Draft 2: Global Standard for Nature-based Solutions

Sustainable solutions are needed to meet societal challenges; solutions that benefit both human well-being and biodiversity. When seeking to address food and water security, economic and social development, human health, disaster risk reduction or climate change challenges, Nature-based Solutions offer an approach that can be both sustainable while offering multiple benefits to people and nature alike.

Nature-based Solutions (NbS) are “actions to protect, sustainably manage and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits” (IUCN Resolution WCC-2016-Res-069).

To benefit from the full potential of NbS, a standard is required in order to:

- Create a common language and understanding
- Engage relevant stakeholders
- Safeguard nature from overexploitation
- Increase demand and supply of interventions
- Incentivise positive sustainable change

Developing a Global Standard for Nature-based Solutions

To address these needs and mainstream NbS, the International Union for Conservation of Nature (IUCN) is developing the Global Standard for this concept. The IUCN is the world’s largest and most diverse environmental network. It harnesses the experience, resources and reach of its 1,300 Member organisations and the input of 14,500 experts (in the form of specific commissions).

To develop the first Global Standard for the design and verification of NbS, the Global Ecosystem Management Programme and Commission have been engaging with relevant stakeholders, both within and outside IUCN, while building upon previous work on defining NbS (Cohen-Shacham, 2016).

For this standard to be relevant and useful across sectors and regions, a participatory development process is required; we need your feedback.

Why you should take part in this public consultation

The goal of this survey is to solicit feedback from across the diverse range of stakeholders connected to NbS. This includes but is not limited to IUCN members, commissions and secretariat, the private sector, UN agencies, IGOs, NGOs, academics and governments.

Because NbS are an intersectional solution, it is important that we gather feedback from different sectors and regions.

In January 2019, IUCN released the first draft of the Global Standard (link), running a six week consultation seeking to engage all relevant stakeholders. That public consultation consisted of an online questionnaire that gathered information on accessibility, vocabulary, barriers, gaps and opportunities. The results (link) were analysed and discussed at a meeting in Washington DC in May, with a small IUCN working group which led to the development of the second draft of the Global Standard for NbS.

Now, in line with ISEAL requirements, IUCN is releasing the second draft of the Global Standard for NbS. To make sure no one is left behind, this public consultation aims at reaching the sectors and regions where the first public consultation failed to garner enough results. Through this participatory approach, we will gather feedback on stakeholder-group-specific opportunities/barriers to the standard and the feasibility of the proposed form of self-assessment.

How we will use the responses

Please note that your contact details will not be used for any other purpose than for the consultation and development of the Global Standard. All data will be handled in accordance with IUCN data policy (link).

How to take part in the public consultation:

The full survey takes less than one hour to complete however you can choose which criteria to comment on so taking significantly less time. To access the survey in English, click here. To access the survey in French, click here. To access the survey in Spanish, click here.

In addition to the publically available survey, IUCN will be hosting an NbS Day for Your Say on the 17th of September, with live face-to-face consultations in hubs such as Nairobi, Geneva and Washington DC. In addition, there will be opportunities to get involved with pilot testing the Global Standard to ensure its added value to the design, scaling up and verification of Nature-based Solutions. For updates on upcoming webinars and other opportunities to hear more about the standard, check the IUCN webpage for the Global Standard here.

Thank you for your time

For more information and related publications check out the IUCN webpage on the Global Standard (link). If you are having any problems completing the survey, or have any questions, please contact Daisy Hessenberger from the Ecosystem Management Programme at nbsstandard@iucn.org

Criterion 1: NbS effectively address one or more societal challenges

1. Guidance

NbS must be designed to effectively and efficiently address specific societal challenges. These include climate change (adaptation and mitigation), food security, water security, disaster risk reduction, social and economic development and healthy and secure lives. Three main types of conservation actions can be used (standalone or in combination) to address the societal challenge – conservation through protection, restoration and/or sustainable use and governance. The design needs to include specific outcomes that directly and explicitly target societal challenges and contribute to human well-being.

A prerequisite for any ongoing intervention to be considered as an NbS is that a socio-economic baseline has been established before the intervention started. This is important so that the type and appropriateness of the proposed NbS can be properly identified and fully understood.

Even though NbS focus on addressing societal challenges, the activities defined should also aim to sustain and enhance ecosystem services while maintaining ecosystem structure, function and composition (see Criterion 3). The reason for this is that greater ecosystem integrity conveys enhanced resilience and durability and thus improves the long-term effectiveness of the NbS in question to address the societal challenge/s. An NbS that simplifies ecosystem structure, function and composition is more likely to deliver short-lived outcomes and eventually collapse. By enhancing and maintaining ecosystem structure, function and composition, we ensure ecosystems are resilient to future environmental changes and that the NbS they provide are sustainable.

