



Australian Government

Department of the Environment, Water, Heritage and the Arts

**Significant impact guidelines for
36 migratory shorebird species**

Migratory species

EPBC Act policy statement 3.21

DRAFT

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Introduction

Thirty-six international migratory shorebird species regularly visit Australia each year. These species are listed as migratory under the Australian Government *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and are identified in Table 1. Listed migratory species are a 'matter 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. Substantial penalties apply for taking such an action without approval (for example, civil penalties up to \$5.5 million or criminal penalties up to seven years' imprisonment).

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. You should consider all of these factors when determining whether an action is likely to have a significant impact on matters of national environmental significance.

This policy statement is designed to help determine the impacts of proposed actions on migratory shorebird species, and to provide mitigation strategies to reduce the level or extent of those impacts. The policy is to promote ecologically sustainable development that allows for the continued ecological functioning of important habitat for migratory shorebirds.

The policy statement applies to the 36 species wherever they occur within Australia or its territories. The policy statement does not apply to migratory shorebirds when they are outside Australia.

This policy statement is based on the best available information, including:

- the EPBC Act Wildlife Conservation Plan for Migratory Shorebirds (2006)
- scientific literature
- consultation with species experts, and
- application of the national environmental legislation (EPBC Act).

This policy statement builds on the information and explanations in *EPBC Act Policy Statement 1.1 Significant Impact Guidelines – Matters of National Environmental Significance*, available at:

www.environment.gov.au/epbc/guidelines-policies.html

Table 1: The 36 migratory shorebird species:

#	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 bicinctus</i>	Double-banded plover
33.	<i>Charadrius mongolus</i>	Lesser sand plover
34.	<i>Charadrius leschenaultii</i>	Greater sand plover
35.	<i>Charadrius veredus</i>	Oriental plover
Glareolidae		Pratincoles
36.	<i>Glareola maldivarum</i>	Oriental pratincole

How to interpret and apply these guidelines

The significant impact thresholds outlined in this policy statement 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 for the biology, ecology and status of the 36 species. The identification and protection of nationally important sites for migratory shorebirds, in addition to internationally important sites as defined under the Ramsar Convention on Wetlands, is required due to the dispersed nature of shorebirds in Australia, and the limited availability of suitable productive habitat capable of supporting large numbers of shorebirds.

If you are planning an action in an area where migratory shorebirds may occur you should consider the following:

- Does my site or a nearby area support habitat for one or more migratory shorebird species (see page 8)? You will need to consider previous records and information from surveys on and near the area where you plan to carry out your action (see page 10).
- What impacts, both direct and indirect, could result from my action?
- Could any of these impacts exceed the thresholds (see Table 2)?
- What measures could be taken to reduce the level of impact (see page 14)?

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 the proposed action.

Referrals made under the EPBC Act

The referral stage determines whether or not a proposed action requires approval under the EPBC Act. If you think that your action may have a significant impact on a matter of national environmental significance, or if you are unsure, you should refer the action to the federal environment minister. A referral should be made as early as possible during the planning and development stages of the proposal. All referrals will be subject to a 10-day public comment period, and a decision on whether a proposed action requires approval will be 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.

An action referred to the minister may be determined:

- 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, or
- a clearly unacceptable action—The impacts of the action on a matter of national environmental significance are considered to be clearly unacceptable, and the action is refused approval to proceed.

Decisions made by the minister must be in line with the objects of the EPBC Act. They must provide protection for the environment, especially aspects of the environment that are matters of national environmental significance. They must also promote ecologically sustainable development through the conservation and ecologically sustainable use of natural resources. When deciding whether or not to give approval or impose conditions on an action, the minister must also not act inconsistently 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).

Further information on the EPBC Act, including guidance on the referral, assessment and compliance processes is available at:

www.environment.gov.au.

What other laws protect 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 list recognises their importance from a national perspective, and does not replace listing 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 your activity could affect a migratory shorebird species, or individual animals, you should also contact the relevant state and local authorities to find out your obligations.

Ecology of migratory shorebirds

Ecology across the flyway

Thirty-five of the 36 migratory shorebird species breed in the northern hemisphere and migrate to the non-breeding grounds of Australia along the East Asian–Australasian flyway (EAA flyway). The EAA flyway stretches from Siberia and Alaska, southwards through east and south-east Asia, to Australia and New Zealand (see Figure 1). The major exception to this rule is the double-banded plover, which migrates between Australia and its breeding grounds in New Zealand.



