MÃ‰TA: MULTI-ATTRIBUTED VEGETATION DATABASE OF HUNGARY

High-Resolution Field-based Survey

Traditional vegetation mapping faces new challenges: much larger survey areas, new habitat categories for uncharacteristic or degraded vegetation, increased number of ecological attributes and new methodological standards. The Hungarian MÃ‰TA field-based vegetation-mapping project has risen to the challenge with a triple-level spatial database.

Ecosystems and biological populations experience many problems: overexploitation, loss of biodiversity and climate change. To tackle these, traditional vegetation science is regaining importance. For example, in Europe field-based high-resolution vegetation mapping over large areas has been conducted in Spain and the Czech Republic, motivated by the European Natura 2000 programme. The European Union has also established the CORINE Land Cover programme to map large areas of landscape by interpreting satellite imagery. Although extremely useful to field botanists, even the most recent satellite imagery shows limitations in mapping habitat quality and diversity, the most serious deficiency being the grouping of too many habitat types into one broad land-cover class. Neither do land-cover maps provide information on quality, naturalness, function and biodiversity of landscape and vegetation, features that can only be observed by the on-site specialist. Table 1 highlights the main characteristics of traditional mapping, CORINE and MÉTA.

MÉTA Goals

In the MÉTA (Landscape Ecological Vegetation Mapping) project a total of 225 botanists spent more than seven thousand days in the field to produce about 360,000 habitat records of more than 90% of the area of Hungary (over 83,000km^2). The goals of MÉTA were: (1) to map the (semi)natural vegetation of Hungary, (2) to evaluate the natural vegetation heritage for nature conservation purposes, (3) to evaluate the present state of landscape in terms of habitat diversity, land use and ecology, and (4) to acquire data for prognosis of future change. MÉTA will serve as a basis for mapping, analysis and construction on both a countrywide and regional level. To store and easily analyse all the data, new standards for grid-based spatial resolution, habitat classes and attributes and mapping methods have been introduced.

Triple Spatial Level

The MÉTA database was implemented and developed in a Microsoft SQL 2000 server environment, which runs on Intel Xeon architecture. Software was developed within the ArcView Avenue and Microsoft NET environments. A systematic nested grid was created using ArcView 3.3 and ArcGIS 9.0 (ESRI). The three spatial levels are:

1. *Quadrants*, size 35km^2, 2,834 in total, storing data such as alien species and connections

2. *Hexagons*, size 0.35 km^2, one hundred in each quadrant, storing data such as potential vegetation, extent of ‘old fields', land-use and regeneration potential

3. *Habitats*, two to four (semi-) natural types in each hexagon, storing data such as extent of degradation, landscape attributes or threats from logging or mining (Figure 1).

Anticipated Products

The spatial balancing of estimated attributes on the surveyor's map sheets (similar to the equalising of an image mosaic) is being tackled. Multidiscipline interest in the MÉTA database calls for sharing in an Open GIS platform. Preparing hundreds of maps and publishing them on the internet requires effective and integrated GIS tools. Preliminary maps and a web portal have been prepared during a pilot. Results such as 18.2% of Hungary being covered by natural or semi-natural vegetation but only 5.2% by vegetation of a high natural value can be used to compile the Hungarian Map of Natural Vegetation Heritage. Results will also be used in applied ecology and strategic planning, for example to examine the impacts of a nature protection act or the effects of water management on an area. It is also anticipated that MÉTA

results will be valuable in the preparation of educational material.

Further Reading

Molnár, Z., et al., 2007, A Grid-based, satellite-image supported, multi-attributed vegetation mapping method (MÉTA), Folia Geobotanica, vol. 42, pp. 225-247.