Norway
grants

Augsnes kartes sastādīšana izmantojot ĢIS

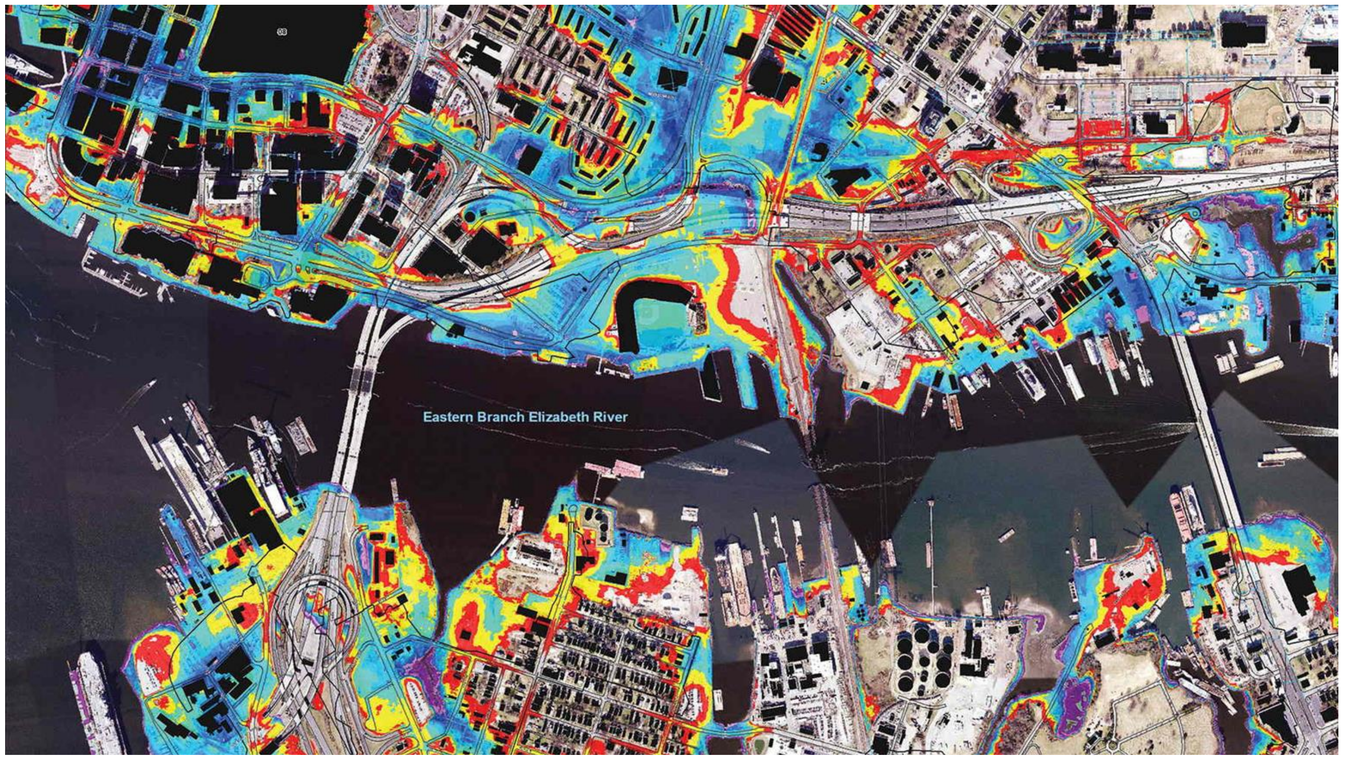
Kristīne Afanasjeva
pētnieks

Ģeogrāfijas un Zemes zinātņu fakultāte
Latvijas Universitāte

14.07.2022

Kas ir ĢIS?

Ģeogrāfiskās Informācijas Sistēmas (ĢIS) ir tehnoloģiju kopums, kas izveidots ģeogrāfisku datu uzglabāšanai, atjaunošanai, analīzei un attēlošanai.



ĢIS pielietojums

- Kartēšana/ vizualizācija *(mapping)*
- Ģeogrāfisko datu apstrāde *(geoprocessing)*
- Telpiskā statistika *(geostatistics)*
- Telpiskā analīze *(spatial analysis)*
- Tālizpētes datu apstrāde *(remote sensing)*
- Simulācijas *(simulations)*
- Modelēšana *(modelling)*
- Datu servisi tīklos

ĢIS sastāv no:

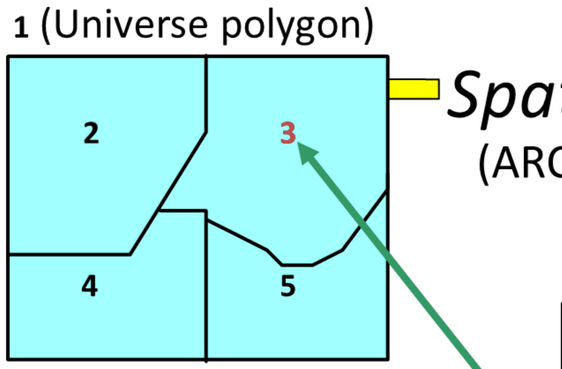
Datortehnika

- Dators
- Printeris
- Skeneris
- GPS

Programmatūra

- **Desktop GIS** (**QGIS**, SAGA GIS, GRASS GIS, ILWIS, IDRISI, Esri products: **ArcGIS**, **ArcMap**, ArcGlobe, GeoMedia, MapInfo, Bentley Systems: MicroStation, ENVI, ERDAS IMAGINE)
- **GIS as a service** (**ArcGIS Online**, Mapbox, **OpenStreetMap**, **Google Maps**, Apple Maps, Here Maps, Bing Maps)
- **Spatial database management systems** (MySQL, Oracle Spatial, Microsoft SQL Server, PostgreSQL)
- **Map servers** (Geoserver, MapServer, Mapnik)

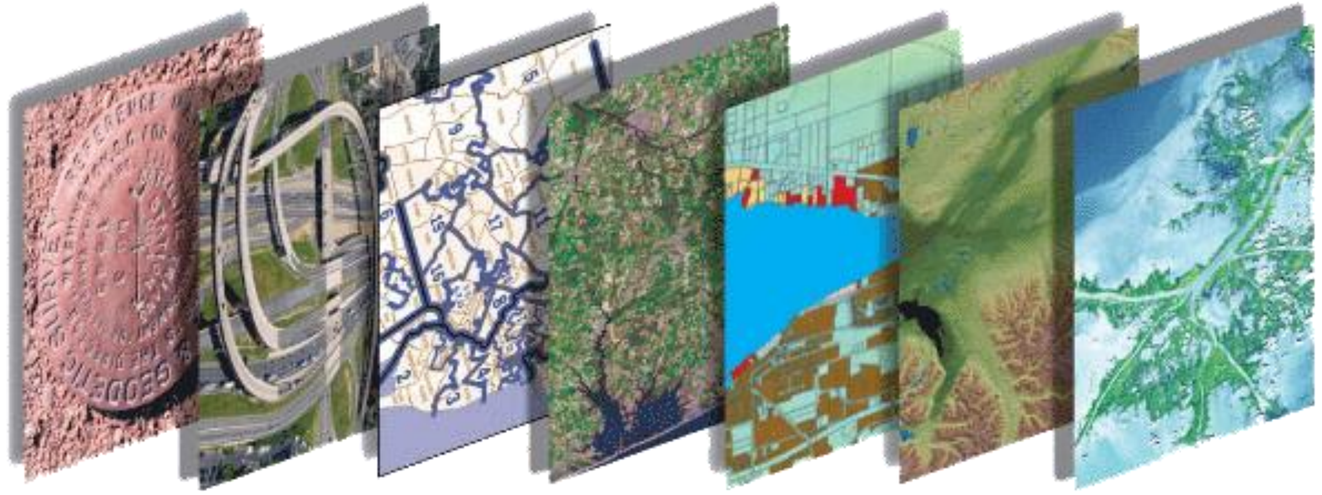
Dati



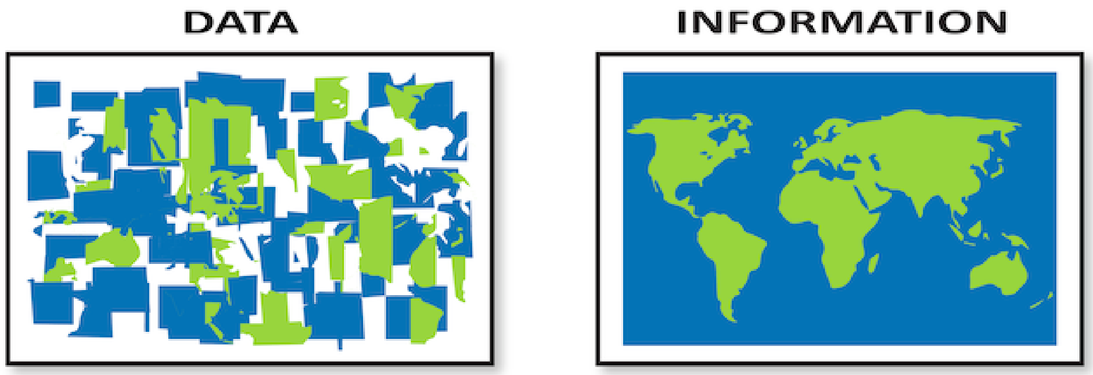
Spatial data
(ARC functions)

Attribute data
(INFO or TABLES functions)

COV#	ZONE	ZIP
1		0
2	C-19	22060
3	A-4	22061
4	C-22	22060
5	A-5	22057



Dati vs. Informācija



Data

- 100

Information

- 100 miles

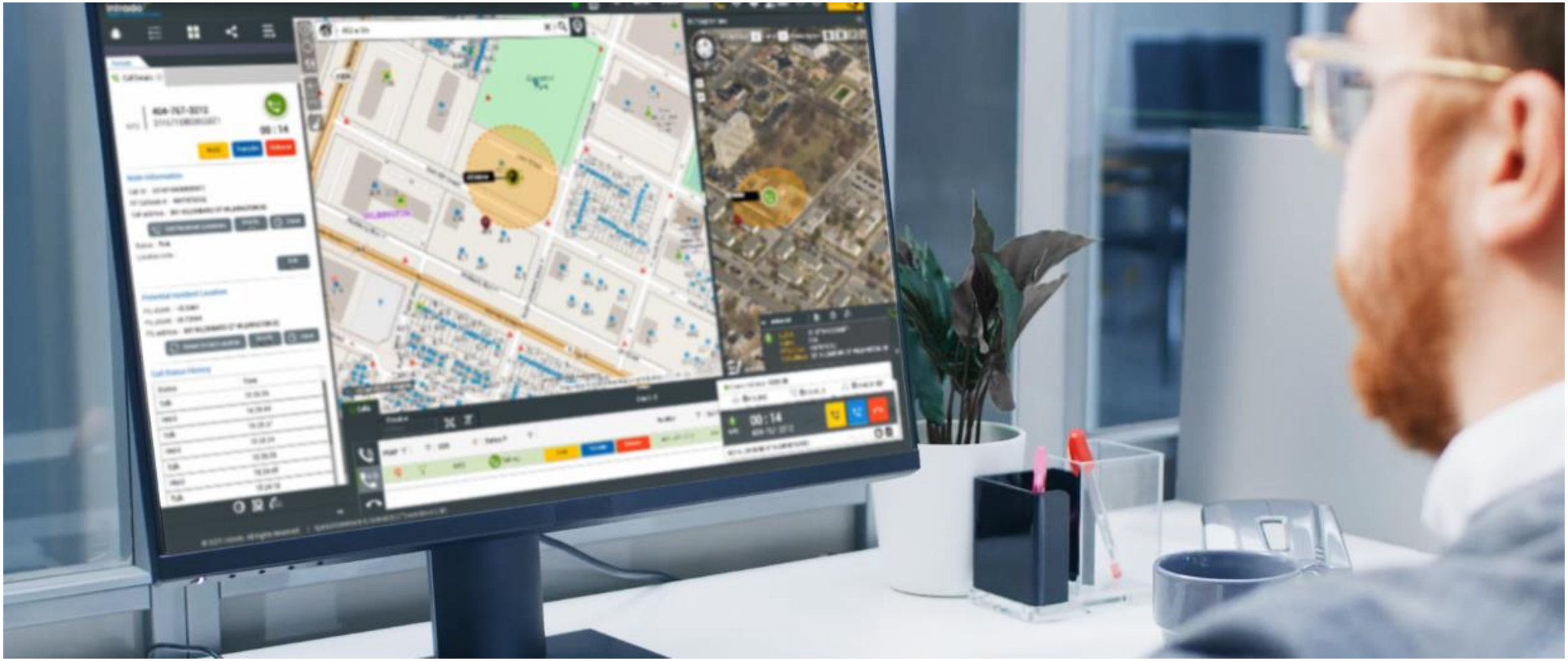
Knowledge

- 100 miles is quite a far distance.

