NATURE-BASED SOLUTIONS: APPLYING A LEGAL PRINCIPLE OF SOLIDARITY TO PROTECT HUMAN AND MORE-THAN-HUMAN COMMUNITIES THROUGH AN "ECOLOGICAL EDUCATION AND SERVICE PROGRAM"

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INTRODUCTION

In theory, nature-based solutions (NBS) should be an attractive proposition. Projects that fully embody the tenets behind NBS acknowledge that human communities can work collectively with nature to conserve and restore ecosystems. In practice, this proposition is less clear. This paper's

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purpose is to explain how the concept of NBS has been developed and promoted and how we can re-imagine community residents' duty as a basis for enhancing engagement in NBS work.

Part I of this Article will explore the range of concepts informing NBS policy. The next section of the paper (Part II) examines two working definitions of NBS in the context of current efforts to develop principles and practices. Part II also raises the specter of financialization of NBS where investment dollars decide what projects will be done and for what purposes. For example, "blue carbon" projects with the primary objective of carbon sequestration create a situation where financialization can pose a real threat to the potential for achieving NBS objectives. NBS-based markets raise legitimate questions about whether a project can achieve real gains for multiple beneficiaries and not just for human interests. Gains in one habitat driven by desirable market outcomes can lead to losses and impacts on another sensitive habitat. Depending on location, for example, restoring seagrass beds may increase blue carbon sequestration, but might also reduce onshore sediment transport and decrease sedimentation for inshore wetlands.[2] Because of all this interconnectivity across landscapes and seascapes, this Part argues that NBS should not operate on the primary basis of economic logic.

Instead, as suggested in Parts III and IV, we need an infusion of a legal principle of solidarity to be a guiding principle for NBS. Part III discusses the roots of solidarity in "communitarianism" and "care ethics" and its development into a legal principle. Part IV offers an unconventional but needed intervention. If NBS is to make sense as a coherent ecological policy that protects both human communities and more-than-human communities, NBS proponents should seek out non-market approaches. One potential approach would be to create opportunities to practice solidarity through implementing a regular and funded "ecological education and service" program for all residents.

I. THE ZEITGEIST OF NATURE-BASED SOLUTIONS

In the past few years, governments have prioritized increasing efforts to achieve NBS in different sectors. In a 2022 United States White House report, the Biden-Harris Administration called on agencies to prioritize NBS-related investments and infrastructure, providing more funding under the Infrastructure Law and Inflation Reduction Act, more leadership at federal

2. Carmine Donatelli et al., *Seagrass Impact on Sediment Exchange Between Tidal Flats and Salt Marsh, and The Sediment Budget of Shallow Bays*, 45 GEOPHYSICAL RSCH. LETTERS 4933, 4933–34 (2018).

facilities, and more workforce development.[3] U.S. agencies have responded to this challenge. The Federal Emergency Management Agency, for example, under its climate resilience information, champions NBS as part of "sustainable planning, design, environmental management, and engineering practices that weave natural features or processes into the built environment to promote adaptation and resilience."[4] On the same page, the agency authors note that NBS can also encompass the "related terms" of "green infrastructure, natural infrastructure, [and] natural and nature-based features" or refer to the U.S. Army Corps of Engineers program "Engineering with Nature."[5]

NBS has become a catch-all term that means different things to different groups. Terms used synonymously and flexibly with NBS include "ecological engineering," "ecosystem-based adaptation," "ecosystem-based disaster risk reduction," "green/blue infrastructure," [6] "integrated land management," "sustainable land management," "catchment management," "ecosystem approach," "agroforestry," "agro-ecology," "forest and landscape restoration," "reduced emissions from deforestation and degradation," "natural climate solutions," and "managed realignment" (referring to the practice of breaching coastal defenses to create flood protection zones that can also have habitat benefits).[7] Other terms regularly used in conjunction with NBS include "blue carbon," "natural capital," "ecosystem services," "nature's contribution to people," and "nature's contribution to adaptation."[8] Some researchers have proposed that "old types of NBS" can be characterized as "new types of NBS," such that "ecosystem services" become "green/blue/hybrid" NBS and "natural capital" becomes

3. THE WHITE HOUSE, OPPORTUNITIES TO ACCELERATE NATURE-BASED SOLUTIONS: A ROADMAP FOR CLIMATE PROGRESS, THRIVING NATURE, EQUITY, & PROSPERITY 27 (2022); *see generally* Inflation Reduction Act of 2022, Pub. L. No. 117-169, 136 Stat. 1818 (2022) (codified as amended in scattered sections of 26 U.S.C. §§ 45, 48) (showing how the federal government has incentivized the use of certain energies); *see generally* Infrastructure Investment and Jobs Act, Pub. L. No. 117-58, 135 Stat. 429 (2021) (codified as amended in scattered sections of 23 U.S.C. §§ 101, 151) (showing how the federal government has granted funds in certain instances).

4. *Nature-Based Solutions*, FED. EMERGENCY MGMT. AGENCY, https://www.fema.gov/emergency-managers/risk-management/climate-resilience/nature-based-solutions (Oct. 13, 2023).

5. *Id.*

6. *See generally Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Green Infrastructure (GI)—Enhancing Europe's Natural Capital*, at 2–3, COM (2013) 249 final (May 6, 2013) (noting how green/blue infrastructure is a term used by the European Union to refer to natural, semi-natural, and man-made ecological features including agricultural land, urban parks, forest reserves, wetlands, coasts, and aquatic ecosystems).

7. Nathalie Seddon et al., *Getting the Message Right on Nature-Based Solutions to Climate Change*, GLOB. CHANGE BIOLOGY 1518, 1520, tbl.1 (2020).

8. *Id.*

"green" NBS.[9] NBS now appears to encompass everything from massive government-sponsored tree planting to corporate restoration pledges focused on achieving net carbon neutrality or zero emissions.[10]

While one could argue that the proliferation of words being used to describe the concept should not matter if the outcome leads to people respecting nature, the use of so many different terms to describe NBS is a recipe for confusion. NBS as a concept has become more than just an umbrella term to describe projects linked by a shared philosophy—it has become incoherent. At best, NBS has become an all-hands effort to accelerate adaptation; at worst, it appears to be a buzzword.

In a moment of environmental consciousness, policymakers have acknowledged that we have a litany of problems that existing technology has failed to address. Now, as communities become increasingly exposed to natural hazards, we need solutions to a range of transboundary problems, from food security to climate mitigation. While it is easy to understand the desire for "solutions," what is potentially fraught is which problems are being prioritized and how governments and the private sector define what constitutes a solution.

In pursuing NBS, are humans extracting from nature or managing nature for chiefly human desires? Or are humans instead trying to design and implement projects to restore ecological relationships that may not primarily serve human interests? Given the recent enthusiasm for the concept and the limited performance of NBS as a "silver bullet" for complex problems, researchers urge that the concept of NBS not be "misappropriated, co-opted[,] or corrupted."[11] Whether a particular project should qualify as an NBS project fundamentally depends on the mindset with which the project is designed. This concept of mindset is discussed further in Part III. If NBS is to have a transformative impact to restore abundant biodiversity, then it must do something different than pre-existing efforts, which largely focused on identifying the economic value of nature. Part IV of this paper explores the work of the European Union (EU) and the International Union for the

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9. Sisay E. Debele et al., *Nature-Based Solutions for Hydro-Meteorological Hazards: Revised Concepts, Classification Schemes and Databases*, 179 ENV'T RSCH. 108799, 108808, tbl.3 (2019) (showing how green infrastructure refers to "green ecosystems" like marshes and coral reefs, blue infrastructure to water spaces such as ponds and oceans, and hybrid infrastructure include "grey infrastructure" or ecological engineered structures such as green roofs and porous pavement).

10. *About the One Billion Trees Programme*, N.Z. MINISTRY FOR PRIMARY INDUS., https://www.mpi.govt.nz/forestry/funding-tree-planting-research/one-billion-trees-programme/about-the-one-billion-trees-programme/ (last visited Mar. 21, 2024); *Enhanced National Greening Program*, PHIL. DEP'T OF ENV'T & NAT. RES. (May 27, 2019), https://denr.gov.ph/priority-program/enhanced-national-greening-program/; *Nature-Based Solutions*, SHELL: SPECIAL REPORT (2019), https://reports.shell.com/sustainability-report/2019/special-reports/nature-based-solutions.html; Seddon et al., *supra* note 7, at 1523, tbl.3.

