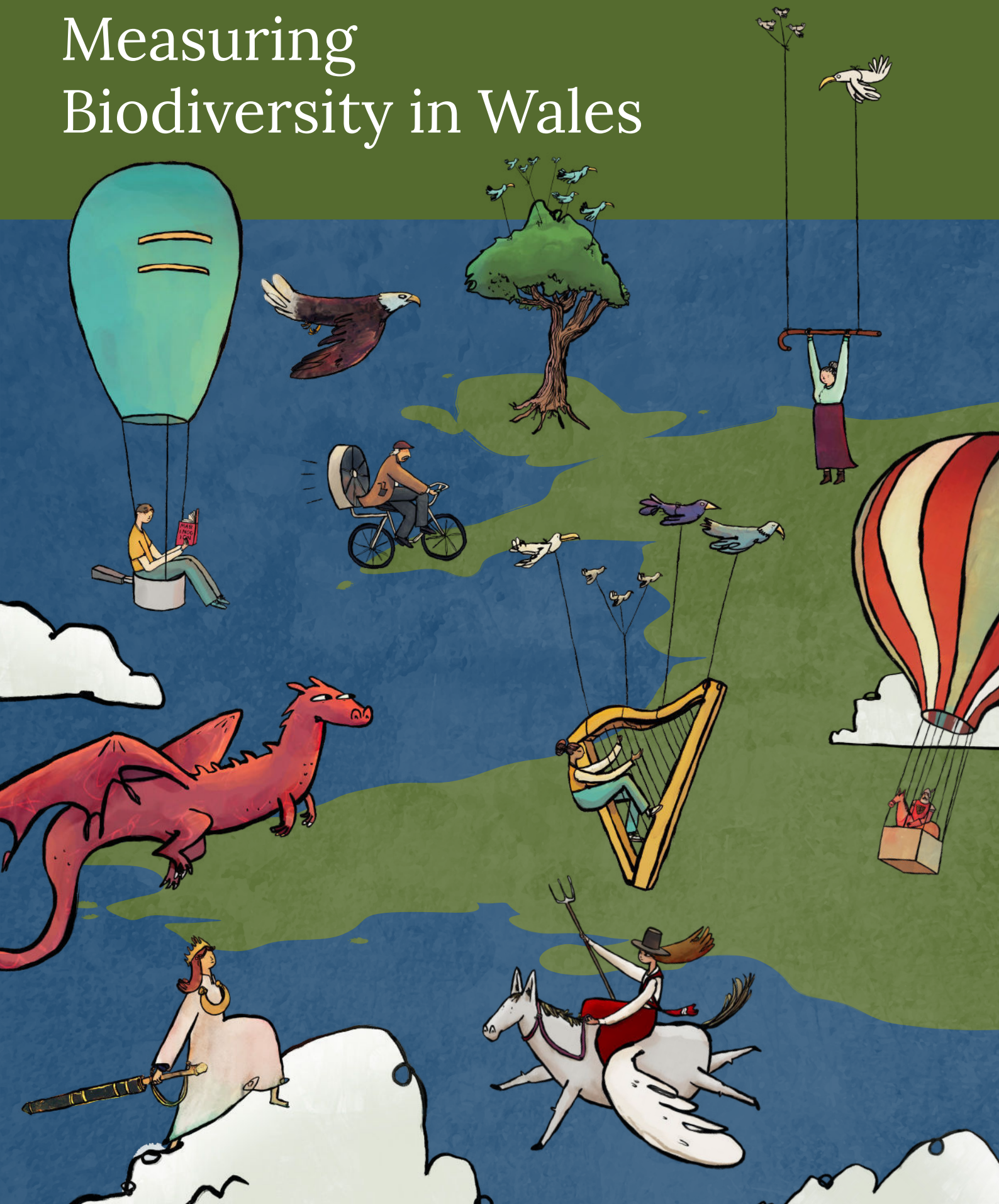
POLICY BRIEFING

CYMDEITHAS DDYSGEDIG CYMRU
THE LEARNED SOCIETY OF WALES

Measuring Biodiversity in Wales



"Biodiversity in Wales has declined"

Biodiversity conservation is not only an ethical concern for nature lovers; it is a legal imperative, and crucial for human life.

In the UK, conservation efforts have recently been positioned by some sectors as being at variance with the needs of economic growth (Treasury accused of 'being nasty' to bats in pursuit of growth, The Times, March 2025).