Wisdom

- It is very difficult to walk 100 miles by any person, but vehicle transport is okay

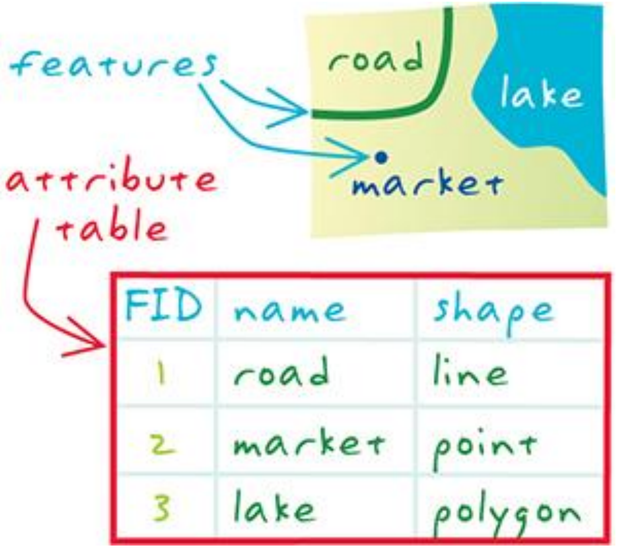
Cilvēki



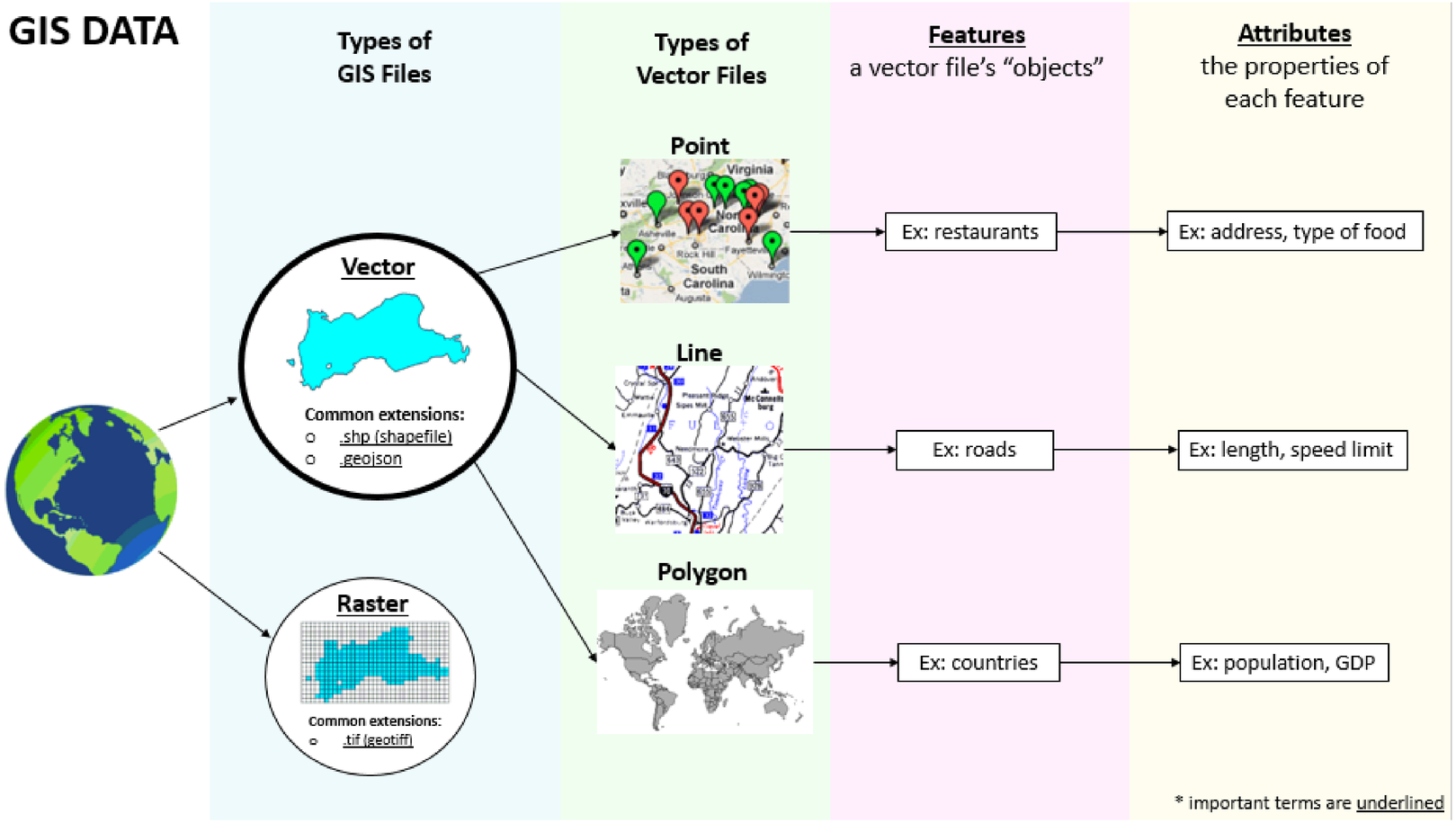
Telpiskie dati un atribūtu dati

Telpiskie dati ir visi dati, kas tieši vai netieši attiecas uz konkrētu atrašanās vietu vai ģeogrāfisko apgabalu. Telpiskie dati apraksta formu, atrašanās vietu, telpiskās attiecības un ar Zemes virsmu saistīto pazīmju atribūtus.

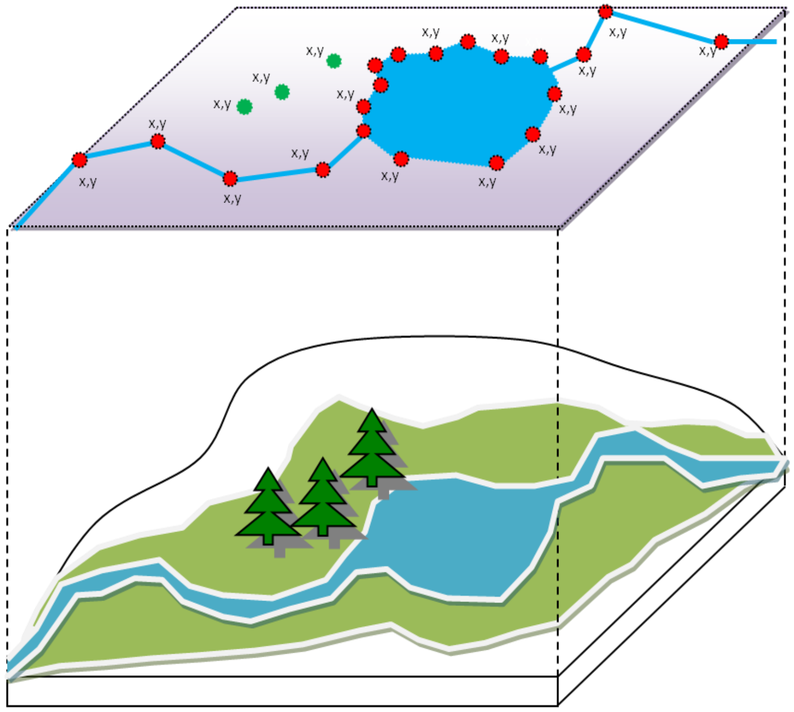
Atribūts ir informācija par objektu, kas parasti tiek glabāta tabulā un saistīta ar objektu ar unikālu identifikatoru (ID), nav telpiska.

