World Health Organization
Collaborating Centre for Healthy Urban Environments

UWE Bristol | University of the West of England

Policy and Practice Note 1

Futureproofing urban parks and greenspaces for climate resilience, people and wildlife

Access to parks and greenspaces is key to public health in cities. How can we futureproof parks and greenspaces to provide climate resilience whilst supporting human wellbeing and biodiversity?

Contact with nature is beneficial to physical and mental wellbeing. By 2050 almost 70% of the world's population will live in towns and cities, remote from wilder natural environments. Nature experience must therefore be provided through access to high quality urban parks and green spaces. The COVID 19 pandemic highlighted the importance of these places for physical recreation and mental escape, particularly for people living in high density housing areas without access to a private garden. Parks and greenspaces also have the potential to enhance plant biodiversity and create valued habitats for urban wildlife including birds and insects. A significant percentage of urban greenspace throughout the world is currently managed as close-mown amenity grass. This is of low biodiversity value, susceptible to 'summer browning' and longer-term deterioration due to a poor 'fit' with the changing climate. Local authorities and other urban land managers are in a position to address these issues by making changes to greenspace management: delivering climate-resilience whilst supporting human wellbeing and biodiversity.

Climate-resilient planting for people and wildlife

As climate-change combines with urban heat island effects in towns and cities throughout the world, many areas are suffering increasing summer temperatures and aridity, combined with the increased risk of flooding due to erratic rainfall events.

Findings from our research in the UK have shown that:

- Planting trees in urban areas mitigates climate change[1] by absorbing carbon, shading streets, pavements and people, reducing temperatures by evapo-transpirative cooling and reducing flood risk (reducing the volume and speed of flooding by intercepting water on leaves, absorbing water through roots, promoting infiltration of rainwater).
- Futureproofing parks and greenspaces can be achieved by sourcing trees and other plants (shrubs and herbaceous flowering plants) from warmer climates. These are more resilient and better-adapted to the warming climate than the ones we have traditionally used[1].
- In the UK 75% research[2] participants would be happy for non-native trees, shrubs and herbaceous planting to be introduced in parks and gardens if these were better-adapted to the changing climate than species currently used.
- People's knowledge and awareness of the implications of climate change are directly related to their educational qualifications[3].
- People are also positive about the appearance of non-native trees, shrubs and herbaceous flowering plants in urban parks and gardens[2].
- Non-native plants such as the late flowering meadow species *Coreopsis tinctoria* (Plains Coreopsis) also provide wildlife benefits[4] in the form of nectar and pollen, after native species have finished flowering.

What type of planting? The importance of colour and naturalness

There is now clear evidence that that different types of nature and planting in urban parks and green spaces provoke different human reactions and provide specific benefits for wildlife – butterflies, bees and other insects.

Why is colour important to people?

The colour of plant foliage (leaves) and flowers has been shown to provoke particular human responses.

Findings from our research in the UK have shown that:

- Participants walking through woodlands, shrubs and herbaceous planting in public parks, green spaces and institutional gardens in England[5], considered planting with a flower cover of 27% or above significantly more attractive than that with a lower percentage flower cover. Most people found colourful flowering plants stimulating and exciting.
- People particularly appreciate woodlands with a colourful, flowering herbaceous ground layer.[6]
- The seasonal colour-change in woodland foliage is valued by the public[6].
- Green vegetation is the best for supporting people's mental restoration and relaxation[5].
- Most members of the public cannot identify biodiversity accurately at the species level, and often use flower colour as a cue for estimating plant species diversity[4,7].

Why is structural naturalness important for people and wildlife?

Over the past 20 years there has been an increasing trend across Europe and other parts of the world to manage parks and greenspaces less intensively, with areas of taller-growing semi-natural grasses and wildflower meadows. This is partly in response to an increased understanding of the benefits of urban grassland for people and wildlife[8], to support dwindling invertebrate biodiversity. It has coincided with a

time when austerity makes any alternative impossible in many urban green spaces. In many urban parks this has involved seeding new areas of flowering perennial and annual meadows. Perennial meadows comprise of grasses and flower species which flower each year and can be cut back once or more during the year. Annual meadows consist of flower species which flower once and often contain non-native species such as the bright orange *Eschscholzia californica*, (California poppy) and golden *Coreopsis tinctoria* (Plains coreopsis).

Findings from our research in the UK have shown that:

- The majority of public site users thought that the introduction of perennial meadows to local green spaces improved the quality of these spaces[8].
- People preferred naturalistic meadow-style vegetation to traditional herbaceous and formal bedding styles[8].
- People preferred highly floral meadows, confirming the role of colour in human appreciation. These also provide valuable resources and habitat for invertebrates[8].
- Although the majority of participants were appreciative of meadows, some preferred short-cut grass immediately outside their homes[9].
- People like to see 'cues to care'; neat mown edges 'framing' an area of longer meadow or grassland, showing the area is being managed deliberately, and allowing access[9].
- Introducing a mosaic of meadows with different heights and species diversity is advantageous to wider invertebrate biodiversity, although this may make mowing and maintenance more challenging[10].
- Once people are aware of the value of taller meadows to urban invertebrates they are more prepared to accept them, even when they may appear brown and untidy, after flowering[8].

