



Australian Government

**Department of the
Environment and Energy**

EPBC Act Policy Statement 3.21

Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species



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Cover image credits: (front) Two Terek sandpipers and a pair of curlew sandpipers © Graeme Chapman, (back) Black-tailed godwits, Brian Furby Collection © Brian Furby and the Department of the Environment.

Introduction

Residential, agricultural and natural resource development across Australia can be a significant threat to migratory shorebirds, primarily from the loss and degradation of foraging and roosting habitat and through interference during important lifecycle stages of migratory shorebirds.

The 37 migratory shorebird species that regularly visit Australia each year are listed as migratory species under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and are hence matters of national environmental significance.

Under the EPBC Act, an action will require approval from the federal environment minister if the action has, will have, or is likely to have a significant impact on a matter of national environmental significance.

The EPBC Act is also the key mechanism for meeting Australia's obligations and responsibilities under a number of international agreements. Australia is a signatory to the following international agreements relating to migratory shorebird conservation:

- the Convention on Conservation of Migratory Species of Wild Animals (also known as CMS or the Bonn Convention)
- bilateral agreements for the conservation of migratory birds between the Government of Australia and the Government of Japan (JAMBA), the Government of China (CAMBA) and the Government of the Republic of Korea (ROKAMBA), and
- the Convention on Wetlands of International Importance (also known as the Ramsar Convention).

The purpose of this policy statement is to assist proponents in avoiding, assessing and mitigating significant impacts on migratory shorebirds listed under the EPBC Act. This policy statement is a key action under the *Wildlife Conservation Plan for Migratory Shorebirds*.

Actions that affect migratory shorebirds or their habitat may need to be assessed by both the Australian Government and state/territory agencies, due to different laws and requirements. This policy elaborates on guidance provided in several existing EPBC Act policies or plans or related programs including:

- *EPBC Act Significant Impact Guidelines 1.1—Matters of National Environmental Significance*
- *EPBC Act Significant Impact Guidelines 1.2—Actions on, or impacting upon, Commonwealth land and actions by Commonwealth agencies*
- *Wildlife Conservation Plan for Migratory Shorebirds*.



Photo: Bar-tailed godwits, Brian Furby Collection © Brian Furby and the Department of the Environment

What are migratory shorebirds and what species do these guidelines apply to?

Shorebirds are birds that inhabit the shorelines of coasts and inland water bodies during most of their life cycles. Most of these birds are from two taxonomic families, the Sandpipers (Scolopacidae) and the Plovers (Charadriidae).

This policy statement is concerned with 37 shorebird species that migrate annually to and from Australia (see Table 1). These species are listed as migratory

under the EPBC Act, and are the subject of the Australian Government Wildlife Conservation Plan for Migratory Shorebirds. Several migratory shorebirds are listed as threatened under the EPBC Act and are subject to additional significant impact criteria (see *EPBC Act Policy Statement 1.1 Significant Impact Guidelines—Matters of National Environmental Significance*).



Photo: Red-necked Stint feeding © Graeme Chapman

Table 1 The 37 migratory shorebird species listed under the EPBC Act.

#	Scientific name	Common name
	Scolopacidae	Sandpipers
1.	<i>Gallinago hardwickii</i>	Latham's snipe
2.	<i>Gallinago stenura</i>	Pin-tailed snipe
3.	<i>Gallinago megala</i>	Swinhoe's snipe
4.	<i>Limosa limosa</i>	Black-tailed godwit
5.	<i>Limosa lapponica</i>	Bar-tailed godwit*
6.	<i>Numenius minutus</i>	Little curlew
7.	<i>Numenius phaeopus</i>	Whimbrel
8.	<i>Numenius madagascariensis</i>	Eastern curlew*
9.	<i>Tringa totanus</i>	Common redshank
10.	<i>Tringa stagnatilis</i>	Marsh sandpiper
11.	<i>Tringa nebularia</i>	Common greenshank
12.	<i>Tringa glareola</i>	Wood sandpiper
13.	<i>Xenus cinereus</i>	Terek sandpiper
14.	<i>Actitis hypoleucos</i>	Common sandpiper
15.	<i>Heteroscelus brevipes</i>	Grey-tailed tattler
16.	<i>Heteroscelus incanus</i>	Wandering tattler
17.	<i>Arenaria interpres</i>	Ruddy turnstone
18.	<i>Limnodromus semipalmatus</i>	Asian dowitcher
19.	<i>Calidris tenuirostris</i>	Great knot*
20.	<i>Calidris canutus</i>	Red knot*
21.	<i>Calidris alba</i>	Sanderling
22.	<i>Calidris ruficollis</i>	Red-necked stint
23.	<i>Calidris subminuta</i>	Long-toed stint
24.	<i>Calidris melanotos</i>	Pectoral sandpiper
25.	<i>Calidris acuminata</i>	Sharp-tailed sandpiper
26.	<i>Calidris ferruginea</i>	Curlew sandpiper*
27.	<i>Limicola falcinellus</i>	Broad-billed sandpiper
28.	<i>Philomachus pugnax</i>	Ruff
29.	<i>Phalaropus lobatus</i>	Red-necked phalarope
	Charadriidae	Plovers and lapwings
30.	<i>Pluvialis fulva</i>	Golden plover
31.	<i>Pluvialis squatarola</i>	Grey plover
32.	<i>Charadrius dubius</i>	Little ringed plover
33.	<i>Charadrius bicinctus</i>	Double-banded plover
34.	<i>Charadrius mongolus</i>	Lesser sand plover*
35.	<i>Charadrius leschenaultii</i>	Greater sand plover*
36.	<i>Charadrius veredus</i>	Oriental plover
	Glareolidae	Pratincoles
37.	<i>Glareola maldivarum</i>	Oriental pratincole

* Species are also listed as threatened under the EPBC Act.

