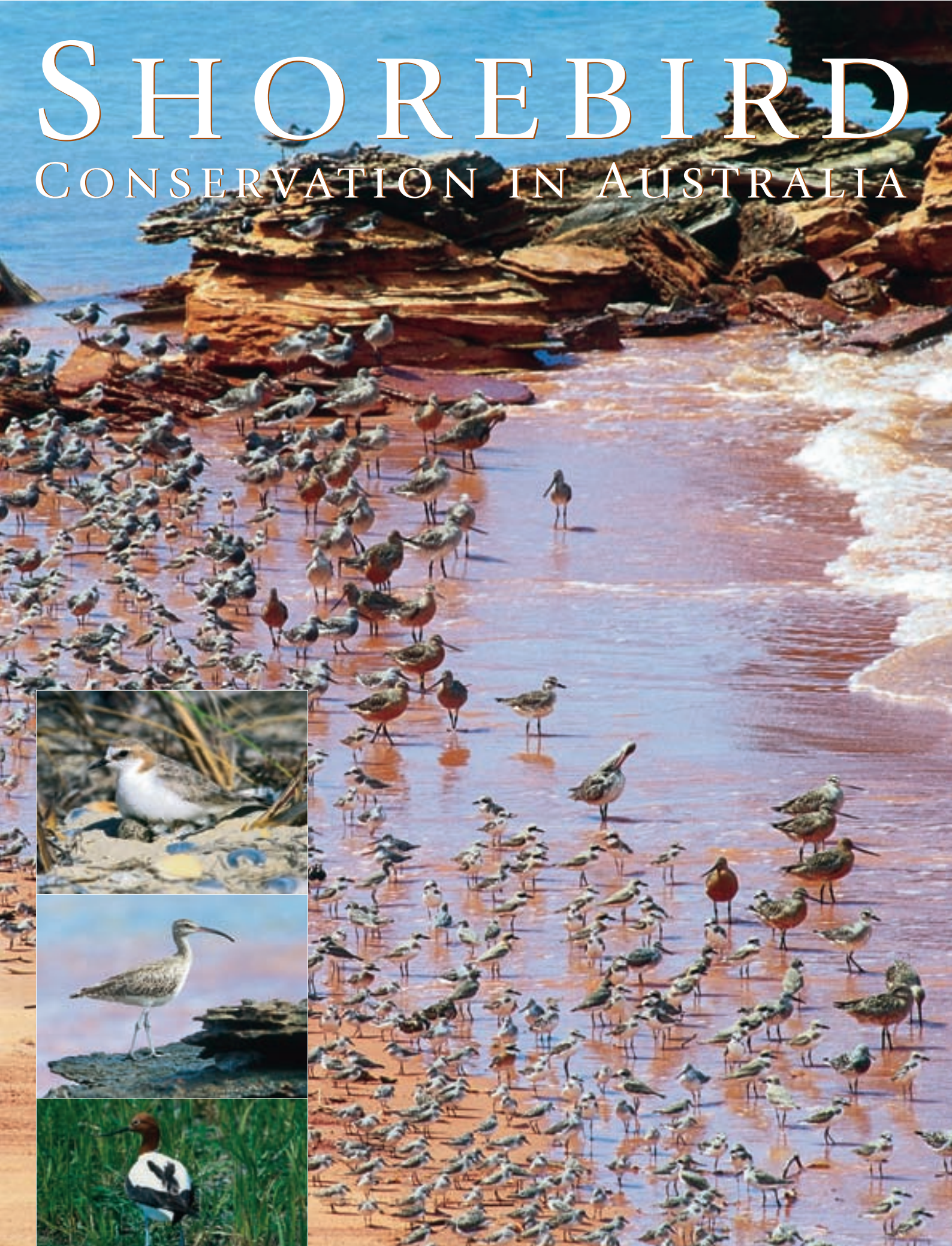


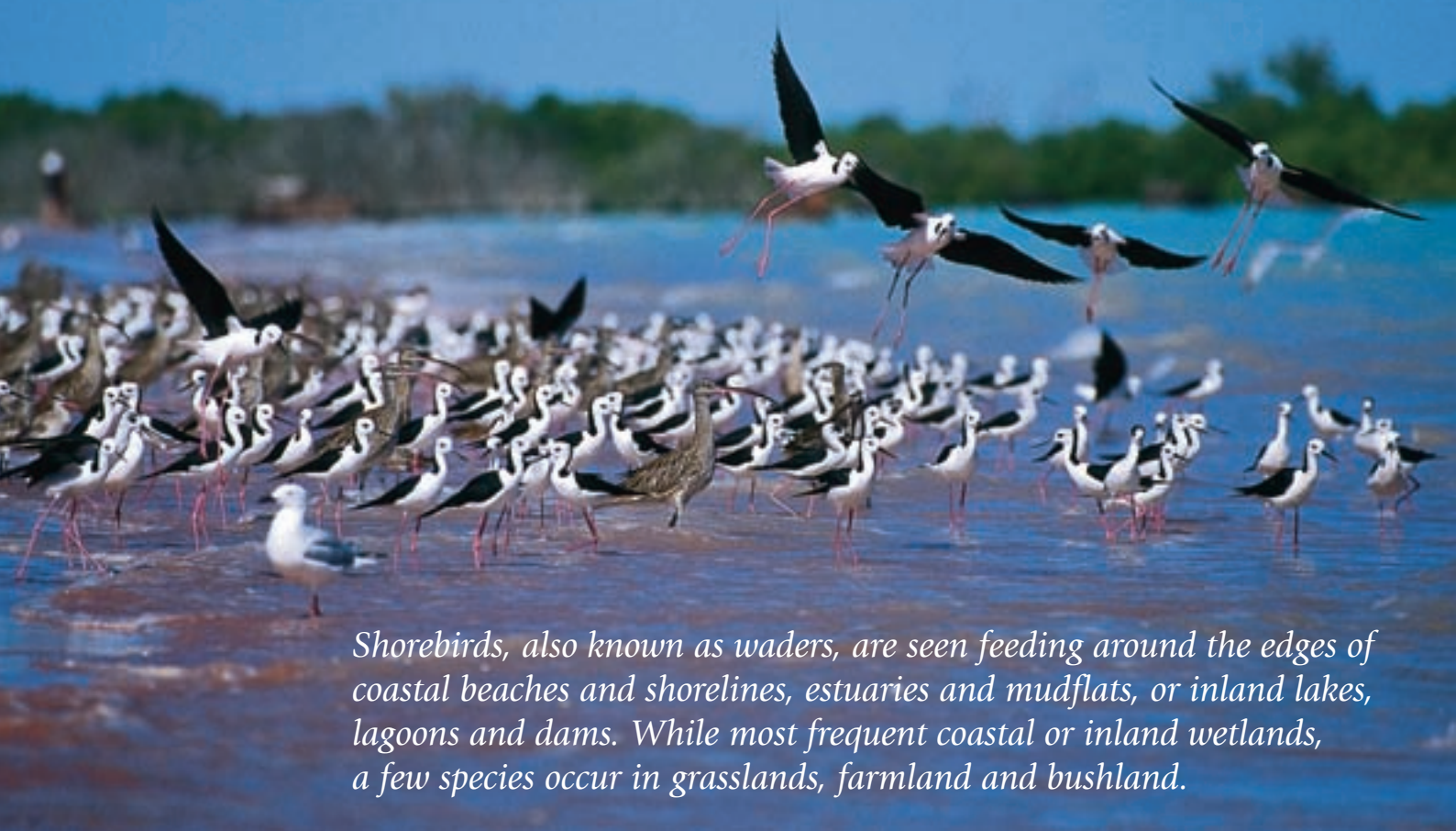
SHOREBIRD

CONSERVATION IN AUSTRALIA



BY BIANCA PRIEST, PHIL STRAW AND MICHAEL WESTON

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Shorebirds, also known as waders, are seen feeding around the edges of coastal beaches and shorelines, estuaries and mudflats, or inland lakes, lagoons and dams. While most frequent coastal or inland wetlands, a few species occur in grasslands, farmland and bushland.