However, according to the World Conservation Union (IUCN), the monetary value of goods and services provided by global ecosystems is estimated at **US$33 trillion per year**. Peatlands and forests store carbon; aquatic organisms purify water; and global food production would collapse without pollinators and soil organisms.

So, conserving biodiversity isn't altruism.

We rely on biodiversity because we are part of the wider biosphere: the food we eat, the products we need, the medicines we use, the air we breathe, and the water we drink. For this reason, in 2022 the Welsh and UK Governments committed to support the COP15 30×30 target to protect 30% of nature on Earth by 2030.

The Joint Nature Conservation Committee (JNCC) works alongside Defra and the devolved governments and Statutory Nature Conservation Bodies to review the Global Biodiversity Framework goals set at COP15, and produce UK Biodiversity Indicators.

Despite this urgency, biodiversity in Wales has declined.

The State of Nature Report 2023 shows that:

18% **of Welsh species are threatened with extinction**

20% **decrease in Welsh wildlife since 1994**

42% **of Wales' plant species are found in fewer places than before**

Over 300 species **have become extinct in Wales since the 1800s, including once widespread birds such as the Turtle Dove and Corncrake.**



Around 3000 other species occur in fewer than five locations in Wales, and around a quarter of these are classified as critically endangered, endangered or vulnerable in Wales.

The long-term future of biodiversity science and conservation is also at risk with universities experiencing financial challenges, and each generation becoming increasingly disconnected from nature.

In September 2025, the Learned Society of Wales invited leading experts on biodiversity in Wales to tackle the issue of how we should measure biodiversity in Wales, and how we can equip policymakers with the best measurements. This briefing summarises their recommendations.

How should we measure biodiversity in Wales?

Key factors to consider:

1 Methods must not only measure populations and communities, but also genetic diversity, as well as inter-related processes affecting biodiversity, connectivity and system-level change.

2 Resource constraints in the public and academic sectors.

3 Standardisation vs. flexibility: Standardisation is usually preferred in science because it allows for more accurate measurement against baselines.

However, different species and ecosystems require different monitoring, and the scientific community is constantly innovating, for example to develop new methods of assessment or ways to reduce costs. How do we manage the crosstalk, intercalibration and migration from older to newer approaches without "starting over" and losing historical trends?

Recommendations

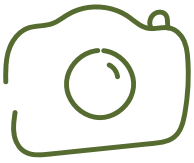
A **blended approach** is needed, where standardised measurements continue against established baselines, enhanced by the addition of new and alternative measurements that form a "basket of indicators" to support a holistic analysis of the situation in Wales. England's 'Indicators of species abundance' offers an example of a similar model in practice.

With the Wellbeing of Future Generations in mind, and legislation on biodiversity targets likely to be imminent, we need to lay the foundations so that new methods can provide additional insights, diagnose problems and guide actions in future.

Emerging methods include:



Molecular methods such as environmental DNA and genomics



Automated and autonomous monitoring using bioacoustics and camera systems



Remotely-sensed data from drones and satellites



Assessment of species traits that help us to understand how species and ecosystems function



Improved ways of assessing pressures such as 'emerging' pollutants, artificial light at night or noise



Methods to store, combine, analyse and interpret biodiversity data

Citizen scientists should be provided with guidance and elective frameworks in line with this blended approach, to marshal, inform and bolster their valuable work in ways that further enable them to contribute in the most effective and useful way possible.

How do we ensure policymakers are equipped with the best evidence and measurements?

The Senedd Climate Change, Environment, and Infrastructure Committee has reported that it lacks sufficient data to assess whether the Welsh Government is meeting its biodiversity targets.

Key factors to consider:

1 Sometimes, the data exist and have been analysed, but are not accessible. Scientific findings are often under-promoted, hidden behind a paywall, or not understandable to a layperson. Citizen science data can also be challenging to access because they are not governed by the same requirements as data produced by institution-based scientists.

2 Sometimes, the data exist, but have not been analysed. Natural Resources Wales, water companies, biological records centres, environmental NGOs and other organisations hold a huge amount of data on biodiversity, but there are resource constraints on processing and analysing the data.

3 Sometimes, the data do not exist. This is particularly likely to be the case for under-represented species which are harder to monitor and/or less likely to benefit from charity interest or citizen science. For some aspects of biodiversity, such as genetic diversity or ecosystem resilience, methods or skills are still limited, especially outside the academic sector.



