Department of Climate Change, Energy,
the Environment and Water
GPO Box 3090 Canberra ACT 2601

28 January 2026

Re: Draft National Environmental Standard (Matters of National Environmental Significance) 2025

For 60 years, the Australian Marine Conservation Society (AMCS) has worked through science-informed advocacy, policy reform, community engagement and education to protect Australia's ocean and coasts for current and future generations. We represent over 300,000 Australians from all walks of life. AMCS welcomes the opportunity to provide comments on the Australian Government's draft National Environmental Standard (Matters of National Environmental Significance) 2025 legislative instrument (draft Standard) and policy paper.

The centerpiece of the Samuel Review into the *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) was the setting of clear outcomes through legally enforceable National Environmental Standards 'that set the boundaries for decision-making to deliver the protections needed'. The Standards require precise language, measurable outcomes, and a process for auditing performance to improve the quality of decision making and ensure the biodiversity of Australia's ocean and coasts are protected.

However, once again the Department appears unwilling to implement the core elements of the Samuel Review recommendation to constrain decision making with the use of 'Precise, quantitative National Environmental Standards that provide for effective environmental protection and biodiversity conservation'. The Draft Standard currently avoids the inclusion of measurable outcomes, processes for assessing performance, and uses language that will undermine the enforceability of the Standard, thereby perpetuating 'the status quo where opaque rules and unfettered discretion in decision-making can result in poor environmental outcomes' described in the Samuel Review of the EPBC Act.

In this response, AMCS provides detail on the key elements that require improvement to deliver the uplift in decision making and rebuild trust in the system.

Yours sincerely

[redacted]

Alexia Wellbelove
Campaigns Director

Background

In October 2020, Professor Graeme Samuel delivered his Final Report of the Independent Review of the *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) to the Government (the Samuel review)[1]. The report found that:

> *"Australia's natural environment and iconic places are in an overall state of decline and are under increasing threat. The environment is not sufficiently resilient to withstand current, emerging or future threats, including climate change. The environmental trajectory is currently unsustainable."*
>
> *"The EPBC Act is outdated and requires fundamental reform. It does not enable the Commonwealth to effectively fulfill its environmental management responsibilities to protect nationally important matters."*

AMCS was deeply involved in the Samuel Review and welcomed Professor Samuel's comprehensive and scathing assessment of the EPBC Act's implementation. We are supportive of the central theme of pursuing 'outcome-based law' based on strong, legally enforceable Standards and a framework that provides assurance that outcomes are being met. However, the Standards currently out for consultation fall significantly short of the reforms called for in Professor Samuel's recommendations.

Improvements required to make the Standards legally enforceable

Protection of critical habitat

A key failing of the EPBC Act has been the unwillingness of successive governments to use available provisions to protect critical habitat. AMCS strongly supported the inclusion of unacceptable impacts in the recent EPBC Act reforms. However, given the constraints industry were able to secure in the reform process (criteria are subject to an enormously higher bar of certainty that impacts will occur), Standards will have an important role – critical habitat mechanisms must work in concert across the Act.
Each mechanism has a different role and application of the mitigation hierarchy should require projects to avoid impacts on critical habitat. Where there are likely to be impacts on critical habitat, unacceptable impact provisions should require those impacts to be refused. National Environmental Standards should support effective implementation of these safeguards (for example, by providing granular direction on the application of the mitigation hierarchy).

In summary, the Standard should ensure that critical habitat is protected and restored.

Outcomes

AMCS has long advocated for strong, legally enforceable Standards. However, without amending the language in the current Draft MNES Standard, it is unlikely to fix the problems it was designed to solve. Samuel recommended Standards to 'improve on the status quo where opaque rules and unfettered discretion in decision-making can result in poor environmental outcomes'.[1]

[1] https://epbcactreview.environment.gov.au/

A core feature of the Standards recommended by the Samuel Review is that they must be legally enforceable—allowing decision-makers to be held accountable for compliance. Qualifying language in the Draft Standard (underlined below) add to the already discretionary language the legislation, making it difficult to ensure accountability.

Part 6 of the 2025 draft MNES Standard legislative instrument (page 4) states:

> *(1) The outcomes which this Standard is intended to achieve are that decisions under the Act:*
>
> *(a) provide for the protection, conservation, and, where necessary, restoration of protected matters;*
>
> *(b) contribute to the promotion and enhancement of the diversity, abundance, resilience, and integrity of protected matters; and*
>
> *(c) facilitate ecologically sustainable development.*

Additionally, the policy paper states that the outcomes must be 'specific results, that when implemented, the Standard aims to achieve'. Measurable outcomes are needed to ensure objective decision-making that sets out the decision-maker's obligations in fact, rather than opinion, and to achieve the desired specific results. It will also ensure decisions consider the cumulative impact of multiple decisions on Matters of National Environmental Significance as well as accounting for the impacts of climate change.

The Standards proposed by the Samuel Review (appended to the Final Report) were developed through extensive consultation and broadly supported by stakeholders. It is unclear why Samuel's proposed Standard has been rejected in favor of a non-outcome focused Standard.

A clear and specific measurable outcome is needed to ensure that National Environmental Standards can be effectively audited and provide confidence that decisions are consistent with relevant international agreements, recovery plans, management plans and threat abatement plans and other conservation planning instruments, including approved conservation advices.

An outcome of 'absolute' net gain for each impacted MNES should be embedded in the Standard, as a mandatory outcome for all approval decisions, to counter existing environmental decline. The concept of net gain has been introduced in the Act, but only for 'residual significant impacts', and this is relative (not absolute) net gain as it is measured against a declining baseline which will lock in downward trajectories.

Failing this the Department should return to the draft Standards recommended by the Samuel Review. Whilst these recommended Standards reflect current settings, and were recommended as a minimum starting point, they are preferred to the current draft in that at least they include measurable outcomes and articulate monitoring and reporting requirements.

Assurance

The topline message of the Samuel Review was that outcome-based law and strong assurance would enable the Commonwealth to rebuild trust in the community.

Samuel noted that Standards alone would not be enough as 'they need to be supported by strong and independent oversight of the performance of all parties …to meet the Commonwealth's outcomes as prescribed in the Standards.'

The Australian National Audit Office (ANAO) has also been highly critical of the Australian Government's lack of outcome-level performance measurement and reporting, and its inability to determine how its decisions related to outcomes for Matters of National Environmental Significance. Samuel strongly recommended performance audits to provide annual reporting, tabled in Parliament, on performance of Commonwealth and accredited parties against National Environmental Standards. Given there is currently no requirement for the Government to report on the performance of Standards it is critical that precise, quantitative outcomes are articulated within the Standard along with "independent oversight and audit to build and maintain confidence that the EPBC Act, and the National Environmental Standards are working as intended".

The MNES Standard must therefore specify how its performance will be measured and assurance provided to build trust in the community.

Objectives

In order to deliver on the MNES Standard's outcomes further clarity is recommended to inform granular decision making. We support the outcome-based description of the 'objectives' but suggest that these might be better framed as matter specific outcomes. Below we suggest some hard lines that will provide further guidance to decision makers, business and the community.

The following text in bold should be added to existing text (in italics) for each of the relevant MNES as follows:

For **Threatened Species (1), Threatened Ecological Communities (2) and Migratory Species (3):**

Relevant actions, decisions, plans and policies must ensure that:

- *Habitat, including critical habitat of the listed threatened species where the habitat is irreplaceable and necessary for a threatened species to remain viable in the wild, is protected, conserved and restored to support the survival and recovery of the threatened species.*
- *Protection and recovery actions support the viability of threatened species in the wild.*

For **Wetlands of International Importance (4):**

The ecological character of a declared Ramsar wetland is maintained, protected, conserved and (where it is in decline) restored **taking into account both individual and cumulative impacts (including upstream and groundwater impacts).**

Relevant actions, decisions, plans and policies must be consistent with the Ramsar Management Principles and relevant conservation planning documents for the Ramsar wetland; and prevent detrimental change to the ecological character of a Ramsar wetland.

For **World Heritage Properties (6):**

The world heritage values of a declared World Heritage property are protected, conserved and (where necessary) rehabilitated in a manner consistent with Australia's obligations under the World Heritage Convention.

Relevant actions, decisions, plans and policies must ensure the Outstanding Universal Value of the property, and associated attributes and conditions of integrity and/or authenticity are not adversely impacted, taking into account both individual and cumulative impacts from actions within the property or elsewhere, and;
Be consistent with the Australian World Heritage Management Principles and relevant conservation planning documents for the World Heritage property.

For the **Great Barrier Reef Marine Park (7):**

The environment, biodiversity and heritage values of the Great Barrier Reef Marine Park,and its individual components, are protected, conserved and (where necessary) restored.

Relevant actions, decisions, plans and policies must not be inconsistent with the Great Barrier Reef Marine Park Act 1975, including policies, zoning plans or plans of management made under section 7(4), section 32A or section 39W.

For **Commonwealth Marine Areas (8):**

Commonwealth Marine Areas, or part thereof, are protected, restored (where necessary) and sustainably managed.

Relevant actions, decisions, plans and policies must be consistent with relevant marine park management plans, marine bioregional plans, and conservation planning documents.

Principles

Principle 1 – Actions appropriately consider the application of the mitigation hierarchy.

Terms such as 'appropriately consider' and 'if possible' (page 4) should be removed from the principle - the decision-maker should be confident that the mitigation hierarchy has been applied.

The MNES Standard should provide more granular guidance, for example that impacts on critical habitat and habitat critical to survival must be avoided. Include as a dot point. This could be added to page 4 to read(strikethrough to delete, bold suggested new text):

Step 1—Avoidance

(2) ~~If possible,~~ impacts to protected matters should be avoided by taking measures to anticipate and prevent significant impacts to protected matters before those impacts occur.
(3) impacts on critical habitat and habitat critical to survival must be avoided.

Further comments on the Policy Paper

We note that under the reformed EPBC Act, a Minister must not approve the taking of an action unless the Minister is satisfied that the approval is consistent with any national environmental standards prescribed by the regulations**.**

In making decisions specified by the regulations, the different ways in which the MNES Standard could apply should not include an option for the decision-maker to 'have regard to' the Standards.

We note the many instances where a Minister still only needs to be satisfied that criteria are met. This is too discretionary. The test needs to be that a Minister can only approve an action or make a decision if the action, policy or plan is consistent with the MNES Standard. Not that the decision maker is satisfied that it is.

The Policy Paper must be clear that approval decisions made under accredited process must also result in the outcomes intended to be achieved by the MNES Standard.

Australian Marine Conservation Society
28 January 2026

Department of Climate Change, Energy, the Environment and Water
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Re: Draft National Environmental Standard (Environmental Offsets) 2025

For 60 years, the Australian Marine Conservation Society (AMCS) has worked through science-informed advocacy, policy reform, community engagement and education to protect Australia's ocean and coasts for current and future generations. We represent over 300,000 Australians from all walks of life. AMCS welcomes the opportunity to provide comments on the Australian Government's draft National Environmental Standard (Environmental Offsets) 2025 legislative instrument (draft Standard) and policy paper.

The centerpiece of the Samuel Review into the *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) was the setting of clear outcomes through legally enforceable National Environmental Standards 'that set the boundaries for decision-making'. With Standards that articulate the outcomes that must be met through **all** decisions made under the EPBC Act.

The draft offsets Standard introduces principles that, with suggested amendments, will improve offset delivery. However, accepting restoration contributions for delivery of marine offsets is a very high-risk strategy. The Standard must also apply to the Restoration Contribution Holder. To avoid the issues that have resulted in the failure of all analogous funds across Australia, the Standard should clearly state that payments will not be accepted unless there is strong evidence that a like-for-like offset is feasible and can be delivered within an ecologically relevant timeframe. An assurance framework with appropriate monitoring of measurable, outcome-based offset conditions will be particularly important in marine systems given the uncertainty and expense of restoration action in the marine realm.

We include the AMCS commissioned report as Appendix One: '*Best practice principles for biodiversity offsetting in marine environments.'* We draw on this extensively to provide that attached detail on the key elements that require improvement to deliver offsets that truly compensate for approved developments by demonstrating a measurable and absolute net gain for impacted matters of national environmental significance.

Yours sincerely

Alexia Wellbelove
Campaigns Director

Background

In October 2020, Professor Graeme Samuel delivered his Final Report of the Independent Review of the *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) to the Government (the Samuel review)[1]. The report found that:

> Australia's natural environment and iconic places are in an overall state of decline and are under increasing threat. The environment is not sufficiently resilient to withstand current, emerging or future threats, including climate change. The environmental trajectory is currently unsustainable.
>
> The EPBC Act is outdated and requires fundamental reform. It does not enable the Commonwealth to effectively fulfill its environmental management responsibilities to protect nationally important matters.

AMCS was deeply involved in the Samuel Review and welcomed Professor Samuel's comprehensive and scathing assessment of the EPBC Act's implementation. We are supportive of the central theme of pursuing 'outcome-based law' based on strong, legally enforceable Standards and a framework that provides assurance that outcomes are being met. However, the Standards currently out for consultation fall significantly short of the reforms called for in Professor Samuel's recommendations.

Offsets in the Marine environment

Whilst principles that underpin appropriate biodiversity offsets have been developed over the past two decades, most experience with offsetting activity has been from terrestrial environments. The specific implications for offsets in the marine environment remain highly uncertain. We append the AMCS commissioned report, '*Best practice principles for biodiversity offsetting in marine environments'*. The report examines the use of offsets in the marine realm. It was commissioned to outline best practice for offsets in marine and coastal environments, using concrete examples and identifying the risks that have led to poor environmental outcomes for marine biodiversity to date. We encourage adoption of the report's recommendations (see checklist on page 40-42) in full. Below we provide comments on the draft offsets Standard and policy paper and our recommendations for improvement.

Key issues requiring improvement in the draft Offset Standard

Impacts to Critically Endangered Species, Critically Endangered Ecological Communities and Critical Habitat can not be offset

AMCS strongly supported the inclusion of unacceptable impacts in the recent EPBC Act reforms. However, given the constraints industry were able to secure in the reform process, Standards will have an important role in protecting critical habitat and ensuring decisions do not result in unacceptable impacts. Given the poor performance of offsets under the EPBC (and other jurisdictions) there is simply too much risk in approving damage that could reduce the viability of species or ecosystems already at very high risk of extinction. The Standard should clearly state that impacts to Critically Endangered species, Critically Endangered Ecological Communities and Critical Habitat can not be offset.

[1] https://epbcactreview.environment.gov.au/

Assurance

AMCS welcomes the commitment to require greater transparency regarding the location and effective achievement of approved offsets. However, we caution that this was also a commitment made by the Australian Government in response to the first independent review of the Act (the Hawke Review) and accompanies the current policy.

Assurance must no longer be a 'nice to have'. The instrument should set out how outcomes will be assured.

Outcome-based offset conditions (with strong monitoring and adaptive management requirements) will be particularly important in marine systems given the uncertainty and expense of restoration actions. Insurance mechanisms (e.g. environmental liability insurance or monetary bond) could help incentivise delivery of outcomes. Each offset (restoration action) and restoration contribution should have transparent and publicly-available reporting that includes the outcome that will be achieved for each affected matter and how progress will be measured. These reports should be available in the public register.

Research may be a pre-condition – but it is not an offset

Given the data paucity in marine environments and the difficulty of estimating project impacts relative to a baseline, a common error in the application of offsetting is the consideration of research to better inform baseline assessment as an offset, rather than as part of the expected Environmental Impact Assessment process. The attached report provides an example of incorrect use of research for determining baselines as 'offset' and the net loss this results in.

The use of research to develop baselines for species being impacted by development may be a necessary precondition for designing an offset, but in itself provides no measurable benefit for the matter, and as such should not be considered an offset. Where research is listed as a higher priority in a conservation planning document than a practical restoration measure, this is a clear indication that there is NOT strong evidence that like-for-like, feasible restoration actions can be achieved.

Benefits for impacted species and places from research are not ecologically equivalent to project impacts, and their use will entrench biodiversity loss.

Enforceability

AMCS has long advocated for strong, legally enforceable Standards. However, qualifying language in the draft Standard adds to the already discretionary language in the legislation, which will make it difficult to enforce. The term 'should' in all principles introduces ambiguity and should be replaced by 'must' 'is' or 'will' throughout the legislative instrument. All references to the Minister being 'satisfied' should be removed to ensure objective decision-making that sets out the decision-maker's obligations in fact, rather than opinion. Standards must be clear that they apply to proponents, not just decision-makers. That is, outcome-based conditions must ensure compliance with the Standards so that the stated outcomes are met (not just that processes were followed). The overall outcome must be measured and reported to ensure that the Standard is working.

