

COST ACTION E43 HARMONISATION OF NFI IN EUROPE: TECHNIQUES FOR COMMON REPORTING.

Freiburg joint workshop
18th / 19th September 2005

Minutes of the working group sessions of the COST E43 Working Group 3 on Biodiversity

Participants: A list of participants is available in ANNEX II

The results of the first questionnaire of WG3 were presented by Dr. Gherardo Chirici and discussed in the group. Dr. Anna-Lena Axelsson gave an overview of the progress of the Forest Focus project COMMON (review and comparisons of methods to assess stand structure, ground vegetation, forest classification, lichens).

The discussion was the basis for the final selection of the core attributes to be working with in the 2nd questionnaire of the WG3. The aim of this second questionnaire will be to compare the definitions and methodologies of NFI attributes assessed in the field. The selected indicators and attributes are:

- Deadwood
- Forest type
- Tree species and ground vegetation species composition
- Naturalness and nativeness
- Regeneration
- Forest management
- Stand structure and veteran trees

The 2nd questionnaire was developed in small working groups. The work was finished in the months following the meeting in Freiburg and is presented in ANNEX I. Disturbances and damages are not yet included in the questionnaire.

It was agreed to send the 2nd questionnaire around to the WG3 participants before the final submission of the questionnaire.

Tentative time schedule

The questionnaire is available on the COST E43 web page from February 6th, 2006. Deadline for comments is March 1st, 2006. The questionnaire will be sent around to NFI contact points in the Europe and US to be filled in by April 30th, 2006 and presentation of first results at the next working group meeting in Bordeaux in May 10-11th, 2006.

APPENDIX I

DRAFT OF THE 2ND QUESTIONNAIRE



COST Action E43

Harmonisation of National Inventories in Europe: Techniques for Common Reporting
Working Group 3 – contribution of field data acquired in NFI for forest biodiversity assessment

General information on the 2nd questionnaire of the WG3

The overall mission of WG3 is to define the possible contribution of information gathered in the field within NFIs to assess and monitor different components of biodiversity. The aim of the first questionnaire was to pick up relevant core attributes to describe forest biodiversity using data sampled/assessed by the NFI in the field. The aim of this second questionnaire is to build up a database of definitions and methods to sample/assess the selected attributes. This database will be deeply analysed to map differences and to attain ways of harmonisation of definitions and inventory methods by conversion and bridges.

This is an open questionnaire, you have the possibility to link and attach documents, images or other data you think may be useful for a better understanding of your answers. This questionnaire will be the base for work in the WG3 in 2006. A STSM will be held in January 2006 to analyze the incoming answers. During the last meetings of the WG3 it was agreed to work with the following core attributes

Overview of questionnaire	Responsibles	Page
Identification		
Deadwood	Christine Sanchez	
Forest type	Gherardo Chirici	
Ground vegetation	Iciar	
Naturalness	Nabila Hazema/Catherine Cluzeau	
Regeneration	Helena Makela	
Stand structure and veteran trees	Elmar Hauk//Nadia Barsoum	

Thank you for your cooperation and good work!!

I. Identification

Responsible for the compilation of the Forest Type questionnaire:

Name	
Affiliation	
Address	
Phone	
Fax	
E-mail	

II. Deadwood

Deadwood is an important structural component of forest ecosystems because of its links to biodiversity. Deadwood is usually described as dead no-self-supporting woody material in various stages of decay and locate above the soil.

What is included in your definition of deadwood?				
Attributes	Yes/No	Minimum diameter	Minimum length	Mean or median diameter
Uprooted stems Clearcut stems Pieces of stems Pieces of branches Cut branches Uprooted staves Logging residues Fine woody debris Intact snags Broken snags More ?				

Calculations with your deadwood assessment.				
Attributes	Yes/No	Minimum diameter	Minimum length	Mean or median diameter
How do you calculate the total cover and surface area of lying deadwood? Provide your formula How do you avoid overlaps? How do you calculate the total length of lying deadwood? Provide your formula How are assessing changes in deadwood through time? More?				

