2 THE MONITORING SYSTEM

2.1 Background

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Forest monitoring in Europe has been conducted for 28 years according to harmonised methods and standards by the International Cooperative Programme on Assessment and Monitoring of Air Pollution effects on Forests (ICP Forests) of the Convention on Long-range Transboundary Air Pollution (CLRTAP) under the United Nations Economic Commission for Europe (UNECE). The monitoring results meet the scientific information needs of CLRTAP for clean air policies under UNECE. According to its strategy for the years 2007 to 2015, ICP Forests pursues the following two main objectives:

(1) To provide a periodic overview of the spatial and temporal variation of forest condition in relation to anthropogenic and natural stress factors (in particular air pollution) by means of European-wide (transnational) and national large-scale representative monitoring on a systematic network (monitoring intensity Level I).

(2) To gain a better understanding of cause-effect relationships between the condition of forest ecosystems and anthropogenic as well as natural stress factors (in particular air pollution) by means of intensive monitoring on a number of permanent observation plots selected in most important forest ecosystems in Europe (monitoring intensity Level II).

The complete methods of forest monitoring by ICP Forests are described in detail in the “Manual on methods and criteria for harmonised sampling, assessment, monitoring and analysis of the effects of air pollution on forests” (ICP Forests 2010). For many years forest monitoring according to the ICP Forests Manual was conducted jointly by ICP Forests and the European Commission (EC) based on EU–co-financing under relevant Council and Commission Regulations. The monitoring results are also delivered to processes and bodies of international forest and environmental policies other than CLRTAP, such as Forest Europe (FE), the Convention on Biological Diversity (CBD), the UN-FAO Forest Resources Assessment (FRA), and EUROSTAT of EC. In order to better meet the new information needs with respect to carbon budgets, climate change, and biodiversity, the forest monitoring system was further developed in the years 2009 to 2011 within the project “Further Development and Implementation of an EU-level Forest Monitoring System” (FutMon) under EU-co-financing. The following chapters describe briefly the selection of sample plots and the surveys on the revised Level I and Level II monitoring networks.

[1] For contact information, please refer to Annex III-4.

2.2 Large-scale forest monitoring (Level I)

The large-scale forest monitoring grid consists of more than 7500 plots. The selection of Level I plots is within the responsibility of the participating countries, but the density of the plots should resemble that of the previous 16 x 16 km grid. For this reason, the number of plots in each country should be equal to the forest area of the country (in km^2) divided by 256.

By the end of FutMon in June 2012, 58% of the Level I plots in the EU-Member States were coincident with National Forest Inventory (NFI) plots. No coincidence with NFI plots was given for 29% of the plots. It is expected, however, that a number of countries will merge these plots with NFI plots at a later date. For the remaining plots no information was made available (Fig. 2.2-1).

