Steps 1 and 2 in the Mitigation Hierarchy: Avoid and Minimise

Why and how to prioritise avoidance and minimisation of impacts on biodiversity and people

Impact Mitigation and Ecological Compensation
Thematic Group

The mitigation hierarchy is made up of four steps. The first two steps are preventive: 1) avoid and 2) reduce or minimise impacts on biodiversity and ecosystem services. Attention to these preventive steps is the highest priority, as the final two steps in the mitigation hierarchy (restoration and offsetting) incur much greater risks. Avoidance is essential for many types of biodiversity, due to their conservation significance, their role in local people's livelihoods, or their irreplaceability (e.g. highly endangered species or ecosystems). Impacts on such biodiversity could be difficult or impossible to address adequately using the later steps in the mitigation hierarchy.

Preventing negative impacts is the highest priority in applying the mitigation hierarchy. This is because there are limits to the effective and acceptable compensation for the loss of certain biodiversity components or ecosystem services. Some impacts cannot be repaired, restored, or offset (see *Brief 6: Steps 3 and 4 in the Mitigation Hierarchy: Restore and Offset*). In these cases, the only acceptable mitigation option is to avoid harm completely.

The emphasis on preventing significant impacts is reflected in most EIA regulations and in international performance standards such as those of the International Finance Corporation and the World Bank. These standards note that avoiding impacts is sometimes the only means of preventing irreversible loss of biodiversity or associated ecosystem services.

Step one: avoiding impacts

Where a proposed development project might have a negative impact on biodiversity or ecosystem services, designing and taking measures to avoid those impacts is the crucial first step. This is the most effective way to prevent significant impacts, especially when taken at both a strategic landscape or seascape level as well as at an individual project level (refer to *Brief 4: Strategic Planning for the Mitigation Hierarchy*).

The rigorous assessment of project alternatives is the best way to determine whether a project should proceed or be cancelled, and which alternative is least harmful to biodiversity. Other reasonable and feasible alternatives to a potentially damaging project could involve addressing the purpose of the project through other means (e.g. reducing demand for energy rather than increasing energy generation capacity), making changes to the proposed location, siting or routing of development, or the use of less harmful technology.

Evidence that every effort has been made to avoid or prevent impacts on biodiversity, especially priority areas for biodiversity and ecosystem services, should be provided to decision makers. Where negative impacts could be irreversible, or cross likely limits to what can be offset or compensated, the development project should not proceed. One exception to this, sometimes included in policy, is where a development project is demonstrably of overriding public interest, where the overall societal benefits outweigh the environmental impacts.

Examples of how to avoid impacts include:

- **Project cancellation:** cancelling a damaging project when a suitable, less-damaging alternative cannot be found.
- **Spatial avoidance:** choosing an alternative location for the project that avoids impact, for example, siting a project away from a species' breeding colony.
- **Temporal avoidance:** scheduling temporary disturbance by a development project at times when species will not be susceptible to impacts, for example, when migratory species are absent.
- **Design-based avoidance:** using a design or technological approach that avoids the impact despite the project proceeding, for example, treating water prior to its release from a site so that it does not detrimentally affect downstream aquatic ecosystems.

Identifying priority areas for avoidance of impacts

There is guidance on how to identify areas where avoiding impacts is essential (see *Brief 3: Impact Assessment and the Mitigation Hierarchy and Brief 4: Strategic Planning for the Mitigation Hierarchy*). Areas that are critical for conserving or restoring biodiversity and ecosystem services should be prioritised for avoidance. These include:

- Protected Areas and Other Effective Area-based Conservation Measures (OECMs).
- Key Biodiversity Areas, threatened/Red Listed ecosystems, habitats of threatened/Red-Listed species or populations of species which are of evolutionary or cultural significance, World Heritage or Ramsar sites, Alliance for Zero Extinction sites, Important Bird and Biodiversity Areas, Intact Forest Landscapes and High Conservation Value or Old Growth forests, and any sites identified as irreplaceable.
- Areas that are targeted for landscape scale ecological restoration, recovery or rewilding programs.
- Areas of habitat (e.g. natural forests) for which the project proponent has made a zero-conversion commitment (e.g. zero deforestation requirement from buyers).
- Ecosystems or species on which there is likely to be heavy dependence by the public as a whole, and affected communities in particular, for health, livelihoods, and cultural values. These may include water sources, erosion control areas, flood or storm-surge buffering areas.