Below: While in Australia, migratory shorebirds begin to moult into breeding plumage before the long return flight to the Arctic. This Black-tailed Godwit (second bird from left) and male Bar-tailed Godwit (far right) are in full breeding plumage. The Bar-tailed Godwits at the back remain in non-breeding plumage, while some of the Great Knots at the front are in the process of moulting into breeding plumage. Roebuck Bay, north-western Australia. Photo by Brian Chudleigh

FROM THE TAXONOMIC order Charadriiformes, shorebirds include plovers, sandpipers, stints, curlews, knots, snipes, godwits, avocets, stilts, oystercatchers, pratincoles, and some other species. (Terns and gulls are often grouped together with shorebirds as they too occur in many of the same habitats, but are not discussed here.)

Shorebirds come in different shapes and sizes, ranging from the tiny Red-necked Stint, which weighs only 30 g, to the Eastern Curlew, which can weigh up to 1.3 kg. They have a variety of bill shapes and sizes adapted to the different prey they feed on, and legs that vary from long to very long.

One spectacular feature of this group of birds is their movements, both within Australia and between the northern and southern hemispheres. In Australia

there are 18 species of resident shorebird (those that live in Australia all year round), and at least 36 species that migrate each year from other countries to spend their non-breeding season here. A further 21 vagrant species are occasionally recorded in Australia (see Table).

Migratory shorebirds

Migratory shorebirds undertake annual migrations of thousands of kilometres between their non-breeding and breeding areas, in many cases flying from the southernmost wetlands of the southern hemisphere to the coasts and islands of the high Arctic. Northward migration to the breeding grounds typically takes place from March to early June, whilst the return migration to non-breeding areas occurs from July to October. During their migration, shorebirds stop off at a number of wetland sites where they feed intensively to build up stores of fat and protein to fuel the next leg of their flight. These migration routes are called Flyways.

There are eight shorebird Flyways around the world, each consisting of a geographical grouping of similar routes shared by many species. The East Asian–Australasian Flyway stretches from Siberia and Alaska southwards through east and south-east Asia, to Australia and New Zealand (see Flyway map, p. V). It encompasses 22 countries and is used by 55 migratory species and by over 5 million birds.

The breeding season of these migratory shorebirds is a short and hectic period that capitalises on the abundant supply of insect food present in the brief arctic summer. Birds must arrive and breed as soon as snow and ice starts to melt in the nesting



areas. Clutches, typically of four eggs, are laid within a week or two of arrival; incubation then takes about three weeks and fledging a further three. Then it's time to head south before the weather worsens and the food supply dries up.

A migrant species that differs from this pattern is the Double-banded Plover, which breeds in New Zealand and migrates to Australia from February to September. A few Australian Pratincole breed in Australia and migrate to Indonesia and New Guinea from March to November; most, however, remain in Australia year-round, so we have classified them here as 'resident species'.

Resident shorebirds

Resident shorebirds breed in Australia and include some species that nest exclusively on beaches (e.g. the Beach Stone-curlew and Pied Oystercatcher) and others such as the Sooty Oystercatcher that nest on rocky coasts. Resident shorebirds use every type of wetland: the Painted Snipe, for example, breeds on ephemeral fresh water wetlands, while the Banded Stilt breeds on hypersaline lakes in inland Australia. Some resident species have moved beyond wetlands – the Plains-wanderer nests in grasslands, the Bush Stone-curlew in open woodland and the Masked Lapwing commonly breeds in agricultural and urban landscapes.

Resident shorebirds may nest in large colonies (e.g. Banded Stilt), as solitary pairs (e.g. Black-fronted Plover) or sometimes in loose groups (e.g. Painted Snipe). They may be sedentary or undertake nomadic movements, depending on availability of habitat and breeding opportunities. An example of a sedentary species is the Hooded Plover, whose beach environment is relatively stable throughout the year, thus fulfilling the bird's requirements year-round. The Banded Stilt, on the other hand, is a nomadic species that moves in vast numbers from coastal areas to central Australia, to exploit the explosion of brine shrimp in ephemeral wetlands following unpredictable rains.



Main picture: Resident Black-winged Stilts and migratory Eastern Curlews roosting at high tide, Roebuck Bay, north-western Australia. Typically, non-breeding shorebirds are gregarious and often occur in very large concentrations. Along the coast, their day is normally ruled by the tides – they feed on shellfish, crabs, shrimps and worms when mudflats are exposed at low tide, and roost on beaches and spits during high tide. Photo by Jan van de Kam

Above: Painted Snipe, Mt Carbine, Qld. The Vulnerable Painted Snipe is the subject of a recent national volunteer survey co-ordinated by Birds Australia's Threatened Bird Network and the AWSG. This survey has documented the distribution and occurrence of the species, and has already saved one wetland from destruction. Photo by Keith & Lindsay Fisher

Below: The tiny Red-necked Stint, Australia's smallest migratory shorebird at only 30 g, nevertheless manages to make the huge journey to breed in the Arctic – a distance of some 15,000 km *one-way!* Photo by Brian Chudleigh

Resident, migratory and vagrant shorebirds in Australia

Resident

Australian Pratincole *
Banded Lapwing
Banded Stilt
Beach Stone-curlew
Black-fronted Dotterel
Black-winged Stilt
Bush Stone-curlew
Comb-crested Jacana
Hooded Plover
Inland Dotterel
Masked Lapwing
Painted Snipe
Pied Oystercatcher
Plains-wanderer
Red-capped Plover
Red-kneed Dotterel
Red-necked Avocet
Sooty Oystercatcher

Migratory

Asian Dowitcher
Bar-tailed Godwit
Black-tailed Godwit
Broad-billed Sandpiper
Common Greenshank
Common Redshank
Common Sandpiper
Curlew Sandpiper
Double-banded Plover
Eastern Curlew
Great Knot
Greater Sand Plover
Grey Plover
Grey-tailed Tattler
Latham's Snipe
Lesser Sand Plover
Little Curlew
Long-toed Stint
Marsh Sandpiper
Oriental Plover
Oriental Pratincole
Pacific Golden Plover
Pectoral Sandpiper
Pin-tailed Snipe
Red Knot
Red-necked Phalarope
Red-necked Stint
Ruddy Turnstone
Ruff
Sanderling
Sharp-tailed Sandpiper
Swinhoe's Snipe
Terek Sandpiper
Wandering Tattler
Whimbrel
Wood Sandpiper

Vagrant

American Golden Plover
Baird's Sandpiper
Buff-breasted Sandpiper
Caspian Plover
Dunlin
Green Sandpiper
Grey Phalarope
Hudsonian Godwit
Kentish Plover
Lesser Yellowlegs
Little Stint
Little Ringed Plover
Pheasant-tailed Jacana
Ringed Plover
Short-billed Dowitcher
South Island Pied Oystercatcher
Spotted Redshank
Stilt Sandpiper
Upland Sandpiper
White-rumped Sandpiper
Wilson's Phalarope



* A few Australian Pratincoles migrate to Indonesia and New Guinea.



MAIN THREATS

Above: Pied Oystercatchers breed on beaches and along the shores of other coastal wetlands, laying their eggs in simple scrapes on the ground. Nests are often cryptic, making them susceptible to trampling by walkers or crushing by 4WDs. Eggs and young chicks which have been abandoned by parent birds disturbed by people, dogs and vehicles are left vulnerable to changes in temperature and predation by foxes, cats and other birds. (Oystercatcher) by Kelvin Jakes; (eggs) by Bianca Priest

Far right: Banded Stilt breeding colony, Lake Ballard, WA, 1995. The nomadic Banded Stilt may travel over 1000 km from coastal areas to breed on flooded hypersaline lakes in inland Australia. Eggs can be laid less than 10 days after the rain falls.

