nature-based solutions in planning

Peter Jones and Daphne Comfort look at some of the ways in which advocates of 'nature-based solutions' approaches have sought to inform local authority planning policies, and offer some reflections on nature-based solutions in planning

Commentators have suggested that NBS have the potential to contribute to meeting a series of contemporary environmental and social challenges

Within planning there is increasing interest in 'nature-based solutions' (NBS), which seek to harness natural processes to address societal challenges in sustainable ways. Scott and Lennon,[1] for example, suggest that 'Nature-based solutions have emerged as a concept to operationalise an ecosystem services approach within spatial planning and practices to fully integrate the ecological dimensions alongside traditional planning concerns'. Duval *et al.*[2] argue that 'exploring the natures of planning provides scope for greater critical attention to what we do as planners when we seek to address the challenge of safeguarding nature through policy'. Wamsler *et al.*[3] claim that 'the need to mainstream ecosystem- or nature-based solutions into urban governance and planning is widely advocated in both academic and governmental bodies'. At the same time, Albert *et al.*[4] suggest that 'a successful development and implementation of nature-based solutions arguably requires processes of transdisciplinary landscape planning and design'.

That said, Frantzeskaki[5] claims that 'with evidence amounting about nature-based solutions, there is a need to translate knowledge about these nature-based solutions to future policy and planning'. Further, Albert *et al.*[4] argue that 'little research so far has addressed the questions of how planning and design processes could be designed to best

fulfil these requirements, and which impacts such processes yield in plan creation and actual implementation'.

With these thoughts in mind, this article outlines the conceptualisations and claims of advocates of NBS, explores some of the ways in which advocates of NBS approaches have sought to inform local authority planning policies, and offers some reflections on NBS in planning.

Nature-based solutions

Despite the growing popularity of NBS, Nesshöver *et al.*[6] have suggested that 'the meaning of NBS can appear vague, and the links to pre-existing concepts may be unclear'. Indeed, Pauleit *et al.*,[7] for example, have argued that:

> *'NBS is broad in definition and scope. While the concept is rooted in climate change mitigation and adaptation, it is understood as an umbrella term for simultaneously addressing several policy objectives. Biodiversity conservation and enhancement of ecosystem services are considered as the basis for finding solutions to major challenges, ranging from climate change and disaster risk reduction to addressing poverty and promoting a green economy.'*

The International Union for Conservation of Nature has described NBS as 'interventions which use nature and the natural functions of healthy ecosystems to tackle some of the most pressing challenges of our time'.[8] According to the European Commission, 'nature-based solutions are defined as a way to address societal challenges with solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help to build resilience'.[9] The University of Oxford based Nature Based Solutions Initiative, whose vision is 'to help increase human well-being by working with and enhancing nature', has argued that 'nature-based solutions are actions that work with and enhance natural habitats to help address societal challenges, including helping people adapt to the effects of change and disasters'.[10]

In outlining the 'evolving conceptualisations of nature within planning policy frameworks' Duval *et al.*[2] identified a number of themes. In the 18th and 19th centuries, for example, the incorporation of nature into cities, as illustrated by the development of urban parks and the growth of the Garden Cities movement, is depicted as a planning response to unhealthy and overcrowded urban living conditions. Duval *et al.*[2] also identified 'nature as boundary', as exemplified by the designation of Green Belts, and 'nature as greening', as illustrated by increasing focus on sustainability, and more particularly the need to introduce measures to mitigate climate change.

More specifically, Cohen-Shacham *et al.*[11] traced the origins of the use of the term NBS to the 1970s, when the idea of environmental or ecosystem services became established in scientific literature. They reported that the term NBS was first used in 2002, but they claimed that it was the late 2000s before the term became more formally and widely recognised. Further, they argued that 'more broadly, the development of the NBS concept has been firmly grounded in global practice as the nature conservation and development sectors, formerly viewed as having contradictory objectives, have moved toward a common recognition of the positive as well as the negative linkages between people and nature'.