Restoration Contributions

The idea of aggregating funds to deliver high impact offsets is intuitively attractive. In practice, however, all major offset funds in Australia (Pilbara fund, Queensland Financial Settlements Fund, NSW Biodiversity Conservation Trust (BCT), Reef Trust) are failing to acquit their accumulated offset obligations. Less than 5% of the funds received by the Queensland Government's offsets fund (established in 2015) have delivered their associated offset. Similarly, around 90% of demand for offset credits could not be matched to supply through NSW's Biodiversity Offsets Scheme, a major feature of which is an ability to pay into a central fund[2]. Interviews with offset-relevant regulators in Australia found that despite unanimous support for 'pooled-assets' there is no successful demonstration of offset outcomes - because some impacts simply cannot be offset and yet liability to offset them was accepted by the fund managers regardless. The funding then sits in an account increasing the time lag between the impact and any potential benefits from an offset, driving further biodiversity decline. This is exacerbated in the marine environment where impacts rapidly accumulate due to high interconnectedness.

A clear lesson therefore is to avoid accepting offset obligations for any impacts unless there is high certainty that adequate offsets can be feasibly, effectively, and rapidly delivered, with the payment received.

Furthermore, the lack of data on cost and effectiveness of restoration action beyond those that target water quality means that accepting in-lieu payments for marine impacts is a very high-risk strategy.

A conservation payment should only be used where there is high confidence that it will deliver a better environmental outcome than the proponent delivering an offset. The Restoration Contribution Holder must be held to the same Standard as proponents.

Comments on the Legislative Instrument

Net gain against a fixed baseline should be defined in the Standard

The Standard should make clear that the term net gain refers to absolute net gain, rather than relative net gain.

Relative net gain relies on the estimation of a future state. A counterfactual scenario must be estimated of what would have occurred at the offset site if the offset did not go ahead. Constructing this counterfactual is complex and it is also prone to manipulation by proponents, as a given amount of offset action could be considered to generate a larger gain if the counterfactual decline was purported to be steep. This situation can generate perverse incentives. And of course, the counterfactual scenario is ultimately unobservable.

For absolute net gain there is no requirement to construct a counterfactual scenario. Instead, the gain is measured against a baseline which is the state of biodiversity at the site prior to the offset action taken place. As such, only improvements from that state are considered to generate creditable gains. This approach ensures that the net outcome across the impact and the offset sites is one of improvement in biodiversity over time, despite the impact proceeding (see appended report for additional references). Amend the legislative instrument to read:

[2] Audit Office of NSW. 2022. Effectiveness of the Biodiversity Offsets Scheme. Sydney, NSW.

4 Definitions …
…
In this standard:
***Net gain** means an absolute net gain for protected matters measured against a fixed baseline.*

For clarity further text could be added such as: 'For example, there is an increase in the number of individuals or hectares of habitat compared to when the decision is made'.

Object

The object is to 'deliver a net gain', not provide a framework. The object should be revised to instead read: *'The object of this Standard is to provide a framework which ensures offsets (where permitted) adequately compensate for residual impacts to deliver net gain for each affected protected matter'.*

Outcome

The outcome must be a measurable result. Amend to read (original text deleted in strikethrough; replacement text in bold):

*The outcome~~s~~ ~~which this standard~~ is ~~intended to achieve are~~ is that **offsets**:*
*(a) **adequately compensate for impacts on each protected matter** ~~offsets are relevant and available to compensate for the impact to the protected matter and support recovery or conservation;~~*
*(b) ~~offsets~~ result in a measurable improvement from ~~the~~ **a fixed** baseline at the time the relevant decision is made under the Act for protected matters; and*
(c) ~~offsets~~ provide certainty that protected matters will be protected and enhanced.

Principles

Principle 1—Feasibility

There are limits to what can feasibly be offset. AMCS strongly supports the principle of limiting offsetting to matters for which offsets are demonstrably effective. This is particularly important for marine environments, given the limited feasibility of restoration success in ecologically relevant timeframes. For example, while high energy coastal ecosystems might be restorable within years, feasibility decreases in deeper water ecosystems and could take thousands of years for cold water corals and millennia for deep sea hydrothermal vents (see attached). Additionally, there are some components of biodiversity for which impacts could theoretically be offset, but that have a high risk of failure. Until successful offset approaches can be demonstrated for a particular type of impact, offset obligations should not accrue. This should clearly apply to restoration contributions. The principle should thus be amended to read:

*(1) An offset activity ~~should be~~ **is** capable of being commenced at the time the relevant decision is made under the Act.*

(2) The delivery of offsets activities ***and restoration contributions must*** ~~*should*~~ *be:*

(a) feasible; and

(b) based on appropriate and suitable data and information which shows, with a high degree of certainty, that the offset activity will ~~*likely*~~ *contribute to the recovery or conservation of the affected protected matter* ***and;***

(c) is not inconsistent with a conservation planning instrument*.*

(3) A high degree of certainty should be demonstrated through:

(a) existing substantiated expert knowledge or peer reviewed science on how the offset activity will achieve offset objectives with a high confidence of success, taking into consideration the reasonably foreseeable future adverse impacts of climate change (including recommended actions in conservation planning documents); or

(b) independent verification of prior success for an analogous activity

AMCS do not support offsets based on expert opinion where there is potential for a conflict of interest and no guarantee of minimum expertise requirements and standing within the expert community.

Principle 2—Security

Offsets must be legally protected. If a project results in permanent destruction of habitat then offsets must be in perpetuity.

Principle 3—Direct and tangible

Despite current policy settings requiring direct offsets to form 90% of actions under the EPBC Act[3], it is often not applied in practice. This is particularly prevalent in the marine context given the high levels of uncertainty around direct offsets achieving a benefit to the affected matter. Whilst this situation ought to preclude a reliance on offsets a review found that 82% of offsets identified for marine development projects included 'out of kind' offsets, including general management, research and education.[4]

Flexibility that enables greater outcomes for impacted biodiversity can be positive, but flexibility that enables circumvention of the fundamental principles of good practice offsetting leaves impacted matters worse off. We therefore do not support the inclusion of indirect offsets in the definition of 'direct and tangible'. As discussed above, research to inform baseline assessment should be part of the Environmental Impact Assessment process. Using research for determining baselines as 'offset' does not provide a tangible benefit to the matter and will result in net loss. Where research is listed as a higher priority in a conservation planning document than a practical restoration measure, this is a clear indication that there is NOT strong evidence that like-for-like, feasible restorations are available.

Principle 4—Measurable improvements

[3] Commonwealth of Australia. 2014. Environmental Offsets. Parliament House, Canberra. Conservation Evidence. Available from https://www.conservationevidence.com/actions/3531

[4] Niner H, Milligan B, Jones PJ, Styan CA. 2017. Realising a vision of no net loss through marine biodiversity offsetting in Australia. Ocean & coastal management 148:22-30.

AMCS strongly supports the use of a fixed baseline prior to project approval to determine net gain.

Absolute net gain means that more of the entity exists compared to when the decision is made, within an ecologically relevant timeframe. Therefore, the timeframe for measuring progress on the delivery of net gain should be embedded in the Standard. 'Absence of action' should be removed as this invites conjecture as to future states and suggests that gain can be estimated against a declining baseline.

Offset conditions must ensure that the offset will continue to provide a measurable and absolute net gain under future climate change scenarios.

Offset conditions should also describe what will happen should improvements not be measured within ecologically relevant timeframes.

Therefore, a third point should be added to the principle along the lines of 'Offsets must deliver net gain over the baseline condition within an ecologically relevant timeframe'.

A significant challenge in implementing offsets in the marine environment is the lack of data, which ultimately limits how accurately marine biodiversity values can be measured. Nevertheless, monitoring of offsets requires direct monitoring of the impacted matter, not just proxies or intermediate metrics, such as water quality.

Indicators and metrics appropriate for the measurement of each type of matter and the requirement to use these as a measure of 'condition' should be included in the Standard.

Principle 5—Additionality

AMCS supports this principle noting the word 'should' should be replaced throughout.

Principle 6—Like-for-like

Exemptions to the like-for-like requirement should not be permitted. AMCS is not opposed to non-standard approaches to offsets where these have demonstrated feasibility (e.g industry buybacks in fisheries with licence quotas, adoption of bycatch reduction gear that does not include a commercial gain, predator control in seabird rookeries). The key element is that offsets result in a demonstrable and absolute net gain for the impacted entity within an ecologically appropriate timeframe.

We do not support deviation from the like-for-like requirement where bioregional guidance plans, or bioregional plans identify a higher conservation priority for the affected protected matter. As discussed above, if research is listed as a higher priority in a conservation planning document than a practical restoration measure, this is a clear indication that there is NOT strong evidence that like-for-like, feasible restorations are available.

Principle 7—Relevant area

AMCS strongly supports this principle to ensure offsets are delivered in an area that is ecologically relevant to the affected protected matter. We encourage further specificity to ensure offsets are not so far away that they compromise local population structures and viability.

Principle 8—Offset commenced prior to impact

We support the intent of this principle noting that the term 'should' should be replaced. Note 1 should be deleted. The principle of finding and commencing the offset should equally apply to the Restoration Contributions Holder – or else the funds may accumulate and repeat the mistakes of analogous funds across the country.

Monitoring outcomes

Outcomes must be reported in a way that they can be evaluated against offset obligations as well as performance of the Standard overall. Absolute net gain provides the least complexity – there is either more of the protected matter than before the impact occurred, or there is not.

We can then tell if offsets adequately compensate for impacts on each protected matter (as per our comments on the recommended Outcome above).

Currently, there is a lack of robust monitoring and outcome reporting under offset schemes. For example, a recent review of the NSW offset program found that 90% of offset sites did not require ecological monitoring[5]. A separate review of marine offsets in Australia (primarily port development in Qld and WA) found no discussion of post-approval compliance monitoring within the 42 projects reviewed, and that only 11% of projects included any assurance that outcomes would be achieved (e.g. through bonds or adaptive management - see attached report). Offset management plans are rarely available to the public so effectiveness is difficult to evaluate. Increased transparency on offset performance would improve evaluation of offsets to help progress the science and improve implementation.

The Standard should therefore be clear that each offset requires reporting and who has the obligations to report. The Standard should include requirements to monitor and report not only the offset location and activities, but also the outcome for each affected matter - and that reporting of absolute net gain is required over an agreed timeframe.

Further comments on the policy paper

Application of the Standard

Given the challenges in achieving net gain in marine environments, avoidance is particularly important to achieving offset outcomes. However, few assessments have evaluated the extent of avoidance and minimisation and a review of marine projects found no evidence of how the mitigation hierarchy was applied or how that influenced

[5] Audit Office of NSW. 2022. Effectiveness of the Biodiversity Offsets Scheme. Sydney, NSW.

offsets[6]. Compulsory reporting against the steps of the mitigation hierarchy could ensure avoidance and mitigation measures are better embedded in the offset process. Offsets should be a rarely-used, last resort. However the existence of a simple payment pathway risks increasing the use of offsets, not decreasing them. The option to make a restoration contribution should therefore be restricted to those matters for which there is strong evidence that like-for-like, feasible restoration actions can be achieved, and that payments are adequate to fully cover the cost (see above).

In making decisions specified by the regulations, the different ways in which the Standard could apply should not include an option for the decision-maker to 'have regard to' the Standard.

References to the Minister being 'satisfied' should also be removed. This is too discretionary. The test needs to be that a Minister can only approve an action or make a decision if the action, policy or plan is consistent with the MNES Standard. Not that the decision maker is satisfied that it is.

The policy paper must be clear that approval decisions made under accredited process must also result in the outcomes in the Standard. For landscape-scale approaches, the decision-maker must ensure the Standard will be met.

The requirement for high certainty that a net gain outcome can be achieved for the specific protected entity affected should be made mandatory also for the restoration contribution pathway. The same quantitative net gain outcome for the impacted protected entity should be required for restoration contributions as for restoration actions.

AMCS strongly supports the regulations prescribing impacts to protected matters that can not be offset. We argue that this should include all critically endangered species and critically endangered ecological communities. Further safeguards should include the ability to red flag restoration contributions if it is found that like-for like offsets are not feasible. That is, should a restoration payment be accepted, but the fund later concludes that a like-for-like offset meeting the requirements of the Standard is not possible, this raises a red flag preventing any further restoration contributions. This red flag would only be lifted if the inability to provide a suitable offset is demonstrably resolved.

Attachment A: Legislative setting for Offsets

AMCS do not support restoration contributions that are inconsistent with the principles given the failure of all analogous approaches to date and the significant risks to Matters of National Environmental Significance. This would be reconsidered should the Standard and Regulations ensure that the acceptance and expenditure of restoration contributions were consistent with the Standard. The ability to discharge residual offset compensation obligations through offset contribution payments will only work if the Restoration Holder is able to deliver offsets better than the proponent

[6] Niner H, Milligan B, Jones PJ, Styan CA. 2017. Realising a vision of no net loss through marine biodiversity offsetting in Australia. Ocean & coastal management 148:22-30.

would (as per the Standard). It should not be an avenue for approval because offsets are unfeasible.

AMCS strongly opposes the statement that, 'in the absence of regulations the Minister retains discretion over what constitutes a net gain.' Net gain is based on science and can be determined using clear criteria. We also strongly oppose any exemptions to the net gain test which threatens to undermine the integrity of the whole approach.

Attachment C: Application of Principles to the Restoration Contributions Holder

When the regulations are developed they should ensure that the Holder meets the Standard, including all requirements set out in the principles. AMCS is opposed to 'exemptions or variations for the Holder when compared to proponent-delivered offset requirements' except in truly exceptional and constrained circumstances.

How the Standard will apply to the Holder

The integrity of the Standard is undermined by the flexibility of the Restoration Holder, who only needs to 'consider' the Standard. Again, the Restoration Contributions Holder should be required to *apply* the Offsets Standard to ensure that restoration actions funded by the Restoration Contributions Holder are consistent with the outcomes and principles set out in the Offsets Standard. Where delivering a like-for-like offset is not feasible then an impact on protected matters should not be approved

Conclusion

There are many strong elements aligned with the best-practice principles introduced in the Standard. However these are largely undermined by the availability to use 'research' as an offset (as opposed to an enabling condition for an offset) and, most seriously, by the ability of proponents to select to make a 'restoration contribution' payment which is then not required to deliver a like-for-like offset (the expenditure of the contribution is not held to all the principles of the offsets Standard). This approach carries considerable risk and has been found to result in failure in each jurisdiction that has been used in.

Only direct, measurable, and attributable 'gains' can be counted as an offset. These gains must be absolute, measured against a fixed baseline and not relative to a predicted future state.

Australian Marine Conservation Society
30 January 2026

Appendix One:

THE UNIVERSITY OF QUEENSLAND
AUSTRALIA
CREATE CHANGE

Best practice principles for biodiversity offsetting in marine environments

A report prepared for the Australian Marine Conservation Society

Authors: Nicole Shumway, Martine Maron
The University of Queensland
17 May, 2024

Contents

1. Summary

Biodiversity offsets are increasingly relied upon to help mitigate the damaging impacts of development on biodiversity. They are also an important focus in the current EPBC Act reform process. Key principles to underpin sound and appropriate biodiversity offsets have been developed over the past two decades. These principles are touchstones to guide offsetting policy and decision-making, regardless of the environmental context. However, most experience with offsetting activity has been from terrestrial environments. The specific implications of offsets in the marine environment remain, on the whole, highly uncertain.

This report aims to provide the Australian Marine Conservation Society (AMCS) with a summary of the current situation regarding offsets in coastal and marine environments, outline how best practice principles relate to the marine environment, and propose a way forward for marine offsets that does not worsen the extinction crisis. This work is intended to help inform AMCS's views on offsets in the marine environment, and prepare AMCS to assist with continued input into the EPBC Act reform process and evaluate its outcomes. The report focuses on clearly outlining best practice for offsets in marine and coastal environments, using concrete examples wherever possible, and identifying risks and pitfalls that lead to poor environmental outcomes.

The first section of this report gives a brief overview of biodiversity offsets and the key principles which, taken together, provide the basis for potentially achieving no net loss outcomes, in line with the mitigation hierarchy. We outline the distinction between 'absolute' and 'relative' no net loss and net gain outcomes, and show that only absolute net gain outcomes are aligned with nature positive ambitions. The report then gives a brief overview of offsets in the Australian context. Drawing on published examples, as well as discussions with key practitioners internationally, we then detail the use of biodiversity offsets in the marine realm in Australia and internationally, including highlighting examples of existing practice and issues identified with each. Finally, we propose a series of best-practice principles for the translation of biodiversity offsets to the marine realm, in 'checklist' form.

We find that despite Australian offset policies sometimes aligning with best practice in theory, we found no examples of marine offsets that align with all essential elements of good practice. The shortcomings of offsets that we examined arose from problematic design, implementation, and monitoring and evaluation. Key elements of the proposed checklists include (1) the mitigation hierarchy has been followed demonstrably and rigorously; (2) specific offsets are identified prior to impact occurrence and that liability is not transferred without demonstration of offset

feasibility and resourcing; (3) there are compulsory requirements to monitor and publicly report on offset actions and outcomes for each affected matter relative to any counterfactual assumptions; and (4) offsets are not relied upon where the efficacy of an offset action is unknown or highly uncertain.

