Conservation from space: Landscape diversity helps to conserve insects

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Rugged, hilly landscapes with a range of different habitat types can help maintain more stable butterfly populations and thus aid their conservation, according to new findings published today (8 February 2010) in the journal *Ecology Letters*.

The research, carried out by scientists from the Centre for Ecology & Hydrology, Butterfly Conservation and the University of York, has implications for how we might design landscapes better to help conserve species.

The scientists used UK Land Cover Map data (from satellite images) to collect information on the topography and diversity of habitats in the landscape. They found that sites with a greater diversity of habitat types (e.g. woodland, grassland, heathland) and more varied terrain tended to have butterfly populations that were more stable over time.

The study's lead author, Dr Tom Oliver from the Centre for Ecology & Hydrology, said, "More stable insect populations are better for conservation because it means that, in years with extreme weather (e.g. drought years), populations are less likely to go extinct.
Our research shows that populations of species such as the Brown Argus and Dingy Skipper butterfly are more stable when they are located in hilly landscapes with a range of habitat types."

Thirty-five British butterfly species were included in the analysis using records collected by volunteers of the UK Butterfly Monitoring Scheme

from 166 transect sites across the UK. The research team compared the stability of butterfly populations over an 11 year period with the diversity of habitats in the surrounding landscape up to 5km from monitored sites. They concluded that landscapes with a greater range of habitats harboured more stable butterfly populations. In addition, landscapes with a greater range of topographic aspect (e.g. north, south, east and west facing slopes) were also better for the insects.

Co-author Dr Jane Hill of the Department of Biology at the University of York said, "Our findings show that more diverse landscapes may provide a greater range of resources and microclimates, which can buffer insect populations from declines in difficult years."

A surprising result from the study was that, for some butterfly species, the diversity of habitats up to 5km away from monitored sites affected the butterfly populations. Co-author Dr Tom Brereton, Head of Monitoring at Butterfly Conservation, said, "Our results highlight the importance of taking a landscape perspective for species conservation."

The researchers hope that in the future it may be possible to design landscapes that are more effective at conserving species. Co-author Dr David Roy from the Centre for Ecology & Hydrology said, "With a rapidly changing climate we need our landscapes to support biodiversity as well as provide other ecosystem services such as food production and clean water. Using remotely-sensed land cover data from satellites to design landscapes may help us to achieve the right balance."

Provided by Centre for Ecology & Hydrology