What is the basic ecology of EPBC listed migratory shorebirds?

Australia is geographically and ecologically an important location for migratory shorebirds within the East Asian–Australasian flyway (the flyway). Thirty-six of the 37 Australian migratory shorebird species breed in the northern hemisphere and migrate annually to southern nonbreeding areas including Australia. Double-banded plovers migrate between Australia and breeding grounds in New Zealand, rather than north-south through the flyway. The flyway stretches from Siberia and Alaska, southwards through east and south-east Asia, to Australia and New Zealand (see Figure 1).

Figure 1 East Asian–Australasian flyway.



Migratory shorebird species are mostly present in Australia during the non-breeding period, from as early as August to as late as April/May each year (excluding the double-banded plover, which is generally present from March to September). After arrival in Australia at the end of long migrations they disperse throughout the country to a wide variety of habitats. These coastal and inland habitats include:

- coastal wetlands, estuaries, mudflats, rocky inlets, reefs and sandy beaches, often supporting mangroves
- inland wetlands, floodplains and grassland areas, often with ephemeral water sources.

These important habitats in Australia allow adult birds to build up the energy reserves necessary to support northward migration and subsequent breeding. While they support large numbers of adult shorebirds during the non-breeding period, many also support smaller numbers of immature shorebirds of many species during the breeding season. Immature birds of some species remain in Australia for a number of years before reaching maturity and migrating north to breed for the first time.

While in Australia, migratory shorebirds need to maintain an energy intake greater than their energy expenditure to recover from the southward migration, to allow moulting and replacement of worn feathers, and to build fat reserves in preparation for the northward migration. Relative amounts of time spent feeding and resting, and distances between feeding and roosting areas, are therefore important factors in the energy budgets of individual shorebirds. Further information is available in van de Kam et. al. (2008).

Areas used most by migratory shorebirds in Australia usually comprise networks of foraging and roosting habitats. Shorebirds move within these areas depending on the time of day, availability of resources, levels of disturbance and environmental conditions. Some habitats are important refuges during extreme high tides or when weather conditions prohibit occupancy of more commonly used habitats.

Migratory shorebirds tend to aggregate in large multi-species flocks during high tide periods when their feeding habitat is submerged, but a few species such as Latham's snipe usually disperse in small numbers across wide areas of habitat.

Because migratory shorebirds mostly feed on intertidal mudflats, they require safe roosting areas to rest during high tide periods. The high energy demands on migratory shorebirds resulting from their migratory lifecycle means that resting is critical when not breeding. Generally, migratory shorebirds prefer roosting areas in open habitat on slightly elevated ground so they can watch for potential predators.

In northern Australia, significant proportions of the populations of some species including whimbrel, terek sandpiper and grey-tailed tattler disperse to mangrove roosting areas during high tide periods. Migratory shorebirds at non-tidal wetlands such as inland systems tend to show more dispersive behaviour.

During bad weather, shorebirds may temporarily utilise different roosting habitats, choosing more sheltered roosts in depressions, behind low shrubs, behind sandy hummocks and even in four-wheel drive track depressions. Within estuarine environments, principal roost areas include: exposed sands at estuary mouths and on adjacent beaches, saltmarshes that are only marginally submerged during high tide, grassy areas adjacent to estuaries, mangroves, nearby freshwater wetlands, claypans, and occasionally, rock groynes and exposed reefs.

Migratory shorebird foraging habitats vary depending on the species. Many migratory shorebirds have specialised feeding techniques that enable them to feed on specific prey within particular foraging areas. The distribution of prey species, generally invertebrates, crustaceans and small fishes, also depends on factors such as sediment type and particle size which influences foraging habitat selection. In coastal areas foraging habitats are typically found in soft substrate tidal areas exposed during low tide.

Some Australian inland wetlands and grasslands are also important habitat for migratory shorebirds. Many of these inland areas are ephemeral due to variability in Australia's climate and rainfall. For this reason, many inland areas may not be used for several years. However, when these areas receive rain they can provide extremely productive and important food sources for migratory shorebirds (for example, Lake Eyre in northern South Australia).



Photo: Fencing for stock exclusion, and the planting of native shrubs and trees © John Baker and Department of the Environment

As a proponent what are my legislative obligations relating to migratory shorebirds?

Listed migratory species are a matter of national environmental significance under the EPBC Act. As such, any action that has, will have, or is likely to have a 'significant impact' on a matter of national environmental significance will require approval. Substantial penalties apply for taking such actions without approval.

