Australian Government
Department of the Environment

# Consultation Document on Listing Eligibility and Conservation Actions

## *Charadrius leschenaultii* (greater sand plover)

You are invited to provide your views and supporting reasons related to:

1) the eligibility of *Charadrius leschenaultii* (greater sand plover) for inclusion on the EPBC Act threatened species list in the vulnerable category; and

2) the necessary conservation actions for the above species.

Evidence provided by experts, stakeholders and the general public are welcome. Responses can be provided by any interested person.

Anyone may nominate a native species, ecological community or threatening process for listing under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) or for a transfer of an item already on the list to a new listing category. The Threatened Species Scientific Committee (the Committee) undertakes the assessment of species to determine eligibility for inclusion in the list of threatened species and provides its recommendation to the Australian Government Minister for the Environment.

Draft information for your consideration of the eligibility of this species for listing as vulnerable starts at page 9 and information associated with potential conservation actions for this species starts at page 12. To assist with the Committee's assessment, the Committee has identified a series of specific questions on which it seeks your guidance at page 14.

Responses are to be provided in writing either by email to:
species.consultation@environment.gov.au

or by mail to:

The Director
Migratory Species Section
Wildlife, Heritage and Marine Division
Department of the Environment
PO Box 787
Canberra ACT 2601

**Responses are required to be submitted by 4 December 2015.**


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## General background information about listing threatened species

The Australian Government helps protect species at risk of extinction by listing them as threatened under Part 13 of the EPBC Act. Once listed under the EPBC Act, the species becomes a Matter of National Environmental Significance (MNES) and must be protected from significant impacts through the assessment and approval provisions of the EPBC Act. More information about threatened species is available on the department's website at: http://www.environment.gov.au/biodiversity/threatened/index.html.

Public nominations to list threatened species under the EPBC Act are received annually by the department. In order to determine if a species is eligible for listing as threatened under the EPBC Act, the Threatened Species Scientific Committee (the Committee) undertakes a rigorous scientific assessment of its status to determine if the species is eligible for listing against a set of criteria. These criteria are available on the Department's website at: http://www.environment.gov.au/biodiversity/threatened/pubs/guidelines-species.pdf.

As part of the assessment process, the Committee consults with the public and stakeholders to obtain specific details about the species, as well as advice on what conservation actions might be appropriate. Information provided through the consultation process is considered by the Committee in its assessment. The Committee provides its advice on the assessment (together with comments received) to the Minister regarding the eligibility of the species for listing under a particular category and what conservation actions might be appropriate. The Minister decides to add, or not to add, the species to the list of threatened species under the EPBC Act. More detailed information about the listing process is at: http://www.environment.gov.au/biodiversity/threatened/nominations.html.

To promote the recovery of listed threatened species and ecological communities, conservation advices and where required, recovery plans are made or adopted in accordance with Part 13 of the EPBC Act. Conservation advices provide guidance at the time of listing on known threats and priority recovery actions that can be undertaken at a local and regional level. Recovery plans describe key threats and identify specific recovery actions that can be undertaken to enable recovery activities to occur within a planned and logical national framework. Information about recovery plans is available on the department's website at: http://www.environment.gov.au/biodiversity/threatened/recovery.html.

## Information about this consultation process

Responses to this consultation can be provided electronically or in hard copy to the contact addresses provided on Page 1. All responses received will be provided in full to the Committee and then to the Australian Government Minister for the Environment.

In providing comments, please provide references to published data where possible. Should the Committee use the information you provide in formulating its advice, the information will be attributed to you and referenced as a 'personal communication' unless you provide references or otherwise attribute this information (please specify if your organisation requires that this information is attributed to your organisation instead of yourself). The final advice by the Committee will be published on the department's website following the listing decision by the Minister.

Information provided through consultation may be subject to freedom of information legislation and court processes. It is also important to note that under the EPBC Act, the deliberations and recommendations of the Committee are confidential until the Minister has made a final decision on the nomination, unless otherwise determined by the Minister.

# *Charadrius leschenaultii*

Greater sand plover

## Taxonomy

Conventionally accepted as *Charadrius leschenaultii* Lesson, 1826. Charadriidae.

Other common names include: large sand plover; great, large or large-billed dotterel or sand-dotterel; Geoffroy's plover (Marchant & Higgins 1993).

