



GIS – AN INTRODUCTION

HOW TO USE YOUR RESEARCH DATA SPATIALLY

PEDER GAMMELTOFT

DH-LAB, UBB

9. NOVEMBER 2021

SEMINARROM 555 + ZOOM

WORKSHOP PLAN

The workshop is divided into three parts:

1. 09.00-09.30: What is GIS?
2. 09.30-09.50: Open GIS ressources
09.50-10.00: Break
3. 10.00-11.45: Getting started – how to use GIS

WHAT IS GIS (GEOGRAPHIC INFORMATION SYSTEM)?

PART I

WHAT IS GIS?

GIS = *Geographic Information System*, and consists of:

- **Digital Data:** geographical information for viewing and for analyses, using computer hardware and software.
- **Computer Hardware:** used for storing and processing data and displaying graphics.
- **Computer Software:** computer programs that allow you to work with digital data. A software program that forms part of the GIS is called a GIS Application.

With a GIS application you can open digital maps on your computer, create new spatial information to add to a map, analyse data spatially, create and visualize maps customised to your needs and perform spatial analysis.

WHAT IS GIS?

- What will GIS do?
 - GIS is designed to capture, store, manipulate, analyze, manage, and present all types of geographical data.
 - GIS provides:
 - Spatial data entry
 - Data management, retrieval and analysis
 - Visualization functions
- Operates with two main types of data:
 - Raster data
 - Scanned maps
 - Vector data
 - Points
 - Polylines
 - Polygons
- *Originally designed for planning and decision making*



WHAT IS GIS?

GIS consist of:

- Spatial data (geographical locations)
 - Location data (XY coordinates / Latitude-longitude)
- Information about the spatial data
 - Attribute data
 - What is it?
 - *mountain*
 - How to describe it?
 - *Name*
 - *Class*
 - *Height*
 - *Extent*

WHAT IS GIS

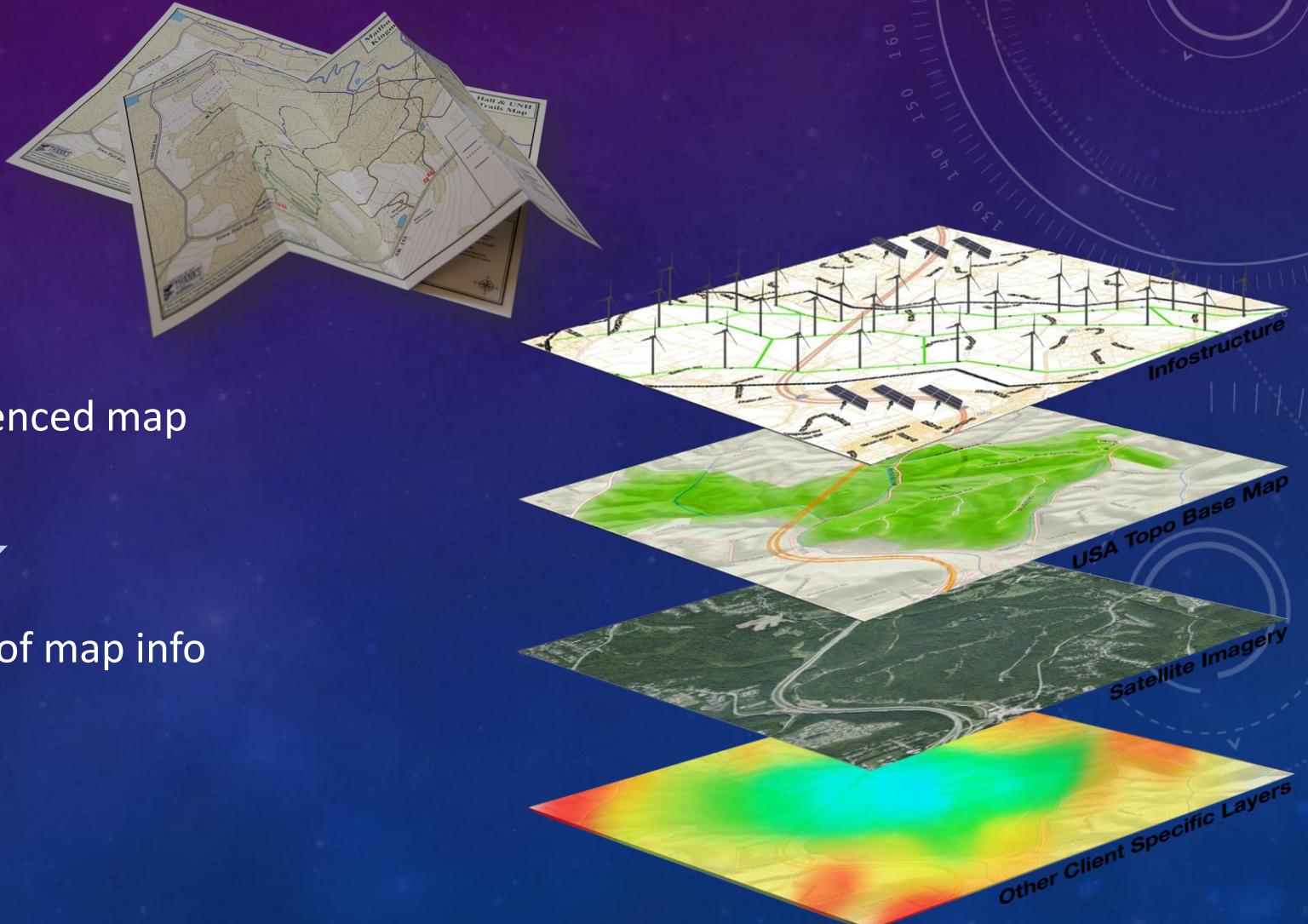
Datasets

Raster data:

- Paper map > digital map > georeferenced map



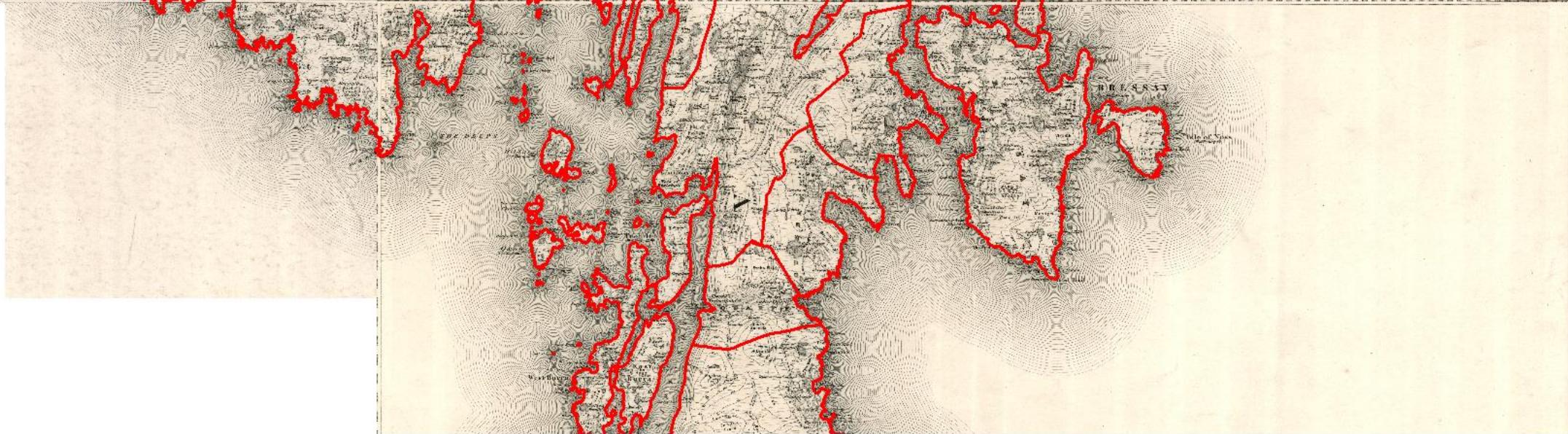
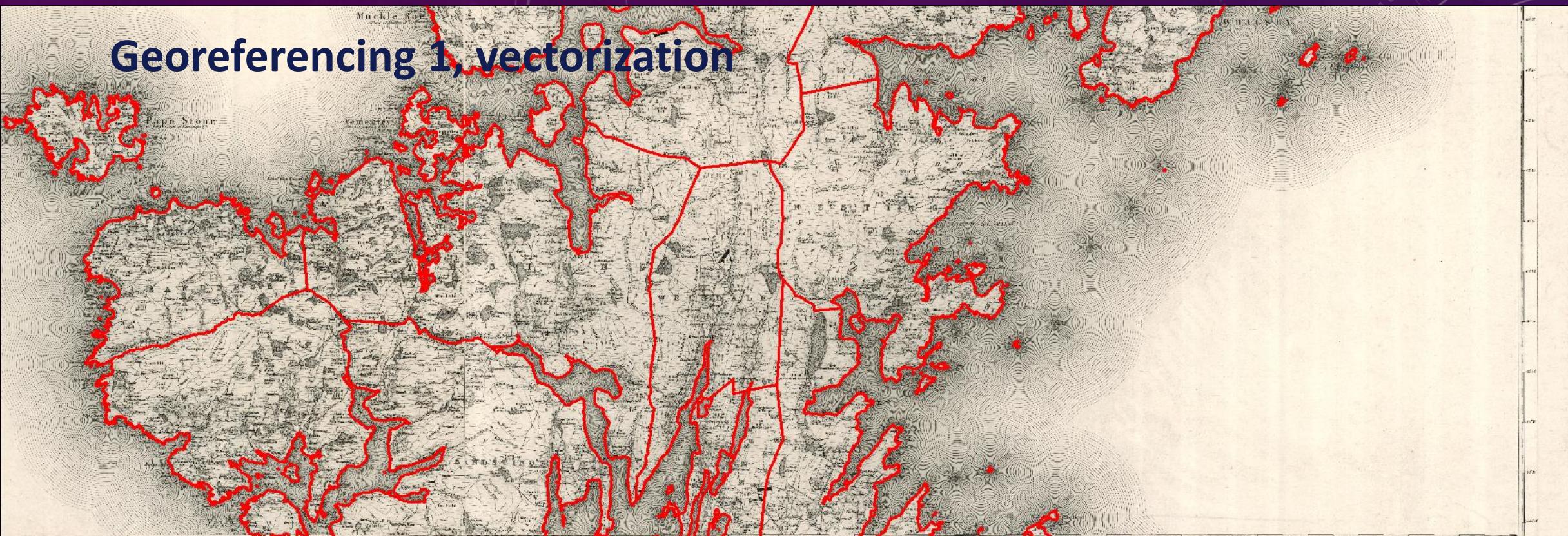
vectorisation of map info