Compiling information to identify these areas early, and planning accordingly, is fundamental to the effective implementation of the mitigation hierarchy. Project impacts on biodiversity in these priority areas present a significant risk of irreplaceable loss. In many cases, addressing these impacts through later mitigation steps will be difficult or impossible. Guidance on how to consider the risk of residual impacts not being offsetable is provided in Pilgrim et al. (2012).

Step two: reducing and minimising Impacts

After all alternatives to the project are considered, and avoidance options have been employed as far as possible, impact reduction or minimisation is the next step, if some projected impacts remain. Impact minimisation does not provide the same ecological assurance as preventing an impact outright, as some impacts remain even after appropriate reduction measures have been taken, and addressing these becomes necessary (see *Brief 6: Steps 3 and 4 in the Mitigation Hierarchy: Restore and Offset*). However, the more that these remaining, or 'residual', impacts can be reduced, the less reliance is placed on the higher-risk, reparative, stages of the mitigation hierarchy.

Measures to reduce or minimise impacts can include physical changes in project design (e.g. wildlife crossings, flight diverters), altering construction methods, timing and sequence of vegetation removal, pollution abatement treatments, and operational controls. On-site mitigation measures that minimise harm can be identified by the planning and engineering team, along with biodiversity and social specialists.

Examples of how to minimise impacts include:

- Reducing the footprint of the project, for example, reducing the area of a mine that will be open cast or reducing the number of dwellings to be built;
- Configuring the project footprint to minimise losses, for example, moving some construction into areas with lesser biodiversity and ecosystem service values, while retaining more-valuable areas on site;
- Reducing the intensity, frequency, and/or duration of disturbance associated with the project, for example, using directional night lighting designed to reduce impacts on nocturnal and migrating birds and bats in adjacent areas;
- Using technologies and engineering methods to reduce disturbance, for example, implementing speed limits or traffic calming devices to reduce the risk of vehicle strike.

Moving from prevention to repair

Any impacts that remain after avoidance and minimisation need to be addressed through the later two steps in the mitigation hierarchy—restoration and offsetting (see *Brief 6: Steps 3 and 4 in the Mitigation Hierarchy: Restore and Offset*).

However, restoration interventions have mixed success, and the outcomes of biodiversity offsets or ecological compensation are often uncertain due to their complexity, resource requirements, time delays, and the need to assure long-term commitments, monitoring and enforcement. Finding suitable areas for offsets is increasingly challenging and often more costly than long-term minimisation, restoration, or compensation measures.

About COMBO+ and IMEC

From 2016 – 2025 AFD and FFEM financed the **Conservation, Mitigation and Biodiversity Offsets Programme (COMBO+)**, as part of which technical briefs 1 -10 were drafted, in collaboration with the IUCN Thematic Group Impact Mitigation and Ecological Compensation. COMBO has been implemented across six countries in Africa and Asia, together with government, private sector and civil society, to help reconcile economic development and biodiversity conservation through application of the mitigation hierarchy in policy and practice to achieve no net loss or net gain of biodiversity and contribute to national biodiversity targets aligned with the Kunming-Montreal Global Biodiversity Framework. The initiative was led by the Wildlife Conservation Society in partnership with Biotope, BIOFUND, Guinée Ecologie, Myanmar Biodiversity Fund and the University of Queensland.

The **Impact Mitigation and Ecological Compensation (IMEC)** Thematic Group of the IUCN's Commission on Ecosystem Management (CEM) serves as an international community of practice, guiding best practice application of the mitigation hierarchy and improving alignment of impact mitigation and ecological compensation with biodiversity targets.

Useful resources

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- Cross Sector Biodiversity Initiative. (2015). *Cross-sector guide for implementing the mitigation hierarchy. http://www.csbi.org.uk/wp-content/uploads/2017/10/CSBI-Mitigation-Hierarchy-Guide.pdf*
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- Phalan, B., Hayes, G., Brooks, S., et al. (2018). Avoiding impacts on biodiversity through strengthening the first stage of the mitigation hierarchy. *Oryx, 52*(2), 316–324. h*ttps://www.cambridge.org/core/journals/oryx/article/avoiding-impacts-on-biodiversity-through-strengthening-the-first-stage-of-the-mitigation-hierarchy/DDBA2EA1D468985A9CE5D089ABC5FAD5*

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The views expressed in this work do not necessarily reflect those of IUCN or other participating organisations.

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