

## Supplementary Material A: Keywords for the selection of LCA studies

**Table S1.** Description of criteria taken into account within the LCA-NBS literature review.

	Relevant for LCA	Search keywords for the NBS
<b>1. On the ground</b>		
<i>1.1. Park and gardens</i>		
Large urban public park	Y	park
Heritage garden	Y	garden
Botanical garden	Y	garden
Pocket garden/park	Y	garden
Community garden	Y	garden
Green cemetery	Y	cemetery
Public urban green space (place, square, etc.)	Y	"green space"
Hedge and planted fence	Y	hedge, fence
Private garden	Y	garden
Flower field	Y	"flower field"
Urban green space with specific uses (school playground, camp ground, sport field, etc.)	Y	"green space", playground, "camp ground", "sport field"
Wood	Y	(wood OR forest OR grove) AND (urban OR city OR municipal)
Lawn	Y	lawn, turf
Single tree	Y	tree
<i>1.2. Urban network structures</i>		
Green tram track	Y	"tram track"
Street tree	Y	"street tree"
Green strip	Y	strip, buffer, greenway
Green waterfront	Y	waterfront
Unsealed parking lot	Y	parking, "car park", unsealed
Green parking lot	Y	parking, "car park"
<i>1.3. Structures characterised by food and resource production</i>		
Vegetable garden	Y	garden
Urban orchard	Y	orchard AND (urban OR city OR municipal)
Urban vineyard	Y	vineyard AND (urban OR city OR municipal)

Meadow	Y	meadow
Urban farm	Y	(farm OR agriculture) AND (urban OR city OR municipal)
<i>1.4.1. Ecological restoration</i>		
Quarry restoration	Y	quarry
Management of polluted area by plants (phytoremediation)	Y	phytoremediation
<i>1.4.2. Choice of plants</i>		
Use of pre-existing vegetation	Y	xeriscaping
Introduced plants	N	-
Vegetation diversification	N	-
<i>1.4.3. Systems for erosion control</i>		
Soil and slope revegetation	Y	"slope revegetation", "erosion control"
Strong slope revegetation	Y	"slope revegetation", "erosion control"
<i>1.4.4. Works on soil</i>		
Structural soil	N	
Soil improvement	N	
Mulching	Y	mulch
<b>2. Water</b>		
<i>2.1. Natural and semi-natural water bodies and hydrographic network</i>		
Excavation of new water body (pond, lake)	Y	pond (includes "stormwater pond", "stormwater management pond", "retention pond", "wet pond"), lake, "retention basin"
Infrastructure removed on river (ex. dam)	Y	"dam removal", "river infrastructure"
Reopened stream	Y	reopen
Remeander river	Y	remeander, "water transfer"
Reprofiling river bank	Y	"river bank", riverbank
Vegetation engineering system for riverbanks erosion control	Y	"erosion control"
Revegetation of aquatic planting	Y	"aquatic planting", "aquatic revegetation"
Gravity fountain (captation of a spring)	Y	"gravity fountain"
<i>2.2. Constructed wetlands and built structures for water management</i>		
Swale	Y	swale, bioswale, "infiltration trench"
Rain/infiltration garden	Y	"rain garden", raingarden, infiltration (includes "infiltration garden", "infiltration pit", "infiltration planter", "infiltration basin"), bioinfiltration, bio-infiltration, bioretention (includes "bioretention

		basin", "bioretention cell"), bio-retention, "recharge basin", "percolation pond", sump
Desealed area	Y	"de-sealed", unsealed, "sustainable drainage system", SUD, trench (includes "infiltration trench", "percolation trench", "drainage trench"), "grassed pavement", "drainage pavement"
Floodplains	Y	floodplain, "flood plain"
Constructed wetlands for phytoremediation	Y	"constructed wetland"
Constructed wetlands for wastewater treatment	Y	"constructed wetland"
Use of terrace (based on cultivation terraces principles)	Y	terrace
General search for water systems		> "drainage system" > stormwater (to cover "urban stormwater infrastructure", "stormwater Best Management Practices", "stormwater BMP"...) > LID, "Low Impact Development", "Low Impact infrastructure Development"
<b>3. On building and structures</b>		
<i>3.1. Green roofs</i>		
Intensive green roof	Y	"green roof", "sedum roof", "meadow roof", "vegetative roof", "vegetated roof"
Semi-intensive green roof	Y	
Extensive green roof	Y	
Roof pond	Y	"roof pond"
<i>3.2. Green walls</i>		
Climber green wall	Y	"green wall", "green facade", "vertical greenery", "vertical greening", "living wall", "vegetated wall"
Green wall system	Y	
Planter green wall	Y	
Vegetated pergola	Y	pergola
<b>4. Strategies and Actions</b>		
<i>4.1. Urban (green) spaces management</i>		
<i>Direct human interventions</i>		
Sustainable use of fertilisers	Y	"organic fertiliser", "organic fertilizer", biostimulant
Integrated pest management	Y	"pest management", "biological control", "pest control"

