Appendix 1 – Supplementary Document.

Indicator	Key findings	References
Aesthetic (Water)	• Water-bodies presence and quality are important landscape elements. • Water bodies arouse contemplative and aesthetic interest — they affect nature perception and permit physical and mental recreation. • Colour and clarity affect public perceptions; in opposition, litter abundance and clandestine sewage dumps cause a reverse effect on aesthetic pleasure. • Macrophytes infestation leads to ecosystem disruption and recreation restriction.	Volker and Kistemann (2001); Uka et al. (2009); Haase (2015); Grunewald and Bastian (2017); Massoni et al. (2018); Queiroz and Carvalho (2019).
Aesthetic (Flowers)	• Plant experimentation is highly appreciated. • Aesthetic value is a reason given for natural-landscapes conservation. • People appreciate plants with large, brightly coloured flowers. • Decorative flowers, mixed with the green matrix, compose an ideal and beautiful landscape. • Diversity arouses creativity and appreciation. The richer the biotic community, the more it appeals to people, and greater the restorative effects.	Lindemann-Matthies and Bose (2007); Fuller et al. (2007); Lindemann-Matthies et al. (2010); Santos-Eurich and Carvalho (2014); Rocha et al. (2015); Schewenius et al. (2014); Dallimer et al. (2012); Hofmann et al. (2012); Lundh (2017); Zhang et al. (2017); Daniels et al. (2018); Methorst et al. (2021); Syrbe et al. (2021).
Aesthetic (Attractive animals)	• Fauna appearance has recreational values. • Birds and butterflies are the most observed animals in nature, and their presence is considered 'pleasant' and charismatic. They often serve as key attractions in tourist destinations; and attract individuals which travel specifically to observe butterfly aggregations. • People also appraise birds as one of the favourite biological outdoors elements. Birds are valued for their easy-to-observe physical beauty and interesting behaviour. Their abundance and richness are also associated with life satisfaction. • Higher bird and butterfly richness enhance psychological well-being and restorative effects.	Bolund and Hunhammar (1999); Fuller et al. (2007); Dallimer et al. (2012); Hofmann et al. (2012); Schewenius et al. (2014); Mononen et al. (2016); Cox et al. (2017); Palliwoda et al. (2017); Maes et al. (2018); Schowalter et al. (2018); Torres-Merchan et al. (2018); Methorst et al. (2021); Syrbe et al. (2021).
Comfort (Accessibility)	• Distance affects visitation. People are more likely to visit an area with easier and quicker access. Most visitors come from a distance within a 1km radius to their houses, reachable within five minutes on foot. • Physical accessibility is a design criterion for urban green spaces. • Residents with higher availability of green areas close to home are more prone to experiencing nature, more satisfied with their neighbourhood, and are more active during workdays. • Natural environments in neighbourhoods affect the contact with nature. UGA visitation-frequency associates with social cohesion, positive physical behaviour and health improvements.	Hofmann et al. (2012); Breuste et al. (2013); Calderón-Contreras and Quiroz-Rosas (2017); Grunewald and Bastian (2017); Hong and Guo (2017); Shanahan et al. (2017); Zhang et al. (2017); Cox et al. (2018); Queiroz and Carvalho (2019); Venter et al. (2020); Methorst et al. (2021); Syrbe et al. (2021).
Recreation (Activities and events)	• Different types of events and activities permit individuals to socialise and experience the current culture. • Individuals widely visit parks to meet others or cultivate neighbourhood relationships.	Massoni et al. (2018); Liu et al. (2020); Syrbe et al. (2021).
Health (Walking trails)	• The World Health Organisation recommends nature walks: they improve cognitive benefits, well-being, positive mood and self-esteem, and reduce stress and depression. • Outdoor exercise improves the ability to cope with new pathogens. • Trails surrounded by green arouse people to exercise more regularly. • Dwellers value the presence of walking or cycle paths in the neighbourhood.	Barton and Pretty (2010); WHO (2010); Bratman et al. (2015); Albert et al. (2016); Lundh (2017); Massoni et al. (2018); Kleinschroth and Kowarik (2020); Liu et al. (2020); Venter et al. (2020).
Health (Bird vocalizations)	• Bird richness positively relates to life satisfaction and enhances well-being. People perceive birds due to their pleasant and highly appreciated songs. • Hearing birds and water sounds provides restorative effects e.g. attention improvement and stress recovery.	Fuller et al. (2007); Hofmann et al. (2012); Hedblom et al. (2014); Cox et al. (2017); Lundh et al. (2017); Methorst et al. (2021).
Education (Guided visitation)	• History of use for educational proposals and presence of educational infrastructure are adequate education indicators. • Environmental education sheds light on the importance of conservation measures.	MEA (2005); Lindemann-Mathies and Bose (2007); Mace et al. (2016); Lundh (2017); Shanahan et al. (2017).
Food (Fruit trees)	• Fruit-trees arouses nature manipulation, in contrast to the transformation of nature into a static and untouchable showcase. • Fruit harvested in urban green areas is potentially safe for consumption. • Increased food biodiversity enhances nutrition security.	Schewenius et al. (2014); Rocha et al. (2015); O'Sullivan et al. (2017); Palliwoda et al. (2017); Gaudereto et al. (2019).
Water (Springs)	• Safe water is a basic material for a good life. • Protecting springs is more feasible economically than investing in purification systems.	MEA (2005); Grizzetti et al. (2016); Reilly (2018).

