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European Commission

Science for Environment Policy

A straightforward approach to assessing urban ecosystem services

Ecosystem-based adaptation to climate change relies on the services provided by nature; new research has now demonstrated the wide potential of urban ecosystem services to aid local adaptation efforts. This study developed and trialled a streamlined method for assessing ecosystem services, such as temperature reduction and carbon sequestration, in four European cities, providing a valuable tool to help city planners enhance ecosystem services.

In an increasingly human-dominated and urban world, there is a need to understand how cities can maintain and restore the ecosystem services on which people depend, especially in the face of climate change. This study, conducted by members of the EU BiodivERsA network[1], sought to develop a practical method for quantifying the ecosystem services of urban locations that would be of use to city planners.

It first examined a range of previous studies to identify sources of data which might simplify ecosystem service assessment. For example, the area of 'impervious' land, which cannot absorb water, such as concrete or road surface, was used as a basic indicator for all ecosystem services. In addition, 'regulatory' ecosystem services were represented by factors which helped cool the city, such as rivers, or provide carbon sequestration, such parks and gardens. The study also considered 'recreational' ecosystem services by assessing areas of forest and lakes.

Four major EU cities were assessed using this method: Berlin, Salzburg, Stockholm, and the Helsinki Metropolitan Area. Data were collected within the urban centres and at regular intervals up to 30km into the outskirts of the cities.

Each city showed a different pattern of ecosystem service provision, making it difficult to show a direct link between urban design and services provided, for example, some city centres were more impervious to water than the outer areas, but in others, this was reversed. Some city centres performed highly – central Salzburg and Helsinki showed good water permeability and climate regulation due to abundant green spaces. However, the study concluded that it was difficult to locate 'optimal sites' in which all indicators scored highly, although forested areas were identified as ecosystem service 'hotspots' due to their ability to sequester carbon and cool the surrounding air.

The researchers say their work helps planners simplify the complexity of monitoring ecosystem services through the use of manageable data. A deliberately limited subset of ecosystem services is considered (for instance, excluding biodiversity), however, they suggest that other data could be added to enhance their approach, for example, climate cooling information could be combined with data on the number of deaths as a result of high temperatures.

The approach provides planners with a way to quantify the potentially complex field of ecosystem services across urban areas. The data can help planners in a variety of ways, by providing information to assess development proposals, helping develop policies to reduce environmental inequalities, and strengthening integration of local and regional planning.