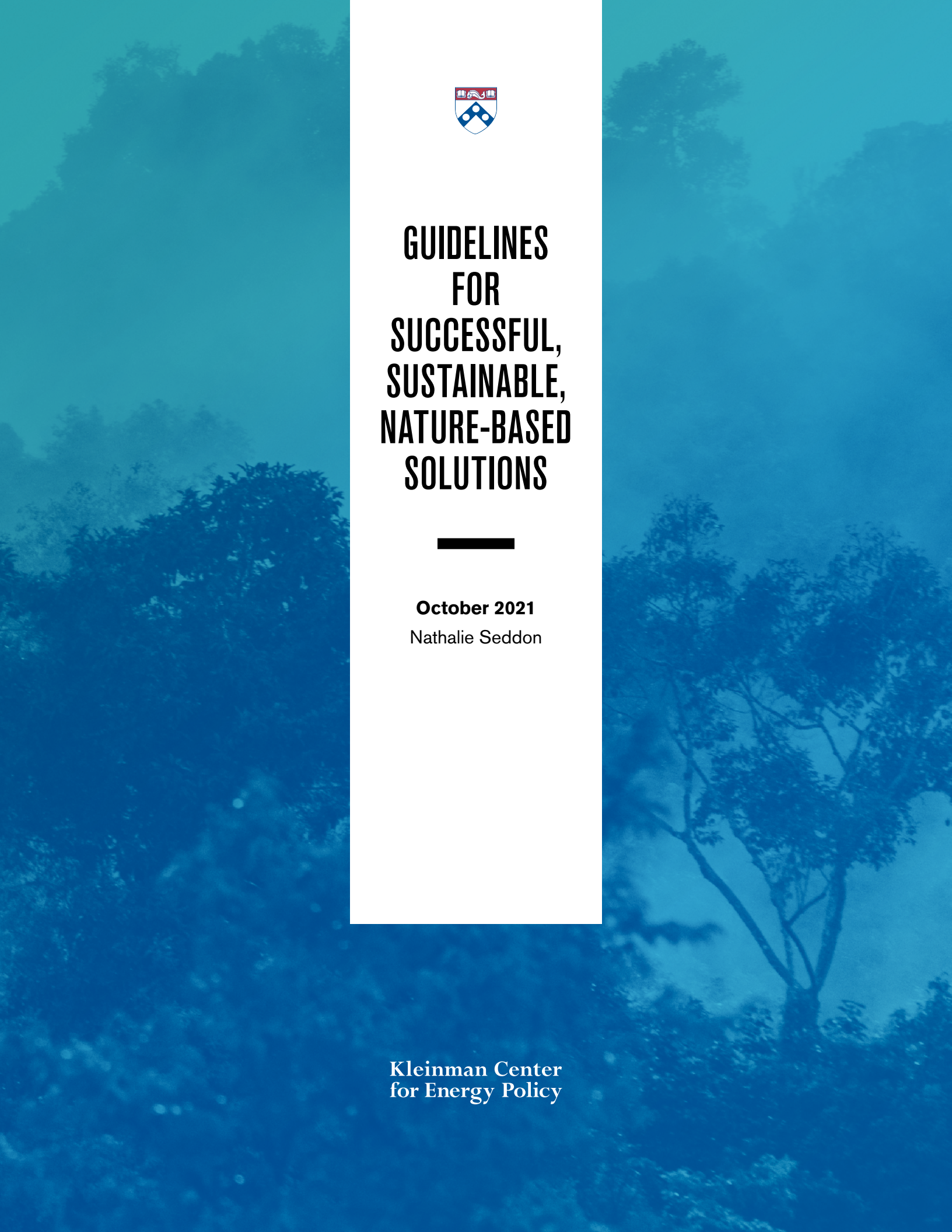

GUIDELINES FOR SUCCESSFUL, SUSTAINABLE, NATURE-BASED SOLUTIONS

October 2021

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INTRODUCTION

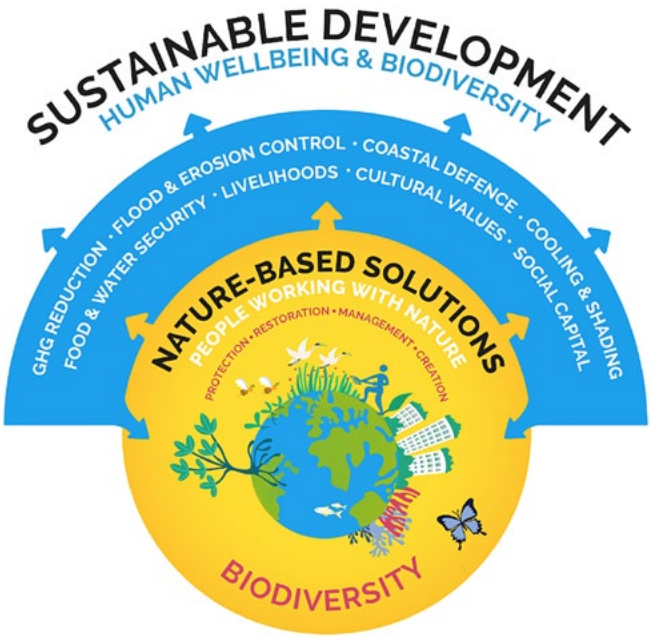
Back in 1992, at the United Nations Earth Summit, the three Rio Conventions were established (one on climate change, one on biodiversity, and one on desertification), but while their interdependencies were acknowledged at the time, the policy, practice, and research communities that grew around each convention largely followed independent trajectories (Biermann 2019). Until now. Over the past year or so, these communities have started to work together to achieve alignment on targets and action plans.

For example, this year saw the first joint report of the Intergovernmental Science–Policy Platform on Biodiversity and Ecosystem Services (IPBES) and the Intergovernmental Panel on Climate Change (IPCC) (Pörtner et al. 2021). In this landmark report, both communities acknowledged the interdependency of climate change and biodiversity loss, agreeing that we cannot fight one crisis without also addressing the other.

This recognition arises from the knowledge that biodiversity loss and climate change share some of the same drivers. In particular, land-use change (such as deforestation to make way for agriculture) is a major source of GHG emissions whilst also being the biggest driver of biodiversity declines on land (Brondizo et al. 2019; Shukla et al. 2019). As such, protecting and restoring natural ecosystems can, in theory, both limit global temperature rise while stemming the tide of biodiversity loss.

But nature's role in the climate crises is not restricted to slowing warming; it also can support human adaptation

FIGURE 1: WHAT ARE NATURE-BASED SOLUTIONS?



Source: Seddon et al., 2021. *Global Change Biology.*