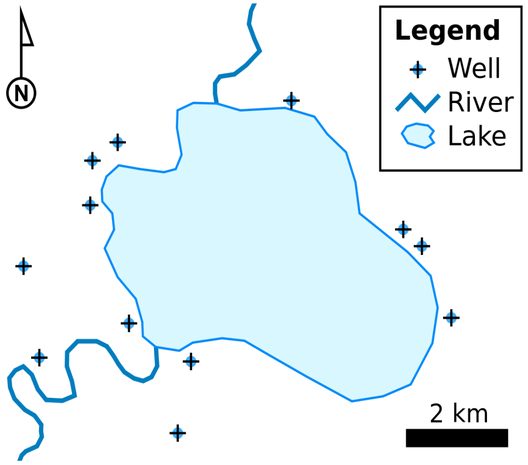


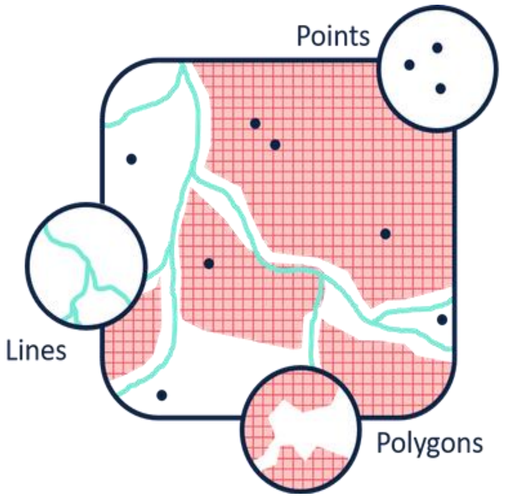
GIS datu tipi

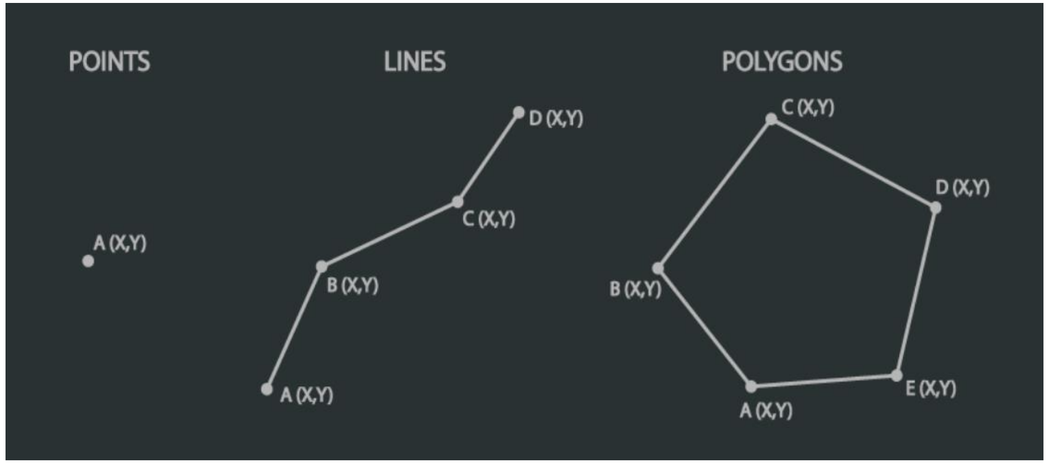


Vektora dati

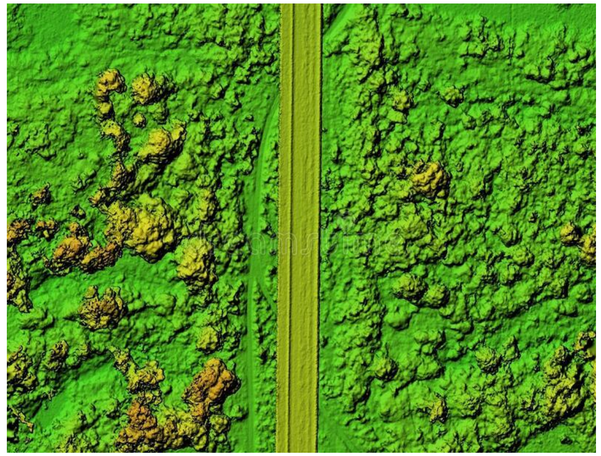


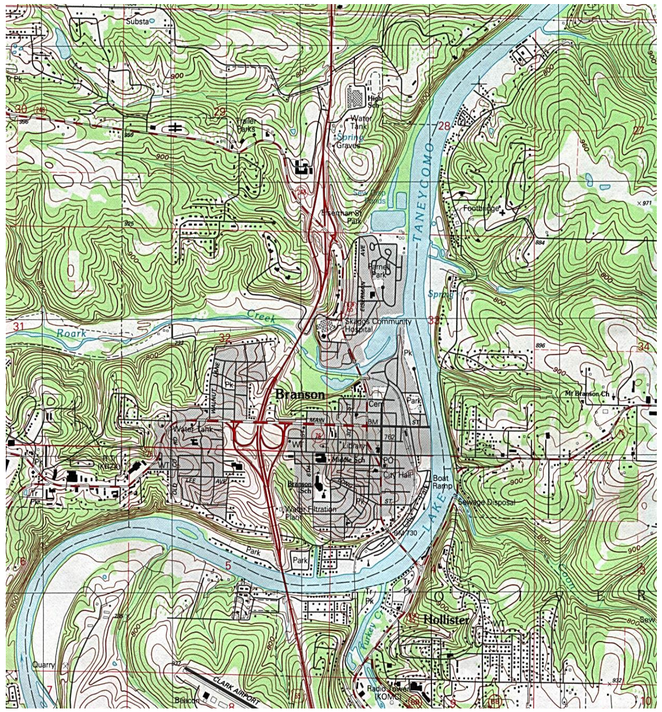


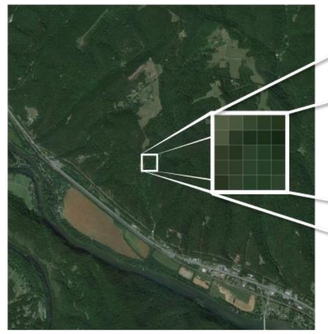


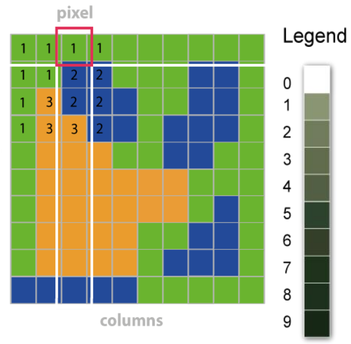


Rastra dati

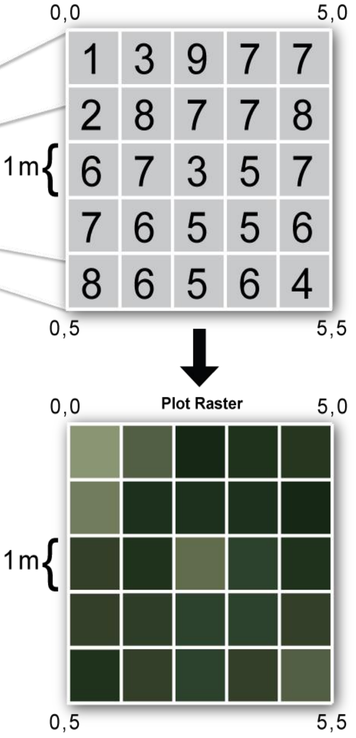


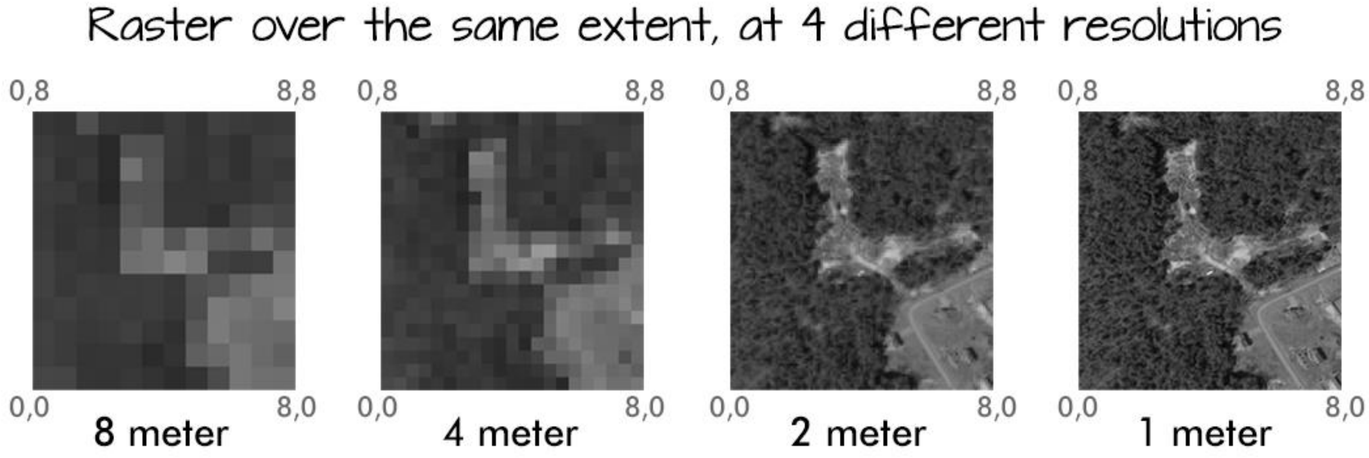

Branson
Hollister
TANEYCOMO
LAKE
Roark Creek
CLARK AIRPORT




pixel
rows
columns

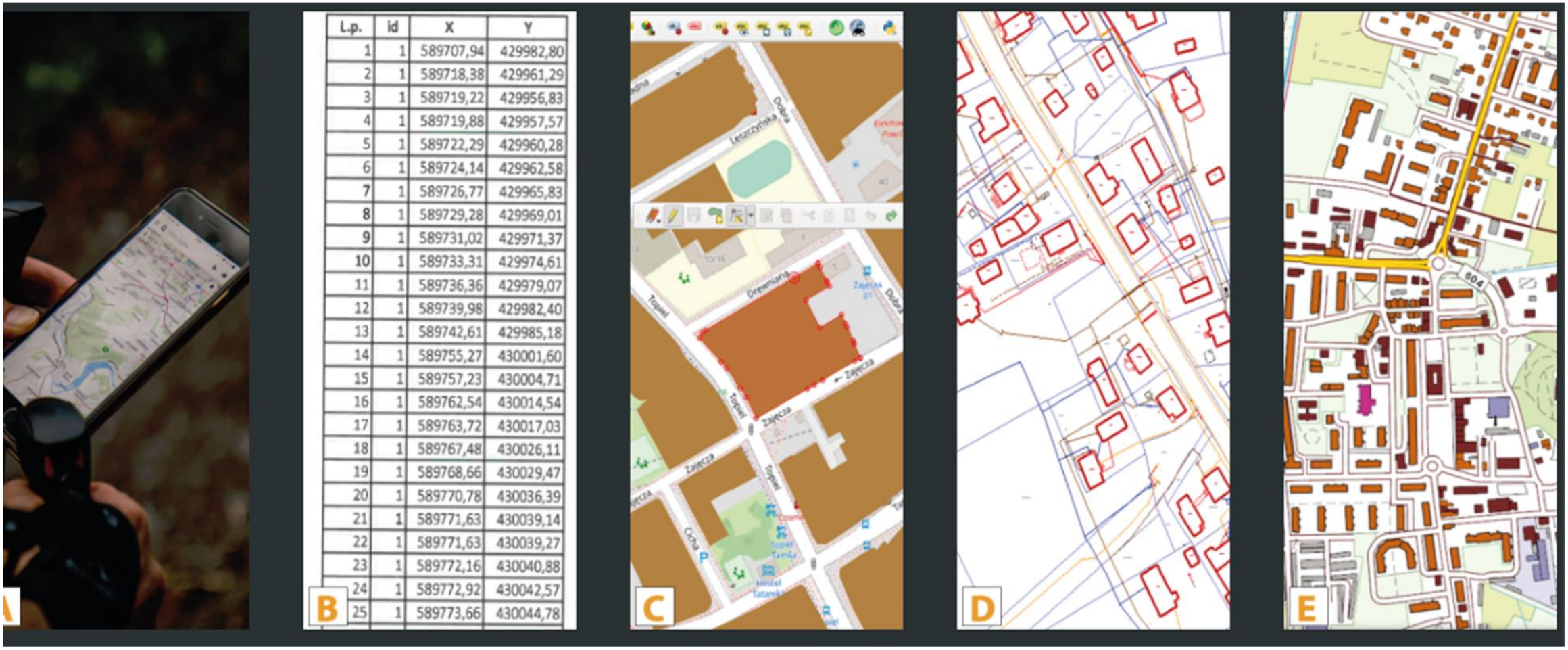
Legend
0
1
2
3
4
5
6
7
8
9


0,0
5,0
1 3 9 7 7
2 8 7 7 8
1m
6 7 3 5 7
7 6 5 5 6
8 6 5 6 4
0,5
5,5
Plot Raster
0,0
5,0
1m
0,5
5,5


Raster over the same extent, at 4 different resolutions
0,8
8,8
0,0
8,0
8 meter
4 meter
2 meter
1 meter

Vektora datu avoti

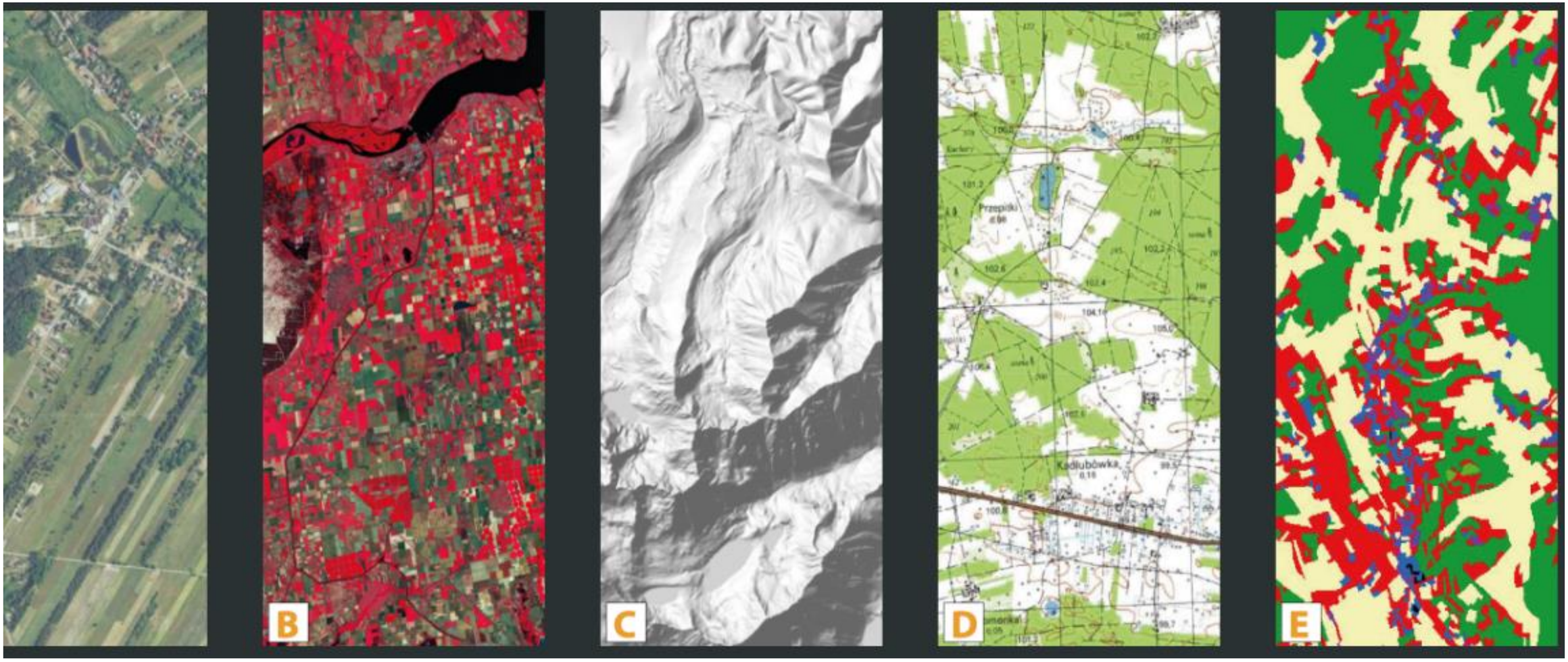
A - GPS measurements
B - list of coordinates
C - digitizing and conversion tools *e.g. raster to vector*
D, E - existing databases