Continue...

Appendix 1 – Continuation.

Indicator	Key findings	References
Global climate mitigation (Carbon storage)	• Since trees store carbon fixed during photosynthesis as biomass, carbon storage is directly related to the amount of tree cover; • Brazilian UGA and UF covered with Atlantic Forest stock kilotons of carbon and CO_2. • Urbanisation results in small and sparse green areas, with lower biotic integrity. A high biotic integrity guarantees forest patches (and, consequently, stored carbon) survival over time, and biotic integrity relates to patch size - areas with at least 20ha can present, along with proper management, high integrity. • For each hectare of Semideciduous Seasonal Forest (SSF) standing, it is estimated that 108 tC/ha are stored in the aerial part and more 120 tC/ha in the soil.	Lemos et al. (2010); Nowak et al. (2013); Galvani et al. (2020); Cardoso-Leite et al. (2022); Giacon et al. (2022); Candido et al. (2025).
Local climate amelioration (Temperature) **Local climate amelioration** (Shading)	• People prioritise microclimatic regulation. Trees moderate temperature providing humidity and shade. • Green infrastructure absorbs heat through evapotranspiration and ameliorates heat-stress features and moderate urban-heat-island (UHI) effects. • Cooling effects provided by green areas save buildings energy costs and reduce carbon emissions. • People evaluate UGAs as thermally comfortable in contrast to urban "grey" areas. Temperatures gradually increase the farther the green areas get. • Sealed surfaces such as asphalt have higher heat storage capacity and retain heat when exposed to solar radiation. The greater the paved surface, the warmer the air-layer temperature on the near-surface gets. On the other hand, trees intercept solar radiation and provide shade, which relates to thermal comfort and landscape improvement. • Tree coverage influences thermal variance among urban green areas. An area with dense tree coverage has the maximum cooling effect. An area with medium tree coverage also reduces temperatures, albeit less. An area covered only with grass is warmer than an area with tree canopy. • The higher the green volume, the higher the temperature reduction; the cooler the park, the greater the improvement of the outdoor space. • Whilst field measurement of temperature reduction is a direct indicator for climatic regulation, cooling potential derived from vegetation characteristics is a valid proxy indicator.	Bolund and Hunhammar (1999); Potcher et al. (2006); Chang et al. (2007); Huang et al. (2008); Lafortezza et al. (2009); Bowler et al. (2010); Nowak et al. (2013); Lehmann (2014); Santos-Eurich and Carvalho (2014); Klemm et al. (2015); Kong et al. (2016); Gómez-Baggethun and Barton (2013); Breuste et al. (2013); Kong et al. (2016); Panasolo et al. (2019); Charoenkit and Piyathamrongchai (2019); Grunewald and Bastian (2017); Syrbe et al. (2021); Bzroska et al. (2021)
Erosion control (Protected soil)	• Vegetation cover and non-disturbed soil contribute to erosion control by diminishing the impact of raindrops on surfaces; thus, they prevent loss of soil stability, which may lead to soil particles being carried to water bodies (which results in silting) or landslides.	Stovin and Clayden (2008); Burkhard et al. (2012); Mononen et al. (2016); O'Sullivan et al. (2017).
Flood prevention (Draining soil)	• Urban growth exposes more portions of land to extreme events. If ecosystems cannot buffer those disasters, there may be life losses and economic losses. • If soils are sealed, river volume increases during storms, resulting in more intense and potentially disastrous precipitation events. Moreover, floods contaminate water bodies through the pick-up of urban street litter. • Unsealed soils combined with green infrastructure permit water to infiltrate instead of flow as surface runoff, reducing the pressure on urban drainage systems. • Urban gardens and parks with multiple uses can be an option for the enhancement of stormwater management in cities, since this practice has the potential to improve the physical characteristics of urban soils. • The quantification of unsealed surface is a common proxy indicator to estimate the ability to reduce exposure to flooding.	Bolund and Hunhammar (1999); MEA (2005); Stovin and Clayden (2008); Dobbs et al. (2011); Gómez-Baggethun and Barton (2013); McPhearson et al. (2015); Rocha (2015); Maes et al. (2018); Silva et al. (2018); Charoenkit and Piyathamrongchai (2019); Gaudereto et al. (2019); Corrêa et al. (2022); Syrbe et al. (2021).
Noise pollution reduction (Noise)	• Noise levels (dB (A)) indicate pressures due to the consistent increase in traffic noise. • Conventional noise abatement methodology has been demonstrated to be economically infeasible. • Vegetation barriers diminish noise levels through insertion loss. [1] A relatively narrow green strip provides a measurable noise reduction.	Harris and Cohn (1985); Bolund and Hunhammar (1999); Gómez-Baggethun and Barton (2013); O'Sullivan et al. (2017); Maes et al. (2018); Massoni et al. (2018); Queiroz and Carvalho (2019).
Water cycle maintenance (Canopy)	• Deforestation turns trees into CO_2 sources, and leads to global warming and desertification, hence reducing local precipitation. A rainfall-rate drop reduces reservoirs supply and menaces urban forests, whose existence depends on precipitation. The relation between tree loss and rainfall drop leads to a positive feedback loop • Vegetation cover influences usable water availability. Tree density, vegetation cover percentage and vegetation structure indicate hydrological cycle maintenance as both urban forest canopy (trees), or shallow rooted vegetation types (e.g. shrubs and grasslands), reduce runoff and increase infiltration. Trees, however, potentially intercept more, endure higher stem and through-fall.	MEA (2005); Gómez-Baggethun and Barton (2013); Nowak et al. (2013); Rocha et al. (2015); Livesley et al. (2016); Maes et al. (2018); Queiroz and Carvalho (2019); Brzoska et al. (2021); Rahman et al. (2023).

