Australian Marine Conservation Society

OFFSHORE WIND FAQs

Offshore Wind Energy
Frequently Asked Questions

The Australian Government has declared six priority areas for offshore wind development in Australian Commonwealth waters. Read our offshore wind energy FAQ to learn about some of the benefits, challenges, and what needs to happen to ensure our precious marine biodiversity is protected. Here you can find the most common questions from our supporters regarding this renewable energy source.

Australian Marine Conservation Society (AMCS) is dedicated to protecting Australia's precious marine environment and advocating for sustainable practices. As part of our commitment to combat climate change, we support the responsible transition to 100% renewable energy. Offshore wind energy is set to play a role in this transition.

However, this must be done in a way that protects our precious environment. As with any large-scale development, it is important to address the potential impacts on marine ecosystems and ensure that offshore wind farms are planned and implemented with the utmost care, guided by science.

This FAQ answers some of the most common questions about offshore wind farms, its benefits, challenges, and what needs to be done to ensure it is developed responsibly to protect nature.

ACKNOWLEDGEMENT OF COUNTRY: AMCS, ACOWE and the Biodiversity Council acknowledge the Traditional Custodians of this land and sea Country, and pay our respects to their Elders past and present. We acknowledge that this land and sea Country was, and always will be, Aboriginal land and sea.

As the oldest continuing culture in the world, Indigenous Australians have a deep, enduring connection to Country – Land, Sea and Sky. This connection encompasses cultural identity, health, and wellbeing. For Indigenous Australians Country refers to more than a physical or geographical area. Rather, it encompasses the interconnectedness of 'all living things on the land and in the seas, and it also includes connected language, knowledge, cultural practice and responsibility' .

Each designated zone for offshore wind development is situated on Aboriginal Country, holding deep cultural significance and rich cultural heritage, including submerged cultural landscapes on the continental shelf.

Indigenous Australians maintain a deep connection to Sea Country. It is important that decisions made in relationship to the Offshore Energy Infrastructure Zones, prioritise the rights, and needs of Indigenous Australians, promote Indigenous leadership and ensure the wellbeing of Country.

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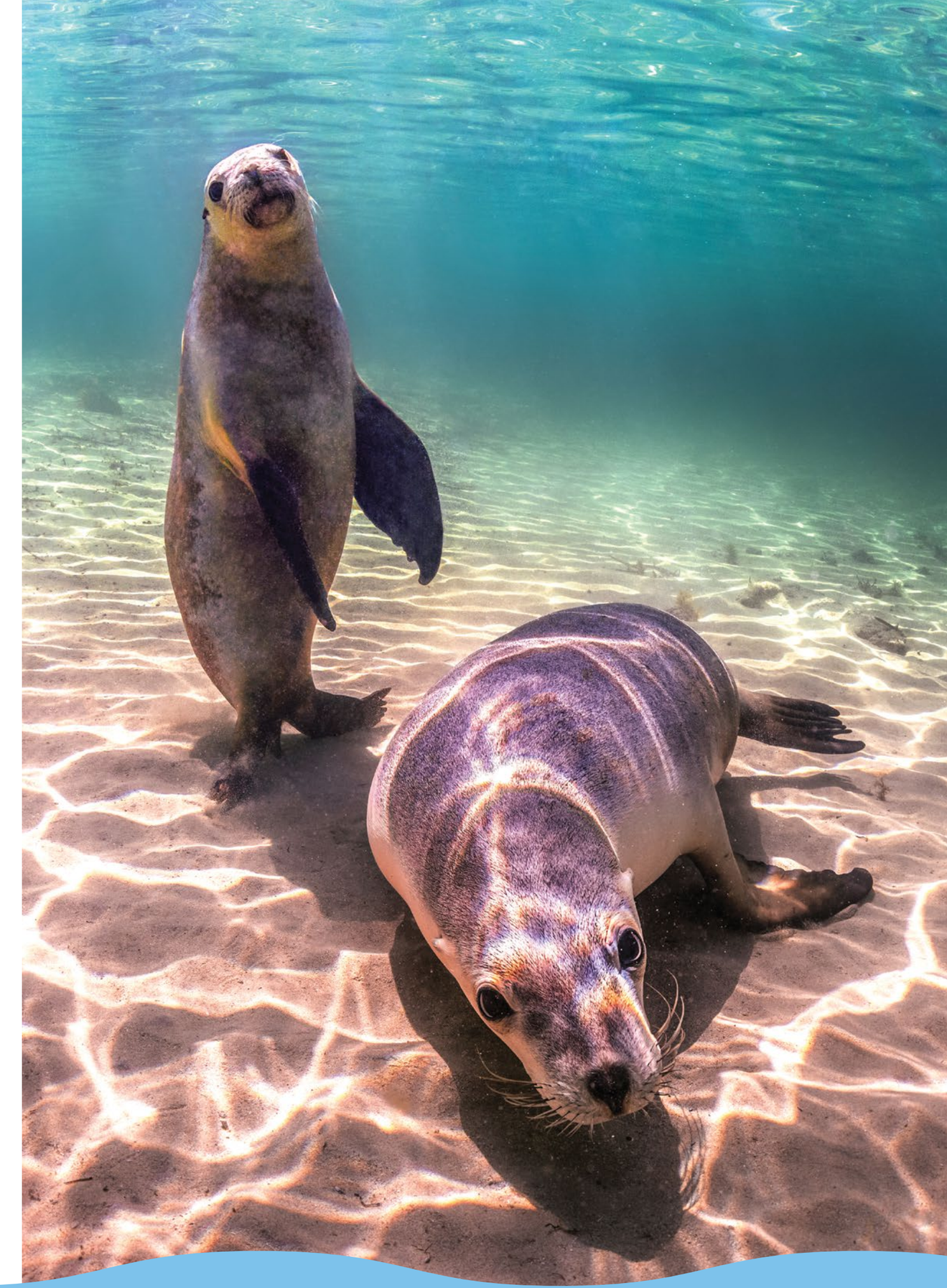


