

Australian Government

Department of the Environment, Water, Heritage and the Arts

ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999



EPBC Act Policy Statement 2.3

Wind Farm Industry



EPBC Act Policy Statement 2.3

Disclaimer

The contents of this document have been compiled using a range of source materials and is valid as at June 2009. The Australian Government is not liable for any loss or damage that may be occasioned directly or indirectly through the use of or reliance on the contents of the document.

© Commonwealth of Australia 2009

This work is copyright. You may download, display, print and reproduce this material in unaltered form only (retaining this notice) for your personal, non-commercial use or use within your organisation. Apart from any use as permitted under the Copyright Act 1968, all other rights are reserved. Requests and inquiries concerning reproduction and rights should be addressed to Commonwealth Copyright Administration, Attorney General's Department, Robert Garran Offices, National Circuit, Barton ACT 2600 or posted at http://www.ag.gov.au/cca.

CONTENTS

1.Introduction	5
EPBC Act Policy Statements	5
What is a 'wind farm'?	5
When to make a referral under the EPBC Act	5
How to make a referral under the EPBC Act	6
2. How do I decide whether a referral is required under the EPBC Act?	6
Context of the impact	8
Extent and ntensity of the impact	9
Existing levels of impact from other sources	9
The degree of confidence with which the impacts of the action are known and understoo	d .9
3. Matters of national environmental significance relevant to wind farms	9
Listed threatened species and ecological communities	10
Listed migratory species	12
Wetlands of international importance	13
World Heritage Properties	14
National Heritage places	14
Commonwealth marine areas	15
4. Avoiding or mitigating impacts on matters of national environmental	
significance	16
Avoidance	16
Mitigation	17
5. Further information about the EPBC Act	18
The EPBC Act and state and territory legislation	18
6. Glossary	19
Appendix A - Guide to the identification of matters of national environmental	
significance, and their avoidance or mitigation	20

Wind Farm Industry

1. Introduction

The purpose of this policy statement is to assist operators in the wind farm industry to decide whether or not proposed actions require referral under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The EPBC Act provides substantial penalties for actions that have a significant impact on any matters of national environmental significance which have not been referred and approved under the EPBC Act.

EPBC Act policy statements

You should read this policy statement in conjunction with other relevant EPBC Act policy statements, in particular, the *EPBC Act Significant Impact Guidelines 1.1 – Matters of National Environmental Significance,* which provides guidance in determining whether an action is likely to have a significant impact on a matter of national environmental significance.

For actions on Commonwealth land or which may impact upon Commonwealth land, or actions by Commonwealth agencies anywhere in the world, you should also refer to the *EPBC Act Significant Impact Guidelines 1.2 – Actions on, or impacting upon, Commonwealth land and actions by Commonwealth agencies.*

You can obtain EPBC Act policy statements from the Department of the Environment, Water, Heritage and the Arts (the department) Community Information Unit on 1800 803 772 or from the department's web site at: http://www.environment.gov.au/epbc/guidelines-policies.html

What is a 'wind farm'?

For the purposes of this policy statement a wind farm is a site on which wind turbine(s) are erected and operated to generate electricity, and includes the associated infrastructure on and off-site, such as access roads, sub-station, transmission lines and temporary structures, including structures built prior to, during and after construction.

When to make a referral under the EPBC Act

This policy statement is intended to assist you in deciding whether or not an action should be referred. A referral is the first step in the assessment and approval process and involves filling out a referral form and sending it to the department. You will need an assessment and approval under the EPBC Act if:

- (a) you propose to take an 'action' ('action' is defined broadly under the EPBC Act and includes a project, development, undertaking, activity or series of activities, or an alteration to any of these things), and
- (b) your proposed action will have or is likely to have a significant impact on one or more matters of national environmental significance, including:
- World Heritage properties
- National Heritage places
- Ramsar wetlands of international importance
- listed threatened species and communities
- migratory species protected under international agreements, and
- the Commonwealth marine environment.

Details on matters of national environmental significance which may be relevant particularly to wind farms are set out in section 3 of this policy statement (page 7). A guide to tools for identifying matters of national environmental significance is set out in Appendix A to this policy statement (page 25).

If your proposed action fulfils the description in both (a) and (b) above, then it should be referred to the department for a decision by the Minister for the Environment, Heritage and the Arts (the Minister)

about whether the action needs assessment and approval. Circumstances where you might consider referring might also include where doubt or uncertainty exists as to the nature and type of impacts on matters of national environmental significance, where the likely significance is marginal, or where a proposal is likely to be highly contentious. In the event that, following reasonable environmental investigations and self-assessment, you decide that a referral is not needed (e.g. significant impacts on matters of national environmental significance are not likely), you should carefully document your conclusions and supporting information so that you can clearly demonstrate that you have considered your obligations under the EPBC Act.

Your self-assessment should be as objective as possible and based on sufficient information to make an informed judgment. This policy statement should provide some guidance, however you may also need to consider other information. You **must** make a referral if your action will have or is likely to have a significant impact.

If you have any questions on the referral process, please contact the Community Information Unit on 1800 803 772 or email epbc.referrals@environment.gov.au.

How to make a referral under the EPBC Act

The purpose of the referral stage is to determine whether the proposed action requires approval under the EPBC Act. A referral identifies the person proposing to take the action and includes an accurate and up-to-date description of the proposal, the proposed project location, potential impacts on matters of national environmental significance, and any proposed measures to mitigate those potential impacts. The length and complexity of any subsequent assessment and approval processes may be reduced where more complete information is provided at the referral stage.

You can submit the referral electronically or in paper form.

Referral forms and further guidance on submitting a referral is available from the department's website at:

http://www.environment.gov.au/epbc/assessmentsapprovals/referral-form.html

Once the referral is received, the Minister has 20 business days to decide if the proposed action will require assessment and approval under the EPBC Act, provided that sufficient information is provided in the referral.

If the Minister decides that the action will not or is unlikely to have a significant impact on a matter of national environmental significance, then no further assessment and approval under the EPBC Act is required. You will not contravene the EPBC Act if you then take the action as described in the referral.

2. How do I decide whether a referral is required under the EPBC Act?

Potentially, wind farms can impact on matters of national environmental significance at any stage including construction, operation, maintenance, refurbishment and decommissioning. Hence consideration must be given to potential environmental impacts from the planning stage onwards.

