The INSPIRE Data Specification Soil and its relevance for Society

Arnold Arnoldussen, Stijn Keijers and Jan Dirk Bulens

7th EUREGEO, Bologna, 14th of June 2012

skog+ landskap
NORWEGIAN FOREST AND LANDSCAPE INSTITUTE

Mandate TWG INSPIRE Soil

skog+ landskap
NORWEGIAN FOREST AND LANDSCAPE INSTITUTE

- Development of an infrastructure for the exchange of soil data, both within the soil domain and across domain borders.
- Focus on both present situation and future developments.
- TWG INSPIRE Soil: Arnold Arnoldussen (TWG Facilitator), Stijn Keijers (TWG Editor), Christine Le Bas, Jandirk Bulens (TWG co-editor), Edoardo Costantini, Einar Eberhardt, Patrick Engels, Marc van Liedekerke, Stephan Marahrens, Milan Sanka, Ainara Senar, Kees Versluijs, Robert Tomas (European Commission contact point).

Need for Soil data

- Increasing
- Prevention and mitigation of soil degradation
- Optimalisation sustainable agricultural and forest production
- Mitigation effects climate change
- Mitigation effects soil contamination
- Applications: very few at an European level; at national scale probably many hundreds. More than 100 User Requirements and Reference Material were submitted.
- 1990s: establishment European Soil Data Base (1:1000.000) by the European Soil Bureau Network.
- 2006: EC adopted European Soil Thematic Strategy.
- No EU Directive is directly dealing with soils – no requirements for reporting on soils

skog+ landskap
NORWEGIAN FOREST AND LANDSCAPE INSTITUTE

Soil definition

skog+ landskap
NORWEGIAN FOREST AND LANDSCAPE INSTITUTE

> Soils and subsoil characterised according to depth, texture, structure and content of particles and organic material, stoniness, erosion, where appropriate mean slope and anticipated water storage capacity (Inspire Directive 2007/2/EC)

Scope Soil

- **Soil inventories**, providing one-off assessments of soil conditions and/or soil properties at certain locations and at a specific point in time, and allow soil monitoring, providing a series of assessments showing how soil conditions and/or properties change over time.
- **Soil mapping**, providing a spatial presentation of the properties linked to the soils, including soil types; typically, soil maps are derived with the help of data available in soil inventories. Also other soil related information derived from soil properties, possibly in combination with non-soil data are within the scope.

Methodology

- INSPIRE methodology was followed
- 15 Use cases were studied in detail covering:
  - Agri-Environmental Indicators (3x)
  - Thematic maps derived from Soil information (7x)
  - Contaminated sites (4x)
  - Soil monitoring (1x)

