HARMONISATION OF ECOSYSTEM DEFINITIONS

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Introduction

This study was carried out by the UK NFC as one of its "contribution-in-kind" activities for the International Cooperative Programme on Modelling and Mapping. Countries calculate critical loads for a wide range of ecosystem types, identified from a number of different data types, for example, land cover, land use, national inventories or atlases etc. However, no information had been collated on the methods and data used to define the ecosystems, so one could only assume that if several countries gave the same name (eg, heathland) to an ecosystem, that these were similar ecosystems, when this may not have been the case. The UK NFC therefore proposed a study to address this issue.

Aims of the study

The main aims of the study were:

- To collate information on the definitions, data and methods used to describe and identify those ecosystems selected by individual countries for critical loads work.
- To review and harmonise these ecosystem definitions.
- To classify the ecosystems for future work under the Convention on Long Range Transboundary Air Pollution.
- To report the findings of the work to the CCE and the ICP on Modelling and Mapping.

Approach and methods used

The UK NFC wrote to each NFC that had provided critical loads data to the CCE, ie 24 NFCs. The following information was requested for each ecosystem for which critical loads had been calculated: ecosystem name, description, land use or land cover classification on which the ecosystem distribution was based (including the classes used), key indicator species representing the ecosystem, and any other information used to define the ecosystem. Replies were received from 14 countries.

Working with the ecosystem names alone, it was possible to aggregate the ecosystems into eight broad classes: forests, coniferous forests, deciduous forests, natural areas, grasslands, heathlands, wetlands and waters (Figure 1). However, this is a simple approach and does not consider the additional information collated. The types of data used to define the ecosystems can vary from one country to another, some may use land cover, others national inventories or combinations of different data types. This can also vary by ecosystem type. Table 1 lists the various classifications and databases used by NFCs to define their ecosystems.

Figure 1. Ecosystem categories defined for the ecosystem names provided by National Focal Centres

