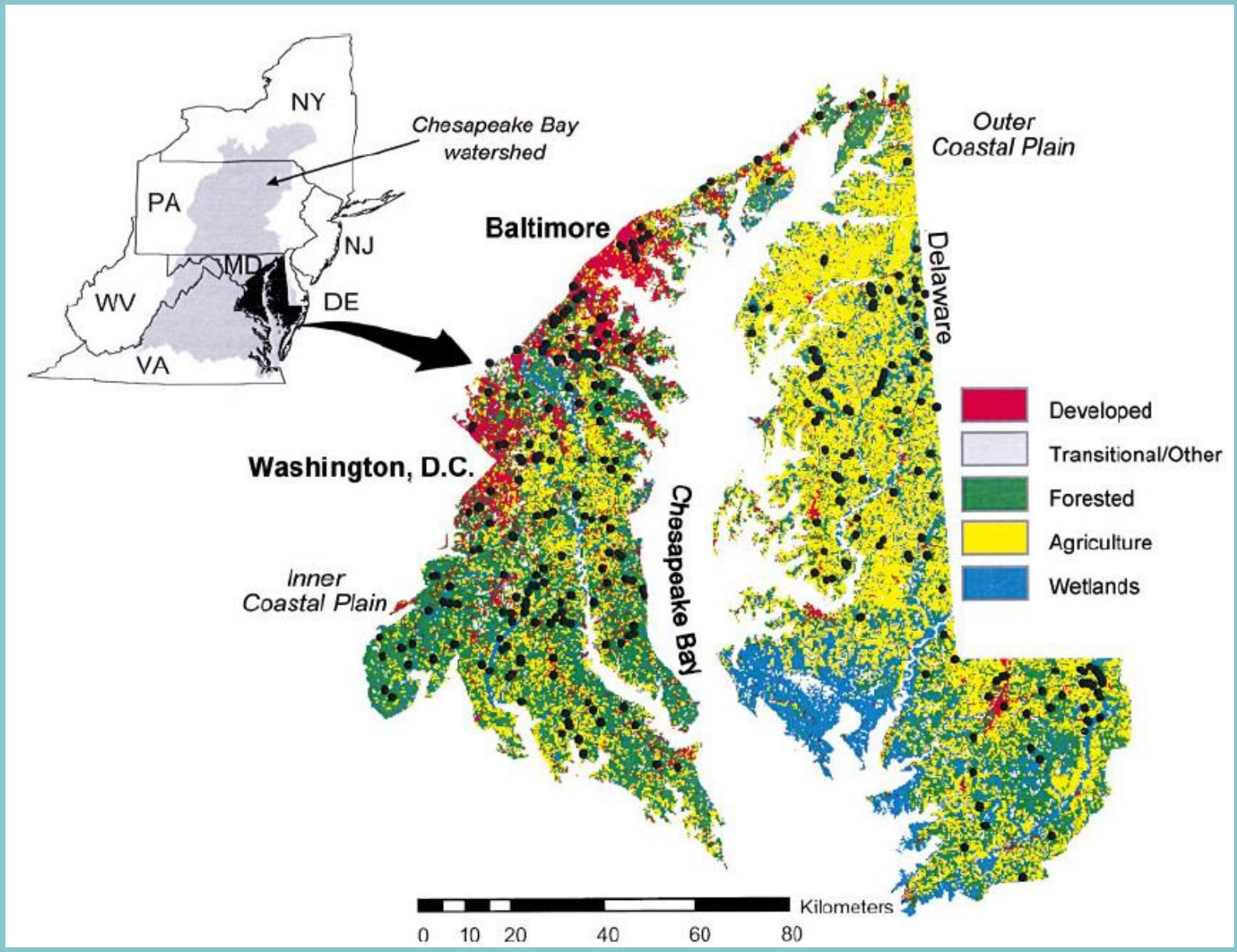
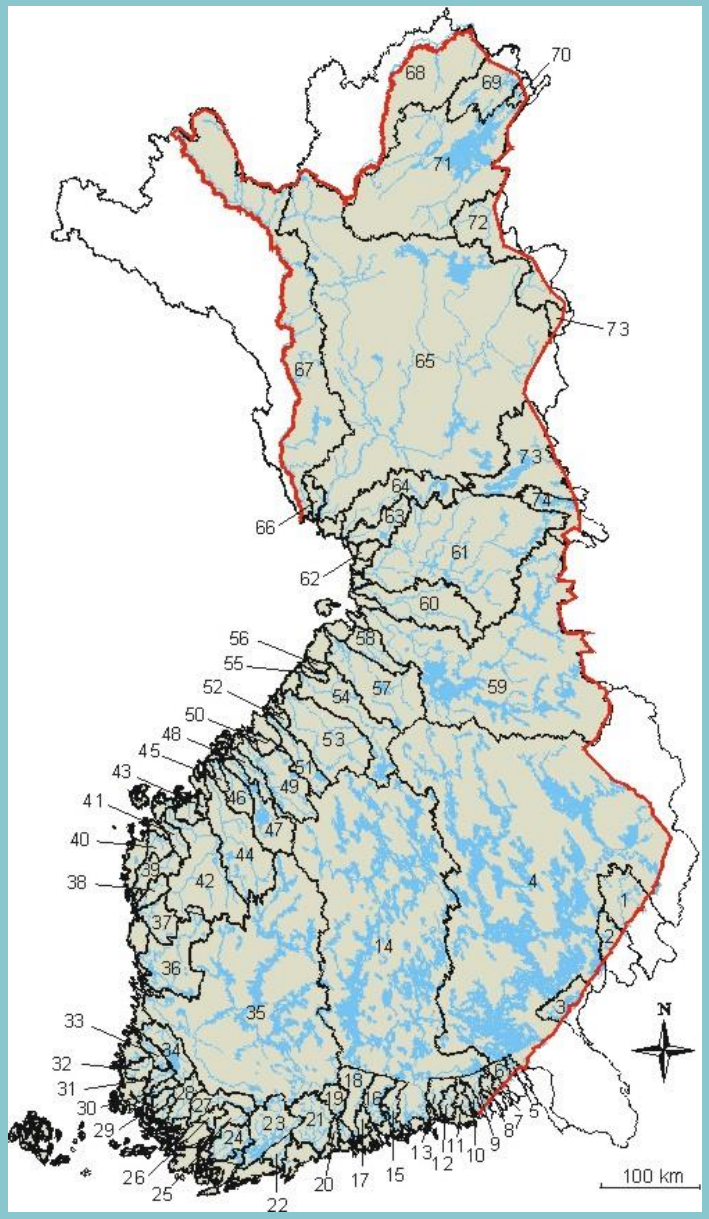
3. CATCHMENT CHARACTERISATION



