with professional scientists, State and Federal governments, bird study groups and other bird-related networks. Without their efforts much of the data presented here would have been unattainable.

Above: Commendably, four Canada Geese that arrived in coastal southern New South Wales in December 2007 were humanely removed in March 2008. The introduced goose has become a pest in New Zealand and was likely to become so in Australia. Photo by **David Stowe**

Top: This agricultural landscape in north-east Victoria still contains a lot of connected woodland remnants and supports a suite of woodland-dependent birds. Photo by **Dean Ingwersen**

The State of Australia's Birds reports

The annual *The State of Australia's Birds* (SOAB) reports address the major conservation challenges to birds and their habitats, and the ways to ameliorate them. Every fifth SOAB is an overview featuring long-term trends. The reports are available as free downloads at: http://www.birdsaustralia.com.au/wingspan/supplements.html.

The State of Australia's Birds 2003. **Supplement to *Wingspan* 13 (4).**

The State of Australia's Birds 2004: Water, Wetlands and Birds. **Supplement to *Wingspan* 14 (4).**

Fire and Birds: Fire Management for Biodiversity. **Supplement to *Wingspan* 15 (3).**

The State of Australia's Birds 2005: Woodlands and Birds. **Supplement to *Wingspan* 15 (4).**

The State of Australia's Birds 2006: Invasive Species. **Supplement to *Wingspan* 16 (4).**

The State of Australia's Birds 2007: Birds in a Changing Climate. **Supplement to *Wingspan* 17 (4).**

The nationally Vulnerable Regent Parrot, nests only in seasonally flooded River Red Gums within about 120 m of water and feeds in adjacent mallee, but water starved rivers in recent years have resulted in few breeding attempts. Photo by **Chris Tzaros**

Major threats to Australia's birds

- **Habitat loss (clearance, degradation and fragmentation, including loss of mature trees with nesting holes and the ongoing legacy of past clearance)**
- **Inappropriate fire regimes**
- **Poor environmental water flows and changed hydrology**
- **Overgrazing (especially by livestock, but also overabundant macropods and feral animals)**
- **Predation, competition and habitat change by feral animals and weeds**
- **Increasing human pressure from urbanisation, recreational and other land uses**
- **Climate change**

A highly overgrazed sheep paddock in Western Victoria supports little life. Photo by **Rohan Clarke**

I. THREATS

BIRDS FACE A number of threats, foremost amongst them habitat loss. Land birds are also impacted by overgrazing and by fires that are too frequent, too hot or too widespread, waterbirds by the scarcity of environmental water, seabirds by long-line fisheries. Island species and ground-nesters, in particular, are affected by introduced predators. The importance of these threats varies between species and regions, but they are the same primary pressures that threaten biodiversity in general. Many threats are interrelated (e.g. too frequent fire and habitat loss) and most have been in operation for a long time. Even with remediation, the legacy of some threats, such as habitat loss, will continue for decades (this is often referred to as the 'extinction debt').

This section presents short articles that focus on just some of the threats to birds and point to ways of mitigating their impacts: habitat fragmentation by habitat restoration, inappropriate burning regimes by less frequent burning, urbanisation by quiet green spaces. Both forestry and climate change are threats, but keeping forests in the ground can lessen climate change as well as help birds directly. The box (p. 8) deals with less universal, but nonetheless very real, threats to Major Mitchell's Cockatoo in the Victorian mallee, including hybridisation (ultimately due to habitat change), which threatens the genetic integrity of the species. Threats (and their mitigation)—including livestock grazing and water diversion—are also dealt with in the next section (Section II) and in past SOABs.

The Swift Parrot: emblem of climate change mitigation

The Swift Parrot roams the forests and woodlands of south-eastern Australia all winter, returning in spring to feed in the nectar-rich bluegums of Tasmania and breed—but where? Forestry operations in Tasmania are destroying the remaining extensive hollow-rich forests near the east coast, favoured by Swift Parrots for breeding. Wielangta Forest, described by Swift Parrot expert Peter Brown as the 'finest' breeding habitat he had seen, is slated for logging in the coming year; in the spring of 2006 logging on Bruny Island only halted when active nests were found in trees about to be felled and plans are afoot to begin logging again.

The most recent population estimate of Swift Parrots is less than 1000 breeding pairs and declining. The parrot is the victim of an under-resourced and ineffective approach to biodiversity conservation. Australia's national biodiversity strategy dates from 1996. We have environment legislation that does not even mention climate change, and now a Green Paper on reducing carbon pollution that is seriously deficient in its treatment of living systems.

But all this could change. While the coal industry is spending billions trying to work out how to capture and store carbon dioxide underground through 'geosequestration', nature is doing it everywhere for free. Recent research by scientists at the Australian National University shows that the quantity of carbon stored in native vegetation is enormous, and intact forests can reach quite extraordinary densities—up to 9000 t CO_{2e} per hectare in south-eastern Australian eucalypt forests. One thousand hectares of such forest would store close to nine million tonnes of carbon dioxide (Mt CO_{2e}), equivalent to 2% of Australia's annual emissions. These carbon stores are literally invaluable. If cleared or logged, there is not enough land or water to store the carbon elsewhere without displacing food production and the carbon is irreplaceable in any relevant time frame.

The government's Carbon Pollution Reduction Scheme Green Paper fails to address properly the relationship between biodiversity and climate. It adopts 'Kyoto' greenhouse gas accounting, which omits emissions from native forest logging entirely. Land clearing is to be dealt with through 'incentives'. The potential for permanent carbon uptake through forest restoration is ignored, but unlimited plantation expansion is encouraged (adding to the push from tax incentives). Storing carbon in new plantations is slow, inefficient and impermanent. Between 1990 and 2006, uptake by new plantations recovered only a fraction of the emissions from native forest logging and clearing, both of which are largely avoidable (total uptake of 225 Mt CO_{2e} by plantations compared with total emissions of 1875 Mt CO_{2e} from logging and clearing, the latter already a significant underestimate).

We are due for a paradigm shift in the way native vegetation and biodiversity are viewed. Biodiverse natural ecosystems are not just another casualty of climate change, they are central to the solution. The priority is to protect all existing stores of carbon in natural ecosystems, first by reducing and eliminating emissions and then by ensuring that they are protected in perpetuity. Ecological permanence depends on the self-regenerating, resilient and adaptive capacities of biodiverse ecosystems. Legal permanence means protecting native vegetation on public land through reservation and on private land through covenants and management agreements.

Protected forests will store large additional quantities of carbon as they recover from past logging and other disturbance. There is also enormous carbon storage potential through restoring degraded rangelands and other non-forest vegetation, and improving soil management in agriculture.

Internationally, negotiations are in train to 'Reduce Emissions from Deforestation and Degradation' (REDD) in tropical rainforests, and the Australian government is contributing by funding forest protection in Indonesia and Papua New Guinea. Domestically, we need an equivalent scheme to protect and enhance Australia's natural ecosystems—*REDD Plus*; complemented by funding proportionate to the importance of biodiversity as part of the climate change solution. This would be an excellent unifying theme for terrestrial ecosystems in a new biodiversity strategy.

Let the Swift Parrot, endangered because of its reliance on mature forests, be an emblem of change as biodiversity moves to centre stage, an exciting and positive part of the response to the climate crisis.

Margaret Blakers, *Green Institute, Hobart, Tasmania*

Postscript: Professor Garnaut's final report (www.garnautreview.org.au) is disappointing. He left the living environment to the last and it looks as if it was just too hard. There is no serious policy analysis, not even climatic or economic, and certainly not ecological. It is up to the government to do better, urgently. A dedicated taskforce, with the right expertise, to look at the role of the living environment in mitigating climate change would be a good start.

Further reading

Australian Government's Carbon Pollution Reduction Scheme Green Paper (www.climatechange.gov.au/greenpaper/)

Mackey, BG, Keith, H, Berry, SL & Lindenmayer, DB (2008) *Green Carbon. The Role of Natural Forests in Carbon Storage. Part 1. A Green Carbon Account of Australia's South-Eastern Eucalypt Forests, and Policy Implications*. ANU E Press, August 2008 (http://epress.anu.edu.au)

Blakers, M (2008) *Biocarbon, Biodiversity and Climate Change.* A REDD Plus scheme for Australia. Green Institute Working Paper 3, July 2008. (www.greeninstitute.com.au)

The Wielangta Forest Landmark Trial, 2005–2008. (www.on-trial.info)

Webb, M (2008) *Swift Parrot Breeding Season Survey Report.* Department of Primary Industries and Water, Hobart (www.dpiw.tas.gov.au).

Reconnect the bush

Over the past 200 years the extent of clearing and modification of native vegetation, especially for agriculture and urban expansion, has left many of Australia's landscapes highly fragmented. Even though broadscale vegetation clearing has now come to an end in most States, the resultant loss of connectedness of natural habitats remains one of the biggest threats to the survival of Australia's birds.

The agricultural zone of inland south-eastern Australia is one of the most affected regions (Fig. 1). The Murray Darling Basin may now be the food bowl of the nation but it was formerly a diverse, dynamic landscape of forests, woodlands, grasslands, shrublands and wetlands—a complex, interwoven and highly connected system rich in birds. The region maintains remnants of some of these habitat types and an immensely interesting array of birds, but where formerly many birds would have moved freely across the landscape, connectedness has been lost in every habitat type across the basin, isolating bird populations, preventing movement and inhibiting ecological processes. With increasing population isolation comes decreasing population viability and reduced capacity for recolonisation, and local extinctions begin to occur. The demonstrable decline of the Grey-crowned Babbler from the southern part of its range is an example. This once common woodland species has dropped out of the landscape in many rural districts, despite persisting for decades following initial habitat clearance. Currently, one family group of babblers is known to persist in South Australia, fewer than five groups remain in western Victoria and there has been a 30% decline in central Victoria. The 'extinction debt', as this process is known, applies to many other species in south-eastern Australia and the region is noted for having one of the most seriously depleted bird faunas in the nation.

The range of the Grey-crowned Babbler, Near Threatened nationally, has been much reduced in south-eastern Australia where there are signs that some remaining populations are responding well to revegetation programs (see p. 37). Photo by **Chris Tzaros**

Within the Murray Darling Basin, the only examples of habitats broadly connected at a landscape scale are the linear stretches of riparian woodland associated with the major rivers such as the Murray, Darling, Lachlan and Murrumbidgee. Yet, even these connected systems are under threat and their ecological integrity compromised due to the severe lack of water. Periodic flooding is required to maintain properly functioning floodplain woodlands. Starved of water, vegetation dependent on periodic flooding rapidly and seriously degrades and this significantly affects bird populations, including a range of insect, seed and nectar feeding species reliant on healthy functioning Red Gum and box woodlands. Some threatened species, such as the Regent Parrot, which nests only in River Red Gums within about 120 m of water, require seasonal flooding of billabongs and river tributaries in order to breed. Along the Wimmera River on Lake Albacutya, there has not been a significant colonial breeding event of Regent Parrots since 1976 when the lake was last full (the last recorded breeding, of a single pair, was in September 1992).

Reduced environmental flows also create a habitat connectivity issue (Fig. 2). The Darling River, for example, has experienced such a reduction in flow (due to long-term over-extraction for irrigation, and to recent drought) that it is now a discontinuous series of pools of water interspersed by sections of dry riverbed. River and wetland connectivity are seriously compromised and lakes and wetlands in the lower parts of the Murray Darling Basin are isolated and starved of water. Unique wetlands such as the lower Murray Lakes and the Coorong are facing irreversible damage. Their once teeming populations of freshwater birds—waterfowl, spoonbills, ibis and even large breeding aggregations of Brolgas and Cape Barren Geese—dependent on different parts of the system at different times, may never be witnessed again.

Birds Australia believes that a primary conservation priority for Australia is reversing the loss of landscape-scale habitat connectivity. With landscape remediation, bird populations can bounce back, as evidenced through the increase of Grey-crowned Babblers in some north-east Victorian districts that have been the target of strategic revegetation and regeneration activities with an emphasis on improving habitat linkages (see Grey-crowned Babbler p. 37).

Strategic action is needed to restore enough connectivity and habitat to support viable populations of birds and other animals and plants. The long-term survival of bird populations in the Murray Darling Basin, indeed Australia generally, depends on the retention of enough native forests, woodlands, shrublands, grasslands and wetlands to provide supportive, connected habitats at a landscape scale. To achieve this we must retain and maintain intact native vegetation, repair degraded habitats, replace habitat that has been removed in the past, and reconnect natural habitats to recreate a functional landscape—retain, repair, replace and reconnect.

BY CHRIS TZAROS, *Conservation Manager, Birds Australia*

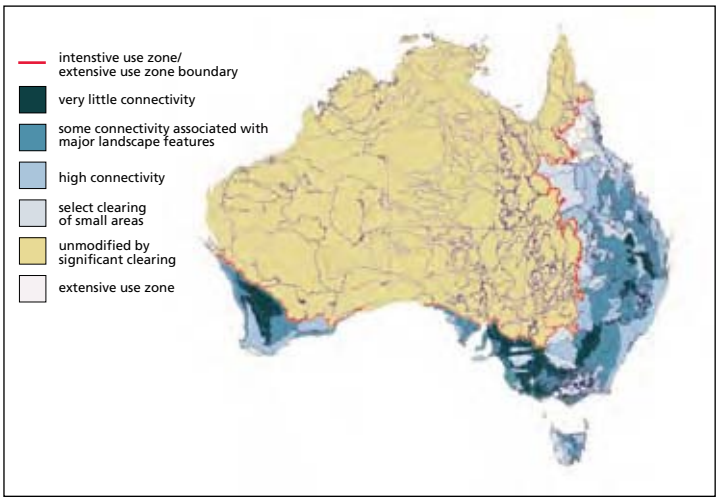
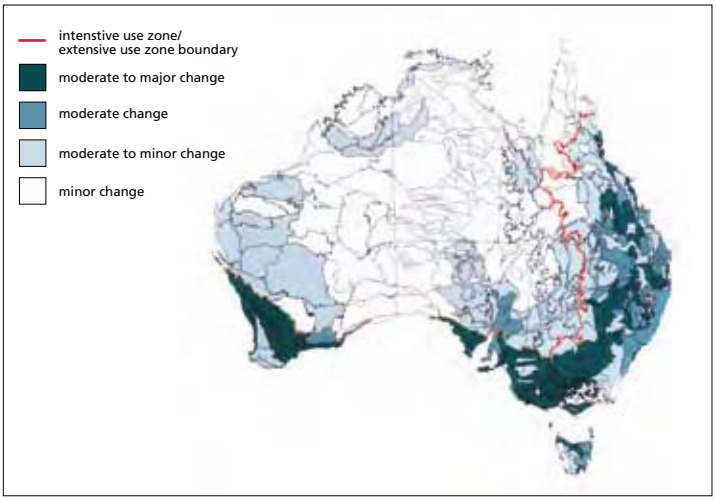


Figure 1. The degree of connectivity of native vegetation in Australia. In the intensive land use zone native vegetation often remains as isolated patches surrounded by cleared land rather than continuous vegetation networks. In the intensive zone, subregions were allocated to one of five connectivity classes. Connectivity is broken in 88 subregions (47%); 49 (27%) have little or no clearing; and 49 (27%) are in the early stages of fragmentation and contain some isolated remnants. Source: Australian Natural Resources Atlas: http://www.anra.gov.au/topics/vegetation/health/index.html

Figure 2. The degree of change in hydrological condition in Australia, which can be changed by: soil degradation through over-cultivation or overgrazing; land surface changes such as clearing; levelling, replacing or blocking natural drainage lines; contour banking; and building dams or levees. In the intensive use zone 66 subregions (36%) have moderate to major changes in hydrology mainly due to clearing, disrupted flow paths, or soil degradation. In the extensive use zone 117 subregions (68%) have little or no changes to their hydrology and 52 (30%) have minor to moderate changes mainly in the more intensively grazed subregions that have shallow topsoil or soils prone to compacting. Source: Australian Natural Resources Atlas: http://www.anra.gov.au/topics/vegetation/health/index.html

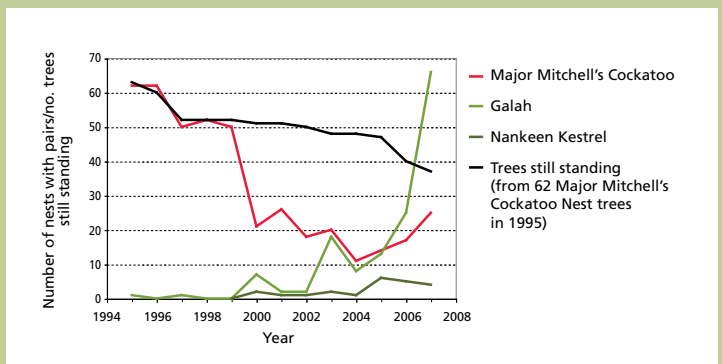


Major Mitchell's Cockatoo: changing threats

In the Victorian mallee, long-term monitoring of Major Mitchell's Cockatoo, listed as Vulnerable in Victoria, has revealed an ongoing series of threats. A sustained illegal take of eggs over nearly 15 years ended in 1991, when smugglers were intercepted at Sydney Airport carrying eggs and photos of nest trees. The illegal take is thought to have resulted in a population crash due to greatly reduced breeding output and hence recruits for the breeding population. There has been a steady recovery since 2004 (Fig. 3). Although there has been a loss of their old nest trees, at a rate of about 1.6 trees per year, this is not thought to be limiting. The recent increase in the Galah population coincides with changes in land management practices: adoption of minimum tillage cropping and a new style of combine harvester, both of which leave extra second-rate and cracked grain on the surface of paddocks all year round, providing Galahs with an extended reliable food source. (Reduced livestock grazing is thought to have resulted in a small increase in nesting kestrels.) Galahs, in particular, can outcompete Major Mitchell's Cockatoos for nest sites and also egg dump in their nests. Finally, in these human-altered landscapes the two parrot species occasionally hybridise.

BY VICTOR HURLEY,
Department of Sustainability and Environment, Mildura, Victoria

Figure 3. Annual surveys of tree hole nesting species in the Victorian mallee, in the area around 62 trees containing actively nesting Major Mitchell's Cockatoos in 1995.
Source: Victor Hurley, Department of Sustainability and Environment, Mildura, Victoria



Fire, drought and honeyeaters

In heath and mallee inappropriate fire regimes are now the main threat to a suite of birds characteristic of those habitats. Heathland birds need a mosaic of different fire ages; heathland patches soon after fire (recovering) and long after fire (senescing) both support low numbers of birds. In SOAB 2003 trends (1990–2002) were presented in counts of Tawny-crowned Honeyeaters in relation to time since bushfire at four heathland sites at Ngarkat Conservation Park, the species' stronghold in South Australia. At all four sites (which had burned in different years), honeyeater numbers had crashed immediately post-fire, then recovered to varying degrees. In the years since 2002, numbers dropped in 2003, then increased somewhat through 2004 and 2005, but have since plummeted. This is also apparent in the composite graph (Fig. 4), which shows an overall sharply declining trend across the entire area between 1989 and 2007, probably because of the impact on the honeyeaters of the interaction between drought and 11 separate fires in various parts of the park. Climate change is predicted to bring more frequent fires and lower rainfall, adding yet another layer of complexity to the management of the park and yet another challenge for the Tawny-crowned Honeyeater. Indeed, of the threatened species whose relationships with fire regime have been comparatively well researched, most show a clear preference for much less frequent fire than is currently prevailing.

BY DAVID PATON, ***University of Adelaide, South Australia***

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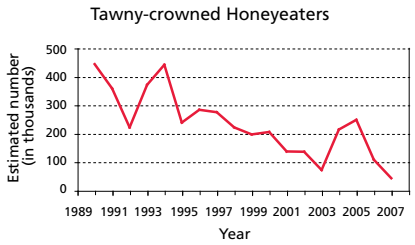

Figure 4. Total numbers of Tawny-crowned Honeyeaters in 270,000 ha Ngarkat Conservation Park, South Australia, estimated from regular winter surveys in different parts of the park (with different fire histories).

Fire and drought are conspiring to make Ngarkat Conservation Park, South Australia, less and less suitable for the Tawny-crowned Honeyeater and other species. Photo by **Graeme Chapman**

URBANISATION AND OTHER HUMAN POPULATION PRESSURES

In the five years since the first SOAB Australia's human population increased from about 19.9 to 21.4 million. The pattern of human settlement is characterised by an increasingly high rate of urbanisation and concentration of over 80% of the population within 50 km of the coast, mainly in two crescents: the south-eastern and the south-western coasts.

Capital city, coastal and hinterland development presents challenges for many birds. Not only is some of the most fertile habitat lost, but planning decisions are often made on a case-by-case basis, leading to incremental loss of ecological function across the landscape. In some areas, development encroaches into fire-prone areas. In response, more bushland is cleared as a firebreak around the new settlements and there is increased pressure on managers of adjacent natural vegetation to burn more frequently. Alternatively, there is no response until a large fire occurs. Neither outcome is good for birds, but there has been greater awareness of the importance of controlled ecologically-friendly burning regimes in recent years.

The intensification of human use (e.g. for recreation) has also put pressure on birds (also see waterbird and seabird sections below). As a recent study has shown, even the walking of a dog on a leash leads to a 35% reduction in bird diversity and 41% reduction in abundance, both in areas where dog walking is common and where dogs are prohibited, and the authors argue against access by dog walkers to sensitive conservation areas.

Generally, Australia's relatively low-density cities have left some room for wildlife in parks and gardens. Indeed some offer year round food, shelter and water where previously it may have been seasonal or absent. Red Wattlebirds, Little Corellas, Pied Currawongs, Collared Sparrowhawks, Peregrine Falcons, Rainbow Lorikeets, Australian Magpies and Magpie-larks are just some of the often large and aggressive native species that adapt well to life in city and suburb. Cities are also havens for several introduced species, such as House Sparrow, Common Myna, Common Blackbird, European Goldfinch, Spotted and Laughing Doves, and newly established Barbary Dove, all of which seldom settle far from human habitation. While cities may present extra hazards to some of their bird populations (e.g. more chance of collision with windows or predation by cats), these may be offset by improved breeding success in urban areas.

Cities change over time as land is cleared, built upon, and parks and gardens are established and mature. Not surprisingly, there has been great change in the birds of Brisbane and surrounds (see pp. 10–11).

In Canberra's botanic gardens, overall numbers of the intensively studied, cooperatively breeding Superb Fairy-wren have remained relatively stable, but fewer breeding groups now have 'helpers', non-parents that help raise the young (Fig. 5). Whether this threatens the long-term viability of this population is unknown.

In Adelaide, 27 years of regular weekly counts of four species show a sustained long-term decline in all four (Fig. 6 [p. 11]). The Tree Martin, which gathers before migrating to breeding grounds north of the Tropic of Capricorn has declined dramatically. The House Sparrow appears to have stabilised at low numbers since about 2000 and numbers of European Goldfinch, and perhaps Common Greenfinch, appear to ebb and flow every two to four years or so, but have never returned to former numbers.

BY PENNY OLSEN, *Birds Australia*

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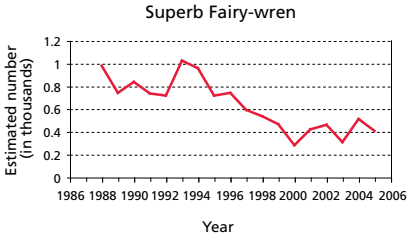


Figure 5. Australian Botanic Gardens: The onset of drier weather in the Canberra region has substantially reduced one of the defining features of reproduction in Superb Fairy-wrens, the presence of supernumerary 'helper' males that assist the dominant pairs to raise offspring. Source: Andrew Cockburn, The Australian National University, Canberra

Birds of Brisbane: 40 years of change

Many Australian native bird species have been declining and this trend is predicted to continue. Alarming signs of decline have emerged from surveys of woodland birds in the Mount Lofty Ranges (South Australia), Western Australia, northern Australia, in the south-east and the arid zone. Here, we focus on the avifauna of south-east Queensland, known to be at risk from habitat loss and fragmentation.

Over the past 40 years, Birds Queensland has held regular outings in and around Brisbane to record birds. Recently, they entered all of these bird lists into a database. The question remained—could data collected in such an ad hoc fashion be useful for detecting changes in the abundance of the birds of the area? Fortunately, Don Franklin has developed a method for detecting changes using simple bird lists. We adapted his method and placed it in a Bayesian framework to look for changes in the abundance of birds around Brisbane.

We selected an area with a relatively large number of surveys, bound by longitudes 152°30′ E and 153°30′ E and latitudes 26°30′ S and 28°00′ S. The number of surveys from each of the six 1:100,000 scale map sheets encompassed was: 71 (Nambour); 43 (Caloundra); 131 (Caboolture); 168 (Brisbane); 145 (Ipswich); and 189 (Beenleigh). After removing very short lists, and species that appeared on few lists, we had 865 lists with 269 species to analyse. We then looked at whether the chance of seeing a species on a list of a particular length changed significantly through time.

We found that over the past 40 years there have been statistically significant changes in the abundance of at least 26% of the bird species analysed: of the 269 species for which there were sufficient data, 40 showed statistically significant declines and 30 showed statistically significant increases (Fig. 7). For example, the chance of seeing a Speckled Warbler during a typical outing, relative to other species, fell by 92% over the 40 years! That means, for a standard 45-species long list, the probability of observing the Speckled Warbler in the Brisbane area in 2006 was 8% of the probability of observing it in 1964. This is not surprising; Speckled Warblers are recognised as a declining woodland bird species and during the past 40 years some of their Brisbane habitat has been replaced by suburbs.

