eklipse Brief

Optimising the Mitigation Hierarchy: Enhancing the 'Avoid' Stage through Ecosystem Services

A science policy brief of the Eklipse Expert Working Group on the mitigation hierarchy

Context

The EU Biodiversity Strategy for 2030 and the Kunming-Montreal Global Biodiversity Framework both focus on halting further biodiversity loss. They also ensure that ecosystems remain viable to deliver the benefits essential for life for all people. Adequate and strengthened mitigation measures are required, raising key questions around: how to avoid and minimise irreparable harm to nature; in understanding who benefits and who loses from the necessary trade offs; how to ensure a just distribution of benefits and costs from the policy interventions.

This policy brief provides evidence-based knowledge for policymakers on how to improve the use of the mitigation hierarchy. The aim is to achieve strategic policy goals through national and local level action, especially at the avoid and minimise stages of the mitigation hierarchy, which need more attention. It is based on a study undertaken by the Eklipse mitigation hierarchy Working Group in response to a knowledge request from the French Biodiversity Agency (OFB) to Eklipse (Savilaakso et al., 2023).

What is mitigation hierarchy?

The **mitigation hierarchy** is the sequence of actions (avoid-minimise-restore-compensate) to anticipate and avoid adverse impacts on **biodiversity and ecosystem services**. The avoid or prevent stage is the first and most important stage of the mitigation hierarchy in which policymakers and others in the decision-making process can anticipate adverse impacts on biodiversity before actions or decisions are taken. Action is then taken to prevent adverse impacts by considering different options in the project location, scale, layout, technology and phasing. Avoidance is often the easier, more cost-effective and efficient way; instead of restoring a damaged habitat later or offsetting elsewhere.

The mitigation hierarchy in the EU Legal Framework

Biodiversity conservation is at the core of many EU policies, including the EU Biodiversity Strategy for 2030 and the very foundation of the Birds Directive[1] and the Habitats Directive[2]. Article 6, par. 2, of the Habitats Directive requires that Member States take appropriate steps in the special areas of conservation to 'avoid' pollution or deterioration of habitats to the extent that it violates the Directives' objectives. Likewise, Article 4, par. 4 of the Birds Directive sets down that Member States shall 'strive to avoid pollution or deterioration of habitats' but adds that this is also required 'outside protection areas'. More recently, EU Commission guidance documents stressed the 'anticipatory' nature of avoidance[3] and the need to define 'exclusion zones' in areas with high biodiversity value[4]. The latter guidance suggests that the best way to minimise negative effects on biodiversity is to locate projects away from vulnerable protected species and habitats, and the most efficient tool would be 'strategic planning' at multiple levels of land use. However, the EIA Directive only requires that developers include a description of the measures to avoid, minimise and possibly remedy significant adverse impacts in their projects without providing a clear definition of what avoidance and minimisation are. Likewise, the Marine Spatial Planning Directive refers to various mitigation measures but not explicitly to the mitigation hierarchy. At the national level, some countries, like France or Germany, stand out in comparison with other Member States since they introduced a legally binding obligation to respect the sequence order (avoid-minimise-restore-compensate) in projects, and they explicitly linked the mitigation hierarchy to the No-Net-Loss principle.

1 Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds.
2 Council Directive 1992/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora.
3 Commission Notice C(2018), 7621 final, Brussels 21.11.2018, 'Managing Natura 2000 sites – The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC'.
4 Commission Notice C(2020) 7730 final, Brussels 18.11.2020, ''Guidance document on wind energy developments and EU nature legislation'.

Recommendations in brief

Achieving effective avoidance of biodiversity loss across Europe requires a holistic approach. Sustainable transformation requires society to value existing biodiversity and planners and practitioners need to be committed to improving and enacting legislation and practices to protect it.

Recommendations

01
Create overarching ***minimum legal requirements*** (i.e. Biodiversity Law) and ***guiding principles*** for systematic application of mitigation hierarchy in all sectors.

02
Decide ***where to avoid or minimise*** in land-use planning processes.

03
Include stakeholders at the beginning of the planning, design and implementation phases.

04
Address ***different impacts*** on biodiversity and ecosystem services during planning processes.

05
Address ***connectivity and cumulative*** impacts during planning processes.

06
Champion ***capacity building*** to ensure effective implementation and monitoring of the results.

Where does the evidence come from?