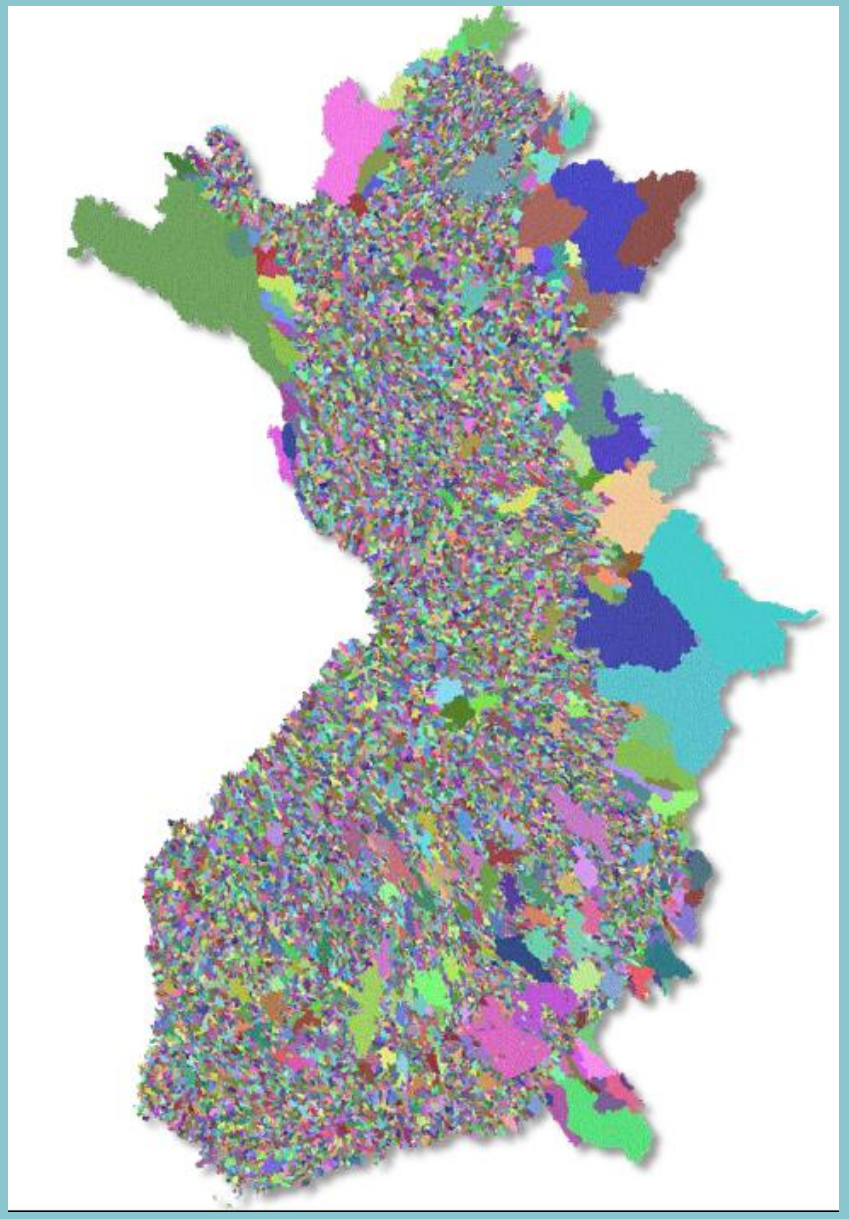
King, Baker, Whigham, Weller, Jordan, Kazyak, Hurd. 2005. Spatial considerations for linking watershed land cover to ecological indicators in streams. Ecological Applications 15:137–153.

Catchment areas in Finland

Old system (Revised in 1993): 5637 sub-catchments



Suggested new system: 22 211 catchments



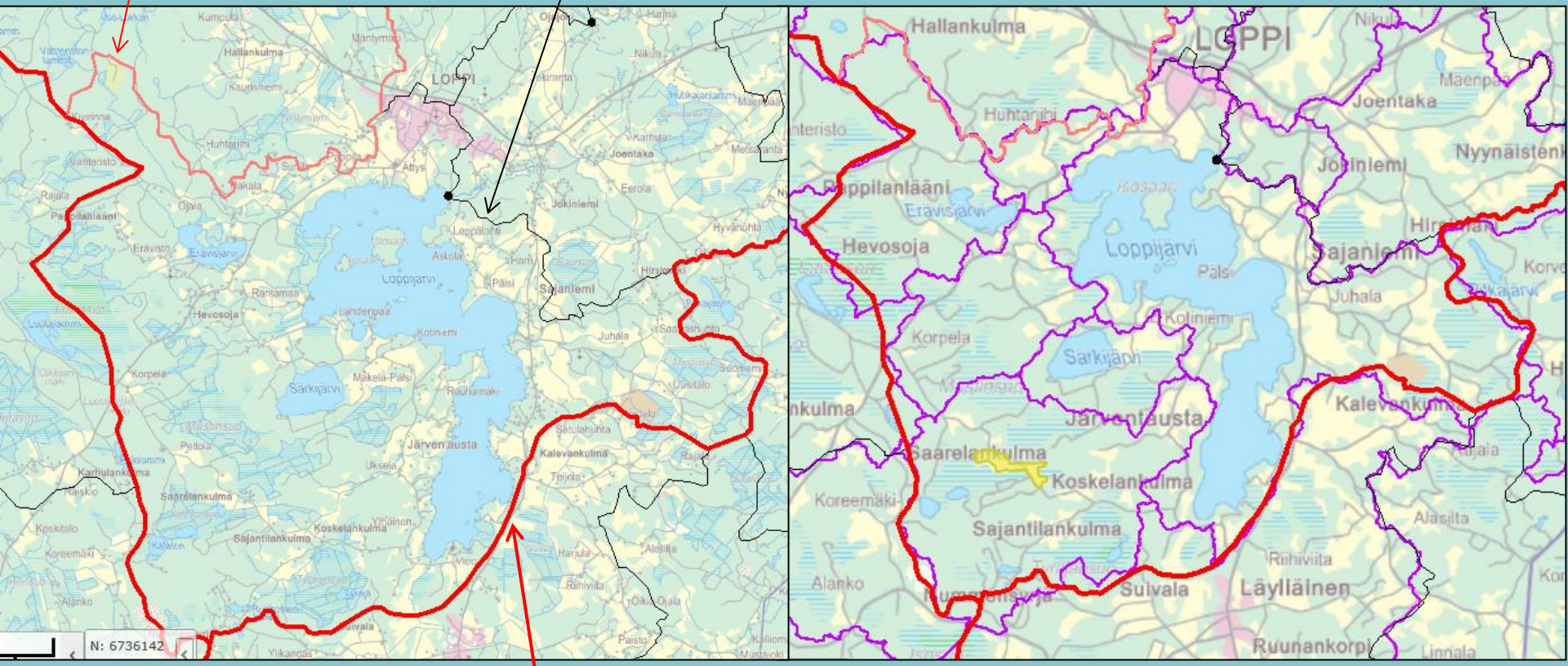
Teiniranta (SYKE)