What is the current process for developing offshore wind farms in Australia?

Australia's oceans are windy, and governments have identified harnessing the power of offshore wind as an important part of the renewable energy mix for the future. Australia is beginning the journey of establishing offshore wind farms. While you can see wind turbines on land already, wind farms will unlikely be operating off Australia's coastline before 2029[1,2].

Multiple steps need to happen before construction starts.

Here are some of the steps the Australian Government put in place for the development of wind farms in federally managed waters[3]:

The Australian Government identifies offshore wind areas off our coastline as priority areas.

1. The Minister for Climate Change and Energy opens up consultation on whether to declare these areas as suitable for offshore renewable energy infrastructure.
2. The Minister can declare all or some of the proposed areas suitable, or decide that none are suitable.
3. Once an area is declared, offshore renewable energy companies can apply for a feasibility licence to carry out investigations to inform an individual wind farm proposal within that area. At this point, developers undertake specific surveys of the proposed areas, including the environmental values and the kind of ocean floor they would be building on.
4. If any development is likely to cause significant harm to wildlife or habitat, it will need to be assessed under Australia's environment law, the Environment Protection and Biodiversity Conservation Act (EPBC Act), and the Environment Minister will decide whether to approve it or not.[4]
5. Developers also need to secure additional licences to begin building in the oceans.

What decisions have been made already, and how have local communities and stakeholders been involved in the offshore wind farm process so far?

The Australian Government has identified six offshore wind areas off our coastline as priority areas. In 2022-23, the Australian Government consulted on the areas proposed off Gippsland and Portland (VIC), Hunter and the Illawarra (NSW). All were subsequently declared suitable for offshore renewable energy, though there were some modifications to the original areas designated in some locations.[5,6,7,8] Consultation for Bass Strait (TAS) and Bunbury (WA) took place in 2024 and these areas were also declared for offshore wind.[9,10] By declaring the area, the Australian Government has identified where more environmental assessments and investigations are needed to inform future development.

Some companies have been granted feasibility licenses.

As a first step in the process, the Australian Government has conducted information and engagement sessions in these regions, as well as community and stakeholder consultation via government websites. Should development companies choose to proceed, further public consultation will occur.

AMCS have long campaigned for better public participation in decision making that affects our nationally important marine biodiversity as part of our campaign for stronger nature laws. We are advocating for culturally appropriate consultation with First Nations people and local communities, based on First Nations aspirations, science and clear and accessible information as Australia embarks on the journey of establishing offshore wind.

Why are offshore wind farms being considered and what are the potential benefits of offshore wind farms?

Climate change represents the greatest threat to our marine environment and is why AMCS supports the transition to 100% renewable energy.