Right: In 2000, however, two initial breeding attempts at Hughes Island in northern Lake Eyre were disrupted by Silver Gulls: as many as 70,000 eggs and chicks may have been wiped out before the SA Parks & Wildlife Service intervened and eradicated the gulls. This resulted in the successful fledging of approximately 40,000 young stilts after a third breeding attempt. Silver Gulls have multiplied 1000-fold in the last 50 years, and now regularly breed inland. Photos by Clive Minton

Threats to migratory shorebirds

Australia's migratory shorebirds encounter few human-induced problems on their breeding grounds, which are in sparsely populated areas. However, they share the East Asian–Australasian Flyway with more than 45 per cent of the world's human population, in countries with rapidly developing economies. The resultant economic and social pressures pose major threats to migratory shorebirds, primarily through wetland destruction and alteration, pollution and hunting.

Northward migration is a critical time for migratory shorebirds because they have a very tight schedule if they are to arrive at the breeding grounds on time and in good condition, to make full use of the short breeding season. Good feeding conditions and safe roosting sites on the way are essential for successful breeding.

The most important region for shorebirds on northward migration is the Yellow Sea, yet its coastal wetlands are probably the most threatened in the Flyway.

The Yellow Sea

The Yellow Sea is a shallow sea located between the Korean Peninsula in the east and China to the

west. It has a massive 22,400 km² of intertidal flats – the largest expanse in the world. Six hundred million people (about 10 per cent of the world's population) live in its catchment area.

The numbers of shorebirds using the Yellow Sea wetlands are staggering: at least 2 million birds, or about 40 per cent of all birds using the East Asian–Australasian Flyway (EAAF), during their northward migration alone. The area supports more than 30 per cent of the EAAF populations of 18 species during northward migration; for six of the species (Bar-tailed Godwit, Eurasian and Eastern Curlews, Great Knot, and Grey and Kentish Plovers), the region carries almost the whole EAAF population at this time.

About 1 million birds use these wetlands on their southward passage.

While most shorebirds use the region's wetlands as migration stopover sites, seven species also occur in significant concentrations during the non-breeding season and five species breed there in important numbers.

The maintenance of healthy intertidal areas in the Yellow Sea is crucial for these shorebirds. Unfortunately, the extent and quality of these areas are being seriously threatened by reclamation,





reduced river flows and sedimentation, pollution, and disturbance and competition from humans, particularly in China and South Korea.

Approximately 37 per cent of the intertidal areas that existed in the Chinese portion of the Yellow Sea in 1950, and 43 per cent of the South Korean part that existed in 1917, have since been reclaimed. Extensive reclamation continues: China plans to reclaim a further 45 per cent of the mudflats and South Korea, 34 per cent.

Threats to resident shorebirds

Shorebirds, both migratory and resident, are also threatened in developed countries, such as Australia and New Zealand, where they face disturbance, and destruction or alteration of habitat. Many resident shorebirds breed between September and March, some nesting in the open on beaches and along bays, laying their eggs in simple scrapes on the sand or shell grit. They are threatened by introduced predators such as foxes, rats, dogs and cats, increased numbers of native predators such as gulls and ravens, and crushing of nests and young by humans, stock and vehicles.

Resident species that breed in Tasmania (e.g. Hooded Plovers, Pied Oystercatchers) are

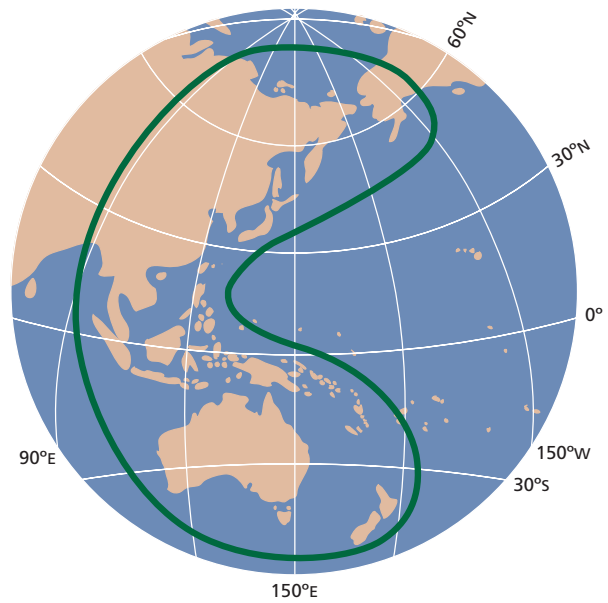
at increased risk from the recent introduction of the fox to the island. There is an urgent need to manage this threat.

As a result of these threats, the following resident shorebirds are considered threatened or near threatened: Plains-wanderer (Endangered), Painted Snipe (Vulnerable), Bush Stone-curlew (Near Threatened) and Hooded Plover (Vulnerable in the east and Near Threatened in the west).

Coastal pressures

Threats to all shorebirds, both resident and migratory, are greatest in the coastal zone. Although Australia's human population is low by world standards, it is heavily concentrated near the coast. Over 80 per cent of Australians live in cities or local government areas abutting the coast, and 25 per cent live within three kilometres of the coast.

The threats to shorebirds are set to intensify with increasing human pressures on Australia's coastal areas.



THE EAST ASIAN–AUSTRALASIAN FLYWAY

Source: Wetlands International–Oceania

Above left: Pied Oystercatcher feeding with Great Knots and Red-necked Stints, Roebuck Bay, north-western Australia. Habitat destruction and alteration along Australia's increasingly developed coastline pose the greatest threats to both resident and migratory shorebirds. Photo by Jan van de Kam





Right: Curlew Sandpiper brooding newly-hatched chick, Tamy Peninsula, Siberia. Note how marvellously the bird's breeding plumage is camouflaged on the tundra.

Above: On returning to Australia and other non-breeding areas, the Curlew Sandpiper moults into grey and white non-breeding plumage. (Breeding sandpiper) by Jan van de Kam; (non-breeding) by Dave Watts



Above right: Ruddy Turnstones, newly arrived to their snow-covered breeding grounds, Tamy Peninsula, Siberia. They will have to rely on their remaining fat reserves until the thaw.

Photo by Jan van de Kam

Right: Bar-tailed Godwits on migration. There are substantial aerodynamic advantages to flying in formations such as this 'V' shape, as every bird in the flock (except for the one at the front!) is flying in the slipstream of those ahead.

The energy saved in formation flight increases the potential flight range of migratory shorebirds.

Photo by Brian Chudleigh

Adaptations for a migratory lifestyle

Migratory shorebirds have an energetically expensive lifestyle. On top of the costs associated with annual breeding and moult that all birds have to cope with, they devote three to four months a year to migration.

There is more to migration than extraordinarily long direct flights: each flight is preceded by a long period of preparatory feeding, as birds accumulate the fuel they will need for a non-stop flight of several days.

Feeding

A successful migratory shorebird needs to be a superb foraging machine. With a wide variety of morphological adaptations, different species of shorebird are capable of living in habitats as diverse as tropical wetlands and cold temperate shorelines. For example, Grey Plovers are adept at scanning the mudflats in search of the tiny rear-end of a defecating bristle-worm, then dashing over and grabbing the worm before it can retreat into the mud. Red Knots hunt buried bivalves below the mud surface, using receptors in the bill-tip to detect pressure differentials in the mud with such sensitivity that they can locate a hard buried object at least 5 cm away.

Most of the fuel used in migration is fat – it releases more energy per gram than any other form of tissue. However, protein is also important to the fuelling of migration. In the early stages of weight-gain, shorebirds increase the size of their digestive organs, thereby increasing their ability to turn food into fat. However, on the flight itself, there is not much

point in having a muscular stomach (there is no food to digest during the flight, and the extra weight costs energy). On the other hand, there is an advantage to increasing the size of flight muscles, especially as initially they have to carry a heavy load of fat. Shorebirds have a remarkable ability to undergo rapid changes in organ size, and just before they depart on migration, they reallocate protein from the digestive organs to the flight muscles.

