



## **Consultation Document on Listing Eligibility and Conservation Actions**

### ***Limosa lapponica baueri* (bar-tailed godwit (western Alaskan))**

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

- 1) the eligibility of *Limosa lapponica baueri* (bar-tailed godwit (western Alaskan)) 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 8 and information associated with potential conservation actions for this species starts at page 11. To assist with the Committee's assessment, the Committee has identified a series of specific questions on which it seeks your guidance at page 13.

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

# *Limosa lapponica baueri*

Bar-tailed godwit (western Alaskan)

## **Taxonomy**

Conventionally accepted as *Limosa lapponica baueri* Naumann, 1836. Scolopacidae.

Other common names include barred-rumped godwit, Pacific Ocean godwit, southern or small godwit.

The bar-tailed godwit is polytypic, meaning more than one subspecies exists. Globally, the following four subspecies are recognised:

- The nominate species, *L. l. lapponica*, breeds in northern Europe and north-western Asia;
- The subspecies *L. l. taymyrensis* breeds in north-west and north-central Siberia;
- The subspecies *L. l. baueri* breeds in north-east Siberia and west Alaska;
- The subspecies *L. l. menzbieri* also breeds in northern Siberia (Woodley 2009; Gill & Donsker 2015).

Note that some assessments recognise a fifth subspecies, *L. l. anadyrensis*, (Tomkovich 2010; Leyrer et al. 2014). Based on plumage differences, *L. l. anadyrensis* has been proposed as a separate subspecies rather than as a cline between westerly Siberian *L. l. menzbieri* and easterly Siberian *L. l. baueri* (e.g. Tomkovich 2010; Leyrer et al. 2014). However, this taxonomic split does not appear to be universally accepted with some considering the *L. l. baueri* population includes *L. l. anadyrensis* (Gill & Donsker 2015).

Two subspecies, *L. l. baueri* and *L. l. menzbieri*, regularly occur in Australia (Garnett et al. 2011).

## **Species/Sub-species Information**

### **Description**

The bar-tailed godwit (western Alaskan) is a large migratory shorebird. It has a length around 37-39 cm, a wingspan of 62-75 cm and body mass between 250 - 450 g. It has a long neck with a very long upturned bill which is characterized by a dark tip and pinkish base. All plumages have a uniform upper pattern, with a dark back and upper rump. It is distinguishable from other godwits by the dark barring on the lower white rump, upper-tail and lining of the underwing. The sexes differ with females being larger and with longer bills than males and having a duller breeding plumage. Males and females exhibit marked variation in plumages with males having a deep rufous head and neck. Juveniles are similar to non-breeding adults with the exception that the crown is more heavily streaked (Higgins & Davies 1996).

The two subspecies in the East Asian – Australasian Flyway (EAAF), *L. l. baueri* and *L. l. menzbieri*, are distinguishable morphologically in the field (Wilson et al. 2007; Choi et al. 2015). The bar-tailed godwit (western Alaskan) is slightly larger and stockier than the black-tailed godwit, *L. limosa*, with a shorter neck and legs, a steeper forehead, and a more upturned and pointed bill (Higgins & Davies 1996).

### **Distribution**

#### *Australian distribution*

The bar-tailed godwit has been recorded in the coastal areas of all Australian states. It is widespread in the Torres Strait and along the east and south-east coasts of Queensland, NSW and Victoria. In Tasmania, the bar-tailed godwit has mostly been recorded on the south-east coast. In South Australia it has mostly been recorded around coasts from Lake Alexandrina to Denial Bay. In Western Australia it is widespread around the coast, from Eyre to Derby. Populations have also been recorded in the northern Australia, from Darwin east to the Gulf of

Carpentaria. The bar-tailed godwit is a regular migrant to Christmas Island, Norfolk Island, Lord Howe Island. It has also been recorded on subantarctic islands such as Macquarie Island, Snares Islands, Auckland Islands and Campbell Islands (Higgins & Davies 1996).

During the non-breeding period, the distribution of bar-tailed godwit (western Alaskan) is predominately New Zealand, northern and eastern Australia (Bamford et al. 2008). In Australia, *L. l. baueri* mainly occur along the north and east coasts (Garnett et al. 2011).

#### *Global distribution*

The bar-tailed godwit (all subspecies combined) has an extremely large global range. For the species, the global extent of occurrence is estimated to be 1,470,000 km<sup>2</sup> (BirdLife International 2015).

