

LANDSCAPE ECOLOGY AND SPATIAL PLANNING IN W.-BELGIUM

ECKHART KUYKEN

Introduction

Although several private organisations for the study and conservation of nature were already active, and in spite of the efforts of some departments, spatial planning agencies did not take into account the real ecological basis of the environment. In this way, urban and industrial development, together with modern agricultural techniques, increasing traffic, recreation and pollution, caused a disastrous situation in the densely populated western part of Belgium, where only a limited number of 'natural' or 'semi-natural' landscapes are still to be found. Only a few small relicts are protected as nature reserves (together 0,4% only of the total area).

Since 1962, the Ministry of Public Works has set up 'Sectorial Development Plans' in the framework of a more regional spatial planning concept. At the end of 1973, the first of these plans were ratified by Ministerial Decree; the whole operation should be terminated in 1976 by Royal Decree. These valuable instruments for rural planning give a legal basis in safeguarding interesting landscapes and sites of great natural (or cultural) value; in the first place, they provide the development of urban, industrial and recreational zones.

However, the Administration of Urbanism and Spatial Planning, responsible for these sectorial plans, does not get adequate ecological information, as no appropriate official research institute exists to render the required advice.

Apart from the destination as a 'green zone' on the sectorial development plans, another possibility to protect landscapes and nature reserves is recently given by the 'Law on the Conservation of Nature' (12.VII.1973). It is now possible to appropriate interesting areas for proper nature conservation purposes.

Further, some interesting landscapes (both private or publicly owned) are 'classified' as a Monument by Royal Decree. Although several measures must ensure the integrity of those sites, in practice this procedure has not yet been very efficient.

As a result of this unfavorable situation, and with the intention to give the required biological information to the land planning administration, we try since 1972 to draw up an inventory and a provisional evaluation of all sites and landscapes of biological importance. Our work is carried out in two provinces: east and west-Flanders. At the same time, the Antwerp University Centre started a project to inventory a major part of the province of Antwerp. Finally, since 1973, the Biological Centre of Bokrijk has set up comparable work in the province of Limburg, as is dealt with during this Meeting by Dr. NEF. We will limit our information to the work done in the western (Flemish) part of our country.

Research in W.-Belgium

Based upon more or less detailed, biological surveys, we are aiming to assess the relative biological value of several sites (not the actual economic value, expressed in valuta). Each of these attempts is carried out in a different way, depending on priorities given to either scientific or practical planning aspects.

1. *Research in the province of Antwerp*

In the middle of 1972, Prof. R. VERHEYEN started a very detailed project to inventory this province. The test-area of about 80 sq. km is situated mainly in heath and agricultural land, including some parks, woods and one small town. The area has been divided in quadrats of 1/4 sq. km on aeral photographs. For each of these units, about 35 items are to be recorded; this data-bank will be worked out with the aid of a computer.

To be noted, measured or counted are, e.g.:

- in cultural landscapes: 'negative' elements, as houses, manufactures etc; possibly positive elements, such as dikes, canals etc; agricultural areas, gravel or sand pits etc.
- in semi-natural landscapes: the number of hectares of heathland, wood, fens, etc. each of them are to be subdivided in several types (wet, dry, oligotrophic, eutrophic etc).

For this moment, about 600 features per sq. km have been recorded (both biological and others); the evaluation of the biological value is not yet worked out. Of great importance here is the overall coverage and the very detailed descriptions within standard units. This will make it possible to compare landscapes after a number of years.

2. *Research in Limburg*

This project of biological inventory and evaluation in a test-area in the surroundings of Hasselt (80 sq. km) is mainly based upon the important work on landscape ecology, done in the Netherlands by VAN DE MAAREL (*Gorteria* 5, 1971) and others. Full details are given in the contribution of Dr. NEF.

3. *Own research in east and west Flanders*

We started our biological evaluation program in 1972, partly based upon former personal knowledge of some areas. The main principles, problems and some results are presented here (see also KUYKEN, *Extern* 3 (4), 1974)

(a) Basic methods and concepts of inventory

- Series of field survey within a certain geographic region are prepared and completed with the aid of topographic maps (1/25,000; 1/50,000) and aeral photographs (1/10,000). Urban and industrial areas are excluded beforehand.
- The field units are homogeneous parts of the 'open' or 'rural' space, outlined by visible marks and boundaries (both natural or man-made). 'Homogeneity', however, is one of the major difficulties in our work. Depending on the type of the landscape and on the scale of the final maps, the minimum area distinguished varies from 1 to 10 ha.

