



Eurosita

# TUTORIAL: ECOSYSTEM SERVICES AND QGIS

## A PRACTICAL EXERCISE

Eurosita: Economics and Ecosystem Services Working Group  
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# Quick intro to (Q)GIS

- **Geographic Information Systems (GIS)**
  - powerful tools (platforms) for data input, management, analysis and presentation
  - help us reveal patterns, trends and relationships about both natural and human phenomena and activities

## Why QGIS?

- a **free and open-source** GIS application
- **wide range of users** and a **strong community** of volunteer developers
- a continuously **growing number of capabilities** (core functions and plugins)
- **algorithms** developed and/or used in other freeware GIS software (e.g. **GRASS GIS** and **SAGA GIS**) are also **available through the QGIS interface**

# Today's Assignment



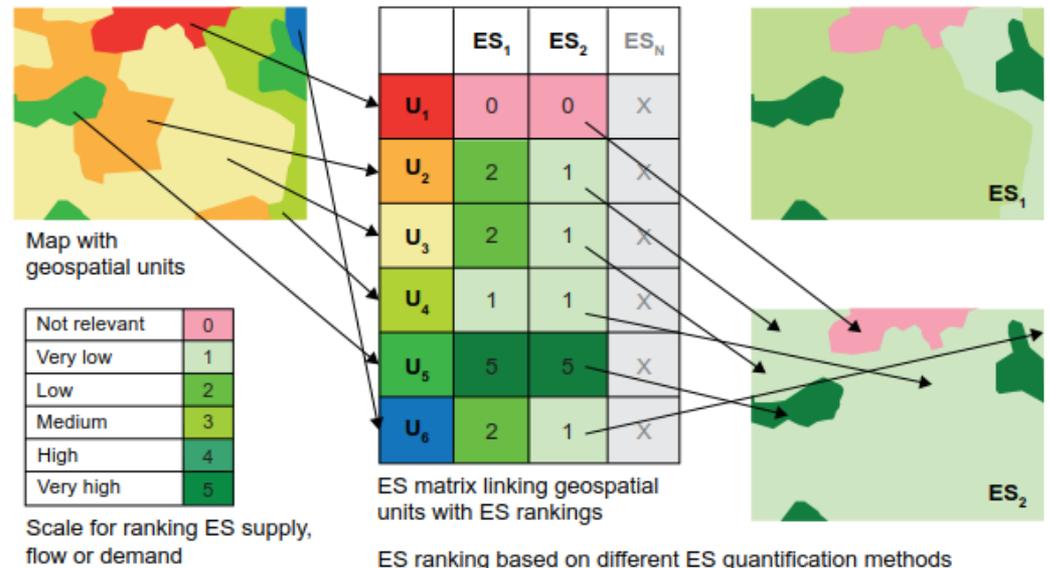
# Assignment

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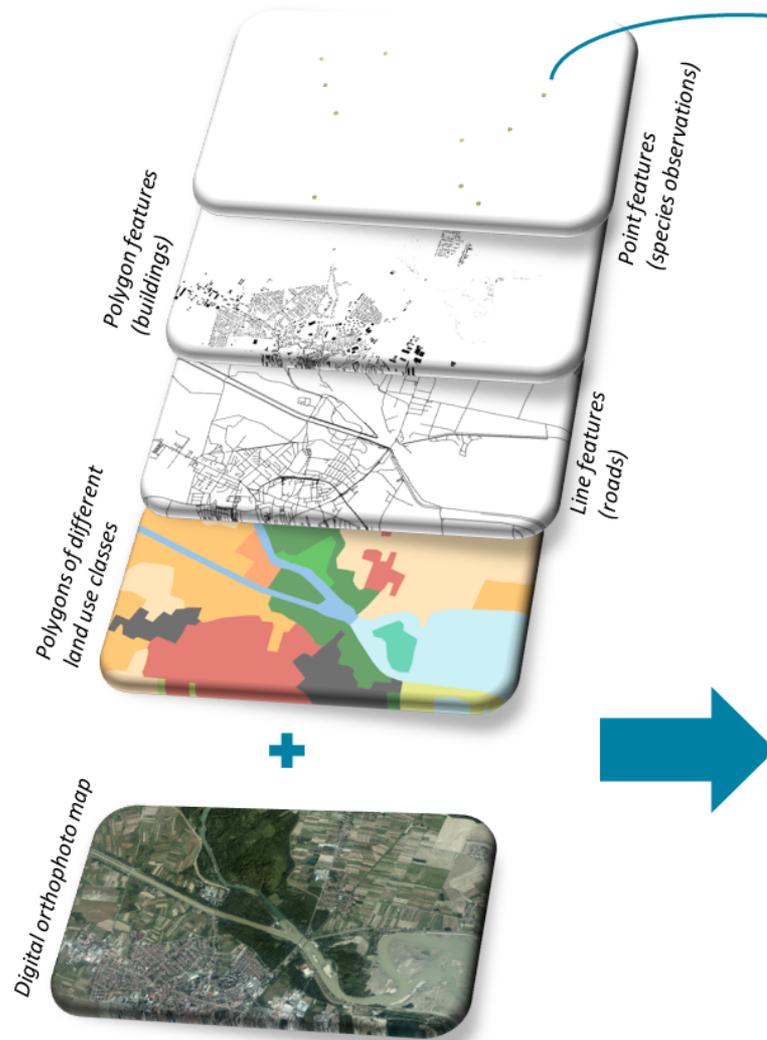
- For the purpose of this presentation, you are preparing a Management plan for your Natura SCI site and you are looking at ecosystem services in order to:
  - communicate the importance of your site to the local community,
  - consider potential synergies
  - and avoid any future conflicts with other stakeholders.
- At this stage, your plan is to:
  - assess the current situation by preparing the first ES screening study and using the ES matrix,
  - communicate with your colleagues and/or some of the stakeholders, what needs to be done  
→ via map prepared in QGIS :)

# Ecosystem services matrix (Burkhard & Maes 2017)

- links ES to appropriate geo-biophysical spatial units
- ES supply, flow and/or demand are ranked using a relative scale
  - works in data-poor & data-rich study areas
- a very flexible ES mapping methodology that can be applied
  - on all spatial and temporal scales
  - for all ES
  - for various multidisciplinary ES quantification approaches
  - for different mapping purposes



