



Soil monitoring systems and soil information in Austria

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- **Legislation & Responsibilities**
- **Soil inventories and soil monitoring systems**
- **Soil Information System BORIS**
- **Spatial soil information**
- **Conclusions & Outlook**

Legislation on soil protection

- **No comprehensive federal law on soil protection in Austria**
- **Soil Protection Acts at regional level**
- **Ordinances on Sewage Sludge Application on agricultural land at regional level**
- **Federal Forest Act**
- **Soil Protection Protocol of Alpine Convention**
- **EU Soil Thematic Strategy proposed by EC**

Soil Inventories/Soil Monitoring Overview & responsibilities

- **Forest Soil Monitoring** - Federal Research and Training Centre for Forests, Natural Hazards and Landscape (BFW) – 514 sites
- **Environmental Soil Inventories** (Federal Provinces) – ~ 5.500 sites
- **Permanent Soil Monitoring Sites** (Federal Provinces, BFW, Umweltbundesamt) - ~ 40 sites
- **Other special investigations** (University, Federal and Provincial Institutions,.....)

Most of them are included in the

Soil Information System BORIS of the Umweltbundesamt
(more than 10,000 sites)

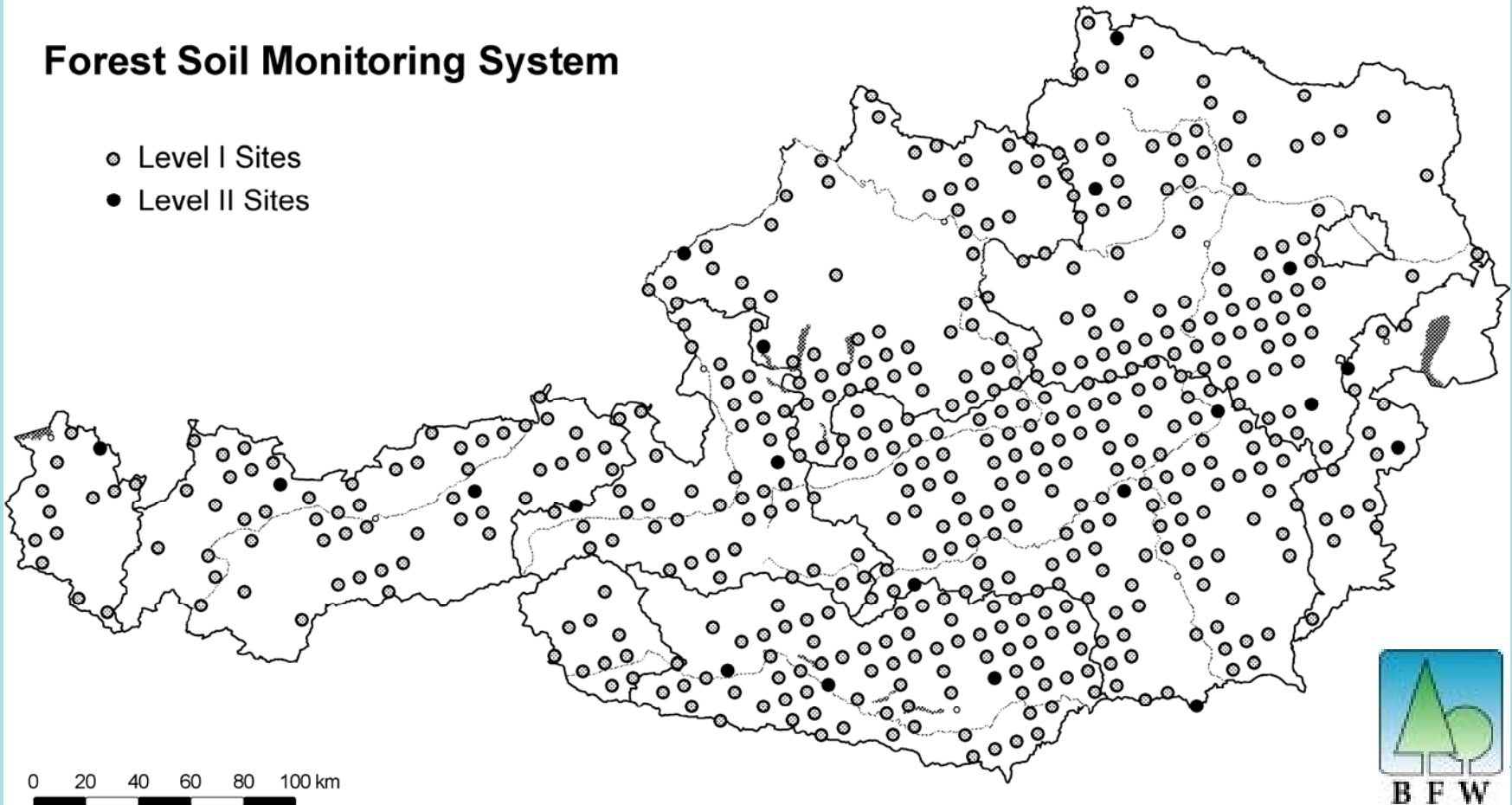
Forest soil monitoring

- **Aim:** contribution to obtain information on the causes and effects of forest die-back
- **Coverage:** territory of Austria
- **Investigation:** vegetation measurements, site and soil descriptions, chemical soil and foliar analyses, crown damage assessments
- **Density:** grid 8.7 x 8.7 km
- **Frequency:** up to now once, repetition currently at 140 sites within the scope of the EU-wide "Biosoil-Project"