to climate change impacts. Ecosystems provide natural barriers that can reduce the exposure of communities, infrastructure, and agriculture to extreme events (e.g. flooding along coasts or heatwaves in cities); properly protected and sustainable managed, they can limit our sensitivity to climate change (e.g. by supporting diverse alternative sources of income and food during times of shortage); and they can increase our capacity to deal with future shocks and changes because social capital, as well as natural capital, is built through the process of protecting, restoring, and sustainably managing the natural world (Chausson, Turner et al. 2020).

The idea that biodiversity conservation, climate change mitigation, and climate change adaptation can be aligned is at the core of the concept of "nature-based solutions" (hereafter NbS; Figure 1). However, alignment between these goals is not guaranteed. It depends critically on whether we:

1. Rapidly phase out use of fossil fuels
2. Restore, protect, and connect a wide range of ecosystems, on lands and seas, not only forests
3. Center policies and practices around the rights and knowledge of local communities and Indigenous Peoples
4. Design solutions that deliver measurable benefits for biodiversity

Alignment also depends on ensuring that global finance from both public and private sectors is "Paris-compliant," in other words that it does not lock in long-term damage to the biosphere and climate (making the goals of the Paris Agreement impossible to meet) and is invested in projects that support biodiversity and provide benefits to local people.

To help achieve synergy among climate and biodiversity goals through the implementation of NbS, and to channel investment in the best biodiversity-based and community-led projects, a group of conservation, development and research organizations developed a set of four evidence-based guidelines for policy makers, based on these key factors (*nbsguidelines.info*).

In this policy digest, I will outline the rationale for these guidelines, before going on to discuss what is needed by and at the UN climate summit, COP26, to help ensure NbS can be taken to scale.

