



## Environmental Factor Guideline

# Marine Fauna

The objective of the factor *Marine Fauna* is:

*To protect marine fauna so that biological diversity and ecological integrity are maintained.*

### Purpose

The purpose of this guideline is to communicate how the factor *Marine Fauna* is considered by the Environmental Protection Authority (EPA) in the environmental impact assessment (EIA) process.

Specifically, the guideline:

- describes the factor *Marine Fauna* and explains the associated objective
- describes EIA considerations for this factor
- discusses the environmental values of marine fauna, and their significance
- describes issues commonly encountered by the EPA during EIA of this factor
- identifies activities that can impact on marine fauna
- provides a summary of the type of information that may be required by the EPA to undertake EIA related to this factor.

### What are marine fauna?

For the purposes of EIA, marine fauna are defined as:

*Animals that live in the ocean or rely on the ocean for all or part of their lives.*

Marine fauna are highly diverse and range in size from microscopic zooplankton to the blue whale. Marine fauna that live their entire life in the ocean include sharks, whales, dolphins, dugongs, sea snakes, most fish and crustaceans. Marine fauna are also animals that either leave or enter the ocean for breeding or resting purposes, such as turtles, seals and sea lions, penguins, and crabs. Other animals such as seabirds can also be considered as marine fauna as they rely on fish and other marine life for food. While animals such as sponges and corals that are attached to the seabed are also marine fauna, they are typically considered under the environmental factor of *Benthic Communities and Habitats*.

## How this factor links with other environmental factors

The EPA recognises that there are inherent links between the factor *Marine Fauna* and other environmental factors. For example, impacts to marine fauna can result from changes to *Marine Environmental Quality* and *Benthic Communities and Habitats*. While impacts to these associated values will be addressed under the relevant environmental factor, the EPA will consider the impacts to marine fauna in concert with these other factors in order to assess impacts on an ecosystem's integrity as a whole.

## The environmental objective for Marine Fauna

The EPA's objective for the factor *Marine Fauna* is: 'To protect marine fauna so that biological diversity and ecological integrity are maintained'.

In the context of this objective:

*Ecological integrity* is the composition, structure, function and processes of ecosystems, and the natural variation of these elements.

This objective acknowledges the importance of protecting marine fauna for their ecological roles. The EPA also recognises the iconic nature of many of these animals and the importance society places on them, including traditional aboriginal cultural usage. The larger species are seen by many as indicators of the 'health' of the marine environment.

## Considerations for Environmental Impact Assessment

Considerations for EIA for the factor *Marine Fauna* include, but are not necessarily limited to:

- application of the mitigation hierarchy, to avoid and minimise impacts to marine fauna, wherever possible
- the marine fauna species affected by the proposal
- the management measures and approaches proposed and whether they are technically and practically feasible
- the spatial and temporal scale of the residual impacts to marine fauna and the flow-on implications for ecological integrity and/or biodiversity
- the current state of knowledge of the affected species of marine fauna and the level of confidence underpinning the predicted residual impacts
- the risk posed to marine fauna should those predictions be incorrect.

## Environmental values of marine fauna, and their significance

All species of marine fauna are important and are part of the broader marine and coastal ecosystem. However some of these species, or even groups of species, have critical roles to play in maintaining key ecological functions and processes within the ecosystem. For some species, the number of individuals have declined to levels where they are now considered threatened under State legislation.

Other species are of social, cultural and/or economic significance to Western Australians. These include commercially and recreationally important fish as well as iconic species important to local or regional communities such as turtles and dugongs.

## **Issues**

The following issues are matters that are commonly encountered by the EPA due to the nature of proposals that are referred to it. Background on these issues is provided here to help proponents and the community engage with EIA. This issues section will be updated from time to time to reflect new issues as they arise in referrals and EIA.

### ***Direct impacts on marine fauna***

Direct impacts on marine fauna include vessel strike or entanglement in equipment such as dredges and aquaculture cages. These impacts can be severe, but are localised and relatively easy to monitor and measure. As such they are amenable to adaptive management actions to avoid and minimise those impacts.

### ***Indirect impacts on marine fauna***

Most indirect effects on marine fauna result from changing the characteristics of the marine and coastal environment. These can result from changes to chemical and physical properties such as temperature, pH, hydrodynamic processes, and water clarity. Other effects, such as those from underwater noise, can result in behavioural impacts that are more subtle and occur far from the activity in question. While some of these impacts will also be considered under other environmental factors, the consequent impacts on marine fauna can be much more difficult to quantify and manage. They may result in temporary changes during the construction phase of a proposal, or in long-term or permanent changes during the operational phases.

Examples of these types of proposals include seismic surveys, pile driving, waste from discharges, installation of coastal and marine infrastructure, enclosure of marine and coastal waters in marinas and ports, and increased vessel movements.

The focus of the EPA in assessing proposals is on both minimising emissions and maintaining the characteristics of the marine and coastal environment that support marine fauna. Consideration and assessment of indirect impacts, particularly with regard to the potential to changes to key environmental parameters, should be given appropriate focus during EIA for marine fauna.

### ***Impacts to critical habitats and during key ecological windows***

Marine fauna rely on a range of ecological conditions, physical and chemical properties of the marine and coastal environment and specific habitats during key stages of their lifecycle. Turtles, for example, nest on beaches that meet specific physical characteristics regarding beach profile, and come ashore during specific times of the year when wave energy is low. Many fish and invertebrate species rely on specific habitats such as seagrass meadows to provide protection and food resources for juveniles. Other species migrate to specific areas to spawn, relying on specific hydrodynamic conditions and physical properties such as water temperature as signals to prompt aggregation and breeding.