Forest soil monitoring

Forest Soil Monitoring System

- Level I Sites
- Level II Sites



Source: Blum et al. in Soil Resources of Europe, 2005

Environmental soil inventories

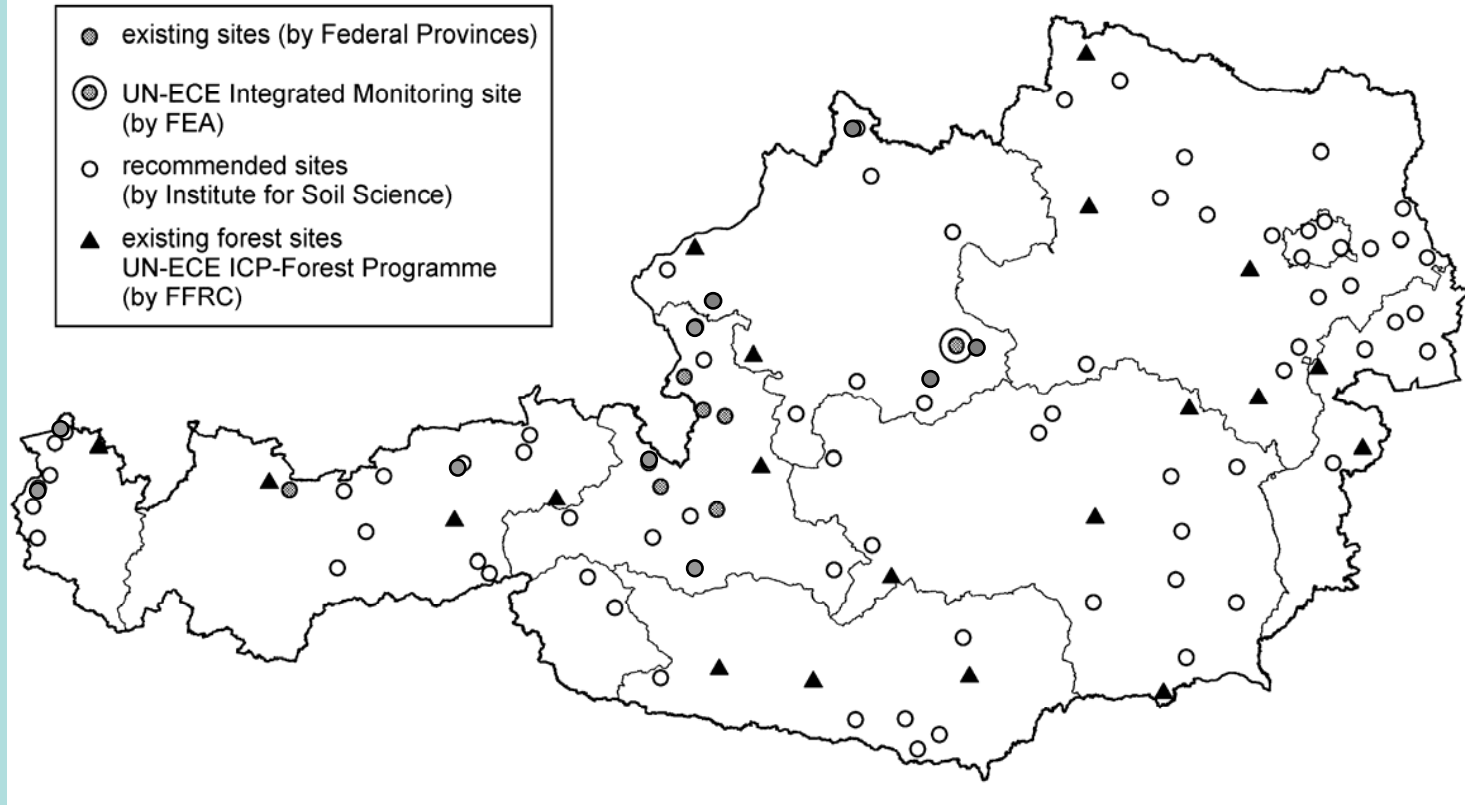
- **Aim:** gather information on spatial variability of soil condition and change over long periods
- **Coverage:** all provinces of Austria
- **Investigation:** site and soil profile description, phys. and chem. parameter
- **Density:** grid 4 x 4 km, partly more dense
- **Frequency:** up to now once except 2 provinces

Permanent soil monitoring

- **Aim:** monitor short- and mid-term changes of soil conditions for control and prediction
- **Coverage:** parts of Austria
- **Investigation:** vegetation, site and soil descriptions, physical, chemical, biological and zoological soil analyses
- **Density:** selected sites
- **Frequency:** periodical

Permanent soil monitoring

Soil Monitoring Sites in Austria



Source: Blum et al. in *Soil Resources of Europe*, 2005 (updated)

Soil Information System BORIS

The development of BORIS started in 1992.

Currently the database holds over 1.5 Mio records from about 10,000 sites all over Austria.

