

Geopark comparisons, functional system modeling, and landscape-scale sustainability

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Geoparks are recognized by UNESCO with respect to important geo-heritage features, but the range of characteristics and the varied connections to the local ecology and culture are significant for their individual management. The long-term goal is to develop a basis for comparison between Geoparks and a generic model that can be adapted and used to understand the crucial, functional relationships between system variables and how these variables can be optimized for sustainable management. The model is related to management variables and the Geopark comparisons. Multi-criteria evaluation can be used to combine these in predicted scenarios, for instance, to evaluate the advantages and risks of creating geoparks in densely populated areas. Where geological sites of global importance and valuable landscapes are located in close proximity to historical settlements, the Geoparks have influenced the regional identity. Conservation customs, culture development, economy, and scientific research can be affected positively or negatively. The previously established Geoparks of Western Europe and possible Geoparks in Sweden and elsewhere in Europe were selected for comparison. Best management practices are considered for the selected sites. Geoinformation technologies can be used to improve the visualization of spatial features and as a basis for scenario predictions. Overall, the comparison indicated the important role of sustainable resource management in the design of effective Geoparks, including their possible contributions toward comprehensive, low-carbon economies and biodiversity. Conceptual modeling of “system” components and processes can potentially help include qualitative and quantitative information for a wider and more in-depth investigation. For instance, the modeling methodology can address the likely consequences in 10, 50, and 100 years if a Geopark is, or is not, established. Further, these models can facilitate the establishment of new Geoparks in areas of special geo-heritage.

Keywords: Geopark, landscape, multi-criteria evaluation, geo-heritage