11. Seddon et al., *supra* note 7, at 1521.

Conservation of Nature (IUCN) to define NBS as something more than existing ecosystem-service efforts.

II. CONCEPT OF NBS AND FINANCIALIZATION

Nature-based solutions are intended to be multipurpose, no-regret solutions.[12] The term was popularized in the early 2000s but received even more global attention with the World Bank's 2008 report titled *Biodiversity, Climate Change, and Adaptation: Nature-Based Solutions from the World Bank Portfolio*.[13] While recognizing the broader goals of NBS, including maintaining and restoring ecosystems, enhancing ecosystem services, and mitigating and adapting to climate change, the report also proposed a distinctly human-first approach to the concept of NBS. For example, in describing the designation of a National Park in Indonesia and a conservation area in Laos, the World Bank authors observed that the park was formed "to protect a major irrigation investment" and the conservation area was created for "extending the lifespan of the hydropower generation facility."[14] While protecting undeveloped lands and building ecological corridors for conservation is a net good,[15] the report's attitude towards ecosystem services was grounded in fundamental utilitarian values. In the case of this early report, nature-based solutions were construed as nature engineering solutions (e.g., mangroves as coastal disaster risk reduction) and nature production solutions (e.g., coastal nurseries as food stocks). Arguably, NBS was simply a rebranding of ecosystem services.

Later definitions of NBS offer more nuance than the World Bank's initial effort to secure support for its investment projects in the name of NBS. For example, IUCN's definition from 2016 defines NBS as:

> actions to protect, sustainably manage, and restore natural or modified ecosystems, that address societal challenges [e.g., climate change, food and water security, or natural disasters] effectively and

12. Christian Schleyer et al., *Opportunities and Challenges for Mainstreaming the Ecosystem Services Concept in the Multi-Level Policy-Making Within the EU*, 16 ECOSYSTEM SERVS. 174, 174–75 (2015).

13. THE WORLD BANK, BIODIVERSITY, CLIMATE CHANGE, AND ADAPTATION: NATURE-BASED SOLUTIONS FROM THE WORLD BANK PORTFOLIO 39 (2008), https://openknowledge.worldbank.org/server/api/core/bitstreams/5a3ca700-5c7e-5670-bb6c-dd9247a60d7c/content.

14. *Id.*

15. *Id. at* 40. Ecological corridors are natural lands connecting habitat areas that may be fragmented across a landscape. *See* Andrew Gregory et al., *Toward Best Management Practices for Ecological Corridors*, LAND, Feb. 1, 2021, at 1, 1, https://www.mdpi.com/2073-445X/10/2/140 (describing best management practices for ecological corridors).

> adaptatively, simultaneously providing *human well-being and biodiversity benefits*.[16]

In a slight variation on the IUCN definition, the European Commission defined NBS as those solutions that:

> are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social[,] and economic benefits[,] and help build resilience. Such solutions bring more, and more diverse, nature and natural features and processes into cities, landscapes, and seascapes, through locally adapted, resource-efficient and systemic interventions. Nature-based solutions *must benefit biodiversity and support the delivery of a range of ecosystem services.*[17]

A final and quite similar definition offered by the United Nations Environmental Assembly (UNEA)—the world's highest environmental decision-making body, with the membership of all 193 UN member states—equates NBS with those 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.*[18]

Each of these definitions provides a variation on the same theme: humans act strategically within a natural system to improve some aspect of that natural system that will benefit humans and deliver "biodiversity benefits." While there is no further description of what "biodiversity benefits" entail in any of the definitions, it can be inferred that IUCN, the European Commission, and UNEA intended for NBS to encompass and benefit more-than-human interests. This reading conforms with IUCN efforts to draft a set

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16. INT'L UNION FOR CONSERVATION OF NATURE, DEFINING NATURE-BASED SOLUTIONS 1 (2016), https://portals.iucn.org/library/sites/library/files/resrecfiles/WCC_2016_RES_069_EN.pdf (emphasis added).

17. *Nature-Based Solutions*, EUR. COMM'N, https://research-and-innovation.ec.europa.eu/research-area/environment/nature-based-solutions_en (last visited Mar. 21, 2024) (emphasis added).

18. Env't Assembly Res. 5/5, UNEP/EA.5/Res.5 (Mar. 7, 2022), https://www.unep.org/environmentassembly/unea5/unea-5.2/outcomes-resumed-session-unea-5-unea-5.2 (scroll down to UNEA-5 Resolutions and download UNEP/EA.5/Res.5) (emphasis added).

of NBS guiding principles, which provide that an NBS project should "embrace nature conservation norms" and maintain "biological and cultural diversity and the ability of ecosystems to evolve over time."[19]

While the NBS theory reflected in each of these definitions is sound as an effort to promote the value of ecosystems for both human and more-than-human communities, in practice, NBS implementation is less expansive than the definitions and leans heavily towards human-first priorities. One example of implemented NBS described by IUCN includes the restoration of wetlands to improve fish stocks for fishing livelihoods, reduce flooding, and increase tourism.[20] Another example includes using barrier islands and oyster reefs to protect shorelines and communities from impacts of sea-level rise.[21] In some ways, these practical examples that prioritize human needs are not surprising, despite the various definitions that specifically identify the need to provide for "biodiversity benefits."[22] Existing projects, which seem to largely draw on traditional international development projects, reflect a largely utilitarian perspective of NBS, with benefits to biodiversity in these case studies operating as co-benefits and not design priorities. Human adaptation and development are the primary focus of many existing NBS projects.

A recent European research project, FutureMARES, proposes using NBS not just for human priorities, such as sequestering carbon and ecosystem-based harvesting, but for preserving the integrity of food webs and protecting endangered species by restoring or conserving habitat-forming species and designating marine protected areas.[23] Most of the proposed NBS projects have not yet been implemented and are in the visionary stage. The project is noteworthy because in reflecting on the future of habitat restoration, conservation, and seafood harvesting, the research team has created three long-term scenarios based on different climate models, which they label "global sustainability," "national enterprise," and "world markets."[24] The "world markets" scenario, in particular, is interesting because it predicts full financial support only for restoring degraded marine ecosystems that produce market-valuable resources or services. This scenario expects "exploitation of

19. INT'L UNION FOR CONSERVATION OF NATURE, NATURE-BASED SOLUTIONS TO ADDRESS GLOBAL SOCIETAL CHALLENGES xii (E. Cohen-Shacham et al. eds., 2016), https://portals.iucn.org/library/sites/library/files/documents/2016-036.pdf.

20. *Id.* at 7.

21. *Id.*

22. *Id.* at 5.

23. *Climate Change and Future Marine Ecosystem Services and Biodiversity*, NETWORK NATURE, https://networknature.eu/ridb/climate-change-and-future-marine-ecosystem-services-and-biodiversity (last visited Mar. 21, 2024).

24. FUTUREMARES, E.U., IMPLEMENTATION SCENARIOS FOR MARINE NATURE-BASED SOLUTIONS (NBS) 5 (2021), https://www.futuremares.eu/_files/ugd/550799_217acea195334527905c08bf0e9999d2.pdf.

marketable ecosystem services such as blue carbon."[25] With current trends to commodify NBS, the "global markets" scenario is "business as usual." The FutureMARES project suggests that, depending on the mindset with which NBS is pursued, NBS may do very little for more-than-human communities needing "biodiversity benefits."

Efforts to accelerate NBS as it has been conceived normatively by the EU and UNEA seem constrained by these business-as-usual mindsets. In 2023, the High-Level Panel for a Sustainable Ocean Economy—established in 2018 by several coastal states, including small and large states—commissioned a *Blue Carbon Handbook: Blue Carbon as a Nature-Based Solution for Climate Action* (Handbook).[26] Focusing on tidal marshes, mangroves, and seagrasses, the Handbook identifies the key ecosystem services of "blue carbon" as carbon sequestration and storage, coastal protection, fisheries enhancement, water purification, and biodiversity.[27] The blueprint proposed in the Handbook calls for upscaling blue carbon through functional interventions including innovative financing, carbon markets, standard methodologies, advanced research, institutional capacity, transparency, and participatory process.[28] Apart from the "participatory process," most of the blueprint is administrative and managerial, and blue carbon as an NBS is treated akin to any other implementation of a utilitarian technology. The theory behind blue carbon as a primarily carbon-sequestration-and-storage approach diverges from a holistic seascape-restoration endeavor. The Handbook authors do not directly engage with the topic of biodiversity benefits but simply remark that the mandated review and update of national biodiversity strategy and action plans under the Convention on Biological Diversity, planned for 2024, should address the "biodiversity" aspect of NBS for blue carbon.[29]

The above commentary on the Handbook is not intended as a critique but rather as an illustration that much of the emerging guidance for NBS projects, including blue carbon projects, has been aimed at operationalizing NBS within the logic of capitalism and the confines of financialization. To succeed

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25. *Id.* at 7, 9.