The greater sand plover is a conventionally accepted species (Marchant & Higgins 1993; Christidis & Boles 2008). There are three subspecies:

- nominate subspecies *C. l. leschenaultii* which breeds in the northern parts of the Gobi Desert in Mongolia, in north-western China and southern Siberia, and spends the non-breeding season in Australasia, south-east Asia and the Indian subcontinent;
- *C. l. columbinus* which breeds in the Middle East, Turkey to southern Afghanistan, and spends the non-breeding season in the Red Sea, Gulf of Aden and the south-eastern shores of the Mediterranean Sea (Marchant & Higgins 1993); and,
- *C. l. scythicus* which breeds from Turkmenistan through south Kazakhstan and spends the non-breeding season along the coasts of eastern and southern Africa (Gill & Donsker 2015).

Note that *C. l. scythicus* was previously known as *C. l. crassirostris* until it was established that this name is pre-occupied by another plover, a subspecies of Wilson's Plover, *C. wilsonia crassirostris* (Carlos et al. 2012; Gill & Donsker 2015).

## Species/Sub-species Information

### Description

The greater sand plover is a small-to-medium sized shorebird (length 22–25 cm; body mass 75–100 g) with a straight longish bill that bulges towards the end but has a pointed tip. The legs are long and olive-grey (Marchant & Higgins 1993; Ward 2012).

In non-breeding plumage, the head, nape and upperparts are grey-brown and there are large grey-brown patches on the sides of the breast. The forehead eyebrow, chin, neck and underparts are white. Sexes are non-distinguishable from each other when in non-breeding plumage. However, sexes differ when in breeding plumage with males having a chestnut breast-band and rufous tinging to the head and nape and with black on the face (Marchant & Higgins 1993; Ward 2012). Juvenile birds appear similar to non-breeding adults, but the feathers of the upperparts have narrow buff fringes and indistinct dark streaking and sub-terminal bands. Juveniles may also have a buff tinge to the face, and grey-brown patches at the sides of the breast, which may extend as a wash across the breast (Marchant & Higgins 1993).

When in Australia the species is usually in non-breeding plumage and is often difficult to distinguish from the similar lesser sand plover *C. mongolus* although the greater sand plover is distinctly larger (Marchant & Higgins 1993). To untrained observers, greater sand plovers may be difficult to detect in mixed flocks of shorebirds although, when roosting, the greater sand plover tends to roost higher up the beach than other shorebirds and is usually segregated from lesser sand plovers (Marchant & Higgins 1993). Similar to the oriental plover *C. veredus*, although the greater sand plover has a smaller head, longer neck and longer wings (Marchant & Higgins 1993).

### Distribution

*Australian distribution*

The greater sand plover breeds in the northern hemisphere and undertakes annual migrations to and from southern feeding grounds for the austral summer. The subspecies *C. l. leschenaultii* occurs in the East Asian-Australasian Flyway, EAAF (Bamford et al. 2008). Nearly three quarters of the EAAF population is in Australia during the non-breeding period (Bamford et al. 2008).

The greater sand plover distribution in Australia during the non-breeding season is widespread, although the most are found in northern Australia (Minton et al. 2006; Garnett et al. 2011; Ward 2012). In general, the distribution of this species is:

Western Australia - especially widespread between North West Cape and Roebuck Bay and also occasionally recorded along the coast of southern Western Australia;

Northern Territory - recorded from most of the coastline with the most significant areas around the Joseph Bonaparte Gulf, the coast from Anson Bay to Murgenella Creek (including the south coast of the Tiwi Islands), the northern Arnhem coast, and the Port McArthur area;

Queensland - south-eastern parts of the Gulf of Carpentaria and widespread from the Torres Strait along the eastern coast of Queensland;

New South Wales - found from the Queensland border along the coast to the Northern Rivers region with occasional records south to about Shoalhaven Heads;

Victoria - mostly recorded from Corner Inlet, Western Port and Port Phillip Bay;

Tasmania - small numbers occur in most years; and,

South Australia - mostly recorded from the Coorong, Gulf St Vincent and Spencer Gulf, as well as on the Eyre Peninsula, west to about Streaky Bay (Marchant & Higgins 1993; Barrett et al. 2003; Chatto 2003; Minton et al. 2006; Garnett et al. 2011).

This species has also been recorded on Ashmore Reef, Cocos (Keeling) Islands, Christmas Island and Lord Howe Island (Marchant & Higgins 1993).

*Global distribution*

The greater sand plover has an extremely large global range with the extent of occurrence estimated to be 3,460,000 $km^2$ (BirdLife International 2015).

