Dulra Biodiversity Series

Part 1

Understanding the Significance of Biodiversity in Europe

dulra

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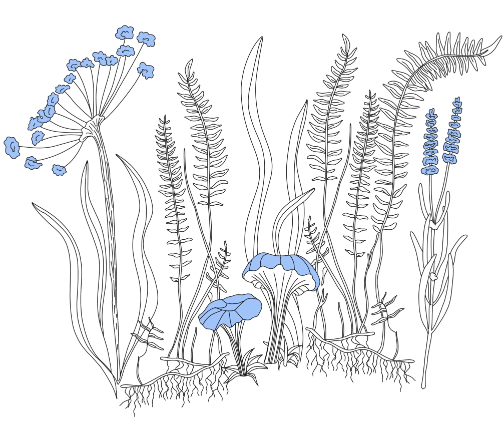
Foreword

At Dulra, we specialise in assisting organisations to implement nature strategies that have the potential to transform short-term positive action into long-term environmental opportunities. As we engage with organisations around the world advocating for the significance of supporting nature projects and preserving habitats, we consistently encounter the same questions. There's a keen interest in understanding biodiversity — what it entails, its scope and why it should be of paramount concern for business leaders as we pursue global climate objectives.

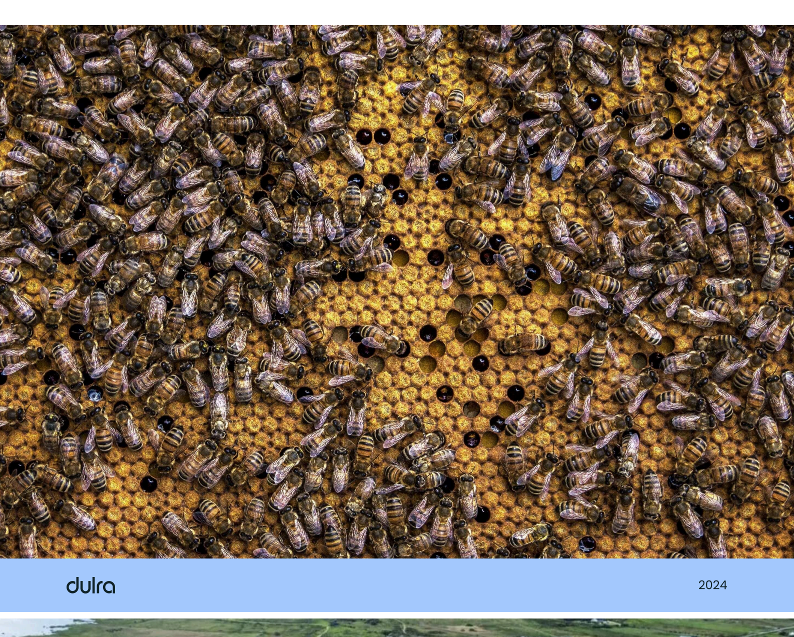
To answer these questions, we've put together a Biodiversity Series covering the most pressing topics over three short and compelling parts:

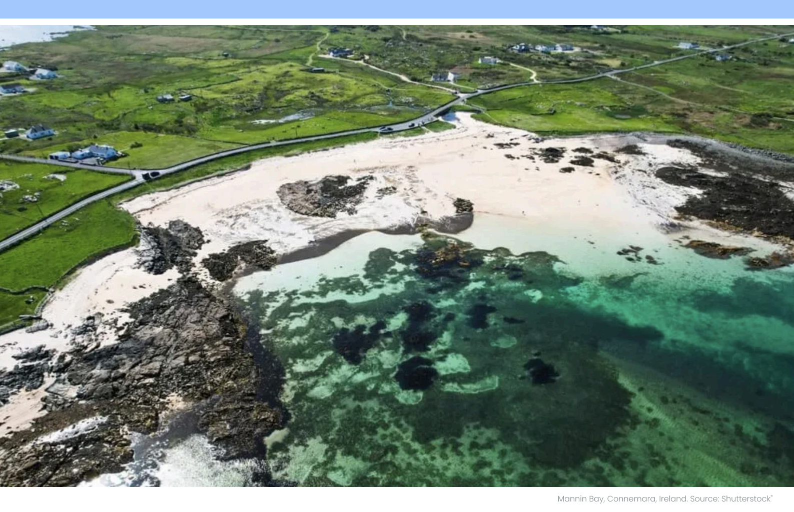
- **Part 1:** Understanding the Significance of Biodiversity in Europe
- **Part 2:** Why Private Industry and Public Policy Must Work Together Towards Nature-Positivity
- **Part 3:** How to Develop a Corporate Biodiversity Strategy



