Specific Contract 3 (SC3) proposal

Feasibility and demonstration study of the potential use of National Forest Inventory data to describe the richness of the European forests

"Framework contract for the provision of forest data and services in support to the European Forest Data Centre"
Reference: 2007/ S 194-235358 of 09/10/2007

Contents

1. The Framework context

The objective of the framework contract is to broaden and develop the knowledge base of the European Forest Data Centre (EFDAC) hosted by the Joint Research Centre (JRC) of the European Commission which has been established to supply European Union decision-makers with processed, quality checked and timely policy relevant forest data and information within the EU and territories where EU policies are operating.

The EFDAC will be developed and implemented as the single and central point for forest information at European level in support to relevant EU policies and as the basis of the European Forest Monitoring System proposed in the EU Forest Action Plan. The implementation of EFDAC will contribute to enhancing data harmonization and to streamlining data collection and reporting to international commitments such as the Ministerial Conference of the Protection of Forest in Europe (MCPFE), the FAO Global Forest Resources Assessment (GFRA) and the UN Convention on Biological Diversity (CBD). EFDAC will be built on the basis of the information systems currently existing or under development and in compliance with the guidelines of the Infrastructure for Spatial Information in Europe (INSPIRE). In particular, these systems are the European Forest Fire Information System (EFFIS), the Forest Focus Data Platform, and the European Forest Information and Communication Platform (EFICP). New methods and tools developed for forest and natural hazards monitoring (forest fires, storms, etc) will decisively contribute to the further development and implementation of the Global Monitoring for Environment and Security (GMES) initiative.

Thus, the framework contract will include the provision of the following services or data at EU level:

- **technical assessments** such as reports, models, reviews, etc.
- **data** in the form of either statistics from forest inventory data (e.g. spatially aggregated plot data to provide harmonized estimates of selected indicators/attributes for given areas) or selected plot attributes derived from plot observation/measurements (e.g., forest type), to be used as validation or training fields for modeling.

This service provision needs to be organized around a dedicated platform.

2. Objectives of SC3

The SC3 consists in a direct application of the data provided to the EFDAC E-forest platform in order to show the potential of this new tool and also to emphasize the richness of data collected by the European Forest Inventories.

The main objective of this project is to demonstrate the feasibility of the elaboration of a spatial representation of “tree species” in 11 European countries: Austria (AT), Czech Republic (CZ), Denmark (DK), England (UK), Finland (FI), France (FR), Norway (NO), Romania (RO), Spain (ES), Sweden (SE), and Switzerland (CH). The creation of this spatial representation will demonstrate to the European Commission that NFIs have a considerable quantity of information at their disposal.

National forest inventories

Forest information is collected in almost all countries of Europe through user-driven National Forest Inventories (NFIs). The main objectives of the National Forest Inventories are to acquire information on wood volume by tree species and diameter class, area estimates of forest land by type, stand size, ownership, site quality and stocking. Additional information is usually also included in the inventories like changes in the forest area, growth, mortality, timber removals and measures for successful regeneration.

This information is gathered from systematic assessments based on statistical sampling. The periodicity of the assessments of the national forest inventories may vary – but more and more continuous sample based inventories are applied.

Tree species

Tree species needs first to clearly define what is considered as a tree. The Cost Action E43 established that: "A tree, for NFI purposes, is a woody perennial of a species typically forming a single self supporting main stem and having a definite crown." (Gschwantner et al. 2009). This definition is used for trees in forest, but in this Specific Contract trees outside forest could have been assessed because no harmonization process is undertaken. Since tree species occurring in European countries are noticeably different depending on climatic and ecological conditions, so from one country to another, there is a need for specifying a list of tree species employed in the EFDAC E-forest platform.

Context

The Specific Contract 3 considers that the EFDAC E-forest platform as defined in the Specific Contract 1 is already developed. The SC1 was mainly dedicated to authentication, data gathering and data queries. The main purposes of the SC1 were to offer a user friendly interface to carry out these operations. The SC2 corresponds to an enrichment of the platform in order to carry out the main jobs for which the platform exists: providing to the JRC services or data at a European level. Finally, the SC3 offers a representation of data collected by the NFIs to show the European Commission the potential of the European NFIs and also the capabilities of the new tool developed within the Specific Contracts 1 and 2.
The Specific Contract 2 and the present Specific Contract 3 must run in parallel.

3. Main functionalities and goals

The main goal of the new functionalities is to provide mapping tools to produce spatial representations and maps at the European level.
With the SC1 platform, the uploaded data were compliant with national definitions. When the data are uploaded, the platform provides a process to aggregate them using different geographical units. The recommended cell-size can be one of the following: 5x5 km or 10x10km INSPIRE Grids. Afterwards, the grid data can be transformed into a spatial representation (Figure 1).

From a **data provider** point of view, the purpose of the study is to explore the feasibility of elaborating a tree species representation for Europe. This includes: providing data to the EFDAC E-forest platform as defined in SC1 and SC2 to give a thematic spatial representation of the variable "tree species".

From a **SC3 project team** point of view, the purpose of the study is to use and manage data provided by the NFIs using the EFDAC E-forest platform and to use and adapt some interactive tools to display spatial representation and also a map viewer to display static maps of different main tree species at the European level to show the potential of the European NFIs in response to a service required by the JRC.