26. Lisa Schindler Murray & Ben Milligan, *The Blue Carbon Handbook: Blue Carbon as a Nature-Based Solution for Climate Action and Sustainable Development*, HIGH LEVEL PANEL FOR A SUSTAINABLE OCEAN ECON. (2023), https://oceanpanel.org/wp-content/uploads/2023/06/Ocean_Panel_Blue_Carbon_Handbook-1.pdf. Panel membership includes Australia, Canada, Chile, Fiji, France, Ghana, Indonesia, Jamaica, Japan, Kenya, Mexico, Namibia, Norway, Palau, Portugal, and the United States. *Id.* at ii.

27. *Id.* at 3, fig.1.

28. *Id.*

29. *Id.* at 23. Under Article 6 of the Convention on Biological Diversity, June 5, 1992, 1760 U.N.T.S. 79, parties must "develop national strategies, plans, or programmes." Secretariat of the Convention on Biological Diversity, *Convention on Biological Diversity Text and Annexes* 6 (2011), https://www.cbd.int/doc/legal/cbd-en.pdf. Article 26 of the treaty requires states to report on measures which have been taken to implement the treaty. *Id.* at 20.

in conservation and restoration, the argument goes, the government will need to create financial incentives and markets to attract financial investors, particularly private investors. The Handbook authors suggest that such an approach is potentially misinformed:

> The economic value of blue carbon ecosystems is often unknown or poorly communicated. Thus, they are seen only for their conservation or mitigation value, which vastly underappreciates their asset value. This is why establishing ocean accounts [estimates of blue carbon stocks and carbon sequestration potential], national capital taxonomies[,] and economic valuation exercises can be important for aligning national policymaking and investment.[30]

This logic of NBS financialization to scale up NBS efforts is also later reflected in a different report commissioned by the High-Level Panel for a Sustainable Ocean Economy, *The Ocean as a Solution to Climate Change*. Report authors encourage governments to develop by 2025 "a robust value of blue carbon sequestration services" and to legally devise biodiversity-related incentives that will encourage the private sector to increase investments in coastal and marine conservation projects.[31] While the report acknowledges the value of the government supporting "non-market-based approaches,"[32] the report does not develop this point further. As will be suggested below in Part IV, national and subnational efforts in support of NBS should start with non-market-based approaches to create conditions for changing relationships between people and places.

In cooperation with the Friends of Ocean Action, World Economic Forum, the Ocean Risk and Resilience Action Alliance, Salesforce, the Nature Conservancy, and Meridian Institute, Conservation International perpetuates the logic of the financialization and capitalization of ecosystem recovery with its publication of *High-Quality Blue Carbon Principles and Guidance*.[33] The report offers five principles, "each of equal importance": to "safeguard nature"; "empower people"; "employ the best information, interventions, and carbon accounting practices"; "operate locally and contextually"; and "mobilize high-integrity capital."[34] While this is a well-

30. Schindler Murray & Milligan, *supra* note 26, at 31.

31. OVE HOEGH-GULDBERG & ELIZA NORTHROP, THE OCEAN AS A SOLUTION TO CLIMATE CHANGE: UPDATED OPPORTUNITIES FOR ACTION, OCEAN PANEL 49, tbl.5 (2023), https://oceanpanel.org/wp-content/uploads/2023/09/Full-Report_Ocean-Climate-Solutions-Update-1.pdf.

32. *Id.*

33. CONSERVATION INT'L ET AL., HIGH-QUALITY BLUE CARBON PRINCIPLES AND GUIDANCE 1, 10–11 (2022), https://climatechampions.unfccc.int/wp-content/uploads/2022/11/HQBC-PG_FINAL_11.8.2022.pdf.

34. *Id.* at 14–16, 18, 22–23.

intentioned document, it contains internal contradictions. On the one hand, the authors call upon efforts to "safeguard nature" with projects that "do no harm" but also to mobilize "high-integrity capital."[35] The authors do not answer what constitutes "high-integrity capital" in this context. Instead, there is a presumption that all investment sources are equal because money is fungible. Does "high-integrity" refer to the reliability of the funding source? Or does "high-integrity" refer to the originating source of the money? Does it make sense for NBS projects to be funded by the fossil-fuel industry if the source of the money is continued fossil-fuel production?[36]

Further explanation of the principles does not offer much clarity or factor in the accepted definitions of NBS offered by IUCN, European Commission, and UNEA that explicitly reference "biodiversity benefits." The Conservation International document calls upon industries to have a decarbonization strategy as part of NBS blue-carbon principles.[37] Industries do not have any guidance under the principles about the quality of any biodiversity benefits delivered by a particular project. Project developers are expected to "prioritize conservation of current systems" and design restoration projects to "recover ecological integrity and connectivity and to enhance opportunities for natural regeneration"[38] without any measure of achievement for these general objectives. As the document observes, conservation of current systems that already offer biodiversity benefits will not actually bolster a blue carbon market because such systems will not provide additionality.[39] Markets depend on additionality as a pre-requisite for selling legitimate credits or offsets. The document, however, still pushes for the development of markets and calls upon governments to "provide robust regulatory and policy frameworks for the issuance and sale of blue carbon credits." They can do this by "accelerat[ing] public investment financing . . . to grow the marketplace by underwriting the development of blue carbon projects."[40] Part of the challenge inherent in using the Conservation International document to define NBS principles is posed by its singular reliance on capital-based economic justifications. A conceptualization of NBS that considers benefits to both human and more-than-human

35. *Id.* at 10–11, 15, 23.

36. One example of an NBS program that may have questionable financing is Shell's NBS Programme (2019-2021), which invested in the restoration of forests, grasslands, and wetlands as an offset for fuel use by customers at 1400 fuel stations in the Netherlands and the UK. ROYAL DUTCH SHELL, DELIVERING ENERGY RESPONSIBLY: SUSTAINABILITY REPORT 2019, at 80 (2019).

37. CONSERVATION INT'L ET AL., *supra* note 33, at 24.

38. *Id.* at 15.

39. *Id.*

40. *Id.* at 26.

communities would be better sustained under different logics, such as the principle of solidarity discussed in Part III.

When NBS depends on the generation of financial capital but no regulatory regime requires entities to measure "biodiversity benefits," the ability of an NBS project to benefit "biological diversity" is less certain.[41] At present, ecosystem services for human well-being are the priority interests for most NBS efforts. For example, the EU Handbook authors conceive of NBS as being responsive to climate resilience, water management, natural and climate hazards, green-space management, biodiversity, air quality, place regeneration, knowledge and social capacity-building for urban transformation, participatory planning and governance, social justice and social cohesion, health and well-being, and new economic opportunities and green jobs.[42] "Biodiversity" is just one among many issues for NBS projects and is not identified as a priority issue. What biodiversity benefits will emerge from these programs is uncertain because even projects that intend to support better biodiversity outcomes, such as coastal mangrove-restoration efforts, often experience challenges with implementation. For example, after years of mangrove planting in the Philippines, fewer than 20% of the mangroves have survived, in part because of poor site choices.[43] Likewise, in Sri Lanka, only three out of 23 mangrove restoration sites had survival rates of more than half; the other sites had no survival.[44]

Yet enthusiasm to build out more blue markets and blue infrastructure remains high even when outcomes are difficult to achieve or measure. While existing blue-carbon markets have reliably quantified carbon sequestration from mangroves, seagrass, and wetland restoration, there are recurring proposals to include seaweed farming as part of blue carbon. Leaving aside any of the technical questions of sequestration in seaweed, including the quantity and duration of sequestration,[45] questions remain about whether

41. Alexandre Chausson et al., *Going Beyond Market-Based Mechanisms to Finance Nature-Based Solutions and Foster Sustainable Futures*, PLOS CLIMATE, Apr. 6, 2023, at 1, 2, https://journals.plos.org/climate/article?id=10.1371/journal.pclm.0000169.