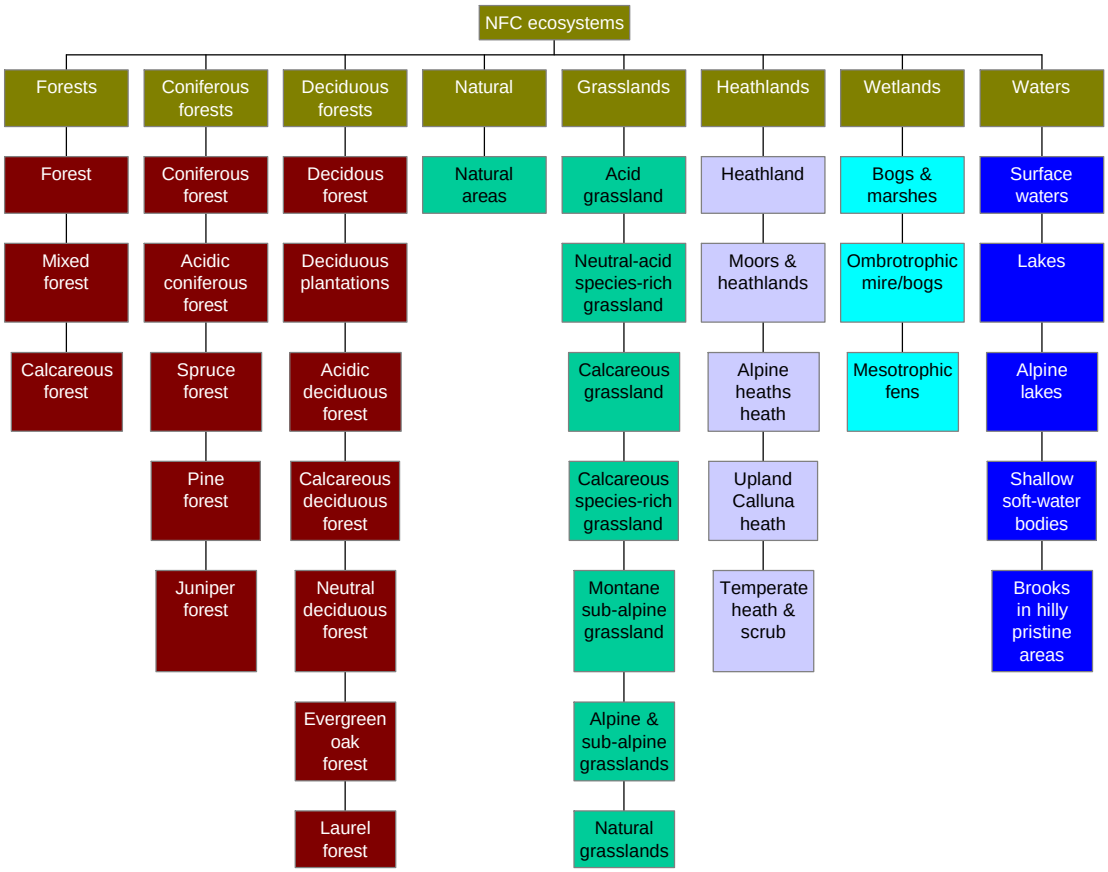


Table 1. Classifications and databases used by NFCs to classify ecosystems

- Aerial photography/field observations
- CORINE Biotopes classification of Palaearctic habitats
- CORINE Land Cover (levels 3 or 4)
- Lake registers
- PHARE Natural Resources/CORINE Information System
- National land use or land cover maps
- National forestry inventories
- National soil maps
- National species data (indicator species or distributions)
- National survey data
- National vegetation classifications/atlases
- Topographic maps/digital terrain models

Two different approaches were then considered to harmonise and re-classify the ecosystems: (i) by ecosystem type and key indicator species; (ii) by comparison with other classification schemes. After investigating method (i) it was rejected on the basis that it was:

- subjective as to who did the classification
- not easy to define new class descriptions
- not easy to update or extend to include new ecosystems for other countries
- not related to other classification
- yet another classification.

Therefore, method (ii) was explored. The FAO/UNEP Land Cover Classification System (Di Gregorio & Jansen, 2000) and the Program for the inter-comparison of land classifications prepared for the European Topic Centre on Land Cover (Wyatt, Gerard & Fuller) were rejected because they focus on the use of land cover data only, and as seen in Table 1, the information countries use to define their ecosystems is more complex than this. The CORINE Biotopes habitat classification was also rejected because of its complexity of classes for different regions across Europe; it was not easy to assign the most appropriate classes to ecosystems.

A simpler classification framework was required. This was found in the form of EUNIS – the European Nature Information System (Davies & Moss, 1999). This classification had been developed for the European Environment Agency (EAA), European Topic Centre for Nature Conservation, as a pan-European tool of the EAA. It is a successor to the CORINE habitat classification and uses a common language and a common framework with links to other classifications, for example, the CORINE Palaearctic classification. The classes can also be cross-matched to those of the CORINE Land Cover Map and the habitats listed in Annex 1 of the EU Habitats Directive. EUNIS is a hierarchical classification with clear criteria for each division; it is applicable at different levels of complexity and is easy for the non-expert to use and apply. The 10 major habitat classes are given in Table 2.

Table 2. European Nature Information System (EUNIS) habitat classifications

Habitat class	Habitat name
A	Marine habitats
B	Coastal habitats
C	Inland surface water habitats
D	Mire, bog and fen habitats
E	Grassland and tall forb habitats
F	Heathland, scrub and tundra habitats
G	Woodland and forest habitats and other wooded land
H	Inland unvegetated or sparsely vegetated habitats
I	Regularly or recently cultivated agricultural, horticultural and domestic habitats
J	Constructed, industrial and other artificial habitats

