

Title:

**Title: A7.2-D3 Profiles for land cover & vegetation**

Title: A7.2-D3 Profiles for land cover & vegetation

**Author(s)/Organisation(s):**

Otakar Cerba (HSRS), Martin Pospisil (FMI), Karel Charvat (HSRS), Josef Fryml (FMI), Marian de Vries (TUD)

**Working Group:**

WP7

**References:**

0836-a7\_2-d2\_profiles\_for\_land\_cover\_\_\_vegetation-tud-002-final

**Quality Assurance:**

- |  |                             |
|--|-----------------------------|
| <input type="checkbox"/> Review WP Leader            | (WP Leader: )               |
| <input type="checkbox"/> Review dependend WP Leaders | (Depended WP Leaders: )     |
| <input type="checkbox"/> Review Executive Board      | (Executive Board Members: ) |
| <input type="checkbox"/> Review others               | (Other Reviewers: )         |

**Delivery Date:**

**Short Description:**

This document is about data models and classification schemes related to Land Cover & Vegetation. They were examined and evaluated in the context of the Forest and Urban Planning Scenarios.

**Keywords:**

<b>History:</b>			
<i>Version</i>	<i>Author(s)</i>	<i>Status</i>	<i>Comment</i>
000	Marian de Vries	new, rfc	template
001	Otakar Cerba, Martin Pospisil, Karel Charvat, Josef Fryml		
002	Marian de Vries	final	

Title:

## Table of contents

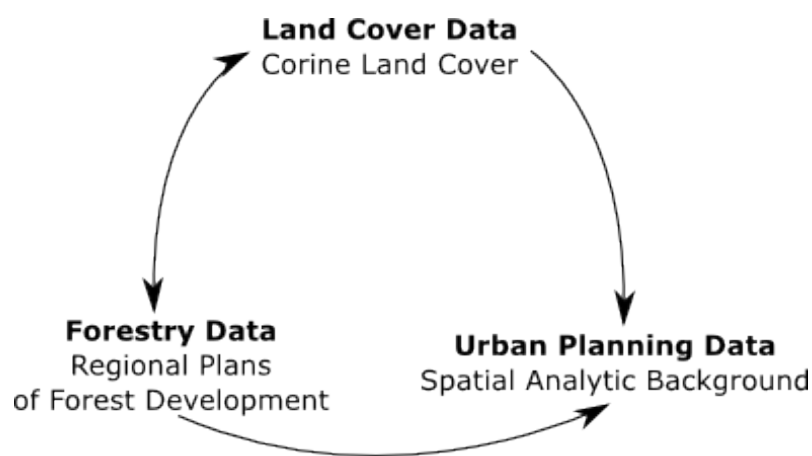
1 Introduction.....	4
2 Scope of the Profile.....	5
3 Land Cover.....	6
3.1 Regional Plans of Forest Development (RPFD).....	6
3.2 Spatial (Territorially) Analytic Backgrounds (SAB).....	7
3.3 CORINE Land Cover.....	8
4 Forest and Vegetation.....	11
5 Harmonisation initiatives.....	12
5.1 COST E43.....	12
5.2 European Forest Data Centre (EFDAC).....	12
5.3 Related projects and initiatives.....	13
6 References.....	15
7 Glossary.....	16
Annex A: Harmonisation issues.....	17
1 Data format.....	17
2 Spatial and temporal reference systems.....	17
3 Conceptual data model.....	17
3.1 Geometry types.....	17
3.2 Identification and Versioning.....	17
3.3 Importance of time / Dynamic data.....	17
4 Classification.....	18
5 Terminology.....	18
6 Metadata.....	18
7 Scale/resolution, level-of-detail, aggregation.....	18
8 Portrayal.....	18
9 Processing functions.....	18
10 Multi-linguality.....	18
11 Spatial, temporal and thematic consistency of data.....	19
12 Priorities.....	19
Annex B: Spatial (Territorially) Analytic Backgrounds (SAB).....	20
Annex C: CORINE Land Cover (CLC).....	28

Title:

Title:

## 1 Introduction

During the work on the previous versions of the use cases of the Forest and Urban Planning scenarios, it was realised that many of the activities (and the corresponding legislation) are overlapping and cannot be considered in isolation. Many of the urban planning tasks need land cover data, including information about forest areas. And many of the management tasks of forest agencies are guided by legislations that are described in the land cover legislations (Figure 1). Instead of developing two separate data models it was therefore decided to merge the data specifications of the two Scenarios.



*Figure 1. Link between forestry, land cover and urban planning activities*

Therefore a re-formulation of the use cases was needed which had to consider the main geospatial data activities of both forestry and urban planning.

This integrated approach is centred on the theme 'land cover'. The integrated Forest and Urban Planning use case investigates the update of the land cover data set CORINE Land Cover (CLC). As CORINE is used by many European states, this combined use case can provide useful insight for update and consistency check at European level.

Title:

## **2 Scope of the Profile**

The scope of the use cases in the HUMBOLDT Forest and Urban Planning scenarios is on data harmonisation related to land cover and land use based on the CORINE Land Cover (CLC) standard. The interconnections of CLC with domain specific spatial data of forestry, urban and spatial planning have the highest importance.