Finally, we provide an evaluation of the proposed approach to offsets under the current EPBC Act reform process, with a particular focus on the draft Restoration Actions and Restoration Contributions National Environmental Standard. Although there are many strong elements of the policy aligned with the best-practice principles we outline, we find these are largely undermined both by the availability of 'research' as an offset (as opposed to an enabling condition for an offset) and, most seriously, by the ability of proponents to select to make a 'restoration contribution' payment instead of deliver a like-for-like offset, an approach which carries considerable risk and has been found wanting in each jurisdiction that has introduced it in Australia. We detail a series of changes to the proposed approach that would minimise risk and deliver better environmental outcomes in line with the mitigation hierarchy.

2. Overview of biodiversity offsets and key elements of good practice

Key points:
Biodiversity offsets are actions that counterbalance specific impacts on particular elements of biodiversity. They are the final step in the mitigation hierarchy, after avoidance, minimisation, and restoration, due to their high-risk nature and proneness to failure. Only direct, measurable, and attributable 'gains' count as offsets – not indirect actions such as funding for research. Offsets should comply with established criteria for best practice. Most offsets, even 'net gain' offsets, are only designed to achieve 'relative' gain, in which the target biodiversity still declines over time. Offsets aligned with 'nature positive' require a different approach and higher standards.

Biodiversity offsets are a common mechanism for addressing impacts on biodiversity from development. Akin to a 'polluter pays' approach, they are used globally in a range of contexts, and may be government-mandated requirements, voluntary corporate commitments, or requirements of financiers. The aim of offsetting is to allow for economic development while mitigating impacts to biodiversity (Madsen, Carroll & Moore Brands 2010; Madsen et al. 2011; BBOP 2012c; Bull & Strange 2018). However, offsets are a high-risk approach, and because of this, are only recommended as a last resort.

Theoretically, biodiversity offsets work by measuring an 'impact' to a particular biodiversity value or suite of values (e.g., threatened species or ecosystems) and then restoring and/or protecting the same biodiversity features that are lost from development in order to generate an equivalent gain (McKenney & Kiesecker 2010b). In reality, 'biodiversity' itself is too complex to be quantifiable, and no two living entities or ecosystems are identical. There are therefore risks and uncertainties in offset exchanges, and some net losses of biodiversity are inherent to such exchanges. In Australia, for example, offsets are directed only at a subset of protected matters, leading to a net loss of all other non-protected matters.

The goal of an offset is to achieve at least 'no net loss'. This means that the biodiversity values impacted by a development must be counterbalanced by offsets benefiting the same biodiversity value(s), such that losses and gains are *ecologically equivalent* (Quétier & Lavorel 2011; BBOP 2012c; BBOP 2012a; Gonçalves et al. 2015). Ecological equivalence has three dimensions: equivalence of **type**, meaning the impacts and the offsets should be 'like for like' or 'in kind' (ten Kate, Bishop & Bayon 2004; BBOP 2012c); equivalence of **amount**, such that the amount of gain is at least as large as the amount of loss (IUCN 2016) (IUCN 2016), and equivalence of

duration, such that the gains last at least as long as the development impact occurs – often, in perpetuity (Bull et al. 2013).

To achieve at least 'no net loss', the benefit of the offset action for the affected biodiversity value must be both attributable and measurable. This means that actions such as funding for research is not an offset, as it does not directly benefit the affected protected matter. Research can be an important component of a conservation strategy, but only if it is translated into an action that affects the protected matter 'on the ground' (or 'in the water'). As such, the research itself may be necessary to enable an offset, but is not itself part of an offset. A successful offset depends upon knowledge of what type, how much, and where actions need to be done to create a particular amount of benefit for a particular species or ecosystem. Often, this is simply not known, and research is necessary to inform an offset approach. However, in this situation, the research is merely a necessary precursor to an offset proposal – not an offset itself. Equally, paying a fee in lieu of an offset is not, itself, an offset – it requires that fee to be used to deliver an ecologically equivalent offset, and therefore an approach for the practical delivery of the offset must be available with adequate certainty.

Done well, offsetting has the potential to help reduce net impacts on biodiversity by internalising the replacement cost of impacted biodiversity, and making clear the limits of what can be replaced. However, it is also the highest-risk approach. Reviews of offset performance globally and in Australia have repeatedly found that outcomes fall short of achieving no net loss for affected biodiversity (zu Ermgassen et al. 2019; Zu Ermgassen et al. 2023). Even otherwise well-designed policy is prone to poor outcomes due to implementation challenges (Evans 2023), and even perfectly implemented policy still fails to account for all aspects of biodiversity, and generally falls well short of standards required for 'nature positive' outcomes (Simmonds et al. 2022; see Biodiversity offsets, net gain, and nature positive, below). For all these reasons, offsets are considered a high-risk approach.

The mitigation hierarchy

Best practice guidelines in biodiversity offsets were developed around the concept of the mitigation hierarchy: that impacts to biodiversity values must first and most importantly be avoided, then minimized, and any remaining impacts restored. Only when all three of these steps have occurred should an offset for any residual impacts be considered, with the goal of achieving 'no net loss' (NNL) of biodiversity (ten Kate, Bishop & Bayon 2004; BBOP 2012c).

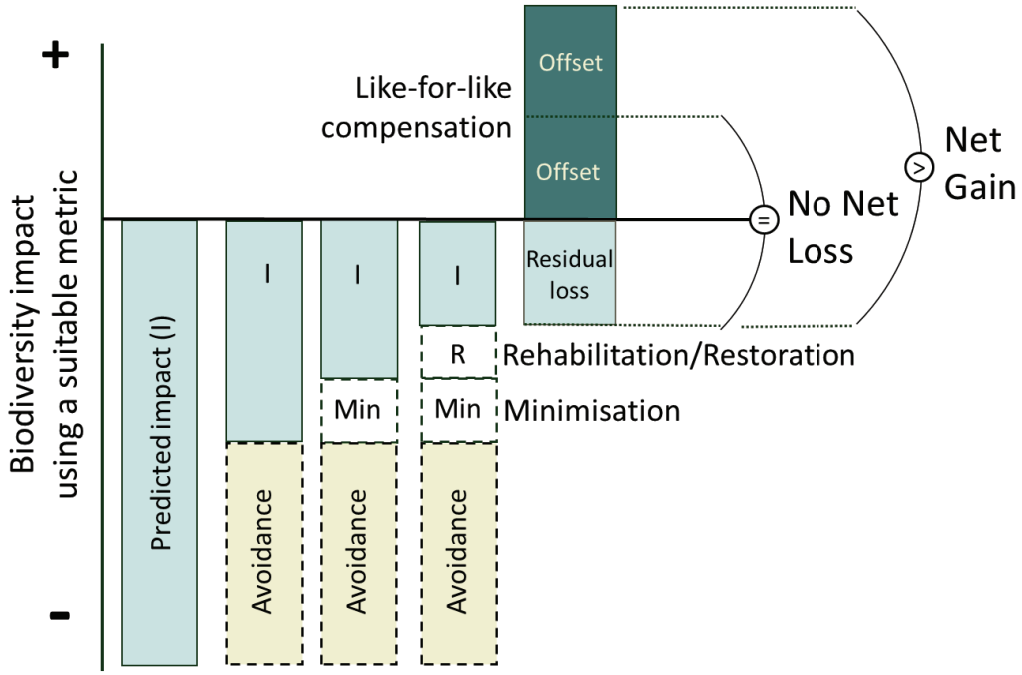

Figure 1. *The mitigation hierarchy is a successive series of steps prioritising avoidance of impacts on biodiversity, followed by minimisation and repair of short-term impacts on-site, with offsets as a last resort.*

Strict application of the mitigation hierarchy (MH) is crucial to the achievement of NNL. In particular, the International Union for the Conservation of Nature's *Policy on Biodiversity Offsets* (IUCN 2016) outlines that the mitigation hierarchy *must* at a minimum be applied as early as possible in the development process; prioritise avoidance and lower-impact project designs (including not proceeding with the project; Bull et al. 2022); work at the broader landscape/seascape level; identify 'no-go' areas; clearly distinguish impacts at all steps in the mitigation hierarchy – including direct, indirect and cumulative impacts throughout the landscape and through time; follow a science-based, transparent, participatory and rights-based approach; apply the precautionary principle; and finally, take an ecosystem-based approach (e.g. considering ecosystem structure, interactions and functions/services) in all stages.

Key elements of offsetting

International best practice standards recognise a series of elements that are integral to robust application of biodiversity offsetting and the achievement of no net loss. Key standards include the IUCN Policy on Biodiversity Offsets (IUCN 2016) and the Business and Biodiversity Offsets Programme's Offsets Standard (BBOP, 2012c). Here, we summarise these key elements. In Table 1, we tabulate these elements and provide summary examples of how adherence or otherwise to each can affect offset outcomes in the marine environment.

1. ***Limits to offsetability*:** Not all impacts to biodiversity can be offset. For some systems, particularly those that are irreplaceable within ecologically-relevant time scales or highly vulnerable to extinction, achieving no net loss through offsetting will not be feasible and development impacts would not be acceptable (BBOP, 2012b). Biodiversity impacts on highly vulnerable or irreplaceable values, or where there is a high level of uncertainty around achieving successful offset outcomes, should rather refocus on the first three stages of the mitigation hierarchy (avoided, minimised, restored; BBOP, 2012a; Pilgrim et al. 2013).

2. ***Measuring biodiversity*:** Planning and evaluating an offset exchange to ensure that no net loss is achieved requires considerable attention to measurement. The types of biodiversity that are the focus of the no net loss requirement first need to be specified, and the way in which those are quantified (e.g., indicators) determined. The ability to measure those indicators in the field is required, including the ability to detect change in the value of the indicators in relevant timeframes. Finally, most offset planning and impact assessment requires an ability to predict, with reasonable accuracy and precision, expected changes in the values of the indicators over time, in scenarios with and without both the development project and the proposed impact.

3. ***Additionality*:** The benefit attributed to an offset action must only include those outcomes that would not be expected to have occurred in the absence of the offset action. In other words, offset benefits must be “additional” to those expected to occur under a counterfactual or reference scenario (McKenney & Kiesecker 2010a; Maron, Rhodes & Gibbons 2013; e.g what would have happened without either the impact or the offset; Bull et al. 2014). Therefore, having appropriate reference scenarios are critical to measuring impact and achieving offset additionality (although see ‘Biodiversity offsets and relationship to net gain’, below). Offsets also must not simply move negative activities to another area.

4. ***Timeframes and uncertainty*:** Offsets should also be maintained at least as long as the impact occurs, and in many cases, this means in perpetuity (Bull et al. 2013). Time lags between the development impact and the realisation of offset benefit should be minimised or accounted for within the offset metrics or multipliers used, though advanced offsets (i.e. offsets that are in place before the impact occurs) are best where practical to ensure appropriate biodiversity offset sites are available and able to achieve biodiversity gains (Bekessy et al. 2010). Uncertainty about losses and gains must also be accounted for, which is often done through the use of multipliers (BBOP, 2012c; Bull et al. 2013; IUCN 2016);

for example, multipliers that account for lack of data confidence, time lags or success rates (e.g. success of restoration, Maron et al. 2016b). However, large uncertainties, such as whether successful restoration is possible, cannot be adequately addressed through the use of multipliers.

5. ***Monitoring and evaluation*:** Offsets must be planned based on projected or estimated outcomes. Thus, monitoring and evaluation of the realised outcome of offsets are key to ensuring adaptive management and understanding net outcomes (Harper & Quigley 2005b; Pickett et al. 2013). Appropriate baseline surveys are required prior to either the impact or the offset, and monitoring and evaluation of the offset should continue to measure actual losses and gains at the offset site, as well as establish the appropriateness of any counterfactual scenarios used for estimating offset benefits. This will help ensure actual losses and gains are ecologically equivalent and that management actions can be iteratively evaluated and updated to help achieve no net loss outcomes. To enable evaluation, clarity around the goal of offsets is key (Maron et al. 2018). For example, no net loss is often only intended to be achieved relative to a baseline of decline, such that a 'no net loss' or even a 'net gain' outcome from an offset still means less biodiversity after the impact and offset, than before (see 'Biodiversity offsets and relationship to net gain', below). Ultimately, a lack of clarity behind the meaning of these definitions impedes both robust policy and offset design, and evaluation of offset success.

6. ***Governance and administration*:** Strong governance and effective administration of policy is key to ensuring implementation and compliance of offset projects (Salzman & Ruhl 2000; Mann 2015). This includes strict application of the mitigation hierarchy, limiting discretion and flexibility, as well as enforcement of long-term implementation of offsets and monitoring of outcomes.

7. ***Social, cultural and other ecosystem service values*:** Biodiversity underpins ecosystem service provisioning. This includes services critical for humans, such as food provisioning, water purification and coastal protection, all of which will become increasingly important in the future given the impacts of climate change. There are also social and cultural values that should be accounted for. Offset design should therefore take into consideration how changes in ecosystem function, structure and composition might change the flow of ecosystem service to different stakeholders and rights-holders at different spatial and temporal scales (BBOP, 2012c).

Policy context in Australia and EPBC Act reforms

Australia is one of 77 countries globally that currently have some form of national biodiversity offsetting or compensatory policy framework in place (Shumway et al. 2018). Biodiversity offsets in Australia are generally part of the environmental impact assessment (EIA) framework applied to individual development activities. Five of Australia's six states (QLD, NSW, WA, VIC, SA) and one territory (NT) have also developed offsetting policies that are applicable to marine environments (Niner et al. 2017b; Shumway et al. 2018). At a state level, there are a range of matters which may trigger offsetting requirements, in particular impacts relating to declared fish habitat areas, fish passageways, marine plants, marine parks, marine wetlands, and threatened animals (State of Queensland 2023). However, here, we focus on biodiversity offsets in the context of the Federal EPBC Act.

The EPBC Act itself does not refer to environmental offsets. However, an offset policy framework has operated in conjunction with the Act since 2012 (and prior to this, offsets were commonly included in conditions of approval). Offsets are required in accordance with the Environment Protection and Biodiversity Conservation (EPBC) Act Environmental Offsets Policy 2012 for significant residual impacts on Matters of National Environmental Significance (MNES or 'protected matters') after impacts have first been avoided and then mitigated. In the marine realm, these include a range of MNES including world heritage properties, listed threatened species and ecological communities, Commonwealth marine areas, and the Great Barrier Reef Marine Park.

The EPBC Act Environmental Offsets Policy aligns quite closely with international best practice, and appropriately addresses most of the key elements outlined above. It is supported by an offsets calculation tool, called the Offsets Assessment Guide, which, if used with robust inputs and in line with the policy, would support good practice use of offsets in cases where significant impacts on MNES are approved (Miller et al. 2015).

In reality, the implementation of the policy has been poor, and fallen well short of the standards that the policy sets out (Samuel 2020). As a result, many, perhaps most, offsets conditioned under the Act are likely to fall well short of achieving a no net loss outcome, let alone an absolute net gain outcome aligned with a nature positive vision (see 'Biodiversity offsets, net gain and nature positive ', below). This means that approval decisions under the EPBC Act, even those that attract offset requirements, have helped to drive continued biodiversity declines in Australia.

The shortcomings of offsets under the EPBC Act have been identified in several reviews including that of the ANAO (ANAO 2020) and the 2020 statutory review of the EPBC Act (Samuel 2020) as well as through independent research (Evans 2023; ACF 2024). The ANAO report highlighted a tendency for precedent (often, low-quality

offsets), rather than scientific input, to inform offset obligations imposed on proponents. A recent study demonstrated widespread problems with conditions of approval not specifying offset requirements, and instead leaving the identification of specific offset actions to the post-approval stage, at which point negotiated solutions that may not achieve the policy objective could occur (Evans 2023). Another recent study found that only 30% of terrestrial offset sites were adequately legally protected (ACF 2024). Finally, the Samuel review was particularly critical of the over-reliance on averted loss offsetting, recognising that such offsets by their nature resulted in net declines over time for already-threatened matters (Figure 2).

The current process of EPBC Act reforms has proposed to deal with these criticisms by overhauling the environmental approvals system, including substantial changes to offsetting. The key changes most relevant to offsetting are captured in a proposed new national standard, which, although it no longer uses the term (replacing offsets with the term 'restoration action'), sets out the way that offsets would be done under a new Act. This "*National environmental standard for restoration actions and restoration contributions*" proposes a sound, though incomplete, set of principles for the use of offsets as conditions of approval. However, it then includes an option for any proponent to make a payment ('restoration contribution') in lieu of procuring an offset into a fund (the Restoration Contributions Fund), which would transfer the liability for offset delivery to the government agency administering the fund. The fund would be overseen by a committee which would make recommendations on the use of the payments received. The stated intent is for the payments to be used to deliver an ecologically equivalent offset. However, there is wide scope to evade this requirement, and for other uses of the payments to be permitted, as long as they achieve an overall better environmental outcome. How that would be judged is not clear. We provide a full review of the proposal to reform offsets under the EPBC Act in Section 5.

