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Restoration or Nature-based Solutions: What's the difference and why does it matter?

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Restoration is a long-standing concept in ecology and guiding principle for many environmental institutions including the European Union's proposed Nature Restoration Law. The terms 'restoration' and the newer term of 'Nature-based Solutions' are both commonly used, sometimes interchangeably. However these concepts are not identical and understanding these differences might help us find ways to tackle the nature and climate crises more effectively. We examine the implications of the different concepts, to help shape and prioritise future action.

Comparing definitions

The definitions below are recent, expert-led and internationally accepted. We define restoration by reference to the International Standard for Ecological Restoration, which informs the current UN Decade of Ecosystem Restoration[1]. The definition of Nature-Based Solutions is the global standard adopted in 2016 by the IUCN (International Union for Conservation)[2] and informs the March 2022 resolution of the UN endorsing NbS for sustainable development[3].

These definitions are also used by MERLIN project, which focuses on Europe's catchment systems; this encompasses not only instream channels and riparian zones but also wider connected landscapes through which fresh waters drain.

- Restoration means "assisting in the recovery of ecosystems that have been degraded or destroyed, as well as conserving the ecosystems that are still intact"[4].
- Nature-Based Solutions (NbS) are "actions to protect, sustainably manage, and restore natural and modified ecosystems that address societal challenges effectively and adaptively, simultaneously benefiting people and nature"[ii].

The two concepts are similar and mutually supportive. However, the starting point of restoration is nature itself; whereas the starting point of NbS is societal needs and goals. Restoration's focus of healthy ecosystems can and often does have benefits for society, but traditionally such benefits have not been the primary aim, making it harder to be perceived as relevant to non-conservation actors. NbS is a paradigm shift to focus on how restoring ecosystem function creates benefits for human well-being, economies and societies, particularly in terms of building resilience to environmental and other changes. This should better motivate the commitment of all sectors of society, including economic actors that affect, or are affected by, ecosystem degradation.

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[1] In Resolution 73/284, the United Nations General Assembly declared 2021–2030 as the United Nations Decade on Ecosystem Restoration; supported by the IUCN and FAO www.decadeonrestoration.org/

[2] At the 2016 World Conservation Congress, IUCN's members adopted resolution defined the use of nature for simultaneous benefits to biodiversity and human well-being: WCC-2016-Res-069-EN Defining Nature-based Solutions. www.iucn.org/sites/dev/files/content/documents/wcc_2016_res_069_en.pdf

[3] The 5th UN Environment Assembly 'Resolution on Nature-based Solutions for Supporting Sustainable Development' defined NbS as 'actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems, which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services and resilience and biodiversity benefits.' https://www.unep.org/news-and-stories/press-release/un-environment-assembly-concludes-14-resolutions-curb-pollution

[4] Gann, G. D., McDonald, T., Walder, B., Aronson, J., Nelson, C. R., Jonson, J., Hallett, J. G., Eisenberg, C., Guariguata, M. R., Liu, J., Hua, F., Echeverria, C., Gonzales, E. K., Shaw, N., Decleer, K. and Dixon, K. W. (2019). International principles and standards for the practice of ecological restoration, Restoration Ecology, S1-S46. https://www.ser.org/page/SERStandards/International-Standards-for-the-Practice-of-Ecological-Restoration.htm

Example

Figure 1 shows a hypothetical catchment. Across this landscape there are many human activities as well as many natural features. Different parts of the landscape play different roles in terms of catchment functioning and are also home many different habitats and species. Many economic sectors use ecosystem services in activities ranging from farmers using water for irrigation through to water supply for housing. Significant alterations to parts of this ecosystem have been introduced by interventions such as draining uplands to improve agricultural productivity and infrastructure such as hydropower instream barriers.

Figure 1 A MERLIN diagram of a hypothetical catchment similar to the real-life cases involved in our project.

A restoration project that aims to improve the extent and quality of wetland habitats will focus on ecological connectivity and include a range of activities to improve water quality, biology, morphology and hydrology[5]. Actions that slow the flow of water through the landscape, e.g. by upland rewetting, may also reduce some downstream flood risks and provide some cultural ecosystem services like increased landscape amenity; however these tend not to be the aim or the intervention. The project does not ignore human activities in the landscape but seeks to reduce the resultant impacts and pressures, for thriving ecosystems.

An NbS project would instead start with a societally defined problem, such as flood risk management, and intervene in nature accordingly. The selection and placement of Natural Water Retention Measures to protect communities and settlements would also consider other ecosystem services delivered by the catchment system, such as improving recreational access, or drinking water quality. Regulating extreme events helps many businesses including agriculture, hydropower, navigation and water supply for example. Improvements to hydrological connectivity will tend to benefit wetland habitats, but there may be less attention to conservation issues such as tackling non-native invasive species.

Whether restoration or NbS is the starting point, some similar activities may be planned - such as reinstating a wetland, but the overall mix of activities will differ. In the next section we discuss other differences that arise.

[5] Addy, S., Cooksley, S., Dodd, N., Waylen, K., Stockan, J., Byg, A. and Holstead, K. (2016). River Restoration and Biodiversity: Nature Based Solutions for Restoring the Rivers of the UK and Republic of Ireland, IUCN-2016-064, The International Union for the Conservation of Nature (IUCN) and Scotland's Centre of Expertise for Waters (CREW), Aberdeen, UK. https://portals.iucn.org/library/node/46347

Implications for planning, implementing and monitoring interventions

Below we outline distinctions in focus, priorities and ways of working that arise from the different starting points. These are based on the authors' reflections on discussions about the shift entailed from existing restoration (MERLIN demonstration cases) towards NbS at greater scales (MERLIN regional scalability plans), based on NbS based on the IUCN Global Standard[ii].