Breeding

Shorebirds moult into breeding plumage before they reach the nesting areas; these offer marvellous camouflage on the tundra and are sufficiently warm to keep birds insulated in subzero temperatures.

Shorebirds have also evolved the most diverse range of mating behaviours seen in any group of birds. Examples include monogamous species highly faithful to both their mates and their nesting sites; lekking species, in which the males mate with as many females as possible and never see their offspring; and sequentially polyandrous species in which the female leaves a male with one clutch of eggs, then immediately lays another clutch and brings that one up herself.

By the time the chicks hatch, the Arctic has bloomed, with enormous amounts of food to support the growing birds. Chicks hatch in downy plumage, and within minutes of hatching are capable of walking and feeding themselves.

They are, nevertheless, completely dependent on their parents for a period. While the chicks' down offers wonderful camouflage, it doesn't offer as good insulation as adult plumage. This is a problem, especially in very small chicks, which lose heat rapidly. They get around it with a behaviour called brooding. Adults have a pair of brood patches – areas of bare, highly vascular skin on each side of the belly. Chicks have large blood vessels at the back of their necks. When the chicks are getting cold, the parent calls them in to press the back of their necks against the adult brood patches. This raises the body temperature of the chicks with extraordinary speed.

As soon as the chicks are large enough to fly and survive without brooding, the adults abandon them and set off on southwards migration. They have a tight schedule to meet,





because if they do not migrate to their non-breeding areas and complete their annual flight feather moult on time, they will not be able to attempt breeding in the next summer.

The chicks remain a little longer, fattening up before the Arctic freezes over. Like the adults, they migrate south using a range of navigational cues – the stars, the sun and the Earth's magnetic field help set them in the right direction. Unlike adults, however, they lack experience: it takes the young birds longer to find food on the staging areas and they typically arrive in non-breeding areas such as Australia a month or two after the adults.

This may be in part why the young of most species of long-distance migrants take a long time to mature – they are not ready to migrate north with the adults for the following breeding season. Instead, they remain in the non-breeding areas learning to feed in coastal habitats, and finding the non-breeding area to which they will probably remain faithful for the rest of their life. After two years – or three, or four, depending on the species – they are ready to join the adults in their migrations to the other end of the world.

DANNY ROGERS



Above: Great Knot in breeding plumage, Roebuck Bay, north-western Australia. Photo by Brian Chudleigh



Left: Red Knots and Great Knots feeding. The wetlands surrounding the Yellow Sea are critical feeding grounds for Australia's migratory waders en route to and from their arctic breeding areas. Photo by Jan van de Kam

A Year in the life of the Great Knot

The Great Knot is the second most abundant migratory shorebird in the East Asian–Australasian Flyway, with an estimated total population of 380,000 birds. About 95 per cent of the population spend the non-breeding season in northern Australia, particularly in north-western Western Australia, the Gulf of Carpentaria and the north coast of Arnhem Land.

In February–March Great Knot begin to put on fat in preparation for the northward journey to their breeding grounds. They depart in late March–early April, after increasing their weight by up to 70 per cent. About five days later, after 7000 km of non-stop flight, they land on the coast of the Yellow Sea, especially the west coast of South Korea. By the middle of May, most have relocated to the northernmost intertidal areas of the Yellow Sea that have thawed after the northern winter. These mudflats are critical feeding areas for Great Knot about to depart on the final leg of their migration – to the mountain tundra breeding areas in far north-eastern Siberia.

The remainder of their journey is over areas mostly covered with ice and snow. If the breeding areas are still snow-covered when they arrive, the birds will have to rely on their remaining fat reserves until food becomes available with the thaw.

The birds pair and nest in late May, sharing incubation duties until chicks hatch towards the end of June. Females then depart, leaving the adult male birds to rear the chicks. The breeding grounds are abandoned by early August, as females, then males and finally young birds move to the shores of the Sea of Okhotsk, where the once-frozen mudflats have now thawed and provide food to fuel the long journey back to Australia.

There is evidence to suggest that Great Knot fly directly from the Sea of Okhotsk to northern Australia – an amazing non-stop flight of some 9000 km.

Great Knot first arrive on the non-breeding grounds in Australia around mid-August. Large numbers of adults appear towards the end of the month, with the juvenile birds following a month or more later. Then it's a well-earned five months' rest until the cycle starts again the following February.

Life is a race for Great Knot. Interruptions to the tight schedule of fattening in preparation for migratory flights can be caused by loss of feeding habitat or excessive disturbance. Such delays could lead to the birds running out of fuel while attempting a trans-oceanic crossing, or arriving at the breeding grounds too late to take advantage of the very brief arctic summer. Perhaps the greatest dangers come on northwards migration, where the birds face a diminishing number of potential feeding sites in the Yellow Sea as mudflats are reclaimed in China and Korea.

MARK BARTER

SHOREBIRD CONSERVATION

International action

For over 30 years it has been recognised that co-ordinated international action is needed to maintain populations of migratory shorebirds. In 1971 Australia was the first country to accede to the Convention on Wetlands of International Importance (Ramsar Convention), which promotes wise use of wetlands and wetland species. To date, 15 of the 22 countries in the EAAF have ratified the Ramsar Convention (for more information see: www.ramsar.org).

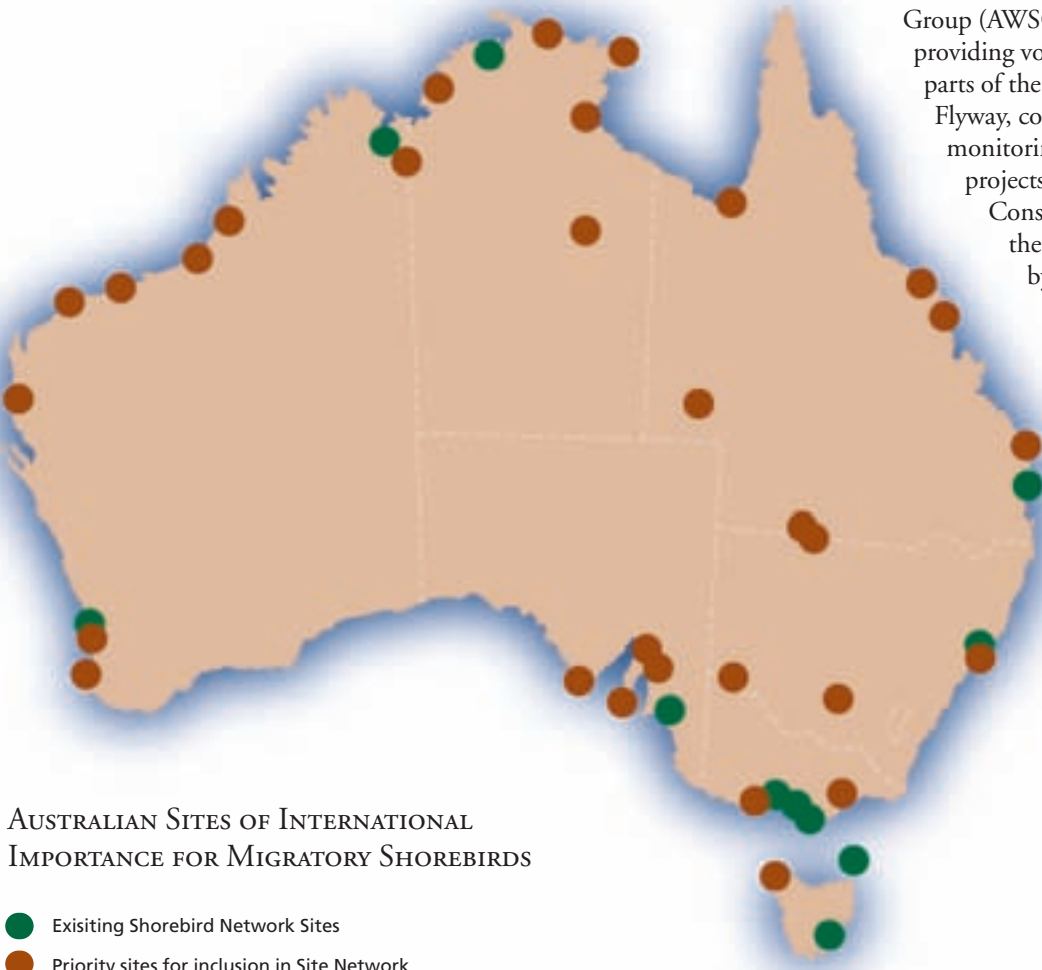
Australia is also an active party to the Convention on Migratory Species, and the Convention on Biological Diversity, and has developed bilateral agreements with Japan (JAMBA) and China (CAMBA) for the conservation of migratory birds.

