

When biodiversity monitoring data is not good enough

Can today's scientists accurately predict global biodiversity trends? No, according to a new study, since current approaches make it impossible.



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Researchers supported by the EU-funded EuropaBON project have reached a worrying conclusion about current biodiversity monitoring data. Published in the journal 'Ecography', their [study](#) reveals that the existing data is far too incomplete to form a reliable picture of global biodiversity trends.

We are facing a global decline in biodiversity, a problem that cannot be tackled without better biodiversity monitoring. The most common monitoring method is measuring

species richness at the local scale. However, the alarming loss of species globally does not always reflect what is happening locally.

"There has been a heated debate on the scientific community on why major global syntheses so far have not found negative trends of local species richness," states study senior author Prof. Henrique Pereira of EuropaBON project coordinator Martin Luther University Halle-Wittenberg (MLU), Germany, and the German Centre for Integrative Biodiversity Research (iDiv) in an [iDiv media release](#). "We show that the declines in local species richness are likely to be much smaller than many anticipated and that, in those conditions, even minor spatial biases and errors in monitoring lead to the lack of detection of global trends."

The road to inaccuracy

To detect global biodiversity trends using local species richness, monitoring data needs to be compiled and assessed over time. However, there is a catch, as iDiv and MLU postdoctoral researcher and study first author Dr Jose Valdez explains: "The

occurrence of species is recorded locally all over the world by many different people and organisations. The problem with the data is that they were and are recorded under completely different conditions and mostly not under standardised rules. If you then pile them together, the errors and deviations add up, making the result very inaccurate.”

The team studied how monitoring results were affected by factors such as the number of or size of sampling sites, time intervals between sampling, local species richness measurement errors and site selection biases. They found that it was theoretically possible to determine global changes in biodiversity based on hundreds of perfect samples sites within a decade, and from thousands of such sites within 3 years. However, there is no such thing as perfect sampling – monitoring data usually contain 10 % to 30 % errors. The researchers discovered that a mere 5 % error in measurement drastically reduced the ability to reliably detect any global trend.

“Our results demonstrate that capturing accurate trends in local species richness would require monitoring an unfeasibly large number of perfectly sampled sites,” observes Dr Valdez. “However, the question is whether this would even be useful or meaningful for effective and responsive biodiversity conservation.”

The authors therefore suggest prioritising local and regional assessments of biodiversity change, supported by models accounting for measurement errors and biases. Dr Valdez notes: “Conservation strategies and measures are coordinated and implemented not on a global level, but at local and national scales. Measuring biodiversity trends at these smaller scales is not only more practical but also helps in understanding the drivers of biodiversity loss and assessing the progress of conservation policies.”

As part of its efforts to improve biodiversity monitoring, the EuropaBON (Europa Biodiversity Observation Network: integrating data streams to support policy) project is also hosting a virtual workshop on Essential Biodiversity Variable workflows.

[Registration](#)  is now open for the workshop taking place on 22-24 February 2023.

For more information, please see:

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