A Systematic Mapping and an Applied Policy Delphi process were used to synthesise the evidence. Of the 15,561 articles screened, 215 were included in the final evidence synthesis. Forty-five of those specifically mentioned the mitigation hierarchy, with the focus largely on terrestrial studies (Fig. 1). The Applied Policy Delphi process was based on interviews and feedback from an international pool of 11 experts (researchers, policymakers, resource managers and private sector representatives who had on-the-ground experience in avoiding or mitigating biodiversity and/or ecosystem services impacts) that complemented the findings from the literature. The process was conducted over 3 rounds.

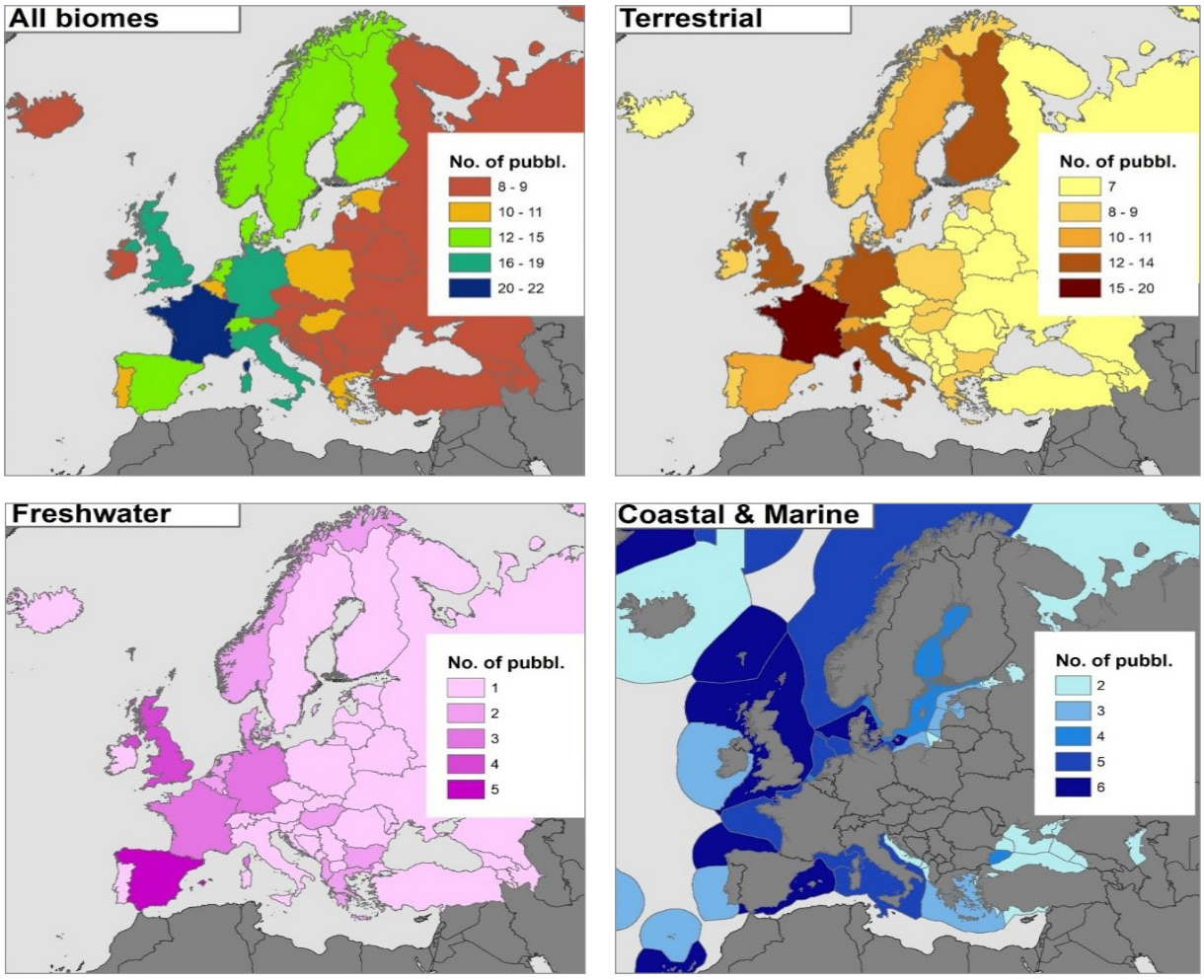

Figure 1. Summary of the literature coverage (by number of publications) by country and biome

MORE INFORMATION IS AVAILABLE AT https://eklipse.eu/request-mitigation/

Key findings

1. The mitigation hierarchy is not consistently and systematically applied across European countries nor within different planning levels.