1. Indicators

1.1 The one or more societal challenges the NbS aims to address are described and documented

The NbS intervention must address the societal challenges that directly impact a specific group of people (e.g. an NbS to control coastal erosion that is endangering a specific municipality) or indirectly impacts society as a whole (e.g. an NbS to sequester carbon as a climate mitigation option). However, an NbS intervention around one particular societal challenge often yields multiple societal benefits, such as job creation and, wherever appropriate, the societal challenges these additional benefits address should also be described, documented and accounted for. While the IUCN definition of NbS specifies six societal challenges, namely,

climate change adaptation and mitigation, disaster risk reduction, human health, socio-economic development, food security and water security, other challenges may be identified and solved using NbS interventions, for example, clean energy or human-wildlife conflicts.

Equally, this means that not all conservation interventions can automatically claim to be an NbS. While conservation interventions may (directly or indirectly) generate ancillary societal benefits, they are not explicitly designed or managed to deliver such benefits. For an existing conservation intervention to be expanded or converted into an NbS, this would require that the mandate and/or the management plan be amended to respond to NbS objectives along with the establishment of requisite baselines to measure and account for delivery. Particularly, Criterion 7 (Adaptive Management) would need to guide such a transformation of an intervention.

1.2 Consensus based prioritisation identifies the most pressing societal challenge(s) for the site

While NbS can generate multiple benefits for a multitude of challenges, the NbS interventions need to respond to one (or more) specific societal challenges. This is to avoid implementing generic conservation actions that do not lead to specific and verifiable human well-being gains. This will also ensure that the most relevant knowledge, tools and approaches are used in designing and implementing the intervention (for example, solving food security versus health issues in a community require very different sources of knowledge and choice of tools as well as approaches).

However, it is important that due process is used to identify the societal challenge. What may be perceived as a priority challenge by external stakeholders may not be seen by the local populations as the most pressing and vice versa. In such cases, the scope of work of the external actors/initiative as well as processes described in Criterion 7 (Adaptive Management) need to inform the decision making. Additionally, it is important to understand and recognise that, due to the inter-linked impacts of the societal challenges on local stakeholders, solving a particular societal challenge may require addressing another challenge as well. For example, in some rural communities, it is impossible to work on long-term climate change impacts without, first, supporting the communities in being able to cope with seasonal disasters.

1.3 NbS intervention is aimed to meet specific and defined targets for human well-being

Targets need to be developed for the intervention to deliver human well-being benefits. This is pertinent in differentiating between conservation actions and NbS (Indicator 1.1). Ideally, targets for both implementation of the intervention and impacts of the interventions may be developed. While full impacts of the NbS may be realised beyond the intervention timeline, indicative targets may be developed (for example, X hectares of trees planted as an implementation target will sequester Y tonnes of carbon for climate change mitigation but only after Z number of years). Such targets would be useful for long-term monitoring of the intervention. Additionally, the targets would be needed for incentivising the long-term investment for and maintenance of the NbS.

In determining the impacts of the intervention, it is important to consider cascading effects linked to other societal challenges, especially in the context of ecosystem services associated with other challenges. Positive intended impacts for one challenge could have negative unintended consequences on another. For example, tree planting for climate change benefits in areas where there were no trees to start with may leave less land for farming. This could lead to increased food prices and ultimately, a larger and longer term negative consequence, arising from local communities having to find coping solutions through intensified exploitation of the ecosystems they have access to.

Criterion 2: Design of NbS is informed by scale

2. Guidance

Landscapes and seascapes are mosaics of interacting socio-ecological systems. Although they can occur at any spatial scale, over large geographic areas they are composed of overlapping ecological, social, cultural and economic activities and values and yield important ecosystem services such as water regulation and climate mitigation. NbS must be applied at a landscape scale because ecosystems are affected by and have effects on the larger land and seascape in which they are embedded and cannot be managed in isolation. Furthermore, because ecosystem goods and services often accrue at the land- or seascape scale, for NbS to effectively provide benefits to human well-being while safeguarding or enhancing ecological integrity, NbS activities must be strategically deployed across the larger landscape.

This requires operating at levels of the biological hierarchy above the individual ecosystem scale and explicit consideration of: the types and proportions of ecosystems within the landscape, the spatial organisation of the units, and linkages among landscape composition, structure and functions. In fact, managing functions, flows of energy, nutrients, and other ecological subsidies through the landscape may be as or more important than managing for the composition and structure within individual ecosystem units, especially for the delivery of ecosystem services. Therefore, the assessment, planning, implementation, and monitoring of activities intended to impact ecosystem goods and services that benefit society at large (water, climate mitigation and adaptation, etc.) require landscape-scale approaches and integrated implementation and monitoring of site-specific measures. For these reasons, at each phase of the development and execution of NbS, the larger land/seascape must be considered.

2. Indicators

2.1 Design responds to the scale of the economic, social and ecological systems

While NbS does not need to be implemented at scales above the target site level, the interventions, including those that occur at single sites or small spatial scales, must be considered in the context of larger landscape planning, in order to ensure that activities are strategic, maximise benefits to people and ecosystems, while minimising adverse effects on adjacent ecosystems and human populations. The context of the larger landscape includes ecological, economic and socio-cultural perspectives, as well as institutional arrangements.