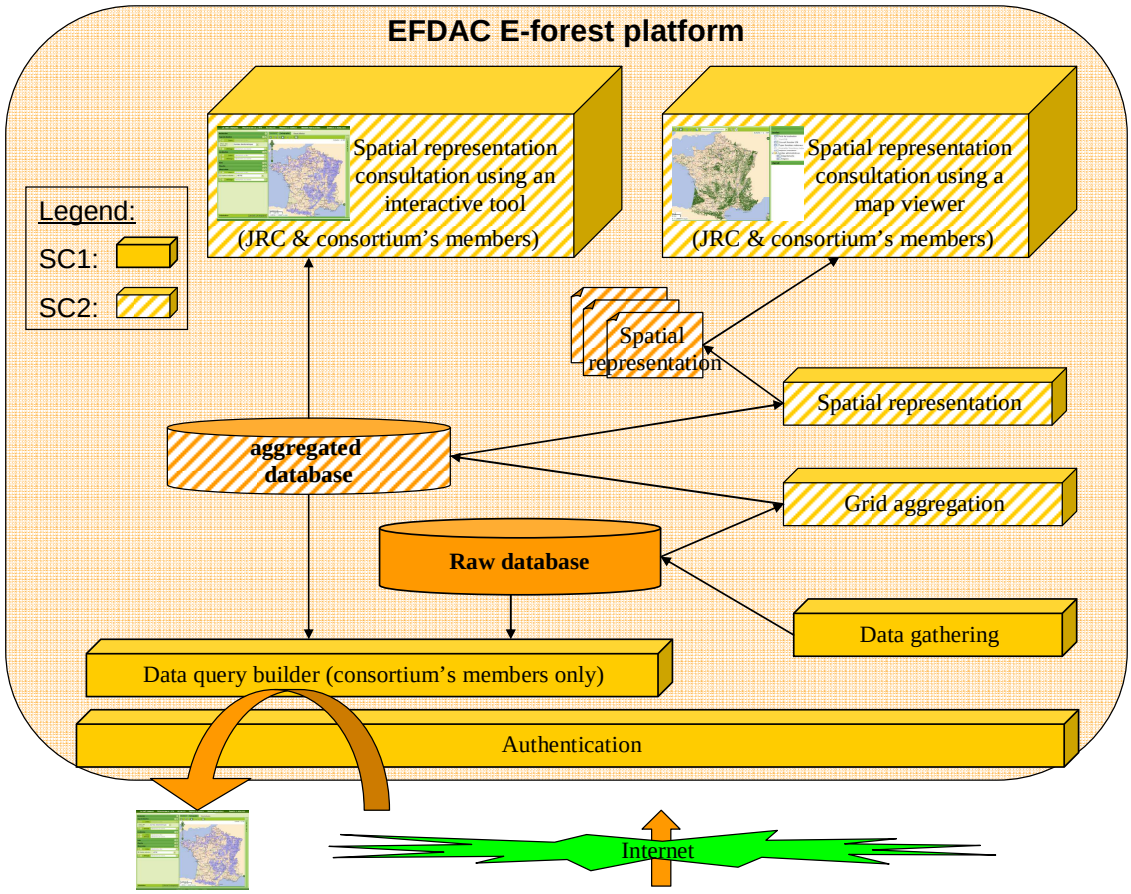

Figure 1: Links among the Specific Contracts within the EFDAC E-forest platform

From the **JRC** point of view, the purpose of this study is to evaluate the possibility and feasibility of using data coming from data providers in order to produce a spatial representation at the European level. This spatial representation will be a first descriptive display of tree species to show the JRC the richness of data collected by the European NFIs and also the capabilities of the EFDAC E-forest platform developed within Specific Contracts 1 and 2.

4. Methodology

The repartition of work load between the data provider and the project team composed of thematic scientific officers and scientific managers proposed in the framework proposal will be defined. The project is subdivided into subtasks. For each subtask, the possible actors are identified among the data providers and/or the SC3 team and the deliverables are listed.
For data provision, the basal area by tree species per hectare will be assessed by each data provider who will input these values on the EFDAC E-forest platform. Then, the SC3 project team will produce maps or spatial representations using these data.

4.1. SC3.1- Data provision

This task is carried out by each data provider involved in the study.

This SC3 is closely linked to the SC1 and SC2 and will make use of the proposed EFDAC E-forest platform. This means that the SC1 will be fully operational for the data gathering and so the SC3 can only start afterward. The study may run in parallel with the SC2 development.

Each consortium member will be in charge of the extraction of quality controlled raw data from the national forest inventory databases, the preparation of the data for the requested format (CSV file provided to each member of the consortium, cf. Appendices), the process of uploading to the EFDAC E-forest platform.
The E-forest administrator will have several tasks under this Specific Contract : the description of the metadata in the metadatabase for the variables needed for the study, testing the E-forest platform, assistance and coordination.

Since the JRC would like to access tree species using the 1x1 km INSPIRE grid, the plot location provided by the consortium members should be as accurate as possible. Depending on their data dissemination policy, the countries will choose one of the following solutions:

- If the country provides real plot coordinates, the E-forest platform will process these coordinates and determine the centre of the 1x1 km grid cell which contains the plot (if the grid cell contains more than one plot the E-forest platform can not process the coordinates and the country has to process the plot data itself to provide only one plot corresponding to the centre of the cell).
- If the country can not (in case of clusters see above or for political reasons) provide the exact location of the plot, they should provide coordinates that correspond to the centre of the INSPIRE 1km x 1 km grid for restitution at grid level. If necessary, the E-forest platform can transform real coordinates into grid cell centres for the consortium members with the exception that each grid cell contains no more than one plot. In that case, the consortium members will send the plot location file to be transformed to the EFDAC E-forest platform by email.

In neither case will the JRC receive real plot locations, rather only coordinates that correspond to the centre of the 1x1 km INSPIRE grid cells.

The 1x1 km grid is only used for transformation of plot coordinates. It does not concern the data aggregation or spatial representation which are other subtasks in the SC3. Each grid cell does not have to contain data. If there is no plot in a cell, the cell is empty and thus, there is no line in the plot location file.

The 1x1 km INSPIRE grid will be provided by the JRC to the consortium and will be available on the E-forest website to give consortium members the opportunity to process the plot locations in their own infrastructure.

