

[1] "*Pluvialis fulva* — Pacific Golden Plover
 Glossary SPRAT Profile
 information to assist regulatory considerations, refer to Policy Statements and Guidelines, the Conservation Advice, the Listing Advice and/or the Recovery Plan. EPBC Legal Status and Documents Top EPBC Act Listing Status Listed marine Listed migratory - EPBC Act, Bonn, CAMBA, JAMBA, ROKAMBA
 Approved Conservation Advice There is no approved Conservation Advice for this species Listing Advice There is no Listing Advice for this species Adopted/Made Recovery Plans There is no adopted or made Recovery Plan for this species Adopted/Made Threat Abatement Plans No Threat Abatement Plan has been identified as being relevant for this species Wildlife Conservation Plans Commonwealth of Australia (2015). Wildlife Conservation Plan for Migratory Shorebirds. Canberra, ACT: Department of the Environment. Available from: <http://www.environment.gov.au/biodiversity/publications/wildlife-conservation-plan-migratory-shorebirds-2016>. In effect under the EPBC Act from 15-Jan-2016. Marine Bioregional Plans Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) (2012). Marine bioregional plan for the North-west Marine Region. Prepared under the Environment Protection and Biodiversity Conservation Act 1999. Available from: <http://www.environment.gov.au/topics/marine/marine-bioregional-plans/north-west>. In effect under the EPBC Act from 27-Aug-2012. Other Commonwealth Documents Top Other EPBC Act Plans EPBC Act Policy Statement 3.21 - Industry Guidelines for avoiding, assessing and mitigating impacts on EBBC Act listed migratory shorebird species (Department of the Environment, 2015) [Admin Guideline]. Policy Statements and Guidelines National Light Pollution Guidelines for Wildlife Including Marine Turtles, Seabirds and Migratory Shorebirds (Department of the Environment and Energy, 2020) [Admin Guideline]. Seagrass - A Vulnerability Assessment for the Great Barrier Reef (Great Barrier Reef Marine Park Authority (GBRMPA), 2011) [Admin Guideline]. Shorebirds - A Vulnerability Assessment for the Great Barrier Reef (Great Barrier Reef Marine Park Authority (GBRMPA), 2011) [Admin Guideline]. Information Sheets Migratory Shorebirds of the East Asian - Australasian Flyway: Population estimates and internationally important sites (Bamford M., D. Watkins, W. Bancroft, G. Tischler & J. Wahl, 2008) [Information Sheet]. Revision of the East Asian-Australasian Flyway Population Estimates for 37 listed Migratory Shorebird Species (Hansen, B.D., R.A. Fuller, D. Watkins, D.I. Rogers, R.S. Clemens, M. Newman, E.J. Woehler & D.R. Weller, 2016) In effect under the EPBC Act from 29-May-2017. [Information Sheet]. Federal Register of Legislative Instruments Marine: Declaration under section 248 of the Environment Protection and Biodiversity Conservation Act 1999 - List of Marine Species (Commonwealth of Australia, 2000c) [Legislative Instrument] Migratory: List of Migratory Species (13/07/2000) (Commonwealth of Australia, 2000b) [Legislative Instrument] Migratory (name change): Environment Protection and Biodiversity Conservation Act 1999 - Update of the List of Migratory Species (12/03/2009) (Commonwealth of Australia, 2009q) [Legislative Instrument] Wildlife Conservation Plan: Wildlife Conservation Plan for Migratory Shorebirds (Commonwealth of Australia, 2006r) [Legislative Instrument] Wildlife Conservation Plan: Environment Protection and Biodiversity Conservation Act 1999 - Section 285 - Instrument revoking and making a wildlife conservation plan (Commonwealth of Australia, 2016) [Legislative Instrument] State Government Documents and Websites QLD: Shorebirds (Department of Environment and Heritage Protection (DEHP), 2013bi) [Internet]. State Listing Status SA: Listed as Rare (National Parks and Wildlife Act 1972 (South Australia): Rare species: January 2020 list) Non-statutory Listing Status IUCN: Listed as Least Concern (Global Status: IUCN Red List of Threatened Species: 2020.2 list) VIC: Listed as Vulnerable (Advisory List of Threatened Vertebrate Fauna in Victoria: 2013 list)

NGO: Listed as Least Concern (The Action Plan for Australian Birds 2010 - non-threatened)

Scientific name: *Pluvialis fulva* [25545]

Family: Charadriidae:Charadriiformes:Aves:Chordata:Animalia

Species author: (Gmelin,1789)

Reference: Distribution Map

The distribution shown is generalised from the Departments Species of National Environmental Significance dataset. This is an indicative distribution map of the present distribution of the species based on best available knowledge. Some species information is withheld in line with sensitive species policies. See map caveat for more information.