Rather than focusing on a specific ecosystem or social group, the landscape/seascape scale considers how ecosystems, their functions and multiple stakeholders are connected to provide for landscape sustainability. This makes landscapes/seascapes the ideal unit for planning and decision-making, allowing the integration of diverse needs, sector plans, programmes and policies, and use of suitable traditional practices for implementation, into one single spatial

context that has considered the trade-offs, options and scenarios. Monitoring at the landscape/seascape level will not only include measures of site-specific effects but also impacts among sites and multiple stakeholders

2.2 Design and scale embrace complementarities with a range of interventions and sectors

NbS can be implemented alone or in an integrated manner with other types of solutions to address societal challenges (e.g. technological, engineering solutions, communication related tools). While NbS are different from more conventional conservation types of approaches, since the vast majority of NbS interventions are hybrid solutions, between nature-based and grey type solutions, NbS synergies with other types of solutions are not usually made automatically and should be explicitly planned for. It is important to have a solid basis in science and an integrative approach for monitoring, as part of the co-design of the solution, when NbS are implemented in complementarity with other types of solutions.

Links between a broad range of sectors to broaden the scope of societal challenges to be addressed will also support long-term synergies amongst different challenges, promote joint approaches for interdependent challenges, sustainability and ownership of the approach, reduce risks of negative unintended consequences and facilitate overall mainstreaming of NbS into national policies and sectors. Some illustrative examples could include reaching out to and incorporating the agriculture or crop insurance sectors to better address food security; or the health sector to better address human health in cities; or infrastructure to address disaster risk from flooding on a coastline (through a mixture of protecting mangroves and seawalls).

2.3 Design and scale incorporate risk identification and management

Credible design processes require an assessment of how external factors may influence the intended outcome of a project or initiative, especially negative impacts as well as those arising from a larger scale, thus beyond the control of the intervention. This is particularly the case with NbS where multiple sources can impact the long-term health and integrity of the underlying ecosystem services. Early action in terms of the assessment and proactive management of threats can make the difference between a successful and failed NbS. Basic key questions that can help identify key threats include:-

a) Are there competing national or sub-national policies that could undermine the NbS management objectives of the ecosystem in question?

b) Are there competing claims over the ecosystem or ecosystem service that will underpin the NbS?

c) Are there particular neighbouring or up-stream land-use practices that could reduce the efficacy of the NbS?

d) Is the NbS design sufficiently robust to absorb anticipated economic, demographic and climate-related changes?

e) Does the NbS itself introduce potential risks or additional pressures on the support ecosystem (e.g. risk of introduction or spread of invasive species)?

Criterion 3: NbS result in net benefits to biodiversity and ecosystem integrity

3. Guidance

While the overarching rationale for NbS is to effectively and efficiently address societal challenges (Criterion 1), the application of NbS presents a unique opportunity to complement and reinforce national and sub-national biodiversity conservation strategies. This is important for two reasons:

a. The world is currently facing a biodiversity crisis that not only threatens rare species with extinction but risks making the common aspects of the natural world increasingly rare. This phenomenon undermines both planetary health and broader human well-being.

b. The more 'biological diversity' that is built into a specific intervention, the greater the capacity of the NbS to absorb the impacts of unexpected changes and shocks without a commensurate loss in its effectiveness.

The following ecosystem attributes can all help to enhance the biodiversity component and ecosystem integrity of an NbS:

- Diversification of species composition
- Diversity in vegetation structure, habitats and spatial heterogeneity
- Complexity of the food chains (trophic levels) supported by the NbS
- Proximity or connectedness to other natural areas
- Genetic diversity that exists within the NbS

Ecological restoration, in particular, has the potential to optimise the recovery of lost biological diversity, within an NbS, though options may be limited by cost constraints in some situations. However, irrespective of the particular approach deployed, it is very important that NbS avoid further simplifying an ecosystem (such as replacing natural mixed woodland with a monoculture tree plantation). In addition to working with intact and modified natural ecosystems, NbS also provides the scope to harness and deploy 'novel' ecosystems. This is particularly relevant where new ecosystems have emerged after a period of major anthropogenic disruption, including, notably in the urban context.

3 Indicators

3.1 The biological component of the baseline assessments is sufficient to broadly characterise the current ecological state and identify options for net improvements

Surveys and data collection are expensive so there is always a risk that NbS proponents limit baseline assessments exclusively to the ecosystem service(s) of interest, for example, that an initiative to sequester carbon through improved peatland management only assesses the carbon capture potential. However, as the delivery of ecosystem services is underpinned by the health and state of the ecosystem itself and given that one of the key attractions of NbS is that it also contributes to biodiversity conservation, it is desirable that baselines are sufficient to guide these types of management decisions during implementation.

Basic information should, at a minimum, include:-

a. Species diversity by key taxonomic groups (e.g. vascular plants, mammals, birds) and their current conservation status
b. Spatial distribution (and patterns of distribution) of key ecosystem types in the NbS area and their current conservation status.

