Forest Monitoring in Europe

- National forest inventories (NFIs)
  - Aim: Forest volume, growth and yield
- International Co-operative Programme on Assessment and Monitoring of Air Pollution Effects on Forests (ICP Forests)
  - Aim: Response of forest trees to environmental changes
  - Focus: Air pollution effects

Forest Monitoring in Europe

- Typical question
  - Why do we need forest monitoring?
- Typical answers
  - To provide forest information for decision making
  - To comply with political information needs
- But: What are the political information needs?
- Standing Forestry Committee of EC
  - Established ad hoc Working Group on Forest Information
  - Identifies information needs to be met

EC needs forest information on

- Relationships between forests and climate change
  - Influence of forest on climate
  - Carbon sequestration by forests
  - Potential carbon release after harvesting trees
- Carbon cycle
  - Forest growth
  - Forest yield
- Forest Biodiversity
  - Ecosystem coverage and integrity
  - Fragmentation
  - Deadwood

EC needs forest information on

- Air pollution effects
  - CO_2 considered as air pollution
  - CO_2 considered to cause climate change
  - Air pollution affects forest condition incl. biodiversity
- Forest condition
  - Health and vitality of trees
  - Condition of forest soils
- Other issues
  - Forest fires
  - Reproductive material
  - Invasive alien species

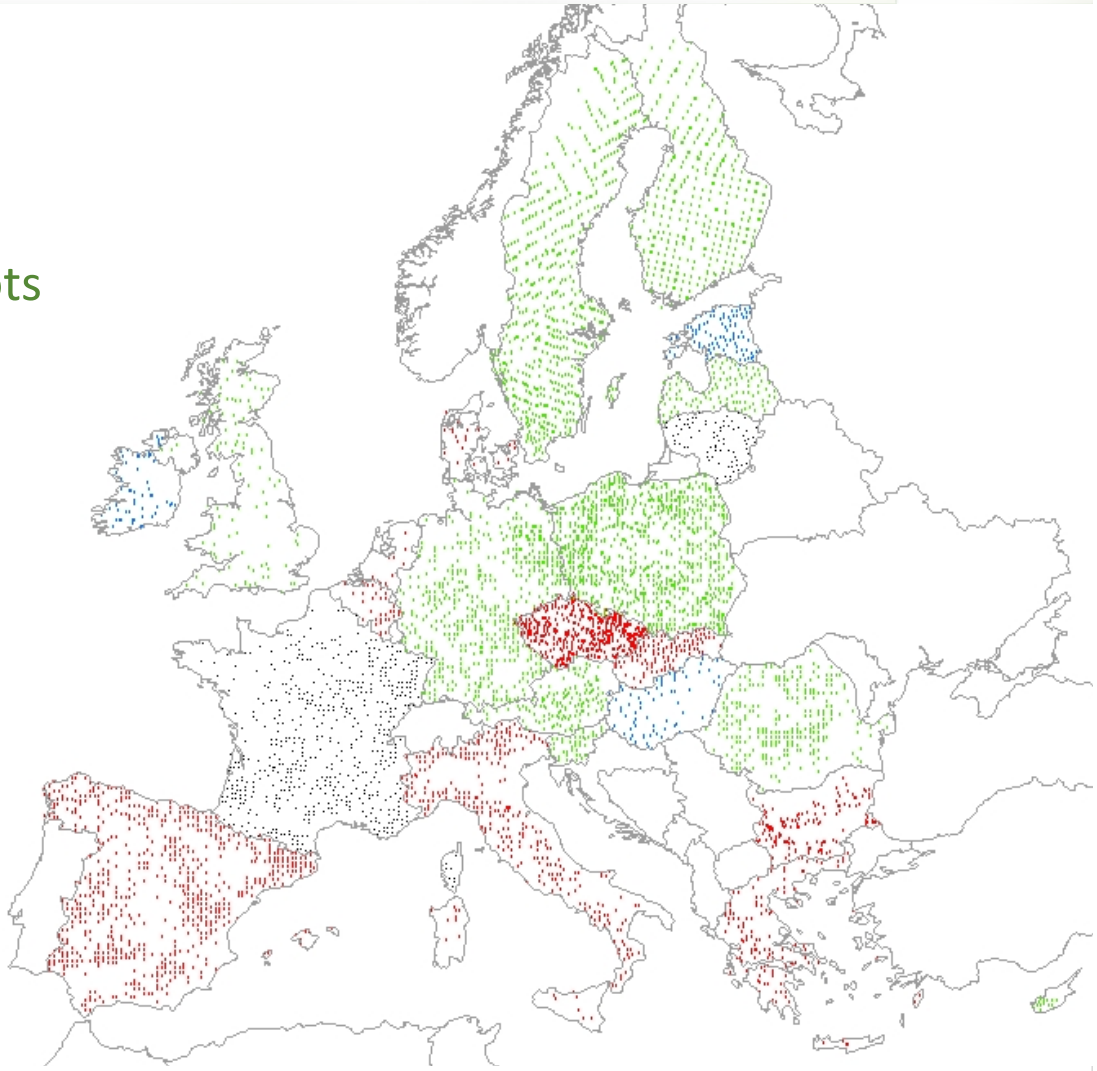
FutMon

- Relies on monitoring system
  - ICP Forests
  - European Commission (DG Agri and DG Env)
- Develops monitoring further
  - Link of large-scale monitoring (Level I) with NFIs
  - Revision of forest ecosystem monitoring (Level II)
  - Improvement of harmonisation of methods and standards
  - Improvement of data quality
  - Establishment of an on-line database system