The contribution of the Forest and Urban Planning scenarios is to make possible to use different types of land cover and/or vegetation classification. We use domain specific data models – Regional Plans of Forest Development (HS Forest) and Spatial (Territorially) Analytic Backgrounds (HS Urban Planning) – and CLC as de facto European standard. The approach is generic however, and can be applied to the conversion of other types of international or national standards of land cover classification.

There are many activities suitable for application of this profile: Nature and environment protection, suitable growth, sensor technologies (forest fire protection), remote sensing or monitoring and representing of spatial temporal changes.

At an early date the results of HUMBOLDT project will be applied in many European projects (Plan4all, BRISEIDE).

Title:

### 3 Land Cover

For the data harmonisation use case in the Forest and Urban Planning scenario three data sets were used.. The three data models can be seen as source or target depending on the direction of the transformation: from Czech data to the European (CORINE) standard, or the other way around. This Chapter gives a short description of the data sets and their conceptual model.

#### 3.1 Regional Plans of Forest Development (RPFĐ)

The Regional Plans of Forest Development (RPFĐ) contain data summaries on the state of the forest and the service needs of the forest as a public interest. They stem from the principle of sustainable forest management and form conditions for minimization of collision between society interests and interests of individual forest owners. As a methodical tool of state forest policy, they serve as an aid for state administrative decision-making and form the background for forest management plans.

RPFĐ is legislatively defined in forest law no:289/1995 Coll. §23 and in ordinance no. 83/1996 Coll. of the Ministry of Agriculture in regards to regional plans of forest development and classification. RPFĐ data is shared with the Forest Management Institute (FMI) through the Information and Data Centre (IDC).

Figures 1 and 2 show the data content of the Regional Plans of Forest Development. The first diagram contains the original terms in Czech, the second one contains these terms translated into English.

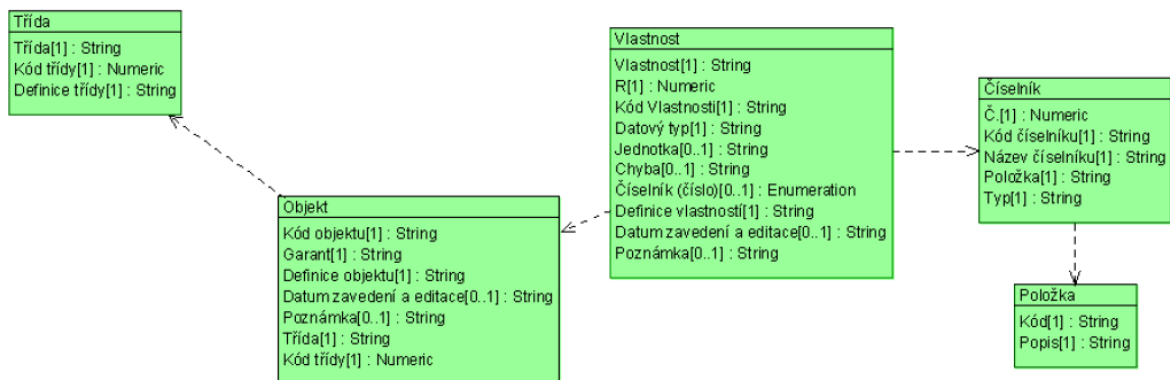


Figure 1: Regional Plan of Forest Development (Czech)

The RPFĐ classes are

- 0 Cartographic items (Kartografické prvky)
- 1 Transport communications (Komunikace)
- 2 Natural conditions (Přírodní podmínky)
- 3 Hydrography (Výškopis)
- 4 Forest protection (Ochrana lesa)
- 5 Declared roles of the forest (Deklarované funkce lesa)

Title:

6 Functional potential of forest (Funkční potenciál lesa)

In the Forest and Urban Planning use case not all RPF classes and object types are used, only the following ones:

Class 4. Forest protection

Object VEPO (Forest areas wind damaged)

Object SNNA (Forest areas snow and frost damaged)

Object POIM (forest area air pollution damaged)

Object PODM (Forest areas waterlogged)

Class 5. Declared roles of the forest

Object MEST (Suburban and recreation forests)

Class 6. Functional potential of forest

Object MELI (Water potential of forest areas)

Object REKR (Recreation potential)

