

Biodiversity at the heart of accounting for natural capital:

the key to credibility

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Summary

Human society across the globe ultimately depends on goods and services provided and replenished by the natural environment. Today it is widely recognised that average global consumption of this 'natural capital' far outstrips its natural ability to regenerate.

The Natural Capital Protocol sets out guidelines for businesses to help better understand, measure, and value their inter-dependencies with natural capital and use the results for better management. However, one of the key challenges the Protocol highlights is how to incorporate 'biodiversity'.

Biodiversity, the diversity of all living things, is a fundamental component of natural capital that underpins or influences almost every product or service we value, as well as having value in and of itself.

Its importance is often missed by organisations looking to understand and mitigate their impacts on the natural environment. Instead, biodiversity is frequently listed as just one of many concerns, alongside (and increasingly behind) greenhouse gas emissions or water consumption and other benefits that flow from natural capital.

Biodiversity values tend to be missed or hidden in natural capital assessments, particularly when the focus is on current flows of benefits for the following reasons:

- While the values we attribute to our appreciation of nature are of fundamental importance to many, the economic techniques to quantify and monetise these values are inadequate to develop robust estimates. As a result these values tend to be missing.
- Biodiversity plays a fundamental role in ecosystem functioning and therefore underpins the delivery of all ecosystem benefits. Its role is hidden within a natural capital account, but not explicit, and therefore these values of biodiversity are not adequately visible.
- Biodiversity provides nature's insurance, helping adapt to shocks and stresses, such as climatic change and disease. An assessment that only considers the flow of benefits provided today will overlook the likelihood of benefits being supported into the future, and therefore these values are also missing.
- Information and data on biodiversity and its interdependencies with business also needs further investment and is often not easily available, which can also lead to values being missed.

Many of the problems of these hidden and missing values of biodiversity can be avoided by focussing on the stock of biodiversity as the asset which generates the benefits, rather than the flow of benefits themselves. This also provides a less complex and more credible approach to thinking about biodiversity in the context of both natural capital accounting and consequent decision-making around the natural capital management.

Approaches to natural capital accounting that better capture biodiversity are currently being developed and piloted and should be integrated into the Natural Capital Protocol as methods become more robust.



Society's unsustainable reliance on the natural environment

Businesses, and indeed all aspects of human society, ultimately depend on the wide range of 'goods and services' provided by nature, including clean air and water, healthy soils, and the raw materials that form the basis of all economic activity.

For many years these dependencies have been taken for granted, with nature more often than not being undervalued and commonly being overlooked completely in decision-making.

However, as our impacts on nature have grown, so too has our awareness of these dependencies. In the 1970s, average global human consumption started outstripping planetary capacity to regenerate for the first time¹. Today, it is estimated that at least 60% of all services we derive from nature are degraded or unsustainably exploited². For more than forty years, global society has been consuming natural resources faster than they are being regenerated, drawing on tomorrow's capital to satisfy today's demand.³ Although the finite nature of some resources – such as minerals and fossil fuels – has long been recognised, the impact of over-use of most renewable resources including water, soil or pollination has generally been overlooked.

Recognition of the seriousness of the implications of these losses has grown immensely with some governments and businesses seeking more information and taking action. While progress has been made by some, there remains a major challenge to better reflect the importance of nature in decision-making.

BOX 1: NATURAL CAPITAL, ECOSYSTEM SERVICES AND BIODIVERSITY

Natural capital is the **stock** of renewable and non-renewable **natural resources**, (e.g. plants, animals, air water, soils, minerals) that combine to yield a **flow** of benefits to people. Natural capital is an anthropocentric framework for understanding the multiple benefits and inter-dependencies between nature, people, the economy and society.

The United Nations definition of **ecosystem services** from the Millennium Ecosystem Assessment is: 'The **flows of benefits** to people from ecosystems, commonly divided into the following categories: provisioning, regulating, cultural and supporting services.'