Illustrations: Top

Other Links, Including Superseded Commonwealth Documents: Top

Australian Government Department of the Environment and Heritage (AGDEH) (2006f). Wildlife Conservation Plan for Migratory Shorebirds. Canberra, ACT: Department of the Environment and Heritage. Available from: <http://www.environment.gov.au/biodiversity/migratory/publications/shorebird-plan.html>. In effect under the EPBC Act from 25-Feb-2006. Ceased to be in effect under the EPBC Act from 15-Jan-2016.

Commonwealth of Australia (2000b). List of Migratory Species (13/07/2000). F2007B00750. Canberra: Federal Register of Legislative Instruments. Available from: <http://www.comlaw.gov.au/Details/F2007B00750>.

Commonwealth of Australia (2000c). Declaration under section 248 of the Environment Protection and Biodiversity Conservation Act 1999 - List of Marine Species. F2008B00465. Canberra: Federal Register of Legislative Instruments. Available from: <http://www.comlaw.gov.au/Details/F2008B00465>.

Commonwealth of Australia (2007h). Environment Protection and Biodiversity Conservation Act 1999 - Listed Migratory Species - Approval of an International Agreement. F2007L02641. Canberra: Federal Register of Legislative Instruments. Available from: <http://www.comlaw.gov.au/Details/F2007L02641>.

Commonwealth of Australia (2009q). Environment Protection and Biodiversity Conservation Act 1999 - Update of the List of Migratory Species (12/03/2009). F2009L01064. Canberra: Federal Register of Legislative Instruments. Available from: <http://www.comlaw.gov.au/Details/F2009L01064>.

Department of the Environment, Water, Heritage and the Arts (DEWHA) (2009bc). Draft background paper to EPBC Act policy statement 3.21. Canberra, DEWHA. Available from: <http://www.environment.gov.au/epbc/publications/migratory-shorebirds.html>.

Newsletters: Top

EPBC Act email updates can be received via the Communities for Communities newsletter and the EPBC Act newsletter.

Caveat: Top

This database is designed to provide statutory, biological and ecological information on species and ecological communities, migratory species, marine species, and species and species products subject to international trade and commercial use protected under the Environment Protection and Biodiversity Conservation Act 1999 (the EPBC Act). It has been compiled from a range of sources including listing advice, recovery plans, published literature and individual experts. While reasonable efforts have been made to ensure the accuracy of the information, no guarantee is given, nor responsibility taken, by the Commonwealth for its accuracy, currency or completeness. The Commonwealth does not accept any responsibility for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on, the information contained in this database. The information contained in this database does not necessarily represent the views of the Commonwealth. This database is not intended to be a complete source of information on the matters it deals with. Individuals and organisations should consider all the available information, including that available from other sources, in deciding whether there is a need to make a referral or apply for a permit or exemption under the EPBC Act.

Citation: Department of the Environment (2022). *Pluvialis fulva* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: <https://www.environment.gov.au/sprat>. Accessed Tue, 18 Jan 2022 21:37:58 +1100.

Where available the sections below provide a biological profile for the species. Biological profiles vary in age and content across species, some are no longer being updated and are retained as archival content. These profiles are still displayed as they contain valuable information for many species. The Profile Update section below indicates when the biological profile was last updated for some species. For information to assist regulatory considerations, please refer to Conservation Advice, the Recovery Plan, Policy Statements and Guidelines.

Taxonomy: Top

Scientific Name: *Pluvialis fulva*

Common Name: Pacific Golden Plover

Other Names: Eastern Golden Plover, Lesser Golden Plover, Asiatic Golden Plover, Least

Golden Plover, Siberian Brown-winged Plover (Dement'ev & Gladkov 1951; Marchant & Higgins 1993).

The Pacific Golden Plover is a conventionally accepted species (Christidis & Boles 1994, 2008; Marchant & Higgins 1993). The species was formerly considered conspecific with the American Golden Plover, (*Pluvialis dominica*), but as the two species have been recorded breeding sympatrically in western Alaska, they are now considered separate species (Sibley & Monroe 1990).

Description

The Pacific Golden Plover is a medium-sized (length 230.9626 cm; weight: 120.0096175 g) plover with long legs and an upright stance. Sexes are generally inseparable, but juveniles are separable from adults in the field.

In breeding plumage, adults have bold golden spots on the crown and hindneck; a white forehead, which extends as a broad supercilium that curves behind the ear coverts to the sides of the neck; and the rest of the face is black. The upperparts are blackish, boldly spotted with gold, with the tail dark brown with golden-buff bars. The underparts are black, with a broad white stripe (which continues from the sides of the neck) extending down along the sides of the breast to the flanks, where they are spotted black. The underwings are uniform brownish-grey. The bill is black, the eyes are dark brown, and the legs and feet are greyish black (Marchant & Higgins 1993).