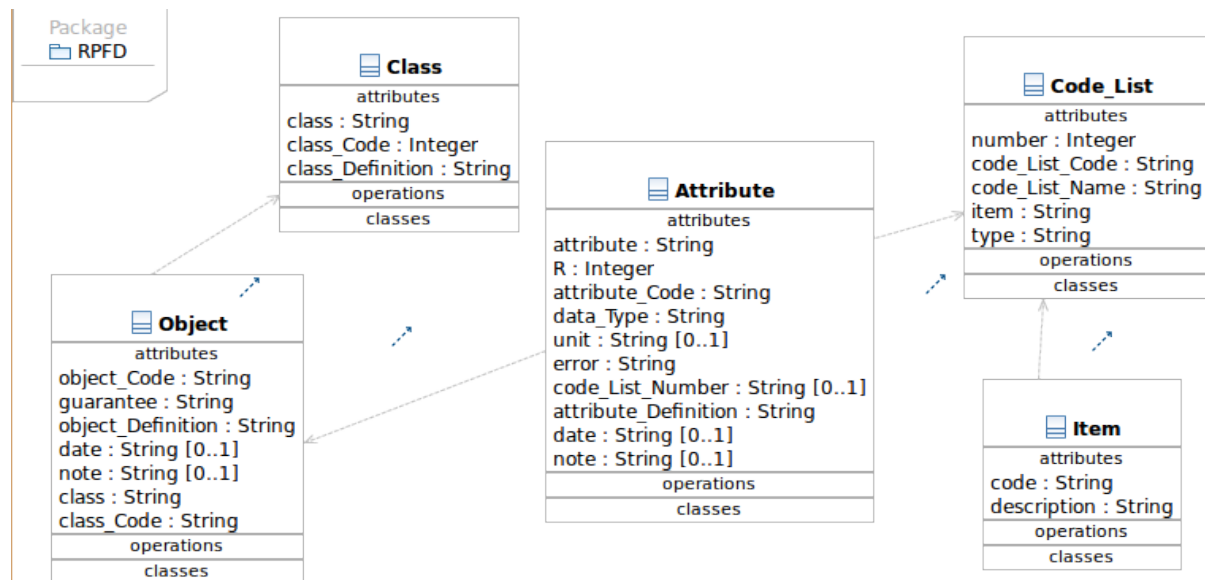


Figure 2: Regional Plan of Forest Development (English)

### 3.2 Spatial (Territorially) Analytic Backgrounds (SAB)

The SAB are collected for design of urban or spatial plans. Different data sets from different providers can be very heterogeneous, because there is not any standard defined by legislative (just a list of data

Title:

themes). They can be based on a CAD model, a GIS model, raster map etc. The SAB data are composed of 156 thematic data layers defined by ordinance 500/2006 (e.g. cultural monuments, natural ecosystems, hydro engineering structures, piping systems, traffic infrastructure etc.).

SAB data are the secondary data in many cases. They are selected from many different sources and providers. These sources are not defined but recommended. The SAB data are without any detailed description (any data models, mandatory attributes, data types, restriction of values, scale etc.). Therefore there is just a simple example described just geometry and code of SAB (code A1-A119 for items collected by municipalities; code B1-B37 for regions). The real can contain some other attributes, but they are not important in our case.

SAB are not described by any concrete data model (only by a list of obligatory layers). Therefore we prepared the set of necessary packages – geometry, features, classification and links.

The data model of SAB is not very complex. There are only two important and mandatory attributes: the geometry and the code of relevant layer of SAB.

GEOMETRY: Geometry

CODE\_SAB: Integer (1-119; 1-39)

PARAMETERS: String...

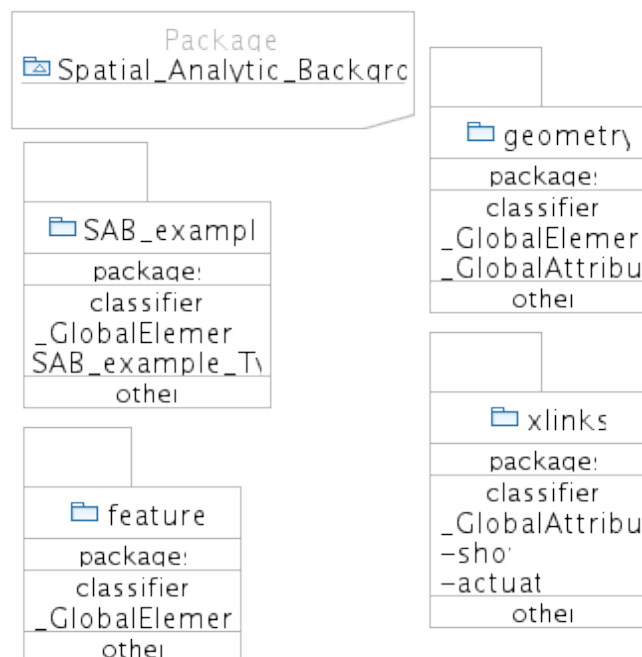


Figure 3: Spatial Analytic Background (SAB)

### 3.3 CORINE Land Cover

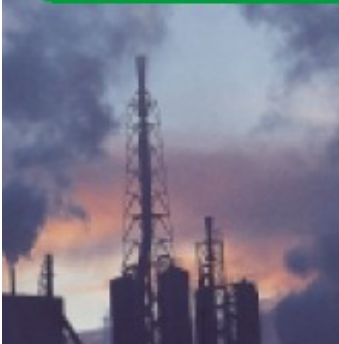




The CORINE Land Cover classification was chosen as most suitable standard classification scheme (and data model) for Land Cover information.

Title:

The classification has 3 levels, as can be seen in Figure 4 (source: EEA, 1999)

The CORINE classification is not very detailed, therefore in some countries initiatives have started to extend the classification (adding a more detailed 4<sup>th</sup> or even 5<sup>th</sup> level), by merging CORINE data with topographic data on a scale of 1:10.000.