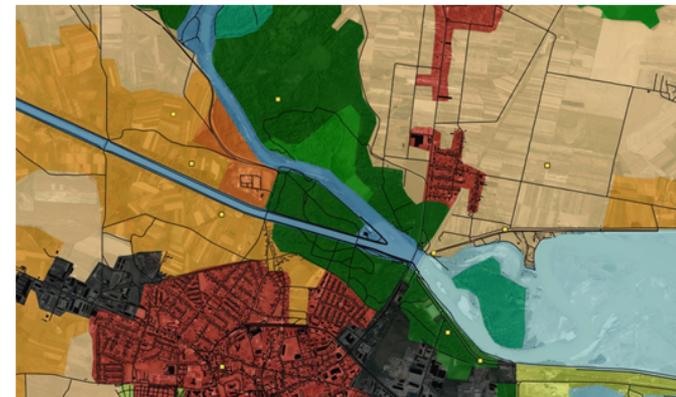
# GIS Vocabulary



ONE RASTER + FOUR VECTOR LAYERS

ID	Name	Species	Abundance	Year
124216	484545.4417888889	012228.92120000000000000000	7171	1985
124217	484545.4417888889	012228.92120000000000000000	2024	1985
124218	484545.4417888889	012228.92120000000000000000	5245	1985
124219	484545.4417888889	012228.92120000000000000000	8475	1985
124220	484545.4417888889	012228.92120000000000000000	11878	1985
124221	484545.4417888889	012228.92120000000000000000	15011	1985
124222	484545.4417888889	012228.92120000000000000000	18144	1985
124223	484545.4417888889	012228.92120000000000000000	21277	1985
124224	484545.4417888889	012228.92120000000000000000	24410	1985
124225	484545.4417888889	012228.92120000000000000000	27543	1985
124226	484545.4417888889	012228.92120000000000000000	30676	1985
124227	484545.4417888889	012228.92120000000000000000	33809	1985
124228	484545.4417888889	012228.92120000000000000000	36942	1985
124229	484545.4417888889	012228.92120000000000000000	40075	1985
124230	484545.4417888889	012228.92120000000000000000	43208	1985
124231	484545.4417888889	012228.92120000000000000000	46341	1985
124232	484545.4417888889	012228.92120000000000000000	49474	1985
124233	484545.4417888889	012228.92120000000000000000	52607	1985
124234	484545.4417888889	012228.92120000000000000000	55740	1985
124235	484545.4417888889	012228.92120000000000000000	58873	1985
124236	484545.4417888889	012228.92120000000000000000	62006	1985
124237	484545.4417888889	012228.92120000000000000000	65139	1985
124238	484545.4417888889	012228.92120000000000000000	68272	1985
124239	484545.4417888889	012228.92120000000000000000	71405	1985
124240	484545.4417888889	012228.92120000000000000000	74538	1985
124241	484545.4417888889	012228.92120000000000000000	77671	1985
124242	484545.4417888889	012228.92120000000000000000	80804	1985
124243	484545.4417888889	012228.92120000000000000000	83937	1985
124244	484545.4417888889	012228.92120000000000000000	87070	1985
124245	484545.4417888889	012228.92120000000000000000	90203	1985
124246	484545.4417888889	012228.92120000000000000000	93336	1985
124247	484545.4417888889	012228.92120000000000000000	96469	1985
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124249	484545.4417888889	012228.92120000000000000000	102735	1985
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124260	484545.4417888889	012228.92120000000000000000	137198	1985
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124264	484545.4417888889	012228.92120000000000000000	149730	1985
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124266	484545.4417888889	012228.92120000000000000000	156000	1985
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124268	484545.4417888889	012228.92120000000000000000	162266	1985
124269	484545.4417888889	012228.92120000000000000000	165400	1985
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124276	484545.4417888889	012228.92120000000000000000	187333	1985
124277	484545.4417888889	012228.92120000000000000000	190466	1985
124278	484545.4417888889	012228.92120000000000000000	193600	1985
124279	484545.4417888889	012228.92120000000000000000	196733	1985
124280	484545.4417888889	012228.92120000000000000000	199866	1985
124281	484545.4417888889	012228.92120000000000000000	203000	1985
124282	484545.4417888889	012228.92120000000000000000	206133	1985
124283	484545.4417888889	012228.92120000000000000000	209266	1985
124284	484545.4417888889	012228.92120000000000000000	212400	1985
124285	484545.4417888889	012228.92120000000000000000	215533	1985
124286	484545.4417888889	012228.92120000000000000000	218666	1985
124287	484545.4417888889	012228.92120000000000000000	221800	1985
124288	484545.4417888889	012228.92120000000000000000	224933	1985
124289	484545.4417888889	012228.92120000000000000000	228066	1985
124290	484545.4417888889	012228.92120000000000000000	231200	1985
124291	484545.4417888889	012228.92120000000000000000	234333	1985
124292	484545.4417888889	012228.92120000000000000000	237466	1985
124293	484545.4417888889	012228.92120000000000000000	240600	1985
124294	484545.4417888889	012228.92120000000000000000	243733	1985
124295	484545.4417888889	012228.92120000000000000000	246866	1985
124296	484545.4417888889	012228.92120000000000000000	250000	1985
124297	484545.4417888889	012228.92120000000000000000	253133	1985
124298	484545.4417888889	012228.92120000000000000000	256266	1985
124299	484545.4417888889	012228.92120000000000000000	259400	1985
124300	484545.4417888889	012228.92120000000000000000	262533	1985