THE FOUR GUIDELINES

GUIDELINE 1:

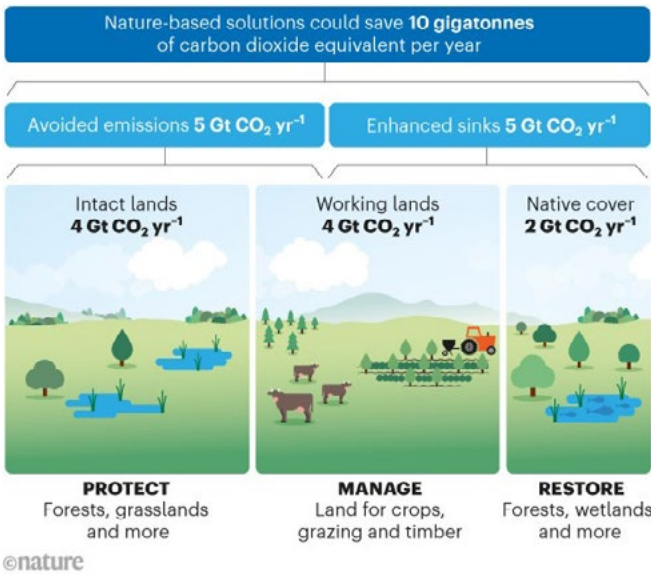
NbS are not a substitute for the rapid phase-out of fossil fuels and must not delay urgent action to decarbonize our economies.

NbS are being widely promoted as a key climate change mitigation solution. However, there's a lot of confusion about nature's role in climate change mitigation. This is hardly surprising. Calculating the global mitigation potential of NbS is technically challenging, as one needs to take into account many different and interacting biophysical and socioeconomic factors, including the price of carbon.

Nonetheless, there is growing consensus that the total cost-effective mitigation potential of NbS on land (i.e. costing less than US$100 per tonne of CO_2 equivalent) is around 10 Gt CO_2 yr^{-1} globally (or 11 GT CO_2-equivalent). Of this, 40% is estimated to come from protecting intact forests, grasslands, and wetlands (including peatlands), 40% from sustainably managing

FIGURE 2: THREE STEPS TO NATURAL COOLING

Protect intact ecosystems, manage working lands, and restore native cover to avoid emissions and enhance carbon sinks.



Source: Girardin et al., 2021. *Nature.*

working lands using nature-based agricultural practices (e.g. agroforestry), and 20% from restoring native habitats (Girardin et al. 2021; Figure 2).

Reframing this global mitigation potential in terms of the Paris Agreement temperature goal, we found that although significant, the contribution of NbS to global cooling is much smaller than what must also be achieved through the rapid phase-out of fossil fuels. Specifically, we found that if scaled up to the maximum extent possible, and assuming a price of carbon less than US$100 per tonne of CO_2 equivalent, NbS on land could reduce global warming by around 0.1°C if warming peaks mid-century at 1.5°C since pre-industrial times or around 0.3°C if warming peaks around 2075 at 2°C (Girardin et al. 2021).

The problem is NbS are being viewed as a means to achieving cheap offsetting in corporate mitigation policies and this is distracting from the urgent need for rapid greenhouse gas emission reduction. Indeed, many high-emitting industries (airports, airlines, and oil and gas companies) are proposing to use NbS to offset their emissions, with some claiming "carbon neutrality," without slashing emissions. The fear is that this could slow global progress towards stabilizing the climate (or reducing biodiversity loss), while encouraging customers to continue driving, flying, and consuming at unsustainable levels.

Over reliance on NbS is problematic for two additional reasons. First, limits on the area of land available for NbS and to the growth of vegetation ultimately places a cap on the amount of carbon that can be removed by NbS. Second, there is the risk that stored carbon will be released back into the atmosphere if fossil fuel use is not phased out. This is because the resultant warming will increase the frequency and intensity of fires, such as those we have seen raging through Canada and California this year.

The bottom line is that unless we rapidly phase out the use of fossil fuels, the mitigation potential of NbS won't be realized, because climate warming will turn the biosphere into a net source of greenhouse gases. A recent study indicated that climate change impacts and deforestation have already turned parts of eastern Amazonia into a net emitter of greenhouse gases (Gatti et al. 2021).

This situation is creating tensions. While high-polluting industries could generate large amounts of much-needed finance for nature recovery now (currently underfunded to the tune of just over US$700 billion per year according to Deutz et al. 2020), we won't meet our long-term climate or indeed biodiversity goals if these industries don't radically scale back on fossil fuel use. To resolve this tension, it is critical to ensure that those investing in NbS have ambitious, credible, and verifiable action plans to rapidly phase out their use of fossil fuels.

