

# A European forest biodiversity status indicator

The European Environment Agency has released the Report “Development and harmonization of a Forest Status Indicator (FSI)”, entirely developed by the Corpo Forestale dello Stato – Italian Forest Service (CONECOFOR Service), on the basis of a grant from the Agency in the framework of the Pan-European Process for the Implementation of Biodiversity Indicators SEBI2010, aimed at implementing the International Convention on Biological Diversity in Europe.

The objective of the report is to implement a new European forest biodiversity status indicator (FSI) obtained through the elaboration and synthesis of current metadata and methodologies at European level. In particular, the work involved detailed collection of the metadata and harmonized methods available in European Networks. The following step was based on SEBI2010 (EG6) sub-indicators, developed progressively at the time of this study (naturalness, deadwood, tree condition, structure, vegetation) and their use as parameters of forest biodiversity in FSI. The last phase of the elaboration is a synthesis and interpretation of FSI parameters, expressed through “radar” graphs. Finally, simulations for a graphic representation of FSI were designed for two metadata collections: one for Italy and one for Slovakia, Spain and Germany.

FSI is based on qualitative attributes of the forest ecosystem, essential to evaluate the quantitative results of other biodiversity indicators, e.g., giving the correct significance to the observed trends in forest types cover. Nowadays, FSI is ready to be included and combined into the SEBI2010 headline macro-indicator “Trend in extent and composition of selected ecosystems”

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## Introduction

The *Pan-European Biological and Landscape Biodiversity Strategy (PEBLDS)* was developed to support implementation of the UN Convention on Biological Diversity at pan-European level, on the initiative of the

Council of Europe (CoE) and the United Nations Environment Programme (UNEP). In this framework, the biodiversity resolution passed by the 5th Conference of the European Environment Ministers “Environment for Europe” (Kiev, 2003) includes a key target to develop a core set of biodiversity indicators by 2006 and to establish a pan-European biodiversity monitoring and reporting programme by 2008, with a framework of collaboration with the Ministerial Conference on the Protection of Forests in Europe (MCPFE). A pan-European Co-ordination Team, formed by the Euro-

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pean Environment Agency (EEA), UNEP World Conservation Monitoring Centre (UNEP-WCMC), European Centre for Nature Conservation (ECNC) and the Expert Group leaders has been operating since 2004, having initiated its work by collecting available information. The elaborated work plan provides the logical framework for the activities required in order to ensure European coordination of the development and implementation of biodiversity indicators. The indicators will be applied in assessing, reporting on and communicating achievement of the 2010 target to halt biodiversity loss. This activity is called *Streamlining European 2010 Biodiversity Indicators (SEBI2010)*, European Community Biodiversity Clearing House Mechanism, 2006).

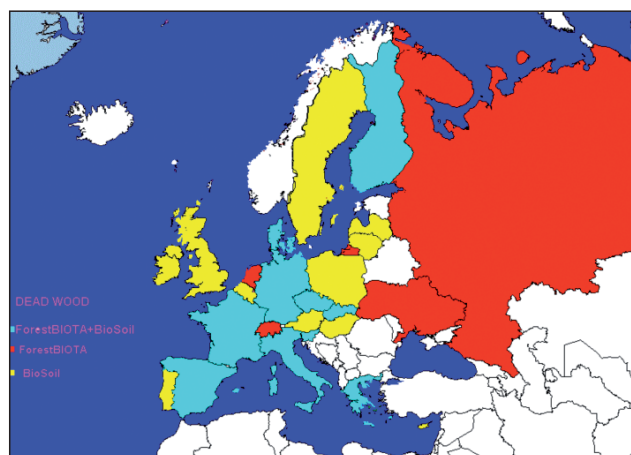
In this framework, an overall headline indicator called *Trend in extent and composition of selected ecosystems* has been developed by the SEBI2010 Expert Group 2. A specific *Forest Area Indicator* is ready for implementation, mainly based on quantitative data (trend of forest area, considering forest types), but for proper understanding and evaluation it needs to be complemented by a qualitative indicator taking into account the status and trends of key characteristics of forest ecosystems, a *Forest Status Indicator (FSI)*, Petriccione et al., 2007).