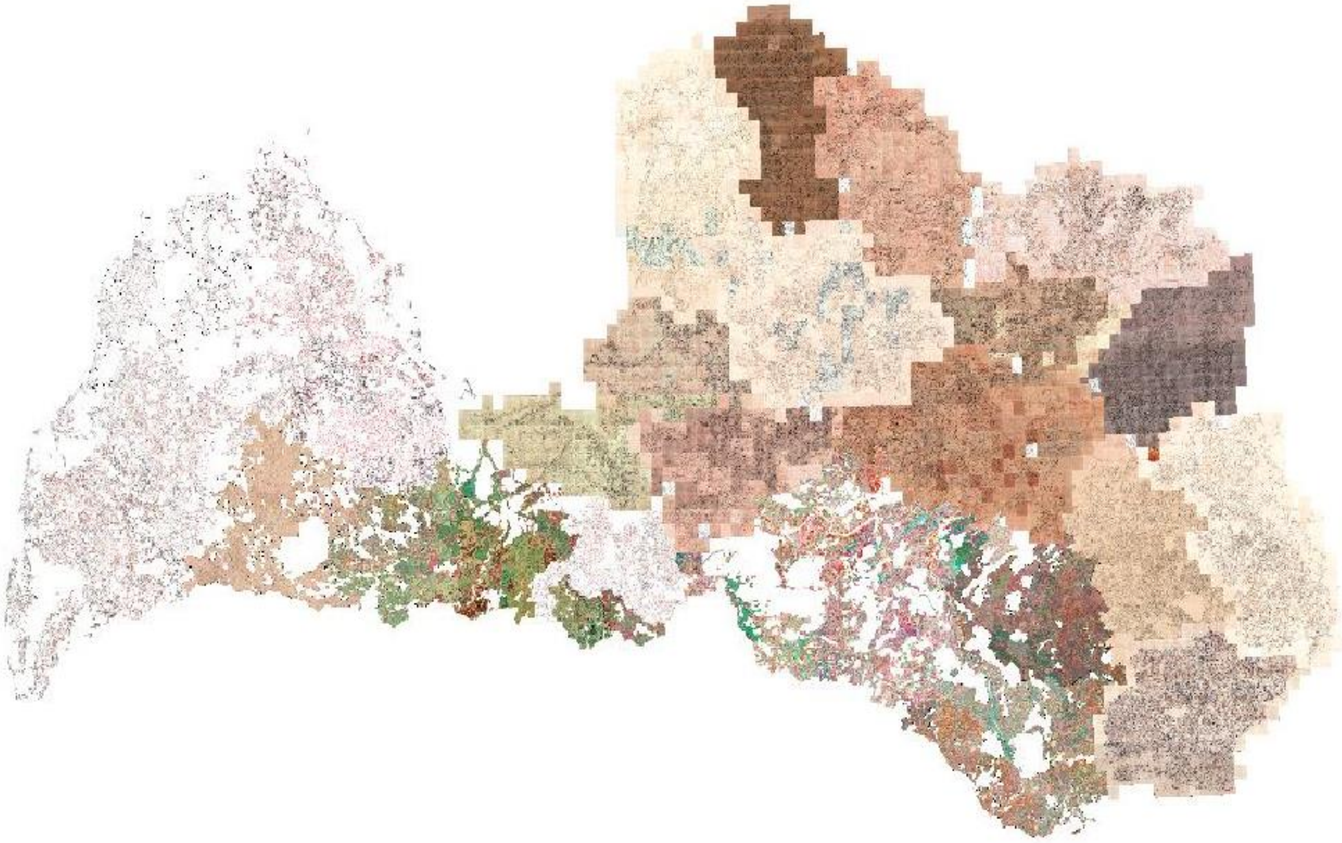
L.p.	id	X	Y
1	1	589707,94	429982,80
2	1	589718,38	429961,29
3	1	589719,22	429956,83
4	1	589719,88	429957,57
5	1	589722,29	429960,28
6	1	589724,14	429962,58
7	1	589726,77	429965,83
8	1	589729,28	429969,01
9	1	589731,02	429971,37
10	1	589733,31	429974,61
11	1	589736,36	429979,07
12	1	589739,98	429982,40
13	1	589742,61	429985,18
14	1	589755,27	430001,60
15	1	589757,23	430004,71
16	1	589762,54	430014,54
17	1	589763,72	430017,03
18	1	589767,48	430026,11
19	1	589768,66	430029,47
20	1	589770,78	430036,39
21	1	589771,63	430039,14
22	1	589771,63	430039,27
23	1	589772,16	430040,88
24	1	589772,92	430042,57
25	1	589773,66	430044,78

Rastra datu avoti

A - orthophoto
B - satellite imagery
C – DEM
D - scanned maps and plans
E - conversion and analysis tools *e.g. vector to raster, interpolation*



Dati par augsnēm



Vektora un rastra failu formāti

ESRI Shapefile - the most common geospatial file type developed by ESRI, consists of:
- shp (feature geometry)
- shx (shape index position)
- dbf (attribute data)
- prj (projection system metadata)
- xml (associated metadata)

GML (Geography Markup Language) - XML based open standard for GIS data exchange

KML/KMZ (Google Keyhole Markup Language) - XML based open standard for GIS data exchange

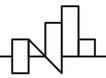
GPX (GPS eXchange Format) - GPS data file

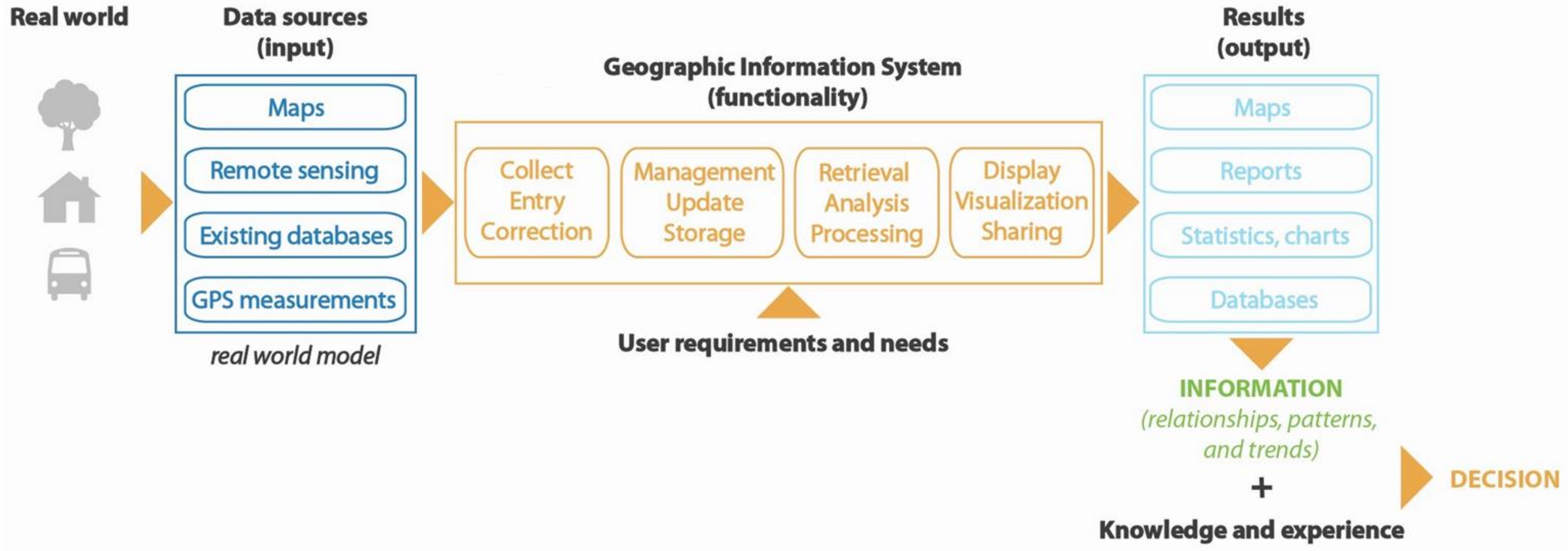
GeoJSON (Geographic JavaScript Object Notation) - a lightweight format based on JSON, used by many open source GIS packages

GeoTIFF - TIFF variant enriched with GIS relevant metadata, may be accompanied by other files:
- tfw (raster geolocation)
- xml (metadata)
- aux (projections and other information)
- ovr (pyramid files improves performance for raster display)

IMG - ERDAS IMAGINE image file format

ESRI Grid - format developed by Esri, which has two varieties: binary or ASCII



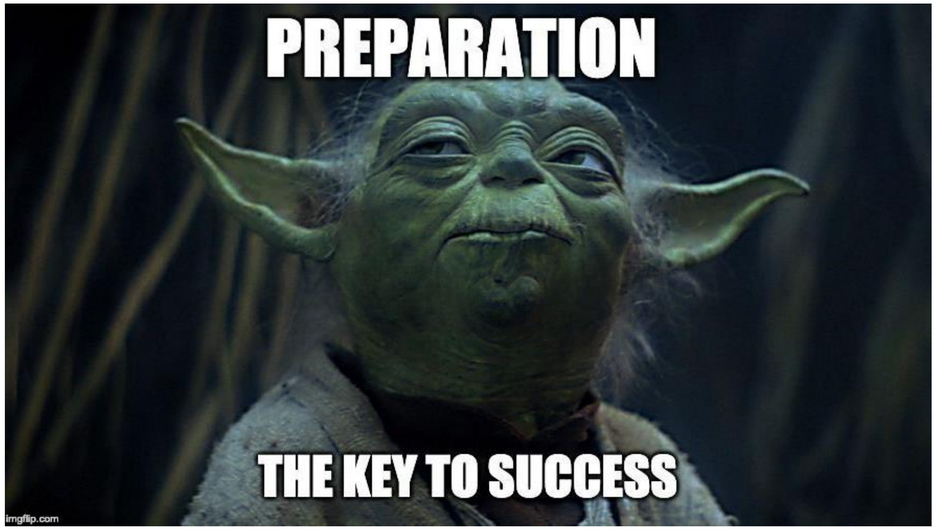

Real world
Data sources (input)
Maps
Remote sensing
Existing databases
GPS measurements
real world model
Geographic Information System (functionality)
Collect Entry Correction
Management Update Storage
Retrieval Analysis Processing
Display Visualization Sharing
User requirements and needs
Results (output)
Maps
Reports
Statistics, charts
Databases
INFORMATION
(relationships, patterns, and trends)
+
Knowledge and experience
DECISION

