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Topic (iv): Spatial analysis in a statistical context and disclosure control procedures

GIS-BASED SWISS NATIONAL INVENTORIES FOR NATURE AND LANDSCAPE IN THE CONTEXT OF THE EUROPEAN NATURE INFORMATION SYSTEM (EUNIS)

Submitted by Swiss Agency for the Environment, Forests and Landscape[1]

Contributed paper

SUMMARY

1. Habitat classification is an essential source of information when evaluating the rarity of certain ecosystems for nature conservation planning. Classification principles are often based on a strong floristic-physiognomic component, which maps habitats by their vegetation communities. The description of habitats varies widely in Europe due to different schools of vegetation science. For this reason the European Union started CORINE (**Co**-o**r**dination of **In**formation on the **E**nvironment) Biotopes in the late eighties - an ambitious project to describe and map habitats at a European level. Later, the classification was extended to include the Palaearctic Habitat Classification (developed at the Institut Royal des Sciences Naturelles de Belgique), which enlarged the geographical coverage of CORINE Biotopes. Because of several problems concerning the clarity and consistency of these classifications, the European Environmental Agency (EEA) decided in 1996 that a classification system, which offers a full description of European habitat types using a descriptive framework containing decision schemes based upon parameters, was needed. Lower hierarchical units would be based on the Palaearctic Habitat Classification in order to retain a link to phytosociological classification of habitats.

2. At the same time, in accordance with and funded by the Swiss Agency for the Environment, Forests and Landscape (SAEFL), a homogenous Swiss Habitat Typology (SHT) was developed, which not only aimed for habitat description on a national level but also included the necessary correspondence and relationships with CORINE Biotopes and Palaearctic Habitat Classification respectively. Swiss nature conservation planners were aware that only a classification system consistent with a European model would allow a comparison of habitats with neighbouring countries. In assessments of biodiversity these transboundary networks are becoming more and more important. Also, they are increasingly the focus of multinational or international conservation zoning projects.

3. Already in 1987 SAEFL had started using GIS for spatial decision support, improvement of the process of data capture, revisions and updating, improvement of ecosystem monitoring, long-term ecological research and quality management, scientific data modelling and exchange of data. The spatial objects of inventories of national importance and their related database have become more and more complex over the years and contain a variety of information, such as vegetation surveys or species data.

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4. Thus it is of vital interest to SAEFL not only to link different classification systems with each other, but also to test the classification system with existing GIS data sets and to offer spatial information comparable to EEA standards on a mid-level scale and attributional detail. For this reason, reclassification of the following vector data sets was tested. These data sets represent habitats of national importance:

- Raised and transitional bogs
- Fenlands
- Floodplains
- High altitude floodplains
- Dry grasslands

5. All these spatial data sets, which were mapped at scale 1:25'000, contain phytosociological information in a geo-relational data model. Attributional resolution in most cases recorded to the alliance level. For forest communities (e.g. riverine forest communities of floodplains), classification reaches to the association level. Samples of the data sets were extracted. For attributional correspondence of the different classification systems, key-tables were generated to compare the different attributional information. Reclassification had to be done on a case by case basis, taking background information such as meta-data and literature, which described the mapped communities of Switzerland, into account. The result was a fairly good match between the Swiss and the European classification systems. It is planned to present these Euro-compatible GIS Data Sets on the website of the Swiss Clearinghouse Mechanism for Biodiversity using internet mapping tools.

6. In some cases, however, problems could be identified that led to ambiguous results or made corresponding matches nearly impossible:

a) Different methods of attributional representation (dominant vegetation per spatial object vs. statistical representation of different vegetation communities per spatial object in percentage of cover) lead to inhomogeneous results within the habitats of national importance.

b) Incomparable classes due to mixing ecological components in either classification lead to ambiguity (n:m relationships).

c) Incomparable classes due to aggregation of ecological and structural components lead to impossibility of representation in the other classification - objects had to be marked with 'nodata' values.

d) Vegetation types as described for Switzerland did not appear in CORINE Biotopes / Palaearctic Habitat Classification / EUNIS and thus could not be spatially represented correctly.

e) Where differences in the classifications occur, they are often a result of different parameter hierarchies, e.g. the first distinguishing parameter for a differentiation - such as altitude and geology. For the floristic composition of some vegetation types, substrate is more determinant than climate. For example, carbonate rock has a much warmer microclimate than siliceous rock. Thus, the primary differentiation in SHT has been made using the substrate (-rock) type.

7. Aggregating to a higher classification level helps in general to even out these problems but also leads to an inevitable loss of information. In the case of a), b) and c) above, it was suggested that future habitat mapping projects in Switzerland strive for comparability and compatibility with other classification systems such as Palaearctic Habitat Classification and EUNIS. In the case of d), several suggestions from Switzerland have led to amendments in the most recent EUNIS classification system. Currently, efforts are being made to record the obtained knowledge in a database that contains the correspondence of national habitat classification with the mentioned European classification systems and their derivatives. The result should be an easily accessible tool to query vegetation information over a variety of classifications, which is stable enough to be widely used but also flexible enough to allow for amendments.