## Results

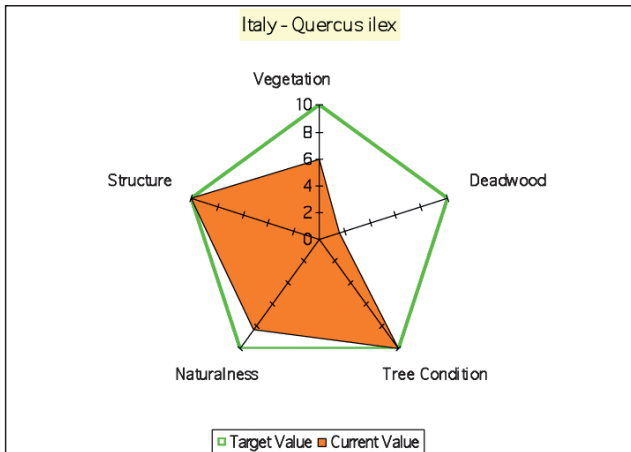
FSI, entirely developed by the Corpo Forestale dello Stato – Italian Forest Service (CONECOFOR Service) on the basis of a grant from the European Environment Agency, is based on the detailed collection of available metadata and harmonized methods (EU Forest Focus & UN/ECE ICPs, National Forest Inventories, Natura2000 National Reports, MCPFE Reports, etc.). It consists of a synthesis of surrogate measures (sub-indicators) for biodiversity (tree condition, deadwood amount and type, plant species composition, etc., Fig. 1) per forest type in Europe, with the aim of evaluating the results provided by the Forest Area Indicator, taking into account concepts like the quality, functionality

and integrity of forest ecosystems. It will be based on sub-indicators identified at pan-European level (4th Ministerial Conference on the Protection of Forests in Europe, MCPFE) and implemented at pan-European (EU Forest Focus & UN/ECE ICP Forests) and National level (NFIs), as follows:

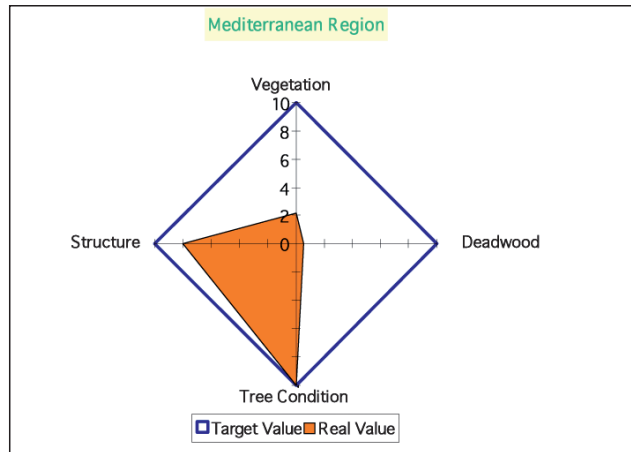
- (1) EU Forest Focus & UN/ECE ICP Forests Level I: tree condition data on ca. 3000 points, since 1985 (continuously for 20 years); forest structure, deadwood and plant species composition on ca. 6000 points, since 2007 (pilot project BioSoil);
- (2) EU Forest Focus & UN/ECE ICP Forests Level II: tree condition data on ca. 700 plots and plant species composition on ca. 500 plots, since 1995 (continuously for 10 years); deadwood data on ca. 100 plots, since 2006 (pilot project ForestBIOTA, Petriccione, 2004, Ferretti et al, 2006);
- (3) National Focal Points: tree species composition and deadwood data from a number of NFIs all over Europe;
- (4) Natura2000 National Reports: “conservation status” of a number of SCIs (47% of them including forests) all over Europe;
- (5) MCPFE Reports and National data: “protected forests” amount.