The subspecies *L. l. baueri* breeds in north-east Siberia from around the Kolyma River to east of the Chukotka Peninsula as well as in west Alaska, from Wales to Barrow (Higgins & Davies 1996). There is some overlap in the breeding range of the two subspecies *L. l. baueri* and *L. l. menzbieri* and, based on plumage differences, some authors have recently recognised *L. l. anadyrensis* as a new subspecies rather than as a cline between westerly Siberian *L. l. menzbieri* and easterly Siberian *L. l. baueri* (e.g. Woodley 2009; Tomkovich 2010; Leyrer et al. 2014). The breeding range of *L. l. anadyrensis* is very restricted to the Anadyr River Lowlands, Chukotka, north-east Siberia (Tomkovich 2010; Leyrer et al. 2014). However, as this taxonomic split does not appear to be universally accepted at this stage, apart from the summary information below from Leyrer et al. (2014), most of this species profile assumes that *L. l. anadyrensis* is part of the *L. l. baueri* population (as per Gill & Donsker 2015).

The subspecies *L. l. baueri* spends the non-breeding season in northern and eastern Australia and New Zealand (Bamford et al. 2008; Garnett et al. 2011). Migrating birds stage in the Yellow Sea region during northwards migration. The Yalu Jiang coastal wetland supports, on average, at least 42% of the EAAF's northward-migrating *L. l. baueri* godwits (Choi et al. 2015). During southwards migration, birds that breed in north-west Alaska stage in south-west Alaska before flying directly to non-breeding grounds (Leyrer et al. 2014).

### **Relevant Biology/Ecology**

#### *Life history*

A generation time of 9.7 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 70% (Cramp et al. 1983) and a maximum longevity in the wild of 22.8 years (Australian Bird and Bat Banding Scheme; Garnett et al. 2011).

#### *Breeding*

The migratory bar-tailed godwit (western Alaskan) does not breed in Australia.

They nest in the northern hemisphere during the boreal summer with egg laying occurring from late May through June (del Hoyo et al. 1996). This species nests in solitary pairs although nests may be grouped together due to polyandrous behaviour. They lay two to five eggs, incubate for 20-21 days, and have a nestling period of 28 days (del Hoyo et al. 1996). The species is gregarious and they often fly in large flocks. They forage in groups outside of the breeding season (del Hoyo et al. 1996); occasionally aggregating into huge flocks of several hundreds or thousands of individuals at favoured sites (BirdLife International 2015).

#### *General habitat*

At northern hemisphere breeding sites, the bar-tailed godwit (western Alaskan) nests on the ground in open tundra, usually on dry elevated sites and often between clumps of grass (del Hoyo et al. 1996; Woodley 2009). The nest is usually a depression lined with bits of vegetation and lichens (del Hoyo et al. 1996).

The bar-tailed godwit (western Alaskan) occurs mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It has also been recorded in coastal sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats (Higgins & Davies 1996).

#### *Feeding habitat*

The bar-tailed godwit (western Alaskan) usually forages near the edge of water or in shallow water, mainly in tidal estuaries and harbours. They prefer exposed sandy or soft mud substrates on intertidal flats, banks and beaches. On Heron Island, Qld they have been seen feeding on insect larvae among the roots of *Casuarina* (Higgins & Davies 1996).

#### *Roosting habitat*

The bar-tailed godwit (western Alaskan) usually roosts on sandy beaches, sandbars, spits and also in near-coastal saltmarsh (Higgins & Davies 1996). In some conditions, shorebirds may choose roost sites where a damp substrate lowers the local temperature. During periods of cyclonic activity, shorebirds moved to sheltered areas to avoid high winds and heavy rain (Jessop & Collins 2000).

#### *Diet*

The bar-tailed godwit (western Alaskan) is mainly carnivorous with a diet consisting of worms, molluscs, crustaceans, insects and some plant material. While it is in breeding grounds it eats mainly ground dwelling insects (Higgins & Davies 1996). On the estuary of the Parramatta River, NSW, polychaetes represented at least 86.7% of their diet and were the only prey able to be identified (Taylor et al. 1996). At Roebuck Bay, Western Australia, birds were observed feeding on bivalves which had been exposed by a cyclone (Jessop & Collins 2000).