In non-breeding plumage, the crown is dark brown with golden streaks; the nape and hindneck are similar, though slightly paler; the forehead, lores, supercilium, chin, throat and sides of the head are all golden or creamy buff. The upperparts are dark brown, heavily marked with bright golden scaly-shaped spots, while the secondary coverts are spotted white, which contrasts with the golden spots of the mantle and scapulars. The foreneck and breast are golden-buff, with grey-brown streaks, and the belly, flanks and undertail are all white with a buff tinge, and the flanks have fine grey-brown streaks. The underwings appear uniform brownish-grey (Marchant & Higgins 1993).

Juvenile birds are similar to non-breeding birds, but the patterning is neater, bolder and more even, with more golden-buff tones to the face and underparts, distinct streaking on the foreneck and barring or marbling on the breast and flanks (Marchant & Higgins 1993).

Pacific Golden Plovers often form flocks, usually of 20 to 50 birds, but single birds are sometimes seen (Marchant & Higgins 1993; C.D.T. Minton 2002, pers. comm.). They roost in areas with other species of shorebirds present, however, usually form a separate communal group (Marchant & Higgins 1993).

Australian Distribution

Within Australia, the Pacific Golden Plover is widespread in coastal regions, though there are also a number of inland records (in all states), sometimes far inland and usually along major river systems, especially the Murray and Darling Rivers and their tributaries. Most Pacific Golden Plovers occur along the east coast, and are especially widespread along the Queensland and NSW coastlines. Elsewhere, they are recorded at scattered sites in the south-east, with most records in Victoria along the coast between Jack Smith Lake (south of Sale) and the Bellarine Peninsula, including Western Port and Port Phillip Bay. In Tasmania, records mainly occur along the eastern and northern coasts with a few scattered records elsewhere, including islands in Bass Strait. In South Australia, they are recorded at many sites between the Coorong and Streaky Bay, including the coasts of Gulf St Vincent and Spencer Gulf. In Western Australia, the species is seldom recorded along the southern or south-western coasts, but is more widespread along the Pilbara and Kimberley coasts between North-West Cape and the Northern Territory border. They are regularly recorded in coastal areas of the Top End of the Northern Territory (Alcorn et al. 1994; Barrett et al. 2003; Blakers et al. 1984; Marchant & Higgins 1993). The species is often recorded on Australia's outlying islands, including Lord Howe and Norfolk Islands, as well as on Christmas and Cocos-Keeling Islands in the Indian Ocean (McAllan et al. 2004; Schodde et al. 1983; Stokes 1988; Stokes et al. 1984).

Internationally important sites in Australia (with maximum counts) include (Bamford et al 2008; Harris 2000; Hewish 1986, 1987a; Watkins 1993): Moreton Bay, Queensland (2163) Additional nationally important sites include: south-eastern Gulf of Carpentaria, Queensland (1370) Great Sandy Strait, Queensland (820) Hunter River estuary, NSW (800) Eighty Mile Breach, Western Australia (440) Clarence and Richmond Rivers, NSW (330) Derwent River estuary-Pittwater, Tasmania (319) The Coorong, South Australia (319) Shoalhaven River estuary, NSW (312) Corner and Shallow Inlets, Victoria (303) north-western Tasmania (382) Swan Bay-Mud Islands, southern Port Phillip Bay, Victoria (255) Anderson Inlet, Victoria (251). Norfolk Island may also be an important site in the region, as up to 1000 birds have been recorded there (Schodde et al. 1983).

There are no published estimates of the extent of occurrence of the Pacific Golden Plover in Australia. The estimated global extent of occurrence is 100,000-1,000,000 km² (Birdlife International 2007h).

The area of occupancy of the Pacific Golden Plover in Australia has been estimated at 46,700 km².

The species occurs at numerous and widespread sites in Australia, especially along the east coast.

There are no current captive populations of this species and none has been reintroduced into the wild.

The distribution of the Pacific Golden Plover is not fragmented, either in its breeding grounds or in its non-breeding areas.

Global Distribution

Breeding distribution
The Pacific Golden Plover breeds mostly in northern Siberia, between the Yamal Peninsula and the Chukotski Peninsula and the Gulf of Anadyr. They breed north to 76° N, on Taimyr Peninsula and Vrangelya Island, and south to 68° N, although as far as 55° N in the east along the western coast of Kamchatka Peninsula. The species also breeds in western parts of Alaska, from Cape Prince of Wales south to the Kuskowin River, including on St Lawrence and Nanivak Islands (AOU 1983; Bent 1962; Connors 1983; Cramp & Simmons 1983; Dement'ev & Gladkov 1951; Johnson et al. 2006; Marchant & Higgins 1993; Wiersma 1996).