Is deadwood assessed on						
	Yes/No	Number of	Plot size (m2)	Radius or length of	Location on the plot ?	Direction (s)
NFI sampling						

plot						
Subplots						
Transects						
Sample trees						
More						

Deadwood and forest biodiversity				
Attribute	Yes/No	If yes name the categories	Any threshold?	State the thresholds
Do you register decay categories?				
Decay per species?				
Decay per group of species?				
Birds or bird activities?				
Nests?				
Holes?				
hollow trees?				
Invertebrates?				
Mosses?				
Fungi?				
more?				

III. Forest type questionnaire

On the basis of the results acquired with the first on-line questionnaire on the contribution of field data acquired in NFI for forest biodiversity assessment forest type classification has been ranked as one of the most important information to be acquired for a forest biodiversity assessment.

This questionnaire has the final aim to acquire information regarding the system of nomenclature, methodologies used and aims of forest type classification used within NFI.

Please provide information just regarding forest type classification used specifically and operatively **just within NFI**.

Do you have a standard system of nomenclature for forest type classification (FT) ?
<input type="radio"/> Yes <input type="radio"/> No
If yes please provide the classes with definitions
<input type="radio"/> Yes <input type="radio"/> No
If yes please provide the use of the FT classification (stratification, area, estimation, mapping) *)
*) If you have manuals in English, German, French, Danish, Norwegian, Swedish, Italian please send it to Annemarie Bastrup-Birk, DG-JRC, IES-LMU, TP261, 21020n Ispra (Varese) Italy
Is FT based just on actual vegetation or include information also on potential vegetation?
<input type="radio"/> Yes <input type="radio"/> No
Is FT classification available in all your sampling units? If not please describe the selecting methods and purposes.
<input type="radio"/> Yes <input type="radio"/> No
If no, describe the selection methods and the purposes
Is FT build up within NFI?
<input type="radio"/> Yes <input type="radio"/> No
If no is it a prior information
<input type="radio"/> Yes <input type="radio"/> No
Please describe
Which source of information and method do you use for FT classification (remote sensing and manual photointerpretation, field work, etc.,)?
<input type="radio"/> Remote sensing <input type="radio"/> Manual photointerpretation <input type="radio"/> Field work <input type="radio"/> Other _____ <input type="radio"/> _____
Which is the output of your FT classification (plots information and/maps)? In case of map output which is the output scale and minimum mapping size? In case of plots which is minimum the reference area of the FT?
<input type="radio"/> Plot information <input type="radio"/> Maps

<input type="radio"/> both
If maps,
Output scale: _____
Minimum mapping size: _____
If plots,
Minimum reference area of the forest type: _____

Do you acquire different information on the basis of different FT? In other words do you have the same data acquired with the same protocol in each forest type?
<input type="radio"/> Yes <input type="radio"/> No
If no specify how you do it

How long (in years) in the past is the time series you are able to provide on FT?
How many inventories in that period?
Since at European level a setup of a common system of classification of Forest Types is on running on the basis of the draft system of nomenclature here annexed do you think you could reclassify or link your data?
<input type="radio"/> Yes <input type="radio"/> No
Is such a classification system satisfying you?
<input type="radio"/> Yes <input type="radio"/> No
If no please provide main problems class by class and/or ideas for improvements

IV. Ground vegetation

Assessments of ground vegetation (type, relative abundance of herbs, grasses, ferns) can be used to assess forest ecosystem health in terms of diversity and rates of changes of community structure for native and non-native vascular plant species.

Individual species can be important indicators of a site's potential productivity, economical value, wildlife forage and shelter, changes in composition and spatial arrangement of vascular plants in a forest may indicate the presence of chronic stresses such as discrete site degradation, climate change, pollution.