Burning coal and gas harms our oceans, driving marine heat waves. In recent years, successive heat waves have damaged some of our most cherished ocean ecosystems, such as the Great Barrier Reef, Ningaloo and Tasmania's kelp forests. Climate change is already impacting whale species, with warmer waters affecting food availability and their ability to reproduce. To protect our oceans and wildlife, we need to stop generating our electricity through burning coal and gas. A rapid transition to renewables can and must be done in a way that protects nature, and offshore wind is likely to play a role in this transition.

The Australian Government is pursuing offshore wind energy as a generation technology that could help meet the growing need for renewables and diversify the country's energy mix. As Australia transitions to renewable energy and phases out coal-fired power, offshore wind is expected to play a role in meeting the nation's goal of achieving net zero greenhouse gas emissions by 2050. Offshore wind farms are being pursued in areas with high electricity demand and existing electricity transmission and port infrastructure.

Offshore wind farms can generate more energy than onshore wind with fewer installations - turbines can be a lot larger than those on land and access stronger and more consistent wind[1112].

In addition to supporting the transition to renewable energy, offshore wind can have local benefits, including the creation of habitat. For example, biodiversity increases have been recorded on wind farm infrastructure, which can become an artificial reef[13]. The infrastructure may also create a refuge due to the exclusion of certain activities such as trawling the sea floor. The construction and maintenance of offshore wind could create direct jobs and support workers in energy-intensive industries onshore that will benefit from the switch to reliable renewable energy. Offshore wind also has the potential to distribute economic benefits to local communities through community benefit sharing arrangements if planned appropriately.

The opportunities to take advantage of these potential benefits of offshore wind – and where this should occur - will need to be assessed against the potential impacts on marine life in each area.

Do wind farms harm ocean wildlife?

Any offshore development, including building wind farms, can come at a cost to natural habitats or wildlife. The challenge is making sure offshore wind farms are sited in the right places. Some areas of our ocean are just too special for any development to occur, because they are critical for threatened or endangered wildlife, are important habitats, or have already been set aside for protection.

There are ways in which governments and developers can minimise the risks to marine life, including whales that are resident or migrate along our coastlines. We must ensure that at all stages of offshore windfarm development, operation and decommissioning, our oceans are properly protected.

To protect our oceans and their extraordinary wildlife, we need to stop new fossil fuel developments and drive renewable energy generation. Constructing renewable energy infrastructure, including offshore wind farms, will require a monumental effort.

Any construction activity in the ocean will impact the seafloor, the wildlife in the area, and the seabirds that fly above the ocean. The critical question the Australian Government has to answer is how these impacts are avoided and reduced to the point where they won't come at too high a cost for nature. Therefore, decisions must be informed by science and data to ensure projects are located in places that minimise impacts on marine biodiversity.

What are the biggest threats to whales?

Evidence suggests that the main human-induced **direct** causes of death for baleen whales are currently collisions with ships and entanglement in fishing gear. These interactions are predicted to increase with increasing climate variability, as are direct consequences of warming oceans. While we lack information for many whale mortalities (e.g., those that aren't detected or autopsied, or for which cause of death cannot be determined), most data suggests that the greatest risk to large whales is vessel collisions. At a population level, climate change is already impacting whale species, with warmer waters affecting food availability and their ability to reproduce.

Collisions with ships are a primary threat to large whales globally. A recent global analysis published in the journal Science[14] produced a global estimate of whale-ship collision risk for humpback, blue, sperm and fin whales. Shipping occurs across 92% of whale ranges, and protections designed to prevent collisions are present in fewer than 10% of whale movement hotspots. The authors argue that better management is essential to protecting whales in an ocean increasingly full of ships. And it wouldn't take much, because shipping intensity is concentrated at global ports. Managing only 2.6% of the ocean's surface — by slowing ship speeds, or moving shipping lanes out of known migration and feeding areas – would dramatically minimise collision risks and assist with recovery.

Climate change is predicted to accelerate the risk of collisions and strandings as whales ranges' shift in response to changing prey distribution[15,9].
For the endangered southern right whale, climate change has been ranked as the highest priority threat[16]. Modelling the links between krill and whale population dynamics with climate change, including changes in ocean temperature, primary productivity, and sea ice, suggests future ocean conditions are likely to have a negative impact on krill populations and thus the baleen whale species that feed on them[17]. The main threats to the survival of the southern right whale are anthropogenic climate variability and change, followed by entanglement in fishing gear, habitat degradation, anthropogenic underwater noise, and vessel strike. Displacement of whales through habitat degradation (including noise) has the potential to reduce breeding success[18] by forcing animals to reproduce in more marginal environments and by increasing their exposure to other risks such as entanglement, predation, collisions and pollution. The potential for impacts from anthropogenic underwater noise is therefore of particular concern close to areas where pregnant and nursing females and calves are resident for long periods.