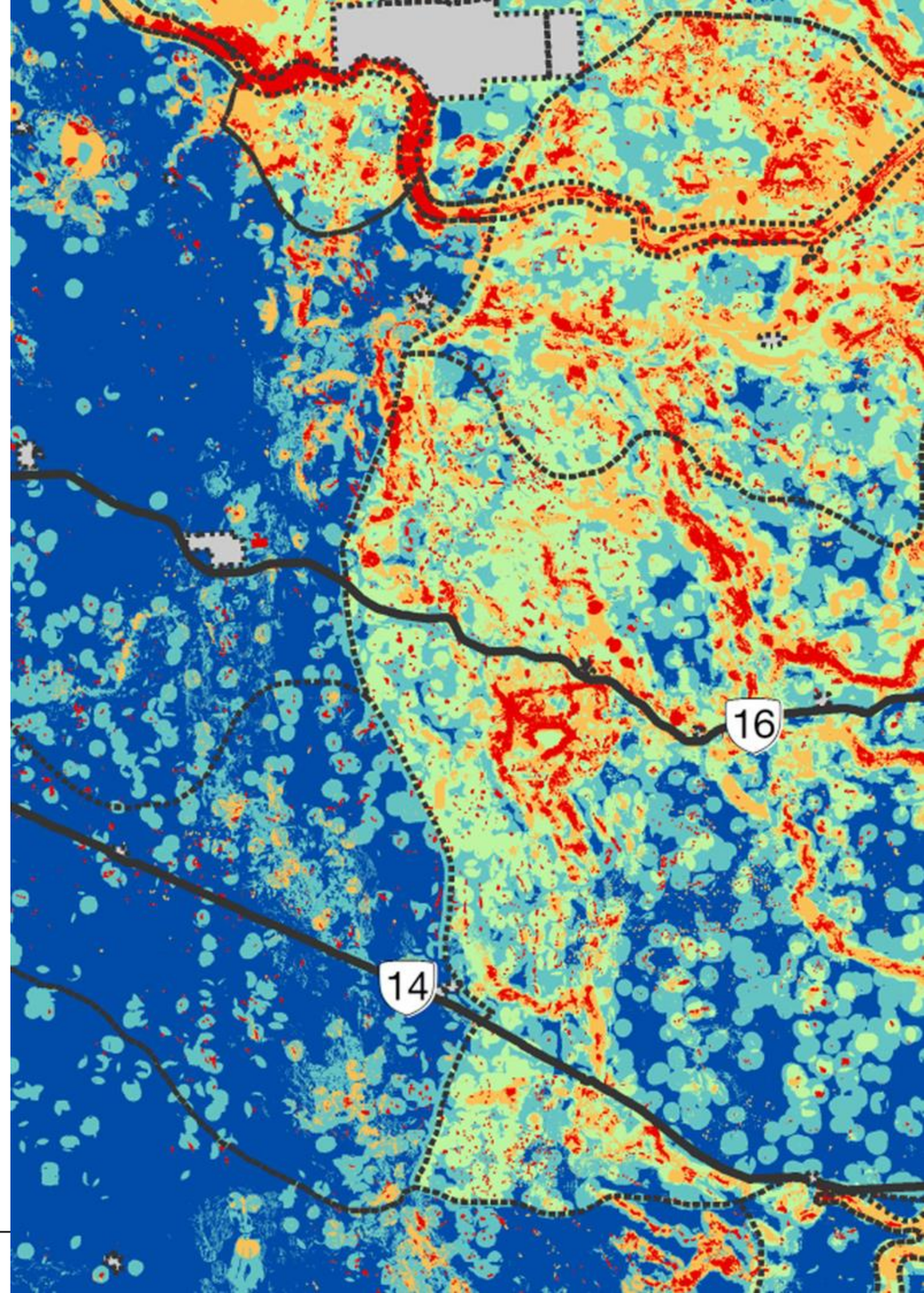
No kartēšanas līdz kartei

- Poligona izvēle un priekšizpēte
- Zondēšana un datu ievākšana
- Kartes melnraksta izveide
- Datu ievade /datubāzes izveidošana
- Digitizēšana / poligonu izveide
- Gatavās kartes noformēšana un analīze

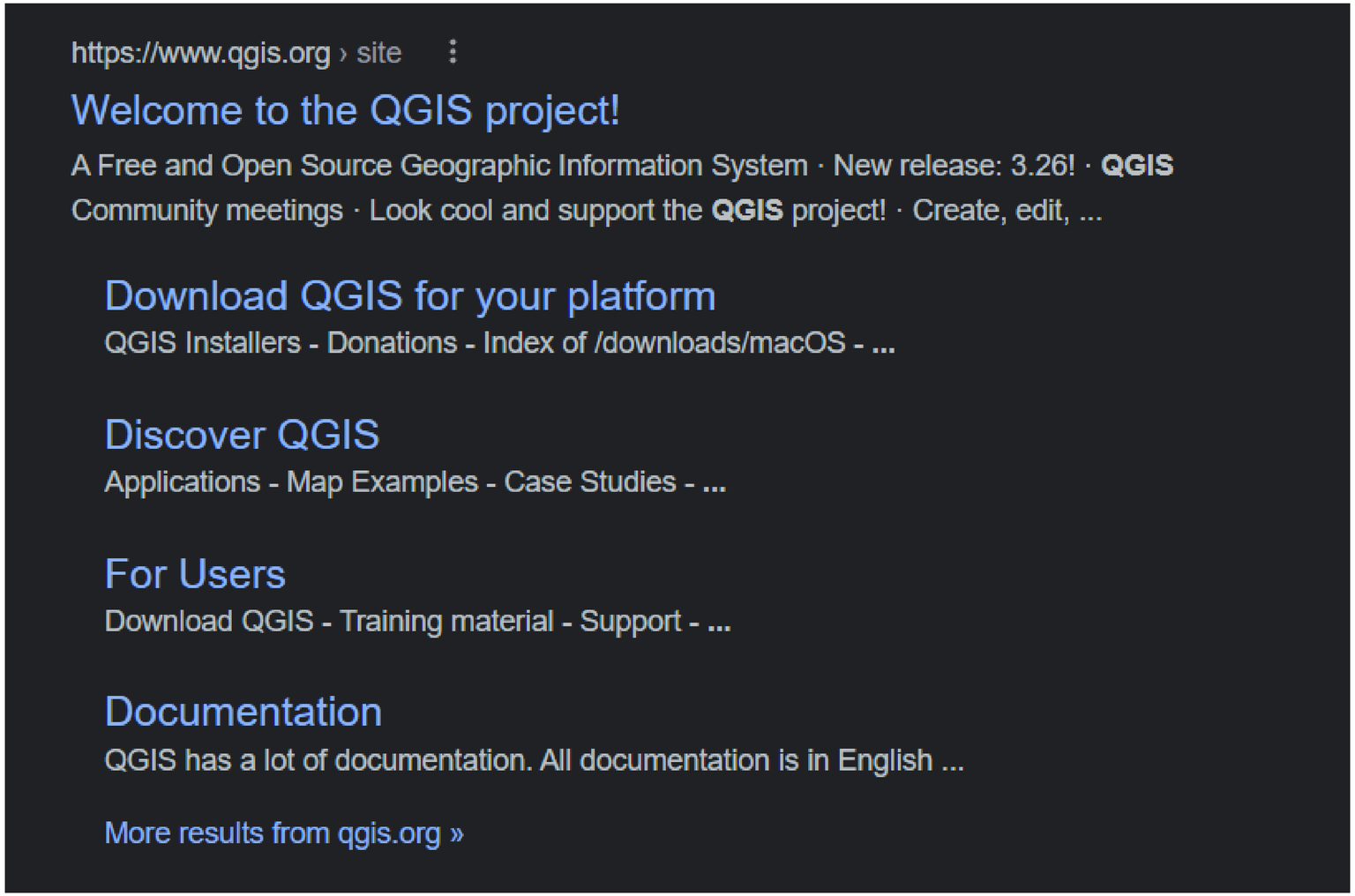
Kas ir nepieciešams kartes sastādīšanai?

- Programmatūra – QGIS
- WMS vai WCS slānis
- Pareizā koordinātu sistēma
- Datubāze
- Apveidfails (.shp)



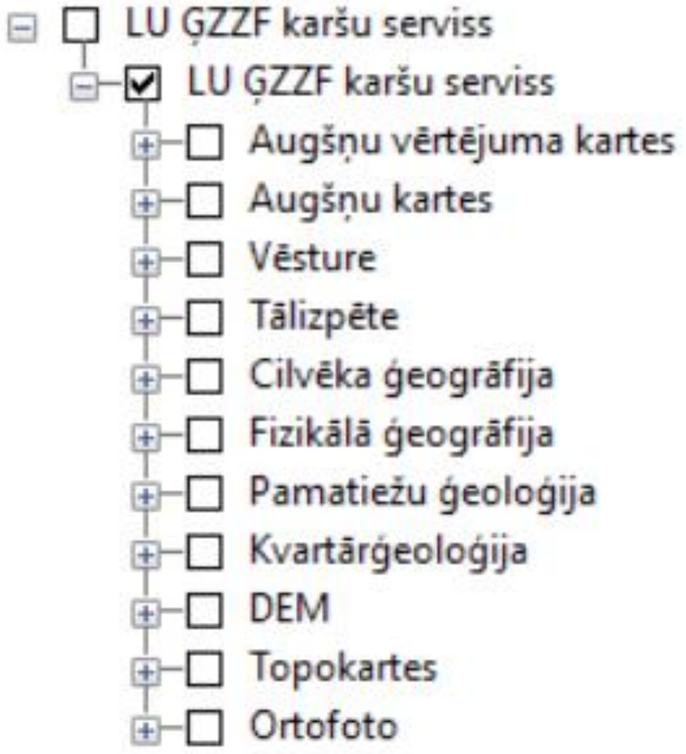


Lejupielādēt QGIS



Kas ir WMS?

Web Map Service (WMS) ir standarta protokols, kas kalpo ģeogrāfisko karšu attēlu pārraidei internetā, ko ģenerē karšu serveris, izmantojot datus no ĢIS datu bāzes.



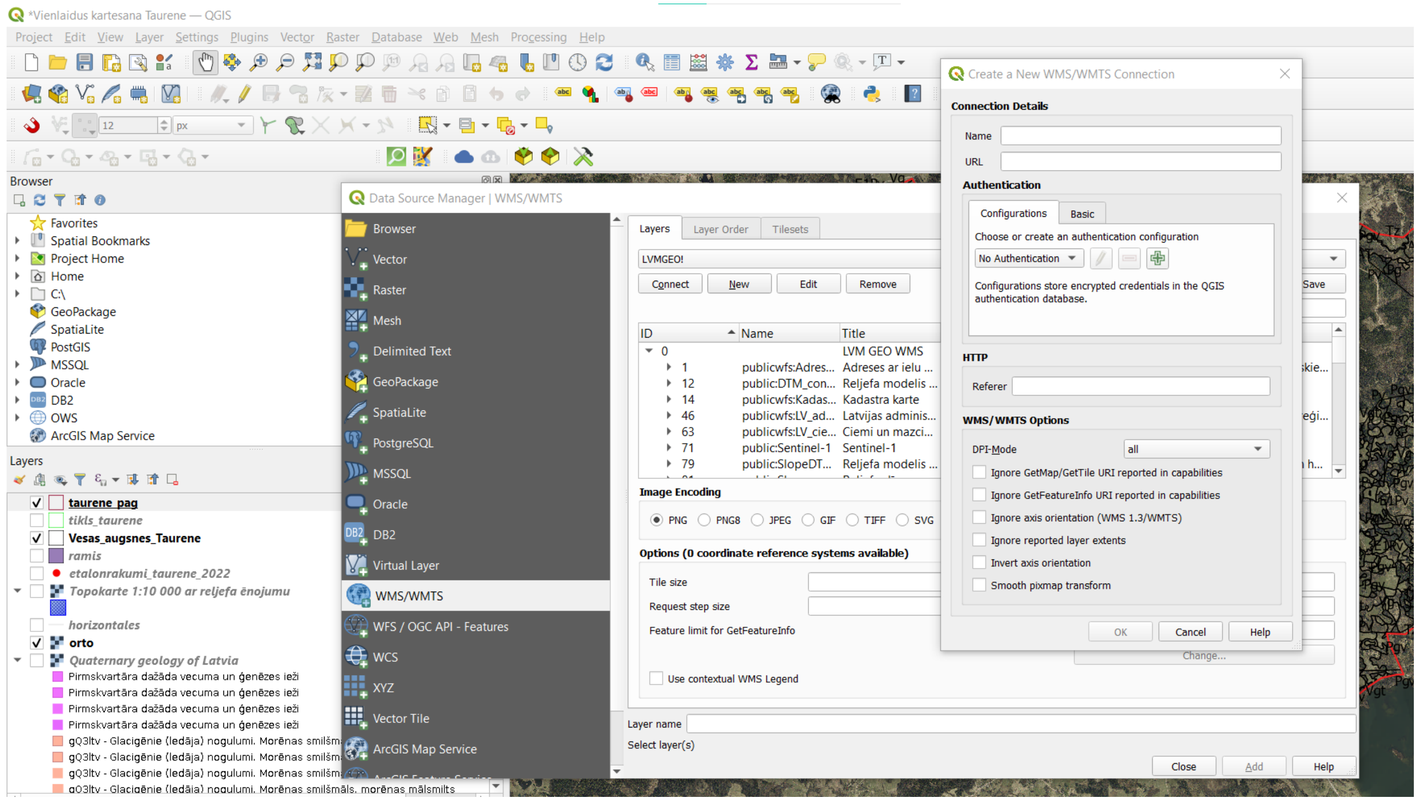
ID	Name	Title	Abstract
0		LVM GEO WMS	LVM GEO GeoServer Web Map Service
1	publicwfs:Adres...	Adreses ar ielu ...	Adrešu punkti ar ielu un autoceļu tīklu, adrešu reģistra atvērtie telpiskie...
12	public:DTM_con...	Reljefa modelis ...	Digitāls reljefa modelis ar horizontālēm
14	publicwfs:Kadas...	Kadastra karte	Kadastra informācijas sistēmas atvērtie telpiskie dati
46	publicwfs:LV_ad...	Latvijas adminis...	Latvijas administratīvais iedalījums ar ciemu nosaukumiem, adrešu reģi...
63	publicwfs:LV_cie...	Ciemi un mazci...	Latvijas ciemi, adrešu reģistra atvērtie telpiskie dati
71	public:Sentinel-1	Sentinel-1	Jaunākā Sentinel-1 datu mozaīkas vizualizācija un metadati
79	public:SlopeDT...	Reljefa modelis ...	Zemes reljefa slīpuma modelis ar reljefa ēnojumu, reljefa modeli un h...