ICLEI (the International Council for Local Environmental Initiatives, now known as ICLEI – Local Governments for Sustainability) claimed that 'nature-based solutions are increasingly being implemented in urban areas to enhance resilience, support sustainable development, and safeguard biodiversity'.[12] In illustrating this approach ICLEI cited tree-planting to improve air quality in the urban environment, the conversion of abandoned industrial sites into urban parks, the creation of green roofs to reduce energy use, and the restoration of degraded wetlands to prevent flooding. Further, ICLEI claimed that NBS 'are multi-functional' in that they 'offer numerous co-benefits in terms of public health, social cohesion, biodiversity, climate change mitigation, etc.', thus 'creating win-win solutions for society, the environment and the economy.'[12]

More widely, commentators have suggested that NBS have the potential to contribute to meeting a series of contemporary environmental and social challenges, including water management, flood control, energy efficiency, ecological footprinting, rapid urban growth, access to food supplies, employment opportunities and the need to (re)connect people to nature – but climate change has received most attention. In addressing NBS climate change mitigation in urban areas, Kabisch *et al.*,[13] for example, concluded that NBS 'hold significant potential for enhancing climate change mitigation and adaptation in urban areas and for contributing to the resilience and livability of cities'. That said, they suggested that further research was necessary to assess the effectiveness of NBS and to compare it with more mainstream technology-based solutions, and that it was important to look to take account of social cohesion when implementing NBS.

More specifically, Wamsler *et al.*[3] suggested that, at the local level, NBS can be applied to a variety of climate change hazards in four ways – namely, reducing exposure, reducing vulnerability, preparing an effective response, and preparing for effective recovery. In tackling flood hazards, for example, Wamsler *et al.*[3] suggested that exposure to floods

can be reduced by improved water management on the outskirts of urban areas, while measures to reduce vulnerability might include the creation of buffer zones, retention ponds or increased permeable surfaces, for example through the creation of green roofs or urban agriculture.

Nature-based approaches in planning in the UK

While 'conserving and enhancing the natural environment', 'habitats and diversity' and 'meeting the challenge of climate change, flooding and coastal change' are all addressed in the recently revised National Planning Policy Framework (NPPF),[14] there is no mention of NBS as such. However, NBS is informing planning thinking and policy in a number of ways, and a number of simple illustrations provide a picture of the elements within this process.

In 2017 South Gloucestershire Council published a Biodiversity Action Plan[15] for the period 2016-2026. The plan emphasises that 'biodiversity is important for its own sake, along with the many benefits we derive from the natural environment – products like food, fibres, wood and water; services like pollination, nutrient cycling, soil formation, water purification, flood defence and opportunities for reflection and recreation – all are critical to our wellbeing and survival'. The plan adopts 'a spatial ecosystem services approach to biodiversity' and is to be used internally within the local authority in making planning decisions and in formulating policy, and externally in working in partnership with organisations and with the community.

Through the plan the local authority is looking to improve the quality of existing habitats, to create new habitats to enhance biodiversity, and to identify and manage habitats to create new ecological networks and manage biodiversity 'at the scale of whole natural systems and landscapes'. More specifically, 'establishing a coherent and resilient ecological network will not only help wildlife to cope with change, but will also improve the ability of the natural environment to provide for us.'

At the same time the plan also emphasises the need to become 'better at deriving multiple benefits from land-use, for example by natural solutions to flood threats, such as habitat creation, restoration and management'. In a similar vein it also identifies the areas which offer the best opportunities to enlarge the existing woodland network, arguing that such woodlands 'will increase the resilience of services woodlands can provide such as carbon storage, water storage, recreation and wildlife habitat' and 'will also ensure woodlands are resilient to future pressures such as climate change'.

In Scotland, West Lothian Council, in conjunction with Scottish Natural Heritage, has produced *Planning for Nature: Development Management and Wildlife*,[16] as Supplementary Guidance, which includes advice on 'good design and mitigation'. The local authority reported that in assessing planning applications for development projects it will protect and enhance the biodiversity and geodiversity of West Lothian, and stressed that 'opportunities for enhancing wildlife and habitats within a site must be considered as part of the overall project' and identified a number of 'on-site opportunities to enhance development design'. These opportunities included retaining trees and incorporating them into design, retaining existing hedgerows to provide feeding and cover for birds, and retaining marshy ground to protect newts and a variety of plants and insects.

In addition, the local authority suggested there may be opportunities to enhance green networks – for example providing an attractive setting for new housing can also deliver wildlife and habitat benefits.

Wales Biodiversity Partnership's *Nature Recovery Plan for Wales*,[17] launched in 2015 to address the decline in biodiversity within Wales, aims, inter alia, to 'encourage and support participation and understanding, to embed biodiversity throughout decision making at all levels', and to 'increase the resilience of our natural environment by restoring degraded habitats and habitat creation'. One example of the type of problems the plan seeks to address is the restoration of active blanket bogs in the Berwyn and Migneint Special Areas of Conservation in North Wales. The restoration of blanket bogs is seen to offer a wide range of benefits, including improving water quality, reducing run-off rates (which can in turn reduce flooding in lowland areas), carbon sequestration, and recreation opportunities.