To decide whether or not to refer an action for a decision by the Minister, you should consider the following questions:



Further detail to help you answer these questions follows:

Q1 - Are there any matters of national environmental significance in the area of the proposed action?

If the answer to this question is 'yes' – go to question 2.

If the answer to this question is 'no' - you do not need to make a referral under the EPBC Act.

If you don't know the answer to this question – the EPBC Act protected matters search tool (http://www.environment. gov.au/erin/ert/epbc/index.html) allows you to search for matters of national environmental significance in an area where you propose to take an action. Surveys of species or other matters of national environmental significance can help to verify the results of the EPBC Act protected matters search tool. Other sources of information to help identify matters of national environmental significance are listed in the table in Appendix A.

When determining whether there are any matters of national environmental significance in the area of the proposed action, you should consider a broader area than just the proposed site of the wind farm. A wind farm may have a significant impact on a World Heritage property, National Heritage place or a Ramsar wetland which is near to, adjacent to or some distance away from the wind farm. You should also consider listed threatened and listed migratory species that may fly or move through the area, even if they do not inhabit the area.

Q2 - Is there potential for impacts on matters of national environmental significance?

If the answer is 'yes' – go to question 3.

If the answer is 'no' - you do not need to make a referral under the EPBC Act.

In answering this question, you should consider the action at its broadest scope, including the impact of infrastructure such as roads and power lines, all stages of the action including site preparation, construction and ongoing operation, deconstruction and any related actions. You should also consider any offsite or indirect impacts that may result from the action.

Indirect and off-site impacts

When considering whether an action requires approval under the EPBC Act the Minister must consider all adverse impacts resulting, either directly or indirectly, from the action, regardless of whether the impacts are within the control of the person proposing to take the action. Consequently, when undertaking an assessment of the potential impacts, all potential adverse impacts must be considered, including indirect and offsite impacts.

Indirect and off-site impacts include:

- 'downstream' or 'downwind' impacts, such as impacts on wetlands or ocean reefs from sediment washed or discharged into river or creek systems, or disturbance of fauna off-site by noise or blade glint
- 'upstream' impacts, such as those associated with the production of energy used to undertake the action, and
- 'facilitated' impacts which result from further actions which are made possible or facilitated by the action, such as the installation of power lines, access roads or power stations.

In determining whether the action requires referral under the EPBC Act only adverse impacts on matters of national environmental significance are relevant. Beneficial impacts of the action, such as the production of clean energy, cannot be offset against adverse impacts. If, after being referred, an action requires assessment and approval under the Act, environmental, social and economic benefits are taken into account.

Q3 - Are there any proposed measures to avoid or reduce impacts on matters of national environmental significance?

If the answer is 'no' – go to question 4.

If there are avoidance and/or abatement measures which reduce or eliminate impact below the level of significance then you do not need to make a referral under the EPBC Act.

Careful planning and design of a proposal can avoid or reduce the potential for impacts on matters of national environmental significance. Refer to section 4 (page 18) for a discussion of measures to avoid or mitigate the impacts of wind farms on matters of national environmental significance.

Q4 - Is the proposed action likely to have a significant impact on a matter of national environmental significance?

If the answer is 'no' - you do not need to make a referral under the EPBC Act.

If the answer is 'yes' - you need to make a referral under the EPBC Act.

In determining the likely nature and magnitude of a proposed action's impacts, it is important to consider matters such as:

Context of the impact

The context for an action is the environment in which the action will occur, including all areas or elements of the environment which may be impacted. A good knowledge of the environment that is likely to be impacted by the action, with particular attention to the presence, character and vulnerability of matters of national environmental significance, is vital in determining whether or not an action is likely to have a significant impact on a matter of national environmental significance. For example, whether developments on sites that are rich or poor in native species are more likely to have significant impacts on listed threatened or listed migratory species depends on whether the site is used for migratory or foraging purposes. Also, sites which are subject to conditions of poor visibility (fog, low cloud cover, glare) might exacerbate any impact, because, for example, birds using the site may be unable to detect and avoid turbines at such times. Matters of national environmental significance relevant to wind farms are discussed in Section 3 (page 7), below.

Extent and intensity of the impact

Another consideration in determining whether an action is likely to have a significant impact on a matter of national environmental significance is to estimate the extent and the intensity of the impacts. For example, a wind farm may have greater or lesser impacts depending on the extent of excavation, vegetation clearance and other disturbance involved in site preparation, the intensity and geographic extent of construction-related impacts, and the number, size and configuration of turbines (though it is noted that a larger number of turbines does not necessarily mean a greater impact). It is important to consider the extent and intensity of all impacts, including indirect and offsite impacts in the context of the environment which will be impacted.

Existing levels of impact from other sources

A proposed wind farm development should not be considered in isolation and existing levels of impact from other sources must also be taken into account. In regions where there are a number of wind farms, or other developments, you should consider existing levels of impact on matters of national environmental significance.

The degree of confidence with which the impacts of the action are known and understood

The wind farm industry in Australia is in its early stages and, although the body of scientific knowledge based on local experience within the wind farm industry is increasing, much of what is known is drawn from overseas experience. For example, modelling the risk of collision, in circumstances where mortality of listed threatened species from collision seems likely, may help clarify the expected level of impact, but models are only based on the best available knowledge including data available overseas.

Assessments of possible impacts should use the best available information on wind farms and their environmental impacts. To manage uncertainty in such assessments you should

- make conservative conclusions, and
- seek further information about the environment which will be impacted to increase your understanding of the likely impacts.

Where there is scientific uncertainty then the precautionary principle is applicable. That is, where there is a risk of serious or irreversible damage, a lack of scientific certainty about the potential impacts of an action will not in itself justify a decision that the action is unlikely to have a significant impact on the environment.

