# The State of Australia's Birds 2004

## *Water, Wetlands and Birds*

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Birds Australia
CONSERVATION THROUGH KNOWLEDGE

*The State of Australia's Birds reports present an overview of the status of Australia's birds, the major threats they face and the conservation actions taken. This second report focuses on wetland birds. With the continuation of drought conditions over much of the country, exacerbating long-term damage to wetlands and other habitats, water issues are taking centre stage, but too often birds and the environment receive scant attention. Restoration of environmental flows to Australia's stressed waterways and wetlands is essential. Wetlands and their birds need water.*

Environmental flow: sufficient water in rivers and groundwater systems, at appropriate times, to maintain downstream ecosystems.

## THE KEY FINDINGS

There is mixed news on the status of Australia's wetland birds. Some positive initiatives are underpinned by developing cooperation between Federal and State Governments and improvements in management strategies. However, widespread, sustainable recovery of damaged wetlands is a long way off. There are many uncertainties because of lack of information, and in developed parts of the continent much of the news is bleak.

### Favourable news

- Moves are under way to better manage the use of water, and governments have recognised the importance of water reform. Nonetheless, political, social and economic forces must be reconciled before reform is achievable. Long-term sustainability dictates that environmental needs should be paramount, and that environmental flows be determined on the basis of ecological considerations.
- Management of water requires cross-border cooperation between States and other jurisdictions, and it is appropriate that the Federal Government has taken a leading role in managing Australia's water resource.
- The National Action Plan for Salinity and Water Quality, and the National Dryland Salinity Program have been prepared and endorsed by all Federal and State environment ministers.
- Wetlands, such as the Paroo, Cooper's Creek, Fitzroy and Ovens (Wentworth) still retain high conservation value, and should be given the highest conservation priority.
- Australia's relatively pristine, tropical rivers, stretch from the Great Barrier Reef coast, across the north to the Kimberley. Together, they form one of the last great river networks and are an internationally significant asset. The same can be said of the unique rivers and wetlands of the Lake Eyre Basin.
- The *Federal Environment Protection and Biodiversity Conservation Act 1999* confers greater protection to migratory shorebirds, and one resident wetland bird has recently been listed under the Act as Threatened (Australian Painted Snipe). The Act also helps protect wetlands listed as internationally significant (Ramsar wetlands).
- Agreements are in place with some countries to protect internationally migratory birds and their habitats. The Federal Government is investigating whether additional agreements can be forged with countries in the East Asian-Australasian Flyway.
- Private landowners are restoring or protecting wetlands on their properties, thus contributing to the conservation of wetland birds.
- Coastal and other areas under pressure from heavy human recreational use can be improved for birds by fencing, revegetation, control of dogs and human access, etc. Wetlands on farms can be reinvigorated. Much of this work is now underway.
- Efforts to monitor wetland birds are increasing, and major studies are planned for hitherto little known drainages such as the Channel Country of Queensland.

### Unfavourable news

- Many major wetlands are in trouble. These include several in the south-east—the once great Macquarie Marshes and Menindee Lakes, mid-Lachlan and upper-Macquarie valleys, Barmah-Millewa Forest, the Gwydir wetlands, Booligal Swamp, Narran Lakes and, in particular, the Lowbidgee, to the Coorong, South Australia—and south-west. Studies point to acute wetland bird declines in these areas.
- In the south-west and south-east massive allocation to water-hungry ventures such as agriculture is the major threat to wetland birds, and this threat is spreading northwards in eastern Queensland.
- Despite a greater recognition of the problem, the Murray-Darling and other major river systems and wetlands have yet to be given a chance to recover by a significant increase in environmental flows.
- In Tasmania recent changes in weather patterns have left waterbird habitat starved of water, while drought has brought higher

Wetlands come in many forms: a Buff-banded Rail bathes in a septic outlet, Lady Elliot Island, Queensland. Photo by **Raoul Slater.**

numbers of previously uncommon species, presumably as they seek refuge from the dry conditions on the mainland.
- Salinisation is an increasing threat to inland wetlands, and is particularly evident in the wheatbelt of Western Australia.
- Across tropical Australia, exotic aquatic weeds and other invasive species such as pigs are a significant and increasing threat to wetlands and their birds.
- A high proportion of the bird species that decreased nationally in the second *Atlas of Australian Birds* were wetland birds, despite a slight increase in rainfall. Several of these birds are also reported to be in decreased numbers by more local monitoring programs in the States.
- In populated areas, coastal wetlands and their birds are under intense pressure from development, disturbance and pollution.

## Uncertain news

- Many wetland birds are dispersive or migratory and depend on a network of wetlands, hence, the consequences of undesirable change in one region can be far-reaching. However, such mobility can also allow certain birds to move to more favourable areas.
- While many birds make use of artificial wetlands, especially sewerage ponds, their conservation importance is mixed: they offer habitat for certain bird species, but the large grazers and predators they attract can render smaller artificial wetlands unsuitable for certain birds. Some man-made wetlands have also been created at the expense of the original, natural wetland.
- In the rangelands, bores are being capped and water is being piped to reduce wastage. This saves water wastage, and helps to maintain water supplies, but the implications of these changes for birds are unclear and in need of urgent study. Caution is urged to avoid undesirable consequences for conservation.
- No accurate information is available on population size for any wetland bird, and population trends over time are known for only a few sites. There is an urgent need to monitor wetland birds on a national scale over a sufficient time period to understand natural cycles of abundance and decline. Use of birds as indicators would provide monitoring data as well as allowing assessment of progress towards sustainability/wise water management goals and wetland health.
- The absence of reliable monitoring information means that the tolerance of populations to potential threats such as hunting, wetland destruction and degradation, reduced frequency of floods and breeding events are poorly understood. Hence, management of these threats may not be effective.

## Wetland birds to watch

- The increasing rarity of the Australasian Bittern suggests that it meets the requirements for listing as nationally Endangered. Four subspecies also warrant consideration for listing as nationally Threatened: the Bulloo Grey Grasswren, Alligator Rivers' Yellow Chat, Tasmanian Lewin's Rail and eastern Hooded Plover.
- Other birds of concern include Yellow-billed Spoonbill, Red-kneed Dotterel and Nankeen Night Heron, which are still common but their populations appear to have declined in recent years.
- The Australian Painted Snipe is the first resident wetland species to be listed as nationally Threatened under the EPBC Act—it could become a flagship species for freshwater wetlands.
- The outlook for the Critically Endangered Capricorn Yellow Chat appears reasonable provided sufficient habitat is maintained and other threats identified and managed.

Budgerigars alight to drink at an isolated dam, Birds Australia's Gluepot Reserve, South Australia. Photo by **Nicholas Birks**

### Types of wetlands

- **Tidal wetlands/coastal wetlands—including shallow marine waters in most cases less than six metres deep at low tide, beaches, dunes and shorelines, estuaries, salt marshes, lagoons and mud flats (examples in this report: Western Port, Hobart, Coorong).**
- **Permanent inland wetlands—including rivers, creeks and streams, freshwater, brackish and saline lakes and marshes, and swamp forests. Near-coastal permanent wetlands fall into this category, although they may be only a few hundred metres from the sea (inland examples in this report: Macquarie Marshes, Natimuk-Douglas).**
- **Ephemeral inland wetlands—the quintessential Australian wetland is dry most of the time but when full provides vital breeding and feeding opportunities for many waterbirds (example in this report: Lake Eyre Basin).**
- **Artificial Wetlands—including sewage ponds, water storages, farm dams and bores, and seasonally flooded agricultural land (examples in this report: Stockyard Plain, box on 'Wetlands as rangeland refugia').**

### Examples of significant artificial wetlands for birds

- **Price Saltfields (South Australia)**
- **Port Hedland Saltworks (Western Australia) (formerly a natural wetland)**
- **Tullakool Evaporation Ponds (New South Wales)**
- **Western (Werribee) Treatment Complex (Victoria)**

### Private wetlands

**Many wetlands are privately owned and managed; 80% of Victorian wetlands occur on private land. Examples of wetlands on private land, which are being managed for nature conservation, include:**

- **Banrock Station Wetlands (South Australia)**
- **Lake Bennett and other wetlands on Newhaven Reserve (Northern Territory)**
- **Murray River frontage of Ned's Corner (Victoria)**

# Introduction

IN 2003, THE first *State of Australia's Birds* (SOAB) report was launched by Senator Gary Humphries at Birds Australia's Australasian Ornithological Conference, at the Australian National University, Canberra. About 15, 000 copies were distributed, to all Birds Australia members, contributors to the Atlas of Australian Birds and Threatened Bird Network, local and federal politicians, and through field and open days. The report served as an introduction and overview, and presented the results of several long-term monitoring programs, many of which will be revisited after five years to assess trends. In the interim, the reports will focus on specific areas and issues.

Much of southern and eastern Australia continues to experience rainfall deficiencies for periods of two years and longer. This has dried or reduced wetlands, stressed water supplies and vegetation, and slowed recovery after the devastating fires in the high country of the south-east in early 2003. Drought is a natural feature of the Australian climate: over most of the country rainfall is not only low, but highly erratic. Hence water, or the shortage of it, has always imposed major restrictions on where Australians live and what activities they undertake, and the same could be said of our birds, particularly wetland species. From this we draw our 2004 theme, featuring wetlands and their dependent birds.

The health of inland and coastal waters and their wetlands is tied to land management practices and other human activities. The drought has likely increased the impacts of broadscale clearance, fragmentation of native vegetation, intensification of land use and other major challenges to birds, exacerbating wetland loss and degradation.

Australian wetlands include marine sites and tidal zones, rivers, floodplains, swamps and freshwater lakes, as well as human created wetlands such as farm dams, salt ponds, sewage farms and irrigation channels. They range from permanent to ephemeral, regular to episodic, freshwater to brackish and saline (see box). They may be on private or public land, protected or unprotected. Scattered from the low tide mark to the heart of the continent, they form a network of possible habits for waterbirds, many of which must move with the seasons or according to annual conditions.

Wetlands support a variety of birds, some of which live in fringes and margins, others in the water itself. Furthermore, waterways, wetlands and shorelines are concentration points for all sorts of birds, and landmarks for their navigation. The more permanent wetlands promise concentrations of food, and drinking water, and refugia during drought. Their more ephemeral counterparts fill briefly, and spasmodically, offering a flush of plenty and a rare opportunity for an abundance of birds to breed.

Wiser use of water—a scarce, vital resource in this driest of populated continents—is a most topical and pressing issue. In July the Federal Government and all States[1] except Western Australia signed the plan to revive the country's water resources, which includes a multimillion dollar deal to revive the Murray-Darling. The need for water reform is inarguable, but too often birds and other wildlife take a back seat in discussions of water allocation. Birds are highly visible markers of environmental health and biological richness, yet they rarely appear as indicators of progress towards water reform and improved wetland condition. For example, they are absent from the National Water Policy list of environmental indicators.

This report examines the status of birds associated with Australia's wetlands at both national and regional scales. It highlights the main threats they face, the species in need of attention, and the national and international efforts to protect them. The performance of governments is examined by their response to the identification of species of high conservation concern in the *Action Plan for Australian Birds 2000*.

The report has been produced by Birds Australia through the assistance of members and supporters, the Australian Government's Natural Heritage Trust (Department of Environment and Heritage) and the Vera Moore Foundation. The bird monitoring programs summarised here were undertaken by thousands of volunteers, and institutional and private researchers, some with support from State governments and the Australian Government's Natural Heritage Trust. This effort and readiness to share data, are evidence of Australians' concern for the fate their birds and the wish to give them a voice in critical issues such as water reform and wetland conservation.

[1] Throughout, the term 'State' refers to States and Territories.

# Threats to wetland birds

Wetland loss and degradation (see table) through river regulation, water diversion, land clearing and salinity, are the greatest immediate threats to wetland birds within Australia. Of these the greatest manageable threat is over-allocation of water removed from the environment, particularly for agricultural irrigation (see section on 'Water reform'), which decreases natural water flows and adds to salinisation. Diversion of water for irrigation not only reduces water for natural systems but in some rivers has reversed flow patterns, so that periods of high flow no longer coincide with the breeding seasons of these birds. Lastly, dryland salinity, mostly a result of land clearing, is an increasing and intractable threat (see box on 'Salinity').

**Estimated areas of known wetlands and the proportion lost or degraded since European settlement**

| State | Wetland area[1] ('000 ha) | Proportion lost/degraded |
|---|---|---|
| New South Wales | 4,500 | 50% |
| Victoria[2] | 400 | 33–50% |
| Queensland | 7,798 | not available |
| South Australia | 4,438 | not available |
| Western Australia[3] | 362 | 70–80% |
| Tasmania | 3 | not available |
| Northern Territory | 1,536 | 7% |

[1] States define wetlands differently; environmentally important wetlands only are accounted for in most cases. [In Tasmania much of the south-west is bog, which is apparently not included in the table].
[2] Wetlands are based on areas surveyed to 1988.
[3] Western Australian figures cover the Swan Coastal Plain only; northern rivers are generally little damaged.
Source: **Australian Bureau of Statistics** (1996) Cat. No. 4601.0, p. 356

## Salinity

Increasing salinity is one of the most significant environmental problems facing Australia. According to the *2001 State of Environment* report, land clearing, and over-allocation and inappropriate use of irrigation water have caused farmland to suffer from saline seepage. Rising water tables threaten most irrigation areas, and one third of rivers are in very poor condition in relation to salinity.

Active salinisation can be reduced by improving water use efficiency, but dryland salinity is more insidious—it is caused by the clearing of deep-rooted trees and shrubs many years earlier. The National Land and Water Resources Audit estimates that 5.7 million hectares have a high potential for the development of dryland salinity, and predicts this will rise to 17 million by 2050.

The risks posed by increased salinity to biodiversity are significant. For example, a study by Lugg reported a high diversity of waterbirds in fresh (1,000–2,000 mg/L NaCl) and brackish (2,000–6,000 mg/L) wetlands. A number of species did not use saline wetlands (6,000–85,000 mg/L), and only six waterbird species were observed in hypersaline wetlands (>85,000 mg/L). A few species occurred in the full range of salinities, for example, Australian Shelduck, Masked Lapwing, Red-necked Avocet and Silver Gull.