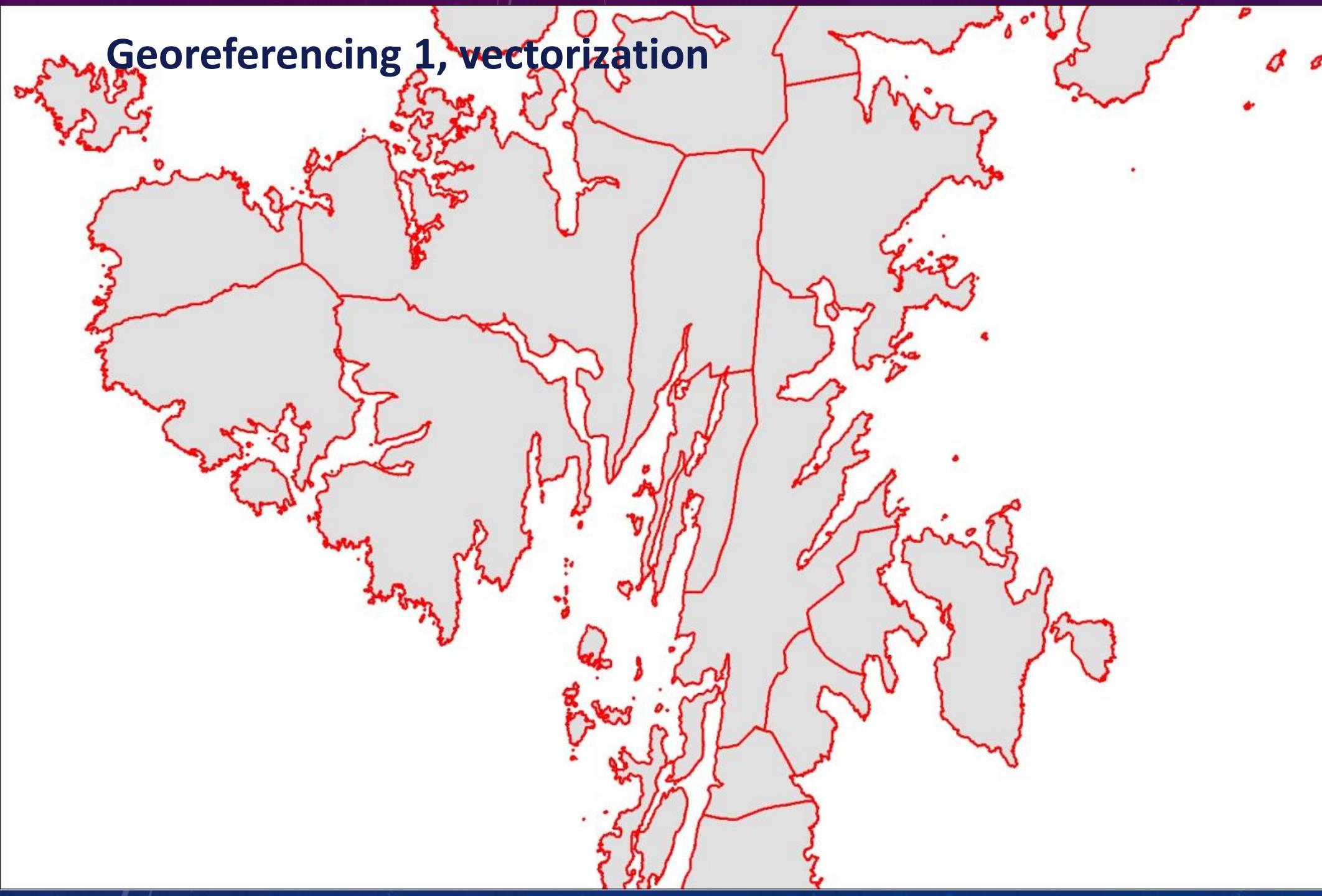
Georeferencing 1, vectorization



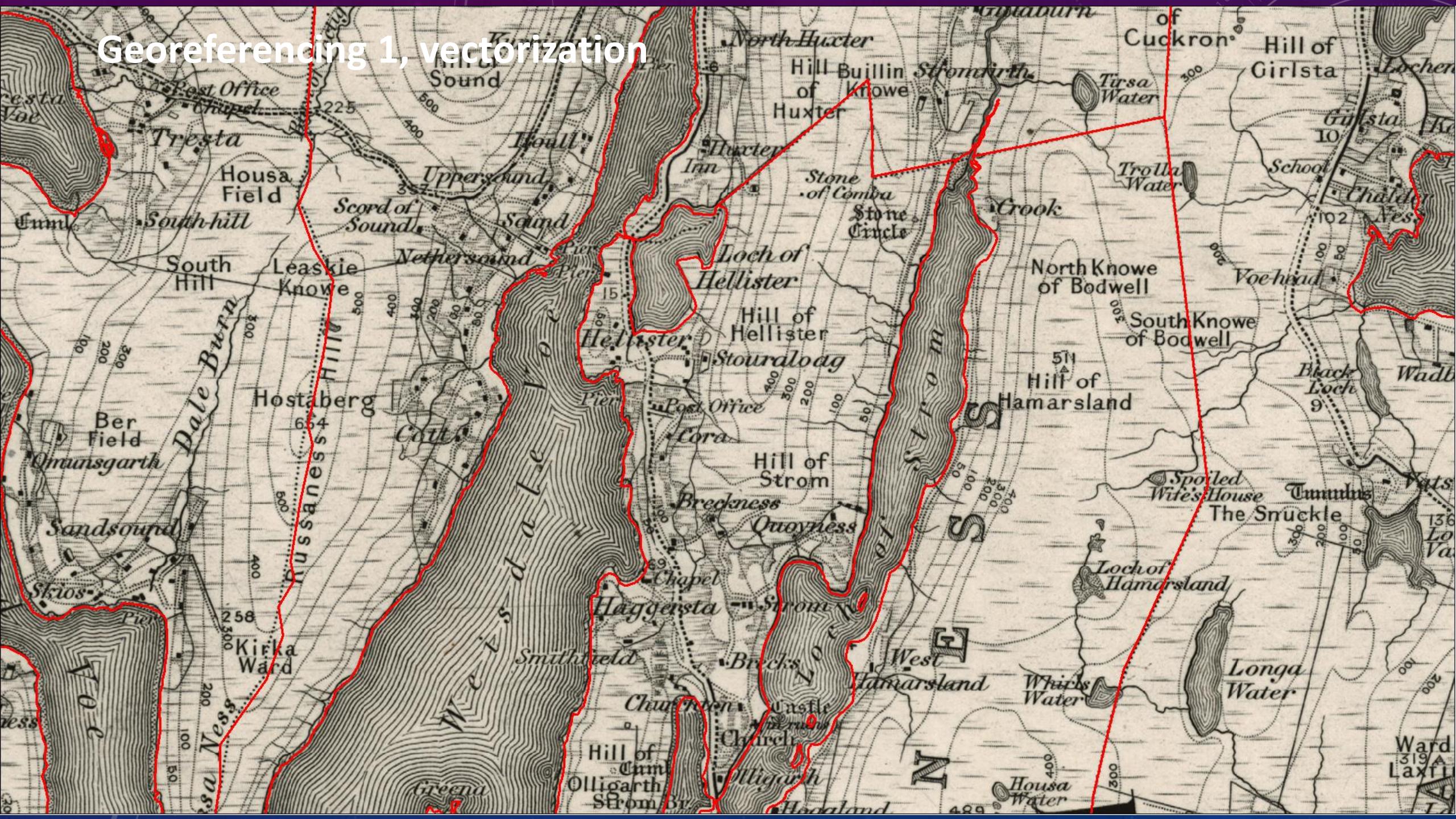
Georeferencing 1, vectorization



Georeferencing 1, vectorization