The *Oxford Principles for Net Zero Carbon Offsetting* (Allen et al. 2020) and the recently released *Natural Climate Solutions for Corporates* developed by the Natural Climate Solutions Alliance convened by the World Economic Forum and World Business Council for Sustainable Development (Natural Climate Solutions Alliance 2021) go some way to addressing this. However, these guidelines need further refining to better ensure the social and environmental integrity of the offsets invested in. Which brings me to the following three guidelines.

GUIDELINE 2:

NbS involve the protection, restoration, and/or management of a wide range of natural and semi-natural ecosystems on land and in the sea; the sustainable management of aquatic systems and working lands; or the creation of novel ecosystems in and around cities or across the wider landscape.

All types of ecosystems have the potential to support efforts to address climate change. However, the recent focus has been on forests in general and tree planting in particular, often in the form of commercial plantations involving non-native species such as Sitka spruce (commonly used in plantations in the UK) and *Acacia* and *Eucalyptus* (commonly used in plantations in the tropics).

Much has been written on this issue (e.g. Chazdon 2020; Seddon, Smith et al. 2021), but the key drawbacks of this focus are worth reiterating. The main issue, from a climate change perspective, is that plantations rarely represent long-term low risk carbon stores. Much harvested wood is used for short-lived goods, such as paper and cardboard, that soon end up

in landfill or incineration, releasing carbon back to the atmosphere (Hudiburg et al. 2019; Lewis et al. 2019). Furthermore, plantations tend to involve single species, meaning they have much lower resilience to pests and climate extremes, including wildfires, compared to the intact, biodiverse, native ecosystems that they sometimes replace (Seddon, Smith et al. 2021).

The other key issue is that a focus on tree planting can distract from the urgent need to effectively protect remaining intact ecosystems (which have a much greater contribution to the global mitigation potential of nature-based solutions; see Figure 2). Such ecosystems are hotspots for both biodiversity and carbon and, compared to degraded ecosystems, are more effective at protecting people from climate change impacts (Watson et al. 2018).

All this speaks to the need to have a holistic approach to NbS that prioritizes 1) protecting remaining intact ecosystems, 2) restoring degraded habitats over non-native tree plantations, and 3) protecting, restoring, and connecting a wide range of native habitats across landscapes and seascapes, not only forests (e.g. Cook-Patton et al. 2020; Philipson et al. 2020).

For example, several landscape-scale projects in the Scottish Highlands such as the Bunloit Rewilding Project,[1] are enhancing biodiversity and long-term carbon storage through peatland restoration, protecting and connecting old-growth Caledonian forests, and replacing non-native conifer plantations with mixed-species native woodland, while also aiming to provide sustainable livelihoods for local people.

GUIDELINE 3:

NbS are designed, implemented, managed, and monitored by or in partnership with Indigenous peoples and local communities through a process that fully respects and champions local rights and knowledge, and generates local benefits.

In many parts of the world, local communities and Indigenous people are playing a vital role in tackling the biodiversity and climate crises in the form of careful, sustainable stewardship of natural habitats within their territories (Etchart 2017). Despite this, they are frequently excluded from land-use decisions, have their lands appropriated, and poor and vulnerable communities are often displaced and marginalized in the name of "the environment" (Scheidel & Work 2018; Veldman et al. 2019).

The detrimental effects of such poorly implemented "offset" projects (mislabeled as NbS) can lead to push-back against NbS from local communities. They are also wary of trade-offs that may arise in situations where there are benefits to project participants but costs to non-participants or where a project benefits all members of a community locally but imposes costs to communities elsewhere. For example, while city-dwellers are shielded from dust storms by an urban shelterbelt in China, rural communities downstream suffer because the shelterbelt's demand for water is drying out the native riparian forests on which they depend (Misall et al. 2018).

To avoid these issues and ensure NbS are sustained over the long term, NbS must be designed and managed adaptively by or in partnership with local communities to take the needs, values, and knowledge of different sectors of society into account (especially of marginalized groups such as women) and to provide a range of benefits to local people, including supporting livelihoods and reducing vulnerability to climate change.

