

Science for Environment Policy

Biodiversity offsetting cannot compensate for 'old growth' habitat loss

'Biodiversity offset' schemes, which aim to compensate for the loss of unspoilt habitats to development, could lead to an overall loss in biodiversity, a recent study warns. Furthermore, the researchers highlight the considerable time needed, often hundreds of years, to fully recreate an ecosystem.

Biodiversity offsetting aims to replicate an ecosystem that has been lost to human development on an 'offset site'. It typically aims for at least no net loss of biodiversity across the landscape. While some offset schemes rely on the protection of existing habitat at the offset site, others, termed restoration offsets, involve ecological restoration of degraded areas.

Restoration offsets have been criticised by conservation experts who argue that we know too little about restoring ecosystems to ensure offset schemes' success. This study explored offsets' effectiveness by gathering 108 studies from around the world which compared 'secondary growth' habitats with 'old growth' habitats.

Secondary growth sites are those where vegetation is becoming re-established following disturbance. In this study, some sites were offset sites, but most were recovering for other reasons (after fire or abandonment, for example). However, the researchers could infer from these the likely ecological development of offset sites more generally.

In total, the studies covered 1 228 secondary growth sites and 716 old growth sites. Three of these studies concerned European sites; the majority concerned Central and South America, and south-east Asia.

The studies provided data on the sites' characteristics, such as location, size, habitat type and species. The researchers then used models to assess whether the restored sites' ecosystems would ever match those of the old growth reference sites and, if so, when.

The results highlight the significant length of time that it takes to recreate an ecosystem. The study simulated restoration of biodiversity (e.g. at an offset site) for different ecosystem types, world regions and species groups. Average trends indicate that forest ecosystems' species richness (i.e. the diversity of species) could recover within around 10-30 years. Similarity in species between the original site lost to development and the restoration offset could be matched within 30-90 years, but their population similarity (i.e. the health of populations of individual species) may only align after hundreds or thousands of years.

Another challenge is the risk of these projects failing to recreate ecosystems within an acceptable timeframe (100 years was assumed in the study). The study estimated that completely recreating species richness in offset sites within 100 years would occur for about 40% of cases. Similarity in species could be compensated in around 50% of cases, and population similarity would only be matched in about 20% of cases.

The researchers argue that current offset practices do not account for the uncertainty in restoration and its considerable time lags. They therefore do not support them in their current form, at least not to compensate the loss of old growth sites. In particular, 'offset ratios', which calculate the amount of new land needed in hectares relative to the amount lost, need much greater consideration. Presently, ratios of less than 10:1 are typically used, but this study points to 20:1 – 100:1 as more realistic. Offsetting should only be used on a complementary basis alongside stronger conservation strategies such as land planning and strict protection, advise the researchers.



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