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Briefing note

Marine biodiversity offsets

Business implications and relevance

- Offsets are increasingly required by governments and lenders as a means of addressing unavoidable impacts on biodiversity.

- Marine offsets will become more common as marine industrial development expands. There are great opportunities for implementing offsets in the marine environment, as well as some challenges.

What is a biodiversity offset?

Biodiversity offsets are measurable conservation gains that compensate for negative impacts of development that remain after full application of the mitigation hierarchy to avoid, minimise and restore impacts. They are measures of last resort, typically designed to achieve a no net loss or net gain of biodiversity[1].

Pressure on marine and coastal ecosystems

Expansion of industrial development into the coastal and marine environment is placing increasing pressure on marine biodiversity, and the well-being and security of the vast number of people it supports. Environmental conservation is now widely recognised as fundamental to long-term sustainability. Governments and lenders increasingly require developers to achieve more stringent biodiversity outcomes through application of the mitigation hierarchy. Biodiversity offsets may be needed to address unavoidable residual impacts to areas of high biodiversity significance[2].

Expanding use of the marine environment by industry, together with growing government and lender requirements, will see an increasing need for the use of marine offsets.

At a glance

- Biodiversity offsets compensate for the negative impacts of development that remain *after* full application of the mitigation hierarchy;
- To date, marine offsets have seen limited application, and they are often perceived to be difficult or complex. This is not necessarily the case, and the same general offset approaches apply on both land and sea;
- Marine environments are under increasing threat, with low levels of protection for biodiversity, so there is great scope for implementing marine offsets;
- However, biodiversity offsets are inherently expensive, with uncertain outcomes, and should only be considered as a last resort following measures to avoid, minimise and restore impacts.

[1] See TBC briefing note on Biodiversity offsets: an introduction

[2] See TBC guidance note on Government policies on biodiversity offsets

Marine biodiversity offsets

Marine versus terrestrial offsets

As yet, relatively few marine offsets have been implemented, and these have been mainly in coastal rather than offshore environments. Marine offsets are thus still viewed as novel, and as particularly challenging. However, the principles and methods of offset design and implementation are the same whether on land or sea, and similar challenges apply. Lessons learnt from terrestrial offset application are therefore likely to apply equally to the marine environment.

Figure 1: Special consideration for the ecological and political setting are needed when implementing marine biodiversity offsets.

Differences between marine and terrestrial systems exist, including in ecology, the availability of biodiversity information to understand impacts and the governance of natural resources (Figure 1).

The connective nature of marine systems can make it difficult to disentangle project- and non-project-related impacts. Effective mitigation, including offsets, therefore requires a good understanding of the wider oceanographic and ecological baseline, as well as other human influences, typically across much broader spatial and temporal scales than on land.

The high connectivity between marine ecosystems provides both challenges and opportunities for undertaking offsets.

As with remote areas on land, the lack of reliable biodiversity data can also be an issue for design and implementation of marine offsets. Ocean sampling, particularly further offshore and in deeper waters, is inherently challenging and expensive. Much of the available information is based on modelled predictions from only a limited number of sampling sites. Robust biodiversity information is necessary to understand feasibility and effectiveness of offsets. Marine offsets may thus need more resources for baseline and monitoring data collection than equivalents on land.

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Opportunities for marine offsetting

Despite the differences, approaches to marine offsets are similar to those on land: *restoration* actions to remediate past (non-project) damage; or *averted loss* actions to prevent anticipated damage in future. Policy-based offsets, aimed at changing policy and practice within a sector or industry, have seen little application on land but are particularly suited to some marine situations (Table 1)[3].

The high connectivity in marine environments may also promote ecosystem recovery. For example, restoration within highly dynamic systems such as estuaries and intertidal wetlands is greatly facilitated by the connectivity of the environment. Depleted fish stocks can also recover rapidly where their habitats are secured. Restoration of ecologically complex systems such as coral reefs is, however, significantly more challenging as such systems are unlikely to recover within any reasonable timeframe (Figure 2).

Averted loss offsets have significant potential for addressing marine impacts, given the high threats to marine biodiversity and lack of effective protection. Many sites important for marine biodiversity conservation (such as Key Biodiversity Areas and Important Bird Areas) have already been identified, are typically unprotected and in need of management, and may be suitable as offset sites[4].