The United Nations definition of **biodiversity** is: 'The **variability** among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the **ecological complexes** of which they are part; this includes **diversity within species, between species and of ecosystems**.'

The 'natural capital approach': The economics of nature

Framing nature as 'natural capital' is a way of looking at the environment from an economic perspective. It focusses on the value that living and non-living natural resources (the 'stocks') provide to society by supplying nature's 'goods and services' (the 'flows'). Natural capital approaches involve understanding, measuring and assigning values to these relationships and therefore represent one way of tangibly integrating nature into decision-making.

The natural capital approach does have its critics as it takes a singularly anthropocentric view of the natural world. Concerns have been raised that the approach reduces nature to a commodity that can potentially be traded or degraded at will. However, when appropriately applied, the natural capital framework sets out an approach that reflects the full array of our inter-dependencies with nature, enabling them to be better reflected in decision-making. This provides a significant improvement on the status quo, which frequently neglects any consideration of nature. Furthermore, the natural capital approach resonates with people used to viewing the world through an economic lens, especially in terms of choices about investment, resource allocation and the setting of strategic priorities. This includes those involved in business, as well as government, and addresses the concerns of those responsible for many of the key decisions that impact the environment.

BOX 2: FINANCIAL, ECONOMIC AND MONETARY VALUES

The word value can be interpreted in many different ways. Price and value are very different concepts in economics. Whilst price represents what one might need to pay to secure a transaction, that price will not necessarily reflect 'value' for many reasons. In the context of nature's benefits, the price may often be zero, as the benefits we enjoy are produced by nature for free. This does not mean that they have no value, even though they are not priced.

Whilst financial values are derived from prices, economic values relate to the concept of welfare or utility i.e. the enjoyment we gain from an object or activity. Observing a beautiful landscape contributes to economic value as it increases our overall welfare. Some of these welfare values can be valued in monetary terms using economic valuation techniques. This enables them to be represented in decisions alongside other costs and benefits.

Other values, particularly moral judgments, such as people's environmental rights or the rights of a species to exist, are different from economic values and require alternative approaches to integrate into decision making. However, they are also of fundamental importance to society and need to be recognised.

Applying a natural capital approach to business: The Natural Capital Protocol

Business activities play a major role in the unsustainable exploitation of natural resources. The natural capital approach offers a framework for companies to integrate environmental impacts and dependencies into existing management systems. A company's accounts play a key role in decision making within the business (managerial accounts) and outside the business (financial statements). They are an important basis for identifying assets, liabilities, risks and opportunities. However, standard accounting practices tend to exclude relationships with the environment meaning that decisions are often taken without recognising the critical risks and opportunities relating to natural capital that are material to the business today and in the future. Better representing the importance of nature in management accounts will improve understanding of business inter-dependencies with nature and support better management.

Furthermore, reporting these relationships in a format consistent with financial statements can assure investors and other stakeholders of the resilience of the business and its investment plans in the face of environmental change.

The Natural Capital Protocol⁴ ('the Protocol') provides guidelines for companies to assess their impacts and dependencies on natural capital. Developed by the Natural Capital Coalition ('the Coalition'), which includes private sector, public sector and civil society organisations, it presents a general framework for conducting a natural capital assessment including establishment of the business case, setting the scope and objectives, measuring and valuing interactions and reporting and responding to the results.

The Protocol has been welcomed by many as a way of standardising approaches to natural capital, but also highlights the areas where further work is needed. One of these is the incorporation of 'biodiversity' into a natural capital assessment. Biodiversity is an issue that challenges companies across the world, with questions on its measurement, valuation and even relevance providing challenges to many (see Box 3).



Biodiversity in a 'natural capital approach'

Hidden and missing values

The natural capital approach views the environment as a stock of living and non-living resources which generates a flow of products and services. Biodiversity therefore forms the whole of the living component of the stock whilst ecosystem services represent almost all of the flows that benefit society.