Most of the other species that declined substantially are similar to those reported as having declined or in decline elsewhere in Australia. Eleven of the 14 species that showed the largest declines were insectivores, mostly inhabitants of more open woodland habitats: Jacky Winter, Speckled Warbler, Horsfield's Bronze-cuckoo, Buff-rumped Thornbill, Pallid Cuckoo, Australasian Pipit, Dusky Woodswallow, Painted Button-quail, Grey-crowned Babbler, Yellow-rumped Thornbill and Weebill.

Among the other noteworthy decliners were two rainforest species—Paradise Riflebird and Noisy Pitta; two waterbirds—Pacific Golden Plover and White-necked Heron; and two introduced species—House Sparrow and Nutmeg Mannikin.

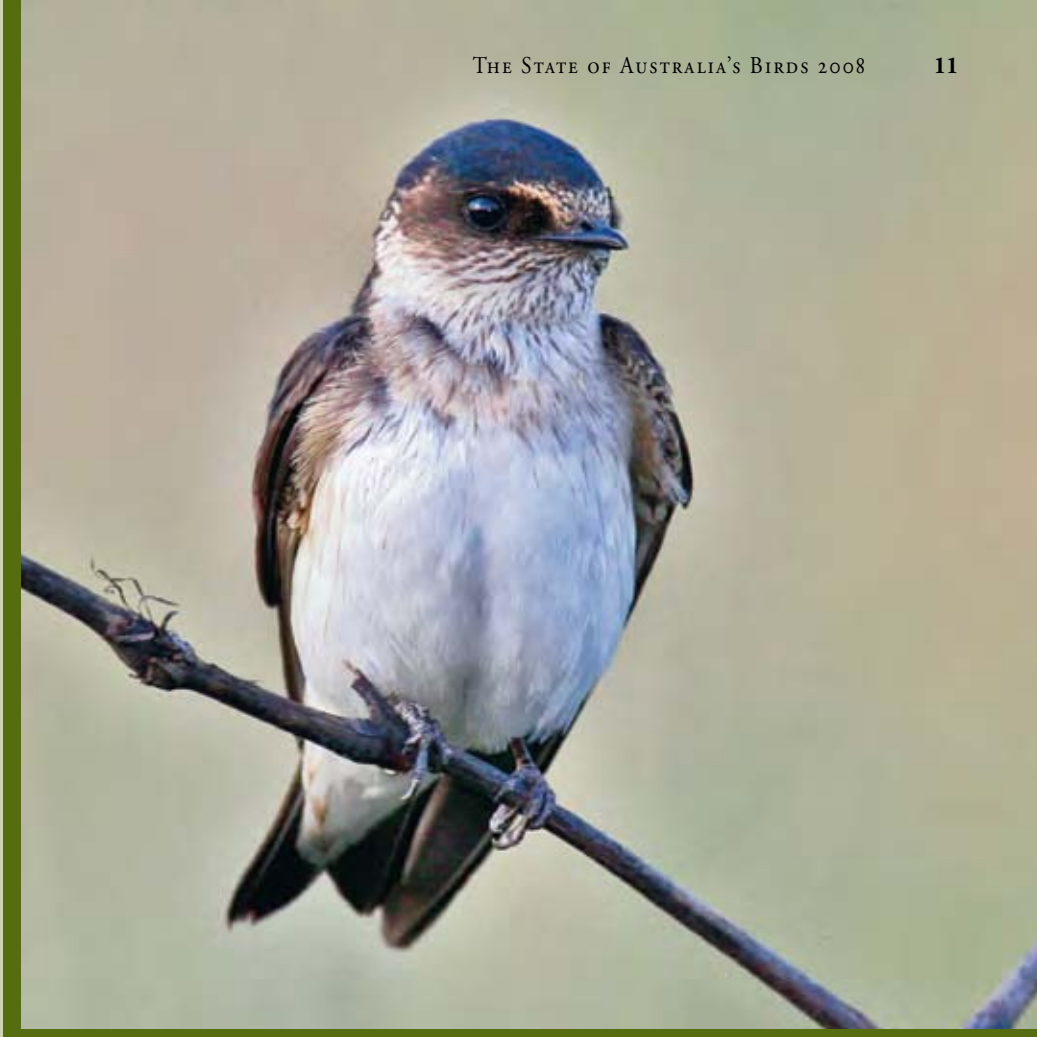
On the flip side, many species increased in abundance. A mix of parrots and introduced species showed increases, with surprises like Peregrine Falcon, Australian Hobby, Dusky Honeyeater (perhaps extending its range south) and Red-kneed Dotterel. Not unexpectedly, the species with the largest increase was the Common Myna.

We need to be careful not to over-interpret this information because the data were not

The Pallid Cuckoo is among the greatest decliners in the Brisbane area over the last forty years; the chances of seeing it have decreased by about 6% a year. Photo by **Dean Ingwersen**

Left: The Peregrine Falcon's ability to make use of man-made structures allows them to nest in cities where there is plentiful prey such as Rock Doves. Here the falcon is nesting in a raven's nest on an electricity transmission tower. Photo by **Rohan Clarke**

Right: Tree Martin numbers have decreased greatly in suburban Adelaide over the last three decades. Photo by **Nevil Lazarus**



collected systematically. There may have been trends in the way data were collected that influence the results; for example, the locations Birds Queensland chose for outings may have shifted consistently over time. Furthermore, the method relies on the assumption that the length of a list is a surrogate for survey effort. While survey effort is hard to quantify, even in standardised surveys, there could easily be systematic changes in the relationship between effort and list length. Hence, all the changes we detected are relative and we recommend that they be interpreted only in the context of other data. Hence, given that many of the trends we found are consistent with existing literature locally and across Australia, this 40-year data set provides valuable confirmation that all is not well for our woodland insectivores. Similarly, comments from local ornithologists suggest that our analysis accords with their anecdotal impressions.

We can take home two more general conclusions. Firstly, the trends picked up from the Birds Queensland data represent the only regional-scale, statistically credible change in biodiversity of a whole taxonomic group for the region over such a long time frame. This is the kind of data one would hope that government agencies would have collected, because it is invaluable for policy and management. Finally, we argue that our analysis shows the potential value of all data. Systematic surveys, where birdwatchers visit the same sites and count birds in the same way at regular intervals, such as the 20-min 2-ha count method of Birds Australia, are the best way to detect changes in the abundance of birds. But, as this analysis suggests, even the humble bird list can usefully reveal trends over time.

BY JUDIT SZABO *University of Queensland and Applied Environmental Decision Analysis,* DAVID NILAND *Birds Queensland and Birds Australia and* HUGH POSSINGHAM *University of Queensland and Applied Environmental Decision Analysis*

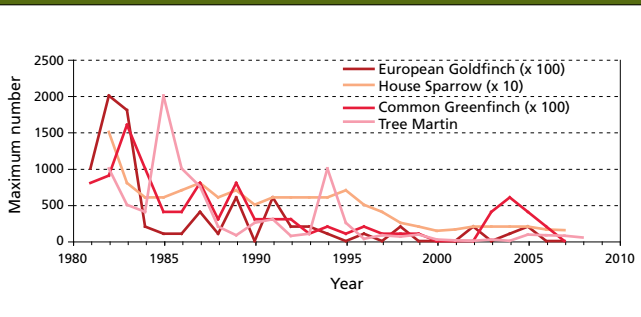


Figure 6. Changes in numbers of Tree Martins and three introduced species—House Sparrow, European Goldfinch, and Common Greenfinch—at Gilbertson, South Australia, as maximum numbers seen for that year on any one occasion during weekly counts. Source: David Paton, The University of Adelaide, South Australia

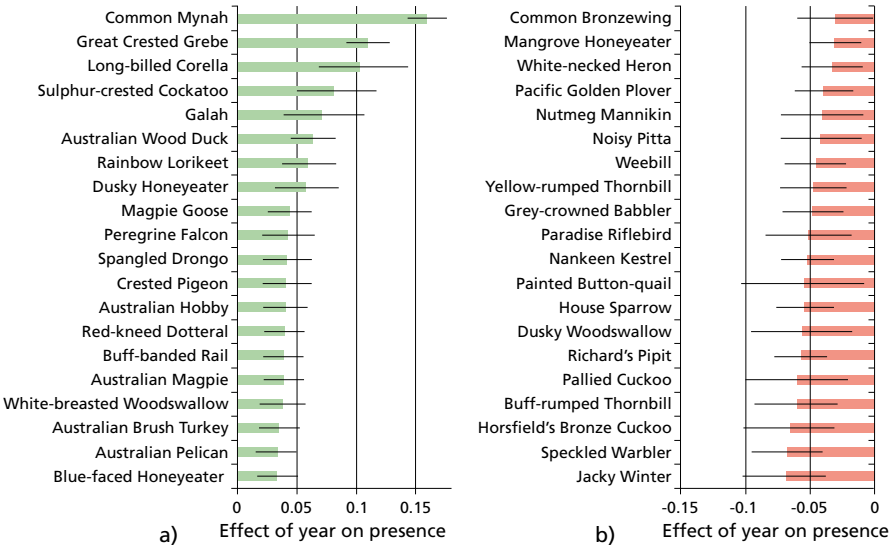


Figure 7. The solid bars show the best estimate of the annual rate of change in the Brisbane area a) 20 largest significant increases or b) 20 largest significant decreases over the past four decades (1964–2006). For example, the occurrence of the Speckled Warbler on lists of average length has decreased by about 7% per year. The thin lines show the 95% credible interval, e.g. in the case of the Speckled Warbler we are 95% sure that the chance of seeing it on an average long list declined between 4 and 9% per annum since 1964.

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Walter, J & Walter, R (2007) Changes in the occurrence of birds and conservation of bird habitats in the Pittsworth shire, Darling Downs, since 1972. *The Sunbird* 37: 1–13.

Left: The colour-banded population of Purple-crowned Fairy-wrens is closely monitored. Photo by **Geoff Jones**

Right: A Male Gouldian Finch amongst spinifex, an important food resource in the early wet season. Photo by **Steve Murphy, AWC**

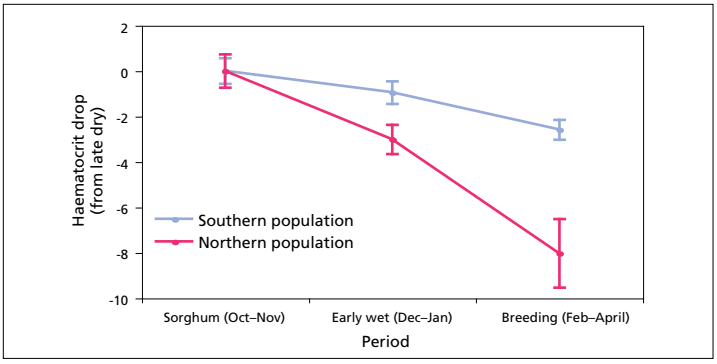

Figure 8. The progressive loss in general condition over the year (as measured by haematocrit, or packed blood cell volume) in populations of Gouldian Finches living in two regions under different land management: (a) the northern population has been exposed to frequent fire and cattle grazing; (b) the southern population to infrequent fire and no cattle. The health of these populations is monitored annually to test whether AWC's land management programs are benefiting wildlife. Values are means with standard errors.

II. Monitoring for Better Management

DESPITE MUCH EMPHASIS on adaptive management, its full implementation requires feedback from monitoring, which is too seldom achieved. To yield effective results for management, monitoring should be standardised and long-term; designed to answer the questions to hand; and analysed and reported on so that the results can be applied. The studies in this section have a particular focus on monitoring to inform conservation management. Also see the section 'Trends in threatened species'.

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Monitoring to evaluate conservation management: fire and grazing

Programs that monitor the outcome of conservation management, especially over the long term, are notoriously rare. There are several reasons why most land management organisations, private and public, do not measure their 'on-ground' performance in a scientifically robust manner; these include imperfect knowledge of many ecological systems and species, funding constraints, shifting reporting requirements and a relatively high turn-over of field staff. This failure to adequately measure and report on-ground performance means that most land management organisations in Australia lack accountability in relation to their operations and rarely know whether they achieve the desired ecological results. This situation must change, particularly if the level of private sector investment in conservation is to be further enhanced and if the ecological performance of organisations is to enjoy continuous improvement.

Table 2. Changes in the population of Purple-crowned Fairy-wrens along creeks at Mornington Wildlife Sanctuary over three years following active fire management and stock removal

Measure	2005	2006	2007
Density of birds/km	8.7	12.1	13.5
Number of birds (& groups)	117 (34)	164 (44)	182 (50)

Source: The data were collected by staff from the Max-Planck Institute for Ornithology as part of a study of the ecology of Purple-crowned Fairy-wrens.

Australian Wildlife Conservancy (AWC)—a non-profit conservation organisation dedicated to saving Australia's animals and their habitats—has been developing a comprehensive performance measurement system for its 19 sanctuaries, which cover an area of 2.4 million hectares of Australia's deserts, rainforests, tall sclerophyll forests, mallee and tropical savannas. The system was developed at Mornington, a 350,000 ha property in the central Kimberley, which protects a number of threatened savanna ecosystems and species including the Gouldian Finch (Endangered), Purple-crowned Fairy-wren (Near Threatened), and Northern Quoll (Endangered).

Over the past four years, monitoring programs at Mornington have tracked changes in species, threats and ecological processes in response to the removal of weeds, horses, donkeys and cattle, and the control of fire, all of which are implicated in the declines of many northern Australian species, including small-medium sized mammals, fire-sensitive plants, and seed-eating birds. Monitoring has demonstrated measurable decreases in the levels of key threatening processes—for example, surveys for large herbivores confirm extremely low densities in the destocked section of Mornington, and satellite imagery analysis demonstrates a reduction in the frequency of extensive mid-to-late dry season fires.

To assess whether this threat management delivers conservation benefits, our performance measurement system includes monitoring programs for declining species, groups and ecological processes thought to be sensitive to fire patterns and/or cattle. The results over the last four years have been dramatic. For example, the abundance of ground-dwelling species that rely on grass for cover and food has increased: small mammal abundance has risen almost ten-fold and Brown Quail numbers have grown twenty-fold. The abundance of the Gouldian Finch has increased and, even more compellingly, the physiological health of the finch at critical times of the year has improved where cattle have been removed and fires controlled (see Fig. 8).

The population of Purple-crowned Fairy-wrens along 14 km of creeks has grown by 56% in three years (see Table 2). This species is a specialist of the habitat that lines the creeks and rivers of the tropical savannas. Elsewhere, frequent intense fires and trampling by stock are degrading this riparian habitat, but on Mornington it is expanding following stock removal and control of fire.

To be valuable for conservation, monitoring programs need to be well-designed, well-resourced and outcome-focused. They also need to be integrated into the culture, planning and decision-making of land management. At Mornington, AWC has succeeded in integrating science and land management, providing a rare empirical example of adaptive management, and introducing an advanced level of accountability in the delivery of ecological outcomes.

by Sarah Legge and Atticus Fleming,
Australian Wildlife Conservancy

The importance of volunteers

Many decisions about species' recovery are made in the absence of adequate information and while this is not ideal it is often the best option available. It is important that as much strategic monitoring as possible is instigated to evaluate and provide feedback to improve management actions. It is here that volunteers play a key role.

Given the large amount of work required to recover threatened species in Australia, there simply aren't enough financial resources available to deliver monitoring with paid staff. Most projects depend on volunteers to assist with monitoring of on-ground actions, and the volunteers do it extremely well. The volunteers who assist with this work, through projects such as the Threatened Bird Network (TBN) and Atlas of Australian Birds, are highly skilled and highly motivated and generate data for many projects. Over 5,000 volunteers are registered with these two projects alone and they are estimated to provide over $2 million of labour per annum. As a result they are highly sought after by recovery teams. The involvement of so many volunteers also has the direct social benefit of engaging the community in activities of direct benefit to conservation.

Over the years volunteers from TBN have visited just about every corner of the country. When you consider that they have counted Gouldian Finches at Kimberley waterholes, searched for Black-eared Miners in the NSW mallee, monitored nesting Orange-bellied Parrots in the south-west of Tasmania, and observed colour-banded Helmeted Honeyeaters in Victoria, there aren't many bird projects around the country which haven't had highly-skilled volunteer assistance at one point or another. The data generated from this work has been responsible for enhancing many management plans, improving the conservation outcomes for our threatened birds.

by Dean Ingwersen,
Threatened Bird Network Project Manager, Birds Australia

Centre top: Genetic samples are taken from Purple-crowned Fairy-wrens on Mornington and throughout the Kimberley as part of a conservation genetics study carried out by AWC, the Australian National University, and Max-Planck. Photo by **Anja Skroblin, AWC and ANU**

Top right: Michelle Hall (Max-Planck Institute for Ornithology) banding a female Purple-crowned Fairy-wren on Mornington Photo by **Mark Godfrey, The Nature Conservancy**

Above: Ray Lloyd, an AWC staff member, sampling the health of Gouldian Finches on Mornington. Photo by **Jo Heathcote, AWC**

Below: The Black-winged Stilt appears to be declining across eastern Australia (see p. 14). Photo by **Dean Ingwersen**

Monitoring woodland revegetation and wetland recovery at Edithvale-Seaford Wetlands

The Edithvale and Seaford Wetlands are the last sizeable remnants of the once extensive Carrum-Carrum Wetlands in what are now the south-east suburbs in Melbourne. At the time of European settlement, the Carrum-Carrum was a mix of permanent deep water, paperbark swamps and ephemeral freshwater meadows that extended over 2,500 ha, but after a century of drainage, agricultural use and urbanisation, the 103 ha of Edithvale and 158 ha of Seaford are essentially all that is left. Both wetlands still maintain a diversity of habitat that supports around 190 bird species. In 2001 their value as a habitat for waterbirds was recognised by their listing as a Ramsar wetland of international importance, one of the few urban wetlands in Australia to achieve this status.

Wetland health and waterbirds of eastern Australia

Aerial surveys of waterbirds are a rapid, efficient way of collecting large amounts of data over extensive areas and monitoring freshwater ecosystem changes. As reported in SOAB 2003, aerial surveys of waterbirds across eastern Australia show that numbers of several species increased dramatically following the breaking of the three-year drought in the early 1980s and again in response to similar subsequent events. Despite these extreme fluctuations, the data indicate continuing long-term stability for all six species reported on in 2003: Banded Stilt, Pacific Black Duck, Brolga, Freckled Duck, Magpie Goose and Radjah Shelduck. Nonetheless, overall waterbird numbers have greatly declined over the survey period (Fig. 9).

Shorebird numbers, in particular, have plummeted over the last two decades and many species are not faring well despite some years of improved breeding success (see Fig. 10a). Populations of small, mostly migratory shorebirds have fallen significantly, by 65% overall, some of which can be attributed to destruction of important staging sites, such as those in the Yellow Sea. However, since 1983 populations of the six resident shorebirds identified to species have fallen and continued to decline—implicating detrimental factors within Australia that are likely to affect migrants as well as residents. Four of the six declined significantly—Black-winged Stilt (by 80%), Red-necked Avocet (85%), Banded Lapwing (98%) and Masked Lapwing (69%).

Rainfall did not explain shorebird trends. Rather, wetlands within the Murray–Darling Basin that are heavily regulated (damming; water diversion) have experienced the most significant declines in shorebird populations, whereas at wetlands outside the Murray–Darling Basin, little evidence was found of change. Ten important shorebird sites were identified (Fig. 10b). Overall, sites with a variable flooding regime of natural flooding and drying cycles provided for the full range of waterbirds at high densities.

Migratory shorebirds are protected under various international agreements to which Australia is signatory, and in Australia the conservation significance of Ramsar wetland sites and migratory shorebirds is recognised under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999*, but it is not clear where such agreements have been used effectively in Australia or other participating countries in the protection of migratory shorebird habitats.

by Richard Kingsford and John Porter,
University of New South Wales, Sydney, New South Wales

The Red-necked Avocet was among the six species which could be identified to species during aerial surveys of eastern Australian wetlands, and was found to have decreased in numbers by over 80% in the last 25 years.
Photos by **Dean Ingwersen**

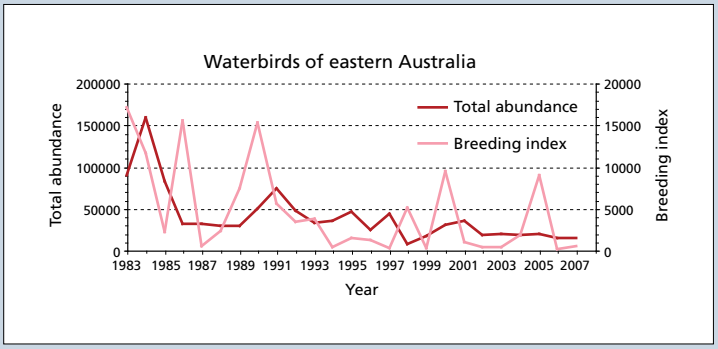


Figure 9. Annual estimates of total waterbird abundance (more than 50 taxa)(lefthand axis) and breeding index (righthand axis) from aerial surveys of waterbirds across eastern Australia.

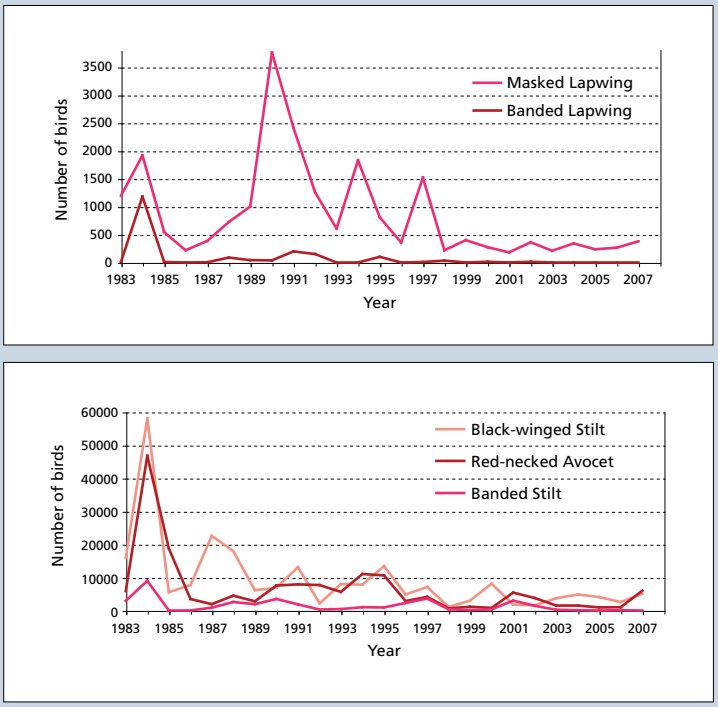


Figure 10a. Numbers of five of the six species (1986–2007) identifiable during October aerial surveys of all waterbirds on wetlands greater than 1 ha counted over ten regularly spaced bands, each 30 km in width, centered on each 2° of latitude between 38°30'S and 20°30'S (see map). Numbers of all five species showed evidence of decrease but trends for the Banded Stilt were not significant. The sixth species, the Pied Oystercatcher was in small, but apparently decreasing, numbers.

Figure 10b. Locations of the ten wetlands supporting the highest number of shorebirds (at least 6,000 individuals as maximum yearly count) within the ten survey bands across eastern Australia. The western limit of each band was 136°00'E, except for the two most southern bands, which ended on the west coast. The eastern limit of all bands was the east coast of Australia. 1 – Lake Eyre North, 2 – Lake Torquinie/Mumbleberry Lake, 3 – Lowbidgee, 4 – Lake Galilee, 5 – Lake Denison/Jack Smith Lake, 6 – Coorong, 7 – Paroo River overflow, 8 – Cooper Creek wetlands, 9 – Lake Cawndilla/Nettlegoe Lake, 10 – Mid-Darling River. Water extraction was significant at 3, 5, 6 and 10.
Source: Nebel et al. 2008, *Biological Conservation* 141: 971–980.

Right: The Australian Reed-Warbler is benefiting from wetland restoration at Edithvale, Victoria. Photo by **Graeme Chapman**

Since 1989 at Edithvale, and 1994 at Seaford, members of Birds Australia have been involved in monitoring the bird populations of the wetlands and their buffer zones. The wetlands were fenced in the early 1990s as part of a program of rehabilitation and active hydrological management by Melbourne Water. The hinterland of both wetlands have been extensively revegetated by Melbourne Water and community groups, in particular the Friends of Edithvale-Seaford Wetlands, and the growth of these plantations is reflected in the growing numbers of bushbirds (Fig. 11), even during the extended recent period of low rainfall. As the open paddocks of primarily introduced pasture grasses are replaced with indigenous plantings, since 2001 there has been a corresponding drop at both sites of open country species and introduced species such as Skylark and House Sparrow (at Seaford) and Skylark and European Goldfinch (Fig. 12).

Certain native species such as the Red Wattlebird and White-plumed Honeyeater are clearly benefiting from the new plantings, as is the Noisy Miner, which was not regularly recorded at Seaford until the mid-nineties. Other species such as Little Wattlebird and New Holland Honeyeater tend to move into the plantings at certain times of the year, returning to their urban garden habitat for the rest of the year.

Whether these buffer zone plantings will have the desired outcome of increasing native bushbird diversity and not just favouring a few dominant species remains to be seen, but the rise in numbers at both sites of Superb Fairy-wren suggests that as the plantings mature and develop an understorey, other smaller native birds may move in.