The bar-tailed godwit (western Alaskan) generally feeds during the day, but sometimes by moonlight (Higgins & Davies 1996). At the Parramatta River estuary, NSW, bar-tailed godwits (western Alaska) lost between 0.1–1% of their prey to Silver Gulls, *Larus novaehollandiae* (Taylor et al. 1996). Sexual differences in the length of the bill (i.e. females have a longer bill than males) lead to corresponding differences in diet and behaviour. At the Parramatta estuary, both sexes fed on polychaete worms with females spending most of their time in water and males spending 50% of their time in the water, 30% on dry ridges and 20% in wet hollows. The prey capture rates of females feeding in water were 41% higher than those of males (Taylor et al. 1999). At Moreton Bay, Queensland, males mainly foraged in areas with seagrass cover (65%), whereas females were more common on sandy flats (83%). It was thought that, as the seagrass areas supported about twice the density of godwits, the males may have been utilising better foraging habitat (Zharikov & Skilleter 2000). In Roebuck Bay, north-west Western Australia, birds showed a strong tendency to follow the tide edge and females tending to feed closer to the sea edge than males (Rogers 1999).

#### *Migration patterns*

The bar-tailed godwit breeds in the northern hemisphere and migrates southwards for the boreal winter. Leg flag sightings and plumage differences suggest that *L. l. menzbieri*, from north-west Australia, has a more westerly migration route than *L. l. baueri* (Barter 2002).

Satellite tracking data has confirmed that some bar-tailed godwits (western Alaska) fly over 11,000 km from Alaska to New Zealand without stopping, making it one of the longest non-stop migrations of any bird (Gill et al. 2009; Woodley 2009). A satellite-tracked bar-tailed godwit (western Alaskan) recorded a long distance, non-stop flight (around 10,200 km in about eight days) from the North Island of New Zealand to Yalu Jiang, Yellow Sea.

From satellite telemetry data, a single *L. l. baueri* godwit had a fully completed return track for the whole migration which totalled 29,280 km over a round-trip journey of 174 days. Bar-tailed godwit (western Alaskan) makes the longest (southbound) and second-longest (northbound)

non-stop migratory flights documented for any bird essentially making only single stops when moving between non-breeding and breeding sites in opposite hemispheres. This reinforces the critical importance of the intertidal habitats used by fuelling godwits in Australasia, the Yellow Sea, and Alaska (Battley et al. 2012).

Despite these large migration distances, bar-tailed godwit adults are thought to have high site fidelity in the non-breeding season (Barter 1989).

#### *Departure from breeding grounds*

The post-breeding migration for *L. l. baueri* involved several weeks of staging in southwest Alaska followed by non-stop flights across the Pacific Ocean to New Zealand (11,690 km in a complete track) or stopovers on islands in the south-western Pacific en route to New Zealand and eastern Australia (Battley et al. 2012).

#### *Return to breeding grounds*

Most bar-tailed godwits (western Alaskan) that had not left south-eastern Australia by the end of the first week of April were immatures (Wilson et al. 2007). Most if not all bar-tailed godwits (western Alaskan) may spend their second austral winter in the non-breeding range, and some their third winter as well (Wilson 2000).

Using satellite telemetry, the migration of *L. l. baueri* (travelling between non-breeding grounds in New Zealand) and *L. l. menzbieri* (from northwest Australia) to breeding grounds in Alaska and eastern Russia, respectively was studied (Battley et al. 2012). Individuals of both subspecies made long flights from non-breeding grounds to coastal staging grounds in the Yellow Sea region of East Asia (average  $10,060 \pm \text{SD } 290$  km for *L. l. baueri* and  $5,860 \pm 240$  km for *L. l. menzbieri*). *L. l. baueri* staged for  $41.2 \pm 4.8$  days before flying over the North Pacific Ocean and then heading northeast to the Alaskan breeding grounds ( $6,770 \pm 800$  km). *L. l. menzbieri* staged for  $38.4 \pm 2.5$  days before flying over land and sea northeast to high arctic Russia ( $4,170 \pm 370$  km) (Battley et al. 2012).

At the key staging site of Yalu Jiang, the mean arrival date for *L. l. baueri* godwits was 29 March and mean departure date was 8 May.

### **Threats**

Migratory shorebirds, such as the bar-tailed godwit (western Alaskan), are sensitive to certain development activities due to their: high site fidelity, tendency to aggregate, very high energy demands, and need for habitat networks containing both roosting and foraging sites (DEWHA 2009a).

Threats to the global population of the bar-tailed godwit (western Alaskan) across its range include: habitat loss and habitat degradation (e.g. through land reclamation, industrial use and urban expansion; changes to the water regime; invasive plants; environmental pollution); over-exploitation of shellfish; pollution/contamination impacts; disturbance; direct mortality (hunting); diseases; extreme weather events; and climate change impacts (DEWHA 2009b; Garnett et al. 2011; BirdLife International 2015).

