



Impact Mitigation and
Ecological Compensation
Thematic Group

Impact Assessment and the Mitigation Hierarchy

What role does impact assessment play in ensuring that the mitigation hierarchy is applied to development proposals?

Impact assessment (IA) is the primary tool for identifying and assessing environmental and social impacts, and planning mitigation measures. The mitigation hierarchy is an important component of impact assessment, whether it involves assessment at the strategic level (SEA) or at the project level (ESIA). Robust impact assessment requires that potential impacts are identified as early as possible, limits of acceptable environmental impact (including cumulative impacts) are respected, and that feasible and reasonable alternatives are fully considered in a way that prioritises the avoidance of significant harm to both people and nature.

The role of impact assessment

Impact assessment is a structured process for considering the implications that proposed development would have on people and the environment. It is used to inform subsequent decision-making regarding project design, financing and execution—including mitigation of environmental and social impacts—while there is still an opportunity to determine whether and how a project, or series of projects, should proceed.

Impact Assessment can be applied at all levels of decision-making, from policies, plans and programmes (Strategic Environmental Assessment—SEA) to individual projects (Environmental and Social Impact Assessment—ESIA). Impact assessment may be a requirement of national policy and regulations, financial institutions seeking to invest, and/or corporate policy. It's also an expectation of many stakeholders and a cornerstone of trustful stakeholder relations. Its use is recognised in international biodiversity agreements such as the Convention on Biological Diversity.

Whether at the strategic or project level, impact assessment legislation and policies should make explicit reference to the mitigation hierarchy and require the rigorous and appropriate use of all steps in the hierarchy, including avoidance, minimisation, restoration and biodiversity offsets. The latter should be recognised as a mitigation option of last resort for residual impacts only (see *Brief 1: The Mitigation Hierarchy* and *Brief 6: Steps 3 and 4 in the Mitigation Hierarchy: Restore and Offset*).

Box 1: Impact assessment at strategic and project levels

ESIAs of individual projects are the most widely used form of impact assessment. The ESIA process is largely reactive, triggered by a proposed development project on a particular site. Its focus lies in identifying, assessing and mitigating the predicted direct and indirect impacts of that project. ESIAs can be quite detailed and involve the collection of new data.

However, they tend to take a narrow spatial and temporal perspective, which means they are not well designed for addressing cumulative impacts. This means that mitigation measures designed on a project-by-project basis using ESIA may fail to help achieve goals for biodiversity conservation at a broader, jurisdictional level.

On the other hand, SEAs provide a broader perspective but with a lower level of detail compared to project-level ESIAs. SEAs are particularly effective in addressing cumulative impacts resulting from multiple proposed developments, encompassing impacts on ecological processes across landscapes and seascapes. SEAs are less commonly used than ESIAs, but can also be embedded in other planning tools such as spatial plans (e.g. for sub-national administrative units) and sectoral policies (e.g. for renewable energy deployment).

Conducting assessments hierarchically, from strategic to project level, is best for ensuring that mitigation is optimised across different scales (see *Brief 4: Strategic Planning for the Mitigation Hierarchy*).

Impact assessment that supports the mitigation hierarchy

To enable the effective application of the mitigation hierarchy, impact assessment, whether conducted at the strategic or project level, must include the following core elements:

1. Early identification of likely significant impacts

Decisions about changes to a proposed project or development plan to reduce harm—or indeed, cancellation of a problematic project—are best and most easily made in the initial stages of planning. For this reason, likely significant impacts must be identified as soon as possible during the impact assessment process, ideally in the early planning, screening or scoping phase.

This involves gathering and analysing all relevant and up-to-date baseline information about the environment that could be impacted. It includes conducting field surveys and engaging with stakeholders who have an interest in, or may be affected by, the proposed development. The synthesis of this information and early engagement with stakeholders are essential for effective decision-making and successful project development. Stakeholder engagement and baseline data enable the identification of intrinsic, use, and cultural values associated with biodiversity features that could be negatively affected, as well as their relative importance.

This is the stage where developers should consider legal, financial, and other restrictions on their projects due to potential impacts on biodiversity and ecosystem services. Useful information on the distribution and occurrence of threatened species and ecosystems, protected areas, and Key Biodiversity Areas is made widely available by conservation organisations and should be sought and used at this stage.

2. Consideration of all possible impacts

Impact assessment should address the full scope of potential impacts within the project or plan's area of influence:

- **Direct impacts**, which occur as a direct result of an action or set of actions, within the direct disturbance footprint (e.g. the clearing of vegetation to build a facility or access road);
- **Indirect impacts**, which occur as a result of an action, but occur later in time or away from the action location through complex pathways (e.g. reduced harvest of crops for local communities due to the impacts of project-related emissions on key pollinators, impact on groundwater quality abstracted from community boreholes due to acid drainage from local mines);
- **Induced impacts**, which are catalysed because of perceived socioeconomic opportunities presented by development (e.g. increased clearing for small-scale agriculture along newly-created access roads);
- **Cumulative impacts**, as the result of incremental, sustained and combined effects of human action and natural variations over time from multiple activities affecting the same biodiversity values (e.g. a local species population lost due to a combination of many small impacts from a series of projects over time, coupled with climate change).

Mitigation must be applied to all potentially significant impacts, not only direct impacts. In many cases, indirect impacts (e.g. downstream of a project or planning area) will be much greater than 'footprint' impacts. They can also be harder to address as they may be outside the area under the developer's operational control.