For example, the Humbo Ethiopia Assisted Natural Regeneration Project involved farmer-managed natural regeneration of 2,728 hectares of degraded native forests with living tree stumps. The government granted legally binding tree user rights, which gave communities confidence they would benefit from restoration efforts, and built capacity by funding training in cooperative forest management.

Vulnerable households were supported with alternative livelihoods during the initial phase until the project produced income from the sustainable production of wood and other forest products. The project will have removed around 870,000 tonnes of CO_2 equivalent by 2036, and has been reported to reduce soil erosion and

1 bunloit.com

flash flooding, and increase groundwater recharge and crop productivity. For more information about this and other similar projects, see Hou-Jones et al. (2021).

GUIDELINE 4:

NbS support or enhance biodiversity, that is, the diversity of life from the level of the gene to the level of the ecosystem.

There is currently some confusion about the relationship between biodiversity and NbS, i.e. whether its protection is a desired outcome or whether it is a foundational property of a good NbS. It is both. Biodiversity is the diversity of life (often measured as genetic, species, functional, or habitat richness). It is a property of nature that underpins the stability and productivity of our ecosystems now and into the future; diverse ecosystems are more resistant to fire, diseases, floods, and droughts (e.g. Hautier et al. 2015, Jactel et al. 2017). In a rapidly changing world, that is essential.

Of course, the degree to which NbS support biodiversity varies with respect to local context, in particular the species involved, the state of the landscape prior to the intervention, and the scale at which outcomes are measured.

It is well established that protecting intact ecosystems, restoring degraded habitats to their natural state, and managing working lands or fisheries more sustainably can deliver significant biodiversity benefits (e.g. Crouzeilles et al. 2016). Conversely, the outcomes for biodiversity will be generally poor if an exotic tree plantation is established in a carbon-rich biodiverse native ecosystems such as a peatland or an old-growth forest (e.g. Heilmayr et al. 2020; Schneidel & Work 2018). However, a plantation established in a highly degraded landscape might bring benefits for biodiversity locally if the trees enable native vegetation to regenerate or regionally if plantations take pressure off native forests.

Therefore, NbS need to be designed explicitly to deliver measurable benefits for native biodiversity. Broadly speaking a good strategy will involve choosing a diverse mix of native species where possible, avoiding destruction of existing species-rich habitats. It will also involve carrying out baseline assessments and monitoring and systematically reporting progress towards quantitative targets.

This will help shine light on the spatial scales and timeframes over which NbS can deliver benefits for both biodiversity and climate. Such information is needed to support the development of more robust, holistic metrics than those currently being used (which focus on carbon and forests); i.e. ones that apply to other habitats, including aquatic systems, and that capture benefits for biodiversity and local communities.

SCALING UP NBS

The upcoming global climate summit in November, COP26, is a major opportunity to catalyze the systemic change needed to get humanity onto a just and sustainable trajectory, with NbS at its heart. However, to enable this, the high-emitting nations of the world need to make robust commitments to increase near-term climate ambition on 1.5 degrees, backed up with well-resourced tractable action plans. They need to establish “Paris-compliant” forms of public and private finance that do not lock in long-term damage to the climate and biosphere, making it impossible to reach the goals of the Paris Agreement. And they need to support nature protection and recovery at a global scale by scaling-up biodiversity based, people-led nature-based solutions to climate change.

A critical opportunity for reaching agreement on these issues is the G20 ministerial meeting in October, just before the climate summit. In particular, the G20 nations would agree to adopt the bold commitments made in the G7 Nature Compact and Leaders Pledge for Nature to reverse nature loss by 2030, while also pushing for more specificity on the underlying actions to meet these commitments. New commitments for public finance for nature recovery will give other countries the confidence that high-polluting nations are serious about meeting their biodiversity targets and will commit tangible resources to support others to do likewise.