The greater sand plover is one of 35 migratory shorebird species that breed in the northern hemisphere during the boreal summer and are known to annually migrate to the non-breeding grounds of Australia along the EAAF for the austral summer. In general, the EAAF stretches from breeding grounds in the Russian tundra, Mongolia and Alaska southwards through east and south-east Asia, to non-breeding areas in Indonesia, Papua New Guinea, Australia and New Zealand (DOE 2014). Of the three subspecies of the greater sand plover, only *C. l. leschenaultii* occurs in the EAAF and this subspecies also occurs in the Central Asian Flyway (Bamford et al. 2008).

The greater sand plover breeds in the northern Gobi Desert of Mongolia and adjacent areas of southern Siberia; north-western China; from south-eastern Kazakhstan west to the Aral Sea and the eastern shores of the Caspian Sea, and south to Afghanistan; and at scattered sites from Azerbaijan, west into Turkey and south through Syria to Jordan (Marchant & Higgins 1993; Wiersma 1996; Gill & Donsker 2015).

The subspecies *C. l. leschenaultii* , which occurs in Australia during the non-breeding period, breeds in China, Mongolia and nearby parts of Russia (Bamford et al. 2008; Garnett et al. 2011).

## Relevant Biology/Ecology

*Life history*

A generation time of 8 years (BirdLife International 2015) is derived from an average age at first breeding of 2 years (Cramp et al. 1983), an annual adult survival of 56% (extrapolated from congeners) and a maximum longevity of 12.6 years (Australian Bird and Bat Banding Scheme; Garnett et al. 2011).

*Breeding*

The migratory greater sand plover does not breed in Australia.

At breeding sites in Mongolia, north-western China and southern Siberia, the greater sand plover nests in a shallow scrape on the ground amongst sand-hills, gravel, or on other barren substrates. In these areas, this species is predominantly found in open desert or semi-arid areas that are predominantly treeless and at elevations up to 3 000 m (del Hoyo et al. 1996; BirdLife International 2015). Egg laying occurring in April and May. Clutches usually comprise three eggs (range 2-4), which are incubated by both parents for at least 24 days. The chicks fledge after about 30 days (del Hoyo et al. 1996).

*General habitat*

In the non-breeding grounds in Australasia, the species is almost entirely coastal, inhabiting littoral and estuarine habitats. They mainly occur on sheltered sandy, shelly or muddy beaches, large intertidal mudflats, sandbanks, salt-marshes, estuaries, coral reefs, rocky islands rock platforms, tidal lagoons and dunes near the coast (Marchant & Higgins 1993; del Hoyo et al. 1996; BirdLife International 2015).

*Feeding habitat*

Greater sand plovers usually feed from the surface of wet sand or mud on open intertidal flats of sheltered embayments, lagoons or estuaries (Marchant & Higgins 1993).

*Roosting habitat*

Greater sand plovers usually roost on sand-spits and banks on beaches or in tidal lagoons (Marchant & Higgins 1993), and occasionally on rocky points or in adjacent areas of saltmarsh (Gosper & Holmes 2002) or claypans (Collins et al. 2001). They tend to roost further up the beach than other shorebirds, sometimes well above high-tide mark (Marchant & Higgins 1993). To avoid heat stress in tropical areas, shorebirds showed a strong preference for roost sites where a damp substrate lowered the local temperature (Battley et al. 2003; Rogers et al. 2006). Approximately one day after a cyclone at Broome, Western Australia, greater sand plovers were recorded in lower than expected numbers and it was thought that some birds may have moved to sheltered areas to avoid the high winds and heavy rain associated with the cyclone (Jessop & Collins 2000).

*Diet*

During the breeding season, the diet of the greater sand plover consists mainly of terrestrial insects and their larvae (especially beetles, termites, midges and ants), and occasionally lizards (del Hoyo et al. 1996). During the non-breeding season, the diet mostly consists of molluscs, worms, crustaceans (especially small crabs and sometimes shrimps) and insects (including adults and larvae of termites, beetles, weevils, earwigs and ants) (Marchant & Higgins 1993; Jessop 2003; del Hoyo et al. 1996; BirdLife International 2015).

The greater sand plover usually forages visually, with a running, stopping and pecking action typical of many species of plovers. It gleans the surface of the substrate or probes just below the surface (Marchant & Higgins 1993; Jessop 2003).