Continue...

Appendix 1 – Continuation.

Indicator	Key findings	References
Habitats and niches (Stratification)	• Since the classic studies of forest ecology in Tropical Rain Forest (Budowski, 1965), the positive relationship between forest successional stage and vertical stratification has been known, i.e. the more stratified a tropical forest is, the more mature or well preserved it is. • Studies in Brazil have shown that the species composition of the different strata (understory and canopy epiphytes) can be used as indicators for monitoring forest quality (Castello et al., 2017). • Plewa et al. (2017), in a study of saproxylic beetles carried out in Poland, demonstrated that the stratification of the canopy layers significantly influenced the species richness of these beetles, as well as the functional groups of predators and scavengers, and as the guilds of decaying dead wood and cavity- dwelling organisms. • A study carried out in the Brazilian Amazon, analyzing bats and vegetation structure (Martins et al. 2017) recorded that taxonomic biodiversity (species diversity and dominance) and total abundance were significant, increasing with tree height. It also showed that abundances of fruit bats were related to vegetation structure, and of nectarivorous bats, to the presence of more mature (and consequently more stratified) forests. The authors noted that protecting areas with large trees and closed canopies increases the persistence of pollinators and seed dispersers, especially bats. • A study in a tropical forest in South Africa demonstrated the existence of a relationship between stratification, species diversity and above-ground biomass, recording that the sub-canopy layer had the highest species richness and diversity, while the emergent layer had the highest biomass, concluding that the relationship between species richness and above-ground biomass was positive (and differentiated) for each stratum of the forest, but stronger for the sub-canopy layer than for the canopy and emergent layers (Mensah et al. 2018), i.e. a mature tropical forest has different strata and this stratification conditions species richness in the different strata by creating differentiated niches. • Studies with amphibians (Oliveira and Scheffers, 2019) have shown that arboreality (in amphibians) is strongly associated with climatic stability, precipitation and vegetation structure. The results of this study highlighted the importance of vertical stratification for species coexistence in species-rich regions (tropical forests). • A study of birds in a tropical forest in Brazil (Melo et al. 2020) showed that the increase in vegetation structure (in restored sites and forest fragments) promoted a reorganization and addition of functional characteristics of birds, which positively influenced the functional richness of this group. Campos-Silva et al. (2020) studied the relationship between vegetation structure and bird taxonomic diversity. The authors predicted that increasing vegetation structure would select birds that depend on forest environments and the resources they support. The results confirmed their prediction, i.e. vegetation structure (canopy cover and stock of dead trees) shaped the ecological attributes of birds, increasing their richness. • Studying temperate forests in Europe, Wildermuth et al. (2024) investigated which architectural properties of the canopy affected canopy arthropod communities. The authors identified that structural heterogeneity (vertical layers and variability of canopy openings) were strong predictors of arthropod abundance and diversity. In other words, even in temperate forests, which have a simpler composition and structure than tropical forests, vertical stratification influences the creation of niches and the abundance and richness of animal species.	Budowski (1965); Castello et al. (2017); Martins et al. (2017); Plewa et al. (2017); Mensah et al. (2018); Campos Silva et al. (2020); Melo et al. (2020); Oliveira and Scheffers (2019); Wildermuth et al. (2024).
Nutrient cycling (Litterfall)	• Litter, or burlap, (plant material deposited on the soil surface) stores and releases nutrients through decomposition. Nutrient cycling produces high-quality soils, which improve forest recovery potential. • Litter acts like a protective cover to soil disturbances, maintains its moisture and reduces erosion and fire risks. • Litter deposition differs among forest fragments, reflecting anthropic influence (management and removal), in addition to biotic and abiotic characteristics (e.g. species and seasons).	MEA (2005); Scoriza and Piña-Rodrigues (2012); Gaudereto et al. (2019); Pedro et al. (2019).

[1]Insertion loss: noise-level difference measured before and after a vegetation barrier insertion.
*This table format was based on Brzoska et al. (2021) and Veerkamp et al. (2021) which selected ES definitions and their benefits to people, along with possible indicators, through the grouping of key-findings and cluster of references.