Identification of 'important habitat' for migratory shorebirds is a key concept in determining the likelihood of significant impact from proposed actions. This policy statement is designed to assist with determination of important habitat and the likelihood of significant impacts from proposed actions.

A 'significant impact' is an impact that is important, notable, or of consequence, having regard to its context or intensity. Whether or not an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment which is affected, and upon the intensity, duration, magnitude and geographic extent of the impacts. All of these factors must be considered when determining whether an action is likely to have a significant impact on matters of national environmental significance.



Photo: Restored area of dunes © John Baker and Department of the Environment

What is important habitat for migratory shorebirds?

Under the EPBC Act, 'important habitat' is a key concept for migratory species, as identified in *EPBC Act Policy Statement 1.1 Significant Impact Guidelines—Matters of National Environmental Significance*. Defining this term for migratory shorebirds in Australia is important to ensure that sites necessary for the ongoing survival of the 37 species are appropriately managed.

Important habitats in Australia for migratory shorebirds under the EPBC Act include those recognised as nationally or internationally important (see below). The widely accepted and applied approach to identifying internationally important shorebird habitat throughout the world has been through the use of criteria adopted under the Ramsar Convention on Wetlands.

According to this approach, wetland habitat should be considered internationally important if it regularly supports:

- 1 per cent of the individuals in a population of one species or subspecies of waterbird **OR**
- a total abundance of at least 20 000 waterbirds.

Nationally important habitat for migratory shorebirds can be defined using a similar approach to these international criteria, i.e. if it regularly supports:

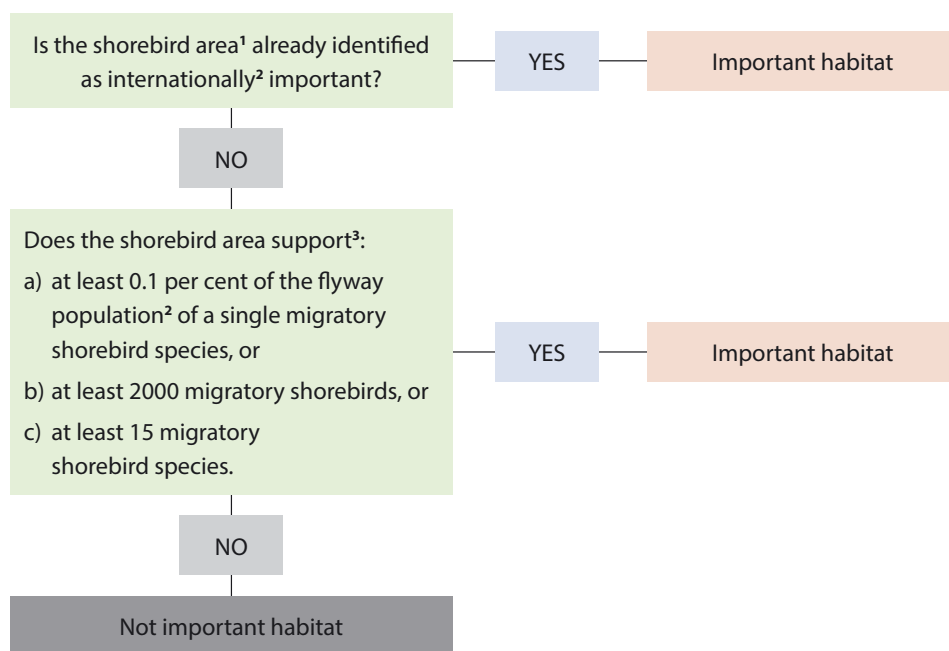
- 0.1 per cent of the flyway population of a single species of migratory shorebird **OR**
- 2000 migratory shorebirds **OR**
- 15 migratory shorebird species.

Figure 2 illustrates the process for identifying important habitat for migratory shorebirds under the EPBC Act. This process applies to each of the migratory shorebird species with the exception of Latham's snipe (*Gallinago hardwickii*), which is treated differently because of its cryptic lifestyle.



Photo: Mixed flock of bar-tailed godwits and great knots © Georgina Steytler

Figure 2. Process for identifying important habitat for migratory shorebirds (excluding Latham's snipe)



1. Following Clemens et al. (2010) a shorebird area is defined as: the geographic area that had been used by the same group of shorebirds over the main non-breeding period. This is effectively the home range of the local population when present. Shorebird areas may include multiple roosting and feeding habitats. While most migratory shorebird areas will represent contiguous habitat, non-contiguous habitats may be included as part of the same area where there is evidence of regular bird movement between them. Migratory shorebird areas may therefore extend beyond the boundaries of a property or project area, and may also extend beyond Ramsar boundaries for internationally important areas. Existing information and/or appropriate surveys can determine the extent of a migratory shorebird area.
2. Population estimates for 37 migratory shorebirds in the East Asian–Australasian Flyway are available at www.environment.gov.au/biodiversity/migratory-species/migratory-birds. Shorebird population estimates, may, from time-to-time be updated as new information is made available. Further information can be found on the Department's website.
3. 'Support' is defined differently depending on whether the habitat is considered permanent or ephemeral.
 - For permanent wetlands, 'support' is defined as: *migratory shorebirds are recorded during surveys and/or known to have occurred within the area during the previous five years.*
 - For ephemeral wetlands, 'support' is defined as: *habitat that migratory shorebirds have ever been recorded in, and where that habitat has not been lost permanently due to previous actions.*

Another issue regarding important habitat is the degree of importance of sites within complexes or areas. For example, a large area may be considered internationally or nationally important, but within that area there may be particular sites that are more valuable than others, such as regular roosting and feeding sites. In promoting the wise use of wetlands, it may be pertinent to strongly protect such sites from development and recreational activities that may disturb shorebirds, but allow these activities within the boundary of the broader area.

