Framework of indicators for evaluation of long-term environmental, social and economic changes in Czech National Parks

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The main goal of this paper is to introduce a framework of aggregated indicators for sustainability evaluation and tourism monitoring of Czech National Parks and similar protected areas (e.g. protected landscape areas or biosphere reserves). Indicators are useful for assessing management effectiveness of protected areas (Hockings 2006). Employing indicators in tourism management of protected areas is recommended by several relevant international organizations (IUCN et al. 1991, WTO – UNEP 1992). Moreover, the proposed headline indicators describe and analyse trends and mutual relationships of the three pillars of sustainable development – environmental, social and economic (Guinomet 1999, Parris 2003). They allow users/target groups (protected area administrators, civil servants, academics, general public and NOGs) to measure and assess the quality of life of local communities and at the same time the quality of local ecosystems and the environment. To cover all aspects of protected areas' sustainability and tourism monitoring, the indicators were divided into eight categories. For number of indicators in each category see table 1.

Table 1: number of indicators in each category

Category	**No. of indicators**
Abiotic environment	6
Biotic environment	3
Management of nature protection	4
Socio-demographic structure	5
Legal and instructional framework	3
Economic structure	3
Infrastructure	4
Tourism	4
Total	32

Data for construction of indicators are provided in part by the existing national and National Park's data sources, statistics and databases, and in part by a long-term monitoring of tourism exploitation of National Parks (Čihař 2006). The monitoring has been carried out by means of research implemented in four Czech National Parks and other protected areas by the Institute for Environmental Studies, Faculty of Science, Charles University since 1996. Standardized surveys focus on three major stakeholder groups in National Parks: visitors, local people and local policymakers. The survey methods include interviewing a random sample of visitors by using an extensive questionnaire (Disman 2000) and counting visitors in the central part of National Parks. Results are transformed into indicators describing different visitors' characteristics (i.e. socio-demographic characteristics, environmental awareness or spending) and visitors' numbers in selected profiles. Long-term monitoring (1996-2009) enables us to create a time series of data and to compare results from four Czech National Parks and three stakeholder groups.

Frameworks of National Park's indicators can be used as a basis of discussion about the future of the national park and its proper management. The database of indicators results is available via the internet at www.managment-chu.cz. The results of monitoring form a basis for an effective

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environmental policy and decision making in large-scale protected areas. They are also helpful in harmonizing typically conflicting interests of nature protection and tourism development. Finally, they can be connected with international activities, assessment and membership of National Parks and wilderness areas – e.g. Europarc, Europa-Diplom or PAN Parks. To conclude, we found that indicators results, presented in proper way, enable different stakeholders groups in national parks to communicate and cooperate.

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