References

Albert, C.; Galler, C.; Hermes, J.; Neuendorf, F.; von Haaren, C.; Lovett, A., 2016. Applying ecosystem services indicators in landscape planning and management: The ES-in- Planning framework. Ecological Indicators, v. 61, 100-113. https://doi.org/10.1016/j.ecolind.2015.03.029.

Barton, J.; Pretty, J., 2010. What is the best dose of nature and green exercise for improving mental health? A multi-study analysis. Environmental Science & Technology, v. 44 (10), 3947-3955. https://doi.org/10.1021/es903183r

Bolund, P.; Hunhammar, S., 1999. Ecosystem services in urban areas. Ecological Economics: The Journal of the International Society for Ecological Economics, v. 29 (2), 293-301. https://doi.org/10.1016/s0921-8009(99)00013-0.

Bowler, D.E.; Buyung-Ali, L.; Knight, T.M.; Pullin, A.S., 2010. Urban greening to cool towns and cities: A systematic review of the empirical evidence. Landscape and Urban Planning, v. 97 (3), 147-155. https://doi.org/10.1016/j.landurbplan.2010.05.006.

Bratman, G.N.; Daily, G.C.; Levy, B.J.; Gross, J.J., 2015. The benefits of nature experience: Improved affect and cognition. Landscape and Urban Planning, v. 138, 41-50. https://doi.org/10.1016/j.landurbplan.2015.02.005.

Breuste, J.; Schnellinger, J.; Qureshi, S.; Faggi, A., 2013. Urban Ecosystem services on the local level: Urban green spaces as providers. Ekologia, v. 32 (3), 290-304. https://doi.org/10.2478/eko-2013-0026.

Brzoska, P.; Grunewald, K.; Bastian, O., 2021. A multi-criteria analytical method to assess ecosystem services at urban site level, exemplified by two German city districts. Ecosystem Services, v. 49, 101268. https://doi.org/10.1016/j.ecoser.2021.101268

Budowski, G., 1965. Distribution of tropical american rain forest species in the light of sucessional processes. Turrialba, v. 15 (1), 40-42.

Burkhard, B.; Kroll, F.; Nedkov, S.; Müller, F., 2012 Mapping ecosystem service supply, demand and budgets. Ecological Indicators, v. 21, 17-29. https://doi.org/10.1016/j.ecolind.2011.06.019.

Calderón-Contreras, R.; Quiroz-Rosas, L.E., 2017. Analysing scale, quality and diversity of green infrastructure and the provision of Urban Ecosystem Services: a case from Mexico City. EcosystemServices, v. 23, 127-137. https://doi.org/10.1016/j.ecoser.2016.12.004.

Candido, H.M.N.; Endreny, T.A.; Carvalho, F.A., 2025. With great ecosystem services comes great responsibility: benefits provided by urban vegetation in Brazilian cities. Plants, v. 14 (3). https://doi.org/10.3390/plants14030392.

Castello, A.C.D., Coelho, S., Cardoso-Leite, E., 2017. Lianas, tree ferns and understory species: indicators of conservation status in the Brazilian Atlantic Rainforest remnants, southeastern Brazil. Brazilian Journal of Biology, v. 77 (2), 213-226. https://doi.org/10.1590/1519-6984.07715.

Chang, C.; Li, M.; Chang, S., 2007. A preliminary study on the local cool-island intensity of Taipei city parks. Landscape Urban Planning, v. 80, 386-395. https://doi.org/10.1016/j.landurbplan.2006.09.005.

Charoenkit, S.; Piyathamrongcha, K., 2019. A Review of urban green spaces multifunctionality assessment: a way forward for a standardized assessment and comparability. Ecological Indicators, v. 107, 105592. https://doi.org/10.1016/j.ecolind.2019.105592.

Corrêa, C.J.P.; Nnadi, E.O.; Mbanaso, F.U.; Tonello, K.C., 2022. Urban Gardens' Potential to Improve Stormwater Management: A Comparative Analysis among Urban Soils in Sorocaba, São Paulo, Brazil. Sustainability, v. 14 (5), 2965. https://doi.org/10.3390/su14052965.

Cox, D.T.C.; Shanahan, D.F.; Hudson, H.L.; Fuller, R.A.; Gaston, K.J., 2018. The Impact of urbanisation on nature dose and the implications for human health. Landscape and Urban Planning, v. 179, 72-80. https://doi.org/10.1016/j.landurbplan.2018.07.013.

Cox, D.T.C.; Shanahan, D.F.; Hudson, H.L.; Plummer, K.E.; Siriwardena, G.M.; Fuller, R.A.; Anderson, K.; Hancock, S.; Gaston, K.J., 2017. Doses of neighborhood nature: the benefits for mental health of living with nature. Bioscience, v. 67 (2), 147-155. https://doi.org/10.1093/biosci/biw173.