Rising salinity, and the consequent loss of floral and faunal biodiversity and increase in salt tolerant species, can lead to imbalances in ecosystems. Examples can be seen in the Chowilla Wetlands, South Australia; Avoca Marshes, Victoria; and the Macquarie Marshes, New South Wales. Similarly, in the Western Australian wheatbelt, Black-winged Stilts are among the few species to have increased in areas that have lost most of the waterbirds they supported before they were damaged by salt. The most effective way to prevent dryland salinity is through retention of natural vegetation.

Salt-affected land near Cadoux, Western Australia. Photo by **Graeme Chapman**

A Banded Stilt feeds on the edge of a hypersaline wetland at Penrice Salt Fields, South Australia. Photo by **Nicholas Birks**

### Major threats to birds of wetlands

- **Deterioration of wetland habitats**
- **Deterioration of water quality**
- **Loss of wetlands**
- **Increased pests and other direct disturbances**

**Due to:**

- **Changed hydrology—clearing of native vegetation; reduced and altered natural flows from over-allocation, flood mitigation, wetland drainage, weirs, reservoirs; artificially permanent inundation; in certain situations, piping of water and bore closure**
- **Agricultural practices—irrigation, infilling and drainage of wetlands, land clearing, erosion, salinisation, turbidity, increased nutrients, pesticides, algal blooms, and inappropriate burning and livestock grazing regimes**
- **Urban and industrial development—pollution, changed salinity from fresh water run-off, disturbance and conversion of wetlands into ornamental, less diverse entities**
- **Climate change—e.g., changed rainfall patterns and sea levels**
- **Foxes, feral or uncontrolled cats and dogs, pigs, carp, aquatic and other weeds, and other exotic pests**
- **Insensitive recreational use, including some waterfowl hunting, and irresponsible boat and vehicle use**

***Many of these threats are interrelated and drought often exacerbates their impacts.***

Masked Lapwings feed along the shoreline of a temporarily flooded rangeland wetland. Photo by **Graeme Chapman**

# WETLANDS AS RANGELAND REFUGIA; CLOSURE OF ARTIFICIAL WETLANDS

*More than 70% of Australia—virtually all except the south-west, south-east, central-east and Tasmania—is broadly defined as rangelands.*

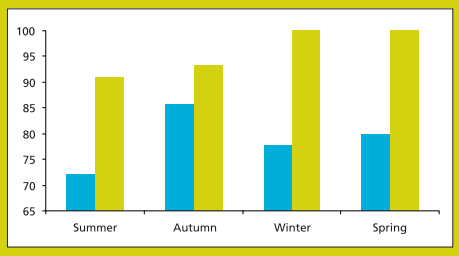
## Loss of artificial wetlands

Bores, some over 100 years old, tap the Great Artesian Basin and at times flow uncontrollably into stock watering points and long drains, from which up to 95% of water is lost to evaporation and seepage. Landholders and government are working together to reduce wastage and preserve water tables by capping the bores and replacing open drains with pipelines. While such restoration projects are laudable from the point of view of water economy, they are likely to have mixed results for wildlife, sometimes disadvantaging species that have become dependent on the water and are suffering from loss of wetland habitat elsewhere.

Not surprisingly, wetlands support a wider variety of wetland species when they are inundated (average 5.5 per site) than when dry (average 0.7 per site)(Source: Ongoing Atlas of Australian Birds). Because artificial wetlands, such as around bores, tend to be more permanent compared with the typically ephemeral natural wetlands of the rangelands (see graph), during dry periods they offer critical refugia for waterbirds (see top table) and birds that must drink. However, not all bores are necessarily of high value for birds. For example, at Newhaven Reserve bores are on sandy soil and although water is accessible to birds, little surface water is available; hence, there is little wetland vegetation and few wetland birds in comparison with local natural wetlands (see lower table).

The nature of the impact of bore closures on wetland birds and species that must drink, will depend on the role that bores play for these birds. A better understanding of the value of artificial wetlands for birds is crucial to proper management of the biodiversity impacts of bore closures in the rangelands.

BY ANDREW SILCOCKS




In the rangelands, artificial wetlands are a more permanent year-round source of water for birds than natural wetlands, illustrated by the percentage of visits to natural (open bars) and artificial (shaded bars) wetlands during which they were recorded to hold water. Source: **Atlas of Australian Birds habitat forms**

**Waterbird species at 86 natural and 70 artificial wetlands in Australia's rangelands**

| | Natural | Artificial |
|---|---|---|
| Number of waterbird species per survey—excluding dry surveys | 3 | 4 |
| Number of all species per survey | 11 | 13 |
| % surveys when the wetland was wet | 79% | 97% |

Source: The wetlands are those surveyed as part of the **Atlas of Australian Birds**, and for which habitat forms were completed.

**Wetland species recorded at bores and natural wetlands on Newhaven Reserve, in the rangelands of the Northern Territory**

| Wetland type | Natural | Bores[1] |
|---|---|---|
| Number of wetland species recorded | 38 (31%[2]) | 1 (1%[2]) |
| Maximum reporting rate for any one wetland species | 20% | 1% |

Only surveys within 1 km of bores and lakes were included: 114 surveys at bores and 213 at natural lakes.
[1]The only waterbird recorded at bores was a single dead Black-necked Stork.
[2]As a percentage of all species recorded.
Source: **Atlas of Australian Birds.**

# HUNTING AND CULLING

## Recreational hunting and pest control

This box concerns the impact of hunting on conservation rather than on welfare, which relates to individual animals. Recreational waterfowl hunting is permitted in Queensland, South Australia, Tasmania, Victoria and the Northern Territory. Ducks, swamphens and other wetland birds can be shot under license when they are thought to be causing damage to crops, dams or waterways, or pose a hazard to aircraft or human health.

Recreational harvesting of certain common waterfowl species is likely to be sustainable. However, there is a need for:

- comprehensive monitoring of duck populations and the impact of hunting on them;
- biologically meaningful specifications for timing of the duck season, integrated across the country;
- protection of non-game and threatened species through better hunter education, changes to shooting times and periodic closures of waters to hunting;
- protection of threatened species, such as Australian Painted Snipe, from disturbance;
- banning lead shot; and,
- a vigorous program to increase the area of biologically productive wetlands.

Recreational hunters could become a force for conservation as they have in countries such as the United States.

## Indigenous harvesting

For thousands of years waterbirds have been hunted by indigenous peoples as part of the social, cultural and economic life of some communities. However, it is possible for such harvesting to affect the conservation of wetland birds in a variety of ways, including:

- Unsustainable harvesting of rare or endangered species;
- Excessive hunting, for example, because of concentrated hunting around certain settlements or more efficient hunting through the use of modern equipment; and
- Management of feral or introduced pest species as a resource, rather than their control as pests; for example, pigs and buffalo, which destroy wetland habitat.

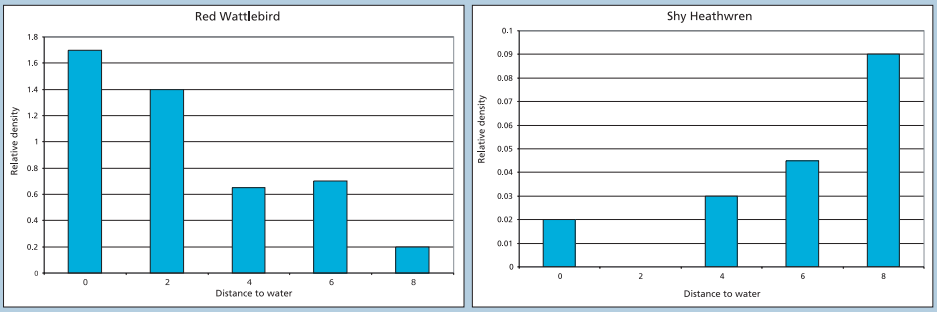
As with recreational hunting, the rate of indigenous harvest of waterbirds is virtually unknown. Magpie Geese (and their eggs) are the main wetland bird targeted. Around Weipa, Queensland, for example, the Aboriginal community is concerned that hunting has caused a scarcity of geese were they were once common. Nevertheless, the Magpie Goose population appears to be recovering nationally, from much reduced numbers and distribution. Brolga and Black Duck are also preferred spring-early summer food in some regions; the former appears to be dwindling nationally, from the combined impact of a variety of pressures.

## Birds that drink

During a study of the importance of artificial waterpoints to birds at Gluepot Reserve in the semi-arid mallee rangelands of South Australia, a total of 42 out of 113 bird species (37%) were observed to drink. Granivorous species such as parrots and pigeons appeared to be the most water-dependent, while some honeyeaters required drinking water during the summer months. The presence of waterpoints (bores, in-ground tanks and farm dams) influenced the abundance and distribution of several bird species. Species richness was higher closer to water, due to an increase in the number of water-dependent species.

Water-dependent species also increased in abundance closer to water (for example, see Red Wattlebird graph). Certain water-independent species were also more abundant closer to water—these were small insectivorous birds and their increased abundance can be attributed to significantly higher shrub height and cover near water. Most bird species that decreased in abundance closer to water were ground-foragers, which were associated with particular low, dense shrubs that were less common near water. This was almost certainly because of soil compaction and trampling by stock and other large herbivores using the water point, rather than proximity to water itself. Among the birds that did not thrive close to artificial waterpoints were the Striated Grasswren, Southern Scrub-robin and Shy Heathwren (see graph), all species of conservation concern.

by Rhidian Harrington




Change in abundance (number per site) at various distances (km) from permanent water at Gluepot Reserve (n = 12 sites at each distance): the Red Wattlebird, a water-dependent species, which decreased with distance from water, and Shy Heathwren, a water-independent species, which increased. Source: **Rhidian Harrington**

**Associations between bird species' abundances and distance from water at Gluepot Reserve, South Australia. Another 23 species showed no trend**

| Decreased with distance from water | | Increased with distance from water |
|---|---|---|
| Australian Magpie[1] | Jacky Winter | Gilbert's Whistler |
| Australian Raven[1] | Red-capped Robin | Shy Heathwren |
| Australian Ringneck[1] | Red Wattlebird[1] | Southern Scrub-robin |
| Brown-headed Honeyeater[1] | Spiny-cheeked Honeyeater[1] | Striated Grasswren |
| Brown Treecreeper | Weebill | White-fronted Honeyeater |
| Chestnut-rumped Thornbill | Willie Wagtail | Yellow-plumed Honeyeater[1] |

[1] Denotes known water-dependent species.
Source: **Rhidian Harrington**

Apostlebirds drink from the overflow of a desert stock tank. Photo by **Nicholas Birks**

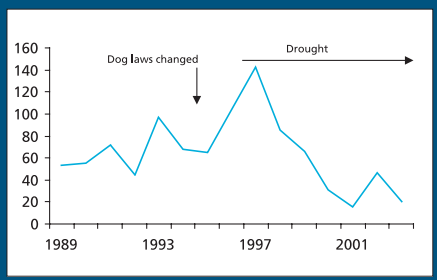
Many wetlands are regarded as dog exercise areas with little regard for the potential impact on birds. Photo by **Michael Weston**


## Disturbance of wetland birds

**Dogs, vehicles, boats, aircraft and people can disturb birds. Responses of birds to disturbance range from increases in heart rate and energy consumption to escape behaviours such as running and flight, desertion or trampling of eggs or chicks, and even abandonment of disturbed areas. The true impact of human-related disturbance is little known, but is the subject of ongoing research and debate.**

**Wetlands are the focus of many human activities, hence many wetland birds must cope with disturbance. An example can be found at a suburban wetland in eastern Melbourne, where dogs frequently chase ducks. At the wetland, the Pacific Black Duck population has decreased since dogs were allowed off the leash in 1994 (see graph). In 1997, drought struck and ducks concentrated at the permanent wetland. It was expected that their numbers would increase as the drought progressed and other wetlands dried up, but numbers declined sharply to below pre-drought levels, apparently because of the effect of disturbance by unleashed dogs.**

**Dog management remains a controversial issue, and is yet to be broadly recognised by wetland managers as a matter of importance for wetland bird conservation.**




Number of Pacific Black Duck each March at Gardiner's Creek, Bennettswood, eastern suburban Melbourne, in relation to drought and a change in dog laws which permitted unleashed dogs in the area.
Source: **J.M. Peter**

### Water use in Australia

**The latest water use figures, released in 2004, relate to 2000–2001. A total of 24,909 gigalitres (1 GL = 1000 million litres) was consumed by the Australian economy. Agriculture used the most (67%); and the highest consumers were livestock, pastures and grains (22%), followed by the cotton (12%) and dairy farming industries (11%; see table). For comparison, water use by the household sector was 2,181 GL (9%).**

**Reuse of water is small but increasing, mainly in the agricultural sector—4% of total water supplied by water providers in 2000–2001, compared with 1% in 1996–1997.**

**Water use in Australian agriculture 2000–2001**

| Consumer | Gigalitres used | Value $million | Earnings per million litres $ |
|---|---|---|---|
| Livestock, pasture, grains | 5,568 | 1,501 | 270 |
| Cotton | 2,908 | 1,222 | 420 |
| Dairy farming | 2,834 | 1,499 | 529 |
| Rice | 1,951 | 350 | 179 |
| Sugar | 1,311 | 284 | 217 |
| Fruit | 803 | 1,590 | 1,981 |
| Grapes | 729 | 1,355 | 1,858 |
| Vegetables | 556 | 1,817 | 3,270 |

Source: **ABS Water Account Australia**

## WATER REFORM

In Australia water has long been intermittently scarce and increasingly in demand. The relatively high rate of extraction of water from the environment in recent dry years has brought a belated recognition that the environment is suffering. Long-term, reduced natural flows and inappropriate use of water have caused untold damage, especially in the south-east and south-west. Many surface and ground water resources are becoming unusable due to mismanagement, not only in the past. Salinity, turbidity, nutrients, sedimentation, and pesticides are compromising the quality of our scarce water, killing vegetation and contaminating the land, with consequences for humans as well as nature.