In the last decade it has become apparent that the major threats to migratory shorebirds are in the staging sites that link breeding and non-breeding areas. In response, an Action Plan has been developed for the conservation of migratory shorebirds in the East Asian–Australasian Flyway. This Action Plan provides a co-operative framework for governments and non-government organisations (NGOs) to address priority needs.

The themes of the Shorebird Action Plan for the 2000–2005 period are:

- (a) *Development of a Shorebird Site Network.* The key element of the Action Plan is the ongoing development of a network of internationally important sites. It is estimated that the EAAF has more than 400 sites of international importance for migratory shorebirds and the objective is to include at least 25 per cent of these sites. The Network now has 31 sites in nine countries; 11 sites are in Australia. In Australia, Commonwealth (Environment Australia) and State/Territory governments have agreed to a target of 36 sites involved in the Network by 2005.
- (b) *Appropriate management of Network sites.* This is to be achieved by improving site management skills, and by building government and community education and involvement in shorebird conservation. This work is targeted at the developing countries of the Flyway.
- (c) *Increasing the knowledge base on migratory shorebirds.* Surveys, monitoring and research on shorebirds and their habitats are needed to document important sites and assess the effectiveness of management actions.

Environment Australia, through the Natural Heritage Trust, has provided core funding for implementation of the Plan, which is co-ordinated by Wetlands International – Oceania. Organisations such as Birds Australia's Australasian Wader Studies Group (AWSG, see Box, p. XV) are contributing by providing volunteer trainers for activities in other parts of the Flyway, publishing a newsletter for the Flyway, conducting research on migration and monitoring shorebird populations. Other projects, such as the WWF Australia Shorebird Conservation Project (see Box, p. XV) have the potential to make a major contribution by involving local communities in the management of important shorebird sites in Australia.



AUSTRALIAN SITES OF INTERNATIONAL IMPORTANCE FOR MIGRATORY SHOREBIRDS

- Existing Shorebird Network Sites
- Priority sites for inclusion in Site Network



Action in Australia

Successful shorebird conservation in Australia can be achieved through partnerships between local communities, management authorities, scientists and NGOs. Examples of such partnerships for shorebird conservation include strong community-based elements and on-ground conservation actions:

Friends of the Hooded Plover: Victoria

Mornington Peninsula National Park, near Melbourne, is the most heavily visited National Park in Victoria, attracting millions of visitors to its sandy surf beaches every year. These beaches are also home to Hooded Plovers that breed and spend their entire lives there – at risk from the many humans, and their dogs and horses, who inadvertently crush nests and chicks, and disturb the parent birds.

In the early 1990s local concern that plover populations were declining led to the formation of a 'Friends of the Hooded Plover' group. The 'Friends' worked with Parks Victoria and other groups (e.g. Bird Observers Club of Australia, Birds Australia) to protect breeding sites, educate and raise awareness, change some local dog and horse regulations, and monitor the plovers to determine the effectiveness of their efforts.

Despite many setbacks, by the late 1990s breeding success had increased and the population had recovered to the extent that record high counts were being made in the early 2000s. Lessons learned during this period have been used by other community groups, with great success.

'Whose Beach Is It?: Tasmania

The 'Whose Beach Is It?' project was created in response to increasing concern about the effects of human disturbance such as 4WD activities, dog-walking and beachcombing on breeding populations of Hooded Plovers, Pied Oystercatchers and Red-capped Plovers along the Tasmanian coastline.

The project, funded by Coastcare, was coordinated by the Tasmanian Conservation Trust with the support of Birds Australia (Tasmania), the Nature Conservation Branch and Tasmanian Parks & Wildlife Service. A series of interpretative, road and fence signs was designed and installed to raise awareness about the plight of beach-nesting shorebirds in the State.

The project also funded a practical workshop to educate members of the community about shorebirds, and to encourage people to become involved in conservation action, ranging from regular bird counts to reporting activities that might impact on nesting birds. Overall, the key message of the project was 'learning to share the beach with the birds'.

The lessons learned from work to conserve resident shorebirds can now be applied to other sites that are important for migratory birds.



Above: The 'Friends of the Hooded Plover' group at Mornington Peninsula National Park has successfully campaigned to protect breeding sites and change the behaviour of beach visitors who might disturb this Endangered shorebird. *Clockwise from left:* Hooded Plover and chicks; Eggs laid straight onto the sand are vulnerable to trampling by humans or horses, crushing by 4WDs and predation by dogs, cats and foxes; Keeping visitors out of breeding areas helps to protect sensitive habitat and prevents disturbance to parent birds; Wire cages (like this one at Phillip Island) around a nest can protect eggs from trampling and predation. Photos: (plover) by Dave Watts; (other photos) by Michael Weston/Aquila Images



Left: The 'Whose Beach Is It?' project in Tasmania was created in response to concerns about the impact of human disturbance on breeding populations of the State's beach-nesting Hooded Plovers, Pied Oystercatchers and Red-capped Plovers. A series of interpretative signs aimed at changing beach-goers' behaviour has been reinforced by community workshops and regular shorebird counts. Photos by Bianca Priest



Above: The Beach Stone-curlew is listed as Vulnerable in Queensland, with just over 1000 birds left in the State. In 2000–01, a community project in far north Queensland trained volunteers to count, band and monitor breeding birds, and facilitated awareness-raising activities. People living alongside the Stone-curlews have now begun to take a protective interest in these shorebirds.

Photos: (Stone-curlew) by Keith & Lindsay Fisher; (banding) by QPWS Rockhampton.

Right: The community research project SROEBIM (Southern Roebuck Bay Invertebrate and Bird Mapping Project) has contributed significantly to knowledge about the feeding ecology of shorebirds in the region.

In 2002, 149 people including 94 volunteers surveyed almost the entire area of tidal mudflats in Roebuck Bay.

Photo by Jan van de Kam

Beach Stone-curlews: Far-north Queensland

The Beach Stone-curlew is listed as Vulnerable in Queensland, and it is estimated that only 1050 birds remain in the State. The species has a low reproductive rate, and nests, often laid near the high tide mark, are susceptible to being washed away during spring tides or storm surges. Other threats include habitat destruction caused by people walking on the beach, 4WDs and dogs, and predation of eggs and young by cats and foxes.

In a bid to protect the species, in 2000–01 a partnership project was created between the Whitsunday Volunteers Association and the Queensland Parks & Wildlife Service. Funded by Coastcare, the project included the training of volunteers, monitoring – including video surveillance – of known breeding sites, bird banding, and education and awareness-raising activities, including preparation of display material, slide shows in schools and interpretative signs at key beaches.

Overall, the project was very successful and communities living alongside the birds began to see them as local icons worthy of protection.