Tees Valley Nature Partnership's 'Local Plan Assessment for Nature and Biodiversity' assessment tool[18] seeks 'to ensure that nature and biodiversity considerations are included in the Local Plans' at all stages of the planning policy or review process. The Tees Valley Nature Partnership's vision is for a 'rich and healthy natural environment in the Tees Valley that sustains a vibrant place for people to live, work and learn'.[19] This vision embraces three themes: 'natural assets', 'natural growth', and 'natural health and wellbeing'. The first theme is focused on 'protecting and improving the natural environment', the second on 'growing a sustainable economy' and the third on 'reconnecting people and nature'. In addressing the first theme the priorities are protecting and managing sites and creating and restoring habitats, while under contributing to natural growth, the priorities include raising the profile of the natural environment and influencing local planning and strategy-making.

The *Central Lancashire Biodiversity and Nature Conservation Supplementary Planning Document*[20] of July 2015 emphasises that 'natural ecosystems

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Networks of green spaces are seen to fulfil a variety of functions

provide us with a wide range of goods and services that support our economic and social wellbeing', including 'protection from natural disasters and regulation of our climate'. The Supplementary Planning Document also outlines how ecological networks are being mapped with the aim of integrating these networks into the development process, and sets out how biodiversity and nature conservation can be integrated into the planning application process.

Biodiversity and Planning in Sussex, published by the Sussex Wildlife Trust in 2014,[21] looks to provide guidance to help 'those involved in planning in Sussex ensure that development within the county protects and enhances our valuable local biodiversity', and to 'identify opportunities to deliver biodiversity enhancements in the most effective way'.

The guidance document highlights the importance of 'Biodiversity Opportunity Areas', where 'targeted conservation action will have the greatest benefit to wildlife'. The main aim within these areas is to restore biodiversity at a landscape scale, and the Sussex Wildlife Trust argues that development that would threaten this aim should be avoided, but concedes that 'consideration should also be given to whether development will affect habitat connectivity and integrity, either positively or negatively'. The guidance document also emphasises the importance of 'green infrastructure' and 'networks of green spaces' in 'both urban and rural settings'. Here, networks of green spaces are seen to fulfil a variety of functions, including the maintenance and enhancement of biodiversity as well as the delivery of a range of cultural and recreational objectives.

The Gloucestershire Economic Growth Joint Committee has pledged to support the creation and enhancement of green infrastructure within the county. In so doing, the local authority recognised the importance of green infrastructure in helping to adapt to climate change, in encouraging economic growth and investment, in contributing to land regeneration, and in supporting wildlife and habitats. In addressing climate change, for example, perceived benefits included heat amelioration, sustainable urban drainage and reduced flood risk, while economic growth and investment benefits were seen to include inward investment and job creation, increased land and property values, and local economic regeneration. In highlighting the economic benefits, the 'officer advice' to the Joint Committee was that supporting the pledge 'would provide the Committee with a practical way of maintaining oversight of an important issue that underpins the delivery of good quality development'.[22]

Building with Nature, an organisation developed by Gloucestershire Wildlife Trust and the University of the West of England's Centre for Sustainable Planning, looks to support the planning and design stage and the long-term maintenance of green

infrastructure features associated with new developments. The organisation's certification for green infrastructure was launched in 2017 in association with a number of companies, including Persimmon Homes, Bloor Homes, and Bathurst Development Limited. Within the certification scheme developments need to demonstrate that they have included green infrastructure in their plans. The scheme is open to housing and commercial development and embraces three main themes – wildlife, water, and wellbeing – through the incorporation of features such as play areas, street trees, natural flood management solutions, parks, allotments, and ponds.

Building with Nature has illustrated its approach in a case study of Elderberry Walk, a brownfield development providing 161 new homes in the Southmead area of Bristol.[23] This development is focused 'around a central green street, with retained trees, new multifunctional green infrastructure features, a communal wildlife garden and edible planting'.[23] Further, Building with Nature has suggested that 'the communal wildlife garden provides a space for people to get together, encouraging community cohesion; and areas of productive planting support local priorities for reducing health inequalities'. More generally, the certification scheme, first introduced in the South West of England, is now rolled out throughout the UK.

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Reflections

Some of the thinking underpinning nature-based solutions to environmental and social challenges is being employed by a number of local authorities and environmental organisations in an attempt to inform planning policies. Although the NPPF emphasises that planning policies and decisions should contribute to and enhance the natural and local environment, and encourages local planning authorities to engage with Local Nature Partnerships in identifying and addressing strategic issues, it offers no explicit guidance or recommendations on employing NBS. As such NBS, per se, can be currently seen to sit outside plan-making and planning policy advice. That said, three sets of issues merit reflection.