3. Matters of national environmental significance relevant to wind farms

To date the primary environmental concern arising from wind farm developments in Australia and overseas has been the **mortality of bird and bat species from collision with turbines.** The groups most at risk and situations in which they are most affected are listed below. The categories are not mutually exclusive:

- waterbirds that are listed threatened species, listed migratory species, and/or part of the ecological character of a Ramsar wetland
- seabirds that are listed threatened species, listed migratory species and/or part of the ecological character of a Ramsar wetland—in the case of coastal and offshore wind farms
- listed migratory species and listed threatened species that migrate within Australia—where wind farms are situated on migration routes, and
- species that are at risk of extinction, that is, species that are listed as endangered or critically endangered, in particular, certain species of bats and birds—where wind farms are situated on a site they frequent.

Other major issues that should be considered are:

- the disturbance or alienation of important sites, on or off the wind farm, such as those where listed threatened animals concentrate when roosting, feeding, breeding or on migration
- the clearance or disturbance of native vegetation for turbines or other infrastructure, and
- impacts on World Heritage properties and/or National Heritage places.

For example, turbine construction may require removal of vegetation which may form part of a listed threatened ecological community, or contain listed threatened plant species, or it may be important habitat for a listed threatened animal species. Transmission lines and access tracks may fragment terrestrial habitats, which could threaten the integrity of a population of a listed threatened plant or animal species, limiting spread and movement across the site, or exposing animals to the risk of collision with infrastructure or vehicles.

Physical disturbance can also affect hydrology or accelerate erosion, which may impact on Ramsar wetlands, listed species, or heritage properties or places, on or off-site. Parts of the site or adjacent areas may include significant Indigenous and/or non-Indigenous heritage areas or culturally/historically significant sites.

The six matters of national environmental significance potentially affected by the wind farm industry sector are discussed below. For each, examples are given of the types of actions that may be likely to have a significant impact. These examples are a guide only, and are not definitive or exhaustive. The examples outlined below should be read in conjunction with the significant impact criteria for each matter of national environmental significance in the **Significant Impact Guidelines 1.1 – Matters of National Environmental Significance**.

Listed threatened species and ecological communities

There are different categories of listed species and ecological communities, reflecting different levels of risk of extinction.

Actions associated with wind farms have potential to impact on a threatened species where they reduce the species' population, disrupt its breeding cycle or movements, or adversely affect its distribution or habitat.

Certain attributes of listed threatened species and site characteristics increase the likelihood that a wind farm development will impact on a listed threatened species or ecological community. Some examples are outlined below.

Numbers and distribution/extent of listed threatened species or ecological communities

An activity that affects, or is likely to affect, a small number of individuals usually would not be expected to have a significant impact on the species as a whole. However, when a species or community is in small numbers nationally, or its distribution or habitat is limited, or if the habitat has particular importance for the species, the activity could have a significant impact. In general, this would apply to species or communities that are most at risk of extinction and are, as such, listed as critically endangered or endangered.

An action is likely to have a significant impact on a species listed as vulnerable where it significantly affects an important population of that species. An example might be where a wind farm is proposed on an island or headland, or near a wetland, that has a key breeding population of a bird species listed as vulnerable. The breeding frequency and success rate for that species would also be relevant considerations.

Appropriate site location, design and construction of wind farms can ensure that native vegetation is largely preserved. Transmission lines and access roads may traverse a much greater area than turbines, sometimes making it difficult to avoid damage to native vegetation. If significant areas or numbers of endangered plant species or communities are likely to be removed, damaged, isolated or fragmented, either directly or indirectly, this could cause a significant impact. For example proposed access roads or transmission lines may dissect an area where a listed endangered ecological community occurs—such as bluegrass ecological community or buloke woodlands. The road or transmission line may cause fragmentation of the community, alter the hydrology of the area where the community occurs, introduce weeds which invade the community, or alienate areas where there is high potential for recovery of the community.

Likelihood of listed threatened species colliding with turbines

Some bird and bat species are more prone to collide with turbines or above-ground transmission lines than others. This should be taken into account when assessing the risk of significant impact on the species. For example, large soaring raptors and large waterbirds, which tend to fly at turbine blade height and transmission line height and are not agile fliers so are more likely to collide with turbines than agile or lower or higher-flying species. Such species are also likely to use the site topography differently and may frequent areas such as cliff edges and other updraft slopes more frequently. It is noted that the presence or observation of a species which fly at turbine height does not necessarily equate with collision risk. Different times of year may result in different site usage, for example heightened activity and territorial displays prior to the breeding season.

Species that travel in flocks, such as swift parrots and some bats are also at relatively high risk of collision, particularly those that travel at night. Similarly, listed threatened species of birds and bats that prefer open airspace tend to be more at risk than those that stay close to vegetation.

Movement routes of listed threatened species

Some species, including some honeyeaters and parrots, undertake seasonal migrations or localised movements. Others make daily movements between roosting and feeding areas. Be aware of differences between species, within species and for the same species for different activities. For example, the southern bent-wing bat (Miniopterus schreibersii basanii) migrates to maternity roosts over long distances, generally at faster speeds and at different heights from normal foraging flight. Topographical features, feeding and roosting resources are some of the factors influencing the route taken. Flight corridors for these movements may be narrow at:

- prominent headlands or peninsulas where migrating species depart or make landfall
- near approaches to wetlands or bat caves
- along ridges, rivers and vegetated corridors, and
- through gaps between habitat patches.

If turbines and above-ground transmission lines cross these bird and bat routes then rates of collision might be likely to have a significant impact on listed threatened species. Surveys may be desirable at locations where high concentrations of listed bird and bat species are known to occur or may fly through the turbine area. Bird and bat surveys, undertaken by relevant experts at appropriate times of the year, will help in determining whether or not populations of listed species are routinely or periodically present, whether impacts may potentially occur (e.g. depending upon the flying characteristics of the species) and help inform turbine placement to minimise risks.

Use of site by listed threatened species for roosting, feeding or breeding

Where a wind farm development is on or near habitat which is important to listed threatened or listed migratory species, an impact might be expected. Such habitat includes:

- roosts of communally roosting species, such as certain bats
- breeding grounds of species which gather en masse in a very restricted area, such as a seabird island or promontory, or a bat nursery cave
- breeding grounds of species that have very specialised breeding habitat of limited distribution, for example, the eucalypt-moorland habitat of orange-bellied parrots, or the shallow often temporary wetlands used by Australasian bitterns and painted snipe
- feeding grounds of species that are very restricted in distribution and specialised in habits, for example buloke trees for red-tailed black-cockatoos, that seasonally feed on buloke seeds
- staging areas where migratory waders congregate to fatten and depart on their annual international migration
- ridges, rivers and other features that provide movement corridors and updrafts where birds and bats feed on the wing
- important drought refugia, such as a wetlands, floodplains and inland (arid-zone) ranges, and
- known breeding or home-range areas for territorial birds with high site fidelity.