Beyond project-by-project offsets, there is provision to use regional plans and 'regional restoration measures' to compensate for priority development actions. These measures will also be able to be delivered through restoration contributions into the fund. These provisions appear likely to apply to both terrestrial and marine areas that are subject to regional planning. A National Environmental Standard for Regional Planning outlines the proposed approach.

Biodiversity offsets, net gain, and nature positive

The goal of offsetting is to achieve *at least* no net loss of the focal biodiversity. Increasingly, however, there are moves to set the bar higher, and require a net gain outcome (Bull & Brownlie 2017; Jones et al. 2019). For example, England has recently

adopted a policy requiring 'Biodiversity Net Gain' for relevant development impacts on nature (Defra 2019). The current EPBC Act Environmental Offsets Policy leaves open whether no net loss or net gain is required, using the wording 'improve or maintain'. The EPBC Act reforms in Australia are being framed as 'nature positive', and refer to 'net gain' requirements from offsets.

Whether a net gain requirement is markedly different from a no net loss requirement, and whether it aligns with 'nature positive', depends on two factors:

1) *How much* net gain is required, over and above the achievement of no net loss; and
2) Is the net gain required to be achieved *relative* to a counterfactual scenario, as is typical in offsetting, or does it signal an intent to move towards *absolute* gains in the relevant biodiversity over time, as would align with a 'nature positive' vision?

In practice, the implications of the first of these factors – how much net gain is required – are the simplest. A net gain requirement of 10% would simply increase the size of the offset obligation accordingly, and in most cases, this would simply mean an offset 20% larger, or providing 20% more of the activities required to deliver no net loss. In sum, it generally requires no difference in how offsets are calculated or delivered – simply that they are somewhat larger.

In contrast, a move to net gain that was associated with a desire for the affected biodiversity to improve over time in absolute, rather than relative, terms, implies a substantial shift in the types of actions that would qualify as offsets and in the way that offset gains are calculated. Currently, in all Australian offset policies, the 'no net loss' or 'improve or maintain' outcomes from an impact-offset exchange are required (or implied) to be achieved relative to a counterfactual scenario of what would have happened otherwise – that is, if neither the impact nor the offset were done (Maron et al. 2015). Often, this counterfactual scenario is envisaged to be one of decline. This is why averted loss offsets are routinely used. Averted loss offsets aim to maintain the current state or condition of a place in terms of its biodiversity. Such offsets can only validly be considered to deliver a gain if, without the offset, that biodiversity would have degraded or been lost. Because of this, 'no net loss' in the Australian context routinely means an ongoing decline is simply maintained – the combination of a loss in one place, and a prevention of a loss in another, is simply the same amount of loss that would otherwise have occurred (Maron et al. 2018).

Likewise, 'net gain' relative to a counterfactual scenario of decline can, and often does, mean a continued decline considering both the impact and offset sites combined – but a decline that is less steep that otherwise would have occurred without the impact and the offset. We call this a 'relative net gain' policy. Clearly,

such an outcome is at odds with the concept of 'nature positive', which requires an absolute reversal of biodiversity decline over time.

For an offsets policy to achieve an outcome aligned with nature positive (at least for protected matters within the scope of the policy), the net gain requirement would need to be required to be achieved in absolute terms – not relative to a counterfactual scenario. We call this an 'absolute net gain' policy. Such a policy has benefits beyond the improved outcomes for biodiversity. For example, it simplifies the calculation of offset requirements and reduces the extent to which they can be 'gamed', because the reliance on an unobservable counterfactual scenario is eliminated. It also allows offset policies to be designed to be in alignment with positive conservation goals (Simmonds et al. 2019; Maron et al. 2024). Absolute net gain, aligned with the concept of nature positive, is the basis of England's Biodiversity Net Gain policy.

The key difference between relative and absolute net gain policies is the treatment of averted loss when estimating the gain achieved by an offset action. In a relative net gain policy, a counterfactual scenario must be estimated of what would have occurred at the offset site if the offset did not go ahead. Constructing this counterfactual is complex, as it must exclude any impacts that themselves would have triggered an offset requirement (Maron et al. 2024). It is also prone to manipulation by proponents, as a given amount of offset action could be considered to generate a larger gain if the counterfactual decline was believed to be steep. This situation can generate perverse incentives (Gordon et al. 2015; Maron et al. 2015)

In an absolute net gain policy, there is no requirement to construct a counterfactual scenario. Instead, the gain is measured relative to a baseline which is the state of biodiversity at the site prior to the offset action taken place. As such, only improvements from that state are considered to generate creditable gains, which can in turn be exchanged for losses. This approach ensures that the net outcome across the impact and the offset sites is one of improvement in biodiversity over time, despite the impact proceeding.

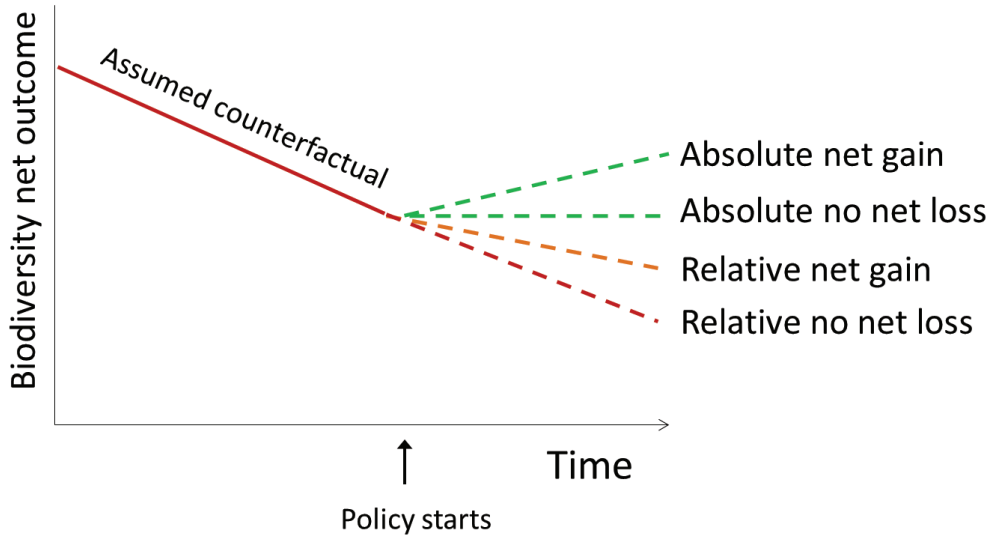

Figure 2. *The difference in net outcomes across impact and offset sites as a result of different 'net outcome' goals.*

Only an absolute net gain approach is consistent with claims of 'nature positive' (Maron et al. 2024). Achieving nature positive requires reversing Australia's environmental decline and recovering its threatened species – not slowing their decline, as relative no net loss or even relative net gain approaches would do. However, given the relative no net loss approaches typical of Australian offset policies currently, a robust relative net gain approach, with strict limits on the use of averted loss offsets, would be an improvement on the status quo, if not aligned with nature positive. To achieve nature positive, such an approach would require the shortfall in gains (the gap between the net outcome achieved from the offset, and an absolute gain for the protected matter) to be achieved through other conservation investments.

3. Challenges for biodiversity offsets in the marine environment

Key messages: *There is a series of requirements that must be met if marine biodiversity offsets are to achieve their objective, whether that be 'no net loss' or 'net gain' of biodiversity. These requirements are stricter if the standard to be met is absolute net gains, consistent with nature positive. However, biodiversity offsets in the marine environment are less common than those in terrestrial environments, and evidence of successful examples is sparse. Most marine offsets meet some, but not all, of the necessary requirements for good practice, and as a result, often fall far short of their goal.*

Biodiversity offsets in the marine environment are much less common than their terrestrial counterparts, and research and evaluation of marine-specific offsets has lagged considerably (The Biodiversity Consultancy 2013; Bos, Pressey & Stoeckl 2014; Niner et al. 2017b). While there are limited examples of biodiversity offsets achieving no net loss in terrestrial environments (zu Ermgassen et al. 2019), there are fewer still in the marine context. There is, however, a lack of outcome reporting across all biodiversity offset projects both in Australia and globally, in part because of the commercial confidentiality that often occurs as part of these projects. As such, uncertainty around the potential for success of marine offsets is particularly high.

Marine and coastal biodiversity offsets have hitherto most often been triggered by impacts from coastal industrial and urban development, and natural resource extraction. However, there have been theoretical and modelled studies investigating the potential for biodiversity offsets to be applied to bycatch impacts from fisheries, and on fisheries resources. For example, offsetting fisheries bycatch of seabirds through the removal of island predators on seabird breeding colonies (Wilcox & Donlan 2007; Donlan & Wilcox 2008; Pascoe, Wilcox & Donlan 2011). The use of bycatch levies has also been considered as a market-based mechanism to achieve no net loss by incentivising bycatch prevention and funding conservation of impacted species, though there are few real world applications (Booth et al. 2021). A similar study modelled the impact of fisheries habitat loss from 84 existing development projects on fisheries resources, finding that offsets nearest to impacts will have the best outcome for fisheries (Ma, Rhodes & Maron 2022), but that the multipliers required varied between 1.7-207 depending on the offsetting goal, and in some instances (e.g. offsetting nearby for all species impacted), there was not enough offset area available (Ma, Rhodes & Maron 2023).

Despite alignment of some of Australia's marine offset policies with best practice recommendations in principle, marine offsets in practice have been implemented inconsistently and generally are unlikely to meet no net loss goals (Niner et al. 2021).

Offsets are seen as integral to development consent for marine systems; however, given the challenges of offsetting in marine environments (see issues 1-7, below) and overarching demand for economic growth, there has been a consistent departure from best practice (Niner et al. 2021). A systematic review of marine and coastal development projects in Australia found that the application of the key principles of offsets was either incomplete or absent, and none of the projects reviewed showed any evidence of outlining the application of the mitigation hierarchy or how offsetting requirements were then identified (Niner et al. 2017a). Therefore, it is as yet unclear whether no net loss is feasible in practice given the currently limited ecological foundations underpinning offsetting in marine and coastal ecosystems (Shumway et al. 2018) and the lack of governance capacity for prioritisation of environmental management outcomes (Niner et al. 2021).

In many instances, terrestrial offset policies are applied to marine offsets with little regard to how the fundamental differences in marine environments might make no net loss much more difficult to achieve. While terrestrial and marine offsets have the same theoretical basis, there are important practical differences that have implications for offset feasibility and effectiveness**.** These include biophysical differences, including greater spatial and hydrological connectivity within and between marine and terrestrial systems and species, which influences the scale of impacts and conservation actions and our ability to quantify them accurately. There are also significant social and governance challenges linked to offsetting in the marine environment, such as a lack of clear tenure and a greater potential for leakage as a result of both the high connectivity and lack of clear tenure (Shumway et al. 2018).

Therefore, while offsets in marine systems include the same key elements as terrestrial offsets, and suffer from many of the same challenges, many of these challenges are much more pronounced, resulting in important practical challenges that must be addressed if offsets are to be effective (Bos, Pressey & Stoeckl 2014; UNEP-WCMC 2015). In addition, there is an overall lack of data and knowledge around the current use of offsets in the marine environment and how to appropriately design and execute an offset that can achieve NNL and account for the inherent challenges described.

Below we outline the challenges specific to achievement of no net loss, summarised under each of the key elements of good practice outlined in Section 2 of this report, with a particular focus on examples and application in the marine environment.

1. Limits to offsetability

1.1 Limiting offsetting to matters for which offsets are demonstrably effective.

There are limits to what can feasibly be offset. This is particularly true for marine environments, given the limited feasibility of restoration success in ecologically relevant timeframes. For example, while high energy coastal ecosystems might be restorable within years, feasibility decreases in deeper water ecosystems (Bayraktarov et al. 2016), and could take thousands of years for cold water corals to restore and millennia for deep sea hydrothermal vents (Van Dover et al. 2014). Additionally, there are some components of biodiversity for which impacts could theoretically be offset, but that have a high risk of failure. Under these circumstances, biodiversity offsets are not appropriate, and this means the project as designed should not proceed (IUCN 2016).

There is significant uncertainty that restoration-based offsets can be relied upon to achieve NNL objectives or provide genuine gains for most marine systems. Therefore, techniques for rehabilitating marine environments and the science underpinning marine restoration need further development before marine restoration can be widely relied upon to achieve offset outcomes. As outlined in section 2, the research itself does not constitute an offset, but is merely an enabling condition. Given this uncertainty, until successful offset approaches can be demonstrated for a particular type of impact, **offset obligations should not accrue, e.g. through payments to offset funds.**

Ecosystems with unique species composition are often difficult to offset as there may be no ecologically equivalent sites elsewhere (Pilgrim et al. 2013). For example, offsets for hydropower projects may have to rely on averting losses by withdrawal or preclusion of potential or planned development from other parts of the same watershed. However, such reliance on averted loss gains precludes the potential for 'nature positive' outcomes, and rather generates a controlled drawdown of environmental values (Simmonds et al. 2019).

Example Box 1. Environmentally friendly (seagrass friendly) moorings

Environmentally friendly moorings (EFMs, also known as seagrass friendly moorings) provide an example of offsets that can be demonstrably effective and provide clear additionality. Traditionally used block and chain moorings have bare sediment halos from dragging along the bottom; however, when replaced with EFMs there is a 44% increase in seagrass cover within the surrounding area (Unsworth et al. 2022). Therefore, impacts from a typical ball and chain moorings are easy to see and evaluate and removal of chains and replacement with EFMs have a clearly measurable biodiversity benefit.

EFMs were used as an offset for direct loss to 410 ha of seagrass for land reclamation and unspecified indirect loss from dredging associated with the development of an LNG facility and port at Curtis Island. As part of their post-approval conditions, 'at least' 20 EFMs were required to be installed (GPC, 2012); however, in 2016 Gladstone Ports corporation requested a variance to install six EFMs instead (as well as six reef protection markers), which was approved. Installation occurred in 2018 with monitoring between 2019-2021, finding at the first post installation survey an increase in cover at one site (GPC, 2021); however, no other monitoring or assessment data were available. So while the Port of Curtis Island LNG project presents an example of best practice in the methodology used to achieve seagrass benefit, there was also a lack of effective implementation, a lack of monitoring to ensure the offsets had achieved their intended outcome, and a lack of evaluation to compare the estimated loss and the gains achieved by the offset. It was therefore unclear from project documents whether no net loss of seagrass was achieved as part of this offset.

2. Measuring biodiversity

- **Identifying biodiversity targets**

Biodiversity is enormously complex. No biodiversity offset approach attempts to counterbalance all impacts on all biota affected by an impact. Instead, biodiversity offsets are generally targeted towards a small subset of biota – often, threatened species (or their habitat) and ecological communities. Sometimes, these species and ecological communities may be partial proxies for other species; often, elements of biodiversity that are not explicitly targeted for offsetting suffer an unaccounted net loss. The application of biodiversity offsetting therefore requires identification of measurable units reflecting the particular subset of biodiversity of interest, and for which the no net loss or net gain goal is sought. In the case of marine systems, impacts are often on places and the range of values they support – e.g., the Great Barrier Reef Marine Park is a listed MNES. Quantifying impact on the marine park requires going beyond simply estimating impact on threatened species and ecological communities, but finding proxies that collectively capture the range of values that the Park represents. Such place-based offsets are more common in marine than terrestrial systems, and therefore the identification of specific and measurable biodiversity targets for offsetting is more challenging in the marine realm.

2.2 Accurately measuring biodiversity values including use of proxies

A significant challenge in implementing offsets in the marine environment is the lack of data, which ultimately limits how accurately marine biodiversity values can be measured (Martin et al. 2015). There is also a substantial lack of finely resolved data in the marine environment. For example, in coral reef ecosystems, mapping the extent of coral reef cover is improving (Lyons et al. 2020; Kennedy et al. 2021); however, comprehensive mapping of

coral communities does not yet exist. The same is true for most coastal and shallow marine systems: despite being relatively well-studied, finely-resolved community composition has not been mapped as it has been in terrestrial systems. As a result, in marine systems, offsetting often uses units of measurement that are one or more steps removed from the biodiversity of concern. For example, offsetting might focus on metrics of water quality, with the assumption that this in turn has a reliable relationship with the condition or abundance of a target species or ecosystem (see Box 2).

Ideally, monitoring of offsets would require direct monitoring of the impacted biota, not just the intermediate metrics, such as water quality. For example, offsets for coral reefs that have been impacted by a water quality reduction would ideally track the change in condition on the reef using a suite of metrics (e.g. change in coral cover, condition, composition), similar to the composite metrics used in terrestrial environments (McKenney & Kiesecker 2010b); however, these are challenging and time-consuming to develop and use given the lack of data in marine environments (Viehman, Thur & Piniak 2009). Therefore, surrogate metrics are often used instead (e.g. change in water quality or sediment), and that then becomes the intermediate factor that will both quantify and mitigate impacts to the reef. However, surrogate metrics that are a step removed from both the impact being measured and the mitigation measure will always be an imprecise and disconnected measurement of both the impact and the offset (Shumway et al. 2018).