The status and trends of an ecosystem may also be included in a baseline. A suitable method that can model key variables against the baseline and over time to understand the changes being driven by the variables could then inform management objectives, including adapting the NbS intervention to reduce any negative outcomes. The model would need to be tested through regular monitoring that provides information for evaluating improvements in the ecosystem and for adjusting the model to keep it relevant.

3.2 NbS include clear and measurable biodiversity conservation targets

Given that NbS depend on the health and condition of the supporting ecosystems, it is in the interest of the proponent to ensure implementation measures at least maintain, and ideally improve, the ecological integrity of the target area over the intervention period. The scope and options for such improvements are context specific, being dependent on the agreement of other stakeholders, national and sub-national policies and available resources. In some situations, it may be possible to build in ‘state-of-the art’ ecological restoration. In others, it may only be possible to diversify species composition of particular sites or improve the delivery of only a sub-set of key ecosystem functions. What is important is that such conservation targets are agreed upon, incorporated into implementation and progress accounted for during implementation monitoring.

3.3 Unintended adverse consequences on biodiversity arising from the NbS are periodically assessed

Ecosystems are complex and dynamic. While a robust planning process (Criterion 2) will help anticipate and address negative secondary impacts, there is always a risk of unintended

outcomes with natural systems and processes. It is therefore prudent that NbS proponents periodically review for adverse non-target effects in target and adjacent ecosystems. Towards that end, an evidence-based review of the potential risks and impacts of the main NbS interventions on the area's biodiversity should be detailed in the NbS operational plan, along with the specified frequency of periodic reviews and a framework response procedure to be followed if negative secondary impacts are detected.

3.4 Opportunities to enhance ecosystem connectivity are considered at scale and, where appropriate and possible, incorporated into the NbS plan

Ecosystem connectivity refers to the two-way flows of biotic (i.e. living) components of ecosystems that otherwise would be separated across a landscape by physical barriers. Contributing to improved ecosystem connectivity may often be a conservation objective that can be relatively easily facilitated by NbS. The scale at which connectivity is addressed in the planning depends on the goals that have been set for the NbS intervention.

There is also a strong social perspective on ecosystem connectivity, and in this respect some of the most promising opportunities for NbS interventions relate to the urban demand for green spaces and recreational opportunities.

Other examples of connectivity include planned corridors linking ecosystem patches across a landscape to accommodate ungulate migrations, and municipalities that have for several decades invested in the purchase and management of headwater landscapes to secure sustainable supplies of water for residents.

Criterion 4: NbS are economically and financially viable

4. Guidance

One of the challenges facing many NbS today, is a lack of economic or financial consideration. Many interventions fall foul of the mistake of investing heavily early on and not considering the economic and financial viability beyond the time bounds of the intervention. Not only does this increase the risk of the NbS failing, it also fails to make use of the opportunities that NbS offer towards economic development. For example, the creation of green jobs or the setup of sustainable livelihoods can be integrated within the scope of an NbS intervention to provide incentives for further impact.

For NbS to be sustainable, there must be a strong economic consideration (in addition to the other two pillars of sustainable development, environment and social). Otherwise we run the risk of implementations confined to their project lifetimes (for example, five years) where, upon closing, the solution and multiple benefits provided cease to exist, even possibly leaving the landscape worse off than before.

Additionally, NbS need to have a viable financial plan regardless of whether the activity is to provide a financial return or not. NbS also do not operate in a vacuum in terms of finance, so there must be some level of cohesiveness and integration with financial institutions and incentive structures. An understanding of whether economic policy and financial structures are complementary is necessary to ensure the NbS offers its full range of benefits to nature and people.

4. Indicators

4.1 NbS identify and document the direct and indirect benefits and costs associated with the NbS and who receives them

The most basic requirement to understand the economic aspects of NbS involves identifying and documenting all the types of benefits provided (financial and non-financial), who receives them, what the costs of provision are, and who bears the costs. Benefits and costs can be assessed in non-economic (e.g. increase in air quality) or economic value (e.g. reduced health costs), or both. Consideration for market and non-market aspects of NbS is essential to ensure a comprehensive assessment. This will inform the consideration of trade-offs under the sixth criterion (indicator 6.1).

4.2 NbS compare the results of 4.1 to alternative solutions if any are available

The primary goal of an NbS is to effectively address at least one societal challenge in a manner that is economically viable. To identify the most effective and affordable solution, alternative solutions must be considered. Alternative solutions may be purely conventional (business as usual) or grey solutions, or they may take the form of other types of NbS. Comparing various

solutions can inform on the most effective way forward in regard to addressing the societal challenge/s as well as understanding the key interests.

4.3 NbS provide an analytical framework to support the choice of NbS

An analytical framework can come in the form of a basic cost-effectiveness study, cost-benefit assessment, or a multi-criteria economic analysis. The appropriate analytical framework will depend on the knowledge and capacity to make these predictions. There are a number of methods and examples to develop cost-effectiveness studies and at the very least an attempt to do so will assist greatly in informing Criterion 6 on trade-offs.