Latham's snipe (*Gallinago hardwickii*)

Latham's snipe does not commonly aggregate in large flocks or use the same habitats as many other migratory shorebird species. Consequently, habitat important to Latham's snipe is not regularly identified using the process outlined in Figure 2 and different criteria are therefore necessary. Threshold criteria are still considered the best way to identify important sites in the absence of data sufficient for more rigorous methods. For the purposes of this plan, important habitat for Latham's snipe is described as areas that have previously been identified as internationally important for the species, or areas that support at least 18 individuals of the species. Definitions for shorebird 'area' and 'support' are as above.

How do I identify important habitat for migratory shorebirds in the absence of credible information?

Important habitat is the key element in assessing likely impacts from a proposed action on migratory shorebirds. Surveys for migratory shorebirds must be conducted in potential shorebird areas where either:

- no suitable survey records exist
- records are too old to be considered reliable
- characteristics of the area have changed.

Where suitable data are lacking, surveys are needed to establish the presence and number of migratory shorebirds, as well as to record some habitat characteristics (for example, type, quality, size and availability). An important consideration is the context of the area within the local region, including the existing level of cumulative habitat loss. High tide roosts used by migratory shorebirds, particularly in large remote regions, can be difficult to locate. In these cases surveys of migratory shorebirds usually need to begin with an aerial inspection during a high tide period, preferably using a helicopter.

While some non-breeding individuals may remain in Australia throughout the year, the majority of migratory shorebirds are present during the non-breeding season (September-March). The window of time in which count surveys can be conducted for most migratory shorebird species is therefore quite narrow.

Where it is not possible to conduct surveys for migratory shorebirds within the non-breeding season, a thorough habitat assessment must be done to identify potential habitat. The characteristics of the area (landform, hydrology, flood levels etc.) should be assessed and used to predict the limits of migratory shorebird habitat. Areas of potential habitat for migratory shorebirds (including both the riparian/wetland fringe and the floodplain

system surrounding the habitat) should be treated in a precautionary manner, with potential habitat assumed to be important habitat for the purposes of significant impact assessment. The action should then be designed to avoid significant impacts on shorebirds (including disturbance and direct mortality) and all areas of potential habitat (including loss, degradation etc.).

Guides to conducting count surveys for migratory shorebirds in both tidal and non-tidal areas are provided below. These survey guidelines are based on a range of existing methodologies. They include survey principles and minimum recommended effort for migratory shorebird surveys in a particular area, to support environmental impact assessment. Surveys of non-tidal wetlands may provide a greater challenge than coastal tidal wetlands, as the roosting and foraging behaviour is less predictable and there are no concentrated high tide roost areas. In addition, many of the non-tidal areas used by migratory shorebirds in Australia are ephemeral. Local knowledge is often available to assist in determining the optimal times to conduct surveys.

Tidal areas

Survey coverage

At a minimum survey coverage should include:

- all of the habitat thought to be used by the same population of shorebirds
- the entire area of contiguous habitat where shorebirds may occur.

This will require consideration of the regional context of the wetland and may include multiple discrete roosts and feeding areas.

Surveying species that roost in mangroves requires a different technique, involving travel along the full length of the mangrove fringe in small boats during high tide periods and tallying birds as they are flushed. This can be time consuming and expensive in extensive mangrove regions and assessment of these populations has often been inadequate.

Survey timing

- Surveys should be conducted during:
 - the months when the majority of migratory shorebirds are present in the area
 - Numbers of shorebirds may vary during these months, particularly in the north of the country, due to presence of additional shorebirds during inbound and outbound migration at the beginning and end of the non-breeding season. Local knowledge should be sought to determine optimum survey times.
 - the northern hemisphere breeding season (mid-April to mid-August) to obtain data on nonbreeding, non-migrating populations of immature migratory shorebirds and double-banded plover populations (March to August).
- Surveys for roosting shorebirds should be conducted as close to the time of high tide as practicable and at a maximum of no more than two hours either side of high tide (unless local knowledge indicates a more suitable time).

- Surveys for foraging shorebirds should be conducted as close to the time of low tide as practicable and at a maximum of no more than two hours either side of low tide (unless local knowledge indicates a more suitable time).
- Surveys should not be undertaken during periods of high rainfall or strong winds.
- Surveys should not be undertaken when activities are taking place which cause shorebird disturbance.