Attributes in the attribute table



RESULT OF OVERLAYING ALL FIVE LAYERS

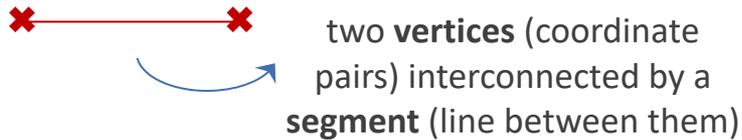
# GIS Vocabulary

## VECTOR DATA

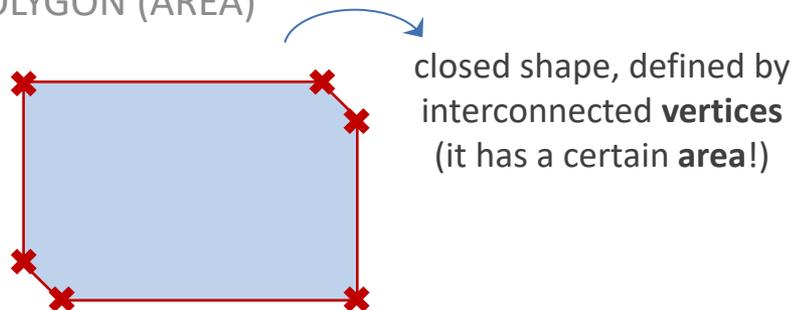
### POINT



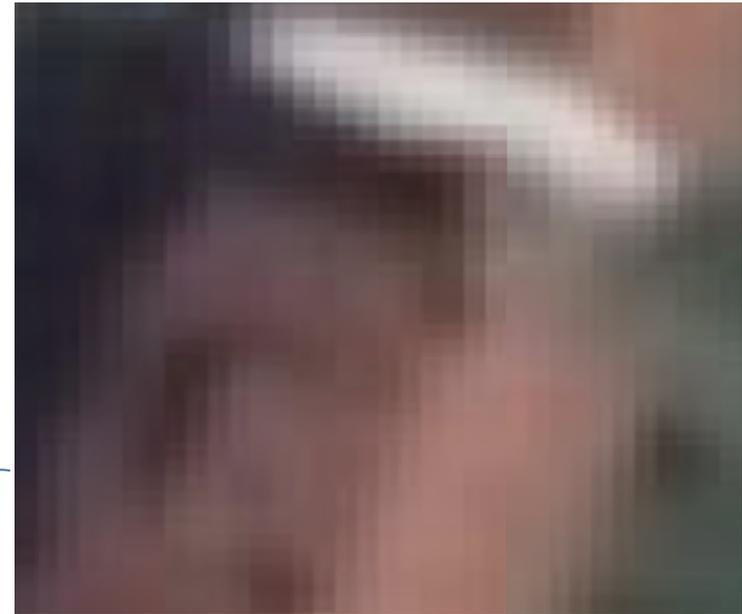
### LINE



### POLYGON (AREA)



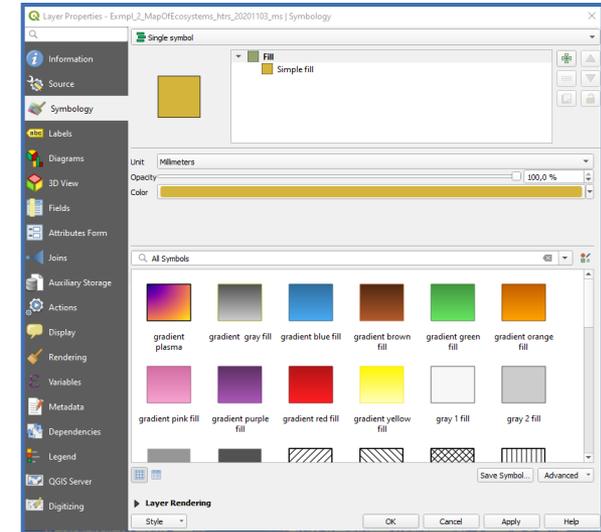
## RASTER DATA



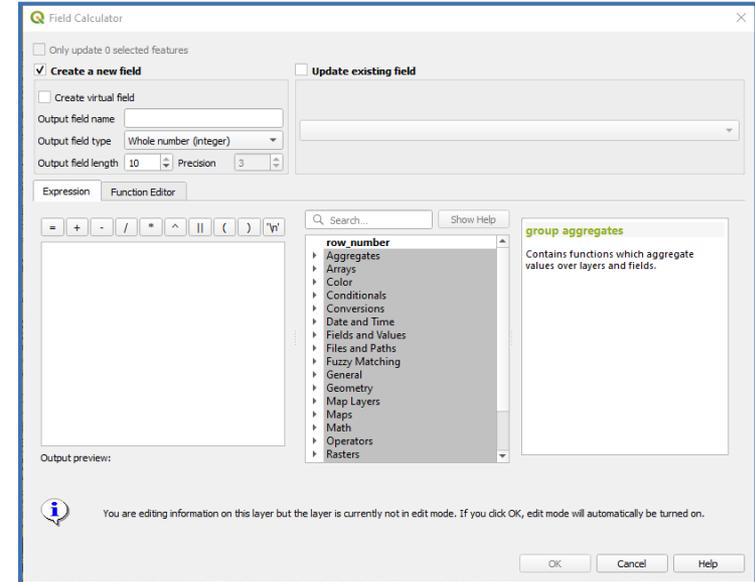
**matrices** of discrete cells, where each cell  
(**pixel**) has the same size  
[ **geocoded** by pixel resolution and the x,y  
coordinate of a corner pixel of the layer ]

# Looking at the data

- Layer properties – symbology and labels
- Geoprocessing Tools
- Attribute table
- Field Calculator