4.4 A business/economic plan for the NbS is developed to assess and ensure the economic and financial feasibility of NbS in both the implementation stage and long-term

A long-term business/financial plan should be developed to address the economic/financial feasibility and constraints of NbS. This plan should also look beyond the timeframe of the planning and implementation phase. If financial considerations are only thought of within these limits, the short-term cost could outweigh the long-term benefits or vice versa. A solution may then not be deemed economically viable through time. Therefore, planning should consider the implementation stage but also include a degree of forward-looking thinking with the above criterion.

Criterion 5: NbS is based on inclusive, transparent and empowering governance processes

5. Guidance

Governance of an NbS intervention involves social structures and decision-making processes. All NbS need to have an inclusive approach when identifying and establishing social structures throughout the lifecycle of the intervention and beyond. A rigorous stakeholder mapping process may be conducted in order to identify the range of stakeholders who will be affected by the NbS and how. All stakeholder groups must be represented and their stakes considered when making decisions concerning the NbS intervention. Doing so can minimise the risk of marginalising a particular stakeholder group or worse, affecting them negatively with the NbS intervention. On the other hand, a lack of such an inclusive approach will lead to decision-making based on limited, skewed and narrowed perspectives, which could lead to increased social and/or economic inequalities amongst stakeholders. This is especially possible due to the inherent power differences amongst stakeholders who may be involved or affected. Furthermore, lack of an inclusive approach may exacerbate the risks highlighted in indicators 2.3 and 3.3, and limit the extent to which adaptive management can be practised.

Furthermore, transparency is critical in ensuring that resources (financial, human and natural) are being used fairly and efficiently for the benefit of the beneficiary group(s) that have been collectively identified and agreed upon by all stakeholders involved. Transparency on the part of the external actors who may be driving the intervention is needed for local stakeholders and especially local communities to understand the immediate and long-term implications of the NbS interventions, whether it be ecological, economic or social (especially negative impacts on cultural, local rights and practices). It is important that all stakeholders understand and are part of the decision-making processes on how they would be affected by such implications, including by any trade-offs that need to be made (Criterion 6) in implementing NbS.

Such participatory and transparent governance of NbS interventions also needs to empower stakeholders, especially those who may be poor, less influential or marginalised at the start of the process, through proactive capacity enhancement and knowledge sharing. Empowerment can provide the foundations for longer-term ownership, create self-sufficiency and ultimately, sustainability as well as scaling up of the intervention.

5. Indicators

5.1 Stakeholders who are directly and indirectly affected by the NbS have been identified and involved in all processes of the NbS intervention

NbS should allow for the active participation of all people who may be directly or indirectly affected from start to end of the intervention. Using a robust stakeholder mapping tool from the many widely available options, a stakeholder analysis needs to be carried out in order to identify

and engage the full range of stakeholders that may be affected by the NbS. The process would also need to identify stakeholders who may be negatively affected and afford opportunities for their empowerment to prevent them being further marginalised due to the NbS. The resulting social structure set up for decision-making and implementation of the NbS intervention must reflect the diversity of the affected stakeholder groups.

5.2 Participation is based on mutual respect and equality

Participation cannot be passive, whereby certain stakeholder groups are simply informed of what will or has happened. Similarly, participation cannot be an information extraction exercise by one or more stakeholder groups, nor can it be based on coercion or incentivised by material gains. Where indigenous peoples are affected, the principle of free, prior and informed consent (FPIC) is applied in NbS design and implementation. Instead, participation is aimed at ensuring that a diversity of knowledge, skills and ideas inform the implementation and evolution of the intervention, whereby stakeholders have ownership of NbS and can even self-mobilise collective and continued actions, post intervention.

5.3 Decision-making processes document and respond to stakes of all participating and affected stakeholders

Where stakeholders are subject to inequity, the underlying causes for this are understood and all efforts are made to reduce or avoid this as much as possible. Doing so would reduce the probability of conflicts. In the case of potential conflicts, they are resolved in respectful negotiation which recognises the rights of stakeholders to nature's benefits and the need for agreement to reduce the risk of failure. Doing so will also inform adaptive management of the NbS intervention as it is impossible to foresee and control all impacts and implications of the intervention through the planning process only. Furthermore, if conflicts cannot be resolved amongst the stakeholders, the grievance resolution mechanism (following indicator) will need to be used.

5.4 A defined and fully agreed upon feedback and grievance resolution mechanism is available to all stakeholders before an NbS intervention can be initiated

A grievance mechanism is a formal, legal or non-legal complaint system made up of procedures, roles and rules for receiving complaints and providing a remedy. Reviews of existing redress mechanisms in international law for conservation activities have shown the importance of including contextually appropriate methods of redress, with examples including the IUCN Whakatane Mechanism. The grievance mechanism should be legitimate, accessible, predictable, equitable, transparent, rights-compatible, adaptively managed and based on engagement and dialogue.

