The trade-offs of tradable permits to protect biodiversity

Tradable permits can be used to conserve biodiversity by allowing habitat destruction only when a permit has been acquired through the restoration of another habitat. New research has indicated that the costs of conservation, amount of habitat turnover and time lags in restoration all influence the efficiency of the permit market.

Recently, tradable permits have been gaining interest as a policy tool to protect biodiversity. Unlike climate change permits, where the location of emission and mitigation of GHGs is relatively unimportant, conservation permits are sensitive to both the spatial and the temporal allocation of habitats. Spatial influences have been researched but temporal influences are less well investigated.

The study focused on two time issues. Firstly, the lag in restoration times, for example, a forest may take decades to reach restoration, and secondly, the habitat turnover, which is the number of times habitats are changed. Habitat turnover is often detrimental to species.

The study modeled a tradable permit scheme to conserve habitat. The model region consisted of 1000 patches which varied in their ecological value and restoration time. The researchers investigated the relationships between habitat turnover, total restoration cost and total opportunity costs (or the foregone profits if patch is not used for economic purposes). It also analysed the impacts of time lags in restoration on the market dynamics.

The results indicated that the turnover of habitats decreased with increasing costs of restoration and increasing restoration times. This is because both of these make restoration unattractive to landowners and it therefore reduces the number of permits on the market. In the case of instant restoration (i.e. with no time lags), fewer changes in habitat leads to a greater loss in profits as there is less potential for trading.

Since habitat turnover is generally harmful for species, this creates a trade-off between minimising habitat turnover and minimising the loss in profits. If restoration is not instant and involves a lag, the market tends to experience fluctuations. This is because the decision to restore a habitat is based on the current price of permits and current cost of restoration, but if full restoration does not occur until later, then permit price and costs may have changed. If too much habitat has been restored and the market is swamped with permits, then excessive restoration may need to be curtailed by taxing restoration activities. If time lags are very large, restoration becomes unattractive and can slow market activity down until it becomes static.

The researchers highlighted a number of assumptions in their model that may limit the applicability of their results. It assumes that landowners base their decisions on current observations when, in reality, they are likely to apply past knowledge and observations. This also means that the model predicts they are unlikely to ‘bank’ permits for future use as they are acting on current information whereas banking behaviour may actually occur more often. The model also neglects spatial issues, both in terms of the spatial variation in conservation costs and benefits and in terms of the knock-on effects of restoration on surrounding areas. These could be incorporated into the model through spatial trading rules and the researchers suggest further study in this area.


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