Title:

Level 1	Level 2	Level 3
<b>1. Artificial surfaces</b>		
	<ul style="list-style-type: none"> <li>1.1. Urban fabric</li> <li>1.2. Industrial, commercial and transport units</li> <li>1.3. Mine, dump and construction sites</li> <li>1.4. Artificial, non agricultural vegetated areas</li> </ul>	<ul style="list-style-type: none"> <li>1.1.1. Continuous urban fabric</li> <li>1.1.2. Discontinuous urban fabric</li> <li>1.2.1. Industrial or commercial units</li> <li>1.2.2. Road and rail networks and associated land</li> <li>1.2.3. Port areas</li> <li>1.2.4. Airports</li> <li>1.3.1. Mineral extraction sites</li> <li>1.3.2. Dump sites</li> <li>1.3.3. Construction sites</li> <li>1.4.1. Green urban areas</li> <li>1.4.2. Port and leisure facilities</li> </ul>
<b>2. Agricultural areas</b>		
	<ul style="list-style-type: none"> <li>2.1. Arable land</li> <li>2.2. Permanent crops</li> <li>2.3. Pastures</li> <li>2.4. Heterogeneous agricultural areas</li> </ul>	<ul style="list-style-type: none"> <li>2.1.1. Non-irrigated arable land</li> <li>2.1.2. Permanently irrigated land</li> <li>2.1.3. Rice fields</li> <li>2.2.1. Vineyards</li> <li>2.2.2. Fruit trees and berry plantations</li> <li>2.2.3. Olive groves</li> <li>2.3.1. Pastures</li> <li>2.4.1. Annual crops associated with permanent crops</li> <li>2.4.2. Complex cultivation patterns</li> <li>2.4.3. Land principally occupied by agriculture, with significant areas of natural vegetation</li> <li>2.4.4. Agro-forestry areas</li> </ul>
<b>3. Forest and semi-natural areas</b>		
	<ul style="list-style-type: none"> <li>3.1. Forests</li> <li>3.2. Scrub and/or herbaceous vegetation associations.</li> <li>3.3. Open spaces with little or no vegetation</li> </ul>	<ul style="list-style-type: none"> <li>3.1.1. Broad-leaved forest</li> <li>3.1.2. Coniferous forest</li> <li>3.1.3. Mixed forest</li> <li>3.2.1. Natural grasslands</li> <li>3.2.2. Moors and heathland</li> <li>3.2.3. Sclerophyllous vegetation</li> <li>3.2.4. Transitional woodland-scrub</li> <li>3.3.1. Beaches, dunes, sands</li> <li>3.3.2. Bare rocks</li> <li>3.3.3. Sparsely vegetated areas</li> <li>3.3.4. Burnt areas</li> <li>3.3.5. Glaciers and perpetual snow</li> </ul>
<b>4. Wetlands</b>		
	<ul style="list-style-type: none"> <li>4.1. Inland wetlands</li> <li>4.2. Maritime wetlands</li> </ul>	<ul style="list-style-type: none"> <li>4.1.1. Inland marshes</li> <li>4.1.2. Peat bogs</li> <li>4.2.1. Salt marshes</li> <li>4.2.2. Salines</li> <li>4.2.3. Intertidal flats</li> </ul>
<b>5. Waterbodies</b>		
	<ul style="list-style-type: none"> <li>5.1. Inland waters</li> <li>5.2. Marine waters</li> </ul>	<ul style="list-style-type: none"> <li>5.1.1. Water courses</li> <li>5.1.2. Water bodies</li> <li>5.2.1. Coastal lagoons</li> <li>5.2.2. Estuaries</li> <li>5.2.3. Sea and ocean</li> </ul>

Title:

## **4 Forest and Vegetation**

There are no international standard data models or exchange formats (yet) on the subject of Forest Management. The main reason is in different legal definitions and expert concepts of Forest Management according to natural, social and economic conditions. For the subject of Forest Inventory the situation is better. Outputs of the National Forest Inventories are harmonised between European countries according to requirements of common reporting.

The codes in Forest Management plans are defined individually on the national level – according to traditions and functional requirements. But on the European level the symbolic keys are harmonised in presentation Map viewer generally.

For the classification of vegetation, including forest, in Europe two classification schemes are available: the vegetation classification of EUNIS (2004) and the forest type classification of the European Environment Agency (2007), see the following list.

### **European forest types – category level**

1. Boreal forest
2. Hemiboreal forest and nemoral coniferous and mixed broadleaved-coniferous forest
3. Alpine coniferous forest
4. Acidophylous oakwood and oak-birch forest
5. Mesophytic deciduous forest
6. Lowland to submountainous beech forest
7. Mountainous beech forest
8. Thermophilous deciduous forest
9. Broadleaved evergreen forest
10. Coniferous forests of the Mediterranean, Anatolian and Macaronesian regions
11. Mire and swamp forest
12. Floodplain forest
13. Non-riverine alder, birch or aspen forest
14. Plantations and self-sown exotic forest

For forest areas the EEA classification seems a good extension to the CORINE land cover classification (it can form the 4<sup>th</sup> level in the CORINE hierarchy). For other types of vegetation the classification of EUNIS could be used.

Title:

## 5 Harmonisation initiatives

There are a large number of projects and initiatives that deal with standardisation and harmonisation of forest, land cover and vegetation information.

They are listed in this chapter, and even this is not an exhaustive list.

Also see the website of the Geoland project for a similar inventory of projects: <http://www.gmes-geoland.info/links.php>

### 5.1 COST E43

COST E43: Harmonisation of National Forest Inventories in Europe: Techniques for Common Reporting - <http://www.metla.fi/eu/cost/e43/> :

This COST Action whose main objectives are to improve and harmonise the existing national forest resource inventories in Europe and to support new inventories in such a way that inventories will meet national, European and global level requirements in supplying up- to-date, harmonised and transparent forest resource information for decision (policy) making, and to promote the use of scientifically sound and validated methods in forest inventory designs, data collection and data analysis.