Threatened species and communities, critical habitats or important populations do not have to be present on the wind farm to be affected by it. For example, birds can collide with overhead transmission lines connecting the wind farm to the grid, or a road constructed at the wind farm may change the hydrology such that it impacts on a distant endangered community dependent on run-off from the site. Sites used irregularly or infrequently by a listed threatened species may in fact be important, particularly in the case of rare migrants such as the orange-bellied parrot, and species which use sites intermittently according to rainfall, such as some ducks or snipe, or food abundances, such as the swift parrot.

Noise and visual impacts from turbines, or noise, dust and increased human presence during construction, may significantly disrupt behaviour, such as movement patterns or site usage, but are generally less likely to have a significant impact than are the types of examples listed immediately above. However, such impacts have been little studied, and the visual presence of turbines may in fact alienate sites, particularly for birds and bats. For example, a bank of turbines built along a major arrival path at an important habitat might deter birds from using the habitat.

It should be noted that species or communities listed as threatened under state or territory legislation may trigger local wildlife protection legislation, but if they are not listed under the EPBC Act, they are not considered to be threatened for the purposes of the Act.

Further information about listed threatened species

More information about Australia's listed threatened species and ecological communities under the EPBC Act, including lists of such species and communities, is available at: http://www.environment.gov.au/biodiversity/threatened/index.html

The species profile and threats database contains information about individual listed threatened species and ecological communities: http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl

Copies of recovery plans and threat abatement plans for individual listed threatened species and ecological communities are available at the following web sites:

Recovery plans - http://www.environment.gov.au/biodiversity/threatened/recovery.html

Threat abatement plans - http://www.environment.gov.au/biodiversity/threatened/tap.html

Listed migratory species

The migratory species list contains species protected under international agreements for the conservation of migratory species, to which Australia is a signatory.

Listed migratory species can be adversely affected by wind farm developments. Wind farms are most likely to have a significant impact on a listed migratory species where they:

- substantially modify, destroy or isolate an area of important habitat for the migratory species—for example, by fragmenting areas of native vegetation or altering hydrological cycles, or
- seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of the species—for example, by causing mortality via collisions with turbines or transmission lines, or by causing alienation of the area.

The same general examples apply as those outlined above for listed threatened species. Listed migratory species tend to occur in larger numbers than listed threatened species, as discussed further below. Several species appear on both the lists.

Numbers and distribution of listed migratory species

Listed migratory bird species generally occur in larger numbers and are more widespread than listed threatened species. If a migratory species occurs in large numbers and has a broad geographic distribution, a single wind farm is unlikely to have a significant impact on that species. Exceptions include wind farms located near important breeding, feeding or staging points where migratory species concentrate, or sites of mass migration, putting significant numbers at risk of death by collision with turbines or deterring them from using an ecologically important site.

Listed migratory species include a broad range of species with different life cycles and population sizes. Therefore what is considered to be an ecologically significant proportion of the population varies between species.

Offshore wind farms

Offshore wind farms have yet to be constructed in Australia, and their environmental impacts have yet to be determined overseas. However, there is concern that they will present a collision hazard to large pelagic seabirds—many of which are both listed threatened species and listed migratory species—and some land birds that migrate over the open ocean. The extent of such collision impacts may be difficult to monitor. A potential way in which they may impact is through collision:

- if the blade swept area is at the height at which wind currents occur which are used by pelagic or migrating listed threatened species or migratory species, or
- where they are sited on flight-ways along which seabirds arrive or depart breeding colonies on islands or the mainland.

Further information on listed migratory species

Further information about listed migratory species under the EPBC Act, including a list of migratory species, is available at: www.environment.gov.au/epbc/protect/migratory.html.

Wetlands of international importance

A wetland of international importance is a wetland that is included on the list of Wetlands of International Importance under the Convention on Wetlands, or specified to be a declared Ramsar wetland in a declaration made by the Commonwealth Environment Minister.

The EPBC Act regulates activities occurring within a Ramsar wetland, as well as actions taken outside the boundaries of a Ramsar wetland if those actions will have or are likely to have a significant impact on the ecological character of the wetland.

Ramsar wetlands are one of the matters of national environmental significance that generally have greater potential to be impacted by wind farm developments. Wetland-dependent fauna which includes ducks and swans; grebes and coots; crakes and rails; large wading birds; and shorebirds (which are often listed migratory species) tend to be among those types of birds most at risk of colliding with wind turbines and transmission lines. Wetlands also tend to be concentration points for feeding, breeding and roosting birds, and some bats, and drought refuges for a variety of organisms. They may also be vital stop-over areas for migratory species. Hence, wind farms in close proximity to declared Ramsar wetlands, indeed any wetland, require careful consideration for their potential environmental impacts.

Wind farms can have a significant impact on the ecological character of a declared Ramsar wetland in a range of ways. Some examples are outlined below.

Clearing and infrastructure

Clearance of wetland vegetation for the installation of turbines or the construction of access roads or transmission lines within a Ramsar wetland would be likely to have a significant impact on the ecological character of a Ramsar wetland if areas of wetland vegetation are destroyed, wetland fauna are more than temporarily displaced, or the hydrology of the wetland is altered.

Infrastructure may deter animals or impede their movements to and from the wetland. For example, the sight of rotating turbines may cause alienation of the wetland to birds and other animals, or disrupt their movement to and from the wetland. Roads may inhibit movement of terrestrial species to and from the wetland. Construction of roads, trenches and other infrastructure uphill or upstream from wetlands could cause erosion, sedimentation and alteration of water flows to the wetland. These impacts vary in extent but are more likely to be significant if they result in long-term or permanent changes to wetland ecology or hydrology.

Collision of wetland species with turbines

Collisions with turbines and above-ground transmission lines can kill birds or bats dependent on the wetland as a breeding, feeding or roosting area. Where a wind farm is sited where birds and bats travel to and from a wetland along defined paths, such as along ridges, rivers or valleys, it may cause mortality. Hence, even though it may be some distance from the wetland, it may still threaten the wetland's ecological values.