An example: Lake Loppijärvi catchment

2. Level
- The Tervajoki

1. Level
- Vanajanreitti

3. Level
- Lake Loppijärvi



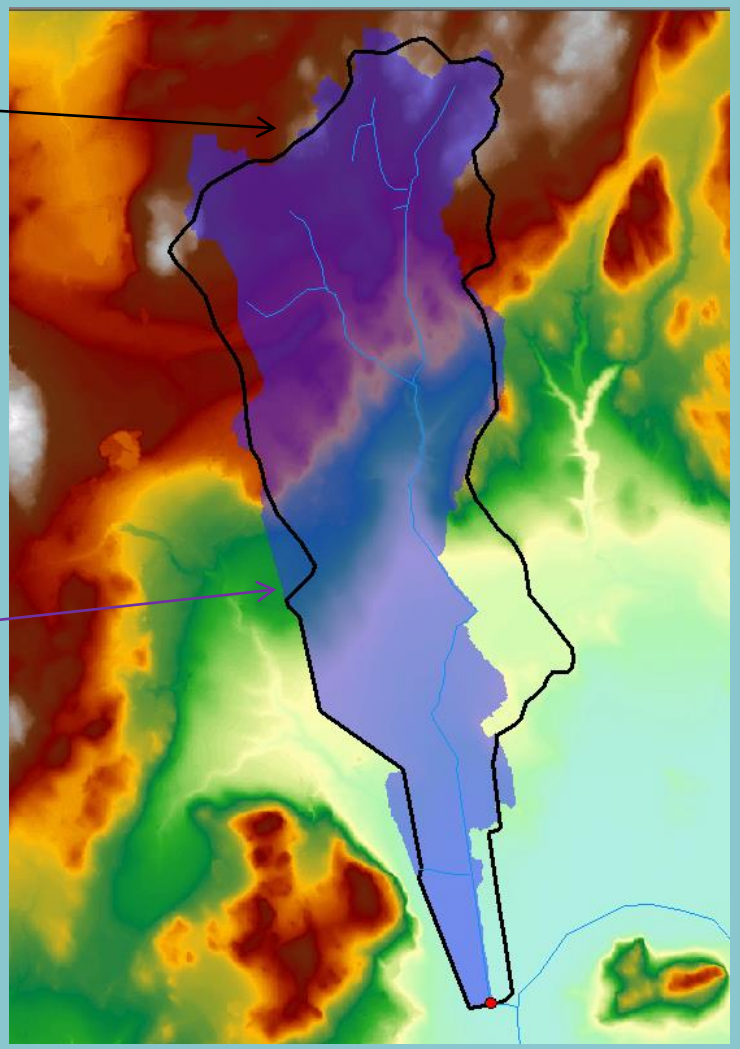
Old system
- **Hierarchical (four levels)**
- **Digitized from maps**

Main river basin
- The Kokemäenjoki

New system
- **Based on a digital elevation model and river network**
- **Not hierachical**

Delineating a catchment

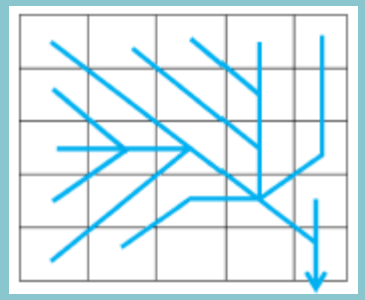
- ”Ancient” method
  - Contour lines in maps and field checks
- Currently based on a Digital Elevation Model (DEM)
  - DEM25 (MML/KM25): Elevation 2.5 m, grid size (25 · 25) m
  - DEM10 (MML/KM10): 1.4 m, (10 · 10) m
- Airborne laser scanning
  - Flood areas first
  - Entire Finland by 2020
  - 0.3 m, (2 · 2) m

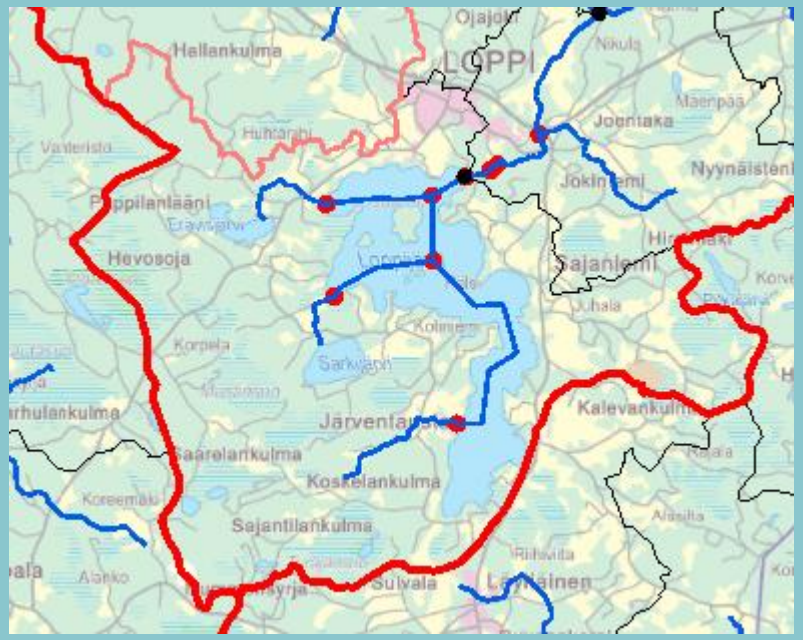


MML = Maanmittauslaitos, National Land Survey of Finland (NLS)

VALUE – A catchment delineation tool on Internet

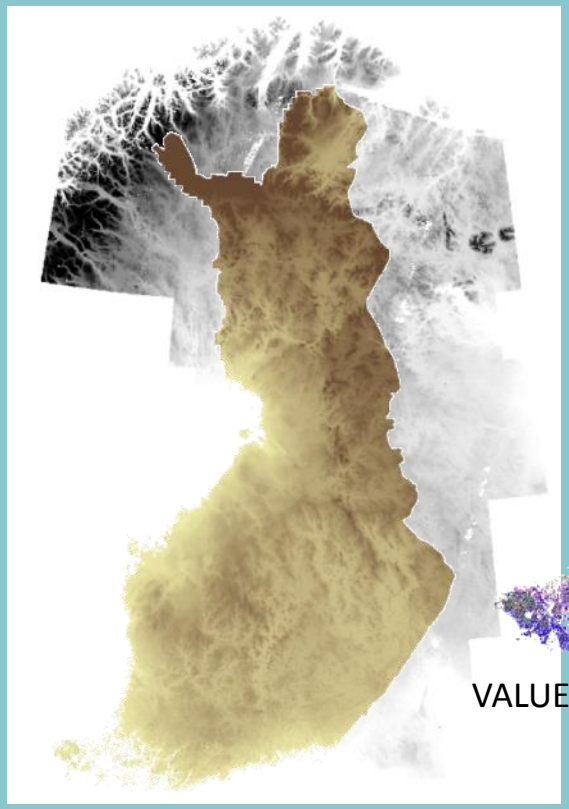
- SYKE holds a large set of spatial environmental databases
- One of the biggest INSPIRE* data producers in Finland
- For information: SYKE's Metadata portal
- VALUE tool
  - Delineates the upper catchment of any point along the river segment of river network
  - Flow direction grid (10 m resolution)
  - Pre-calculated catchment areas of the river network and the lakes over 50 ha (Ranta10)
  - Tables of the river network information system
- http://paikkatieto.ymparisto.fi/value