This Specific Contract will start to explore different evaluation approaches using data from the participating countries and elaborated by the single countries according to common guidelines. For each country, basal area by tree species per hectare will be assessed:

- according to a list of tree species previously defined
- at the plot level **OR** at least, if the country can't (in case of clusters) or won't provide the location of the plot, at the centre of the INSPIRE 1km x 1 km grid for restitution at grid level.

This work implies first to establish a list of tree species occurring in these 11 European countries in order to answer correctly the JRC request. This reference list could be based on the existing one from other European projects, like the Biosoil project, or on the species list of ICP forest. This point has to be discussed among the EFDAC E-forest members. As a part of the SC3 common work, this list will be established and agreed by the EFDAC E-forest members after the launch of the SC3.

Each country, for which tree species assessed differ from the list used in the EFDAC E-forest platform, will adjust its data, i.e. each country will match its tree species with the one listed by the members and merge them if necessary.

The weight of each plot won't be provided in this contract. Thus, it is not foreseen to provide results at NUTS level.

Countries contributing with NFI data

The contributing countries will be referred to as data providers and are: Austria (AT), Czech Republic (CZ), Denmark (DK), England (UK), Finland (FI), France (FR), Norway (NO), Romania (RO), Spain (ES), Sweden (SE), and Switzerland (CH).

Outputs from data providers to the SC3 project team:

- Data uploaded using the EFDAC E-forest platform in accordance with the proposed format (CSV file). The country should also specify if it uses clusters/trakts. The data providers can refer to the CSV file specifications in Appendices for more details *(n.b. the CSV files proposed in this document are not validated yet. For example, new variables such as flag telling if the plot is located in forest or not could be added).*
- Specification of a proposed list to match national tree species with those used in the EFDAC E-forest platform.

4.2. SC3.2- Feasibility of mapping tree species

This task is carried out by the SC3 project team.

Next step will explore options to produce spatial representations of data collected by the NFIs to show the potential of the European NFIs using some interactive graphic tools, or static maps of different main tree species at the European level using a web map viewer. Again, the study will explore possibilities of mapping of NFI variables to show the richness of the NFI databases. As proposed in the SC2, the data provided by the EFDAC E-forest members can be carried out using different INSPIRE grid sizes: 5x5 km or 10x10km. Using these aggregated data and the calculation of indicators depending on the data chosen to be represented, it is then possible to create different spatial representations and maps.

Mapping tree species can be done using two types of tools:

- A interactive tool to carry out requests by specifying columns and criteria to display. The results can be displayed dynamically in a table or in a map.
- A interactive tool to aggregate and/or interpolate the data. In this tool the end-user can choose the quantitative variable to display and the proposed methodology of interpolation. The result is a map available in a map viewer.
- A web map tool or map viewer to display **maps** (static maps) (Figure 2).

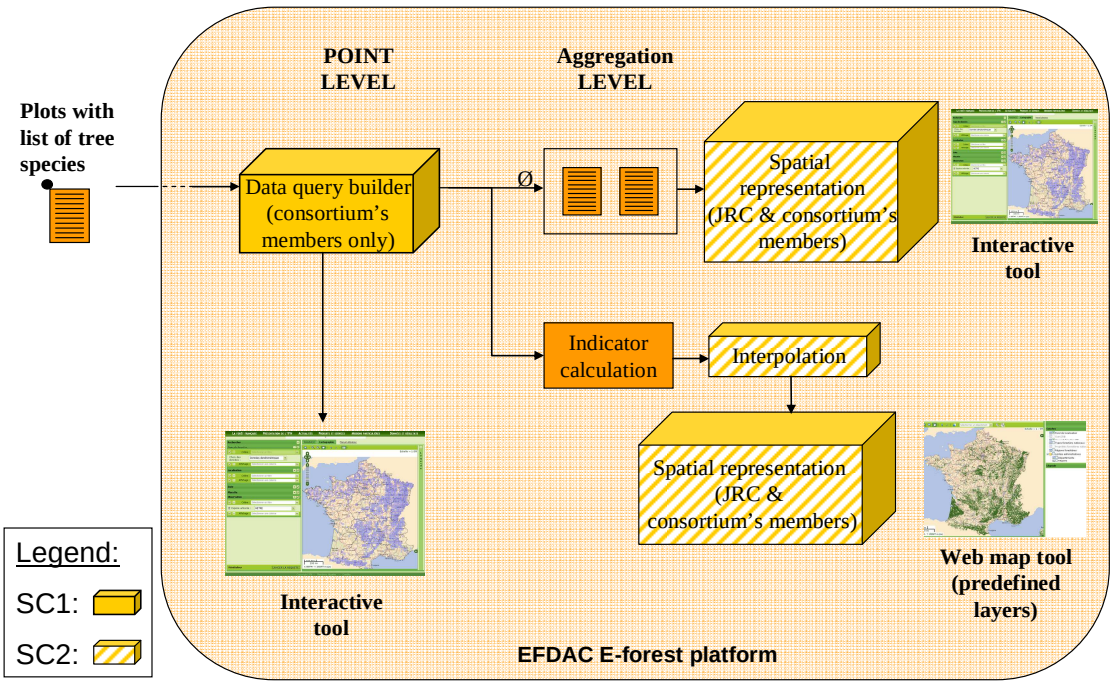

Figure 2. Process of mapping tree species.

4.2.1. Interactive tool

4.2.1.1 The Data query builder

In the case of an interactive tool, the spatial representation does not correspond to the provision of a GIS layer but only a "picture" provided in a web mapping module. The final representation will just display the attribute of a particular tree species chosen by the JRC or EFDAC E-forest members thanks to a web mapping module within the EFDAC E-forest platform. This module consists in a user friendly interface to carry out requests and access the generated results based on different grid sizes (spatial representations and tables) (Figure 3).

