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Measuring the Connectivity of Natural Areas in Cities as an Indicator in the City Biodiversity Index of the CBD

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Abstract

Cities can contribute significantly to global efforts to reduce the rate of biodiversity loss. The City Biodiversity Index (CBI) was developed as a tool to evaluate the state of biodiversity in cities and to provide insights for improving conservation efforts. It was proposed at the 9th Meeting of the Conference of the Parties (COP-9) to the Convention on Biological Diversity (CBD) in May 2008. Three expert workshops in 2009, 2010 and 2011 were organized by the National Parks Board of Singapore and the Secretariat of the CBD in collaboration with the Global Partnership on Cities and Biodiversity to develop the index. The CBI includes 23 indicators such as the proportion of natural areas in the city. We present the CBI with a focus on indicator 2, which measures the connectivity of natural areas in cities. Connectivity is “the degree to which the landscape facilitates or impedes movement among resource patches” and it “can be measured by the probability of movement between all points or resource patches in a landscape”. However, the previous method suggested for this indicator in the CBI was inconsistent. We present an improvement that produces more reliable results without compromising practicality in the application of the metric. The new version applies the effective mesh size method, which is based on the probability that any two randomly chosen locations in the landscape are connected and not separated by any barriers. It includes both within-patch connectivity and between-patch connectivity. We applied the old and new versions of the connectivity metric to Montreal (in collaboration with the Ville de Montreal, Direction des grands parcs et du verdissement) and Lisbon. Montreal and Lisbon agreed to test the CBI, among various other cities. The improved method has been implemented in the CBI in collaboration with the National Parks Board of Singapore and the Secretariat of the CBD. It provides a better account of the state of connectivity of natural areas, which may have implications for cities' conservation efforts. The CBI is supposed to be applied by many cities in the world for monitoring their efforts and successes in halting the rate of biodiversity loss.

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