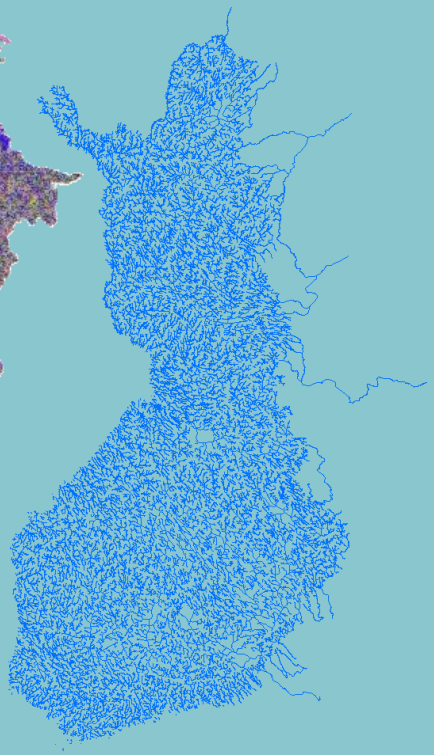
*The INSPIRE Directive aims to create a EU spatial data infrastructure for the purposes of EU environmental policies and policies or activities which may have an impact on the environment

Source data



DEM10 m by (NLS
& Astergdem 30 m (METI & NASA)

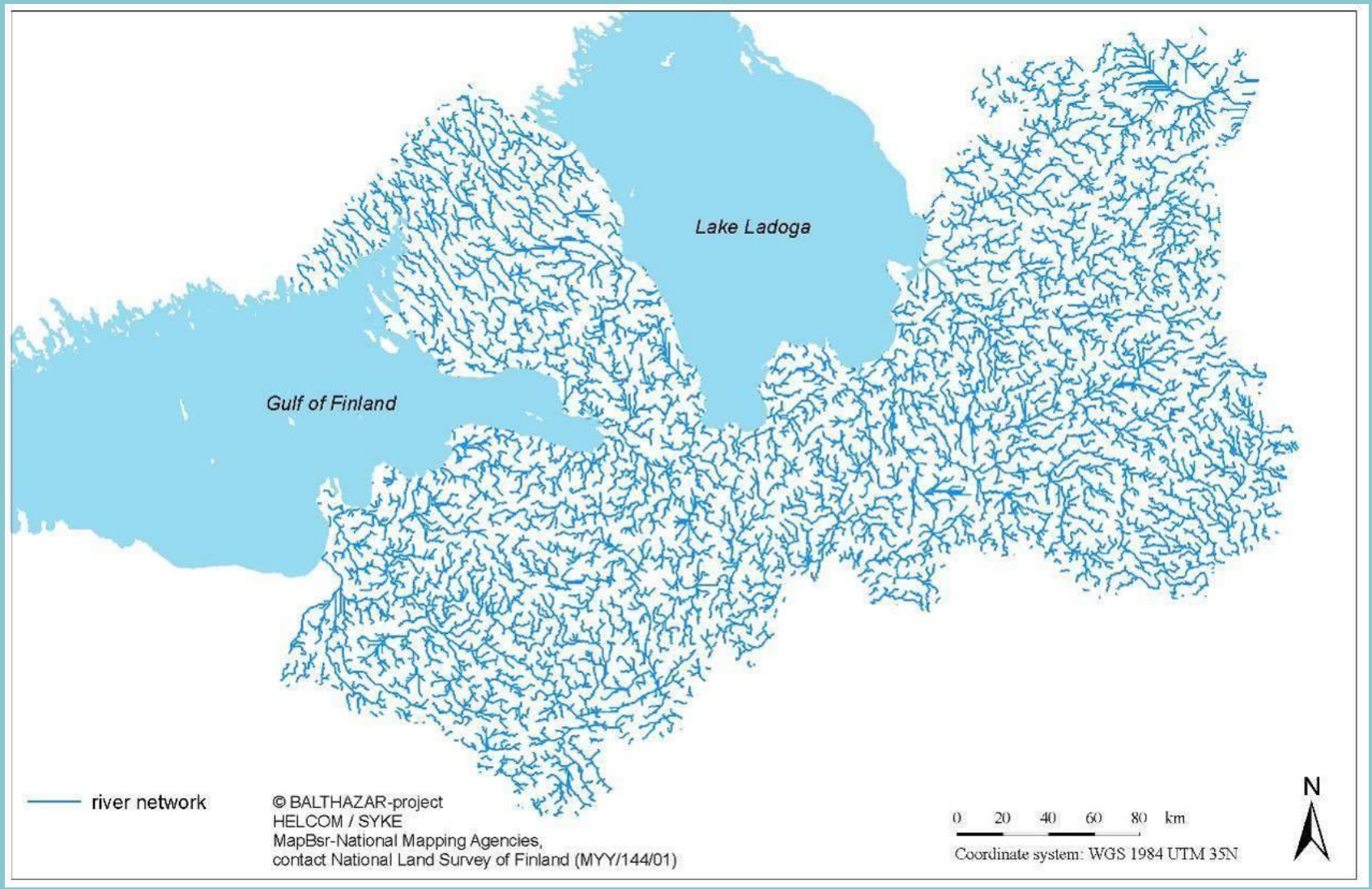
VALUE – Flow direction 10 m



Ranta10: river network, lakes & rivers
1:10 000 (NLS, SYKE)