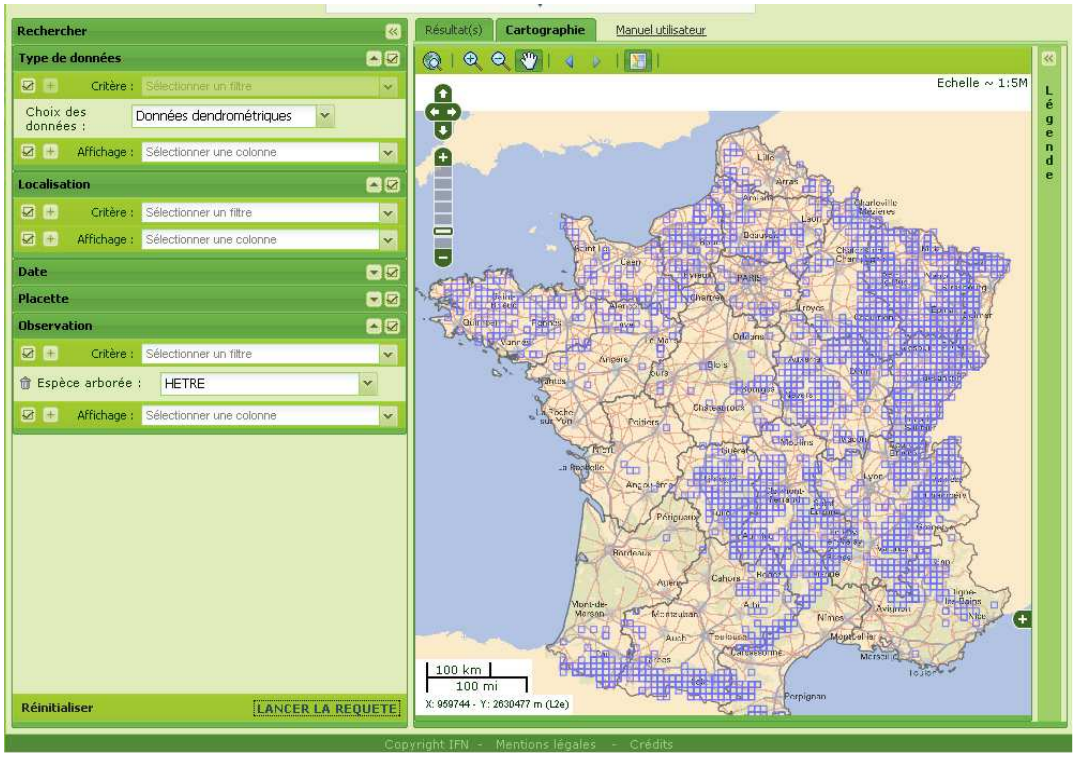

Figure 3. Example of a spatial representation: distribution of European Beech (*Fagus sylvatica*) in France.

As shown in the left part of Figure 3, the users of this interactive tool will have the possibility of displaying the representation they want according to different criteria. Using a pop-up list, they could choose the tree species to display, and next the qualitative data related to this tree species.

Occurrence of tree species

The spatial representation of occurrence (presence/absence) of tree species will be produced using this type of tool. The user of the interactive tool will choose the tree species they would like to display and generated results based on 1x1 km INSPIRE Grid would be available as spatial representations and as tables (Figure 3).

For the sake of showing the richness of plot data collected by the network of European Forest inventories, all the cells containing plot will be displayed in the spatial representations as a raster (plot distribution). However, we will differentiate between cells which have data but does not contain a specific tree species and cells containing data related to the specific tree species chosen by the user. For example, this could be done using a background layer displaying all the grid cells containing data (in a light colour for example) and applying the grid cell including the tree species involved over it (in a dark colour).

4.2.1.2 interactive aggregation tool

An interactive tool, hereafter referred as “interactive aggregation tool”, will also be used to demonstrate the usefulness of the EFDAC E-Forest platform in aggregating forest species basal area at different grid sizes: 5 km x 5 km and 10 km x 10 km INSPIRE Grids. The user of the interactive aggregation tool will have the possibility of displaying the representation they want according to three criteria: the grid size (5x5 km or 10x10 km), the tree species and the aggregation method. Thus, for the selected tree species the data retrieval will be on demand.

For this Specific Contract we could propose different aggregation methods.
Taking into account that some of the cells have no NFI plot and some of the cells have a NFI plot, we have to estimate the basal area of empty cells. For that we need to know if the cell is mainly in forest or not.
Thus, these methods could start by identifying if each cell of the 1x1 km INSPIRE grid is located in forest or not. Even if the European forest layer is not validated by the member states we could use it for a first approach to determine which empty cell is in forest or not to optimise the interpolation. Of course, cells containing a plot are not concerned by the treatment.
Then to estimate the basal area value allocated to the cells of the 5x5 km or 10x10 km INSPIRE Grids we need to use the basal area of the 1x1 km cells located in forest and apply an aggregation method, such as the calculation of the basal area average or an interpolation technique such as IDW (Inverse Distance Weighted Interpolation).

4.2.2. Map viewer

In the case of a map viewer, the first step is to define the number and the thematic of the layers. Indeed, only a few numbers of maps will be provided and they need to be previously produced to be used as ready-built maps. Contrary to the interactive tool which enables users to carry out requests, with the map viewer the user will only access a limited number of maps (Figure 4).