Dallimer, M.; Irvine, K.N.; Skinner, A.M.J.; Davies, Z.G.; Rouquette, J.R.; Maltby, L.; Warren, P.H.; Armsworth, P.R.; Gaston, K.J., 2012. Biodiversity and the Feel-Good Factor: understanding associations between self-reported human well-being and species richness. Bioscience, v. 62 (1), 47-55. https://doi.org/10.1525/bio.2012.62.1.9.

Daniels, B.; Zaunbrecher, B.S.; Paas, B.; Ottermanns, R.; Ziefle, M.; Roß-Nickoll, M., 2018. Assessment of urban green space structures and their quality from a multidimensional perspective. The Science of the Total Environment, v. 615, 1364-1378. https://doi.org/10.1016/j.scitotenv.2017.09.167.

Dobbs, C.; Escobedo, F.J.; Zipperer, W.C., 2011. A framework for developing urban forest ecosystem services and goods indicators. Landscape and Urban Planning, v. 99 (3-4), 196-206. https://doi:10.1016/j.landurbplan.2010.11.004.

Fuller, R.A.; Irvine, K.N.; Devine-Wright, P.; Warren, P.H.; Gaston, K.J., 2007. Psychological benefits of greenspace increase with biodiversity. Biology Letters, v. 3 (4), 390-394. https://doi.org/10.1098/rsbl.2007.0149.

Galvani, F.M.; Graciano-Silva, T.; Cardoso-Leite, E., 2020. Is biotic integrity of urban forests remants related with their size and shape? CERNE, v. 26 (1), 9-17. https://doi.org/10.1590/01047760202026012674.

Gaudereto, G.L.; Gallardo, A.L.C.F.; Ferreira, M.L.; Do Nascimento, A.P.B.; Mantovani, W., 2019. Avaliação de serviços ecossistêmicos na gestão de áreas verdes urbanas: promovendo cidades saudáveis e sustentáveis. Ambiente e Sociedade, v. 21 (01203). https://d oi.org/10.1590/1809-4422asoc0120r3vu18L4TD.

Giacon, V.P.; Valente, R.A.; Cardoso-Leite, E., 2022. Association between urbanization and the biotic integrity of urban forest remnants. Ambiente & sociedade, v. 25. https://doi.org/10.1590/1809-4422asoc20200053r4oa.

Gómez-Baggethun, E.; Barton, D. N., 2013. Classifying and valuing ecosystem services for urban planning. Ecological Economics, v. 86, 235-245. https://doi.org/10.1016/j.ecolecon.2012.08.019.

Grizzetti, B.; Liquete, C.; Antunes, P.; Carvalho, L.; Geamănă, N.; Giucă, R.; Leone, M.; McConnell, S.; Preda, E.; Santos, R.; Turkelboom, F.; Vădineanu, A.; Woods, H., 2016. Ecosystem services for water policy: Insights across Europe. Environmental Science & Policy, v. 66, 179-190. https://doi.org/10.1016/j.envsci.2016.09.006.

Grunewald, K.; Bastian, O., 2017. Maintaining Ecosystem services to support urban needs. Editorial of Special Issue. Sustainability, v. 9, 1647. https://doi.org/10.3390/su9091647.

Haase, D., 2015. Reflections about blue ecosystem services in cities. Sustainability Water Quality Ecol., v. 5, 77-83. https://doi.org/10.1016/j.swaqe.2015.02.003

Harris, R.; Cohn, L., 1985. Use of vegetation for abatement of highway traffic noise. Journal of Urban Planning and Development ASCE, v. 111, 34-48. https://doi.org/10.1061/(ASCE)0733- 9488(1985)111:1(34).

Hedblom, M.; Heyman, E.; Antonsson, H.; Gunnarsson, B., 2014. Bird song diversity influences young people's appreciation of urban landscapes. Urban Forestry and Urban Greening, v. 13, 469-474. https://doi.org/10.1016/j.ufug.2014.04.002

Hofmann, M.; Westermann, J.R.; Kowarik, I.; Van der Meer, E., 2012. Perceptions of parks and urban derelict land by landscape planners and residents. Urban Forestry and Urban Greening, v. 11, 303-312. https://doi.org/10.1016/j.ufug.2012.04.001.

Hong, W.; Guo, R., 2017. Indicators for quantitative evaluation of the social services function of urban greenbelt systems: a case study of Shenzhen, China. Ecological Indicators, v. 75, 259-267. https://doi.org/10.1016/j.ecolind.2016.12.044

Huang, L.; Li, J.; Zhao, D.; Zhu, J., 2008. A fieldwork study on the diurnal changes of urban microclimate in four types of ground cover and urban heat island of Nanjing, China. Building and Environment, v. 43 (1), 7-17. https://doi.org/10.1016/j.buildenv.2006.11.025.

Kleinschroth, F.; Kowarik, I., 2020. COVID-19 crisis demonstrates the urgent need for urban greenspaces. Frontiers in Ecology and the Environment, v. 18 (6), 318-319. https://doi.org/10.1002/fee.2230.

Klemm, W.; Heusinkveld, B.G.; Lenzholzer, S.; Jacobs, M.H.; Van Hove, B., 2015. Psychological and physical impact of urban green spaces on outdoor thermal comfort during summertime in the Netherlands. Building and Environment, v. 83, 120-128. https://doi.org/10.1016/j.buildenv.2014.05.013.

