



# Local Biodiversity Intactness Index

The Local Biodiversity Intactness Index (LBII) is based on a purpose-built global database of local biodiversity surveys combined with highresolution global land-use data. The index provides estimates of human impacts on the intactness of local biodiversity worldwide, and how this may change over time.

## Purpose of the index

The Local Biodiversity Intactness Index (LBII) estimates how much of a terrestrial site's original biodiversity remains in the face of human land use and related pressures. Because LBII relates to site-level biodiversity, it can be averaged and reported for any larger spatial scale (e.g., countries, biodiversity hotspots or biomes as well as globally) without additional assumptions. Building on research published recently in Nature, and repurposing existing biodiversity survey data, it combines scientific rigour with affordability. The LBII is particularly relevant for Aichi Targets 12 (Preventing Extinctions) and 14 (Essential Ecosystem Services). Existing indicators for these targets lack a broad biodiversity perspective; in particular, they are heavily biased





CBD Aichi Target 12 Reducing risk of extinction CBD Aichi Target 14 Essential ecosystems services



Preliminary global map of LBII for species richness, expressed as a percentage, with inset showing how LBII picks out Egmont National Park from the dairy pasture that surrounds it. (From Newbold et al. in prep.)



# Coverage

The LBII covers the world's entire terrestrial realm, and can report both globally and at any smaller scale relevant for global policy. Although published analyses have so far had coarse spatial and temporal grain1, CSIRO's development of annual, global, fine-scale land-use maps allows LBII to report annually at 1km resolution from 2001 to 2020.

### Methods

#### The underpinning science

The LBII is based on rigorously peer-reviewed and transparent science. The global statistical models were published recently in Nature, along with global maps of net changes in local biodiversity by 2005, a hindcast of change from 1500-2005, and global and national projections of future changes under the Representative Concentration Pathway scenarios.

Models of how land use affects the similarity of an ecological community to that of intact sites are now in review; a paper combining these with our earlier models to map LBII is in preparation. These models all use the PREDICTS database, which has collated data from studies that compared terrestrial biodiversity at sites facing different intensities of human pressures; it currently holds over 3 million records for over 26,000 sites (in 94 countries) and a taxonomically representative set of over 45,000 plant, invertebrate and vertebrate species. These data, contributed by a network of over 500 researchers worldwide, will be made freely available in the coming months (some metadata are already available). The database will continue to grow, enabling more precise modeling. Annual land-use data since 2001 are produced by using remotely-sensed land cover change data to statistically downscale global land-use maps to 1km resolution; a paper is in preparation.



Projected net change in local species richness worldwide from 1500 to 2095; LBII additionally discounts species not in the original assemblage. Future projections are based on the four Representative Concentration Pathway scenarios6. Grey shading and error bars show 95% confidence intervals. (From Newbold et al. 2015 Nature 520:45-50.)



Taxonomic representativeness of the PREDICTS database; lines indicate (from bottom to top) 0.1%, 1% and 10% representation of the groups depicted. Note logarithmic scales. (From Hudson et al. in prep.).

**Essential Biodiversity Variables:** 



**Species populations class** Species distribution Population abundance



**Community composition class** Taxonomic diversity