

# **Views on practical implementation of Inspire themes related to geostatistics**

## **Nordic Forum for Geostatistics**

### **Sept 2007**

**Arvid Lillethun,  
Norwegian Mapping and Cadaster Authority**



# *Agenda*

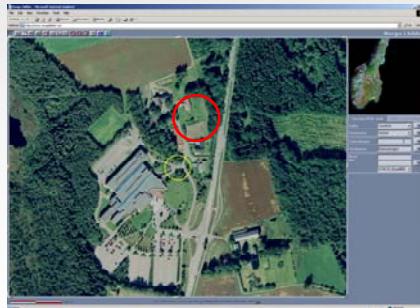
- ESDI as an open infrastructure with distributors and users - based on NSDIs
  
- Inspire into themes and geostatistics
- Geographical units
- Demographic content
- Socio-economic content
- Land use and environmental content
- From data to web map services
- Involvement of Statistical offices in Inspire work

## Geographical infrastructures

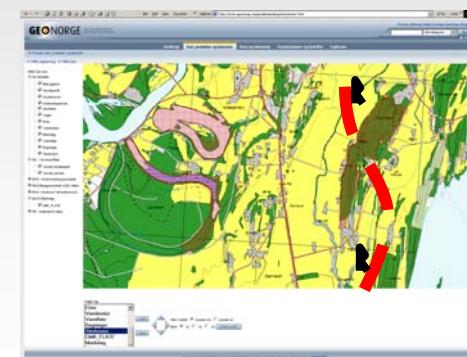
GSDI ESDI NSDI

Inspire as an administrative tool to develop services with Member State focus

Overview portals

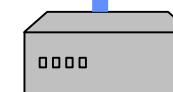
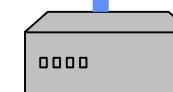


Services integrated into user application



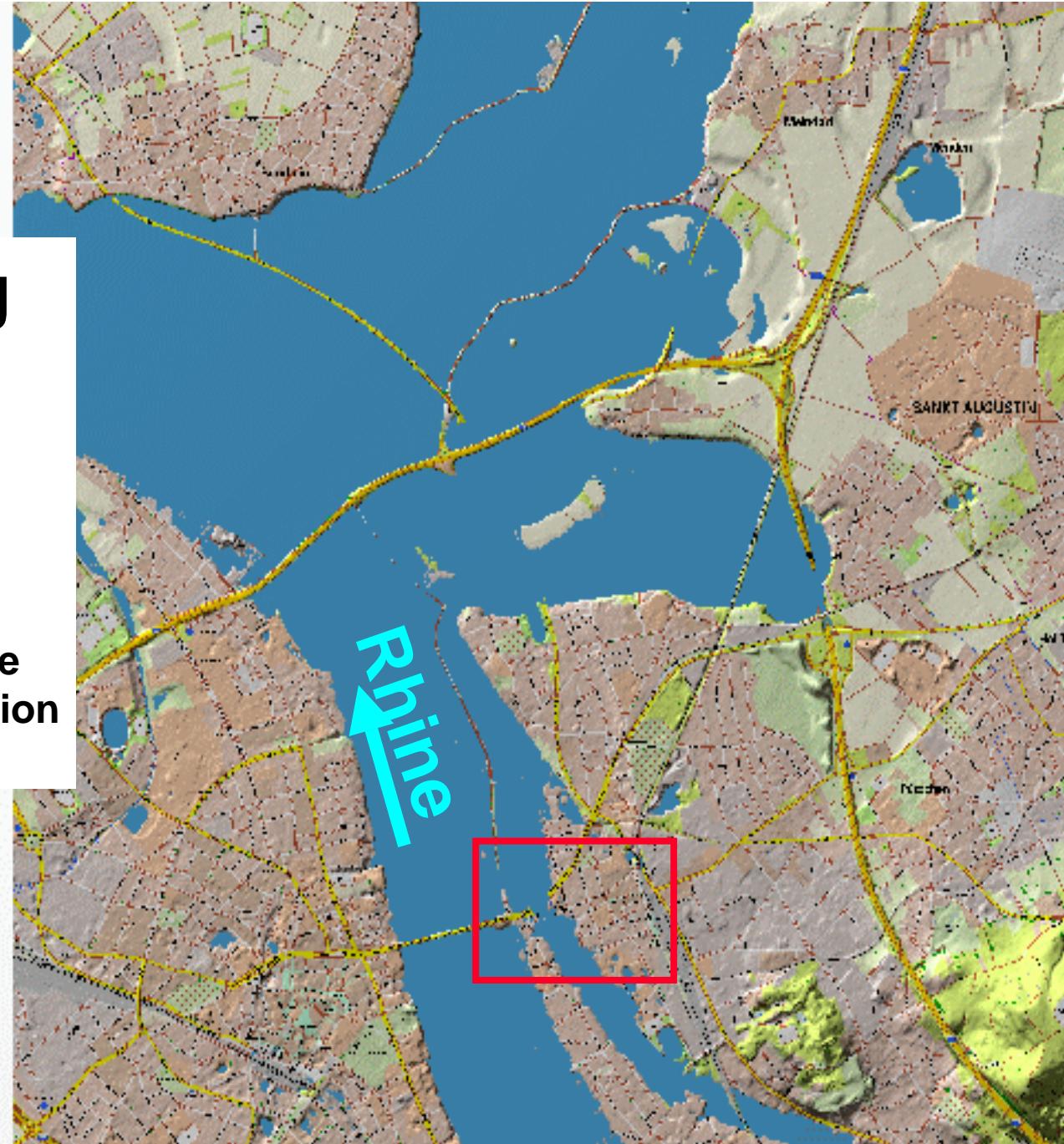
National infrastructure - data connected to internet as services

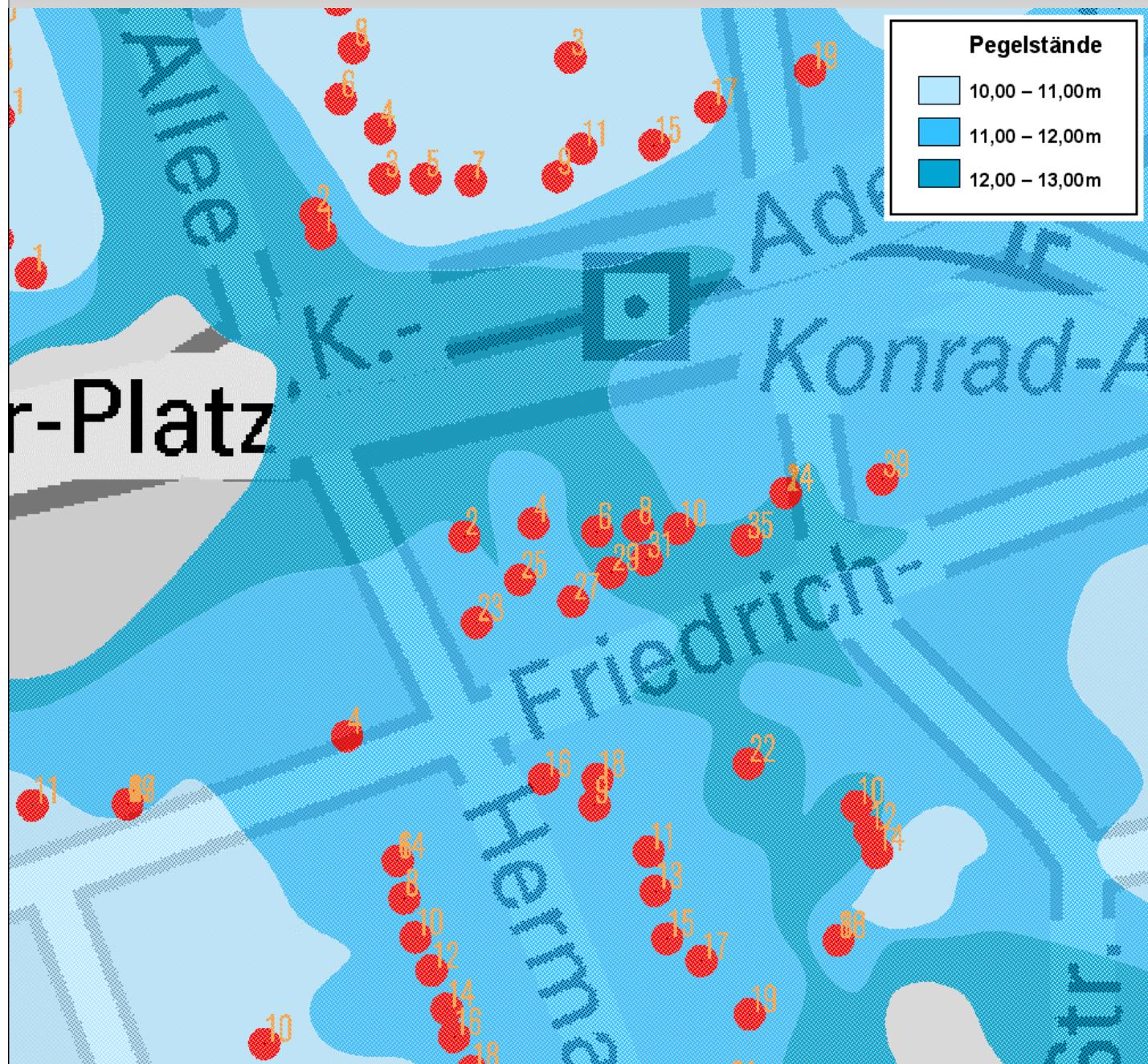
Internet-servers



# Flooding in the Rhine valley

- early warning
- affected people
- affected production
- cross-border



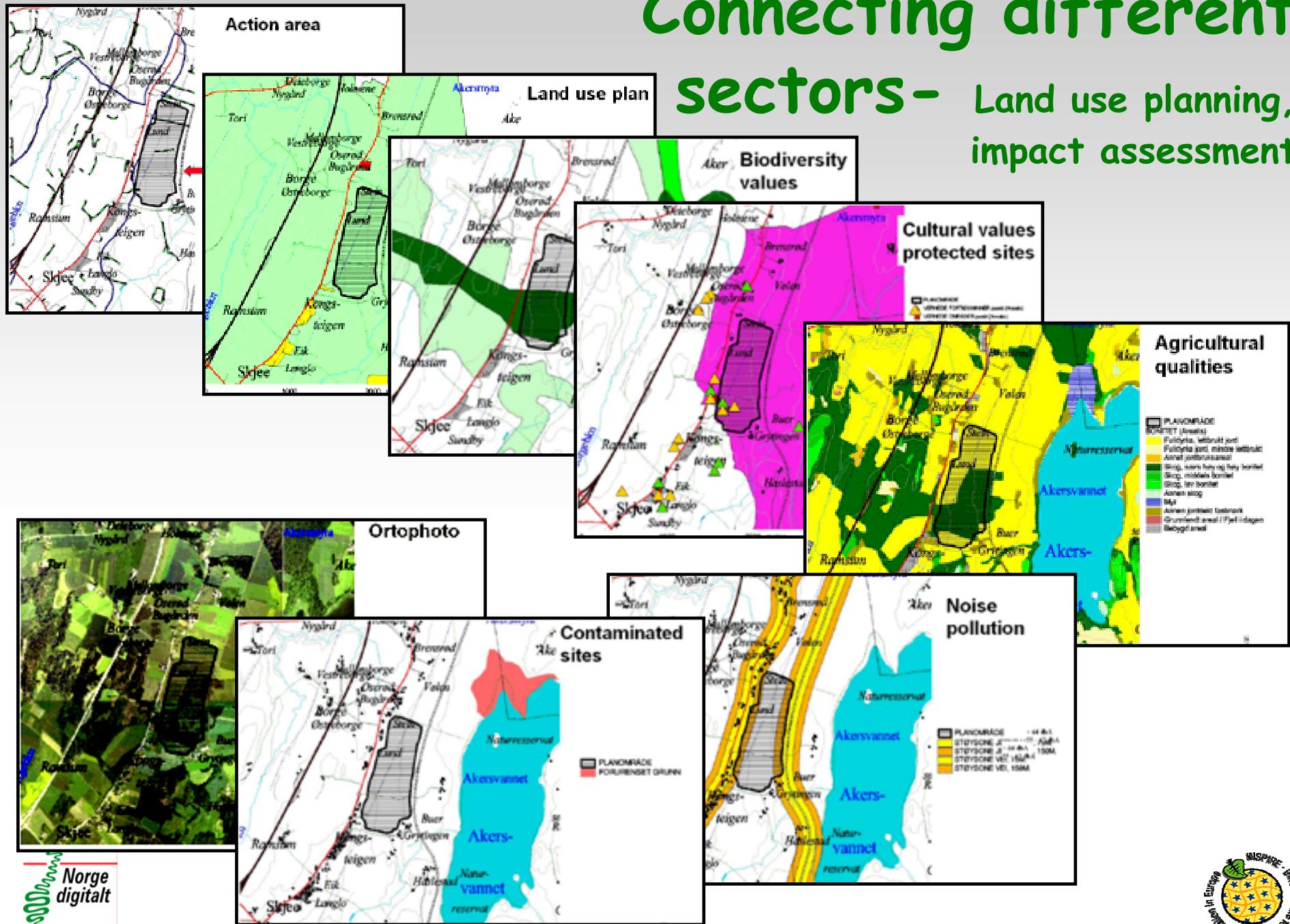


Flooding  
with  
respect  
to gauge  
heights  
close to  
the city  
centre  
of Bonn

-  
affected  
buildings  
(including  
addresses)



# Connecting different sectors- Land use planning, impact assessment



# ***Administrative boundaries - don't fit***

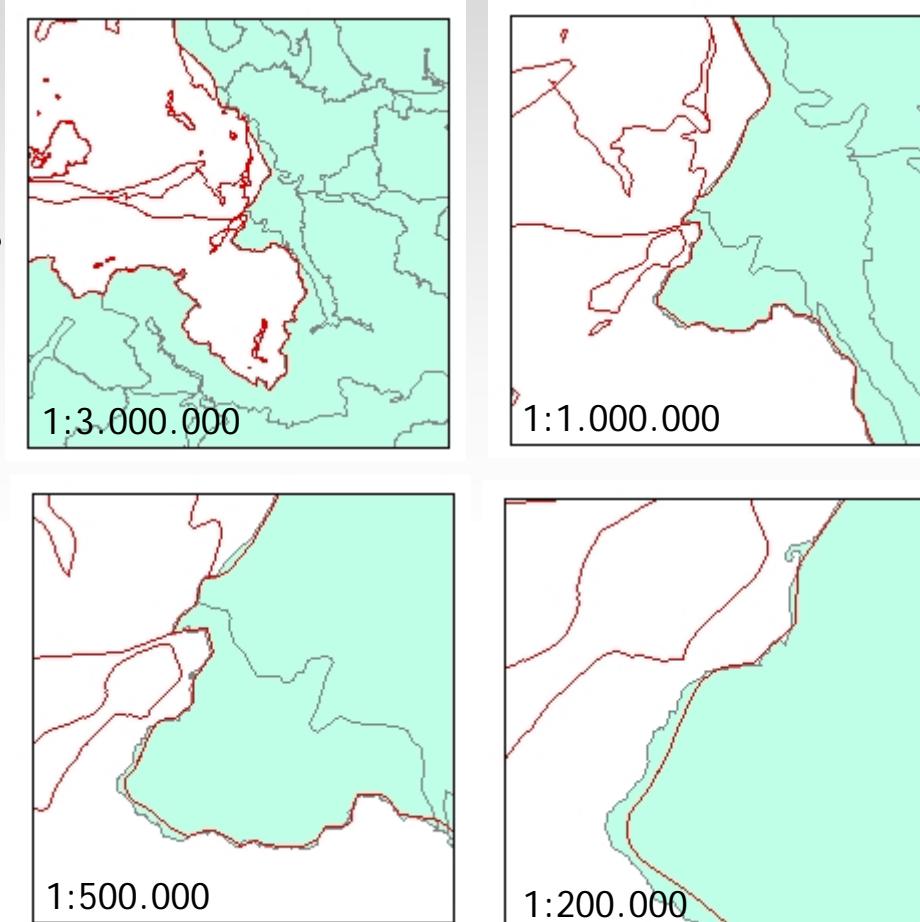
## **Different scales and basic data sets**