SAMPLING

Is ground vegetation (GV) registered on						
Question	Yes/No	Number of sampling unit	Number of units per inventory cycle	Area surveyed per plot	Dimensions (radius/length/width) in meters of sampling unit	Spatial location of the sampling unit
The whole NFI plot						
Subplots						
Transects						
Quadrates						
Other						

What is included in the GV assessment of your NFI?				
Attributes	Yes/No	Abundance	Coverage	Species richness
Vascular plants				
Ferns				
Hepatic plants				
Lichens				
Mosses				
Liverworts				
Herbs, graminoids, forbs				
More?				

Question:	Vascular	Ferns	Hepatic	Lichens	Mosses	Liverworts	Other: specify
What is the length of your time series on GV? From..to What is the frequency of inventory for GV? Period (s) of the year that you sample if it (they) is (are) fixed. Year when the latest (most recent) ground vegetation inventory cycle started Year when the latest (most recent) ground vegetation inventory cycle finished							

Do you record	a taxonomic list of all the species? (Yes/No)	a taxonomic list of aggregations? (Yes/No)	a list of functional groups? (Yes/No)	the species richness of species (group or taxon)? (Yes/No)	the abundance of species (group or taxon)? (Yes/No)	the coverage of species (group or taxon)? (Yes/No)
Vascular plants						
Ferns						

Mosses Hepatic species Lichens Other, specify: <hr/> Other, specify: <hr/>						
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Do you record	The distribution of species (group or taxon)? (Yes/No)	The height of the species (group or taxon)? (Yes/No)	Any other measure of these species (group or taxon)? (Yes/No)	Do you estimate the biomass of these species (group or taxon)? (Yes/No)
Vascular plants Ferns Mosses Hepatic species Lichens Other, specify: <hr/> Other, specify: <hr/>				

Describe the methods:

V. Naturalness – Nativeness

Naturalness

Naturalness usually refers to the degree of anthropogenic influences on the environment. We find at one end of the scale the primary forests with the highest degree of naturalness and at the other end the managed forests.

Naturalness is the 4.3 pan-European indicator for sustainable forest management.

The level of naturalness is assessed through a comparison of the current forest state to the potentially natural forest. The old-growth forest or ancient forest is usually used as potential forest reference.

Some examples of classification used for forest naturalness assessment:

The "hemeroby assessment Austrian forest ecosystem" classification (see http://131.130.57.33/cvl/hemerobie/hem_forest.htm): artificial, altered, moderately altered, semi-natural, natural.

- FAO classification (National Reporting Table T4 of FRA 2005: "Characteristics of forest and other wooded land"): primary, modified natural, semi-natural, productive plantation, protective plantation.

- FAO classification (TBFRA 2000): undisturbed (no human disturbance at all or for a long time), semi-natural (if forests are or were disturbed), plantation (artificial stand).

Nativeness

Species nativeness is another important variable used to measure forest naturalness so it will not be define as a core variable by it but included in the naturalness assessment.

Invasive and Exotic Species (= non native species) = any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem; and whose introduction does or is likely to cause economic or environmental harm or harm to human health (definition from <http://www.invasive.org>)

Naturalness questionnaire

Do your NFI assess naturalness?
<input type="radio"/> Yes <input type="radio"/> No
If yes, what are the different naturalness levels recorded and the definition of those levels?

If no, could you please fill in the second part of the questionnaire

The rest of the questionnaire is divided in two parts. The first one is more general. The second one is focused on attributes usually recorded to assess naturalness (when it is defined through a combined index). This second questionnaire might be filled in even if your NFI does not assess naturalness because it will help to know if naturalness could be assessed even if it is not planned by your NFI

Part 1: general method

Is the index a specific measure
<input type="radio"/> Yes <input type="radio"/> No
If yes: which one(s)? (i.e. indicators of naturalness or anthropogenic disturbances like some associated animal or plant species, other proxy ...)
If no, is the index derived from several NFI data
<input type="radio"/> Yes <input type="radio"/> No
Do you assess naturalness on all the sample units
<input type="radio"/> Yes <input type="radio"/> No
If no, do you assess naturalness on a selection of them?
And what are the selection criteria?
What is the surface area of the naturalness assessment sample plot?
If used in naturalness assessment, what is the potential natural vegetation (or forest stand) model you refer to?