*Migration patterns*

After the end of breeding, migratory flocks of the greater sand plover form between mid-June and early-August, and arrive at non-breeding grounds between mid-July and November with adults arriving before juveniles (del Hoyo et al. 1996; BirdLife International 2015). The greater sand plover is often seen migrating in large flocks with lesser sand plovers (Draffan et al. 1983).

The greater sand plover is one of the first migratory shorebirds to return to north-western Australia, usually arriving in late July (Minton et al. 2005a). It is thought that greater sand plovers may make the trip between the breeding grounds and the non-breeding grounds (a distance of ~7,500 km) with only one major stopover (Minton et al. 2006).

The birds who spend the non-breeding period in south-east Asia start moving northwards to the breeding grounds in late-February (the migration peaking in March to early-April), arriving from mid-March to May. Most non-adult birds remain in the southern non-breeding areas during the breeding season (del Hoyo et al. 1996; BirdLife International 2015).

*Departure from breeding grounds*

The migratory route of the greater sand plover is more westerly than other shorebirds that visit Australia (Minton et al. 2004; Minton et al. 2006). Most band recoveries and flag sighting records have been concentrated in a fairly narrow band in Vietnam, in the southern half of the Chinese mainland, and in Taiwan (Minton et al. 2006). On migration, the species has been recorded only in small numbers in eastern Asia, including eastern and south-eastern China (including Hong Kong), Taiwan and Vietnam (Minton 2005; Ma et al. 2006; Minton 2006; Zheng et al. 2006). However, greater numbers are recorded on passage through south-east Asia, e.g. the Philippines, the Malay Peninsula and Indonesia (Crossland et al. 2006; Bamford et al. 2008).

It has been suggested that greater sand plovers may be capable of non-stop flight between breeding and non-breeding grounds (Marchant & Higgins 1993), which could explain the scarcity of large numbers of greater sand plovers (and “important sites”) in east-Asia (Bamford et al. 2008). It may be that sites in south-east Asia, where large numbers have been recorded during southward migration, are the arrival points for birds migrating southwards from the breeding grounds (Bamford et al. 2008). An assessment of the body fat proportions in both adult and juvenile birds considered that greater sand plovers have the ability to fly directly from Taiwan to Australia (Chiang & Liu 2005).

*Non-breeding season*

The greater sand plover is gregarious during the non-breeding season when it occurs in flocks, sometimes comprising up to several hundred birds (e.g. a single flock of this species at Fog Bay, south-west of Darwin was estimated as 1,800 individuals; Chatto 2005). The greater sand plover often flocks with other shorebirds, especially the lesser sand plover, though the two species usually remain segregated when roosting with one another (Marchant & Higgins 1993).

In Australasia, most records of greater sand plovers during the non-breeding season are from the north coast of Australia, with smaller numbers occurring along other Australian coasts, as well as in Papua New Guinea and New Zealand (Marchant & Higgins 1993). The paucity of inland records within Australia suggests that movements to southern and eastern areas occur around the coastline rather than across the continent, and small numbers migrate through Torres Strait and south along the east coast between September and November (Draffan et al. 1983; Barter & Barter 1988; Marchant & Higgins 1993). The species begins to depart from southern coasts by March, moving north along the east coast, with influxes recorded in Queensland in late March. Birds migrate north through the Top End between late February and

April with most adult birds having left the north-west by mid to late April (Barter & Barter 1988; Marchant & Higgins 1993).

*Returen to breeding grounds*

It is considered that a substantial proportion of greater sand plovers departing from Australia have sufficient weight which may enable them to overfly south-eastern Asia and reach the coast of south-west China (Barter & Barter 1988).

Using geolocators, the northward migration of greater sand plovers was tracked from north-west Australia (Broome). The tracked birds appeared to complete large initial flights before stopping in Vietnam or locations further east and then continuing onwards to breeding grounds. All geolocators in this study ceased to function when birds were over north China or Mongolia (Minton et al. 2011). Only a small proportion of greater sand plovers are known to visit the Yellow Sea area. Further geolocator deployments on greater sand plovers will provide more extensive data on stopover locations (Minton et al. 2011).

## Threats

Migratory shorebirds, such as the greater sand plover, are sensitive to certain development activities due to their: high site fidelity, tendency to aggregate, very high energy demands required for migration; and need for habitat networks containing both roosting and foraging sites (DEWHA 2009a).

Threats to the global population of the greater sand plover across its range, but particularly at East Asian staging sites, include: habitat loss and habitat degradation (e.g. through land reclamation, industrial use and urban expansion; reduced river flows; environmental pollution; invasive plants), pollution/contamination impacts, disturbance, direct mortality (e.g. hunting), diseases; and, climate change impacts (Melville 1997; DEWHA 2009b; Garnett et al. 2011; BirdLife International 2015).