Whilst the detail and boundary of any natural capital assessment is determined by the needs of the organisation conducting the assessment, biodiversity is nearly always material whatever the scope. Yet, even the most comprehensive assessment will face challenges to fully reflect biodiversity.

Within the Protocol, the focus is on ecosystem and abiotic services or flows that natural capital generates and which provide value to business (Figure 1).



One of the key challenges the Protocol highlights is how to incorporate biodiversity

BOX 3: BUSINESS AND BIODIVERSITY: FROM PERIPHERY TO CORE

Biodiversity concerns have historically been viewed as an issue for corporate social responsibility (CSR) teams to deal with, something that is important to consider from a reputational perspective, but not core to a company's performance.

Business activities impact upon biodiversity

- through ecosystem disruption
- through expansion of business operations which often depends on the use of abandoned and degraded land or on the conversion of natural and semi-natural habitats

Business activities are vulnerable as they rely upon biodiversity

- for genetic diversity to provide system resilience to pest and climatic events
- for enhanced ecosystem services from species diversity and abundance
- for high quantity and quality crop harvests delivered by wild pollination

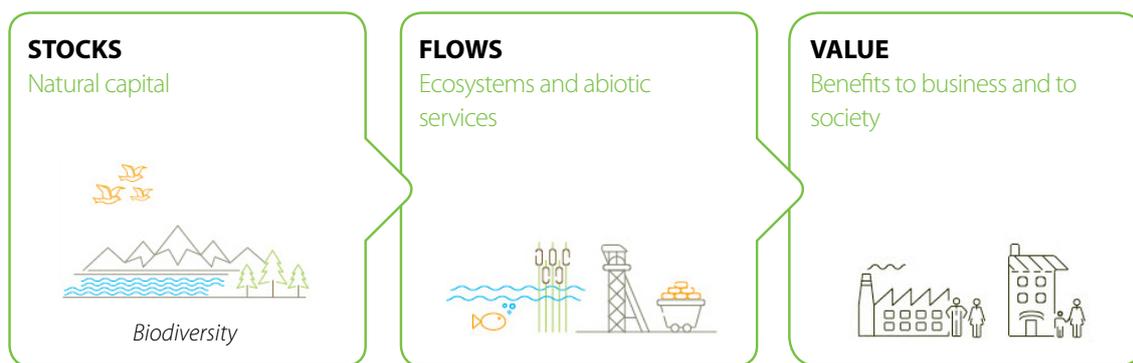
External forces are putting pressure on biodiversity resources

- as competing user demands and interests increase
- as human populations rise and consumption trends change
- as the consequences of climate change increase pressures on biodiversity stocks

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However, it is becoming increasingly clear that the loss of biodiversity is about more than just reputational concerns and can have a direct impact on business operations, such as where key raw materials are no longer available at the quality and in the quantity needed. Similarly, increasing costs in commodity supply chains, as a result of decreasing biodiversity, can have consequences for a company's bottom line and amplify unmanaged risks in supply chains. In order to maintain licenses to operate and to secure supply chains, businesses need to develop strategies that address their dependencies on natural capital and adapt to external pressures. This changing view reveals natural capital as a core element of the asset base upon which companies depend. Biodiversity is a fundamental and irreducible element of natural capital.

FIGURE 1: BENEFITS TO BUSINESS AND SOCIETY DERIVED FROM NATURAL CAPITAL AS DESCRIBED IN THE NATURAL CAPITAL PROTOCOL. Figure from the Natural Capital Protocol



Whilst capturing these flows can be very important, they do not necessarily represent the whole range of benefits derived from biodiversity due to the absence of hidden or missing values. These can be explained by viewing the benefits in three main groups, as summarised below.

1. Biodiversity: Ecosystems and abiotic services. As described in the Protocol, biodiversity provides various measurable benefits to society and business through its direct use, or through the services it generates. Direct benefits to people are often the clearest to understand, such as the value of wildlife watching and hunting. These benefits can be measured and their relative importance valued in monetary terms using economic techniques with a reasonable degree of robustness and validity.