Kong, F.; Sun, C.; Liu, F.; Yin, H.; Jiang, F.; Pu, Y.; Cavan, G.; Skelhorn, C.; Middel, A.; Dronova, I., 2016. Energy saving potential of fragmented green spaces due to their temperature regulating ecosystem services in the summer. Applied Energy, v. 183, 1428-1440. https://doi.org/10.1016/j.apenergy.2016.09.070.

Lafortezza, R.; Carrus, G.; Sanesi, G.; Davies, C., 2009. Benefits and well-being perceived by people visiting green spaces in periods of heat stress. Urban Forestry and Urban Greening, v. 8 (2), 97-108. https://doi.org/10.1016/j.ufug.2009.02.003.

Lehmann, I.; Mathey, J.; Rößler, S.; Bräuer, A.; Goldberg, V., 2014. Urban vegetation structure types as a methodological approach for identifying ecosystem services - Application to the analysis of micro-climatic effects. Ecological Indicators, v. 42, 58-72. https://doi.org/10.1016/j.ecolind.2014.02.036.

Lemos, A.L.F.; Vital, M.H.F.; Pinto, M.A.C., 2010. As florestas e o painel de mudanças climáticas da ONU. BNDES Setorial, v. 32, 153-192.

Lindemann-Matthies, P.; Bose, E., 2007. Species richness, structural diversity and species composition in meadows created by visitors of a botanical garden in Switzerland. Landscape Urban Planning, v. 79, 298-307. https://doi.org/10.1016/j.landurbplan.2006.03.007.

Lindemann-Matthies, P.; Junge, X.; Matthies, D., 2010. The influence of plant diversity on people's perception and aesthetic appreciation of grassland vegetation. Biological Conservation, v. 143 (1), 195-202. https://doi.org/10.1016/j.biocon.2009.10.003.

Liu, Y.; Wang, R.; Lu, Y.; Li, Z.; Chen, H.; Cao, M.; Zhang, Y.; Song, Y., 2020. Natural outdoor environment, neighbourhood social cohesion and mental health: Using multilevel structural equation modelling, streetscape and remote-sensing metrics. Urban Forestry and Urban Greening, v. 48, 126576. https://doi.org/10.1016/j.ufug.2019.126576.

Livesley, S.J.; McPherson, G.M.; Calfapietra, C., 2016. The Urban Forest and Ecosystem Services: Impacts on Urban Water, Heat, and Pollution Cycles at the Tree, Street, and City Scale. Journal of Environmental Quality, v. 45 (1), 119-24. https://doi.org/10.2134/jeq2015.11.0567.

Lundh, J., 2017. Indicators for ecosystem services in urban green space management. Ulls väg. 27, 75007.

Mace, G.M.; Norris, K.; Fitter, A.H., 2012. Biodiversity and ecosystem services: a multilayered relationship. Trends in Ecology and Evolution, v. 27 (1). https://doi.org/10.1016/j.tree.2011.08.006

Maes, J.; Teller, A.; Erhard, M.; Conde, S.; Vallecillo Rodriguez, S.; Barredo Cano, J.I.; Paracchini, M.-L.; Abdul Malak, D.; Trombetti, M.; Vigiak, O.; Zulian, G.; Addamo, A.; Grizzetti, B.; Somma, F.; Hagyo, A.; Vogt, P.; Polce, C.; Jones, A.; Marin, A.; Ivits, E.; Mauri, A.; Rega, C.; Czucz, B.; Ceccherini, G.; Pisoni, E.; Ceglar, A.; De Palma, P.; Cerrani, I.; Meroni, M.; Caudullo, G.; Lugato, E.; Vogt, J.; Spinoni, J.; Cammalleri, C.; Bastrup-Birk, A.; San-Miguel-Ayanz, J.; San Román, S.; Kristensen, P.; Christiansen, T.; Zal, N.; De Roo, A.; De Jesus Cardoso, A.; Pistocchi, A.; Del Barrio Alvarellos, I.; Tsiamis, K.; Gervasini, E.; Deriu, I.; La Notte, A.; Abad Viñas, R.; Vizzarri, M.; Camia, A.; Robert, N.; Kakoulaki, G.; Garcia Bendito, E.; Panagos, P.; Ballabio, C.; Scarpa, S.; Montanarella, L.; Orgiazzi, A.; Fernandez Ugalde, O.; Santos-Martín, F., 2018. Mapping and Assessment of Ecosystems and their Services: An analytical framework for ecosystem condition. Publications office of the European Union, [S.l.]. https://doi.org/10.2779/055584.

Martins, A.C.M.; Willig, M.R.; Presley, S.J.; Marinho-Filho, J., 2017. Effects of forest height and vertical complexity on abundance and biodiversity of bats in Amazonia, Forest Ecology and Management, v. 391, 427-435. https://doi.org/10.1016/j.foreco.2017.02.039.