Georeferencing 1, vectorization



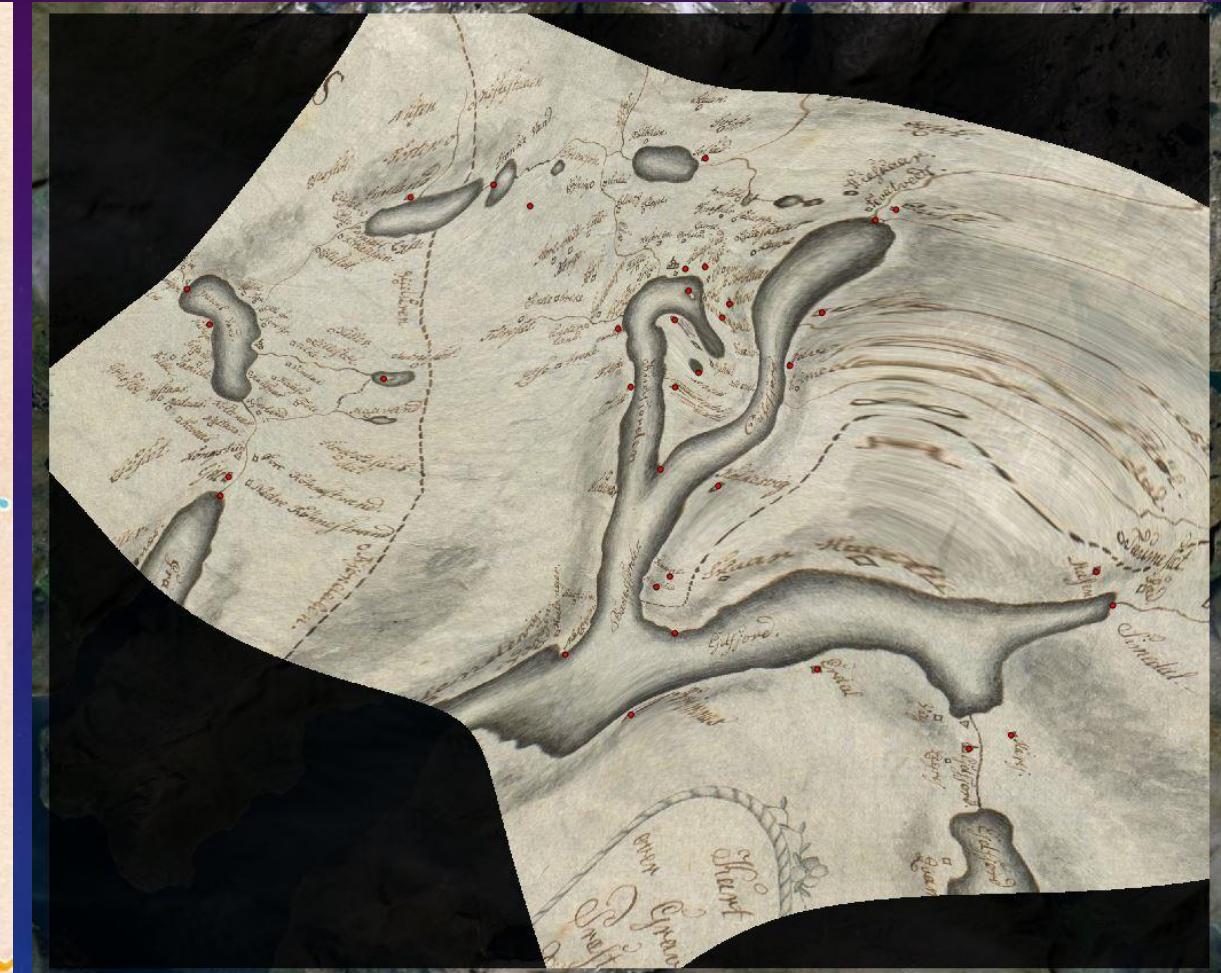
Georeferencing, 2: warping



Georeferencing, 2: warping



Georeferencing, 2: warping



WHAT IS GIS?

