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New tool to assess the ecological impacts of offshore wind turbines

How do offshore wind farms affect marine wildlife? A new study outlines a systematic approach developed for Swedish waters that could also be useful for assessing wind energy impacts on the marine environment more widely.

Under the 20-20-20 targets, the EU is committed to increasing the proportion of its energy that is produced from renewable resources to 20% by 2020. To address this challenge, many Member States are developing plans for extensive offshore wind farms. However, this requires careful assessment of the impacts of on marine wildlife.

For this research, the authors used 600 peer-reviewed studies and government reports to conduct a detailed study of the different impacts of offshore wind farms around the world. Based on their findings, they developed an impact assessment for offshore wind farms on Swedish wildlife, including marine mammals, fish and seafloor species, such as mussels.

The researchers assessed impacts during both the construction and operation phases. They scored the impacts for marine mammals, fish and seafloor species in three regions of Swedish waters: Skagerrak/Kattegat, the central Baltic Sea and the Gulf of Bothnia. Impacts were scored based on three factors: the spatial extent of the impact, how long it might last and the sensitivity of species affected.

Combining these scores gave them a total score out of nine for the severity of each impact. A score of 3-4 indicated a low impact; 5-6 was a moderate impact and 7-9 a high impact. So, for instance, noise impacts on marine mammals were high in all spatial areas during the construction phase, but only moderate during the operation stage.

The researchers also considered both positive and negative impacts. The positive impact of wind farms on fish due to exclusion of fishing boats received a high score for Skagerrak/Kattegat and a moderate score for the other two regions. All three groups of animals were predicted to benefit from moderate positive impacts of turbine structures acting as artificial reefs, and therefore providing new habitats. All differences were due to differences in the sensitivity of the species in each region.

The results for the three different spatial areas – which encompassed a range of different wildlife and environmental conditions – were similar, suggesting that the results may also be applicable outside Swedish waters. The researchers say their scoring approach provides a versatile and simple method that could be applied in other regions, at different spatial scales and for different types of impacts.

A limitation of the study was that it only considered the impacts on underwater species. The effects on birds were not considered, despite previous research showing significant impacts of wind turbines on bird populations.

According to the authors, more systematic approaches to assessing risks to wildlife, such as the method presented in this study, could help inform marine management. Further research regarding the long-term impacts of wind farms is also needed, as uncertainty remains about these impacts.