Introduction

Biodiversity, or the intricate web of all life on Earth, results from billions of years of evolution and encompasses many species, ecosystems and genetic diversity. From the tiniest microorganisms to vast rainforests, every component of biodiversity plays a vital role in maintaining the delicate balance of life on our planet.
Yet amidst the busyness of modernity, the significance of biodiversity often fades into the background. However, it's important to remember that biodiversity is the foundation of human existence by providing essential ecosystem services, from clean air and water to fertile soil and climate regulation. Europe is remarkable for its unique blend of temperate climate, rich cultural heritage and diverse landscapes, fostering a wealth of endemic species. With European biodiversity in mind, let's delve into why biodiversity is crucial for the well-being and sustainability of life on Earth.





Mannin Bay, Connemara, Ireland. Source: Shutterstock

What does biodiversity really mean?

Biodiversity, or biological diversity, refers to all life forms in a particular area, from minuscule microorganisms to the largest animals and plants. It also encapsulates genetics, species and ecosystem diversity. In Europe, biodiversity includes a rich array of plant and animal life adapted to our varied climates and landscapes.

Areas with exceptionally high levels of biodiversity, such as Mannin Bay in Connemara, Ireland, are considered biodiversity hot spots and provide homes to numerous endemic species unique to that place.

Why is biodiversity so important?

Our planet is home to an estimated 8.7 million species of plants and animals, including everything from elephants roaming the Serengeti to worms buried in your garden soil. Together with an even more significant number of microorganisms, these species define the earth's ecosystems — many of which have yet to be officially identified.
Protecting the diversity of life is about much more than scientific discovery. Biodiversity remains a primary indicator of our planet's health. It underpins every facet of our society — from food and medicine to our ability to withstand extreme weather.

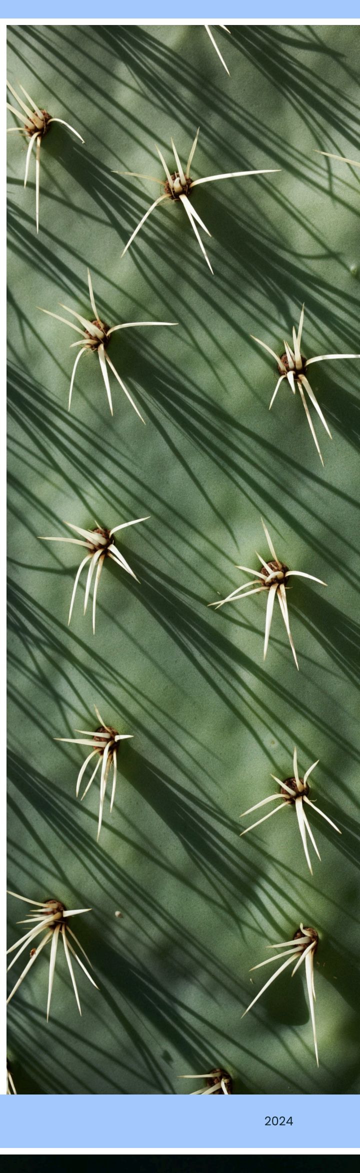
But right now, nature is in crisis. Plant and animal species are disappearing faster than at any time in the last ten million years, and that pace is accelerating. If we fail to curb threats to nature, scientists warn that one million plant and animal species face extinction — and many within just decades.