Part 2: basic data, which can be combined for natural assessment

	<i>Question</i>	<i>Answer (yes/no or comments)</i>
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Stand composition	Specific level (for tree species) : importance of non native species	
	Infra-specific level (for tree species) : genotypes origin	
	Ground flora : occurrence of naturalness related species or ancient forest related species or human disturbances associated species	
	Ground flora : occurrence of non native species (invaders)	
Stand structure	Horizontal structure (diameter distribution, ...)	
	Vertical structure (height distribution, description of the different vertical layers, ...)	
	Age structure (age distribution, occurrence of mature trees, ...)	
	Development stage of the stand	
	Dead wood	
	Regeneration types	
Disturb.	Do you measure human disturbances (forest operations, ...)? Which ones?	
	Do you record other disturbances (natural fires, storms, ...)? Which ones?	
	Other observations	

VI. Regeneration

The FAO definition of regeneration is “The eestablishment of forest plantations on temporarily unstocked lands that are considered as forest.”

Definition of regeneration in your NFI:						
Are these attributes assessed in the NFI of your country?	Yes/No	The source of information? (Sample plots, compartment forest	Land use category where the variable is assessed?	Describe in which forests the variable is	Units, if classes , list them	The reported variable (for example area (km³))

<p>1. Regeneration area</p> <p>2. Type of regeneration</p> <p>3. Regeneration species: Proportion of natural trees Proportion of planted trees Proportion of coppice Proportion of exotic tree species other... Obs! Tree species, size, age and density are attributes that describe the growing stock and are dealt with in stand structure and species composition.</p> <p>4. Time since regeneration Definition and description how this is assessed</p> <p>5. Success of regeneration Definition and description how this is assessed</p>		<p>inventory, RS, other source, which?) Describe measurements in detail.</p>	<p>(Forest, forest and OWL, OWL, other)</p>	<p>assessed? (only in young stands, all stands, other)</p>	<p>and/or %) by regeneration types) number per ha</p>
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Forest management

The FAO definition of regeneration is “Forest and other wooded land which is managed in accordance with a formal or an informal plan applied regularly over a sufficient long period (5 years or more). The management operations include the tasks to be accomplished in individual forest stands (e.g. compartments) during the given period”.

Definition of regeneration in your NFI:						
Are these attributes assessed in the NFI of your country?	Yes/No	The source of information ? (Sample plots, compartment forest inventory, RS, other source, which?). Describe in detail.	Land use category where the variable is assessed? (Forest, forest and OWL, OWL, other)	Describe in which forests the variable is assessed? (only in young stands, all stands, other)	Units, if classes, list them	The reported variable (for example area (km³) by management purposes)
1. Objective of management 2. Type of management/silvicultural system: 3. Intensity of management List and describe intensity-attributes that are assessed, for example: Is the forest managed or not? 4. Management history List and describe history-attributes that are assessed, for example:						

Last silvicultural treatment Time since last silvicultural treatment Last cutting type Time since last cutting etc.						
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VII. Stand structure and veteran/large tree inventory

It seems to be accepted that multi-layered stands with gaps and a big variance in diameter distribution are good indicators for fauna and flora diversity. Nevertheless they can illustrate the silvicultural influence on the forest ecosystem.

Before starting to describe stand structure we must be aware that it depends highly on forest type- classification. All approaches must be seen under this aspect and I think we have to discuss it in the COST Action.

