

Mapping optimal areas of ecosystem services potential in Vilnius (Lithuania)

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Maps are fundamental to understand the spatial pattern of natural and human impacts on the landscape (Brevik et al., 2016; Lavado Contador et al., 2009; Pereira et al., 2010a,b). Urban areas are subjected to an intense human pressure (Beniston et al., 2015), contributing to the degradation of the ecosystems, reducing their capacity to provide services in quality and quantity (Requier-Desjardins et al., 2011; Zhang et al., 2011). Environments that can provide a high number and quality of ecosystem services (ES) must be identified and managed correctly, since are spaces that can mitigate the impacts of human settlements and improve their quality. thus is of major importance have identify the areas that can provide better ES (Deppelegrin and Pereira, 2015). The aim of this work is to identify areas with high ES potential in Vilnius city. Here, we identified a total of 4 different land uses, agricultural areas (32.48%), water bodies (1.46%), forest and semi-natural (31.91%) areas and artificial surfaces (34.16%). CORINE land cover 2006 was used as base information to classify ES potential. The assessment of each land cover potential was carried out using expert assessment. Each land use type was ranked from 0 (no potential) to 5 (High potential). In this work the sum of total regulating, providing and cultural ES were assessed. The areas with optimal ES were the ones with the sum of all ranks equal or higher than the 3rd Quartil of each distribution. After identifying these areas, data was mapped using ArcGIS software. The results showed that on average Vilnius city has a higher potential for regulating services (20.35 ± 15.92), followed by cultural (14.43 ± 8.81) and providing (14.26 ± 8.87). There was a significant correlation among the different type of services. Regulating vs cultural (0.92, $p < 0.001$), regulating vs providing (0.72, $p < 0.001$) and providing vs cultural (0.65, $p < 0.001$). The results of Morans I autocorrelation index showed that regulating (Z-score: 10.45, $p < 0.001$), providing (Z-score: 11.39, $p < 0.001$) and cultural services (Z-score: 10.46, $p < 0.001$) in Vilnius were significantly clustered. In total 39.73% of the area covered was classified as optimal potential for “regulating” ES, 40.19% for “providing” ES and 31.91% for “cultural” ES. These results suggested that ES regulating, providing and cultural ES are located in specific regions, and according to optimal areas assessment, an important area of Vilnius had high potential to provide very good ES. These results are important for a better planing of these areas in order to maintain the quality of these services.

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