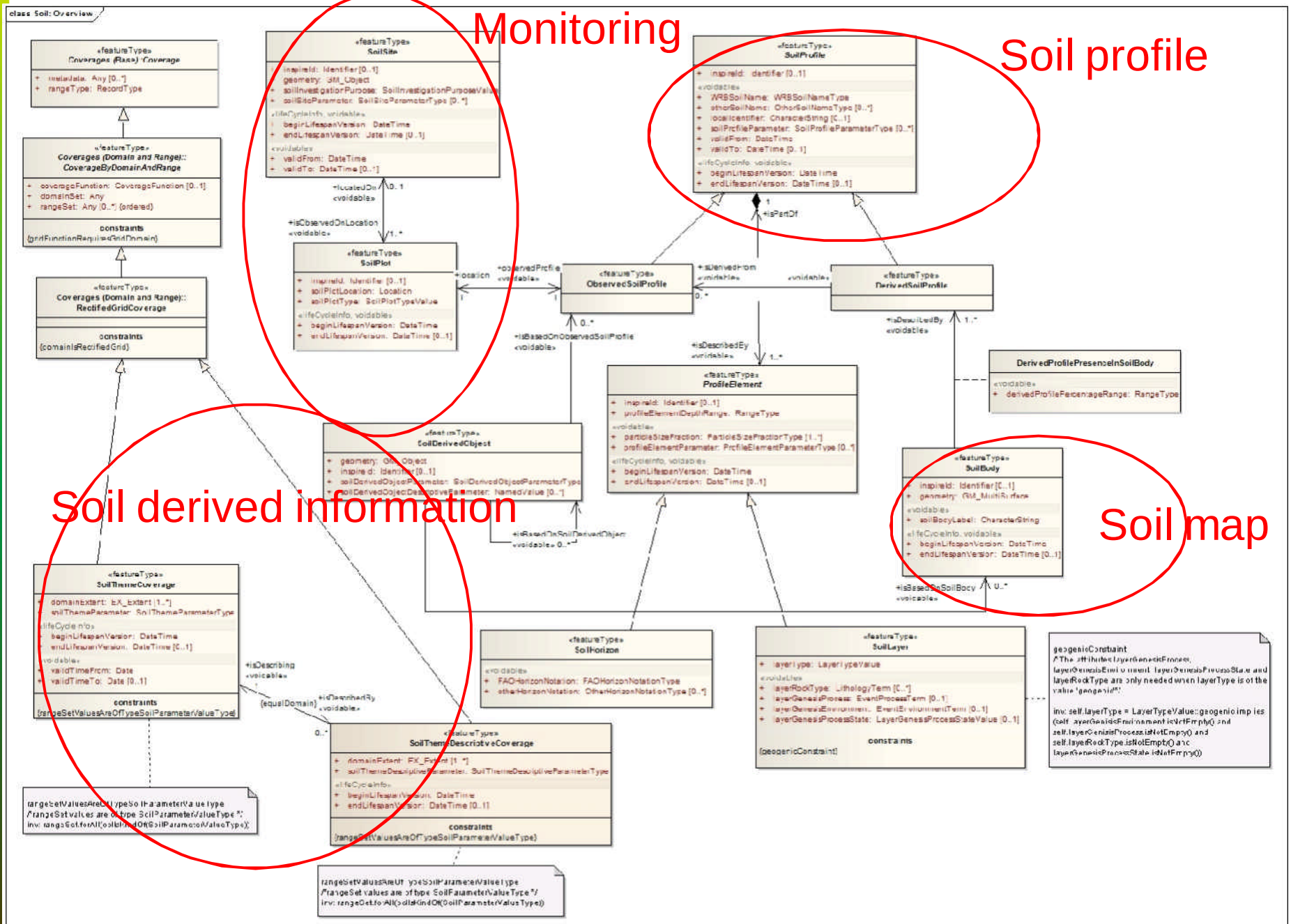
Soil and EU Regulations

Use Cases	Agri-Environmental Indicators	Use Case Environmental Indicator Soil Erosi	Use Case Environmental Indicator Soil Qual	Use Case Environmental Indicator Contaminated Si	Thematic maps	Land irrigation suitability in Navarra (Spai	Development of methodologies for soil salinity surveillance in middle Ebro basin (Spain)	yield forecasting within the MARS proje	Restrictions for N and P in agricultu	Calculation threshold trace elemen	Use of Soil Scape Viewe	Establishment Less Favoured Areas (Franc	Contaminated sites	Contaminated Land Register Austr	Use Case drinking water and soil contaminati	Use Case Ecology and contaminatic	Use Case Property and contaminatic	Soil Monitoring	Use Case state of soil in Europ
Directives																			
CAP. Council regulation (EC) No 1782/2003 of 29 September 2003 establishing common rules for direct support schemes under the common agricultural policy.						•						•							
Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates form agricultural sources.									•										
Directive 200/60/EC of the European Parliament and of the council of 23 October 2000 establishing a framework for Community action in the field of water policy.									•	•					•				
Directive 2009/28/EC of the European Parliament and of the Council. Energy from renewable resources.												•							
Directive 86/278/EC of the European Parliament and of the Council. Sewage Sludge Directive.										•									
Directive 1999/31/EC of the European Parliament and of the Council of 26 April 1999 on the landfill and waste.														•	•	•			
Less Favoured Areas (LFA) Intermediate areas. This regulation is aimed at better targeting of natural handicap payments COM (2009) 161. (regulation not adopted yet)												•							
Proposed Soil framework Directive (state of the proposal is pending)							•							•	•	•	•		