42. EUR. COMM'N, EVALUATING THE IMPACT OF NATURE-BASED SOLUTIONS 17 (Adina Dumitru & Laura Wendling eds., 2021).

43. Jurgenne Primavera & J.M.A. Esteban, *A Review of Mangrove Rehabilitation in the Philippines: Successes, Failures and Future Prospects*, 16 WETLANDS ECOLOGY MGMT. 354, 363 (2008), https://www.researchgate.net/publication/227247550_A_review_of_mangrove_rehabilitation_in_the_Philippines_Successes_failures_and_future_prospects; Shing Yip Lee et al., *Better Restoration Policies Are Needed to Conserve Mangrove Ecosystems*, 3 NATURE ECOLOGY & EVOLUTION 870, 871 (2019), https://www.researchgate.net/publication/332744475_Better_restoration_policies_are_needed_to_conserve_mangrove_ecosystems.

44. Kodikara Arachchilage Sunanda Kodikara et al., *Have Mangrove Restoration Projects Worked? An In-Depth Study in Sri Lanka*, 25 RESTORATION ECOLOGY 705, 709 (2017), https://bluemangrove.fund/wp-content/uploads/2021/03/Have-mangrove-restoration-projects-worked_-An-in-depth-study-in-Sri-Lanka_-Evaluation-of-mangrove-restoration-in-Sri-Lanka.pdf.

45. Catriona L. Hurd et al., *Forensic Carbon Accounting: Assessing the Role of Seaweeds for Carbon Sequestration*, 58 J. PHYCOLOGY 347, 348 (2022).

farming seaweed at scale would be detrimental to biodiversity.[46] In cases such as these, market development is ahead of the science.

What do these varied examples from recent NBS documents mean? They suggest that there is an increasing need for clarity to draw boundary lines about what should or should not qualify as NBS so that investments go to projects with multiple benefits and not merely projects that are rebranded ecosystem-service projects. One group of researchers recently proposed a four-group typology for "marine nature-based solutions."[47] Group A includes solutions that improve sustainable use and protection of natural marine ecosystems and ecosystem services.[48] This includes large marine protected areas and rebuilding of marine ecosystems.[49] Group B includes solutions that improve the multifunctionality of a marine ecosystem and includes seagrass restoration and shoreline protection using reefs and seagrass.[50] Both groups have a high potential to provide some biodiversity benefits. The researchers proposed two other NBS groups: Group C consists of novel, restored, or deliberately designed artificial marine ecosystems (e.g., artificial reefs and low trophic aquaculture),[51] and Group D is nature-inspired designs that reduce environmental pressures (e.g., wind-powered ships).[52] It is unclear whether or how these two latter groups will directly contribute to biodiversity benefits. The authors provide some Group C examples that seem to encourage biodiversity benefits, such as "purposely designed artificial reefs" that decrease trawling and increase habitat variety,[53] but they also provide examples such as sea ranching of abalones with the primary purpose of food production.[54] Aquaculture, however, does not necessarily maintain or benefit biodiversity unless limited to some carefully designed multitrophic mariculture projects.[55]

Categorizing Group D as NBS appears to potentially undermine the NBS definition requiring that projects provide "biodiversity benefits." While

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46. Wouter Visch et al*., Environmental Impact of Kelp (*Saccharina Latissima*) Aquaculture*, 155 MARINE POLLUTION BULL. 110962, 110967, 110970 (2020) (finding a shading effect of 40% at 5-meter depth during peak growth and concluding that, although shading is likely to have only limited functional and ecological effects on seabed floor communities, increased farm sizes could cause "unforeseen ecological impacts").

47. Christian Riisager-Simonsen et al., *Marine Nature-Based Solutions: Where Societal Challenges and Ecosystem Requirements Meet the Potential of the Oceans*, MARINE POL'Y, June 2020, at 1, 3–4, fig. 1, (2020) https://doi.org/10.1016/j.marpol.2022.105198.

48. *Id.*

49. *Id.*

50. *Id.*

51. *Id.*

52. *Id.*

53. *Id.* at 6.

54. *Id.* at 7.

55. Adam D. Hughes, *Defining Nature-Based Solutions Within the Blue Economy: The Example of Aquaculture*, FRONTIERS MARINE SCI., July 2021, at 1, 3, https://doi.org/10.3389/fmars.2021.711443.

Group D projects arguably benefit biodiversity by not further harming it, it is hard to believe that NBS should be considered so broad as to encompass a variety of projects that do not cause further harm to biodiversity but also do not "benefit" it.[56] The process of determining which projects qualify as NBS projects must be more selective. Otherwise, we end up with the proverbial slippery slope, where projects can be considered "nature-based" merely because they do not actively harm nature.

The researchers who developed the four-group typology emphasized several key lessons from analyzing existing NBS cases, including the need for alignment with environmental policies, prioritization of ecosystem targets, and ensuring environmental sustainability of NBS.[57] In spite of this sensitivity, the authors then observe that even though there is something "intuitive" about promoting Type A NBS projects, one should not "dismiss alternative types of NBS . . . in certain contexts" because "it could potentially be more cost-effective to apply a type C or D NBS to reduce a specific environmental pressure, rather than, e.g., restocking a naturally occurring population of animals, seaweed or similar . . . type A or B NBS."[58]

The authors suggest that this is pragmatic because policy efforts such as those being undertaken by the EU in adopting an NBS strategy should not "exclude many key stakeholders who will be needed to deliver the transformational change which, e.g., [the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services] emphasizes is needed to halt the present loss of biodiversity."[59] While the authors may be correct that enlarging the concept of NBS could be more inclusive and more cost-effective, Group C or D actions would not necessarily provide the multiple benefits, including biodiversity benefits, that NBS projects must provide. The proposed four-part typology might prove problematic if it were relied on by policymakers as a potential menu of NBS options.

Without a shared working definition, the effort to promote NBS as a policy pathway becomes problematic, much like the concept of "carbon neutrality" and "net zero" meaning many different things to different interest groups is problematic.[60] In trying to find a working definition, researchers who collected 20 different definitions of NBS from research papers and reports observed that although the concept of NBS can appear difficult to

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56. All three of the definitions discussed in this section (from IUCN, the European Commission, and UNEA) explicitly identify "benefits" to biodiversity as part of an NBS project. *See* IUCN, *supra* note 16; EUR. COMM'N, *supra* note 17; Environmental Assembly Res. 5/5, *supra* note 18.

57. Riisager-Simonsen et al., *supra* note 47, at 2.

58. *Id.* at 8.

59. *Id.* at 9.

60. Rahul Tongia, *Net Zero Carbon Pledges Have Good Intentions. But They Are Not Enough.*, THE BROOKINGS INST. (Oct. 25, 2021), https://www.brookings.edu/articles/net-zero-carbon-pledges-have-good-intentions-but-they-are-not-enough/.

articulate, there must be some shared definitional boundaries for the concept to be meaningful.[61] They conclude that an action cannot qualify as an NBS action without "clearly defined goals, partners, beneficiary groups[,] and management systems," even if there are environmental benefits.[62] Likewise, NBS projects cannot simply have "no impact on biodiversity" but rather must "provide biodiversity gain" and "clearly and measurably set and monitor biodiversity conservation outcomes," preferably over the long term.[63] Biodiversity should not be an afterthought, and NBS projects need "to be designed explicitly to demonstrate how they will deliver measurable benefits for biodiversity."[64]

Although it is beyond the scope of this paper to comprehensively review the pool of existing self-identified marine NBS projects,[65] a short review of a 2020 report titled *Blue Nature-Based Solutions in Nationally Determined Contributions* highlights the challenge of ensuring that projects offer at least some identifiable additional "biodiversity gain" or prioritized management for biodiversity-related goals.[66] This brief review in no way suggests that the projects described in the report are not worthwhile projects as measured by criteria of sustainable development or community development. This review instead raises the question of which multi-benefit projects should really qualify as NBS projects for potential investors. As illustrated in Appendix 1 below, managed "biodiversity gains" are often not stated objectives for projects that are categorized under NBS. Ecosystem-based biodiversity gains received little attention in many of the general project-impact descriptions. Most of the focus in these descriptions was instead on human-based outcomes. Of the 24 projects reviewed by the report, only 7 clearly described

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61. Hughes, *supra* note 55, at 4.