Figure 1: East Asian-Australasian flyway (prepared by Wetlands International)

Ecology in Australia

Australia plays a critical role in the EAA flyway, being both a major destination for southward migrating birds, and the main starting point for the subsequent northward migration. The coastal and inland habitats of Australia provide migratory shorebirds with essential foraging and roosting areas to feed and rest during the non-breeding period, allowing adult birds to build up the reserves necessary to support the upcoming northward migration and breeding season. Juvenile birds, fledged in the far northern hemisphere, and having flown over 10,000 kilometres, may spend several years in Australia before reaching maturity and returning north to breed. The Roebuck Bay/Eighty Mile Beach region of north-western Australia, for example, is a key staging area for migrating birds. It also supports large numbers of adult birds during the non-breeding period, and juvenile birds of many species during the breeding season.

When are migratory shorebirds present in Australia?

Migratory shorebird species are 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). During this time they arrive in Australia from their long migration and disperse throughout the country to a wide variety of habitats where they feed to build up energy resources, before migrating back to their breeding grounds.

Immature birds of some species will remain at feeding and roosting sites in Australia until they reach maturity.

What habitats do migratory shorebirds use?

Migratory shorebirds do not breed in Australia but require habitat for foraging and roosting. The types of habitat used by migratory shorebirds in Australia vary across the 36 species. Migratory shorebirds use both coastal and inland habitats that most commonly include:

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

Foraging sites vary depending on the species. Many migratory shorebirds have specialised feeding techniques that enable them to feed on specific prey

or foraging sites. The distribution of prey species, generally invertebrates, crustaceans and small fishes, also depend on factors such as sediment type and size, and will influence foraging habitat selection. In coastal areas foraging habitats are typically found in the tidal areas exposed during low tide.

Roosting sites provide areas for the birds to rest safely. The high energy demands on migratory shorebirds as a result of their migratory lifestyle means that resting is a critical part of their life cycle. Generally, migratory shorebirds prefer roosting sites in open habitat on slightly elevated ground so they can watch for potential predators. Migratory shorebirds that use coastal habitats tend to roost during high tide, although flocks may also move a short distance inland to roost. During bad weather, shorebirds may temporarily move to 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 sites include exposed sands at the estuary mouth and on adjacent beaches, saltmarshes that are only marginally submerged during high tide, grassy areas adjacent to the estuary, nearby freshwater wetlands, claypans and occasionally rock groynes and exposed reefs.

Migratory shorebirds are known to use networks of connected sites (also known as site complexes). They move within these networks depending on the time of day, availability of resources and environmental conditions at the site. Some habitats represent important refuge sites during extreme high tides or when weather conditions prohibit occupancy of more commonly used sites.

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

What behaviours do migratory shorebirds show?

Behaviour varies across the 36 species of migratory shorebirds. For example, some species, such as the red-necked stint, tend to aggregate in large flocks, while others, such as Latham's snipe, usually disperse in small numbers across wide areas of habitat.

Generally, migratory shorebirds that use coastal habitats tend to congregate together in large flocks during high tide when their feeding habitat is submerged. In contrast, migratory shorebirds at non-tidal wetlands, such as inland systems, tend to show more dispersive behaviour.

More information on each species is available in the background paper to this policy.

Important habitat for migratory shorebirds

Under the EPBC Act, 'important habitat' is a key concept for migratory species. Defining this term for migratory shorebirds in Australia is needed to ensure that sites necessary for the ongoing survival of the 36 species are appropriately identified and managed.