On passage
In the East Asian-Australasian Flyway, Pacific Golden Plovers have been recorded on migration in south-eastern Siberia, eastern and southern China, Japan, the Korean Peninsula, Indochina, the Philippines, the Malay Peninsula and parts of Indonesia. Elsewhere, the species has been recorded on passage overland through China, Nepal and parts of the Indian subcontinent (Ali & Ripley 1980; Chalmers 1986; de Schauensee 1984; Dickinson et al. 1991; Glenister 1974; Gore & Won 1971; Grimmett et al. 1999b; Johnson et al. 2006; Lane 1987; Marchant & Higgins 1993; Wiersma 1996). When migrating across the Pacific Ocean, they are recorded on passage on scattered islands such as the Pribilof Islands in the Bering Sea, Hawaii and Guam (Cramp & Simmons 1983; Johnson et al. 1989, 2006).

Non-breeding distribution
During the non-breeding season, the species is widespread in coastal areas of many parts of Asia, Australasia, Melanesia and Polynesia. In the Indian Ocean, it winters along coasts from Pakistan and India east to the Malay Peninsula and western Indonesia (Ali & Ripley 1980; Crossland et al. 2006; Glenister 1974; Grimmett et al. 1999b); in eastern and South East Asia, it winters from Japan, Korea and China south through the Philippines to eastern Indonesia (de Schauensee 1984; Dickinson et al. 1991; Gore & Won 1971; Johnson et al. 2006; Orn. Soc. Japan 2000; White & Bruce 1986). In Micronesia, Melanesia and Polynesia, it winters from New Guinea east to Hawaii (Bent 1962; Bishop 2006; Coates 1985; Johnson et al. 2006; Pratt et al. 1987); and in Australasia, it occurs during non-breeding season in coastal Australia, especially in the east, New Zealand and outlying islands (Marchant & Higgins 1993). The species also occurs regularly in small numbers in eastern Africa (Somalia, Ethiopia and Kenya), the coasts of the Red Sea and in the Seychelles; and sometimes in southern California. There are also records of vagrants in northern and western Europe and the coasts of the Mediterranean Sea, Greenland, Chile, and inland parts of western United States (AOU 1983; Connors 1983; Cramp & Simmons 1983; Knox 1987; Marchant & Higgins 1993; Urban et al. 1986).

The Pacific Golden Plover is not considered to be globally threatened (Wiersma 1996) and is classified as being of least concern (Birdlife International 2007h). The world population of Pacific Golden Plovers has been estimated at 209 500 (Wiersma 1996), 170 000–220 000 (Birdlife International 2007h) or between 100 000–1 million (Rose & Scott 1997), with the population in the East Asian-Australasian Flyway estimated at 130 000 (Hansen et al. 2016).

It has been estimated that about 4% of the world's population of Pacific Golden Plovers occur in Australia (9000 out of approximately 209 500), and these represent up to about 9–10% of the birds present in the East Asian-Australasian Flyway (Bamford et al. 2006). Because the Pacific Golden Plovers that occur in Australia migrate from breeding areas in eastern Asia and Alaska (Marchant & Higgins 1993; Watkins 1993), they would be affected by global threats.

Surveys Conducted
Populations are regularly surveyed during the Population Monitoring Program carried out by the Australasian Wader Studies Group, in which sites that regularly support good numbers of shorebirds are surveyed twice a year (winter and summer) in co-ordinated counts (for example, Wilson 2001c). These surveys began in 1981.

Population Information
The world population of Pacific Golden Plovers has been estimated at about 209,500 (Wiersma 1996), 170,000-220,000 (Birdlife International 2007h) or 100,000-1 million (Rose & Scott 1997); the latter estimate is simply a less accurate statement of the order of magnitude of the population of Pacific Golden Plovers.

The species does not occur as a number of smaller populations when present in Australia.

The overall trend of the population of this species is unknown. Numbers recorded in regular counts in Australia since the 1980s recorded a slight decline. Between 1986 and 1994, there was a general declining trend of the population present in Australia, but between 1995 and 2006, the trend was one of increase (Harris 1994, 1995, 1996, 1997, 1999b, 2000; Hewish 1986, 1987, 1990, 1992; Skewes 2002, 2003, 2004, 2005, 2007; Wilson 2001). A decline in the area of occupancy in south-eastern Australia was detected between 1977 and 1981 and between 1998 and 2002 (Barrett et al. 2003).

The number of Pacific Golden Plovers recorded in Australia can vary significantly between years. Numbers of Pacific Golden Plovers recorded during annual summer surveys at a fixed number of sites ranged from a maximum of 3902 in 1989 to a minimum of 424 in 1994 (Harris 1994; Hewish 1990). Fluctuations in populations that are detected in Australia probably reflect factors in the breeding grounds rather than in Australia, such as 'lemming cycles' which affect the level of predation of waders' nests and the number of young birds that subsequently arrive in the non-breeding areas (Rogers et al. 2005). Nevertheless, local occurrence at a given site in Australia

may depend, at least partly, on the availability and condition of wetlands, and this species is one of the most affected by changes in water level (Thomas 1968).

There is no published information on the generation length of the Pacific Golden Plover. The only published information is that the oldest bird recorded was at least seven years and three months old (Anon. 2000h).