Moreover, marine protected area networks (both nationally and on the high seas) are relatively underdeveloped: just over 5% of the world's oceans are under some form of protection (compared to 15% on land), far below global conservation targets. A recent global study highlighted that 13 million km^2 of the ocean is likely to support areas of high marine

Table 1. Example approaches to marine offsets

Offset type	Examples
Averted loss	• Supporting the establishment and management of marine protected areas, e.g, Rotterdam's port expansion; • Supporting local communities to improve fisheries management and reduce impacts to threatened fish species; • Implementing upstream pollution and sedimentation controls to improve water quality for coastal ecosystems; • Compensatory mitigation measures, such as addressing impacts to seabirds from fisheries by-catch by controlling invasive rodents on islands with important seabird colonies; • Removing invasive lionfish from Caribbean reefs to reduce predation of native fish species.
Restoration	• Active restoration: transplanting mangrove, seagrass and coral stock from healthy to degraded ecosystems, such as was undertaken in the Gulf of Aqaba in Jordan; • Passive restoration: creation of suitable hard substrates for resettlement of corals as was undertaken for the Dampier port upgrade in Australia.
Policy based	• Supporting uptake of turtle excluder devices in net fisheries to reduce marine turtle by-catch; • Changing longline fishing practices to reduce by-catch of sharks and dolphins (e.g. changing/modifying gear type, night setting, temporary closures etc.);

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[3] Opportunities to implement offsets to address threats to the Great Barrier Reef through a trust fund are explored in this TBC co-authored report

[4] See TBC briefing note on Globally and nationally important sites as biodiversity offset opportunities

[5] Martin, C.S., et al. (2015) A global map to aid the identification and screening of critical habitat for marine industries. *Marine Policy* 53: 45–53