Datasets

Vector data:

- Unofficial data: data generated from private or non-governmental sources
 - www.geonames.org
- Official data: National Mapping Agency data
 - Norwegian Mapping Agency (*free place-name data*)
 - www.geonorge.no

WHAT IS GIS?

Important things to remember in GIS

Coordinate system!

- e.g. WGS84 vs. EUREF89
- Latitude/longitude vs. xy-coordinates
- Degrees (dd°mm'ss") vs. decimals
 - Tools for degrees > decimal: <http://www.gridreferencefinder.com/batchConvert/batchConvert.php>
 - http://www.chelonia.co.uk/lat_long_converter.htm

Datatypes

- Raster data:
- Vector data: Points
 - Polylines
 - Polygons

WHAT IS GIS?

GIS formats:

Raster formats

GeoPackage

GeoTiff

Vector formats

Shape-file (.shp)

Tab-file (.tab)

GeoJson (.geojson)

CSV (.csv)

Plain Text (.txt, .tsv)

GeoPackage

AutoCAD DXF

PostGIS

SpatiaLite

Oracle Spatial

MSSQL Spatial databases

DB2

etc., etc.

WHAT IS GIS?

What have we learned?

- GIS is a system of computer hardware, computer software and geographical data.
- A GIS Application allows you to view geographical data and is an important part of the GIS.
- Vector and raster data are geographical data used in a GIS application.
- Geographical data can have associated non-geographical data.
- Precision is important – but is tied in with scale and digitisation method.

