Special Issue - July 2016

PREDICTS Newsletter Special

Projecting Responses of Ecological Diversity In Changing Terrestrial Systems

This month sees the publication of two PREDICTS papers, one in *Science* and one in *Nature Communications*. Here are summaries of the two papers, taken from the press releases. Thanks once again to everybody who has shared their data with us to make these global analyses possible. The database manuscript has been accepted for publication by *Ecology & Evolution*, pending minor revisions that we are close to completing. We will let you all know once the paper is published, at which point the data themselves will be made available. Thanks to the many co-authors for your time and patience!

Biodiversity falls below 'safe levels' globally

Levels of global biodiversity loss may negatively impact on ecosystem function and the sustainability of human societies, according to the study, published in *Science*, produced by the PREDICTS team and led by the Natural History Museum, UNEP-WCMC, UCL and CSIRO.

The study found that levels of biodiversity loss are so high that if left unchecked, they could undermine efforts towards long-term sustainable development.

"This is the first time we've quantified the effect of habitat loss on biodiversity globally in such detail and we've found that across most of the world biodiversity loss is no longer within the safe limit suggested by ecologists" explained first author, Dr Tim Newbold from UCL and previously at UNEP-WCMC.

The team found that grasslands, savannas and shrublands were most affected by biodiversity loss, followed closely by many of the world's forests and woodlands. They say the ability of biodiversity in these areas to support key ecosystem functions such as growth of agricultural productivity and nutrient cycling has become increasingly uncertain.

For 58.1% of the world's land surface, which is home to 71.4% of the global population, the level of biodiversity loss is substantial enough to question the ability of ecosystems to support human societies. The loss is due to changes in land use and puts levels of biodiversity beyond the 'safe limit' recently proposed by the planetary boundaries – an international framework that defines a safe operating space for humanity.

"It's worrying that land use has already pushed biodiversity below the level proposed as a safe limit," said Professor Andy Purvis of the Natural History Museum, London, the principal investigator of PREDICTS, and a leading author on the study.

"Decision-makers worry a lot about economic recessions, but an ecological recession could have even worse consequences – and the biodiversity damage we've had means we're at risk of that happening. Until and unless we can bring biodiversity back up, we're playing ecological roulette."

The study relied upon the data in the PREDICTS database, donated by hundreds of scientists across the globe to analyse 2.38 million records for 39,123 species at 18,659 sites. The analyses were then applied to estimate how biodiversity in every square kilometre of land has changed since before humans modified the habitat.

"The greatest changes have happened in those places where most people live, which might affect physical and psychological wellbeing. To address this, we would have to preserve the remaining areas of natural vegetation and restore human-used lands" added Dr Newbold.

The team hope the results will be used to inform conservation policy, nationally and internationally, and to facilitate this, have made the maps from this paper publicly available. All the underlying data will be released soon via the Museum's Data Portal.

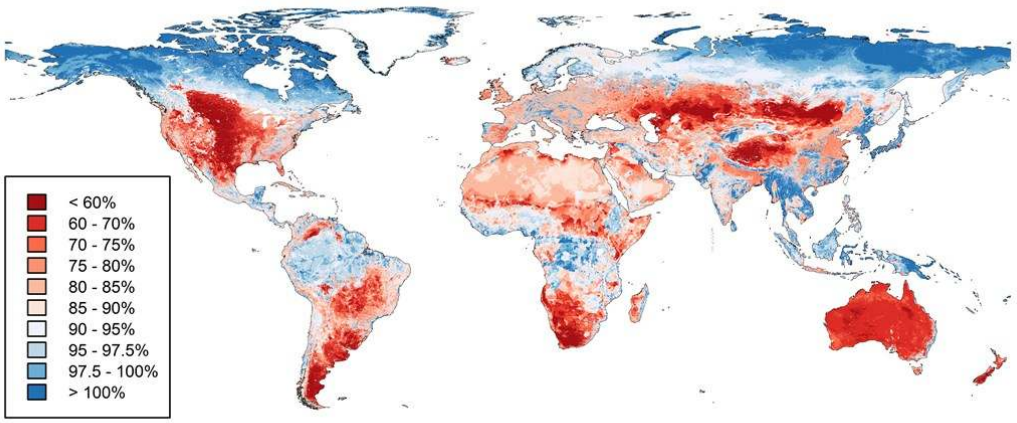


Figure: Biodiversity intactness of ecological assemblages in terms of the total abundance of originally occurring species, as a percentage of their total abundance in minimally disturbed primary vegetation (Biodiversity Intactness Index; BII). Blues areas are those within, and red areas those beyond proposed safe limits for biodiversity, in terms of BII. A high-resolution raster of this map can be freely downloaded.

Tweet about the Science paper

Local biodiversity is higher inside than outside terrestrial protected areas

A collaborative study which provides the strongest evidence so far that the world's protected areas do benefit a broad range of species has been published this week in *Nature Communications*.

The study, conducted by members of the PREDICTS team and led by the University of Sussex working together with the Natural History Museum, UNEP-WCMC, Swansea University and CSIRO is the largest global analysis of biodiversity in protected areas.

By analysing biodiversity samples taken from 1,939 sites inside and 4,592 sites outside 359 protected areas, scientists have discovered that the protected area samples contain 15% more individuals and 11% more species compared to samples from unprotected sites. The research was carried out by using PREDICTS global biodiversity database, which contains data for approximately 1% of all known species and spans 48 countries and 101 ecoregions.