Biodiversity also indirectly supports nature's ability to provide the broader range of goods and services that we value. For example, soil microbes play a role in sequestering carbon which helps regulate our climate; bacteria have an important role in purifying water; and plants provide nectar to pollinators which ensure that crops are fertilised. Again, these benefits are recognised when possible in natural capital assessments, but the problem is that many of them remain hidden. The 'value' of a produced crop, for example, may be visible in a natural capital assessment, but the role of plants that provide nectar to pollinators is not. The value is embedded within the crop value and is therefore not visible without further investigation. Although it may be possible to tease apart these different roles, and attribute a proportion of the value of derived benefits to the different aspects of biodiversity, available natural and social science evidence severely limits such an exercise. Many uncertainties remain and our understanding of the quantitative linkages between different measures of biodiversity and ecosystem services remains poor⁵. Current understanding of these relationships has been described as 'patchy', 'limited' and 'incomplete', due to a combination of the lack of data and the intrinsic complexity of the relationships involved⁶.

2. Biodiversity: Maintaining ecological function. Another crucial value biodiversity brings to society is its importance in the maintenance of ecological systems, which underpin the continued provision of goods and services. This represents one of the key differences between viewing biodiversity as an 'asset', in comparison to the role of most other economic assets. While man-made assets tend to be replaceable, there is a given level of biodiversity that is a critical asset in that it cannot be substituted. If these stocks decline beyond a certain point, the natural functioning of ecological systems will change, with resulting changes in benefit flows. The short- and long-term impacts can be severe, unpredictable, and/or irreversible, such as the conversion of a forest into a savanna after a serious fire, or the loss of soil fertility due to salinisation caused by overuse of fertiliser and other chemical inputs.

Estimates of these benefits are often entirely missing from natural capital assessments. An assessment that provides a present-day snapshot of the goods and services provided by natural capital will fail to consider the likelihood of these flows being maintained into the future. As the living component of natural capital, biodiversity plays a critical role in the ability of flows to be maintained into the future.



Biodiversity, the diversity of all living things, is a fundamental component of natural capital that underpins or influences almost every product or service we value



Related to this is the role of biodiversity in the ecosystem's ability to cope with shocks and change, such as new diseases and changes in climate. As such, biodiversity is nature's insurance; systems that maintain their biodiversity tend to support a wider range of nature's benefits into the future. They also provide more opportunities to deliver different benefits, as desired by future generations. For example, even 20 years ago, it was not widely appreciated that healthy peat bogs could be managed to help regulate our climate, but this is now an important consideration in climate change strategies.

Retaining these as yet undiscovered or unappreciated roles of nature is a critical aspect of future proofing socio-ecological systems, and also contributes to inter-generational equity and fairness. Although this role is increasingly recognised, it is also extremely challenging to quantify and value. A key issue from a valuation perspective is that economic techniques are based on marginal analysis. Monetary valuation approaches based on incremental changes in state cease to be applicable in situations where biodiversity loss is likely to be associated with ecological or biological thresholds, and with non-linear changes in the flow of ecosystem services, many of which may be persistent or irreversible⁷. Continuing to have the option to change the way people and businesses benefit from nature, including options that are still not known or recognised, is important for maintaining biodiversity's role as nature's insurance, and needs to be reflected in natural capital assessments.

3. Biodiversity: Values of nature as nature. A third value of biodiversity to society that is also often missing from assessments is the way it is perceived by individuals. Many people care about conserving nature because they believe it is the right thing to do, regardless of any consideration of the direct benefits that they might receive from it. For example, many people value the continued existence of species in the wild that they may never see⁸. These values may also be associated with religious or cultural beliefs or practices.