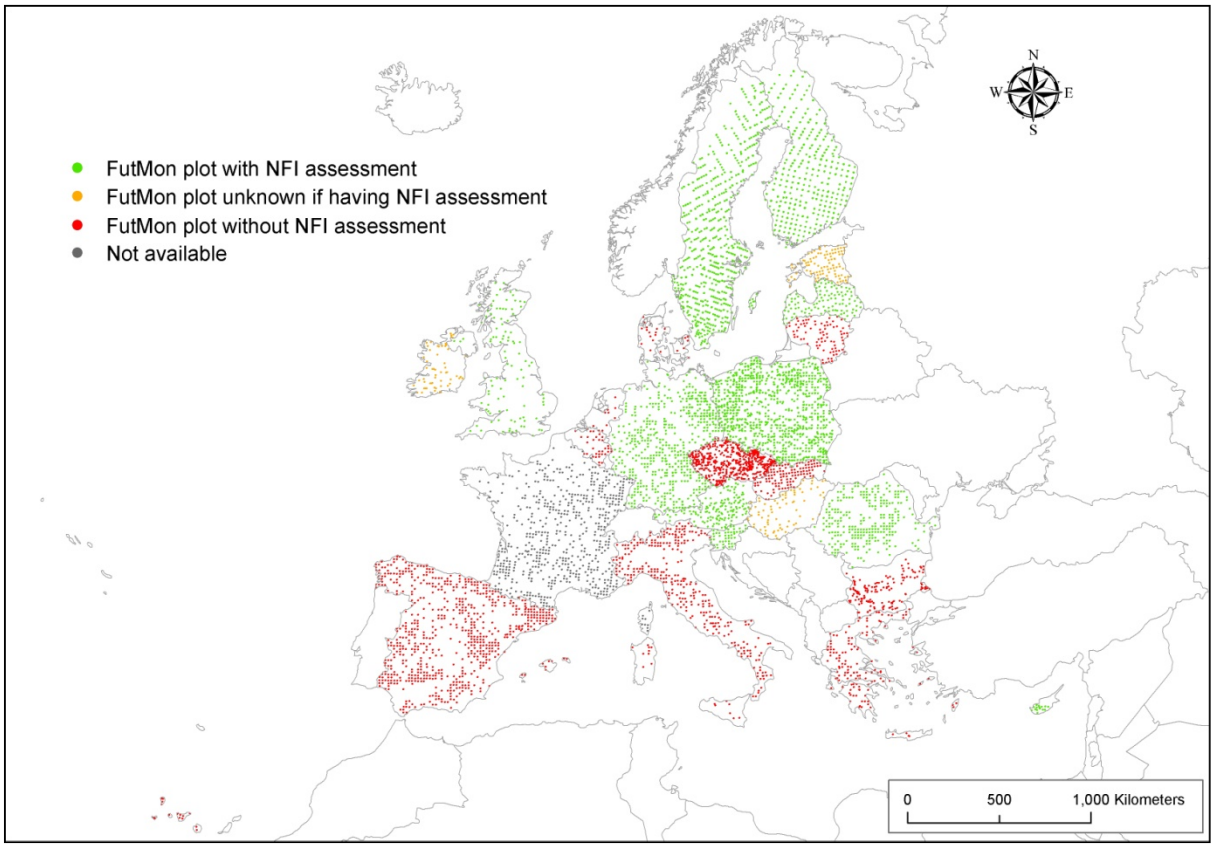

Figure 2.2-1: Spatial distribution of the large-scale plots under FutMon. Green colour implies a coincidence with NFI plots.

On most of the Level I plots tree crown condition is assessed every year. In 1995, element contents in needles and leaves were assessed on about 1500 plots and a forest soil condition survey was carried out on about 3500 plots. The Level I soil condition survey was repeated on about 5300 plots in 2005 and 2006 and the species diversity of forest ground vegetation was assessed on about 3400 plots in 2006 under the Forest Focus Regulation of EC within the BioSoil project (Fig. 2.2-2).

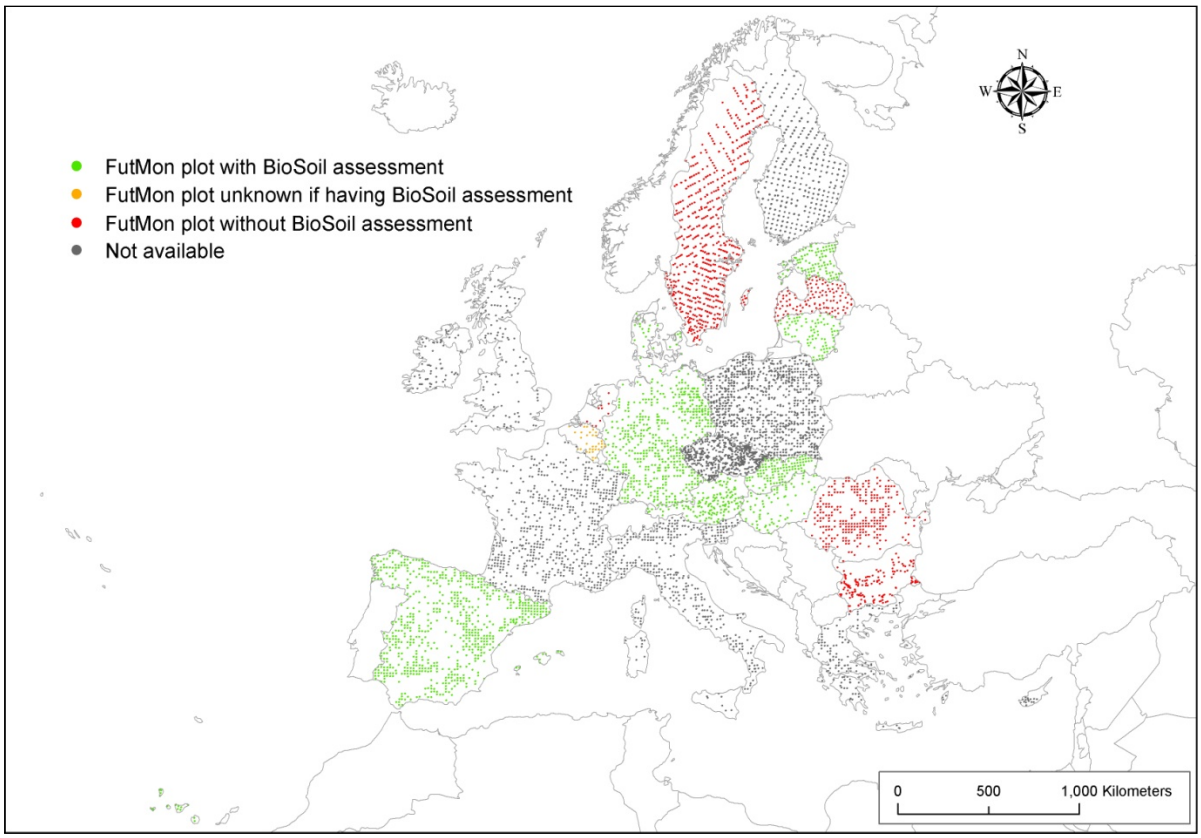

Figure 2.2-2: Spatial distribution of the large-scale plots under FutMon. Green colour implies inclusion in the BioSoil project under the Forest Focus Regulation of EC.