Spread of invasive species

Invasive species may be introduced on construction equipment as weeds that spread to the wetland. This may alter the ecological character of the wetland, for example, by carpeting the water, displacing native vegetation, or making it unsuitable for wildlife that is dependent on the wetland.

Some of these impacts, such as sedimentation and alteration of water flows, and alienation of birds, can be caused by construction of wind farms some distance from the wetland.

Further information about Ramsar wetlands

More information about Australia's Ramsar wetlands can be found at: www.environment.gov.au/epbc/proect/wetlands.html

A list of Australia's Ramsar wetlands, and a map showing their location, can be found at: www.environment.gov.au/water/environmental/wetlands/index.html

World Heritage Properties

A declared World Heritage property is a property included in the World Heritage List, or specified to be a World Heritage property in a declaration made by the Minister.

The EPBC Act regulates activities occurring within World Heritage properties, as well as actions taken outside a World Heritage property if those actions have, will have or are likely to have a significant impact on the World Heritage values of the property.

World Heritage properties are listed because of their outstanding cultural and/or natural significance to the world. Among their unique values may be cultural works of human creative genius and works of exceptional importance to living or extinct civilisations. These may occur alone or in combination with natural features of outstanding scenic beauty, scientific or aesthetic importance or discrete landscape features that constitute habitat of threatened species of outstanding conservation or scientific value. Their values may be as sites representative of ongoing ecological, geological or evolutionary processes, or as records of past processes.

An action that is expected to result in loss, degradation or damage to any of the values of World Heritage property is likely to be considered to have a significant impact. An example might be where a wind farm visually intrudes on the listed landscape, wilderness, historical, cultural or architectural values of a nearby property listed as being of World Heritage significance.

World Heritage values that could be impacted significantly by actions, such as the construction and siting of turbines, and associated infrastructure, include:

- significant natural habitats of universal value, such as a unique island ecosystem
- the integrity and cultural significance of a property of exceptional Indigenous importance
- a site of unique biological significance, and/or
- an example of a superlative natural phenomenon or of exceptional human creativity and effort.

In situations where exceptional natural values include threatened mobile species, a wind farm or its access road, for example, could have a significant impact by interfering with the species' passage to and from the site, fragmenting habitat critical for their survival or causing deaths.

Further information about World Heritage properties

More information about Australia's World Heritage properties, including a list of places and a map showing their location, can be found at: http://www.environment.gov.au/epbc/protect/heritage.html

National Heritage places

The National Heritage List contains places or groups of places with outstanding heritage value to Australia—whether natural, Indigenous or historic or a combination of these.

The EPBC Act regulates activities occurring within National Heritage places, as well as actions taken outside a National Heritage place if those actions have, will have or are likely to have a significant impact on the National Heritage values of the place.

The values of places of National Heritage significance are concerned with national heritage significance rather than international heritage significance, as for World Heritage properties. Nevertheless, actions associated with a wind farm have potential to impact on these two matters of national environmental significance in similar ways.

An action that is expected to result in loss, degradation or damage to any of the values of a National Heritage place is likely to be considered to have a significant impact. These values can be natural and/or cultural, such as features of historical, Indigenous, social, spiritual, technical, aesthetic, archaeological or natural importance. They may be a combination of natural and man-made values of historical importance. For example, a landscape may have historical value because of its connection with the first encounters between the Indigenous people and Europeans. These landscape values may be impacted by the overarching presence of a wind farm. Similarly, a site of significance to Indigenous people, such as a sacred place, traditional burial or ceremonial ground, may be impacted by the presence of a wind farm. Coastal tracks, scenic views, natural features and middens may be of long-standing cultural significance, and any of these values could be threatened by a coastal wind farm development.

Another way that wind farms might impact is through noise, shadow flicker or blade glint from turbines, which may threaten either cultural or natural values. Other examples include:

- a listed building or group of buildings with historic, aesthetic, and/or social values that may be impacted by a wind farm which dominates the visual catchment, intrudes into significant vistas and contributes to night light and noise pollution
- a listed place with natural values may be significantly affected by a nearby wind farm resulting in alienation, mortality or significant impact on birds or disruption of their passage
- roads, cables or transmission lines associated with a wind farm could fragment the habitat of unique populations of flora or fauna or archaeological sites listed as being among the natural and historic values of the listed place, and
- physical disturbance, for example, from construction of roads at or leading to a wind farm, could affect hydrology or result in water or wind erosion, which may also impact adversely off-site, on the natural or cultural values of a downwind or downstream listed place.

Wind farms can be developed to avoid or minimise impacts potential impacts. For example turbines can be placed so that they do not intrude upon the landscape values within the National Heritage area, or disrupt access by birds that are listed as one of the natural values of the National Heritage place. Similarly, roads, tracks, cables and other infrastructure may be sited where they are unlikely to disturb the values of a National Heritage place.

More information about Australia's National Heritage places, including a list of places and a map showing their location, can be found at http://www.environment.gov.au/epbc/protect/heritage.html

Commonwealth marine areas

The Commonwealth marine area is any part of the sea, including the waters, seabed, and airspace, within Australia's exclusive economic zone and/or over the continental shelf of Australia, that is not state or Northern Territory waters. Generally, the Australian Government marine area stretches from three nautical miles to two hundred nautical miles from the coast.

The EPBC Act also applies to actions taken outside the Commonwealth marine area if those actions have, will have or are likely to have a significant impact on the environment in the Commonwealth marine area.

Offshore wind farms have not been developed in Australia yet and their potential environmental impacts overseas are still being investigated. If they were to be developed in Australia, the turbines and their foundations, and associated infrastructure, including undersea cables, could potentially have a significant impact on the environment in a Commonwealth marine area, for example by:

- impacting adversely on a marine species or cetaceans, by disturbing feeding or calving areas or hindering movement
- damaging—for example, by fragmenting, causing sedimentation or polluting—sensitive marine habitat

- resulting in an invasive pest species becoming established in the marine area, particularly during wind farm construction or maintenance visits
- causing significant bird mortality through collision with turbines, particularly to the large pelagic bird species that ride the ocean's winds, and
- damaging historic shipwrecks located in the Commonwealth marine area and therefore captured by the term 'environment'.