Example Box 2. LNG facilities in the Great Barrier Reef World Heritage Area

Three LNG projects collectively have responsibilities to offset both direct and indirect impacts near Curtis Island, Queensland to marine couch, saltpans, seagrass, and mangroves, marine threatened and migratory species, and to world heritage and natural heritage values of the GBR, and for the development of LNG facilities, gas pipelines, marine facilities, docks and offload facilities (including increased vessel traffic) (Commonwealth of Australia 2014a). One project, Queensland Gas Corporation's (QGC) LNG project, was approved by both the state and federal governments prior to the development of an offset strategy, and faced increased scrutiny from a Senate Inquiry into the use of offsets (The Senate 2014). The eventual offset involved the acquisition of land containing remnant coastal habitats of a suitable amount, that were subsequently given to the state government for management with funding for ongoing pest management (e.g. cattle/pig removal, weed management). This land management was considered sufficient to promote passive regeneration of native vegetation, and the removal of cattle and associated erosion and runoff was considered likely to improve water quality and allow an improvement in marine habitats (Queensland 2013). This offset therefore assumes that changes in land management will lead to a change in water quality, which will in turn lead to a benefit to marine habitat and species. Whether this is the case, and whether the benefits are equivalent to the impacts, is not known, because measurement of the impacted entities

was not included, nor quantitative demonstration of the link between a proxy (e.g. adjacent land condition, water quality) and the impacted marine values.

- **Estimating biodiversity scenarios**

For typical, 'relative no net loss' or 'relative net gain' offsets, the baseline state and condition of the biodiversity values being offset (the state of the target biodiversity prior to the impact and offset) and an appropriate counterfactual (what would have happened to the biodiversity without the impact or offset) are both required to estimate or measure both the biodiversity losses caused by a project, and any biodiversity gains as a result of offset actions. However, defining appropriate counterfactuals is challenging in the marine context given their high temporal variability, and the lack of reliable long-term data (Martin et al. 2015). Where lack of data is an issue, the development of appropriate counterfactual scenarios can be a difficult and expensive task (Jacob et al. 2020).

A further challenge, particularly problematic in marine environments, is accurately estimating likely biodiversity impacts. The marine environment is highly connected, both spatially and hydrologically, and can be impacted by activities occurring across great distances (e.g. >200 km; Devlin et al. 2012). While projects usually account for direct impacts at the project-scale, diffuse impacts are more significant in marine environments (e.g. water quality) and impact evaluation should occur across broader spatial and temporal scales (Jacob et al. 2020). Impact estimation must account for direct, indirect and cumulative impacts from multiple impacts at multiple locations, which can be difficult to estimate and mitigate because they follow pathways that are diffuse and difficult to model and predict. In addition, most marine species have at least one widely dispersive or migratory phase, meaning they are likely exposed to a range of impacts at different life-cycle phases. Offset actions and site selection should consider the complex ecological requirements of species, including their full range of threats. Therefore, accurately quantifying development impacts (given the diffuse nature of impact pathways) can be challenging both in marine environments and across the land-sea gradient. For example, a review of Environmental Impact Assessments (EIA) for marine projects found that impact quantification was mostly absent or simplified given these challenges (Vaissière et al. 2014).

Example Box 3. Development of baselines as offsets

Given the data paucity in marine environments, and the difficulty of estimating project impacts relative to a baseline, a common error in the application of offsetting is the consideration of research to better inform baseline assessment as an offset, rather than as part of the expected EIA process *(Niner et al. 2017a)*. An example of both of these issues is demonstrated by Rio

Tinto's Amrun project offset reports. The Amrun project is a Bauxite mine with associated processing and port facilities located on the western side of the Cape York Peninsula, Qld. Part of the offset strategy for impacts to marine species included the development of an inshore dolphin offset strategy (Condition 49 EPBC 2010/5642) to understand distribution and abundance of listed dolphin species in the region and the identification of habitat used by listed dolphin species *(Rio Tinto 2022)*. The use of research to develop baselines for species being impacted by development may be a necessary precondition for designing an offset, but in itself provides no measurable benefit for the target biota, and as such should not be considered an offset.

Example Box 4. Reef Credits in the Great Barrier Reef

The Reef Credit scheme was developed to incentivise better land management practices to improve water quality outcomes within the Great Barrier Reef lagoon. Since its inception, three methodologies for generating 'credits', which can be purchased as offsets, have been approved. One methodology is the Dissolved Inorganic Nitrogen (DIN) methodology, which reduces nutrient run-off to the Reef by managing nutrient application from agriculture (EcoMarket 2024). To date, the method is estimated to have prevented 44 tonnes of DIN from entering the GBR. However, while there is a well-established relationship between the rate of nitrogen application and reduction in DIN, the equation used to generate credits is based on monitoring data from within catchments and benefit to the Reef is modelled using catchment data from the Queensland Government's Paddock to Reef model (Schultz & Sinclair 2020), rather than through observation of improvement to values from end of catchment values. While it is likely that a reduction in nitrogen application will lead to improvements in DIN, the extent to which changes in DIN will explicitly improve coral reef condition and health is challenging to measure with any certainty.

- Additionality

3.1 Attributing change to offset intervention

Because marine environments are highly connected, causal pathways of impacts between terrestrial and marine environments are indirect and difficult to account for explicitly. Therefore, it is difficult to distinguish offset gains from change caused by other activities and drivers in the seascape (e.g. sedimentation, runoff, pollution, climate change, natural cycles and fluctuations). For example, while we can quantify nutrient and sediment loads at the river mouth, directly linking those impacts to biological and ecological changes in marine species or habitats is challenging and has been limited to date (see Box 4). This challenge is compounded by data paucity in the marine context. Effectively estimating and predicting

which actions will lead to offset gains is therefore limited by the complex and interconnected nature of marine systems.

- **Use of averted loss offsets**

Given the expense and difficulty of marine restoration, averted loss offsets (e.g. the prevention of future losses or declines) are often used in marine environments. These may include offset activities such as removal of or reduction in direct threats to species, expansion of protected areas or marine conservation areas, or restrictions on other damaging activities. The effectiveness of such approaches relies upon several underlying assumptions: that the area being protected or conserved was under future threat, that the offset action prevents this, and that the benefit of this to the affected biota can be appropriately quantified. Where these assumptions can be met, the use of offsets to avert losses from other impacts (see box 5, see activities in The Reef Trust 2017) can lead to genuine biodiversity gains. However, averted loss offsets often overestimate threats at offset sites to prevent impacts that were unlikely to eventuate in practice. This inflates the benefit that a given offset is assumed to provide, reducing the offset obligation on a proponent and resulting in net negative environmental outcomes.

Averted loss offsets that rely on funding of existing protected areas can also run the risk of contributing to cost-shifting (Maron et al. 2015). The more funding that flows to such activities, the greater the risk that offsets become relied upon to make up funding shortfalls by governments, or worse - that the additional funding flow from offsets is seen as an opportunity to reduce the dependence on public funds. Such cost shifting erodes additionality (Gordon et al. 2015). Given the relatively slow pace of marine protected area establishment in some countries and the limited resources to support MPA management, a case could be made that funding of MPAs in these locations is additional (Jacob et al. 2020). However, in wealthy countries, it is hard to argue that effective management of existing protected areas, or expansion of protected areas to meet government commitments, must rely upon equivalent damage elsewhere (Maron et al. 2016).

Example Box 5. Averted loss offsets

The development of a bauxite mine on the western Cape York Peninsula was likely to impact threatened sea-turtles in the area, during both the construction/operations phase (e.g. direct losses from reductions in nesting and feeding habitat, increased risk of vessel strikes, and indirect impacts from artificial light and increased recreational activity); however, the reductions in sea turtle populations was unquantified in the EIS (Rio Tinto 2013). Nevertheless, this project demonstrates an approach to averted loss offset that could reduce the loss of sea turtle hatchlings through the management of feral pigs in Weipa, Cape York (QLD) as part of

Rio Tinto's Amrun Bauxite mine project. An adaptive feral pig management strategy aims to reduce nest predation of listed threatened turtle species. The management strategy also requires surveying to develop baseline data for turtle species in the project area to ensure that desired outcomes were being achieved, and if not, that corrective actions are taken. A total of 709 pigs were culled in 2021. Beaches with ground-based shooting had nest predation rates of 5%, while two unmanaged beaches (Southern and Amban) had almost all nests depredated and zero hatchling success (Rio Tinto 2022). An additional 578 pigs were culled in 2022 (Rio Tinto 2023). If done as prescribed, including adaptive management and monitoring, the shooting of feral pigs could lead to significant averted loss of sea turtle hatchlings in Cape York, or even result in absolute population gains, depending on the scale of the effect and the successful implementation of other mitigation measures; for example, the prevention of vessel strikes. However, without monitoring and reporting on the project impacts as well as the offset benefits, it is not possible to assess the net outcomes from this offset.

The development of a dolphin habitat protection area in Shoal Bay as part of the East Arm Wharf expansion, Darwin Harbour, is another example of an averted loss offset that is unlikely to have generated much benefit. Condition 41 of the project approval required the protection of 50 ha of verified dolphin habitat to offset impacts of the harbour expansion on local dolphin populations. The development of the Shoal Bay dolphin habitat protection area was gazetted and signage installed, including that the development of the conservation area would prevent any future development. However, the area is not currently managed outside of existing management of the Harbour and fishing and boating is still allowed within the conservation area. Further, it adjoins a land reserve and was therefore unlikely to be developed. As such, the benefit to the dolphins from this action is potentially very small.

- **Leakage**

The lack of clear boundaries and the greater connectivity in marine environments mean that 'leakage' or the displacement of an impact to another location (rather than its removal from the landscape) may be a significant risk in marine offsets (Shumway et al. 2018). For example, the rezoning of an area to reduce boat traffic or fishing effort may remove a threat to that area, but likely displaces those same activities to another location. This means that the benefit attributed to the offset may be lower than estimated, or there may be no benefit at all. Leakage should therefore either be accounted for as part of the offset process, or offsets should be focused on the removal of threats that are not easily shifted elsewhere (see Box 6). However, there is recognition in the literature that leakage for offsets is poorly reported and accounted for, even in terrestrial settings (Moilanen & Laitila 2016).

Example Box 6. Industry buybacks

While not an offset, the purchase of a shark fishing license in the GBR by the World Wildlife Fund (WWF) is an example of an activity that permanently removed an impact in a way that prevents leakage. In 2016, WWF spent $100,000 to buy back an N4 licence which allowed fishers to target sharks and mackerel with 1.2 km long nets (WWF, 2016). The license caught more than 500,000 kg of sharks between 1993-2004 (approximately 10,000 sharks per year), and though not actively used for sharks at the time of purchase, will prevent future losses of shark and any potential bycatch if the license was bought by someone planning to fish it. This could be used as an example of how to offset direct impacts to species with high incidental interaction with a fishery. For example, the buyback of licenses in the Eastern Tuna and Billfish Fishery which have high levels of sea turtle bycatch, to offset impacts to sea turtles in another location.

- Timeframes and Uncertainty

  - **Offset permanence**

Offset permanence can be difficult to ensure where there is no private ownership (e.g. marine areas) or where there is complex land tenure (e.g. coastal areas; Bell-James, Fitzsimons & Lovelock 2023). This indistinct or lack of private ownership in some cases is likely to change the type of offset actions that can occur, from buying land for protection or aversion of threat (as is often seen in terrestrial environments) to other types of threat removal or restoration activities. Most marine systems are publicly-owned in Australia, making some types of intervention potentially complicated (Dutson et al. 2015). In addition, countries only have jurisdiction over marine ecosystems within 200 nautical miles of the coast (within their Exclusive Economic Zone), while the 'high seas' are governed by the United Nations Convention on the Law of the Sea (UNCLOS). While the UN recently adopted the Agreement on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction ('BBNJ') which calls for the sustainable use of biodiversity in the high seas, the mechanisms and framework for legal enforcement of such obligations are as yet untested. Therefore, there is currently limited legal assurance that continued monitoring and management of offsets would occur over the long-term if they were to occur in areas beyond national jurisdiction. Notably, even most terrestrial offsets under the EPBC Act have been found to lack adequate enduring protections (ACF 2024), and so in the more challenging context of the marine environment, a focus on delivery models that can provide genuinely permanent outcomes will be key.

Example Box 7. Fisheries bycatch reduction

Where the protection of habitat may be challenging (e.g. in the cases of indistinct ownership), non-standard approaches to offsets may prove more successful in providing

lasting outcomes. One such example is the adoption of a more holistic approach to fisheries impacts, whereby a fisher can finance improved gear that reduces bycatch in one fishery to offset impacts caused by their own fishery (Squires, Seminoff & Dutton 2010). This may only be considered additional if there was not already a commercial advantage to the use of technologies. For example, funding the use of pingers (e.g. acoustic devices that alert whales and dolphins) in the artisanal drift gillnet fishery can reduce marine mammal bycatch (Squires, Seminoff & Dutton 2010). Adoption of improved gear can be a pathway to long-term benefit.

- **Ensuring appropriate multipliers**

Multipliers are often applied to account for uncertainties inherent in the offset calculation process; for example, to account for low to moderate data uncertainty, time-lags, and rates of restoration success. For example, the use of science-based multipliers can help account for both rates of success and risks of catastrophic loss from unavoidable events (e.g., cyclones and floods; Bull, Lloyd & Strange 2016). However, multipliers used in offsetting schemes are often arbitrary, and even large multipliers do not fully address these risks. In marine environments, ensuring the use of robust and appropriate multipliers is arguably more important given the data uncertainties and the low rates of restoration success. Multipliers should not be used to address high levels of uncertainty or long time lags (FFI, 2017).

Example Box 8. Appropriate multipliers

Different approaches to multiplier application can result in very different outcomes for the same impacted matter. For example, using the Reef Trust offset calculator, offsets for seagrass incorporate a multiplier (applied to area of impact) of 2.6 which accounts for rate of restoration success (Bayraktarov et al. 2016), a cost data confidence multiplier of 2 which accounts for uncertainties that cost estimation is accurate, a surrogate condition multiplier to account for the risk that locations in poor condition will not respond to restoration as successfully as those in better condition, and a time delay factor to account for the time lag between the implementation of the offset and the predicted achievement of benefits. By contrast, under the Queensland Environmental Offsets Policy, an impact to seagrass would have an offset multiplier capped at a maximum of 4 (State of Queensland 2023). This capping of multipliers under Queensland's offset policy was not a science-based decision, despite evidence that capping multipliers was arbitrary and that higher multipliers were likely needed to achieve intended policy outcomes in marine environments (Parliamentary Committees 2014; Queensland Government 2019).

- **Restoration effectiveness**

Marine restoration is typically expensive, uncertain, and often unrealistic within the timescales of large-scale development projects (Bayraktarov et al. 2016). Coastal systems may take years to yield restoration success; mangrove and warm water coral reefs take decades, while cold water corals may take orders of magnitudes longer given their complexity and inaccessibility (Van Dover et al. 2014). Further, there remains a limited number of successful case studies to learn from (Purandare et al. 2024) and few tried and tested techniques that can be widely applied. For example, most restoration offsets have poorly defined objectives and outcomes were reported in terms of rates of survival (e.g. number of propagules surviving), rather than whether restoration offsets had achieved their intended not net loss objective (Jacob et al. 2018).

Example Box 9. Restoration outcomes

While restoration outcomes in the marine environment are far from guaranteed, there are examples of restoration that have achieved good outcomes. Managed realignment in the UK has been used effectively to improve coastal wetland and intertidal habitat and build natural flood resilience. Coastal areas have historically been 'drained' by creating a gate or a bund in intertidal streams to cut off tidal flow to the upper reaches, which allows for agricultural use where it was previously too saline. However, removal of these obstacles has proved successful in quickly restoring coastal wetlands and salt marsh landscapes. For example, The Hesketh Out Marsh Project, UK created 322 ha of intertidal saltmarsh as an offset for habitat loss for sea defence works by the Lancaster City council (Climate Adapt 2016). In Australia, this method of restoration is called restoration of tidal flow, and while still in its infancy, there are several examples of successful outcomes. For example, the Blue Heart project (Sunshine Coast, QLD) is an area of approximately 5,000 hectares which is in the process of restoring some areas of the Maroochy floodplain, which includes 191 hectares of former cane land that is being naturally restored by tidal reintroduction, as a water quality and nutrient offset for Unitywater (Sunshine Coast Council 2024).