The key breeding population may be the one which breeds in Alaska, as one bird banded in Alaska was recovered in NSW (Minton et al. 2006), and morphometric data of Pacific Golden Plovers occurring in Victoria indicate that they breed in Alaska (Barter 1988, 1989). This does not, however, preclude the possibility that birds breeding in Siberia also occur in Australia, as another bird, which was banded in Australia, was recovered in the southern Yellow Sea (Minton et al. 2006). Within Australia, two of the major staging areas are Moreton Bay and the Gulf of Carpentaria, where large numbers of birds pass through on their arrival/departure in Australia. The maintenance of these site would appear critical for the survival of the species.

The Pacific Golden Plover is not known to hybridise with other species in the wild.

Land Tenure of Populations

Moreton Bay has been identified as a site of international importance for the Pacific Golden Plover in Australia (Bamford 2008), and 113 314 ha has been reserved. A further 34 sites are identified as important for the species within Australia by Wallace (1993). Of these, Shallow Inlet Marine Park, the Coroong, and Hunter River Estuary are reserved.

Habitat

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In non-breeding grounds in Australia this species usually inhabits coastal habitats, though it occasionally occurs around inland wetlands. Pacific Golden Plovers usually occur on beaches, mudflats and sandflats (sometimes in vegetation such as mangroves, low saltmarsh such as *Sarcocornia*, or beds of seagrass) in sheltered areas including harbours, estuaries and lagoons, and also in evaporation ponds in saltworks. The species is also sometimes recorded on islands, sand and coral cays and exposed reefs and rocks. They are less often recorded in terrestrial habitats, usually wetlands such as fresh, brackish or saline lakes, billabongs, pools, swamps and wet claypans, especially those with muddy margins and often with submerged vegetation or short emergent grass. Other terrestrial habitats inhabited include short (or, occasionally, long) grass in paddocks, crops or airstrips, or ploughed or recently burnt areas, and they are very occasionally recorded well away from water (Marchant & Higgins 1993). On its breeding grounds it occurs in tundra (Dement'ev & Gladkov 1951).

Feeding habitat

This species usually forages on sandy or muddy shores (including mudflats and sandflats) or margins of sheltered areas such as estuaries and lagoons, though it also feeds on rocky shores, islands or reefs. In addition, Pacific Golden Plovers occasionally forage among vegetation, such as saltmarsh, mangroves or in pasture or crops (Bransbury 1985; Evans 1975; Ewart 1973; Pegler 1983; Smith 1966; Thomas 1968).

Roosting habitat

They usually roost near foraging areas, on sandy beaches and spits or rocky points, islets or exposed reefs, occasionally among or beneath vegetation including mangroves or low saltmarsh, or among beachcast seaweed. They sometimes also roost on levee banks and islands in evaporation ponds in saltworks (Bransbury 1985; Ewart 1973; Smith 1966; Thomas 1968; Patterson 1982; Pegler 1983; Prendergast et al. 1985).

Breeding habitat

Breeding occurs in dry areas of tundra away from the coast, including upland and montane tundra, usually on slopes of low hills, knolls or foothills vegetated with lichen and moss, or in bare, stony areas. Some sites are near vegetated areas with shrubs, and although usually above the treeline, they very occasionally breed in forest tundra (Cramp & Simmons 1983; Dement'ev & Gladkov 1951; Wiersma 1996). After the young hatch, they move to moister habitats, such as Sphagnum swamps (Cramp & Simmons 1983).

The species does not rely on a listed threatened ecological community.

Life Cycle

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There is no information on the ages of sexual maturity of the Pacific Golden Plover. The oldest bird recorded was at least 7 years and 3 months old (Anon. 2000h).

The species does not breed in Australia (Marchant & Higgins 1993; Wiersma 1996).

Pacific Golden Plovers lay their eggs in June and July (Dement'ev & Gladkov 1951; Hayman et al. 1986; Tomkovich & Weston 2007; Wiersma 1996). Nests are usually shallow scrapes in the ground, lined with lichen or moss, and are located in dry positions in the tundra, such as on hummocks, or among lichen, moss or *Dryas* (Bent 1962; Wiersma 1996). Clutches are usually of four eggs, which are incubated by both parents for 26 or 27 days (Bent 1962; Dement'ev & Gladkov 1951; Wiersma 1996). Chicks are precocial and usually tended by both parents, but sometimes only by the male if the brood is a late one (Bent 1962; Dement'ev & Gladkov 1951; Wiersma 1996). Like many shorebirds which breed on the ground in the Siberian tundra, the Pacific Golden Plover's ground-nesting habit and precocial nature of the chicks, make them vulnerable to predation by Arctic foxes and other predators (Tomkovich & Weston 2007).