SHOREBIRD RESEARCH IN AUSTRALIA

Most shorebird research in Australia has been undertaken by volunteers without government or corporate funding. These studies have focused on counts and banding (see Box, p. XII). Counts have revealed a good deal about the location of the most important shorebird sites in Australia and other parts of the Flyway. However, there are almost certainly still important sites to find, and counts need to continue at known sites to find out whether shorebird populations are stable over time.

Banding programs can also be a valuable monitoring tool, especially as they help reveal the causes of population declines shown by counts.

Banding programs have also been central to revealing the movement patterns of many Australian shorebirds. Knowledge of migration routes is needed to identify all the sites that migratory shorebirds depend on when breeding, moulting and staging. Often migration strategies are complicated and difficult to work out without intensive research: for example, juvenile shorebirds often take a different route on southwards migration to adults, and in some species, males and females migrate to different non-breeding areas. Continuing banding programs and (especially) more extensive surveys of leg-flagged shorebirds along the Flyway (see Box, p. XII) will help to unravel these migration routes and identify the localities where the greatest conservation efforts should be directed.

Aside from the data gained from banding studies, they have performed an important social role in Australasian shorebird research; many of the most active people in Australasian shorebird research and conservation initially developed their interest through participating in banding studies. Exchange of information on band recoveries and flag resightings has been the basis behind much productive networking of shorebird researchers in different parts of the Flyway.





Population monitoring

Birds Australia (then the Royal Australasian Ornithologists Union, RAOU) initiated national shorebird counts in 1981. This enabled an overview of the numbers and distribution of shorebirds throughout Australia, and the identification of nationally and internationally important sites for different species.

There is a continuing need for surveys of this kind, and the Australasian Wader Studies Group (AWSG, see Box, p. XV), recently co-ordinated additional population surveys along the coast of South Australia and Victoria. AWSG members have been involved in urgently needed counts in other parts of the Flyway, especially in the Yellow Sea. The data collected assists in identifying important sites, many of which are included in the Shorebird Site Network.

Although counts to find the strongholds of shorebirds are invaluable, it is also important to find how shorebird populations change over time. The AWSG co-ordinates counts at about 30 sites in summer and winter each year. These counts use scores of volunteers from a number of organisations around Australia. This monitoring program makes it possible to detect population trends over time.

Recent data reveal substantial reductions in the numbers of some species of shorebirds at some sites. We don't know yet if these reductions are due to local changes in habitat, or to changes or problems elsewhere in the Flyway. It is only through the long-term collection of regular counts from many sites that we can distinguish local from global effects.

KEN GOSBELL



Above: Great and Red Knots, Bar-tailed Godwits, Curlew Sandpipers, Greater Sand Plovers, Red-necked Stints, Grey Tattlers and a solitary Terek Sandpiper at high tide, Roebuck Bay, north-western Australia. Leg flags are easily seen in the field, making it possible for birdwatchers to find flagged birds without needing to catch them. Photo by Jan van de Kam

Left: Surveys of leg-flagged shorebirds along the Flyway help to unravel the migration routes of different species: the Victorian-flagged Red-necked Stint (above) and north-west Australian-flagged Grey-tailed Tattler (below), seen here with some Ruddy Turnstones, were both seen in May 2002 by Chung-Yu Chiang at HanBou, ChangHwa County, Taiwan.

There has been relatively little fully funded research on Australian shorebirds. This is regrettable, as there are many outstanding questions about Australian shorebirds that are not easily resolved without long periods of full-time field research, laboratory access and complex analyses. Such studies are not easily performed by volunteers working in their spare time.

Much of the professional research that has been carried out has been done by lone workers at scattered institutes without a strong tradition in shorebird research. Although these studies have generally been successful, the difficulties of working in isolation have probably contributed to the dearth of professional studies on such important topics as the breeding ecology of our resident freshwater shorebirds, and the foraging biology and population dynamics of our migrant visitors.

A potential approach to this problem is offered by an ongoing co-operative study of shorebird ecology in north-western Australia (Roebuck Bay and Eighty-Mile Beach). The extraordinary intertidal flats of this

region are key feeding areas for over half a million shorebirds, but they are mainly remote and difficult to study. Since 1997, specialists in shorebird ecology, intertidal invertebrates, migratory physiology and wetland conservation from different institutes have joined forces to perform field research far beyond the scope of what can be achieved by a single researcher.

As part of this study, the community research project SROEBIM (Southern Roebuck Bay Invertebrate and Bird Mapping Project) has involved an ongoing partnership between Environs Kimberley and the WA Department of Conservation and Land Management. Funding for the project has come from Coastcare, with support from Broome Bird Observatory, local government, business and others. In 2002, during a three-week expedition that involved 149 people, 94 volunteers contributed some 6600 volunteer hours (out of a total 12,000 hours) surveying the invertebrates, sediments and bird densities of almost the entire area of tidal mudflats in Roebuck Bay – 160 km²! For further information see: www.cwu.edu/~rhickey/birds.html

Banding and colour flagging

Shorebird migrations from one side of the world to another have long fascinated people. Why do they do it? How do they do it? When do they do it, and which routes do they take? It is to increase our knowledge of these amazing birds and to try to find answers to some of these questions that shorebird study groups in Australia and other countries undertake banding and flagging programs.

In Australia, banding programs have been operating for almost 25 years and more than 250,000 birds have been banded. Typically, shorebirds are captured using a cannon net that is fired over a flock at a high tide roost. The birds are banded on the leg with a uniquely numbered metal band, then measured, aged, weighed and released.

Analysis of banding data provides information on migratory destinations, seasonal breeding success, survival rates, and site fidelity and use. It also increases our understanding of the shorebirds' physiological characteristics (e.g. weight gain prior to migration).

The recapture of banded birds along the Flyway adds to our knowledge of movements and migration strategies. Some birds are recaptured after many years: for instance, last year in north-western Australia, a Terek Sandpiper that had been banded as an adult bird 19 years previously was recaptured from the same stretch of beach!

Banding of resident shorebirds has revealed some surprising movements as well, such as Pied Oystercatchers crossing Bass Strait and Hooded Plovers moving hundreds of kilometres.

Leg-flagging program

A major limitation with banding is the need to recapture birds in order to obtain the band number. In the early 1990s a leg-flagging program was developed using small coloured plastic 'flags' attached to the legs of the shorebirds. Each region in the Flyway has a unique colour combination; for instance, in Victoria it is orange, in north-western Australia, yellow, and in south-eastern Queensland, green. Leg flags are easily seen in the field with binoculars or a telescope, making it possible for birdwatchers to find flagged birds without needing to catch them.

Today shorebirds are being flagged in Alaska, Russia, Japan, South Korea, China, Taiwan, Hong Kong, the Philippines, Australia and New Zealand. There are estimated to be about 60,000 shorebirds in the Flyway carrying leg flags.

The leg-flagging program has increased the number of reported movements by more than 15 times that of banding birds. It has vastly increased our knowledge of shorebird movements, the timing of migrations of different populations, and the location of critically important sites such as stopover locations and breeding areas.

Every flag sighting is valuable. You can find out more about the program, as well as report sightings, on the AWSG website at: www.tasweb.com.au/awsg

KEN GOSBELL

Voluntary counting and banding programs, such as those conducted by the AWSG, are critical to our understanding of the movement patterns of many of Australia's migratory shorebirds. *From top:* Laying out the cannon net – this will be fired over a flock at a high tide roost; Extracting a Red-necked Stint from the net; Processing the cannon-net catch – each bird is banded on the leg with a uniquely numbered metal band, then measured, aged, weighed and released; Measuring the bill of Grey-tailed Tattler. Photos: (cannon net) by Clive Minton; (extracting stint) by Jim Hooper; (processing birds and measuring tattler) by Jan van de Kam



GETTING INVOLVED: HOW YOU CAN HELP

Everybody can become involved in conserving shorebirds, whether through government or NGOs, industry, business or as individuals.