A less-successful example is the construction of an artificial reef in Dampier Harbour (WA) to offset the loss of nearshore reef habitat from land reclamation for an Iron ore stockyard, with a goal of at least 10% coral cover over 10 years (Blakeway et al. 2013). Project monitoring found that after 5 years of monitoring the artificial habitat had achieved ~2.3% live coral cover, while similar nearby reference sites had up to 35%. Coral composition was also markedly different (e.g. higher abundance of early coloniser species). Other studies suggest that even after decades, artificial reefs have lower species diversity and composition relative to nearby natural reefs (Burt et al. 2009), demonstrating that while some restoration can achieve offset outcomes, others, such as coral restoration, have had limited success (Bayraktarov et al. 2016).

- Monitoring and Evaluation

  - **Lack of monitoring and impact evaluation**

While offset actions are mandated, there is a lack of monitoring and outcome reporting which can then be evaluated relative to offset obligations (Harper & Quigley 2005a; Quigley & Harper 2006; Niner et al. 2017a; Shumway et al. 2018; Jacob et al. 2020). Even rarer is robust evaluation of the gain attributable to an offset action, or retrospective evaluations of impacts. For example, a recent review of the NSW offset program found that 90% of offset sites did not require ecological monitoring (Audit Office of NSW 2022). A separate review of marine offsets in Australia (primarily port development in Qld and WA) found no discussion of post-approval compliance monitoring within the 42 projects reviewed, and that only 11% of projects included any assurance that outcomes would be achieved (e.g. through bonds or adaptive management); however, this was not a surprising outcome given only 14% of the projects could clearly link quantified impacts to the offsetting requirements (Niner et al. 2017a). Ecological monitoring is needed to ensure offset actions are achieving necessary gains to compensate for biodiversity losses; however, without monitoring in place the efficacy of biodiversity offsets remains unknown. Requiring outcome-based offset conditions might improve this lack of demonstrated outcomes (but this must not mean permitting offsets where no evidence of effective actions exists). Therefore, monitoring and adaptive management frameworks should be required, along with regulatory oversight, enforcement and compliance monitoring, to ensure offsets are being implemented effectively. Public registers are one mechanism that could be used to make this information publicly accessible (Kujala et al. 2022).

  - **Clarity around the goal of offsets**

Offset goals are rarely articulated clearly. For example, referring to a requirement of 'net gain' does not provide enough information about what net outcome is required: is it absolute or relative gain? How much gain? Because of this, it is often unclear what the offset objective is. No net loss or even net gain relative to a counterfactual scenario that excludes the impact and offset often means that offsets are not designed to halt biodiversity losses, even across the impact-offset exchange, but to maintain the negative trajectory that biodiversity was on regardless. No net loss or net gain relative to a fixed baseline (e.g. net gain relative to the biodiversity value at a fixed point in time) is better aligned with nature positive, but this requires exclusion of averted loss offsets and the inclusion only of absolute gains from restoration or similar regenerative actions. For example, for an offset for an impact on an area of mangroves to be aligned with nature positive, more than an equivalent increase in cover and condition of mangroves elsewhere would be required. Simply protecting or maintaining the condition of already-existing mangrove habitat would not be adequate.

- **Public disclosure on performance of offsets**

Offset management plans are rarely available for public scrutiny, and are often considered commercially in-confidence. Therefore, the details of offset placement, monitoring and effectiveness are often not able to be publicly evaluated. This was the case in approximately 50% of marine development projects (Niner et al. 2017a). For example, Reef Credits in the GBR uses an online platform and project database operated by Eco-Markets Australia; however, a substantial fee is required to access the information. Increased transparency on offset performance, such as through the use of public offset registers, could improve evaluation of offsets to help progress the science and implementation of offsets, as well as contribute to pressure to improve performance (Kujala et al. 2022). The use of audits has also been proposed to increase rates of offset compliance and improve biodiversity outcomes, as well as to improve public acceptability (Niner & Randalls 2021).

Example Box 10. Disclosure of project outcomes

The Western Bay Dredge and Disposal project (Gladstone, Qld) was part of the development of the Port of Gladstone. Impacts to marine species were to be offset by funding fishing patrols to enforce correct netting use and 'go slow' speed zones in known marine mammal areas. Go slow zones can reduce mortality from boat strikes (Conservation Evidence); however, subsequent project compliance reports show that additional funding was not supplied and that the 'intent' of the offset was said to have been completed through signage and community education (GPC, 2021). It is possible that this action could help avert some fatalities of marine mammals; however, outcomes for marine species are not reported.

Another example is the use of public offset registers. Two states (WA, QLD) currently use offset registers to collate details of project impacts and associated offsets (Government of Western Australia 2020; Queensland Government 2020). While both offset registers included primarily financial contributions, Queensland's lists no associated offset action or location; by contrast, WA's register includes both the impact and offset location information. For effective offset evaluation, registers should include detailed information on both the impact and the offset actions, and all information required for assessments of equivalence between the two (Kujala et al. 2022).

- Governance and administration

- **Securing offsets prior to approval**

Specific offset obligations are often agreed only after approval for a development that is already in place – either due to conditions specifying the development of a plan rather than

the delivery of a specific offset, or due to requirements to pay into a trust in lieu of proponent-delivered offsets. Therefore, development projects are often approved with no guarantee that suitable offsets will be found (McDonald, McCormack & Foerster 2016). For example, interviews with Commonwealth policy administrators found that detailed offset assessment may be 'backloaded' until after the project is approved, primarily due to internal department constraints and pressure from proponents who require approval to finance projects (Evans 2023). This limits what obligations regulators can place on the development impacts since the project has already been approved, and leads to highly negotiated, 'watered down' offset requirements (Evans 2023).

The wording of post-approval conditions can also lead to circumstances where offsets are compliant with conditions but the biodiversity outcome necessary to achieve at least no net loss is not achieved (e.g. Lindenmayer et al. 2017). Therefore, outcome-based offset conditions (in addition to monitoring and adaptive management, see challenge 5.1) may be particularly important in marine systems given the uncertainty and expense of restoration actions. Insurance mechanisms (e.g. environmental liability insurance or monetary bond) could help incentivise required offset outcomes and foster better environmental stewardship (Maron et al. 2016a), which is not uncommon in the mining industry to ensure the environmental objectives associate with mine closure are met (Morrison-Saunders et al. 2016).

- **Application of the mitigation hierarchy**

Strict application of the mitigation hierarchy should ensure that significant residual impacts are as small as possible. However, because assessment officers are not empowered to push for the mitigation hierarchy to be better followed and are required to adhere to very short statutory time frames, the process often moves quickly to the offsets stage, or commences with a presumption that offsets will be necessary and sufficient, and that projects will be approved despite significant impacts. The EPBC Act offsets policy embeds this ambiguity by allowing for offsets to be considered after 'all *reasonable'* avoidance/mitigation measures are taken (Evans 2023).

Given all of the challenges in achieving NNL in marine environments, avoidance is particularly important and key to achieving offset outcomes (Shumway et al. 2018). However, few assessments have evaluated the extent of avoidance and minimisation and a review of marine projects found no evidence of how the mitigation hierarchy was applied or how that influenced offsets (Niner et al. 2017a). **Compulsory reporting against the steps of the mitigation hierarchy could ensure avoidance and mitigation measures are better embedded in the offset process** (Quétier, Regnery & Levrel 2014; Bull et al. 2022).

- **Flexibility**

It has been proposed that offsets that are spatially flexible could lead to better biodiversity outcomes. This could be the case in a variety of circumstances; for example, for migratory or wide-ranging species, where future impacts are likely to reduce offset success, or where protecting or enhancing key habitats or locations could deliver far better conservation outcomes (e.g. targeting offsets to species breeding and feeding aggregation sites; Shumway et al. 2023).

Flexibility in offset requirements has the potential to enable offsets to achieve better outcomes than the minimum standard – but it can also undermine offset outcomes. For example, difficulty in identifying suitable offsets can lead to pressure on approvals and post-approvals officers to allow for flexibility in how offsets are delivered (Evans 2023). This flexibility can undermine how the offset market should operate (e.g. the expense of offsets truly achieving NNL should incentivise avoidance and minimisation of impacts; zu Ermgassen et al. 2020). Given the limitations of marine restoration, and that impact often occurs through indirect and diffuse pathways, out-of-kind offsets, such as research-based offsets, are already common in marine systems (Bos, Pressey & Stoeckl 2014; Niner et al. 2017a). A recent review found that significant residual impacts on mobile species such as marine turtles and mammals were often unquantified and more likely to have out-of-kind offsets, such as research (Niner et al. 2017a). However, benefits for impacted entities from research are not measurable in terms ecologically equivalent to project impacts, and will not achieve at least no net loss outcomes for the impacted entities. The use of research in offset acquittal therefore allows accumulation of loss of biodiversity (see Box 11).

While flexible offsets have the potential to alleviate impacts more effectively than local offsets, the risks involved may also be substantial, particularly where ecological equivalence is lost over large spatial scales (Shumway et al. 2023). Where governance is lacking, flexibility will likely undermine the achievement of NNL rather than enhance it (zu Ermgassen et al. 2020). For example, despite the requirement for direct offsets to form 90% of actions under the EPBC Act (Commonwealth of Australia 2014b), it is often not applied in practice in the marine context, on the premise that there is high uncertainty that a direct offset will achieve a likely benefit to the matter (which ought to preclude a reliance on offsets) (ACT Government 2014; Niner et al. 2017a). A review found that 82% of offsets identified for marine development projects included ‘out of kind’ offsets, including general management, research (for example to inform baseline assessments) and education (Niner et al. 2017a). Flexibility that enables greater outcomes for impacted biodiversity is a positive, but flexibility that enables circumvention of the fundamental principles of good practice offsetting is undesirable and leaves impacted biota worse off.

Example Box 11. Offset flexibility

Flexibility in delivery approach and/or location has been proposed and/or modelled by many as being able to achieve more effective and efficient conservation outcomes. One example is the proposed use of island predator removal on seabird breeding colonies to offset fisheries bycatch, which was shown to be 10 to 23 times more cost effective than fisheries closure (Wilcox & Donlan 2007; Pascoe, Wilcox & Donlan 2011).

The Mardie draft offset strategy for an already approved Salt and Potash project on the Pilbara coast (WA) was approved on the condition of indirect research offsets for significant residual impacts to marine ecosystems (mangroves, samphire, algal mat). This included research to map original habitat extent (i.e. develop relevant baselines), quantify potential effects of sea level rise and identify ecological roles, values and functions of intertidal benthic communities and habitats (Mardie Minerals Pty Ltd 2022). While this is important research, it should have been done to inform the environmental impact assessment (EIA) process and should not be considered an offset as it will not compensate for the immediate and significant loss of intertidal habitat.

- **In-lieu fees and offset fund models**

Proponents often are poorly equipped to identify and deliver offsets themselves. In addition, offsets are sometimes required for relatively small impacts. Therefore, in theory, the use of in-lieu fees (e.g. fees that are paid into a fund, in lieu of direct developer actions) can aggregate offset funding and create greater impact more efficiently and over larger spatial scales, as well as ensure appropriately skilled organisations are delivering the offset outcomes. Several studies have hypothesised that strategically coordinated offset projects are likely to be more cost effective and lead to better outcomes; for example, where offsets could be implemented in larger areas, rather than in small, scattered sites (Bos, Pressey & Stoeckl 2014; Shumway et al. 2018). A key feature of the proposed EPBC Act reforms is a new offsets fund which would receive in-lieu fees ('Restoration Contributions') from proponents in exchange for accepting the obligation to deliver offsets.

In practice, however, all major offset funds in Australia (Pilbara fund, Queensland Financial Settlements Fund, NSW Biodiversity Conservation Trust (BCT), Reef Trust) are failing to acquit their accumulated offset obligations. Less than 5% of the funds received by the Queensland Government's offsets fund (established in 2015) have delivered their associated offset. Similarly, around 90% of demand for offset credits could not be matched to supply through NSW's Biodiversity Offsets Scheme, a major feature of which is an ability to pay into a central fund (Audit Office of NSW 2022). A recent report called for the NSW fund to be phased out (IPART 2024).

An interview of offset-relevant regulators in Australia (Niner et al. 2021) described that despite unanimous support for 'pooled-assets' to be used for large-scale project implementation, there was a lack of established procedures to ensure the principles of offsets, such as equivalence, were maintained. This left strategic funds operating like a bank account with no demonstrated capacity to achieve offset outcomes (Niner et al. 2021). This is because some impacts simply cannot be offset, either because of a lack of suitable conservation actions or available locations, and yet liability to offset them was accepted by the fund managers regardless. The funding then sits in an account until an offset can be identified. Meanwhile, the time lag between the impact and any benefits from the offset becomes greater, driving further biodiversity declines (Audit Office of NSW 2022). Inadequate screening prior to accepting obligations to ensure offsetability and adequacy of funds collected are major contributions to these failures. A clear lesson for future proposed offset funds is to avoid accepting offset obligations for any impacts unless there is high certainty that adequate offsets can be feasibly, effectively, and rapidly delivered, with the payment received. This may involve accepting payments only for a small subset of marine impact types initially, and broadening this as evidence for successful restoration approaches grows. As many proponents prefer to pay into such funds rather than delivering offsets themselves, strong safeguards will be required to ensure funds are effective in achieving offset outcomes (see section 5.1).

Another key challenge in the use of in-lieu fees or fund models is how to consistently estimate the cost of offsetting impacts on marine biodiversity given the lack of data on the cost and feasibility of conservation actions. In the absence of formally-agreed and validated approaches, the financial basis for offsetting in marine environments is currently ad-hoc or based on rudimentary calculations that are unable to capture the broad range of biodiversity values that marine systems often represent (Niner et al. 2021). Because the cost of achieving at least no net loss in marine environments is not well established, it often leads to a situation where offsetting is enabled as a low cost option, despite a lack of knowledge of how to achieve the desired outcomes or the true cost (Niner et al. 2021). Before such pooled funds can be effectively used to help deliver offsets for impacts on the marine environment, improved data on the cost and effectiveness of interventions beyond those that target water quality is required. Overall, given the failures of central funds for accepting in-lieu payments alongside offset obligations in terrestrial environments, and the generally greater risks of offsetting in marine environments (Table 1), the use of such an approach for marine impacts is a high-risk strategy.

Example Box 12. The Reef Trust Offsets Plan and Calculator

To ensure that robust scientific underpinnings were included in calculating the cost of biodiversity offsets in the Great Barrier Reef, the Reef Trust offsets calculator was developed through a National Environmental Science Program (NESP) project (Maron et al. 2016b). This included research into the cost and viability of different restoration projects to identify which could be included in the calculator. Many GBR values were unable to be included in the calculator, as there were no robust data on cost and/or effectiveness of management interventions. However, impacts on values not included in the calculator could still be addressed using the in-lieu fee approach, but on a 'negotiated' basis. In this way, despite the Trust being unlikely to be able to acquit offset obligations for certain values (e.g. those with insufficient data to be included in the calculator), liability can still be accepted. The recommendation was for the plan to be reviewed within 2 years initially and then every 5 years (in line with the GBR Outlook report), with the goal that the calculator would take an iterative approach, such that as additional information became available it would be incorporated. However, in the seven years since its implementation the plan and calculator have not been updated to reflect new scientific knowledge and few examples exist of the fund acquitting offset obligations.

- Social, Cultural and Ecosystem Services Values

  - **Non-biodiversity values often not adequately incorporated**

Biodiversity provides significant ecosystem service benefits to people that are not explicitly included in offset calculations (Sonter et al. 2018). There are also intrinsic social and cultural values that are not quantifiable or offsetable; for example, Traditional Owners' cultural values of Country. Identifying and appropriately managing such issues requires a deep understanding of the values people derive from biodiversity (Maron et al. 2016a). The displacement of biodiversity values also has the potential to lead to increased social inequity and the loss of cultural values at the impact location, particularly where increased flexibility is allowed (see Box 13; Griffiths et al. 2019), such as is common in marine environments. Offsets inherently benefit biodiversity values in a location separate to the location of the impact, which means that place-based values are lost to those who benefit from them at the original location. For example, cultural connection to sea-country is not able to be moved or offset, and accumulation of values in other locations does not offset the impact to the people and communities that depend upon them.

Example Box 13. INPEX Ichthys LNG, NT

The initial offset strategy for Inpex Ichthys LNG in the NT included permanent protection of coastal land to offset impacts to mangroves and marine habitat for dolphins, dugongs and marine turtles (Approval EPBC 2008/4208 Conditions 11(b) and 11(c)). However, because 80% of the NT coastline is granted under the *Aboriginal Land Rights (NT) Act 1976,* any requirement for permanent protection would limit land tenure and could pose issues of intergenerational inequity to Traditional Owner groups (Davis & Carle, 2022). INPEX has therefore gotten post-approval conditions amended to remove the requirement of permanent protection and instead, used legally enforceable agreements to fund and manage a range of pressures on country. This will be done by partnering with and funding an Aboriginal Corporation and Bininj people of West Arnhem Land to protect and manage country while still allowing cultural activities and traditional use for the life of the LNG facility, approximately 40 years (Davis & Carle, 2022). While it is as yet unclear whether this offset will achieve NNL, it provides an example of collaborating and co-designing a project with Traditional Owners that can help achieve both biodiversity and cultural outcomes. However, the Traditional Owner lands and sea country impacted by the Inpex project were those of the Larrakia people; however, the Larrakia were not the recipients of the offset benefits. This project has therefore led to a considerable net loss of cultural and biodiversity values for the Larrakia people at the development site.