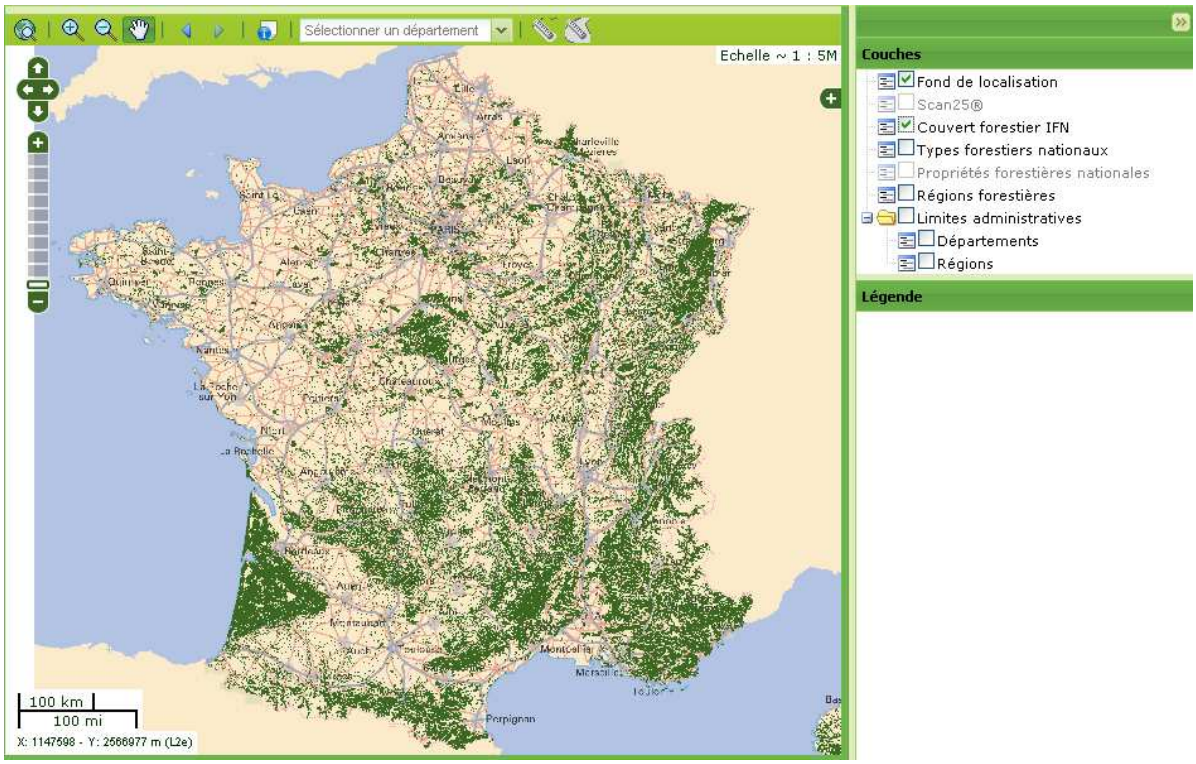

Figure 4. Example of a map viewer: distribution of forests in France.

Following a discussion among the EFDAC E-forest members and the JRC, the SC3 project team will produce four static maps derived from basal area observations by tree species and chosen by the JRC among many proposals. The agreed maps are:

- map of inventory plot distribution (to show the richness of NFI data). To guarantee the confidentiality of the plot locations, this map is a raster layer with a 1km/pixel scale brought up into line with the INSPIRE 1x1 km Grid,
- map of tree species richness (number of different tree species per grid cell) for which the classes should be defined. For this map, we will calculate the sum of different tree species per grid cell and represent the corresponding class. An example is shown in Figure 5. This calculation is right at the country scale but will introduce a bias at the European scale since the sample plot area differs from one country to another and the number of tree species depends on the sample plot area and also on how many plots fall within a grid cell. The correcting could be made only once the harmonization process will be carried out. However, the display of richness by classes will reduce the bias.
- map of tree species groups (majority of conifers or broadleaves). In this map only two classes are differentiated: conifers and broadleaves. To attribute one or the other value to a cell we will calculate the sum of the basal area for each class and the most representative class in term of basal area will determine the value of the cell.
- map of total basal area (basal area per grid cell for all tree species). The total basal area for all tree species by grid cell will be determined and the results will be displayed in 3 or 5 different classes depending on the split which will give the best results.