Conservation activities are greatly enhanced if focused into a framework, and for most shorebirds this can be done through recognising and managing sites of importance. The conservation needs of migratory shorebirds are outlined in the *Action Plan for the Conservation of Migratory Shorebirds – Asia Pacific 2001–2005*; resident shorebirds are included in the *Action Plan for Australian Birds* (2000).

The suggestions below include specific strategic actions that would enhance shorebird conservation in Australia.

What can Federal and State/Territory Governments do?

1. Build the Shorebird Site Network in Australia to 50 sites.

Australia has over 200 sites which meet the criteria for sites of international importance to migratory shorebirds and the Shorebird Action Plan calls for countries to have 25 per cent of these sites involved in the Network by 2005. The Network currently has 11 sites in Australia. Priority sites for nomination to the Network include Roebuck Bay (WA), Eighty Mile Beach (WA), the south-east Gulf of Carpentaria (Qld), Great Sandy Strait (Qld), Port Hedland Saltworks (WA), Peel Inlet (WA), Kangaroo Island (SA), the Boullanger Bay area (Tas.), Lake Macquarie (NSW) and Fog Bay (NT).

2. Identify wetlands of importance for inclusion in reserve systems or recognition under Ramsar.

Additions to the reserve system, and recognition of internationally important wetlands through the Ramsar Convention, will help provide legal frameworks for the ongoing protection of key sites.

3. Enhance management at important sites through planning, training, monitoring and education.

Conservation agencies need to give appropriate priority to shorebird conservation, and appropriate management of important shorebird sites needs to be properly resourced.

4. Implement management plans for 75 per cent of internationally important sites by 2005.

Management plans are the key tool used by conservation agencies. Local communities need to become involved in programs that assist the development and implementation of site management plans.



5. Develop awareness and education programs at 50 per cent of internationally important sites by 2005.

Awareness and education activities lead to enhanced community engagement, and promote long-term stewardship of important sites. There are opportunities for local schools and communities to link with national and international initiatives.

6. Undertake appropriate Environment Impact Assessment for all developments potentially affecting shorebirds.

Migratory and threatened shorebirds are protected under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* and other State/Territory legislation. Activities that significantly impact on shorebirds and their habitat need to be referred to the Commonwealth Government for Environmental Impact Assessment. Assessments should fully and robustly address potential impacts on shorebirds and their habitats.

7. Develop a Wildlife Conservation Plan.

The development of a Wildlife Conservation Plan for migratory shorebirds under national legislation will provide a set of actions that has been agreed by the Commonwealth and State/Territory Governments, and a formal framework for conservation funding and action.

8. Implement threatened species protection and recovery.

The *Action Plan for Australian Birds* (2000) should be implemented for Plains-wanderer, Painted Snipe, Bush Stone-curlew and Hooded Plover.

9. Address widespread threats, such as invasive species.

Through mechanisms such as Threat Abatement Plans, work to eliminate the impacts of widespread threats such as introduced predators and plants that invade intertidal flats and inland wetlands, and colonise coastal dunes.

10. Facilitate the shorebird conservation activities of regional and local authorities.

Federal and State/Territory Governments can continue to build the capacity of local councils, regional programs and catchment authorities, with focused support for their shorebird conservation activities. To assist this, awareness of shorebird conservation issues and local responsibilities needs to be raised.

11. Encourage strategic wetland rehabilitation and restoration.

Considerable effort is being directed at repairing wetlands, and this needs to continue. Habitat compensation (artificial roost sites, etc.) is less desirable than habitat protection, but may be necessary in some circumstances.

Above: 4WD vehicles should be driven only where they are permitted, and close to the water's edge. Dogs should be kept on a leash near wetlands or sensitive breeding habitat.

Photo by Eric Woehler

Below left: Unfortunately, the breeding season of Australia's beach-nesting shorebirds such as the Hooded Plover coincides with the period of peak visitation to our crowded beaches. When walking, jogging or beachcombing, always be aware that you are sharing the beach with shorebirds – and keep your distance.

Photo by Michael Weston/
Aquila Images





Shorebird enthusiasm: who's watching whom? (Miranda, New Zealand) Shorebird conservation begins with increased appreciation and understanding of these marvellous birds.
Photo by Brian Chudleigh

12. International conservation action.

Migratory shorebirds depend on complementary management of their staging and nesting sites throughout the Flyway, so it is essential that Australia continue its involvement in Flyway conservation efforts such as the Shorebird Action Plan 2001–2005, and meet our international obligations domestically.

What can local government and catchment authorities do?

1. **Identify important shorebird sites in your jurisdiction.**
Having information on the location of important sites for shorebirds is the first step toward managing shorebirds and meeting your obligations.
2. **Incorporate shorebirds into planning.**
Shorebirds and threats to their habitat should be considered when managing wetlands and adjacent areas. For example, erosion control in dunes can destroy nests and remove breeding habitat, and freshwater run-off from streets can encourage mangrove growth on intertidal flats.
3. **Use regulatory tools, such as zoning regulations and dog control acts, to protect shorebirds and their habitat.**
4. **Increase stakeholder involvement and develop partnerships.**
Local governments can form partnerships and co-operative management arrangements with NGOs, industry and landholders to achieve more environmentally sustainable land-use plans and practices. This also increases the capacity of local government to manage shorebirds.
5. **Minimise disturbance.**
Disturbance of shorebirds during feeding, roosting and nesting is a major problem in populated areas. Methods to minimise disturbance include seasonal or permanent fencing of sensitive sites, dog restraint, management of 4WD access, and beach closures.

What can private businesses and industry do?

1. **Participate in accreditation programs for nature-based tourism operators.**
Organisations like Ecotourism Australia offer the Nature-based and Eco-tourism Accreditation Program and the Eco-Guide Certification Program. Biodiversity conservation is included as a component of these programs.
2. **Manage coastal operations sympathetically.**
Coastal industries and infrastructure managers can develop Environment Management Plans that

include maintenance of habitat and minimisation of impacts on shorebirds.

3. Maintain high water quality.

Industries and aquaculture projects can minimise impacts on shorebird habitats by careful regard to waste water quality and pollution controls. They can also carefully plan responses to major polluting events, such as oil spills. Many wetlands are vulnerable to the effects of altered water regimes and salinity.

4. Promote Codes of Conduct.

Businesses near shorebird sites can help promote Codes of Conduct and awareness of best-practice for better coexistence between shorebirds and the community. These activities also help to build goodwill and co-operation between businesses and the community.

5. Incorporate shorebirds into marketing campaigns.

Annual festivals that celebrate the arrival of migratory shorebirds are one creative avenue for raising awareness of shorebird issues, involving communities and boosting retail business and local economies.

What can landowners and property managers do?

1. **Participate in government incentives to assist private landholders in managing their wetlands.**
Some Federal and State agencies may be able to provide financial or technical assistance for landholders wishing to protect or conserve shorebirds and important habitats. Environment Australia has funded an information kit, *Wetland Management Assistance for Private Landholders*, that provides information on incentives to promote wise management of private wetlands. See Contacts, p. XVI.
2. **Consider a voluntary conservation scheme for your property.**
All States and Territories offer various conservation schemes to suit the landowner's level of interest and commitment. Information on these schemes is available on the Bush for Wildlife website: www.bushforwildlife.com.au/
3. **Incorporate shorebird conservation issues into property management plans and strategies.**
In many instances, threatened and migratory shorebirds are protected under Commonwealth and State legislation. For example, the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* requires approval for any action that is likely to have a significant impact on a listed threatened or migratory species. The inclusion of shorebird conservation measures in property management plans and strategies will assist you in complying with relevant

legal requirements and in achieving positive environmental outcomes.

What can community groups and NGOs do?