- The short inventory is mainly based upon dominant ecological landscape elements within each homogeneous unit, with additional notes on physical factors and human influences. These features are very often indicated by typical plant species or communities, which then are noted more in detail. Important ornithological data are recorded as well: breeding or feeding grounds for specialised or rare species, large concentrations of wintering birds etc.
 - The ecological landscape elements can be classified into rather ‘constant’ types, which are to be found more or less regularly **within a certain geographic area**. We prepare a detailed concept classification of those ‘habitats’ or ‘biotopes’ (bio-physiognomic, or to be called ‘biognomic’ units), occurring in each of the generally accepted geographic regions of both provinces. This resembles the more general work on ‘ecotopes’ by STUMPEL-RIENKS (*Gorteria*, in press), VAN DE MAAREL and others in the Netherlands.
 - Field notes on ‘potential natural vegetation’ (very important in woods etc.), on integrity and on diversity of the whole unit are most important to assess the value of that site. In this context, I very much prefer the term ‘**spontaneous elements**’, as they can occur in typical man-made landscapes as well, where their presence then reflects the degree of naturalness.
- (b) Relative, overall evaluation, mainly based on landscape ecology (‘naturalistic’ evaluation)
- No separate values for either ornithology, botany, hydrobiology etc. are calculated, to avoid difficulties in integrating different disciplines.
 - The biological value of each of the constant landscape elements mentioned before (‘ecotopes’, ‘habitats’, ‘biognomic units’ or whatever they are called) is previously put in one of the three classes of biological importance; a fourth class being of negligible biological value.
 - Based on inventories, the value of the outlined field units can be arbitrarily put in one of those classes. When several rare species or communities, or when large concentrations of interesting animals are present, the area concerned may be classified in a higher class. In the same way, the value can be increased by the presence of typical or rare geomorphological characters (in that case, the overall value of the site as to its ‘natural history’ is expressed: naturalistic evaluation = **naturhistorische Bewertung**).
 - Thus, our evaluation includes as well natural or semi-natural areas, as the more man-made types of habitats, where then the amount of spontaneous elements indicates the biological value. With old but detailed topographic maps (back to ± 1770!) the age of those elements can be found, which is of importance to assess the potential ‘maturity’: e.g. for woods, heathland, old riverbeds, man-made sites as former forts, dikes, canals, etc.. Criteria such as maturity, age, diversity, naturalness, express the replacement-value (which is of practical importance in spatial planning).
 - In this context, we like to put forward the following principle questions: (1) is it justified, from the ecological point of view, to compare two sites of a completely different structure and situated in a different geographic region, as to their biological value? May we compare the **value** of very old and diverse ecosystems (e.g. old woodlands), with that of an unstable, dynamic saltmarsh? Therefore, in our project, we only compare woods with woods, grasslands with

grasslands, etc., within a same region (dune area, polder area etc.) (2) is it possible, when using separately a great number of criteria, such as rarity, diversity, maturity, vulnerability etc., to calculate a mathematical and biological exact overall value? Several of those criteria are only **descriptive** ones, without giving any answer to the question of relative biological importance or value.

(c) Mapping system

— Only three classes of biological importance are plotted on the maps (most used are 1/50,000): areas without biological importance (forth class), as well as urban/industrial areas remain blanco. This seems to have an important psychological effect: planning agencies thus get the practical conviction that only in those blanco areas new elements can freely be projected, without disturbing important landscapers or natural sites.

(d) Results

Actually, we have mapped about 4,500 sq. km (of which ± 800 in Zeeuws-Flanders, southern Holland). A test-area of ± 375 sq. km (coastal and polder region) shows the following distribution of areas, divided in four classes of biological importance:

blanco (no biol. value)	54%
biol. class 1	31%
biol. class 2	11%
biol. class 3	4%
(highest value)	

These figures suggest that our evaluation also could indicate useful priorities for nature conservation proper, as 4% of the total area can be accepted as a minimal percentage that needs the status of reserve.

Within the area of our survey, Mr. H. STIEPERAERE (also Ghent University) studied in more detail a transect of 10 km x 3 km; he mainly used the botanical evaluation methods described by VAN DE MAAREL (*op. cit.*) and by MENNEMA in the Netherlands. (*Gorteria* 6, 1973).

Although we are convinced that our method is not a pure mathematical one, we are sure that even with this short-term project, a large number of sites can be saved; in most cases, detailed ecological research should have been too late. We have used these maps and biological evaluation with succes in proposing alternatives for planned roads, urban expansion, powerlines, camping sites etc. Above all, these maps (although not yet published) have been used very recently as (informal) basic matter for the official sectorial development plans, that are reviewed at present.

Finally, it is most important to realise that a great deal of the required biological information is to be found in the field-notes of numerous amateur naturalists. The role of professional ecologists and official institutions therefore could be in the first place to bring together the most valuable relevant knowledge, and make it operative for planning purposes and nature conservation.

Anschrift des Verfassers:

Dr. ECKHART KUYKEN Laboratorium voor Oecologie der Dieren. Zoögeografie en Natuurbehoud (Dir. Prof. Dr. J. HUBLE), K. L. Ledeganckstraat 35, B-9000-Gent, Belgium.