### **Example 1**

**Administrative border  
between two countries**

- Country A: basic  
data set 1:500.000**
- Country B: basic  
data set 1:50.000**

-  **Country A**
-  **Country B**



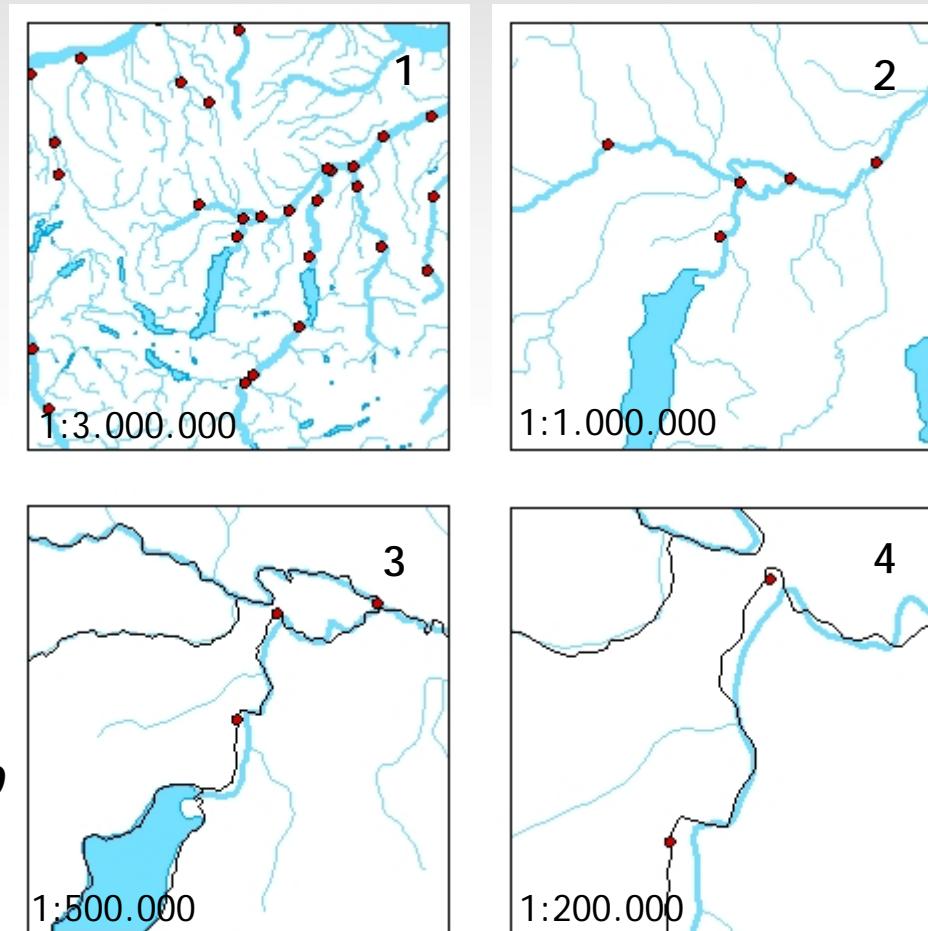
# *Different sources and scales - different geometry - missing harmonisation - use is affected*

## **Different scales**

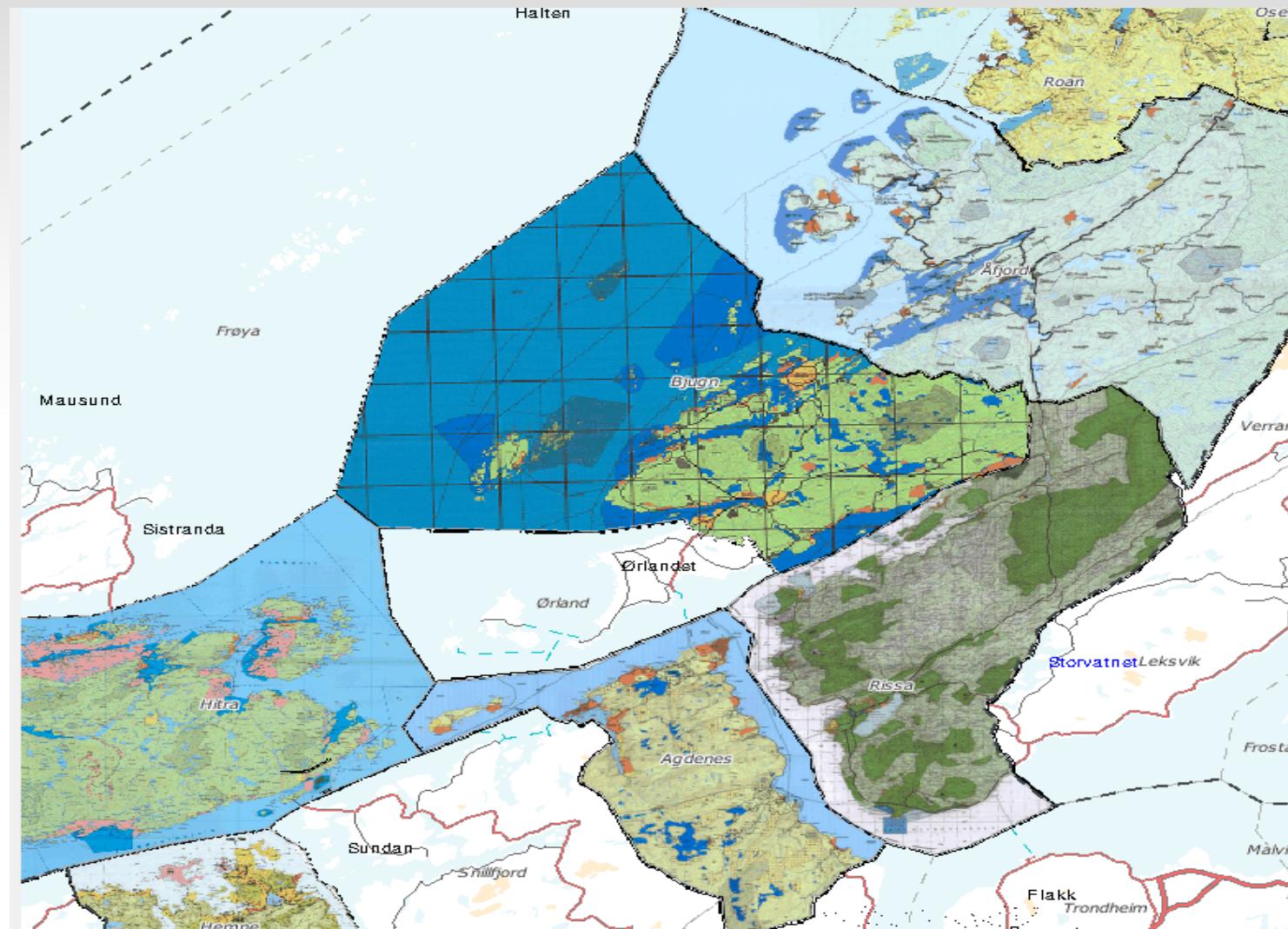
### Example 2

Running water sampling sites and rivers (Austria)

- sampling sites:**  
*mapped with an precision of 1:50.000*
- map 1, 2: water pattern 1:500.000**
- map 3, 4: water pattern**
  - *light blue: 1:500.000*
  - *black: 1:50.000*

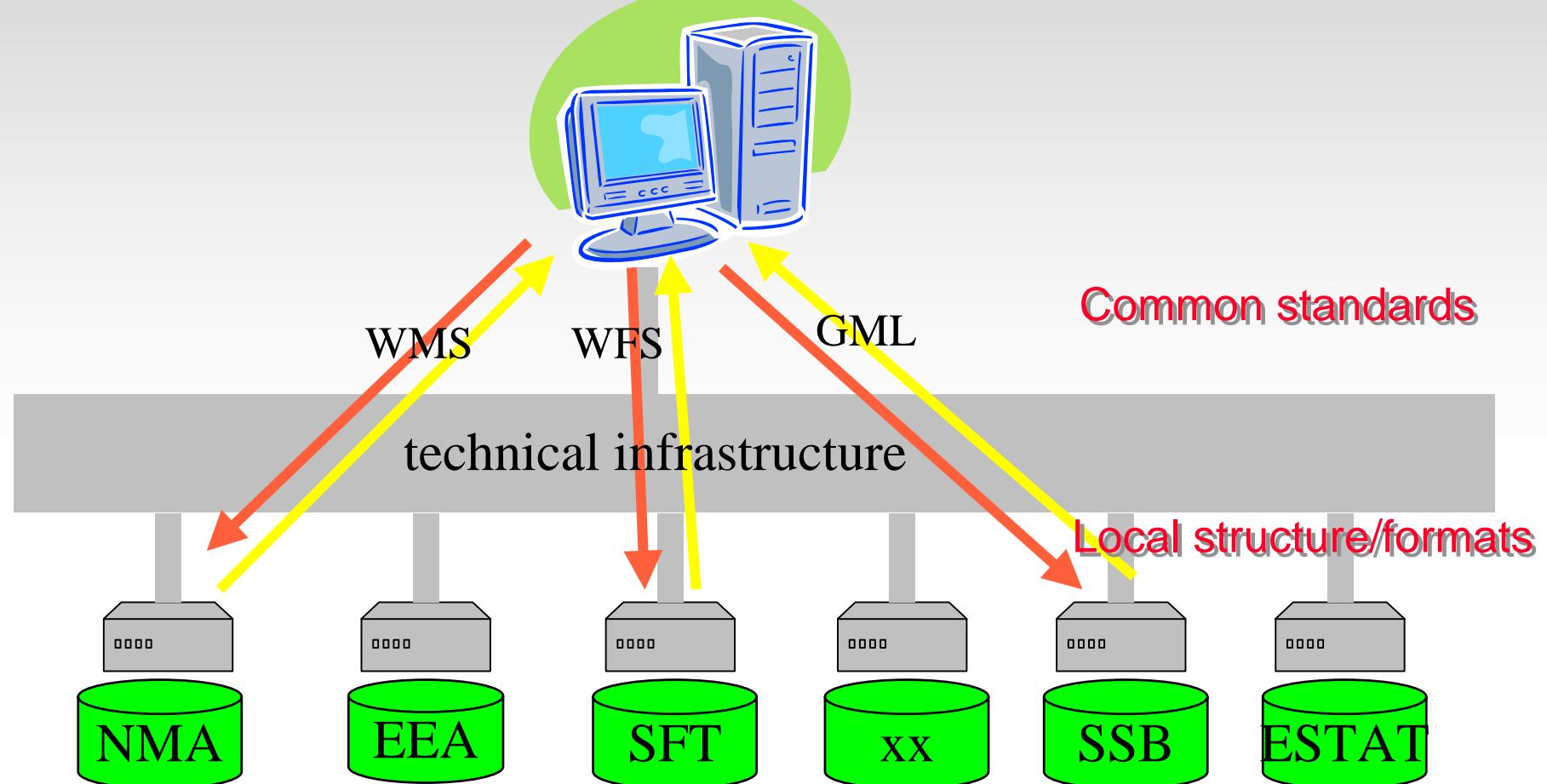


# *Different Norwegian master plans - different structure and cartography even if standards exists*



# Inspire - based on standards

Each member state - agreements, specifications, advice, information, tools, geoportal, working groups....



# The concept of an ESDI

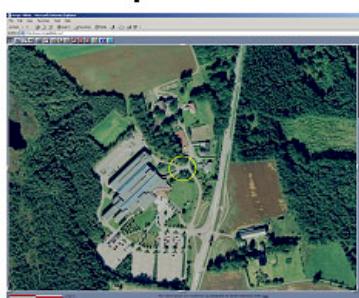
## Variety of users and user applications

Regional administration systems

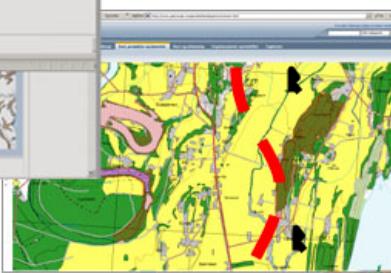
National planning applications



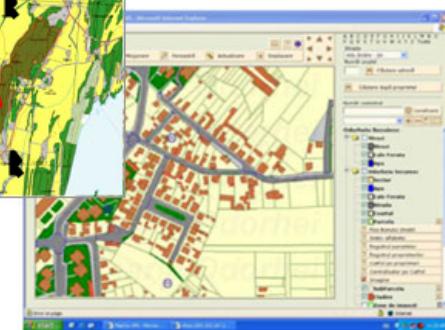
National web viewers for the public



Environmental impact assessment applications

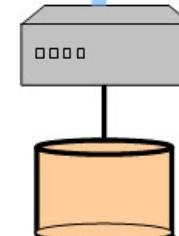
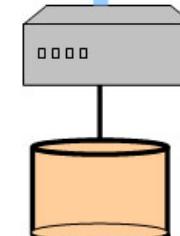
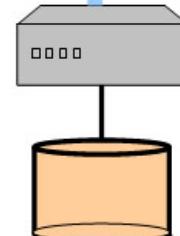
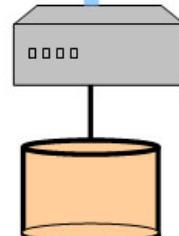
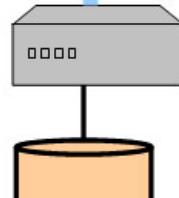