Actions taken outside a Commonwealth marine area, such as in the tidal or estuarine zone, may also have potential to impact the Commonwealth marine area, via sedimentation and other downstream impacts.

Further information about Commonwealth marine areas

A map showing Commonwealth marine areas can be found on the EPBC website at: http://www.environment.gov.au/ coasts/information/marinearea.html

Further information on known or likely locations of historic shipwrecks identified under the Australian Government's Historic Shipwrecks Act 1976 is available at: http://www.environment.gov.au/heritage/shipwrecks/index.html

4. Avoiding or mitigating impacts on matters of national environmental significance

This section is intended to provide guidance on those types of practices that may help avoid or mitigate impacts on matters of national environmental significance at wind farms. These can be implemented at appropriate times from planning to decommissioning. Avoiding impacts is always the best option, but mitigation measures may also be effective.

Even if it appears that a wind farm will be likely to impact on a matter of national environmental significance, and a referral is made, demonstration that carefully researched mitigation procedures will be followed could favourably affect the decision. Location of the wind farm itself, placement of turbines, roads and infrastructure, and turbine design, are key areas where significant environmental impacts can be mitigated or avoided. A wind farm may be established without significant impact on matters of national environmental significance if it is sited, designed, constructed, and operated in a way which minimises impacts.

Avoidance

The main way to avoid having a significant impact on a matter of national environmental significance is to site the wind farm away from World Heritage properties, National Heritage places, Ramsar wetlands, or the habitat of listed threatened or listed migratory species. Where there are matters of national environmental significance on-site or nearby, it may be possible to avoid significant environmental impacts by, for example, well-informed layout of the turbines and infrastructure, well-designed turbines, and well-timed actions.

Turbines should be sited away from likely areas of bird movement and activity, particularly of listed threatened species or listed migratory species. Wherever possible, transmission lines should be installed underground to avoid collision and/or electrocution of large birds or bats. Underground lines should be installed with as little disturbance to the vegetation, substrate or hydrology of the area as possible.

All infrastructure, including turbines, roads, transmission lines and fences should avoid both direct and indirect damage to significant areas of natural habitat, such as:

- wetlands
- dune systems
- important breeding, roosting or feeding habitat for listed threatened species and/or listed migratory species
- listed threatened ecological communities, and
- a population of a listed threatened species of plant.

Significant impacts can be eliminated by timing construction or other activities to avoid sensitive times of the year or periods when weather conditions are unfavourable for listed threatened plants, animals and communities or listed migratory species. An example would be timing construction during the period when migratory birds are absent. Damage to certain habitats or threatened plants or animals might be avoided if construction activities (the passage of heavy machinery, for example) are carried out during dry periods rather than when the ground is very wet.

Also consider avoiding actions that are likely to have a significant impact on the Indigenous or historic values of World Heritage properties or National Heritage places, such as archaeological deposits or historic heritage items. Site location of the farm itself and of turbines and infrastructure is an important consideration.

Mitigation

The likelihood that an action will have a significant impact on a matter of national environmental significance can be lessened through mitigation practices.

Site location of turbines and turbine design can reduce collision risk. For example, placement of turbines where they cause minimal disturbance to important areas of vegetation or important habitats for fauna, or out of the line of known movement routes, will help to mitigate impacts. Tower design should be such that it minimises their attraction as perches.

Features that may attract listed threatened or migratory animals, thereby putting them at risk of collision with turbine blades or transmission lines, should be minimised. The transmission lines themselves, fence lines and similar structures, offer perches for raptors and other birds and, wherever possible, should be placed where they are least likely to attract birds into the collision zone of turbines. Other areas where mitigation can be effective are avoidance of the use of lights that attract insects and insect-eaters such as bats and some smaller birds.

Mitigation measures include land management practices such as pest and weed control. For example, active control of rabbits and livestock (calving/lambing) reduces the attractiveness of the site to large raptors that have been known to collide with turbines. Weeds may be brought in on vehicles and, if they spread, could have a significant impact on a listed threatened plant community, the habitat of a listed threatened animal or the ecological character of a listed Ramsar wetland. A weed management strategy can minimise the risk of any impact being significant.

Collision and electrocution risks from overhead transmission lines can be reduced through measures such as flight diverters and insulation on conductors. Trenching, erosion and stormwater control can be carried out in the least environmentally disruptive manner, to preserve natural processes as much as possible.

Timing of construction work can mitigate actions that would otherwise have a significant impact. For example, construction work on turbines and transmission lines near an important wetland may have little impact if carried out at a time of year when the wetland is little used (provided they are not placed where they are likely to cause longer-term problems, such as collision or alienation). Damage to a listed threatened plant species, such as an orchid, might be reduced to insignificant levels by carrying out work at times of year when the orchids are most visible above ground and more easily avoided.

Noise disturbance impacts are poorly known for animals but appear to be minor in relation to wind farms. Unless information becomes available, where there is concern that noise may significantly impact on a listed threatened or migratory species, or community, guidelines to protect human aural values can be used as a surrogate. Noise, dust and other disturbance, such as human presence, can be reduced by timing construction and maintenance to take place during periods of the year when they are likely to cause the least intrusion and disruption to listed threatened plants, animals, communities and their habitats.

Standard mitigation procedures can include simple measures such as covering construction holes so that listed threatened terrestrial species such as lizards and small mammals do not become entrapped, and fencing off areas of important native vegetation. Where roads must traverse the habitat of certain listed threatened species, the likelihood of their impact being significant can be lessened by having strict speed limits to protect animals from passing vehicles and by making the road and its verges as narrow as possible to allow wildlife to quickly cross the road to avoid increased risk of predation. Contingency plans and stop work procedures might be developed to deal with the discovery of listed threatened species plants, injured or nesting threatened animals, or sites with heritage or Indigenous value. In the case of Indigenous values, consultation may assist in better understanding the values of a place, and how potential impacts on those values may be avoided or mitigated.