5.5 Where the scale of ecological processes and functions extends beyond jurisdictional boundaries, organisations and institutions are established to enable joint decision-making among the stakeholders in all jurisdictions affected by the NbS

Ecosystems do not follow political and administrative borders. Therefore it is important to ensure holistic approaches that may involve stakeholders and institutions beyond the boundaries of the geographical space an NbS is being implemented in. Establishing new organisations and rules is important for interventions that involve things like rivers and migratory species to avoid application of conflicting management objectives in adjacent jurisdictions that are part of the same ecological system. A mismatch of social and ecological scales increases the risk of failure, therefore governance approaches need to explicitly acknowledge these connections (see also Criterion 2 on ecological scales).

Where appropriate, transboundary cooperation agreements between relevant authorities underpin NbS planning and implementation across frontiers. Effective NbS sometimes may require coordination on transboundary cooperation. In such cases, it will be necessary to obtain cooperation agreements from relevant national authorities that frame a shared vision and consistent approach to NbS planning, monitoring, shared decision-making and implementation. Agreement should be accompanied with a legal review to ensure compliance with respective international cooperation arrangements (i.e. that the implementing national authorities have the necessary mandate and there is an established recourse procedure that can be used in the case of any disputes or unforeseen consequences).

Criterion 6: NbS equitably balances trade-offs between achievement of its primary goal(s) and the continued provision of multiple benefits

6. Guidance

Even though the overarching objectives of an individual NbS must prioritise the resolution of specific societal challenges (Criterion 1), the supporting ecosystem will continue to deliver a range of services that are important to society as a whole (Criterion 3). Indeed the ability to deliver multiple benefits simultaneously is a major attribute of NbS. In some cases, the 'stacking' of key benefits (e.g. water protection, carbon sequestration and public health through recreation) is an important determinant as to whether an NbS is economically viable (Criterion 4).

However, this fundamental attribute of ecosystems can also provide a challenge to the NbS proponent. Maximising the provision of multiple benefits from any one NbS risks a commensurate reduction in the key ecosystem benefit that is instrumental for addressing the societal challenge at hand. Conversely maximising the provision of the key ecosystem benefit will almost certainly result in a reduction of the quality and quantity of other ecosystem benefits. Such trade-offs are very often an inherent feature of natural resource management and arise when a particular ecosystem service or stakeholder preference (e.g. clean drinking water) is favoured at the expense of another (e.g. crop output). Some trade-offs result from deliberate decisions, while others occur without planning or awareness of the impacts. Trade-offs become a major problem when the same choice is replicated multiple times, so that suites of important ecosystem benefits disappear or otherwise occur at sub-optimal levels across the entire landscape.

However, trade-offs can be successfully managed if their likely consequences are properly assessed, fully disclosed and agreed upon by the most affected stakeholders. Fair and transparent negotiation of trade-offs and compensation among potentially affected parties for any damages or trade-offs to local opportunities and livelihoods provides the basis for successful long-term NbS outcomes. Critically, it is important to recognise that trade-offs have limits, which means that safeguards will be necessary to ensure that the long-term stabilising properties of ecosystem regulating and supporting services are not exceeded.

6. Indicators

6.1 The potential NbS costs and benefits of associated trade-offs at both the NbS site and across the larger landscape/seascape are explicitly acknowledged and equitably shared

Proponents identify and document the benefits and costs of the NbS, and its recipients (Criterion 4), the results of which then inform actions, and the sharing of benefits and costs

among stakeholders. Such analysis must not be restricted to the planning phase but be built into the entire NbS life cycle, including initiation, planning, execution and closure, acknowledging that NbS interventions can be implemented in perpetuity.

Trade-offs have a spatial, temporal and reversibility dimension. The spatial dimension refers to whether the effects of the trade-offs are felt locally or at a distant location. Temporal refers to whether the effects take place relatively rapidly or slowly. Reversibility expresses the likelihood that the perturbed ecosystem service may return to its original state if the perturbation ceases. Furthermore, benefit-sharing arrangements that have been mutually agreed must be established to ensure equitable balancing of benefits and trade-offs from policies and investments.

6.2 The rights, usage and responsibilities of the different stakeholders regarding resource access and land use are acknowledged and respected

The legal and usage rights of vulnerable and marginalised groups need to be respected. Rights, use and responsibilities of stakeholder groups may be analysed and assessed using appropriate tools, building on the outcomes of stakeholder analysis or mapping. Particularly, when dealing with Indigenous communities, free, prior and informed consent (FPIC) must be used (aligned to Criterion 5).

6.3 Established safeguards are in place to prevent mutually agreed limits of trade-offs being exceeded or trade-offs destabilising the entire ecosystem or land/seascape

Many related policies, such as REDD+, have explicit safeguard policies (see for example the UNFCCC (Cancun Agreement Appendix 1). Voluntary carbon projects have often followed the Climate, Community and Biodiversity Standards. Other safeguards have been established for World Bank investments. These safeguard systems are in place to anticipate and avoid adverse consequences of interventions, and can be used as a basis for an NbS safeguard appropriate to local contexts.