Why does this comply with political information needs?

Linking Level I with NFI

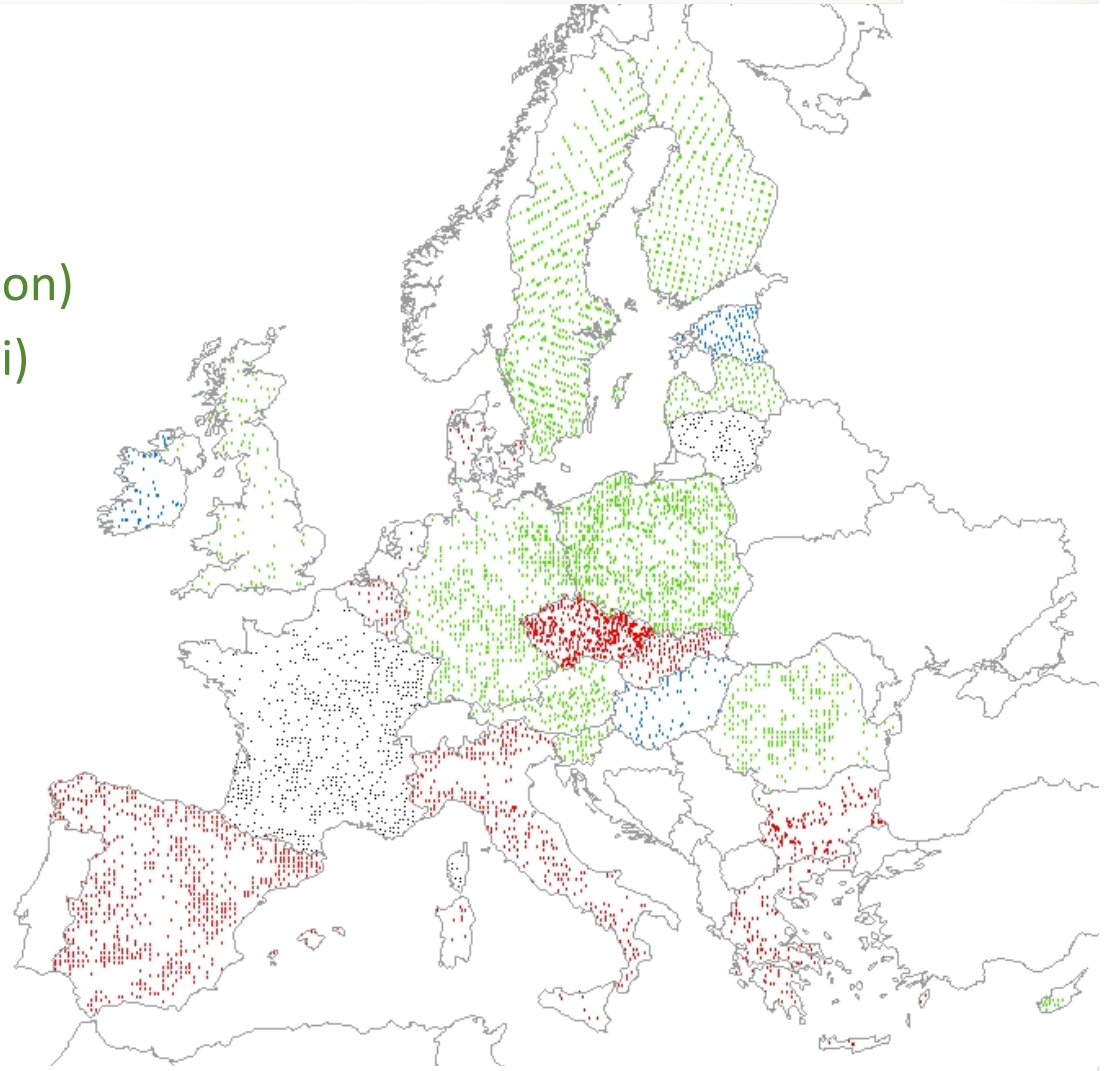
- Map
  - 5455 FutMon large-scale plots
  - Level I with NFI (●): 58%
  - Level I without NFI (●): 29%
  - Remaining 13% Level I plots: Link with NFI uncertain