Local cadastral and master plan applications



National infrastructure - data connected to Internet as online services

Internet servers providing geodata services

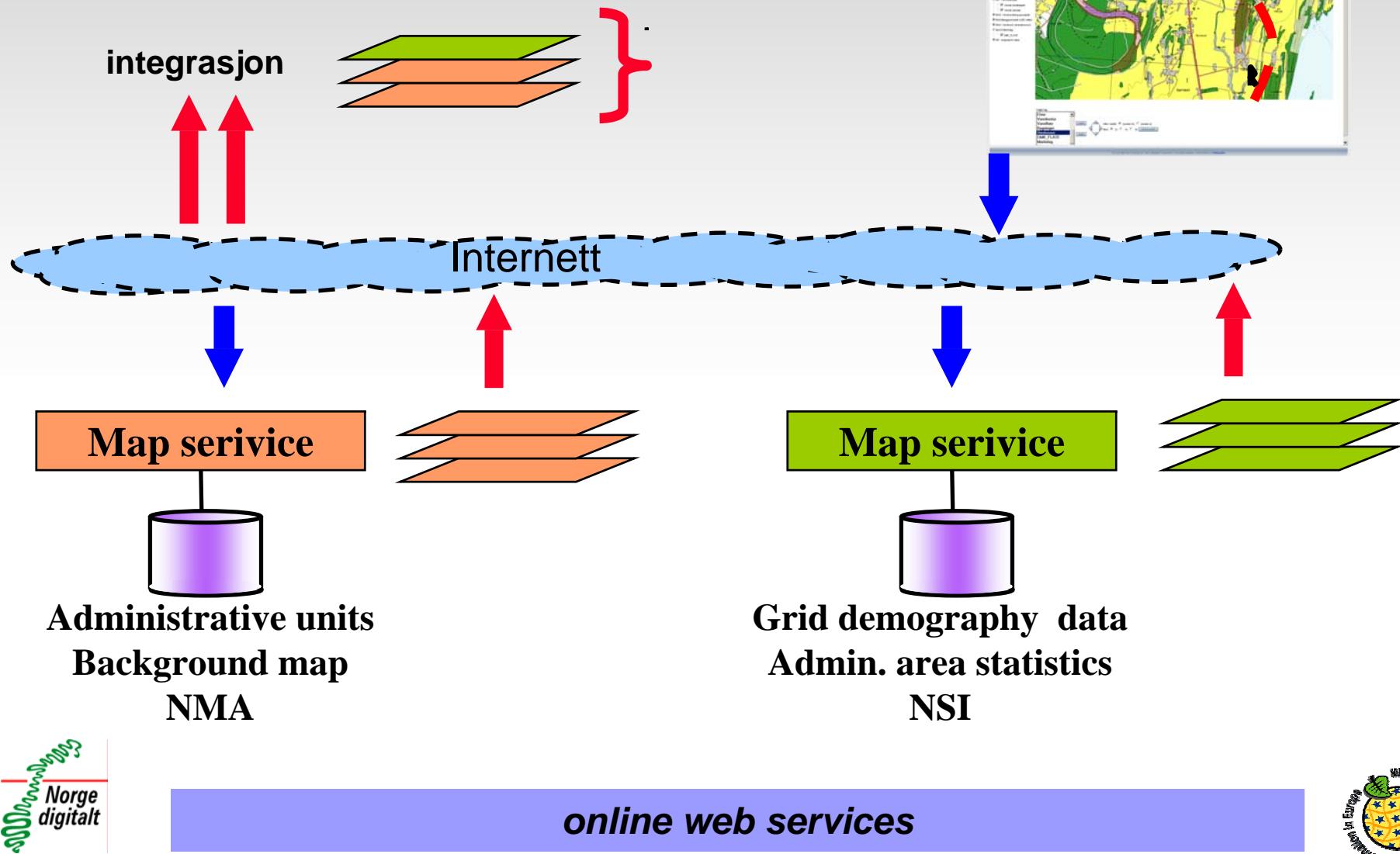


Underlying spatial topographic or thematic databases

National and regional organisations owning and providing data

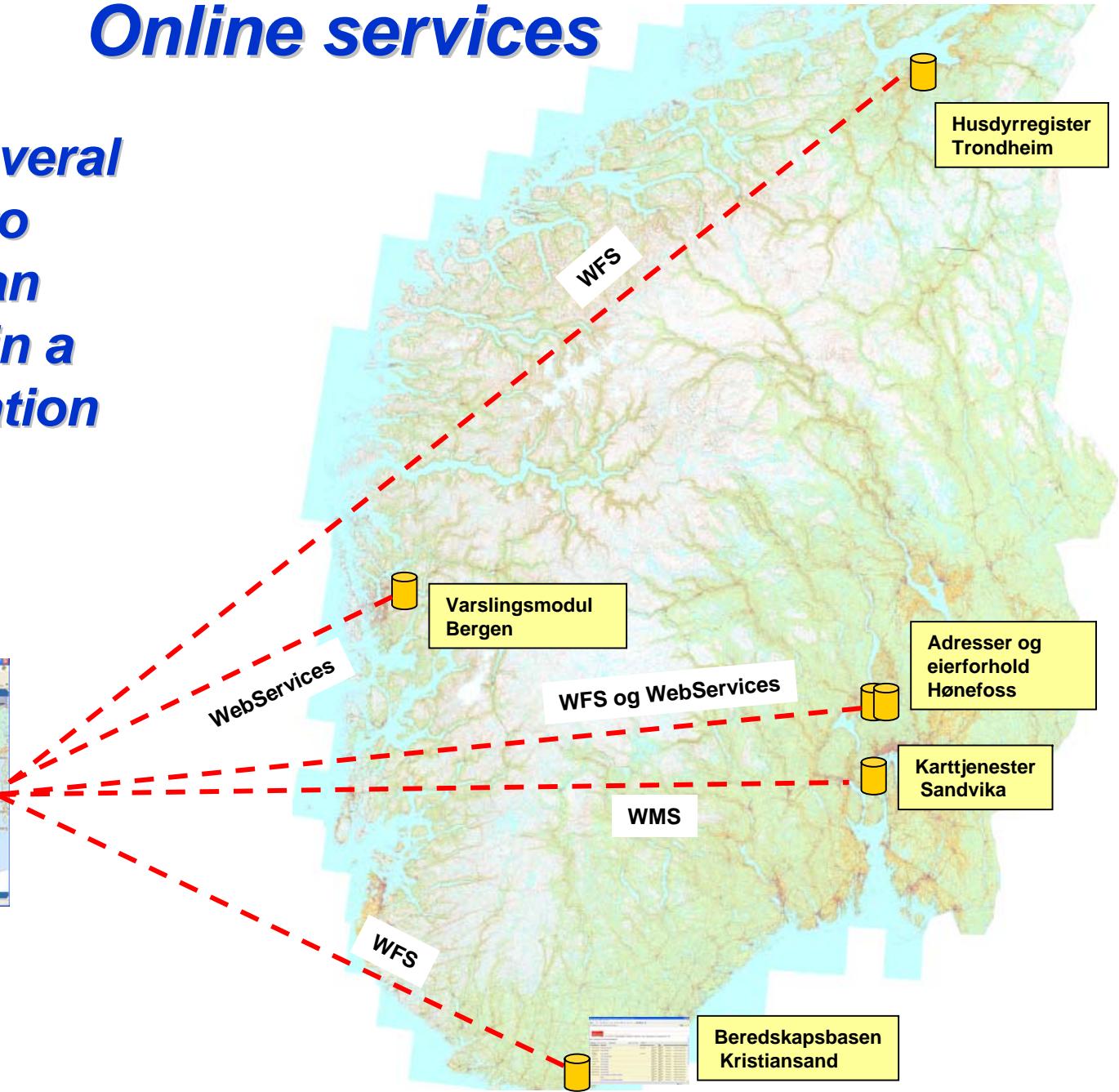
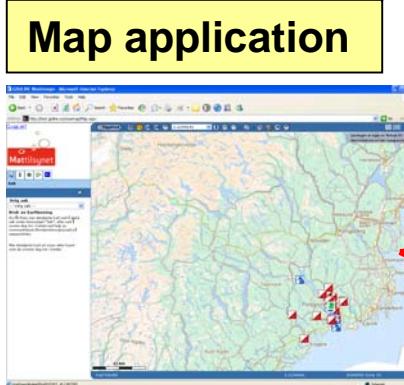
**Web map service (WMS)  
Web feature service (WFS)  
Web coverage service (WCS)  
web service (WS)**

**Map view or other user application**



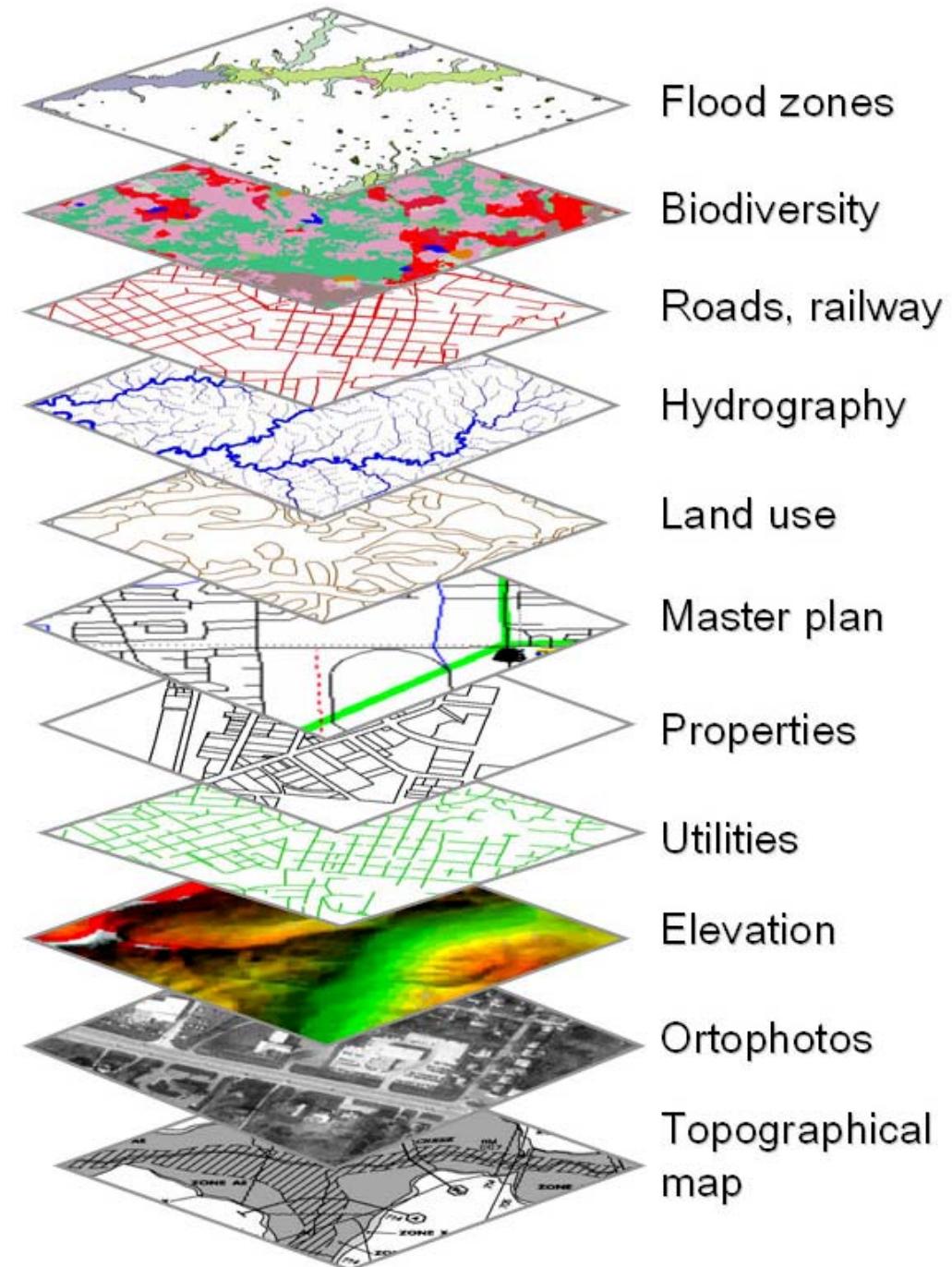
# Online services

*Request to several  
servers to  
perform an  
operation in a  
web application*



**Different layers  
are provided  
from different  
organisations**

**Which are  
relevant from  
statistical  
offices?**



# *Understanding spatial and regional differences by offering geographical services based on geostatistics*

- Very many themes can be illustrated by geostatistical information
- Need some basic geographical units
- Need standardised underlying statistical data with geographical breakdown
- Need agreed classifications

# Inspire themes on geo-statistics

## Annex 1 data:

- ✓ coordinate reference systems
- ✓ geographical grid syst.
- ✓ geographical names
- ✓ administrative units
- ✓ addresses
- ✓ transport networks
- ✓ cadastral parcels
- ✓ hydrography
- ✓ protected sites

## Annex 2 data:

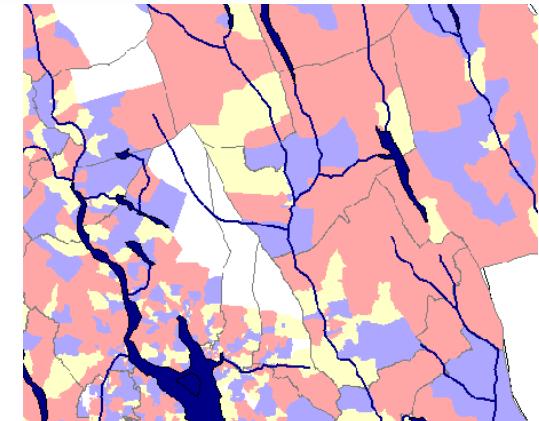
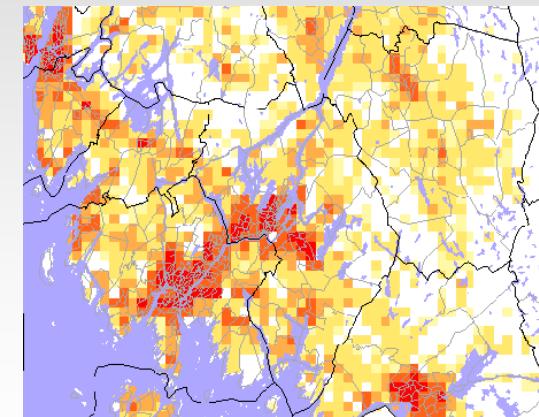
- ✓ elevation
- ✓ land cover
- ✓ orthoimagery
- ✓ geology

## Annex 3 data:

- ✓ Statistical units
- ✓ Buildings
- ✓ Soils
- ✓ Land use
- ✓ Human health and safety
- ✓ Utility and government services
- ✓ Environm. monitoring facilities
- ✓ Production and industrial facilities
- ✓ Agriculture and aquaculture facilities
- ✓ Population distribution - demography
- ✓ Area management/restriction/regulation zone and reporting units
- ✓ Natural risk zones
- ✓ Atmospheric conditions
- ✓ Meteorological geographical features
- ✓ Oceanographic geographical features
- ✓ Sea regions
- ✓ Bio-geographical regions
- ✓ Habitats and biotops
- ✓ Species distribution
- ✓ Energy resources
- ✓ Mineral resources

# **Geographical units - geometry without thematic content**

- territorial units of countries (land territories)
  - ✓ counties
  - ✓ municipalities
- statistical units
  - ✓ census districts, township, block or other units
- sector-administrative spatial units
  - ✓ health regions, agricultural management regions, Ospar sea reporting units, WFD catchment area
- geographical grids
  - ✓ several may be relevant, 100m, 250m, 500m, 1000m
- settlement/city
- addresses and buildings
- generic regionalisation



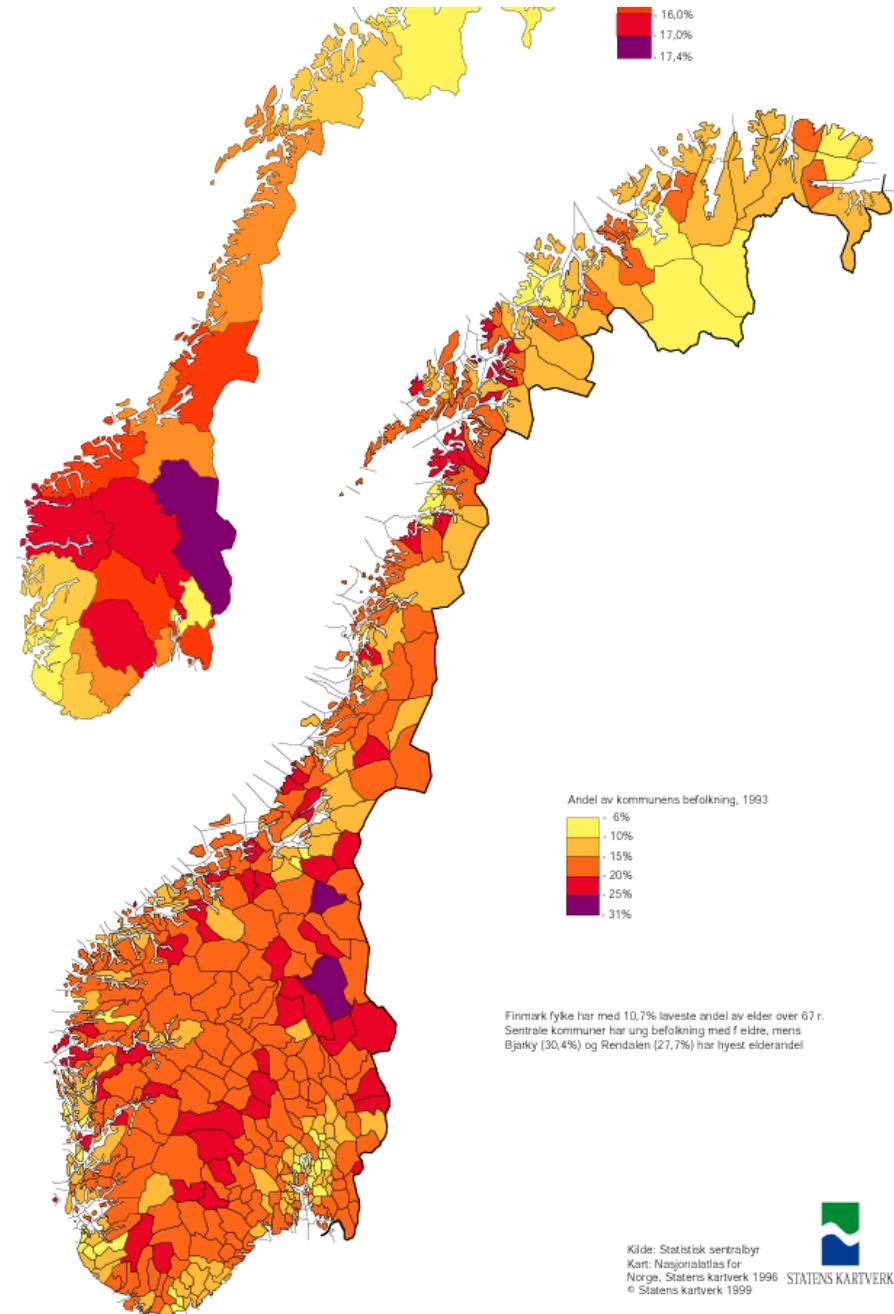
# **Geostatistics content - themes**

- no exact reference to geostatistics, but a relevant way of expressing geographical distribution of many themes
- very many themes where relevant:
  - ✓ Human health and safety: distribution of diseases etc, risk factors, geographical pattern of exposure,
  - ✓ Demography - population and activities
  - ✓ Land use: Territory characterised according to its current and future planned functional dimension or socio-economic purpose (e.g. residential, industrial, commercial, agricultural, forestry, recreational)
  - ✓ Utility and government services: frequencies?
- (later: define online assessment models)
- Define your contributions

