

WHY IS NATURE RESTORATION CRITICAL FOR THE RESILIENCE OF EUROPEAN CITIES?

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Europe loses about 540 km² of soil due to land take annually [1], which is approximately the size of the city of Budapest. Metropolitan areas are particularly affected due to ongoing urbanization, coming at the expense of green and blue areas, agricultural land and other open landscapes as well as the biodiversity depending on these habitats.

Healthy and resilient urban ecosystems and biodiversity are key to ensuring the resilience of European cities. They provide benefits in the areas of climate change mitigation and adaptation, mitigating noise and air pollution, food security, and human health and well-being.

The proposed Nature Restoration Law sets the following targets for urban ecosystems directly targeting local and regional governments:

- No net loss of urban green spaces (compared to 2021) in every EU city, town and suburb by 2030;
- An increase in the total national area of urban green space by at least 3% by 2040 (compared with 2021), and 5% by 2050, with a focus on net gain of urban green space integrated into existing and new building stock and infrastructure development (this includes renovations and renewals);
- A minimum of 10% tree canopy cover in every EU city, town and suburb by 2050.

Ecosystem restoration in cities entails assisting natural regeneration, transforming modified ecosystems to a more natural state, or creating new ecosystems. To optimize nature's ability to provide critical ecosystem services and wider societal benefits, it is critical to **increase the quality and quantity of green urban spaces**, making sure these are rich in structural and functional biodiversity. This can be achieved by restoring degraded wetlands, rewilding rivers, renaturing brownfields and creating new semi-natural ecosystems and habitats (e.g. pocket parks, biodiverse green roofs or building facades) or creating woodlands in urban fringe areas. **Planting trees and ensuring a minimum canopy cover** is key to mitigating climate change-related impacts associated with urban heat islands and heatwaves, heavy rainfall events and droughts.

HOW CAN THE NRL CONTRIBUTE TO RESILIENCE IN URBAN AREAS?¹

- **Improve biodiversity:** By 2030, 44% of the global GDP in cities will be at risk due to biodiversity loss [2]. Intact vegetation cover (trees and other urban green) is the strongest explanatory variable for variation in species density among cities worldwide [3] and a study conducted in Australia has shown that vegetation cover below 10% results in rapid decline in species richness [4].
 - **Reduce flood risk:** in urban areas, surface runoff is a primary cause of flooding. A 10% increase in green space or a 10% increase in tree cover can reduce run-off in residential areas by 5-6%. Adding green roofs to all urban buildings could reduce urban run-off by 17-20% [5]. A global review has shown that at a level of an individual site, small-scale nature-based stormwater management solutions can reduce run-off by 30-65 % for porous pavements, up to 90% for bioretention and 100% for rain gardens [6] with the effectiveness varying with design and local conditions.
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- Rome, Metropolitan City of Rome, Italy, Photo by Mark Harpur
- **Reduce risks associated with heat stress:** in a European context, a 10% increase in urban vegetation can reduce the local temperature by an average of 0.6°C, and green infrastructure cools the local temperature by 1.07°C on average [7]. A young, healthy tree provides a local cooling effect equivalent to ten air-conditioners operating 20 hours per day [8]. Greening 35% of the EU's urban surface would generate net benefits worth €364 billion through reduced cost of cooling and €221 billion through reduced urban heat island effect [9].
 - **Mitigate climate change and save energy:** Urban vegetation contributes to climate mitigation by absorbing carbon and providing thermal insulation to buildings. Greening about 35% of the EU's urban surface could avoid up to 0.06 GtCO₂e per year [9], equivalent to Denmark's annual emissions [10], with parks and (semi)natural urban green areas and blue areas showing the highest mitigation potential per m² in European context [11]. Green roofs and walls can make buildings warmer in winter (up to 4.5°C) and cooler in summer, representing significant energy savings for heating and cooling [5].
 - **Reduce air pollution:** levels of inhalable particulate matter can be up to 60% lower on streets lined with trees, compared to those without trees [5]. Urban forests studied in 10 Italian cities removed over 37,000 tons of air pollutants in a year, providing a monetary benefit to human health, ecosystems and materials equivalent to 344 million USD/year [12].

¹ The data presented in this policy brief is drawn to a large extent from the findings of the impact assessment report accompanying the proposal for Nature Restoration Law (European Commission, 2022)

Why is nature restoration critical for the resilience of European cities?