The COST E43 action resulted in a number of publications and recently in the book of Tomppo et al. (2010).

### 5.2 European Forest Data Centre (EFDAC)

The European Forest Data Centre <http://efdac.jrc.ec.europa.eu/>

The specific goal of the European Forest Data Center (EFDAC) is to become a focal point for policy relevant forest data and information by hosting and pointing to relevant forest information as well as providing web-based tools for accessing information located in EFDAC. The following applications are the core elements of the EFDAC:

- Metadata catalogue: <http://efdac-catalog.jrc.ec.europa.eu/> ,
- Forest Maps/ Patterns and Forest Condition: <http://efdac.jrc.ec.europa.eu/viewer> The Map Viewer application is the customized web map service (WMS/OGC) that allows the user to visualize and navigate the forest maps, forest spatial patterns maps as well as other forest related geo-datasets on forest condition available at the JRC
- European Forest Fire Information System (EFFIS): <http://effis-viewer.jrc.ec.europa.eu/wmi/viewer.html>
- European Forest Resources: <http://efdac.jrc.ec.europa.eu/index.php/efris> , The European Forest Resources Map Viewer allows the user to visualize, navigate and query the European forest resources thematic maps and datasets derived from National Forest Inventories (NFI) and international forest data providers.
- Tree Species Maps and Species Habitat Suitability: <http://efdac.jrc.ec.europa.eu/index.php/climate>, The application (the customized web map service) allows the user to visualize, navigate and download dominant tree species distribution as well as actual and future species habitat suitability maps of 30 main tree species according to the different climate model projections, scenarios and years.

Title:

## 5.3 Related projects and initiatives

### European and global

agriXchange, <http://www.agrixchange.eu/>

BRISEIDE "BRIdging SErvices, Information and Data for Europe", <http://www.briseide.eu/>

COST (2007). COST E27 "Protected forest areas in Europe – analysis and harmonisation (PROFOR): Results, conclusions and recommendations". Vienna.

E-Forest Platform: <http://efdac.ifn.fr/eforest/user>

Eionet: Natura 2000 Documents and related materials,  
[http://biodiversity.eionet.europa.eu/activities/Natura\\_2000/documentation](http://biodiversity.eionet.europa.eu/activities/Natura_2000/documentation)

EC (2003). Natura 2000 and forests 'Challenges and opportunities'. Interpretation guide. Luxembourg, European Commission, Directorate-General for the Environment, Nature and Biodiversity Unit; Forests and Agriculture Unit

EFICP metadata model, see Tilsner, D., C. Figueiredo, et al. (2007). "Metadata Model for the European Forest Information and Communication Platform." International Journal of Spatial Data Infrastructures Research 2: 112-131.

European Forest Institute, <http://www.efi.int/portal/>

FAO Global Land Cover Network, <http://www.glcn.org>

FAO (2005). Land Cover Classification System Classification concepts and user manual. Software version 2. Rome, FAO.

GLC2000: Global Land Cover 2000 database. European Commission, Joint Research Centre, 2003.  
<http://bioval.jrc.ec.europa.eu/products/glc2000/glc2000.php>

Global Land Cover (GLOBCOVER), legend (including the translation from/to CORINE land cover),  
[http://dup.esrin.esa.it/files/project/131-176-149-30\\_2009925141659.pdf](http://dup.esrin.esa.it/files/project/131-176-149-30_2009925141659.pdf)

GMES Land Information Services, <http://www.land.eu/>

GSE Forest Monitoring, <http://www.gmes-forest.info/content/about-gse-forest-monitoring>

ISO/CD 19152, Geographic information - Land Administration Domain Model (LADM), ISO/TC 211 N 2747, 2009-07-10

LCCS (FAO Land Cover Classification System),  
<http://www.fao.org/docrep/008/y7220e/y7220e00.htm#Contents>

LUCAS (Land Use/Cover Area frame Statistical Survey), <http://eusoils.jrc.ec.europa.eu/projects/Lucas/>

Natural habitats (Natura 2000),  
[http://europa.eu/legislation\\_summaries/environment/nature\\_and\\_biodiversity/l28076\\_en.htm](http://europa.eu/legislation_summaries/environment/nature_and_biodiversity/l28076_en.htm)

NEFIS (Network for a European Forest Information Service), <http://www.efi.int/portal/project/nefis/>

Pan European Forest Monitoring Service,  
[http://www.informus.de/gsefm\\_resources/Documents/GSEFM\\_T2\\_S6\\_Ph1\\_GAF\\_EEA.pdf](http://www.informus.de/gsefm_resources/Documents/GSEFM_T2_S6_Ph1_GAF_EEA.pdf)

Title:

Plan4all “European Network of Best Practices for Interoperability of Spatial Planning Information”,  
<http://www.plan4all.eu>

Slovenian Forestry Institute (2006). Multifunctional forest management in Natura 2000 sites.  
Contributions from the International Workshop held at Kočevje/Mašun, Slovenija in October 06.