In the past both wetlands have acted as drought refuges, but with local water management issues and the driest ten-year period in recorded history, they have been drier than normal over the recent decade. When conditions have been favourable, such as in 2005, when water remained in the shallow, ephemeral lagoons into the key summer period, waterbird numbers shot up, and included an internationally significant number of the migratory Sharp-tailed Sandpiper (Fig. 13). But waterbirds are mobile, and in other years when conditions seemed ideal, they were also good elsewhere, and the numbers of some species such as Chestnut Teal did not rise as might be expected.

Perhaps an even better indicator of the water levels in the wetland were the numbers of Australian Reed-Warbler, a passerine that is as dependent on water in a wetland as any duck or shorebird. The data clearly indicate that this reed-bed inhabitant was in far smaller numbers in dry years such as 2003 and 2007 (Fig. 11).

Ongoing monitoring will continue to be a vital tool for the managers of these sites to gauge how their rehabilitation is progressing. The raw data collected by Birds Australia is one of the few concrete measures available to demonstrate the value to wildlife of these urban oases.

by Andrew Silcocks, *Birds Australia,* Sean Dooley, Mike Carter, *Melbourne,* and William Steele, *Melbourne Water*

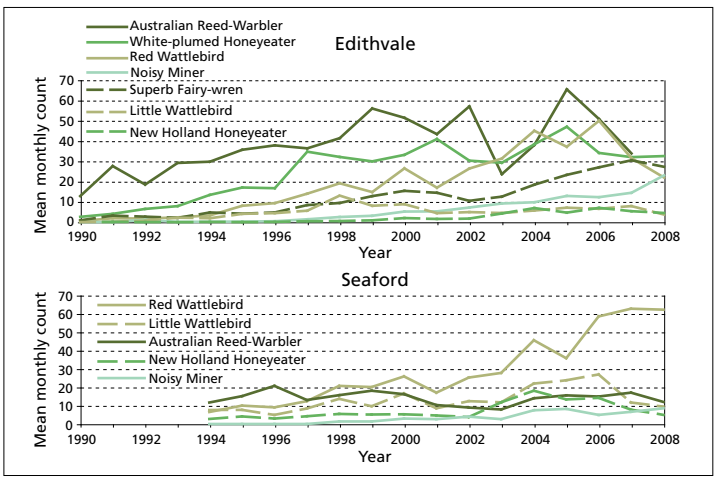


Figure 11. Increasing numbers of bushbirds at Edithvale (at top) and Seaford Wetlands.

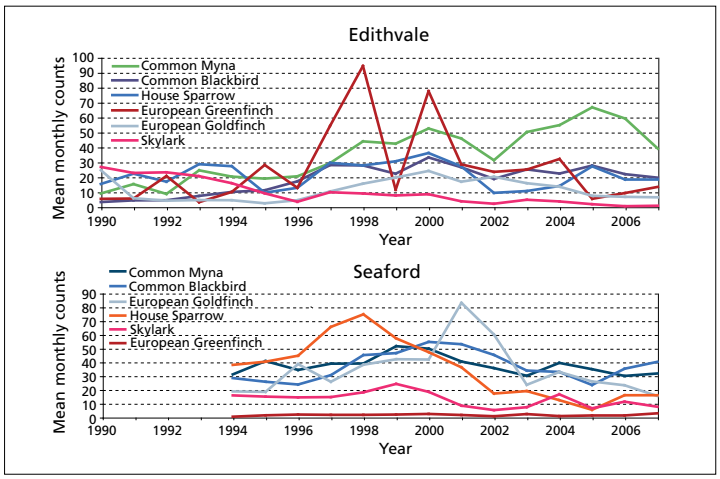


Figure 12. Mean monthly count of introduced birds at Edithvale (at top) and Seaford Wetlands.

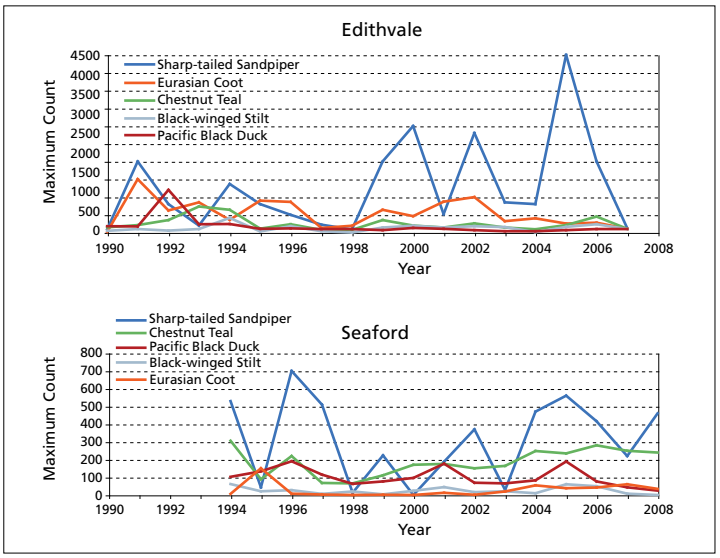


Figure 13. Stable to increasing trends in numbers (the maximum annual count from monthly surveys) of waterbirds at Edithvale (at top) and Seaford Wetlands.

III. Trends in Common and Widespread Species

LONG-TERM TRENDS IN representative common and widespread species from various parts of Australia are reported in this section. Some national trends extracted from the Atlas of Australian Birds are presented first, followed by reports from the regions, according to three main groupings: woodland-grassland birds, waterbirds and seabirds.

Noteworthy gaps in long-term monitoring include forest birds (e.g. Tasmania), and upland birds, both groups predicted to be suffering declines. The trend in populations of many threatened island birds, such as on Christmas Island and Norfolk Island, where there have already been many extinctions, and on Melville Island, is unknown. Studies are only just beginning to track changes in birds of the tropical savannahs, particularly threatened seed-eaters such as the Endangered Gouldian Finch. The arid and semi-arid zones are also poorly covered.

Introducing the National Bird Index

The ability of the Birds Australia Atlas data, indeed any data, to show meaningful trends improves as the years go by. The 'new' Atlas, which has surveys better designed to detect trends than the first Atlas 1977–1981, has just passed its tenth anniversary. To help us to detect and interpret long-term trends, Birds Australia has developed a statistical methodology for calculating multi-species indices of trends in common birds. This is based on the methodology used for the UK and EEC bird indices, headline 'Quality of Life' indicators adopted by governments for reporting on national wellbeing. We have adapted the method for the type of data in the Atlas of Australian Birds and commonly collected in Australia. The method will be used to calculate a set of standard indicators, for example, the woodland bird index and the winter migrant index, to report on the overall state of Australia's birds.

We recently applied the method to eight catchment management areas (Central West, Northern Rivers, Lachlan, Hunter-Central Rivers, Murrumbidgee, Hawkesbury-Nepean, Murray and Southern Rivers) in New South Wales for which there were adequate surveys in the Atlas. The results showed that overall trends over the last ten years have been towards decline in all eight (see typical example in Fig. 14), more so inland than coastally.

To calculate the index, trends for individual species are calculated before being combined. This allows inspection of particular species. In this case, as well as a suite of woodland decliners, a number of common species such as the Australian Magpie, Eastern Rosella, Magpie-lark, and Galah were shown to have declined across seven or eight of the catchment areas, and the Superb Fairy-wren in six; a few species, such as the Yellow-faced Honeyeater, White-browed Scrubwren and White-throated Treecreeper, increased in two catchment areas each and were unchanged or declining in the remainder (see examples in Fig. 15); the Gang-gang Cockatoo strongly increased in one catchment area and decreased in another. The change points in the species' graphs highlight the influence of rainfall and will be useful in future studies to identify points of change that might relate to the impact of management interventions.

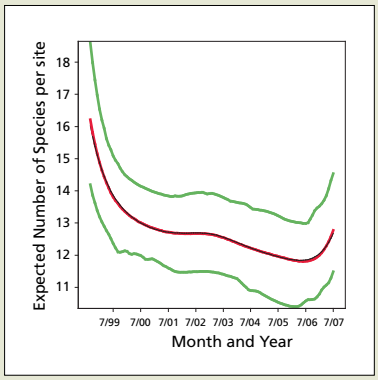
We will continue to develop the method, its presentation and application. Our hope is that bird indices will become part of the Australian Government's set of national biodiversity indicators. This would not only provide meaningful reporting but would be fitting recognition of the dedicated professionals and thousands of volunteers who monitor Australia's birds and make such a huge contribution to understanding of them.

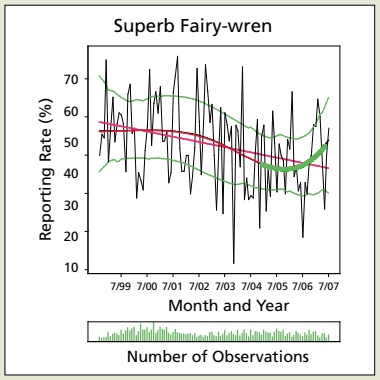
BY ROSS CUNNINGHAM, *Statwise*, AND PENNY OLSEN, *Birds Australia*

Further reading

Cunningham, R. & Olsen, P. (2009 in press) A statistical methodology for tracking long-term change in reporting rates of birds from volunteer-collected presence-absence data. *Biodiversity and Conservation* (BIOC1569R1).

Figure 15. Examples of graphs for two species included in the Hunter/Central Rivers Catchment bird indices, showing: the actual pattern in the reporting rate (black line), which is usually highly variable; the smooth trend, (black and red central lines); the linear fit (straight pink line); highlighted as a bold, thick line when it is statistically significant; change points (blue indicates deceleration of the smooth curve, that is, a slowing in the rate of change; and green indicates acceleration, that is, an increase in the rate of change); and the sub-graph shows the relative sample size for each month (the more observations, the greater the confidence that can be placed on the results). The resident Superb Fairy-wren shows a significant declining trend overall, especially since 2001, and the change points indicate an improvement with easing of dry conditions in 2006. The Yellow-faced Honeyeater, on the other hand, shows slight indication of increase (non-significant) and is a migrant that visits the region in greater numbers in good (flowering) seasons.





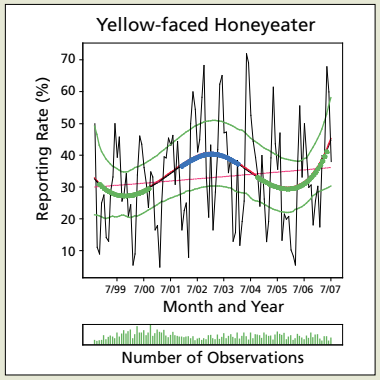


Figure 14. An example of a bird index for the Hunter/Central Rivers Catchment, New South Wales (a composite of trends for 100 species, 1999–2007), showing species richness (expected number of species per site). The red and black lines represent the smoothed trend and the green lines define the confidence intervals.

Far left: The Yellow-faced Honeyeater was found to be among the few species which had not decreased in numbers in eastern New South Wales over the past ten years. Photo by **Rob Drummond**

Left: The Scarlet Robin has decreased over much of its eastern Australian mainland range but increased in the south (Tasmania); perhaps a signal of climate change. Photo by **Nevil Lazarus**

Below: The Jacky Winter is one of many ground-feeding woodland birds that are continuing to decrease in numbers. Photo by **Nevil Lazarus**

The Atlas of Australian Birds: National Trends

Australia is a large, climatically and biogeographically diverse continent with a generally sparse (but increasing) human population. Assessing the state of its bird species—in excess of 700—presents special challenges. Each year Birds Australia receives over 20,000 Atlas datasheets from our dedicated volunteers nationwide. These are lists of birds collected according to a standardised field survey methodology. The 20-minute, two-hectare survey method (20-min, 2-ha) repeated at intervals, with counts, is our preferred survey method. Counts are especially valuable for congregatory species such as waterfowl. This mighty volunteer effort has generated the only long-term, nationwide data on biota available for the assessment of the state of the environment. Continuation and expansion of the Atlas has recently been recommended by the authoritative Wentworth Group of Concerned Scientists.

Atlas data are drawn on for various sections of this report but here we present some national trends. The distribution of the diversity of birds (species richness) mirrors quite closely Australia's major climatic zones (Fig. 16). It is greatest coastally and least in arid and semi-arid areas, reflecting the close relationship between birds and rainfall (amount and predictability), which influences bird diversity and abundance both locally (seasonal and annual variation) and regionally (climatic differences).

The prolonged dry conditions across much of the country (Fig. 17), since 2001, are contributing to long-term declines in total numbers of waterbirds across eastern Australia, largely in the south on some major wetlands (e.g. Macquarie Marshes and Lowbidgee; see p. 14). Change in the past ten years for landbirds strongly indicates that they too are in trouble in these areas and indeed right across the Murray-Darling Basin (Fig. 18).

The few arid areas surveyed indicate that not only are birds stressed in the south-east and south-west, as we reported in past SOABs, but also widely across the arid and semi-arid zones. Australia-wide, approximately twice as many grid blocks show moderate or high decrease in reporting rates as those that show increase.

Though it is easy to blame low rainfall for decreases in many bird populations, the impact of loss of resilience in the landscape due to inadequate environmental water and loss of native vegetation cover (see connectivity Figs. 1 and 2) are exacerbated in dry times—they leave birds with no buffer against extremes.

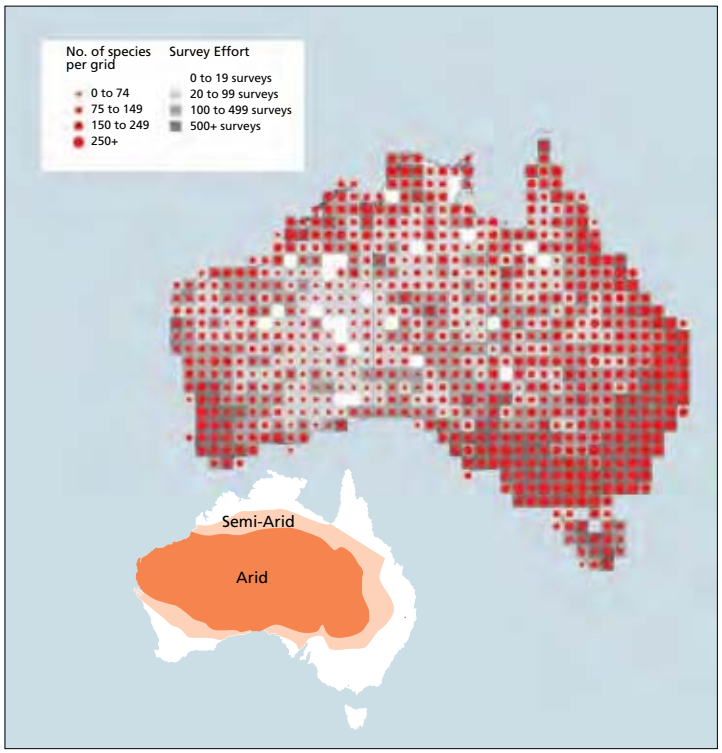


Figure 16. The number of species recorded in each 1° latitude-longitude Atlas grid square 1998–2008. The shade of grey indicates the number of surveys; tallies for the more heavily visited grids are the most reliable; not all grids were surveyed.

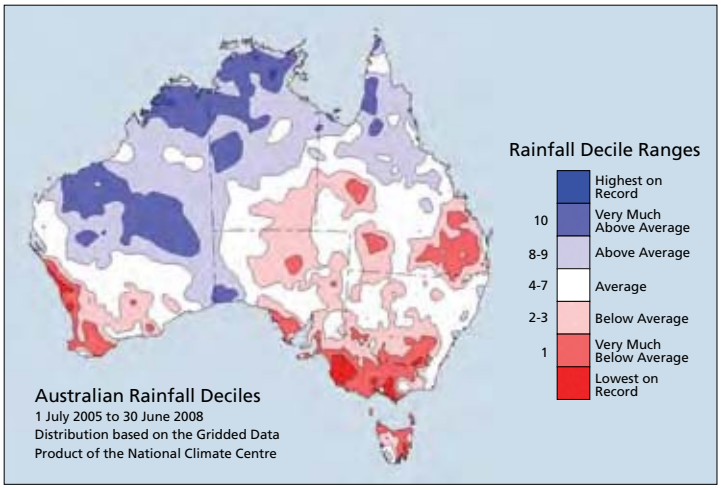


Figure 17. Rainfall deciles for the 36 months from July 2005 to June 2008. Source: Bureau of Meteorology.

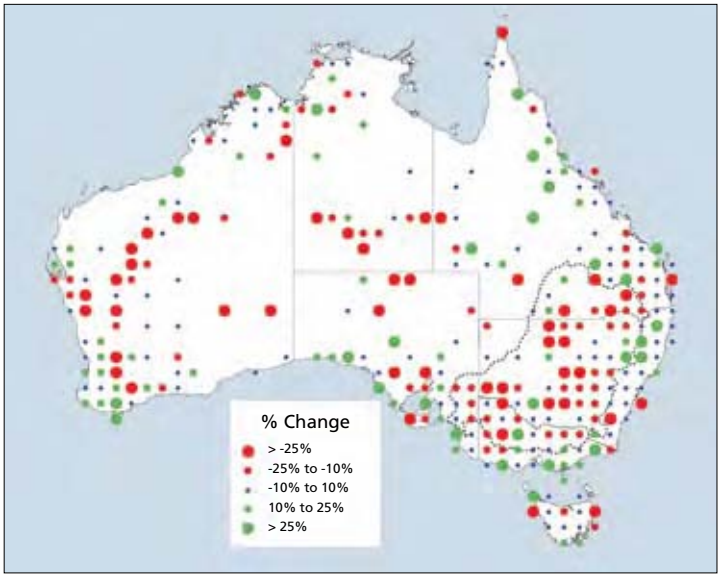


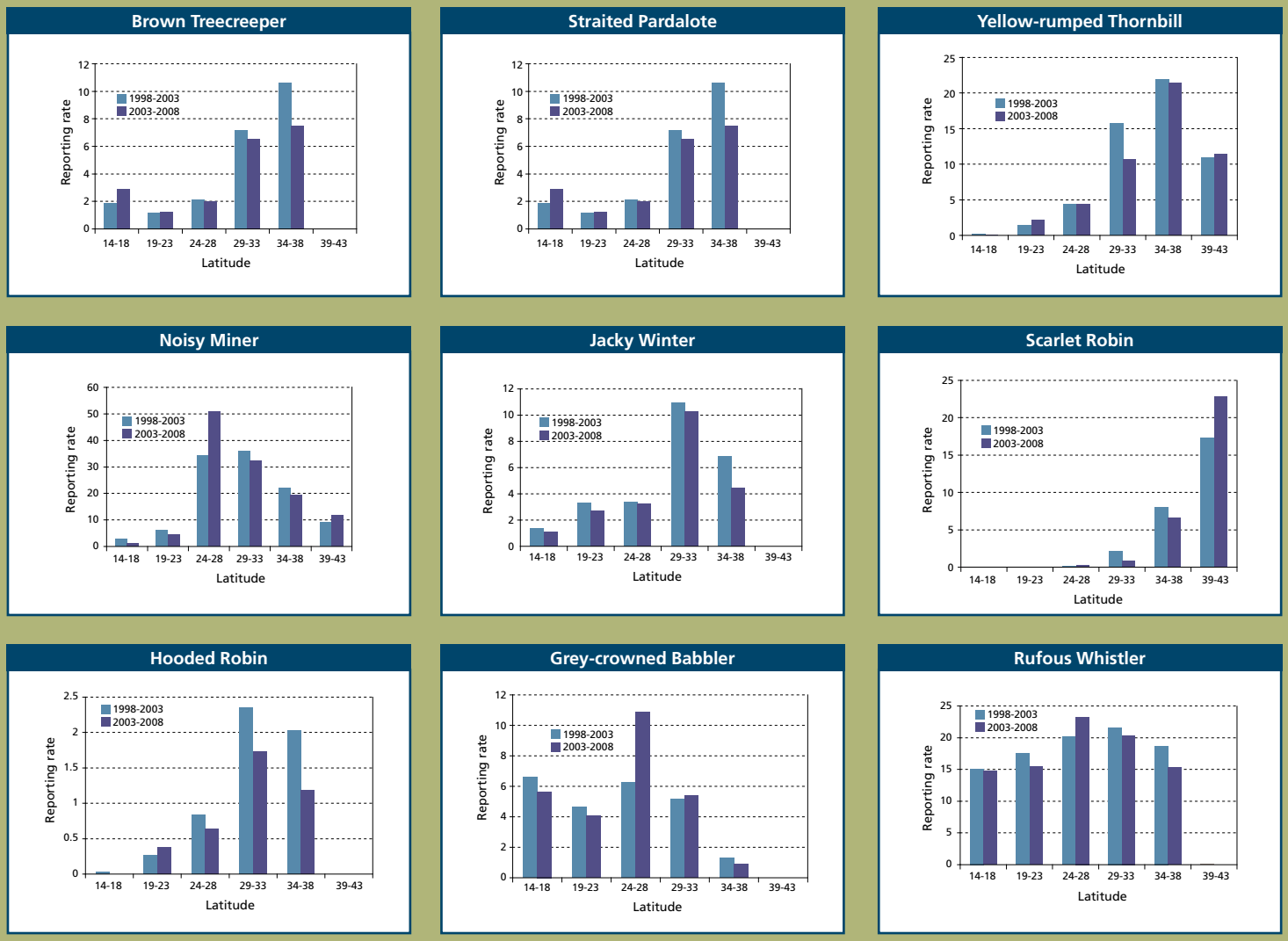
Figure 18. Changes in reporting rate for landbirds between 1998–2003 and 2004–2008 (20-min, 2-ha Atlas surveys; 10 surveys minimum per grid). The boundary of the Murray-Darling Basin Catchment is indicated by a dotted black line.

Left: Since 1998, the fruit-eating Olive-backed Oriole has increased between latitudes 24–33 in eastern Australia (approximately Bundaberg, Queensland, to Newcastle, New South Wales) and is more or less unchanged elsewhere in eastern Australia.
Photo by **Rohan Clarke**

To see how some individual species are faring, and recognising that their status may vary regionally, a north-south transect that ran from the tip of Cape York to southernmost Tasmania was selected, to investigate recent change according to latitude in 23 species that mostly occur across that range (Fig. 19). Some common patterns of change between the two periods mid 1998–2003 and mid 2003–2008 were:

- Between latitudes 29–38ºS many species (14) were faring less well. These were Brown Treecreeper, Striated Pardalote, Yellow-rumped Thornbill, Noisy Miner, Jacky Winter, Scarlet Robin, Hooded Robin, Rufous Whistler, Grey Fantail, Willie Wagtail, Dusky Woodswallow, Silvereye, Pied Currawong and Welcome Swallow.
- Many species (14) showed a marked increase between latitudes 24–28ºS, which is where rainfall has been average in recent years (see Fig. 17). These were Striated Pardalote, Noisy Miner, Grey-crowned Babbler, Rufous Whistler, Grey Fantail, Willie Wagtail, Olive-backed Oriole, Australasian Pipit and Silvereye, Pied Currawong, Rainbow Lorikeet, Welcome Swallow, Spotted Dove and Common Myna.
- Results for northern latitudes (below latitude 24ºS) were mixed, with generally less change than further south.
- Four migrants—Striated Pardalote, Dusky Woodswallow and perhaps Olive-backed Oriole—showed decreases in the north of their range and increases in the south and the more sedentary Australasian Pipit and Scarlet Robin—which could be interpreted as shifts in the distribution of populations consistent with climate change. Rainfall has been deficient in the south over the survey period, so it cannot explain this pattern of change. This pattern was also present in all the introduced species examined—the Common Starling, Common Blackbird, Spotted Dove and, perhaps, Common Myna—and two native species that have spread well beyond their historical range—the Rainbow Lorikeet and Long-billed Corella—a predictable result given the adaptable nature of invasive species.

Figure 19. Examples of changes in the reporting rates of individual species in the last ten years, i.e. beginning with the second Atlas period commencing 1998. A comparison of the period mid 1998–2003 with mid 2003–2008 in 5-degree latitudinal blocks along a north-south transect from the tip of Cape York to southernmost Tasmania, east of longitude 144° (20-min, 2-ha Atlas surveys; the reporting rate is the number of surveys during which the species was seen as a percentage of all surveys).



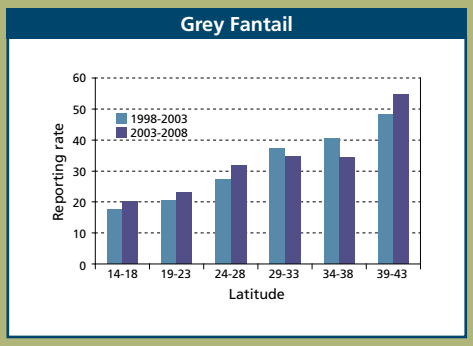
- No species has improved in status across the entire range covered, but the Olive-backed Oriole (a fruit-eating migrant), Grey-crowned Babbler (a resident insectivore that feeds on and off the ground) and Rainbow Lorikeet (a nectarivore) have increased markedly at mid latitudes (24–33ºS) and some species have increased in the south (see previous dot point).
- The status of the Jacky Winter appears to have declined across the entire range covered and that of the Hooded Robin and Rufous Whistler across most of the range (all except one latitudinal block); these are all woodland insectivores.

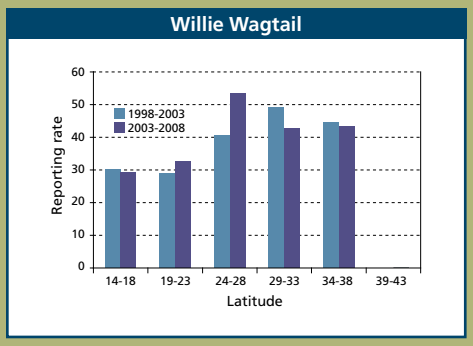
The ability of Atlas data to show trends improves as the years go by; considered with other studies in this report, they point to major change in Australia's birds, at least in the better surveyed south and east, with many species declining and a few increasing.