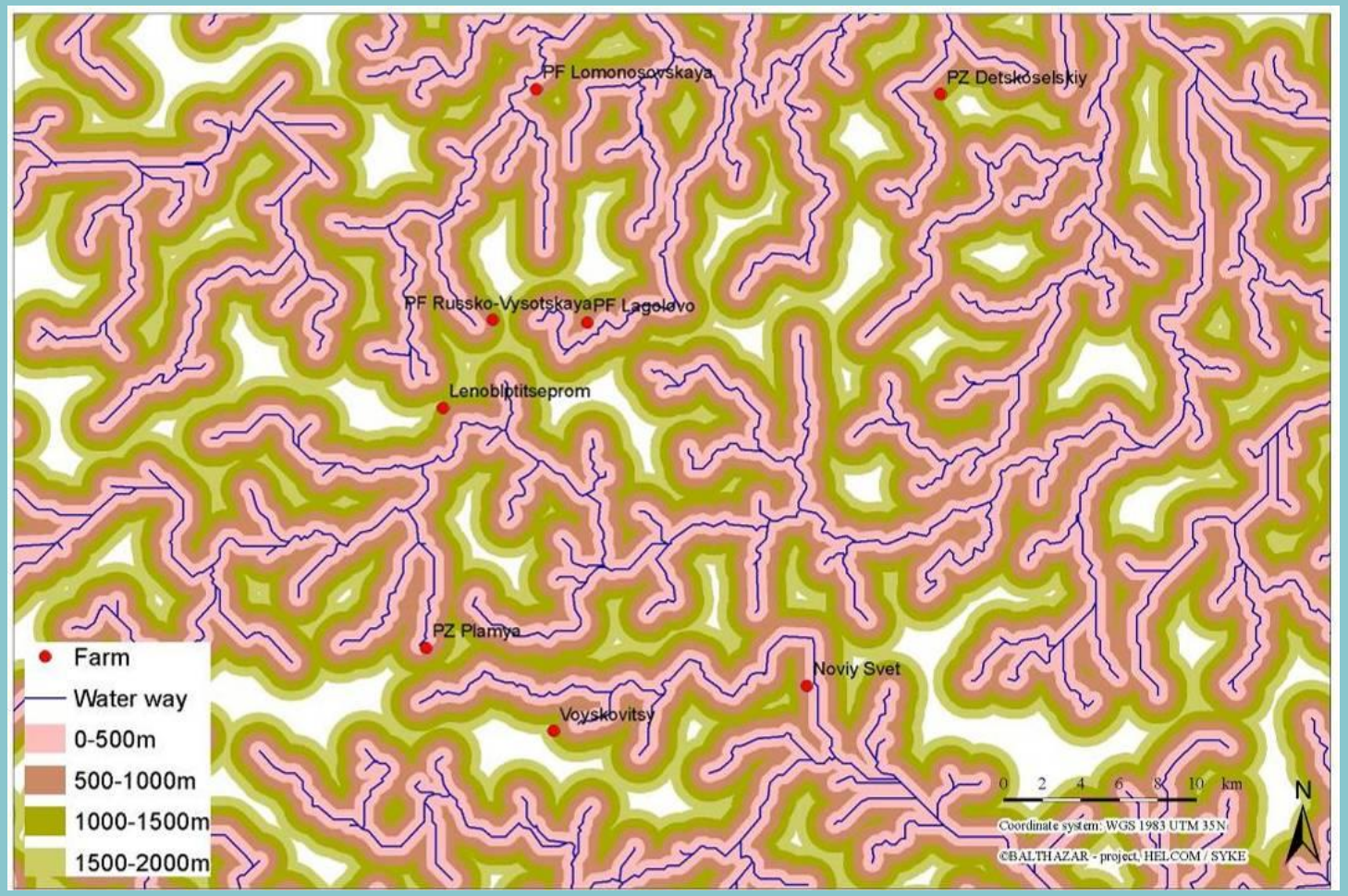
Dia: Riitta Teiniranta et al.

What is missing?
An example on the effect of resolution



Elina Röman, Balthazar project

An example on ArcMap's Buffer tool



Land cover of catchments

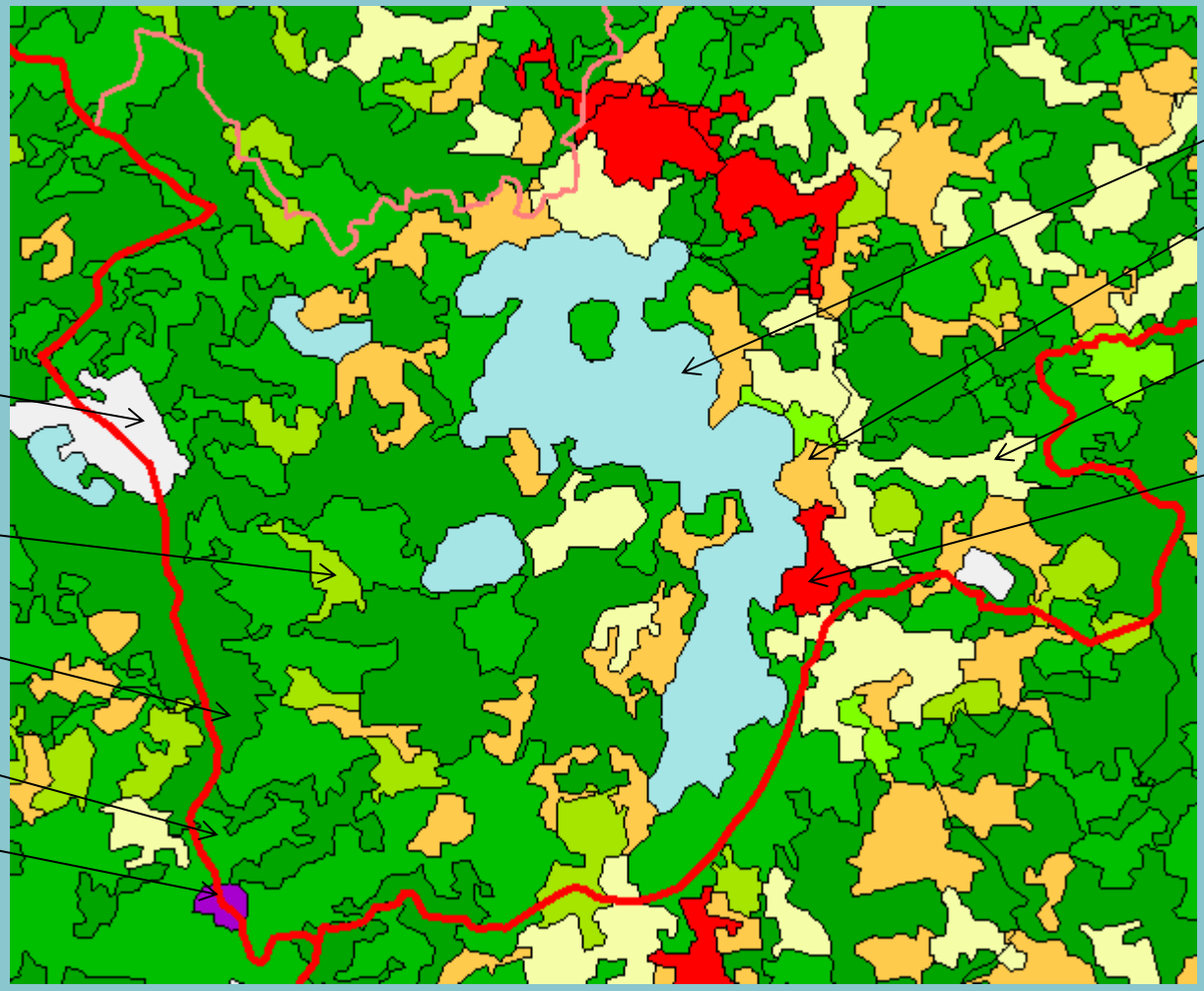
Corine* Land Cover (CLC)