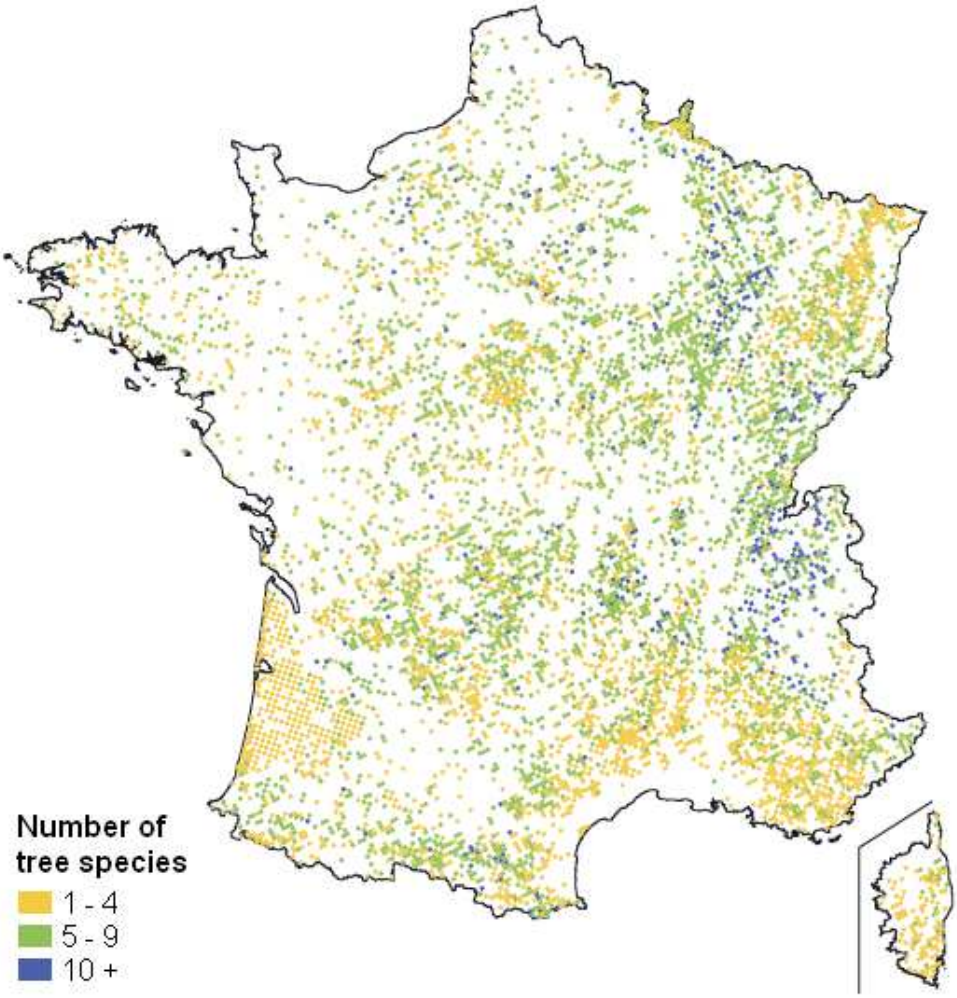

Figure 5. Number of different tree species per plot in France.

These spatial representation and map generations will be carried out in close cooperation with the SC2 team in order to use, whenever it is possible, the module developed in the EFDAC E-forest platform.

4.2.3. Outputs

The study will thus demonstrate the use of national forest inventory data coming from national data providers and the use of the EFDAC E-forest platform and database using the mapping tools as proposed in the SC2. This exercise will permit to evaluate the availability of the information in 11 European countries and the potential use of National Forest Inventory data to describe richness of European forests.

With the use of a reference list and the basal area by tree species per hectare at each sample plot, the occurrence of tree species will be assessed. The process can also produce four static maps chosen by the JRC. Different aggregation levels can be tested and analysed using different INSPIRE grid cell sizes: 5x5 km or 10x10 km.

The study will test different approaches to assess tree species and calculate and map them, to test different aggregation levels and to evaluate the quality of a forest cover representation for Europe.

The JRC will not access raw data. The deliverables to the JRC are:

- Access to the EFDAC E-Forest platform and particularly to the dynamic representations using the interactive tools (data query module and 4.2.1.2 interactive aggregation module).
- Four predefined static maps of different main tree species at the European level using a map viewer and chosen by the JRC.
- Tree species qualitative data on a detailed 1 km x km grid.
- Aggregated forest species basal area at different grid levels (INSPIRE 5x5 km and 10x10 km).

These deliverables are purely reserve to the JRC. Under no circumstances, general public will access the EFDAC E-forest platform and so the restitution tools (interactive tool and map viewer).

Table 1. Deliverables to the JRC

	Product	Grid levels used	Description	Comments
Map viewer (Static Maps)	Inventory Plot Distribution (Raster)	INSPIRE Grid 1x1 km	Display only cells containing data	To show the richness of NFI data
	Number of tree Species per plot	INSPIRE Grid 1x1 km	Number of different tree species per grid cell	Classes to be defined
	Tree Species Groups	INSPIRE Grid 1x1 km	Majority of conifers or broadleaves	2 classes: conifers and broadleaves. Sum of basal area for each class ⇨ comparison
	Total Basal Area	INSPIRE Grid 10x10 km	Basal area per grid cell for all tree species	Basal area split into 3 or 5 classes
Interactive Tool (Spatial Representations)	Occurrence (presence/absence) of one tree species	INSPIRE Grid 1x1 km	Display all the plots + highlight those with the chosen tree species	Qualitative variables chosen by the user
Interactive Aggregation Tool (Spatial Representations)	Basal Area	INSPIRE Grids 5x5 km and 10x10 km	Data retrieval on demand for one tree species	The user chooses: - the aggregation grid (5x5 or 10x10 km) - the tree species - the aggregation method

5. Work plan

The Specific Contract relies on an experienced group of partners having formerly taken part in European projects and having worked closely together under the COST Action E43 during the last 4½ years.

Work progress will be monitored according to the working plan (see below) and according to the general rules under the EFDAC E-forest quality plan and JRC Framework contract.

5.1. Staff description

5.1.1. Overall manager

Function (FNFI):	DIRECTOR OF THE FRENCH NATIONAL FOREST INVENTORY
Name:	Claude VIDAL
Task in the project:	Project manager
Professional Experience:	33 years
Task in the project:	Organisation, Plan, follow up, Meeting, Management, etc…

5.1.2. SC3 project team

Function (WSL):	LEADER OF THE RESEARCH GROUP INVENTORY DESIGN AND PLANNING
Name:	Adrian LANZ
Task in the project:	thematic scientific officer
Professional Experience:	20 years
Task in the project:	metadata and harmonisation tools

Function (BFW):	HEAD OF THE DEPARTMENT OF FOREST INVENTORY
Name:	Klemens SCHADAUER
Task in the project:	scientific manager
Professional Experience:	20 years
Task in the project:	statistical analysis, spatial analysis,

Function (METLA):	PROJECT LEADER OF THE NATIONAL FOREST INVENTORY
Name:	Erkki TOMPPO
Task in the project:	scientific manager
Professional Experience:	38 years
Task in the project:	sample design, geostatistics

Function (F & L):	SENIOR RESEARCHER AND PROJECT MANAGER AT THE DEPARTMENT OF FORESTRY AND WOOD PRODUCTS (DANISH NFI)°
Name:	Annemarie BASTRUP-BIRK
Task in the project:	thematic scientific officer
Professional Experience:	22 years
Task in the project:	biodiversity issues