62. Barbara Sowińska-Świerkosz & Joan García, *What Are Nature-Based Solutions (NBS)? Setting Core Ideas for Concept Clarification*, NATURE-BASED SOLS., Dec. 2022, at 1, 6, https://doi.org/10.1016/j.NBSj.2022.100009.

63. *Id.*

64. Seddon et al., *supra* note 7, at 1532 (adding that how to design each project to deliver benefits will differ by project but that, at a minimum, project proponents working on restoration or conservation should choose diverse mixes of native species, avoid destruction of existing species-rich habitats, conduct baseline assessments, set quantitative targets, monitor progress, and manage any unintended negative consequences).

65. *See generally* Isabel B. Key et al., *Biodiversity Outcomes of Nature-Based Solutions for Climate Change Adaptation: Characterising the Evidence Base*, FRONTIERS ENV'T SCI., Oct. 2022, at 1, https://doi.org/10.3389/fenvs.2022.905767 (noting the limited selection of metrics used for assessing biodiversity outcomes and the limited taxonomic coverage of most interventions).

66. *See generally* MORITZ VON UNGER ET AL., BLUE NATURE-BASED SOLUTIONS IN NATIONALLY DETERMINED CONTRIBUTIONS (2020), https://gridarendal-website-live.s3.amazonaws.com/production/documents/:s_document/610/original/NbS_in_NDCs._A_Booklet_for_Successful_Implementation.pdf?1606858312 (outlining 24 NBS projects, most of which are mangrove restoration projects); *see infra* pp. 25–31 (analyzing each of the 24 projects' biodiversity benefits and scope).

the expansive and additional biodiversity benefits that would result from implementing the projects.[67] Eleven of the other projects described biodiversity benefits but only did so with respect to one species (e.g., coastal mangroves) or one activity (e.g., replanting).[68] There were no further references to other specific biodiversity objectives, so it was unclear whether the mangrove reforestation was managed for broader biodiversity gains or whether broader biodiversity gains (e.g., restored coastal nurseries) were actually achieved. Six of the projects had no meaningful descriptions of biodiversity benefits and seemed to be preliminary projects for pursuing a NBS project (e.g., building participatory governance) rather than NBS projects in their own right.[69]

The rationale for regularly prioritizing human-first projects over multiple benefit projects seems to make sense in a world where human-first development seems more politically achievable than broader multipurpose projects. It is unclear, however, whether we will be able to work our way out of the problems for which NBS is being recommended as an intervention with the same attitudes that we used to create such problems. When NBS becomes a tool to offset emissions from airlines and oil and gas companies without requiring those entities to shift their business practices, then NBS is a distraction. NBS can still potentially support legitimate ecological goals, but any approach to NBS projects must avoid the current relationship, in which humanity believes that somehow "nature" will save us where technology has failed to do so. What will save us and our more-than-human world, rather, will be our mindsets and attitudes towards what it means to be in relation with each other.

As suggested by the 2022 White House Report on NBS, insufficient awareness of NBS, regulatory and policy hurdles, difficulty accounting for costs and benefits, insufficient and uncoordinated funding, limited workforce knowledge, and gaps in evidence of effectiveness are legitimate challenges but are not the true hurdle.[70] The ultimate challenge is figuring out how to awaken human communities to care about NBS with consequences for more-than-human communities. In focusing on humanity's climate problems (e.g., greenhouse gas emissions, urban heat islands, inland flooding, stormwater overflow, shoreline erosion, wildfire, drought, crop loss, loss of culture and jobs, obesity, and stress),[71] we continue to fail to make the long-term,

67. *See generally* VON UNGER ET AL., *supra* note 66 (summarizing the 24 projects); *see infra* pp. 25–31 (taking stock of biodiversity benefits and their scope in the 24 projects described in the von Unger report).

68. VON UNGER ET AL., *supra* note 66; *infra* pp. 25–31.

69. VON UNGER ET AL., *supra* note 66; *infra* pp. 25–31.

70. WHITE HOUSE COUNCIL ON ENV'T QUALITY ET AL., *supra* note 3, at 15–16.

71. *Id.* at 13–14.

fundamental cultural changes that provide an alternative path forward for society—one in which humanity takes a more holistic approach to its relationship with the more-than-human world. We remain victims to our systems that do not see the more-than-human world as a reciprocal partner.

The next Part of the Article focuses on the possibilities of developing the legal principle of solidarity as a mechanism for transforming attitudes, such that NBS can develop in a different direction than the current trend towards market-based financialization and capitalization of NBS. Current NBS efforts depend on emphasizing what nature can do for us rather than helping us reintegrate with our more-than-human world.

III. THE PRINCIPLE OF SOLIDARITY IN ENVIRONMENTAL CONSERVATION AND RESTORATION

Conservation and restoration efforts intended to both improve human well-being and benefit biodiversity are often stymied by a combination of technical, financial, and governance barriers.[72] Technical barriers depend on understanding the larger implications of restoration interventions and unanticipated system changes.[73] Financial barriers include undervaluing the benefits of restoration and failing to attract revenue generation.[74] Finally, governance barriers include decision-making inertia, conflicting stakeholder preferences, and a preference for achieving short-term objectives that interfere with longer-term efforts.[75] While these are all substantial challenges, our mindsets need to change before we can overcome financial and governance barriers to conservation. Even when properly governed, markets will only provide a partial solution if conservation and restoration are reduced to transactions.

What is needed is a non-transactional approach to being with nature that includes fewer demands of nature and more respect for the non-human world in which we reside. These norms are beginning to emerge in the form of a legal principle of solidarity. The normative concept of "solidarity" first emerged as a moral and ethical principle. The Sections below discuss the roots of "solidarity" in the context of communitarianism followed by a discussion of the legal principle derived from human rights.

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72. Agustín Sánchez-Arcilla et al., *Barriers and Enablers for Upscaling Coastal Restoration*, NATURE-BASED SOLS., Dec. 2022, at 1, 2 (*see* Table 1), https://doi.org/10.1016/j.NBSj.2022.100032.

73. *Id.* at 5–6.

74. *Id.* at 6.

75. *Id.*

A. Roots of Solidarity in Communitarianism

"Solidarity" is grounded in ideas of communitarianism, which advances the concept that what we can achieve as a human community depends on the health of our social relations. Communitarianism presents an alternative to populism,[76] which focuses on boosting individualism in the name of freedom. Communitarian writers identify community as located within place, memory, and psychology.[77] Communitarian thinkers call for a change to our "habits of the heart" so that we can communally protect and identify with a community of place as a "home" as well as connect with "communities of memory."[78] The so-called "communities of memory" offer an opportunity to connect to a shared history but also to a future common good.[79] A final form of community relevant to the concept of solidarity is the "psychological communities" of people who, "based on face-to-face interaction, are governed by sentiments of trust, cooperation, and altruism in the sense that constituent members have the good of the community in mind and act on behalf of the community's interest."[80] Collectively, these three types of communities—communities of place, memory, and shared psychology—offer important possibilities for thinking about how we can live in an emergent relationship with our human communities but also with more-than-human communities.

NBS that provides biodiversity gains is an ideal that currently operates in a "community of memory" to help bring us back some of our "lost legacy" of functional landscapes and seascapes. Success for any NBS project, however, will depend on being located within a defined community of place, where there is a shared communal psychology that is based on trust, cooperation, and altruism for the good of the community, including the more-than-human community.[81] While most NBS projects operate in a community of place, there may not be a shared communal psychology around the values inherent in the project, such as benefiting biodiversity. This aspect of "community" may be lost or missing because many human communities are fragmented or detached due to social and political disruptions. Restoring belonging and support within human communities may be a necessary precursor for NBS to achieve long-term goals for both human well-being and biodiversity benefits.