Dr Claudia Gray, co-lead author of the study said: "Previously, regional or global studies of protected areas have mostly used information from satellite photos, to look at changes in forest cover. Instead, we used a particularly exciting new dataset, which brings together information collected on the ground by hundreds of scientists all over the world, and generously shared with us.

"We have been able to show for the first time how protection affects thousands of species, including plants, mammals, birds and insects. This has provided us with important insights into these areas - which previous studies were not able to do."

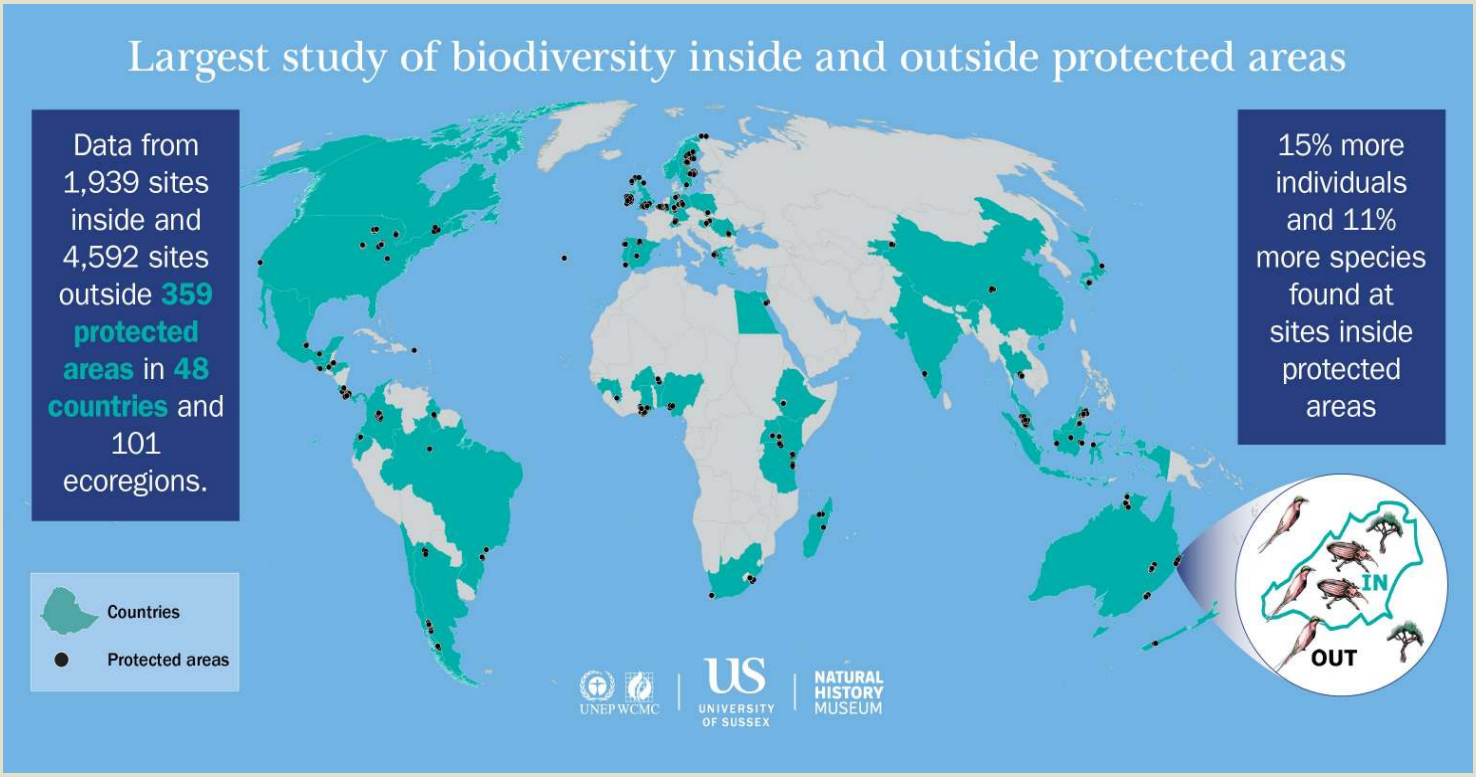
From the study, scientists also discovered protection is most effective when human use of land for crops, pasture and plantations is minimised. The results suggest that better management across the existing protected area network could more than double its effectiveness.

Dr Samantha Hill, co-lead author of the study from the UNEP-WCMC and the Natural History Museum, said: "Humanity faces difficult decisions as to how best to protect biodiversity while providing for the needs of our ever-growing population. This study provides new understanding into the biodiversity found at the intersection of protected areas and human land-uses."

Dr Jörn Scharlemann, from the University of Sussex, said: "Protected areas are widely considered essential for biodiversity conservation, but our results show for the first-time that they do actually benefit a wide range of species.

"Our results reinforce recent commitments by governments for increased support and recognition of the importance of protected areas worldwide.

"Protected areas do not currently benefit all species - but what we have shown in our study is they have the potential to help us conserve some of the most biodiverse areas on Earth - which is why they vitally need increased global support."



Tweet about the Nature Communications paper