LVMGEO WMS

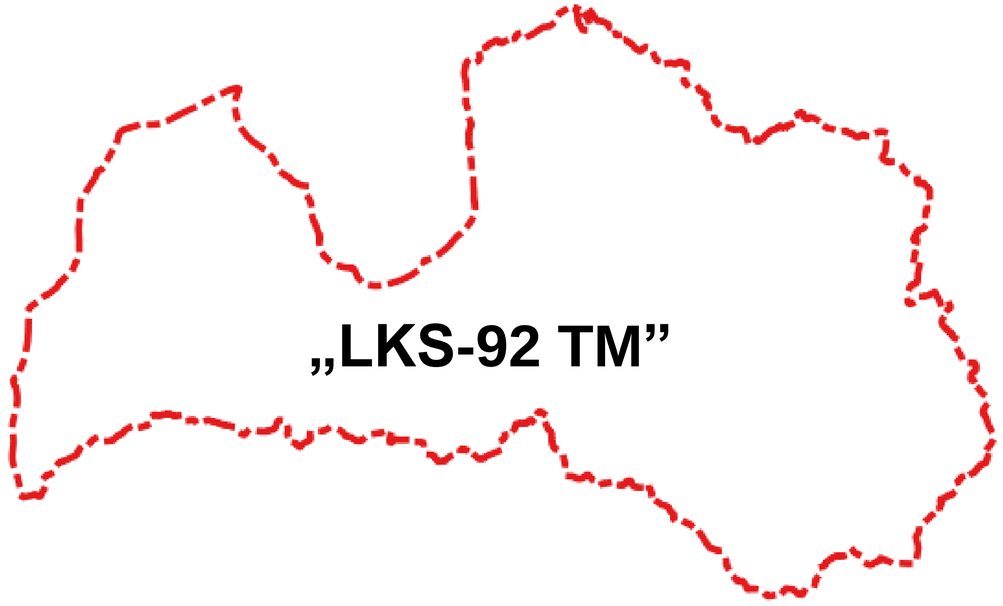
AS "Latvijas valsts meži" ikvienam interesentam piedāvā ortofoto WMS servisu, kas klāj visu Latvijas teritoriju.

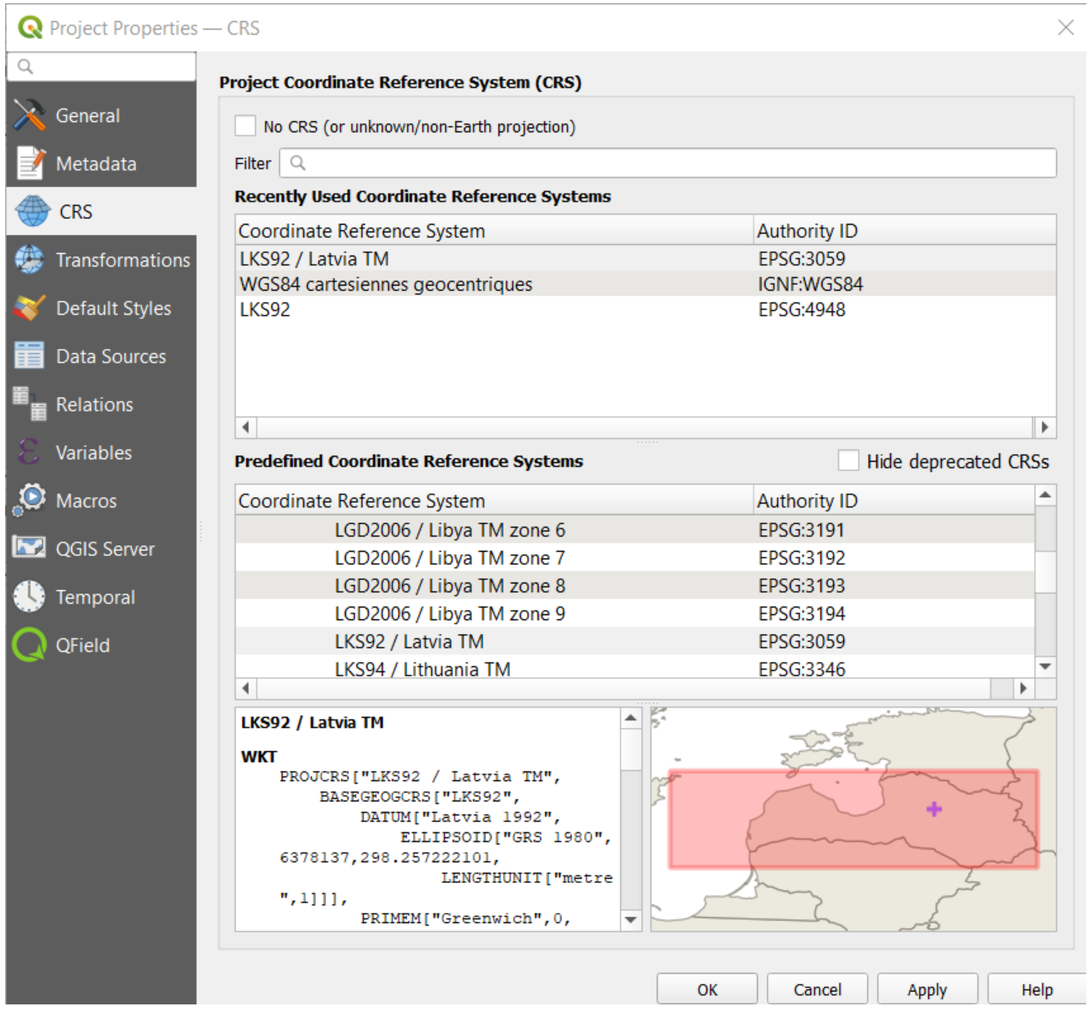
Pieejams:
https://www.lvmgeo.lv/dati

Pieslēgšanas saite:
https://lvmgeoserver.lvm.lv/geoserver/ows?service=wms&version=1.3.0&request=GetCapabilities&layer=public:Orto_LKS



Koordinātu sistēmas





	Decimal Degrees	Delimited Degrees Minutes Seconds	Delimited Degrees Minutes Seconds with symbols	Delimited Degrees Minutes Seconds with symbols & suffix	Degrees. Minutes	Degrees. Minutes with symbols	Degrees.MinutesSeconds	Packed DMS with decimal point	Packed DMS
Lat	43.6969	43 41 48.84	43° 41' 48.84"	43° 41' 48.84" N	43.418140	43° 42'	43.414884	434148.84	43414884
Long	79.3922W	-79 23 32.92	-79° 23' 31.92"	-79° 23' 31.92" W	-79.235320	-79° 24'	-79.233192	-0792331.92	-079233192

Datubāze

	A	B	C	D	E	F	G	H	I	J	K	L
1	X	Y	ATips	GrSastGrup	VirsGrSast	ApGrSast	rbonat	Numurs	Ciems	Jauns_ID	Z_virz	E_virz
2	607872.173	333152.206	E1Pv	M2	2	1	50	901	Taurene	17723	57.12897602	25.78202252
3	607650.779	333856.126	Pgv	M1	2	1	50	902	Taurene	17724	57.13534838	25.77867028
4	605696.342	334144.089	E1Pv	sM3	4	4	70	907	Taurene	17725	57.13838763	25.74651692
5	606032.466	334752.836	Vg	mS	5	3	65	908	Taurene	17726	57.14377619	25.75232642
6	604361.394	336707.278	E2Pv	sM2	3	3	121	912	Taurene	17727	57.16170809	25.72554116
7	602993.811	335244.957	Pv	sM3	5	2	0	910	Taurene	17728	57.14888626	25.70233717
8	603398.738	335515.418	E2Pv	mS	5	1	0	909	Taurene	17729	57.15122384	25.70913864
9	602552.211	335564.315	Tz	T	9	9	0	20	Taurene	17730	57.15185267	25.69517298
10	601717.909	336467.378	E1Pv	sM2	4	2	85	21	Taurene	17731	57.16014713	25.68175692
11	601170.876	335989.106	E1Pv	M2	3	3	0	22	Taurene	17732	57.15597337	25.67252302
12	600162.716	335498.817	Pv	sS	6	4	0	40	Taurene	17733	57.15179179	25.65566768
13	599650.021	336319.992	Pgv	M2	3	2	0	343	Taurene	17734	57.15927707	25.64752479
14	599790.206	336770.305	Pgv	sM3	5	4	0	11	Taurene	17735	57.16329023	25.65002150
15	601260.207	337384.475	Pv	sM3	5	4	0	43	Taurene	17736	57.16848328	25.67456544
16	600455.025	337827.836	E1Pv	mS	5	4	0	42	Taurene	17737	57.17264133	25.66143496
17	605854.332	333587.697	E1Pv	sM2	4	3	60	905	Taurene	17738	57.13335536	25.74889049
18	604860.015	333350.862	Tz	T	9	2	0	906	Taurene	17739	57.13145667	25.73237194
19	604047.728	333597.484	VGt	M1	2	1	0	348	Taurene	17740	57.13385572	25.71906186
20	603787.405	333834.319	Tz	T	9	3	120	2	Taurene	17741	57.13604118	25.71486138
21	605678.031	331319.080	E1Pv	sM2	4	3	0	347	Taurene	17742	57.11302570	25.74502072
22	605996.043	332190.346	Pgv	M1	2	1	70	903	Taurene	17743	57.12077574	25.75063822
23	606244.353	332693.502	E1Pv	sM3	4'	4	126	904	Taurene	17744	57.12523633	25.75495088
24	602192.195	334805.623	E1Pv	sM2	3	4	180	911	Taurene	17745	57.14512033	25.68891443
25	600677.193	334454.909	Pgv	mS	5	4	0	9	Taurene	17746	57.14230556	25.66374696

