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Title: A7.2-D2 Profiles for land cover & vegetation (Interim version)
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WP7
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757-hs_forest___overall_concept-fmi-001-new
919-hs_forest_and_hs_urban_planning_data_specification-hsrs-001-new.xls

Short Description:
<p>This document contains the interim version of the data specification for the Forest scenario as discussed until June 2009. The scenario is since then in transition towards merging with the Urban Planning scenario. This change is not incorporated yet in this document, apart from section 6.2 where a brief motivation for the transition towards combined use cases and data specification is given.</p> <p>In this document the information analysis and the design of the data model (chapters 2 and 3) focus on one of the use cases of the original Forest scenario, which was specified in most detail in the system specification, i.e. the use case about EAFRD related subsidy requests. The main functionality of this use case is that owners of forest parcels can ask subsidy when their parcels are in a Natura 2000 protected area, and certain conditions are met. Owners must make a well-founded subsidy request, and maps and spatial analysis is used to precisely indicate where the forest parcels are and what the economic value is of the current forest stand (depending on the vegetation type of the forest on that parcel).</p> <p>This data specification will be used as basis for the broader profile for land cover and vegetation that is the subject of the final document.</p>
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Forest Scenario, information analysis, conceptual data model, harmonisation issues, forest management, Natura 2000

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000	Marian de Vries	new	Based on data specification components of WP9.x Reports
001	Marian de Vries	draft, rfc	
002	Arta Dilo, Josef Fryml, Martin Pospíšil, Marian de Vries	update	Data model adapted based on discussions at Delft WP7 meeting in November 2008. FMI will investigate cross-border possibilities with Bavaria
003	Marian de Vries	update	Updated chapters 1 and 3
004	Sisi Zlatanova	update	Added motivation about merging of Forest and Urban scenario data specifications (chapter 6.2)
005	Marian de Vries	final	Final edits

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1 Purpose and scope

This document contains the interim version of the data specification for the Forest Scenario. It is based on the system specification for that Scenario, and does not consider yet the overlap with the data specification for the Urban Planning Scenario.

The focus of the information analysis and of the conceptual data model (chapters 2 and 3) is on one of the use cases of the Forest Scenario, i.e. the use case about EAFRD related subsidy requests. The main functionality of this use case is that owners of forest parcels can ask subsidy when their parcels are in a Natura 2000 protected area, and certain conditions are met. The choice to start with this use case was made because of the more detailed description it had in the WP9 system specification.

This interim version of the data specification is the basis for the broader profile for land cover and vegetation that is the subject of the final document. That profile will cover also the other use cases of the Scenario.

Chapter 2 gives an overview of the information needed in the EAFRD use case. In chapter 3 the conceptual data model is presented. It contains a number of classes (spatial object types and data types) that are also relevant for the other use cases of the Scenario. Chapter 4 gives a short list of the data sources that contain the information needed in the use case. The list will be further detailed in the final version.

Chapter 5 has a broader scope again. It contains an inventory of the data harmonisation issues that are especially relevant for the Forest Scenario as a whole.

Chapter 6 mentions an open issue that is a certain handicap for defining a common data model and data specification for forest management spatial data: so far the data sources we can use for testing, and also the example use cases are for the Czech Republic only. It would be better to have data sets and examples of use from bordering regions (for example Bavaria), but attempts to get these data sets have not been successful so far.

Chapter 6.2 discusses the new developments related to this data specification. During the work on the system specifications for the Forest and the Urban Planning scenario's, it was realised that many of the urban planning and forest issues and data sets overlap, and that they should be considered in their integrity.

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2 Information analysis

2.1 Use cases of the Scenario

The following use cases have been proposed in the WP9 system specification:

- 1101 Standardization of forest data - MoA,
- 1102 Harmonization of forest layers,
- 1103 Interconnection between data layers in the project „Virtual Forest Authority“ (cross-border with Germany),
- 1104 field survey of forest typology for RPF D,
- 1105 EAFRD - keeping of economic set of forest stand from previous production cycle in Natura 2000 areas (preparation of subsidy requests by parcel owners)
- 1106 Transportation network database maintenance and update
- 110X Forest typology - Forest health conditions observation

The 1105 EAFRD use case is the one that is described in most detail in the WP9 report, therefore we take that use case now as starting point for the specification of the harmonised data model and the inventory of harmonisation requirements in the Forest Scenario.