Threats in Australia, especially eastern and southern Australia, include ongoing human disturbance as well as habitat loss and degradation from pollution, changes to the water regime and invasive plants (Rogers et al. 2006; DEWHA 2009b; Garnett et al. 2011).

#### *Habitat loss and habitat degradation*

Threats at migratory staging sites include environmental pollution, reduced river flows, human disturbance and reclamation for tidal power plants and barrages, industrial use and urban expansion (Barter 2002; Moores 2006; Garnett et al. 2011). A significant and serious threat to the bar-tailed godwit (western Alaskan) is loss of habitat and/or habitat degradation, particularly at migration staging sites. Staging areas used during migration through eastern Asia are being

lost and degraded by activities which are reclaiming the mudflats for development or utilising them for aquaculture (Barter 2002; Ge et al. 2007; Round 2006; Murray et al. 2014).

There have been major changes and loss of intertidal habitat in the Yellow Sea where c.80% of the EAAF population of bar-tailed godwit (subspecies combined) stages on northward migration (Barter 2002; Bamford et al. 2008). Around 75% of the tidal flat area that historically existed in the Republic of Korea was lost by 2010 (Moore 2012 cited in Choi et al. 2015). These coastal wetlands are important staging areas where shorebirds stop and replenish their energy reserves in order to complete their migration (Battley et al. 2012; Choi et al. 2015). The rates of loss of intertidal habitat in the Yellow Sea region show no sign of slowing (Murray et al. 2014).

The degradation of foraging habitat in some areas, including Australian locations, may also be caused by the invasion of mudflats and coastal saltmarshes from the spread of mangroves. This may be due to increased sedimentation and nutrient loads at the coast from land-use practices in upstream catchment areas (Straw & Saintilan 2006; Woodley 2009) as well as from sea level rise causing landward invasion of plants (Straw & Saintilan 2006; BirdLife International 2015).

In Australia, 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. 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). Anthropogenic nutrient enrichment of wetland areas can cause cyanobacterium blooms that may impact the prey species of bar-tailed godwits (e.g. at Roebuck Bay; Estrella et al. 2011).

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 cord grass; 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).

#### *Pollution/contamination*

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

Feather samples of bar-tailed godwits (western Alaskan) from two New Zealand sites were tested for mercury. The distribution of mercury concentrations in all samples did not differ significantly from normal either from non-breeding plumage samples on arrival in New Zealand or from breeding plumage samples prior to departure from New Zealand (Thompson 2001).

#### *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). Human disturbance can interrupt feeding and may restrict the area of feeding habitat available for bar-tailed godwits. Bar-tailed godwits (western Alaskan) at Phillip Island, Victoria, were recorded taking flight when humans approached within 10–70 m of them (Taylor & Bester 1999).

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).

*Diseases*

The bar-tailed godwit is also susceptible to avian influenza and so may be threatened by future outbreaks of the virus (Melville & Shortridge 2006; BirdLife International 2015).

Since, 1992, the viral disease testing of Charadriiformes from coastal northwest Australia has not detected any evidence of avian influenza virus excretion in the bar-tailed godwit or any other species tested. However, from serologic testing, there was evidence of a very low level of past exposure to the virus (Curran et al. 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 and oil spills (DEWHA 2009b). Hunting is still a very serious problem for shorebirds in China, and the bar-tailed godwit has been identified as one of the species caught (Ming et al. 1998).

*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). Rises in sea level could have a major impact on the bar-tailed godwit due to loss of intertidal habitat (Iwamura et al. 2013). Taking into account up-shore movements of intertidal habitat, modelling indicates that, for this species, population flow (i.e. maximum flow capacity of the migratory population) could reduce by 15% with a 150 cm sea level rise (Iwamura et al. 2013).

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

<b>Criterion 1. Population size reduction (reduction in total numbers)</b>			
Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4			
	<b>Critically Endangered Very severe reduction</b>	<b>Endangered Severe reduction</b>	<b>Vulnerable Substantial reduction</b>
<b>A1</b>	≥ 90%	≥ 70%	≥ 50%
<b>A2, A3, A4</b>	≥ 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.		
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.		
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]		
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.		
		(a) direct observation [except A3] (b) an index of abundance appropriate to the taxon (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat (d) actual or potential levels of exploitation (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites	
		<i>based on any of the followin</i>	

**Evidence:**

The global estimate of the bar-tailed godwit population has been estimated to be between 1,100,000-1,200,000 individuals (BirdLife International 2015). Globally, the overall population *Limosa lapponica baueri* (bar-tailed godwit (western Alaskan)) consultation



trend is decreasing, although some flyway populations may be stable and others have unknown trends. Although around the world the species is considered to be decreasing in numbers, the rate of decline is not great enough to warrant listing as a vulnerable species under the IUCN Red List (BirdLife International 2015).