Function (FNFI): HEAD OF THE INFORMATION SYSTEM DEPARTMENT
Name: Jean-Luc COUSIN
Professional Experience: 15 years
Task in the project: link between SC2/SC3

Function (FNFI): HEAD OF THE GIS DEPARTMENT OF THE FRENCH NFI
Name: Marianne Duprez
Professional Experience: 10 years
Task in the project: development of GIS tools, spatial representation and mapping

Function (FNFI): PROJECT MANAGER
Name: Benoit PESTY
Professional Experience: 10 years
Task in the project: participation in data aggregation and analysis

Function (FNFI): INTERNATIONAL OPERATION MANAGER
Name: Camille BONHOMME
Professional Experience: <1 year
Task in the project: participation in coordination and web site administration

5.1.3. Involved countries

All countries participating to the EFDAC E-forest will participate in this first exercise comprising Austria, Czech Republic, Denmark, England, Finland, France, Norway, Romania, Spain, Sweden, and Switzerland.

5.2. Work repartition

Table 2. Specific Contracts Milestones

Milestone	Description	Partner	Sub-SC3	Month
M0	Contract notification			T_0
M1	Data preparation and provision	All (NFIs)	1	T_0 + 5
M2	Results of feasibility of mapping	All (Short team)[1]	2	T_0 + 10

[1] The short team has to be defined among the EFDAC E-forest members.

5.3. Financial proposal

SC3						
Price component	**Personnel type equivalence**	**Country**	**Staff**	**Price per day**	**Number of days**	**Total cost (€)**
Tasks assigned to data providers						
Data provision and data transformation	Thematic scientific officer and data analyst	11		750	10	82,500[2]
Subtotal data provider tasks (1)						82,500
Tasks assigned to SC3 team						
Metadata management	Thematic Scientific Officer and data analyst	France	Jean-Luc Cousin	750	2	1,500
		Switzerland	Adrian Lanz		3	2,250[2]
Animation, web site administration	Thematic Scientific Officer and data analyst	France	Camille Bonhomme	750	5	3,750
Data aggregation	Scientific Manager and data analyst	France	Claude Vidal / Marianne Duprez / Benoit Pesty	750	15	11,250
		Austria	Klemens Schadauer		6	4,500[2]
Spatial representation and mapping		Finland	Erkki Tomppo		6	4,500[2]
	Thematic Scientific Officer and data analyst	Denmark	Anne-Marie Bastrup-Birk	750	3	2,250[2]
Subtotal SC3 team tasks (2)						30,000
TOTAL(1)+(2) = PRICE SC3						**112,500**

[2]As specified in the Framework Contract the cost of each Thematic Officer includes the potential travelling expenses.

This proposal is valid until 15/09/2009

6. References

FAO. 2004. *Global Forest Resources Assessment Update (FRA 2005): Terms and definitions.* FRA Working Paper 83/E, FAO Forestry Department, Rome. 34 p. Available at: http://www.fao.org/forestry/media/7797/1/0/ [Cited 11 Feb 2009].

Gschwantner, T., Schadauer, K., Vidal, C., Lanz, A., Tomppo, E., di Cosmo, L., Robert, N., Englert Duursma, D., and Lawrence, M. 2009. *Common tree definitions for National Forest Inventories in Europe.* Silva Fennica.

Lanz et al. (2009). *Harmonising national forest inventories in Europe*. Report of the COST Action E43, pp. ~150.

7. Appendices

7.1. Appendix 1. CSV File Description – Plot Location

E-forest
CSV File Description – Plot Location

"Framework contract for the provision of forest data and services in support to the European Forest Data Centre"
Reference: 2007/ S 194-235358 of 09/10/2007

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1. File format

The file will contain information needed to identify a plot location (plot code) and its geographical coordinates.

Data types used are:

- **Integer:** **N**umeric value with no decimal.
- **Boolean:** Boolean value (represented as a 1 for true and a 0 for false).
- **Numeric:** Numeric value with decimals
  The decimal separator must be a dot, there is no precision limit.
  Value that is not measured should be left empty.
- **Code**: Code value, chosen in a list of valid codes given under the type of the data.
- **String:** alphanumeric value for free text
  Value should be quoted and must not contain special characters like the carriage return or the semi-colon.
- **Date:** Date value.
  The date format is YYYY-MM-DD.
- **Coordinate:** Coordinate value in numeric format
  The coordinate must be given in degrees minutes seconds using WGS84.
  The coordinate format is +/-DD.MM.SS.

Example:

```
//
// Plot Locations
//
// PLOT_CODE; CLUSTER_CODE; LATITUDE; LONGITUDE; IS_PLOT_COORDINATE; COMMENT
1234;"Cluster_test";"+45.40.31";"+03.45.40";1;Test
1235;"Cluster_test";"+45.41.31";"+03.45.40";1;Test
1236;"Cluster_test";"+45.42.31";"+03.45.40";1;Test
1237;"Cluster_test";"+45.40.31";"+03.46.40";1;Test
1238;"Cluster_test";"+45.41.31";"+03.46.40";1;Test
```

2. Description of fields

2.1. PLOT_CODE

Description: This is the identifier of the plot inside the country.
Type: String.
Example: A1234
Note: The plot code corresponds to a unique identifier used to identify the plot in all the files to upload. The plot code is a free code. It should be a unique and permanent identifier of the plot inside the country.

2.2. CLUSTER_CODE

Description: This is the identifier of a group of plots. This field allow the country to group its plots in some clusters. If not used, the field should be filled with the plot_code (so that the clusted code is unique).
Example: 1234
Type: String.