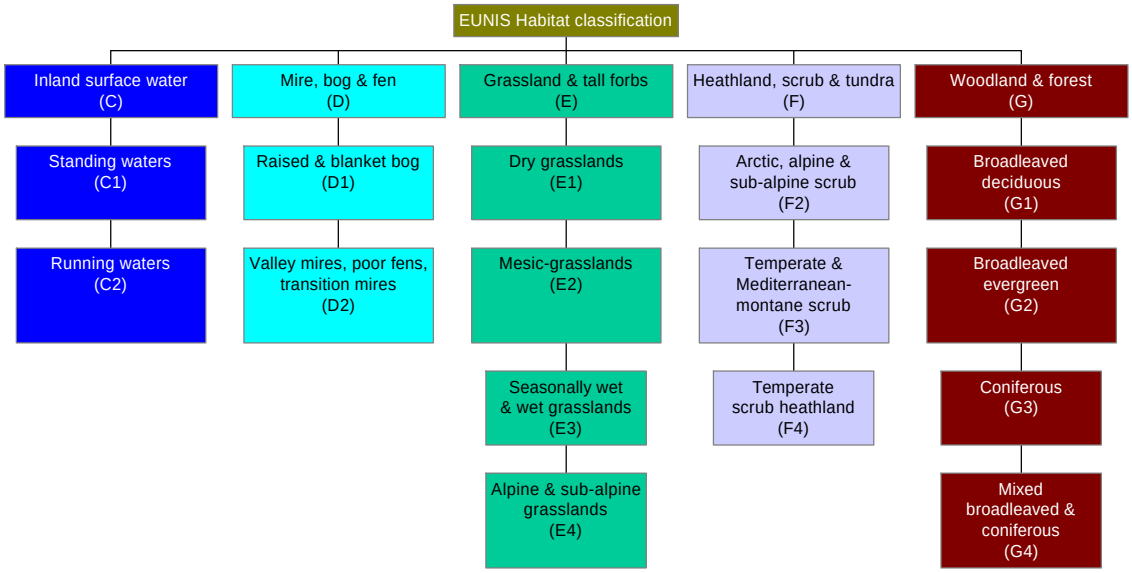
It is not possible to present the full hierarchical structure of the classification here. However, there is a dedicated EUNIS web site, which contains a list and descriptions of all the habitat types; the criteria (including criteria diagrams) for the identification

of habitats; a very useful glossary of terms, and downloadable files and reports, which describe in detail the EUNIS classification and how to use it. The web address for the site is: http://mrw.wallonie.be/dgrne/sibw/EUNIS/home.html

Results

Using the EUNIS system, the UK NFC were able to classify the ecosystems from the 14 countries into five major habitat classes, and where sufficient information on the ecosystems had been provided, into a further 15 Level 2 categories. In some cases Level 3 categories could be assigned to ecosystems. The full classification of ecosystems by country is not included in this report, but figure 2 shows the Levels 1 and 2 classes that could be used. It should be noted that in some cases, ecosystems were assigned to classes that one would not have immediately associated them with, if trying to classify by ecosystem name alone. For example, mesotrophic fens, depending on the actual full description provided by countries, may need to be assigned the "mesic-grassland" class (E2), rather than "base-rich fens" (D4) class.

Figure 2. Level 1 and Level 2 EUNIS habitat classes that can be used to describe the ecosystems for which National Focal Centres provide critical levels data.



Conclusions and recommendations

The UK NFC concluded that the EUNIS habitat classification could be used by NFCs as a common framework for recording and classifying European ecosystems for future critical loads work. This was proposed to the Task Force meeting of the ICP on Modelling and Mapping in May 2001 and it was agreed that NFCs should try using the EUNIS classification to assign habitat codes to their ecosystems. Other advantages of using EUNIS are:

(i) It is quick and easy to use, you don't have to be an expert.

(ii) The EUNIS classes can be linked to the CORINE Palaearctic classification and cross-matched to classes of the CORINE Land Cover Map.

(iii) Using it as a framework for classifying ecosystems for critical loads work could provide "added value" to the European critical loads database, because of its links to the habitats in Annex 1 of the EU habitats directive. This could

enable the effects of critical loads exceedance to be examined for habitats of particular importance under the directive.

References

Davies, C.E. & Moss, D. 1999. EUNIS Habitat Classification. Draft Final Report to the European Environment Agency, European Topic Centre on Nature Conservation. 1999 Work Programme: Task 4.3. Institute of Terrestrial Ecology, November 1999.

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