Soil model

- One soil model distinguishing following major spatial objects:
  - Soil profile (both observed and derived)
  - Profile element (including soil layer and soil horizon)
  - Soil Body
  - Soil Derived Object
  - Soil Theme Coverage and Soil Theme Descriptive Coverage
  - Soil Site
  - Soil Plot
- In the annexes:
  - Overview contaminated sites as a possible extension to the INSPIRE data model Soil (not to be part of legislation)
  - Use case how to provide soil organic carbon content by using the Soil model

skog+ landskap
NORWEGIAN FOREST AND LANDSCAPE INSTITUTE



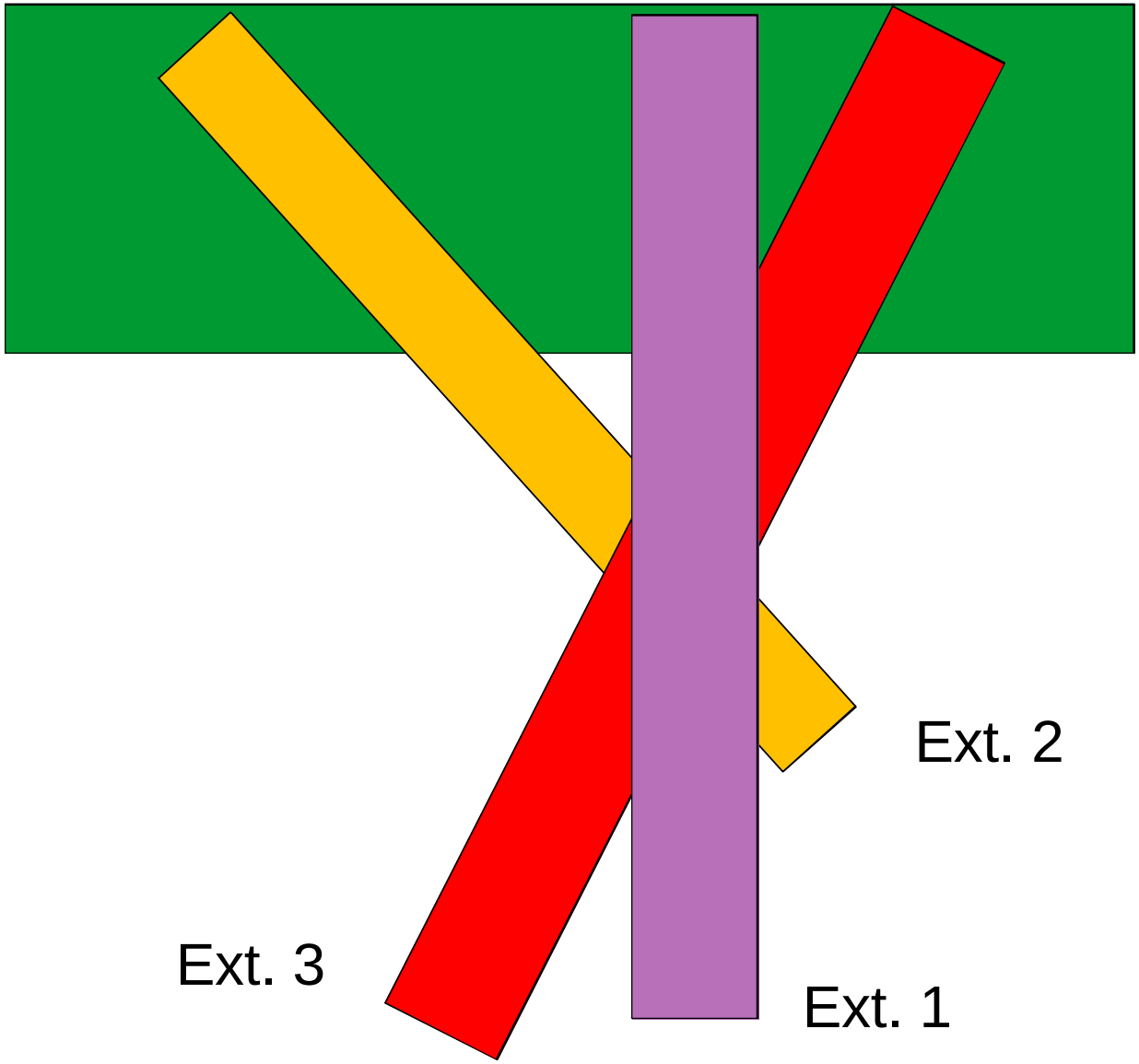
Monitoring
Soil profile
Soil derived information
Soil map
class Soil: Overview
«featureType» Coverages (Base) Coverage
«featureType» Coverages (Domain and Range):: CoverageByDomainAndRange
«featureType» Coverages (Domain and Range):: RectifiedGridCoverage
«featureType» SoilSite
«featureType» SoilPlot
«featureType» ObservedSoilProfile
«featureType» SoilProfile
«featureType» DerivedSoilProfile
«featureType» ProfileElement
«featureType» SoilDerivedObject
«featureType» SoilBody
«featureType» SoilThemeCoverage
«featureType» SoilThemeDescriptiveCoverage
«featureType» SoilHorizon
«featureType» SoilLayer
DerivedProfilePresenceInSoilBody
constraints

