Policy Brief

# Effective biodiversity management and conservation systems in wind farms' areas

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## Introduction

Wind farms impact biodiversity and ecosystems both within the wind farms' areas but also in the surrounding areas. Impacts such as habitat loss or fragmentation, species disturbance or mortality can lead to a breakdown in the functioning of the ecosystem and the services it provides to animals and people.

Three elements contribute to responsible environmental stewardship within a wind energy project: adequate Environmental Impact Assessment (EIA), a strong Environmental Management Plan (EMP) and an effective Environmental Management System (EMS).

This policy brief is based on a workshop[1] and an associated background study [2] of the Interreg Europe BIOWIND project. The workshop on effective biodiversity management and conservation systems in wind areas took place on 20 and 21 February 2024 in Jelgava, Latvia.

## Policy recommendations

1. **Make EIA mandatory, thorough and detailed**
   Developing a comprehensive EIA as an integral part of the approval process is critical for identifying potential impacts on ecosystems, habitats and biodiversity and understanding which mitigation measures are needed.
2. **Research and Innovation**
   Invest in studies & pilot projects to refine impact assessments and mitigation techniques.
3. **Legislative Compliance**
   Align wind projects with national and international biodiversity protection regulations and protocols.

[1] Interreg Europe BIOWIND, 'Summary report of the workshop on elements of a comprehensive environmental plan and effective systems for biodiversity monitoring' (March 2024)
[2] Interreg Europe BIOWIND, 'Background study on elements of a comprehensive environmental plan and effective systems for biodiversity monitoring.'

4. **Involve local stakeholders**
   Input from local stakeholders such as environmental groups, civil society organisations, nature and mountaineering clubs as well as environmental NGOs is essential during the process of determining biodiversity protection requirements and related targets. These stakeholders possess valuable local knowledge and insights which may not be easily acquired through external assessments alone.
5. **Take into account direct, indirect and cumulative impacts**
   Addressing all impacts ensures a holistic understanding of the potential consequences of the wind farm throughout its life-cycle on biodiversity, guiding effective mitigation strategies. This includes looking at the combined impact of nearby windfarms on the environment.
6. **Make use of technology to avoid risks for animals**
   Advanced predictive modelling algorithms and data visualisation tools and techniques can enhance the accuracy of the assessment process and thus support informed decision making. Coupling historical data analysis with simulations of the various policy, climate change and land use development scenarios can improve understanding of risks. Telemetry devices such as GPS trackers or radio tags can help to map migratory corridors, allow to better understand animal behaviour and inform evidence-based mitigation strategies. However, it is also worth considering low-tech solutions that are much simpler to apply, such as the painting of turbine blades[3].
7. **Revise Spatial Planning to Include Buffer Zones**
   Buffer zones with specific guidelines and limits on the proximity of wind turbines to ecologically sensitive areas can provide a protective radius around critical habitats and migration routes. In practice, this is often made difficult by the lack of a clear set of standardised values for the buffer zone agreed by all actors.
8. **Adopt the mitigation hierarchy**
   Avoiding or minimizing harm should be prioritized over restoring or offsetting biodiversity loss during construction, operation, and decommissioning of the farm.
9. **Make room for adaptive assessment and adaptive management**
   Assessments should be re-evaluated at regular intervals to sufficiently account for regulatory, infrastructure, land-use and environmental changes potentially not foreseen in the prior assessment. This can enable addressing new emerging threats or adjust current conservation efforts. Equally important is the assessment of the outcomes of previous biodiversity management decisions and taking into consideration feedback from stakeholders. This can help to adjust or refine monitoring protocols and mitigation action plans.

[3] The painting of turbine blades is a scientifically proven tool to radically reduce bird collisions. https://doi.org/10.1002/ece3.6592

Regarding management, it is important to continuously adapt strategies to new monitoring data.

10. **Implement joint monitoring and conservation programs**
    Continuous monitoring programs can track and analyse the impact of wind farms on avian and bat populations. By actively involving NGOs or project developers in the monitoring process, policymakers can combine expertise and resources for more effective outcomes. An annual report summarizing the monitoring results, either publicly available or directed at policymakers/relevant authorities, can facilitate the implementation or enforcement of corrective measures by policymakers.
    The same goes for conservation and restoration projects.
11. **Make use of early warning systems**
    Radars, thermal and optical cameras and bio-acoustic monitoring systems allow for gathering large amounts of data to perform big data analysis and identify behavioural, seasonal and combinational patterns of species. Additionally, they allow for targeted shutdown on demand or automatised shutdown of wind turbines in the presence of birds or bats. Further research and development on interpretating the data for automatic shutdown should be enacted and applied as soon as possible. Implementing these systems can be considered as a potential precondition for approving windfarm permits.
12. **Make emergency response plans**
    Comprehensive emergency response plans can address potential unexpected incidents, including extreme weather events and wind turbine fire breakouts, which could pose additional stresses to local biodiversity.
13. **Adhere to Standards**
    Conforming to recognized standards such as EMAS and ISO 14001 provides a framework for continuous improvement, accountability, and transparency. This also enhances credibility of wind energy projects, garnering support from stakeholders and regulatory bodies.
14. **Promote Public Awareness and Education**
    Alongside regulatory measures, public awareness and education campaigns emphasize the importance of biodiversity conservation in the context of wind energy projects. Educational programs that actively engage local communities, schools, and organizations build a foundation for responsible environmental stewardship.

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