The main functionality of this use case is that owners of forest parcels can ask subsidy when their parcels are in a Natura 2000 protected area, and certain conditions are met, so that they can stop economic activity (forest production) on that forest parcel in favor of nature conservation. The EAFRD (European Agricultural Fund for Rural Development) has a subsidy program to make this possible.

Owners must make a well-founded subsidy request, and maps and spatial analysis is used to precisely indicate where the forest parcels for which the subsidy is requested are, to find out if parcels are indeed in the Natura 2000 protected area, and what the economic value is of the current forest stand (depending on the vegetation type of the forest on that parcel).

2.2 Spatial information needed for the EAFRD use case

(source: chapter 4 of WP9 report, 757-hs_forest___overall_concept-fmi-001-new)

Information item	Purpose
Forest management plan - FMI	Getting information on Forest management plan and forest borders : Basic data set for spatial analysis.
NATURE 2000 data - CENIA	Getting information on Nature 2000 border : Basic data set for detecting of subsidy corresponding Forest border

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	Detecting of area for subsidy , for which borders areas will be calculated with WPS
Target Management Unit map - FMI	Basic data set needed for orientation purposes. providing information on types of Forest land use
Cadastral Map - CUZK	Getting information on ownership Basic data set for spatial analysis. Data is needed for information on whether subsidy for forest owners are possible or not
Very High resolution satellite data, orthofoto - CENIA	Getting information on pre-calculated forest areas: Thematic data set for orientation for owners. Data is needed for information on whether forest parcels and / or not use for subsidy Especially used in the run-up to a forest subsidy event (“Which areas can potentially affected by subsidy”)
RPFĐ (regional plan of forest development)	Data background for the WMS and WFS
Podkladové lesnické a státní Mapy	Better orientation in forest stands Access into subsidy areas

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3 Data model (EAFRD use case)

Based on the use case description and the information analysis in chapter 2 a conceptual data model was created that captures the spatial information used in the EAFRD use case, see Figure 1. This data model was further discussed with the Forest partners, and adapted based on this discussion. Note: see section 6.2 for a motivation on the future direction of this data model.