Survey effort

- Ideally, survey effort should be comprised of a minimum of:
 - four surveys for roosting shorebirds during the period when the majority of shorebirds are present in the area
 - Replicate surveys over this period are important to measure population variability. Some areas will meet the importance criteria only during the migration periods when many birds are temporarily stopping over. In most cases, one survey in December, two surveys in January, and one survey in February will be adequate.
 - four surveys for foraging shorebirds, including two surveys at spring low tide and two surveys at neap low tide
 - one survey during the northern hemisphere breeding season to capture data on birds that remain in Australia during the breeding season, as well as the double-banded plover (March to August).
- For large areas or for areas where many birds are expected, it is recommended that at least two people undertake the counts and agree on the number of birds and the number of species present. It is acknowledged that in such circumstances it is often difficult or impossible to achieve more than one complete survey of shorebird populations, in which case it is most important to adhere to optimum timing and survey coverage requirements.

Minimum data requirements

The following should be included in the survey report:

- Shorebird statistics relating to roosting areas:
 - total abundance (total number of birds present across all species)
 - species richness (number of species observed)
 - species abundance (number of birds of each species present).
- Shorebird behaviour:
 - activity (roosting, foraging)
 - foraging location (spatial data of the area used by shorebirds for feeding to enable mapping of foraging habitat).
- Survey conditions:
 - date, time of day
 - tide height
 - weather conditions (temperature, precipitation, wind speed & direction).
- Number of observers and experience level.
- Method used to conduct the survey.
- The following habitat characteristics may also be useful:
 - dominant landform type
 - hydrology
 - dominant terrestrial and aquatic vegetation types
 - intertidal substrate characteristics
 - invasive species
 - current disturbance regime (see below)
 - presence of suitable nocturnal roosting areas (see below).

Non-tidal areas

Survey coverage

As for tidal areas described above.

Survey timing

- Surveys should be conducted during:
 - the period when the majority of migratory shorebirds are present in the area to obtain data on the total population

This period will vary across Australia. In the north of the country key staging areas are often used by additional shorebirds during inbound and outbound migration, and therefore should also be surveyed at the beginning or end of the non-breeding season. Local knowledge should be sought to determine the appropriate time period.

 - the northern hemisphere breeding season (mid-April to mid-August) to obtain data on nonbreeding, non-migrating immature populations, as well as double-banded plover.
- Surveys should be conducted when habitat conditions are suitable for migratory shorebirds. Typically this will be when water is present with a minimally vegetated, exposed margin.
- Surveys should not be undertaken during periods of high rainfall or strong winds.
- Surveys should not be undertaken when activities are taking place which cause disturbance to the birds.

Survey effort

As for tidal areas described above.

Minimum data requirements

As for tidal areas described above.

Additional considerations

Levels of human disturbance

Human disturbance is a major threat to migratory shorebirds in some areas and can have a significant impact on the quality of habitat available to migratory shorebirds. As such, it is important that shorebird surveys adequately assess the current disturbance regime. This will allow for an analysis of whether cumulative disturbance in the area (for example existing disturbance plus expected disturbance from the proposal) will likely result in a significant impact on migratory shorebirds.

Refuge areas

Some areas may only be marginal habitat for migratory shorebirds under normal conditions but may be an important refuge when shorebirds are disturbed from preferred roosting or feeding areas, or when there are unusual conditions such as extreme high tides or very strong winds. Surveys should therefore make note of any shorebird habitats outside the project area and attempt to place them in the context of the larger wetland environment. Some questions that may help place the area in the broader context include:

- Is the proposal area in close proximity to known shorebird roosting and feeding areas?
- Is similar habitat widely available within the region?
- What is the level of connectivity to other areas of known or potential shorebird habitat, or how much movement exists between adjacent areas?
- Are birds known to fly to the area when disturbed elsewhere or during unfavourable conditions elsewhere, and if so how long do birds spend in the area before returning to preferred habitat?
- Is the area available during extreme high tides?

Nocturnal roosts

Migratory shorebirds may use different roost areas during the hours of darkness. The most commonly used nocturnal roosts (except for species that often perch in mangroves such as whimbrel and grey-tailed tattler) are shallow pools such as flooded saltmarshes that are free from wave action. These areas apparently offer increased security from predation, as predators must walk through water and wide-open areas.

Surveying nocturnal roosts can be difficult and may not be practicable during short term assessments of areas. However areas of flooded saltmarsh, coastal lagoons and wet grassland should be noted during surveys as potential nocturnal roosts and visited where possible during nocturnal spring high tides (the two tides in a day vary greatly and the larger of the two tides may not be at night).

Where it is not possible to do surveys for migratory shorebirds in the manner recommended, a thorough habitat assessment should be done to identify potential habitat. Areas of potential habitat for migratory shorebirds (including both the riparian/wetland fringe and the floodplain system surrounding the habitat) should be defined and treated as important habitat for the purposes of significant impact assessment. In these situations, the proposed action should be designed to avoid significant impacts on birds and all areas of potential habitat.

What is a significant impact on migratory shorebirds?



Photo: Birdlife of the Little Swamp Wetland, Dragi Markovic © Department of the Environment

Important migratory shorebird habitat in Australia is specifically protected under the EPBC Act. Under the Act, approval is required for any action that has, will have, or is likely to have, a significant impact on a matter of national environmental significance, which includes migratory species. An 'action' is broadly defined as a project, a development, an undertaking, an activity or a series of activities, or an alteration of any of these things.