WHAT A "NATURE COP" LOOKS LIKE

Whatever the political landscape around emissions targets and climate finance ahead of COP26, the summit holds genuine promise for the nature agenda. However, to be declared a successful "nature COP," we would see several key things:

1. The COP26 decision text would acknowledge the role of biodiverse ecosystems in general (not only forests) in climate change mitigation and adaptation and it would commit to joint work programs on climate change and biodiversity loss by the UNFCCC and the Convention on Biological Diversity.
2. Many countries would commit to increase ambition for nature in their revised or new Nationally Determined Contributions and National Adaptation Plans—in addition to, and not instead of, increasing ambition on emissions reductions. Such commitments would involve evidence-based targets for improved protection and restoration of a wide range of ecosystems, with an emphasis on both biodiversity and human rights, underpinned by tractable, verifiable, and properly financed action plans.
3. Widespread adoption of clear, evidence-based standards for demand and supply of carbon sequestration by nature-based solutions to ensure biodiversity and equity benefits (in addition to permanent carbon storage), such as those outlined in the NbS Guidelines discussed in this digest.
4. Robust commitments to defund ecosystem loss and damage in commodity supply chains by 2025.
5. Pledges for increased finance for biodiversity-based and people-led NbS from governments, multilateral development banks, funding mechanisms under the UNFCCC, among others.

FINAL REFLECTIONS

The concept of NbS arose from a growing awareness, based on evidence from science and practice, that many of the challenges we face can be met by working with rather than against nature. However, recent attention has been very narrowly focused on tree-planting schemes for climate change mitigation, rather than protecting, restoring, and connecting a wide range of ecosystems for the broad range of benefits they bring.

To address this issue and help channel investment into sustainable and ethical NbS, a group of research, conservation and development organizations collaborated to develop four clear evidence-based guidelines for policy makers and investors. But arguably as important, if not more, to scaling up finance of good NbS, we need to radically scale back investments that harm the climate system and biosphere.

In particular, we need to end new finance for fossil fuel projects and subsidies that drive loss and damage to the biosphere. Globally we invest nearly US$540 billion a year in agricultural subsidies, most of which support high-emitting commodity production (FAO, UNDP and UNEP 2021). Eliminating these subsidies and repurposing the finance that is freed up towards protecting and restoring ecosystems and sustainably managing our working lands and seas would help to plug the vast funding gap for nature recovery globally.

Widespread, systemic change in the way we behave as individuals and run our economies ultimately requires a fundamental shift in the zeitgeist in our relationship with the natural world—as well as with each other. It requires a shift in the dominant world view. Rather than valuing material wealth, we must value quality of life (health and wellbeing). Rather than isolating ourselves, we must connect all cultures. Rather than striving to conquer nature, we must help nature flourish.

There are strong signals that this shift is taking place, evidenced by the rise of global climate activism and the recognition of nature as an ally in the fight against climate change by governments and businesses worldwide. However, to accelerate this shift we need

more concerted communication and collaboration among individuals from across cultures, disciplines, and sectors. Only in this way will we convince a majority that being careful stewards of our ecosystems is fundamental to creating flourishing healthy societies and to finding meaning in life. Nature is, after all, our life-support system. We ignore it or undervalue it at our peril. The evidence for that has never been clearer.

GUIDELINES: HISTORY AND FUTURE

Four guidelines for successful, sustainable NbS were originally developed in February 2020 by a consortium of 20 UK-based organizations, as a letter to the then incoming President of COP26, Alok Sharma, to encourage adoption of the guidelines by other Parties to the UN Framework Convention on Climate Change (UNFCCC). In May 2020, the guidelines were adopted by the Together With Nature campaign, a call to corporate leaders to commit to four principles for investing in nature-based solutions. They also formed the basis of recommendations in a *recent letter* from the House of Lords Science and Technology Committee to inform the Government's domestic policy and agenda at COP26.

In order to meet these guidelines, policymakers across the public and private sectors need to set goals and quantitative targets relating to each guideline, and practitioners should monitor progress toward these targets using robust holistic metrics (i.e. those that take carbon, biodiversity and social equity into account), and use adaptive management to improve outcomes.

As public and policy interest in NbS grows rapidly, we are promoting these guidelines to encourage their broad adoption by businesses and governments. The goal is to ensure investment in NbS is channeled to the best biodiversity-based and community-led NbS and does not distract from or delay urgent action to decarbonize the economy. To build momentum around this in the run-up to the UNFCCC's COP26, we are now inviting additional signatories from research, conservation, and development organizations across the globe.

If you would like to sign, please reach out: *nathalie.seddon@zoo.ox.ac.uk*. For examples of good-practice NbS that meet most if not all of the guidelines, please visit: *naturebasedsolutionsinitiative.org/nbs-case-studies*

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