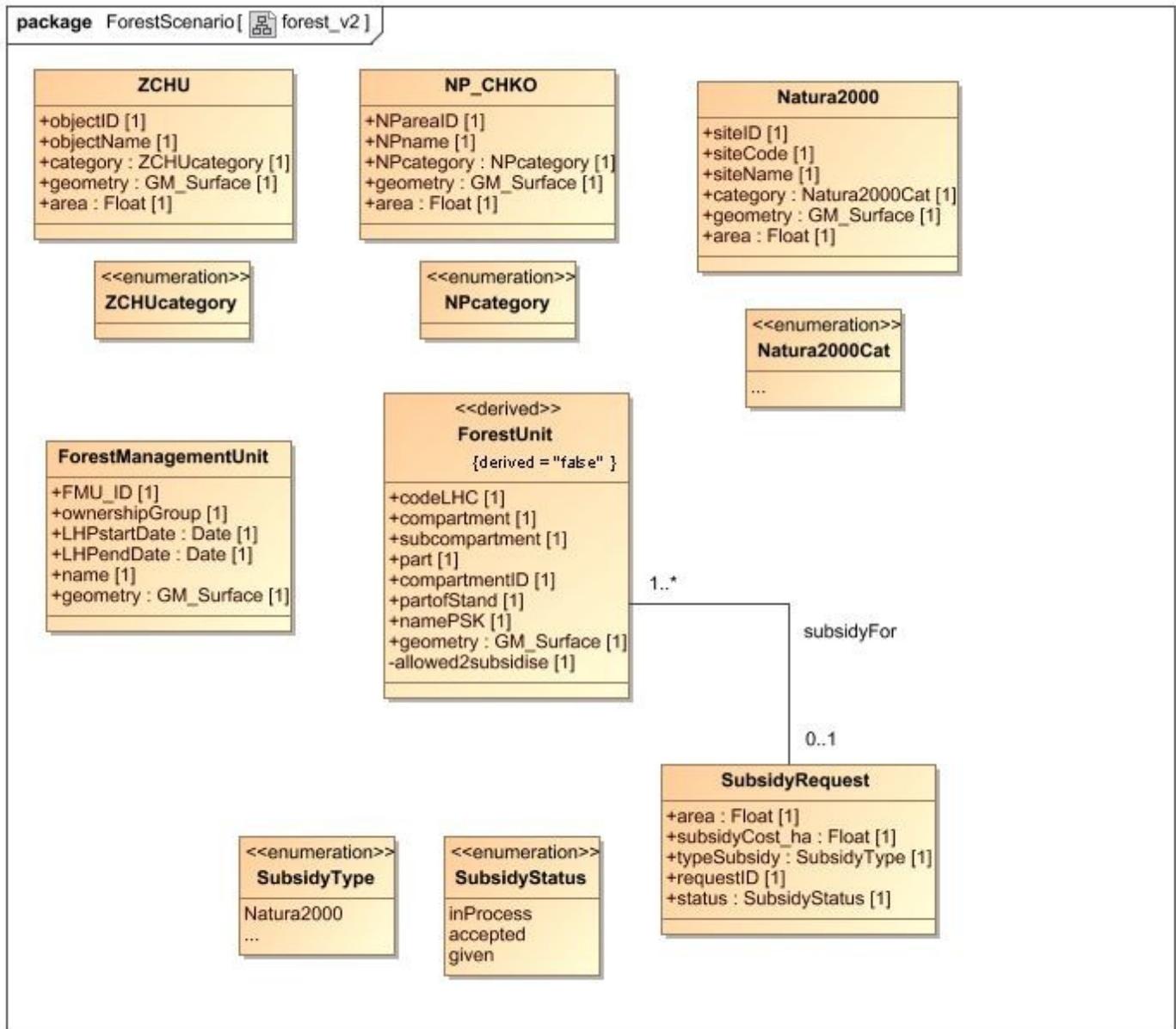


Figure 1 Scenario data model (scope: use case 5)

(Note: The prefix GM_ means that the ISO 19107 names for the geometry types are used.)

This is a first sketch, with only the important (spatial and non-spatial) object classes for the subsidy request. The next step is to investigate whether there are suitable (parts of) international standards related to forest management that we can re-use.

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For the cadastral object classes (parcel, ownership, owner) two data specifications are important: the INSPIRE Annex I specification for Cadastral Parcels, and in addition the recent Land Administration Domain Model (LADM), proposed by FIG (now ISO 19152 working document), see reference in chapter 7.

4 Datasets needed for EAFRD use case

In this chapter the object classes identified in the data model are related to concrete data sources (in the form of static data in files or databases, dynamic data produced in real-time, or web services that serve the data on request). As said before at present the scope of the data model is limited to use case 5. Following the discussion in WP9 the data model will be extended.

The purpose of this chapter is to specify which concrete existing datasets are needed as input for the data harmonisation steps (conceptual schema transformation, reclassification, and other necessary data harmonisation steps). This chapter is still in a rudimentary stage. In the end it has to hold all details that make the data transformation to the common Scenario data model possible.

4.1 Natura 2000 sites (protected areas)

NATURE 2000 data – data provider: CENIA

4.2 Cadastral parcels and owners of parcels

Cadastral Map – data provider CUZK

4.3 Forest information

Forest management plan – data provider: FMI

Target Management Unit map – data provider: FMI

4.4 Background layers (for orientation)

Very high resolution satellite data, orthofoto – data provider: CENIA

RPF (regional plan of forest development) – data provider: FMI

Reference Forest and State Maps – data provider: several

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5 Harmonisation issues

This is based on the table in chapter 8 of the WP9 system specification Report. These requirements are meant for all Forest use cases, not only for the EAFRD use case.

5.1 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).

5.2 Spatial and temporal reference systems

5.2.1 Spatial reference system

The spatial reference systems differ between Czech Republic, Poland, Germany and Slovakia.

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.

5.3 Conceptual data model

The conceptual data models for the basic geographic reference information (RPF, EAFRD, transportation networks, forest typology, forest damage/condition) differ between the Czech Republic, Poland, Germany and Slovakia.

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 create a common data model that suits and serves the use cases for HS Forest. 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 (see 5.11).

5.3.1 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.

5.3.2 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 in vegetation type related to the forest units over time (keeping history of changes).

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5.3.3 Importance of time / Dynamic data

Due to the nature of the use cases all data in this Scenario will be static data (no sensor data, no otherwise dynamic data that is collected and processed in real-time).

5.4 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.

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

Approach

Adopt existing classifications (Natura 2000, EAFRD, EFIS, FAO, ...) when possible.

5.5 Terminology

The terminology used in the forest management field should be published in a (multi-lingual?) thesaurus or ontology. See the WP9 system specification for plans to do so in combination with a metadata catalogue.

5.6 Metadata

Metadata is very important for this Scenario.