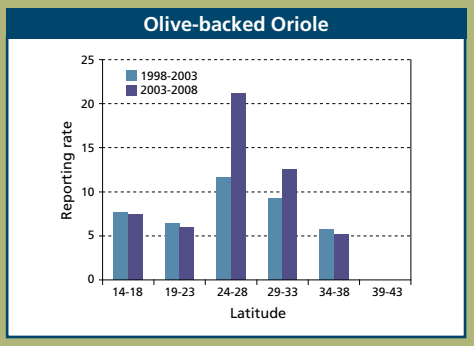
by Penny Olsen and Andrew Silcocks, *Birds Australia*

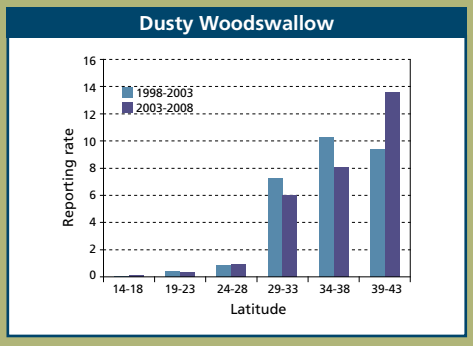
Further reading

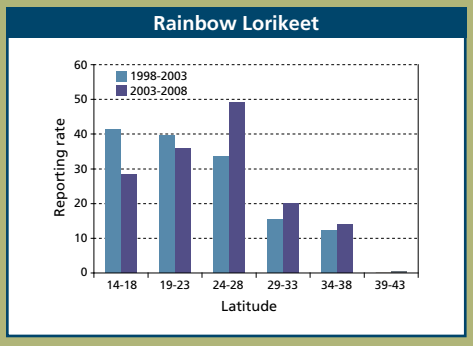
Wentworth Group (2008) *Accounting for Nature: A Model for Building the National Environmental Accounts of Australia*. Wentworth Group of Concerned Scientists, May 2008.

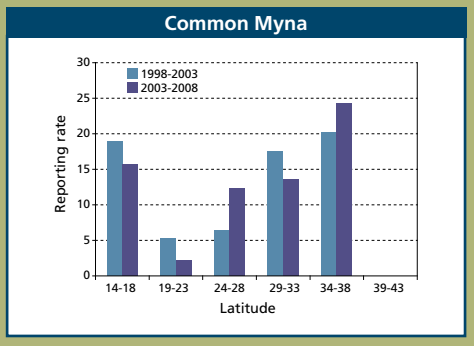


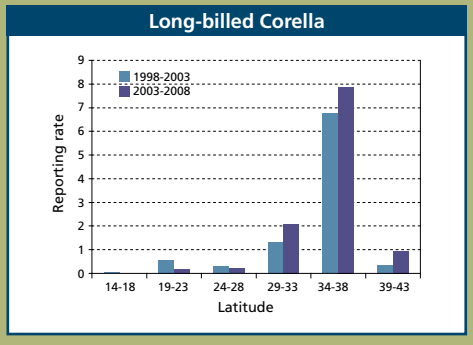


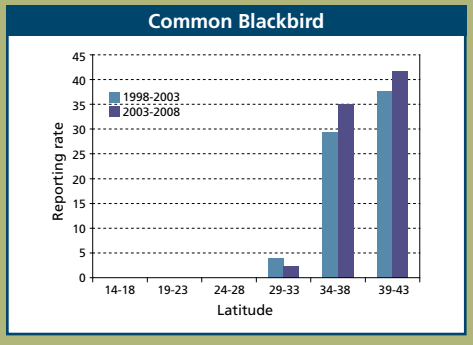


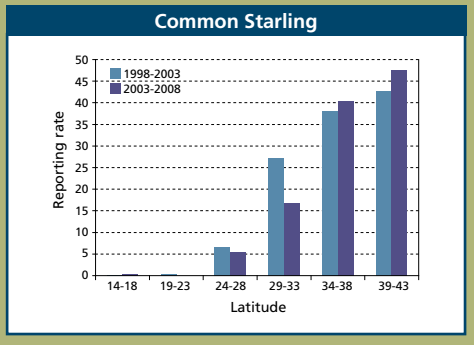












A decade of change in the birds of a Victorian box-ironbark forest

Change in the composition and abundance of local bird assemblages is characteristic of the dry box-ironbark forests of the inland slopes of south-eastern Australia. An ongoing, long-term (11+ years) monitoring project is starting to reveal some of the complexity of the dynamics of this avifauna.

Birds were surveyed at 12 sites, each of 2 ha, in the Rushworth-Graytown forest block (~40,000 ha in size) from December 1996 to December 2007. Red Ironbark, a prominent winter-flowering species, dominates the dry forest, which also has small amounts of Grey Box, Red Stringybark or Red Box.

At least four main kinds of change in the avifauna can be noted. First, seasonal migration results in regular changes in abundance of numerous species: the Rufous Whistler (Fig. 20 a), Sacred Kingfisher and Olive-backed Oriole, for example, occur in the forest in spring-summer; while others such as White-naped Honeyeater, Yellow-faced Honeyeater and Golden Whistler typically move into the region in the cooler months. Second, nectar-feeding species such as Red Wattlebird and Musk Lorikeet (Fig. 20 a) display marked irregular fluctuations in numbers in response to flowering patterns of the eucalypts, especially Red Ironbark. In the years when ironbarks flower heavily, the forest is 'alive' with these birds, whereas in years when flowering fails there may be mass emigration from the forest. Third, local interactions occur between *Lichenostomus* honeyeaters (Fuscous, Yellow-tufted, Yellow-plumed) and small insectivores (e.g. robins, thornbills, treecreepers), which result in dynamic changes in the composition of local assemblages. When these honeyeaters are locally common, the insectivores are excluded.

Lastly, there has been long-term decline in the abundance of many species, linked to long-term drought. Over the 11 years (1997–2007), rainfall has been much below (>15%) the long-term average in six years, but substantially above it only once! Numerous species have declined in abundance or disappeared, especially ground-foraging species such as Superb Fairy-wren, Speckled Warbler (Fig. 20 b), and Red-capped, Scarlet and Eastern Yellow Robins. This long-term decline in the avifauna is of great concern, especially as these observations are from a potential refuge—the largest remaining box-ironbark forest in the region. The mechanism of decline varies between species. Reduced rainfall has probably affected the abundance of invertebrate food sources and, consequently, the breeding success of birds. Flowering of ironbarks has become less regular, with limited or no flowering in five of the last seven years. Massive loss and depletion of the shrubby understorey, a consequence of drought (and probably also macropod browsing), has affected foraging, refuge and nesting sites for numerous species.

What does the future hold? Will 'recovery' be part of future changes to be observed? Alternatively, if the climate experienced over the last decade is a harbinger of that in coming years, we are likely to experience profound changes in the avifauna of the iconic dry forests and woodlands of southern Australia.

BY ANDREW F. BENNETT, *Deakin University, Victoria*

Right: The Speckled Warbler, an obligate ground-feeder and nester, is decreasing in numbers in many woodlands. Photo by **Graeme Chapman**

Far right: The Buff-rumped Thornbill, a ground-feeding insect-eater, is among the common woodland birds declining in ACT woodlands and elsewhere. Photo by **Chris Tzaros**

Birds of woodlands and grasslands

Woodlands and grasslands provide habitat for the majority of Australian land bird species. They also provide much of the country's agriculture, which has greatly modified them. About one-third of eucalypt woodlands nationwide and 80 per cent of temperate woodlands have been cleared. Much of the remainder is thinned, degraded and deteriorating, and often in poorer country—steep, rocky, wet or with less fertile soils. Grazing and the introduction of exotic pasture grasses to support it have reduced the extent of native grasslands in a range of temperate areas to less than two per cent of that present in 1750 and these changes are now converting northern savannas, simplifying their structure and quality. Fire frequency, fierceness and extent have increased, furthering these undesirable changes. For decades there has been recognition that woodland and grassland birds are among the most threatened in Australia; while a handful of species has increased, many more continue to decline. Of particular concern are small ground-feeding granivores and insectivores.

Woodland re-establishment and restoration have been demonstrated to reverse the declines of some species, as has control of fire and grazing. Structural complexity caters for more species and can be increased by the planting of understorey species, and the inclusion of ground cover elements such as logs, rocks and tussock grasses.

Broadscale clearing has slowed in New South Wales and Queensland, but is an emerging threat to northern woodlands. In addition, remaining grasslands and grassy woodlands such as those in the network of travelling stock routes of Queensland and New South Wales, which contain some of the best remaining native vegetation in those States, are far from secure. In addition, long-term protection of native grasslands and woodlands on private lands through stewardship payments and other incentives is still to be fully realised. Another woodland-grassland issue with potential to affect birds is whether or not to thin or clear invasive native scrub; the answer will depend on the region and the desired outcomes.

Further reading

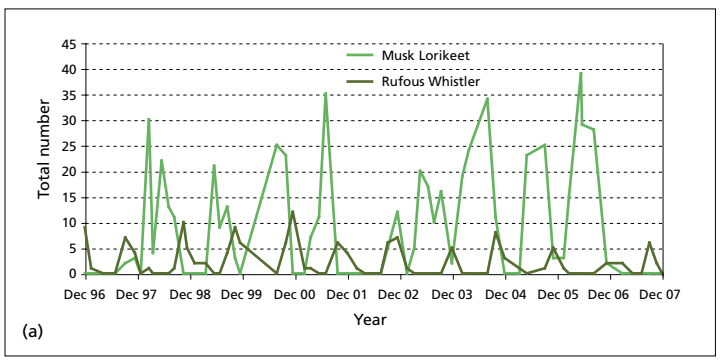
Bennett, AF, Radford, JQ & Haslem, A (2006) Properties of land mosaics: implications for nature conservation in agricultural environments. *Biological Conservation* 133: 250–264.

Mac Nally, R, De Vries, L & Thomson, JR (2008) Are replanted floodplain forests in southeastern Australia providing bird biodiversity benefits? *Restoration Ecology* (in press).

Olsen, P, Weston, M, Tzaros, C and Silcocks, A (2005). *The State of Australia's Birds 2005: Woodlands and Birds. Wingspan* 15 (4) supplement.

Radford, JQ & Bennett, AF (2007) The relative importance of landscape properties for woodland birds in agricultural environments. *Journal of Applied Ecology* 44: 737–747.

Figure 20. Examples of patterns of change in bird numbers in the Rushworth-Graytown box-ironbark forest block, pooled across 12 survey sites (at least 5 visits per year): (a) the Musk Lorikeet shows irregular fluctuations with eucalypt flowering and the Rufous Whistler is a regular spring-summer migrant; neither shows signs of long-term change; (b) many species such as the Speckled Warbler and Superb Fairy-wren are seriously declining in numbers is a regular spring-summer migrant.



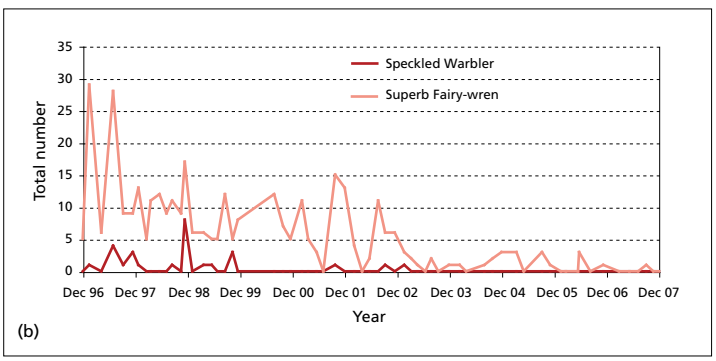
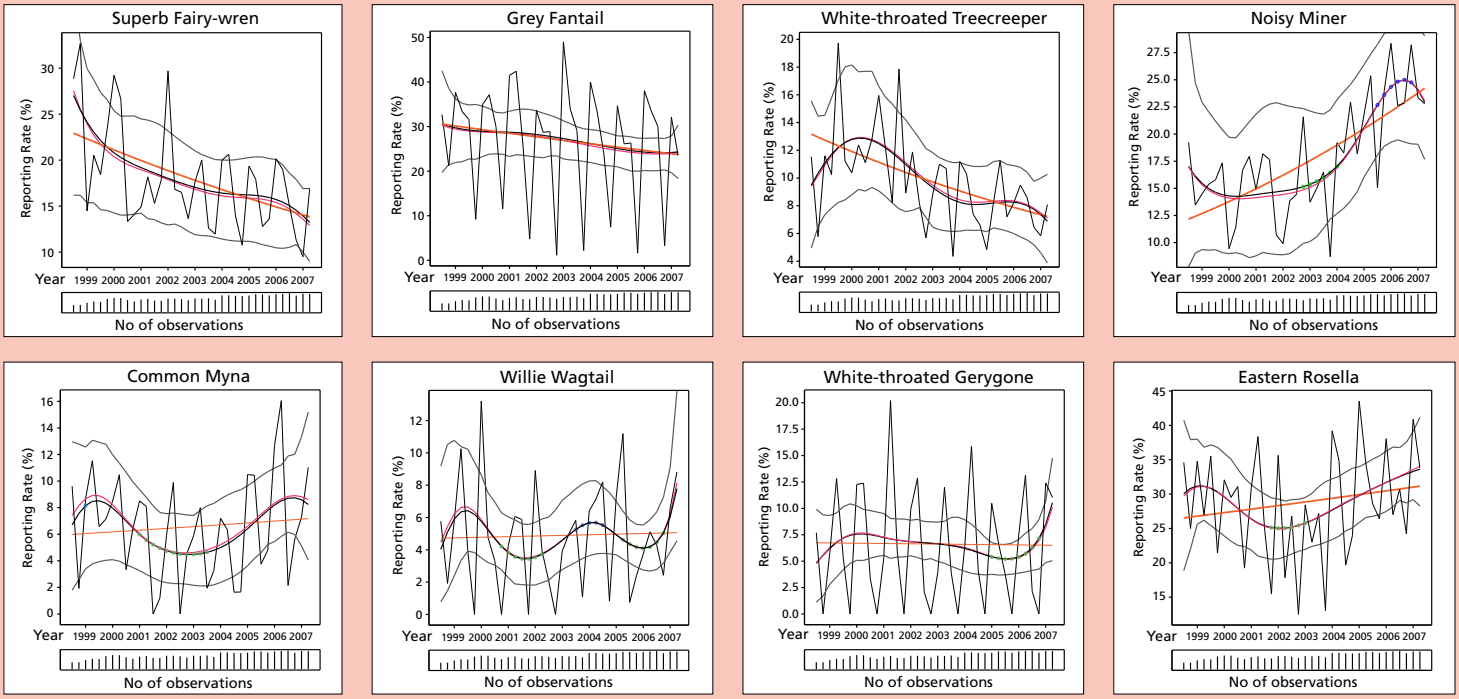


Figure 21. Examples of trends in reporting rates for eight woodland bird species at 142 woodland sites in the ACT since 1999: (a) decreasers—Superb Fairy-wren, Grey Fantail and White-throated Treecreeper; (b) increasers—Noisy Miner, Eastern Rosella; (c) no significant change in trend—Common Myna, Willie Wagtail and White-throated Gerygone.

The pink and black lines are the smoothed trends; the straight orange line is the linear trend and is shown in bold when the trend is significantly declining or increasing; the jagged black line is the raw data; the dashed lines are the 90% confidence intervals; significant change points are shown as blue dots (decelerations in the rate of change) and green dots (accelerations).



Birds of ACT woodlands

The Canberra Ornithologists Group's Woodland Bird Monitoring Project is now in its tenth year, with 142 monitoring points at 15 grassy woodland patches in the Australian Capital Territory. Results from data collected up to December 2004 were reported in the SOAB 2005.

A further analysis of data on 50 woodland birds for the nine years from January 1999 has been undertaken. This longer timeframe has clarified some trends and includes some wetter seasons, following the extremely dry years 2001–2004, apparently resulting in improvements in trends for some species, which had previously shown declining or uncertain trends (e.g. Eastern Rosella, Red-rumped Parrot and Willie Wagtail).

The latest analysis indicates that:

- **Eight species (16%) showed evidence of a decreasing trend in reporting rate. These were mostly small, resident, ground feeding insectivores: Grey Fantail (Fig. 21), Scarlet Robin, Grey Shrike-thrush, Buff-rumped Thornbill, Superb Fairy-wren (Fig. 21), White-throated Treecreeper (Fig. 21) and Silvereye. The Hooded Robin (listed as threatened in the ACT) showed a 24% decrease in occupancy rate between 1998 and 2005 and since then there have been insufficient records for analysis, pointing to a further decline.**
- **14 species (28%) showed evidence of increase in reporting rate. These were mostly large and/or bold species, some possibly finding refuge in Canberra during the extended dry in the region—Common Bronzewing, Crested Pigeon, Sulphur-crested Cockatoo, Galah, Australian King-Parrot, Eastern Rosella (Fig. 21), Magpie-lark, Weebill, Brown-headed Honeyeater, Noisy Miner (Fig. 21), White-winged Chough, Australian Raven, Striated Pardalote and Common Starling.**
- **28 species (56%) show no significant change overall: Australian Wood Duck, Crimson Rosella, Red-rumped Parrot, Laughing Kookaburra, Tree Martin, Willie Wagtail (Fig. 21), Leaden Flycatcher, Golden and Rufous Whistlers, Black-faced Cuckoo-shrike, Western and White-throated Gerygones (Fig. 21), Brown and Yellow-rumped Thornbills, Speckled Warbler, Dusky Woodswallow, Mistletoebird, Spotted Pardalote, Yellow-faced, White-eared and White-plumed Honeyeaters, Red Wattlebird, Noisy Friarbird, Olive-backed Oriole, Pied Currawong, Grey Butcherbird, Australian Magpie and Common Myna.**
- **Several birds of concern continue to be in low numbers and there are insufficient data to detect clear trends; these include Diamond Firetail, Jacky Winter, Crested Shrike-tit and Varied Sittella.**

The next analysis of data is expected in 2009 when there will be ten years of data at a majority of sites. As the project continues even clearer long-term trends for many species should emerge, because they will be less affected by short-term influences such as annual rainfall fluctuations.

While habitat loss due to urban expansion continues to impact on woodland birds in the ACT, several land management issues are emerging concerns, for example, overgrazing by Eastern Grey Kangaroos, inappropriate prescribed burning regimes and weeds.

BY JENNY BOUNDS, NICKI TAWS AND ROSS CUNNINGHAM,
Canberra Ornithologists Group

Further reading

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Left: The Wedge-tailed Eagle is faring well in New South Wales despite the introduction of calicivirus which has lessened densities of its main prey (when available), the European Rabbit. Photo by **David Whelan**

New South Wales' woodland birds

The SOAB 2003 presented some of the results of 25 years of statewide monitoring of birds by New South Wales Bird Atlassers Inc. With another five years of data it is clear that the Brown Treecreeper continues to decline sharply (Fig. 22). On the other hand the White-naped Honeyeater and Flame Robin have stabilised at low numbers following their decline up to the late 1990s. Similarly, reporting rates for the state-listed (Vulnerable) Grey-crowned Babbler continue to hover about the same or lower levels than those in the years before 1990.

Wedge-tailed Eagle numbers fluctuate widely with drought and other impacts, but show no trend toward increase or decrease over the long term. The steady increase in reporting rate for the Pacific Baza since the 1960s, along with a slight spread southwards in the species range, seems to have ceased in recent years.

Over the three decades, there have been regional declines in some of these species, which are masked by the statewide analysis. For example, there has been a crash in coastal populations of the White-naped Honeyeater, presumably through urban sprawl and associated clearing of forest and heath. Through to the early 1980s it was not uncommon to see flocks of hundreds if not thousands in winter; now such numbers are rare. The Grey-crowned Babbler still remains in uncleared western areas, such as near Cobar, but clearing of the western slopes and Hunter region has caused the species to become much less common there. Similarly, for the Flame Robin, loss of its preferred wintering habitat of 'rough open country', through clearing and overgrazing in drought years, is probably behind the earlier decline. For the robin, Landcare plantings have been unable to compensate, as they do not provide the appropriate habitat.

By Ian McAllan, Dick Cooper, Brian Curtis and Julian Reid, ***New South Wales Bird Atlassers Inc.***

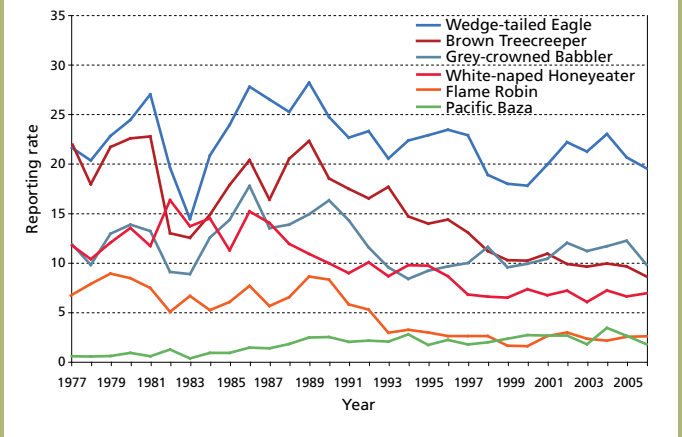

Figure 22. Long-term trends statewide in a subset of woodland birds of New South Wales. Reporting rate is the percentage of surveys during which the species was recorded (the number of surveys average nearly 3000 annually; sheets with less than six species were excluded).

Woodland birds of the western slopes of New South Wales

New South Wales Bird Atlassers have been monitoring the State's birds since 1975. Here we report on trends in bird populations in the heavily cleared box woodland biome centred on the Lachlan River near Cowra. The Brown Treecreeper (listed as Vulnerable in NSW) has undergone a severe decline in reporting rate, dropping from 45% in 1977 to 20% in 2005. Similarly, reporting rates for the Hooded Robin (Vulnerable), Chestnut-rumped Thornbill and Crested Bellbird have all fallen by well over half (see Fig. 23 a). Several other of the declining woodland bird species identified by Reid (1999) as declining from indirect lines of evidence also show a significant and continuing decline in reporting rate over the 29 year period, e.g. the Whistling Kite, Speckled Warbler (Vulnerable), Southern Whiteface, Black-chinned Honeyeater (Vulnerable), Crested Shrike-tit, Eastern Yellow Robin, Red-capped Robin, Jacky Winter, Restless Flycatcher, Varied Sittella, Dusky Woodswallow, White-browed Woodswallow and Diamond Firetail (Vulnerable).

On the other hand, reporting rates for the Sulphur-crested Cockatoo and Wedge-tailed Eagle more than doubled between 1977 and 2005, mostly in the last eight to 12 years (see Fig. 23 b). Other prominent increasers were Red Wattlebird, Noisy Miner, Pied Butcherbird (not shown) and Pied Currawong.

Species showing no clear change include the sedentary Grey-crowned Babbler (Vulnerable) and Buff-rumped Thornbill (not shown), whereas the trends for the migratory Rufous Whistler and Western Gerygone are equivocal but tend toward decrease in recent years. The Flame Robin and White-naped Honeyeater (also migrants) show some indication of cyclical changes in reporting rate (see Fig. 23 c), which may reflect the fact that

Right: The nomadic, tree-feeding Scarlet Honeyeater visited in greater numbers in the drier years at Warakeila, New South Wales, in contrast to some resident species, which decreased in numbers. Photo by **Rob Drummond**

Hunter Valley

Over a twelve-year period to 2007 birds have been monitored regularly in the Hunter Valley of New South Wales. The latter period of this study corresponded to a prolonged and widespread drought, which finally broke during June 2007. Trends in average annual bird numbers at Warakeila, a cattle property in the Allyn Valley on the eastern slopes of the Great Dividing Range, are indicative of the relative resilience of different species to the drought conditions.

Rainfall was high in 1998 and 1999 and has been below average since. The Superb Fairy-wren and Grey Fantail showed modest increases in numbers, corresponding to the period of higher rainfall, and their numbers have decreased since (Fig. 24). There has been a marked fall in Red-browed Finch numbers and the Buff-rumped Thornbill has become extremely scarce. Even more dramatic was the disappearance of the Double-barred Finch, which was not recorded at all during the second half of the study. In contrast, the coastal Scarlet Honeyeater, which occurs only intermittently at Warakeila, was more numerous during the drier conditions in the latter part of the study.

Similar trends were experienced at the other locations lower in the Hunter Valley, involving declines in the small ground feeding species—the finches and Buff-rumped Thornbill—and an increase in the more nomadic, tree-feeding Scarlet Honeyeater. At an unnamed property at Butterwick on the edge of the Hunter floodplain, Superb Fairy-wren and Grey Fantail numbers have reduced only slightly (Fig. 24) and these species appear relatively resilient to drought conditions. Monitoring will continue to determine whether species like the finches and Buff-rumped Thornbill can recover as conditions improve and whether numbers rebuild more quickly at the better-connected remnant woodlands of the Butterwick property.

By Mike Newman and Ann Lindsey, ***Hunter Valley, New South Wales***

Right: The Brown Treecreeper, an insect-eater which often feeds on the ground, has been disappearing from woodland fragments for some years while its more tree-dependent cousin the White-throated Treecreeper is beginning to decrease in some regions. Photo by **Rohan Clarke**

the box woodlands biome is not part of their core breeding distributions (being sub-alpine woodlands and wet forests, respectively) but is important non-breeding habitat for them at intervals of decades.