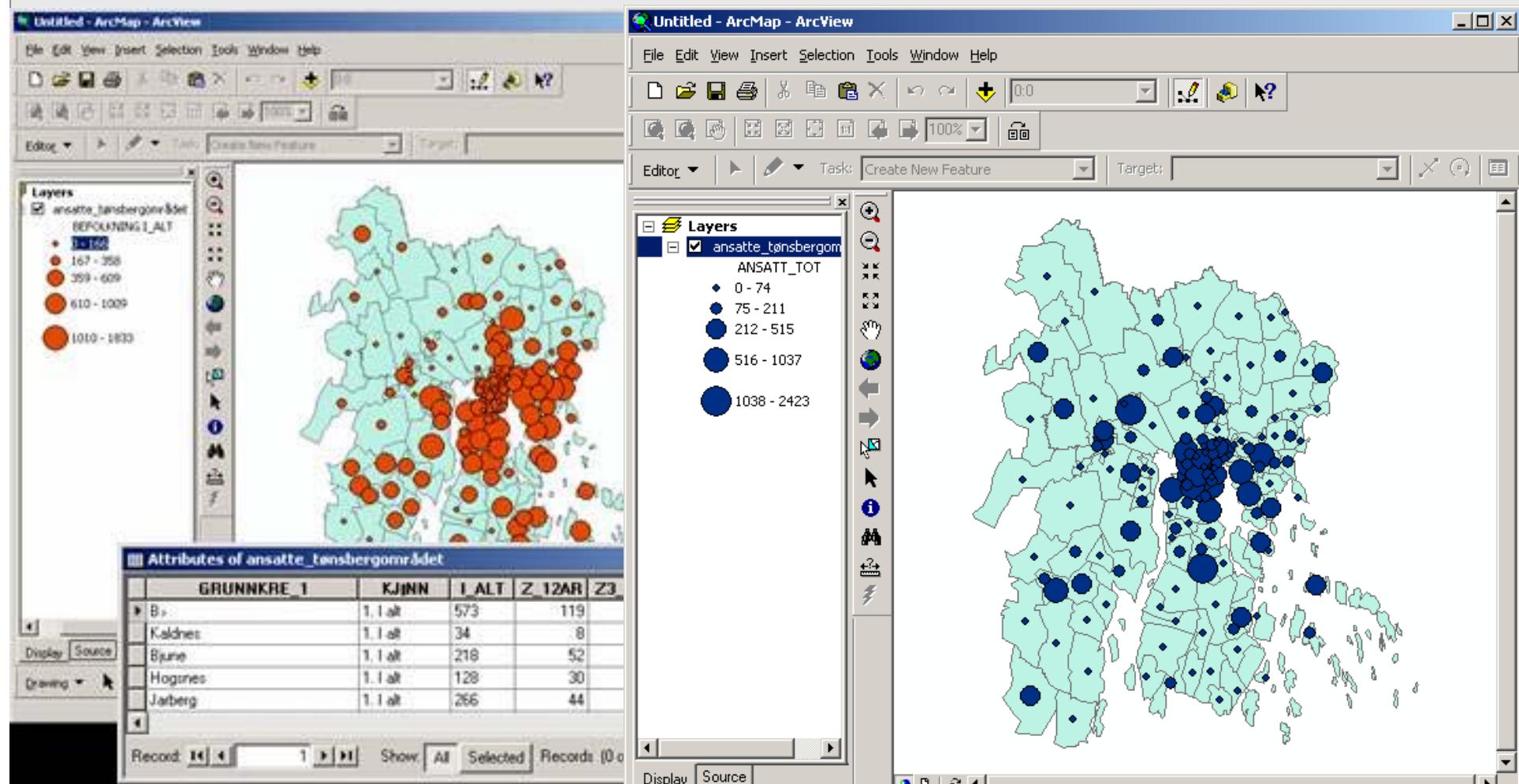
# Municipal and county level data

## *Demography*

*Example:  
% 67 and above*



# *Population, number of employees...*



# *Example 100 x100 m grid*

Buildings

People

Businesses

Sports facilities

100 x 100 m grid  
Population per Da.

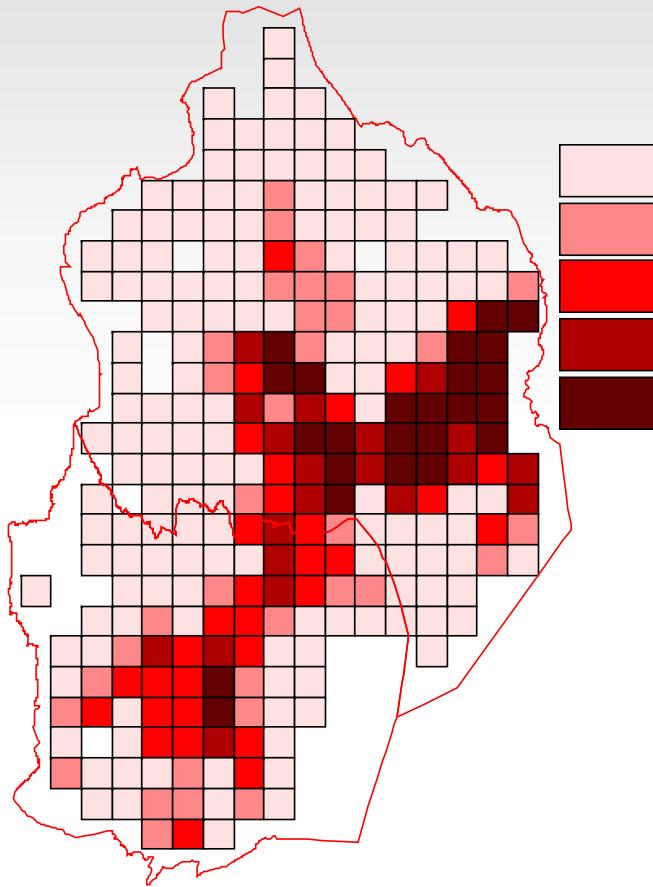
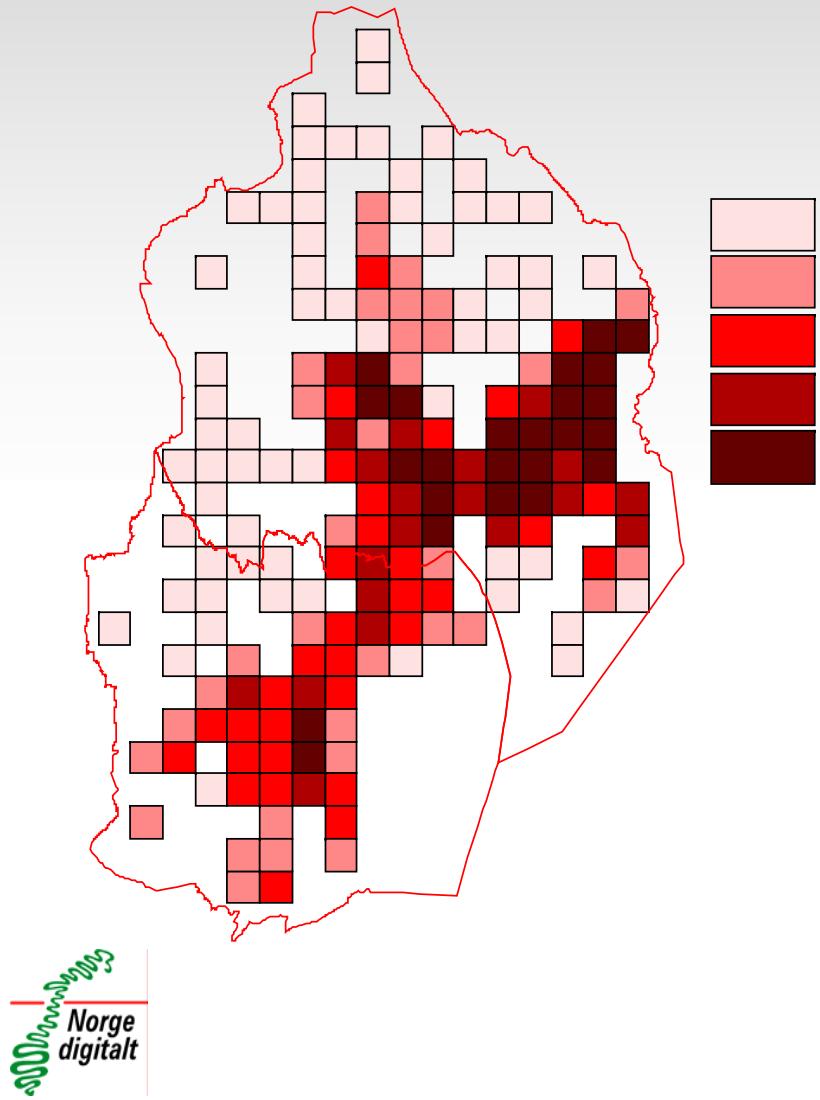