As defined in the *EPBC Act Policy Statement 1.1 Significant Impact Guidelines*, an action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:

- substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species
- result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species
- seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.

Significant impact judgements must be made on a case-by-case basis and with consideration for the context of the action. The potential for a significant impact on migratory shorebird species will depend on the:

- timing, intensity, duration, magnitude and geographic extent of the impact
- sensitivity, value and quality of the environment within and around the area
- combined effects of impacts within and outside the area, direct and indirect impacts, as well as cumulative impacts already sustained
- presence of this and other matters of national environmental significance.

Note that where important habitat is associated with a Ramsar site, the criteria for actions affecting Ramsar sites must also be considered (see *EPBC Act Policy Statement 1.1 Significant Impact Guidelines—Matters of National Environmental Significance*).

Where migratory shorebirds contribute to the: Outstanding Universal Value of a World Heritage property the criteria for actions affecting the Outstanding Universal Value of the property and/or, National Heritage values of a National Heritage place the criteria for actions affecting the National Heritage values of the place must be considered (see *EPBC Act Policy Statement 1.1 Significant Impact Guidelines - Matters of National Environmental Significance*).

Having considered the threats to migratory shorebirds and their habitats across Australia, the following actions may constitute a significant impact on migratory shorebirds (Table 2). Where there is a possibility of a significant impact on a matter of national environmental significance, a referral under the EPBC Act should be considered.

Table 2. Thresholds of significant impacts on migratory shorebirds

Ecological element	Significant impact	Comment
Important habitat	Loss of habitat	The loss (for example, clearing, infilling or draining) of important habitat areas is likely to have a significant impact when it results in a reduction in the capacity of the habitat to support migratory shorebirds. The magnitude of the impact may increase with the number of shorebirds using the area, the regional significance of the site and/or the extent to which the loss reduces carrying capacity.
	Degradation of habitat leading to a <i>substantial reduction</i> in migratory shorebird numbers	Defining <i>substantial reduction</i> is made on a case-by-case basis. Factors to consider include: - the number of migratory shorebirds historically using an area (based on surveys and historical data) - likely resultant changes in bird numbers and species diversity - alterations to the value, quality, geographic extent of the area (for example, will the area still be classed as important habitat) - the function and role of the area (roosting, foraging) and likely changes in ecology and hydrology - the regional and local context of the area - the nature, extent, duration and timing of impacts, their likelihood and consequence.
	Increased disturbance leading to a <i>substantial reduction</i> in migratory shorebird numbers	
	Direct mortality of birds leading to a <i>substantial reduction</i> in migratory shorebird numbers	

The elements and criteria in the table above give guidance to the level of impact that may be significant for migratory shorebirds. They are not intended to be exhaustive or prescriptive, but rather to highlight the need to maintain the ecological function of important habitat and hence minimise impacts on migratory shorebirds.

Significant impact thresholds outlined in Table 1 are not designed to be prescriptive, but rather to clarify the level and type of impacts that may be significant at a national level, having regard to the biology, ecology and status of the 37 species. Identification and protection of important areas for migratory shorebirds, in addition to internationally important wetland areas as defined under the Ramsar Convention on Wetlands, is required due to the dispersed nature of shorebirds in Australia and the limited availability of habitat capable of supporting significant shorebird populations (See *Wildlife Conservation Plan for Migratory Shorebirds*).

If planning an action in an area where migratory shorebirds may occur, the following must be considered:

- Whether the action is proposed in an area that contains important habitat for one or more migratory shorebird species. Previous records and information from surveys on and near the area where the action is proposed will need to be considered.
- Potential impacts—direct and indirect impacts that could result from the action.
- Whether any of these impacts exceed set population thresholds.
- Measures that could be taken to reduce the level of impact, such as timing the impact to coincide with periods when few birds are present.

Note that this policy statement relates only to migratory shorebirds. Consideration will also need to be given to any other matter of national environmental significance likely to be affected by a proposed action.

What kinds of actions are likely to result in significant impacts on migratory shorebirds in Australia?

While extensive and on-going coastal development in other parts of the flyway is demonstrated to be significantly impacting migratory shorebird populations (see MacKinnon et. al. 2012), this document is focused on identifying the kinds of actions within Australia that will significantly impact migratory shorebirds.

Migratory shorebirds are sensitive to certain development activities due to their:

- high site fidelity
- tendency to aggregate (most species)
- very high energy demands
- need for habitat networks containing both roosting and foraging areas.

The types of actions most likely to result in significant impacts on migratory shorebirds are those that result in habitat loss or degradation, disturbance or direct mortality.

Habitat loss

Loss of any important habitat is **highly likely** to result in a significant impact. Loss of areas that support large numbers of migratory shorebirds can cause disproportionate declines in shorebird populations, as displaced birds are unable to find suitable replacement habitat. Similarly, incremental loss of smaller areas affects the broader conservation of habitat availability. In Australia, loss of important habitat reduces availability of foraging and roosting areas, affecting the ability of birds to build up energy stores necessary for successful migration and breeding. Some areas are also important year-round for juvenile birds, with loss of these habitats affecting future breeding populations of these species.