Soil model

skog+ landskap
NORWEGIAN FOREST AND LANDSCAPE INSTITUTE

- WRB is used as standard classification system; however it is made possible to use national classification systems in the case they are not convertible into WRB.
- Contamination not included. Contamination treated as a chemical element in the same line as f.ex. nutrients.
- Important parameters in the model due to adopted EU Regulations:
  - *Soil profile*: WRB name (or national soil type), potential root depth, available water capacity, carbon stock, water drainage
  - *Soil element*: particle size fraction, organic carbon content, N, pH, Cd, Cr, Cu, Pb, Hg, Ni, Zn
  - *Soil derived object:* potential root depth, available water capacity, carbon stock, water drainage, particle size fraction, organic carbon content, N, pH, Cd, Cr, Cu, Pb, Hg, Ni, Zn

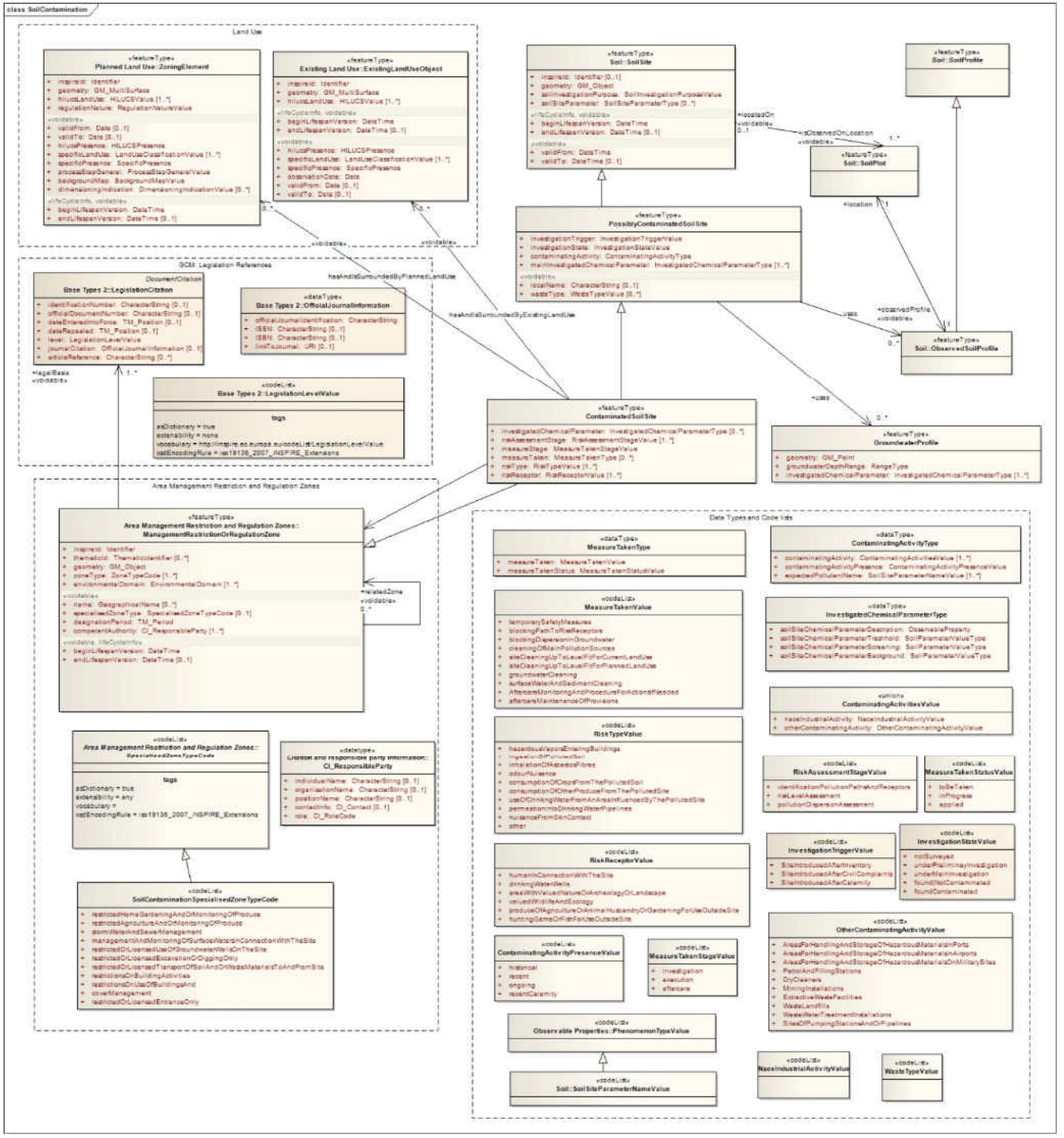
Extensions



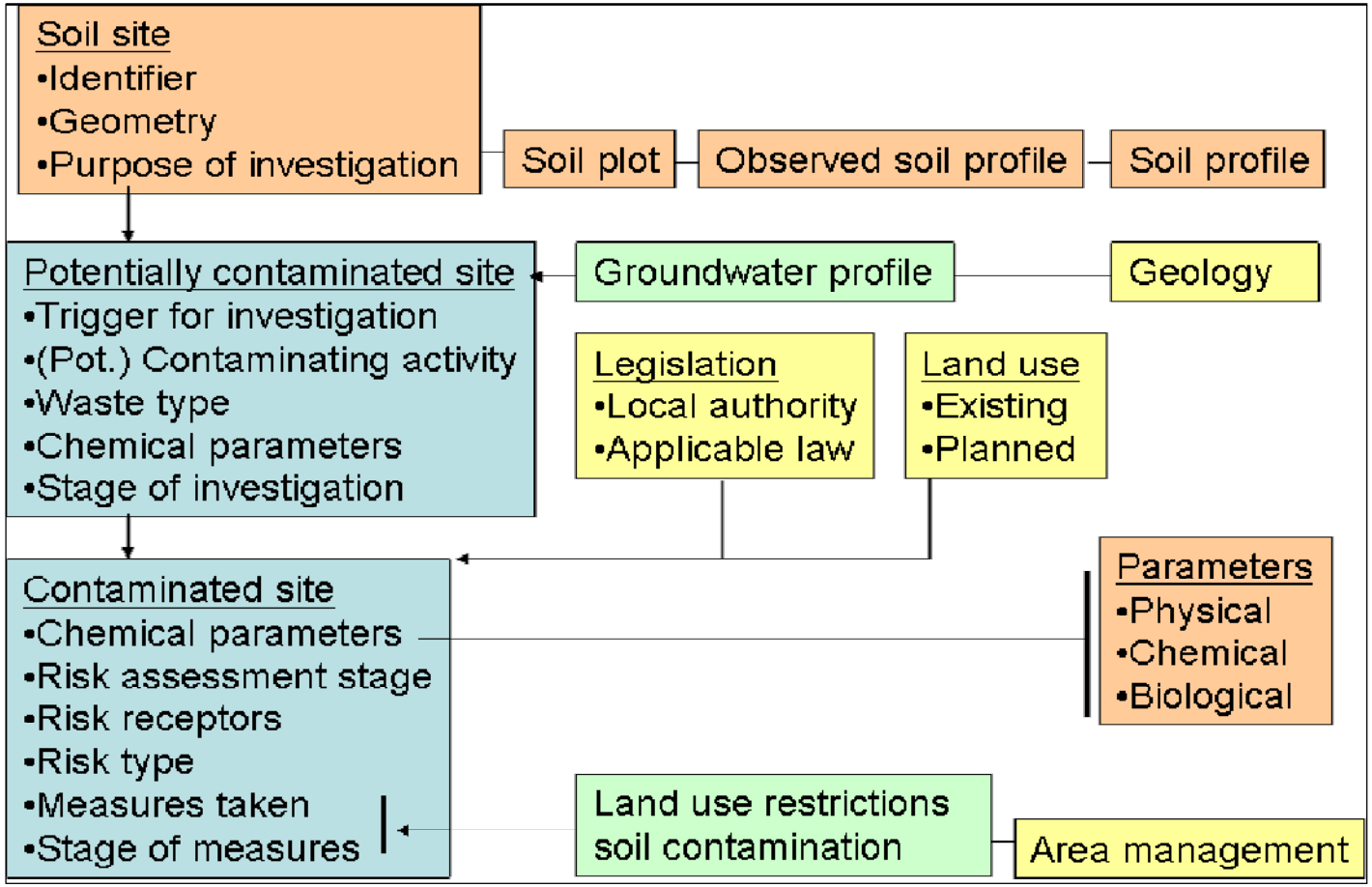
skog+ landskap
NORWEGIAN FOREST AND LANDSCAPE INSTITUTE