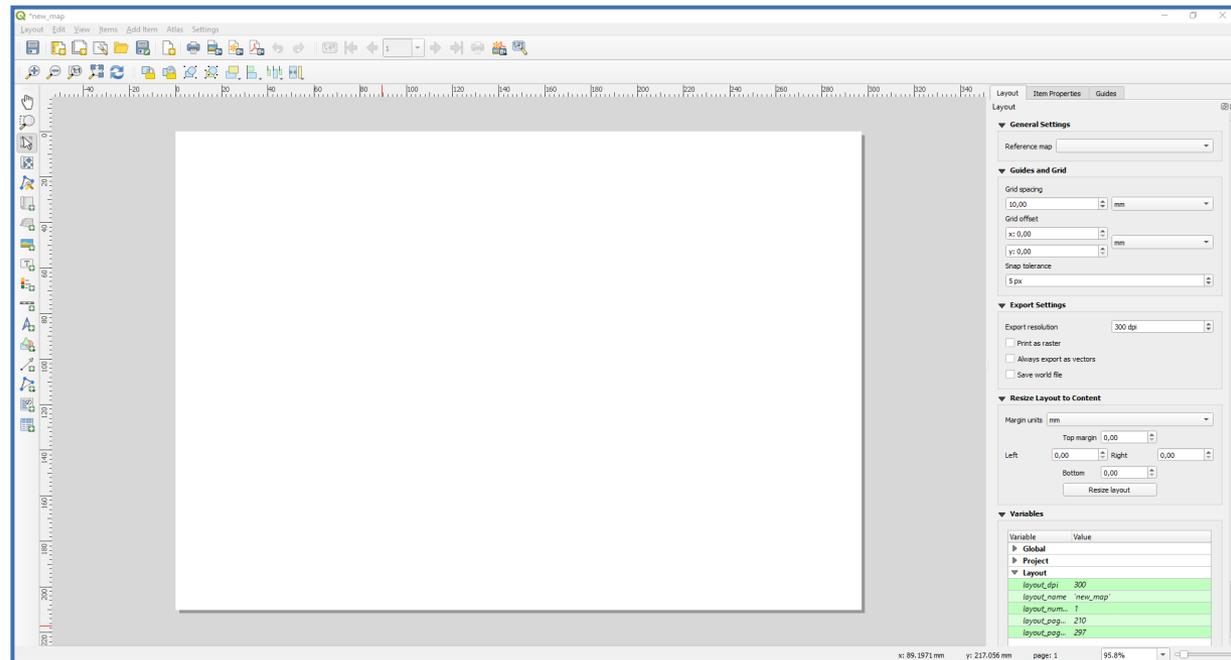


og_fid	id	code_12	area_ha	remark	created_us	created_da	last_edit	last_edt_l	shape_star	shape_sle	eunis_code	eunis_name	eunis_ime	nks_code	napomena	clic_ime
1	133	HR-24676	111	308,98194770...	NULL	NULL	NULL	NULL	3089819,476...	11769,40185...	J1	1	Zgrade u gradovi...	1	1	Cjelovita gradska područja
2	132	HR-24675	111	54,336223660...	NULL	NULL	NULL	NULL	543362,2363...	3730,900392...	J1	1	Zgrade u gradovi...	1	1	Cjelovita gradska područja
3	131	HR-24674	111	51,793527970...	NULL	NULL	NULL	NULL	517935,2792...	4743,782320...	J1	1	Zgrade u gradovi...	1	1	Cjelovita gradska područja
4	130	HR-24673	111	42,106496520...	NULL	NULL	NULL	NULL	421064,9648...	3111,008283...	J1	1	Zgrade u gradovi...	1	1	Cjelovita gradska područja
5	129	HR-24672	111	40,421976379...	NULL	NULL	NULL	NULL	404219,7633...	2658,546606...	J1	1	Zgrade u gradovi...	1	1	Cjelovita gradska područja
6	128	HR-24671	111	26,652603220...	NULL	NULL	NULL	NULL	266526,0324...	2506,494097...	J1	1	Zgrade u gradovi...	1	1	Cjelovita gradska područja
7	127	HR-24670	111	25,457007369...	NULL	NULL	NULL	NULL	254570,0732...	2569,279161...	J1	1	Zgrade u gradovi...	1	1	Cjelovita gradska područja
8	1456	HR-26650	112	0,07122834	NULL	NULL	NULL	NULL	712,2829589...	323,6589035...	J1	1	Zgrade u gradovi...	1	1	Nepovezana gradska pod...
9	1455	HR-26649	112	0,28440031	NULL	NULL	NULL	NULL	2844,003292...	1246,708637...	J1	1	Zgrade u gradovi...	1	1	Nepovezana gradska pod...
10	1454	HR-26648	112	55,02178330...	NULL	NULL	NULL	NULL	550217,8339...	6526,236167...	J1	1	Zgrade u gradovi...	1	1	Nepovezana gradska pod...