Threats to the greater sand plover in Australia, especially eastern and southern Australia, include ongoing human disturbance, habitat loss and degradation from pollution, changes to the water regime and invasive plants (DEWHA 2009b; Garnett et al. 2011).

*Habitat loss and habitat degradation*

There are a number of threats that affect migratory shorebirds in the EAAF with the greatest threat being indirect and direct habitat loss (Melville 1997). As most migratory shorebirds have specialised feeding techniques, they are particularly susceptible to slight changes in prey sources and foraging environments. Activities that cause habitat degradation include (but are not restricted to): loss of marine or estuarine vegetation, which is likely to alter the dynamic equilibrium of sediment banks and mudflats, invasion of intertidal mudflats by weeds such as cordgrass, water pollution and changes to the water regime, changes to the hydrological regime and exposure of acid sulphate soils, hence changing the chemical balance at the site (DEWHA 2009a, 2009b).

Migratory shorebird staging areas used during migration through eastern Asia are being lost and degraded by activities which are reclaiming intertidal mudflats for development or converting them for the aquaculture industry (Moores et al. 2008; MacKinnon et al. 2012; Murray et al. 2014).

It is thought that only a small proportion of the EAAF population of greater sand plovers visit the Yellow Sea (Minton et al. 2011). Therefore, compared to a range of other migratory shorebird species that occur in Australia, the greater sand plover may be less likely to have been affected by major loss of intertidal habitat and foreshore reclamation that has been occurring, and continues to occur, in the Yellow Sea region (Minton et al. 2011).

However, habitat loss and intertidal reclamation is also a threat in other areas of the EAAF, such as in Malaysia, where significant numbers of greater sand plovers have been recorded (Wei et al. 2006). In coastal and intertidal areas of Malaysia, migration shorebird habitat is being destroyed or degraded due to land reclamation development activities (e.g. for industries, housing, aquaculture, agriculture and tourism purposes), fishing, logging/destruction of mangroves, and pollution (e.g. domestic sewage, industrial waste, aquaculture waste; Wei et al. 2006).

One of the species' migratory staging areas in China (Chongming Island) is undergoing significant habitat loss and degradation through conversion to aquaculture ponds, farmlands and vegetable gardens, the cultivation of the invasive plant *Spartina alterniflora* on tidal flats (promoting rapid sedimentation with the intention of reclaiming the area), and the Three Gorges Dam on the upper reaches of the Yangtze River reducing the supply of river-borne sediment to mudflats in the area (Ma et al. 2002b; BirdLife International 2015). More than half of all Chinese coastal wetlands were lost between 1950 and 2000 (An et al. 2007). In addition, intensive oil exploration and extraction, and reduction in river flows due to upstream water diversion, are other potentially significant threats in parts of China where this species is present in internationally significant numbers (Barter et al. 1998; Barter 2005).

In Australia, there are a number of threats common to most migratory shorebirds, including the greater sand plover. The loss of important habitat reduces the availability of foraging and roosting sites. This affects the ability of the birds to build up the energy stores required for successful migration and breeding. Some sites are important all year round for juveniles who may stay in Australia throughout the breeding season until they reach maturity. A variety of activities may cause habitat loss at Australian sites. These include direct losses through land clearing, inundation, infilling or draining. Indirect loss may occur due to changes in water quality, hydrology or structural changes near roosting sites (DEWHA 2009a, 2009b).

Residential, farming, industrial and aquaculture/fishing activities represent the major cause of habitat loss or modification in Australia (DOE 2014).The non-breeding grounds of the species in south-eastern Australia are threatened by habitat degradation, loss and human disturbance (Garnett et al. 2011) whereas sites in the Northern Territory are thought to be generally free of such disturbances (Ward 2012).

*Pollution/contamination impacts*

Migratory shorebirds are also adversely affected by pollution, both on passage and in non-breeding areas (Melville 1997; Harding et al. 2007). Pollution is a particular threat as pollutants tend to accumulate and concentrate in wetlands (DOE 2014). Industrial pollution (e.g. via accidental release) can lead to the build-up of heavy metals or toxic elements in the substrate of wetlands which, in turn, can affect the benthic prey fauna of shorebirds like the greater sand plover (DOE 2014).