One response was the formation of the Council of Australian Governments (COAG) in 1994 to establish a water reform framework (www.ea.gov.au/wwater/policy/coag.html) to ensure that water extraction is efficient and sustainable. A contentious issue for water authorities is the competing value of water between human users and the environment. Consequently, water extracted from the environment is increasingly being priced at a figure better reflecting its true value. Regrettably, the process towards reform is slow and wetland birds are already suffering the consequences.

### The need for effective water reform: the views of wetland managers

Like many other Australian wetlands, the flora and fauna of the Macquarie Marshes have adapted to high natural variability in how much and how often water reaches the wetland. However, since the building of Burrendong Dam in the 1960s there have been dramatic changes to the flow regime of the Macquarie River. Attempts have been made to allocate a share of the water to maintain river and wetland health, but the dynamism of the ecological system makes it difficult to make effective management decisions.

Fieldwork has recently been completed which aimed to gain a better understanding of the situation in the Marshes from the perspective of experienced, on-ground managers, who often have an intimate knowledge of the systems in which they work. The preliminary results suggest the Marshes are critically threatened and there are serious impediments to their effective conservation and management.

While there are local and ecological management issues, such as dealing with weeds and feral animals, inadequate delivery of water is by far the greatest threat. Since the building of the dam there has been a large decrease in the amount of water reaching and flowing through the Marshes, as it is now extracted for town supplies and agriculture. There are also physical and bureaucratic hindrances to best use of the share of water allocated to the environment. For example, the size of the outflow from the dam and threat of litigation from those who have developed the floodplain means that, even if water is available, it is difficult to deliver floods to achieve the best environmental outcomes.

Many of the problems of water delivery seem to arise from a complex interplay between the high profit returns from some irrigation industries, water management by government agencies, and lack of political will to make effective changes to the bureaucratic and institutional system.

High profits from cash-crop production are obtained partly because many producers were originally granted water entitlements at minimal cost, and now contribute only by paying a fee for the annual delivery costs (approximately $8/ML). They do not pay the true value of the resource, which is currently traded at $200–300/ML. In addition, the current market price only reflects the marginal value of water in the high value irrigation industries, and does not take into account its value for the ailing river system. Hence, it can be argued that the real costs of production are borne by the environment.

Another problem is that agencies responsible for water delivery were historically set up to cater for production activities, rather than to use natural resources sustainably. For example, it has generally been assumed that off-river irrigation schemes, which deliver water in open channels to areas which previously had relatively little access to water, has been appropriate. Yet, such schemes not only result in considerable waste of water through evaporative loss, but also create greater demand for an already limited resource. The on-ground managers of the Marshes suggest that this traditional resource use mind-set has changed very little. They point to the difficulty they experience when trying to get environmental water delivered in a way that achieves the most effective conservation outcomes. They are also concerned that government water regulation agencies, which are supposed to cater for all sectors of society and the natural environment, appear to favour certain stakeholder groups.

Lastly, managers believe that a major obstacle is the lack of political will to make a real commitment to the Marshes' conservation. This appears to be due to the influence and lobbying of irrigation industries (driven in part by the high profits), and the 'water experts' advising the politicians, who are often from agencies without a strong environmental focus. There is also a lack of counter-pressure from the general public, who appear to be largely unaware of the threat to the Marshes, and the causes and implications.

BY IOAN FAZEY,
*Centre for Resource and Environmental Studies, Australian National University*

## Farm wetlands for birds

**Birds Australia's Birds on Farms survey, mostly of grazing farms in the south-east, found that:**

- **Bird diversity increases by 3% with each additional farm dam.**
- **Woodland bird diversity is 21–22% greater on farms with a river or major creekline.**
- **For every 10 m increase in the distance to permanent water, the diversity of waterbirds decreases by 10%.**
- **Waterbird diversity increases by 14% with each additional wetland feature, such as:**
  - **Shallow flats, as well as deep pools.**
  - **Old trees and fallen trees in the water and around the wetland.**
  - **Tree cover and dense, shrubby vegetation surrounding and over-hanging the water.**
  - **Islands where birds can nest and roost.**
  - **Exclusion of stock from a 40–50 m strip either side of creeks and up to 100 m from farm dams and rivers.**

A Pacific Black Duck, the most common and widespread of Australia's ducks. Photo by **Raoul Slater**

Duck nesting boxes stands high and dry during a drought. Photo by **Michael Weston**

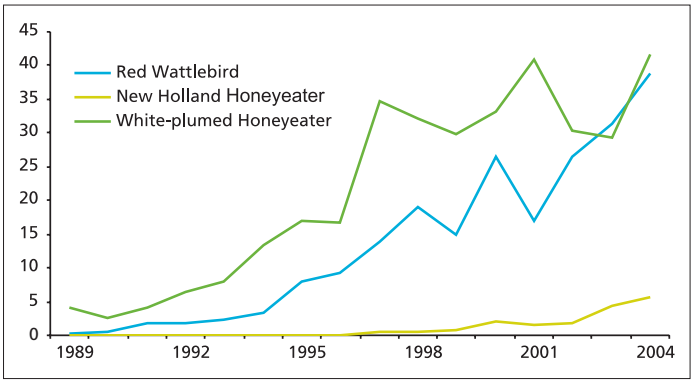
## Creating more wetland habitat for birds

Remarkable restorations of wetlands that had been drained, damaged or disturbed, have benefited the general environment, wildlife and humans. For example:

- Over 40 years a family has beautified their 800 ha grazing property, Lanark, in Victoria's Western Districts and buffered it against drought, by reinstating wetlands, planting trees and fencing off areas. In the process, birds have returned, gradually increasing from 40 species to nearly 200, among them about 45 repatriated wetland species (see supplement to *Wingspan* Vol. 9 No. 1 1999).
- The Yarra River is a focus for the city of Melbourne, Victoria, and a source of recreation. Despite efforts to improve the state of the river and associated wetlands in the last decade or so, the National Land and Water Audit in 2000 and 2002 found that 33% of the Yarra River catchment is affected by excessive nutrients and turbidity, water quality exceeds safe levels of nitrogen and phosphorus content, and 70–100% of the sustainable water flow is diverted from the river. These and other impacts threaten more than half of the river's ecosystem, and are associated with a decrease in bird abundance. Restoration work is underway and includes extensive revegetation with native species and weed control carried out by local community and environment groups, to reduce erosion and sedimentation, thereby stabilising the river's banks and improving water quality.
- The 883,567 ha Coorong tidal wetland, at the mouth of the Murray in South Australia, suffers from dryland salinity, loss of native vegetation, poor water quality and lakeshore erosion. It supports diminishing numbers of migratory wading birds (see *The State of Australia's Birds 2003*, p. xvii). Since 1995 landholders, and conservation and industry groups have been striving to restore the region's health by such on-ground works as revegetation with native species, planting of deep rooted pastures, and farm forestry.
- Within a month of the removal of the encroaching mangroves and weeds at Stockton Sandspit, Hunter River Estuary, New South Wales, thousands of migratory and resident waders had returned to roost at high tide. A hide for those wishing to view the birds, and interpretive signage have been erected to lessen disturbance to the birds.

Another approach is to create new wetland bird habitat:

- Near Bribie Island, Queensland, a new residential development could have been a disaster for an important shorebird roost, but an artificial roost was constructed nearby and has held up to 2,500 shorebirds.
- The Stockyard Plain Disposal Basin Reserve, South Australia, was created in 1992 to reduce salinity levels in the Murray River at Morgan. Saline water is pumped from the ground before it reaches the river and discharged onto the Plain. Landholders, community groups and governments have planted trees and reduced pests, so that the once badly degraded farmland now offers wetland habitat for about 130 bird species, including about 10,000 Black Swans.




In 1989 revegetation began adjacent to Edithvale Wetlands, Victoria, with the main work since1993; consequently, woodland birds have colonised and increased in abundance. Source: **Mike Carter (Melbourne Water and Birds Australia)**

*Left:* Little Grassbird increasing nationally.
*Below:* Nankeen Night Heron decreasing nationally.
Photos by **Peter Merritt**

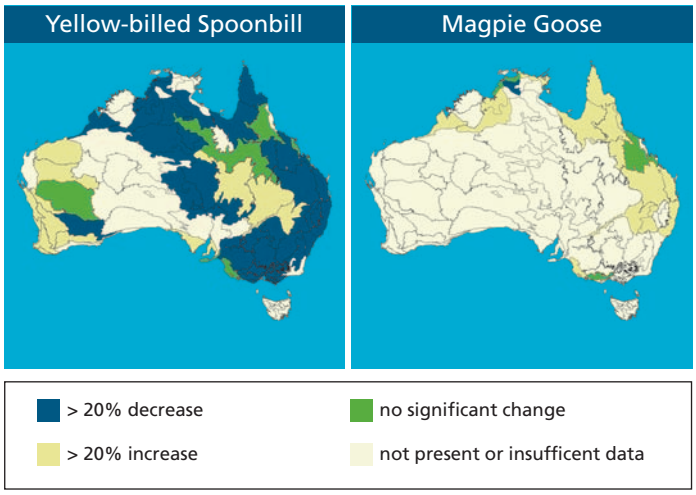
# National overview

## The national atlas

The first national Birds Australia Atlas was conducted from 1977 to 1981 and the second 20 years later, from 1998 to 2002. This section presents the broad patterns and changes between Atlases. It should be noted that each Atlas is a snapshot in time, hence any differences between them do not necessarily reflect long-term trends, particularly for dynamic bird groups such as waterbirds. Nonetheless, interpreted cautiously, with regard to other information, the comparison can be a useful indicator of change.

## *Declining wetland birds*

Among the 20 species that showed a uniform pattern of decline in reporting rate between Atlases across their range, eight were waterbirds (see table). Several other species decreased regionally, particularly in the south-west, perhaps due to salinity. These include the resident White-necked Heron, Nankeen Night Heron, Glossy Ibis, Yellow-billed Spoonbill (see map), and Red-kneed Dotterel.




Regional change in reporting rate between Atlases (1977–1981 and 1998–2002) for the Yellow-billed Spoonbill, which declined overall, and Magpie Goose, which increased (and has been reintroduced to Victoria); calculated according to IBRA (Interim Biogeographical Regionalisation of Australia) region. Source: ***The New Atlas of Australian Birds*** **(2003)**

## *Increasing wetland birds*

Of the 83 species that were reported more frequently nationally in the second Atlas, six were waterbirds or species associated with waterways (see table). Species that increased regionally included the Magpie Goose (see map), Wandering Whistling-Duck, Pacific Black Duck, Australasian Shoveler, Chestnut Teal, Australasian Grebe, Marsh Sandpiper, Clamorous Reed-Warbler, Little Grassbird and Golden-headed Cisticola.

**Change in reporting rate between Atlases 1977–1981 and 1998–2002 for the more common water-associated birds that showed a uniform change across their national range**

| | | | | | |
|---|---|---|---|---|---|
| Black-necked Stork | – | Terek Sandpiper | – | Cape Barren Goose | 0 |
| Pied Heron | 0 | Wood Sandpiper | 0 | Red-necked Stint | 0 |
| Red-necked Avocet | 0 | Little Tern | 0 | Sanderling | + |
| Brolga | – | Curlew Sandpiper | – | Cotton Pygmy-goose | 0 |
| Cattle Egret | 0 | Common Sandpiper | 0 | Beach Stone-curlew | 0 |
| Grey Plover | 0 | Fairy Tern | 0 | Buff-banded Rail | ++ |
| Australian Bustard | – | Pacific Golden Plover | – | Australasian Gannet | 0 |
| Australian Spotted Crake | 0 | Grey-tailed Tattler | 0 | Sooty Oystercatcher | 0 |
| Lesser Crested Tern | 0 | Radjah Shelduck | + | Comb-crested Jacana | ++ |
| Black-tailed Godwit | – | Double-banded Plover | – | Black-faced Cormorant | 0 |
| Bar-tailed Godwit | 0 | Great Knot | 0 | Banded Stilt | 0 |
| Common Tern | 0 | Green Pygmy-goose | + | Kelp Gull | ++ |

The symbols indicate a change in reporting rate between Atlases as follows:
- decrease of up to 49%; 0 no significant change; + increase of up to 49%;
++ increase of 50% or more. For details of survey and statistical methodology see ***The New Atlas of Australian Birds*** **(2003).**

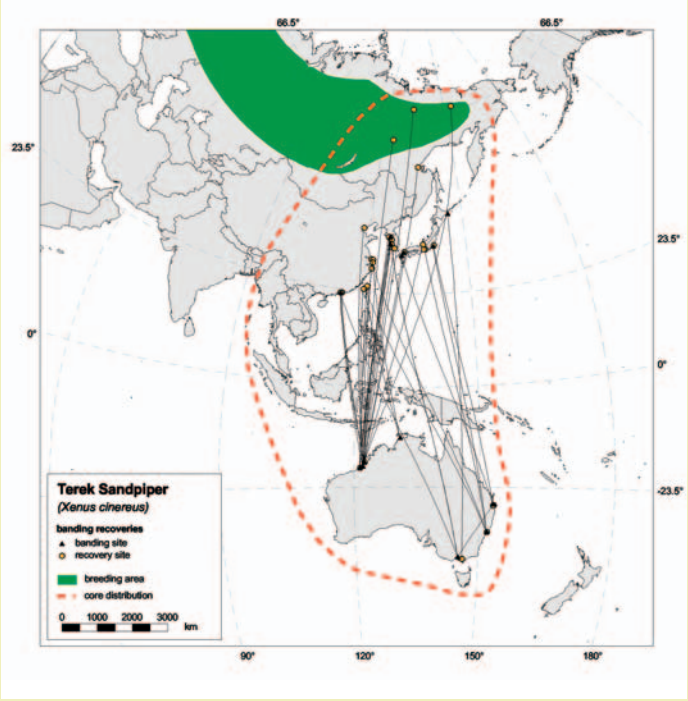
## Long-term monitoring programs

Throughout Australia, dedicated bands of volunteers count wetland birds, providing important long-term data sets on the populations of Australia's wetland birds. Many of these counts are shown on the map (central pages: pp. xii–xiii). Several of the graphs show the regular comings and goings of migratory species, such as Clamorous Reed-Warblers at Edithvale, Victoria, or Black-tailed Godwits at Mackay, Queensland. Others illustrate the irregular patterns of movement of certain residents, which move between wetlands, staying only as long as favourable conditions prevail. Examples include Australian Shelducks at Lake Mitre, western Victoria, and Red-necked Avocets at the Alice Springs sewage treatment plant, Northern Territory.