Feeding

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During the non-breeding season, Pacific Golden Plovers mainly eat molluscs, polychaete worms, insects and insect larvae, spiders and crustaceans (Domm & Recher 1973; Evans 1975; Frith & Calaby 1974; Vestjens 1977c). They are also said to very occasionally eat seeds, leaves,

lizards, birds' eggs and small fish (Marchant & Higgins 1993). During the breeding season in the tundra of the Northern Hemisphere, berries are also an important source of food (Bent 1962; Wiersma 1996).

This species forages both diurnally and nocturnally, gleaning and probing moist mud or sand for invertebrate prey on mudflats, saltmarsh, in wave-wash, among tide-wrack on beaches and in pasture (Marchant & Higgins 1993). They usually forage by running, then pausing briefly, then pecking the substrate (Evans 1975). They forage singly or in flocks of up to 100 or more (Marchant & Higgins 1993).

Movement Patterns

Top

The Pacific Golden Plover is a migratory species, breeding in the Northern Hemisphere and flying south for the boreal winter (Cramp & Simmons 1983; Lane 1987; Marchant & Higgins 1993).

Departure from breeding grounds

Non-breeding birds leave the breeding grounds in Siberia and Alaska in mid-July, with breeding adults departing in August, and juveniles leaving in September and October (Bent 1962; Cramp & Simmons 1983; Dement'ev & Gladkov 1951). The last birds leave Alaskan breeding grounds in mid to late October (Dement'ev & Gladkov 1951).

Southern passage

Some birds are thought to migrate along a broad front (Stickney 1943), while others migrate along the coasts. The southern passage from breeding grounds in Alaska takes some birds across the Pacific Ocean, using various islands as staging posts, such as the Pribilof Islands in the Bering Sea (adults in August and juveniles in September), Hawaii (where adults arrive between mid-August and mid-September, with juveniles arriving in late September and October), Guam and islands in the south-western Pacific Ocean (Bent 1962; Cramp & Simmons 1983; Connors 1983; Johnson et al. 1989, 2006). Other birds which breed in Siberia migrate through the East Asian-Australasian Flyway. This route takes them south through the Kamchatka Peninsula, the Sea of Okhotsk and Sakhalin between late July and early October, eastern China generally between mid-July and mid-October, the Korean Peninsula between late July and late October, Japan between late August to early October, and Borneo in August and early September (Dement'ev & Gladkov 1951; Gerasimov 2003, 2005; Gerasimov & Huettmann 2006; Gore & Won 1971; Johnson et al. 2006; Moores 2006; Smythies 1981). In the Indian Ocean, they have been reported on passage on the Cocos-Keeling Islands in October and November (Gibson-Hill 1949b). In addition, some birds pass overland through western Siberia, Mongolia, Tibet and Nepal on passage to some wintering grounds (Cramp & Simmons 1983; Dement'ev & Gladkov 1951; Grimmett et al. 1999b; Johnson et al. 2006; Vaurie 1972; Wiersma 1996). It is possible that some birds that breed in Alaska use the East Asian-Australasian Flyway (Johnson et al. 2006). When on migration, they sometimes remain at staging posts only briefly, such as a few hours, or may stay there for much longer (Dement'ev & Gladkov 1951; Marchant & Higgins 1993).

Non-breeding season in Australasia

Australia: The species is present at non-breeding grounds in Australia mostly between September and May, with greatest numbers in eastern and south-eastern Australia (Alcorn et al. 1994; Lane 1987; Marchant & Higgins 1993). Pacific Golden Plovers generally arrive in northern Queensland in September and October (Lane 1987; Marchant & Higgins 1993), the Top End of the Northern Territory in August (Noske & Brennan 2002) and the Kimberley coast in late September (Collins 1995). Most birds arriving in northern Queensland move southwards along the east coast (though some use inland routes) (Blakers et al. 1984), arriving in southern NSW, Victoria and Tasmania in September, and south-eastern South Australia in October and November (Lane 1987; Marchant & Higgins 1993). Those arriving in the Kimberley Division of Western Australia occur on passage in October (Storr 1980). Though numbers of Plovers are generally stable in south-eastern Australia, Victoria sometimes experiences influxes of birds in December (Lane 1987). Birds begin to migrate northwards along the east coast of Australia (none move overland through the interior) in late February and March, and are thought to fly directly from Australia without stopping in northern Australia (Lane 1987). In northern Western Australia, Plovers occur on passage in February and March (Storr 1980) and leave the Kimberley Division in late April (Collins 1995). Small numbers of Pacific Golden Plovers remain in the non-breeding range throughout the austral winter, though generally not in the extreme south: in southern Australia, only up to 2% remain over winter, while further north in Queensland, up to 41% remain over winter (Hewish 1988). There is some evidence from banding studies of fidelity to non-breeding site (Marchant & Higgins 1993).

New Zealand: The first Plovers of the season arrive in August and September, but most arrive in October and early November. They continue to move south through New Zealand until December, and leave again between March and late May (Marchant & Higgins 1993).

Papua New Guinea: The earliest Plovers arrive in mid-July and they usually leave in April and May (Bishop 2006; Coates 1985; Hicks 1990).