Undertaking development activities within these key areas and/or during these key times has the potential to have a significant impact on these species. As a result, avoiding these locations and times is important. The focus of the EPA is ensuring that these critical habitats and key ecological windows have been appropriately identified and impacts minimised through avoidance where possible and as much as practicable.

### ***Changing climate***

Biological diversity is vulnerable to a changing climate. The scale, rate and nature of the projected change, and the interactions between climate change and other threatening processes, have the potential to overwhelm the capacity of current ecosystems to adapt. From a marine perspective, the consequences of climate change such as increasing storms and wave energy, marine heatwaves, and ocean acidification are likely to significantly affect marine fauna. While some species may be able to adapt and others may be able to shift their ranges, this may not be the case for all species.

For the purposes of EIA, the EPA is concerned with proposal specific impacts that, when considered in combination with climate change, are likely to exacerbate changes to biological diversity and ecological integrity.

### ***State of the science and/or knowledge***

The EPA recognises that the current state of scientific knowledge for marine fauna is highly variable. The size and remote nature of much of Western Australia, combined with a high level of biological diversity and a lack of full knowledge, is a key challenge to impact assessment for marine fauna in Western Australia.

Detailed knowledge regarding all stages of a species lifecycle – such as migration patterns, spawning or calving areas, and foraging grounds – is rarely available. For a few species, such as those important for commercial and recreational fishers, scientific understanding is stronger and predictions can be made for a number of key parameters such as population sizes and recruitment. For other species, detailed knowledge around key life stages is available, such as the location and populations of turtles at nesting beaches and the locations of sea lion haul out areas, breeding islands and populations at those areas, but there may be very little information for the remaining life stages. For many other species, including some species of conservation listed marine fauna, little information is available regarding recruitment rates, population sizes, migration patterns or key foraging areas.

Understanding at the marine and coastal ecosystem level is also highly variable, particularly for processes, functions and responses to pressures. In some areas, such as Ningaloo Reef and Cockburn Sound, significant research effort has been undertaken and these systems are relatively well understood. However there has not been a systematic survey across the majority of Western Australian's marine and coastal environment, and the scale, remoteness and difficulty of undertaking marine fauna surveys means that within every bioregion new species are still being found and ecosystem processes are still being investigated. This is particularly the case for remote areas of the State.

For all proposals which have the potential to significantly impact on marine fauna the EPA will take into account the level of knowledge underpinning predictions of environmental impacts and risks. While region-wide studies are beyond the capacity of any individual proponent, the EPA strongly encourages the sharing of information on marine fauna so that there is a collective improvement and consolidation of knowledge over time. This increased certainty will result in more straight forward assessments and also lead to improved environmental outcomes.

## Impacts

Development activities that have the potential to impact marine fauna include, but are not necessarily limited to:

- activities that change the characteristics of the marine and coastal environment including:
  - dredging and rock dumping through increases in turbidity and the mobilisation of contaminants located within the sediment
  - construction of breakwaters, bridges, rock walls and other marine infrastructure that has the potential to change marine currents and other coastal processes
  - water quality within confined water bodies, such as marinas and ports, and its exchange with the broader marine and coastal environment
  - outflows and discharges from commercial and industrial development and aquaculture operations
  - accidental discharges
- underwater noise including from pile driving, rock dumping, dredging, vessel movements and seismic exploration have the potential to generate underwater noise that can negatively impact marine fauna either through physical injury or avoidance behaviour
- interaction with vessels and equipment, including from aquaculture developments, during construction and operation has the potential to injure or kill marine fauna or result in avoidance behaviour
- inappropriate lighting on either the shore or on vessels that can alter natural turtle behaviour during the nesting season
- high volume seawater intakes (e.g. desalination and cooling water) can entrain or trap adult and juvenile marine fauna as well as large numbers of planktonic larvae and result in mortality
- introduction of invasive marine species through poor inspection of marine plant and equipment and through ballast water exchange.

For the purposes of EIA, the EPA is focussed on significant impacts to marine fauna, which can include:

- harm of individuals and/or declines in the population or the range of species protected under state legislation
- reductions in populations of species of local and regional importance
- impacts to species or groups of species that fulfil critical ecological functions within the ecosystem
- loss or impact to critical marine fauna habitat, including habitats such as nesting beaches, nursery areas, sea lion haul out areas, specific foraging or breeding areas, and fish spawning aggregation areas
- reduction in species diversity in an area, which may be due to factors such as migration or range contraction resulting from a decline in the quality of the local environment
- introduction and/or spread of invasive marine species or diseases.

## Information required for EIA

Where marine fauna has been identified as an environmental factor the EPA may require the proponent to provide information or studies within the following broad topics:

- description of the marine fauna likely to be impacted by the proposal, including identification of critical habitat and ecological windows for affected species
- assessment of the values and significance of marine fauna likely to be impacted at a relevant local, regional and state scale
- identification of the threats and pressures on marine fauna from the proposal
- for proposals that generate significant underwater noise, modelling of the likely impacts including delineating areas of likely physical impact as well as areas of likely behavioural impact
- quantification of the likely direct and indirect impacts to marine fauna in terms of the extent, duration and severity, in order to predict the consequent impacts on the maintenance of biological diversity and ecological integrity of the broader ecosystem
- consideration of cumulative impacts from other existing and approved developments in order to determine whether the proposal, in combination with other developments, will significantly impact marine fauna and any consequent impacts to ecological integrity and/or biodiversity
- analyses of the above to a standard consistent with recognised published guidance where available
- demonstration of how impacts to marine fauna have been avoided, managed and mitigated.

Environmental Protection Authority 2016, *Environmental Factor Guideline: Marine Fauna*, EPA, Western Australia.

This document is available in alternative formats upon request.

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