Understanding what drives these changes between years is difficult. Local and distant conditions influence waterbird distribution as well as abundance. The suitability of wetlands varies across the continent and through time: in the tropical north it is determined largely by the wet/dry seasons, in the south by the more regular dry summer/wet winter seasonal pattern, and in the interior by unpredictable rains. While the unusually high numbers of Purple Swamphens at Edithvale in 1994–1996 may be due to successful breeding at the site, high peaks of Sharp-tailed Sandpiper numbers in 1999 and 2003 at the same wetland might be due to in part to successful breeding of the species on the Arctic tundras. High numbers of Black Swans at Lake Gore (southern Western Australia) after 1999 may reflect that the lake was particularly suitable at that time.

Despite high variability, long-term trends are evident. For example, Australasian Shoveler numbers at Logan's Lagoon on Flinders Island, Tasmania, have increased in recent years. Conversely, breeding Cattle Egret numbers near Newcastle, New South Wales, seem to have declined in recent years, as have Nankeen Night Herons. Similarly, Red-necked Stints have apparently declined on the Swan Estuary, Western Australia, and Australian Shelduck at Lake Mitre since the late 1980s and early 1990s. These trends might reflect the condition of catchments, which is poorest in the south-east and south-west of the country (see central pp. xii–xiii).

Tracking wetland bird populations relies on long-term data sets from many wetlands and will also require a much better understanding of how wetland birds move and live. We have a long way to go before we are able to track the populations of most wetland birds in Australia effectively.

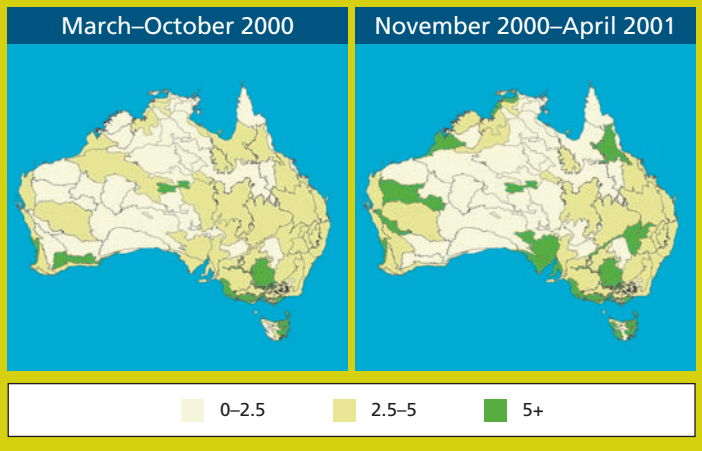



Recoveries and sightings of Terek Sandpipers—banded and flagged in Australia where they spend the non-breeding season—as they move to and from the eastern section of the species' breeding grounds. Source: **Clive Minton and the Australasian and Victorian Wader Studies Groups**

## The wetland network

Waterbirds are among the most mobile of birds, many are dependent for their survival on a national and even an international network of wetlands (see Terek Sandpiper map above). Resident waterbirds must move to take advantage of Australia's ever changing surface water (see Black-tailed Native-hen and duck maps below left). Management of these systems requires cross-border cooperation. International migrants spend the austral summer feeding and resting before returning to breed as far afield as Siberia and Alaska.

A Black-tailed Godwit, fitted with a yellow flag in Australia and sighted on migration at Geum Estuary, Korea. Photo by **Hansoo Lee**

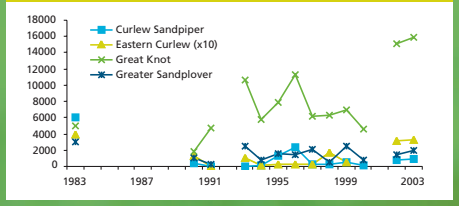



## Ducks and rainfall

Wetland birds are particularly responsive to rainfall, making them difficult to census. More importantly, these responses point to the importance of a national network of wetland options for mobile waterbirds. During wet periods many disperse widely across the continent, contracting to areas with more permanent surface water in dry times (see maps).

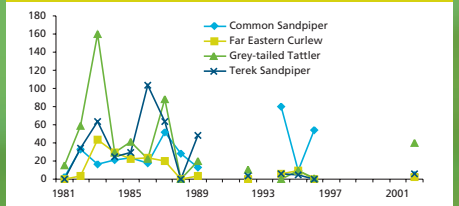
Regional reporting rates for ducks during a recent wet period (March–October 2000; left) compared with a dry period (November 2000–April 2001; right). In the wet months ducks were more scattered across the country, during the dry months they concentrated in more coastal areas and had deserted large areas of the inland.
Source: **Ongoing Atlas of Australian Birds**

### ROEBUCK BAY, WA



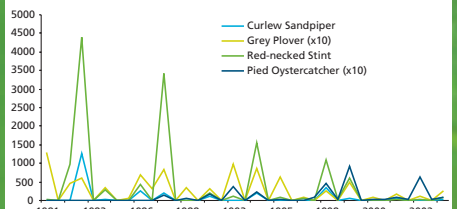

6 Source: **Australasian Wader Studies Group (summer counts)**

### DARWIN, NT



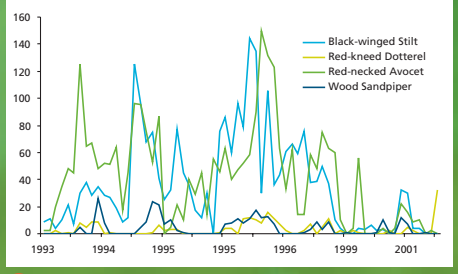

1 Source: **Australasian Wader Studies Group (summer counts)**

### SWAN ESTUARY, PERTH, WA

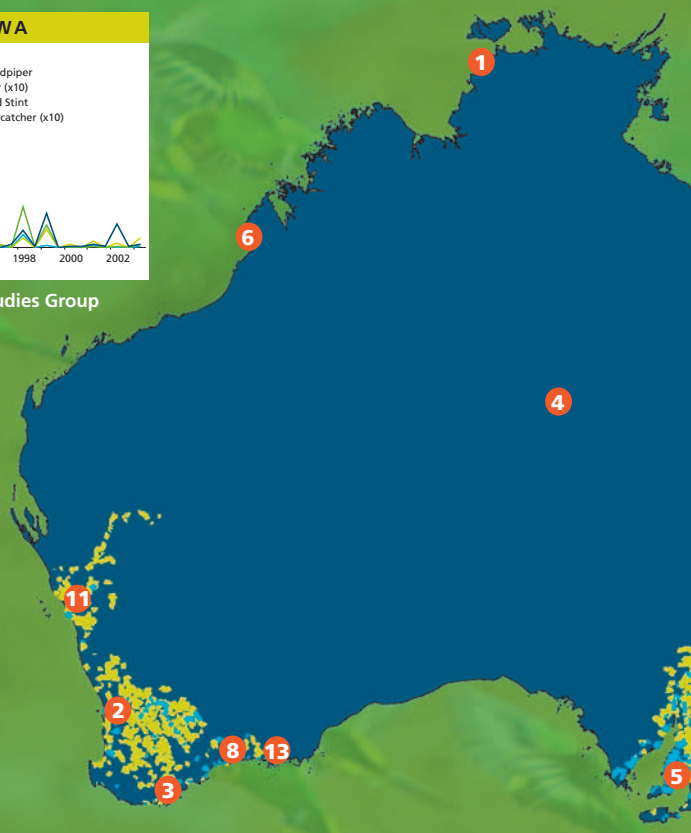



2 Source: **Australasian Wader Studies Group**

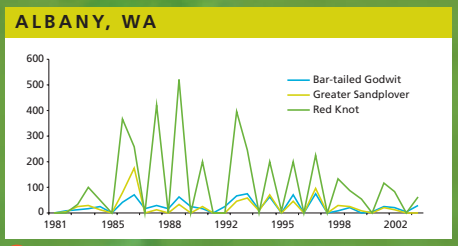
### ALICE SPRINGS SEWAGE PONDS, NT




4 Source: **Australasian Wader Studies Group**

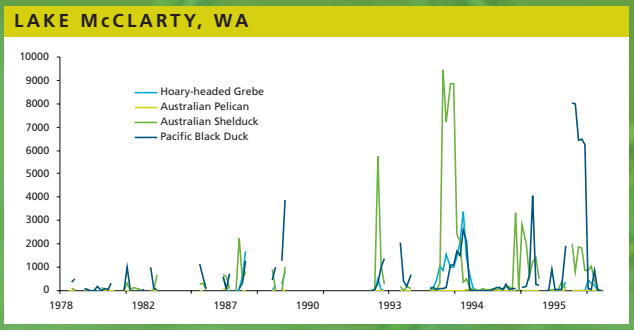



### ALBANY, WA



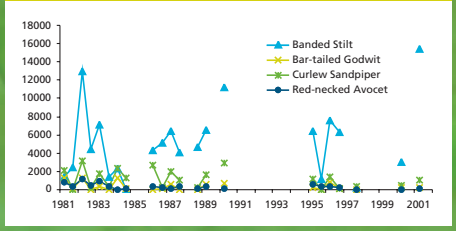

3 Source: **Australasian Wader Studies Group (winter and summer counts)**

### LAKE McCLARTY, WA



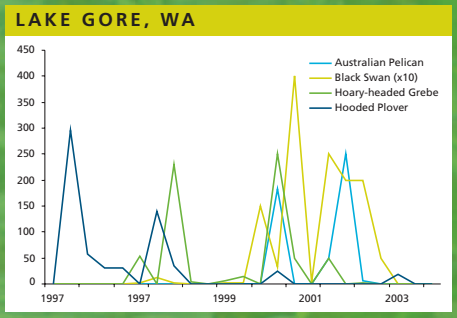

11 Source: **Marcus Singor, Michael Craig, Tony Kirkby, Colin Davis**

### PRICE SALTFIELDS, SA



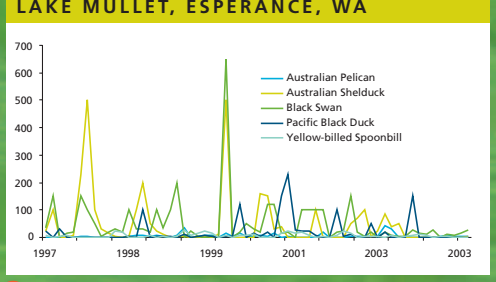

5 Source: **Australasian Wader Studies Group**

### LAKE GORE, WA



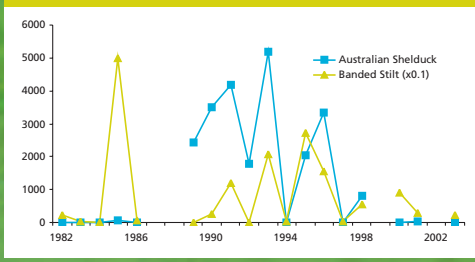

8 Source: **Ongoing Atlas of Australian Birds**

### LAKE MULLET, ESPERANCE, WA



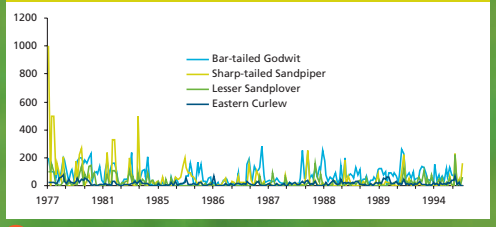

13 Source: **Australasian Wader Studies Group**

### MITRE LAKE, VIC



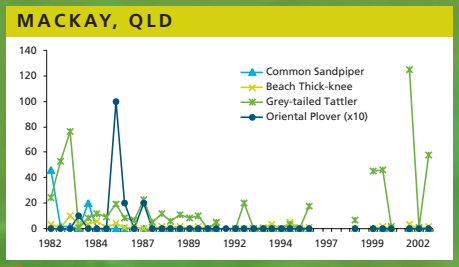

14 Source: **R. and M. Alcorn, R. Sutherland (maximum counts)**

## CAIRNS FORESHORE, QLD



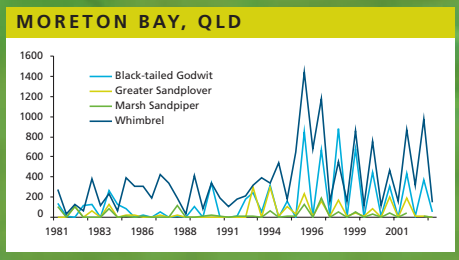

12 Source: **Australasian Wader Studies Group**


## MACKAY, QLD




7 Source: **Queensland Wader Studies Group and Australasian Wader Studies Group**

## MORETON BAY, QLD

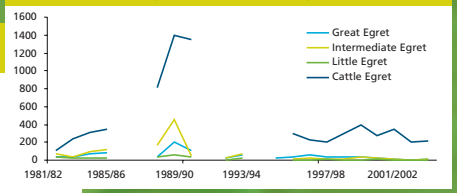



9 Source: **Queensland Wader Studies Group and Australasian Wader Studies Group**

**The graphs show counts of variety of wetland birds at a range of sites; they show trends at that site, but are not necessarily representative of regional trends. The map shows river reaches with modified catchments, habitat, nutrient and suspended sediment loads. The worst affected are those in highly modified catchments that have lost much of their riparian vegetation and have dams and levees that disrupt movement of biota and material in the river (lime green areas). These reaches are located in parts of the Murray-Darling Basin, south-west Western Australia, western Victoria, and the South Australian wheat-growing areas. The light blue areas are also modified, but less severely. Source: National Land and Water Resources Audit, Assessment of River Condition (2001).**

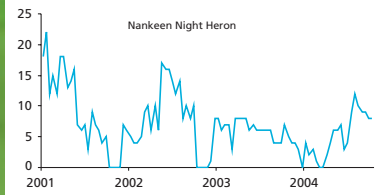
**Footnote:** For certain species, counts had to be scaled to fit with others on the graph: so that x0.1 denotes that the count was scaled down, for example, from 2000 to 200; and x10 denotes that the count was scaled up, for example from 200 to 2000.