The marked variability in reporting rates across the period 1982–1984 is probably attributable to both extreme drought conditions (1982–1983) and a lower participation rate by volunteer Atlassers after the First Atlas of Australian Birds finished at the end of 1981.

BY JULIAN REID, DICK COOPER, BRIAN CURTIS AND IAN MCALLAN,
New South Wales Bird Atlassers Inc.

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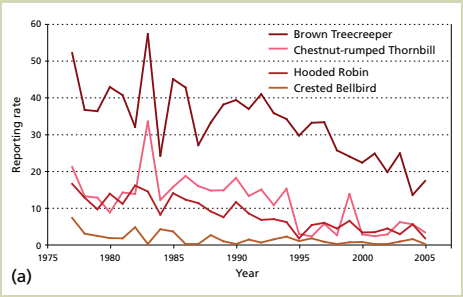
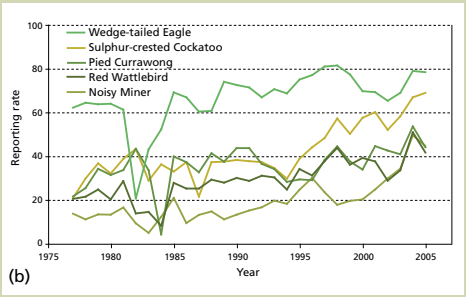
Figure 23. Long-term trends in populations of representative woodland birds of the Lachlan biome: those showing a) decrease; (b) increase; (c) no clear change. Reporting rate is the percentage of surveys during which the species was recorded.





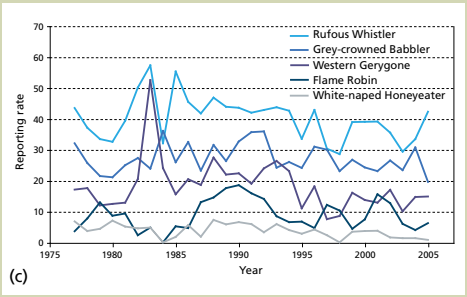
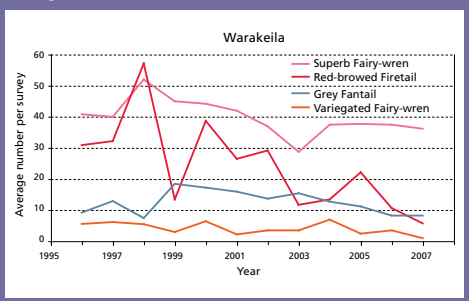
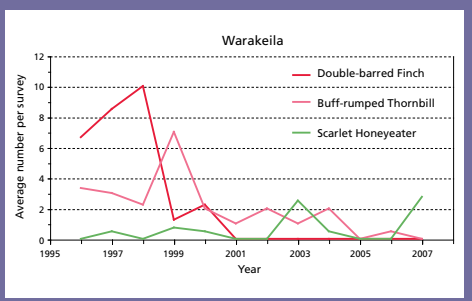
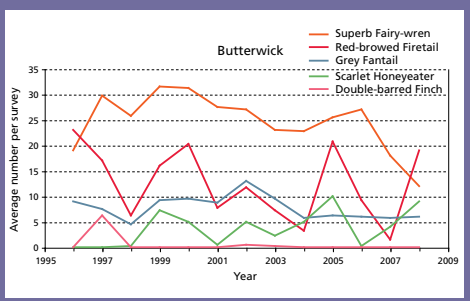


Figure 24. Counts of woodland birds at two farms, Warakeila and an unnamed property at Butterwick, in the Hunter Valley of New South Wales. (The Birds Australia 'Birds on Farms' method was used which involved counting birds during a survey lasting three to four hours, quarterly. Each survey involved a combination of four 2ha 20min counts and recording birds along a fixed route linking the 2ha sites.)







A pair of Splendid Fairy-wrens; the species appears to be more resilient than some other small passerines to the impacts of fire and drought. Photo by **Rob Drummond**

The Splendid Fairy-wrens of Gooseberry Hill

The density of Splendid Fairy-wrens has been measured continuously on a section of the Darling Scarp east of Perth, Western Australia, since Ian Rowley commenced the study in 1973. The area monitored varied over time, but the same 60 ha was censused every year except 1973, 1974, 2004, 2005 and 2006 when only a portion of the woodland-heath (at least 30 ha) was searched. During each breeding season, the number of adults in the colour-banded population was determined, usually at the first nesting attempt of each group.

In the 36-year period 1972–2007, twelve wildfires affected the area and four burnt at least 95% of it (1972, 1985, 1994 and 2007) (Fig. 25). The wren density fell immediately following the major fires in 1994 and 2007, but not after the equally intense 1985 fire. No single factor, such as fire history or rainfall, can fully explain all of the observed fluctuations in density.

Density estimates for the Splendid Fairy-wrens and three other species of small passerine on the study area peaked in the mid-1980s and declined in the early 1990s, but only the fairy-wrens subsequently recovered. In the last five years, Western Thornbills have been uncommon, whereas in 1984 they were at a density of 80+ adults per 100 ha. Similarly, both Yellow-rumped Thornbills and Scarlet Robins have been rare or even absent, whereas in 1987 there were 16 groups per 100 ha and 12 pairs per 100 ha, respectively.

BY MICHAEL BROOKER, *Gooseberry Hill,*
AND IAN ROWLEY, *Guildford, Western Australia*

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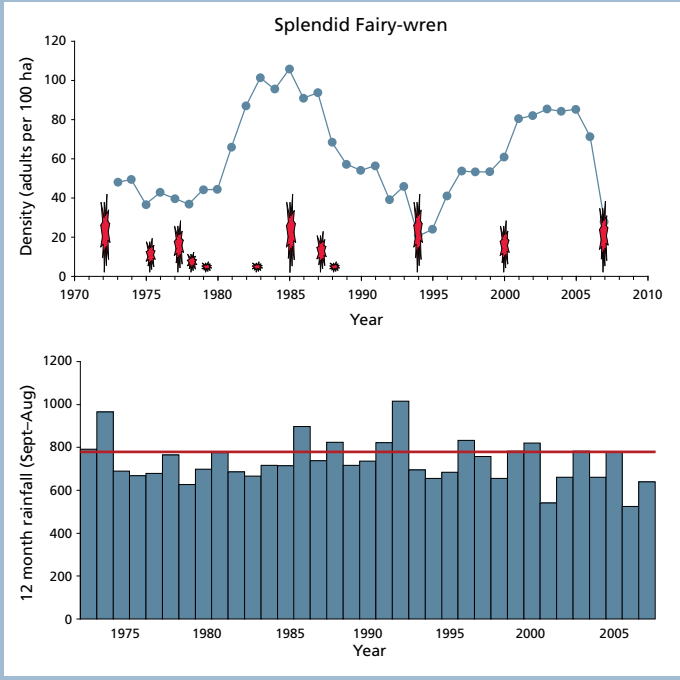

Figure 25. The density of adult Splendid Fairy-wrens per 100 ha at Gooseberry Hill, Western Australia, over 35 years, in relation to the occurrence of fires (red flares; upper graph). Annual rainfall at Perth Airport (bars, lower graph) with mean rainfall 1948-2007 (horizontal line, lower graph).

WATERBIRDS

Waterbirds (shorebirds and waterfowl) and their wetland habitats are under threat worldwide. In Australia, major changes have occurred in the composition of waterbird communities on inland and coastal wetlands over time. Although there is a wide range of variation, several waterbirds, especially small migratory waders, and some larger resident waterbirds, are showing severe declines in numbers (also see Kingsford p. 14).

Australia has 65 wetlands of international significance (Ramsar listed) and hosts migratory waders that breed as far away as Siberia, and has an international obligation to protect both. Some wetlands have ever been ephemeral, but the recent prolonged dry conditions in southern Australia have left many waterless for several years. The main threats to inland wetland habitats are water diversion and damming (including farm dams), but trampling and grazing by livestock, hydrological changes to catchments and increased nutrient load also have an impact. On the coast, increasing development and associated human disturbance (including pets and recreational activities) are the greatest threats to wetlands and their birds.

Many riparian areas are in need of active management. The provision of environmental water will assist the water-starved freshwater wetlands of the south, but will require greater resolve by governments to decrease the number of water extraction licenses and barriers to flow.

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Olsen, P & Weston, M (2004). *The State of Australia's Birds 2004: Water, Wetlands and Birds. Wingspan* 14 (4) supplement.

Two of several species that are disappearing from the drying, increasingly salty Coorong of South Australia, at the mouth of the once mighty Murray River: Fairy Tern [below] (which is listed as Vulnerable internationally) and Red-capped Plover [top right] (both juveniles). Photos by **Rohan Clarke** and **Rob Drummond**

Waterbirds of the Coorong

Vast flocks of waterfowl once blackened the skies over the Coorong, the world-renowned South Australian wetland, where the last of the Murray River trickles into the sea. In the past, coastal wetlands like the Coorong were important refuges in periods of severe drought. But freshwater flows to the Murray Mouth and Coorong have been negligible for the last six years, so much so that the mouth has been kept open since 2002 by constant dredging. Now only marine water enters the Coorong to offset evaporative losses over summer. Salinities have jumped dramatically to become five times saltier than seawater in the southern half of the Coorong and exceeding the tolerances of fish and key invertebrates. With lower water levels, the aquatic vegetation that was once food for a variety of waterbirds has also vanished from the southern Coorong.

In 1985, the Coorong's unique environment earned it a listing as a wetland of international importance under the Ramsar Convention, in part because of the rich variety of birds it supported. The latest data indicate a two-thirds reduction in migratory bird numbers visiting the Coorong since the 1980s (and the extinction of several species of fish) (Fig. 26). Among the worst affected is the migratory Curlew Sandpiper, which has plummeted from 40,000 birds in the 1980s, to 8,000 in 2000 and just 1,500 in 2006 and 2007. The South Lagoon was once home to about one-quarter of the world's Fairy Terns, but with no fish near their breeding islands they cannot breed successfully and are facing regional extinction (Fig 26). Despite these dramatic declines, the Coorong still easily meets criteria to be a Ramsar-listed wetland.

BY DAVID PATON, *University of Adelaide, South Australia*

Further reading

Paton, DC, Rogers, DJ, Hill, BM, Bailey, CP & Ziembicki, M (in press) Temporal changes to spatially-stratified waterbird communities of the Coorong, South Australia: implications for the management of heterogeneous wetlands. *Animal Conservation.*

Figure 26. Numbers of small migratory waders, the Red-necked Stint, Sharp-tailed Sandpiper, Curlew Sandpiper (at top) and Red-capped Plover and the Fairy Tern, a regular Coorong breeder, counted across the Coorong, South Australia, each January 2000–2008, relative to their numbers in the 1980s.

Waterbirds of Western Port

The Western Port, Victoria, survey was initiated in 1973 as part of the Western Port Bay Environmental Study, and has been maintained by BOCA (Bird Observation and Conservation Australia).

Western Port is a Ramsar-listed wetland and one of the three most important sites for shorebirds in Victoria. Most of the bay is shallow, fringed by mangroves and saltmarsh especially in the north, and with extensive mudflats at low tide. There have been some port developments near Hastings and more are planned. The bay supports a small commercial fishing industry, and it is very popular for recreational fishing. Hence it is subject to some of the pressures that affect intertidal habitats throughout much of the world.

The survey began with the aim of locating major high-tide roosts and counting birds while they were concentrated there. Some additional areas were visited at intermediate tides to locate flocks of species such as the Black Swan that were sometimes concealed among mangroves at high tide.

Long-term monitoring is revealing change at several levels.

1. *Seasonal changes*. All species showed marked seasonal changes on an annual basis. This was expected for the migratory waders, but more of a surprise for locally breeding species such as the Black Swan that can be seen (in varying numbers) at any time of year. The seasonal monitoring also illustrates that detecting long-term change is not straightforward. For example, the numbers of overwintering Red-necked Stints showed no overall change, but the December and February counts, which are swelled by migrants returning from northern hemisphere breeding sites, indicate that numbers have increased in recent years (see Fig. 27). For many other species, such as the Australian Pelican, the overall trend was similar regardless of season (see Fig. 27).
2. *Inland breeders*. Birds such as the Grey Teal were virtually absent in wet years (notably 1973–1974) when there was plenty of habitat elsewhere in Australia and most of the population would have been breeding in ephemeral wetlands. Western Port is not an important breeding area for this and other inland breeders such as Great Egret. These birds were most numerous in dry periods that follow wet periods.
3. *Cyclic changes.* Several species showed fluctuations with amplitudes of decades, e.g. the Pacific Gull (Fig. 28), Black Swan and Caspian Tern. These may be related to local events such as fluctuations in seagrass abundance (see below) or to global events elsewhere in the flyway of international migratory species. Even 35 years of data may not be enough to evaluate such patterns.
4. *Early decreases* (Fig. 28). Several species declined dramatically in the late 1970s and early 1980s. These included one Palaearctic migratory wader, the Grey-tailed Tattler, which has continued to decline at Western Port and is critically endangered in Victoria. The species has also decreased elsewhere in the flyway. Several other species declined at the same time, including the Black Swan and some fish-eating birds such as the Little Pied Cormorant and Australian Pelican. Some recovered subsequently (e.g. the Black Swan) in parallel with local recovery of seagrass beds, while others remain in diminished numbers (e.g. the Little Pied Cormorant, Grey Teal and Australian Pelican).
5. *Recent decreases* (Fig. 28). The most spectacular recent decrease involved a Palaearctic migratory wader, the Curlew Sandpiper, whose numbers fell in the late 1990s and early 2000s, reflecting a major decrease throughout the flyway. The Eastern Curlew has also declined in recent years, after maintaining numbers previously when some other populations were declining. A surprising decline over the years is evident for the Silver Gull, and this may be due mainly to closure of local rubbish tips near the coast.
6. *General increases*. A few species, including the Bar-tailed Godwit (Fig. 28) and Pied Oystercatcher, showed evidence of a slight overall trend for increasing numbers.

Long-term studies such as this have obvious value, but they are just one step in understanding and managing the changes that may be observed. We have looked at some of changes in waterbirds at Western Port in relation to climatic variation, but there is much we don't know. For example, why have seagrass beds—usually associated with increased nutrient loads (principally nitrogen), and considered to be good indicators of the health of coastal lakes—recovered in some parts of the bay and not others? Why did they and their dependent waterbirds decline in the first place?

Recently, alarm bells have been sounded about declining numbers of shorebirds detected from aerial surveys of wetlands in eastern Australia. At coastal wetlands, declines have been less dramatic and usually associated with particular species (such as, at Western Port, Grey-tailed Tattler and Curlew Sandpiper). Coastal wetlands are not well sampled by the aerial surveys, but

inland wetlands are poorly sampled by regular wader counts. It is important to look at multiple sources of data to provide different windows on the reality of changing waterbird numbers in our vast continent.

BY RICHARD H. LOYN AND XENIA DENNETT, *Arthur Rylah Institute, Victoria, with thanks to observers who have taken part over the years, especially the BOCA coordinators, to Laurie Living (BOCA) for maintaining the database and to Kasey Stamation (ARI) for preparing the data used in this short report.*

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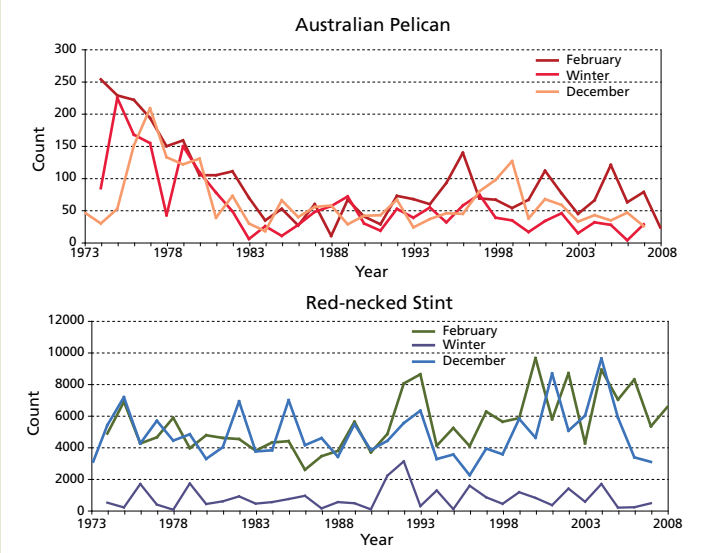


Figure 27. Total counts of the migratory Red-necked Stint and resident Australian Pelican at Western Port, Victoria, illustrating differences between seasons, which are minimal in the pelican but large in the stint.

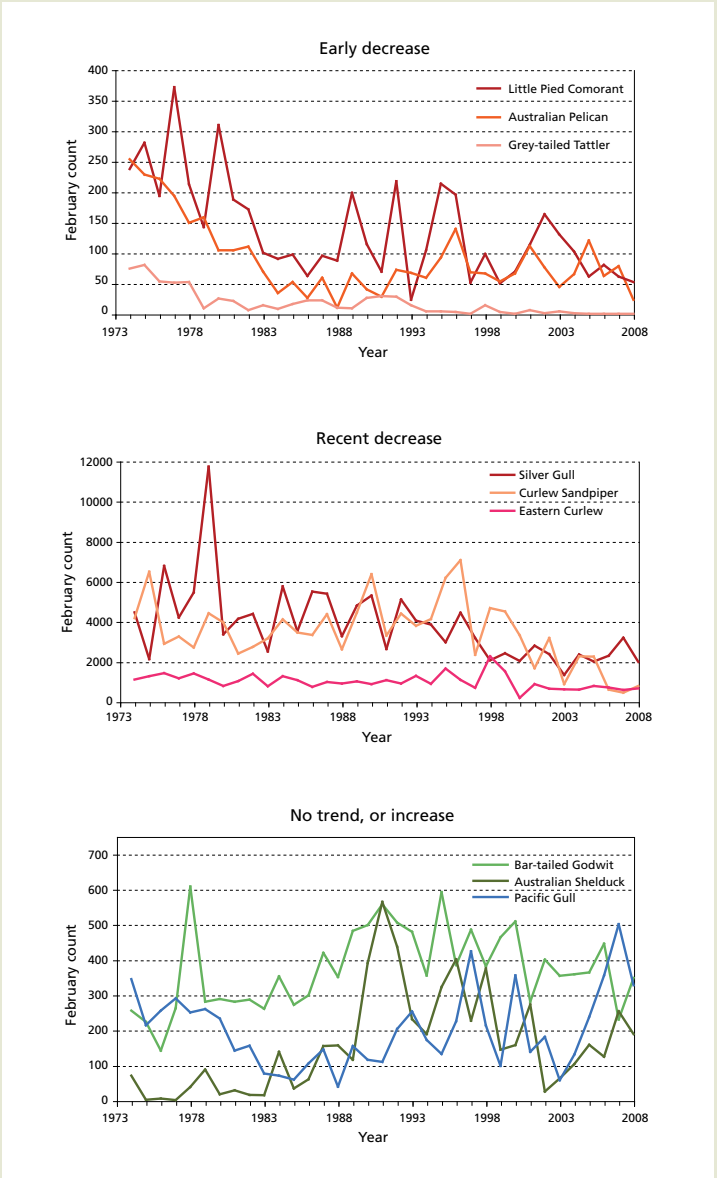


Figure 28. Counts of waterbirds at Western Port, Victoria, illustrating some of the patterns of change: species showing a decrease in numbers in the early 1980s; species showing a decrease in numbers since the late 1990s; and species showing no trend or indications of increase.

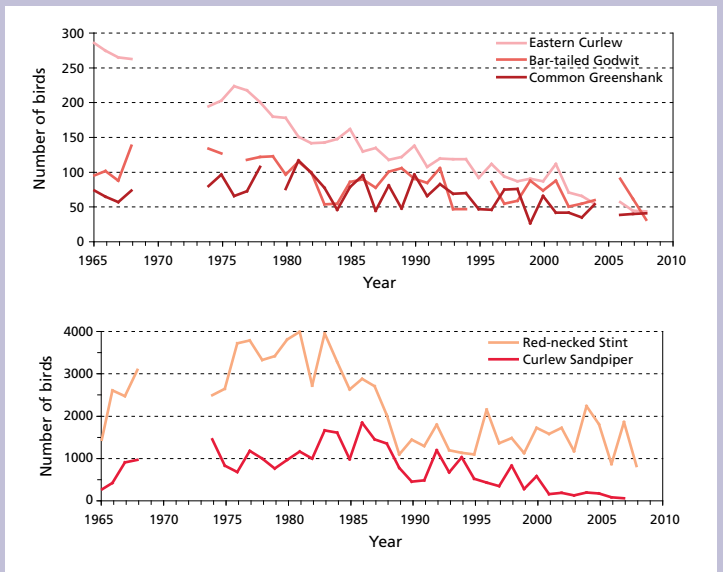
Migratory shorebirds of the Hobart area

In south-east Tasmania, the numbers of Eastern Curlew, a large migratory shorebird, continue their relentless long-term decline from the 1960s, to less than one quarter of former numbers in 2003 (as reported in SOAB 2003) and only 15% in 2008 (Fig. 29). Winter counts—which reflect the number of young birds entering the population—also show a consistent decrease. Over the same period, the Bar-tailed Godwit and Common Greenshank show more gentle decreases, but nonetheless are now at about half their former numbers.

Of the more numerous species that return to Hobart every year, the Red-necked Stint and Curlew Sandpiper have also decreased in numbers from a peak in the 1980s. Their numbers appear to be cyclic and were also low in the 1960s, when surveys began. However, numbers of both species have been at all time lows in recent years.

BY MIKE NEWMAN *for the Shorebird Study Group and Birds Tasmania*

Figure 29. Trends in numbers of five species of migratory shorebirds in summer counts in the Hobart area, Tasmania.



Left: The Eastern Curlew, an intercontinental migrant that is declining in numbers at many monitoring sites. Photo by **Nevil Lazarus**

Lake Bathurst waterbirds

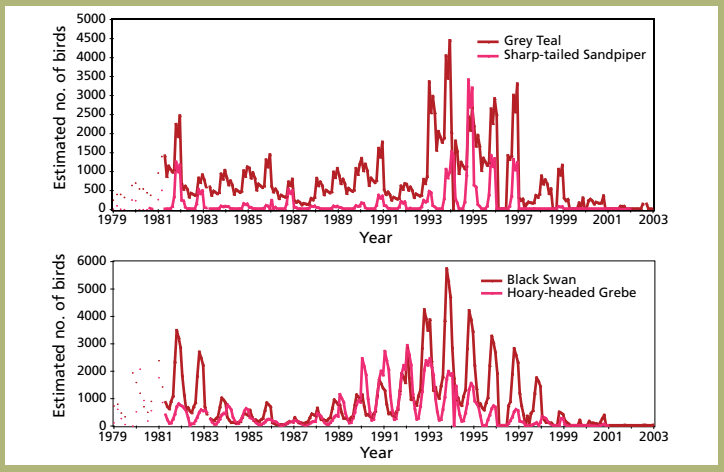
The Canberra Ornithologists Group's waterbird surveys commenced at the wetland system of Lake Bathurst and the Morass, New South Wales, in December 1979. Initially the lake was visited every two months, and from April 1982 onwards, every month. There are a few gaps and also some incomplete counts when not all parts of the wetland could be visited.

Bird numbers generally reflect changes in water levels. High water levels were recorded from June 1989 to the end of 1996, with correspondingly high waterbird numbers. The lake was dry for three months in 1988, six months in 1997 and three months in 1999, and from April 2000 onwards only small areas of Lake Bathurst and/or the Morass have been under water for intermittent periods. From 2003 onwards counts have not been graphed because of the scarcity of birds. However, the lake is still regularly visited whether dry or not.

Only a few species, such as the Silver Gull, Black Swan, and on rare occasions Hoary-headed Grebe, breed in significant numbers on the lake. There is a strong seasonal pattern to the numbers recorded: the highest numbers of waterbirds are usually found outside the main breeding season (or when inland wetlands dry up).

Despite the fact that waterbird numbers track water levels of the lake, there are differences between species in when conditions for them are best (Fig. 30). For example, the Hoary-headed Grebe is most numerous when water levels have been high for a number of years and underwater vegetation is well developed. The Black Swan, on the other hand, uses the wetlands even at quite low water levels and will graze on fresh growth on adjoining land. However, for breeding it also requires a rich growth of underwater vegetation from which to construct a nest (unless nesting on islands and using grass). Nonetheless, breeding by the swan was more common when water levels started to fall from their peak. The Grey Teal is the most common duck at Lake Bathurst and is present even at low water levels, but its numbers fluctuate widely. For this highly mobile species, events well outside Lake Bathurst may be key factors determining its presence and numbers at the lake. Maximum numbers of the Sharp-tailed Sandpiper (and other migratory waders) were recorded in October to December 1995 when falling water levels exposed large mats of decaying underwater plants and waders were present all around the lake. In other years, favourable feeding habitat is more patchily distributed and the waders are more restricted across the lake system.

Figure 30. Numbers of four waterbird species estimated from counts at Lake Bathurst and the Morass, New South Wales. Over the past decade numbers have been at all time lows and since 2003 numbers have been so few that they are not graphed.
A generalised linear model with Year and Month as factors was fitted to the data assuming a Poisson distribution for the observed counts. When only part of the waterbody was surveyed, the weight of those observations was set to 0.5 and for all other observations the weight was set to 1. The fitted values were used to generate the plots of abundance over time. Source of model: A.O. Nicholls, Canberra Ornithologists Group.