*Disturbance*

Human disturbance can cause shorebirds to interrupt their feeding or roosting and may influence the area of otherwise suitable feeding habitat that is actually used. Disturbance from human recreation activities may force migratory shorebirds to increase the time devoted to vigilance and anti-predator behaviour and/or may compel the birds to move to alternative, less favourable feeding areas (Goss-Custard et al. 2006).

Disturbance can result from residential and recreational activities including fishing, boating, four wheel driving, walking dogs, noise and night lighting. While some disturbances may have a low impact, it is important to consider the combined effect of disturbances with other threats (DEWHA 2009b).

With increasing tourist visitation and development around Broome, Western Australia, increasing levels of disturbance from human recreational activity are likely for the migratory shorebirds in this area. Recreational fishing, four-wheel driving, unleashed dogs and jet-skiing

may disturb the foraging or roosting behaviour of migratory shorebirds. Migratory shorebirds are most susceptible to disturbance during daytime roosting and foraging periods (DOE 2014).

*Introduced species*

Introduced plants, such as cord grass *Spartinia*, can invade intertidal mudflats and reduce the amount of suitable foraging areas, as has already occurred in other countries (Goss-Custard & Moser 1988). Exotic marine pests may also result in the loss of benthic food sources (DOE 2014).

*Direct mortality*

Direct mortality may result from collision with large structures (e.g. wind farms) which cause a barrier to migration or movement pathways, bird strike with aircraft, hunting, chemical spills, oil spills and predation (attack by domestic pets, hunting by humans; DEWHA 2009b).

The greater sand plover is subject to commercial hunting (for sale at market or to restaurants) which is a major threat in the area of Chongming Island, China (Ma et al. 2002a; BirdLife International 2015).

*Disease*

Since, 1992, the viral disease testing of Charadriiformes from coastal northwest Australia has not detected any evidence of avian influenza virus excretion in the greater sand plover or any other shorebird species tested. However, from serologic testing, there was evidence of a very low level of past exposure to the virus (Curran et al. 2014).

*Climate change*

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 shorebirds (Harding et al. 2007). Migratory shorebirds are also particularly susceptible to heat stress (Battley et al. 2003; Rogers et al. 2006). Climate change projections for Australia include the likelihood of increased temperatures and rising sea levels with more frequent and/or intense extreme climate events which may result in species loss and habitat degradation (Chambers et al. 2005).

Any sea level rise will greatly alter coastal ecosystems, causing habitat change and loss for shorebird species. Modelling has shown that migratory species in the EAAF are at greater risk from sea level rise than previously thought (Iwamura et al. 2013). The modelling indicated that the effect of sea level rise inundating 23–40% of intertidal habitat areas along the migration routes of migratory shorebirds would cause a reduction in population flow (i.e. maximum flow capacity of the migratory population) of up to 72% across the shorebird species assessed. This magnification of effect was particularly due to shorebirds using a few key sites in the EAAF where a large proportion of the population stops and stages (Iwamura et al. 2013).

## Assessment of available information in relation to the EPBC Act Criteria and Regulations

**Criterion 1. Population size reduction (reduction in total numbers)**
Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4

| | Critically Endangered Very severe reduction | Endangered Severe reduction | Vulnerable Substantial reduction |
|---|---|---|---|
| **A1** | **≥ 90%** | **≥ 70%** | **≥ 50%** |
| **A2, A3, A4** | **≥ 80%** | **≥ 50%** | **≥ 30%** |

| | | | |
|---|---|---|---|
| A1 | Population reduction observed, estimated, inferred or suspected in the past and the causes of the reduction are clearly reversible AND understood AND ceased. | *based on any of the followin* | (a) direct observation [*except A3*] |
| A2 | Population reduction observed, estimated, inferred or suspected in the past where the causes of the reduction may not have ceased OR may not be understood OR may not be reversible. | | (b) an index of abundance appropriate to the taxon |
| A3 | Population reduction, projected or suspected to be met in the future (up to a maximum of 100 years) [(*a) cannot be used for A3*] | | (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat |
| A4 | An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a max. of 100 years in future), and where the causes of reduction may not have ceased OR may not be understood OR may not be reversible. | | (d) actual or potential levels of exploitation |
| | | | (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites |

**Evidence:**

The global population of the greater sand plover has been estimated to be c.180,000 - 360,000 individuals (Wetlands International 2006; BirdLife International 2015). The global population trend for the species is unknown although it is not thought to be decreasing sufficiently rapidly to warrant up-listing from its current global status of 'Least Concern' (BirdLife International 2015). However, the global population trend is difficult to determine because of uncertainty surrounding the impacts of habitat modification on population sizes (BirdLife International 2015).