## THE WETLAND CENTRE AUSTRALIA, SHORTLAND, NEWCASTLE, NSW



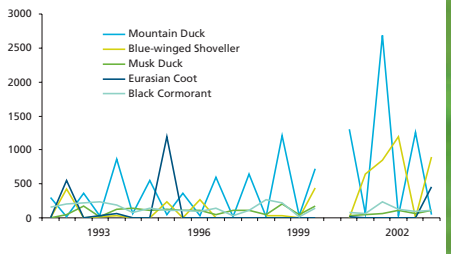

Source: **Max Maddock** 18

## ROSS WALLBRIDGE RESERVE, NEWCASTLE, NSW



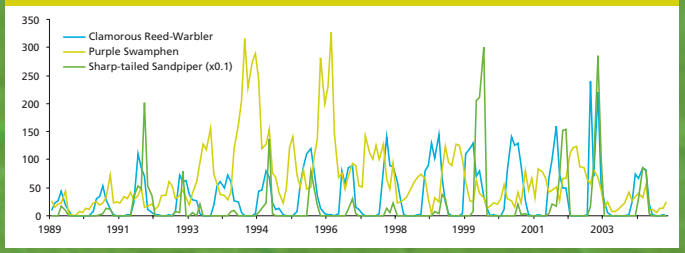

17 Source: **Max Maddock Ross Wallbridge Reserve, Raymond Terrace, Newcastle, New South Wales**

## MOULTING LAGOON, TAS



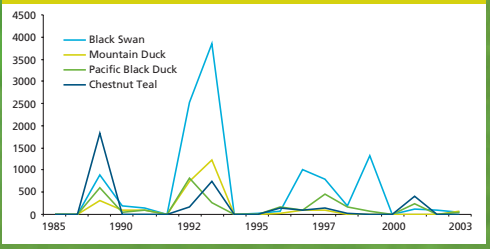

10 Source: **Stewart Blackhall, DPIWE Group**

## EDITHVALE WETLAND, SOUTH-EASTERN MELBOURNE, VIC




16 Source: **Melbourne Water Corporation, Mike Carter, Birds Australia (monthly counts)**

## LOGANS LAGOON, FLINDERS ISLAND




15 Source: **Stewart Blackhall, DPIWE**

An Australian White Ibis colony at Bool Lagoon, South Australia. The species is one of the few that has benefited from pastures and farm dams. Photo by **Nicholas Birks**

# REGIONAL REPORTS

## SOUTH-EASTERN AUSTRALIA

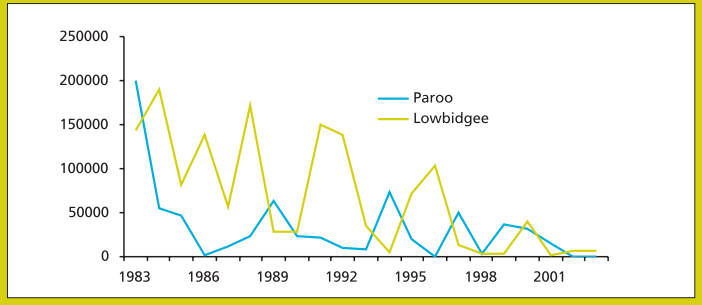
On 25 June 2004, the Prime Minister and Premiers of New South Wales, Queensland, Victoria and South Australia signed what was described as the historic National Water Initiative. The agreement acknowledged the poor state of many of Australia's rivers, mainly from over-allocation of water to agriculture, and the need for restoration. The River Murray is guaranteed an additional 500,000 ML each year (about the capacity of Sydney Harbour). What does this mean for waterbirds?

It is hard to predict what the long-term prospects are for waterbirds, but they will certainly be improved. To understand the extent of the current problem, we need to review briefly the state of waterbird populations in our most developed river basin, the Murray-Darling Basin, which accounts for about 70% of Australia's water use. Despite their considerable mobility and unpredictability, waterbird numbers and diversity have declined in many core wetlands in the Murray-Darling Basin. They have fewer places to feed and breed. The Coorong in South Australia is supporting diminishing numbers of migratory wading birds (see *The State of Australia Birds 2004*), and waterbird numbers have declined in the Macquarie Marshes and Menindee Lakes, and collapsed in the Lowbidgee (see graph), the major floodplain of the Murrumbidgee River. This is the result of loss of feeding habitat from less frequent flooding or, occasionally, too frequent flooding. The dead trees of Menindee Lakes betray an ecosystem that has lost much of its ecological productivity for waterbirds, as aquatic plant and invertebrate populations decline. Nevertheless, such changes are relatively small compared to the extensive and inexorable loss of flooding on nearly every major river system in the Murray-Darling Basin.

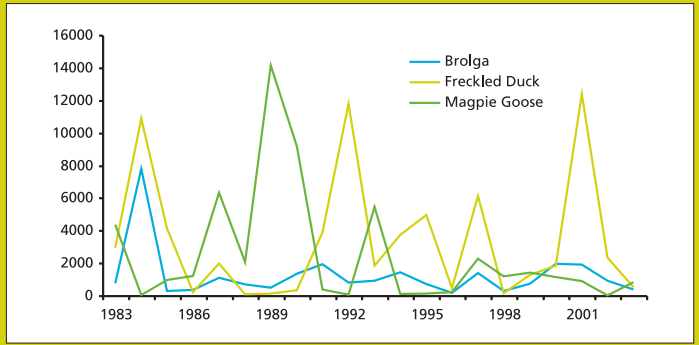
The breeding of colonial waterbirds is turning out to be a key measure of river health. Of all the species that are sensitive to river flows, the colonially breeding ibis, herons, egrets, cormorants and spoonbills are particularly responsive to large floods on our rivers. They only breed when certain thresholds of overbank flows are exceeded. Over the last 50 years, the frequency and extent of such flows and the breeding events that they spawn have declined considerably in the Barmah-Millewa Forest, Gwydir wetlands, Booligal Swamp, Narran Lakes and the Lowbidgee. These are not just the Murray-Darling Basin strongholds for breeding waterbirds but are also of continental importance, as most of the largest colonies and most frequently breeding colonies occur in this part of Australia. The extent of this impact is considerable. For example, we estimated that river regulation and diversions upstream could be preventing about 100,000 pairs of colonial waterbirds from breeding in the Macquarie Marshes, and this number will double in 11 years.

The construction of dams, and subsequent diversion of water and building of levee banks, is the greatest problem for waterbirds in the south-east of the continent, with implications for their populations across Australia. We know little of the compounding effects of water resource development and drought on wetland dependent birds. On the doorstep, climate change and reafforestation are predicted to reduce river flows further, while the ever-present salinity threat may be increasing its hold. At least governments have recognised the problem. Future generations will tell us whether we realised how big a problem it was and whether we did enough about it.

BY RICHARD KINGSFORD, *New South Wales Department of Environment and Conservation*




Total waterbird counts from aerial counts at two western NSW wetlands. Waterbird numbers have declined by more than 80% on the Lowbidgee wetlands as a result of water diversions upstream and floodplain development. Abundances on the near pristine Paroo River overflow lakes reflect natural patterns of drying and flooding on inland wetlands. Source: **Kingsford and Thomas (2004) and Kingsford *et al.* (2004)**




Estimated numbers of selected species counted during aerial counts of eastern Australia, 1983–2003. Source: **Richard Kingsford and John Porter (NSW DEC), East Australian Aerial Count**

## Pervasive waterbird decline in the NSW central-western slopes

The mid-Lachlan and upper-Macquarie valleys of the Murray-Darling Basin extend from Dubbo south to Yass and west to Condobolin and Junee, and include Lake Cowal. Over the 20 years of bird atlasing, agriculture has diversified, although mixed farming (sheep, cattle, crops) still predominates over most of the region. With the increasing development of irrigated crops and pastures, considerably more water is extracted from the rivers and storages now than 25 years ago. There are many more farm dams in place, and two recent shifts in standard agricultural practice have also greatly reduced surface runoff: conservation tillage whereby stubble and off-season growth are retained until the next crop (as opposed to ploughed fallow paddocks), and the conversion from short-rooted annual pastures to deep-rooted perennials. All these developments have probably contributed to the great decline in seasonal wetlands and swamps in the region.

The analysis of reporting rates of 46 species of waterbird recorded in the region in 11 or more years between 1981 and 2000 paints a gloomy picture. There appear to be few winners and many losers. Most species show signs of long-term decline (see table). Considering the overall trends, 29 species trend down and five species up. The Black-fronted Dotterel has suffered the worst decline—a fourfold decrease in 20 years (see graph). Four basic types of trend were detected (see examples in the graphs): linear increase (five species); linear decrease (21 species); humped so that the species was in decline for at least the last 10 years (8 species); and no trend towards long-term change (12 species).

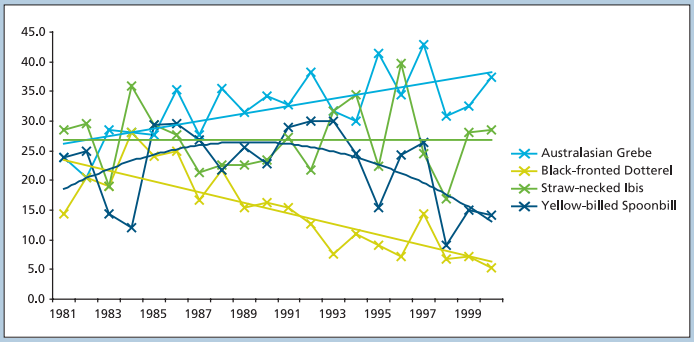
Will these waterbird declines continue, or will reporting rates stabilise at some lower equilibrium? We do not know, but these results point to a regional level of agricultural development which is ecologically unsustainable. Under current farming systems, too much water is being pumped out of the rivers by irrigators, and too much of the overland flow is captured in farm dams, further exacerbating the thirst of rivers. Just as excessive loss of natural wooded habitat has endangered many of the region's woodland birds, so the loss of natural wetlands is impacting on the waterbirds. It is little consolation that the latter may be better buffered by their greater ability to disperse long distances.

by Julian Reid, *CSIRO Sustainable Ecosystems,*
and Dick Cooper, Brian Curtis and Ian McAllan,
*New South Wales Bird Atlassers Inc.*

**Population trends for wetland birds in the mid-Lachlan and upper-Macquarie Valleys, 1981–2000. The species followed by a plus or minus showed a tendency towards linear change in the direction indicated**

| Significant linear decline (16[1]) | No significant trend (18[1]) |
|---|---|
| Black-fronted Dotterel | Banded Lapwing – |
| Red-kneed Dotterel | Black-tailed Native-hen – |
| Glossy Ibis | Intermediate Egret – |
| Black-winged Stilt | Purple Swamphen – |
| Eurasian Coot | Latham's Snipe – |
| Pink-eared Duck | Blue-billed Duck |
| Dusky Moorhen | Plumed Whistling-Duck |
| Hardhead | Australian Pelican |
| Nankeen Night Heron | White-necked Heron |
| Great Cormorant | Little Pied Cormorant |
| Sharp-tailed Sandpiper | Australasian Shoveler |
| Silver Gull | Marsh Sandpiper |
| Royal Spoonbill | Australian Shelduck |
| Whiskered Tern | Straw-necked Ibis |
| Masked Lapwing | Pied Cormorant |
| Black Swan | Little Black Cormorant |
| **Humped decline (81)** | Australian White Ibis |
| Musk Duck | Grey Teal + |
| Great Egret | **Significant increase (41)** |
| Red-necked Avocet | Australasian Grebe |
| Yellow-billed Spoonbill | Australian Wood Duck |
| Darter | Pacific Black Duck |
| Hoary-headed Grebe | White-faced Heron |
| Chestnut Teal | Freckled Duck |

[1]*Total number of species in that category*




Examples of the three contrasting linear trends in reporting rate—Australasian Grebe, increasing; Straw-necked Ibis, flat; and Black-fronted Dotterel, declining—and a humped decline (the Yellow-billed Spoonbill). Note that the lower survey effort in the first five years resulted in wild fluctuations in reporting rate, particularly for less common species. Source: **New South Wales Bird Atlassers Inc.**

## Macquarie Marshes

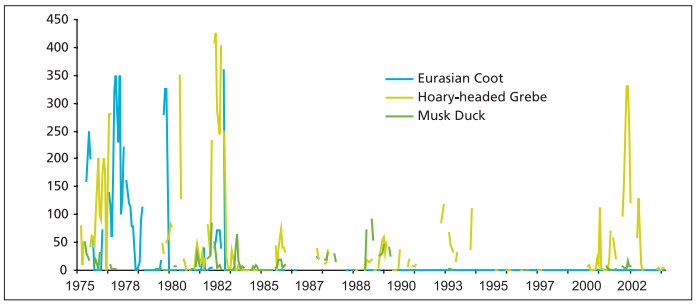
**A visit to the Macquarie Marshes today is not pleasant. This magnificent wetland reels from the impact of a major drought and water resource development upstream. In the nature reserve, thousands of hectares of Red Gum are dying from lack of water. Colonial waterbirds have not bred since 2000, the longest period on record. What does this mean for continental populations? The Marshes may be the nation's most important breeding site for these species. Prospects for breeding in 2004 look grim, with an almost empty dam and blue skies. Many fear that we still have not adequately seen the real long-term ecological costs of water resource development, despite the river valley arguably being the best served in the country in terms of environmental flows. Droughts are natural but before water regulation the Marshes would have had some respite, even in the worst of droughts. For example, the flood in early 2003 would previously have sustained the Marshes through this drought, but the water made it no further than Burrendong Dam's wall, near Wellington. It is hard to be optimistic about how resilient this wetland will be. Floods will inevitably return and many parts of the Marshes will bounce back but, like the bounce of a tennis ball, the next one may only be half as high. And then what shape will the wetland be in when the next drought hits or the predicted effects of climate change or reafforestation remove more water upstream?**

by Richard Kingsford,
*New South Wales Department of Environment and Conservation*

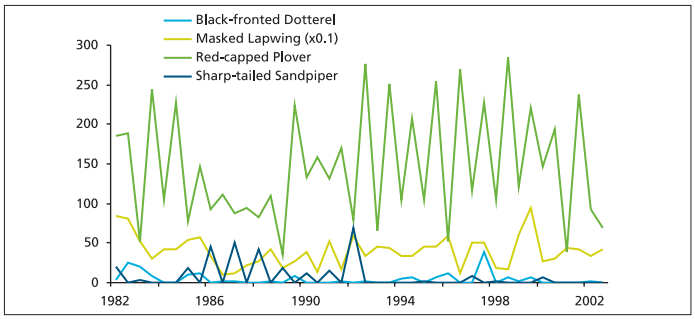
*Left:* Pink Lakes, Victoria: natural salt lakes which evaporate over summer leaving salt crusts over black mud. Photo by **Michael Weston**

*Below:* Populations of Plumed Whistling Ducks, of northern and eastern Australia, appear to be stable. Photo by **Ian Montgomery**

Nesting Great Crested Grebes, a rare sight in Tasmania, where they breed only on a few impoundments. Photo by **Peter Merritt**




Numbers of Hoary-headed Grebe, Eurasian Coot and Musk Duck in the Cape Portland area, north-east Tasmania. Numbers fluctuate substantially, partly because some birds move across Bass Strait in relation to prevailing conditions on the mainland, with influxes when conditions on the mainland are dry. Source: **Ralph Cooper**




Counts of four shorebirds in the Derwent Estuary, which seem to be faring well, with the possible exception of the Sharp-tailed Sandpiper. Source: **AWSG and Stewart Blackhall (DPIWE)**

## TASMANIA

The last ten to fifteen years have seen interesting changes in Tasmania's wetlands and waterbird populations. Traditionally, wetlands have received enough rain in winter to last through the following summer. These patterns seem to be changing, with drier winters and heavy rainfall events in early summer. The water left by these storms then frequently evaporates quickly, leaving many shallow wetlands dry for most of the year. This has caused stress to bird populations in parts of the State.

