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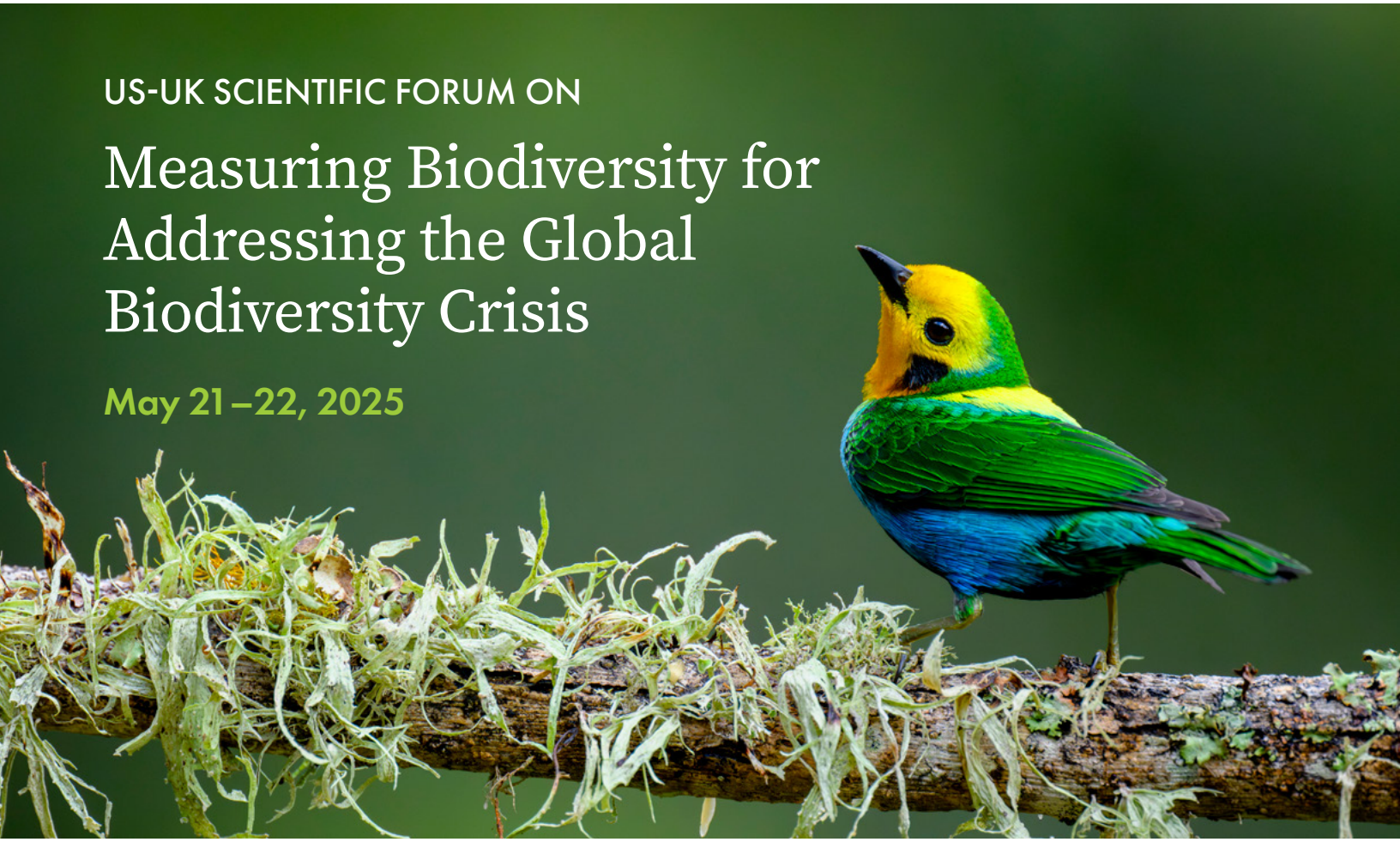