Habitat may be lost due to a variety of activities that make the habitat unavailable to shorebirds. These may include direct loss through clearing, inundation, infilling or draining (for example, for buildings or marine services such as harbours, marinas, ports or oil terminals) or indirect loss through changes to hydrology, water quality or vegetation structural changes near roosting areas (for example increased vegetation cover or encroachment of buildings).

Habitat degradation

Migratory shorebirds are sensitive to subtle changes to their habitat. In particular, many have specialised feeding techniques making them susceptible to slight changes in prey availability or to their foraging environments. Any activity that reduces the ability of shorebirds to use an area for roosting or foraging, or reduces the availability of food, degrades habitat and is **highly likely** to have a significant impact. These activities include (among others):

- substantial loss of marine or estuarine vegetation which is likely to alter the dynamic equilibrium of sediment banks and mudflats, as well as providing organic matter to support the invertebrates on which migratory shorebirds feed
- invasion of intertidal mudflats by weeds such as cord grass (*Spartina* species)
- water pollution and changes to the water regime
- artificial changes to hydrological regimes that affect the productivity of the feeding environment (for example, changes in water depth)
- exposure of acid sulphate soils changing the chemical balance of the area.

Disturbance

Disturbance is emerging as a major conservation issue for migratory shorebirds, particularly because it is so widespread. Certain activities interrupt or prevent feeding during limited foraging periods. Disturbance can also affect roosting birds and cause loss of energy reserves being accumulated for migration.

Actions which involve disturbance at important habitat areas during vital life cycle stages are **highly likely** to be significant. Disturbance can result from residential and recreational activities such as four-wheel-driving, jet- and water-skiing, power boating, fishing, walking, wind-surfing, kite-surfing, walking dogs, noise and night-lighting. While some activities may result in only low-levels of disturbance, it is important to consider the combined effects of disturbance with other threats when determining the level of potential impact of a proposed action. Roosting and foraging birds are most sensitive to discrete, unpredictable disturbances such as sudden loud noises (for example from demolition activities) and from objects that approach them from the water (for example boats). High and sustained levels of disturbance can prevent shorebirds from using all or parts of the habitat.



Photo: Black-tailed Godwit resting on one leg © Graeme Chapman

Direct mortality

Actions that introduce risk of mortality in important habitat (e.g. through collision, strike or predation) **may** result in a significant impact. Direct mortality of birds may result from a variety of activities. These include development of wind farms in migration or movement pathways, bird strike caused by aeroplanes or fixed structures such as towers with support cables, inappropriate waste management and chemical or oils spills.



Photo: 4WD tracks on the beach © Department of the Environment

How do I avoid and/or mitigate impacts on one or more EPBC Act listed migratory shorebird species?

It is important to consider the environmental impacts of a proposed action early in the planning stages. Where possible and practicable it is best to avoid impacts, particularly on sensitive environments such as wetlands. If impacts cannot be avoided, then they should be minimised or mitigated as much as possible. Careful and early planning of the action can avoid or reduce the likelihood of a significant impact under the EPBC Act.

Care should be taken to ensure that any mitigation and/or management actions implemented for migratory shorebirds do not have a negative impact on other matters of national environmental significance. Any proposed mitigation or management measures must take into account the needs of all matters of national environmental significance in a project area.

The following are a general set of measures that may help avoid or minimise impacts on migratory shorebirds associated with loss or degradation of important habitat, or disturbance or direct mortality of birds using important habitat. They should be used with the aim of reducing the impact of an action to below the assessment criteria threshold outlined in Table 1. A referral (including all proposed avoidance and mitigation measures) may still be required if a real chance or possibility of a significant impact on migratory shorebirds remains, or if legal certainty is desired.

Habitat loss

Given the serious threats associated with loss of migratory shorebird habitat, proposed actions should be designed to avoid any loss of habitat, including riparian/wetland fringes and floodplain systems surrounding core habitat. Careful planning through choice of project area and design can avoid or minimise habitat loss. Actions that do not result in habitat loss for migratory shorebirds may not have a significant impact and may not need to be referred under the EPBC Act (however please note that impacts on other matters of national environmental significance may still need to be referred).

Habitat degradation

Efforts should be made to avoid degradation of migratory shorebird habitat that may occur through the introduction of exotic species, changes to hydrology or water quality (including toxic inflows), fragmentation of habitat or exposure to litter, pollutants and acid sulphate soils. Actions should be designed to avoid reducing the capacity of important habitat to support migratory shorebirds by implementing measures to manage likely impacts. Best practice waste management should be implemented.

Disturbance

Measures to mitigate against the impacts of disturbance need to be determined on a case-by-case basis, as different species of shorebird respond differently to disturbance. Options for mitigating impacts from disturbance include:

- the use of buffer zones around important areas for migratory shorebirds. Appropriate buffers will depend on local circumstances, including the species present, type of habitat (ephemeral or permanent), habitat use (roosting or foraging) and scale of disturbance. As a guide, studies have recommended buffer zones with widths ranging from 165 metres to 255 metres
- the construction of appropriate barriers, such as fences around important habitat to restrict access. Ideally, there should be no public access (by humans and/or domestic animals) to areas identified as important to migratory shorebirds. Where this is not feasible, particular recreational activities may need to be excluded or it may be necessary to limit the number of people using an area at one time and/or limit activities during the period between October and March (when the majority of shorebirds will be present)
- landscape and urban design, including sympathetic lighting strategies, vegetation screening and sound attenuation
- increased community education through mechanisms such as interpretive signs at access points to shorebird habitats.