In some instances damage caused at the construction stage (or later) can be repaired through revegetation programs. However, where vegetation is permanently removed, compensation in the form of repair or establishment of habitat native to the area in another part of the site may be appropriate. This would be the case particularly where the vegetation to be revegetated was likely to be utilised by listed fauna species, and the substituted area for revegetation was located away from the immediate vicinity of the turbines. While this is good practice, it should be noted that revegetation and compensation are not relevant when deciding whether or not an action is likely to have a significant impact on a matter of national environmental significance.

5. Further information about the EPBC Act

For general information about the EPBC Act, including information about the referral, assessment and approvals processes, please contact the Department of the Environment, Water, Heritage and the Arts Community Information Unit on 1800 803 772, or access the EPBC web site at: http://www.environment.gov.au/epbc

The EPBC Act and state and territory legislation

The EPBC Act is Commonwealth legislation. The assessment and approval provisions of the EPBC Act focus on matters of national environmental significance, Commonwealth areas, and actions by Commonwealth agencies. It is separate and distinct from state and territory systems and does not affect the validity or conduct of state/territory-based environmental and development assessments and approvals. If your action requires approval under both state and/or territory and Commonwealth legislation, you will need to submit a separate referral or application in the relevant jurisdiction.

6. Glossary

Biodiversity – the range of organisms in a given community or system. Also known as biological diversity, the term encompasses the variety of life forms: the different plants, animals and micro-organisms, the genes they contain, and the ecosystems they form.

Birdstrike – in the context of wind farms, collision of birds with the (usually turning) blades of wind turbines or towers and wind monitoring towers, support wires and other associated structures.

Blade glint – occurs when sunlight on the rotating blades reflects flickering beams of light.

Blade swept area – the area moved over by the rotating blades.

Cetaceans - whales and dolphins.

EPBC Act - Environment Protection and Biodiversity Conservation Act 1999.

Fauna – animals such as birds, bats and other mammals, reptiles, amphibians, fish, crustaceans, spiders, butterflies and other insects.

Flora – plants such as trees, shrubs, grasses, lichens and mosses.

Habitat - the natural conditions in which a plant or animals lives, for example, a particular type of grassland.

Land bird – a bird that lives on the land as opposed to the water.

Likely - where a significant impact on the protected matter is a real or not remote chance or possibility.

Listed threatened species and ecological communities – plant and animal species and communities determined to be nationally endangered because they are in small or declining numbers, have a greatly reduced area of habitat, are subject to severe threat, etc. They do not necessarily match those listed as threatened at the state and territory level. There are four levels of decreasing endangerment: extinct; critically endangered; endangered; vulnerable.

Migratory – in the context of the EPBC Act, 'listed migratory species' are species that are listed under international conventions to which Australia is a signatory—the Japan-Australia Migratory Bird Agreement (JAMBA), China-Australia Migratory Bird Agreement (CAMBA) and Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention).

Minister – refers to the Minister responsible for administering of the *Environment Protection and Biodiversity* Conservation Act 1999.

Mitigate or abate - to lessen in intensity or level.

Pelagic – occurring in or over the deep waters of the ocean, as opposed to near the shore.

Ramsar wetland – Wetlands of International Importance, listed under the international *Convention on Wetlands* (signed at Ramsar, Iran, in 1971), or declared to be a Ramsar wetland by the Minister.

Raptor - a bird of prey.

Recovery plan – a plan that provides for the research and management actions necessary to stop the decline of, or support the recovery of, the listed threatened species or listed threatened ecological community concerned so that its chances of long-term survival in nature are maximised.

Resident - a species that stays in the same general area year round.

Seabird – a type of bird, such as a petrel or albatross that spends much of its life at sea.

Shorebird – a bird that feeds along the shoreline of coasts and estuaries, and occasionally on inland water bodies; also known as a wader.

Shadow flicker - occurs when the rotating blades cast a flickering shadow across the ground or nearby structure.

Significant - 'an impact that is important, notable, or of consequence having regard to its context or intensity.'

Threat abatement plan – a plan that provides for the research, management and other actions necessary to reduce the key threatening process concerned to an acceptable level in order to maximise the chances of the long-term survival in nature of native species and ecological communities affected by the process.

Transformer – converts the voltage generated by the wind farm to that suitable for general distribution on the network (electricity grid).

Transmission lines - transmit the power from the turbines to the transformers and out into the distribution network.

Turbine - a mechanical generator of electricity, in this case from wind power.

Waterbird – ducks and other species, such as coots, grebes and ibis that typically frequent non-marine waters and wetlands.

Front and back photo credits: Photo 1, 3 & 4 © Michelle McAulay; photo 2 © Dragi Markovic

Copyright © Commonwealth of Australia 2008

This work is copyright. You may download, display, print and reproduce this material in unaltered form only (retaining this notice) for your personal, non-commercial use or use within your organisation. Apart from any use as permitted under the Copyright Act 1968, all other rights are reserved. Requests and inquiries concerning reproduction and rights should be addressed to Commonwealth Copyright Administration, Attorney General's Department, Robert Garran Offices, National Circuit, Barton ACT 2600 or posted at www.ag.gov.au/cca.

Disclaimer

The views and opinions contained in this document are not necessarily those of the Australian Government. The contents of this document have been compiled using a range of source materials and while reasonable care has been taken in its compilation, the Australian Government does not accept responsibility for the accuracy or completeness of the contents of this document and shall not be liable for any loss or damage that may be occasioned directly or indirectly through the use of or reliance on the contents of the document.

4 ł = F E H

Appendix A - Guide to the identification of matters of national environmental significance, and their avoidance

or mitigation

		I NIS TADIE IS INTENDED AS A GUIDE. I NE FEIEVANCE OT SOME POIL	ts will depend on the location and	I nature of the wind farm
Environmental values	Infor	nation sources	Presence on site, or in the immediate area, of:	Ways to avoid or mitigate
Floral values	•	PBC Act protected matters search tool: http://www. nvironment.gov.au/erin/ert/epbc/index.html	 Listed threatened species and ecological communi- 	Sensitive and informed fine-scale site location of turbines, roads and other infrastructure
	•	ite surveys	ties	Construction, maintenance, etc at annoniate times of veer
	•	terature search, database searches and collation of local nowledge	 World Heritage values 	Vegetation management plan
	>	egetation maps	 National Heritade values 	Weed and plant disease management plan
	•	sted threatened species and ecological communities: http://	2	Landscape/site rehabilitation
	\$	www.environment.gov.au/bioaiversity/uneateneo/index.numi		 Contingency plans for injured threatened
	•	formation about individual listed threatened species and cological communities: http://www.environment.gov.au/cgi-		species or discovery of new threatened species
	<u>م</u>	in/sprat/public/sprat.pl		Revegetation
	ш Ö	ecovery plans for listed threatened species and ecological pmmunities: http://www.environment.gov.au/biodiversity/		Weed control
	t	ireatened/recovery.html		 Compensation program for threatened
	⊢ Ω •	hreat abatement plans: http://www.environment.gov.au/ iodiversity/threatened/tap-approved.html		species, e.g. re-location of plants
	ت به •	usWEA best-practice guidelines: ttp://www.auswind.org/bestpractice.		