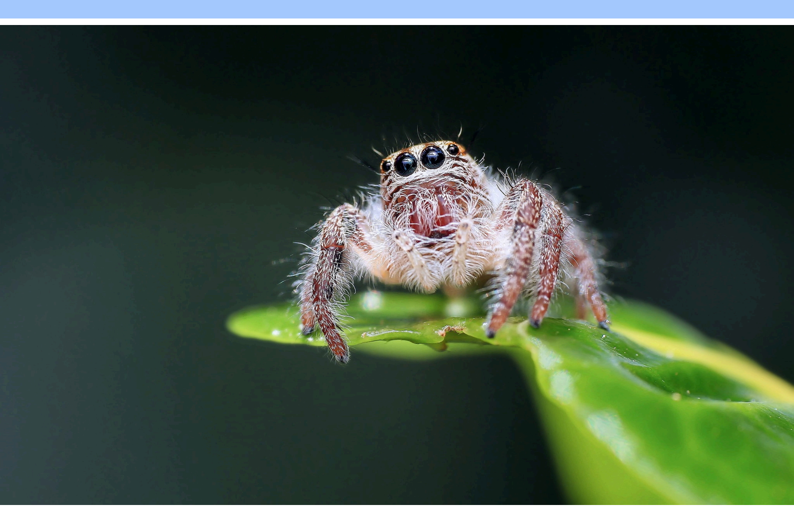
What benefits does biodiversity provide?

Thriving biodiversity is essential for healthy ecosystems, without which we wouldn't have clean water, basic medicines, a habitable climate or a secure food supply. Biodiversity has numerous benefits for countries across Europe. Let's take Ireland as an example:

- **Ecological benefits:** Biodiversity is essential for ecosystem resilience in Ireland, providing services such as water purification, flood protection and carbon sequestration.
- **Economic contributions:** Biodiversity supports sectors like agriculture, forestry and tourism, all of which contribute significantly to the Irish economy.
- **Cultural significance:** Ireland's natural landscapes are deeply embedded in its cultural identity and heritage, influencing literature, music and art.

Ireland's biodiversity is a vital resource with immense ecological, economic and cultural value. Preserving this diversity is critical to maintaining the health and sustainability of the environmental and human communities it serves.





What is the ecological importance of biodiversity?

At its most essential, biodiversity improves ecosystem stability and resilience. The more complex an ecosystem — i.e., the more abundant and variable its life and resources — the more likely it is that some species will withstand stressors like drought, disease or a changing climate.

For example, if a nature project plants a single monoculture crop, an infestation will likely break out, which can devastate the entire field. However, in a more diverse ecosystem, some species may be affected, but chances are that some will be naturally less vulnerable and survive. This allows the ecosystem to maintain a foothold and bounce back without destruction.

Biodiversity plays a crucial role in maintaining an ecosystem's intricate map of codependencies. In every ecosystem, species are codependent and provide food and shelter for each other. When a species starts to disappear, the delicate balance of an ecosystem can be put in jeopardy. Each player in an ecosystem fulfils its own unique niche, and as certain species start to decline, their important ecological role diminishes. This can throw a whole ecosystem off kilter.

How does biodiversity contribute to ecosystem services?

Ecosystem services are described as "nature's contributions to humans" and describe the various benefits people derive from nature. Biodiverse ecosystems and habitats contribute to human well-being in a myriad of ways, including these critical functions:

Water filtration
Specific ecosystems possess the remarkable ability to purify the environment by removing pollutants. Take robust wetlands, for instance. These wetlands effectively filter sediment, surplus nutrients and harmful chemicals, safeguarding water sources and marine ecosystems from contamination.

The value of biodiversity lies as much in its largest species as its tiniest inhabitants. Bacteria and fungi excel at breaking down compounds such as nitrogen, a prevalent pollutant stemming from agricultural runoff notorious for inducing aquatic dead zones. A study delving into the protective role of biodiversity in natural ecosystems against nutrient pollution uncovered that streams boasting a diverse array of algae species can eliminate nitrogen at a rate 4.5 times swifter than those inhabited by a solitary algae species.