Northern passage

When undertaking northern migration to return to their breeding grounds, Pacific Golden Plovers are recorded on passage through New Guinea in May (Bishop 2006; Coates 1985; Hicks 1990). They leave Brunei in March (Howes 1987), pass through the Philippines mostly in March (Magsalay 1990), Hong Kong between mid-March and early May (Chalmers 1986), the Korean Peninsula between mid-April and mid-May (Gore & Won 1971; Rogers et al. 2006), Japan in early May (Bent 1962; Orn. Soc. Japan 2000), and the Sea of Okhotsk between late March

and late May (Gerasimov & Huettmann 2006). Plovers migrating back to Alaska have been recorded on northward passage through Hawaii in April and May and the Pribilof Islands between mid-April and early May (Bent 1962).

Arrival back at breeding grounds

Pacific Golden Plovers arrive back at their breeding grounds in mid- to late May (Bent 1962; Hayman et al. 1986).

Home ranges and territories are not maintained while the birds are in Australia, though territories are apparently defended elsewhere in the non-breeding range (Hayman et al. 1986).

Threats

Top

Though there are no threats that apply specifically to Pacific Golden Plovers, there are a number of threats that will affect all migratory waders.

Australia Pollution, including industrial and discharge nutrient hyperenrichment, with subsequent eutrophication, adversely affects the number of micro-organisms which occur in the benthos of the littoral zone, which, in turn, affects the efficiency of feeding by species such as the Pacific Golden Plover (Harding et al. 2007; Straw 1992a). It may also affect the Plovers directly through the accumulation of heavy metals, insecticides, herbicides and similar pollutants in their tissues. Conversely, efforts to increase the efficiency of treating effluent before it is released into the greater environment may result in lower levels of bacteria and invertebrates and their larvae which constitute a major proportion of the diet of the Pacific Golden Plover.

With increasing tourist visitation along the coasts of NSW, Queensland and around Broome, Western Australia, and subsequent development, increasing levels of disturbance from human recreation are likely. Residential or other development of saltworks or land adjacent to mudflats near the outskirts of built-up areas (for example in areas along the western shores of Port Phillip Bay, or Botany Bay) results in a reduction of suitable habitat for the species and increased levels of disturbance (Straw 1992a).

The spread of introduced plants, such as cord grass *Spartina*, can invade intertidal mudflats and reduce the amount of suitable areas to forage, as it has in other countries (Goss-Custard & Moser 1988).

Elsewhere There are a number of threats that affect migratory waders in the East Asian-Australasian Flyway. The greatest threat facing waders is habitat loss, both direct and indirect (Melville 1997). Staging areas used during migration through eastern Asia are being lost and degraded by activities which are reclaiming the mudflats for future development (Barter 2002, 2005c; Ge et al. 2007). In many suitable staging areas along the East Asian-Australasian Flyway many intertidal areas have been reclaimed, and the process is continuing at a rapid rate and may accelerate in the near future (Barter 2002, 2005c; Wei et al. 2006). In addition, water regulation and diversion infrastructure in the major tributaries have resulted in the reduction of water and sediment flows, which compound the problem (Barter 2002; Barter et al. 1998; Melville 1997).

Global warming and associated changes in sea level are likely to have a long-term impact on the breeding, staging and non-breeding grounds of migratory waders (Harding et al. 2007; Melville 1997).

Migratory shorebirds are also adversely affected by pollution, both on passage and in non-breeding areas (Harding et al. 2007; Melville 1997; Wei et al. 2006).

Disturbance from human activities, including recreation, shellfish harvesting, fishing and aquaculture is likely to increase significantly in the future (Barter et al. 2005; Davidson & Rothwell 1993).

The biological characteristic of the species which poses a key threat to its survival is that it regularly flies for thousands of kilometres over densely populated areas of the world. The huge human population in East Asia places enormous pressure on natural resources, and manifests itself in activities such as the reclamation of mudflats, which has seriously detrimental effects on populations of migratory waders (Barter 2002, 2005c).

Threat Abatement and Recovery

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Governments and conservation groups have undertaken a wide range of activities relating to migratory shorebird conservation (AGDEH 2005c) both in Australia and in cooperation with other countries associated with the East Asian-Australasian Flyway.

Australia

The Wildlife Conservation Plan for Migratory Shorebirds (AGDEH 2006f) outlines national activities to support flyway shorebird conservation initiatives and provides a strategic framework to ensure these activities and future research and management actions are integrated and remain focused on the long-term survival of migratory shorebird populations and their habitats.

Since 1996/97, the Australian Government has invested approximately \$5 000 000 of Natural Heritage Trust (NHT) funding in projects contributing to migratory shorebird conservation (DEWHA 2007e). This funding has been distributed across a range of important projects, including the implementation of a nationally coordinated monitoring programme that will produce robust, long-term population data able to support the conservation and effective management of shorebirds and their habitat; migration studies using colour bands and leg flags; and development of a shorebird conservation toolkit to assist users to develop and implement shorebird conservation projects.