- Land use and land cover in 2000, 2006, 2012 + changes
- High resolution version based on
  - Satellite images
  - Map based national data sets
    - The Topographic Database of Finland
    - Digiroad (digital road database of Finland)
    - Building and dwelling register
    - Finnish Land Parcel Information System
  - 20 m raster
- European version (25 ha) generalized from national data
- Main level, Level 2, Level 3, Level 4
  1. Artificial surfaces
  2. Agricultural areas
  3. Forests and semi-natural areas
  4. Wetlands
  5. Water bodies

*Coordinated information on European Environment

Soil cover in the catchment of Lake Loppijärvi

Corine2006 (25 ha)



Building and dwelling register (Rakennus- ja huoneistorekisteri, RHR)

- Held by Population Register Centre (Väestörekisterikeskus)
- Data on all the buildings in Finland (3 million)
- 0/1 data on teh connection to sewer systems
- Problem: 0 can also mean missing information

Soil sealing/imperviousness

Degree of soil sealing (DSS), (20 · 20) m raster

- **Green: 0-29%**
- **Orange: 30-49%**
- **Dark pink: 50-79%**
- **Red: 80-99%**
- **Red brown: 100%**

Discontinuous urban fabric

Continuous urban fabric

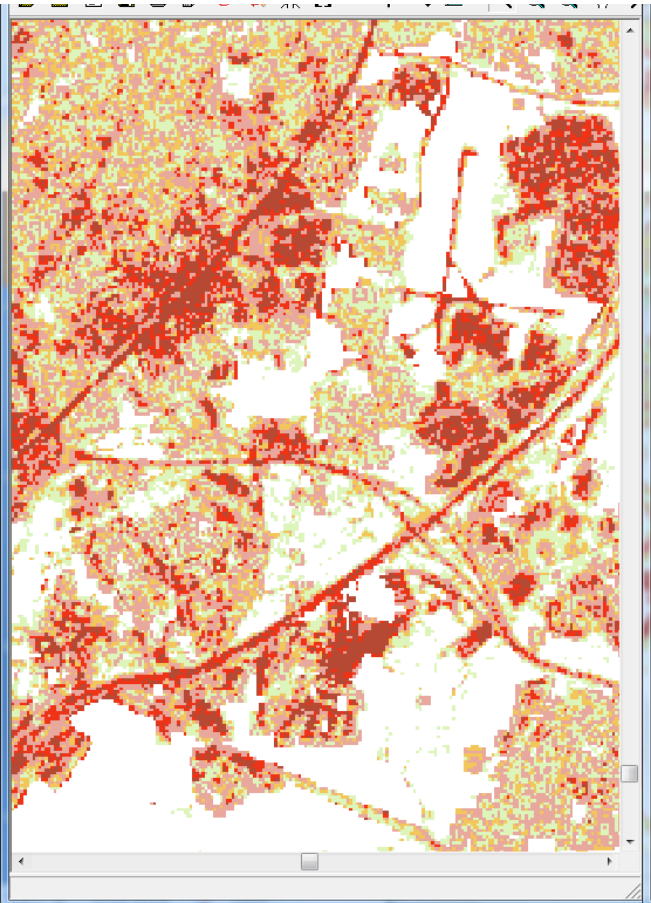
Road and rail networks and associated land