If diameters at breast height (DBH) and/or co-ordinates of sample trees are measured, the threshold diameter is very important for results of stand structure evaluation.

Stand structure can be assessed on sample tree level or on stand level. The questionnaire includes a questionnaire about sample trees and one about stand description.

Their benefit of indices **calculated on metric data** (Clark-Evans, Winkelmass, variance of diameter distribution, is that they could be calculated nearly without any individual influence.

Tree level stand structure				
Attributes	Yes/No	If yes describe the method	If no, will it be done in the future?	
Insert your minimum DBH (= in cm) Can you calculate the number of trees pr dbh pr ha Tree co-ordinates Distance to				

nearest neighbour tree Do you assess social position? Do you measure tree height Threshold for height measurements (=)				
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Stand level stand structure				
Attributes	Yes/No	If yes describe the method	If no, will it be done in the future?	
Number of layers Partition of layers (1,2,..) Categories of layers Area of gaps pr. ha Abundance of species per layer Volume of dead trees(snags) pr ha Edge effects pr ha				

Nomenclature of European forest types for biodiversity assessment

Reference: EEA nomenclature for 31 countries at category level, September 2005

1. Boreal forest

Boreal spruce pines and birch forests of Fennoscandia. Boreal forest with an oceanic character can be found also in central and northeastern Grampians of Scotland.

2. Hemiboreal and nemoral Scots pine forest

The hemiboreal forest covers the transitional forest zone between the boreal coniferous and temperate deciduous ones: *Pinus sylvestris* and *Picea abies* are dominant, but are mixed with broadleaves. In EU-25 countries this forest zone covers: i) as a wide belt south central Sweden, thinning out in southernmost parts of Norway and Finland; ii) most of Estonia, Latvia and NE Poland.

Lowland to mountain, non-alpineous, *Pinus sylvestris* dominated forest of the middle European nemoral zone alpine is also included.

3. Alpine coniferous forest

Forests of the alpine climate regions dominated by coniferous forest tree species, mainly *Picea abies*, *Abies alba* and *Pinus sylvestris*, *P. mugo*. Although included in this class are climatically similar high altitudinal vegetation belts of the central European mountain ranges dominated by *Picea abies*, minor *Abies alba* and, under local microclimatic and edaphic conditions, termophilous pure *Pinus nigra* forests of the southern Alps.

4. Atlantic and nemoral oakwoods, Atlantic ashwoods and dune forest

Atlantic and nemoral oakwoods, Atlantic ashwoods and Atlantic dune forests are forests of the mesophytical, summer-green broadleaf forests and the temperate and submeridional zones (Schröder, 1998) and occur in areas with high precipitation and mild winters.

5. Oak-hornbeam forest

Forests dominated by hornbeam *Carpinus betulus* and oak *Quercus spec.* and, generally present on clay to lime-clay substrates in plain, colline to submountain levels and in sub-Atlantic to continental climates. Two potentially natural variants exist which are in competition with beech forests: oak-hornbeam forests on wet soil water regimes (predominantly high water tables) or on dry soils (dominating dry phases in the soil water budget). On wet soils, *Quercus robur* dominates, on dry soils *Quercus petraea* prevails. In both cases beech is not strong enough to compete as a result of root damage.

6. Beech forest

Beech forests are characterised by the dominance of European beech *Fagus sylvatica* L. or its transitional hybrids with *Fagus orientalis* Lipsky in the eastern and southern parts of the Balkan Peninsula, and along the eastern periphery of the Carpathians (Paule 1995). These latter were described as Balkan beech *Fagus moesiaca* Czech, Podolian or Moldovian beech *Fagus podolica* Yap., and Crimean beech *Fagus taurica*

Popl., though some other authors treat them as subspecies of *Fagus sylvatica*. Specific elevation range (from lowlands to submountain, 0 to 600(-800) meters above sea level) and the lack of conifers (c.f. mountain beech forest) define this type often referred to as lowland and submountain beech forest. Important additional tree species include *Acer platanoides*, *Acer pseudoplatanus*, *Betula pendula*, *Carpinus betulus*, *Castanea sativa*, *Fraxinus excelsior*, *Populus tremula*, *Prunus avium*, *Quercus petraea*, *Quercus robur*, *Sorbus aucuparia*, *Tilia cordata*, *Tilia platyphyllos*, *Ulmus glabra*.