Institute  
for  
Digital  
Cities

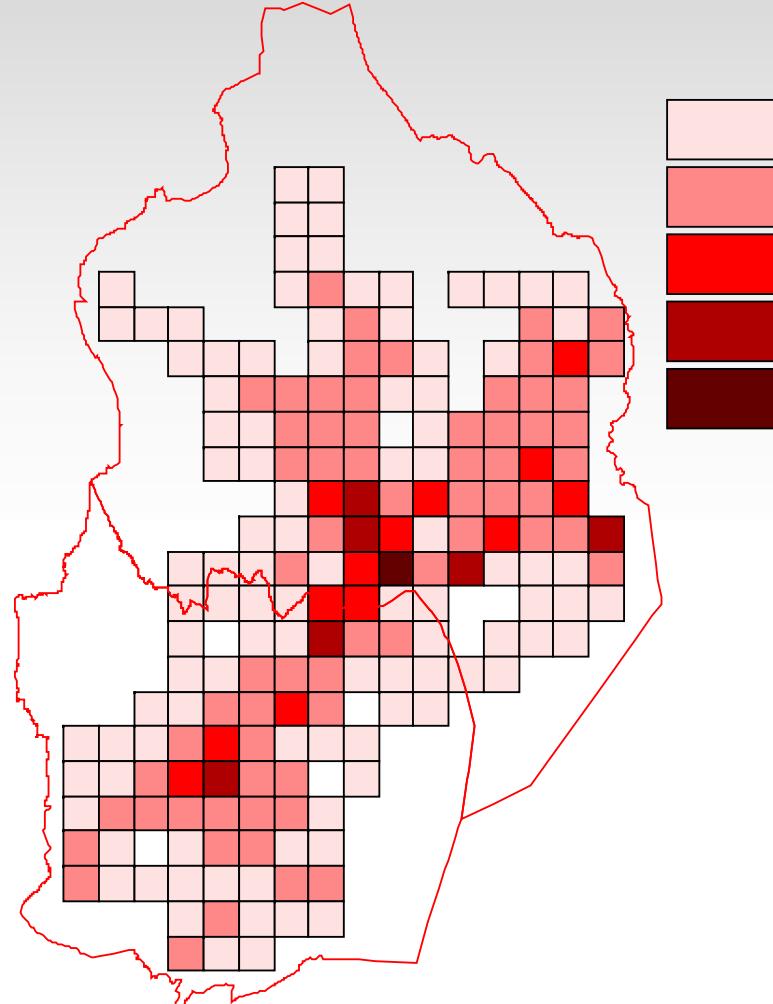


University of Salzburg  
WIR SIND WIRKLICH

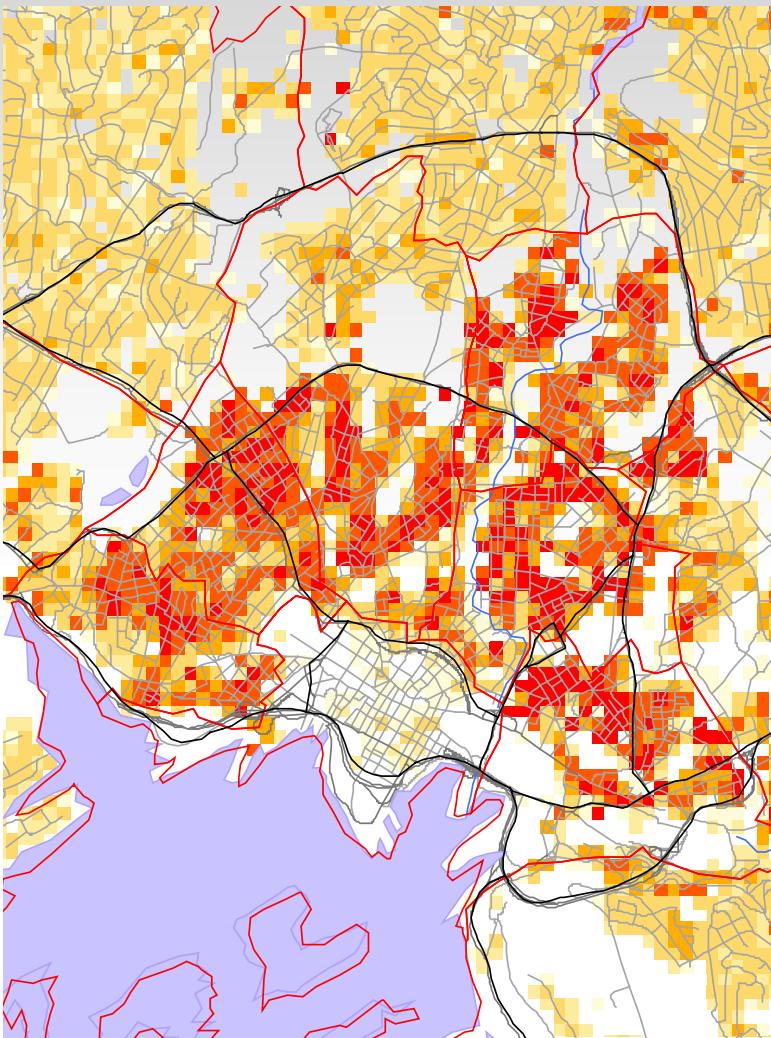
# *Buildings register*



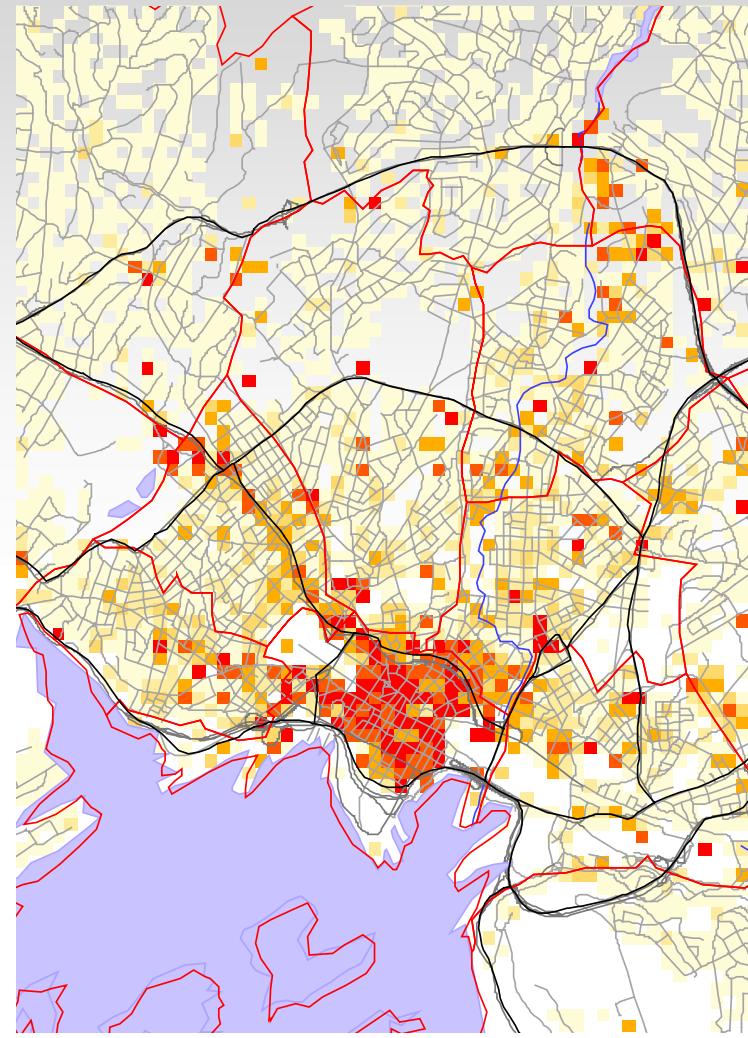
# *Business register*



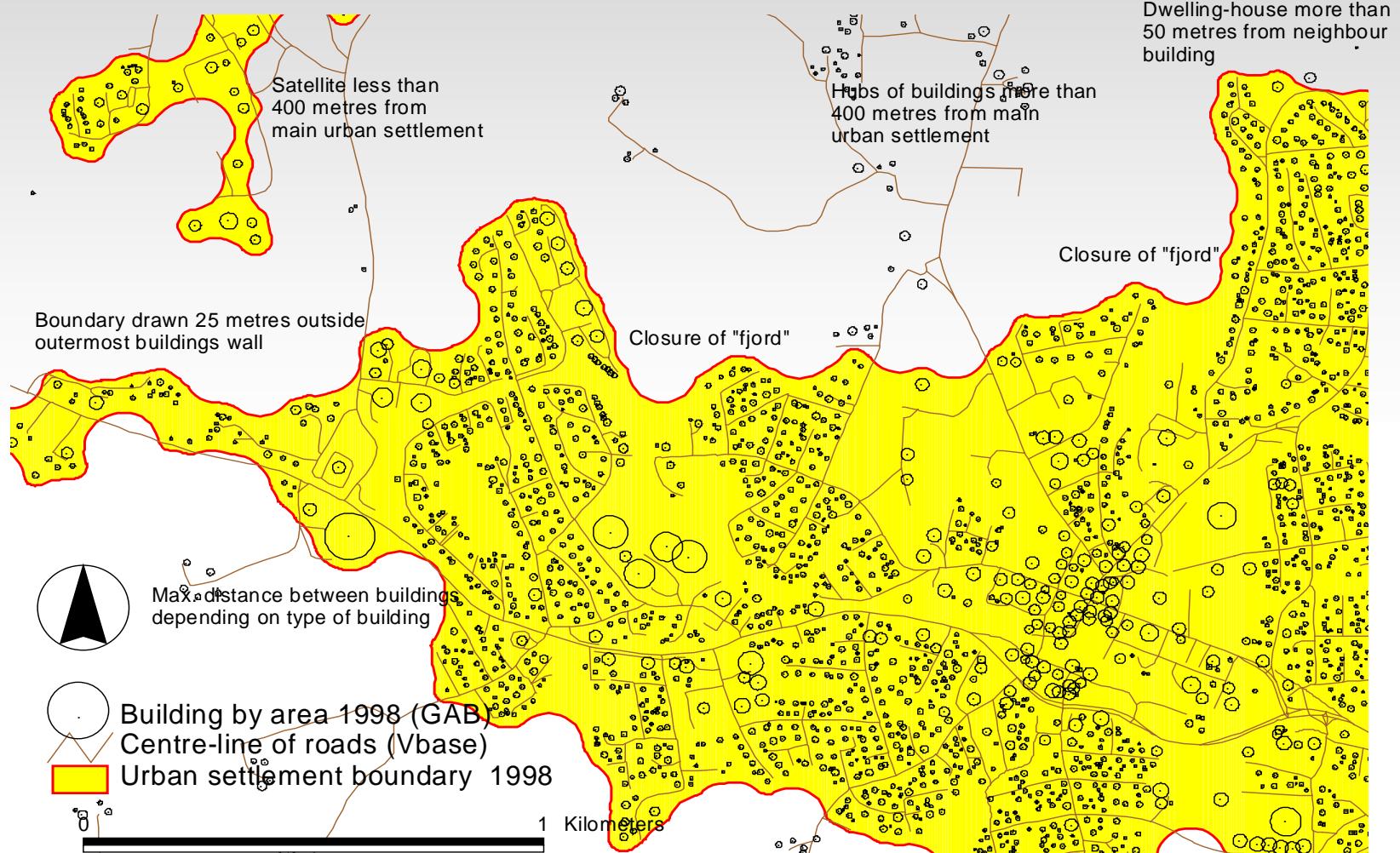
# *Population - day and night*



 Norge  
digitalt



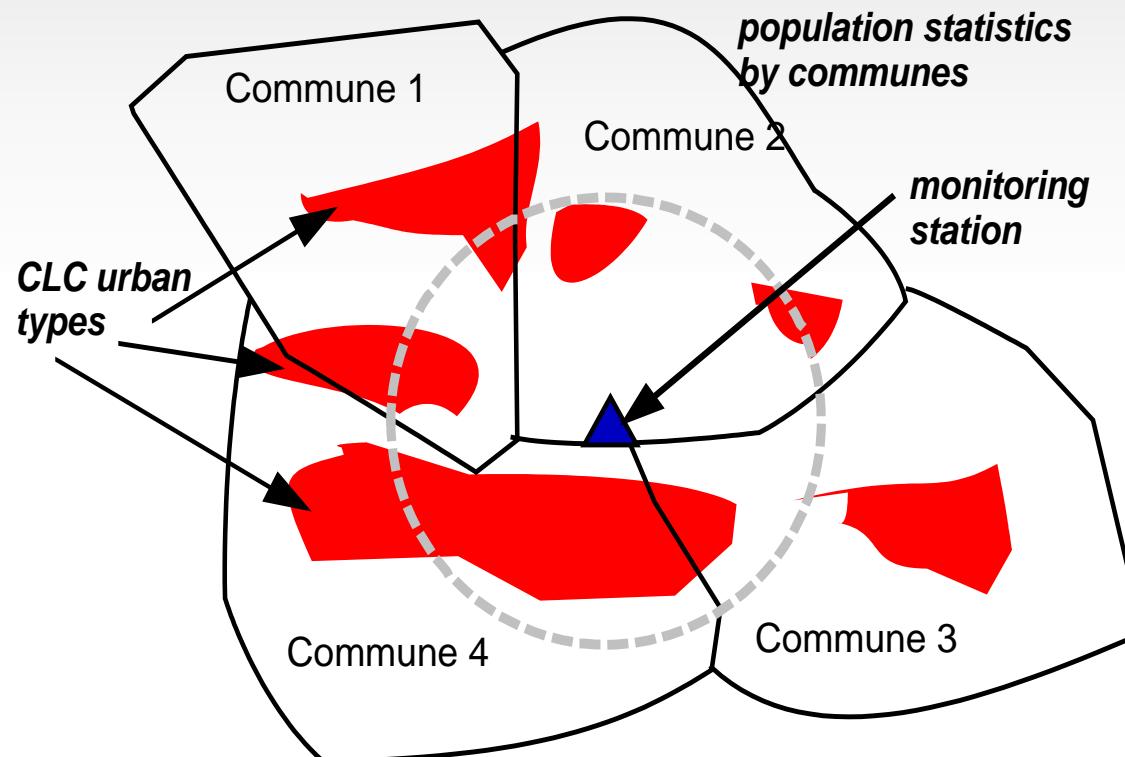
# *Settlement delineation*



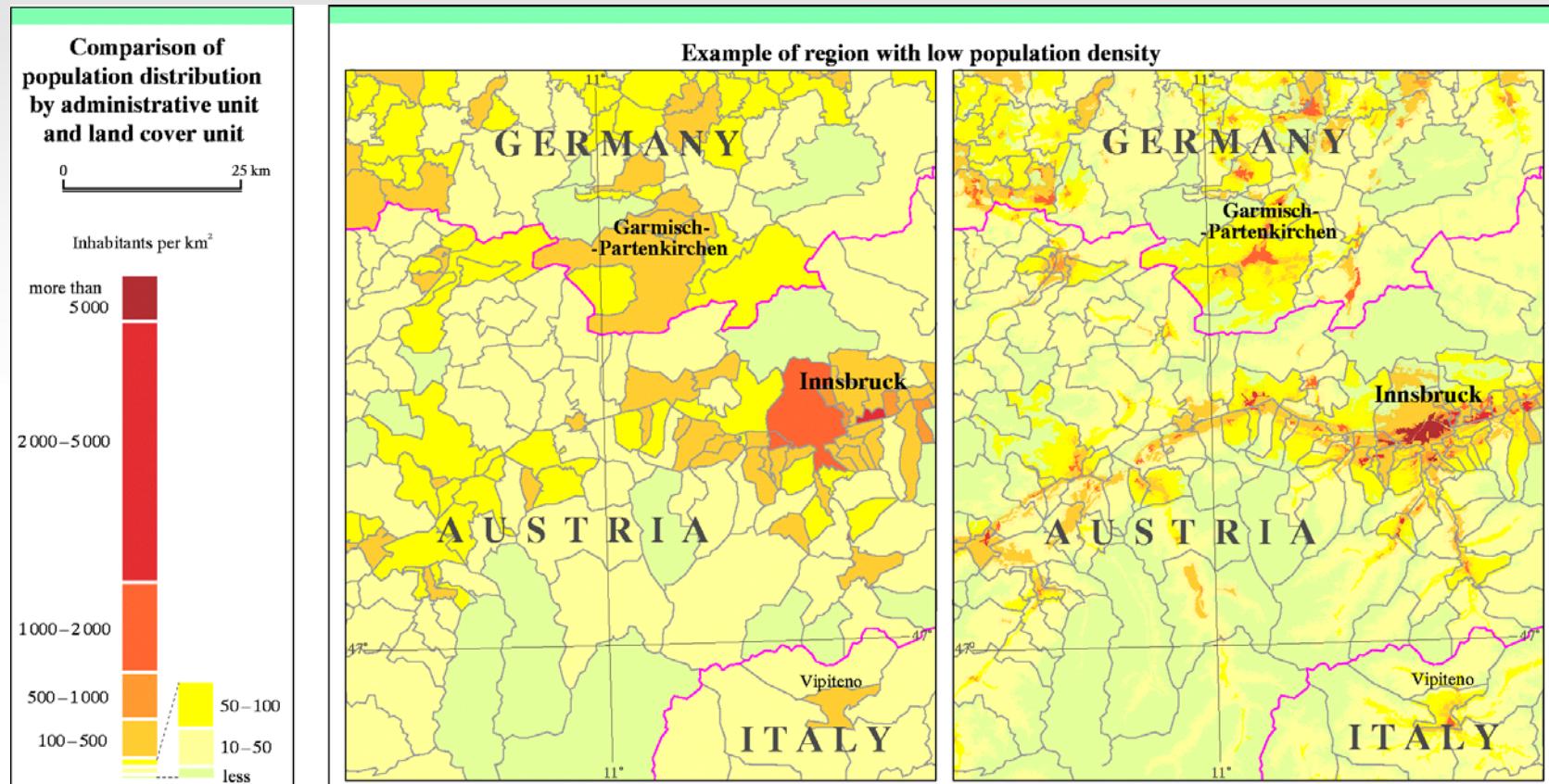
# ***Disaggregation of statistics by use of Corine land cover - geostatistical analysis***

**Breakdown of  
statistics based  
on administrative  
limits and  
allocation of the  
data to physical  
zones =**

- ✓ CLC urban,
- ✓ CLC agric land
- ✓ CLC forest
- ✓ etc



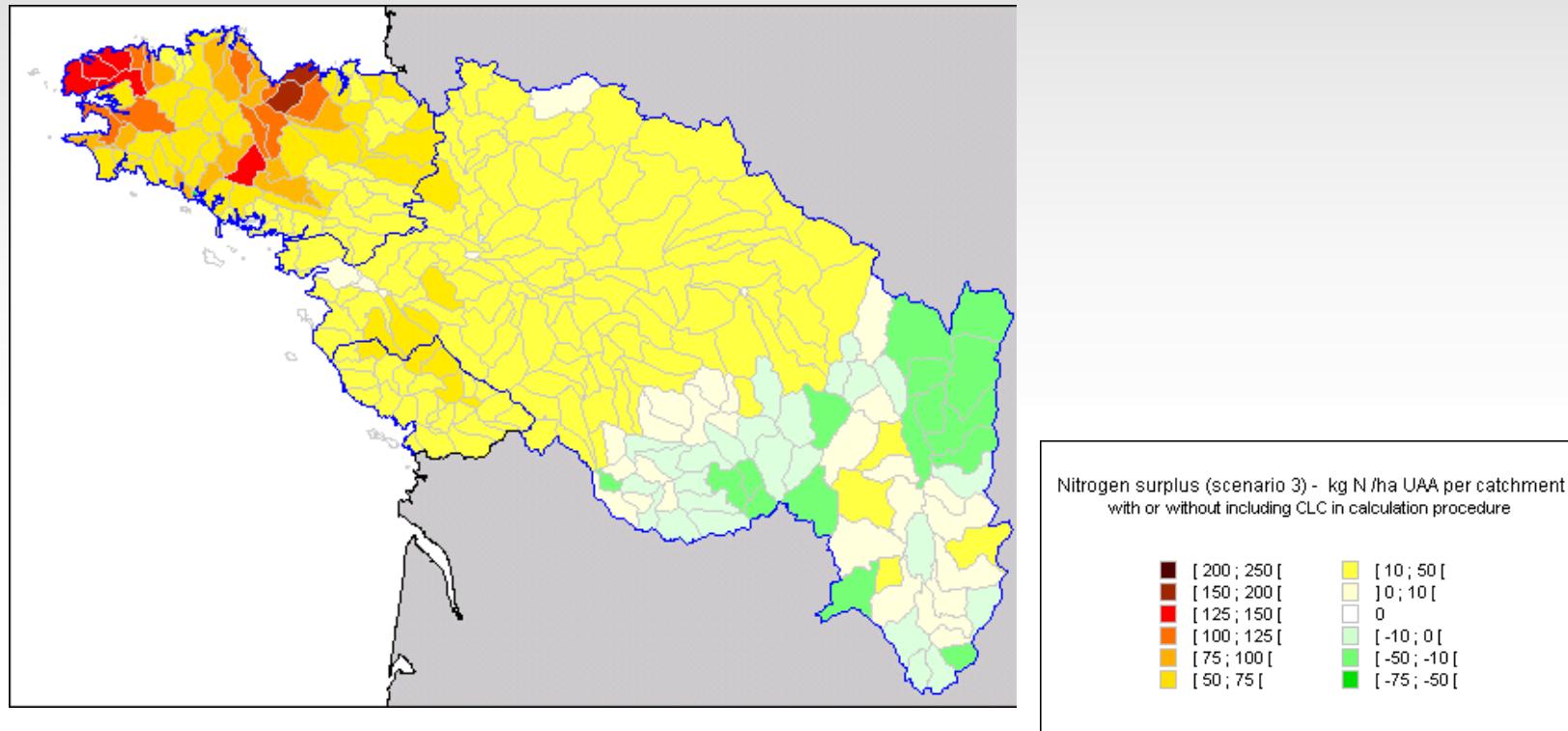
# *Population density change by land reporting units - disaggregation method for other themes?*