### **Regional or national**

Africover map and data (FAO), uses LCCS, <http://www.africover.org/>

agroXML 1.3, agroXML 1.4, <http://www.agroxml.de/>

EOSD (Earth observation for sustainable development of forest, Canada): EOSD Land Cover  
Classification Scheme, <http://cfs.nrcan.gc.ca/subsite/eosd/home>

Land Information System Austria (LISA), <http://www.landinformationsystem.at/>

Mode d’Occupation du Sol (MOS), Base de connaissance sur le MOS

Sistema de Información de Ocupación del Suelo en España (SIOSE),  
<http://www.siose.es/siose/documentacion.jsp>

US Geological Society: Land Use and Land Cover (LULC) classification system

NLCD Land Cover of USGS, <http://landcover.usgs.gov/classes.php>

Title:

## 6 References

CORINE Land Cover 2000 seamless vector data - version 13 (02/2010),

<http://www.eea.europa.eu/data-and-maps/data/corine-land-cover-2000-clc2000-seamless-vector-database-2>

EEA (1999), CORINE Land Cover: a key database for European integrated environmental assessment

EEA (2007). European forest types. Categories and types for sustainable forest management reporting and policy. EEA Technical report. No 9.

EUNIS (2004). ANNEX 1: Index numbers and names of all EUNIS Habitats 2004,

[http://eunis.eea.europa.eu/upload/EUNIS\\_2004\\_list.pdf](http://eunis.eea.europa.eu/upload/EUNIS_2004_list.pdf)

Tomppo, E., T. Gschwanter, et al., Eds. (2010). National Forest Inventories - Pathways for common reporting, Springer.

Title:

## **7 Glossary**

EEA = European Environment Agency

EAFRD = European Agricultural Fund for Rural Development

EUNIS = European Nature Information System

LUCAS = Land Use/Cover Area frame statistical Survey

MCPFE = Ministerial Conference on the Protection of Forests in Europe

MOLAND = Monitoring Land Use/Cover Dynamics

Natura 2000 = a European ecological network of protected areas designated by the EU Member States based on legally binding legislation: the Habitats and Birds Directives

RPFD = Regional Plan of Forest Development

SAC = Special Area of Conservation (Natura 2000)

(p)SCI = (proposed) Site of Community Importance (Natura 2000)

SPA = Special Protection Area (Natura 2000)

Title:

## **Annex A: Harmonisation issues**

As part of the information analysis phase in the Forest and Urban Planning Scenarios the main data harmonisation issues were identified. For documentation purposes this list is included here.

### **1 Data format**

The target would be to achieve syntactical interoperability by establishing data exchange via a standardised metadata catalogue (including a Feature Catalogue), and web services (WMS, WFS, WPS, WCS, etc).

### **2 Spatial and temporal reference systems**

The spatial reference systems involved are the S-JTSK (Czech national system) and ETRS 1989. The current solution is depending on the situation. Coordinate transformations to another system are usually processed directly in the knowledge database.

For the use cases described in the Scenario coordinate transformation by a WPS or WCTS would be useful.

### **3 Conceptual data model**

The conceptual data models for forest data sets differ. Current solutions to overcome these problems rely on manual work, there are no commonly agreed data models available, nor are (semi-) automated tools for data model harmonisation available.

As prerequisite we expect to use the HUMBOLDT framework to serve the needed transformations for both Scenarios. We expect the HUMBOLDT framework to provide at least semi-automated solutions for the harmonisation of conceptual data models, and for the harmonisation of the geometry of objects (also see point 11).

#### **3.1 Geometry types**

The geometry types are the basic ones: point, line, polygon (2D and 2.5 D), and image data (raster).

No special harmonisation needs exist related to this.

#### **3.2 Identification and Versioning**

This has to be further looked at. For example: do the forest units have unique identifiers (id's)?

Versioning is probably necessary to be able to follow changes of land cover (history of changes).

#### **3.3 Importance of time / Dynamic data**

Time can be important although in the current use cases no sensor data or otherwise dynamic data are collected and processed in real-time.

Title:

## **4 Classification**

Yes, it is significant to have standard classifications to follow the development of landscapes from the point of view of forest damage, biodiversity, erosion, and conservation policies and urban development.

For all attributes that have a list of possible values (an enumeration attribute) the Scenarios will try to use already existing standard (official or not official) classifications, e.g. for the type of forest and type of land use.

## **5 Terminology**

The terminology used in the forest management field should be published in a multi-lingual (Czech and English) thesaurus or ontology.

## **6 Metadata**

Metadata is very important for both Scenarios. In the context of the discussion about the core HUMBOLDT metadata profile, the Urban Planning Scenario has proposed a metadata profile.

## **7 Scale/resolution, level-of-detail, aggregation**

Aggregation is not part of the use cases in the Forest and Urban Planning scenarios, but scale issues can be important, also see 9: Processing functions.

## **8 Portrayal**

Yes, this is important.

Currently there are predefined a number of cartographic queries for different scales and for overlaps of the data layers in the Regional Plan of Forest Development (RPFDD).

In HUMBOLDT portrayal should be customisable as follows: For each user it should be possible to define a certain portrayal style. A possible solution could be to define presentation styles (via Styled Layer Descriptors, SLD) and to connect them with Context information. I.e. a context profile must be developed for each user that also contains information about preferred portrayal solutions.