The summer of 2002–2003 was the driest on record for much of south-east Australia and brought influxes of species not usually seen in Tasmania. There were many hundreds of Hardheads present throughout the State and several people commented on seeing them for the first time. An even more interesting event occurred on Flinders Island, when approximately 3000 Banded Stilts arrived and spent about six months feeding in the shallow brackish lagoons along the east coast of that island. Records of this species going back to the 1800s have only ever been of numbers less than ten.

A waterbird count is carried out each year in early February, prior to the duck hunting season. This has been done for 19 years and although there have been problems with consistency and methodology, which are now being addressed, it is felt that the results are sufficiently accurate to pick up major long-term trends in populations (see graph).

Cape Barren Geese, brought back from the edge of extinction in Tasmania, but still Vulnerable in south-western Australia. Photo by **Nicholas Birks**

The most serious threat to waterbirds other than climate change is alteration of habitat. In the past ten years there has been a significant change in agricultural practices, from extensive livestock grazing to intensive cropping. This has led to an increased demand for water for irrigation and a consequent increase in extraction from and damming of creeks, streams and rivers. This has had an as yet unknown effect on waterbirds. It may be that the creation of impoundments will provide alternative habitat for some species. An example is the Great Crested Grebe. For many years its only known breeding place in the State was Lake Dulverton, a shallow modified lake in the central midlands. This lake dried out completely in 1993 for only the third time in living memory and has not refilled since. Subsequently, the grebes have bred on an impoundment near Triabunna on the east coast and possibly on another impoundment in the central highlands. Another species of interest is the Australian Wood Duck. It has been known in Tasmania since the late 1800s but did not increase significantly until the 1980s and 1990s. It has now reached the point where a hunting season has been declared for a trial period of three years. The sudden expansion seems to coincide with the drier periods mentioned above and has probably been assisted by the spread of cropping and farm dams.

BY STEWART BLACKHALL, *Nature Conservation Branch, Department of Primary Industries, Water and Environment*

## Western Australia

Improved knowledge of waterbird distributions in Australia is showing that the arid zone is an important nursery for waterbirds, something that was poorly recognised as recently as 25 years ago. The use of arid zone wetlands in Western Australia is in the early stages of documentation, but Lake Gregory, Fortescue Marsh and Mandora Marsh in the north, together support over a million waterbirds during the late dry season in some years and are important breeding sites. However, it must be emphasised that Fortescue and Mandora Marshes flood only occasionally, so that waterbird populations are maintained only if other suitable wetlands in the arid zone, or elsewhere, are flooded when these lakes are dry. Thus, it is important to ensure that a network of big wetlands with high waterbird carrying capacity, throughout the arid zone and elsewhere, is conserved.

In south-west Western Australia, it is likely there has been a substantial reduction in numbers of waterbirds over the past 50 years, which may have been partly masked by range expansions of arid-zone species, such as the Australian Wood Duck and Pink-eared Duck, in conjunction with land-clearing in the wheatbelt. However, the distribution of always-rare species such as the Australasian Bittern has contracted, breeding colonies of species requiring live trees or dense fringing sedges in wetlands have disappeared from the wheatbelt, and there is anecdotal evidence of reduction in numbers of several species of waterfowl, including Pacific Black Ducks and Australasian Shovelers.

The major threat to waterbirds in the wheatbelt is salinisation. As a result of extensive clearing of native vegetation groundwater is rising and surface waters are becoming more saline. Although the number of wetlands has increased (many have been created by rising groundwater), increase in water salinities has prevented many species from using these or existing wetlands because they cannot cope with salt levels. Higher salinities have also killed fringing wetland vegetation and, consequently, waterbird nesting habitat.

Historically, coastal wetlands have been viewed as drought refuges and some of them, particularly estuaries, fulfill this function, although recent evidence suggests birds often move to other inland wetlands rather than the coast during the dry season. One of the major values of coastal areas is providing breeding habitat. Small, poorly defined bodies of water flooded only for a few months (rather than lakes) account for more than half of the breeding by ducks. On the Swan Coastal Plain, and adjacent to coastal towns, such areas are still at risk from clearing, drainage and landfill for urban development, horticulture and industry, despite environmental protection policies. Their loss is another major threat to waterbird populations.

One of the causes of waterbird decline in south-west wetlands appears to be a 20% decline in rainfall over the past 30 years, an ongoing trend often attributed to climate change.

A major impediment to better targeted waterbird conservation is the lack of an overview of population trends that would enable prioritisation of management effort. Waterbirds are highly mobile and numbers of a particular species at an individual wetland usually change over time because of variation in local conditions at the wetland and extent of rainfall elsewhere, rather than a change in status of the species. Assessment of species status requires monitoring across the range of the species. Although technically challenging, this would change waterbird conservation from the present *de facto* species management, via habitat management at individual wetlands, to more strategic identification of threats to the entire population of species, and appropriate responses.

by Stuart Halse, *Department of Conservation and Land Management*

*Left:* Australasian Bittern. Photo by **Hans and Judy Beste**

*Below:* A Pink-eared Duck incubates: the species has expanded its range in Western Australia but is declining in south-eastern Australia. Photo by **Peter Merritt**

### Australasian Bittern

**In Australia, the secretive, poorly-known Australasian (Brown) Bittern occurs in the south-east and south-west, in inland and coastal zones, and on temporary and permanent waters. It inhabits reedbeds, sedgelands, shrubby swamps and similar habitats, including ricefields and swamps sustained by irrigation.**

**On inland waters the bittern has declined markedly over the past 50 years. In eastern Australia, cessation of floodplain inundation due to water harvesting and alteration of drainage systems has destroyed much seasonal habitat. In the south-west, salinisation of inland swamps since land clearing has meant the bitterns no longer occur inland. The remaining population is reduced to a few hundred birds in semi-permanent freshwater swamps in coastal districts from Perth to Esperance, and perhaps a few thousand from the South Australian Gulfs region to Tasmania and south-east Queensland, mainly in coastal catchments. Though many bittern sites are in protected areas—some remote from urban areas—the coastal zone is subject to intense pressure from housing, semi-rural and other development.**

**Internationally, the Australasian Bittern is considered to be globally threatened (Endangered: IUCN), yet its threatened status is unrecognised under national laws. As one of Australia's most at-risk waterbirds, the species warrants listing under the EPBC Act 1999, and action taken to understand and halt its decline.**

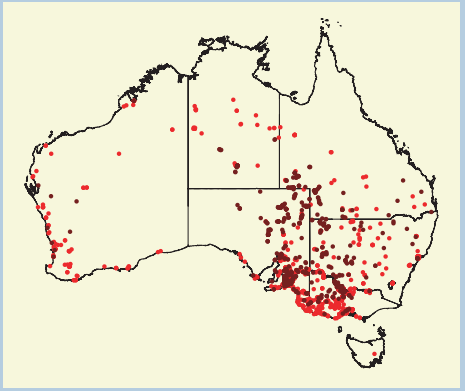
**by Roger Jaensch, *Wetlands International***

## Central drainage system: Lake Eyre Basin

The principal waterbird habitats of the arid inland of central-eastern Australia lie within the internally-draining Lake Eyre and Bulloo-Bancannia Drainage Divisions. There, floodplains of the Channel Country rivers—the Georgina, Diamantina, Cooper and Bulloo—provide extensive freshwater habitats. Swamps dominated by trees, shrubs, grasses, sedges and/or annual herbs complement tree-lined waterholes. At or near the rivers' ends are fresh to saline lakes, some among the continent's largest. Most of these waterbird habitats are temporary, renewed spasmodically—most widely every three to five years—by monsoon-driven floods starting far upriver, and erratic local rain events. Deeper waterholes and some sub-terminal lakes are more persistent. Countless claypans in sand dune swales and on gibber plains multiply the region's temporary waterbird habitat.

The total number of waterbirds in the Channel Country seems to be largest when water is most extensive soon after major floods in the region's principal rivers, usually in summer-autumn. Research since 2000 has shown that at such times waterbirds may be present at mean densities of a few birds per hectare over millions of hectares of inundated floodplain, totalling at least several million waterbirds. Breeding is widespread and urgent, exploiting an opportunity of only three to six months duration. Multi-species (heron, egret, ibis, spoonbill, cormorant) breeding colonies of up to 50,000 pairs may occur, with 10–20 colonies of various sizes on each inundated floodplain. Tens of thousands of Australian Pelicans and Banded Stilts may breed on the region's lakes. At later stages, Pink-eared Ducks and other waterbirds retreat to the sub-terminal lakes, forming aggregations of hundreds of thousands. Drying floodplains, swamps and lakebeds provide important stopover habitat for Sharp-tailed Sandpipers and other migratory shorebirds.

Unlike most Murray-Darling wetlands, the Channel Country wetlands are near pristine in terms of hydrological regime, the absence of tree clearance and scarcity of wetland weeds. In the global context, particularly in arid regions, this is an increasingly rare situation. The Channel Country rivers are at present free flowing and unregulated,



Shift in the distribution of sightings of the Black-tailed Native-hen from mainly inland in 2000 (dark red dots), associated with the flooding of Lake Eyre Basin, dispersing towards the coast and Tasmania in 2002 (red dots), as the Basin dried out. Source: **Ongoing Atlas of Australian Birds**

with substantial protection of flows prescribed in Queensland legislation, or proposed, but vigilance is needed to ensure that controls and implementation are adequate and not weakened over time. Controls are now extending to overland flows, to mitigate the impact of minor barriers to dispersing floodwaters and the cumulative effects of small local storages. The long-term effects of pastoral grazing on wetlands and waterbirds in the arid zone are not yet adequately understood, but stocking pressure must be wisely managed, especially during escalating drought. Appropriate burning regimes in floodplain shrub swamps, especially at breeding colony sites, remain undetermined.

There is mounting evidence that wetland processes and waterbird ecology in the Channel Country differ significantly from the Murray-Darling Basin, Top End or east coast, where much of our knowledge has been gleaned. Thus, studies of waterbird diets and breeding in the Lake Eyre Basin should be given high priority for funding. Investment plans of the relevant regional bodies (e.g., Desert Channels Queensland) under *Natural Heritage Trust 2* address some of the broad conservation issues for wetlands and waterbirds, but cross-border cooperation will be necessary.

by Roger Jaensch, *Wetlands International,* and Julian Reid,
*c/- CSIRO Sustainable Ecosystems*

Black-tailed Native-hen. Photo by **Peter Merritt**

## Northern Territory

The wetlands of northern Australia are considered to be still in a fairly pristine condition. They include extensive areas of unmodified and largely intact waterbird and shorebird habitat. To date only two Ramsar sites (see section on legislation) have been designated in the Top End: Cobourg Peninsula and Kakadu National Park. Recent surveys across the Top End have identified several more areas which could qualify for listing under the Ramsar convention and/or as sites under the East Asian-Australasian Shorebird Site Network. These include the wetlands of the south-west of the Top End; those in the Daly to Finniss River systems and to the west and north of Kakadu; the Arafura Swamps; and around Blue Mud Bay, the Roper River and Port McArthur.

The wetlands of Kakadu National Park are a particularly good example of the many important refuge areas that are critical to the conservation of waterbirds in the Top End. The importance to waterbirds of the Alligator Rivers Region, within Kakadu, has been extensively documented over many years. During the late dry season(August– October), the floodplains of the Alligator Rivers Region are used by up to 2 million waterbirds, including large concentrations of Magpie Geese and Wandering Whistling-Duck. Kakadu National Park is also a major, iconic tourist area and has high cultural and socio-economic significance to Aboriginal people. Hence, Kakadu has also been listed as a World Heritage area on the grounds of both cultural and natural heritage values.