There is a Metadata portal for Czech spatial datasets, called MICKA, that is able to access different kinds / versions / profiles of Catalogue Services (see <https://maps.kraj-lbc.cz/metadata/index.php?l=eng>)

In the context of the discussion about the core HUMBOLDT metadata profile, the Scenario will list the metadata elements that should be mandatory from the perspective of the Forest Scenario.

5.7 Scale/resolution, level-of-detail, aggregation

This aspect does not have priority for the use cases in this Scenario.

5.8 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 (RPFD).

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.

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5.9 Processing functions

Yes, harmonisation of some processing functions should be looked at, e.g. satellite imagery classification, tolerance values etc. in the calculation of spatial intersections for the subsidy calculation, defining of the conflict areas between the commercial interests in the forest management and the principles of nature conservation.

It is important for the state of the environment evaluation and planning of the investments in regions and also for the evaluation of subsidy policy effects (in problematic areas).

5.10 Multi-linguality

Yes, because the end-users will use the system in their own language.

5.11 Spatial, temporal and thematic consistency of data

5.11.1 Spatial consistency

In this Scenario 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').

5.12 Priorities

Common, standard classifications for core attributes (as part of the Scenario data model), user/context specific portrayal, harmonisation of processing functions (for important calculations), and dealing with overlapping datasets appear the most important part of the data harmonisation processes in this stage.

Note: at present the cross-border aspect in the use cases has to be discussed further, and specified in more detail. The priorities can still change when the cross-border aspect of the use cases becomes more clear in the final version of the WP9 system specification.

6 Scope of data model, cross-border aspect

6.1 Current scope

This version of the data model (profile) for land cover and vegetation is primarily based on use case 5 of the original Forest Scenario. For the final version of the land cover and vegetation profile the current data model will be extended, so that also the data harmonisation requirements of the other use cases in the Forest Scenario can be dealt with.

In the final document more information about available datasets will be incorporated, together with the attempt to show how cross-border data exchange about Natura 2000 sites can be handled. To accomplish this, datasets are needed of Natura 2000 sites in the Czech Republic and for example Germany, Poland or Slovakia.

6.2 Integrated Forest/Urban Planning data specification

During the work on the previous versions of the use cases of the Forest and Urban scenarios, it was realised that many of the activities (and the corresponding legislation) are overlapping and cannot be considered in isolation. According to the HUMBOLDT approach, each scenario should be able to agree on a common data model. However, 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 2). Instead of developing two separate data models it was therefore decided to merge the data specifications of the two Scenarios.

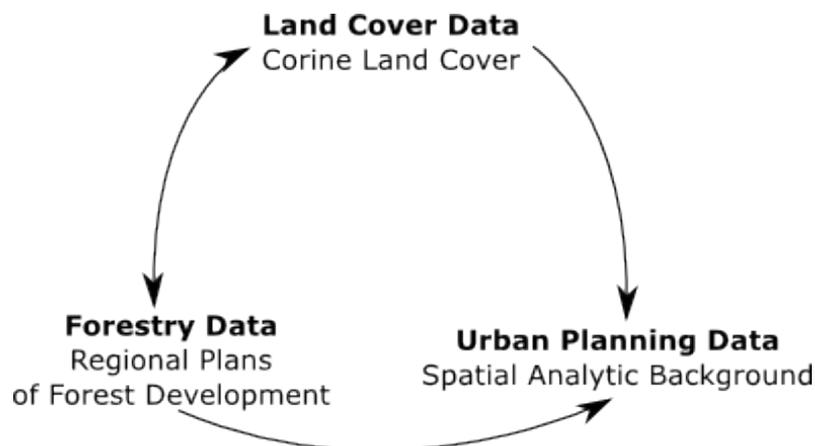


Figure 2. Link between forestry, land cover and urban planning activities

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

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

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update and consistency check at European level. The scenario will follow the developments within MOLAND and LUCAS, which propose extended levels of land cover nomenclature.

The integration between the Forest and Urban Planning scenario is currently under development. A new list of available data sets is established and a new conceptual data model is in preparation.

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7 Related projects and initiatives

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

Eionet: Natura 2000 Documents and related materials,
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

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

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

LUCAS, <http://eusoils.jrc.ec.europa.eu/projects/Lucas/>

Natural habitats (Natura 2000),
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/>

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

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8 Glossary

EAFRD = European Agricultural Fund for Rural Development

LUCAS = Land Use/Cover Area frame statistical Survey

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)