Soil protection and strategic goals in local environmental planning

Mandy Courtney[A], Harald Zepp[A] and Bernd Marschner[A]

[A]Ruhr-University Bochum, Institute of Geography, Universitaetsstr. 150, 44780 Bochum, Germany, Email Mandy.Courtney@rub.de

Abstract
Strategical Environmental Planning is a newly developed interdisciplinary planning tool for sustainable urban development. A regular environmental reporting is to document the long-term developments in the quality of the local environment. Purpose is to develop an instrument with specific relation to space and time so that environment-related data processing, planning and control can be simplified. Besides the interests of soil protection, the environmental goods species/habitats, water, climate and human health are also considered.

Key Words
Environmental quality goals, monitoring, soil protection, Strategical Environmental Planning, surface claim, sustainable urban development.

Introduction

Daily nearly 113 hectares of surface are newly built up in Germany – for residential, industrial and recreation areas and traffic. Every German claims 564 square metres of space – trend rising according to statistics. On the other hand, about 180,000 hectares of derelict land are potentially available in urban areas. In the Ruhr Area - an urban area with a long history of coal mining and steel production in Germany - these are often more or less contaminated industrial brown fields. Through high space consumption and intensive land utilisation areas with ecosystem service functions are increasingly lost. Therefore, the city of Bochum has initiated the development of a new tool for the comprehensive documentation and evaluation of ecosystem services for the city area. This will allow to identify priority areas where measures to improve the environmental quality will render the highest returns in terms of ecosystem services, with special respect to soil protection.

Methods

Five steps of the Strategical Environmental Planning form the basis for monitoring and controlling the environmental indicators (Figure 1). During the first step, the available data was collected and evaluated in terms of its suitability to serve as an indicator for the status of the single environmental goods (soil, flora/fauna, surface/ground water, air/climate, human health. One important criteria for all data sets was that they need to be available with geographically explicit references so they can be documented and updated regularly with GIS. At the same times, specific quality goals were developed for each environmental good. In the second step, the current status of each environmental good was compared to the goals and deficiencies identified and documented in the GIS. Based on the produced maps, priority areas for action were identified in the next step. These priority areas were selected in such a way, that single measures (like unsealing or restoring vegetation) would positively affect as many environmentally goods as possible. Finally, a monitoring concept was developed that will ensure that all relevant parameters are evaluated at regular intervals at a specified spatial resolution. The whole process was conducted in close cooperation with representatives from all relevant administrative bodies of the local city council, with whom regular meetings were held and who participated in the identification of relevant parameters and their evaluation. In this way it was ensured that the new planning tool is known and accepted by the regulators.

Results

For soil quality, the presence and remediation status of contaminated sites and the ability of soils to fulfil its natural functionality were identified as the relevant criteria. While data on contaminated sitesand on surface sealing was available and only needed to be transformed into a GIS-compatible format, data on soil functionalities was missing. For the rural parts of the city (about 25% of the city area), agricultural soil maps on a scale of 1:5000 are available and the data was transformed into formats that allowed the calculation of relevant soil functionalities such as water retention capacity, pollutant filtering capacity or agricultural production potential. For the other parts of the city, soil maps are not available and soil functionality was estimated by deriving soil properties from numerous sources in which the degree of anthropogenic influence

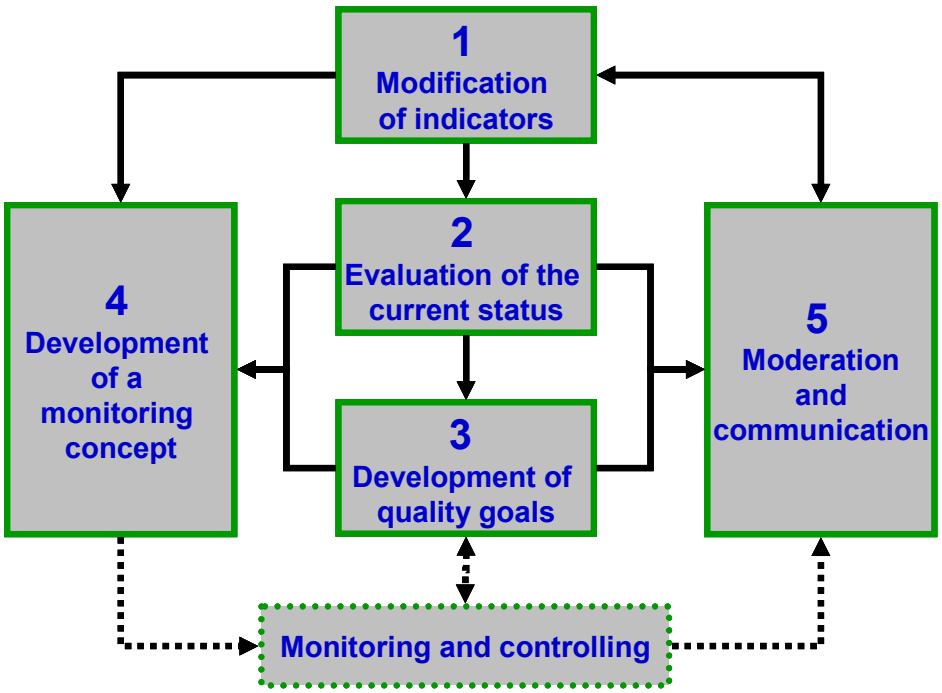

Figure 1. The five steps of the Strategical Environmental Planning

was estimated (historical maps, age of housing/industry, degree of destruction during WW II, aerial photographs). Data for most other environmental goods was also available and incorporated into the GIS. A concept of "environmental corridors" was developed, that stretch through the whole city and are not restricted to areas that are currently not built up. These corridors are to serve as priority action areas, where measures aiming at improving the environmental quality should be focused. Such measures may include upgrading the environmental functionality of derelict industrial sites by removing surface seals or by supporting revegetation. In built-up areas within the corridors, new constructions will be obliged to minimize surface sealing and include green roofs to contribute to soil functionality, local climate and habitat connectivity without profoundly interfering with current city planning. The results of the inventories and their evaluation are documented and updated in a GIS that is available to all administrative bodies of the city council. Part of the results will also be made available to the public through a web-GIS on the city's homepage.

Conclusion

By providing a GIS-based data set for the spatially resolved documentation and evaluation of the status of environmental goods the importance of soil protection has been established securely within the overall evaluation of ecosystem services for the city of Bochum. By providing an atlas that not only documents the status but also the long-term goals for the environmental goods, a tool has been developed that is a base for pro-active planning of measures to improve environmental quality as opposed to the current policy, where environmental issues are only evaluated through EIAs in reaction to proposed building projects