Even though the wetlands of northern Australia are considered to be less disturbed than those elsewhere in Australia, a suite of pressures are affecting their ecological condition and the biota that they support, or are expected to do so in the future. These include:

- loss of extent and diversity of habitat due to introduced weeds such as Mimosa pigra, Olive Hymenachne, Para Grass and Salvinia;
- loss of freshwater habitat due to rising sea level from climate change and consequent saltwater intrusion;
- damage to micro and macro-scale habitats caused by feral animals such as pigs and buffalos;
- the yet unknown potential impacts of Cane Toads;
- changes to historical fire regimes;

Salvinia, a free-floating fern from Brazil—left uncontrolled, during the dry season its thick mats smother waterbird habitat. Source: **Maria Bellio**

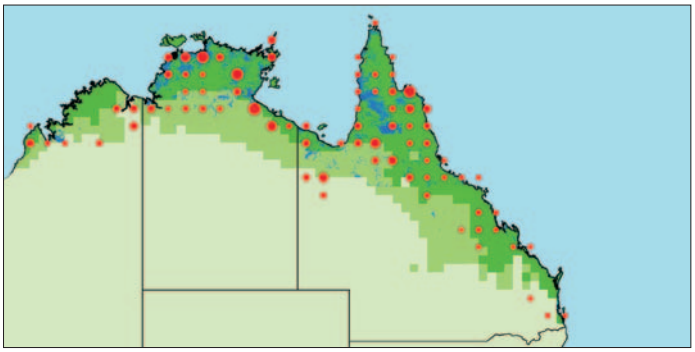
- clearing and modification of hydrology due to water diversions for agricultural practices; and
- disturbances from tourism and other human activities (including hunting).

There is a need to identify wetlands that are vulnerable to one or more of the pressures described above, assess their impacts and seek ways of managing them. The first challenge lies in identifying the extent of wetlands at risk. This is particularly the case in the Northern Territory, where a comprehensive wetland inventory is yet to be conducted. Threats to wetlands and priorities for research are quite well known, but have not often been placed in a spatial context. In addition, the socio-economic values and benefits that wetlands provide are yet to be determined.

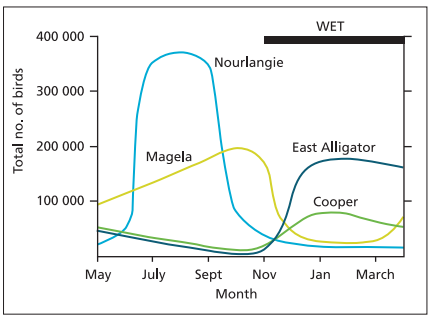
Climate change has been recognised as a major threat for the future. Migratory and resident animals may lose important staging, feeding and breeding areas. However, climate change will act in conjunction with a range of other pressures, which may actually pose a far greater threat for wetlands in the short to medium-term.

Response to change requires a multi-scale approach to research and a multi-jurisdictional approach to management. Strong cooperation between local associations and all spheres of government should be encouraged in the planning, implementation and appraisal of management activities, to achieve management outcomes that are beneficial and lasting. The success of management efforts will be readily measured by economic, social and ecological outcomes.

by Maria Bellio, *Australian Government Department of Environment and Heritage, and* Ray Chatto, *Parks and Wildlife Commission of the Northern Territory*



Up to 4.2–4.6 million ha of natural wetland habitat in northern Australia is at risk of infestation from the tropical wetland weed *Mimosa pigra*. The potential area of infestation contains the entire ranges of the Green Pygmy-goose (shown as dots representing reporting rate) and Cotton Pygmy-goose, and overlaps that of many other wetland birds. Source: **Walden *et al.* (2004)**




Seasonal use of four floodplains (Nourlangie, Magela, East Alligator and Cooper Creek) of the Alligator Rivers Region by waterbirds, as determined by aerial surveys, illustrating the importance of a network of wetlands.
Source: **Morton *et al.* (1984)**

Magpie Geese are reclaiming some of their formerly extensive range.
Photo by **www.birdphotos.com.au**

## Queensland: the North and East

The north-east of the continent, under Queensland's jurisdiction, is drained by the abundant rivers of the North-East Coast and Gulf of Carpentaria Drainage Divisions. Wetland systems provide waterbird habitat almost continuously along the coast, in the intertidal zone and/or adjacent lowland.

Extensive freshwater habitats occur on floodplains of major rivers such as the Fitzroy and Normanby on the east coast, and the Holroyd and Mitchell on the Gulf coast. These north-eastern wetlands support most of the population of the Australian subspecies of Sarus Crane and Cotton Pygmy-goose (see box). They also support substantial numbers of Wandering Whistling-Duck, Magpie Goose, Green Pygmy-goose, Pied Heron, egrets, Black-necked Stork and Brolga.

In the ecotone between fresh and saline regimes lie marine plains such as those around Broad Sound, the Proserpine-Townsville strip, western Cape York and the southern Gulf. Here, Radjah Shelducks and migratory Marsh Sandpipers may be plentiful in season and, in Capricornia, a Critically Endangered subspecies of the Yellow Chat persists (see box). The Australian Painted Snipe (nationally Vulnerable) breeds in small wetlands on some marine plains.

These conservation values endure in Australia's north-eastern wetlands despite prolonged, intensive grazing over much of the landscape. The long-term impacts of grazing on waterbird populations are, however, poorly known and widespread alien pastures and weeds in wetlands will require interventions such as controlled grazing to sustain the diversity of waterbird habitats. Major agricultural developments—notably for cane farming—have diminished natural waterbird habitats from near Cairns southward, though the full extent of wetland loss has not been quantified. Proposals for new, broad-acre irrigation schemes in the Gulf Plains region are sometimes aired but would alter river flooding and introduce weeds and pollutants, thereby posing a new and great threat to waterbirds. New dams have been approved or considered in coastal catchments, adding to the countless existing reservoirs, weirs, farm

### Capricorn Yellow Chat

**The wetland-associated Capricorn (Dawson) subspecies of Yellow Chat is Critically Endangered nationally. This small passerine provides something of a success story. With new discoveries in the last 18 months, the known population has increased from 40 individuals at a single location to 250+ at several locations near Rockhampton, in central coastal Queensland.**

**All sites where the Chat has been found to persist year-round are associated with drainage channels on coastal marine plains connected to tidally influenced wetlands. Typical breeding habitat is a network of braided channels flanked by rank vegetation (rushes, sedges or grass) that provides shelter adjacent to muddy substrates for foraging. Dry season habitat requirements are under investigation and may be critical to the Chat's conservation.**

**Habitat degradation is the main threat to the subspecies. Management issues of most concern include changes to hydrology, either by reduction in freshwater in-flow through water removal upstream (harvesting, pondage or weirs) or construction of extensive levee banks that interrupt the tidal connections of these marine coastal floodplains. Livestock grazing (absence or over-grazing) may affect habitat by causing changes in density, height or cover of plant species (native grasses/sedges and introduced semi-aquatic pasture grasses) required for shelter or foraging. Feral pigs damage rushbeds, reducing available habitat. Lastly, introduction and spread of 'new' semi-aquatic pasture species is also of concern. Despite these issues, the outlook for this bird is reasonable.**

**by Wayne Houston, *Central Queensland University, Rockhampton***

Yellow Chat, subspecies *crocea* of the Kimberley to Lake Eyre, which is secure, unlike its endangered Queensland counterpart *macregori*. Photo by **Ian Montgomery**

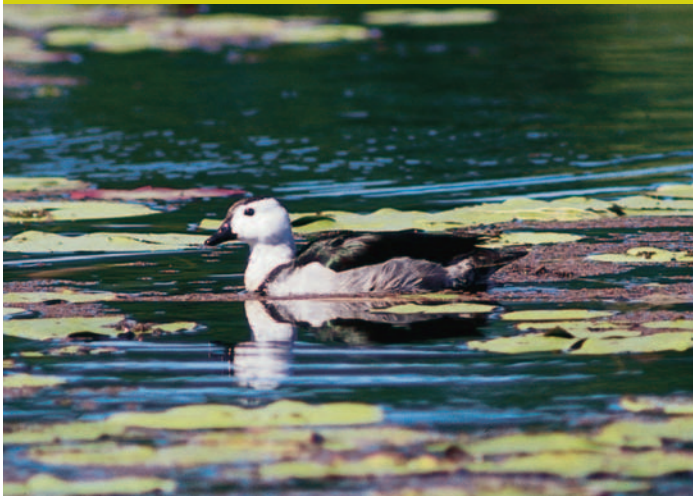
### Cotton Pygmy-goose

**The Australian sub-species of Cotton Pygmy-goose is poorly known. Now virtually confined to Queensland, its range once extended to northern New South Wales. Highest numbers are in the Fitzroy River floodplain wetlands and around Townsville, where impounded deepwater storages along the Ross River can hold stable populations of several hundreds. Moderate numbers are resident in wetlands and farm dams between Townsville and Gladstone, and on the Atherton Tablelands, but conditions during the dry season and decreasing water quality can trigger dispersal of most birds in a district. Post wet season movements to southern Queensland and to sub-coastal wetlands of the Burdekin and Fitzroy/Dawson catchments occur. It is not known how significant these movements are, or whether depressed wet season rainfall and widespread extended drought conditions, such as experienced in 2002–2004, cause severe population declines in core habitats, although currently numbers appear to be reduced by about a third.**

**The Pygmy-goose prefers clear water with a moderate cover of floating water plants. Rapid changes in water level associated with extraction or storage of irrigation water, increasing turbidity and invasion by exotic pasture grasses such as Olive Hymenachne appear to be reducing suitable habitat in areas such as the Fitzroy River Barrage impoundment. Reduction in availability of tree hollows for breeding is another threat. Some artificial water impoundments and moderate to large farm dams can, however, provide additional temporary and permanent habitat.**

**by John McCabe, *with assistance from* Gavin Blackman**

Cotton Pygmy-Goose. Photo by **Graeme Chapman**



dams and ponded pastures. These storages reduce and disrupt natural flooding but have created new habitat for diving waterbirds, such as Great Crested Grebe and Great Cormorant, and reintroduced habitat for pygmy-geese and jacanas. New storages and water schemes have been partly prompted by long periods of below-average rainfall and high levels of consumption, which have led to widespread decline in groundwater levels.

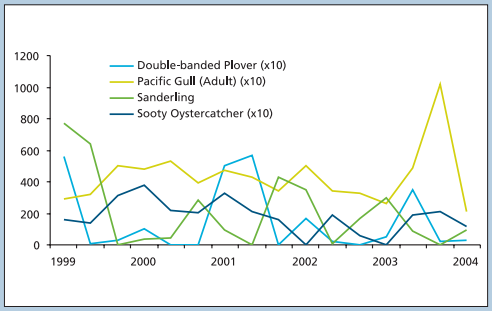
Queensland's extensive intertidal systems, such as Great Sandy Strait and the south-eastern Gulf coast, support many tens of thousands of shorebirds and are globally important for Black-tailed Godwit, Whimbrel, Eastern Curlew, Grey-tailed Tattler, Pacific Golden Plover and Lesser Sand Plover.

In the global context, these intertidal wetlands are generally in good condition, with total destruction confined to relatively small areas mainly near urban and industrial centres. Disturbance to feeding and roosting shorebirds by human activity is localised, though escalating: 16 million people visit coastal regions of Queensland each year. However, on the east coast, greatly reduced freshwater discharge and increased sediment and nitrogen loads possibly are affecting food supplies of intertidal waterbirds. Closure of tidal channels has disrupted the connectivity between marine plains and estuaries, but the overall impacts on waterbirds are not yet understood.

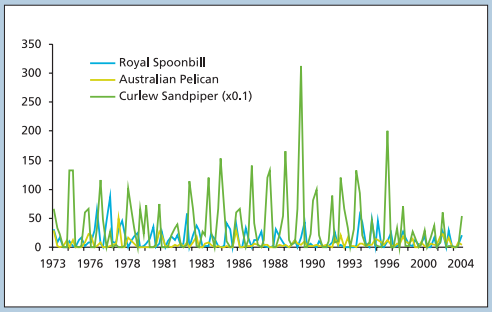
by Roger Jaensch, *Wetlands International*

Eastern Reef Egret, of Australia's coastal beaches, mangroves and islands, now all but extinct in Victoria and Tasmania. Photo by **Raoul Slater**

Mangroves fringing the South Alligator River support large multi-species colonies of wetland birds. Photo by **Maria Bellio**




Quarterly counts from Darby and Waratah Bay beaches, southern central Victoria, suggest a slight downward trend in Sooty Oystercatcher numbers, though further counts are required to confirm this. Source: **Susan Taylor (Department of Sustainability and Environment) and Parks Victoria**




Many wetlands are important seasonally, not only to residents (e.g., Royal Spoonbill and Australian Pelican) but also to waterbirds that breed in the Northern Hemisphere and spend the non-breeding season in Australia (e.g., Curlew Sandpiper). There seem to be fewer Curlew Sandpipers visiting the Bunyip-Yallock Creek area of Western Port Bay, Victoria, in recent years. Source: **Bird Observers Club of Australia**

## Coastal wetlands

Coastal wetlands consist of estuaries, embayments and open ocean coasts. Some ocean coasts have high-energy wave actions (surf), whereas many, particularly in northern Australia, have low-energy wave actions but massive tidal variations. Tidal wetlands are permanent and play an important role as drought refugia, and as predictable habitat for the migratory birds which travel tens of thousands of kilometres to use them. Estuaries are used by many species, such as Eastern Curlew. Several species use ocean beaches (e.g., Sanderling and Ruddy Turnstone), but only a few resident species spend their entire lives there (e.g., Beach Thick-knee and the eastern population of Hooded Plover). A number of species which breed in the interior spend most of their lives on coastal and near-coastal wetlands, waiting for the ephemeral wetlands of the interior to fill (e.g., Banded Stilt).

In populous coastal areas, wetlands are under pressure. Most of Australia's human population lives close to the coast, and the remainder often holiday at the beach. Disturbance to coastal wetlands, and the birds that inhabit them, by humans, their vehicles and companion animals is intense. Human settlements, many of which are clustered near the coast, provide productive habitat for introduced predators (e.g., foxes), are a source of domesticated predators (e.g., cats and dogs), and create pollution in the form of sewage and storm-water run off.

Other risks to birds include oil spills from shipping, dangerous, discarded rubbish such as fishing line, predicted sea level rises associated with global warming, and invasive plants which colonise dunes and mud flats. Insensitive efforts at erosion control on dunes are also detrimental to coastal birds. Much of the coast is sought after by developers who propose to build new resorts, residential estates and marinas. Overall, coastal wetlands are among the most threatened wetlands in the country.

# LEGISLATIVE PROTECTION OF WATERBIRDS AND WETLANDS

A number of national and international legislative mechanisms protect wetlands and their birds.