Table

1Taurene_Dzilrakumi_vecie_K.csv Events

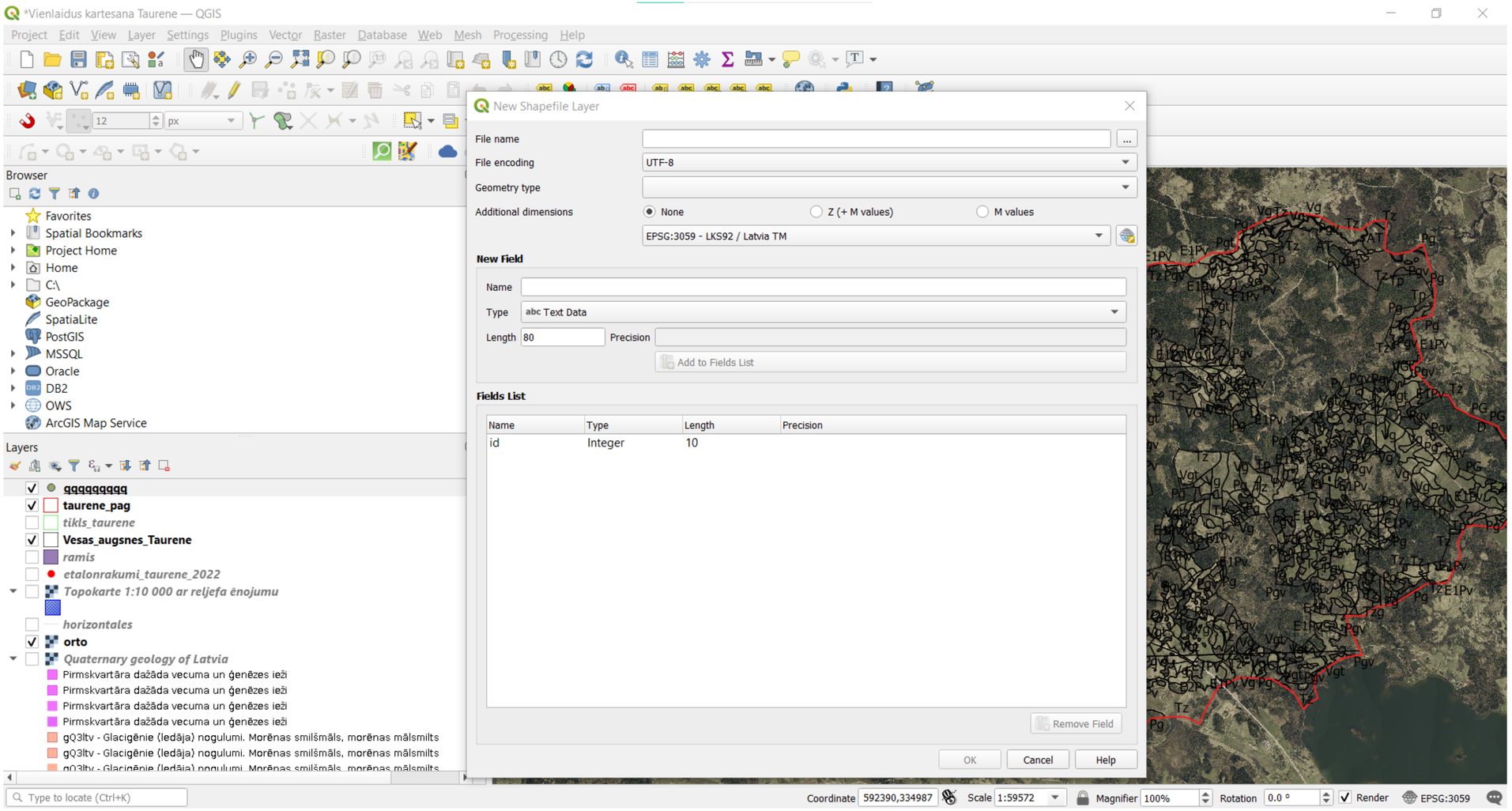
	X	Y	ATips	GrSastGrup	VirsGrSast	ApGrSast	KarbonatDz	Numurs	Ciems	Jauns_ID	Z_virz	E_virz	Shape *
▸	607872.173	333152.206	E1Pv	M2	2	1	50	901	Taurene	17723	57.128976	25.782023	Point
	607650.779	333856.126	Pgv	M1	2	1	50	902	Taurene	17724	57.135348	25.77867	Point
	605696.342	334144.089	E1Pv	sM3	4	4	70	907	Taurene	17725	57.138388	25.746517	Point
	606032.466	334752.836	Vg	mS	5	3	65	908	Taurene	17726	57.143776	25.752326	Point
	604361.394	336707.278	E2Pv	sM2	3	3	121	912	Taurene	17727	57.161708	25.725541	Point
	602993.811	335244.957	Pv	sM3	5	2	0	910	Taurene	17728	57.148886	25.702337	Point
	603398.738	335515.418	E2Pv	mS	5	1	0	909	Taurene	17729	57.151224	25.709139	Point
	602552.211	335564.315	Tz	T	9	9	0	20	Taurene	17730	57.151853	25.695173	Point
	601717.909	336467.378	E1Pv	sM2	4	2	85	21	Taurene	17731	57.160147	25.681757	Point
	601170.876	335989.106	E1Pv	M2	3	3	0	22	Taurene	17732	57.155973	25.672523	Point
	600162.716	335498.817	Pv	sS	6	4	0	40	Taurene	17733	57.151792	25.655668	Point
	599650.021	336319.992	Pgv	M2	3	2	0	343	Taurene	17734	57.159277	25.647525	Point
	599790.206	336770.305	Pgv	sM3	5	4	0	11	Taurene	17735	57.16329	25.650022	Point
	601260.207	337384.475	Pv	sM3	5	4	0	43	Taurene	17736	57.168483	25.674565	Point
	600455.025	337827.836	E1Pv	mS	5	4	0	42	Taurene	17737	57.172641	25.661435	Point
	605854.332	333587.697	E1Pv	sM2	4	3	60	905	Taurene	17738	57.133355	25.74889	Point
	604860.015	333350.862	Tz	T	9	2	0	906	Taurene	17739	57.131457	25.732372	Point
	604047.728	333597.484	VGt	M1	2	1	0	348	Taurene	17740	57.133856	25.719062	Point
	603787.405	333834.319	Tz	T	9	3	120	2	Taurene	17741	57.136041	25.714861	Point
	605678.031	331319.08	E1Pv	sM2	4	3	0	347	Taurene	17742	57.113026	25.745021	Point
	605996.043	332190.346	Pgv	M1	2	1	70	903	Taurene	17743	57.120776	25.750638	Point
	606244.353	332693.502	E1Pv	sM3	<Null>	4	126	904	Taurene	17744	57.125236	25.754951	Point
	602192.195	334805.623	E1Pv	sM2	3	4	180	911	Taurene	17745	57.14512	25.688914	Point
	600677.193	334454.909	Pgv	mS	5	4	0	9	Taurene	17746	57.142306	25.663747	Point

ID	name	street	number	class	plan	date	time	area	length
1	Jones	Bell St.	12	4	true	2019-08-06	06:30:00	96,25	136,2
2	Smith	York St.	9	1	false	2018-01-10	08:25:15	112,37	242,0

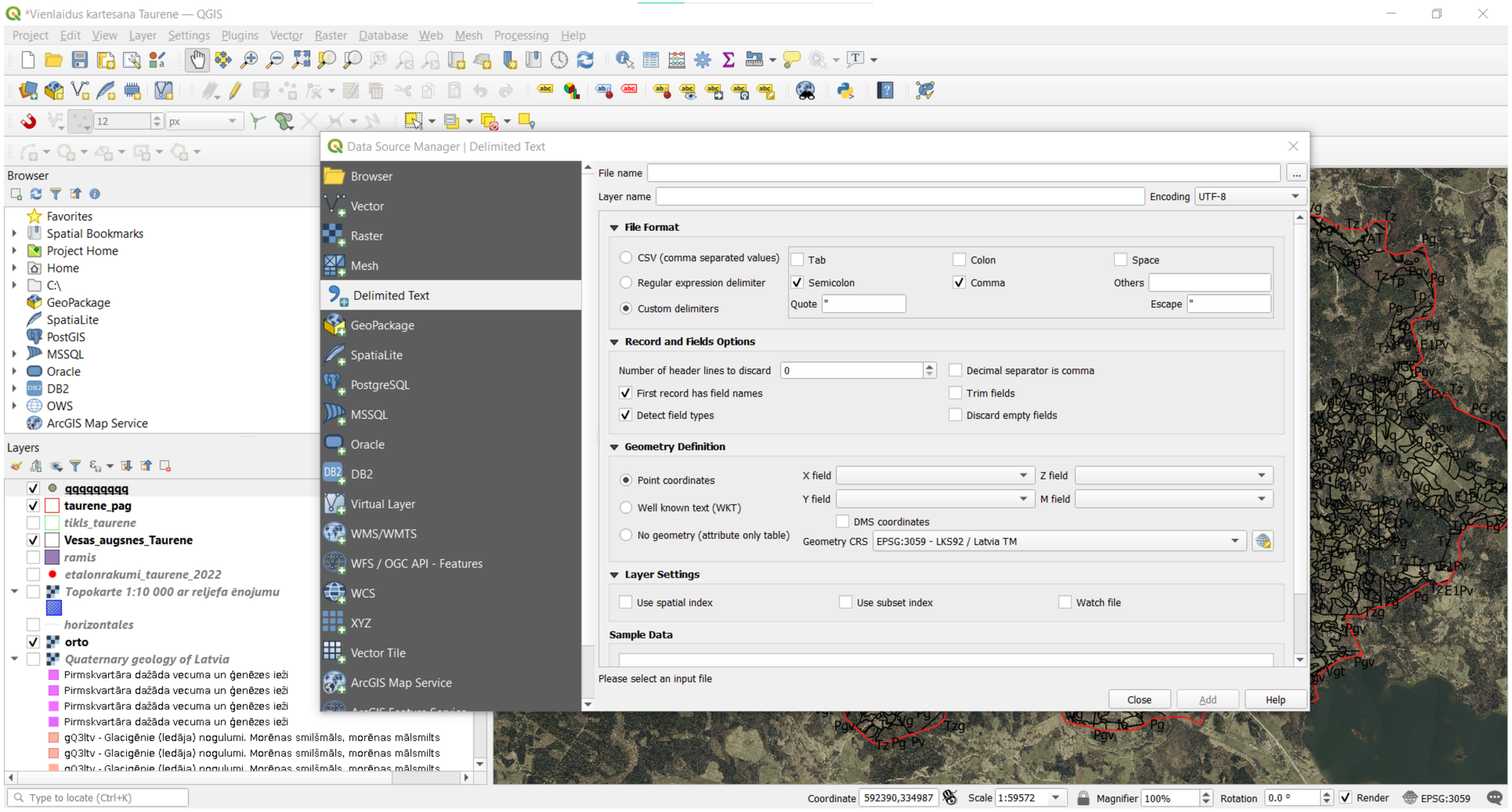
Basic data types:

- NUMERIC: INTEGER (long int, short int) - numbers, code list
- NUMERIC: FLOAT (double, real) - floating-point numbers
- STRING (char, varchar, text) - names and other texts
- DATE/TIME (date, time, year, timestamp) - data and/or time
- BOOLEAN (0/1, true/false, yes/no) - logical expression
- BLOB - multimedia files

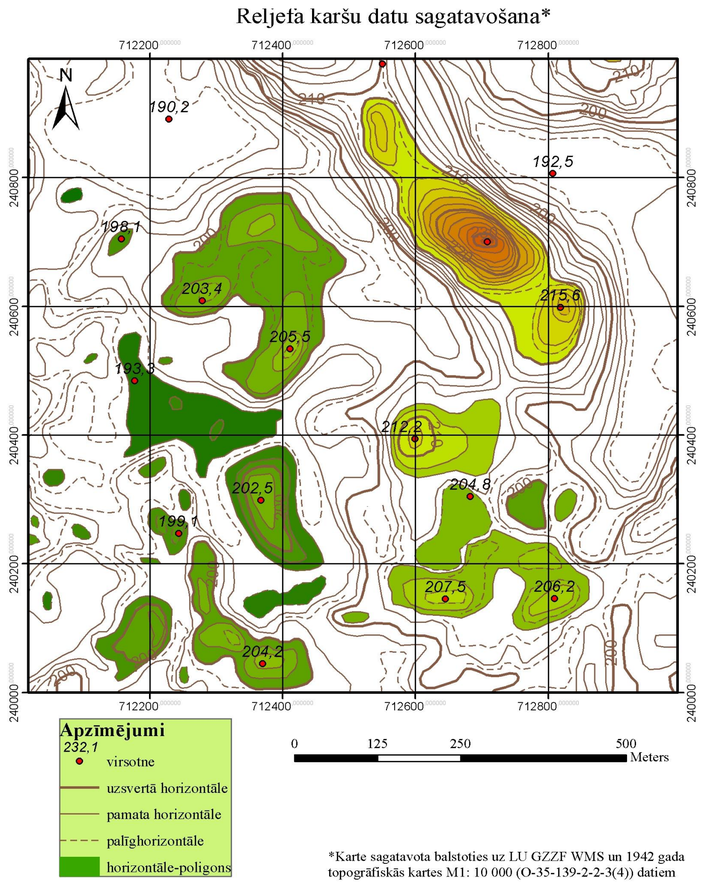
Kā izveidot jaunu vektordatu slāni?



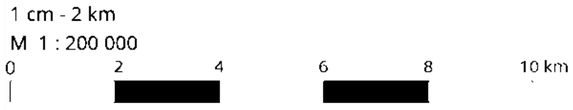
Kā importēt Excel failu QGIS?