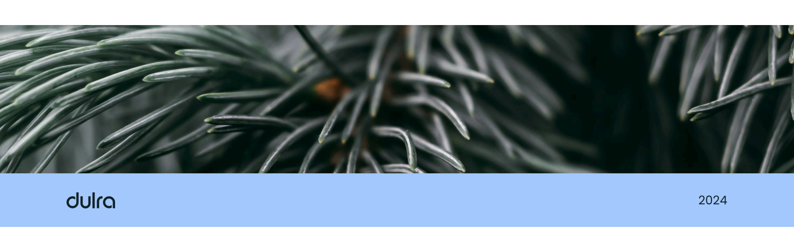
Peatlands play a significant role in water filtration in Ireland as an example, with 68% of the island's water coming from these areas.

Flood protection
Rich, biodiverse soil offers a cost-effective means to mitigate flood damage and safeguard ecosystems in drought. With climate change escalating rainfall, this natural flood defence becomes increasingly vital. Recent research indicates that investing in floodplain protection yields a fourfold return in damage prevention.

Ecosystem restoration should be the first line of defence against climate-fueled disasters. For example, a recent Climate Council of Ireland report highlights the importance of nature-based solutions for flood defence and other natural disasters.

Food security
Due to global inequality, nearly eight billion people worldwide lack sufficient food and nutrition. As climate change exacerbates extreme weather and poverty, more individuals will struggle to access healthy and affordable food.
In contrast to the focus on monocultures in industrial agriculture, diverse biodiversity can enhance food production and security. For instance, a third of our food supply relies on pollinators like bees, birds and bats, whose populations are sharply declining.
The variety of plant life above ground enhances soil biodiversity, including beneficial microbes, insects and fungi, thereby boosting agricultural output. However, biodiversity losses are already exacerbating our food challenges.

Development of medicines
Countless vital medications, ranging from penicillin to morphine and aspirin, have originated from natural chemical compounds. The World Health Organization reports that 11% of essential medicines worldwide stem from flowering plants, with ongoing



discoveries annually, including anti-cancer drugs sourced from Himalayan fungi and pain-relief compounds extracted from chilli peppers. As biodiversity diminishes, so does the potential to tap into nature's impactful chemical resources.

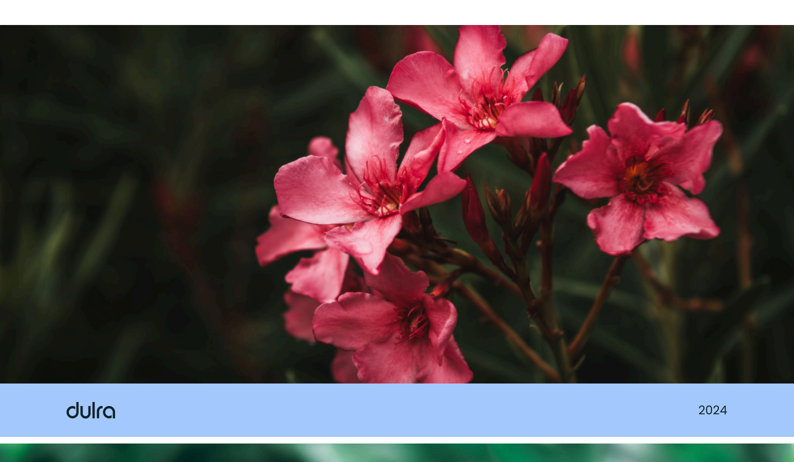
While the climate crisis poses an immense financial burden, projections suggest it could cost the global economy $23 trillion annually by 2050, highlighting the steep price of commodities sourced from these ecosystems.

Economic Importance
The combined value of services provided by healthy ecosystems is estimated to reach hundreds of trillions annually. Conversely, ecosystem degradation and biodiversity loss incur significant economic repercussions. The World Economic Forum highlighted biodiversity loss as a major economic threat in the 2022 Global Risks Report. Insurance firm Swiss Re discovered that while over half of the global economy relies on robust biodiversity and ecosystem services, one-fifth of the world's nations face the risk of ecosystem collapse.

For instance, the decline of coral reefs devastates tourism industries, reduces natural storm protection and diminishes food and shelter for dependent fish populations. Destruction of natural carbon sinks, such as rainforests or boreal forests through logging yields harmful consequences.

Social Importance
Biodiversity profoundly impacts society, permeating our cultural, heritage and religious customs. It inspires our intellectual endeavours and artistic expressions while shaping our connection to the world around us. Nature provides avenues for experiencing joy, adventure and profound wonder.