## **9 Processing functions**

In the view of harmonisation of processing the edge matching is very important (but not necessary) to modify (improve) the geometry of CLC data, because CLC data sets are in smaller scale and granularity than RPFDD data and SAB data from other sources.

## **10 Multi-linguality**

Yes, because the end-users will use the system in their own language (Czech, English, in the near future Latvian).

Title:

## **11 Spatial, temporal and thematic consistency of data**

In these Scenarios there is data harmonisation not only from the data model point of view, but also from the geometry point of view: the same real-world objects exist in a different layers and map compositions, and this must be dealt with (removing or merging 'doubles').

## **12 Priorities**

The main priority for the Forest and Urban Planning Scenarios is to combine heterogeneous spatial data from different sources and create harmonised data sets. Therefore the harmonisation tools must be able to convert different spatial data models including re-classification.

Other suitable harmonisation functions (e.g. multi-linguality, edge-matching) are described in previous sections.

Title:

## **Annex B: Spatial (Territorially) Analytic Backgrounds (SAB)**

The SAB Code is created by the combination of Annex (A or B) and the number of a layer.

SAB Code	Topographic Data layers (features in view)
Annex A	
1	Built-up area
2	Fabrication areas
3	Civic facilities areas
4	Recovery areas or re-using of degraded areas
5	Preserved reservation including protective zone
6	Preserved zone including buffer zone
7	Landscape preserved zone
8	Real cultural monument, eventually set of real cultural monuments, including protective zone
9	Real national cultural monument, eventually set of real national cultural monuments, including protective zone
10	Monument under the protection of UNESCO
11	Urban merits
12	Region of folk-style architecture
13	Historically important construction, set of historically important constructions
14	Architecturally important construction, set of architecturally important constructions
15	Important constructional dominant

Title:

SAB Code	Topographic Data layers (features in view)
16	Territory of archaeological discoveries
17	Zone of landscape type and its characteristic
18	Place of landscape type and its characteristic
19	Place of important event
20	Important sight-seeing point
21	Territorial system of ecological stability
22	Important landscape component, registered, if it is not expressed by other item (data layer)
23	Important landscape component by law, if it is not expressed by other item (data layer)
24	Intermediate protected area
25	National park, including zones and protective zone
26	Protected landscape area, including zones
27	National nature preserve, including protective zone
28	Nature preserve, including protective zone
29	National natural monument, including protective zone
30	Nature park
31	Natural monument, including protective zone
32	Monumental tree, including protective zone
33	Biosphere Reserve of UNESCO, geo-park of UNESCO
34	NATURA 2000 – European important locality
35	NATURA 2000 – birds special protection areas

Title:

SAB Code	Topographic Data layers (features in view)
36	Nationally important localities of appearance of special protected species of plants or animals
37	Protection forest
38	Forest of special determination
39	Production forest
40	50 m distance from forest edge
41	Valuated Soil-Ecological Units (BPEJ)
42	Biochores border
43	Investments to improvement of soil productivity
44	Water source, surface and subsurface water, including protective zone
45	Protected area of natural water storage
46	Vulnerable (risk) territory
47	Water body of surface and subsurface water
48	Water reservoir
49	River-basins, watershed divide
50	Flooding areas
51	Active zone of flooding areas
52	Area designate to flood water spreading
53	Area of specific floods under waterworks
54	Object / equipment of flood control
55	Natural curative (medicinal) source, source of natural mineral water, including protective zone

Title:

SAB Code	Topographic Data layers (features in view)
56	Health resort, interior and exterior territory of health resort
57	Mining area (allotment)
58	Protected deposit area
59	Protected area for special interferences with earth crust
60	Deposit of mineral raw materials
61	Undermined territory
62	Landslip area and area of geological risks
63	Old mine working
64	Old ballast of area and contaminated areas
65	Territory of deterioration in quality of atmosphere
66	Spoil heap, dumping hopper, sludge bed, stack
67	Technological object of water provision, including protective zone
68	Water-supply network, including protective zone
69	Technological object of waste-water discharge and waste-water purification, including protective zone
70	Network of sewer lines, including protective zone
71	Power production, including protective zone
72	Electrical substation (of power system), including protective zone
73	Aerial and subterranean lines of electricity supply system, including protective zone
74	Technological object of gas supply, including protective and safety zone
75	Gas distribution lines, including protective and safety zone

Title:

SAB Code	Topographic Data layers (features in view)
76	Technological object of supply of other products, including protective zone
77	Oil pipeline, including protective zone
78	Pipeline of other products, including protective zone
79	Technological object of supply of heat, including protective zone
80	Heat pipeline, including protective zone
81	Electronically communication device, including protective zone
82	Communication lines, including protective zone
83	Nuclear equipment
84	Objects or equipments registered to groups A or B with placed dangerous substances
85	Dumping ground, including protective zone
86	Incineration plant, including protective zone
87	Equipment for hazardous waste, including protective zone
88	Highway, including protective zone
89	High speed route, including protective zone
90	First class route, including protective zone
91	Second class route, including protective zone
92	Third class route, including protective zone
93	Village and tertiary road
94	Nationwide railway, including protective zone
95	Regional railway, including protective zone

Title:

SAB Code	Topographic Data layers (features in view)
96	Corridor of high-speed railway line
97	Branch line, including protective zone
98	Funicular railway, including protective zone
99	Special railway, including protective zone
100	Tramway line, including protective zone
101	Trolley-bus line, including protective zone
102	Airport, including protective zones
103	Aircraft construction, including protective zones
104	Waterway
105	Border checkpoint
106	Cyclist track, cycle-way, horse-way, tourist trail
107	Object, which is important to defence of the state, including protective zone
108	Military training territory
109	District of emergency planning
110	Object of civil defence
111	Object of fire prevention
112	Object, which is important to performance of the tasks of the Police of the Czech Republic
113	Protective zone of cemetery or crematorium
114	Other protective zones
115	Other public infrastructure

Title:

SAB Code	Topographic Data layers (features in view)
116	Number of completed flats at 31st December of every year
117	Pledgeable area
118	Other intentions
119	Other accessible information, for example average price of square metre of building land classified according to cadastral units
Annex B	
1	Development of number of the population
2	Part of population between the ages of 0 and 14 years in total number of the population
3	Part of population at the age of 65 years and more in total number of the population
4	Part of population with basic scholarship
5	Part of population with university education
6	Residential structure
7	Economic activity according to branches
8	Unemployment rate
9	Moving out to occupations and schools
10	Commuting to occupations and schools
11	Housing construction and house development
12	Part of unoccupied flat in total housing stock
13	Structure of housing stock
14	Locally common rent
15	Recreation area with year-round (all season) and season utilization
16	Number of buildings of family recreation
17	Capacity and category of accommodation facilities
18	Health resorts and health resorts territory
19	Part of population supplied with water from public water tap

Title:

SAB Code	Topographic Data layers (features in view)
20	Part of population supplied with gas
21	Part of population attached to public sewer systems
22	Part of farmland in the total land area of cadastre
23	Part of arable land in farmland
24	Part of stable grass vegetation in the total land area of farmland
25	Part of special agriculture plantation in the total land area of farmland
26	Part of protection classes represented on separate cadastral units
27	Part of built-up area and other area in total land area of cadastre
28	Part of water area in total land area of cadastre
29	Part of forest area in total land area of cadastre
30	Ratio of ecological stability
31	Level of naturalness of forest crop
32	Border of nature forest crops
33	Border of bioregions and biochores
34	Border of climatic regions
35	Number of municipalities and population in territories of deterioration in quality of atmosphere
36	Values of environment pollutions and its progression
37	Other accessible information dealing with for example demography, economic activities, housing, recreation, satisfying of social needs and environment

Title:

## **Annex C: CORINE Land Cover (CLC)**

Code\_00 (Corine Land Cover nomenclature)

### **1 Artificial surfaces**

- 1.1 Urban fabric
  - 1.1.1 Continuous urban fabric
  - 1.1.2 Discontinuous urban fabric
- 1.2 Industrial, commercial and transport units
  - 1.2.1 Industrial or commercial units
  - 1.2.2 Road and rail networks and associated land
  - 1.2.3 Port areas
  - 1.2.4 Airports
- 1.3 Mine, dump and construction sites
  - 1.3.1 Mineral extraction sites
  - 1.3.2 Dump sites
  - 1.3.3 Construction sites
- 1.4 Artificial non-agricultural vegetated areas
  - 1.4.1 Green urban areas
  - 1.4.2 Sport and leisure facilities

### **2 Agricultural areas**

- 2.1 Arable land
  - 2.1.1 Non-irrigated arable land
  - 2.1.2 Permanently irrigated land
  - 2.1.3 Rice fields
- 2.2 Permanent crops
  - 2.2.1 Vineyards
  - 2.2.2 Fruit trees and berry plantations
  - 2.2.3 Olive groves
- 2.3 Pastures
  - 2.3.1 Pastures
- 2.4 Heterogeneous agricultural areas

Title:

- 2.4.1 Annual crops associated with permanent crops
- 2.4.2 Complex cultivation
- 2.4.3 Land principally occupied by agriculture, with significant areas of natural vegetation
- 2.4.4 Agro-forestry areas

### 3 Forests and semi-natural areas

- 3.1 Forests
  - 3.1.1 Broad-leaved forest
  - 3.1.2 Coniferous forest
  - 3.1.3 Mixed forest
- 3.2 Shrub and/or herbaceous vegetation association
  - 3.2.1 Natural grassland
  - 3.2.2 Moors and heathland
  - 3.2.3 Sclerophyllous vegetation
  - 3.2.4 Transitional woodland shrub
- 3.3 Open spaces with little or no vegetation
  - 3.3.1 Beaches, dunes, and sand plains
  - 3.3.2 Bare rock
  - 3.3.3 Sparsely vegetated areas
  - 3.3.4 Burnt areas
  - 3.3.5 Glaciers and perpetual snow

### 4 Wetlands

- 4.1 Inland wetlands
  - 4.1.1 Inland marshes
  - 4.1.2 Peatbogs
- 4.2 Coastal wetlands
  - 4.2.1 Salt marshes
  - 4.2.2 Salines
  - 4.2.3 Intertidal flats

### 5 Water bodies

- 5.1 Inland waters

Title:

- 5.1.1 Water courses
- 5.1.2 Water bodies
- 5.2 Marine waters
  - 5.2.1 Coastal lagoons
  - 5.2.2 Estuaries
  - 5.2.3 Sea and ocean