Criterion 7: NbS are managed adaptively, based on evidence

7. Guidance

NbS harness services of ecosystems, which are complex, dynamic and self-organising systems. Ecosystems may respond in desirable ways to an NbS intervention. However, the intervention could also create unintended, unforeseen and undesirable consequences. Therefore, NbS are attempts to influence an ecosystem to change in ways that support meeting societal needs in the long term and cannot be regarded as interventions that can fully predict outcomes in an absolute problem solving sense. As a result, NbS is based upon a hypothesis (or theory of change), which must be tested and adapted based upon evidence. The theory of change recognises the self-organising properties of ecosystems and is based on an assessment of process and function as these relate to societal challenges. To the full extent possible, assumptions must be clearly stated and tested against evidence.

Adaptive management may, therefore, be incorporated into the NbS implementation process. Adaptive management is defined as: “A structured, iterative process of … decision making in the face of uncertainty, with an aim to reducing uncertainty over time.” Furthermore, in responding to such a management approach, continuous learning about system-wide processes and adapting NbS according to systemic changes would be needed from all stakeholders involved. This may also include considerations of long-term sustainability impacts of the immediate NbS site, changes that may be triggered in adjacent landscapes and impacts that may occur at larger scales, both over timescales and geographical spaces.

On the other hand, undesirable impacts on the NbS intervention from adjacent landscapes and larger scale systems may also impact NbS and may be beyond management control. This further stresses the need for adaptive management, flexibility and iterative learning processes when implementing NbS. Underpinning such learning and management approaches would be the recognition of interactions between the social and ecological components of the entire system within a landscape as well as the interactions that occur across the different levels of social and ecological scales. The success of this is strongly dependent on Criterion 5, inclusive, transparent and empowering governance processes.

7. Indicators

7.1 The NbS hypothesis or theory of change is established and used as a basis for regular monitoring and evaluation of the intervention

In an NbS, the theory of change is not static; it is dynamic and acknowledges the uncertainty of ecosystems, social systems and changing economic conditions. Assumptions and enablers identified in the theory of change must regularly be reviewed against the established baseline. Other relevant and new social, economic and ecological evidence that would enhance the

impacts of the NbS as well as reduce the risks of negative unintended outcomes, may also be considered alongside the baseline. A monitoring and evaluation plan, established during the planning process, will also enable systematic review of the NbS intervention against the baseline and other new evidence.

7.2 A monitoring and evaluation plan is developed and implemented throughout the lifecycle

A monitoring and evaluation (M&E) plan will ensure that the NbS intervention is on track with implementation and delivery as well as help manage positive and negative long-term impacts. While it can sometimes be perceived as an administrative burden, it is a powerful approach to understand whether the NbS intervention effectively addresses the societal challenge. When done well, not only can M&E help assess the changes throughout the intervention, but also capture immediate and short-term impacts on nature and people's lives. It will support NbS interventions in upholding accountability and compliance.

Such a plan is also important when identifying responses under changing conditions described in Indicator 7.1 and managing the resulting deviations. These responses will serve as adaptive management actions to be undertaken by the stakeholder community. The actions must be developed and executed in an inclusive and participatory way, thereby upholding Criterion 5. Information on the processes to identify the actions as well as the execution of the actions must be available for inspection, with appropriate attributions, while respecting the privacy and security of informants. The appropriate ecological and social scales must be reflected in adaptive management actions since NbS can have influences across varying scales and the actions may require engaging at scales different to the original NbS. Without such an adaptive approach, the actions may have marginal or no corrective impact and at best, short-lived impacts.

7.3 Iterative learning for adaptive management is practised throughout the lifecycle of NbS

Learning is the process of developing an understanding based upon the evidence, and adaptation is the adjustment of management according to new information. Learning based on evidence should drive NbS management. Furthermore, iterative learning-application-learning is essential in informing adaptive management actions, in order to respond to the factors influencing NbS interventions. For this Criterion, 7.1 and 7.2 would provide a continuous feedback loop in order to learn and adapt the NbS intervention. Further evidence, produced from both traditional and scientific knowledge, can also be brought into the iterative learning process, and this is especially important given the climate change impacts being experienced by systems. Ideally, iterative learning may be institutionalised so that it carries on even after the NbS intervention ceases.

Criterion 8: NbS are mainstreamed beyond standalone, time bound interventions

8. Guidance

Given that NbS is a relatively new and emerging concept, in order to increase demand and supply of NbS, it must be possible to scale up and replicate individual NbS. Both of these processes will add evidence for and understanding of the NbS approach, further enabling the design of even more effective, affordable and sustainable NbS.