2.3 Forest ecosystem monitoring (Level II)

The number of forest ecosystem monitoring (Level II) plots in the data base is 938 including plots with different assessment intensities and a number of abandoned plots as well. On the plots up to 17 surveys are conducted. Of these surveys many are not conducted continuously or annually, but are due only every few years. The complete set of surveys, however, is carried out on only about 100 Level II “core plots”. The map in Fig. 2.3-1 shows those plots on which crown condition was assessed in 2009, coming close to the total of all Level II plots assessed in 2009. Moreover, the map indicates the locations of Level II plots of previous years.

2.4 References

ICP Forests (2010) Manual on methods and criteria for harmonized sampling, assessment, monitoring and analysis of the effects of air pollution on forests. UNECE, ICP Forests, Hamburg. ISBN: 978-3-926301-03-1, [http://www.icp-forests.org/Manual.htm]

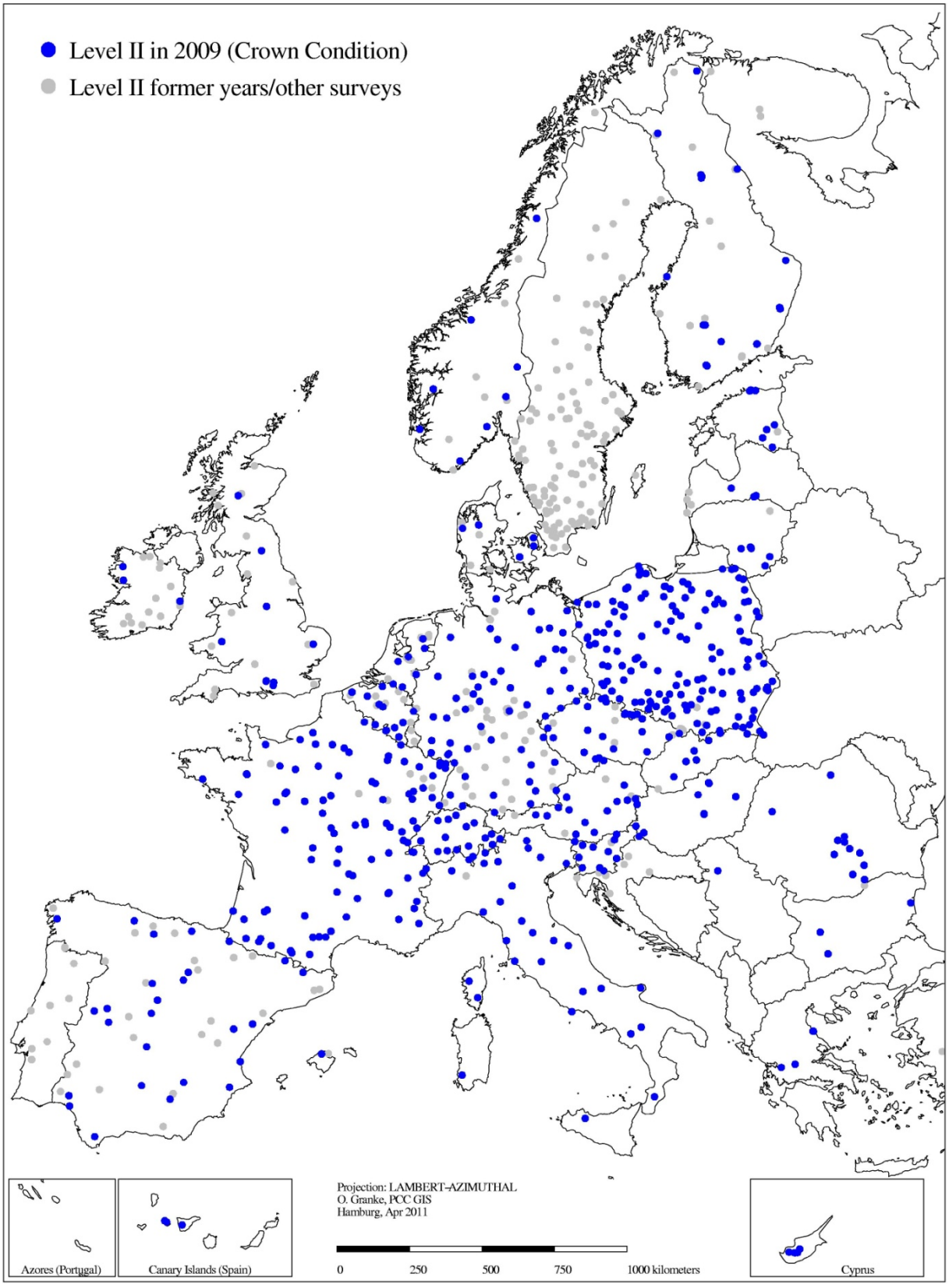

Figure 2.3-1: Level II plots with crown condition assessments in 2009. Also shown are plots with other surveys and of previous years.

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