Key questions	Catchment Restoration	Nature-based Solutions
What are the goals?	*To restore ecosystem function, which entails removing or mitigating significant human impacts. Biodiversity and habitat conservation are usually prioritised. Defining the ideal natural state may be challenging, especially given changes in climate.*	*To support sustainable development by responding to major societal challenges. These range from climate change mitigation and adaptation, through to human health, food security and water security. Each intervention must define its own priorities.*
What is the scale of work?	*Interventions aim to restore functional ecosystem units, this could be whole catchments, though in practice restoration activities have often been confined to small rural sub-catchments*	*Interventions are planned according to the scale of benefits required; this may entail working at catchment scales – or connecting work across catchments – but specific goals may also be achieved working by targeting smaller scales.*
How is work conceived and planned?	*Usually a small group of partners with strong conservation interests*	*Requires input from all the relevant stakeholder groups beyond conservation*
Who is involved?	*Mainly public sector (environmental statutory agencies), fisheries and related interest groups & eNGOs (environmental Non-Governmental Organisations). The majority of the expertise used is that on ecosystem function*	*Many groups from across sectors: including the public sector, but also ranging from for-profit businesses through to community organisations). Expertise used includes that ecosystem function but extends to include wider economic and social issues*
How are projects typically funded?	*Public sector grants, as well as 'in kind' resources such as staff time from eNGOs, fisheries interest groups and public sector. eNGO resources are provided are in turn provided by members and/or donations.*	*Fixing societal problems helps unlock more types of funding than for restoration; additional resources provided by other stakeholder groups who are motivated to support & resource the work – ranging from crowd-funding, community volunteers, through to corporate investments.*
How is the project monitored?	*Monitoring is often focused on assessing ecological, biophysical and hydrological parameters.*	*Monitoring will focus on achieving the societal goals; and intermediate steps, and project processes. Using monitoring information for adaptive management is required.*

Should we replace restoration with NbS?

Focusing on NbS may seem preferable and indeed inevitable given the urgent need to achieve sustainable development and safeguard societal needs in the face of the climate and nature crises. Framing interventions in terms of restoration risks interventions that are not responsive to current drivers and societal needs; and as a result these Interventions may be hard to justify and achieve.

However, there are risks entailed by the NbS concept[6], due its utilitarian framing. This may encourage attention only to aspects of nature that are obviously useful, a view of ecosystem services as conveniently predictable and commodifiable. However, nature is inherently complex and dynamic; there are tradeoffs in what services it generates and for whom; and many of these services are irreplaceable even if they are not understood to be immediately responding to societal challenges. Additionally, nature has intrinsic value, worthy of conservation in its own right.

Adopting the IUCN global standard for NbS may help mitigate against these risks (figure 2). Its 8 criteria and associated indicators reflect insights from restoration ecology as well as other fields. These criteria are all equally important for guiding and evaluating action. For example, it requires all NbS to maintain and enhance biodiversity; it highlights the likelihood of tradeoffs; and it specifies the need for adaptive management in respond to the unpredictable changes of complex socio-ecological ecosystems. Appraising experiences of using this standard to avoid the risks, is a future priority tackled by H2020 MERLIN.

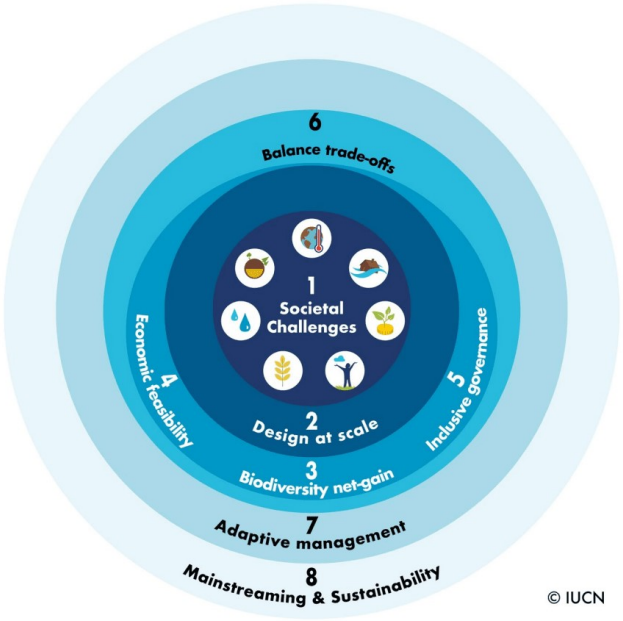

Figure 2 The eight criteria of the IUCN Global Standard for NbS are designed to reflect all aspects of sustainable development and resilient project management. https://www.iucn.org/our-work/nature-based-solutions

Conclusion

It is important to consider the scope of ambition and the differences entailed by focusing on restoration versus nature-based solutions. We do not propose that one term is better than another, but it is useful to consider what is Implied when by using one term or the other. We recommend the global standard for NbS as a means to navigate the challenges of working with a wide range of societal actors, such as businesses, who may not be traditionally involved in catchment management. What matters is finding ways of living and working with nature that deliver benefits for both nature and people.

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[6] More ideas about these and other risks are discussed by the recent NetworkNature Brief "Ensuring the quality of Nature-Based Solutions" https://oppla.eu/sites/default/files/uploads/networknature-nbs-knowledgebrief-2.pdf