Whales are already facing some of the most severe impacts of global change.

An essential breeding ground for humpbacks in the Western Antarctic Peninsula for example, has warmed by 7°C over the past 50 years, and sea ice duration has declined by almost 100 dayssince 1978[19]. Warming has resulted in the collapse of ice shelves and there is evidence that prey resources are decreasing due to reduced cycling of nutrients. The humpbacks' main food source, krill, feed on phytoplankton blooms. The magnitude of the blooms is proportional to the extent of ice cover during winter. However, Antarctic sea ice has been declining as the climate warms. In 2023, it reached a record low, with over 2 million sq km less ice than usual during winter[20].

Scientists have found that humpback whales' pregnancy rates are directly correlated with sea ice.[21]

In the Northern hemisphere there has also been a 50% decline in surface krill abundance over the last 60 years due to warming. With no associated shift in the krill's range, studies document a 'squeeze on living space' within this system demonstrating that not all species can shift latitudes and adapt to rapidly warming oceans.[22]

Australian blue whale experts have also ranked climate variability and climate change as the most significant current threat to blue whales.23

Do wind farms kill whales?

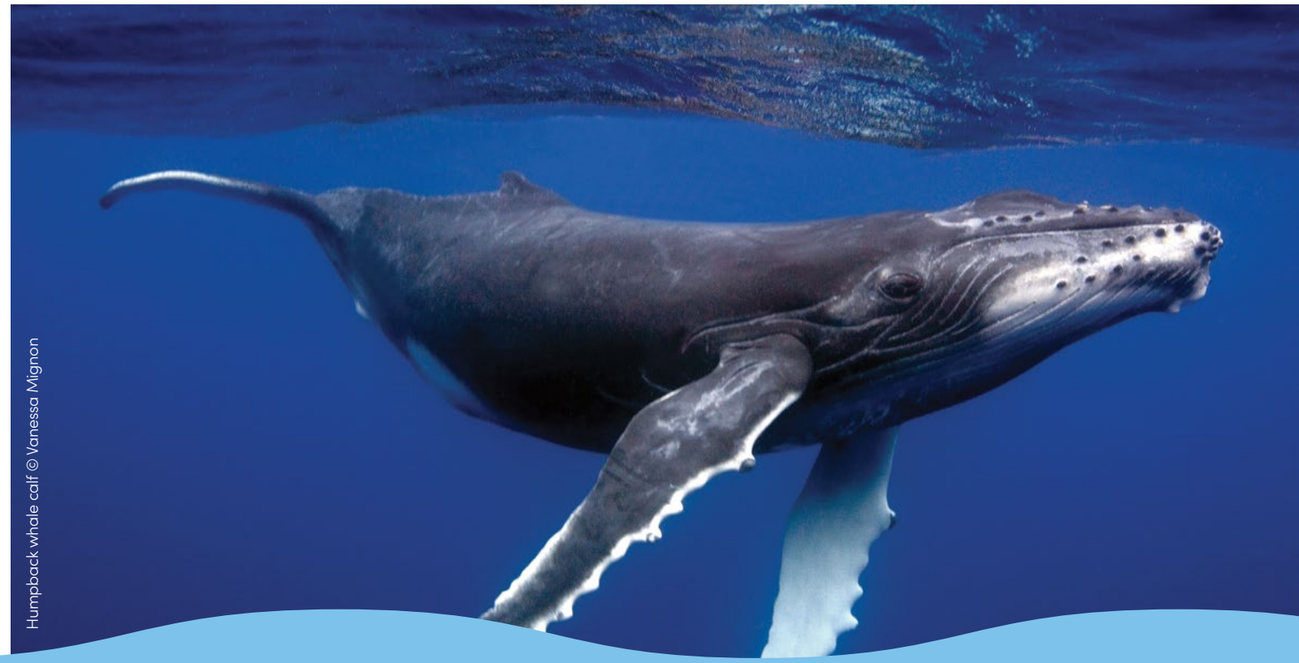
While offshore wind farm development, like any marine development, has the potential to affect whales, there is currently no evidence that offshore wind farm activities directly kill whales.