Table 1: Summary table of challenges with marine offsets.

Color-coding denotes relative difficulty in marine setting compared with terrestrial environments: orange indicates higher, yellow is similar and green is lower relative difficulty.

	Challenge	Explanation	Marine-specific comment	Example (marine)	Recommendations
1	Limits to offsetability				
1.1	Limiting offsetting to matters for which offsets are demonstrably effective	There are practical limits to what biota can be re-created. Old-growth ecosystems and habitat elements generally cannot be recreated in ecologically relevant timeframes; some ecosystems or species require particular combinations of abiotic factors that cannot be created.	Lower feasibility of restoration, less data and more uncertainty. Diverse and mature coral systems are slow-growing and difficult to restore to pre-impact condition and diversity.	Reef trust offset calculator only applies to certain values with enough data; however, other more data-poor values are allowed to be offset through a negotiated process.	Recognise no-go areas; set strict limits to uncertainty and what is achievable; stricter application of the MH.
2	Measuring biodiversity				
2.1	Identifying biodiversity targets	Offsets only target a subset of biodiversity and require simplifying it to units, such as specific threatened species (individuals) and ecological communities (area x condition). Offsets must be like-for-like, within a given target.	In marine areas, impacts commonly affect protected places (e.g. Ramsar sites, GBR Marine Park), not just individual species, and capturing the wide range affected biota in a set of indicators or proxies is especially challenging.	The Commonwealth Marine Environment is an MNES, but this is not a measurable target. Any metrics used to estimate losses and gains would reflect only a subset of the values that comprise this MNES.	Require more explicit quantification of biodiversity values being impacted.
2.2	Accurately measuring biodiversity values including	The target biodiversity needs to be able to be reliably and precisely measured at the impact site and the offset site.	Finely resolved data tend to be less available for marine systems and therefore the use of proxy metrics to estimate biodiversity values	Coral reef systems often use a % coral cover metric that does not account for changes in species diversity or	Use of multiple surrogates may be more representative (Quétier & Lavorel, 2011); develop accurate composite

	use of proxies		is typical; however, connection between these proxies and target biodiversity is often loose and uncertain.	composition through time (e.g. GBR outlook report).	metrics as part of EIA to accurately measure biodiversity values benchmarked against similar undisturbed habitats.
2.3	Estimating biodiversity scenarios	Estimating benefits from an offset action requires the estimation of how biodiversity at a site will change over time, with and without the offset action.	Limited, finely- resolved, long-term data limit our ability to develop robust site-based estimates of likely change in marine biodiversity over time.	Most marine projects fail to assess impacts against a baseline, and the development of baselines often occur as part of the offset instead.	Strict application of the MH, particularly where there is a lack of baseline data or for data-poor biodiversity values.
3	**Additionality**				
3.1	Attributing change to offset interventions	Not only does change need to be estimated, but the component of it that can be attributed to the offset action must be apportioned.	Identifying cause and effect is challenging, especially when dealing with water quality offsets that produce a small signal in a noisy system, whereby marine water quality is a function of a multitude of factors,	Effects of offset projects to address diffuse sources of pollution are hard to track (e.g. Reef credits).	Require robust modelling of land-sea linkages, build in large buffers, and adjust offset requirements following validation.
3.2	Use of averted loss offsets	Offsets often assume protection of an area is preventing future loss. This approach is commonly misused in terrestrial offsets, and precludes an 'absolute net gain' approach.	Expansions of marine protected areas are prone to be in areas where management and use regimes will change only minimally.	Offset to develop a conservation area, where management arrangement does not change (e.g. Shoal Bay conservation area offset).	Require direct offsets; robust demonstration of threat being removed.
3.3	Leakage	Offsets may displace damaging activities to elsewhere in the region rather than remove them entirely.	In marine areas subject to communal use, users are more likely simply to move the activity to another location rather than ceasing it entirely.	Offset projects that 'close' areas, for example to vessel traffic, displace rather than remove threats entirely.	Require that action remove threats from the landscape permanently; account for leakage as part of additionality of offset calculation.
4	**Timeframes and uncertainty**				

4.1	Offset permanence	The benefits generated by offsets must persist at least as long as the impact, which often is permanent. Ensuring this requires long-term security and funding.	Complex or no private ownership in marine environments, make assurance of offset permanence challenging.	No legal standing for offset management and monitoring for areas outside EEZs (e.g. deep sea mining).	Use of financial surety bonds prior to offset implementation.
4.2	Ensuring appropriate multipliers	Multipliers may be used to adjust the amount of offset required to account for uncertainty, time delay, and benefit per unit area of offset action. However, this is rarely done based on evidence and thus multipliers are often too small.	Multipliers would generally be much higher to account for greater uncertainty and greater time lags for offset success, which should increase cost and therefore drive avoidance.	Multipliers are often a political rather than science-based process (e.g. Qld offset multiplier capped at 4).	Use robust, science-based multipliers when estimating offsets.
4.3	Restoration effectiveness	Restoration is often expensive, and restoring intact ecosystems is often not feasible. Evidence of successful ecosystem re-creation is rare for complex ecosystems.	Restoration success in marine systems can depend on many factors that are dynamic and beyond the control of individual site managers e.g. hydrology, substrate, water quality.	Successful restoration often measured in decades to millennia (e.g. cold-water corals).	Longer funding for monitoring offsets (e.g. on realistic timescale); outcome-based restoration initiatives; higher multipliers to account for restoration effectiveness.
5	**Monitoring and evaluation**				
5.1	Lack of monitoring and impact evaluation	To know if an offset achieved its no net loss or net gain goal, not only must actions be monitored, but outcomes, and the difference they made (impact) estimated. This is rarely done.	Monitoring is poorly done for both terrestrial and marine offsets. Impact may be more challenging to disentangle given the connected nature of marine environments.	Impacts more likely to be indirect and diffuse in nature and difficult to quantify in practice (e.g. impact of water quality on changes in condition).	mandatory and public reporting; compliance monitoring and enforcement; detailed offset registers which include impacts and associated offset requirements, locations and monitoring information.
5.2	Clarity around the	The goal of offsets can differ widely, depending on whether the aim is no net loss or net	Most offsets assume ongoing decline (enabling averted loss offsetting); an	Explicit baseline assessment are often missing or overly	Require mandatory public reporting of offset

	goal of offsets	gain relative to a baseline of decline, or in absolute terms.	absolute no net loss/net gain goal would require additional effort.	simplified in marine environments (Niner et al., 2017a).	outcomes relative to the counterfactual.
5.3	Public disclosure on performance of offsets	Very little information about the performance of offsets against their no net loss/net gain goals is available; no register in Australia currently reports on this.	Limited public information about marine offsets exists, and no register yet reports on performance.	While impact assessments are publicly available, offset management plans and any monitoring and reporting on the plans offsets are often not.	Require full disclosure of impacts, offset requirements, estimated benefits from offsets, monitoring outcomes and evaluations of whether the offset goal was achieved to be published in an offset register.
6	**Governance and administration**				
6.1	Securing offsets prior to approval	Projects are often approved before the feasibility of offsets is understood, and with conditions not requiring a specific course of action or outcome from an offset (delaying the work to identify offsets until later).	Unclear the extent to which this occurs in marine systems, but is likely similar to terrestrial offsets if not more likely given the challenges discussed.	Offsets management plans often not required until after project approval	Require outcomes-based offset conditions; Require development of offset plans prior to project approval, including detailed information on offset availability.
6.2	Application of the mitigation hierarchy	The first three steps of the MH (avoid, minimise, rehabilitate) are not adequately adhered to leaving significant offset obligations; offsets are the riskiest stage of the MH to rely upon.	Avoidance is particularly key, given low restoration feasibility and lack of detailed, long-term data.	Developers often skip to the final step of the MH without consideration for the first three stages (e.g. Niner et al. 2019).	Require documentation of each step of the mitigation hierarchy; require environmental assessment at each stage of project development (e.g. even pre-planning).
6.3	Flexibility	Greater flexibility may both lead to better outcomes and undermine NNL. A move away from like-for-like requirements – in terms of type, amount, or duration – results in accumulation of net	Marine offsets more likely to be flexibly applied and out of kind, tied to the lack of data, lack of restoration effectiveness, and few reliable options for threat mitigation.	The consequences of flexibility on like for like are similar, but out of kind offsets likely more common e.g. Offset banks, research to improve species knowledge (e.g. EPBC	Strict application of like for like offsets; strict application of no more than 10% of out of kind offsets; identification of.

		losses for the affected biodiversity.		offsets only allow 10% out-of-kind, but regularly exceed this in marine systems).	
6.4	In-lieu fee/trust models	Offset policies often provide the potential to pay into a central fund which in turn carries the liability for offset delivery. This option is often used when identifying and delivering offsets is challenging logistically or would be costly, leaving an obligation with the fund that it may not be able to acquit.	Given the difficulty of offsetting in the marine environment, these in-lieu fees models or offset banks in theory allow more effective or more 'strategic' application of conservation funds; however, ecological equivalence is often lost.	Offset funds often sit for years with no reporting on whether the funding went to improve the value it was meant to offset (e.g. Qld offset register).	Ensure offsets are identified prior to project approval; require a publicly available accounting system for offset acquittal; offset audits; require environmental liability insurance or monetary bonds.
7	**Social, cultural, and other ecosystem service values**				
7.1	Non-biodiversity values often not adequately incorporated	ES values and provisioning, and cultural and social values often not considered in offset assessment.	Wider range of values could be impacted given the scale and diffuse nature of impacts; cultural and spiritual connection to country values not offsetable.	May be difficult to account for loss of all downstream values with limited impact quantification.	Explicitly consider changes to ES values in impact assessment.

4. Recommendations for best practice in marine offsets

In this section, we draw from the above analysis to summarise the key elements necessary for robust, high-integrity offsets in the marine environment, in simple checklist form. We present separate checklists for evaluating an individual offset exchange, and an offset policy framework.

Checklist 1: Essential ingredients for best practice in planning and implementing a marine offset

- **Limits to offsetting**

- Offsets must not be used as a response to impacts for which specific actions that generate measurable gains have not yet been demonstrated
- Offsets must not be used as a response to direct impacts on diverse, high-condition marine ecosystems e.g. coral reefs

- **Measuring biodiversity**

- All target biota (species, ecosystems) affected by the project must be identified, and appropriate indicators (that consider structure and function, not only area) used to first estimate, and then measure, positive and negative impacts on each
- Equivalence of type, amount, and duration must be required
- Water quality must be used as a proxy only where impacts are also mediated by water quality
- Baselines and counterfactuals must be established prior to offsetting to support estimates of positive and negative change over time

- **Additionality**

- Offsets in marine protected areas must be strictly limited to actions that are not already required to be done
- Offsets targeting fishery activity, boat traffic, or recreational activities must avoid displacement of those activities, other than to areas where their impact will not be exacerbated

- **Timeframes and uncertainty**

1. The duration of benefits from an offset must be commensurate with the duration of the impact

2. Offsets must not be relied upon as a response to a significant impact when their efficacy at benefiting the impacted matter is highly uncertain or not yet known
3. The offset requirement must be increased in cases where acceptable but moderate levels of uncertainty exist

- **Monitoring and evaluation**

❑ The required net outcome, and the baseline or counterfactual against which it is to be attained, must be clear (e.g., absolute net gain of X%; no net loss relative to what would have occurred without the impact and the offset)

❑ There must be compulsory requirements to monitor, and report publicly, not only the offset action/s, but also their outcome for each affected matter, and the plausibility of any counterfactual assumptions (e.g., by monitoring nearby sites not subject to offset actions)

❑ The size of the impact must be monitored to enable comparison with the realised gain at the offset site and the net outcome to be calculated

- **Governance and administration**

❑ The mitigation hierarchy must be followed demonstrably and rigorously

❑ Exceptions and negotiations that jeopardise the required net outcome for impacted matters must be avoided

❑ Specific offsets must be identified and, ideally, secured prior to any impact occurring

❑ Liability for offset delivery must not be transferred to a third party without adequate resourcing and demonstration of the feasibility of a compliant offset commencing prior to, or within a very short time of, the impact occurring

- **Social, cultural, and other ecosystem service values**

❑ Potential impacts on local people and Indigenous communities must be identified through a consultative process, and resolutions to conflicts co-designed

❑ Wider ecosystem services implications are considered and addressed

❑ Where relevant, free, prior, and informed consent is attained from Traditional Owners and rights holders at early stages of offset discussions

Checklist 2: Essential ingredients for best practice marine offset policy frameworks

1. Limits to offsetting

- Offsets must not be relied upon as a response to unacceptable impacts
- Offsets must be a rarely-used, last resort
- Offsets must be limited to only to those matters for which there is sound evidence that gains can be reliably achieved and attributed to specific actions
- *For absolute net gain: offsets must be limited to those matters which can be re-created within an ecologically relevant time frame – i.e., are not irreplaceable*

2. Measuring biodiversity

1. All important biota must be within the scope of the policy requirement of no net loss/net gain
2. Equivalence of type, amount, and duration must be required
3. Indicators and metrics appropriate for the measurement of each type of biota must be required to be used for the calculation of losses and gains
4. Water quality must only be used as a proxy where impacts are also mediated by water quality
5. Baselines and (for relative net outcome approaches) counterfactuals must be established, and any counterfactuals must be robust to gaming or abuse, and exclude negative impacts that themselves would trigger offset requirements

3. Additionality

- ❑ Offsets must generate a clear and measurable gain over and above what would most likely have occurred in the absence of the offset
- ❑ Offsets must not replace actions that are already the responsibility of government agencies or fund actions to which parties are already committed
- ❑ Offsets must avoid displacement of damaging activities to other areas

4. Timeframes and uncertainty

- ❑ The duration of benefits from offsets must be commensurate with the duration of the impact
- ❑ Offsets must not be relied upon as a response to a significant impact when their efficacy at benefiting the impacted matter is highly uncertain or not yet known
- ❑ The offset requirement must be increased in cases where acceptable but moderate levels of uncertainty exist

5. Monitoring and evaluation

- ❑ The required net outcome for offsets, and the baseline or counterfactual against which it is to be attained, must be clear (e.g., absolute net gain of X%; no net loss relative to what would have occurred in the absence of the impacts and the offsets; etc)
- ❑ There must be compulsory requirements to monitor, and report publicly, not only the offset action/s, but also their outcome for each affected matter, and the plausibility of any counterfactual assumptions (e.g., by monitoring nearby sites not subject to offset actions)
- ❑ The size of the impact must be monitored to enable comparison with the realised gain at the offset site and the net outcome to be calculated
- ❑ There must be regular review and reporting on performance of the offset scheme against its stated net outcome goal

6. Governance and administration

- ❑ The mitigation hierarchy must be followed demonstrably and rigorously through the assessment and approvals process
- ❑ Exceptions and negotiations that jeopardise the required net outcome for impacted matters must not be permitted
- ❑ Specific offsets must be identified and, ideally, secured prior to any impact occurring
- ❑ Liability for offset delivery must not be transferred to a third party without adequate resourcing and demonstration of the feasibility of a compliant offset commencing prior to, or within a very short time of, the impact occurring

7. Social, cultural, and other ecosystem service values

- There must be requirements for impacts on local people and Indigenous communities to be identified through a consultative process, and resolutions to conflicts co-designed
- Wider ecosystem services implications of both the impact and the offset must be required to be considered and addressed
- Where relevant, free, prior, and informed consent must be required to be attained from Traditional Owners and rights holders at early stages of offset discussions

5. Review of proposed National Environmental Standard for Restoration Actions and Restoration Contributions (offsets) against best practice principles for marine offsets

Key messages:
The current proposal for Restoration Actions and Restoration Contributions represents the proposed approach to biodiversity offsets under the current EPBC Act reform process. The proposed approach enshrines the mitigation hierarchy in legislation, and sets some strong standards for offsets that are delivered by the proponent. However, these benefits are wholly undermined by an option for proponents to make a 'restoration contribution' payment instead of delivering an offset. Such approaches have repeatedly been found wanting in Australia. The proposal also evades the core requirement of like-for-like, meaning that some protected entities will sustain significant impacts that are never compensated. In summary, the proposal is likely to result in poor environmental outcomes and represent a step backwards from current policy.

This summary and assessment are based on a viewing of consultation draft documents, particularly the National Environmental Standard for Restoration Actions and Restoration Contributions and the Restoration Actions and Contributions draft paper, which sets out how compensation and offsetting will be included in the proposed Nature Positive (Environment) Act. Please note that as these documents could not be transcribed or removed from the consultation, the following may include errors. This assessment is based on material provided in consultations in early 2024 which is noted as subject to change.