Field

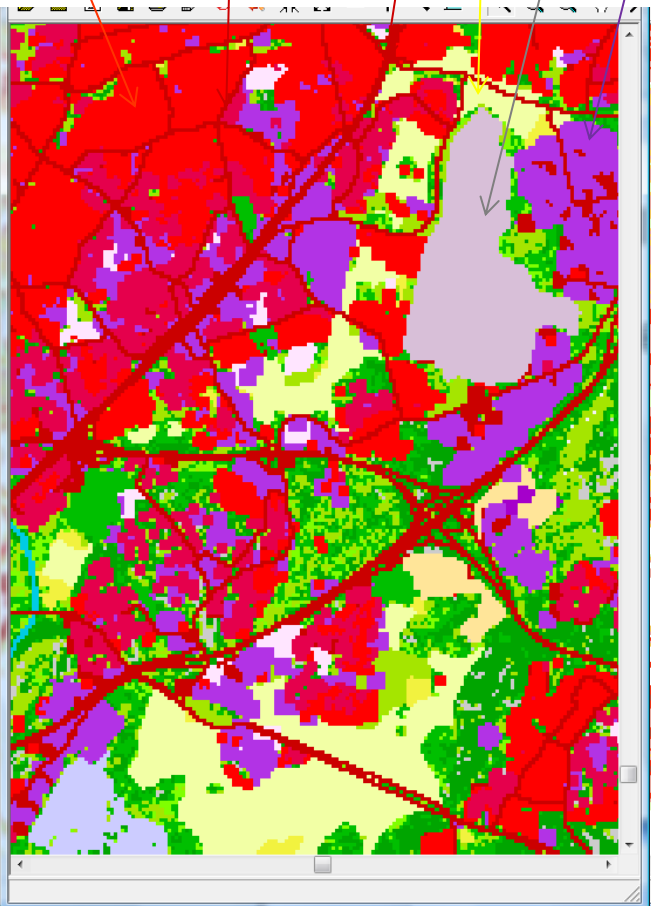
Airport

Industrial or commercial units

DSS 2006



CLC2006



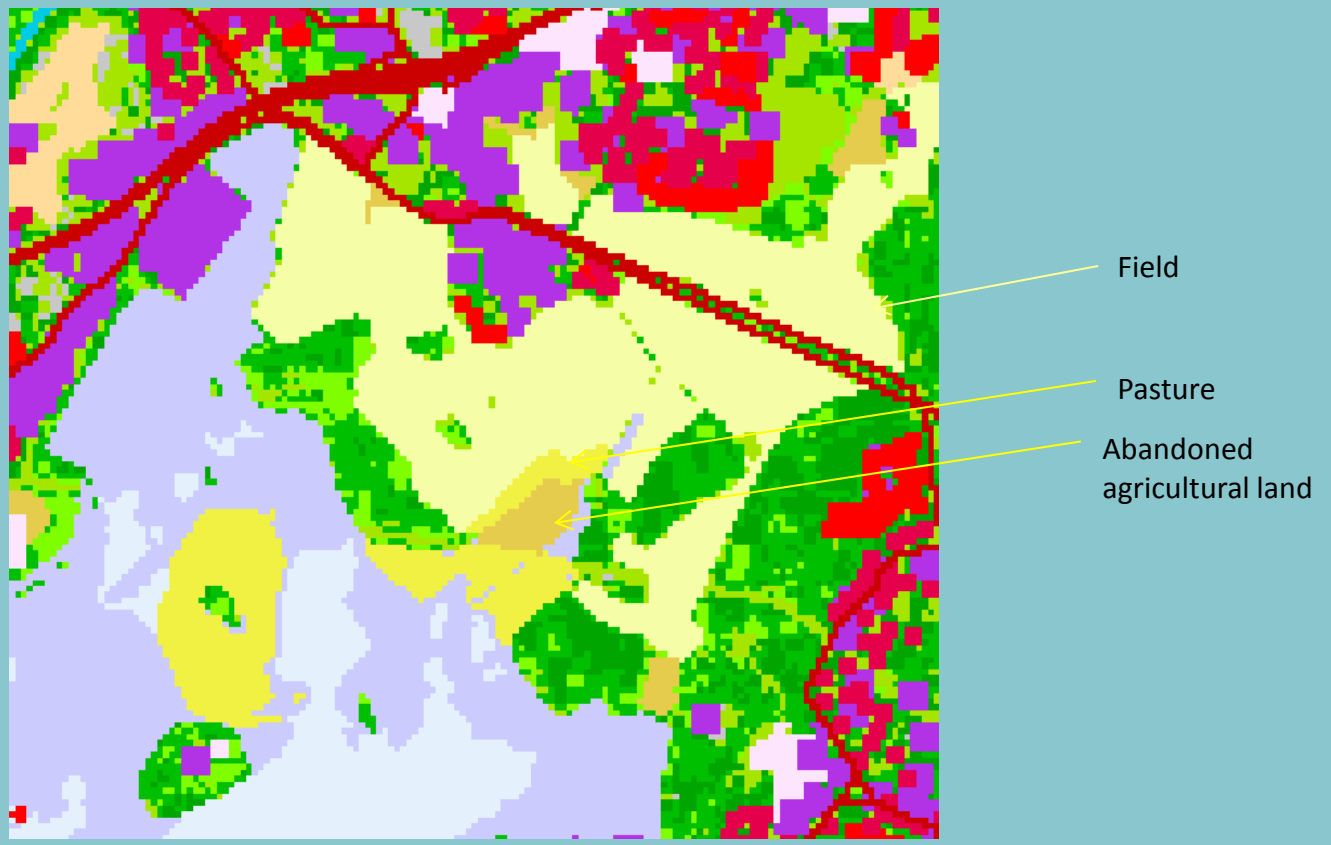
DSS 2009

Dia: Härmä (SYKE)

CORINE agricultural areas in Finland

4. Level distinquishes

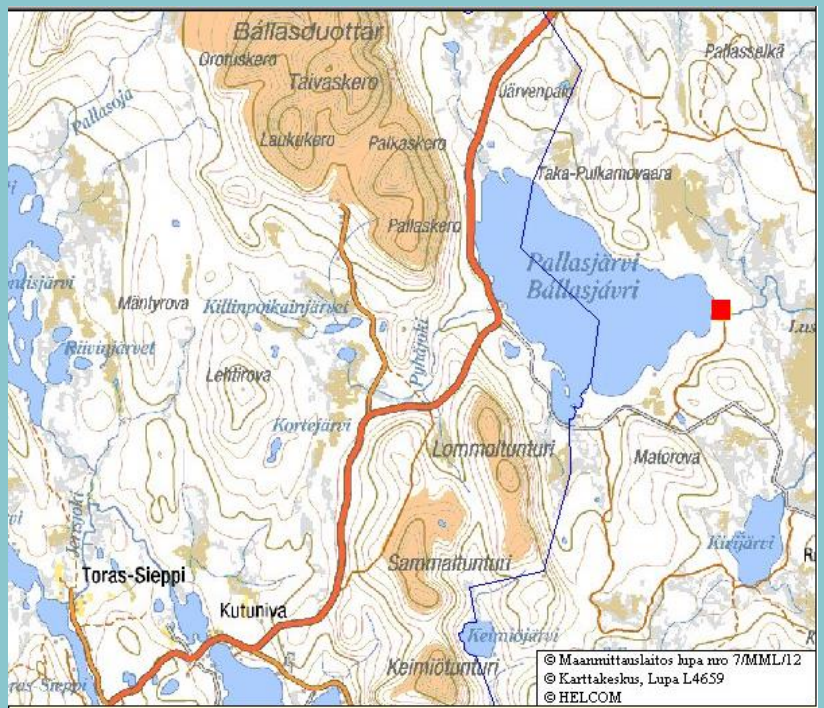
- **Fields**
- **Abandoned fields**
- **Fruit trees and berry plantations**
- **Pastures**



Fields in the catchment of Lake Pallasjärvi?