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76. Daniel Bell, *Communitarianism*, STAN. ENCYC. OF PHIL., https://plato.stanford.edu/archives/fall2023/entries/communitarianism/ (May 15, 2020).
77. *Id.*
78. *Id.*
79. *Id.*
80. *Id.*
81. *Id.*

Related to communitarian ideals is care ethics, which calls upon individuals to cultivate nurturing and caring relationships. In the context of care ethics, rules and their consequences may only provide certain kinds of reductionist responses to otherwise highly contextual challenges.[82] A care ethicist, for example, endeavors to think not just about "abstract individuals and their actions" but "concrete, situated people with feelings, friends, and dreams—persons who can be cared about."[83] Jane Addams, in her applied social-ethics work, captured the spirit of care ethics as she called upon individuals to express care for each other through their neighborly relationships in social settlements.[84]

While Addams never worked on biodiversity, her work on the need to understand, learn, and respond to context through care is central to NBS. The concept of care empowers human communities to invest in existing and future generations without the need for the intervention of a market. Care ethicists call for "care respect," which encourages individuals to both value nature for its unique qualities and to protect nature because it has special care needs.[85] Humans can exercise this "care respect." The shared communal psychology for NBS needs to be one grounded in "care ethics"; that is, one that reflects our responsibility to care for the natural world for its own sake and to protect it for future generations. It is this notion of shared responsibility that is captured in the legal "principle of solidarity."

B. Principle of Solidarity and its Relevance to NBS

"Solidarity" has been recognized as both a value and a principle within international law, and, more recently, there have been efforts to recognize it as a right. International solidarity is the collective basis for the formation of the United Nations (UN). This principle has been refined over time and was encompassed in the 2000 UN Millennium Declaration.[86] Designed to assist states with achieving a broad implementation of human rights, this document described solidarity as a value shared across the international legal system. International solidarity addresses global challenges by emphasizing a fair distribution of costs and burdens "in accordance with basic principles of

82. *See* Maurice Hamington, *Jane Addams*, STAN. ENCYC. OF PHIL., https://plato.stanford.edu/archives/fall2022/entries/addams-jane/ (July 7, 2022) (explaining Addams's desire to improve society through communities built on trust, care, altruism, and cooperation).

83. *Id.*

84. *Id*.

85. *See* Robin S. Dillon, *Respect and Care: Toward Moral Integration*, 22 CANADIAN J. PHIL. 105, 112 (1992) (suggesting that by respecting individuals' particularities, we in turn respect nature and its value to individuals).

86. *See* G.A. Res. 55/2, UN Millennium Declaration, ¶ 6 (Sept. 8, 2000), https://www.ohchr.org/en/instruments-mechanisms/instruments/united-nations-millennium-declaration (declaring the concept of solidarity "fundamental" to 21st-century international relations).

equity and social justice," meaning that "[t]hose who suffer or who benefit least deserve help from those who benefit most."[87] In this same declaration, states agreed that "[w]e must spare no effort to free all of humanity, and above all our children and grandchildren, from the threat of living on a planet irredeemably spoilt by human activities, and whose resources would no longer be sufficient for their needs."[88] State signatories agreed to adopt a "new ethic of conservation and stewardship."[89]

From these values of equity, social justice, care, and collective stewardship, a principle of "international solidarity" has emerged. As a precondition for human dignity, international solidarity calls for deep cooperation to meet shared challenges. Such cooperation must include not just the delivery of humanitarian assistance or delivery financing but also "refraining from doing harm or posing obstacles to the greater well-being of others, including in the international economic system and to our common ecological habitat, for which all are responsible."[90]

While the principle of solidarity focuses primarily on addressing human rights, there is a recurring theme in many human rights documents that "solidarity" also encompasses environmental protection. The argument for environmental protection is that rights and freedoms cannot be fully realized without a healthy environment. In a recent draft declaration on a right to international solidarity, the authors noted that "international solidarity" is essential to preventing and overcoming many challenges, including "environmental degradation."[91] In particular, the declaration observes that "reactive solidarity" by states, international organizations, and non-state actors can form the basis for addressing environmental degradation.[92] Article 9 of the draft declaration calls upon states:

> to realize international solidarity as a human right that is indivisible from, interrelated to[,] and interdependent on all other human rights, and is normatively anchored in a system of rights and corresponding obligations established by international law, relating to . . . environmental protection . . . [and] creating a global enabling environment for sustainable development that is centered on

87. *Id.*
88. *Id.* ¶ 21.
89. *Id.* ¶ 23.
90. Rudi Muhammad Rizki (Independent Expert on Human Rights and International Solidarity), *Report of the Independent Expert on Human Rights and International Solidarity*, ¶ 58, U.N. Doc. A/HRC/15/32 (July 5, 2010) [hereinafter *Report of Independent Expert Rizki*].
91. Obiora Chinedu Okafor (Independent Expert on Human Rights and International Solidarity), *Report of the Independent Expert on Human Rights and International Solidarity*, at 12, U.N. Doc. A/HRC/53/32 (May 2, 2023).
92. *Id.* annex I, art. 2.2.

> individuals and peoples and is grounded in intergenerational justice and equity.[93]

While the language from the multiple UN Independent Experts for International Solidarity is human-centric in its approach to implementing solidarity, states can extend solidarity obligations to humanity's relationship with the more-than-human world. States can avoid environmental degradation by respecting rights for international solidarity situated in human communities and acknowledging interdependence across life systems as a basis for human rights. Human-rights practitioners already contemplate ecology as a key shared foundation for solidarity rights and human well-being.[94] In particular, we have obligations "to all those within a generation, and also to those yet unborn, encompassing the idea of solidarity with humanity and its ecological habitat."[95] Behind the legal drafting to protect and promote human rights through international solidarity is a simple message: we are all in this together, and "we" includes more than humanity.

This principle of solidarity, which the declaration identifies as a right, offers a mindset change. It recognizes international solidarity as essential for overcoming environmental degradation while directing states to focus on "individuals and peoples" as a source of change. Embedded throughout the draft declaration is an implicit call for communitarianism. When Virginia Dandan served as the Independent Expert on Human Rights and International Solidarity, she delivered a key message capturing this theme:

> Solidarity should and must be a positive force in the lives of people and of nations, but we must be vigilant and protect the bonds that link us together. To build a better future requires everyone to work together and as one. Sustainable development requires international solidarity not only among the Governments of the world, but also among the peoples of the world, to actively participate in this project of building a better world.[96]

NBS can contribute to international solidarity, but only if projects do more than just offset carbon-intensive activities. NBS projects must belong

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93. *Id.* annex I, art. 9.1.

94. Promotion and Protection of All Human Rights, Civil, Political, Economic, Social and Cultural Rights, Including the Right to Development, Hum. Rts. Council, ¶ 11, U.N. Doc A/HRC/12/27 (July 27, 2009), https://www2.ohchr.org/english/bodies/hrcouncil/docs/12session/A-HRC-12-27.pdf.

95. *Id.* ¶ 31.

96. Press Release, Virginia Dandan, U.N. Hum. Rts. Off. of the High Comm'r, "Moving Together as One: Solidarity as the Foundation of the UN Development Agenda Beyond 2015" International Human Solidarity Day – Saturday 20 December 2014, U.N. Press Release (Dec. 20, 2014), https://www.ohchr.org/en/press-releases/2014/12/moving-together-one-solidarity-foundation-un-development-agenda-beyond-2015.

to a community that engages in the project not just to generate income but to restore relationships with the land, the coast, or the oceans. Recent efforts from actors like the World Business Council for Sustainable Development (WBCSD) have lost this point. WBCSD publishes technical NBS factsheets under the rubric of "natural climate solutions" for their membership, which call for investments in "core" benefits. These benefits, which include "increased biodiversity, climate adaptation, improved quality of life for rural communities[,] and many others,"[97] are intended to ensure that a "natural climate solution" is "nature positive."[98] The WBCSD includes a variety of standards to achieve these core benefits, including "verified emission reductions,"[99] "planned emission reductions,"[100] "verified carbon units,"[101] and recognition of landscape performance claims.[102] Only one of these standards directly identified biodiversity as a project objective using under Verra's Verified Carbon Standard Climate, Community and Biodiversity Standards.[103]

Where does this leave us? NBS is a conceptually powerful approach to create an equitable and just world for human and more-than-human communities by recognizing and restoring interdependence. Regrettably, the intent behind the concept has become confused. Too many purported NBS projects provide great value to human communities but only minimal value for more-than-human communities. NBS has become a buzzword, and projects focused only on the ecosystem-service values of nature have become conflated with NBS. As more so-called "NBS" projects become

97. WORLD BUS. COUNCIL ON SUSTAINABLE DEV., "CORE BENEFITS STANDARDS" AND THE IMPACT OF NATURAL CLIMATE SOLUTIONS (NCS) ON SUSTAINABLE DEVELOPMENT 3 (2022), https://www.wbcsd.org/contentwbc/download/15114/213957/1 [hereinafter *Core Benefits Standards*].