BY MICHAEL LENZ, *Canberra Ornithologists Group, Canberra*

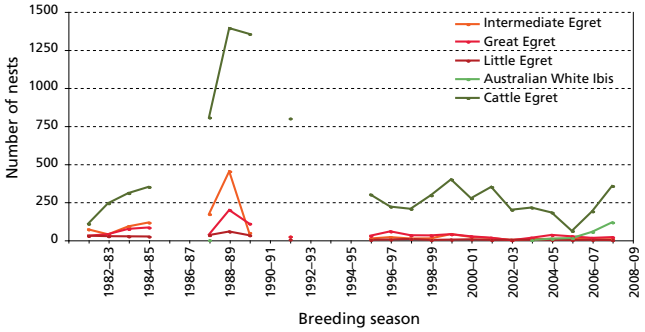
Waterbirds of the Hunter Estuary

The Hunter Estuary is the most important estuary along the New South Wales coast in terms of both the abundance and diversity of its birds. However, since the 1970s, there has been a significant decline in the abundance of birds accompanied by a slight decline in species diversity. In that period there has been continuous loss of habitat to more intensified land use (housing estates, resorts, major heavy industries and industrial parks). Relatively healthy wetlands, in rural settings, are becoming degraded ponds surrounded by housing or industry. For migratory species, habitat has also been lost or degraded along migration routes.

The Hunter region's mosaic of moist grazing land and wetland habitat suits the colonially breeding egrets and White Ibis. The Cattle Egret first appeared in the region as a winter migrant during the 1970s and first stayed to nest late in that decade. A nesting colony of Great and Intermediate Egrets at Kooragang Island, established in the 1960s, was destroyed in 1972. After a long, severe drought ended, Great, Intermediate, Little and Cattle Egrets established a new colony in 1981–1982, at what is now the Hunter Wetlands Centre Australia (HWCA).

Annual surveys showed a quick growth in the colony (Fig. 31). However, since the mid 1990s, numbers of nests of all four egret species have fallen and remained low at HWCA and elsewhere in the Hunter. In contrast, the Australian White Ibis, a species which is colonising cities but faring poorly in its usual inland habitats (e.g. *Wingspan* vol. 18, no. 1, pp. 34–37), has established a growing breeding colony at Hunter Wetlands.

Figure 31. Annual counts of the nests of four species of egret (which established a colony in 1981–1982), and the recently established Australian White Ibis, at The Wetlands Centre (Hunter Wetlands Centre Australia), New South Wales.



Latham's Snipe migrate between wetlands in Japan and the Lower Hunter. During summer in the Hunter, numbers fluctuate locally, indicating movement between sites. Both Pambalong Nature Reserve and Irrawang Swamp have been significant sites for the species since the 1980s, with Pambalong reaching its peak (an internationally important one percent of the estimated total world population) in December 1997. However, annual December surveys since show a significant decline, and as do parallel surveys at Irrawang since 2004–2005 (Fig. 32).

BY MAX MADDOCK, *Ashtonfield, New South Wales*

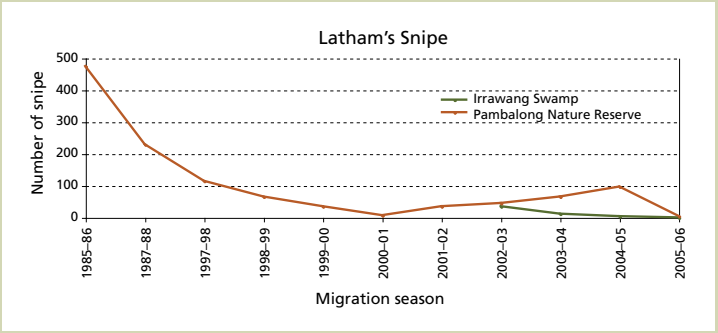


Figure 32. December surveys of the migratory Latham's Snipe at Pambalong (by Hunter Bird Observer's Club) and Irrawang Swamp, Hunter Valley, New South Wales.

Below: The Latham's Snipe *(left)* and Great Egret *(right)* have decreased in the Hunter region of New South Wales, and elsewhere. Photos by **Dean Ingwersen**

Numbers of individuals in the Little Penguin parade at Phillip Island were steadily falling when the nightly counts began in late 1978, but improved protection from foxes, dogs and cars allowed them to recover until a pilchard die-off in 1995 sent numbers down again. They have since recovered somewhat. Photo courtesy of **Phillip Island Nature Parks**

SEABIRDS

In addition to their threats at sea, seabirds (and shorebirds) that feed or nest onshore face some of the same threats as landbirds, including disturbance and predation by feral animals, and disturbance by humans, their vehicles and their pets. At seabird colonies, control of introduced animals (including free-ranging pets), and restricted human access, can ameliorate these particular threats.

A major threat to several species is incidental capture during longline fishing operations. The Australian Government's 1997 *Threat Abatement Plan for the Incidental Catch (or By-catch) of Seabirds During Oceanic Longline Fishing Operations* has been broadly successful in reducing seabird by-catch in Australian fisheries, particularly in regard to albatrosses. However, some fisheries still present a serious by-catch problem, particularly with the Flesh-footed Shearwater (which has recently been nominated for listing as threatened).

Little Penguins of Phillip Island

Every night between November 1978 and June 2008, with a handful of exceptions due to heavy fogs or power failures, 50-minute counts of Little Penguins were made at Summerland Beach on Phillip Island in northern Bass Strait, Victoria, for a total of almost 11,000 counts. Three periods, each of ten-year duration, were obvious (Fig. 33): the first (to 1987) of decreasing numbers particularly related to predation by foxes and dogs and road deaths; the second of increasing numbers following extensive control of fox and dog numbers and traffic exclusion at night in the penguin colony; and the third following the widespread pilchard mortality in autumn 1995. In the third decade, pilchards have not returned to the prominence they had in the penguins' diet in the first and second decades, but penguin numbers have recovered somewhat.

BY PETER DANN, ***Phillip Island Nature Parks, Victoria***

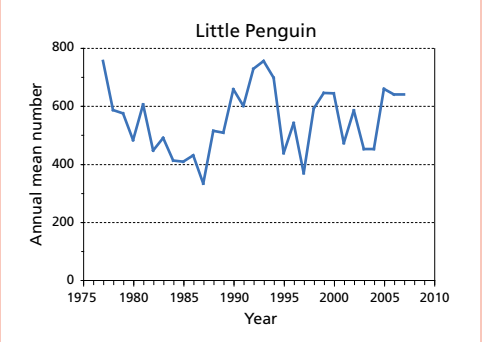


Figure 33. Mean number of Little Penguins crossing Summerland Beach, Phillip Island, each night between 1977 and 2008.

Gulls of south-east Tasmania

Winter counts of the three species of gull that are resident in south-east-Tasmania have been undertaken since the 1980s. The annual counts are made during June, when the gulls have moved from their breeding islands to the coast, sports and agricultural fields, and urban tips.

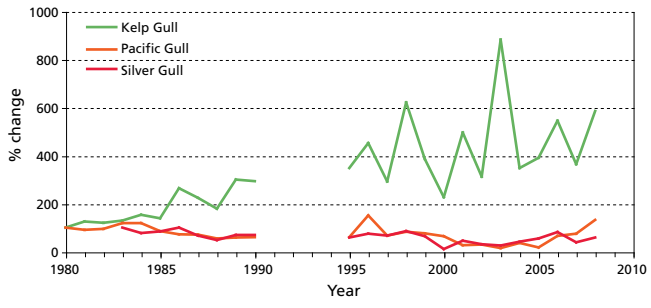
Kelp Gulls are a relatively recent arrival to Tasmania, with the first record in the late 1950s and the first breeding record in the early 1960s. Their numbers in south-east Tasmania have increased steadily since the first count in 1980. The current winter population is between 6000 and 8000 birds, which is approximately six times that recorded in 1980 (Fig. 34).

In contrast, over the long-term the trend is for a decrease in numbers of Silver and Pacific Gulls. Both gulls exhibit more-or-less synchronous cycles in abundance; with few exceptions their populations increase and decrease at short times scales (approximately seven year cycles), while at longer time scales (decadal) their numbers appear to have decreased to less than half of those 25 years ago.

Thanks are due to all counters and the previous organisers for contributing to this long-term data set.

BY ERIC WOEHLER, ***Birds Tasmania***

Figure 34. The change in numbers of Silver, Kelp and Pacific Gulls recorded during winter counts in south-east Tasmania, expressed as percentages of initial counts (1980 for Kelp and Pacific Gulls, 1983 for the Silver Gull).

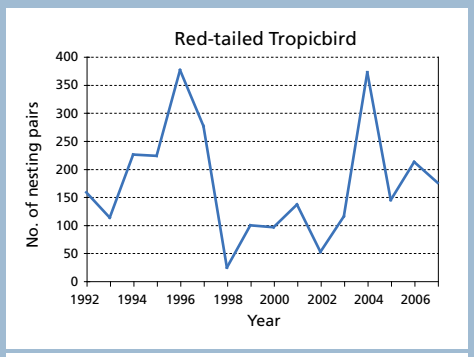


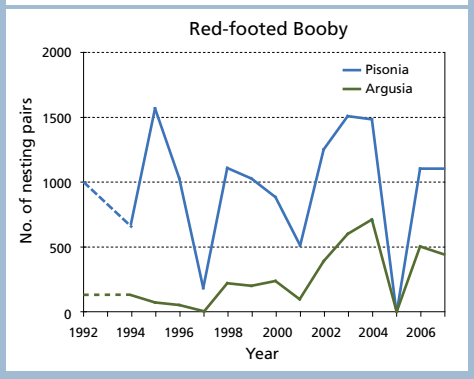
Kelp Gulls colonised Tasmania in the 1950–1960s, and since 1980 their numbers in the south-east have increased about six-fold. Over the same period the numbers of the endemic Pacific (immature in foreground) and Silver Gulls (background) have halved. Pacific and Silver Photo by **Nevil Lazarus**

Seabirds of the Coral Sea

The cays and islets of Australia's Coral Sea Island Territory contain extensive seabird rookeries. Some of these seabirds, such as the Red-footed Booby, Lesser Frigatebird, Great Frigatebird and Red-tailed Tropicbird, have an extensive distribution outside of Australian waters, but are uncommon in Australia. On North East Herald Cay in the Coringa-Herald National Nature Reserve, populations of the Red-footed Booby and Red-tailed Tropicbird have shown no overall long-term trend toward change since 1992 (Fig. 35). However, since 1997 the frigatebird population (Lesser and Great combined) declined to around one-third of its earlier numbers. The populations of all of these species fell dramatically at the time of the 1997 to 1998 El Nino event, and the booby and tropicbird recovered quickly but, for unknown reasons, there has been no recovery in frigatebirds.

BY BARRY BAKER, *Latitude 42 Environmental Consultants, Tasmania,* MIKE DOUBLE, *Australian Antarctic Division, CSIRO, and* MARK HOLDSWORTH, *Department of Primary Industries and Water, Tasmania*





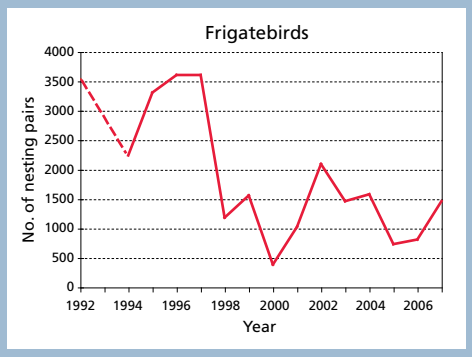


Figure 35. Annual counts of nesting pairs of Red-footed Booby, Red-tailed Tropicbird and frigatebirds (Lesser and Great Frigatebirds combined) at North East Herald Cay in the Coral Sea. Counts of the Red-footed Booby were made in two habitats, *Pisonia* forest and *Argusia* shrubland.

Great *(left)* and Lesser Frigatebirds; their breeding numbers in the Coral Sea have decreased over the past 15 years. Photo by **Graeme Chapman**

Montague Island seabirds

Montague Island, off the south coast of NSW, supports the southernmost colony of Wedge-tailed Shearwater and one of the most northerly colonies of Short-tailed Shearwater on the east coast. About 15,000 pairs of shearwaters—in mixed colonies of Wedge-tailed, Short-tailed and a few Sooty Shearwaters—commence breeding in November each year, and chicks fledge the following April.

Annual numbers vary widely (Fig. 36). Catastrophic flooding in 1971 and 1999, after exceptionally heavy summer rainfall, caused high mortality of chicks. The extraordinarily high numbers of Short-tailed Shearwaters up to 1987 have never been observed since. Although the number of Sooty Shearwater chicks produced is smaller than in some early years, it remains small and relatively stable.

Over the last five years the upward trend in the number of Wedge-tailed Shearwaters has continued. Since 1967 there have been two years only when the number of Wedge-tailed Shearwater chicks has exceeded the number of Short-tailed Shearwater chicks, in 2001 and again in 2008. It may be that warmer breeding seasons during recent years have favoured Wedge-tailed Shearwaters, which feed in warmer waters than Short-tailed Shearwaters, which must travel to the Antarctic pack-ice to gather food for their chicks.

BY PETER FULLAGAR, CHRIS DAVEY, MIKE CROWLEY AND PETRUS HEYLIGERS

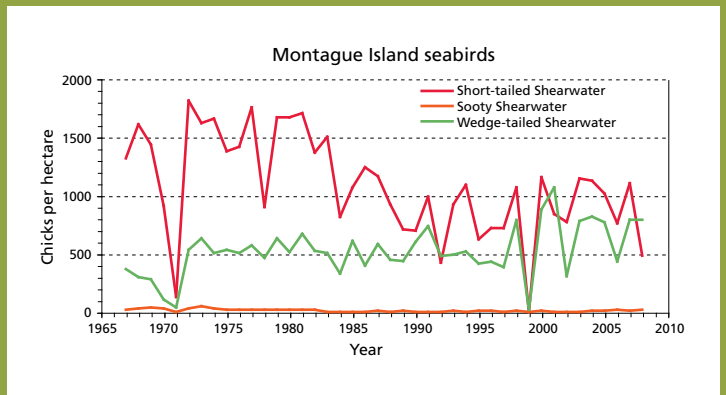


Figure 36. Annual counts of chicks of the shearwater species on fixed study plots in the last week of March on Montague Island, New South Wales over 40 years.

IV. Trends in Threatened Species

AUSTRALIA HAS AN increasing number of threatened species (see Section V) and a number of common, widespread species continue to decline and disappear from parts of the landscape. Despite this gloomy situation, recovery efforts have achieved the persistence and improvement in the status of several threatened birds. Governments and volunteers have collaborated to demonstrate, against the odds, that where there is a will, there is a way.

Below: A Malleefowl (Vulnerable) tends its mound; the numbers of active mounds, a measure of the breeding population, appear to be declining. Photo by **Lynn Pedler**

Malleefowl

The nationally Vulnerable Malleefowl occurred over much of the southern half of the mainland, but may now be extinct in the northern part of its former range in the Northern Territory, and is reduced in numbers elsewhere. Apart from clearing of habitat and associated impacts, the main threatening processes are thought to be predation by the introduced European Fox, too-large and too-frequent fires, and habitat degradation due to over-grazing by domestic sheep and probably feral goats.

In Victoria, over the past twenty years a general slow decline in breeding numbers is apparent at seven long-term monitoring sites covering an area totalling about 27 km^2 (Fig. 37), although individual sites show a range of trends. Sharp drops in the number of breeding pairs are associated with droughts (e.g. 1994 and 2002), which temporarily inhibit Malleefowl breeding.

Since 2000, the Victorian Malleefowl Recovery Group, with financial assistance from Parks Victoria, has been the main source of monitoring in Victoria. Volunteers, researchers and government employees visit several hundred mounds each year. There are now about another 100 Malleefowl monitoring sites across Australia in South Australia, Western Australia and New South Wales. Over the years monitoring protocols have been refined and recently volunteers and agencies from each State developed a national standard and agreed to centralise data. This consistent approach to monitoring Malleefowl is applicable to all but the most arid portions of the species' range, and will assist in identifying the causes of population trends and measuring the effectiveness of management actions through a proposed adaptive management program. A recent analysis of the trends in Malleefowl populations across Australia confirmed that declines have occurred in many areas, most markedly in South Australia, and that this was most strongly related to fire history and declining winter rainfall, but not to the degree of fox control.

BY JOE BENSHEMESH, *Victorian Malleefowl Recovery Group*

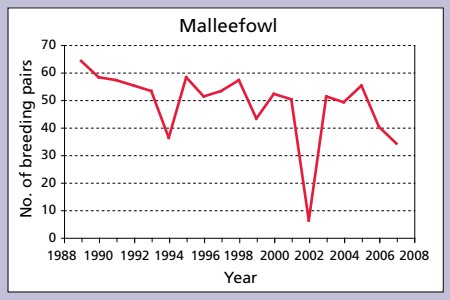


Figure 37. The numbers of breeding pairs of Malleefowl at seven sites in National Parks and reserves of north-west Victoria, where currently over 1200 mounds at 35 locations are revisited annually (October–January).

Gould's Petrel

Traditionally, the Australian subspecies of Gould's Petrel, listed nationally as Vulnerable, nested only in two gullies on Cabbage Tree Island, New South Wales. From 375 pairs in 1970, only 122 remained in 1990, mainly because grazing by introduced rabbits reduced cover, exposing the birds to predation. Removal of rabbits and control of predatory Pied Currawongs and birdlime trees (whose sticky seeds entrap birds) allowed the population to increase rapidly to around 1000 pairs in 2001 (Fig. 38). In recent years the numbers on Cabbage Tree Island appear to have more or less stabilised and some of the young birds have been successfully translocated to Boondelah Island where, with the help of artificial breeding burrows, the population has increased from just one pair in 1999 to 30 pairs in 2007.

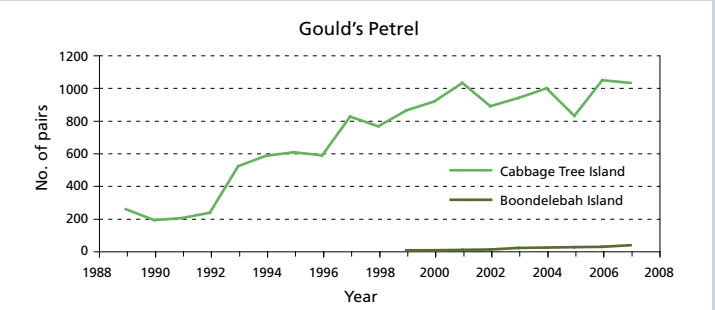
BY DAVID PRIDDEL,
Department of Environment and Climate Change, New South Wales

Further reading

Priddel, D, & Carlile, N (2007) Population size and breeding success of Gould's Petrel *Pterodroma leucoptera leucoptera* on Cabbage Tree Island, New South Wales: 1996–97 to 2005–06. *Corella* 31: 79–82.

Priddel, D, Carlile, N & Wheeler, R (2006) Establishment of a new breeding colony of Gould's Petrel (*Pterodroma leucoptera leucoptera*) through the creation of artificial nesting habitat and the translocation of nestlings. *Biological Conservation* 128: 553–563.

Figure 38. The number of pairs of Gould's Petrel on eggs along standardised transects in December, Cabbage Tree Island, New South Wales.



The nationally Vulnerable Gould's Petrel nested only on Cabbage tree Island, New South Wales, and has now been introduced to nearby Boondelah Island and is increasing in numbers. Photo by **Nicholas Carlile**

Left: Rangers and volunteers banding during the annual Lord Howe Island Woodhen survey. Photo by **Chris Haselden**

Lord Howe Woodhen

By the late 1970s only a small number of Lord Howe Woodhens survived on the plateau of Mt Gower, above the cliff line. Predation on nesting woodhens and habitat disturbance by feral pigs contributed significantly to the near disappearance of the species between the nineteenth century and 1983 when the last of the pigs were eradicated.

Between May 1981 and March 1984, following a successful captive breeding program, a total of 82 woodhens were released to the wild. In recent years, as part of the recovery plan for the species (NPWS 2002), an annual survey is undertaken in the settlement area and southern section of the Permanent Park Preserve (Fig. 39). Held when the woodhen is not breeding, the survey takes between 8–10 days and involves a team of five to six people using hand-held nets. All unbanded birds caught are banded onsite. To minimise the risk of injury to the birds, all team members are trained and experienced. As an extra safeguard, the island doctor stands by in case of the (unlikely) need for emergency veterinary assistance.

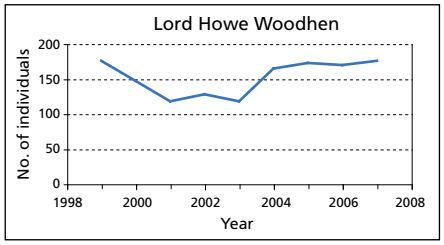


Figure 39. Number of Lord Howe Woodhens estimated each November from captures of individuals at four or five main locations: Settlement; Far Flats; Grey Face/Boat Harbour; Little Slope; Erskine Valley; and Mt Gower.

The aims of the project are to assess the long-term success of the captive breeding and wild release program, to regularly review the need for further management intervention to ensure the survival of the woodhen, and to gather as much biological information about the woodhen as possible within the constraints of the resources available for monitoring.

The woodhen appears to be restricted largely to megaphyllous broad scherophyll forest. Since 2002–2003, when it was thought that the population may have reached its carrying capacity, there has been an increase of approximately 50 individuals, mostly around the settlement. It will be interesting to observe the population trend over the next few years.

Chris Haselden and Hank Bower, *Lord Howe Island Board*

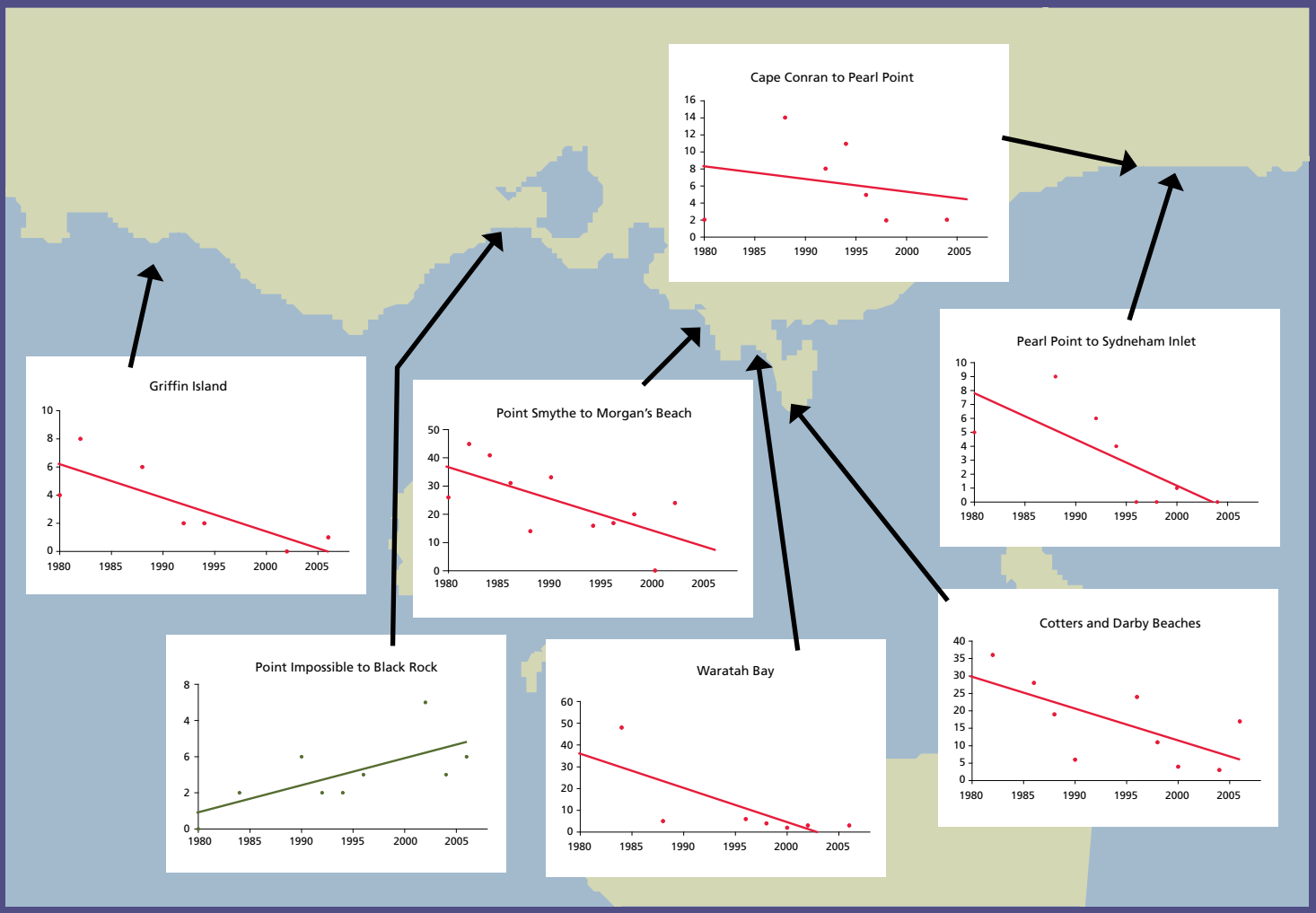
Hooded Plover (eastern)

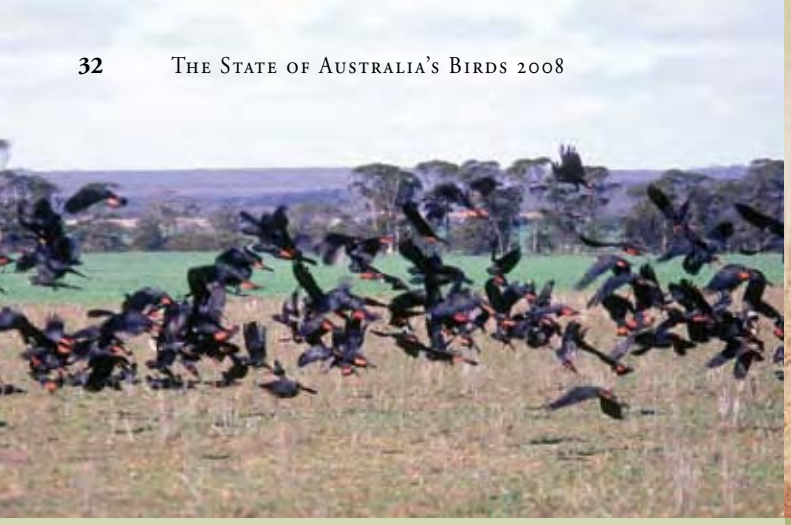
Since 1980 the Australasian Wader Studies Group (Birds Australia) has been surveying the coast of Victoria every two years for Hooded Plovers. A student project at Deakin University recently examined this valuable dataset to investigate population trends. Every count sheet was transferred to a GIS so that years could be overlaid, and we could find areas that had been counted consistently to be analysed for trends. Seven regions had significant temporal trends, six of which were downward (Fig. 40). The remaining site involved small numbers and an increase from zero; historical evidence indicates that many more birds occurred in this area around 1900, so this recent trend might represent recovery from local extinction sometime in the past. Further analysis is planned to confirm these findings.