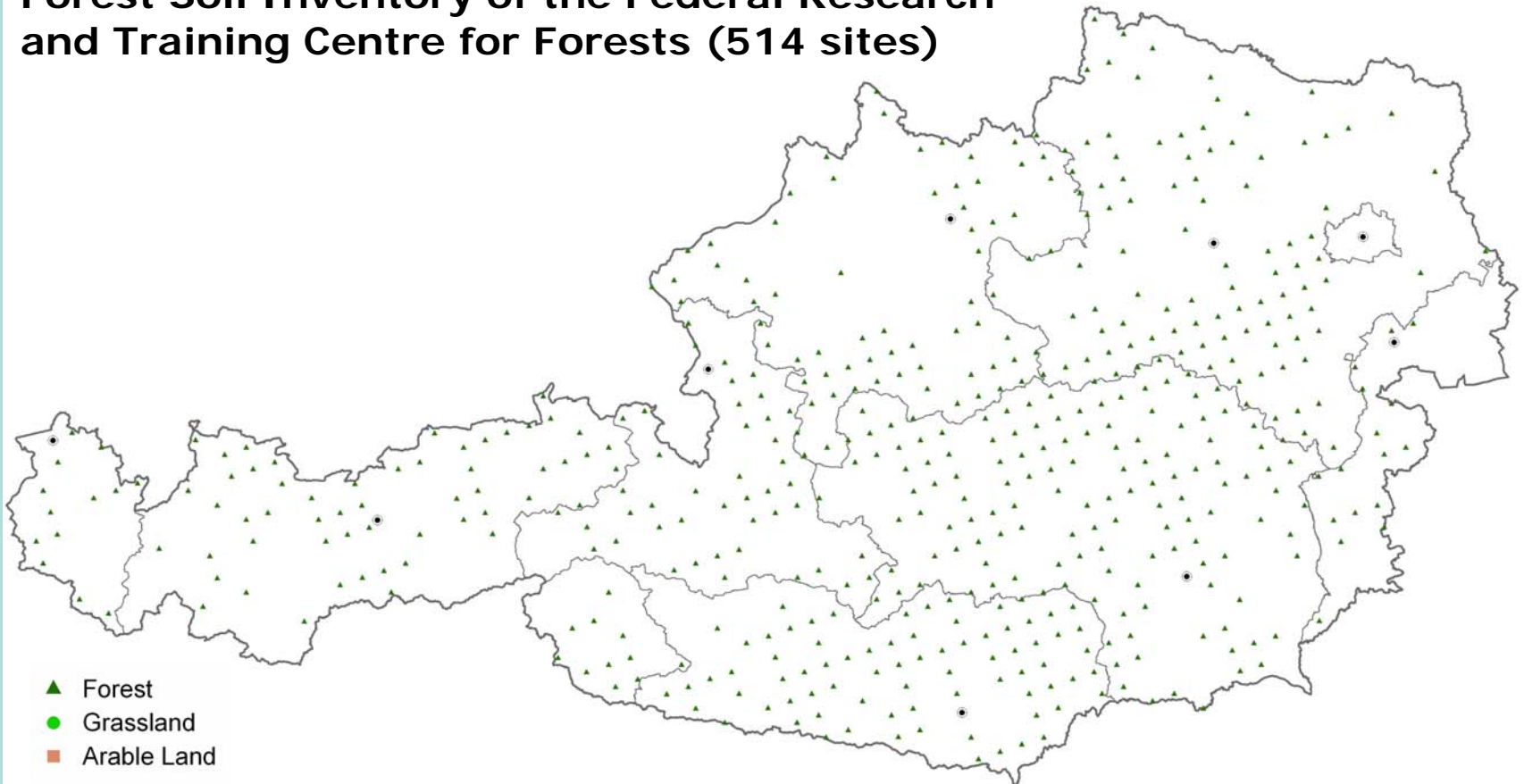
BORIS contains over 600 soil-relevant parameters, which provide

- site information
- profile descriptions and
- analytical values.