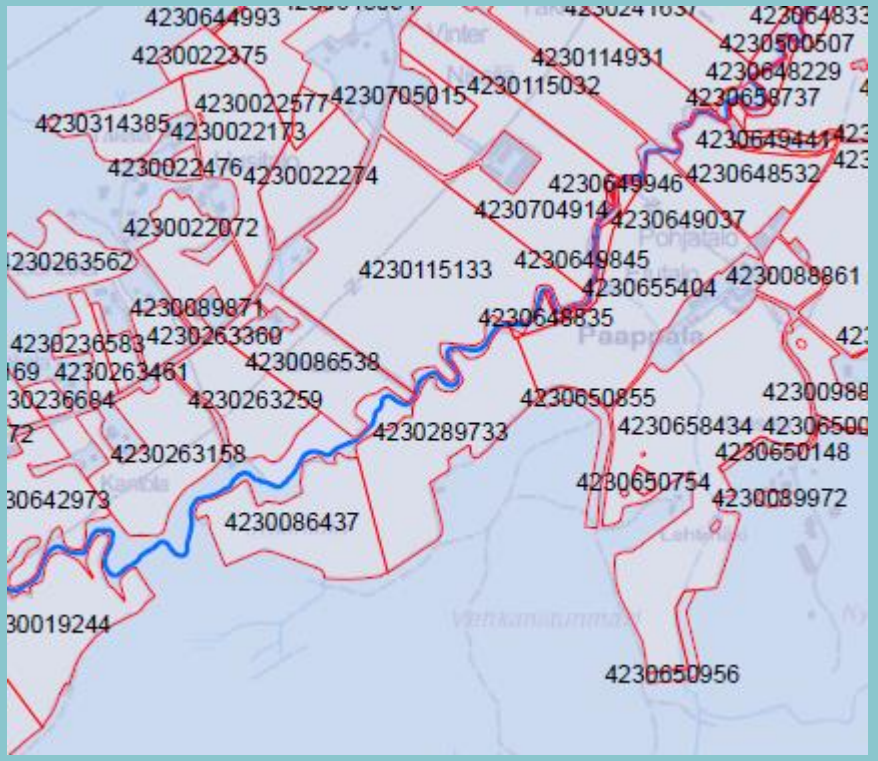
CORINE
- Pasture: 45 000 m^2

Field plot register
- 0 m^2



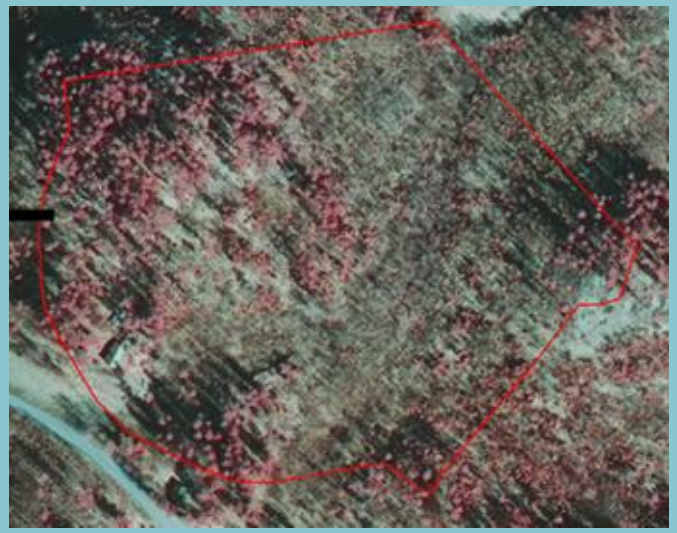
Further info on agricultural areas

- Parcel register (peltolohkorekisteri)
  - Fields receiving subsidies
  - By the Agency of Rural Affairs (Maaseutuvirasto, Mavi)
- Livestock numbers
  - The Finnish Food Safety Authority (Evira) and Mavi
  - Farm coordinates and numbers of various domestic animals, excluding the majority of horses



A monitored forested catchment: Yli-Knuuttila (in Vihti), 0.07 km²

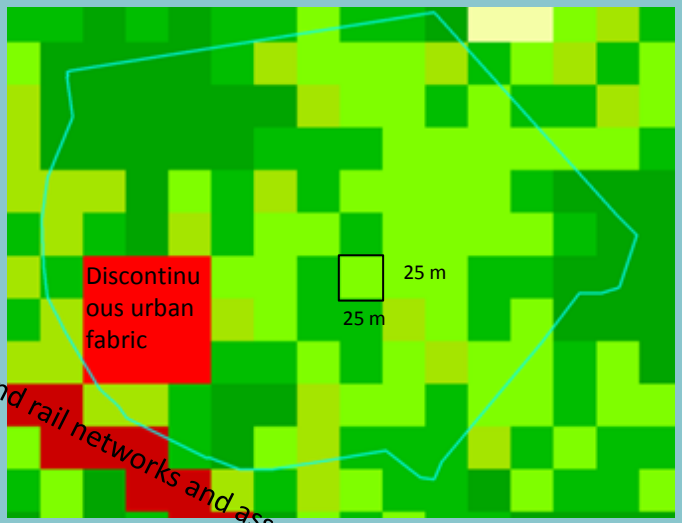
Aerial colour photo



Aerial false colour photo

False colour photo

- Visible and near-infrared light
- Highlights chlorophyll (= vegetation)
- Dark red = ”Good” vegetation
- Light red – white= ”Poor” vegetation
- Dark = water, moist areas



Corine Landcover 2006

Transitional woodland, shrub on rocky soil

Transitional woodland, shrub on rocky soil

Coniferous forest on rocky soil

Mixed soil mineral soils

Mixed forest on rocky soil

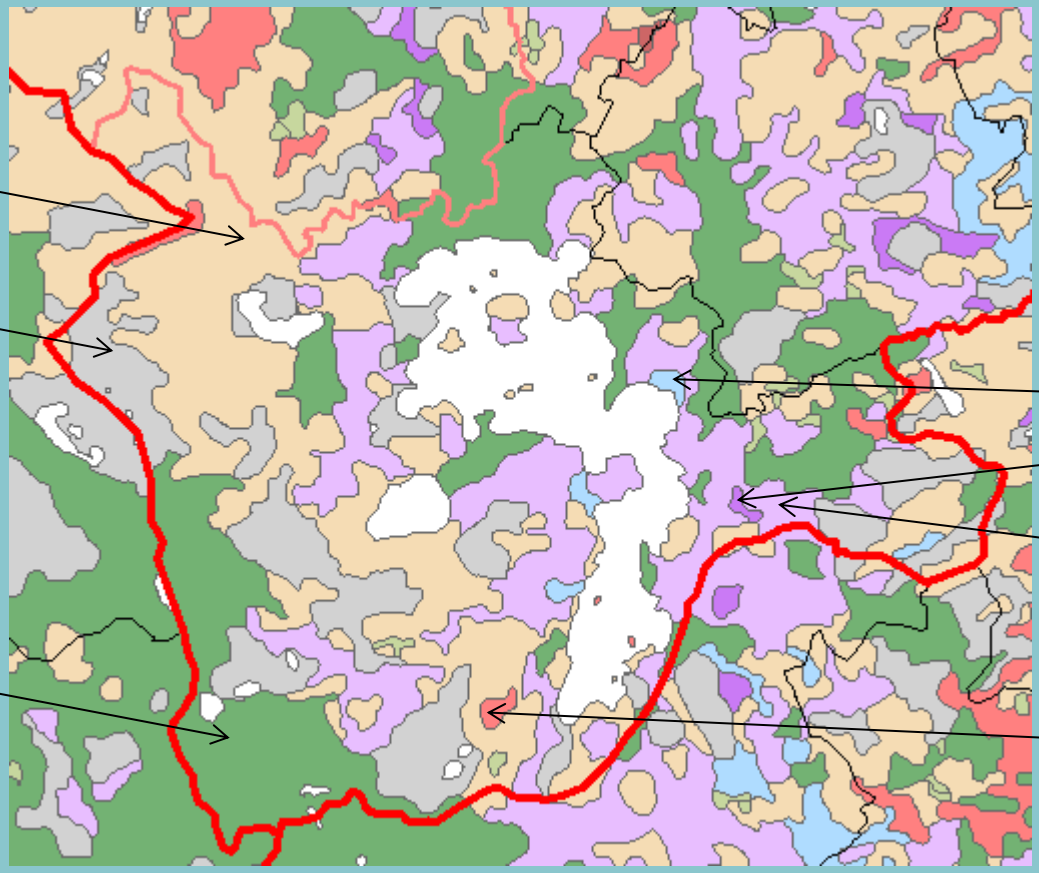
Coniferous forest on mineral soil

Broad-leaved forest on mineral soil

Urban layer by SYKE

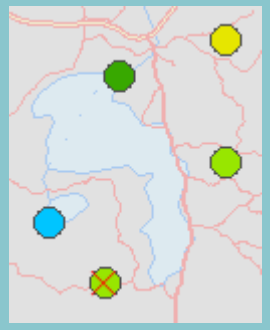
NDVI = Normalized Difference Vegetation Index

Soil types in the catchment of Lake Loppijärvi



Digital soil map (1 : 200 000), Geological maps also available

LUCAS



http://www.eea.europa.eu/data-and-maps/explore-interactive-maps/lucas-viewer-with-ground-level-pictures