Hooded Plovers, like many beach-nesting birds, suffer from a variety of problems associated with recreation, erosion control and coastal development. While we cannot directly infer causes of declines, our findings suggest that, in the context of 'noisy' data, which makes detection of significant trends difficult, decline in Victorian Hooded Plovers is widespread and substantial.

By Hayley Glover and Michael Weston, *School of Life and Environmental Sciences, Deakin University, Victoria, and* Grainne Maguire and Glenn Ehmke, *Birds Australia*

Figure 40. Trends in Hooded Plover numbers at seven sites in coastal south-east Victoria.





Far left: A flock of Red-tailed Black-Cockatoos; a rare sight in south-eastern Australia, where they are Endangered. Photo by **Graeme Chapman**

Left: The Endangered Kangaroo Island Glossy Black-Cockatoo is increasing in numbers thanks to nest boxes and other management interventions. Photo by **Lynn Pedler**

South-eastern Red-tailed Black-Cockatoo

The range south-eastern subspecies of the Red-tailed Black-Cockatoo has contracted to the region of the South Australian/Victorian border and the subspecies is considered to be Endangered. The annual population count depends on the efforts of up to 200 volunteers across the cockatoo's range. The 2008 count was the highest (1400 birds) recorded since the recovery program commenced in 1996 (400 birds), attributable to improved counts rather than to an actual increase in numbers. This improved count gives a better idea of the actual size of the population, which is still considered to be decreasing due to the ongoing loss of critical feeding habitat to legal and illegal vegetation removal. The proportion of adult males in autumn flocks is used as an index of breeding success; this ratio has not changed much at all over the survey period but does indicate reduced breeding success in poor stringybark fruiting years (Fig. 41).

Since 2003, significant projects with links to the Red-tailed Black-Cockatoo include Habitat Tender, a $1.3 million initiative funded by the Australian Government, which allowed eligible landholders to bid for the cost of conservation work to protect cockatoo habitat (stringybark and Buloke) on their farming enterprise. Forty-one landholders bid successfully for 193 sites covering 3076 ha, mainly of stringybark. Less than 200 ha were Buloke, which occurs on more productive soils with much greater opportunity costs. Unprotected habitat was also purchased via successful fundraising initiatives organised by the Nature Foundation South Australia and Judith Eardley Save Wildlife Foundation in Victoria.

An Australian Government funded consultancy focusing on habitat concluded that habitat protection and restoration works for the cockatoo should focus on Desert Stringybark and Buloke. In addition, paddock stringybark trees were identified as having much higher seed crops per tree (and therefore more food for cockatoos) than trees in remnant vegetation, emphasising the importance of their protection.

The Recovery Team has also been promoting the protection of the cockatoo's feeding resource through initiatives to achieve minimum canopy scorch during prescribed burning for fire protection purposes. High intensity fires impact on seed crops for up to 10 years. Seed crop assessments are now conducted prior to all proposed burns of the cockatoo's habitat on Victorian public land areas (which contain 70% of all Red-tailed Black-Cockatoo feeding habitat). In South Australia, similar methodology has been adopted by Forestry and increasingly by the Department of Environment and Heritage. However, following the large fires that Victoria has seen in the past few years, it is likely that there will be pressure to substantially increase the extent of burning in stringybark habitats above the agreed maximum of 15% recently-burnt. This could significantly reduce the stringybark food resource for the cockatoos.

BY TANIA RAJIC, RICHARD HILL AND MARTINE MARON,
Red-tailed Black-Cockatoo Recovery Team, Birds Australia

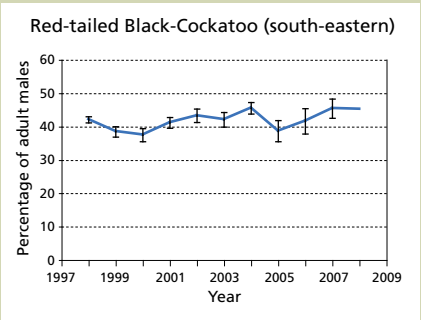


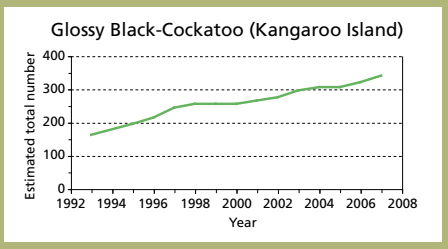
Figure 41. The percentage of adult male Red-tailed Black-Cockatoos in post-breeding autumn flocks. The (statistically) lower values in 1999 and 2005 indicate that the flocks contained a greater proportion of immatures, and suggest that these were years of greater breeding success; both followed years of high stringybark fruiting, which provides abundant food. (Standard deviations are shown as bars.)

Kangaroo Island Glossy Black-Cockatoo

On Kangaroo Island, South Australia, nest sites of the nationally Endangered Glossy Black-Cockatoo are protected from introduced Common Brushtail Possums, in particular, by tin trunk collars and branch trimming, and by removal of Little Corellas and feral bees. An annual census of post-breeding flocks for the whole of the island has been conducted since 1995. The population continues to grow steadily (Fig. 42), and has doubled since active management began. The number of recently fledged juveniles observed during census counts has also increased about twofold in this period.

BY LYNN PEDLER AND ELEANOR SOBEY,
Department for Environment and Heritage, South Australia
(www.environment.sa.gov.au/biodiversity/glossyblack.html)

Figure 42. The increasing population of the Kangaroo Island Glossy Black-Cockatoo (± 5–10), estimated from counts of flocks and banded individuals.

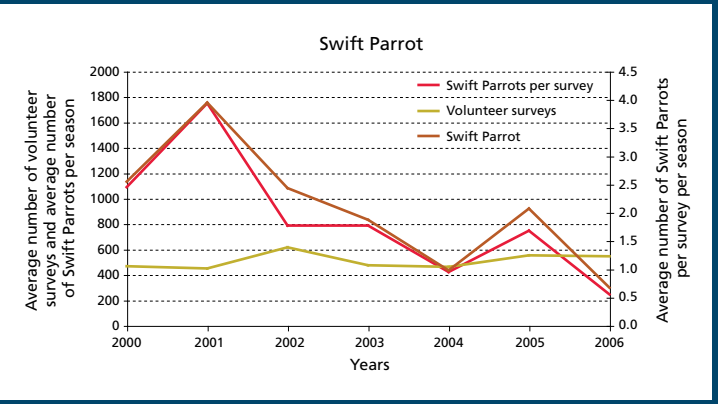


Swift Parrot

Since the SOAB 2003 report, the Swift Parrot Recovery Program has continued, with 900 to 1100 surveys conducted by volunteers within the species' winter range each year (except in 2006 when there was a period with no survey coordinator). Despite these generally high levels of survey effort, the numbers of Swift Parrots detected across their winter range has varied from moderate to low (Fig. 43). Although Swift Parrot numbers have always fluctuated from year to year, it is of concern that less than half as many birds have been detected over the last five years compared to the previous five-year period, despite similar survey effort. The counts have helped to identify the parrot's temporal and spatial use of mainland wintering habitat and highlighted the importance of coastal habitats in drought. Local action to protect and enhance habitats for this species has made a positive contribution to the species' management. Extensive, ongoing loss of old growth nesting habitat in Tasmania remains the greatest threat.

BY DEBBIE SAUNDERS AND BELINDA COOKE,
Department of Environment and Climate Change, New South Wales

Figure 43. Numbers of Swift Parrots observed during Recovery Program volunteer survey weekends (for all years with >400 surveys per season).



The Endangered Tasman Parrot of Norfolk Island forests, once down to as few as six breeding females. Photo by **Rohan Clarke**

Tasman (Green) Parrot

The Tasman Parrot (Green Parrot), restricted to Norfolk Island, is nationally Endangered. At European settlement in 1788, it probably occurred island-wide and on adjacent Phillip Island, both then forested. Clearing by convicts, and later settlers, and damage by feral animals, removed over 80% of the island's forest cover and totally denuded Phillip Island. By the 1970s the parrot was found mainly in the largest area of remnant forest that in 1986 was declared a national park (465 ha; 12% of the island). From 1986 the population fluctuated between three and 10 breeding pairs, with an acute scarcity of adult females, estimated to total only six in 1991–1992. This was thought to be due largely to predation of females at the nest, mainly by rats. Rat-proofing and weather-proofing of all known nests was instigated and improved female survival. In 1995 the total wild population was estimated at 44 individuals, which increased to c. 69 and 17 breeding pairs in 1997. No total population census has been conducted since, mainly due to the spread of range outside the National Park into private lands and the non-availability of a durable colour band system. Extended dry conditions since 2001 have seen a fall in the number of breeding attempts and fledglings (Fig. 44). Nonetheless, Green Parrots are now often seen and small flocks are recorded regularly outside the Park. Subject to agreement of the Lord Howe Island Board, consideration is being given to establishing a back-up population on Lord Howe Island, to replace the closely related parrot lost to extinction in the 1800s. Control of weeds, rats, cats and the introduced Crimson Rosella and Common Starling are among the other ongoing management interventions in place on Norfolk Island that help to protect the parrot and a number of other threatened species.

BY PENNY OLSEN, *Birds Australia, and* RON WARD, *Department of the Environment, Water, Heritage and the Arts, Norfolk Island*

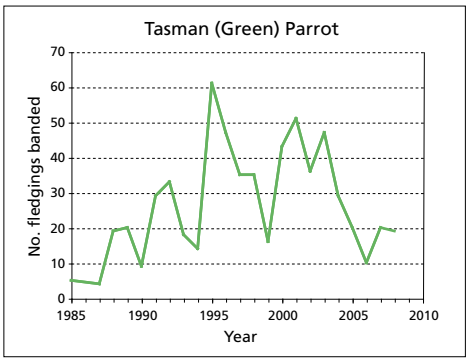


Figure 44. The number of Tasman (Green) Parrot fledglings banded each year on Norfolk Island (an attempt is made to find and band all parrots in the National Park, where most of the breeding occurs).

Superb Parrot

The nationally Vulnerable Superb Parrot has been the focus of research and conservation management actions since 1985. The Riverina (New South Wales and Victoria) and South-west Slopes of New South Wales bioregions contain the majority of the breeding population. Within the Riverina the species utilises River Red Gum and box woodlands, whereas box-gum woodlands are the species' stronghold in the south-west slopes.

Monitoring of the population has been undertaken annually in northern Victoria since 1992 and in the southern New South Wales since 1997. This work is organised by the Superb Parrot Project (Vic) and Southern Riverina Field Naturalists (NSW) through the Threatened Bird Network. Volunteer counters observe birds on one specific day around Barmah-Millewa forest on the Murray River. Although there is wide variation in the total number of birds observed from year to year there does appear to have been a slight increase in the population within the region during the survey period (Fig. 45); recruitment of birds to the adult population from the particularly successful 1999 and 2001 breeding seasons may have contributed.

There has been improved management of nesting habitat in both States including re-establishment of an understorey in several existing box woodlands and replanting of box woodland to improve habitat linkages (within Victoria 250,000 seedlings have been planted). Although no regular monitoring is done on the south-west slopes, management activities there that are likely to have had a positive impact on the parrot include: protection of known nest trees; establishment of foraging habitat; and the implementation of an awareness program to reduce deaths of birds hit by vehicles while feeding on grain spilt by the side of the road.

BY RICK WEBSTER, *Ecosurveys Pty Ltd, and* SUE LOGIE, *Superb Parrot Project Coordinator*

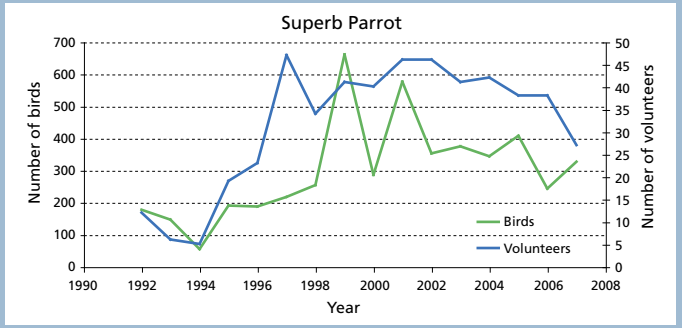


Figure 45. Number of Superb Parrots sighted during the annual one-day count in the Barmah-Millewa forest region.

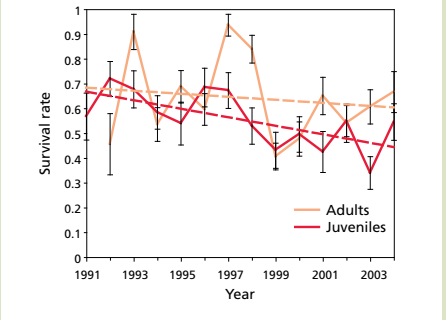
Orange-bellied Parrot

For almost 30 years, a huge effort has gone into securing the survival of the Critically Endangered Orange-bellied Parrot, coordinated by a national recovery team and involving community volunteers, Birds Australia, other conservation organisations, governments and zoos. Key actions include management and monitoring of breeding and non-breeding habitats and their parrot populations, and a captive breeding and release program based in three States.

The parrot once bred in eucalypts and fed on buttongrass plains sprinkled across southern and western Tasmania but, apart from a few scattered pairs, breeding is now confined to the Melaleuca area in south-western Tasmania. Attempts to establish a second breeding population, at Birches Inlet, are showing early signs of success. Over the last decade, at least 100 individuals each year are known to have returned to the Melaleuca breeding grounds. Nonetheless, there has been a decline in survival, especially amongst juveniles (Fig. 46). At the same time, winter counts have shown that there has been a shift from traditional feeding areas where food resources are assumed to have deteriorated (see *Wingspan* Vol. 18, no. 3, pp. 18–23). Habitat models, which will allow targeting of prime wintering areas for management, are in development.

BY BARRY BAKER, *Latitude 42 Environmental Consultants, Tasmania,* GLENN EHMKE, *Birds Australia,* MARK HOLDSWORTH, *Department of Primary Industries and Water, Tasmania,* PETER MENKHORST, *Department of Sustainability and Environment, Victoria, and* CHRIS TZAROS, *Birds Australia*

Figure 46. Estimated survival rates of Orange-bellied Parrots, with trendlines (broken lines), assessed from returns of banded individuals to the Tasmanian breeding grounds (bars are ± 1 standard error).



Noisy Scrub-bird, Western Bristlebird and Western Whipbird

Since the release of SOAB 2003, when the Noisy Scrub-bird, Western Bristlebird and Western Whipbird had been downlisted from Endangered to Vulnerable in Western Australia as the result of successful recovery programs, the situation for the three species has again deteriorated.

Following the rediscovery of a small population of the Noisy Scrub-bird on Mt Gardner in 1961, the recovery program resulted in an increase in numbers and distribution, primarily through a number of successful translocations in the Albany Management Zone (AMZ) (Fig. 47). However, since 2001, a number of separate wildfires have reduced the Noisy Scrub-bird's potential breeding habitat within this area by almost two-thirds. The entire Mt Manypeaks sub-population (reported in the 2003 SOAB as representing 56% of the total AMZ population) was decimated by wildfire in 2004–2005. As a result, the Noisy Scrub-bird was re-categorised from Vulnerable to Endangered in Western Australia to reflect a higher level of concern. The State also funded Project Phoenix to monitor the post-fire recovery of the birds, their habitat and other significant species that were affected and assist with translocations. An attempt to establish a new population in the Porongurup National Park in 2006 was discontinued when the park was also severely affected by wildfire. On the other hand, the translocated population on Bald Island has been increasing at almost 10% per year in recent years and now constitutes a very significant part of the overall population. Recent monitoring has also revealed scrub-birds attempting to breed in a couple of larger gullies on the southern slopes of Mt Manypeaks only 18 months post-fire (it was previously considered that habitat required at least 7–10 years to recover post-fire) and a gradual movement of birds back into affected areas.

The wildfires in the Two Peoples Bay–Mt Manypeaks area also affected other threatened birds. The area contains almost all the known habitat for the Western Whipbird (western heath subspecies), which has also been re-categorised as Endangered. The Western Bristlebird was affected but remains in the Vulnerable category, because in addition to the Two Peoples Bay population, there are significant numbers in the Fitzgerald River National Park.

Neither the Western Whipbird [left] (Endangered) nor the Western Bristlebird [above] (Vulnerable) have much to sing about; extensive fires have destroyed much of their south-west Australian habitat.
Photos by **Rohan Clarke** and **Chris Tzaros**

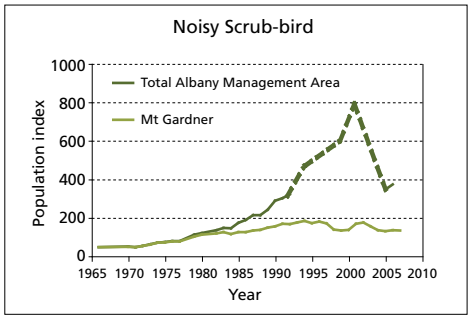


Figure 47. The estimated population size of Noisy Scrub-birds on Mt Gardner and in the wider Albany Management Area of Western Australia. The dashed line links years after 1992 when the population was monitored: 1994, 1999, 2001, 2005 and 2006.

BY CAMERON TILLER AND ALAN DANKS,
Department of Environment and Conservation – South Coast Region

Western Ground Parrot

Monitoring of the Critically Endangered subspecies of Ground Parrot in Western Australia indicates local extinctions at two sites. The only apparently stable population is at a third site, in Cape Arid National Park, but there are no long-term data for this population.

For reasons unknown, at Waychinicup, near Albany, the trend of decline reported in SOAB 2003 has continued and no birds have been heard at this site since late 2003 (Table 3).

At the monitoring site in Fitzgerald River National Park, between Jerramungup and Ravensthorpe, despite the increase in numbers observed in the late 1990s, the population has since declined drastically and no birds were heard in 2008 (Fig. 48). Observations at other sites in the park revealed dangerously low numbers. Again, reasons for the decline are unknown.

Current activities are directed at gaining a better understanding of the ecology of the Cape Arid population. This includes determining whether predation by feral animals is having an impact on the parrots and reducing it if necessary.

BY ABBY BERRYMAN AND ALLAN BURBIDGE,
Department of Environment and Conservation, Western Australia

Table 3. The number of Western Ground Parrots heard calling during surveys at Waychinup

Survey period	No. sessions	No. calling
1998 (Autumn)	58	29*
2003 (Autumn)	115	4*
2004 (Summer, Autumn, Spring)	56	0
2006 (Summer, Autumn, Spring)	55	0
2007 (Summer, Autumn)	32	0

***Minimum number heard calling.**
Source: S McNee, B Newbey, B Barrett and M Barth

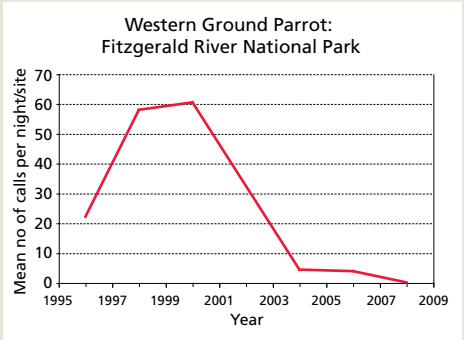


Figure 48. The average number of individual Western Ground Parrots heard calling per site visit in Fitzgerald National Park, Western Australia.

An adult Western Ground Parrot (Critically Endangered) calling in Fitzgerald River National Park Western Australia, where numbers have fallen dramatically. Photo by **Brent Barrett**, courtesy of Mike Barth.

Right: A male Mallee Emu-wren, in Ngarkat National, South Australia. There are between 40 and 100 birds left in the State and the species, which also occurs in Victoria, has recently been listed as Endangered. Photo by **Lynn Pedler**

Mallee Emu-wren: South Australia

The Mallee Emu-wren occurs in mallee regions south of the Murray River in north-west Victoria and adjacent South Australia, where it is largely restricted to small areas within or near two mallee parks: Billiatt and Ngarkat. Most South Australian records come from mallee-heaths at least 10 years after fire and up to 28 years after fire, although the emu-wren also occurs in mallee-heath unburned for over 50 years (particularly where there is a high density of *Xanthorrhoea australis*).

In 1990 at least 40% of Ngarkat was heathland less than 10 years post-fire and by early 2006 newly burned areas had increased this to over 65% (Fig. 49a). As a result, the Mallee Emu-wren has been restricted to a diminishing portion of the park (from which it can recolonise heathlands when they are sufficiently mature approximately 10 years post-fire). Over the same period the emu-wren population decreased by about 80%, especially during 1991–1992 and 1995–1996, coinciding with drought years and major fires (Fig. 49b).

Fire and drought will continue to conspire to threaten the remaining Mallee Emu-wrens in Ngarkat. There is the potential for a single wildfire to eliminate most if not all of the remaining birds. Fortunately, the South Australian Department for Environment and Heritage have recently minimised this risk by breaking the remaining populations up with strategically placed firebreaks across the interdunal flats.

The entire current South Australian population is about 100 birds (possibly as low as 40), with an extent of occurrence of 130 km^2 and an area of occupation of 23 km^2, at best, but in reality dependent on a few hundred hectares of suitable habitat. The need for management action is urgent.

BY DAVID PATON AND DANIEL ROGERS,
University of Adelaide, South Australia

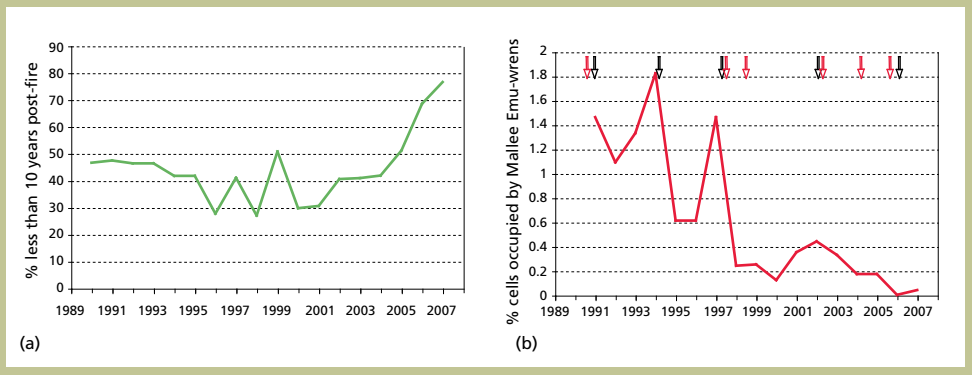


Figure 49. The relationship between rainfall, fire and the abundance of the Mallee Emu-wren in Ngarkat National Parks between 1990 and 2007: a) the percentage of surveyed cells in which the Mallee Emu-wren was recorded; b) the percentage (by area) of Ngarkat less than 10 years post-fire. Summer fires that burned more than 9,000 ha are indicated by red arrows; black arrows indicate years in which less than 300 mm of rainfall were recorded.

Eastern Bristlebird

The Endangered Eastern Bristlebird occurs in scattered, isolated populations coastally from about Mallacoota in Victoria to the Conondale Ranges just north of Brisbane, Queensland. The northern subspecies once occurred on upland tussock grasslands north from Dorrigo, New South Wales. Since 1996, declines in the northern subspecies have been recorded at all seven remaining known sites in Queensland despite attempts by the State agency and local landowners to improve habitat (Fig. 50). Fire has contributed to local losses. Actions for improvement in the status of the southern subspecies by fire management (to achieve less frequent burns), fox control and reintroduction programs are being transferred to the northern subspecies. Since 2004, the Queensland Environment Protection Agency and the New South Wales Department of Environment and Climate Change have undertaken a captive breeding program. This success of this program will enable a trial release of eight birds in spring 2008, when radio-tagged birds will be released in previously occupied areas. After the batteries fail, the birds will be monitored via call playback. The outcomes of this trial will be used to determine strategies for future releases of captive-bred bristlebirds.