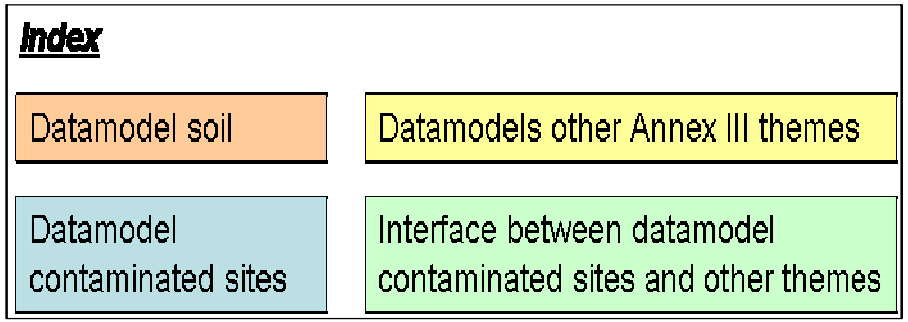
INSPIRE model

Extension on soil contamination



Soil contamination extension





skog+ landskap
NORWEGIAN FOREST AND LANDSCAPE INSTITUTE

Relevance for Society

skog+ landskap
NORWEGIAN FOREST AND LANDSCAPE INSTITUTE

- INSPIRE:
  - Interoperability important
  - INSPIRE free of any scale
  - Requisite: no enforcement to do additional data capture in the field

Relevance for society (2)

skog+ landskap
NORWEGIAN FOREST AND LANDSCAPE INSTITUTE

- INSPIRE Soil model:
  - Not a soil data base, but an infrastructure for the exchange of soil data
  - Relevance:

  - exchange of soil information across borders of territories within the same domain

  - exchange across domain borders nationally and internationally
  - Focus on these data which are relevant for one or more adopted EU regulations
  - Based on the Soil model the Implementation Rules will be written, which will be part of INSPIRE legislation. Member States will be enforced to implement them.
  - It is to be expected that the structure can be build out in future: development and implementation (voluntary) of extensions.

Thanks for your attention

skog+ landskap

NORWEGIAN FOREST AND LANDSCAPE INSTITUTE