Of the total global population of 180,000 - 360,000 individuals for the species (Birdlife International 2015), about 125,000–200,000 are thought comprise the subspecies *C. l. leschenaultii*, >10,000 the subspecies *C. l. columbinus*, and about 65,000 the subspecies *C. l. scythicus* (Wiersma 1996).

It has been estimated that ~46% of the global population of the great sand plover occurs in the EAAF (MacKinnon et al. 2012) with about three quarters of the EAAF population occurring in Australia (Bamford et al. 2008). The number of greater sand plovers (all belonging to the subspecies *C. l. leschenaultii*) that occur in the EAAF has been estimated at around 100,000 with approximately 75,000 of these spending the non-breeding period at sites in Australia (Bamford et al. 2008; DEWHA 2009b; Garnett et al. 2011).

Numbers of greater sand plovers declined at Moreton Bay, Queensland by c.60% between 1998 and 2008 (Fuller et al. 2009) which has been assessed as a statistically significant decrease of 6% per year (Wilson et al. 2011). Numbers decreased at Eighty-mile Beach, Western Australia by c.65% between 2000 and 2008, whereas numbers at Bush Point were variable between 2004 and 2008 (Rogers et al. 2009; MacKinnon et al. 2012).

Population trends outside Australia are poorly known but numbers in Japan have, in general, slightly increased between 1978 and 2008 (Amano et al. 2010). Overall, the evidence suggests there has been an overall decline of 30-49% over 17 years across the EAAF (averaging some contradictory trends) (Garnett et al. 2011). This decline is likely to continue given ongoing threats to this species' migratory staging sites in East Asia (Garnett et al. 2011).

The data presented above appear to demonstrate that the species is **eligible for listing as vulnerable** A2(a) under this criterion. However, the purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

| Criterion 2. Geographic distribution as indicators for either extent of occurrence AND/OR area of occupancy | | | |
|---|---|---|---|
| | **Critically Endangered Very restricted** | **Endangered Restricted** | **Vulnerable Limited** |
| B1. Extent of occurrence (EOO) | **< 100 km²** | **< 5,000 km²** | **< 20,000 km²** |
| B2. Area of occupancy (AOO) | **< 10 km²** | **< 500 km²** | **< 2,000 km²** |
| AND at least 2 of the following 3 conditions indicating distribution is precarious for survival: | | | |
| (a) Severely fragmented OR Number of locations | **= 1** | **≤ 5** | **≤ 10** |
| (b) Continuing decline observed, estimated, inferred or projected in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent and/or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals | | | |
| (c) Extreme fluctuations in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations;( iv) number of mature individuals | | | |

**Evidence:**

The extent of occurrence in Australia is estimated to be 35 700 km$^2$ (stable) and area occupied 2 600 km$^2$ (stable; Garnett et al. 2011).

The data presented above appear to demonstrate the species is not eligible for listing under this criterion. However, the purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

| Criterion 3. Population size and decline | | | | |
|---|---|---|---|---|
| | | **Critically Endangered Very low** | **Endangered Low** | **Vulnerable Limited** |
| Estimated number of mature individuals | | **< 250** | **< 2,500** | **< 10,000** |
| AND either (C1) or (C2) is true | | | | |
| C1 | An observed, estimated or projected continuing decline of at least (up to a max. of 100 years in future) | **Very high rate 25% in 3 years or 1 generation (whichever is longer)** | **High rate 20% in 5 years or 2 generation (whichever is longer)** | **Substantial rate 10% in 10 years or 3 generations (whichever is longer)** |
| C2 | An observed, estimated, projected or inferred continuing decline AND its geographic distribution is precarious for its survival based on at least 1 of the following 3 conditions: | | | |
| (a) | (i) Number of mature individuals in each subpopulation | **≤ 50** | **≤ 250** | **≤ 1,000** |
| | (ii) % of mature individuals in one subpopulation = | **90 – 100%** | **95 – 100%** | **100%** |
| (b) | Extreme fluctuations in the number of mature individuals | | | |

The number of mature individuals in Australia was estimated at 75 000 (decreasing) in 2011 (Garnett et al. 2011), but has declined since.