3. Due consideration of alternatives

Fundamental to all impact assessment is the early, and iterative, consideration of alternatives to the proposed plan or project. Feasible and reasonable options that could meet the project's or plan's purpose and need should be sought, and a 'no go' option seriously considered if significant impacts appear likely. Alternatives could include changes in the location, siting, layout, scale, design, timing of implementation and use of technology. It is essential to involve all interested and affected parties in generating, assessing, and selecting acceptable alternatives.

4. Defensible evaluation of impact significance

Evaluating the significance of impacts is at the core of impact assessment. Mitigation should be required at least for all negative impacts which are rated as being significant. The 'significance' of an impact has a technical and a social aspect. The technical aspect is typically addressed by relevant specialists and considers the spatial scale, duration and severity or magnitude of a likely effect on species, ecosystems and ecological processes.

The social aspect is about what matters, and what is acceptable, to stakeholders and to society. Social values may be reflected in government policies (for example, about threatened species protection) and environmental standards (e.g. restrictions on the conversion of old-growth forests), or are elicited through engagement with interested and affected parties.

5. Respecting limits to acceptable impacts

The concept of limits to acceptable change, or thresholds beyond which environmental change would be unacceptable, is crucial in impact assessment. Thresholds apply to critical values which, if exceeded, would lead to unacceptable or irreversible consequences, or loss of irreplaceable resources. Such limits are often spelled out in legislation or lender and corporate standards. Limits could include:

- The extinction of a species or a local population of a species, or the conversion of the last remaining area of a habitat supporting a threatened species;
- Impacts that would prevent the achievement of targets for conserving or recovering biodiversity features; or
- The loss of place-based ecosystem services that cannot be compensated, replaced, or adequately substituted, particularly where indigenous peoples or local communities are affected.

Such impacts would likely be considered unacceptable, and compensation or biodiversity offsets cannot effectively address them. In these cases, mitigation must prevent such impacts altogether (see *Brief 5: Steps 1 and 2 in the Mitigation Hierarchy: Avoid and Minimise* and *Brief 6: Steps 3 and 4 in the Mitigation Hierarchy: Restore and Offset*).

6. Taking a risk-averse and precautionary approach

A risk-averse and cautious approach should be adopted when estimating residual impacts, and assessing and evaluating their significance. This approach should account for gaps in information and knowledge, and uncertainty about the outcomes of avoidance, minimisation, and restoration activities.

Where it is highly uncertain whether it is feasible to mitigate residual impacts—for example, where valued biodiversity or ecosystem services could be irreplaceable—alternatives must be sought as the proposed development would be unacceptable or a 'no go' in most contexts.

7. Formulating mitigation measures to achieve desired outcomes

Mitigation measures must be formulated with the engagement of relevant expertise and key stakeholders. Measures should be designed to deliver clearly defined, quantified, and measurable outcomes for biodiversity, ecosystem services and their beneficiaries—especially with regard to offsets and compensation. These outcomes should be aligned with jurisdictional targets for biodiversity, where they exist. Key stakeholders should be included in the design, implementation and performance monitoring of mitigation measures, with care taken to avoid conflicts of interest.

Appropriate implementation arrangements are especially key for offsets, which typically involve land not controlled by the project developer, and actions that are outsourced as they require conservation and restoration expertise that most developers don't have in-house. Roles and responsibilities as well as enforcement mechanisms must be formalised to ensure developers remain accountable for their offsets.

8. Preparing robust plans for implementing, monitoring and adapting mitigation measures

Providing assurance that mitigation measures will be successfully implemented is essential. This requires both ongoing management plans, and monitoring and evaluation plans. Management plans and/or action plans should be prepared for the implementation of a project or plan. These plans set out what mitigation measures must be undertaken, when and by whom, to achieve the desired results.

Management or action plans should be required together with impact assessment documentation to inform decision-making processes, or be prepared as a condition of authorisation or approval.

Monitoring and evaluation plans should be required to track the progress of both implementation and outcomes against quantified milestones. These plans should use appropriate indicators of performance, to enable adaptive and corrective management (see *Brief 10: Ensuring Lasting Outcomes from Mitigation*).

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

- Brownlie, S., & Treweek, J. (2018). *Biodiversity and ecosystem services in impact assessment*. (Special Publication Series No. 3). Fargo, USA: International Association for Impact Assessment (IAIA).
- Business and Biodiversity Offset Programme (BBOP). (2009). *The relationship between biodiversity offsets and impact assessment: A BBOP resource paper*. BBOP, Washington, D.C. <https://www.forest-trends.org/wpcontent/uploads/bbop/the-relationship-between-biodiversity-offsets-and-impact-assessment-pdf.pdf>
- Convention on Biological Diversity. (2006). VIII/28. *Impact assessment: Voluntary guidelines on biodiversity-inclusive impact assessment*. <https://www.cbd.int/doc/decisions/cop-08/cop-08-dec-28-en.pdf>
- International Association for Impact Assessment (IAIA). (2013). *FastTips No. 6 on mitigation in impact assessment*. https://www.iaia.org/uploads/pdf/Fasttips_6Mitigation.pdf
- International Association for Impact Assessment (IAIA). (2016). *FastTips No. 14: Assessing significance in impact assessment of projects*. https://www.iaia.org/uploads/pdf/Fasttips_14%20Significance_1.pdf





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