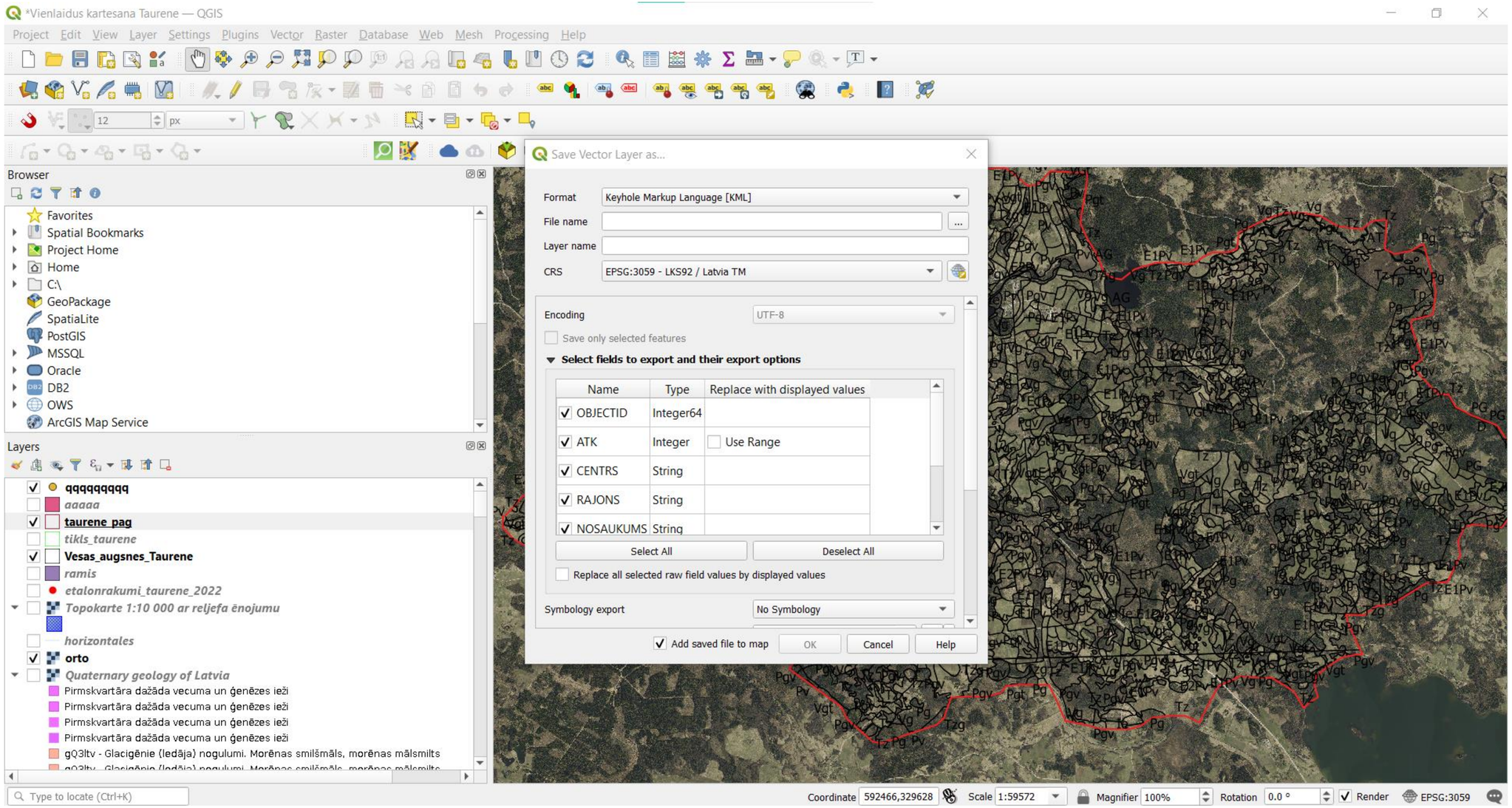
Kartes noformēšanas prasības

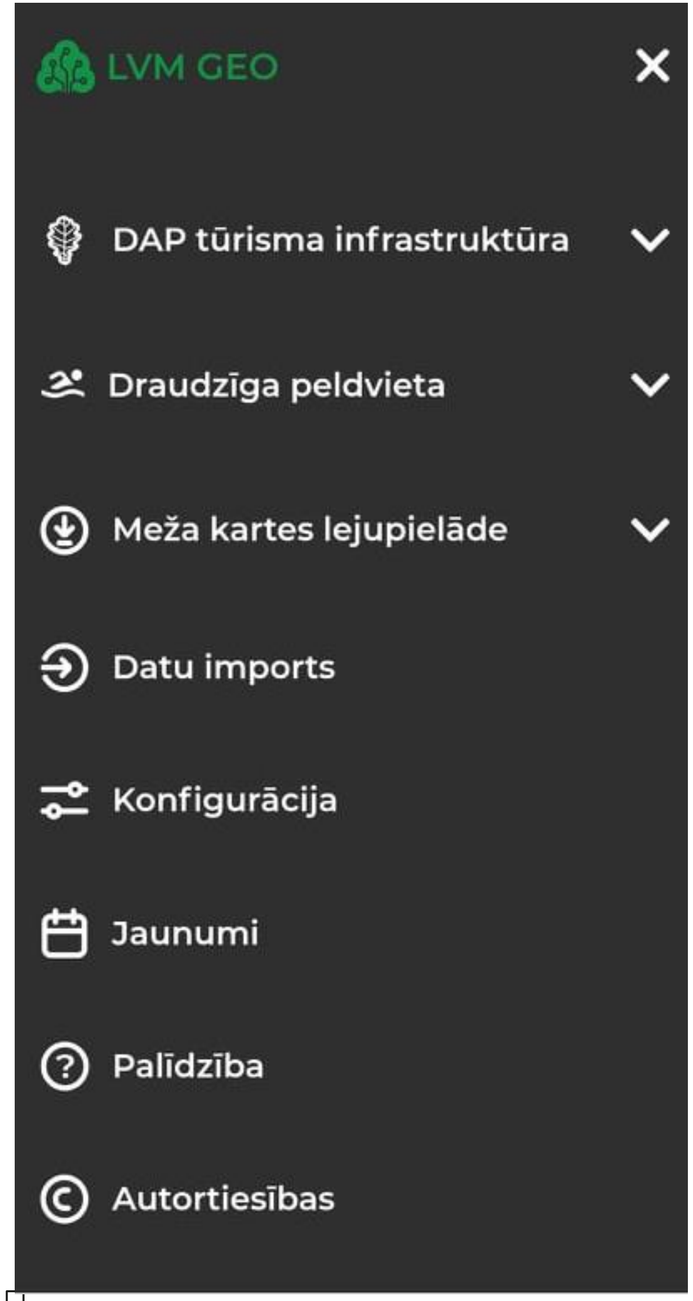


- Nosaukums
- Debespušu norādes bulta
- Leģenda (apzīmējumi)
- Mērogs
- Kartes avots



Kā izveidot KML failu?

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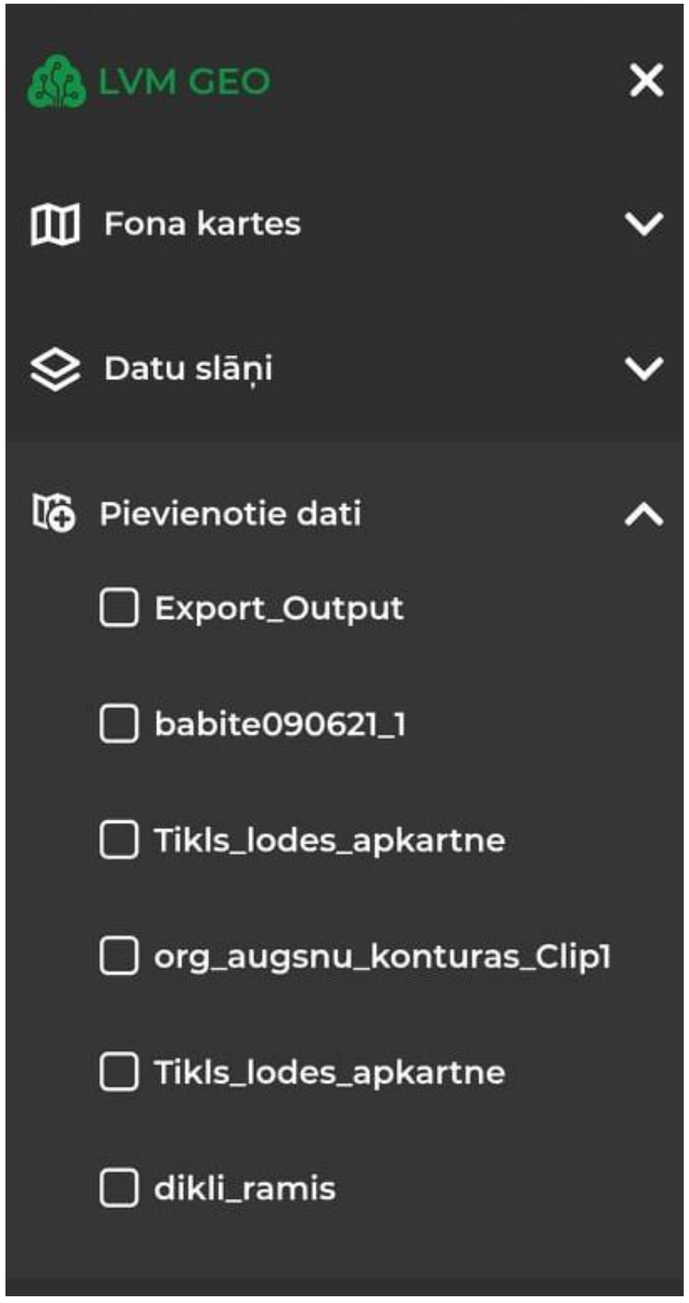
DAP tūrisma infrastruktūra
Draudzīga peldvieta
Meža kartes lejupielāde
Datu imports
Konfigurācija
Jaunumi
Palīdzība
Autortiesības


LVM GEO
Fona kartes
Datu slāņi
Pievienotie dati
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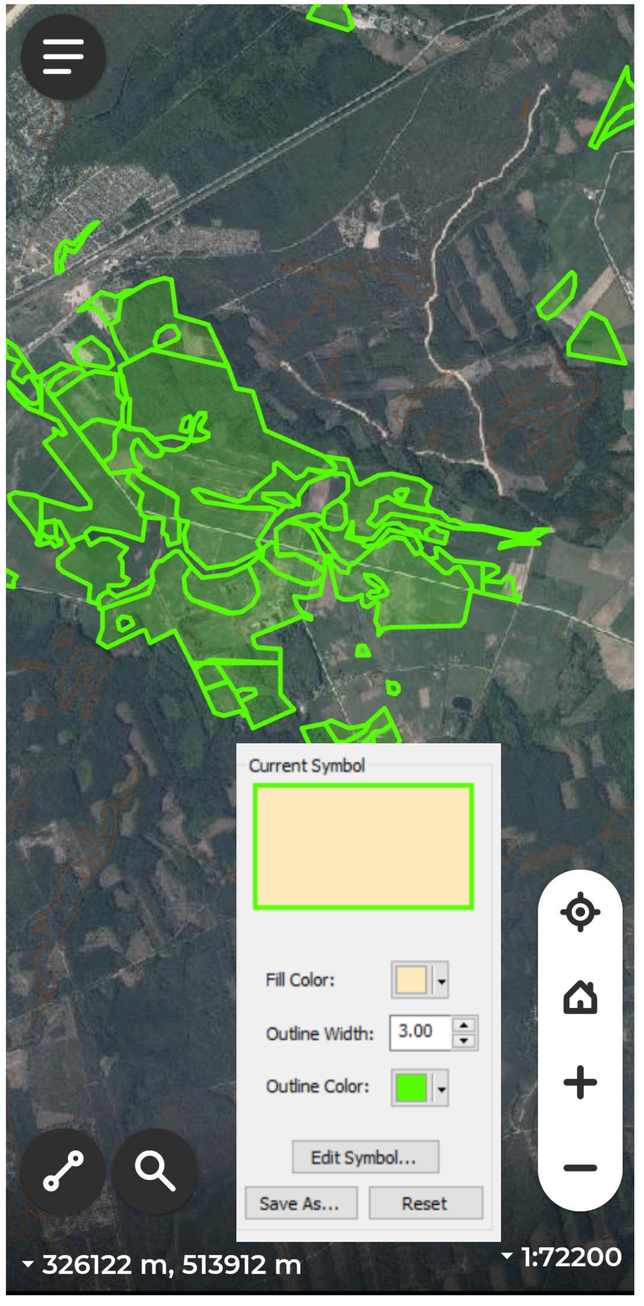
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Save As...
Reset
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Paldies par uzmanību!