Such deeply held values regarding the conservation of nature for its own sake are often referred to as being based on the 'intrinsic' value of nature⁹, although others consider them intertwined with other 'non-use' values, such as sense of place, and other cultural values. Regardless of how we refer to such values, what is clear is that they are extremely important. For example, repeated surveys have demonstrated that nearly all EU citizens think it is important to halt biodiversity loss, and that the majority see this first and foremost as a moral obligation.¹⁰

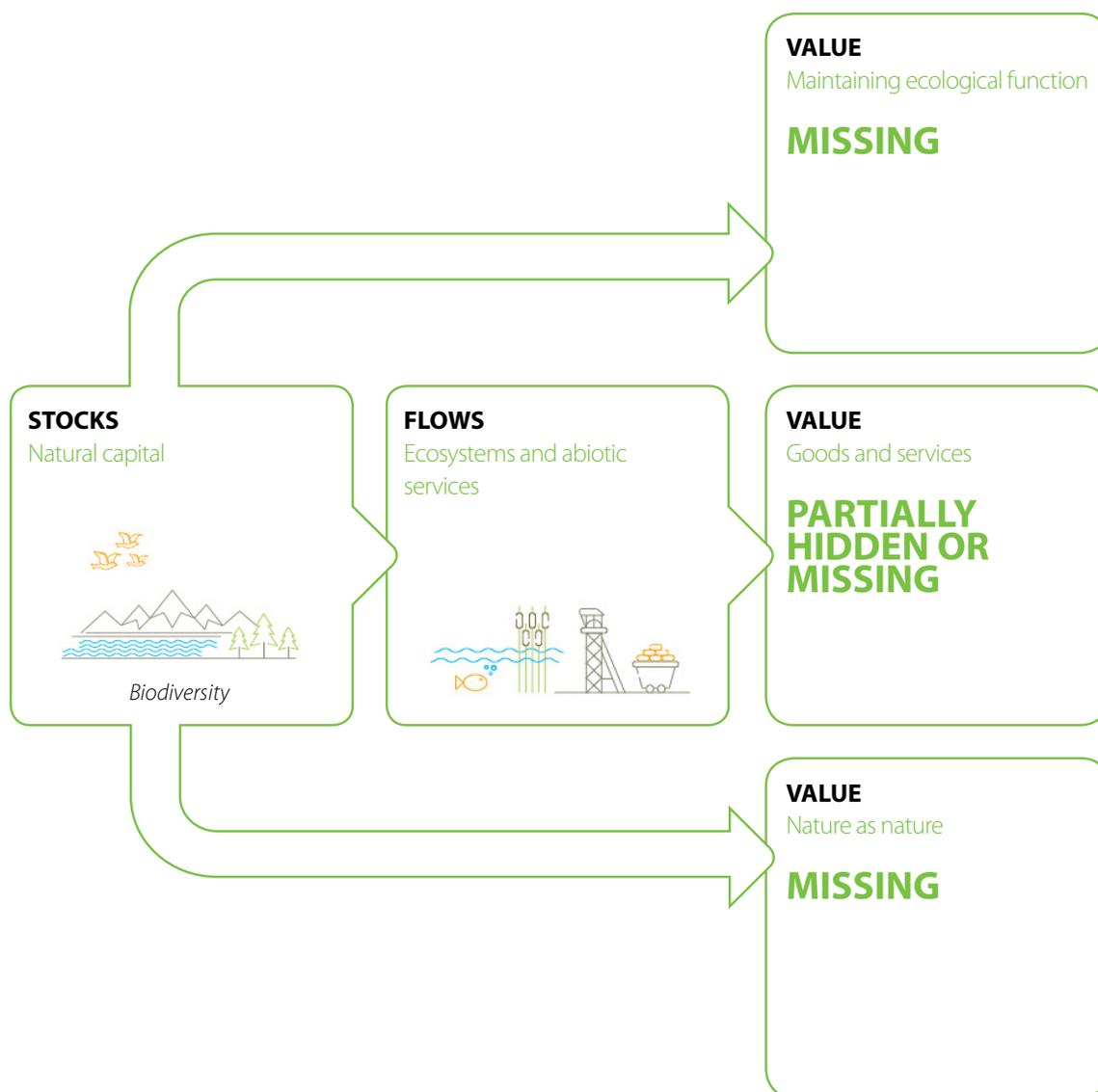
However, the methods available for seeking to capture such values in monetary terms are extremely limited. Being unable to quantify these values, especially in terms of monetary flows of benefits from natural capital is problematic. This is also one of the main sources of concern about natural capital-based approaches, expressed particularly by conservation actors who are often motivated to protect nature for its own sake.