US-UK SCIENTIFIC FORUM ON

# Measuring Biodiversity for Addressing the Global Biodiversity Crisis

**May 21–22, 2025**

**GOVERNMENTS, BUSINESSES, AND FUNDERS** all have a strong interest in biodiversity measurement to inform decision making, assess impacts, and track progress toward conservation and restoration goals. The US-UK Scientific Forum on Measuring Biodiversity for Addressing the Global Biodiversity Crisis held in Washington, DC, on May 21–22, 2025, aimed to build momentum toward standardizing methods for using environmental monitoring technologies to assess biodiversity, ensure interoperability between different outputs, increase confidence that observed changes in biodiversity result from real changes in what is being measured, and advance integrating biodiversity monitoring with evaluation to help ensure conservation at a variety of scales can be more effective. The discussions at the forum highlighted a major challenge to achieving such a state, namely that biodiversity is a complex concept that cannot be captured by a single metric, as it encompasses genetic, species, and ecosystem diversity, as well as the relationships among them. Thus, there is a need to standardize biodiversity measurement approaches to enable comparisons and track progress, while also recognizing the diverse perspectives and needs of different stakeholders.

The forum's first session noted there are gaps and biases in existing plant biodiversity data, including geographic, taxonomic, and trait-based biases. There are, however, opportunities to use machine learning and informatics to address these data gaps and biases, such as predicting true native plant diversity and automating trait extraction from herbarium specimens. The discussions highlighted challenges in monitoring small mammals, such as bats in West Africa, and the importance of using appropriate sampling methods to capture elusive species. They also pointed out the value of "two-eyed seeing"—incorporating Indigenous and local knowledge alongside Western scientific approaches to biodiversity monitoring and restoration—and using population genomic data as a complement to time series data to model and project changes in plant community dynamics over time.

Session two discussed various approaches to making biodiversity measurement more meaningful and actionable for decision makers, rather than simply as a means of describing the state of nature, and that collaboration among scientists, policy makers, and other stakeholders is essential to ensure biodiversity data and metrics are relevant and actionable. The discussions noted the importance of constructing "focal conservation values" and using viability analysis to create useful biodiversity indicators. They also highlighted the opportunity to leverage large-scale citizen science data and integrate it with other data sources to inform policy and decision making and use environmental DNA and other emerging technologies to scale up biodiversity monitoring. In addition, this session discussed applying remote sensing, spectral data, and machine learning to map and model plant diversity, functional traits, and community composition at continental scales; combining observational data and scientific literature through multimodal artificial intelligence (AI) approaches to improve biodiversity assessments and decision support; and the need to develop scalable, cost-effective, and repeatable monitoring approaches to track biodiversity change over time.

The forum's third session focused on the interoperability of biodiversity data. The discussions noted that the Earth BioGenome Project has established standards and best practices for biodiversity data collection, processing, and sharing biodiversity genomics—including sample collection, DNA sequencing, genome assembly, and data sharing—that are being adopted by the broader biodiversity research community. Other topics addressed included the need to leverage large-scale genome sequencing efforts to create a comprehensive digital repository of life on Earth; integrating diverse biodiversity data sources, including genomics, field observations, and remote sensing, to enable more comprehensive assessments of biodiversity; and applying AI and machine learning techniques to biodiversity data to

improve species distribution modeling, visual data analysis, and other applications. The discussion also pointed to the importance of maintaining and safeguarding databases, given their value for monitoring changes over time and for informing AI and machine learning applications. One cautionary note about AI and machine learning techniques was that while they have significant potential to enhance biodiversity data analysis and integration, they require developing standardized evaluation frameworks and benchmarks to measure progress and ensure the methods are fit for purpose.

The final session of the forum presented a range of case studies related to biodiversity conservation and monitoring. These included:

- Bat Conservation International's work to protect bat populations and ecosystems and the importance of on-the-ground fieldwork and community engagement.
- The goal of the Group on Earth Observations Biodiversity Observation Network is to build a global biodiversity observing system to support action and decision making.
- Research on quantifying the biomass of different taxonomic groups, including those of humans and domesticated animals, to communicate the scale of humanity's impact on the natural world.
- Examples from the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services pollinator assessment pointing to the importance of effectively translating complex biodiversity data and insights into actionable policy and decision making at multiple scales.

Over the course of the forum, recurring themes included the need for comprehensive, coordinated biodiversity monitoring programs at multiple scales and the importance of bridging the gap between biodiversity science and effective policy and decision making. They also included the need to engage local communities, incorporate diverse knowledge systems, and communicate the scale and urgency of the biodiversity crisis.


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