<http://www.umweltbundesamt.at/umwelt/boden/boris>

BORIS – Overview of available data set

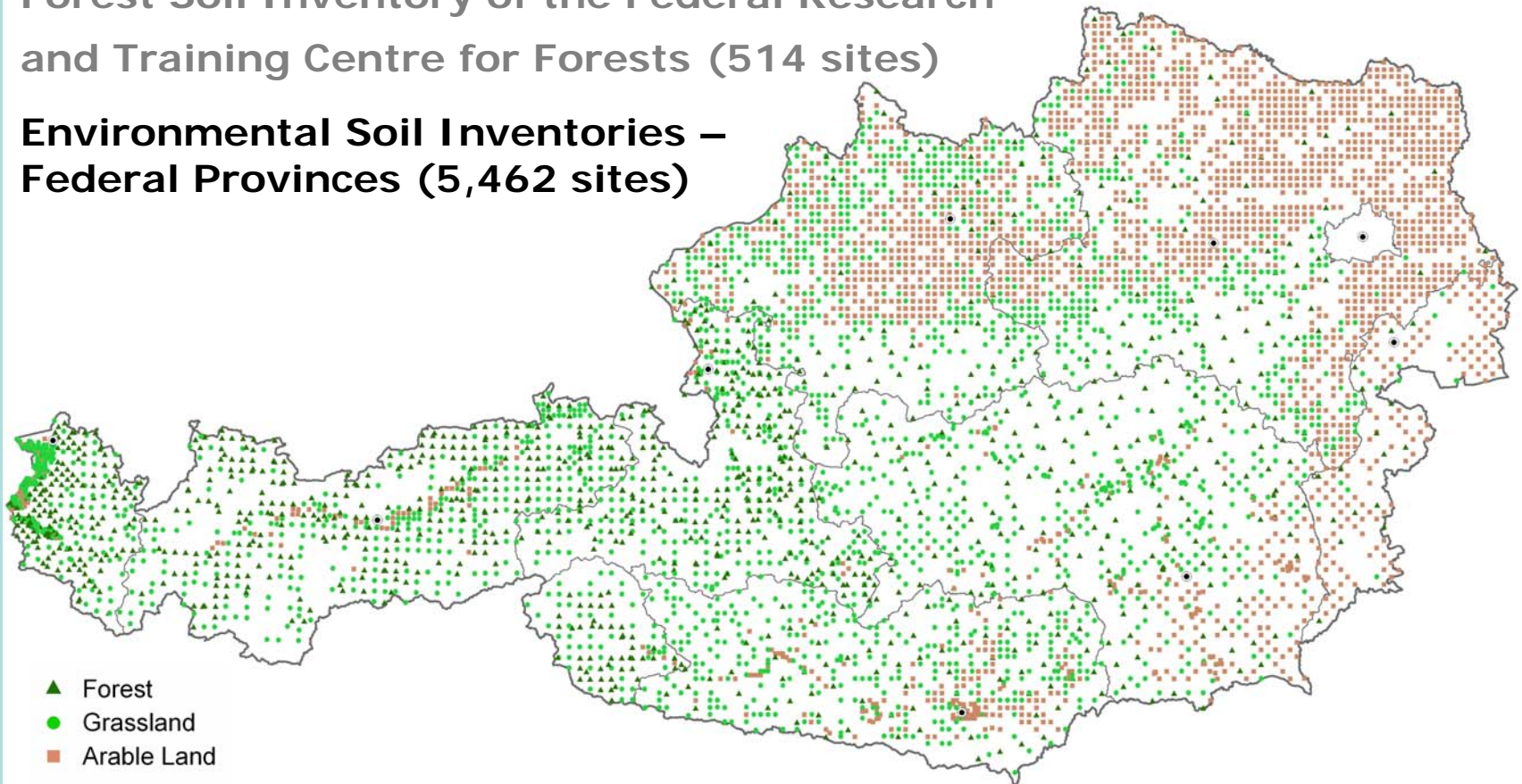
Forest Soil Inventory of the Federal Research and Training Centre for Forests (514 sites)



BORIS – Overview of available data set

Forest Soil Inventory of the Federal Research
and Training Centre for Forests (514 sites)