A common myth is that wind farms in the US have been causing whale strandings, this is a classic case of where correlation is not causation. Necropsies of stranded whales have found that ship collisions and entanglement have led to increased mortality events as whales have moved into new inshore areas in response to changing prey distribution (a direct result of a changing climate)[24]. While there are genuine issues with the placement of offshore wind farms, there is a lot of misinformation circulating at the moment, fueled by vested interests seeking to delay the transition to renewable energy and keep coal and gas projects operating for longer.

The US National Ocean Atmospheric Administration (NOAA) have stated that during the construction phase of offshore wind: "there is no scientific evidence that noise resulting from offshore wind site characterisation surveys could potentially cause mortality of whales. There are no known links between recent (early 2023) large whale mortalities and ongoing offshore wind surveys"[25]

It is well established that whales and dolphins are sensitive to unnatural and elevated levels of underwater noise. Anthropogenic underwater noise is recognised as having a potentially significant impact on marine mammals, such as whales, because they rely on sound for survival and basic life functions such as communication, navigation, foraging, and predator avoidance. Noise can affect the health and fitness of individuals, and can ultimately result in population level effects. The potential for impacts from underwater noise is of particular concern within or close to habitat critical to survival for whales, such as reproduction and nursery areas, where they are resident for long periods of time, and pregnant and nursing females and calves are present.

Surveys for offshore wind farms are much quieter than techniques currently used by extractive industries and defense. Activities like seismic blasting, used in offshore oil and gas exploration, can be highly damaging to cetaceans. Whilst the use of air guns for offshore oil and gas exploration and active sonar used by the military have both been linked to negative impacts to cetaceans[26], there have been no strandings of any marine mammal associated with the types of equipment used in offshore wind farms surveys – which only survey the sea floor, not what is beneath it. Equipment used in oil and gas exploration to penetrate deep below the seafloor to search for deposits produces much louder, lower-frequency sound. Noise from exploration, construction, operation, and decommissioning



Humpback whale calf © Vanessa Mignon

of wind turbines could potentially impact cetaceans. However, the sounds produced during offshore wind farms exploration, building and decommissioning are insufficient to cause direct mortality.

That said, there is a risk that if not managed appropriately, sound emitted may impact hearing or whale behavior, particularly during construction. Furthermore, the combination of sounds from developments, on top of all the other underwater noises (caused by shipping, drilling for oil and gas, and coastal development for example), may lead to chronic effects.

What are some of the knowns and unknowns?

Most of the research on the impact of offshore wind farms on whales, dolphins and seabirds comes from off European or US coasts. The first wind farm was built off the coast of Denmark in 1991, and expansions in the North Sea have continued ever since.

Overall, while no evidence shows wind farms directly hurt whales, we do know (from studies on smaller cetaceans in the northern hemisphere) that construction could potentially disturb or displace them. However, we don't know what the impacts on individual whales or populations are likely to be. While international insights need to be applied, the distinctive qualities and global significance of Australia's megadiverse oceans must be considered in any development proposals.

Advances in technologies, such as floating wind farms for example, may reduce issues associated with construction noise, however, we currently don't have any data or experience of how whales will react to wind farms in Australian waters.

For that reason, any construction in the ocean will need to be carefully managed at all stages and monitored to ensure no long-term impacts. Science-based decision-making about offshore wind farms includes ensuring they are located in the right places or excluded from the wrong places.

We therefore need to urgently collect much more data and conduct analysis to understand broader potential impacts such as potential "barrier effects" turbines may have on marine mammals (and sea birds), and if it is likely to displace them from key foraging or breeding habitats. This could lead to individuals expending more energy to go around wind farms.

Fairy penguin © Attila e Kaszo

More construction in the ocean means more pressure on Australia's whales, so making sure wind farms are located in the right places and properly mitigating impacts at all stages will be vital to ensuring Australia's renewable energy transition is successful in the oceans. This includes monitoring to ensure no entanglement of animals – in mooring lines or cables or in fishing gear/debris caught on mooring lines or cables (floating turbines), and strict regulations (such as limits to timing and speed) to reduce the risk of vessel collisions and disturbance during construction and maintenance. Our nature laws must be strengthened to ensure operators need to act should negative impacts be observed.