Recommendations:

Improved alignment between the statutory sector, university scientists, research bodies, charities and citizen scientists underpins the recommended solutions to this complicated issue.

It is important that the scientific community takes time to look back as much as forward, ensuring that existing research is synthesised and fully translated into useable formats. The current research system traditionally incentivises novel research; incentives are needed for scholars to **analyse, synthesise and translate existing evidence.**

Indeed, policymakers need to be careful that premature conclusions are not drawn from short-term trends: a scientific system that has the capacity to filter and explain evidence for policymakers and the media can help to avoid this pitfall.

Additionally, although it can be cost-intensive, data integration offers significant advantages and long-term efficiencies: a single front door for the data required by the Senedd committee would be invaluable.

Cross-sectoral join-up may also help to alleviate the resource strain. Charities with responsibility for protected sites can be **empowered** to perform some data collection (with specialists still needed for auditing and for more complex cases such as less visible species, or those that are difficult to identify).

Private developers can be required to fund monitoring, but this needs stricter regulation to prevent "gaming the system". Skills can be shared between sectors, for example through academics aiding data analysis in the statutory sector. There needs to be space for multiple champions and multiple advocates, with alignment on key priorities.

The scientific community must ensure that **under-represented, less visible and less "charismatic" species** (like fungi, lichens, crop wild relatives and some insects) are included in monitoring efforts. In some cases, this can be achieved by explaining their importance to citizen scientists, but funders, academia and statutory bodies will also need to bridge the gap with additional work, especially where the data collection process is highly technical.



Conclusion

> "Major issues like biodiversity require tailored infrastructure to support integrated data, shared frameworks and agreed priorities"

Improved collaboration between the statutory sector, university scientists, other researchers, charities and citizen scientists is key.

But with the university and public sectors experiencing acute financial challenges, effective collaboration becomes even more difficult.

National institutions of knowledge like the Learned Society of Wales provide an invaluable platform for starting conversations and bringing together diverse experts, but major issues like biodiversity require tailored infrastructure to support integrated data, shared frameworks and agreed priorities.

An infrastructure of this kind would also support the synthesis of existing research to ensure that reliable and understandable evidence is accessible by policymakers and the media.

About the Learned Society of Wales

LSW is Wales' National Academy for Sciences, Arts and Humanities. We believe in the advancement of knowledge, and the power of research and innovation to benefit Wales' economy and society.

National Academies are a route for experts to support independent, evidence-based policymaking, on key issues such as climate change, health, and the economy. We represent Wales in the international science and research community, positioning Wales as a knowledge economy that values evidence-based decision-making.

LSW's Fellows are Wales's foremost experts across all areas of knowledge. Elected on the basis of excellence, their multidisciplinary expertise, experience, and connections are an invaluable resource and asset for Wales.

Expert contributors

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Links to further information

Key scientific reports McGill et al., Trends in Ecology and Evolution 2015.

"Terrestrial and Freshwater Species in Peril in Wales", Sam Bosanquet, Mike Howe, Sam Dyer, Elisabeth Halliwell, Tristan Hatton-Ellis, Patrick Lindley & Julian Woodman, National Resources Wales Evidence Report No.818, 2025.

"State of Nature Wales 2023", State of Nature, 2023.

"Limited and biased global conservation funding means most threatened species remain unsupported", Guénard et al., Proc. Natl. Acad. Sci. U.S.A. 122 (9), 2025.

"Measuring Biodiversity for Addressing the Global Biodiversity Crisis", National Academy of Sciences and the Royal Society, 2025.

Key organisations and initiatives

Senedd (Welsh Parliament)

Area of Research Interest: Environmental Governance, Principles and Biodiversity Targets

Environment (Principles, Governance and Biodiversity Targets) (Wales) Bill

Welsh Government Sponsored

Natural Resources Wales

Interim Environmental Protection Assessor for Wales

A 30by30 framework for Wales

Wales Biodiversity Partnership

UK

Department for Environment, Food & Rural Affairs (Statutory biodiversity metric)

UK Biodiversity Indicators

JNCC - Adviser to Government on Nature Conservation

England's Biodiversity Indicators

Charities

WWF (World Wide Fund for Nature)

Groundwork

National Trust

The Wildlife Trusts

RSPB Bird & Wildlife Conservation Charity

International

Conference of the Parties (COP)

UN Framework Convention on Climate Change

Convention on Biodiversity | United Nations

Global Biodiversity Information Facility

Convention on the conservation of European wildlife and natural habitats (Bern Convention)



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