**Environmental Soil Inventories –
Federal Provinces (5,462 sites)**

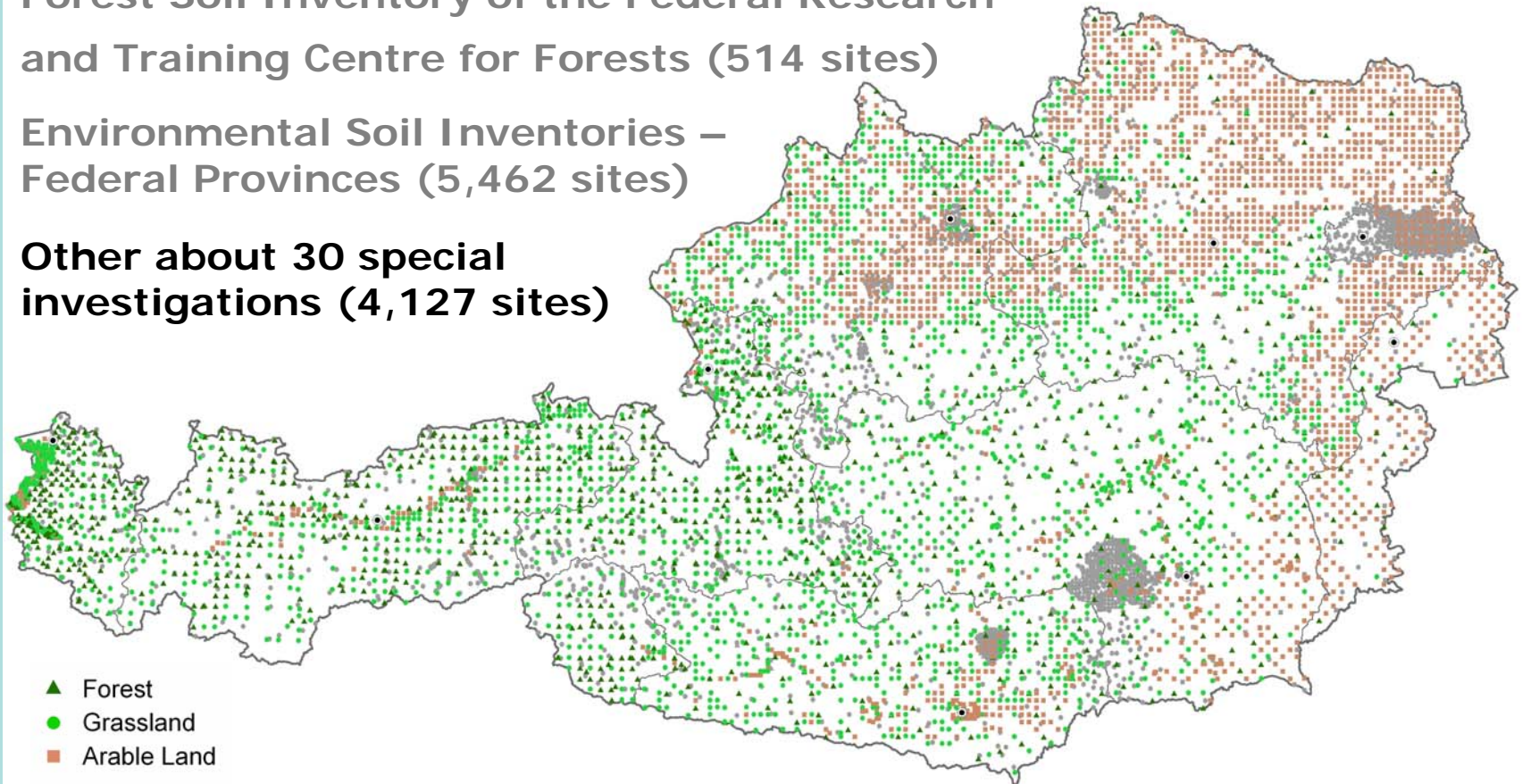


BORIS – Overview of available data set

Forest Soil Inventory of the Federal Research
and Training Centre for Forests (514 sites)

Environmental Soil Inventories –
Federal Provinces (5,462 sites)

Other about 30 special
investigations (4,127 sites)



Data Key Soil Science



- Available, heterogeneous data sets can be checked for their comparability
- Translation of soil data according to the codes of the 'Data Key Soil Science'
- Integration into BORIS
- Evaluation of soil data beyond provincial borders

- **Soil Maps of Austria**

1:1 Mio - ESDB; (Nestroy, 2002; BMLFUW, 2005)
1:750,000 (Fink, 1979)