Massoni, E.S.; Barton, D.N.; Rusch, G.M.; Gundersen, V., 2018. Bigger, more diverse and better? Mapping structural diversity and its recreational value in urban green spaces. Ecosystem Services, v. 31 (C), 502-516. https://doi.org/10.1016/j.ecoser.2018.02.013.

McPhearson, T.; Andersson, E.; Elmqvist, T.; Frantzeskaki, N., 2015. Resilience of and through urban ecosystem services. Ecosystem Services, v. 12, 152-156. https://doi.org/10.1016/j.ecoser.2014.07.012

Melo, M.A.; Silva, M.A.G.D.A.; Piratelli, A.J., 2020. Improvement of Vegetation Structure Enhances Bird Functional Traits and Habitat Resilience in an Area of Ongoing Restoration in the Atlantic Forest. Anais Da Academia Brasileira de Ciencias, v. 92 (Suppl 2), e20191241. https://doi.org/10.1590/0001-3765202020191241.

Mensah, S.; Du Toit, B.; Seifert, T., 2018. Diversity-biomass relationship across forest layers: implications for niche complementarity and selection effects. Oecologia, v. 187, 783-795. https://doi.org/10.1007/s00442-018-4144-0.

Methorst, J.; Rehdanz, K.; Mueller, T.; Hansjürgens, B.; Bonn, A.; Böhning-Gaese, K., 2021. The importance of species diversity for human well-being in Europe. Ecological Economics, v. 181, 106917. https://doi.org/10.1016/j.ecolecon.2020.106917.

Millennium Ecosystem Assessment (MEA), 2005. Ecosystems and Human Well-being: Synthesis. Island Press, Washington, DC. Copyright, World Resources Institute.

Mononen, L.; Auvinen, A.; Ahokumpu, A.; Rönkä, M.; Aarras, N.; Tolvanen, H.; Kamppinen, M.; Viirret, E.; Kumpula, T.; Vihervaara, P., 2016. National ecosystem service indicators: Measures of social-ecological sustainability. Ecological Indicators, v. 61, 27-37. https://doi.org/10.1016/j.ecolind.2015.03.041.

Nowak, D.J.; Greenfield, E.J.; Hoehn, R.E.; Lapoint, E., 2013. Carbon storage and sequestration by trees in urban and community areas of the United States. Environmental Pollution, v. 178, 229-236. https://doi.org/10.1016/j.envpol.2013.03.019.

O'Sullivan, O.S.; Holt, A.R.; Warren, P.H.; Evans, K.L., 2017. Optimising UK urban road verge contributions to biodiversity and ecosystem services with cost-effective management. Journal of Environmental Management v. 191, 162-171. https://doi.org/10.1016/j.jenvman.2016.12.062.

Oliveira, F., Scheffers, B.R., 2019. Vertical stratification influences global patterns of biodiversity. ECOGRAPHY, v. 42 (2). https://doi.org/10.1111/ecog.03636.

Palliwoda, J.; Kowarik, I.; Lippe, M.Vd., 2017. Human-biodiversity interactions in urban parks: the species level matters. Landscape and Urban Planning, v. 157, 394-406. https://doi.org/10.1016/j.landurbplan.2016.09.003.

Panasolo, A.; Galvão, F.; Higachi, H. Y.; Oliveira, E. B.; Campos, F.; Wroblewski, A., 2019. Percepção dos serviços ecossistêmicos de áreas verdes urbanas de Curitiba/PR. Biofix, v. 4 (1), 70-80. https://doi.org/10.5380/biofix.v4i1.64451

Pedro, C.M.; Silva, F.C.S.; Batista, A.C.; Viola, M.R.; Coelho, M.C.B.; Giongo, M., 2019. Supplying and decomposition of burlap in a fragment of Cerrado sensu stricto. Floresta, v. 49 (2), 237. https://doi.org/10.5380/rf.v49i2.57011.

Plewa, R., Jaworski, T., Ilszczański,J., Horák, J., 2017. Investigating the biodiversity of the forest strata: The importance of vertical stratification to the activity and development of saproxylic beetles in managed temperate deciduous forests. Forest Ecology and Management, v. 402. https://doi.org/10.1016/j.foreco.2017.07.052.

Potcher, O.; Cohen, P.; Bitan, A., 2006. Climatic behavior of various urban parks during hot and humid summer in the mediterranean city of Tel Aviv. Israel. International Journal of Climatology, v. 26, 1695-1711. https://doi.org/10.1002/joc.1330.

Queiroz, D.A.H.O.; Carvalho, S.M., 2019. Avaliação da qualidade das áreas verdes urbanas de Ponta Grossa - PR, Brasil. Terr@Plural, v. 13 (3), 217-236. https://doi.org/10.5212/TerraPlural.v.13i3.0015.

Rahman, M.A.; Pawijit, Y.; Xu, C.; Moser-Reischl, A.; Pretzsch, H.; Rötzer, T.; Pauleit, S., 2023. A comparative analysis of urban forests for storm-water management. Scientific Reports, v. 13 (1), 1451. https://doi.org/10.1038/s41598-023-28629-6.

Reilly, K., 2018. How forests help cities manage water. Revolve, v. 27, 25-31.