Integrated weed management	Y	"weed management", "biological control", "weed control"
Integrated and ecological management: spatial aspects	N	
Integrated and ecological management: time and frequency aspects	N	
Create and preserve habitats and shelters for biodiversity	Y	"biodiversity shelter", "shelter for biodiversity", "biodiversity habitat", "habitat for biodiversity"
<i>Use of fauna</i>		
Use of grazing animals	Y	grazing
Insect hotel (for wild bees)	Y	insect
Beehive (for honeybees)	Y	beehive, honey
<i>4.2. Waste management</i>		
Composting	Y	compost
<i>4.3. Protection and conservation strategies</i>		
Limit or prevent access to an area	N	
Limit or prevent some specific uses and practices	N	
<i>4.4. Urban planning strategies</i>		
Ensure continuity with ecological network	N	
Take into account the distribution of public green spaces through the city	N	
Planning tools to control urban expansion	N	
<i>Monitoring</i>		
Bio-indicator	N	

Keywords relative to LCA and to each NBS type were searched for in "Title, abstract, keywords" on Science Direct. However, because ScienceDirect only includes the papers published by the Elsevier journals, the literature review was then completed with an additional search on Google Scholar with an advanced search limited to the "Title" field. Google Scholar is a very powerful search engine for scientific and grey literature but it is more complicated to obtain an overview of literature on a certain topic because it offers limited options to combine multiple search terms with Boolean operators. Moreover, it does not allow the search to be limited to, e.g., title, abstract, and keywords fields only. Note that singular and plural forms of keywords have been considered (in particular, for Google Scholar).

Given the large amount of close "water-related NBS", a general search has completed the search by NBS for water systems, using inclusive keywords: "drainage system", "stormwater", which covers urban stormwater infrastructure and stormwater Best Management Practices (BMP), "LID practices", "Low Impact Development", and "Low impact infrastructure development".

In addition, given the large coverage of some topics in the literature and/or to focus on NBS as defined in the EU-funded Nature4Cities project—adopting the NBS definition

of the European Commission ([https://ec.europa.eu/info/research-and-innovation/research-area/environment/nature-based-solutions\\_en](https://ec.europa.eu/info/research-and-innovation/research-area/environment/nature-based-solutions_en)), which precises that NBS solutions should be inspired and supported by nature—restrictions have been applied: permeable pavements included in the “de-sealed areas” category have been limited to *grassed pavements* (e.g., pervious concrete paving blocks were excluded), and composting has been limited to *community compost* (i.e., LCAs of large-scale, municipal composting facilities have been excluded, and focus has been made of organic material from community, e.g., urban allotments, small-scale urban livestock, nearby restaurants, markets, fruit stores, etc.).

### Supplementary Material B: LCA studies analysed

**Table S2.** List of the studies analysed within the LCA-NBS literature review sorted by type of NBS

Typology of NBS	Publications
<b>1. On the ground</b>	
Large urban public park	[1,2]
Public urban green space (place, square, etc.)	[3]
Urban green space with specific uses (school playground, camp ground, sport field, etc.)	[4–6]
Wood	[7]
Lawn	[8–13]
Single tree	[14,15]
Green strip	[7,16–18]
Vegetable garden	[19,20]
Urban farm	[21–35]
Management of polluted area by plants (phytoremediation)	[36–39]
Use of preexisting vegetation	[9]
Soil and slope revegetation	[40]
Mulching	[41,42]
<b>2. Water</b>	
Excavation of new water body (pond, lake)	[17,18,43–46]
Remeander river	[47,48]
Swale	[17,18,44,45,49,50]
Rain/infiltration garden	[9,17,18,44,46,50–55]
Constructed wetlands for wastewater treatment	[17,18,44,56–70]
<b>3. On building and structures</b>	
Green roof	[7,18,55,71–93]

Green wall	[73,94–100]
<b>4. Strategies and Actions</b>	
Sustainable use of fertilisers	[101–106]
Composting	[107–110]

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