- **Soil Management Survey (1:25,000)**

Agricultural Soils -> digital soil map (BFW)
eBOD: <http://bfw.ac.at/ebod>

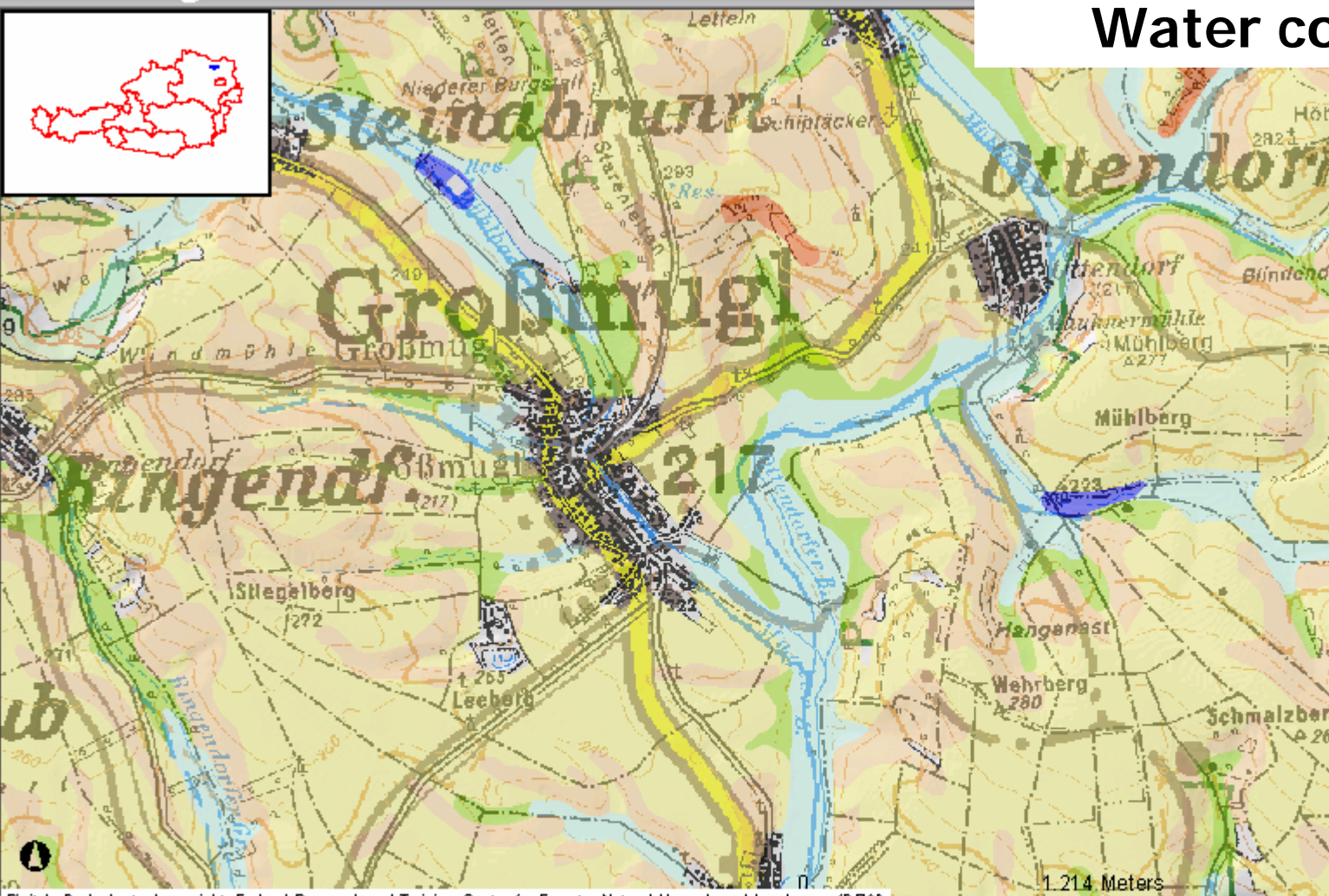
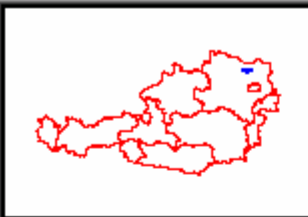
- **Soil Taxation Survey (1:2,000; 1:2,880)**

