10.16 Number/proportion of conservation priority species

Project Name: CONNECTING Nature (Grant Agreement no. 730222)

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Number/proportion of conservation priority species	Biodiversity
Description and justification	Biodiversity generates a wide range of benefits to society (ecosystem services) therefore its conservation is essential to achieving Sustainable Development Goals (SDGs) and to meet the United Nations Convention on Biodiversity (CBD) Aichi Biodiversity Targets. Measuring net changes to biodiversity to monitor gains or losses as a consequence of NBS can be undertaken using various methodologies, involving either primary observations of species or assessments of habitat extent/quality as a proxy for biodiversity value. Conservation priority species are those species that are seen as keystone species, umbrella species, or species at particular risk locally, regionally or globally. Evaluation of the number/proportion of conservation priority species in a survey area can represent an effective proxy for overall habitat quality. Conservation priority species can include Article 17 species, European Red Data Book Species, national Red Data Book Species, National Biodiversity Action Plan Species, and local Red Data Book Species Key drivers include: • Assisting local authorities to evaluate their progress in urban biodiversity conservation objectives (for example against Aichi/national/local biodiversity targets); • Ensuring NBS contributes positively to biodiversity conservation; • Serving as a public platform upon which biodiversity awareness raising exercises can be launched.
Definition	Measure net change in individual conservation priority species numbers or proportion of overall sample in an area affected by NBS.
Strengths and weaknesses	+ Very good representation of biodiversity value of habitats for species groups considered in conservation action plans. Fairly good proxy for groups not considered.

	- Can be resource intensive dependent upon level of scale of survey and/or availability of existing survey protocols.
Measurement procedure and tool	Methods tend to focus on more applied/participatory methods rather than earth observation/remote sensing methods as, whilst some conservation priority species have been identified and counted from remote sensed data, inventories of conservation priority species and proportional surveys of conservation priority species amongst all background species represent more of a challenge. Nevertheless, if remote sensing methods are a priority, see methods details in Species Diversity Indicator. For applied/participatory methods, standard presence absence or population count surveys can be carried out for target conservation priority species. Carrying out standardised surveys before NBS implementation can provide a baseline from which comparisons can be made. Similarly, surveys of groups of species or species inventories can provide an intuitive biodiversity metric of proportion of conservation priority species. Such survey methodologies can have public resonance and the data can be used to populate indicators and measure progress towards conservation policy targets. UK Common Standards Monitoring using PANTHEON represents an effective way of quantifying habitat value in relation to conservation priority species. Invertebrate surveys are carried out following the Common Standards Methodology reported in Drake et al., (2007). Subsequent species lists are processed through the online PANTHEON portal (https://www.brc.ac.uk/pantheon/) to identify conservation priority statuses, traits and habitat associations. The resulting dataset can be used to present the number of conservation priority species, the proportion of conservation priority species, or an indices of conservation values that combines species inventories with conservation priority status to generate a Species Quality Index or SQI. An example of this is the Saproxylic Quality Index (Fowles et al. 1999; Alexander 2004). Whilst national standardised evaluation processes such as this are a useful aim, it is also possible to make more bespoke approaches on a site-by-site or city-wide scale based on local, regional, national, or international priority species.

Scale of measurement	**Applied methods**: Typically, more local or project scale but can be used to capture data at city scale. Scale is typically related to recorded networks and their scale. **Earth observation / Remote sensing methods**: at various geographical scales. Satellite remote sensing technology in the last decade has empowered interdisciplinary research at regional and local scale with high temporal resolution in order to provide information about changes in species distribution.
Data source	
Required data	Presence/absence and or numerical data on target species or inventories of species. This data will be associated with a spatial attribute and, often, combined with mapping data.
Data input type	Quantitative numerical data, spatially referenced
Data collection frequency	Ideally annual. If resources do not permit this, longer-time periods might be feasible (max 5-yearly)
Level of expertise required	Expertise level is dependent upon level of difficultly of identification required. For a single easily identifiable target species, level of expertise required can be low. More comprehensive/inventory surveys typically require a greater level of expertise. For some species, eDNA methods might be possible (Thomsen and Willerslev 2015). For further details see Metagenomic mapping indicator.
Synergies with other indicators	Synergies with other biodiversity indicators, particularly Article 17 species and broader biodiversity measures. Also with landuse change, greenspace area and accessibility to greenspace (wildlife areas).
Connection with SDGs	Strongest link to SDG 15. However there are links to all SDGs except 1 and 5: Biodiversity underpins food production; Links between biodiversity and health & wellbeing benefits; Links to environmental education; Links between biodiversity and water quality; Links between biodiversity and clean energy (biosolar, biofuel); Job creation; Improved green infrastructure and industry associated with biodiversity (potential disservices also); Social equality in relation to access to nature; Sustainable urban development; Biodiversity a good indicator of responsible consumption; Climate change adaptation; More sustainable water management; Biodiversity benefits; Environmental Justice in relation to biodiversity; Opportunities for collaborative working.

Opportunities for participatory data collection	Such monitoring schemes offer great opportunities for citizen participation. This can be a mechanism to increase the scale and extent of the monitoring, and to increase community engagement with, and awareness of, urban biodiversity.
Additional information	
References	Alexander, K.N.A. 2004. Revision of the Index of Ecological Continuity as used for saproxylic beetles. English Nature Research Reports. 574. Drake C.M., Lott, D.A., Alexander, K.N.A. and Webb, J. (2007) Surveying Terrestrial and Freshwater Invertebrates for Conservation Evaluation. Natural England Research Report NERR005. Natural England, Sheffield: http://publications.naturalengland.org.uk/publication/36002 Fowles, A.P., Alexander, K.N.A. & Key, R.S. 1999. The Saproxylic Quality Index: evaluating wooded habitats for the conservation of dead-wood Coleoptera. The Coleopterist, 8: 121-141 Thomsen, PF and Willerslev, E (2015) Environmental DNA – An emerging tool in conservation for monitoring past and present biodiversity, Biological Conservation 183, 4-18.

10.17 Article17 species richness

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Article 17 species richness	**Biodiversity**
Description and justification	Species richness is a crucial component of biodiversity and species density describes how many Art.17 species are encountered within a defined area (e.g., Functional Urban Area). This can be calculated using a count of species listed under Art. 17 per hexagonal grid cell.
Definition	Count of Art. 17 species per hexagonal grid cell, derived from modified Art. 17 dataset.
Strengths and weaknesses	+ uses a standardised EU-wide survey protocol so that data is comparable - data is only as precise as the survey methods employed and might not pick up changes related to smaller scale implementation of nature-based solutions in urban areas.