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Habitat mapping method could help restore biodiversity

A new method for mapping long-term changes in habitat over large areas and in fine detail has been developed, which could help inform conservation plans to restore biodiversity to previous states. In a UK case study, researchers have used it to demonstrate the dramatic effects of intensive agriculture and afforestation on rural habitats since the 1930s.

Driven by increased demand for food and growing populations, major changes in rural landscapes during the second half of the 20th century, particularly in Western Europe, have had damaging effects on biodiversity. Intensive agriculture, afforestation for timber production and urbanisation have been shown to not only reduce available habitat for wildlife, but to also cut the links between habitats - the 'ecological connectivity' that allows species to spread and move around. Without these connections, there is a greater risk of extinction.

There is increasing interest in restoring habitats at a landscape and regional scale. This study, conducted under the EU SCALES project[1], presents a new method of mapping habitat change to assist these efforts. The researchers argue that mapping is an important first step in conservation planning, with implications for the EU's Natura 2000 initiative[2], and that their approach is unique in that it can cover a large area of land, show small details and assess changes over a long period of time.

They demonstrated its use by applying it to Dorset, a county in the UK of over 2500km^2. The researchers combined historic maps and soil data from the 1930s, before the onset of intensive agriculture, and developed appropriate habitat classifications, such as 'heathland' and 'managed grassland'. Referring to habitat types, instead of land use functions, makes it easier to compare maps produced at different times or using different methods.

The information was used to produce a digital map of Dorset in the 1930s, with a fine-scaled resolution of 25 x 25 metres. The map illustrated the range of habitat types across the district at the time, and presents what could be considered an 'ideal' situation for semi-natural habitats. These maps were then compared to a land cover map of Dorset, produced from satellite data, for the year 2000.

The maps revealed that the total area of semi-natural vegetation in Dorset fell by 74% over the 70 year period, considerably reducing the amount of quality habitat for wildlife. This was mainly the result of conversion to land for intensive agriculture, but afforestation also played a role by introducing conifer plantations for timber.

Furthermore, the connectivity between the remaining fragments of habitat had fallen considerably. Most grasslands in 2000 had almost zero connectivity with other habitats more than a few hundred metres away, when 'connectivity' is considered as the ability of seeds from one habitat patch to disperse and end up at another habitat patch of the same type.

The case study demonstrates the capacity of this mapping method, although its accuracy could be improved with better data; the researchers suggest that actual losses in habitat are likely to be even greater than the maps indicate. They propose a quantitative framework for conservation planning that uses high resolution maps, such as these, to help identify habitats for preservation and a target level of connectivity.

1. SCALES (Securing the Conservation of biodiversity across Administrative Levels and spatial, temporal, and Ecological Scales) is supported by the European Commission under the Seventh Framework Programme. See: www.scales-project.net
2. See: http://ec.europa.eu/environment/nature/natura2000/index_en.htm

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