

# Comparing instructions to assess Natura 2000 Habitat conservation status across borders

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## 1. Introduction

Natura 2000 is one of the largest international schemes for habitat conservation in terms of protected areas. It was established based on the EU Habitats Directive (European Commission 1992). This Directive also requests regular monitoring of the situation of species and Habitat types listed in its annexes. All EU member states are obliged to report on the current conservation status (A - favourable, B - good, C - insufficient) of the Habitat types occurring on their territory in a six years' period. While the Directive defines the way habitat quality is interpreted and lists the main variables to be monitored, it does not provide strict guidelines on the methodological details for monitoring. These are left to be decided by each member state, based on local knowledge and subject to local scientific and political discussion. This means each member state has its own monitoring rules for Natura 2000 habitat quality.

One goal of the ChangeHabitats2 project was to investigate the potential for manual and automatic derivation of habitat parameters relevant for Natura 2000 assessments from remote sensing data. Therefore, we first investigated the content of the Natura 2000 assessment schemes of different countries/regions to identify the features we are looking for in the remote sensing data. Additionally we analysed the influence of the applied instructions on the assessment results.

## 2. Methods

We systematically reviewed national/federal Natura 2000 assessment guidelines of four countries/regions – Hungary (Horváth et al. 2009), Austria (Ellmauer 2005), German Federal states of Brandenburg (LUGV 2011) and Saxony (LfULG 2009a, b) for our investigated Habitat types (forests: Natura 2000 Habitat Codes 9110/9130, 91G0, 91E0, 91F0 and 91I0; grasslands: 1530 and 6250). The features were compiled in a table and allowed a comprehensive comparison between the assessment schemes.

For a practical comparison study we selected exemplarily beech forest plots (Habitat types 9119 and 9130) in two of our study areas - Natura 2000 sites “Soproni-Hegység” in Western Hungary (N 47°41', E 16°34') and “Hardenbeck-Küstrinchen” in Uckermark region, North-eastern Germany (N 53°16', E 13°28'). For these plots, we carried out Natura 2000 assessments

according to the corresponding local instructions but also according to the chosen rules of a comparable, mostly neighbouring country/region. This allowed for quantitative comparison between the rules, investigating whether the different guidelines result in different scores of the conservation status for the same area.

### 3. Results

There is a general difference in the method how to calculate the final assessment result between the Hungarian assessment scheme and the other three analysed rule sets. In Austria, Brandenburg and Saxony all assessment (sub-)criteria are already described in three classes that meet an A, B or C. There are different ways to aggregate them to the final assessment result. In Hungary, there is a point scoring system for all requested parameters and the sum of the points assigned for favourable and unfavourable conservation status decides upon the final A, B or C.

The layout of the field monitoring is also different between some states, with Hungary taking an approach with nested sampling plots. In the German federal countries the fieldwork is carried out on the whole habitat area, Saxony prescribes one or two plots inside the area only for the vegetation relevées.

Regarding the content of the assessments, our results show many similarities between all four compared schemes on a rough level. For our investigated forest types for example, all instructions require to collect and evaluate data regarding the structure of the forest stand (spatial structure of the living trees, deadwood), its species composition and the human influence. Differences on this level concern for example the involvement of the spatial extent of the habitat area (in Austria it is part of the assessment itself, Saxony has defined a minimum size for the habitat types, no requirements in Hungary and Brandenburg) information about the surrounding landscape (only in Hungary relevant), and the status of forestry management.

A more detailed view into the features and their definitions revealed a lot more dissimilarities between the compared guidelines. Criteria like the 'structure' of a forest are divided into different levels of detail for example, and contain different features. Even if similar features are listed, the details or definitions of the feature differ between the countries. Coarse woody debris for example is defined by different diameters ( $\geq 20$ ,  $\geq 30$ ,  $\geq 35$ ,  $\geq 40$  cm in Austria, Hungary, Brandenburg and Saxony respectively) and has to be measured/counted in different units (volume/ha in Brandenburg and Austria, number/ha in Hungary and Saxony). Additionally the thresholds for a favourable, good and poor conservation status (A, B, C) can be on different levels in the compared countries ( $\geq 2$  dead trees/ha = favourable in Hungary, in Saxony there must be  $\geq 3$ ).

Based on the many differences in the instructions we expect that for many of the forest plots we studied, assessment by the local set of rules results in a different final evaluation score for its conservation status compared to applying rules from neighbouring countries/regions.

### 4. Conclusions

Whereas some of the observed differences reflect the variations in the natural conditions of the countries/regions and were expected (as species lists for Habitat types or to a certain extend age and size categories for living trees) other differences or their range were rather surprising.

On one hand, the monitoring guidelines have to reflect the local conditions and local expert knowledge as well as fit the practice in science and/or nature conservation authorities of each particular state. On the other hand, such differences cause difficulties with the data fusion and comparability on a European level and are especially impractical if habitat evaluation is to be supported by remote sensing on a broader (e.g. European) scale. The structure of the schemes themselves are already considered Earth-Observation friendly and would allow the use of remote sensing applications if methods to extract the necessary information were available. We

suggest that in the framework of the EU 2020 Biodiversity Strategy target "improve and streamline monitoring and reporting" these aspects should also be taken into account.

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