OPEN GIS RESSOURCES

PART II

OPEN GIS RESSOURCES



QGIS



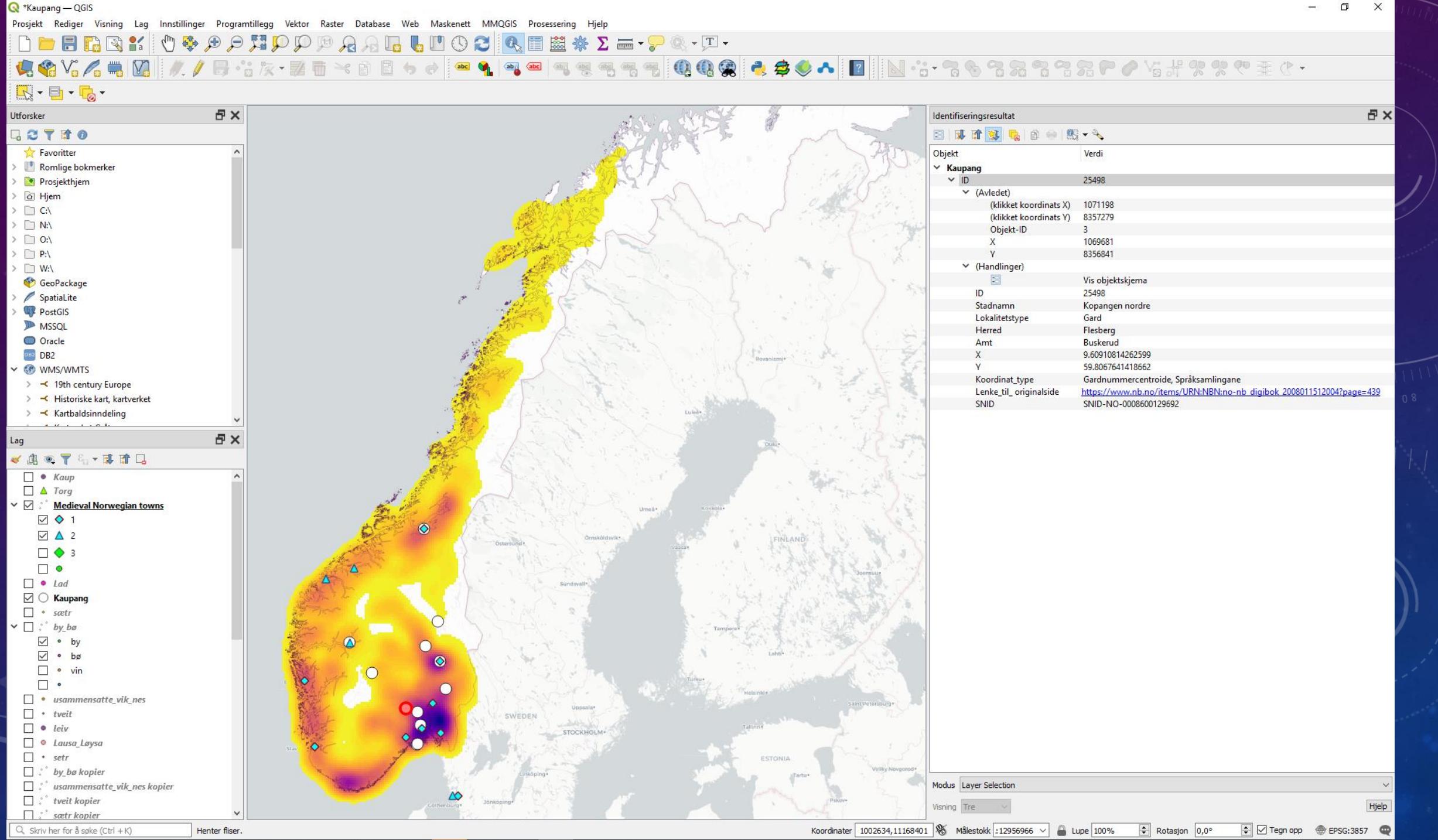
BLUE MARBLE
GEOGRAPHICS
MIND THE GAP BETWEEN WORLD AND MAP

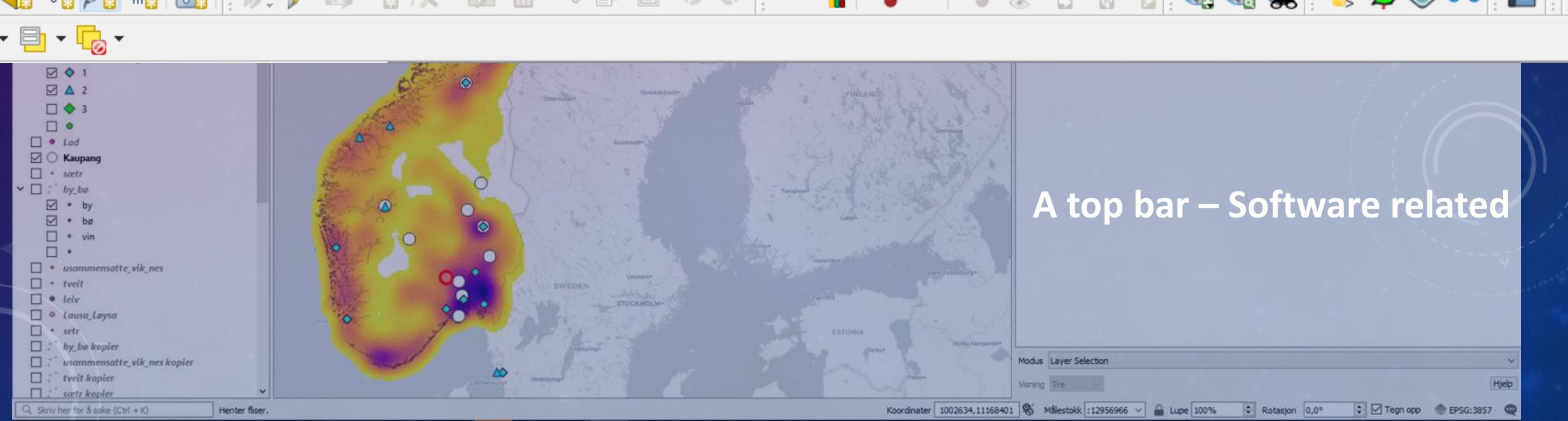
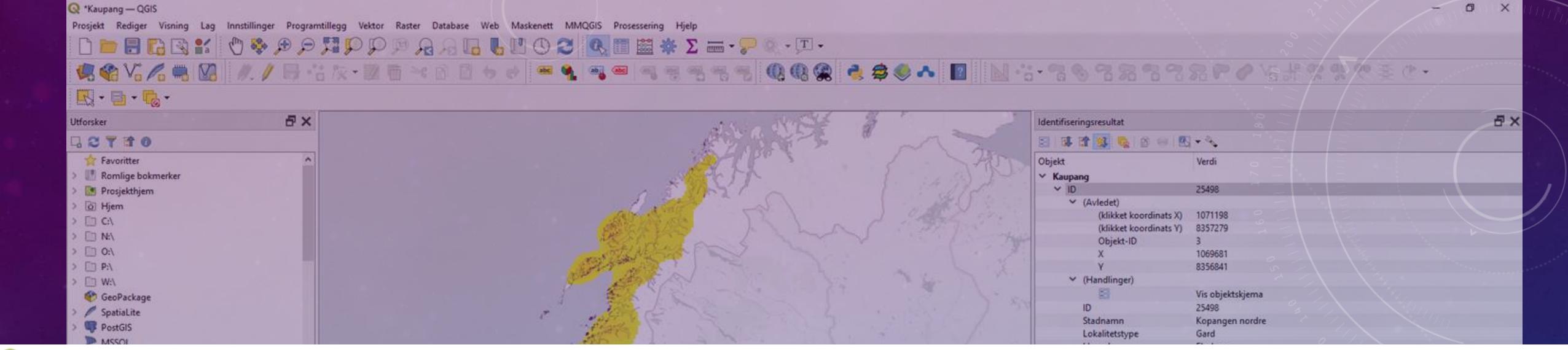


ArcGIS

OPEN GIS RESSOURCES

Name	Desktop application	Web application	Payment model
ArcGIS	X	X	Yearly licence, Uni licences
GIS Cloud		X	Yearly licence, add-ons
Global Mapper	X		Version licence fee
MangoMap		X	Yearly licence, limited free use
MapInfo	X		Yearly licence
QGIS	X		Free, donations possible





Kaupang — QGIS

Projekt Rediger Visning Lag Innstillingar Programtillegg Vektor

Utforser

Favoritter

- Romlige bokmerker
- Prosjekthjem
- Hjem
- C:\
- N:\
- O:\
- P:\
- W:\
- GeoPackage
- SpatiaLite
- PostGIS
- MSSQL
- Oracle
- DB2
- WMS/WMTS
- 19th century Europe
- Historiske kart, kartverket
- Kartbaldsinndeling