98. WORLD BUS. COUNCIL ON SUSTAINABLE DEV., THE ROLE OF NATURE-BASED SOLUTIONS IN STRATEGIES FOR NET ZERO, NATURE POSITIVE AND ADDRESSING INEQUALITY 8 (2022), https://www.wbcsd.org/contentwbc/download/15116/213973/1.

99. *Core Benefits Standards*, *supra* note 96, at 4.

100. *Id.*

101. *Id.* at 5.

102. *Id.* at 10.

103. *Id.* at 7; *see also CCB Standards*, THE CLIMATE, COMMUNITY, & BIODIVERSITY ALL., https://www.climate-standards.org/ccb-standards/ (last visited Feb. 12, 2024); *Welcome to the Verra Registry*, VERRA, https://registry.verra.org (last visited Feb. 12, 2024). Verified Carbon Standard projects are much more popular than projects under the Climate, Community, & Biodiversity Standards (CCB) requiring co-benefits. *Id*. As of October 28, 2023, Verra had issued Verified Carbon Units to 1,659 projects, but only 46 CCB projects had been validated for credit units and 82 CCB projects had been verified. *See Climate, Community, & Biodiversity Standards*, VERRA, https://registry.verra.org/app/search/CCB (last visited Feb. 12, 2024). Of the verified projects, only 47 had qualified as biodiversity projects as of February 26, 2024 (e.g., Serra do Amolar REDD Project, Pendjari and W-Benin National Parks REDD+ Project, Tahuamanu Amazon REDD Project, Guoluo Grassland Sustainable Management Project, Mindanao Tree Planting Program for our Climate and Communities, Zhanjiang Mangrove Afforestation Project, TIST Program in Kenya, TIST Program in Uganda, Blue Carbon Project Gulf of Morrosquillo "Vida Manglar"). *Id*. All of these projects have focused on reducing emissions from deforestation and degradation, avoiding conversion of grasslands and shrublands, afforestation/reforestation/revegetation, or wetland rewetting. *Id*.

commoditized within existing global markets in the name of carbon offsets or carbon credits, we face the possibility of losing a transformational opportunity to do actual restoration work, which requires not just offsetting carbon but restoring relationships between human and more-than-human communities as well as within more-than-human communities. NBS projects are hard to implement because they require much more holistic efforts than the existing commodity markets value, but they are worth community investments because they offer a different pathway. The final Part of this paper offers one possibility for instilling the emerging legal principle of solidarity within our current communities to restore a mindset of respect for interdependence.

IV. PRINCIPLE OF SOLIDARITY IN "ECOLOGICAL EDUCATION AND SERVICE"

To ensure NBS is more than a Corporate Social Responsibility effort operating within the current market system, NBS must incorporate place-based solutions that are co-created and co-produced with the communities implementing them rather than just designed by experts for private companies. To change mindsets, we need to re-engage human communities with their surrounding more-than-human communities. One potential U.S. application would be an "ecological education and service" program that involves paid community service and uses jury duty as a template.

Parties under federal and state law have the right to a jury of their peers, which originates from constitutional and state law.[104] Jury duty is a civic duty, and nearly all residents can anticipate possibly being called for service. Jury duty is a fundamental mechanism to ensure the rule of law by engaging citizens as decision-makers and agents of the law.

Drawing on international solidarity and the need to protect "our common ecological habitat, for which all are responsible,"[105] state governments might consider a new mechanism to offer individuals the opportunity to engage in long-term NBS projects. What if community members dedicated time to restoring their own communities? Restoration projects, particularly active restoration projects, are typically expensive and require long-term management and monitoring. Leadership of these community service projects will require trained specialists in biology, hydrology, or ecology. Much of this work can be done by laypersons by creating opportunities within a place-based community to support restoration efforts. Involving residents in a project facilitates a psychological community that better understands the interdependence of place-based ecological relationships.

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104. FED. R. CIV. P. 38; *cf.* CAL. CONST. art. I, § 16 (comparing California's right to trial by jury to the federal rule).

105. *Report of Independent Expert Rizki*, *supra* note 90, ¶ 58.

This proposal intends to extend current efforts, such as the American Climate Corps,[106] to all residents to increase human power in furthering restoration work and opportunities for developing new mindsets. What might this look like in practice? It could look a lot like jury duty, where adults receive a summons to appear at a location within the community to provide one day of service. Qualified individuals must appear at the service location unless excused and participate in service activities. During the day of service, a service-project leader will introduce the program and the long-term goals of the project. Part of this introduction will educate the service group for the day on the biological benefits of their work. Depending on the project's complexity, the project leader will assign individuals to various roles, which might include vegetation planting, habitat maintenance, or habitat monitoring. Government employers and large-revenue employers (i.e., employers netting a certain amount of revenue) will provide full pay and benefits for their employees engaged in ecological service. Individuals not working for a large-revenue employer or the government or who are self-employed will receive minimum wages for each hour of the service day. Failure to appear without an excused absence will result in a fine that will go to a fund used to run the service program. The program should be designed inclusively, such that individuals with health conditions can still participate in the day of service by contributing volunteer hours with preparing refreshments or taking pictures. The most important part of the project is getting people out to a site and engaged in learning about their own place-based community.

There are two primary challenges with this proposal. One will be creating the human resources needed for coordinating this program to ensure that the projects qualify as NBS projects with biodiversity benefits. This would require regional, state, and local authorities to invest substantial resources in identifying appropriate projects on public lands. In future iterations of this service, it might be possible to extend service efforts to the lands of willing private landowners whose properties provide opportunities for meritorious biodiversity projects. The second challenge is the potential for political resistance from populist groups or individuals. If we can pilot "ecological service," it may overcome political resistance as individuals experience the

106. *FACT SHEET: Biden-Harris Administration Launches American Climate Corps to Train Young People in Clean Energy, Conservation, and Climate Resilience Skills, Create Good-Paying Jobs and Tackle the Climate Crisis*, THE WHITE HOUSE (Sept. 20, 2023), https://www.whitehouse.gov/briefing-room/statements-releases/2023/09/20/fact-sheet-biden-harris-administration-launches-american-climate-corps-to-train-young-people-in-clean-energy-conservation-and-climate-resilience-skills-create-good-paying-jobs-and-tackle-the-clima/. The American Climate Corps is a Biden-Harris Administration initiative to assist youth in finding jobs in deploying low-cost and reliable clean energy; implement energy efficiency efforts; rebuild coastal wetlands; manage forests to prevent wildfires; protect public lands; enhance agricultural systems to conserve water; and advance environmental justice. *Id.*

benefits of working in their own community to protect and conserve local places for this generation and generations to come.

There are two major benefits for this proposal that justify investments to allocate human resources to support this proposal. First, there are likely to be more tangible restoration and conservation outcomes as individuals contribute their labor to reviving ecological functions for their community. Second, there are likely to be more opportunities to build solidarity, both across human communities working towards a shared place-based cause and between human communities and more-than-human communities, as individuals have the opportunity to interact outside of their habitual human-built communities. Working with people from many different backgrounds who call a particular place home offers a chance to understand other people beyond preconceived, stereotypical ideas. At the same time, groups get the chance to better understand the more-than-human communities that call particular places home.

While one day of service is minimal, a short service experience could encourage certain individuals to become further involved in their own communities by enhancing their natural knowledge of a place and perhaps conservation skills. To implement this NBS ecological service proposal, states would need to introduce legislation. A draft law is provided in Appendix 2.