Finally, it should be noted that the below assessment is relevant only in the context of a decision on a proposal being made by the CEO of the EPA. The proposed reforms currently allow for wide discretion by the Minister to call in decisions, and the Minister is then not subject to a requirement to be satisfied that their decision is not inconsistent with the Standards (as the CEO of the EPA would be), but must merely have regard to them.

5.1 Summary of proposed reforms

Four consultation sessions have been held (up to end of March, 2024) at which various documentation outlining the proposed national environmental law reforms were presented to attendees for viewing only. These documents have included drafting notes and summaries of how the proposed new legislative package will operate. The documentation is not complete and so it has been challenging to form a comprehensive understanding of the likely effect of the proposed reforms. However, with respect to biodiversity offsetting, several key documents have been provided, and this has enabled some clarity on the intended direction and departure from current practice.

In summary, the proposal will legislate the use of the mitigation hierarchy, including offsets, which is a departure from current circumstances in which these matters are primarily considered in policy and guidance documents. This is a step forward. The relevant provisions will be split between the Act and the National Environmental Standards (the status of which is still somewhat unclear).

The NES for offsets is called the National Environmental Standard for Restoration Actions and Restoration Contributions. It sets out the requirement to apply the mitigation hierarchy and to compensate for all residual significant impacts (noting that sub-significant impacts will still accumulate, and must be accounted for and addressed in other ways if net gain outcomes or nature positive are sought). It also makes clear that where 'net gain' is intended to be achieved for impacted protected entities, this is meant in a relative sense only. This is in contrast to a requirement for absolute gain over time, which would be necessary for the approach to align with 'nature positive' ambitions.

The standard further specifies requirements for offsets, called 'restoration actions', which are largely strong and appropriate. However, it sets out the option for proponents to freely choose (for listed threatened species, ecological communities, migratory species and the Commonwealth Marine Environment) to instead make a restoration contribution – a payment to a government fund.

The drafting notes relating to the restoration contributions fund make clear that the fund has wide latitude to circumvent the requirements of best practice offsets, and the risk that it would accept payments where offsets are not feasible – an issue that has affected the major existing analogous funds in Australia - is high. Further, there is no firm requirement for the same specific matter to benefit from the offset action eventually funded by the payment.

As the overwhelming majority of proponents select to pay into a fund rather than deliver an offset where the option exists (e.g. Queensland, New South Wales), the proposed availability of this pathway, coupled with its lax requirements around offset delivery and like-for-like outcomes, presents a substantial threat to ensuring net gain outcomes for impacted protected matters in the marine environment. Much stronger safeguards are necessary if the fund is to be effective and not result in outcomes for impacted protected matters that are poorer than those already seen under the EPBC Act. These safeguards should include a clear upfront test of offsetability that sets strict limits to the matters for which payments will be accepted, and a safety net that feeds back to preventing further payments for matters that are later found not to be offsetable with the payment

5.2 Assessment against checklist

Table 2: Summary of assessment of proposed National Environmental Standard for Restoration Actions and Restoration Contributions (offsets) against checklist 2 for marine offsets.

Criterion	Evaluation	Change needed
1. Limits to offsetting		
Offsets must not be relied upon as a response to unacceptable impacts	● Offsets (called 'restoration actions') and payments (called 'restoration contributions') must not be used for residual significant impact that are 'not unacceptable', and cannot make unacceptable impacts acceptable. The threshold of acceptability therefore becomes crucial.	● Unacceptable impacts on protected entities should include in their definition any losses of habitat that cannot be replaced with high certainty within an ecologically relevant time frame, or other impacts that cannot be reversed or fully counterbalanced.
Offsets must be a rarely-used, last resort	● Offsets are proposed to be used as a last resort, after all 'reasonable steps' to avoid and mitigate impacts on protected matters. The mitigation hierarchy requirements are proposed to be included in the legislation. The requirement already exists in policy, and the effect of moving it to legislation on judgements about the adequacy of avoidance and mitigation measures is uncertain. ● The existence of a simple payment pathway ('restoration contributions') risks increasing the use of offsets, not decreasing them,	● Guidance on appropriate avoidance and minimisation measures should be provided in some form to help proponents understand the extent of their obligations. ● Safeguards are required to ensure the restoration contributions pathway is not used inappropriately, and limits to what impacts these payments are accepted for are set (see below)
Offsets must be limited to only to those matters for which there is sound evidence that gains can be reliably achieved and attributed to specific actions	● The standard proposes that restoration actions must be like-for-like, feasible, and supported by data or expert assessment to high certainty. ● The proposal is that proponents can elect not to do this, and instead to make a restoration contribution payment.	● The decision-maker should have access to evidence that restoration actions proposed are like-for-like, feasible, and supported by data or expert assessment to high certainty, prior to a decision.

Criterion	Evaluation	Change needed
	● The requirements for evidence that offset gains for the same matter can be achieved do not apply to this option, leading to a very high risk that unoffsettable impacts will be permitted in exchange for payments.	● The option to make a restoration contribution should be restricted to those matters for which there is strong evidence that like-for-like, feasible restoration actions can be achieved, and that payments are adequate to fully cover the cost.
For absolute net gain: offsets must be limited to those matters which can be re-created within an ecologically relevant time frame – i.e., are not irreplaceable	● The proposal makes clear that offsets need only achieve a net gain in relative terms (relative to what would have occurred in the absence of the action), not an absolute gain, and so this does not apply; averted loss offsets are still allowable, although it is noted that they should be used in limited circumstances.	● To align with a nature positive outcome, averted loss offsets should be ruled out, and all losses should be required to be counterbalanced with an absolute gain over time in the protected entity. This may require protection of existing values as a requirement, but not as a method to generate gains in and of itself.
2. Measuring biodiversity		
All important biota must be within the scope of the policy requirement of no net loss/net gain	● There is no expansion of the scope of MNES. It is not clear what specific measurable elements of the Commonwealth Marine Environment, The Great Barrier Reef Marine Park, Ramsar Wetlands or World Heritage Places would be accounted for.	● Guidance on the specific, measurable attributes of MNES that are protected places that would require the net gain to be achieved should be developed.
Equivalence of type, amount, and duration must be required	● Where 'restoration actions' are required, the standard includes moderately strong wording that requires equivalence of type, amount, and duration. ● There is also potential for a payment for research to be used as an offset ("offsets must provide a direct restoration action unless conservation planning documents identify an indirect action (e.g. research project or public education) as a higher priority for the protected matter").	● The ability to use research as an offset/restoration action should be deleted; this would not be consistent with the other requirements within the Standard, nor generate a measurable gain for the protected entity. Where research is listed as a higher priority in a conservation planning document than a practical restoration measure, this is a clear indication that there is NOT strong evidence that like-for-like, feasible restoration actions can be achieved. In these cases, offsets are not appropriate.

Criterion	Evaluation	Change needed
	● Crucially, if a 'restoration contribution' is made, these requirements no longer apply. The costing of such payments is tied to the estimated cost of delivering equivalent offsets; however, the requirement for the fund to actually do so is only 'where feasible'. Funds are then only required to deliver a benefit for the same *category* of MNES (e.g., any threatened species, not necessarily the one impacted).	● The option to make a restoration contribution should be restricted to those matters for which there is strong evidence that like-for-like, feasible restoration actions can be achieved, and that payments are adequate to fully cover the cost. ● Exemptions to the like-for-like requirement should not be permitted. ● A safeguard should be built in whereby should a restoration payment be accepted, but the fund later concludes that a like-for-like offset meeting the other requirements of the Standard is not possible, this raises a red flag preventing any further restoration contributions for that protected entity. This red flag would only be lifted if and when the issues that led to the inability to provide a suitable offset are demonstrably resolved.
Indicators and metrics appropriate for the measurement of each type of biota must be required to be used for the calculation of losses and gains	● Not specified in the material to date.	● This requirement should be included in the Standard.
Water quality must only be used as a proxy where impacts are also mediated by water quality	● Not specified in the material to date.	● This requirement could be included in the Standard, or in associated guidance.
Baselines and (for relative net outcome approaches) counterfactuals must be established, and any	● This is a relative net gain policy, so counterfactuals are required against which net outcomes are to be measured. There is some wording that requires an evidence-based	● The definition of 'baseline' should be clarified to ensure that impacts that would otherwise likely require some form of offset if they were to occur

Criterion	Evaluation	Change needed
counterfactuals must be robust to gaming or abuse, and exclude negative impacts that themselves would trigger offset requirements	counterfactual (called a baseline in the document), but no detail. ● There appears to be no explicit exclusion of impacts that themselves would trigger offset requirements, which potentially enables large overstatement of averted loss benefits. This appears to apply to restoration contributions as well as restoration actions.	are explicitly excluded from inclusion in this baseline.
3. Additionality		
Offsets must generate a clear and measurable gain over and above what would most likely have occurred in the absence of the offset	● There is a statement to this effect in the requirements for restoration actions, which appears also to apply to restoration contributions. ● The definition of baseline potentially allows for avoidance of impacts that themselves would require offsets to be included, which undermines additionality. ● The potential for research actions to be considered offsets presents a risk to additionality.	● The definition of 'baseline' should be clarified to ensure that impacts that would otherwise likely require some form of offset if they were to occur are explicitly excluded from inclusion in this baseline. ● The ability to use research as an offset/restoration action should be deleted; this would not be consistent with the other requirements within the Standard, nor generate a measurable gain for the protected entity.
Offsets must not replace actions that are already the responsibility of government agencies or fund actions to which parties are already committed	● There is a requirement that the actions must be additional to existing actions and regulatory obligations. ● This does not rule out more insidious cost shifting, such as the ability for such payments to replace future budgets for management.	● An explicit requirement to consider and report on the risk of cost-shifting, particularly when offsets fund actions in marine protected areas, may help mitigate this risk.
Offsets must avoid displacement of damaging activities to other areas	● There is no wording that requires this.	● Defining a 'projected gain' as an overall net outcome for the protected entity, rather than restricting it to the direct effects of the offset and impact, would help mitigate this risk.

Criterion	Evaluation	Change needed
4. Timeframes and uncertainty		
The duration of benefits from offsets must be commensurate with the duration of the impact	● There is a requirement in the standard that protection arrangements yield a reasonable expectation that the benefits will be maintained for the duration of the impact.	
Offsets most not be relied upon as a response to a significant impact when their efficacy at benefiting the impacted matter is highly uncertain or not yet known	● The ability of a restoration action to contribute to the viability of the impacted entity is required to meet a 'high certainty' test. It is not clear whether this high certainty requirement applies also to the estimate of gain/equivalence (an action can be certain to make at least some very small contribution, but highly uncertain to make a contribution of adequate size). ● The high certainty test does not apply if a restoration contribution is made, and there is no longer a requirement for the same specific matter to benefit.	● The requirement for high certainty should be expanded beyond simply evidence that a restoration action can 'contribute' to the viability of a protected entity, to include high certainty that the net gain outcome can be achieved as a result of this action. ● The requirement for high certainty that a net gain outcome can be achieved for the specific protected entity affected should be made mandatory also for the restoration contribution pathway.
The offset requirement must be increased in cases where acceptable but moderate levels of uncertainty exist	● Not specified in the material to date; however, if the 'high certainty' standard does apply to all aspects of the estimation of gain, this is less critical.	● All restoration actions carry some uncertainty; the Standard should require the offset requirement to be increased where uncertainty is relatively higher.
5. Monitoring and evaluation		
The required net outcome for offsets, and the baseline or counterfactual against which it is to be attained, must be clear (e.g., absolute net gain of X%; no net loss relative to what	● For restoration actions, this is moderately clear, although the X% gain is not yet specified. The required net outcome appears to be intended as a net gain relative to what would have happened in the absence of the action.	● The percentage that constitutes net gain should be specified. ● The same quantitative net gain outcome for the impacted protected entity should be required for restoration contributions as for restoration actions.

Criterion	Evaluation	Change needed
would have occurred in the absence of the impact and the offset; etc)	● For restoration contributions, there is no clear requirement, and a subjective 'better overall' environmental outcome test can apply instead.	
There must be compulsory requirements to monitor, and report publicly, not only the offset action/s, but also their outcome for each affected matter, and the plausibility of any counterfactual assumptions (e.g., by monitoring nearby sites not subject to offset actions)	● In the case of a restoration action, there are strong requirements for a management plan that sets out requirements and assumptions and is published prior to the action commencing. The plan must include monitoring and evaluation and reporting requirements, but requirements for the standard these must meet are not specified. ● In the case of a restoration contribution, the requirements are less specific and weaker in terms of documentation of assumptions. An annual report is proposed that should report on progress towards the net gain outcome for protected matters.	● Each restoration action AND restoration contribution should have associated with it transparent and publicly-available reporting that includes a point-by-point description of how the requirements of the Standard were met, and the outcomes achieved for the affected entity. These reports should be available in a searchable public offset register.
The size of the impact must be monitored to enable comparison with the realised gain at the offset site and the net outcome to be calculated	● This is not specified in the Standard, but exceedances of the initial approved impact may be dealt with in other sections of the reform documentation.	● Include a requirement to monitor and report on realised impacts, alongside offset outcomes
There must be regular review and reporting on performance of the offset scheme against its stated net outcome goal	● In the case of restoration actions, there does not appear to be a requirement for scheme-level monitoring and reporting. ● In the case of restoration contributions, an annual report appears to require this.	● There should be a requirement for regular review and reporting of the performance of restoration actions as well as restoration contributions.
6. Governance and administration		
The mitigation hierarchy must be followed	● Offsets are proposed to be used as a last resort, after all 'reasonable steps' to avoid and	● Guidance on appropriate avoidance and minimisation measures should be provided in

Criterion	Evaluation	Change needed
demonstrably and rigorously through the assessment and approvals process	mitigate impacts on protected matters. The mitigation hierarchy requirements are proposed to be included in the legislation. The requirement already exists in policy, and the effect of moving it to legislation on judgements about the adequacy of avoidance and mitigation measures is uncertain.	some form to help proponents understand the extent of their obligations.
Exceptions and negotiations that jeopardise the required net outcome for impacted matters must not be permitted	● The combination of the EPA and requirements to adhere to a National Environmental Standard are likely to reduce considerably the scope for such negotiations in the case of restoration actions. ● The existence of the restoration contributions pathway provides a substantial exception to these requirements that will likely jeopardise net gain outcomes for impacted protected entities. ● The apparent potential for research to be used as an offset also circumvents requirements for net gain outcomes for impacted protected entities.	● The option to make a restoration contribution should be restricted to those matters for which there is strong evidence that like-for-like, feasible restoration actions can be achieved, and that payments are adequate to fully cover the cost. ● The ability to use research as an offset/restoration action should be deleted.
Specific offsets must be identified and, ideally, secured prior to any impact occurring	● In the case of restoration actions, this is required. ● In the case of restoration contributions, this is not required.	● The requirement for high certainty that a net gain outcome can be achieved for the specific protected entity affected should be made mandatory also for the restoration contribution pathway. This may require the Restoration Contributions Fund managers to pre-identify a range of potential offset actions and locations.
Liability for offset delivery must not be transferred to a third party without adequate	● In the case of a restoration contribution, liability would appear to pass to the Restoration Contribution Fund. The test of	● The ability to use research as an offset/restoration action should be deleted; this would not be consistent with the other

Criterion	Evaluation	Change needed
resourcing and demonstration of the feasibility of a compliant offset commencing prior to, or within a very short time of, the impact occurring	feasibility contained within the Standard would appear to apply, but the process through which this would occur is not clear. ● Commencement of the restoration action funded through this pathway need not be for 3 years after the payment is received and even after this timeline may not be required.	requirements within the Standard, nor generate a measurable gain for the protected entity. Where research is listed as a higher priority in a conservation planning document than a practical restoration measure, this is a clear indication that there is NOT strong evidence that like-for-like, feasible restoration actions can be achieved. In these cases, offsets are not appropriate. ● A safeguard should be built in whereby should a restoration payment be accepted, but the fund later concludes that a like-for-like offset meeting the other requirements of the Standard is not possible, this raises a red flag preventing any further restoration contributions for that protected entity. This red flag would only be lifted if and when the issues that led to the inability to provide a suitable offset are demonstrably resolved.
7. Social, cultural, and other ecosystem service values		
There must be requirements for impacts on local people and Indigenous communities to be identified through a consultative process, and resolutions to conflicts co-designed	1. Not specifically evident from these relevant documents	2. This requirement should be built in either to this Standard, or via the First Nations Engagement and Participation in Decision-making Standard (yet to be viewed).
Wider ecosystem services implications of both the impact and the offset must be required to be considered and addressed	3. Not evident from these documents	4. These types of impacts in themselves are not triggers under the EPBC Act; however, they should be included as relevant attributes when considering offsets for impacts on protected places.

Criterion	Evaluation	Change needed
Where relevant, free, prior, and informed consent must be required to be attained from Traditional Owners and rights holders at early stages of offset discussions	5. Not evident from these documents	6. This requirement should be built in either to this Standard, or via the First Nations Engagement and Participation in Decision-making Standard (yet to be viewed).

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