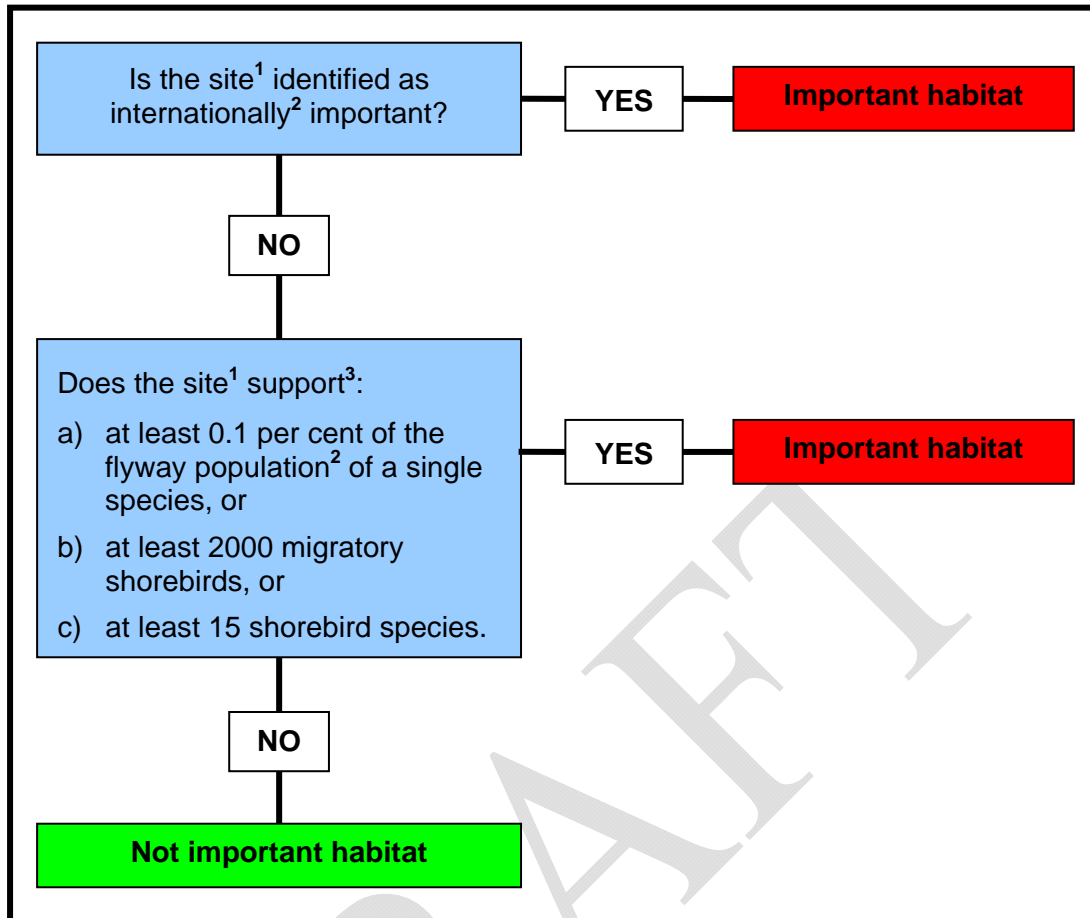
The widely accepted and applied approach to identifying internationally important shorebird sites throughout the world has been through the use of criteria adopted under the Ramsar Convention on Wetlands. According to this approach, a wetland should be considered internationally important if it regularly supports:

- one 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.

While the international criteria are effective in identifying important shorebird sites in many countries across the EAA flyway, they are insufficient to provide protection for migratory shorebirds within Australia. The distribution of migratory shorebirds in Australia is more dispersed than in other countries, due in part to unpredictable climatic conditions and the generally lower productivity (lower carrying capacity) of our wetlands. This situation is exacerbated by the recent and prolonged drought, in which many of the inland wetlands in southern Australia that once supported internationally significant numbers of shorebirds are drying up. As a result, fewer shorebird areas are identified in Australia using the existing international criteria. Fewer sites mean that a much smaller proportion of shorebird populations are protected. To facilitate appropriate shorebird management and conservation in Australia, and ensure the maintenance of sustainable migratory shorebirds populations, there is a need to establish national criteria.

Figure 2 describes the process for identifying important habitat for migratory shorebirds under the EPBC Act. This process applies to each of the migratory shorebird species identified in Table 1, with the exception of Latham's snipe (*Gallinago hardwickii*) which is discussed separately below. More information on this decision process is available in the background paper to this policy.

Figure 2: Important habitat for migratory shorebirds (except Latham’s snipe)



1. 'Site' is defined for migratory shorebirds as: *the entire (discrete) area of contiguous habitat used by the same group of migratory shorebirds, which may include multiple roosts and feeding areas.* The area covered by a migratory shorebird 'site' may extend beyond the boundaries of a property or project area, and may also extend beyond Ramsar boundaries for internationally important areas. Appropriate surveys can determine the extent of a migratory shorebird 'site'.
2. The list of internationally important sites and flyway population estimates, as at 2008, are at: www.environment.gov.au/biodiversity/migratory/publications/shorebirds-east-asia.html
Local and/or more recent information should be sought during the project planning phases to determine the likelihood of important habitat for migratory shorebirds being present within or near the proposed project site.
 - Where population estimates are presented as a population range, the lowest estimate in the range should be used to calculate the population percentage.
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 at the site within the previous five years.* Refer to the background paper to this policy statement for information regarding survey methodology.
 - 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.*

Latham's snipe (Gallinago hardwickii)

Latham's snipe does not commonly aggregate in large flocks or use similar habitat to many other of the coastal species. Consequently, habitat important to Latham's snipe is not regularly identified using the process outlined in Figure 2. A different method for identifying important habitat for Latham's snipe is below.