Rocha, S.M.; Zulian, G.; Maes, J.; Thijssen, M., 2015. Mapping and assessment of urban ecosystems and their services. European Comission Technical Reports, [S.l.]. https://doi:10.2788/638737.

Santos-Eurich, Z.R.; Carvalho, S.M., 2014. Análise quali-quantitativa da arborização e infraestrutura de praças da cidade de Ponta Grossa-PR. Revista da Sociedade Brasileira de Arborização Urbana, v. 9, 29. https://doi.org/10.5380/revsbau.v9i3.63224.

Schewenius, M.; McPhearson, T.; Elmqvist, T., 2014. Opportunities for increasing resilience and sustainability of Urban social-ecological systems: insights from the URBES and the cities and biodiversity outlook projects. Ambio, v. 43 (4), 434-444. https://doi.org/10.1007/s13280-014-0505-z.

Schowalter, T.D.; Noriega, J.A.; Tscharntke, T., 2018. Insect Effects on Ecosystem Services—Introduction. Basic and Applied Ecology, v. 26, 1-7. https://doi.org/10.1016/j.baae.2017.09.011.

Scoriza, R.N.; Piña-Rodrigues, F.C.M., 2013. Aporte de serapilheira como indicador ambiental em fragmentos de floresta estacional semidecidual em Sorocaba, SP. Brazilian Journal of Agricultural Sciences, v. 8 (4), 634-640. https://doi.org/10.5039/agraria.v8i4a2807.

Shanahan, D.F.; Cox, D.T.C.; Fuller, R.A.R.A.; Hancock, S.; Lin, B.B.; Anderson, K.; Bush, R.; Gaston, K.J., 2017. Variation in experiences of nature across gradients of tree cover in compact and sprawling cities. Landscape Urban Planning, v. 157, 231-238. https://doi.org/10.1016/j.landurbplan.2016.07.004.

Silva, R.T.; Fleskens, L.; Van Delden, H.; Ploeg, M.V.D., 2018. Incorporating soil ecosystem services into urban planning: status, challenges and opportunities. Landscape Ecology, v. 33 (7), 1087-1102. https://doi.org/10.1007/s10980-018-0652-x.

Stovin, V.R.; Jorgensen, A.; Clayden, A., 2008. Street trees and stormwater management. Arboricultural Journal, v. 30, 297-310. https://doi.org/10.1080/03071375.2008.9747509.

Syrbe, R.-U.; Neumann, I.; Grunewald, K.; Brzoska, P.; Louda, J.; Kochan, B.; Macháč, J.; Dubová, L.; Meyer, P.; Brabec, J.; Bastian, O., 2021. The Value of Urban Nature in Terms of Providing Ecosystem Services Related to Health and Well-Being: An Empirical Comparative Pilot Study of Cities in Germany and the Czech Republic. Land, v. 10, 4. https://doi.org/10.3390/land10040341.

Torres-Merchán, N.Y.; Salcedo-Plazas, L.A.; Becerra-Niño, Á.; Valderrama, W., 2018. Fuentes de conocimiento en la identificación y preferencias de fauna en niñez de contextos rurales y urbanos. Revista Electrónica Educare, v. 22 (3). https://doi.org/10.15359/ree.22-3.4.

Uka, U.N.; Mohammed, H.A.; Ovie, S.I., 2009. Current diversity of aquatic macrophytes in nigerian freshwater ecosystem. BJAST, v. 13, (2), 9-15. https://doi.org/10.14210/bjast.v13n2.p9-15.

Venter, Z.; Barton, D.; Gundersen, V.; Figari, H.; Nowell, M., 2020. Urban nature in a time of crisis: recreational use of green space increases during the COVID-19 outbreak in Oslo, Norway. Environmental Research Letters. v. 15, 104075. https://doi.org/10.1088/1748- 9326/abb396.

Volker, S.; Kistemann, T., 2001. The impact of blue space on human health and wellbeing - Salutogenetic health effects of inland surface waters: a review. International Journal of Hygiene and Environmental Health, v. 214 (6), 449-460. https://doi.org/10.1016/j.ijheh.2011.05.001.

World Health Organization (WHO), 2010. Global Recommendations on Physical Activity for Health. World Health Organization, Geneva.

Wildermuth, B.; Penanhoat, A.; Sennhenn-Reulen, H.; Matevski, D.; Drescher, J.; Aubry-Kientz, M.; Seidel, D.; Schuldt, A., 2024. Canopy Structure Influences Arthropod Communities within and beyond Tree Identity Effects: Insights from Combining LiDAR Data, Insecticidal Fogging and Machine Learning Regression Modelling. Ecological Indicators, v. 160 (111901), 111901. https://doi.org/10.1016/j.ecolind.2024.111901.

Zhang, Y.; Van den Berg, A.E.; Van Dijk, T.; Weitkamp, G., 2017. Quality over quantity: contribution of urban green space to neighborhood satisfaction. Int. J. Environmental Research Public Health, v. 14 (5), 535. https://doi.org/10.3390/ijerph14050535.