Agricultural Soils -> BMF, Federal Surveying Office
~20% in digital form, currently no digital access

- **Forest Site Mapping**

about ~ 20% of the forest area is mapped; availability partly digital, diverse data owners (private, public, university)

eBOD - Digitale Bodenkarte Österreich

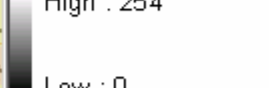


Water conditions

- nals
- feucht bis naß
- feucht
- mäßig feucht bis feucht
- mäßig feucht
- gut versorgt bis mäßig
- gut versorgt
- mäßig trocken bis gut
- mäßig trocken
- trocken bis mäßig tr
- trocken
- sehr trocken bis troc
- sehr trocken
- uneinheitlich
- wechselfeucht
- wechselfeucht mit Ü
- wechselfeucht mit Ü

Geländeschumm

Value



High : 254

Low : 0

■ Situation

■ Gewässer

■ Höhenschichtlinien

ÖK 200

Digitale Bodenkarte / copyright: Federal Research and Training Centre for Forests, Natural Hazards and Landscape (BFW)

Willkommen auf der eBOD Webseite, einer Internetapplikation zur Ansicht der digitalen Bodenkarte von Österreich.

Informationen zur eBOD siehe: <http://bfw.ac.at/ebod>

- Zoomen Sie einen Ausschnitt Ihrer Wahl, je weiter Sie sich einzoomen, desto größer wird die Karte.
- Die Daten der Bodenkarte werden ab Maßstab ca. 1:30.000 angezeigt.
- Die Kartierungsbereiche 215 (Mank), 216 (Klosterneuburg), 218 (Mödling) sind ebenfalls verfügbar.

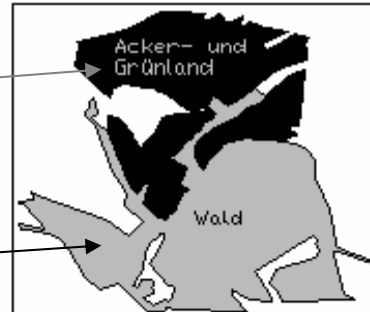


Applications and thematic maps

Combination of soil surveys – sewage sludge

Arable and
grassland

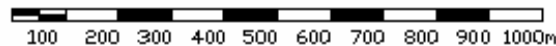
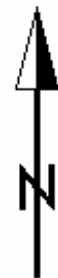
Forest



— Kulturgattungsgrenze
 - - - - - der Bereich innerhalb
 der Linie wurde in
 beiden Kartierungen
 angesprochen

■ Weitere Untersuchungen
 für Klärschlammausbringung
 sinnvoll
 ■ Klärschlammausbringung
 ausgeschlossen
 ■ Klärschlammausbringung verboten
 laut Forstgesetz

Kulturgattungsgrenze



- **Cross linking of soil relevant data**
Further development of interfaces of soil and soil relevant databases
- **Further soil investigations**
Investigation of organic pollutants
Repetition of soil inventories, implementation of permanent soil monitoring to provide time series
- **Comparability of soil information**
Good documentation of soil data
Standardisation of data recording
Transformation functions to convert different methods
Soil information system has to be flexible

- **Development of a metadatabase to existing Forest Site Mapping (Meta Map - BFW)**
- **Interpolation of point related soil data and intersection with other spatial (soil) information**
- **Contribution to the development of soil indicators (national & EU level)**
- **Contribution to international projects (e.g. Danube basin, EcAlp, Envasso)**