- Educate others about shorebirds, their needs and threats.**
Educating the community about shorebirds is one of the most valuable things that community groups and NGOs can do. The case studies included in this supplement provide some good ideas on how to raise awareness about shorebirds, including signage, workshops, and mobile community displays.
- Support education initiatives in schools.**
Check out *Feathers, Flyways and Fastfood* as a useful guide for teachers and birdwatchers wanting to encourage students to learn about shorebirds (www.ea.gov.au/water/wetlands/mwp/shorebirds/index.html). *A Year on the Wing*, the online documentary operated by ABC and Film Australia, and supported by Environment Australia, includes a number of interactive components suitable for classroom use (www.abc.net.au/wing).
- Develop your own community-driven shorebird conservation project.**
Community groups wishing to develop shorebird projects can obtain advice and assistance in the preparation of project proposals from Coastcare (State facilitators), the Bird Observers Club of Australia, Birds Australia (AWSG and the Threatened Bird Network), or WWF Australia (Shorebird Conservation Project and Threatened Species Network). See Contacts, p. XVI.
- 'Adopt a Wetland'.**
Local communities may wish to focus on a particular wetland, and work towards its restoration or protection through fencing and other on-ground works.
- Help with surveys and monitoring.**
Local and national NGOs are the major groups undertaking shorebird surveys and monitoring. These are necessary for identifying sites of importance and for understanding the status and trends of shorebird populations – crucial information for shorebird conservation.
- Continue to advocate and lobby for shorebird conservation.**
Many shorebird conservation issues are addressed by NGOs every year. Community groups have a crucial input into many proposals that potentially impact on shorebirds and their habitats.

BIANCA PRIEST is *Co-ordinator of the WWF Australia Shorebird Conservation Project*; PHIL STRAW is a *consultant avian ecologist specialising in migratory shorebirds and Vice-Chair of the AWSG*; MICHAEL WESTON is *Birds Australia's Research and Conservation Manager*.

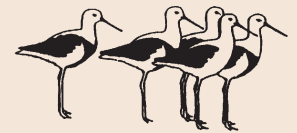
What can individuals do?

- Borrow some binoculars and discover birdwatching, or join a birding organisation such as Birds Australia or the Bird Observers Club of Australia.**
- If you enjoy walking, jogging or beachcombing, be aware that you are sharing the beach with shorebirds and keep your distance.**
- If walking your dog near a wetland, keep it on a leash so as not to disturb the birds.**
- Drive 4WD only where they are permitted, and drive close to the water's edge.**
- Be aware of birds and try and minimise disturbance while launching or landing your boat.**
- Report colour flagged shorebirds to the AWSG (see below).**
- Report concerns about development projects to Environment Australia (www.ea.gov.au/epbc/compliance/index).**
- Link with existing National and State projects for shorebird conservation, such as WWF Australia's Shorebird Conservation Project (see below).**

Australasian Wader Studies Group

The AWSG was formed in 1981 as a special interest group of Birds Australia. Its objectives are to:

- Monitor shorebird populations;
- Study the migrations of shorebirds;
- Instigate and encourage other scientific studies of shorebirds;
- Communicate the results of these studies to a wide audience;
- Formulate and promote policies for the conservation of shorebirds and their habitat, and to make available information to local and national governmental conservation bodies and organisations to encourage and assist them in pursuing this objective; and
- Encourage and promote the involvement of a large band of amateurs, as well as professionals, to achieve these objectives.



Membership enquiries: Birds Australia, 415 Riversdale Rd, Hawthorn East, 3123, Tel: (03) 9882 2622; fax: (03) 9882 2677; email: membership@birdsaustralia.com.au
Visit the AWSG website at: www.tasweb.com.au/aws

WWF Australia Shorebird Conservation Project

World Wide Fund for Nature (WWF) Australia recognises the urgent need to raise awareness about shorebirds and their habitat needs, and to build the capacity of communities and governments to conserve important shorebird habitat.

While some significant sites for shorebirds have been recognised through international habitat-protection initiatives including Ramsar listing and the Shorebird Site Network, on-ground protection and action is needed at these and other sites. WWF Australia's Shorebird Conservation Project will help fulfil this need.

The Shorebird Conservation Project offers a community-based, on-the-ground approach to the conservation of shorebirds and their habitat. Its objectives are to:

- Increase awareness, understanding and involvement by communities in conservation of shorebird habitat;
- Reserve and wisely manage significant shorebird sites; and
- Maintain and, where necessary, restore the diversity and abundance of shorebirds.

Five priority sites have been identified as the focus for the project: Roebuck Bay (WA), Gulf St Vincent (SA), Boullanger Bay/Robbins Passage (Tas.), Western Port Bay (Vic.) and the Mackay area (Qld).

With funding from the Natural Heritage Trust, the project will be working in partnership with community groups, government and NGOs including: Birds Australia, the AWSG, Wetlands International – Oceania, the Marine and Coastal Community Network, Wetland Care Australia, Conservation Volunteers Australia, and State-based Conservation Councils including the Tasmanian Conservation Trust and the Conservation Council of Western Australia.

To find out more about the project, call 1800 032 551 or visit the WWF Australia website at: www.wwf.org.au

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CONTACTS

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Tel: Birds Australia (03) 9882 2622; Website: www.tasweb.com.au/aws

Bird Observers Club of Australia:

Tel: (03) 9877 5342; Website: www.birdobservers.org.au/

Birds Australia (Threatened Bird Network):

Tel: (03) 9882 2622; Website: www.birdsaustralia.com.au/

Broome Bird Observatory:

Tel: (08) 9193 5600; Website: www.birdsaustralia.com.au/observatories.html

Coastcare:

Tel: (02) 6274 1490; Website: www.ea.gov.au/coasts/coastcare

Conservation Volunteers Australia (Revive Our Wetlands Program):

Freecall 1800 032 501; Website: www.reviveourwetlands.net

Eco-tourism Australia:

Tel: (07) 3229 5550; Website: www.ecotourism.org.au

Wetland Care Australia:

Tel: (08) 8582 3677; Website: www.wetlandcare.com.au

Wetlands International – Oceania:

Tel: (02) 6274 2890, Website: www.wetlands.org

Wetlands Section, Environment Australia:

Tel: (02) 6274 1111; Website: www.ea.gov.au/water/wetlands/

WWF Australia (Shorebird Conservation Project and Threatened Species Network):

Freecall 1800 032 551; Website: www.wwf.org.au

Enviros Kimberley:

Tel: (08) 9192 1922

Tasmanian Conservation Trust:

Tel: (03) 6234 3552; Website: www.tct.org.au

ONLINE RESOURCES

Wetland Management Assistance for Private Landholders – Information Kit:

www.ea.gov.au/water/wetlands/publications/management/index.html

Assistance for Land Managers – Information on voluntary conservation

schemes available to landowners in each State:

www.bushforwildlife.com.au/

A Year on the Wing – Online documentary following the annual migrations

along the EAAF: www.abc.net.au/wing

Cover photos: Massed shorebirds roosting at high tide, Roebuck Bay, north-western Australia; inset from top: Red-capped Plover; Whimbrel, Roebuck Bay, WA; Red-necked Avocet, Rupunyup, Vic. Photos: (landscapes) by Jan van de Kam; (plover) by Dave Watts; (whimbrel) by Jan van de Kam; (avocet) by Frank Park



Birds Australia

CONSERVATION THROUGH KNOWLEDGE

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Founded in 1901, Birds Australia (Royal Australasian Ornithologists Union) is Australia's oldest national conservation organisation, dedicated to the study and conservation of native birds and their habitat. New members are welcome.

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Since 1901 Birds Australia (Royal Australasian Ornithologists Union) has worked for the conservation of Australia's birds and their habitats, principally through scientific research. It is an independent, not-for-profit organisation with over 20,000 members and supporters, and the proven ability to inspire the involvement of thousands of volunteers in its conservation projects. It relies on the financial support of companies, trusts and foundations and private individuals. New members are welcome.

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