Linking Level I with NFI

- Information available
  - Forest health (crown condition)
  - Damage types (insects, fungi)
  - Soil condition
  - Foliar chemistry
  - Volume and growth (partly)
  - Species diversity (partly)
- Benefits
  - More information per plot
  - Data for model applications

➔See coming presentations



Revision of Level II

- From previous 850 ICP Forests Level II plots
  - 200 Level II Standard Plots
  - 100 Level II Core Plots
- 200 standard plots
  - Crown condition (annually)
  - Foliar chemistry (every 2 years)
  - Tree growth (every 5 years)
  - Ground vegetation (every 5 years)
  - Soil condition (every 10 years)
  - Deposition (continuously)
  - Meteorology (continuously)

Revision of Level II

- From previous 850 ICP Forests Level II plots
  - 200 Level II Standard Plots
  - 100 Level II Core Plots
- 100 core plots plots
  - Surveys of the standard plots
  - Litterfall (continuously)
  - Phenology (several times each year)
  - Ambient air quality (continuously)
  - Ozone injury (continuously)
  - Soil solution (continuously)
  - Soil water (continuously)

Revision of Level II

- Benefits
  - More information per plot
  - Data impossible to assess at large scale
  - Data permitting modelling approaches
  - Insight into cause-effect relationships
  - Explanation of changes in forest ecosystems
  - Possibility of up-scaling from ecosystem to large scale
  - ➔See coming presentations

Forest scientists agree

- Decision making should rely on
  - Large-scale representative surveys
  - Monitoring of forest ecosystems
- Large-scale surveys can describe
  - Spatial patterns of the status of forests
  - Temporal trends of the status of forests
- Forest ecosystem monitoring
  - Explain cause-effects relationships

Forest damage due to air pollution

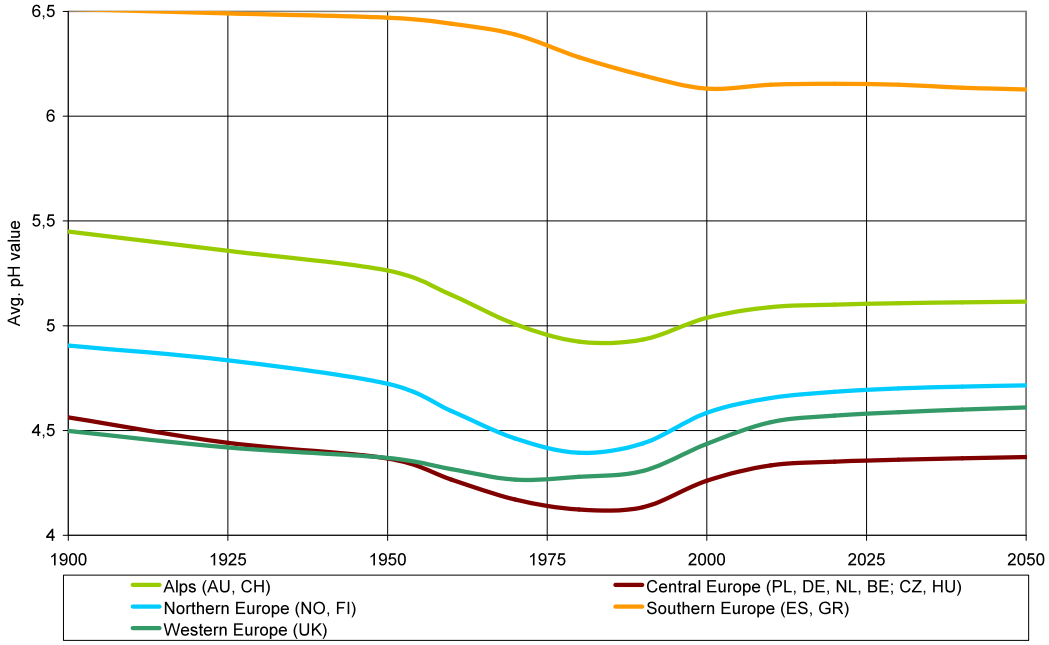
- Can you imagine
  - Assessments of Level I crown condition, soil condition and foliage chemistry only?
- Level II revealed
  - Deposition
  - Critical loads and their exceedance
  - Critical limits and their exceedance
  - Response of ground vegeation and forest trees

Example

- Recent meeting with DG Env B.1
  - Mr. M. Hamell: „Can you say whether the soil will recover from acidification if we do this and that?“
- Yes, we can
  - Soil solution pH
  - 158 plots in 13 countries
  - 5 regions of Europe
  - Recovery after about 1980
  - Condition:

    Gothenburg Protocol

    implemented



Further results of political relevance

- In Sessions 2 and 3
- At the end Session 1

Before that

- Davide Travaglini
- Italian Academy of Forest Sciences (University of Florence)
- Revision of the large-scale forest monitoring system