Lag

Kaup Torg Medieval Norwegian towns

Medieval Norwegian towns

- 1
- 2
- 3
- Lad
- Kaupang
- saetr
- by_be
- by
- ba
- vin
- usammensatte_vik_nes
- tveit
- leiv
- Lausa_Laysa
- setr
- by_be_kopier
- usammensatte_vik_nes_kopier
- tveit_kopier
- saetr_kopier

Identifiseringsresultat

Objekt	Verdi
✓ Kaupang	
ID	25498
(Avledet)	
(klikket koordinats X)	1071198
(klikket koordinats Y)	8357279
Objekt-ID	3
X	1069681
Y	8356841
(Handlinger)	
Vis objektskjema	
ID	25498
Stadnamn	Kopangen nordre
Lokalitetstype	Gard
Hered	Flesberg
Amt	Buskerud
X	9.60910814262599
Y	59.8067641418662
Koordinat_type	Gardnummertreide, Språksamlingane
Lenke_til_originalside	https://www.nb.no/items/URN:NBN:no-nb_digibok_2008011512004?page=439
SNID	SNID-NO-0008600129692

A left bar – Controlling view

Kaupang — QGIS

Prosjekt Rediger Visning Lag Innstillingar Programtillegg Vektor Raster Database Web Mackenett MMOGIS Processing Hjelpe

Utforsker

Oracle
DB2

WMS/WMTS

- 19th century Europe
- Historiske kart, kartverket
- Kartbaldsinndeling
- Kartverket Gråtöne
- mat
- Matrikkel
- Matrikkelen bygningspunkt
- N5
- N5 raster
- Norgeskart standard
- Sjøkart
- SSR Historisk
- SSR Stedsnavn

Vector Tiles

XYZ Tiles

- Carto Positron
- Carto Voyager
- ESRI Imagery
- ESRI Shaded Relief
- ESRI streets
- ESRI topo
- Google Imagery
- Google Roadmap

Lag

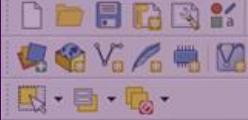
Kaup Torg Medieval Norwegian towns

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Koordinater 1002634,11168401 Målestokk 12956966 Lupe 100% Rotasjon 0,0° Tegn opp EPSG:3857



Utfordrer

- Favoritter
- Romlige bokmerker
- Prosjekthjem
- Hjem
- CA
- NA
- OA
- PA
- WA
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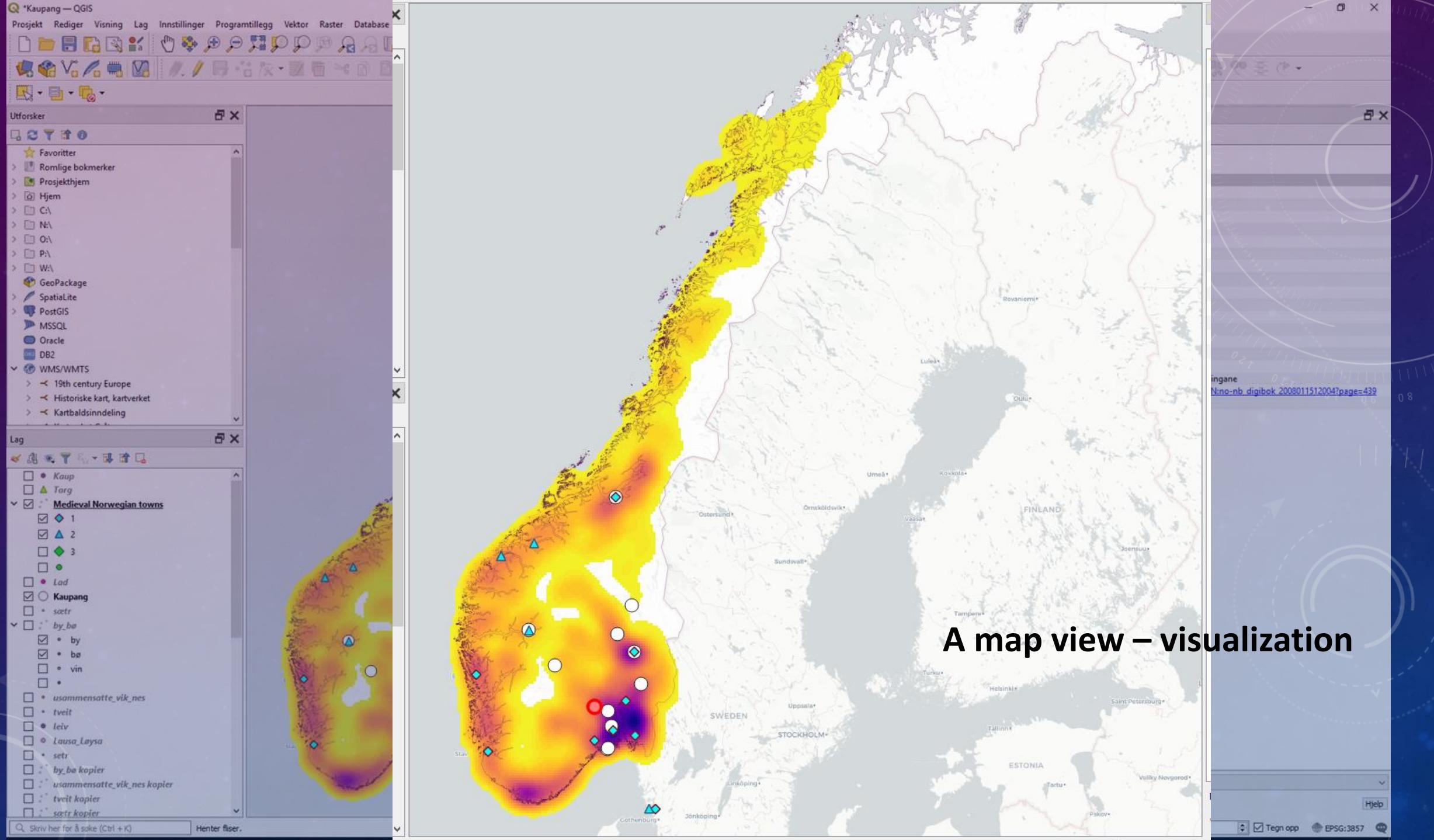
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A right bar – dataset view