Faunal values	•	EPBC Act protected matters search tool: http://www. environment.gov.au/erin/ert/epbc/index.html	•	Bird/bat migration route for listed threatened species or	•	Informed fine-scale site location of turbines, oads and other infrastructure
	•	Site surveys		listed migratory species	•	Turbine design (does not offer perches,
	•	Flight path/site utilisation surveys				minimises shadow flicker and blade glint)
	•	Habitat surveys	•	Listed threatened species and ecological	•	Lighting of turbines and the site to minimise the attraction of insects that in turn attract
	•	Collision risk modelling when collision appears to present a significant risk		communities		nunting birds and bats
	•	Targeted studies when there is potential for significant impact	•	Habitat of listed threatened	•	Construction, maintenance, etc at appropriate times of year
	•	Literature search, database searches and collation of local		species or ecological	•	Ongoing monitoring
				community, particularly habitat critical to survival	•	Contingency plans
	•	Listed threatened species and ecological communities: http:// www.environment.gov.au/biodiversity/threatened/index.html			•	Vegetation (habitat) management plan
	•	Information about individual listed threatened species and	•	World Heritage values	•	Noise impact mitigation
		ecological communities: http://www.environment.gov.au/cgi- bio/constrianibio/constrial)	•	Feral pest management plan
	•	Recovery plans for listed threatened species and ecological	•	National Heritage values	•	Site design and fine-placement of turbines and other infrastructure
		communities: http://www.environment.gov.au/biodiversity/ threatened/recovery.html			•	Compensation program for threatened species is a habitat restoration or creation
	•	Vegetation maps			•	Vegetation (habitat) management plan
	•	Literature search, database searches and collation of local knowledge			•	Preventative weed management
	•	Threat abatement plans: http://www.environment.gov.au/ biodiversity/threatened/tap-approved.html			•	Preventative plant disease management
	•	AusWEA best-practice guidelines: http://www.auswind.org/bestpractice				
	•	AusWEA Interim Standards for Assessing the Impacts of Windfarms on Birds				

	•	Information on ecology, status and threats (but not conservation ranking): for birds (http://www.environment.gov. au/biodiversity/threatened/publications/action/birds2000/ index.html); and bats (http://www.environment.gov.au/ biodiversity/threatened/publications/action/bats/index.html)				
	•	EPBC Act protected matters search tool: http://www.environment.gov.au/erin/ert/epbc/index.html	•	Listed migratory species	As above	
	•	Site surveys				
	•	Flight path surveys				
	•	Habitat surveys				
	•	Site utilisation surveys				
	•	Collision risk modelling, when collision appears to present a significant risk				
	•	Targeted studies when there is potential for significant impact				
	•	Vegetation maps				
	•	Listed migratory species: http://www.environment.gov.au/epbc/protect/migratory.html				
Ecological character of	•	EPBC Act protected matters search tool: http://www.environment.gov.au/erin/ert/epbc/index.html	•	Ramsar wetland	Turbine and site design Management plan incli	iding feral animal and weed
Ramsar wetland	•	Waterbird flight path surveys			control	
	•	Hydrology surveys			Additional protection me	asures (e.g. run-off and erosion
	•	List of Ramsar wetlands: http://www.environment.gov.au/ water/environmental/wetlands/index.html			control)	
	•	Map of locations of Ramsar wetlands: http://www. environment.gov.au/water/publications/environmental/ wetlands/pubs/ramsar.pdf				
World Heritage values	•	EPBC Act protected matters search tool: http://www.environment.gov.au/erin/ert/epbc/index.html	•	Listed World Heritage property	Turbine and site design aspects)	(including visual amenity and noise
	•	List of World Heritage properties: http://www.environment.gov. au/epbc/assessmentsapprovals/nes/worldheritage.html			Management plan, inclu	ding feral animal and weed control
					Additional protection me control)	easures (e.g. run-off and erosion
					See also 'Flora values' <i>ɛ</i> where World Heritage lis values.	and 'Faunal values' above in cases ting based on flora and faunal

nal Heritage • Turbine and site design (including visual amenity al aspects)	 Management plan, including feral animal and weed is or non- us or non- cultural heritage Additional protection measures (e.g. run-off and er control) Management plan to mitigate impacts on identified bring heritage values, including impacts on identified or archaeological deposits, etc. 	See also 'Flora values' and 'Faunal values' above i where National Heritage listing based on flora or fa values.	clude migrating • See relevant information above migratory rreatened uding introduction mage to f ecosystems, of historically rrecks	effects:
Listed Natio place	Sites or lanc of Indigenous significance		Concerns in birds, listed birds, and th species inclu cetaceans, i of pests, dat habitats and disturbance significant w	Cumulative (combined in of the above more existin developmen
•	•		• s: s: ·	•
C Act protected matters search tool: //www.environment.gov.au/erin/ert/epbc/index.html	ist of National Heritage places: ttp://www.environment.gov.au/epbc/protect/heritage.htr		See relevant sections above EPBC Act protected matters search tool: http://www. environment.gov.au/erin/ert/epbc/index.html Guidelines on the application of the EPBC Act to interacti between offshore seismic operations and larger cetacean http://www.environment.gov.au/epbc/publications/seismi html	As above EPBC Act protected matters search tool: http://www. environment.gov.au/erin/ert/epbc/index.html Check with relevant planning authority
EPB http:				
e EPB	•		••••	••••