What we do know is that climate change is already affecting whales. Strong correlations have been observed between environmental conditions (e.g., sea surface temperature anomalies) in feeding grounds and southern right whale female reproductive success[27]. It takes a huge amount of energy to give birth and raise baby whales!

What about other ocean wildlife?

Australia's oceans are incredibly biodiverse. One significant challenge to implementing the renewable energy transition safely in our oceans is ensuring that in solving the climate crisis we're not worsening the extinction crisis.

Studies from other countries have shown that offshore wind farms impact seabirds. However, different seabird species respond differently to the development of offshore wind farms, with behavioural reactions ranging from complete avoidance to attraction[28], with population level impact assessments remaining a major challenge[29]. Inappropriately-placed wind farms put birds at risk of collision with turbine blades, and may displace them from their key flight paths and migration routes, effectively reducing their foraging and/or migration habitat. This can lead to increased energy expenditure, in turn impacting individual fitness and breeding success[30].

Australia is home to threatened albatross, petrel, and migratory shorebird species, whose flight pathways overlap with areas proposed for offshore wind farms. More data is urgently needed to understand flight heights, flight paths, and the usage of declared areas under a range of weather conditions, which will inform science-based decision-making.

There may also be unforeseen impacts on other species such as migratory terrestrial birds, mammals, fish, sharks and rays, and invertebrates, sponges, plants and species of cultural significance. Among Australian marine fauna, vertebrates are a very well known group, although there continues to be a high discovery rate of new fish and shark species. Invertebrates, in general, are less well known. Whilst an incredible amount of work has been undertaken to describe Australia's marine biodiversity, we have only scratched the surface of what is out there[31]. To conserve Australia's exceptional marine biodiversity requires the ability to make good decisions now in the face of uncertainty.

Again, important reforms are needed in our nature laws to ensure that offshore wind farms do not significantly impact biodiversity. For example, approvals must include new mechanisms that quickly respond to and address risks if unforeseen population level impacts become apparent.

What is needed to protect our oceans?

As with any development, governments have responsibilities to ensure anything built in the ocean is done responsibly, guided by science, and doesn't drive endangered species into more trouble. This means the system, the laws, regulations and policies put in place to manage risks are done with conservation and wildlife protection at their core. We need to ensure our nature laws are strengthened to address the lack of trust in the system[32] and ensure guardrails are in place if impacts on our precious marine life becomes apparent.

As there is a wealth of information from overseas, Australia has the opportunity to do the renewable energy transition well, including ensuring the impacts of the oceans are mitigated at all stages - exploration, construction, operation and decommissioning.

However, a lack of data on likely impacts makes it difficult for the community to consider the full impacts of current proposals properly. While some effects of offshore wind farms can be avoided or mitigated through project design and operational constraints, there are limits to what can be achieved in this way. It is therefore critical that this early determination of a wind farm zone is robust to ensure there are no significant and unacceptable, ongoing impacts to marine life.

Developers also have a role to play. They need to commit to ensuring development happens to the highest standard, bringing in lessons from international experiences. This may mean going above and beyond what other industries do, ensuring community and First Nations consultation is genuine, and, based on that consultation, resulting in material changes to development proposals, ensuring local communities benefit materially, and taking an extremely precautionary approach where there are unknowns (for example by employing the best available impact mitigation measures – even if it costs more to do so).

Where uncertainties remain, we need the Australian Government to put safeguards in place – to ensure companies respond if monitoring reveals harmful impacts down the track.

This relies on an effective monitoring regime and a regulatory framework that triggers a legally enforced response if predetermined thresholds are crossed. In turn it's critical we gather baseline data on the movement and spatial habitat use by species of concern now, before any development decisions occur.

A post approval adaptive management framework is also critical to direct and learn from research, monitor cumulative impact, and assess the efficacy of applied mitigation efforts.

Does AMCS support building wind farms in Australia's oceans?

AMCS supports the transition to a renewable energy future, which must be done in a way that protects our marine environment. Any offshore development, including building wind farms, can come at a cost to natural habitats or wildlife. The challenge is making sure offshore wind farms are sited in the right places. Some areas of our ocean are just too special, are critical for threatened or endangered wildlife, are important habitats, or have already been set aside for protection. There are ways in which governments and developers can minimise the risks to marine life, including whales that are resident or migrate along our coastlines. Decisions about where wind farms should go and the controls put in place need to be underpinned by stronger nature laws, better community consultation and better data. We must ensure that our oceans are properly protected at all stages of offshore wind farm development, operation and decommissioning.