Map: Population density by NUTS5 and by land cover unit  
Reference: EU at the turn of the century, 1999  
Data source: CLC, SABE

# **Nitrogen surplus by river basins**

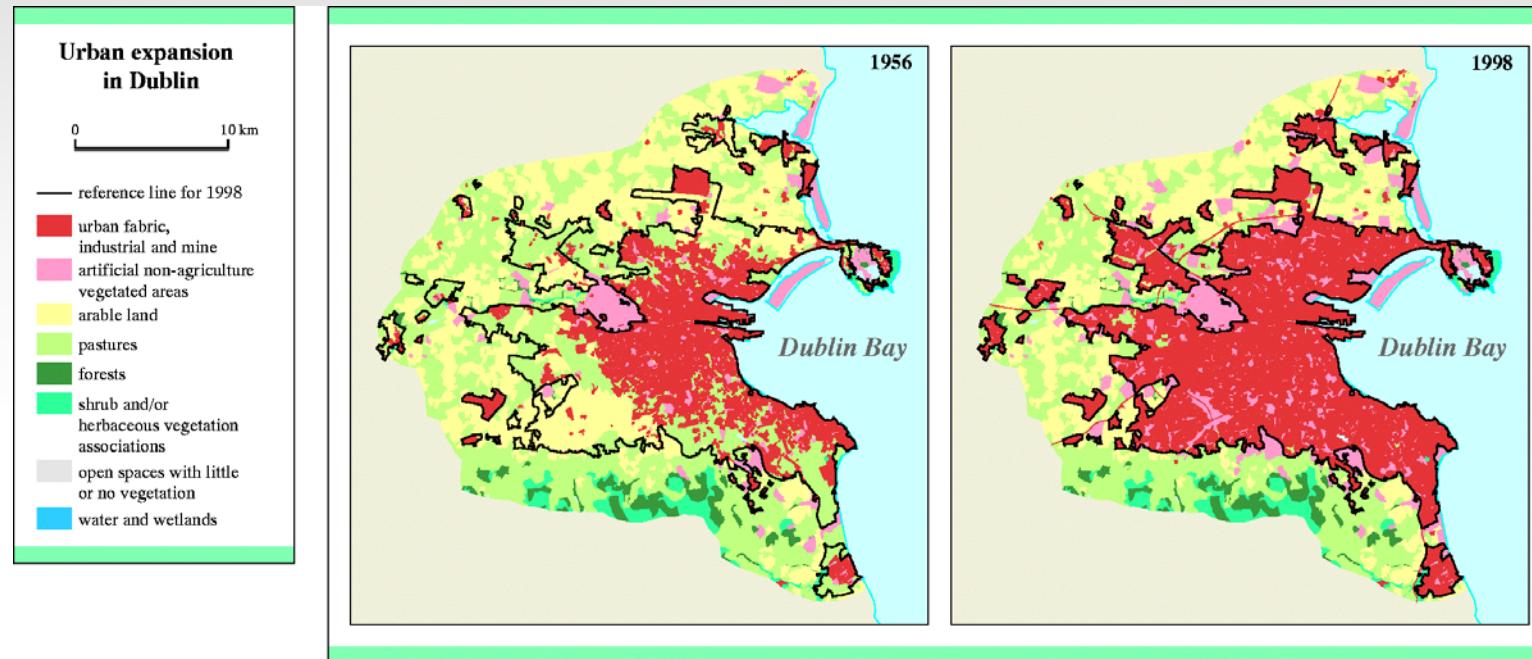
Map: Nitrogen surplus in kg N/ha UAA per catchment



Reference: Towards agri-environmental indicators, 2001  
Data source: CLC, Eurostat

# *Urban sprawl*

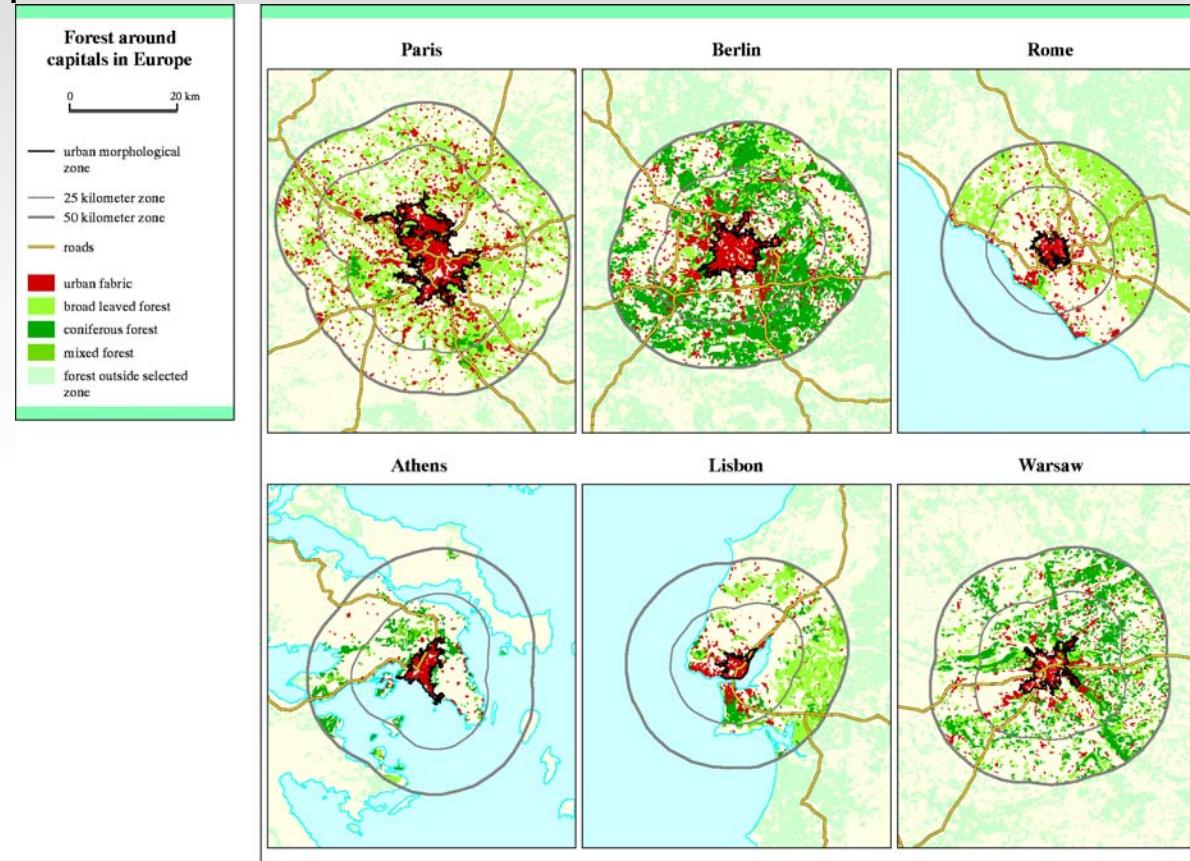
Indicator: increase of built up area 1956 - 1998



Reference: EU at the turn of the century, 1999  
Data source: JRC

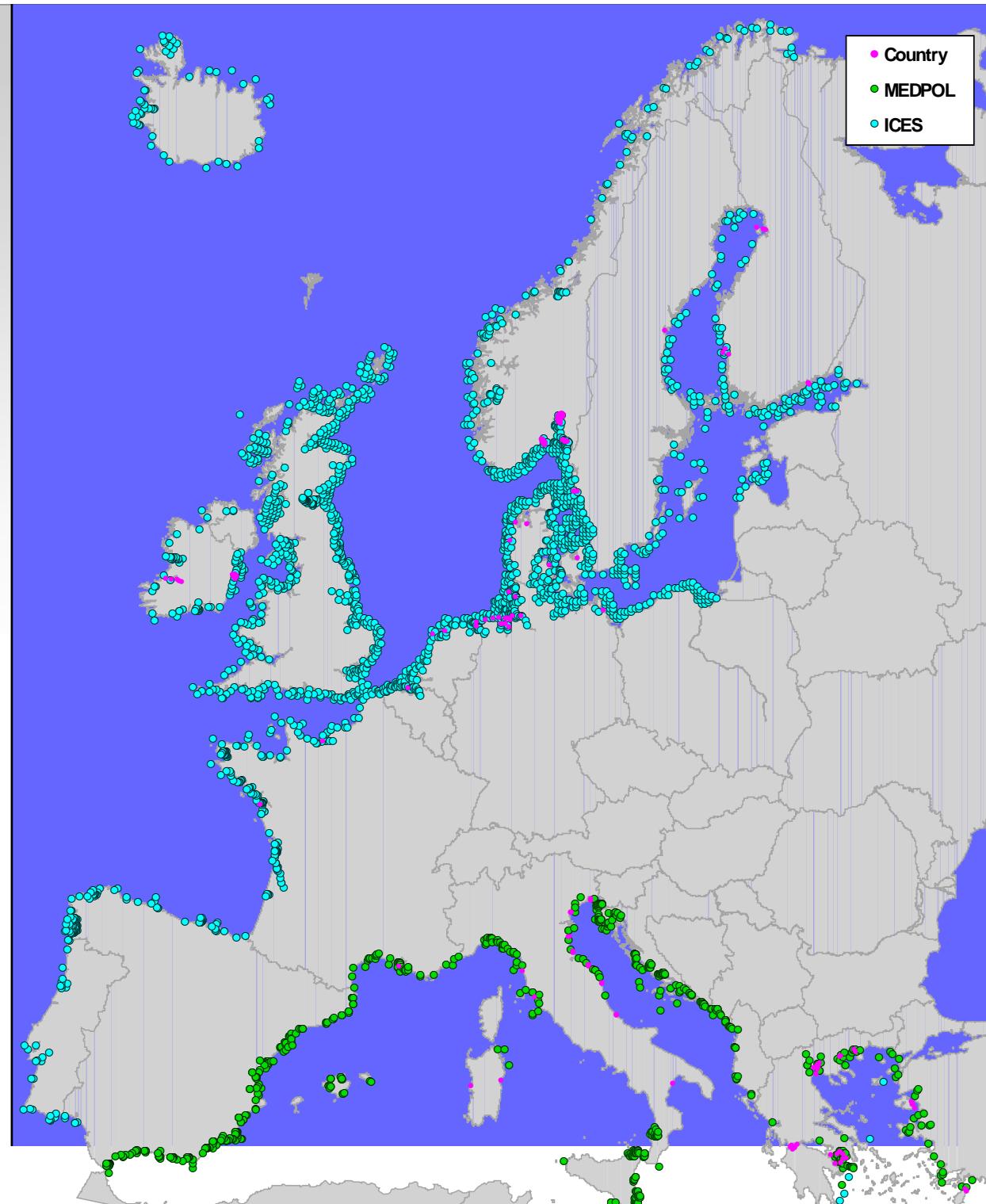
# *Access to green urban areas*

Map: forest around cities within 1, 25 and 50 km distance

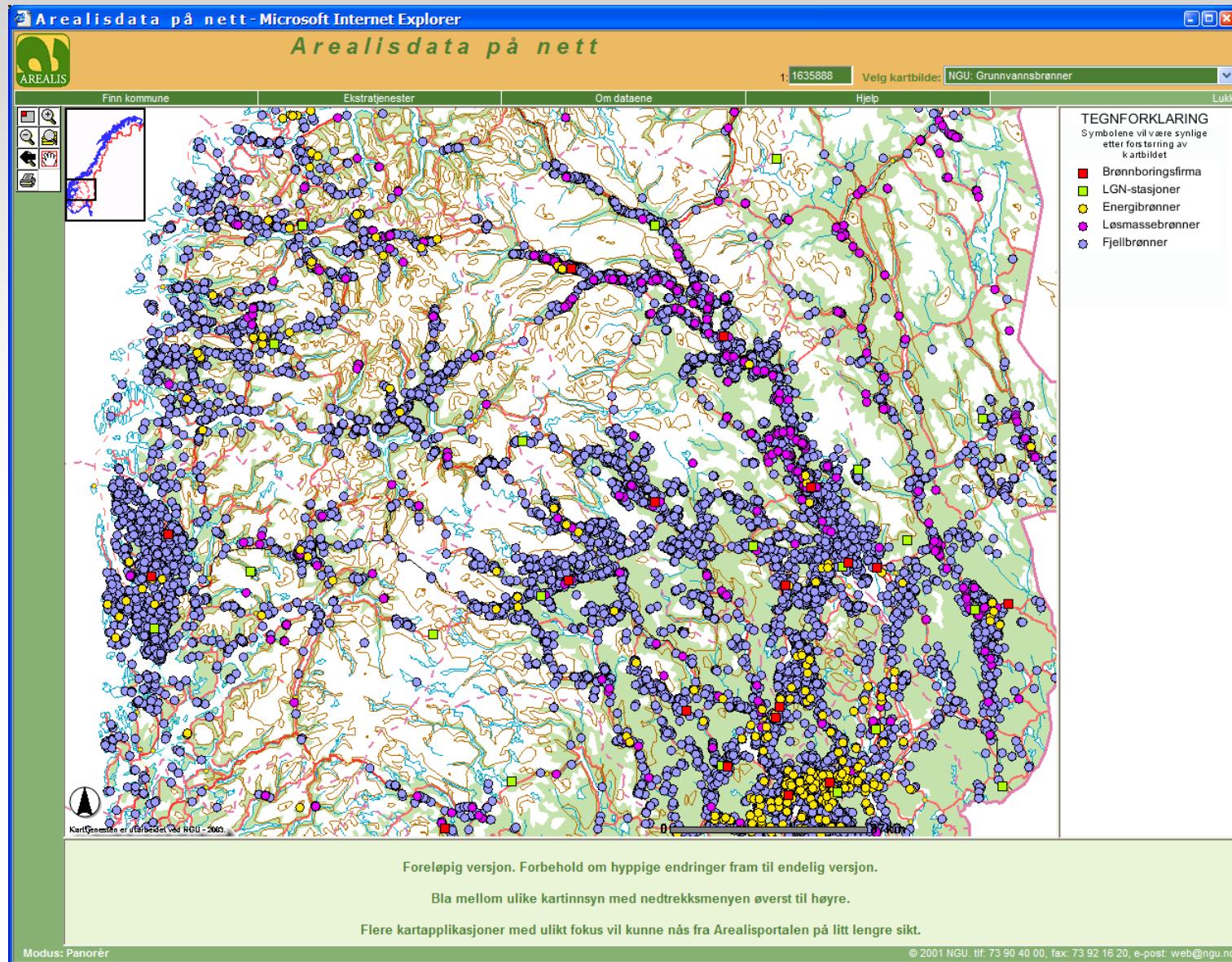


Reference: EU at the turn of the century, 1999  
Data source: CLC, DG TREN, GISCO