For companies, impacts upon biodiversity can also affect brand reputations, especially where charismatic or rare species are put at risk, or places of natural beauty degraded. Despite not providing tangible direct benefits in a company's production processes or supply chain, biodiversity for its own sake is still a factor that needs to be considered by business.



Capturing the value of biodiversity: The limitations of measuring flows

FIGURE 2: HIDDEN AND MISSING VALUES OF BIODIVERSITY. Figure modified from original in the Natural Capital Protocol



Much of the concern around integrating biodiversity into natural capital assessments, either as part of the Protocol or elsewhere, has been about the lack of visibility of biodiversity and the under-representation of its true 'value'. When the wider picture of the range of benefits provided by biodiversity is considered (Figure 2), the near impossibility of measuring all of the flows and capturing every hidden and missing benefit is clear. The total value that can be measured and monetised is often a small subset of the total value, resulting in a clear sense that biodiversity is not adequately reflected in most current approaches to natural capital assessment.

This under-valuation is exacerbated by an increasing consensus that existing valuation techniques are unable to robustly assess non-use values, including the cultural and non-consumptive values associated with biodiversity. This is due to a combination of methodological shortcomings, limited data, and the high levels of uncertainty and complexity involved¹¹. Whilst these values may be more associated with the public, as opposed to the private, benefit flows, they are still likely to be relevant to businesses as they will influence how a business's actions with regard to biodiversity are perceived.



Many biodiversity values can be missed or hidden in natural capital assessments

TABLE 1: A SUMMARY OF HOW BIODIVERSITY VALUES ARE CAPTURED IN NATURAL CAPITAL ASSESSMENTS

Biodiversity in natural capital	What can be captured in a natural capital assessment
Measuring the quantity and quality of biodiversity is a fundamental part of understanding what natural capital is.	Data tends to be available for only certain elements of biodiversity, particularly higher plants and animals. This provides a good first step while further work is underway to help identify what information businesses and others should collect.
Biodiversity plays a fundamental role in the way natural systems and processes operate. It underpins the delivery of all of nature's benefits.	Scientific understanding of these complex relationships is extremely limited. Research is ongoing to better understand them. However, given their complexity and case specific nature it is not possible to reflect these in a robust and credible way.
As biodiversity declines, nature can no longer function in the same way. The short and long-term impacts can be severe and irreversible.	Scientific understanding on what aspects of biodiversity and how much is critical to maintain ecosystem function is not available. Non-marginal changes are not amenable to economic valuation.
Biodiversity is nature's insurance, helping adapt to shocks and stresses, such as climatic change and disease.	While this important role is well documented, it is impossible to robustly value as so little is understood about what elements of biodiversity are needed and how much.
The values that people hold to protect nature for its own sake as well as other non-use cultural values are often deeply held.	Existing valuation techniques are unable to robustly measure non-use values.
Direct use benefits of biodiversity, such as wildlife watching and hunting.	These are often the only values attributed to biodiversity that are visible in the natural capital assessment. While they are important, they are likely dwarfed by the other missing or hidden values of biodiversity.

The potential solution:

A stock based approach to incorporating biodiversity in natural capital assessments

The development of guidance that enables natural capital assessments to better reflect biodiversity values is important, both to maintain the credibility of the natural capital framework and to avoid misleading information resulting in losses to nature, society, and businesses. Some work is already underway, such as the RSPB's piloting of biodiversity natural capital accounts and the Kering Group's commission of biodiversity indicators within their assessment of Environmental Profit and Loss accounts. Our measures of biodiversity stocks are also improving (see Box 4). While further work is needed, the key features of an approach that could be developed and integrated into the Protocol guidance are clear.