**Protecting wetlands** The Ramsar convention allows for the designation of wetlands of international significance and encourages their wise use for the benefit of nature conservation. This international agreement has been further strengthened in Australia because 'the ecological character of declared Ramsar wetlands' is considered a matter of National Environmental Significance under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and, hence, prohibits any activity or development that is likely to have a significant impact on a Ramsar site. Worldwide, there are 141 Contracting Parties to the Convention, with 1387 wetland sites, totaling 122.7 million ha, designated for inclusion in the Ramsar List of Wetlands of International Importance. Australia has 64 sites designated, with a surface area of 7,371,873 ha.

The Wetlands Policy of the Commonwealth Government of Australia was inspired by the Ramsar Convention and seeks to ensure that the activities of the Federal Government promote the conservation, ecologically sustainable use and, where possible, enhancement, of wetland functions. It is supported by an Implementation Plan.

In addition, the Directory of Important Wetlands lists 851 wetlands as nationally important. These wetlands are recognised by State and Federal Governments as significant.

**Protecting birds** Australia is signatory to bilateral agreements, the China and Japan Migratory Bird Agreements (CAMBA and JAMBA), for the protection of migratory species, most of which are wetland birds. Negotiations are under way with the Republic of South Korea for a third agreement. The agreements have also been strengthened by the inclusion of listed species as matters of National Environmental Significance under the EPBC Act.

Australia and 85 other countries are party to the intergovernmental Bonn Convention on the Conservation of Migratory Species, under the aegis of the United Nations Environment Programme. Parties agree to restrict harvesting, conserve habitats, and control other adverse factors. Many species listed under the convention are wetland birds and because of their listing are also protected under EPBC Act.

In addition to the legislation outlined above, States have developed their own habitat and bird conservation laws, and there are other guidelines, principles and action plans that are not enshrined in legislation. Many of these are relevant to wetlands and their birds.

## Experiences of the owner of a privately listed Ramsar wetland

**Because of our deep respect and love of the Macquarie Marshes and its birds, and our belief that the whole of the Marshes are seriously threatened, in 2000 we privately listed a section of our property under the Ramsar convention. The site contains one of the very few waterbird colonies in Australia where three ibis and four egret species nest together, in addition to the cormorants, darters, ducks, waders and herons. Our property has been grazed since the mid 1800s, and by our family since 1909, and relies on flooding to facilitate the growth of vegetation to provide feed for cattle.**

**Some claim that grazing is the primary issue for the Marshes, yet the same problems of dying red gums, loss of wetland vegetation, weed encroachment and feral animal infestation are also occurring on the Nature Reserve, which has not been grazed since 1990. The preoccupation with grazing only acts to move attention away from the real issues. It is the lack of water, changes in flow regime, and manner of water delivery that are the most immediate and serious threats to the Marshes (see 'South-eastern Australia' section above).**

**Throughout the Murray-Darling Basin, wetlands and their lifeblood, the rivers, have been managed primarily as irrigation channels and not as flowing streams. Instead of truly searching for more sustainable ways to manage river systems, it seems that we are plundering our natural environment for short-term gain, which will only end in long-term pain. Not only will significant components of our natural heritage be lost, but also the human communities that live and rely on wetlands like the Macquarie Marshes.**

**Listing our site has helped focus attention on the importance of the Marshes as an internationally recognised Australian wetland, and I believe that Ramsar is, in theory, one of the best tools available to wetland managers. It has helped us make some small progress in raising awareness of the plight of wetlands in New South Wales, through discussions with the present State Environment Minister and Director General of the Department of Environment and Conservation, who have taken up the challenge on behalf of the Marshes. Yet, it never ceases to amaze me that for all the talk-fests around our country how little on-ground action is actually achieved. Until governments, conservationists and our society show a real commitment to the conservation of wetlands, return a greater share of water to rivers, and plan for 100 to 150 year outcomes, we will continue to head the same way as many other countries, which have squandered and irretrievably lost their valuable freshwater ecosystems.**

**BY ERIC FISHER, *Wilgarra, Quambone, Coonamble***

Darter and young; the species breeds in the Macquarie Marshes but is declining in south-eastern Australia. Photo by **Peter Merritt**

# Commitment of government

As a simple measure of government commitment to bird conservation in Australia, the listing of species in trouble and preparation of recovery plans addressing the major threats were examined. *The Action Plan for Australian Birds 2000*—a comprehensive assessment of the conservation status of all bird taxa (species and subspecies)—served as a benchmark.

In 2004 the Australian Painted Snipe became the first resident wetland bird to be listed (although marine and migratory species are listed). The Snipe is also recognised as threatened in all the States in which it regularly occurs (see table).

A number of other wetland species warrant listing as threatened. The Australasian Bittern (see p. xvii), highlighted as a species worthy of consideration for listing in *The State of Australia's Birds 2003*, remains unlisted. Three subspecies identified in the Action Plan, the first two with highly restricted ranges, also warrant consideration: the Grey Grasswren (Bulloo), of inland swamps, may be threatened by agricultural development and has been nominated for listing; the Yellow Chat (Alligator Rivers), of alluvial flood plains, may be threatened by the spread of the weed Mimosa; and the eastern Hooded Plover, is reduced in numbers and under increasing pressure from human use of coasts. Lastly, the once numerous Tasmanian subspecies of Lewin's Rail appears to have decreased markedly, presumably from wetland loss.

Several Key Threatening Processes, listed under the EPBC Act, have relevance to wetland birds. These include land clearance (listed in 2001), loss of climatic habitat caused by anthropogenic emissions of greenhouse gases (2001), predation by feral cats (2000) and the European Red Fox (2000), and predation, habitat degradation, competition and disease transmission by feral pigs (2001). Threat Abatement Plans provide for any key actions necessary to reduce the impact of these threats, but have been approved only for cats and foxes.

As yet, there is no national recovery plans for any threatened wetland dependent bird, despite the stressed state of many of the nation's wetlands.

The States list species according to their status within their jurisdiction, and a number of waterbirds have been identified as threatened in South Australia, Tasmania and Victoria, in part a reflection of the poorer state of southern wetlands compared with those in the north.

**Wetland associated birds identified as threatened or near threatened in *The Action Plan for Australian Birds 2000* and their legal status Federally and in the States[1] and Territories in 2004**

| Common name | Action Plan 2000 | National | Vic | NSW | Qld | NT | WA | SA |
|---|---|---|---|---|---|---|---|---|
| Cape Barren Goose (south-western subsp.) | V | V | | | | | R | |
| Cotton Pygmy-goose (Australian) | NT | | | E | | | | |
| Little Bittern | NT | | E | | | | | R |
| Australasian Bittern | V | | E | V | | | | V |
| Buff-banded Rail (Cocos-Keeling Islands subsp.) | V | E | | | | | | |
| Buff-banded Rail (Macquarie Island subsp.) | EX | EX | | | | | | |
| Lewin's Rail (eastern) | NT | | V | | | | | R |
| Lewin's Rail (western) | EX | | | | | | | |
| White Gallinule | EX | | | | | | | |
| Australian Painted Snipe | V | V | CR | E | V | V | R | R |
| Hooded Plover (eastern subsp) | V | | V | | | | | R |
| Hooded Plover (western subsp) | NT | | | | | | | |
| Purple-crowned Fairy-wren (western subsp.) | NT | | | | | NT | | |
| Grey Grasswren (Bulloo) | V | | | E | | | | |
| Yellow Chat (Capricorn subsp.) | CR | CR | | | E | | | |
| Yellow Chat (Alligator Rivers subsp.) | E | | | | | E | | |

[1]No wetland birds are listed in the ACT or Tasmania. Definitions vary between States, Territories and the Commonwealth.
**Rare** (R), rare or likely to become extinct, is a category used in Western Australia and South Australia. The Action Plan for Australian Birds 2000 applied the IUCN (1994) red list criteria:
**Extinct** (EX): no reasonable doubt that the last individual has died
**Critically endangered** (CR): facing an extremely high risk of extinction in the wild in the immediate future
**Endangered** (EN): not critically endangered but facing a very high risk of extinction in the wild in the near future
**Vulnerable** (VU): neither critically endangered nor endangered, but facing a high risk of extinction in the wild in the medium-term future
**Near Threatened** (NT): close to qualifying for Vulnerable.

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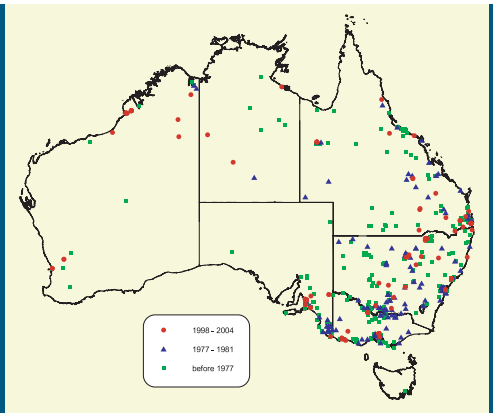


## Painted Snipe

**An increasingly rare inhabitant of shallow, vegetated, temporary or infrequently filled wetlands from Cape York to Tasmania, the Australian Painted Snipe is the only resident waterbird to be listed as nationally threatened (see *Wingspan* Vol. 14 (4), pp. 7, 2004).**

**The map shows all Painted Snipe sightings made before the first atlas, during the first atlas, and as part of the ongoing atlas. Since 2001, there has been an intensive national search program, yet this has added only a few additional records. Murray-Darling Basin used to be the species' stronghold yet there are relatively few recent records from that region. Painted Snipe are very cryptic, but the paucity of records suggests they are well deserving of their national 'Vulnerable' status. The cause of their rarity is thought to be the decreasing number of shallow, ephemeral wetlands in their core eastern Australian range.**

BY CHRIS TZAROS, *Threatened Bird Network*

Pacific Black Ducklings. Photo by **Peter Merritt**


## Acknowledgements

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Monitoring of Australia's birds involves partnerships between Federal and State governments, non-government organisations, and many independent ornithologists and birdwatchers. Birds Australia is indebted to the Atlasers who contributed to the Atlas of Australian Birds, cooperating bird clubs and other organisations, and private landholders and indigenous communities who provided access to their land.

We are particularly grateful to the following individuals who generously wrote sections of this report or provided data from long-term monitoring projects. These programs represent State and Australian governments, non-government organisations and private individuals working towards the common goal of conserving species. Maria Bellio, Stewart Blackhall, Gavin Blackman, Ray Chatto, Dick Cooper, Brian Curtis, Ioan Fazey, Eric Fisher, Stuart Halse, Rhidian Harrington, Wayne Houston, Roger Jaensch, Richard Kingsford, Ian McAllan, John McCabe, Julian Reid, Andrew Silcocks and Chris Tzaros provided the regional accounts and some box texts. Richard and Margaret Alcorn, the Bird Observers Club of Australia (via Richard Loyn and Don Saunders), Stewart Blackhall, Mike Carter, Ralph Cooper, Michael Craig, Colin Davis, Stuart Halse, Hunter Bird Observers Club (via Alan Stuart), Mick Keenan, Richard Kingsford, Tony Kirkby, Max Maddock, David Milton, New South Wales Bird Atlassers Inc. (via Dick Cooper, Brian Curtis, Ian McAllan and Julian Reid), John Peter, John Porter, Bill Russell, Andrew Silcocks, Marcus Singor, William Steele, Rod Sutherland, Susan Taylor, Elaine Thomas and the Queensland, Victorian, Western Australian and Australasian Wader Studies Groups supplied data from their long-term monitoring studies. Clive Minton and Alice Ewing provided the Terek Sandpiper migration map. Michelle de Plater, National Land and Water Resources Audit, supplied the central base map. Andrew Silcocks prepared the various maps from the Atlas of Australian Birds. Maria Bellio, Rob Drummond, Roger Jaensch, Lynn Pedler, Roaul Slater, Chris Tzaros, and Greg Holland and Leon Keasey (www.birdphotos.com.au), allowed free use of their photographs.

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## Ongoing Atlas

Birds Australia's first Atlas of Australian Birds (1977–1981) laid a foundation for nationwide monitoring of bird species. Subsequently, birds were recognised as indicators of biodiversity and change to the environment, providing the impetus to conduct a second Atlas (1998–2002), funded by the Australian Government's National Heritage Trust. Every 1∞ grid across Australia was visited and the result was the largest continent-wide survey of birds in the world, with 7,000+ Atlasers recording four million bird records and more than 750 bird species over the four years.

The Ongoing Atlas builds on this foundation. Point-survey techniques—in particular, repeated intensive surveys of 2-ha blocks—can be used by volunteers under minimal supervision and produce data that can be used to examine long-term trends in bird abundance.

We welcome new Atlasers. For information, contact Andrew Silcocks (03 9882 2622; a.silcocks@birdsaustralia.com.au).

## Other Birds Australia initiatives

The **Threatened Bird Network** links volunteers with recovery efforts for more than 25 threatened species. Contact Chris Tzaros (03 9882 2622; c.tzaros@birdsaustralia.com.au)

The **Important Bird Area** project identifies areas critical to the survival of native birds. Contact Mike Weston (03 9882 2622; m.weston@birdsaustralia.com.au)

**Birds Australia Reserves** protect important bird habitat and incorporate monitoring into adaptive land management; they encourage volunteer involvement. Contact Michelle Sweeny (03 9882 2622; m.sweeney@birdsaustralia.com.au)

The **Australasian Wader Studies Group** involves professionals and amateurs in the monitoring of shorebird populations and movements, and promotes shorebird study and conservation (www.tasweb.com.au/awsg)

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Since 1901 Birds Australia (Royal Australasian Ornithologists Union) has worked for the conservation of Australasia's birds and their habitats. As an independent, not-for-profit organisation, Birds Australia relies on the financial support of companies, trusts and foundations, and private individuals, and the involvement of thousands of volunteers in its conservation and monitoring projects.


Vera Moore Foundation

Natural Heritage Trust
Helping Communities Helping Australia
An Australian Government Initiative

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*Cover pic:* The nationally Vulnerable Painted Snipe: juvenile male (foreground) and female, Hope Island, Queensland. Photo by **Graeme Chapman**