The understanding and the implementation of the mitigation hierarchy in practice needs strengthening, especially at the avoidance stage, to protect irreplaceable habitats. Enforcing the mitigation hierarchy requires consistent operational guidance on how to avoid impacts on biodiversity from the EU to national levels. Experts recommend strengthening regulations related to both land-use planning, resource use, and conservation. Moreover, a stronger focus should be put on avoidance and minimisation rather than offsetting. We, therefore, recommend that the mitigation hierarchy be firmly established in law in all EU countries, following the French example, and that the precautionary principle be implemented where scientific data on biodiversity are missing or scarce. However, political will, a lack of resources and staff are the biggest challenges to ensure effective design, implementation, monitoring and evaluation practices.

2. There is support that ecosystem services should be mainstreamed into the mitigation hierarchy, but caution is needed.

Ecosystem complexity presents a significant barrier to the implementation of the mitigation hierarchy in land-use planning. Present assessments tend to focus on the flow of benefits to people and so fail to recognise the current and future role of biodiversity. Therefore, there is a need for clear definitions and terminology to be used to ensure a common understanding, particularly of technical language. There is a need to identify key hooks by translating the language of ecosystem services to the priorities of other stakeholders. However, it is also important to construct narrative accounts that are specific to a place, as each landscape unit presents unique challenges to biodiversity and the people who live and work in that landscape. Building the capacity to understand this natural capital across sectors and stakeholder groups is critical, but challenges exist, including: the limited knowledge of the participants; the loss or lack of motivation of the public authorities and organisations; insufficient funding for implementation; and the significant investments of time and funding required. However, failing to do so incurs greater costs in the future.

3. Community-based stakeholders are often not included in decision-making.

Conflicts often arise from the different values and perspectives on nature and the local environment. Yet, community-based stakeholders are often not included. Including these varying perspectives requires active and institutionalised involvement of different stakeholders through the ecosystem services concept. Identification of clear strategies for involvement and consensus building is needed, with the possibilities to influence, negotiate and deliberate on decisions by all stakeholders.

Mapping is a key component of this, both landscape-scale mapping of biodiversity and stakeholder mapping and analysis. Landscape-scale mapping involves identifying sensitive ecosystems along with their relevant ecosystem services. Stakeholder mapping and analysis requires the identification of stakeholder groups with their level of influence, the activities that already exist and how to engage them. This can also bring scientists and stakeholders together in mutually inclusive learning processes, linking expert and local knowledge(s). The aim is to implement meaningful territorial strategies and build local capacity to understand and implement the strategies. These processes also help bring priority groups who are currently under-represented into the dialogue and build trust.

4. Current mitigation measures at the species level are inadequately implemented or have never been proven to be effective.

A multi-species approach is needed to support the avoidance of biodiversity loss. It should consider the mobility of species through the landscape and their varying sensitivities to habitat fragmentation using a habitat connectivity framework. Trade-offs are inevitable and need to be identified and managed in a transparent manner at the landscape-level to ensure the maximum ecological benefit for a larger number of species. Landscape-level mapping of the functional ecological units can draw attention to landscapes where fragmentation can be avoided and identify the potential threats from multiple sources as well as their cumulative impacts. The development of blue and green infrastructure buffer zones also potentially supports biodiversity and provides a range of ecosystem services.

Technological innovations and design can, in some cases, alleviate the impacts of specific infrastructure projects on biodiversity. However, they may bring with them uncertainty with new and diversified pressures and pressure mechanisms. The cancellation of infrastructure projects should be considered if the process generates high uncertainty of impacts on biodiversity and society. To increase the effectiveness of avoidance mechanisms of the infrastructure project, it should be identified how the social dimension could be included in the avoidance measures.

Future research and networking needs

More studies are required on the risks, trade-offs and impacts of the implementation of the mitigation hierarchy, as well as the limiting factors such as educational capacity. In this context, networking among different countries and regions (e.g. by establishing Communities of Practice) to share experiences and best practices in the implementation of the mitigation hierarchy is essential to tackle existing gaps. Overall, ecological aspects of the avoid and minimise stages have been studied more than social or governance aspects.

However, to succeed in using mitigation hierarchy to its full potential, a more holistic understanding of all these aspects is needed. More generally, research is lacking at the ecosystem level, in marine and freshwater environments and geographically from the Central and Eastern European countries.