Birds Australia is currently co-ordinating the Shorebirds 2020 project, which aims to monitor shorebird populations at important sites throughout Australia; and Birdlife International is identifying sites and regions which are important to various species of birds, including shorebirds, and the processes that are affecting them. The aim is to inform decisions on the management of shorebird habitat. It may be possible to rehabilitate some degraded wetlands or to create artificial wader feeding or roosting sites to

replace those destroyed by development, such as by creating artificial sandflats and sand islands from dredge spoil and by building breakwaters (Dening 2005; Harding et al. 1999; Straw 1992a, 1999).

International

Australia has played an important role in building international cooperation to conserve migratory birds. In addition to being party to international agreements on migratory species, Australia is also a member of the Partnership for the Conservation of Migratory Waterbirds and the Sustainable Use of their Habitats in the East Asian-Australasian Flyway (Flyway Partnership), which was launched in Bogor, Indonesia on 6 November 2006. Prior to this agreement, Australia was party to the Asia-Pacific Migratory Waterbird Conservation Strategy and the Action Plan for the Conservation of Migratory Shorebirds in the East Asian-Australasian Flyway and the East Asian-Australasian Shorebird Site Network.

The East Asian-Australasian Flyway Site Network, which is part of the broader Flyway Partnership, promotes the identification and protection of key sites for migratory shorebirds. Australia has 17 sites in the network:

- Kakadu National Park, Northern Territory (1 375 940 ha)
- Parry Lagoons, Western Australia (36 111 ha)
- Thomsons Lake, Western Australia (213 ha)
- Moreton Bay, Queensland (113 314 ha)
- Hunter Estuary, NSW (2916 ha)
- Corner Inlet, Victoria (51 500 ha)
- The Coorong, Lake Alexandrina & Lake Albert, South Australia (140,500 ha)
- Orielton Lagoon, Tasmania (2920 ha)
- Logan Lagoon, Tasmania (2320 ha)
- Western Port, Victoria (59 297 ha)
- Port Phillip Bay (Western Shoreline) and Bellarine Peninsula, Victoria (16 540 ha)
- Shallow Inlet Marine and Coastal Park, Victoria
- Discovery Bay Coastal Park, Victoria
- Bowling Green Bay, Queensland
- Shoalwater Bay, Queensland
- Great Sandy Strait, Queensland
- Currawinya National Park, Queensland

Marine Bioregional Plans

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Marine bioregional plans have been developed for four of Australia's marine regions - South-west, North-west, North and Temperate East. Marine Bioregional Plans will help improve the way decisions are made under the EPBC Act, particularly in relation to the protection of marine biodiversity and the sustainable use of our oceans and their resources by our marine-based industries. Marine Bioregional Plans improve our understanding of Australia's oceans by presenting a consolidated picture of the biophysical characteristics and diversity of marine life. They describe the marine environment and conservation values of each marine region, set out broad biodiversity objectives, identify regional priorities and outline strategies and actions to address these priorities. Click here for more information about marine bioregional plans.

The Pacific Golden Plover has been identified as a conservation value in the North-west (DSEWPaC 2012y) Marine Region. See Schedule 2 of the North-west Marine Bioregional Plan (DSEWPaC 2012y) for regional advice. Maps of Biologically Important Areas have been developed for Pacific Golden Plover in the North-west (DSEWPaC 2012y) Marine Region and may provide additional relevant information. Go to the conservation values atlas to view the locations of these Biologically Important Areas. The "species group report card - seabirds & migratory shorebirds" for the North-west (DSEWPaC 2012y) Marine Region provides additional information.

Major Studies

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There have been no major studies which have dealt specifically with the Pacific Golden Plover in Australia, though there have been extensive studies of shorebirds in general, which includes data on this species. Overseas, the main studies on this species are Connors (1983), Connors and colleagues (1993), and Johnson and colleagues (1989, 2006).

Management Documentation

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There is a detailed summary of all that is known of the species in Australasia in Marchant and Higgins (1993), and international summaries in Cramp and Simmons (1983) and Wiersma (1996). There are also general discussions and summaries of the ecology, conservation and threats of this species and other shorebirds in Geering and colleagues (2007), Barter (2002) and Watkins (1993).

The Department of the Environment, Water, Heritage and the Arts (DEWHA 2008b) have prepared draft Marine Bioregional Plans for the North, North-West, East and South-West of Australia. These plans provide descriptions of the ecosystems, and conservation values of the regions that include information on the Pacific Golden Plover.

The Department's Wildlife Conservation Plan for Migratory Shorebirds (AGDEH 2006f) and The Action Plan for Australian Birds (Garnett & Crowley 2000) also contain actions aimed at the conservation of migratory birds within Australia.

Species Profile

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