Important habitat for Latham's snipe occurs at sites that have previously been identified as internationally important for the species, or sites that:

- support at least 18 individuals of the species, and
- are naturally occurring open freshwater wetland with vegetation cover nearby (for example, tussock grasslands, sedges, lignum or reeds within 100 m of the wetland).

Definitions for 'site' and 'support' are as above.

Threshold criteria are considered the best way to identify important sites in the absence of data sufficient for more rigorous methods.

Existing information

In addition to the internationally important sites for migratory shorebirds identified by Bamford et al. (2008), several sites supporting nationally important numbers of migratory shorebirds have been identified as part of the Shorebirds 2020 project, a collaborative enterprise between Birds Australia, the Australasian Wader Studies Group (AWSG), WWF Australia and the Australian Government. These sites will be progressively made available through the Shorebirds 2020 website and the department's protected matters search tool. Additional information may be found on the Australian Wetlands Database, including wetlands listed on *A directory of important wetlands in Australia*.

Historic and recent survey data may also be available locally (for example, bird observer groups), or through state/territory government agencies.

Survey guidelines for migratory shorebirds

Important habitat is the key element that needs to be identified when assessing the significance of potential impacts on migratory shorebirds. To determine whether a site meets the criteria for important habitat (above) you will need to do the following investigation:

- check for existing suitable survey data collected from the site during previous monitoring activities
- if no suitable survey data exists, if it is too old to be considered reliable, or if the site characteristics have changed, surveys of the site must be done to establish the presence and number of migratory shorebirds, and
- assess habitat characteristics (for example, type, quality, size and availability) and existing threats to the site in relation to its regional context.

An outline of suitable survey method for the migratory shorebird species is presented in the background paper to this policy statement. This guidance describes the survey principles and minimum recommended effort for the survey of migratory shorebirds in a particular area to support environmental impact assessment.

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. Under this option, the action should be designed to avoid significant impacts on birds and all areas of potential habitat.

Principal threats to migratory shorebirds

While several threats operate across the EAA flyway, the following is focused on threats likely to occur within Australia.

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

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

The principal threats most relevant to judgements on significance include habitat loss and degradation, disturbance and direct mortality.

Habitat loss

The loss or degradation of sites 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, the incremental loss of smaller sites affects the broader conservation of habitat availability. In Australia, the loss of important habitat reduces the availability of foraging and roosting sites, affecting the ability of birds to build up the energy stores necessary for successful migration and breeding. Some sites are also important year-round for juvenile birds, with loss of these habitats affecting the 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, oil terminals) or indirect loss through changes to hydrology, water quality or structural changes near some roosting sites (for example, increased cover, 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 to prey sources and 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. 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), and
- exposure of acid sulphate soils changing the chemical balance of the site.

Disturbance

Disturbance is emerging as a major conservation issue for migratory shorebirds. Certain activities may interrupt migratory shorebirds during their limited foraging periods, such as during low tide, and prevent them from foraging effectively. Disturbance can also affect roosting birds and cause them to waste energy stored for migration.

Disturbance can result from residential and recreational activities such as four-wheel-drive vehicles, 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 an 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.

Direct mortality

Direct mortality of birds may occur due to a variety of reasons. Activities that may result in direct mortality may include development of wind farms in migration or movement pathways, bird strike caused by aeroplanes, and chemical or oil spills.

What sorts of actions may have a significant impact on migratory shorebirds?

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 a listed migratory species will depend on the:

- intensity, duration, magnitude and geographic extent of the impact
- sensitivity, value and quality of the environment on and around the site
- combined effects of on-site, off-site, direct and indirect impacts, and
- presence of this and other matters of national environmental significance.