BY DAVID STEWART, *Environmental Protection Agency, Queensland*

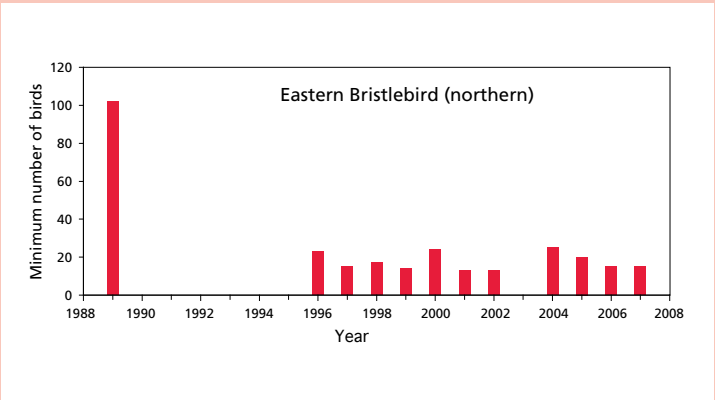


Figure 50. Minimum numbers of Eastern Bristlebirds in the Conondale Ranges, Spicer's Gap, Mt Barney, Duck Creek, Snake Ridge, Stretcher Track, Mt Gipps, of south-east Queensland; surveyed by call playback and subsequent counts of birds seen or heard. Not all sites could be accessed in recent years.

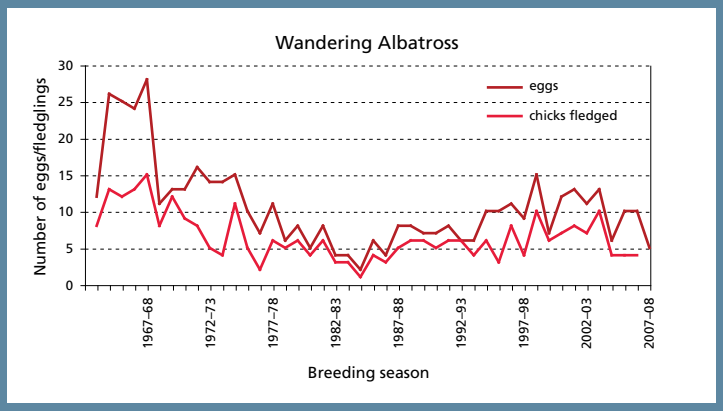
Wandering Albatross

In Australian territory, the Wandering Albatross (nationally Vulnerable) nests on Macquarie Island, where the population was all but destroyed by sealers in the 1800s, and only one breeding pair was found in 1913. The population slowly built up until the early 1960s, but by the 1980s had again declined to levels close to extinction—coincident with the rapid expansion of longline fishing in the Southern Hemisphere. Access to the breeding grounds was closed to minimise disturbance, which appeared to be successful and about ten pairs bred annually. However, since SOAB 2003 there appears to have again been a decline, to around five pairs (Fig. 51).

Fisheries bycatch and feral pests have been identified as the most significant threats to the albatross and other island-nesting seabirds. Until recently, commercial fishing around Macquarie Island has been limited to trawl operations and no seabird deaths have been reported during 13 seasons of fishing. In 2007 and 2008, longline fishing was trialed, subject to a raft of precautionary mitigation requirements, including strict seabird bycatch limits, and no seabird interactions were observed. On the island, cats have been eradicated and an operation targeting rabbits, rats and mice will commence in the winter of 2010. Helicopters will broadcast up to 260 tonnes of bait over the island and be followed by shooting, trapping and use of detector dogs.

BY ROSEMARY GALES,
Department of Primary Industries and Water, Tasmania

Figure 51. The number of Wandering Albatross eggs and resultant number of chicks surviving to fledging on Macquarie Island, Tasmania. In this biennially breeding species, the number of eggs laid is roughly equivalent to half the number of breeding pairs that nest on the island.



On Macquarie Island, the nationally Vulnerable Wandering Albatross is down to just five egg-laying pairs from a high of 28 in the late 1960s. Photo by **Rohan Clarke**

Helmeted Honeyeater

The Helmeted Honeyeater, a Critically Endangered subspecies of the Yellow-tufted Honeyeater, once ranged over the streamside and swamp habitats of the tributaries of the mid-Yarra River and Western Port drainages. The last naturally occurring population occupies a small portion of the Yarra River drainage basin, approximately 50 km east of Melbourne in southern Victoria. In the early 1990s there were 15–22 breeding territories occupied by 32–44 breeding birds at small sites on Cockatoo Creek in the Yellingbo Nature Conservation Reserve, and on Macclesfield Creek just outside the reserve, with some movement between the sites. The Macclesfield Creek property was subsequently added to the reserve.

After a period of higher numbers at Yellingbo, since the last SOAB in 2003 and with the onset of drier conditions the population has again reduced in size (Fig. 52). Ongoing habitat enhancement works are taking place within and outside the reserve and release of captive-bred birds is occurring to reverse the decline.

The colony at Tonimbuk, established by releases of captive-bred birds since January 2001, continues to grow and now numbers some 33–34 individuals (Fig. 53). Nest supplementation is being used successfully to gain higher breeding output by Tonimbuk breeding pairs: eggs or chicks produced in captivity are added to nests to increase clutch or brood sizes. Specific nest protection measures aim to reduce the chances of known predators of Helmeted Honeyeater nestlings (Tiger Snakes and Laughing Kookaburras) from gaining access to nests. Egg swaps between captive and wild populations will occur during the 2008–2009 and subsequent breeding seasons to maximise the genetic diversity of each population.

BY BRUCE QUIN AND PETER MENKHORST, ***Department of Sustainability and Environment, Victoria, and Helmeted Honeyeater Recovery Team***

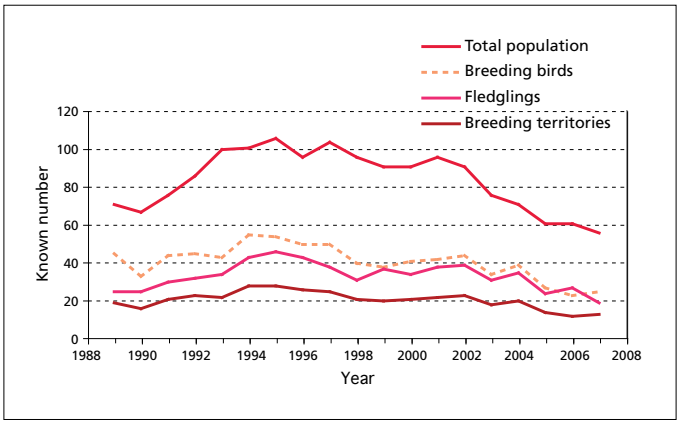


Figure 52. The number of Helmeted Honeyeater breeding territories, breeding birds and fledglings for the breeding seasons 1989–1990 to 2007–2008, and the overall population size in autumn at Yellingbo Nature Conservation Reserve, Victoria.

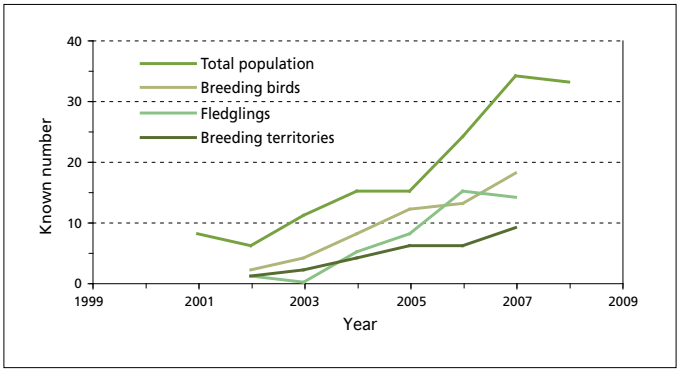


Figure 53. The increasing number of Helmeted Honeyeater breeding territories, breeding birds and fledglings for the breeding seasons 2002/2003 to 2007/2008, and the overall population size in autumn, at the newly established colony at Tonimbuk, Victoria, where the release of captive-bred birds commenced in January 2001.

A female Bush Stone-curlew (Near Threatened nationally) on eggs at Bordertown, South Australia; well concealed visually amongst fallen branches but vulnerable to predation by foxes and possibly cats. Photo by **Dan Harley**

Trends in Near Threatened Species

The Action Plan for Australian Birds 2000 **identified 81 taxa (species and subspecies) as Near Threatened, those that are close to qualifying as Vulnerable. These include the Purple-crowned Fairy-wren (western) [pp. 12–13], Brown Treecreeper (south-eastern) [pp. 12, 22–23], Black-chinned Honeyeater (eastern) [p. 22], Crested Bellbird [pp. 22–23], Western Whipbird (western) [p. 34], Hooded Robin [pp. 18–19, 21, 22–23] and Diamond Firetail [pp. 21–22]. This box contains reports on the Grey-crowned Babbler (eastern subspecies) [also see pp. 18–19, 22–23] and the early results of new studies on the Bush Stone-curlew.**

Grey-crowned Babbler

Monitoring of the Grey-crowned Babbler (listed as Endangered in Victoria) continues across all seven of the larger populations remaining in Victoria. Overall, the trends are encouraging with increases in numbers of birds and groups reported in 4000–6000 ha survey grids for six of the seven populations. In some districts, the increases are evidently associated with habitat protection and restoration efforts. In the Lurg district survey grid, for instance, group numbers have increased from six groups in 1997 to 11 groups in 2008, with corresponding increases in individuals from 25 to 45 birds (Fig. 54). There have also been indications of increase at Koonda, Brimin and Barmah. For one sub-population (Tamleugh) the numbers have remained stable but average group size has improved over the past thirteen years, again apparently in response to improved habitat quality and extent.

One significant decrease has occurred—the Longwood population has fallen by more than 50% since 1994. Substantial intensification of land use, from low-input grazing to cropping, and associated impacts such as increased traffic and pesticide use, appear to be the cause.

BY DOUG ROBINSON, *Regional Manager, Goulburn Broken, Trust for Nature, and Grey-crowned Babbler Working Group*

Bush Stone-curlew

While the Bush Stone-curlew is still widespread and common in fox-free northern Australia, it has undergone substantial declines throughout south-eastern Australia, to the extent that it is now locally extinct in several districts and is listed as Endangered in New South Wales and Victoria and Rare in South Australia.

New South Wales

Habitat degradation and introduced predators are blamed for the decline of Bush Stone-curlews across south-eastern Australia, yet the current factors threatening individual breeding pairs and preventing juvenile recruitment remain unknown. On the central coast of New South Wales, a community group, in conjunction with local councils and the NSW Department of Environment and Climate Change, is addressing these knowledge gaps by undertaking regular population censuses and individual nest site monitoring.

The monitored population is in an urban environment around the estuarine foreshores of Brisbane Water. It appears to have decreased from eight to 10 breeding pairs (14–20 individuals) in 2002 to only two breeding pairs in 2007 (8–9 individuals); however, comparison between years is confounded by differing survey methods and levels of effort.

Management of nest sites in 2007 facilitated the successful fledging of four chicks. It is hoped that continuing surveys will give a clearer understanding of the status and dynamics of the population and unravel some of the causes of its apparent decline. Ongoing management is targeted towards increasing breeding success and improving habitat to improve the long-term viability of the population.

BY CATHERINE PRICE, *University of New South Wales*, AND GARON STAINES

South Australia

At Bordertown and Mundulla, where Bush Stone-curlews are still relatively common, reproductive data have been collected for seven pairs over four consecutive breeding seasons (2004–2007):

- **23–27 nesting attempts were made by the seven pairs;**
- **at least one egg hatched in at least 15 of 23 clutches (a hatching rate of ≥ 65%);**
- **20–30 chicks were hatched over the four breeding seasons; five of these chicks survived to flying age.**

These values translate to the following:

- **chicks were successfully reared to maturity in less than 20% of nesting attempts;**
- **of chicks that hatched, 17–25% survived to maturity.**

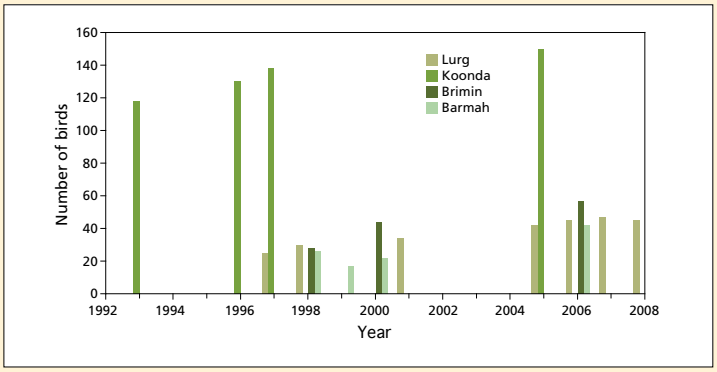
This low rate of chick survival potentially limits the population. However, it is possible that Bush Stone-curlews have always experienced low nesting success, which might be predicted for a species with a long lifespan, high density of pairs (historically) and multiple clutches per breeding season. This would not have posed a problem in the past when the species was more abundant.

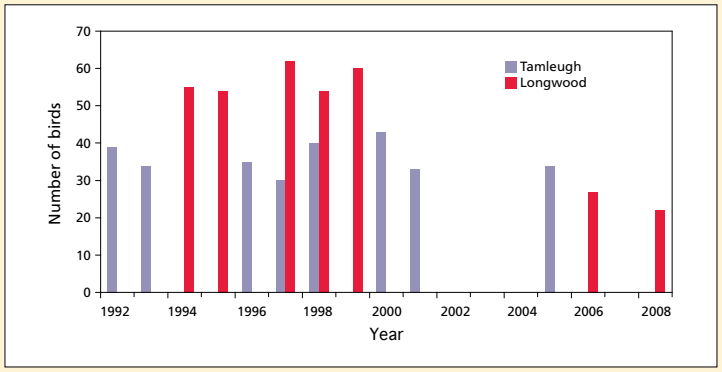
The principle cause(s) of chick mortality are not known. At Bordertown, trials using portable electric fencing to protect nest sites from mammalian predators have failed to reliably increase the rate of chick recruitment.

In 2006, adult mortality occurred in two of the four breeding territories at Bordertown. All four territories remained as active breeding sites the subsequent spring because surplus unpaired individuals rapidly filled the two vacancies. This situation contrasts strongly with that reported from several farming areas, where pairs are isolated and the death of one adult may leave the remaining bird unpaired for years. The local presence of surplus unpaired birds (maintained by regular recruitment of chicks into the adult population) is necessary to offset adult mortality and stabilise local populations.

BY DAN HARLEY, *Department for Environment and Heritage, South Australia*

Figure 54. The numbers of Grey-crowned Babblers counted during autumn-winter surveys of six of the seven remaining large Victorian populations: the areas where the population seems to be increasing (at top) and decreasing or stable (at bottom).





V. Performance of Governments and the Rise of the Private Conservation Sector

'It is still not possible to give a comprehensive national picture of the state of Australia's environment because of the lack of accurate, nationally consistent environmental data. Therefore, the need for an enduring environmental data system remains a high priority if Australia is to measure progress and make sound investments in the country's environmental assets.'

Australia's State of Environment report (2006)

SEVERAL RECENT REVIEWS (see Further reading below) have found that government performance in the management of the natural environment is wanting, but that the community is rising to the challenge.

Most States and Territories have introduced legislation aimed at regulating broadacre vegetation clearing, which has slowed the rate of clearing. Nonetheless, unsustainable wholesale clearing still occurs in some forests and the legacies of past clearing—including changed hydrology, habitat loss and fragmentation, and impacts on seed supplies and regeneration of native vegetation—remain strong drivers of biodiversity decline. Government commitments to provide environmental flows to some wetlands and rivers remain largely unfulfilled.

On a more positive note, the increasingly cooperative approach between States and Territories and the Australian Government in developing a consistent, national approach to biodiversity management has improved policy, regulatory and planning processes. By their nature biodiversity outcomes will take longer, nonetheless the reviews conclude that there has been insufficient effort and financial commitment to set enough change in train on-ground to trigger widespread recovery of biodiversity in the landscape. Although there are many worthy schemes in place, they have generally been unstrategic (in terms of nationally or even regionally integrated outcomes) and inadequate to even offset the rate of change in such overwhelmingly vital areas as native vegetation loss and wetland degradation, let alone to make net gains.

Biodiversity management needs to continue to move away from piecemeal decisions and actions towards a landscape-based model, with adaptive management applied across productive and protected lands towards common environmental goals. With the uncertainty surrounding climate change, the best way to secure future human food supply is to invest in the conservation of the environmental services (soil, water and biodiversity) that are essential for productive farming.

Measuring biodiversity outcomes and identifying which management actions were successful or not remain critical areas of need. Better supported and targeted monitoring of birds can assist in this assessment of Australia's environmental assets and inform their management.

Protected areas

Between 2002 and 2006, Australia's terrestrial protected areas (parks, reserves, conservation areas, indigenous protected areas) increased by approximately 12 million hectares to 89,528,859 ha (11.6 per cent of Australia). Protected area by State ranges from 55% in the ACT to 6% in Queensland. Despite this increasing coverage, the protected area system is only partly representative of Australia's ecosystems, nor can it conserve all of Australia's biodiversity.

Large areas of land of high conservation potential are found on private property and there is growing interest in mechanisms to encourage these landholders to conserve biodiversity, including binding conservation covenants and less formal co-management agreements (examples include the Property Vegetation Planning in New South Wales and Bush Tender in Victoria) and a few, small trial stewardship programs. Well managed production lands also offer important habitat for some species especially when they are integrated with areas managed for biodiversity conservation in a whole of landscape approach.

The increasing value many Australians place on biodiversity is reflected in the large increase in community action and investment in recent years. Government initiatives such as the Natural Heritage Trust have brought greater awareness that biodiversity is an integral part of natural resource management. This has assisted the burgeoning of organisations that purchase land to keep, or pass on to other conservation entities or private landowners under covenant. Over the last two years, private conservation organisations have more than doubled their ownership and management of land for conservation to about six million hectares and protected more under conservation covenants. Their aim is to maintain or improve the biodiversity and other natural assets of the land. Funding for their activities comes from a range of sources including government, corporate investment, philanthropy and individuals. The struggle to attract medium- to long-term investment for management is a greater challenge than land-purchasing campaigns, but is often supported by volunteerism.

All these arrangements have an important role in complementing the reserve system and augmenting efforts to protect biodiversity at risk. They need to be targeted, monitored and resourced appropriately.

Threatened species recognition and recovery

A 2006 review of the *Federal Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) found that it had greatly improved public accountability and access to information about proposed development. However, this was counteracted by significant flaws in its framework, which severely limit its legislative clout. For example, the absence of triggers for land clearing and greenhouse gas emissions are very significant gaps in the regulatory framework of matters of national environmental significance. There are also problems with implementation, such as the length of time (sometimes years) taken in the listing process and poor resourcing.

In addition, there are many exemptions in the legislation that subvert the EPBC Act's objectives. In particular, the exemption of Regional Forest Agreements enables land clearing by forestry operations to bypass threatened species and ecological community protection provisions. The 2009 review of the Act is an opportunity to make important reforms and readjustments for today's challenges, particularly climate change.

Left: The Chestnut-rumped Heathwren [far left] and Grey Grasswren [left] both have subspecies recently listed as nationally threatened with extinction. Photos by **Graeme Chapman**

Right: A male Albert's Lyrebird displays at his arena. Following the protection of Whian Whian State Forest, where the lyrebird is at its highest density, it has been recommended that the conservation status of Albert's lyrebird be dropped to a category of lesser threat, from Vulnerable to Near Threatened on the IUCN Red List. Photo by **Michael Snedic**

Far right: The Christmas Island Emerald Dove, one of several little-known Endangered species on the island. Photo by **Rohan Clarke**

Across all jurisdictions the development of recovery plans lags well behind the listing process. The trend is towards multi-species or regional plans, which is sensible. Of concern is that there are numerous listed species and communities, but few are effectively managed under recovery plans, nor have adequate resources been made available for their management.

In the absence of better information, the listing of species in trouble is a simple measure of government commitment to bird conservation in Australia. Across Australia there are several layers of recognition and listing of threatened species. Under the *Environment Protection and Biodiversity Conservation Act 1999,* the Australian Government treats species and subspecies similarly and lists them according to their status nationally. The States and Territories list species according to their status within their jurisdiction and generally support the national listing for species that occur within that State.

What changes have there been since 2003? All jurisdictions have added species to their threatened bird lists and it appears that none have been removed. A great many species are listed somewhere in Australia. Federally, in the five years since 2003 the status of three species has been assessed as worse, by uplisting of the Orange-bellied Parrot from Endangered to Critically Endangered, and Mallee Emu-wren from Vulnerable to Endangered and the addition to the list of the Australian Painted Snipe, as Vulnerable. In addition eight subspecies have joined the list: Masked Owl (Tiwi Island), Emerald Dove (Christmas Island), Chestnut-rumped Heathwren (Mt Lofty), Hooded Robin (Tiwi Island), Yellow Chat (Alligator River), Black-throated Finch (southern), all as Endangered; and the Grey Grasswren (Bulloo), as Vulnerable.

Internationally, in 2007–2008 BirdLife International, which compiles the bird section of the IUCN Red List, carried out a global reassessment and, with advice from Birds Australia and Australian ornithologists, amended the status of the Fairy Tern and Rufous Scrub-bird. The tern, uplisted from Least Concern to Vulnerable, has suffered recent declines over much of its breeding range and is threatened by predation by introduced species, human disturbance on beaches and inappropriate water level management. The Rufous Scrub-bird has been uplisted from Near Threatened to Vulnerable, due to its continued decline within its small range and inappropriate management of some of its known and potential habitat. Recent recommendations are that the Painted Honeyeater be uplisted from Near Threatened to Vulnerable and that, with the protection of Whian Whian Forest, Albert's Lyrebird drops down from Vulnerable to Near Threatened. Data are being collected on the increasingly rare Australasian Bittern, which may also warrant listing. These species are yet to be assessed under the Federal *Environment Protection and Biodiversity Conservation Act 1999*.

Importantly, work on threatened birds is overwhelmingly funded by government and birds such as the Tasman Parrot, Orange-bellied Parrot, Helmeted Honeyeater, Black-eared Miner and Noisy Scrub-bird would almost certainly be extinct or perilously close to extinction without this funding and the work of many volunteers. These successes demonstrate what is achievable with sufficient effort and commitment.

Since 2003 the following Threat Abatement Plans, with direct relevance to birds, have been added to those for feral goats, rabbits, cats, foxes: 'Beak and Feather Disease Affecting Endangered Psittacine Species'; 'Incidental Catch (or by catch) of Seabirds during Longline Fishing Operations'; 'Predation, Habitat Degradation, Competition and Disease Transmission by Feral Pigs'; and 'Reduction in Impacts of Tramp Ants on Biodiversity in Australia and its Territories'. A further two have been nominated: 'To Reduce the Impacts of Exotic Rodents on Biodiversity on Australian Offshore Islands of Less than 100 000 Hectares' (currently under consideration) and 'Ecosystem Degradation, Habitat Loss and Species Decline Due to Invasion of Northern Australia by Introduced Gamba Grass and Other Introduced Grasses' (for consideration 30 September 2009). While these are useful policy instruments, their implementation has been limited and sporadic (see Macquarie Island baiting p. 36 for an exception).

Management of the seas and of internationally migratory species, many of them birds, involves international treaties and agreements, which presents yet other challenges.

A mixed report card for governments

All in all this is a rather gloomy picture and, if anything, the situation has worsened since SOAB 2003, in part because of the dry conditions. Nonetheless, several of the success stories in this report suggest that, given the effort and resources, improvement in the declining state of Australia's birds, and the underlying deterioration in the state of the environment that reflects, is possible.

It is sobering in this Olympic year to hear that just a single gold medal conservatively costs Australian taxpayers $17 million. At the same time the 2008–2009 environment budget allocated just $25 million for the entire Caring for Our Country open grants budget, 'to deliver an environment that is healthy, better protected, well managed and resilient in the face of climate change'. The same budget allocated $75 million for studies into urban congestion. Why isn't there a similar or greater level of investment in a program of strategic monitoring of the state of the environment and the sustainability of its management? Where is the commitment to maintaining and restoring Australia's degraded natural landscapes? China has reportedly pledged 1.35% of GDP for environmental protection, while Australia has allocated less than 0.05%. Nor do State and Territory governments place enough value, and invest accordingly, in the natural world that supports us all.

by Penny Olsen, *Birds Australia*

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Left: The Red-kneed Dotterel has increased in the Brisbane area over the past 40 years. Photo by **Rob Drummond**

Right: A flock of Sharp-tailed Sandpipers, an intercontinental migrant that is dwindling in numbers. Photo by **Rob Drummond**

Cover: Since the last *The State of Australia's Birds* overview report in 2003 the status of the unique Orange-bellied Parrot (here a male) has been reassessed as Critically Endangered, that is, the species is at extremely high risk of extinction in the immediate future. Photo by **Chris Tzaros**

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What you can do to help

Participation in volunteer bird atlassing and threatened species recovery efforts is enjoyable and rewarding. By increasing understanding of how Australia's birds are faring, and by improving bird habitats, you can make a valuable contribution to nature conservation. We welcome new volunteers (you don't have to be a member), and you can help simply by joining Birds Australia.

The Atlas of Australian Birds is a long-term, nationwide, volunteer-based bird-monitoring project that welcomes new participants. Contact Andrew Silcocks (03 9347 0757; atlas@birdsaustralia.com.au; www.birdata.com.au)

The Threatened Bird Network links volunteers with recovery efforts for more than 25 threatened species. Contact Dean Ingwersen (03 9347 0757; tbn@birdsaustralia.com.au)

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