7. Mountain beech forest

Mountain beech forests are defined by the altitudinal range of distribution, by the dominance of *Fagus*, and in most cases, by the presence of coniferous species (*Abies alba* and/or *Picea abies*) as important components. As in the category 6, locally important additional tree species include *Acer pseudoplatanus*, *Betula pendula*, *Carpinus betulus*, *Castanea sativa*, *Fraxinus excelsior*, *Populus tremula*, *Prunus avium*, *Quercus petraea*, *Quercus robur*, *Sorbus aucuparia*, *Tilia cordata*, *Tilia platyphyllos*, *Ulmus glabra* depending on trophic status and/or successional phase (Ellenberg 1988, Jahn 1991).

8. Thermophilous deciduous forest

Forest of submediterranean climate regions and supramediterranean altitudinal levels dominated by deciduous or semideciduous thermophilous species, mainly *Quercus pubescens*; other oaks associate with or replace *Q. pubescens* in submediterranean woods: *Quercus faginea*, *Q. pyrenaica* and *Q. canariensis* (Spain), *Q. cerris* (Italy), *Q. frainetto*, *Q. trojana* (Greece). The species typically associated in these oak woods are maples (*Acer monspessulanus*, *Acer opalus*, *Acer obtusatus*) and, in eastern areas, *Ostrya carpinifolia*, *Fraxinus ornus*, *Carpinus orientalis*. Forest dominated by thermophilous deciduous oaks, under local microclimatic or edaphic conditions are found also far north in the Atlantic region, Pannonic and Continental regions.

The class includes also:

other deciduous non-alluvial formations of meso- and supra-Mediterranean zone dominated by *Fraxinus spp.*, *Ostrya carpinifolia*, *Carpinus orientalis*, *Acer spp.*, *Tilia spp.*, *Carpinus betulus*, *Aesculus hippocastnus* and *Juglans regia*;
supramediterranean and submediterranean *Castanea sativa* dominated forests, represented, for the most part, by old established and naturalised plantations.

9. Broad-leaved evergreen forest

Forests characteristic of the Mediterranean and warm-temperate humid zones of Macaronesia dominated by broad-leaved sclerophyllous or lauriphylloous evergreen trees or by palms.

10. Coniferous forests of the Mediterranean, Anatolian and Macaronesian regions

The category covers a wide range of forests dominated by coniferous species (pines, firs, junipers, cypress, cedar) growing in the Mediterranean, Anatolian and Macaronesian biogeographical Regions.

11. Swamp forest

Coniferous or broad-leaved more or less open and developed woodland on mires of the boreal zones in Fennoscandia or on peaty soils throughout Europe.

12. Floodplain forest

European fluvial and riparian forests.

13. Native plantations

The category includes two main types of plantations:

1. Reforestation with native species: i.e. plantations of native coniferous species established inside or near the present or recent natural range of the species. In some cases these are old established plantations accompanied by semi-natural undergrowth.
2. Highly artificial forestry plantations: conifers plantation within their broad biogeographical area of occurrence, characterised by intensive exploitation for commercial purpose. The decisive character is the artificial forest condition with a considerably modified accompanying floristic cortege.

14. Exotic plantations

Plantation of forest species non native to Europe or outside of their broad biogeographical region of occurrence established for the production of wood; some species (Robinia, Eucaliptus) species are able to regenerate naturally competing successfully with autochthonous forest species.

APPENDIX II: LIST OF PARTICIPANTS

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