Note that where important habitat is associated with a Ramsar-listed site you will also need to consider the criteria for actions affecting Ramsar sites (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, and in consultation with species experts, the Department of the Environment, Water, Heritage and the Arts is of the view that the following actions may constitute a significant impact on migratory shorebirds. 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: Significant impact assessment for migratory shorebirds

Ecological element affected	Significant impact assessment	Comment
Important habitat (see page 8)	Loss of important habitat	The loss (for example, clearing, infilling or draining) of important habitat areas is likely to have a significant impact on migratory shorebirds 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 important habitat leading to a <i>substantial reduction</i> in migratory shorebirds using the site	Defining <i>substantial reduction</i> will need to be made on a case-by-case basis. Factors to consider will include:
	Increased disturbance leading to a <i>substantial reduction</i> in migratory shorebirds using important habitat	<ul style="list-style-type: none"> • the number of migratory shorebirds historically using a site (based on surveys and historical data) • likely resultant changes in bird numbers and species diversity • alterations to the value, quality, geographic extent of the site (for example, will the site still be classed as important habitat)
	Direct mortality of birds leading to a <i>substantial reduction</i> in migratory	

	shorebirds using important habitat	<ul style="list-style-type: none"> • the function and role of the site (roosting, foraging) and likely changes in ecology and hydrology • the regional and local context of the site, and • the nature, extent, duration of impacts, their likelihood and consequence.
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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 minimise impacts to migratory shorebirds across Australia.

Mitigation measures

It is important to consider the environmental impacts of the proposed action early in the planning stages of a project. 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, and when properly integrated into the project design may qualify the proposal for a 20-day not-controlled action (particular manner) decision 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 present at a site. The mitigation and management proposed at a site needs to 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 important habitat loss, important habitat degradation, disturbance and 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 laid out in this document, to avoid significant impacts on migratory shorebirds. A referral (including all proposed avoidance and mitigation measures) to the federal environment minister 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 developments should be designed to avoid any loss of habitat, including the riparian/wetland fringe and the floodplain system surrounding the habitat. Careful planning through choice of site and project design can avoid or minimise habitat loss. Projects that do not result in habitat loss for migratory shorebirds may not have a significant impact and not need to be referred under the EPBC Act (please note that impacts on other matters of national environmental significance may need to be referred).

Habitat degradation

Efforts should be made to avoid the 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 sites and exposure to acid sulphate soils. Actions should be designed to avoid reducing the capacity of the important habitat to support migratory shorebirds by implementing measures to manage the likely impacts.

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 areas important for the migratory shorebirds. The appropriate buffer will depend on the nature of the individual circumstances, including the species present, type of habitat (ephemeral vs. permanent), habitat use (roosting or foraging) and scale of disturbance. As a guide, previous studies have recommended buffer zones ranging from 165m to 255m
- 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 from the area or it may be necessary to limit the number of people using an area at one time and/or to limit activities during the period between October and March (when the majority of birds will be present at the site)
- landscape and urban design, including sympathetic lighting strategies and sound attenuation, or
- Community education through mechanisms such as interpretive signs at access points to shorebird habitats.

Direct mortality

Some developments may lead to direct mortality of migratory shorebirds. Consideration should be given to the location and design of these developments to avoid the possibility for direct mortality. For instance, effort should be made to locate structures with potential migratory shorebird collision risks (for example, wind turbines) away from known migratory pathways. Other potential causes of mortality, including toxic chemical release and domestic pets, must also be addressed.

What does this mean for actions in or near migratory shorebird habitat?

If you plan an action that may have a significant impact on migratory birds, you should refer the proposal to the minister before starting the action. The minister will decide, within 20 business days, whether assessment and approval is required under the EPBC Act. More information on referral and assessment is available

www.environment.gov.au/epbc/assessments/process.html.

Where can I get more information?

The background paper for this policy statement provides a biological and ecological context for the identification of important habitat, significant impact thresholds and mitigation measures.

Internationally important sites and current flyway population estimates have been identified by Bamford et al. (2008), *Migratory shorebirds of the East Asian–Australasian Flyway: Population estimates and internationally important sites*. This paper is available at: www.wetlands.org/WatchRead/tabid/56/mod/1570/articleType/ArticleView/articled/2012/Default.aspx

Several organisations in Australia are involved with migratory shorebird monitoring and conservation. For instance, the Australasian Wader Studies Group has been surveying migratory shorebirds for more than 20 years (see www.awsg.org.au). The Shorebirds 2020 project, coordinated by Birds Australia, aims to facilitate shorebird monitoring across the country (see www.birdsaustralia.com.au). More information on the Shorebirds 2020 project is available at: www.shorebirds.org.au.

Other EPBC Act policy statements are available to help you to understand the EPBC Act and your obligations. They are available from the department's website at: www.environment.gov.au/epbc/guidelines-policies.html, or by contacting the Community Information Unit by email: ciu@environment.gov.au or by phone: 1800 803 772.

The protected matters search tool can provide a good starting point for determining the likelihood of having matters of national environmental significance in your area. State and territory Government agencies may also hold relevant information including habitat and species distribution information.

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