- **Reduce noise:** planting vegetation reduces noise from traffic more effectively than man-made barriers. If compared to concrete pavement, an area with green cover reduces noise by up to 3 decibels [5].
- **Provide benefits to health and well-being:** Green and blue (water) spaces provide benefits to the mental and physical health and well-being of urban populations, not least through opportunities for recreation. Residents of European areas with the most greenery were 3 times as likely to be physically active and 40% less likely to be overweight or obese, than those living in the least green settings [5]. In European context, exposure to green space has also shown benefits to health by reducing mortality and morbidity from chronic diseases, improving mental health and pregnancy outcomes [13].

In order to achieve the targets of the NRL, the local governments will need to play a crucial role in establishing **supportive planning, administrative, management, monitoring, and financing mechanisms** to implement the legislation at the local level and foster local actions. An increasing number of cities already have integrated **urban development plans, greening plans, biodiversity strategies, or open space strategies** that can provide a solid foundation for thriving urban ecosystem restoration. However, further EU support, including support for **capacity building, technical assistance and funding** (also in conjunction with urban greening plans) will be required to support local governments in fulfilling this role.



Ljubljana, Slovenia, Photo by Eugene Kuznetsov

References

1. EEA (2021), Land take in Europe <https://www.eea.europa.eu/data-and-maps/indicators/land-take-3/assessment>
2. World Economic Forum (2022), BiodiverCities by 2030: Transforming Cities' Relationship with Nature. Available at: https://www3.weforum.org/docs/WEF_BiodiverCities_by_2030_2022.pdf
3. Aronson MFJ et al. (2014) A global analysis of the impacts of urbanization on bird and plant diversity reveals key anthropogenic drivers. Proc. R. Soc. B 281: 20133330. <http://dx.doi.org/10.1098/rspb.2013.3330>
4. Radford et. al. (2005), Landscape-level thresholds of habitat cover for woodland-dependent birds. Biological Conservation 124(3):317-337. DOI: 10.1016/j.biocon.2005.01.039
5. European Commission (2022), Commissions staff working document. Impact assessment report. Annex VI-b Accompanying the proposal for a Regulation of the European Parliament and of the Council on nature restoration. Available at: <https://environment.ec.europa.eu/system/files/2022-06/Impact%20Assessment%20accompanying%20the%20proposal%20%28Part%205%29.pdf>
6. Ruangpan L, Vojinovic Z, Di Sabatino S, Leo L S, Capobianco V, Oen AMP, McClain ME, Lopez-Gun E (2020) Nature-based solutions for hydro-meteorological risk reduction: a state-of-the-art review of the research area. Natural Hazards and Earth System Sciences 20: 243–270
7. Marando, F., Heris, M. P., Zulian, G., Udías, A., Mentaschi, L., Chrysoulakis, N., Parastatidis, D., & Maes, J. (2022) Urban heat island mitigation by green infrastructure in European Functional Urban Areas. Sustainable Cities and Society, 77(November 2021), 103564. <https://doi.org/10.1016/j.scs.2021.103564>
8. USDA (2010), Sustaining America's Urban Trees and Forests. https://www.fs.usda.gov/openspace/fote/reports/nrs-62_sustaining_americas_urban.pdf
9. Quaranta, E., Dorati, C. & Pistocchi, A. (2021) Water, energy and climate benefits of urban greening throughout Europe under different climatic scenarios. Sci Rep 11, 12163 (2021). <https://doi.org/10.1038/s41598-021-88141-7>
10. Eurostat (2022) https://ec.europa.eu/eurostat/databrowser/view/ENV_AC_AINAH_R2_custom_1203470/bookmark/table?lang=en&bookmarkId=4c3b32b5-c54f-43b4-9bab-82e27bbd25a0
11. Bulkeley H. (2020), Nature-based Solutions for Climate Mitigation. Analysis of EU-funded projects.
12. Manes, F., Marando, F., Capotorti, G., Blasi, C., Salvatori, E., Fusaro, L., Ciancarella, L., Mircea, M., Marchetti, M., Chirici, G., & Munafò, M. (2016) Regulating Ecosystem Services of forests in ten Italian Metropolitan Cities: Air quality improvement by PM10 and O3 removal. Ecological Indicators, 67, 425–440. <https://doi.org/http://dx.doi.org/10.1016/j.ecolind.2016.03.009>
13. EEA (2019), Healthy environment, healthy lives: how the environment influences health and well-being in Europe. <https://www.eea.europa.eu/publications/healthy-environment-healthy-lives>



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