Conclusions

- There is a need to ensure the implementation and evaluation of the mitigation hierarchy is strengthened, especially the avoid stage, to protect irreplaceable habitats.
- To achieve effective avoidance at the country level, we recommend a holistic approach that targets the underlying drivers of avoidance (e.g., policies and regulations) alongside improving practices to use the mitigation hierarchy.
- Moving towards sustainability requires fundamental transformations, including changes in how biodiversity is perceived and valued. Putting biodiversity first and avoiding further loss is both possible and needed for the benefit of society, the economy and the planet we live on.
- Improved partnerships involving all key stakeholders are required to improve understanding of the mitigation hierarchy and trade-offs in land use policy and decisions.

The recommendations presented in this policy brief provide a roadmap on how to do improve the mitigation hierarchy. It will only be effective if decision makers, land use professionals across the built and natural environment commit to improving legislation and practices.

What is Eklipse?

This evidence comes from an Eklipse process, following a request from the French Office for Biodiversity (OFB). This process was financed by the French Office for Biodiversity (OFB).

Eklipse is a knowledge brokering mechanism created in 2016 to support governments, institutions, businesses, and NGOs in making better-informed decisions.

Eklipse is recognised by the EU Commission as a key actor in developing the Science Service for Biodiversity as the scientific pillar of the Knowledge Centre for Biodiversity (EC-KCBD). Since 2022, Eklipse is managed by the non-profit organisation Alternet
https://alterneteurope.eu

More information is available at:
https://eklipse.eu/request-mitigation/

16
Number of evidence reports produced

131
Experts involved in Expert Working Groups

1312
Citations in scientific articles

Glossary

TERM	DEFINITION	KEY REFERENCES
Avoidance	The first step of the mitigation hierarchy comprises measures taken to avoid creating impacts from the outset, such as careful spatial or temporal placement of infrastructure or disturbance. For example, the placement of roads outside of rare habitats or key species' breeding grounds or by timing of seismic operations when aggregations of whales are not present.	The Biodiversity Consultancy, 2021, Ekstrom et al., 2015
Applied Policy Delphi	This method is a subset of expert consultation, representing the most rigorous approach to eliciting expert knowledge. It combines the knowledge of multiple, carefully selected experts into either quantitative or qualitative assessments, using formal consensus methods such as the Delphi process (described and reviewed by Mukherjee et al. 2016) or other elicitation techniques, including Cooke's method for weighting experts for their accuracy, described in Martin et al. (2012).	Eklipse, 2021
Ecosystem services (ES)	Contributions that ecosystems make to human well-being, such as flood protection and harvestable products. Ecosystem services can be categorised into provisioning, cultural, regulation and maintenance services.	Haines-Young, T. and M.B. Potschin, 2018
Cumulative effects	The impacts (positive or negative, direct and indirect, long-term and short-term impacts) arising from a range of activities throughout an area or region, where each individual effect may not be significant if taken in isolation. Such impacts can arise from the growing volume of traffic, the combined effect of a number of agricultural measures leading to more intensive production and use of chemicals, etc. Cumulative impacts include a time dimension since they should calculate the impact on environmental resources resulting from changes brought about by past, present and reasonably foreseeable future actions.	EEA https://www.eea.europa.eu/help/glossary/eea-glossary/cumulative-impacts)
Mitigation hierarchy	The sequence of actions to anticipate and avoid impacts on biodiversity and ecosystem services. Where avoidance is not possible, the aim is to minimise the impacts. When impacts occur, the preferred options are to rehabilitate or restore. In a case where significant residual impacts remain, offsetting is recommended.	Ekstrom et al., 2015
Natural capital	Natural capital can be defined as the world's stocks of natural assets, which include geology, soil, air, water and all living things. These assets are considered essential to the long-term sustainability of development for their provision of "functions" to the economy, as well as to mankind outside the economy and other living beings.	World Forum on Natural Capital https://naturalcapitalforum.com/about/ and Glossary of Environment Statistics, Studies in Methods, Series F, No. 67, United Nations, New York, 1997.
Systematic mapping approach	Structured, stepwise methodology following an a priori protocol to comprehensively collate and describe existing research evidence (traditional academic and grey literature).	Eklipse, 2021

Policy brief written by *Sini Savilaakso, Joanna Storie, Beatriz Caitana, C. Sylvie Campagne, Daniel Depellegrin, Davide Geneletti, Ifigeneia Kagkalou, Francesca Leucci, Sandra Luque, Alister Scott, Lyudmyla Zahvoyska.*

Figures: *Danica Lacarac*

Edited by *Karla E. Locher-Krause, Onno Knol, and Agnes Zolyomi*