2.3. LATITUDE

Description: This is the latitude of the plot, given in degrees minutes seconds using WGS84.
Example: +45.40.31
Type: Coordinate

2.4. LONGITUDE

Description: This is the longitude of the plot, given in degrees minutes seconds using WGS84.
Example: +03.45.40
Type: Coordinate

2.5. IS_PLOT_COORDINATE

Description: This field indicate if the plot coordinates are real plot coordinates (in this case the value should be 1) or if the plot is in fact the centre of a grid cell of the INSPIRE grid of 1Kmx1Km(in this case the value should be 0).
Example: 1
Type: Boolean

2.6. COMMENT

Description: This field is an optional comment field.
Example: « This plot is located in the mountain »
Type: String

7.2. Appendix 2. CSV File Description – CS3 - Plot Data

E-forest
CSV File Description – CS3 - Plot Data

“Framework contract for the provision of forest data and services in support to the European Forest Data Centre”
Reference: 2007/ S 194-235358 of 09/10/2007

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1. File format

The file will contain information needed to submit data related to the plot in order to respond to the CS3 JRC Request.

Data types used are:

- **Integer:** **N**umeric value with no decimal.
- **Boolean:** Boolean value (represented as a 1 for true and a 0 for false).
- **Numeric:** Numeric value with decimals
  The decimal separator must be a dot, there is no precision limit.
  Value that is not measured should be left empty.
- **Code**: Code value, chosen in a list of valid codes given under the type of the data.
- **String:** alphanumeric value for free text
  Value should be quoted and must not contain special characters like the carriage return or the semi-colon.
- **Date:** Date value.
  The date format is YYYY-MM-DD.
- **Coordinate:** Coordinate value in numeric format
  The coordinate must be given in degrees minutes seconds using WGS84.
  The coordinate format is +/-DD.MM.SS.

Example:

```
//
// Plot Data
//
// PLOT_CODE, INV_DATE, CYCLE, REF_YEAR_BEGIN, REF_YEAR_END, COMMENT
1234;2006-01-26;1;2006;2009;test data plot
```

2. Description of fields

2.1. PLOT_CODE

Description: This is the identifier of the plot inside the country.
Type: String.
Example: A1234
Note: The plot code corresponds to a unique identifier used to identify the plot in all the files to upload. The plot code is a free code. It should be a unique and permanent identifier of the plot inside the country.

2.2. INV_DATE

Description: This is inventory date that means the date when the field plot has been assessed.
Example: 2006-01-26
Type: Date

2.3. CYCLE

Description: This is the cycle of inventory. It is the number of the ongoing cycle and not the duration of the cycle.
Example: 3
Type: Integer

2.4. REF_YEAR_BEGIN

Description: This is the beginning reference year for the plot assessment.
Example: 2006
Type: Integer

2.5. REF_YEAR_END

Description: This is the ending reference year for the plot assessment
Example: 2009
Type: Integer
Note: set REF_YEAR_END=REF_YEAR_BEGIN if the reference year is a year and not a reference period. This is the final year of the cycle, so the year of the plot assessment in general and not of the particular plot that you are registering. The measurement year of the plot corresponds to another code: INV_DATE.

2.6. COMMENT

Description: This field is an optional comment field.
Example: « This plot is a permanent plot »
Type: String

7.3. Appendix 3. CSV File Description – CS3 - Species Data

E-forest
CSV File Description – CS3 - Species Data

“Framework contract for the provision of forest data and services in support to the European Forest Data Centre”
Reference: 2007/ S 194-235358 of 09/10/2007

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1. File format

The file will contain information needed to submit data related to the species inside a plot in order to respond to the CS3 JRC Request.

Data types used are:

- **Integer:** **N**umeric value with no decimal.
- **Boolean:** Boolean value (represented as a 1 for true and a 0 for false).
- **Numeric:** Numeric value with decimals
  The decimal separator must be a dot, there is no precision limit.
  Value that is not measured should be left empty.
- **Code**: Code value, chosen in a list of valid codes given under the type of the data.
- **String:** alphanumeric value for free text
  Value should be quoted and must not contain special characters like the carriage return or the semi-colon.
- **Date:** Date value.
  The date format is YYYY-MM-DD.
- **Coordinate:** Coordinate value in numeric format
  The coordinate must be given in degrees minutes seconds using WGS84.
  The coordinate format is +/-DD.MM.SS.

Example:

```
//
// Species Data
//
// PLOT_CODE; CYCLE; SPECIES_CODE; BASAL_AREA; COMMENT;
1234;1;35;157.6;test basal area
1234;1;74;65.4;test basal area
1234;1;76;48;test basal area
1234;1;77;356.3;test basal area
```

2. Description of fields

2.1. PLOT_CODE

Description: This is the identifier of the plot inside the country.
Type: String.
Example: A1234
Note: The plot code corresponds to a unique identifier used to identify the plot in all the files to upload. The plot code is a free code. It should be a unique and permanent identifier of the plot inside the country.

2.2. CYCLE

Description: This is the cycle of inventory. It is the number of the ongoing cycle and not the duration of the cycle.
Example: 3
Type: Integer

2.3. SPECIES_CODE

Description: This is the identifier of the species. A standardized list of authorized species codes will be given.
Example: 77
Type: Code
Code list: *(to be defined among the EFDAC E-forest members).*

Code	Label
1	QUERCUS PEDUNCULATA OU SESSILIFLORA OU LANUGINOSA
2	QUERCUS PEDUNCULATA = ROBUR
3	QUERCUS SESSILIFLORA = PETRAEA
4	QUERCUS RUBRA
…	…

Note: if the species has been observed, only one line per PLOT_CODE, CYCLE and SPECIES_CODE is expected even if this species corresponds to more than one tree.

2.4. BASAL_AREA

Description: This is the basal area of the given specie on the plot (in square meters per hectare).
Example: 123.4
Type: Numeric
Note: this basal area corresponds to the aggregation of the basal area of all the trees of the same species.

2.5. COMMENT

Description: This field is an optional comment field.
Example: « The Quercus is the dominant specie on this plot »
Type: String