In Ireland, for example, the farming community is the custodian of biodiversity. Understanding their needs and working with them to protect and improve biodiversity is essential. Farmers continue to engage positively with scientifically proven measures to enhance biodiversity. Improved communication between the public and farming groups is needed so we can all work together to help restore and protect nature for future generations.



Case study: Sea oysters

Sea oysters have evolved into hundreds of specialised species, uniquely adapted to various coastal marine and estuarine habitats, making them remarkable coastal engineers found on every continent. Historically, oyster reefs could span vast areas 4-7 metres high. These reefs form as oysters settle gregariously, preferably on their shells or other calcium carbonate substrates, creating complex three-dimensional structures that foster essential ecological services.

As ecosystem engineers, oyster reefs promote biodiversity throughout entire ecosystems, facilitate connections between benthic and pelagic environments by providing habitats for juvenile and small fish species and act as natural buffers against coastal erosion by absorbing wave energy. Furthermore, oysters excel at water filtration, removing nitrogen from phytoplankton and organic matter, while their shells possess pH buffering capabilities, contributing to bioremediation efforts.

What can you do as a business to protect and preserve biodiversity?

The private sector can support biodiversity by adopting sustainable practices, investing in restoration and conservation partnerships and integrating biodiversity considerations into their decision-making processes. Companies can reduce their ecological footprint and mitigate habitat destruction by prioritising sustainable sourcing and innovation. Collaborating with NGOs and government agencies enables leveraging resources for effective conservation initiatives.

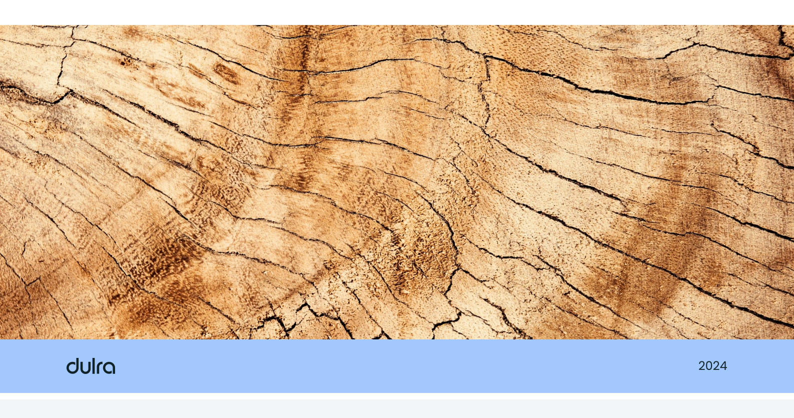
Integrating biodiversity into decision-making mitigates risks and unlocks new business opportunities for eco-friendly products and services in emerging markets. Ultimately, supporting biodiversity safeguards ecosystems, secures supply chains and enhances brand reputation, benefiting businesses and society.

For more information on building and adopting sustainable strategies for your business, check out part three of this series.

Preserving our most valuable resource

Safeguarding biodiversity in Ireland and across the globe is paramount for our collective well-being and the planet's health. Ireland's unique blend of temperate climate, rich cultural heritage and diverse landscapes harbours invaluable ecosystems and endemic species deserving of protection. Beyond national borders, preserving global biodiversity is essential for maintaining essential ecosystem services, such as clean air and water, fertile soil and climate regulation, which sustain life on Earth.

Furthermore, biodiversity conservation is an ethical imperative and a pragmatic investment in our future. By protecting biodiversity, we secure vital resources, enhance resilience against environmental threats, and foster sustainable development for future generations. Preserving biodiversity is not just a choice but an obligation — a commitment to nurturing the intricate web of life that sustains us all.



Dulra Biodiversity Series

Dulra is building the infrastructure to support ambitious organisations in developing and implementing their biodiversity and nature strategies. This report is part 1 of a 3-part series on the importance of biodiversity and what organisations can do to protect and restore it. The series includes:

Part 1. Understanding the Significance of Biodiversity in Europe

Part 2. Why Private Industry and Public Policy Must Work Together Towards Nature-Positivity

Part 3. How to Develop a Corporate Biodiversity Strategy