The data presented above appear to demonstrate the species is not eligible for listing under this criterion. However, the purpose of this consultation document is to elicit additional information to

better understand the species' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

| Criterion 4. Number of mature individuals | | | |
|---|---|---|---|
| | **Critically Endangered Extremely low** | **Endangered Very Low** | **Vulnerable Low** |
| Number of mature individuals | **< 50** | **< 250** | **< 1,000** |

**Evidence:**

The number of mature individuals in Australia was estimated at 75 000 in 2011 (Garnett et al., 2011), but has declined since. The estimate is not considered extremely low, very low or low.

The data presented above appear to demonstrate the species is not eligible for listing under this criterion. However, the purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

| Criterion 5. Quantitative Analysis | | | |
|---|---|---|---|
| | **Critically Endangered Immediate future** | **Endangered Near future** | **Vulnerable Medium-term future** |
| Indicating the probability of extinction in the wild to be: | **≥ 50% in 10 years or 3 generations, whichever is longer (100 years max.)** | **≥ 20% in 20 years or 5 generations, whichever is longer (100 years max.)** | **≥ 10% in 100 years** |

**Evidence:**

Population viability analysis has not been undertaken.

The data presented above appear to demonstrate the species is not eligible for listing under this criterion. However, the purpose of this consultation document is to elicit additional information to better understand the species' status. This conclusion should therefore be considered to be tentative at this stage, as it may be changed as a result of responses to this consultation process.

## Conservation Actions

### Recovery Plan

A decision about whether there should be a recovery plan for this species has not yet been determined. The purpose of this consultation document is to elicit additional information to help inform this decision.

### Conservation and Management Actions

- Work with governments along the East Asian – Australiasian Flyway to prevent destruction of key breeding and migratory staging sites.
- Protect important habitat in Australia.
- Support initiatives to improve habitat management at key sites.

- Maintain and improve protection of roosting and feeding sites in Australia.
- Advocate for the creation and restoration of foraging and roosting sites.
- Incorporate requirements for greater sand plover into coastal planning and management.
- Manage important sites to identify, control and reduce the spread of invasive species.
- Manage disturbance at important sites when greater sand plovers are present – e.g. discourage or prohibit vehicle access, horse riding and dogs on beaches, implement temporary site closures.
- Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary.

**Survey and Monitoring priorities**

- Enhance existing migratory shorebird population monitoring programmes, particularly to improve coverage across northern Australia.

**Information and research priorities**

- Undertake work to more precisely assess greater sand plover life history, population size, distribution and ecological requirements particularly across northern Australia.
- Improve knowledge about dependence of greater sand plover on key migratory staging sites, and non-breeding sites to the in south-east Asia.
- Improve knowledge about threatening processes including the impacts of disturbance and hunting.

## Questions to Stakeholders

1. Do you agree with the current taxonomic position of the Australian Faunal Directory and Birdlife Australia for this species (as identified in the draft conservation advice)

2. Can you provide any additional references, information or estimates on longevity, age of maturity, average life span and generation length?

3. Has the survey effort for this species been adequate to determine its national distribution and adult population size?

4. Do you accept the estimate provided in the nomination for the current population size of the species?

5. For any population with which you are familiar, do you agree with the population estimate provided? If not, are you able to provide a plausible estimate based on your own knowledge? If so, please provide in the form:
   Lower bound (estimated minimum):
   Upper bound (estimated maximum):
   Best Estimate:
   Estimated level of Confidence: %

6. Can you provide any additional data, not contained in the current nomination, on declines in population numbers over the past or next 10 years or 3 generations, whichever is the longer?

7. Is the distribution as described in the nomination valid? Can you provide an estimate of the current geographic distribution (extent of occurrence or area of occupancy in $km^2$) of this species?

8. Has this geographic distribution declined and if so by how much and over what period of time?

9. Do you agree that the species is eligible for inclusion on the threatened species list, in the category listed in the nomination?

10. Do you agree that the threats listed are correct and that their effects on the species are significant?

11. To what degree are the identified threats likely to impact on the species in the future?

12. Can you provide additional or alternative information on threats, past, current or potential that may adversely affect this species at any stage of its life cycle?

13. In seeking to facilitate the recovery of this species, can you provide management advice for the following:

    - What individuals or organisations are currently, or need to be, involved in planning to abate threats and any other relevant planning issues?
    - What threats are impacting on different populations, how variable are the threats and what is the relative importance of the different populations?
    - What recovery actions are currently in place, and can you suggest other actions that would help recover the species? Please provide evidence and background information.

14. Can you provide additional data or information relevant to this assessment?

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