First, there is the question of how the effectiveness of NBS might be evaluated. There is a recognition that one of the key challenges in implementing NBS is the need to define appropriate indicators that can be used to monitor and evaluate policies and programmes. A number of evaluation frameworks have been have been proposed. For example, the EKLIPSE project[24] has published an *An Impact Evaluation Framework to Support Planning and Evaluation of Nature-Based Solutions Projects*, with a focus on using NBS to promote climate resilience in urban areas and with the aim of developing a list of criteria and indicators to assess the performance of NBS, to help prepare guidelines to measure how NBS fare against these indicators and to help make recommendations on how to improve the effectiveness of NBS projects. HKV Consultants[25] have developed a qualitative evaluation framework to compare and evaluate projects and tested it against three NBS projects in the Netherlands, Scotland and Bulgaria.

Raymond *et al.*[26] presented a framework for the assessment of NBS co-benefits and outlined how they translated it 'from theoretical support to practical importance by presenting a seven-stage process which can guide NBS implementation'. More practically, they identified a number of indicators and units of measurement to assess the impact of NBS across a range of environmental challenges. In looking to assess accessibility to public green space, for example, the suggested unit of measurement is 'the number and % of people being physically active (minimum 30 minutes 3 times per week) in urban green spaces', while the unit for ecological connectivity is 'the probability that two dispersers randomly located in a landscape can reach each other'.

However, the relevance of such relatively complex frameworks and approaches to measurement may, at best, be limited, in that planning authorities have limited time, expertise and resources to undertake such exercises. Here, at best, local planning authorities will be looking for assessment methods that can be easily understood and applied and that lend themselves to communication to a range of non-technical stakeholders and decision-makers.

Secondly, there are issues relating to NBS and wider political debates about the value of nature. On the one hand, for example, in illustrating the mainstream political position the UK Government has stressed its commitment to 'securing the value of nature' and 'putting natural capital at the heart of our economic thinking and decision making'.[27] Here, the value of the approach is seen to be clearly illustrated in protecting and improving the natural environment, growing a green economy, and

reconnecting people and nature. These commitments to valuing nature sit well with NBS approaches to planning. On the other hand, from an overtly Marxist-inspired perspective, Kay and Kenney-Lazar[28] have stressed the complexities of valuing nature and have suggested what we 'neatly refer to as nature simply does not exist'.

While the vast majority of local authority planning officers and local authority planning committees seem unlikely to embrace such thinking, they may have an eye to the way in which the benefits associated with NBS approaches to planning might be distributed. Sekulova and Anguelovski,[29] for example, have argued that the distribution of the benefits does not seem to be a major research focus for much of the literature on NBS. More specifically, they argue that the 'planning of green areas (such as parks and urban forests) cannot go without consideration of the pertinent social and economic factors (e.g. inequalities), and the uneven landscape of socio-natural power relations'. Further, they claim that large parks 'have been associated with increasing real-estate prices placing [the] economically vulnerable (low income) part of the population at a disadvantage' and that 'in parallel, low-income individuals tend to live in areas with less green space and higher levels of contamination.'

Thirdly, and more specifically, there are issues regarding the relationship between development and NBS. At the macro scale, Pauleit *et al.*,[7] for example, have noted the European Commission's emphasis on simultaneously promoting economic growth and sustainability via NBS. While NBS are seen by some commentators as having a potentially important role to play in protecting, restoring and sustainably managing natural resources and ecosystems, there are dangers that the term might effectively be captured to support development and to privilege such development over environmental protection. In some ways, the scene has been set here, in that the NPPF,[14] with its 'presumption in favour of sustainable development', advises that 'plans should positively seek opportunities to meet the development needs of their area' and that 'strategic policies should, as a minimum, provide for objectively assessed needs for housing and other uses'.

Here, developers might see NBS as a new buzzword and include some natural elements, such as limited tree planting or pond creation, to badge the 'sustainability' of their development proposals. While the authors would not wish to impugn the integrity of officer advice to the Gloucestershire Economic Growth Joint Committee,[22] or the work of Building with Nature, in promoting NBS, there is a danger that if such solutions are used largely cosmetically within development, then genuine environmental gains and contributions to sustainable developments may be limited.

Conclusion

NBS are seen by a number of organisations and commentators as offering solutions to a range of environmental, social and economic challenges. Within planning there is increasing interest in NBS, but this interest is largely confined to advocates of a greater role for NBS in planning and to researchers who are concerned with theoretical approaches to planning policies: there is less evidence of interest within local authority planning departments that are concerned with plan-making and development control. That said, and looking to the future, local authority planners may wish to maintain a watching brief on if, and how, NBS influences planning policies within the UK.

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Notes

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