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Investigation the connection between the landscape pattern and naturalness of vegetation: a case study of Hungary

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Vegetation based naturalness is a key element of nature conservation and preservation. The Hungarian vegetation-based Natural Capital Index (NCI), developed in the frame of the Hungarian Vegetation Mapping Project (MÉTA, 2000); it was calculated for the whole area of Hungary. NCI is a standardized index of habitat quality and their quantity; calculation was based on field surveys. However, values are compiled from mean values and referred to a square grid network; thus, it has its limitations as calculated values cannot reflect the landscape pattern and structure. It raised the question, whether this fieldwork based on a very detailed vegetation database gives us the opportunity to identify general statements on landscape pattern connection with the vegetation based naturalness, i.e. to quantify the limits.

Our aim was to find those key landscape indices (indicators), which showed the strongest correlation with the NCI. Our analyses also addressed to investigate the scale sensitivity and scale dependence of the statistical connection between the NCI, and different landscape metric parameters. We also investigated the statistical connection between the NCI and the landscape indices derived from CORINE Land Cover (CLC) inside those selected areas, which have different level of importance on natural conservation.

We applied the CORINE database from 2000, and 2006 years in 1:100,000 scale, and the 1:50,000 scale CLC maps from 2000 for the calculation of the patch level landscape indices. The area weighted patch level landscape indices of each CORINE land cover database was calculated for the following selected areas (which represent different natural conservation importance): national parks, nature reserves, NATURA 2000 sites, areas inside the administrative borders of the Hungarian settlements over 100,000 population, and within their 5000 m buffers. ArcGIS 10, and SPSS software was used in the analyses.

After the statistical analyses we concluded that in regional (1:100,000) scale the Area Weighted Main Patch Size (AWMPS) showed the strongest correlation with the NCI, but in 1:50,000 scale the Area Weighted Mean Perimeter Area (AWMPA), and the Area Weighted Fractal Dimension Index (AWFDI) showed the strongest statistical connection with the NCI. Our results showed a strong scale dependent sensitivity of this connection. In this study, the authors also introduced some findings

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about the connection between NCI and landscape indices related with the selected area level of importance from natural conservation aspect. We found the strongest connection between the NCI and the landscape indices in case of the national parks of Hungary.

Our results can help to find the best landscape indices, which can be used as indicators of the vegetation based naturalness of different study areas (with different scale, and with different level of protection).