CONCLUSION

The current trends in nature-based solutions offer an important opportunity to rethink what we are trying to achieve through NBS projects. Yes, we need to decarbonize. Yes, we need to create sustainable development opportunities. Yes, we need to restore our environment. And while the forces of financialization and commoditization in the form of markets can contribute to some of these goals, they can also undermine the longer-term transformations called for and the efforts to promote a "right to international solidarity" based on community care ethics. This Article argues that we need to shift to a new mindset, such as Iris Young's proposed shift from a "liability model" of the world—where responsibility exists based on linking a particular action with a particular consequence—to a "social connection model" that calls for participatory problem-solving across a community.[107]

The proposal in this Article for a legally driven "ecological education and service" effort formulated on jury duty is a modest attempt to further a principle of solidarity through a social connection model. The state would provide opportunities for individuals to reconnect themselves to a place with

107. IRIS M. YOUNG, RESPONSIBILITY FOR JUSTICE 96–97 (Samuel Freeman ed., 2011).

human communities and more-than-human communities. These are the nature-based solutions that we need but for which modern life, for many, does not afford the opportunity. One day of service in one community may seem minor in the scope of global challenges, but it offers a small root to connect people to each other and to their place.

APPENDIX 1

Review of List of "Nature-Based Solutions" from "Blue Nature-Based Solutions in Nationally Determined Contributions: A Booklet for Successful Implementation" (GIZ 2020)[108]

Project	*Stated Objective*	*Biodiversity Benefit*	*Meets NBS with Managed "Biodiversity Benefits"*
Integrated Mangrove Fishery Farming	To respond to specific vulnerabilities of coastal communities to climate change by introducing saline-tolerant plants, growing brackish water fish in ponds to generate sustainable and additional income, and planting mangroves and halophytes to protect the coastline.	Maybe - insufficient details	Maybe
Multi-Sectoral Partners for Climate Resilience	To identify specific vulnerabilities to develop adaptation strategies through partnerships with communities, private sector, academia, and NGOs.	No (increase in biodiversity was for purpose of "fish ponds" and "mangroves and halophytes farming")	No
Sustainable Management of Morocco's	To help vulnerable communities adapt to climate change	Yes ("Refinement of MPAs and	Yes

108. *See generally* VON UNGER ET AL., *supra* note 66 (summarizing the 24 projects outlined here).

Marine Resources	by creating a network of fisheries cooperatives that sustainably manage marine protected areas on the basis of scientific and local knowledge.	creation of new ones" and "Estimated 20% to 30% increase in marine species and ecosystem")	
Strengthening Community Leadership for Mangrove Restoration and Food Security of the Paz River	To strengthen adaptative capacity by restoring coastal and mangrove forests and improving com-munities self-governance and political agency.	Maybe - insufficient details	Maybe
Ecosystem-Based Coastal Protection Through Floodplain Restoration	To provide protection to people living directly behind dikes by restoring flood plains and rehabilitating mangrove forests.	Unclear - noted result of "increased biodiversity and availability of ecosystem services," but all the information focuses on human community disaster risk reduction and biodiversity management	Maybe
Coral Gardening for Climate Change Adaptation in Vanuatu	To rehabilitate coral reefs, which are essential for livelihoods, income generation, and climate change adaptation.	Yes- 3,000 coral fragments planted and spread of heat stress tolerant corals	Yes

At the Water's Edge: Enhancing Coastal Resilience in Grenada	To build social and ecological resilience through the implementation of NBS including the installation of artificial reef structure.	No - no mention of biodiversity	No
Multi-Sectoral Coastal and Marine Management Vision	To solve the general problem of ungovernability of seascapes and unsustainable management.	No	No
Lauru Ridges to Reefs Protected Area Network (PAN)	To form a network of marine protected areas to strengthen marine resources protection and use them sustainably.	Yes ("establishment of protected area sites," "coordinated monitoring of protected areas")	Yes
An Incentivized Participatory Approach to Mangrove Conservation	To restore mangroves through carbon finance.	Yes - for mangroves, uncertain for other biodiversity	Maybe
Blue Carbon Credits Financing Community-Based Mangrove Management	To protect and restore mangroves using carbon finance.	Yes - for mangroves, uncertain for other biodiversity	Maybe
Building with Nature for Safe, Prosperous and Adaptive Coastlines	To increase resilience of 20 kilometers of coastline by combining civil engineering with	Yes - for mangroves, uncertain for other biodiversity	Maybe

	mangrove rehabilitation.		
Ghana Mangrove Restoration Within the Muni-Pomadze Ramsar Site	To restore the mangrove degraded area along the Muni Lagoon and its ecological integrity while providing alternative income sources to reduce pressure on the ecosystem.	Yes - improvement of fish spawning areas and increase in migratory birds	Yes
Blue Carbon A-Z: From Small Projects to Policy Development	To facilitate the development of sound scientific and political frameworks, including carbon stock inventories, livelihoods and vulnerability studies, and assessments of land/use dynamics	No	No
Pesca Responsable: Responding to Climate Change Through Sustainable Responsible Fishing and Mangrove Rehabilitation	To foster communities' ownership and involvement in a participatory management strategy to preserve the biosphere reserve and promote the sustainable management of resources.	Yes - for ecosystem productivity, mangrove seed dispersal, and species diversity	Yes
Marine Protected Area Learning Site	To address unsustainable practices that	Yes	Yes

for the Coral Triangle	degrade ecosystems and threaten biodiversity and livelihoods.		
Empowering Island Communities: The Use of Cost-Benefit Analysis to Support Informed Climate Change Decisions	To identify and select ecosystem-based adaptation solutions through a participatory process.	No	No
Community-Based Ecological Mangrove Restoration	To restore barren, unproductive areas into healthy mangrove ecosystems to protect communities from natural disasters and sustain their livelihoods.	Yes - for mangroves, uncertain for other biodiversity	Maybe
Addressing Resource Degradation to Enhance Climate Change Resilience	To use local knowledge to reforest areas, restore degraded lands, and regulate natural resource use.	Maybe - 180 hectare of reforestation but unclear other biodiversity enhancement	Maybe
Palau National Marine Sanctuary	To dedicate the entire marine territory to conservation by protecting the Exclusive Economic Zone using traditional practices of whole domain	Yes - managing 80% of the area as a "no-take" zone	Yes

	management and promote holistic, sustainable development.		
Valuating Climate Adaptation Options on Placencia Peninsula	To conduct a cost-benefit analysis on adaptation solutions to facilitate decision making, raise awareness, and engage all stakeholders to foster collaboration with policy makers; and, ultimately, to reduce the Peninsula's vulnerability and erosion risks.	No	No
Mangrove Restoration for Sustainable Fishery in Palk Bay	To address mangrove degradation by raising community awareness of mangrove benefits by involving the community in participatory conservation practice.	Yes - for mangroves, uncertain for other biodiversity	Maybe
Private Sector Investment in Conservation of Dry Forests and Mangrove Restoration	To create an innovative financial mechanism for the conservation and rehabilitation of mangroves and the development of sustainable activities.	Maybe (money invested in restoration of mangroves and a forest reserve)	Maybe

A Multi-Actor Alliance to Reduce the Risks of Cascading Hazards in Sian Ka'an	To increase local adaptive capacity through an EbA strategy based on mangrove rehabilitation and income diversification using public financial mechanisms.	Unclear	Maybe

APPENDIX 2

Model Legislation for an "Ecological Education and Service" Program

(a) Duty of citizenship

Ecological service is a responsibility of citizenship, and citizens are expected to engage in enhancing and improving ecological connections within their community.

(b) Principles

(1) No class or category of persons may be automatically excluded from ecological service except as provided by law on the basis of undue hardship. An individual will only be granted an exemption when requested. Inconvenience is not a reason for being excused.

(2) Individuals may defer ecological service for a temporary hardship.

(c) Requests to be excused from service

All requests to be excused from ecological service that are granted for undue hardship must be put in writing and submitted to [agency responsible for summoning for service].

(d) Reasons for excusing because of undue hardship

An excuse on the ground of undue hardship may be granted for any of the following reasons:

(1) The individual has no reasonably available means of public or private transportation to the project site with carpooling with other group members impossible.

(2) The individual must travel more than one-and-one-half hours from the prospective juror's home to the site.

(3) The individual is a caretaker for another person who cannot be brought safely to the site. Where appropriate, individuals who are caretakers may participate only in the portion of the program that is educational.

(4) The individual has a disability or impairment that will prevent them from coming to the site. The disability or impairment must be documented.

(5) The individual is engaged in the protection of the public health and safety, and it is not feasible to make alternative arrangements to relieve the person of those responsibilities during the period of service without substantially reducing essential public services.

(e) Indemnity

The service site is responsible for protecting service members from foreseeable hazards and gross negligence of site leaders but is not responsible for harms arising from natural hazards or weather events.