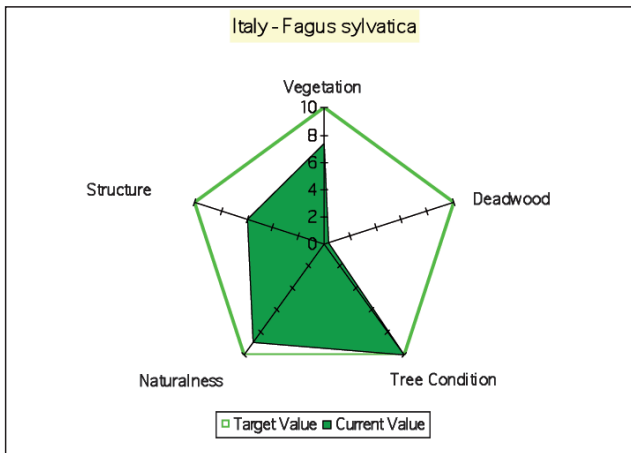
**FIGURE 1** Deadwood: meta-data availability in the CoE Countries (EU/ICP Forests Lev. I and II)  
Source: Petriccione et al., 2007



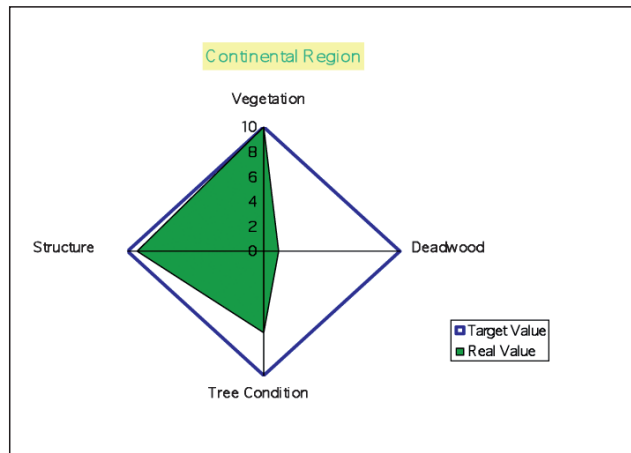
**FIGURE 2** FSI radar diagram (*Quercus ilex* forest plots in Italy)  
 Source: elaborated from 2005 original data, Ferretti et al., 2006, Petriccione, 2004



**FIGURE 4** FSI radar diagram (*Quercus ilex* forest plots in Italy and Spain)  
 Source: Petriccione et al., 2007



**FIGURE 3** FSI radar diagram (*Fagus sylvatica* forest plots in Italy)  
 Source: elaborated from 2005 original data, Ferretti et al., 2006, Petriccione, 2004



**FIGURE 5** FSI radar diagram (*Fagus sylvatica* forest plots in Italy and Germany)  
 Source: Petriccione et al., 2007

Data are organized according to a revised and improved version of FTBA (*BEAR Forest Types for Biodiversity Assessment*), recently released by EEA. The indicator is represented by radar diagrams including all sub-indicators/forest types/year (each diagram per each available year). Changes in the time and “distance” from target values can be easily rec-

ognized by the change in shape of the diagrams. Some examples, related to the Italian *Quercus ilex* and *Fagus sylvatica* forest plots, is reported in Fig. 2 and 3. Testing of the developed methodology has been done on three key forest types (*Picea abies*, *Fagus sylvatica* and *Quercus ilex*-dominated forests), across three biogeographical Regions (data from EU/ICP Forests Lev.



II plots participating to the pilot project ForestBIOTA):

- Alpine Region (*Picea abies* forest): data from Italy, Germany and Slovakia;
- Continental Region (*Fagus sylvatica* forest): data from Italy and Germany (Fig. 4);
- Mediterranean Region (*Quercus ilex* forest): data from Italy and Spain (Fig. 5).

## Conclusion and perspectives

FSI developing meets the requirements of SEBI2010 delivering data on changes over time of some key attributes of forest ecosystem in Europe; the emphasis on the qualitative aspects of biodiversity is a policy fundamental to the management of the environment. Most data is harmonized at Pan-European level; in some cases they cover a period of 20 years, according to a systematic network which accurately represents all Europe and are easily available from international bodies (EU & UN-ECE). There is the possibility for up- and down-scaling of data collected at Level I and Level II. FSI is based on broadly accepted sub-indicators, it is very sensitive, being able to detect changes in the

timeframes and on the scales important to decisions. It can be updated regularly, if adopted at European level, on the basis of routine monitoring programmes. The available data are consistent in space and cover most EEA countries. The FSI, based on quantitative attributes of forest ecosystems, has been included in the SEBI2010 indicators, in the area *Trend in extent and composition of selected ecosystems*.

### References

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