- **The stock of natural capital should be at the heart of any natural capital assessment;** there are many ways in which nature's benefits are supported by biodiversity, but due to the problems of hidden and missing values highlighted above, a reliance on the value of benefit flows to inform business decisions in connection to biodiversity could put at risk the very benefits that the Protocol helps companies to recognise.



Many of the problems of these hidden and missing values of biodiversity can be avoided by focussing on the stock of biodiversity

- **Targets with respect to biodiversity should be identified.** The process of determining the necessary or required biodiversity stock is likely to be the outcome of social negotiation (which could be reflected in legislation), but in many cases will be determined by the company's environmental objectives and material considerations, alongside its engagement with its key stakeholders. Options could include (a) maintaining existing stocks (status quo); (b) restoring to some prior state; (c) investing to improve or enhance stocks; and (d) allowing some biodiversity loss, to a level that stays above an agreed threshold (i.e. subject to minimum legislative standards).
- **Indicators that provide information on the state of biodiversity that the business is responsible for, or has commitments to, should be developed.** Data tends to be available only for limited groups of biodiversity, notably higher plants and vertebrates. A threats based approach, such as the IUCN Red List discussed in Box 4, can provide a pragmatic way forward to provide information on a business's likely impacts on rare and threatened species.
- **The cost of delivering biodiversity targets should be estimated and reported in natural capital accounts to reflect – at least the biodiversity element – of a company's liability with regard to the maintenance of natural capital assets on which it depends or has impacts.** Where the state of biodiversity is not expected to achieve its target, actions needed to achieve the commitment should be identified and costed. Whilst this will not represent the value of the flow of natural capital benefits, it will allow companies to credibly report on how they plan to invest in natural capital stocks, alongside the other assets that contribute to the businesses performance and long term viability.

BOX 4: MEASURING BIODIVERSITY STOCKS

Measuring biodiversity stocks and a business's impact upon it can be challenging. One readily available source of global information is the IUCN Red List of Species. This identifies the threats that affect the probability of species extinction. While assessment of species in the Red List is incomplete (79,000 species) and heavily biased towards large vertebrates, it does at least offer a global, scientifically-grounded analysis of a portion of the risk-of-loss issue. The accompanying threat data also provide a substantial body of information that can be used to orient measures to reduce the risk of loss. Furthermore, much of the Red List of Species data is aggregated into spatial land-use management units through the recently agreed Key Biodiversity Areas concept (www.kbaconsultation.org/). The KBA dataset covers more than 14,000 sites across the world and includes land management information and further detail on threats to each site. Information on threats, and actions that can be taken to reduce these threats, can help to inform (the costs of) business action in relation to biodiversity stocks.

See: www.iucnredlist.org



To keep every cog and wheel is the first precaution of intelligent tinkering”

Aldo Leopold, c. 1938

Next steps

The Protocol and other initiatives represent significant steps forward in the understanding and integration of inter-dependencies with natural capital. However, further work is needed to raise the visibility of biodiversity in decision-making and this includes steps to improve the:

- Dissemination of information on the importance of biodiversity to businesses and the challenges of fully reflecting its importance in natural capital assessments
- Approaches to developing biodiversity targets
- Sources of biodiversity information and data
- Methods for measuring and monitoring biodiversity stocks
- Methods to integrate and present the costs of maintaining the biodiversity stock alongside the flows of benefits it directly or indirectly supports
- Approaches to presenting the wider values of biodiversity that are otherwise not adequately visible within natural capital assessments.

From July 2016 the Cambridge Conservation Initiative will formally partner with the Natural Capital Coalition to advise on the integration of biodiversity into natural capital accounting and to work with Coalition members on the development of approaches to facilitate this. Development of a stock-based approach to incorporating biodiversity is likely to be one of the initial foci of this collaboration.



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