The transition to renewable energy is vital to addressing climate change, a major threat to Australia's oceans. Climate change harms the oceans and us, with rising temperatures leading to increased adverse weather events, such as cyclones and bushfires.

You can read more on our position here, including the principles for how the renewable energy transition should be done in a way that doesn't harm nature.

Leafy sea dragon and weedy sea dragon amongst kelp © Scott Portelli

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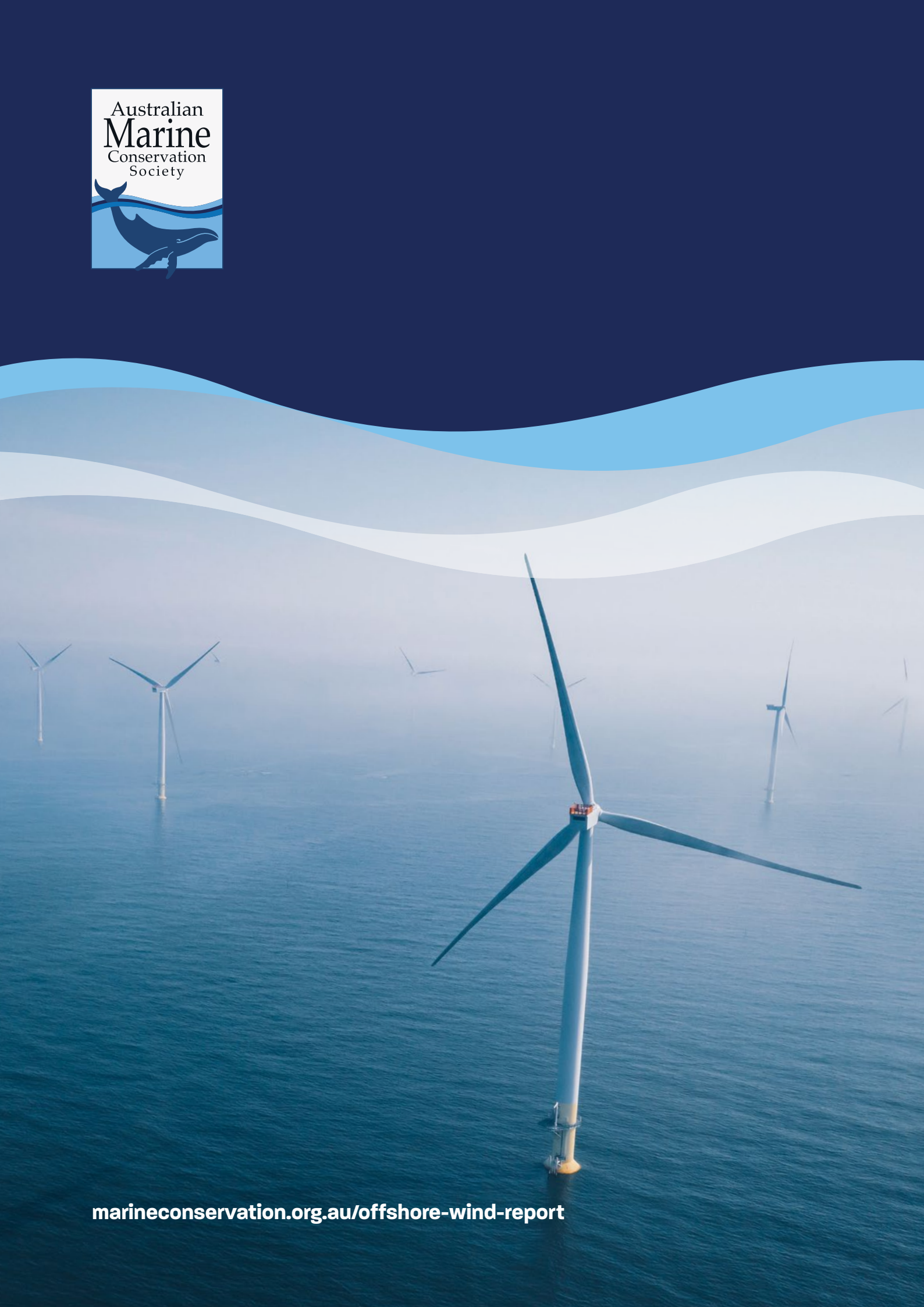

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