NbS are designed and managed to be complementary to institutional structures, policy, plans, laws, regulations and nearby interventions (see Design at Scale Criterion 2 and Adaptive Management Criterion 7 respectively). However, while an NbS intervention may be time bound (for example, where specific actions such as planting mangroves is limited to five years), the NbS overall, including the resulting framework and impact, continues outside these boundaries. The purpose of this criterion is to ensure that NbS enable their own mainstreaming for solutions to persist through time.

In supporting the uptake and scaling of NbS across time and well beyond the timeline of the intervention, NbS proponents ensure that NbS have a long-term trajectory that spans several decades. There are varied approaches to mainstreaming NbS, however all rely on strategic communications and outreach. Audiences to consider include individuals (the general public, academics), institutions (national government, start-ups, organisations) and global networks (Sustainable Development Goals, Paris Agreement).

8. Indicators

8.1 NbS share and communicate their design, implementation and lessons learnt

For an NbS approach to be scaled up and replicated, it is important that the process of design and implementation, along with lessons learnt, are made available and accessible to relevant individuals. Audiences for this communication include individuals such as decision makers, investors and other NbS proponents and the general public. Examples include news articles on lessons learnt, press releases on partnerships formed, capacity trainings on design or implementation, policy briefs and lobbying.

For these communications to be accessible, audiences that may encounter barriers in terms of technology, culture or social-economic background must be considered. NbS proponents may consider it appropriate to publish results in an open-access publisher. Additionally, site specific visibility and awareness raising can be considered, such as billboards and signs.

8.2 NbS inform and enhance facilitating policy frameworks to support its uptake and mainstreaming

NbS are already subject to a range of pre-existing policies, plans, laws and regulations. They need to address and be compatible with the context provided by current policies, plans, laws and regulations so that they are fully enabled to deliver their intended outcomes (Design at

Scale Criterion 2). Failure to do so may risk the durability of the NbS over the long term if, for example, it requires actions or interventions that contravene or are otherwise incompatible with established land-use strategies and practices. There may also be situations where existing land-use policies undermine one another and therefore present additional challenges to NbS implementation. Under these circumstances, NbS can provide the opportunity to highlight these incompatibilities to policy makers and act as a trigger to amend regulations in order to ensure sustainability and durability.

On occasions, contradictions between the objectives or requirements of different land-use or sectoral policies may be encountered which have the potential to reduce the effectiveness and/ or efficiency of NbS implementation. These should be fully documented along with options to resolve or work around any such obstacles both for monitoring purposes and for the consideration of policy makers. In order to improve the design and facilitate effective policy alignment of future NbS, monitoring and evaluation outcomes as well as other forms of lesson learning, should be maintained and remain easily accessible within the public domain.

8.3 Where relevant, NbS contribute to national and global targets for human well-being and biodiversity

NbS are aimed at contributing to global societal challenges. Individual NbS build on this momentum, by recording their progress towards increasing human well-being and tackling the biodiversity crisis. Where NbS impacts contribute to relevant national and global targets (mapped in Design at Scale Criterion 2), the bodies responsible for these targets are informed so that this impact is documented. Targets to consider informing include:

- UN Sustainable Development Goals (SDGs)
- Those specific to a societal challenge (Paris Agreement, WHO Global Nutrition Targets, Sendai Framework)
- Those specific to the biodiversity crisis (Aichi Targets, National Biodiversity Strategies and Action Plans).

[1] Brondizio, E.S., Settele, J., Díaz, S. and Ngo, H.T. (eds.) (2019). *Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services.* Bonn, Germany: IPBES.

[2] IUCN (International Union for the Conservation of Nature) (2016). Resolution 69 on Defining Nature-based Solutions (WCC-2016-Res-069). IUCN Resolutions, Recommendations and Other Decisions. 6-10 September 2016. World Conservation Congress Honolulu, Hawai'i, USA. https://portals.iucn.org/library/sites/library/files/resrecfiles/WCC_2016_RES_069_EN.pdf.

[3] Cohen-Shacham, E., Andrade, A., Dalton, J., Dudley, N., Jones, M., Kumar, C., Maginnis, S., Maynard, S., Nelson, C., Renaud, F., Welling, R. and Walters, G. (2019). Core principles for successfully implementing and upscaling Nature-based Solutions. *Environmental Science and Policy* 98: 20-29.

[4] Cohen-Shacham, E., Andrade, A., Dalton, J., Dudley, N., Jones, M., Kumar, C., Maginnis, S., Maynard, S., Nelson, C., Renaud, F., Welling, R. and Walters, G. (2019). Core principles for successfully implementing and upscaling Nature-based Solutions. *Environmental Science and Policy* 98: 20-29.

[5] Cohen-Shacham, E., Walters, G., Janzen, C. and Maginnis, S. (2016). *Nature-Based Solutions to Address Societal Challenges.* Gland, Switzerland: IUCN. https://doi.org/10.2305/IUCN.CH.2016.13.en.

[6] http://www.stapgef.org/the-resilience-adaptation-and-transformation-assessment-framework

[7] https://wayfinder.earth/