Direct mortality

Some actions can lead to direct mortality of migratory shorebirds. Consideration should be given to the location and design of actions to avoid the possibility for direct mortality. For instance, structures with potential migratory shorebird collision risks (for example, wind turbines or metal towers with supporting wires) should be established away from known migratory pathways. Other potential causes of mortality, including toxic chemical release and domestic pets, must also be addressed.

Consideration of climate change

Areas landward of important shorebird habitat areas should be maintained in an undeveloped state to allow the natural coastal processes of erosion and accretion to respond to possible rising sea levels. These natural processes may form new migratory shorebird habitat in place of lost areas.



Photo: Latham's Snipe feeding in the shallow water © Graeme Chapman

What should I do if my actions are likely to have a significant impact?

An action should be referred for consideration under the EPBC Act if:

- you believe that it is possible that a proposed action will have a significant impact on a matter of national environmental significance
- you are unsure on whether or not a proposed action will have a significant impact on a matter of national environmental significance.

A referral should be made as early as possible during the planning and development stages of the proposal. All referrals are subject to a 10 business day public comment period, and a decision on whether a proposed action requires approval is made within 20 business days.

Substantial penalties apply for taking an action without approval that has, will have, or is likely to have, a significant impact.

A referred action may be determined to be:

- not a controlled action
Approval is not required as the action (as described in the referral) will not have a significant impact on a matter of national environmental significance.

- not a controlled action 'particular manner'
Approval is not required provided that the action is done in a particular way, specified in the decision notice. The referral documentation must identify measurable and clear avoidance procedures or mitigation measures that will be taken to prevent significant impacts on matters of national environmental significance. This option allows for a shorter process by avoiding the need for a full assessment.

- a controlled action
Approval is required due to the likelihood of the action having a significant impact on a matter of national environmental significance. The action must undergo assessment under the EPBC Act. An action may be refused approval to proceed if, after assessment and negotiation, the impacts cannot be appropriately avoided, mitigated and/or offset.

- a clearly unacceptable action

The impacts of the action on a matter of national environmental significance are considered to be clearly unacceptable.

Decisions made regarding a proposed action must be in line with the objectives of the EPBC Act. They must provide protection for the environment, especially aspects of the environment that are considered matters of national environmental significance. They must also promote ecologically-sustainable development through the conservation and ecologically-sustainable use of natural resources.

In terms of habitat important to migratory shorebirds, decisions made regarding the approval of, or the imposition of conditions on, an action must be consistent with Australia's obligations under the Ramsar Convention, or with international agreements pertaining to listed migratory species (approved under subsection 209 (4) of the EPBC Act).

Other laws protecting migratory shorebirds

All states and territories have legislation that protects biodiversity and native species. Migratory shorebirds and/or their habitat may also be protected through these various mechanisms.

The listing of these migratory shorebird species on the EPBC Act migratory species list recognises their importance from a national perspective, and does not replace responsibilities under state, regional or local legislation or regulations.

Judgements may differ between Australian, state and local decision-making processes, due to the different laws and requirements. If a proposed activity could affect a migratory shorebird species, or individual animals, you should contact the relevant state and local authorities to establish any further obligations.

Where to get more information

This policy statement provides further clarification of the biological and ecological context for the identification of important habitat, significant impact thresholds and mitigation measures for proposed actions relative to shorebird species listed as migratory under the EPBC Act.

Further information about migratory shorebird areas in Australia is available through the Shorebirds 2020 project, which is coordinated by Birdlife Australia and aims to facilitate shorebird monitoring across the country (see www.birdlife.org.au/projects/shorebirds-2020).

While this project provides an indication of the number and distribution of important shorebird areas in Australia, many other areas potentially meet the criteria. Responsibility for identifying important habitat for migratory shorebirds remains with proponents, and must therefore be assessed on a case-by-case basis.

Other EPBC Act policy statements are available to assist with understanding obligations under the EPBC Act. They are available from the Department's website at: www.environment.gov.au/epbc/policy-statements, or by contacting the Department's Community Information Unit by email: ciu@environment.gov.au or by phone: 1800 803 772.



Photo: Coastal scenery, Michelle McAulay © Department of the Environment

The Department's protected matters search tool is useful to assist in determining the likelihood of matters of national environmental significance occurring in a proposal area (see www.environment.gov.au/epbc/pmst/index.html).

State and territory government agencies may also hold relevant information including habitat and species distribution information.

Information on listed migratory species is available at the Department's species profiles and threats database (SPRAT) at: www.environment.gov.au/cgi-bin/sprat/public/sprat.pl.



Photo: Aerial view of the Oyster Farms and coastal area of Barilla Bay © Nick Rains

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Photo: Black-tailed godwits, Brian Furby Collection © Brian Furby and Department of the Environment