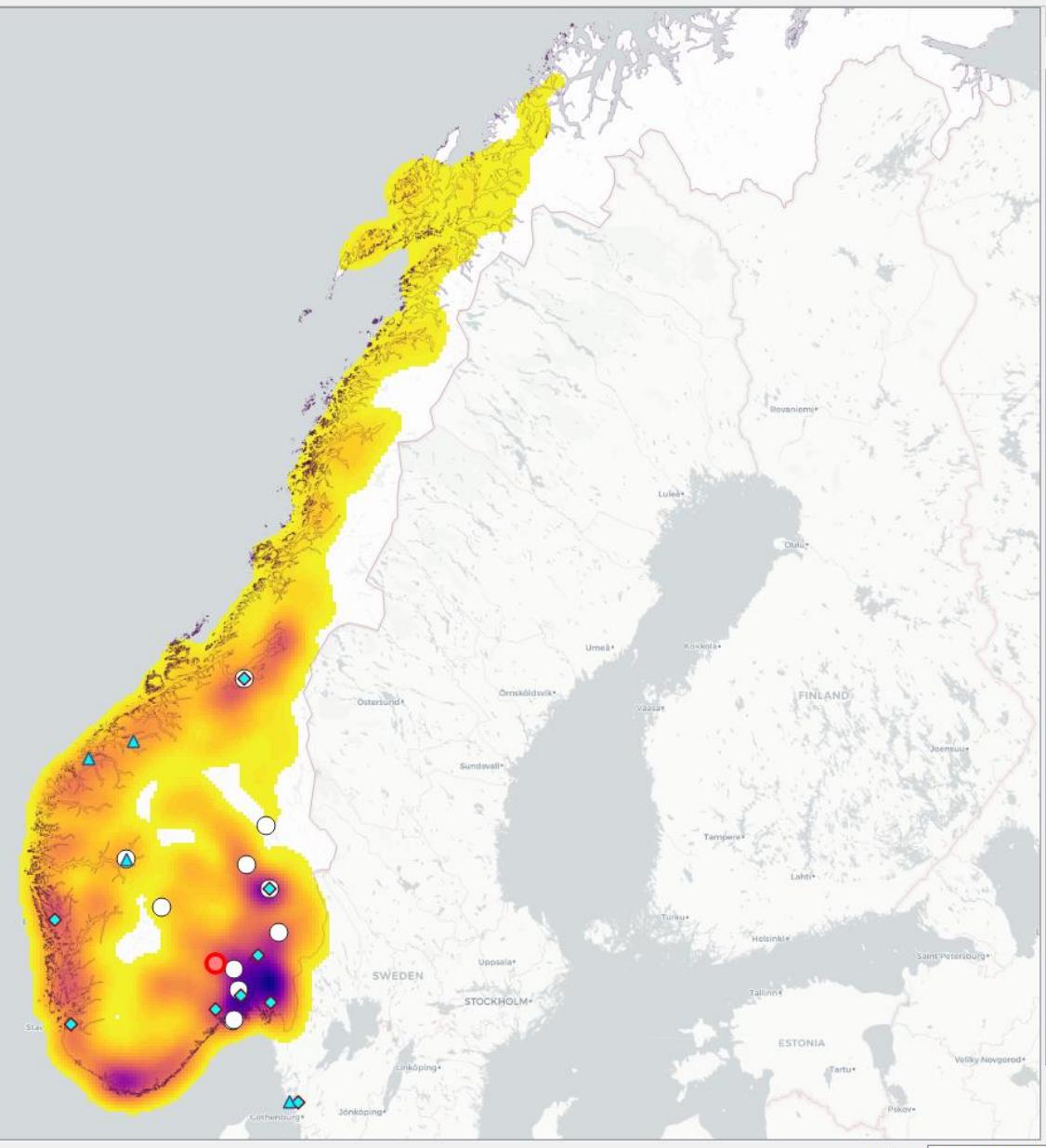


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OPEN GIS RESSOURCES

What have we learned?

- A GIS Application normally consists of a number of bars:
 - Top bar – software related (upload, workspace, plugins, calculations, etc.)
 - Left bar – to define and modify what you can see in the map view
 - Right bar – to show selected data
 - map view – map view and ‘work area’

GETTING STARTED – HOW TO USE GIS

PART III

GETTING STARTED – HOW TO USE GIS

- Adding maps
- Working with points
- Working with polygons
- Georeferencing



GETTING STARTED – HOW TO USE GIS

- Let's get started!
- Open your GIS application
- ([QGIS documentation here](#))