The number of bar-tailed godwits in the EAAF has been estimated to be 325,000 and, during the non-breeding period, 88% of the EAAF population occurs in Australia and New Zealand (Bamford et al. 2008). Previously, there have been estimated of 185,000 bar-tailed godwits (both subspecies) in Australia during the non-breeding period (Bamford et al. 2008).

On the basis of the hypothesised distribution of the two subspecies during the non-breeding period, and using regional population estimates for Australia, the EAAF population estimate of *L. l. baueri* is 155,000 individuals (Bamford et al. 2008; Garnett et al. 2011). Therefore, by extrapolation, the population spending the non-breeding period primarily in Australia is assumed to be 61,000 individuals as most of the c.94 000 bar-tailed godwits in New Zealand are *L. l. baueri* (Southey 2009; Garnett et al. 2011).

Numbers of bar-tailed godwits (western Alaskan) declined at Moreton Bay by 68% between 1993 and 2008 (Fuller et al. 2009) and at Gulf St Vincent by 78% between c.1981 and c.2004 (Close 2008) although numbers increased by around 8% across 49 Australian sites between c.1983 and c.2007 (Garnett et al. 2011). At Corner Inlet, counts gave the appearance of periods of sustained growth and decline over a 30 year period although there was no significant change in either summer or winter count data (1982-2011; Minton et al. 2012).

In Japan, between 1998 and 2008, populations of both subspecies have declined in general and by about 53% in spring counts (Amano et al. 2010). The numbers of bar-tailed godwits on migration at Saemangeum and adjacent estuaries declined by 11% from 2006 to 2008 (Choi et al. 2015). Populations of bar-tailed godwits in New Zealand (mainly considered to be *L. l. baueri*) declined by 18% (103,000 to 85,000) between 1993 and 2003 (Southey 2009).

A recent and more detailed assessment by a University of Queensland team (partly funded by the Department of the Environment under an Australian Research Council grant), puts the subspecies into the vulnerable category (Fuller, pers. comm., 2014). Time series data from directly observed summer counts at a large number of sites across Australia indicate a substantial population decline of 32.4% over 29 years (1.4% per year) which for this species is equal to three generations (Fuller, pers. comm., 2014).

In large part, the observed decline in bar-tailed godwit (western Alaskan) numbers across Australia stems from ongoing loss of intertidal mudflat habitat at key migration staging sites in the Yellow Sea (Murray et al., 2014). Threats are also occurring in Australia including coastal development, habitat degradation and human disturbance. As such, qualification under criterion A2 rather than A1 seems warranted.

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 km <sup>2</sup>	< 5,000 km <sup>2</sup>	< 20,000 km <sup>2</sup>
B2. Area of occupancy (AOO)	< 10 km <sup>2</sup>	< 500 km <sup>2</sup>	< 2,000 km <sup>2</sup>

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 7 500 000 km<sup>2</sup> (stable) and area occupied 8 100 km<sup>2</sup> (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.

<b>Criterion 3. Population size and decline</b>			
	<b>Critically Endangered Very low</b>	<b>Endangered Low</b>	<b>Vulnerable Limited</b>
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)	<b>Very high rate 25% in 3 years or 1 generation (whichever is longer)</b>	<b>High rate 20% in 5 years or 2 generation (whichever is longer)</b>	<b>Substantial rate 10% in 10 years or 3 generations (whichever is longer)</b>
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
(a) (ii) % of mature individuals in one subpopulation =	90 – 100%	95 – 100%	100%
(b) Extreme fluctuations in the number of mature individuals			

**Evidence:**

The number of mature individuals in Australia was estimated at 61 000 (decreasing) in 2011 (Garnett et al. 2011), but has declined since. There are no current data available to allow assessment against the criterion.

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 61 000 (decreasing) 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 – Australasian 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 bar-tailed godwit (western Alaskan) into coastal planning and management.

- Manage important sites to identify, control and reduce the spread of invasive species.
- Manage disturbance at important sites when bar-tailed godwit (western Alaskan) 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 bar-tailed godwit (western Alaskan) life history, population size, distribution and ecological requirements particularly across northern Australia.
- Improve knowledge about dependence of bar-tailed godwit (western Alaskan) 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<sup>2</sup>) 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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