# *Monitoring stations in Marinebase*



# *Groundwater resources - boreholes - facilities*



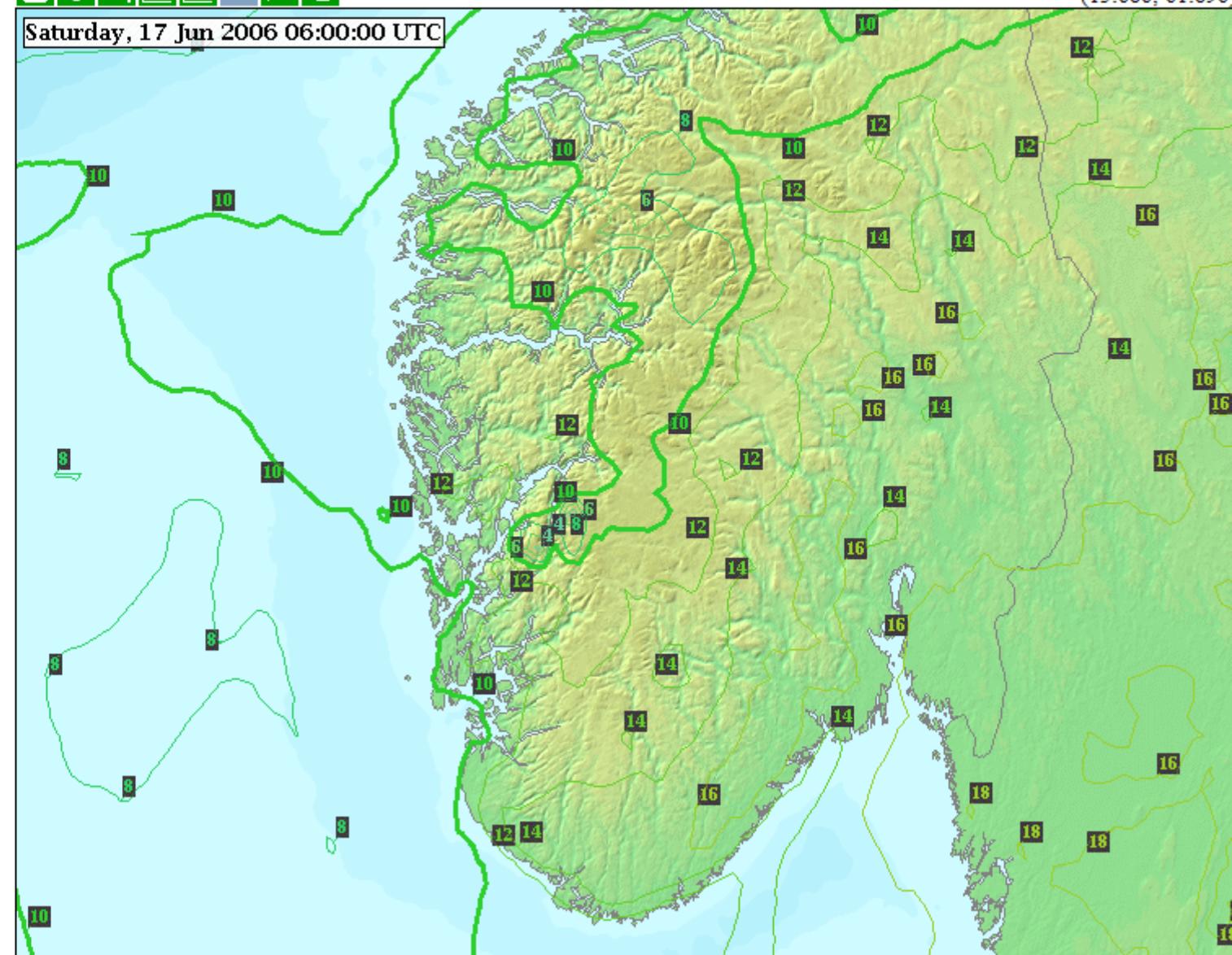
Map

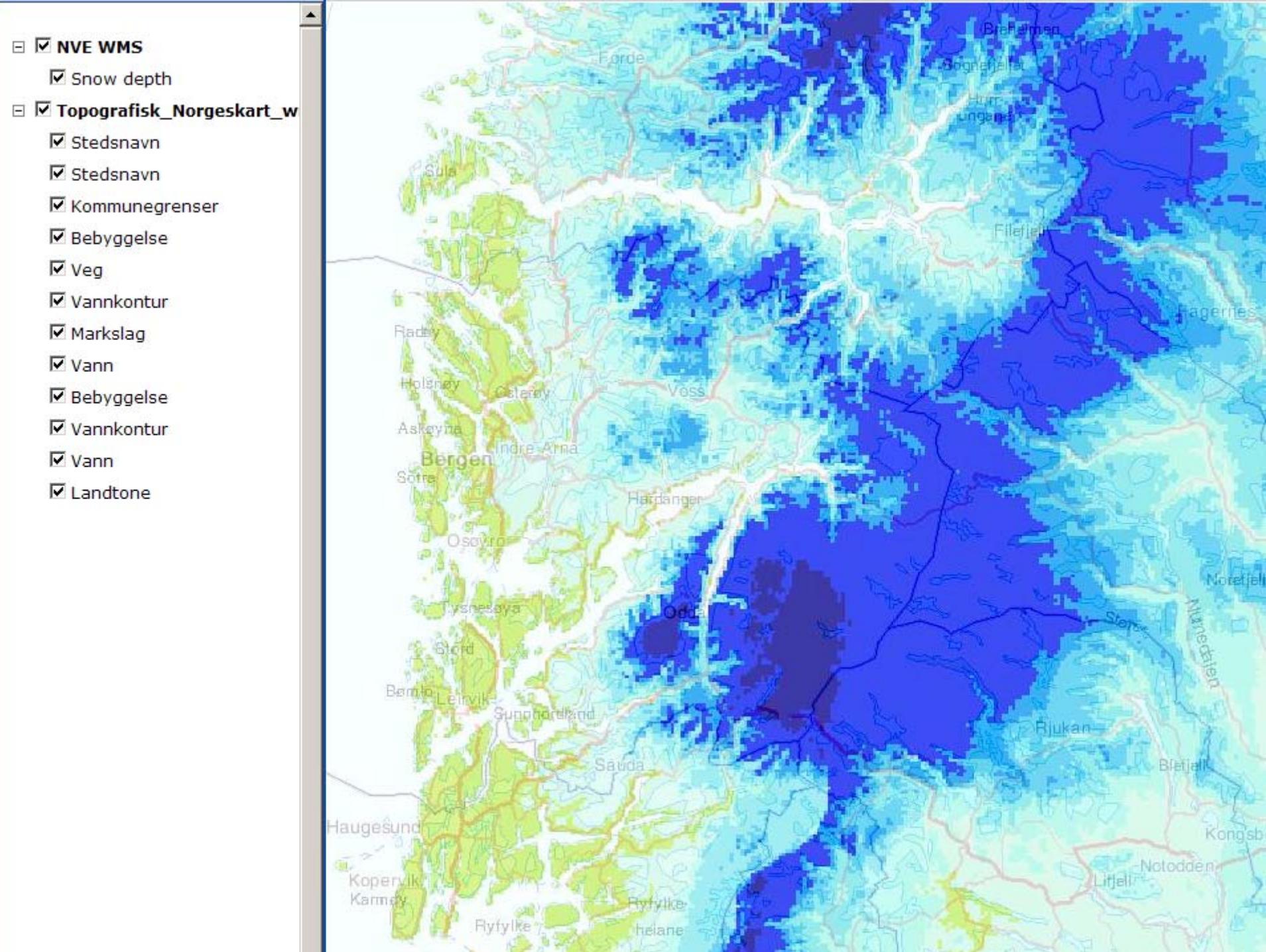
METOC Layers

- Wind
- Sea level pressure
- Cloud cover
- Rainfall, 3 hr
- Geostrophic wind
- Reduced to MSL
- Geostrophic current



Saturday, 17 Jun 2006 06:00:00 UTC





RINGERIKE KOMMUNE - Kart over Ringerike

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Back Search

Address: <http://kart.ringerike.kommune.no/Content/Main.asp?layout=ringerike&vwr=java> Go Link

**Ringerike kommune**

**Tegnforklaring**

**Rutenett**

**Søkeresultater**

**Grunnkart**

Diverse

PresGatenavn

PresGnrBnr

PresAdressepunk

Spormeldt

BYGG.BYGNING

Stolpe EL

VSIT.STI

VSIT.GANGSYKK

VSIT.VEGREKKV

VSIT.VEGAVGRE

Jernbane

VSIT.VEG

VSIT.GANGSYKI

VANN.ELVBEKKI

VANN.ELVBEKK

HDB5.HØYDEKL

HDB1.HØYDEKL

**Eiendommer**

**Vann- og avløp**

Velg søk

Adresse

Gnr Bnr Fnr

Stedsnavn

Barnehager

Helse og sosialtjenester

Skoler og SFO

Kirker

Idrett og friluftsliv

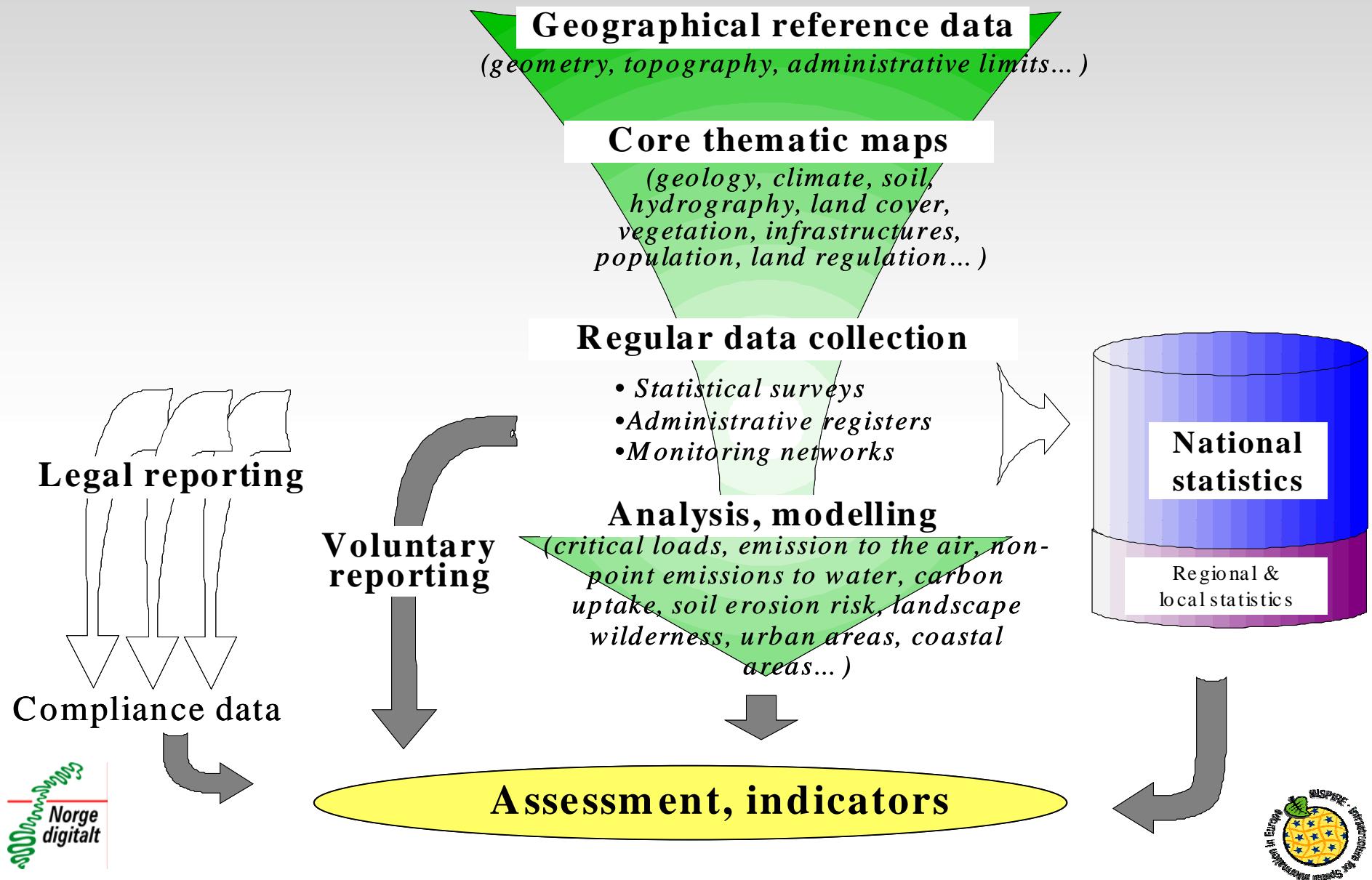
Turisme

Reguleringsplaner

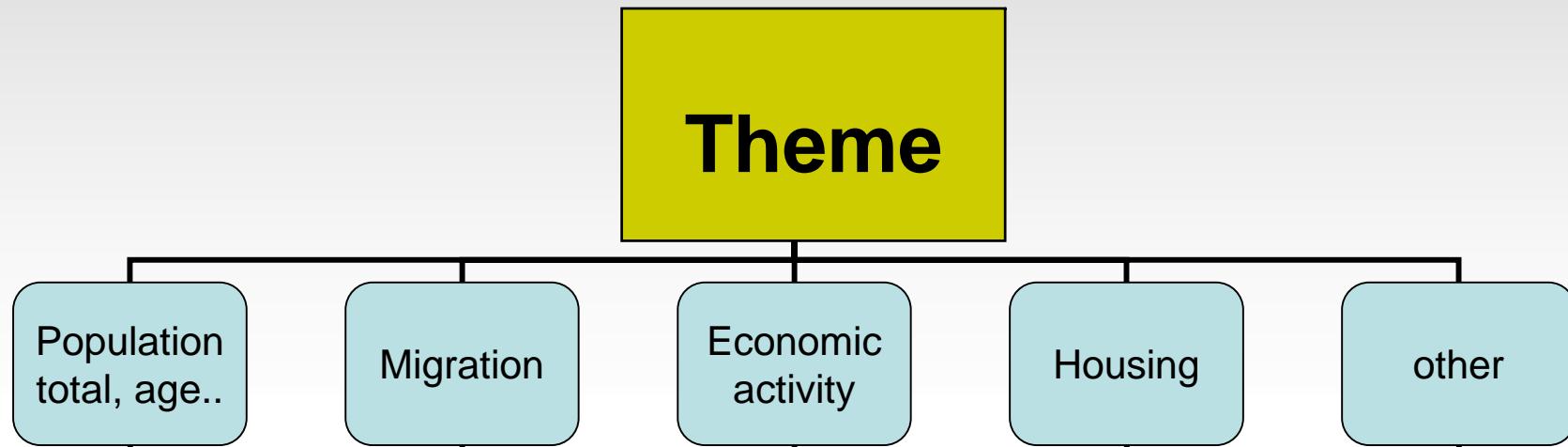
Send en tilbakemelding!