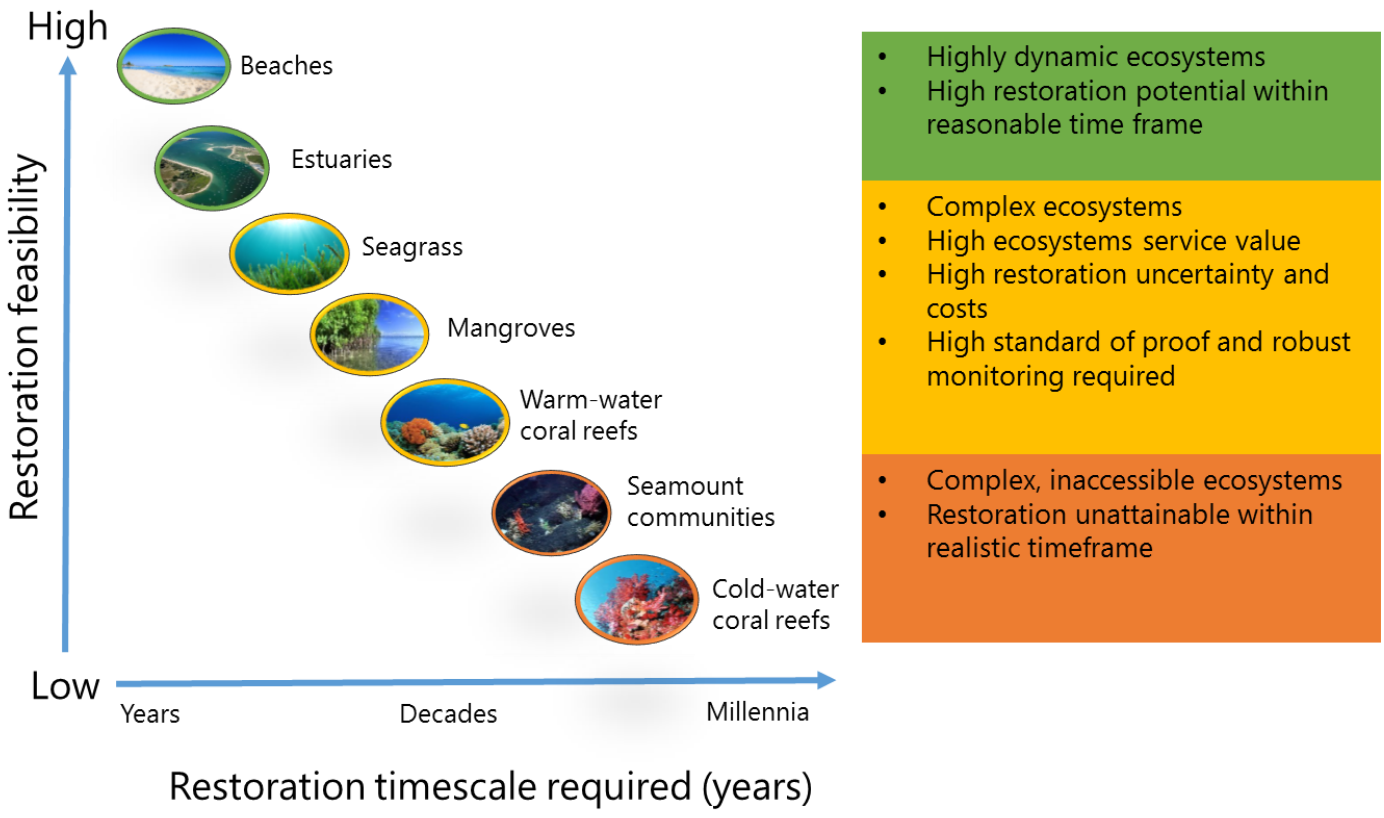
Marine biodiversity offsets

There is significant potential for business to work with governments (and, where relevant, local communities) to develop offsets that align with conservation goals under existing national policies and plans. Such offsets are likely to be lasting, receive high stakeholder support, and offer potential for sustainable implementation and management partnerships.

The high seas, beyond areas of national jurisdiction, comprise 64% of the ocean surface and nearly 95% of its volume. Implementation of offsets here is complicated by the lack of clear and effective ocean governance. The most effective approach may be supporting policy changes, such as through interventions that aim to address by-catch impacts from industrial fisheries (Table 1).

Marine offsets provide the opportunity for business to achieve better conservation outcomes whilst delivering a more sustainable basis for development.

Figure 2: Offset restoration feasibility varies widely between marine ecosystems (schematic representation, feasibility represents a function of costs and success)[6].



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6. TBC contributed to an article on the restoration feasibility assessment for deep-sea ecosystems

Marine biodiversity offsets

The future of marine offsets

Offsets are likely to see continued and wider application within the marine environment as business expand their operations into sensitive coastal and offshore environments, and as an increasing number of lenders and governments implement more rigorous mitigation standards that require the use of offsets.

Some governments already have or are developing policies specifically around marine offsets, and existing legislation often recognises impacts on coastal and marine environments (see box right).

Offsets should remain a last resort, rather than a matter of course. Offsets generally have high uncertainty and significant costs, particularly in marine environments. Early screening of biodiversity risks and exploration of alternatives for infrastructure siting and design can help business avoid these risks[7]. Recognition of the potential costs and difficulty of offsets can often help motivate project redesign and lead to innovative solutions that save costs and improve the reputational standing of businesses.

[7] See TBC briefing note on Biodiversity screening

Examples of government policies related to marine offsets

- The State of Queensland in Australia has advanced marine-specific offset requirements, for all coastal developments which impact on marine fish habitat or protected plants.
- United States No Net Loss policy on wetlands, under section 404 of the Clean Water Act (1972), includes intertidal wetlands, such as salt-marshes and mangroves.
- European Union Birds and Habitats directives allow for the use of offsets for unavoidable impacts on Natura 2000 sites (Article 6 (4)). Both directives include coastal and offshore habitats.
- Canada's Fisheries Productivity Investment Policy recognises a variety of offset measures including fish habitat restoration as a means to compensate for fisheries impacts.
- South Africa's Western Cape Province has developed guidelines on biodiversity offsets which includes coastal and marine biodiversity, although these are not yet legally binding.

The Biodiversity Consultancy works together with industry-leading clients to achieve an ecologically sustainable basis for development by tackling complex biodiversity challenges and by supporting positive conservation outcomes. Contact us to find out how we can help you to:

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- Turn environmental challenges into opportunities
- Demonstrate shared value to stakeholders
- Build a positive brand and sustainable business

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