"Beauty lies in the eyes of the beholder": different stakeholders have different priorities

A key message for green infrastructure planners and designers is the need to include local stakeholders in decision-making. Although research has revealed that planting type influences people's perceptions and preferences, the way in which individuals and groups experience nature and their needs and priorities for parks and greenspaces, varies greatly. It is necessary to consider how factors such as sex, education, migration background, and even being a landscape or environmental professional, have a role in driving people's perceptions, values and priorities in relation to urban parks and greenspaces.

Findings from our research in the UK have shown that:

- Women found walking through areas of woodland, shrub and herbaceous planting more restorative than men[5].
- Women perceived higher levels of naturalness in the planting than men, regardless of the style of planting they walked through[11].
- Women demonstrated a stronger preference for meadow style planting over traditional herbaceous and formal bedding styles than men[8].
- People working in landscape, environmental and horticultural professionals find spending time in green spaces less restorative than other members of the public, maybe because this is their usual 'work' environment[3,5].
- These professionals usually prefer a wilder more naturalistic style than other research participants, so need to be mindful of this when planning and designing green spaces for other people[3,12].
- People's perceptions of nature may be related to their migration background. First generation migrants from Islamic parts of the world where wild nature is seen as dirty and inhospitable often prefer a neater, more manicured approach to greenspace management[12].
- People who are already 'nature-connected' both appreciate the aesthetic qualities of different green spaces and feel more mentally restored than the less nature-connected[11].

How can we futureproof urban parks and greenspaces for climate resilience, people and wildlife?

Local authorities and other organisations managing urban parks and greenspaces can help by:

- Introducing trees, shrubs and flowering plants which are 'fit for place' and adapted to the changing climate. This may mean sourcing species from other parts of the world.
- Prioritising plants and trees with colourful foliage and flowers in focal parts of parks and greenspaces to support human delight.
- Leaving some areas on semi-natural grassland in parks and greenspaces to grow longer to support invertebrate biodiversity. This supports pollinators and provides habitat for other invertebrates, particularly over winter.
- Creating a mosaic of meadows with different heights and species diversity to support wider invertebrate biodiversity, although this may make mowing and maintenance more challenging.
- Framing the edges of longer urban grasslands and meadows to create 'cues to care' – visible signs of intentional management practice, enhancing public acceptability.
- Providing on-site signage to explain the biodiversity benefits of urban grasslands.
- Sowing colourful flowering perennial and annual meadows in areas where human aesthetic enjoyment is a priority.
- Incorporating some late flowering non-native species such as *Coreopsis tinctoria* (Plains coreopsis) to extend meadow attractiveness to both people and pollinators.

Further information

This policy and practice note was written by Dr Helen Hoyle from the Centre for Sustainable Planning and Environments and the WHO Collaborating Centre for Healthy Urban Environments at UWE Bristol.

Useful resources

[1]Hoyle & Gomes Sant'Anna (2020): Rethinking 'future nature' through a transatlantic research collaboration: climate-adapted urban green infrastructure for human wellbeing and biodiversity, Landscape Research https://doi.org/ 10.1080/ 01426397.2020.1829573

[2]Hoyle et al. (2017) Attractive, climate-adapted and sustainable? Public perception of non-native planting in the designed urban landscape. *Landscape and Urban Planning*, 164. pp. 49-63. https://doi.org/10.1016/j.landurbplan.2017.03.009

[3]Hoyle, H. (under review November 2020) Climate-adapted, traditional or cottage-garden planting? Public perceptions, values and socio-cultural drivers in a designed garden setting.

[4]Hoyle et al. (2018)* Plant species or flower colour diversity? Identifying the drivers of public and invertebrate response to designed annual meadows. *Landscape and Urban Planning* 180 pp. 103-113. https://doi.org/10.1016/j.landurbplan.2018.08.017

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[6]Hoyle, H. (2015) Human happiness v urban biodiversity? Public perception of designed urban planting in a warming climate. http://etheses.whiterose.ac.uk/10738/

[7]Southon et al. (2018)* Perceived species-richness in urban green spaces: Cues, accuracy and well-being impacts. Landscape and Urban Planning 172 pp.1-10. https://doi.org/10.1016/j.landurbplan.2017.12.002

[8]Southon et al. (2017)* Biodiverse perennial meadows have aesthetic value and increase residents' perceptions of site quality in urban green-space. Landscape and Urban Planning. 158 pp.105-118 https://doi.org/10.1016/j.landurbplan.2016.08.003

[9]Hoyle et al. (2017)* "Not in their front yard" The opportunities and challenges of introducing perennial urban meadows: A local authority stakeholder perspective. *Urban Forestry and Urban Greening*, 25. pp. 139-149. https://doi.org/10.1016/j.ufug.2017.05.009

[10]Norton et al. (2019)* Urban meadows as an alternative to short mown grassland: Effects of composition and height on biodiversity. Ecological Applications Sep;29(6): e01946. https://doi.org/10.1002/eap.1946

[11]Hoyle et al. (2019). What determines how we see nature? Perceptions of naturalness in designed urban green spaces. People Nat. 00: 1–14. https://doi.org/10.1002/pan3.19

[12]Hoyle H. (2020) What Is Urban Nature and How Do We Perceive It? In: Dempsey N., Dobson J. (eds) Naturally Challenged: Contested Perceptions and Practices in Urban Green Spaces. Cities and Nature. Springer, Cham. https://doi.org/10.1007/978-3-030-44480-8_2

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