50 m 1:3321

# Streamlining data flow

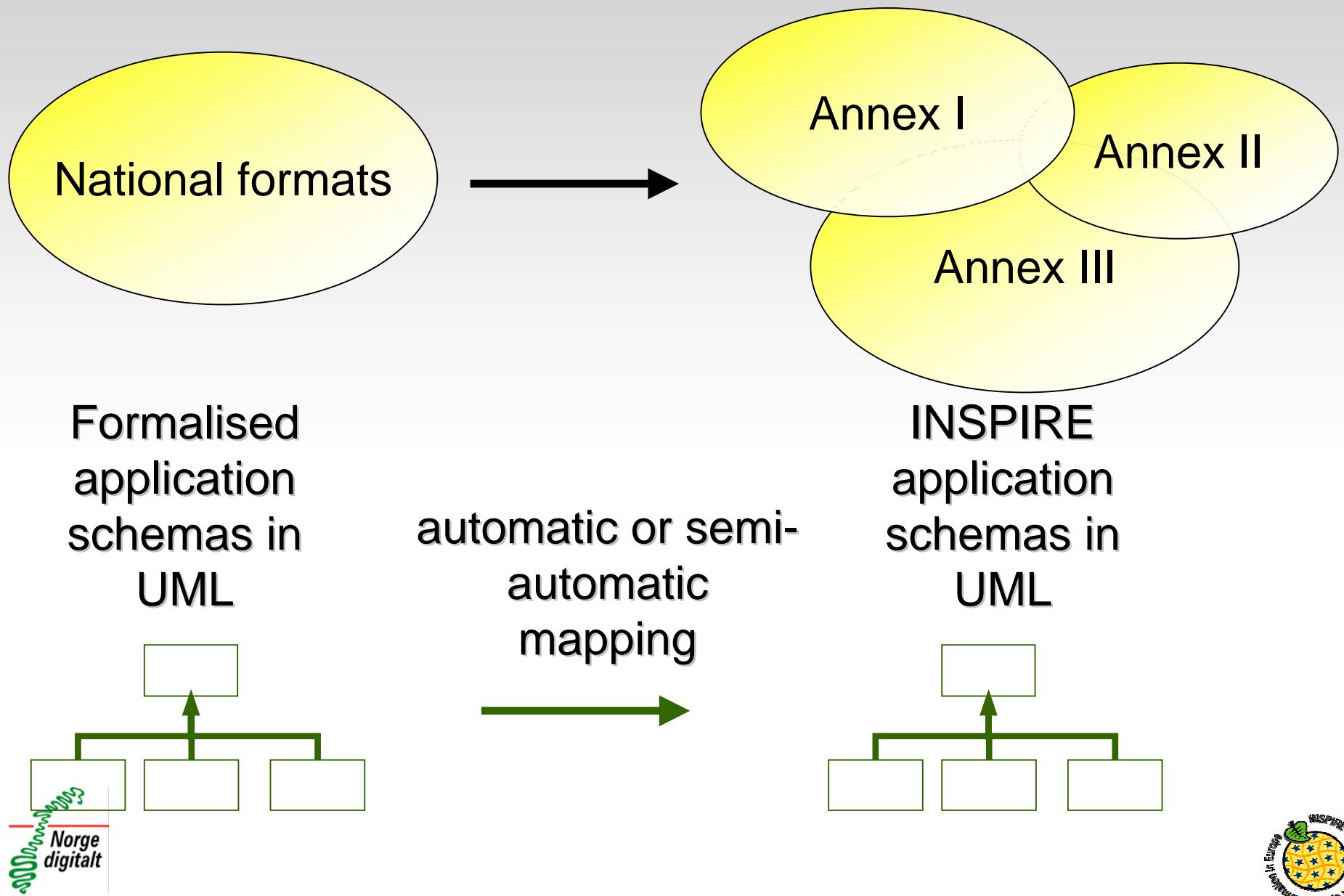


# *Defining data sets and underlying atributes, classification etc*



*Population and activities  
to be defined by the community itself through  
TWG= Inspire thematic working groups*

# **Online data harmonisation**



# **Make map services - demography and activities**

## **Population**

- number of persons
- number of households

## **Age and sex**

- rate male/femal
- age 0-6, 7-15, 16-20, 20-30

## **Household characteristics**

- with kids
- without kids
- household w/ employed persons

## **Work**

- number of employees
- employee pr wage rate groups.
- average income, classes
- unemployment rate
- migrant workers rate

## **Education**

- rate high eductation, univ degree
- rate high school

## **Welth**

- savings average
- government social payment rate

## **House classification**

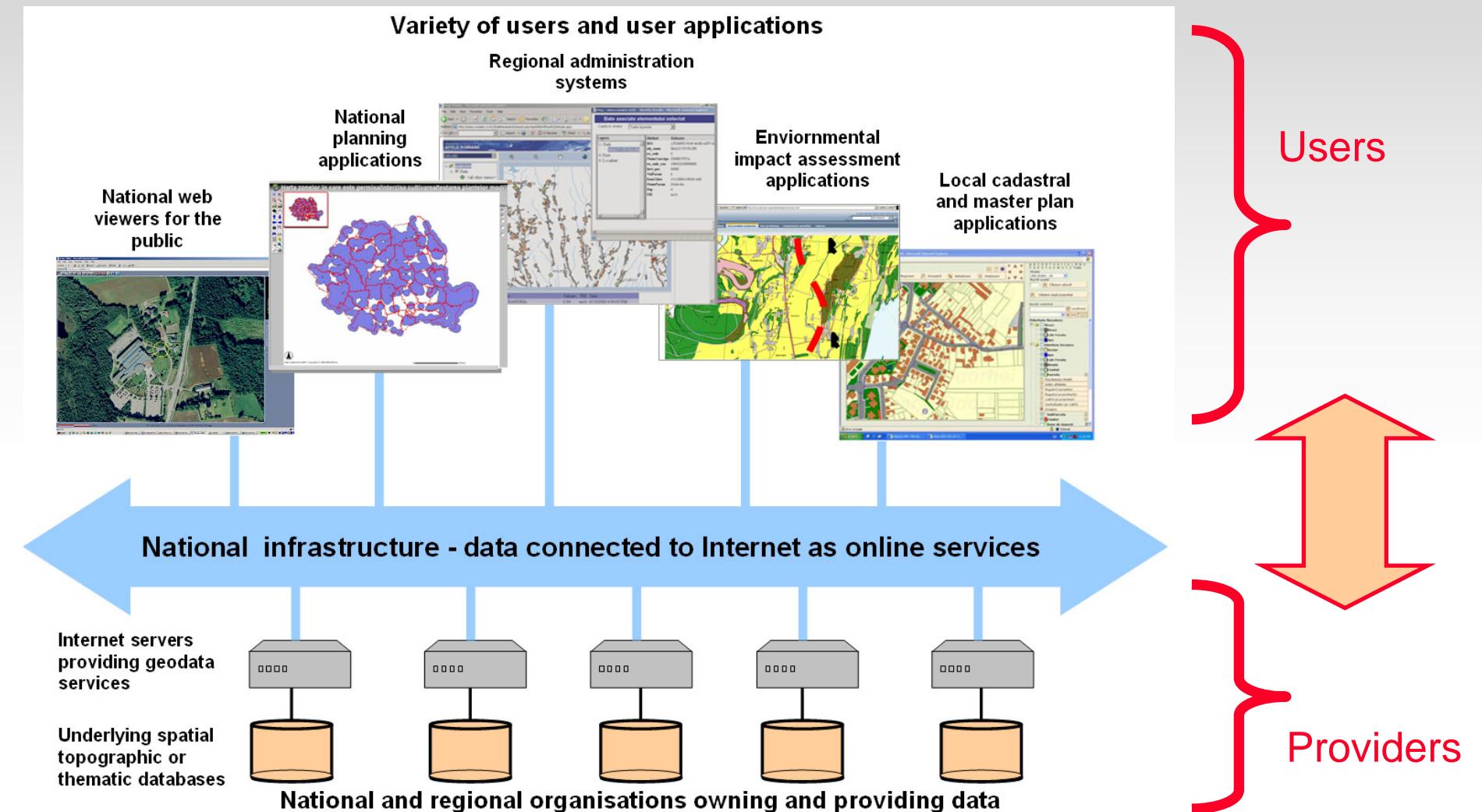
- kind of house

## **Health and social services**

## **Production**

- Agriculture activities
- Forestry
- Fishing
- Mining and quarrying
- Manufacturing

# User needs approach



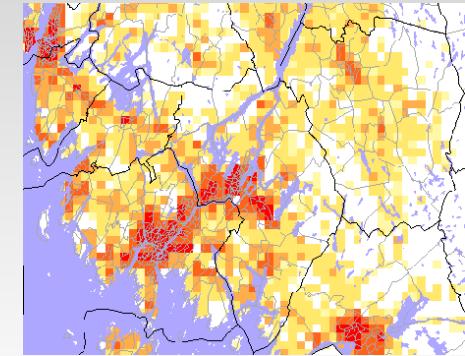
# **LINKS**

- [www.geonorge.no](http://www.geonorge.no)
- [www.norgedigitalt.no](http://www.norgedigitalt.no)
- [Www.nordatlas.no](http://Www.nordatlas.no)
- [www.senorge.no](http://www.senorge.no)

# ***Summary***

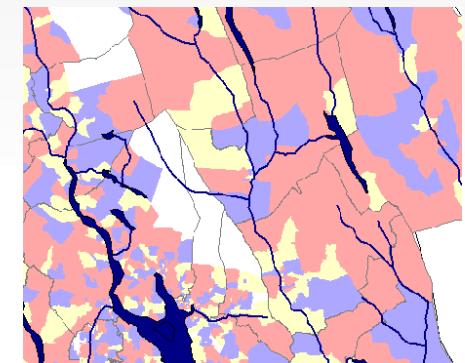
- **define which basic geographical units to use**

- ✓ administrative units
  - ✓ grids
  - ✓ settlements



- **define standardised content**

- ✓ basic data and derived data/ assessment results, with time series
  - ✓ population
  - ✓ production and activities
  - ✓ land use and environment



- **develop standardised data flows**

- ✓ national
  - ✓ European

- **disseminate data through web map services**

- ✓ WMS
  - ✓ download options


[Start page](#) : [Map page](#)
[Snow](#) [Weather](#) [Water](#) [Climate](#)

[Location search](#)
[Show/hide](#)

## Theme list

Select time resolution:

[Day](#) [Month](#) [Year](#)

Select theme:

Weather

Snow

- [Snow amount in %](#)
- [Snow amount ranked](#)
- [Snow weekly change](#)
- [Snow depth](#)
- [Fresh snow](#)
- [Fresh snow weekly](#)
- [Fresh snow depth](#)
- [Snow melt](#)
- [Snow melt weekly](#)
- [Snow wetness](#)
- [Skiing conditions](#)

Water

## Reference layers

Select extra layers on map:

### Refresh map

- Basic
- Contours
- Hydropower
- Catchments
- Topography
- Imagery

## Back in time

[-1 year](#)

[-1 week](#)

[-1 day](#)

[Today](#)

[+1 day](#)

[+1 week](#)

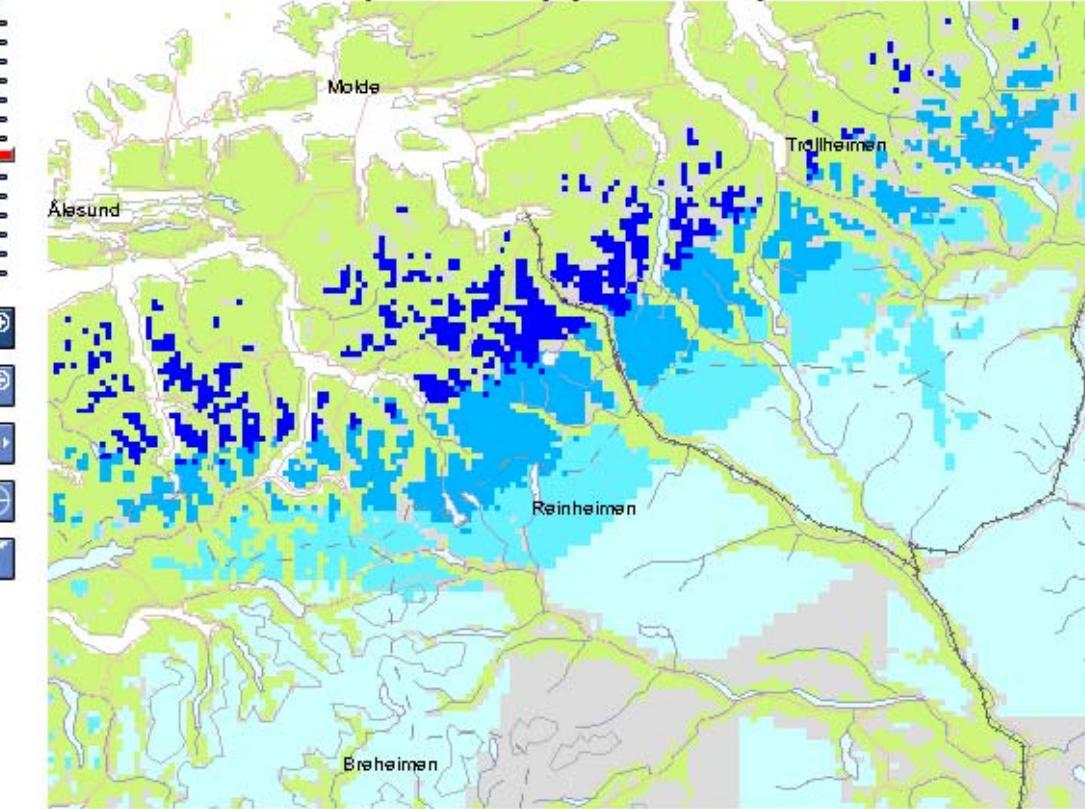
[+1 year](#)

...or enter date

[Get map](#)

## Time navigation

### Fresh snow amount previous day (18.09.2007)



UTM zone 33 coordinates are 140394 East and 6875375 North

Map scale 1: 1294263

[Show larger map](#) | [Printer friendly version](#) | [Display link to map](#) | [Feedback](#)

## Forward in time

## Theme information

Map shows amount of fresh snow (in mm water equivalent) during previous 24-hour period at 7 a.m. (8 a.m. in summer time) for given date (1 a.m. (2 a.m. in summer time) for forecast map). Maps for "today" and "tomorrow" are forecasts; earlier maps are based on observations.

Forecast maps are released daily at 7 a.m. and observation maps at 10 a.m. Maps for the previous 14 days are updated every Tuesday afternoon.

Data from 01.01.1971 until tomorrow.

## Colour legend

### mm water equivalent

Above 50
25 - 50
10 - 25
Below 10
No fresh snow
Bare ground

## Map legend

### Oslo Placename

- National boundary
- County boundary
- Lake

# ***Recommendations - Inspire - NSI as delivery organisations***

- Without NSIs - lots of information missing
- Data will come from other organisations - maybe without good methodological foundation
- We have defined our organisation "Nordic forum for geostatistics" as a "Spatial data interest community"
- participate in Inspire work - relevant fora
- Be active as an SDIC and LMO
- comment documents - absent?
- "The shared reference model": develop the reference models for specific themes: annex 1: grid systems, annex III: statistical units + demography
- thematic working groups from late 2007...
- publication and material about Inspire themes
- Its your responsibility - it's expected - your chance.....

# ***Recommendations - actions***

- focus mainly on existing data and data flows
- simple geometry/ units
  - ✓ administrative units - use euroboundaries
  - ✓ grid - use European agreed grid LAEA
  - ✓ (settlements as points)
- specify content - themes
  - ✓ select from Inspire -demography, economic activity, health
  - ✓ provide what you have got - don't start with user assessments
- define projects
  - ✓ WMS for the existing Joint European grid map
  - ✓ develop web map services - one from each organisation
  - ✓ develop joint map viewer based on WMS
- don't make it too complicated

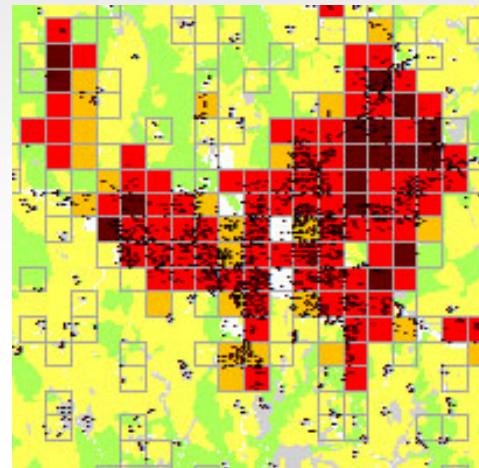
# *Recommendations - Inspire as a source for NSIs*

- Inspire will feed NSIs with information online.
- what to do with it?
- develop a long term strategy for utilization of the data
  - ✓ be part of the process in Inspire - present your user needs
  - ✓ technical utilization trials
  - ✓ methodological issues

# *Inspire - recommendation towards the commission*

- better information
- explaining the concept and technology
- handle multi-dimesional data
- expectations on data harmonisation and reengineering og data
- better capacity in secretariate(s)
- define user needs

# Questions?



*End*