11	1453	HR-26648	112	41,001900050...	NULL	NULL	NULL	NULL	410019,0004...	3746,873316...	J1	1	Zgrade u gradovi...	1	1	Nepovezana gradska pod...
12	1452	HR-26641	112	0,09965171	NULL	NULL	NULL	NULL	966,5166015...	198,9307283...	J1	1	Zgrade u gradovi...	1	1	Nepovezana gradska pod...
13	1451	HR-26639	112	159,59368656...	NULL	NULL	NULL	NULL	1595936,866...	12820,70789...	J1	1	Zgrade u gradovi...	1	1	Nepovezana gradska pod...
14	1450	HR-26638	112	40,083724539...	NULL	NULL	NULL	NULL	400837,2443...	4342,633903...	J1	1	Zgrade u gradovi...	1	1	Nepovezana gradska pod...
15	1449	HR-26637	112	55,431685569...	NULL	NULL	NULL	NULL	554316,8562...	5485,286468...	J1	1	Zgrade u gradovi...	1	1	Nepovezana gradska pod...
16	1448	HR-26636	112	37,673924329...	NULL	NULL	NULL	NULL	376739,2431...	4010,534671...	J1	1	Zgrade u gradovi...	1	1	Nepovezana gradska pod...
17	1447	HR-26635	112	60,988821270...	NULL	NULL	NULL	NULL	609888,2143...	8827,222725...	J1	1	Zgrade u gradovi...	1	1	Nepovezana gradska pod...
18	1446	HR-26634	112	26,653826489...	NULL	NULL	NULL	NULL	266538,2841...	3810,747775...	J1	1	Zgrade u gradovi...	1	1	Nepovezana gradska pod...
19	1445	HR-26632	112	84,702508019...	NULL	NULL	NULL	NULL	847025,0803...	4829,120933...	J1	1	Zgrade u gradovi...	1	1	Nepovezana gradska pod...
20	1444	HR-26631	112	25,729670169...	NULL	NULL	NULL	NULL	257296,7019...	3040,143291...	J1	1	Zgrade u gradovi...	1	1	Nepovezana gradska pod...
21	1443	HR-26629	112	57,582646810...	NULL	NULL	NULL	NULL	575826,4687...	3959,469119...	J1	1	Zgrade u gradovi...	1	1	Nepovezana gradska pod...
22	1442	HR-26628	112	29,961396930...	NULL	NULL	NULL	NULL	299613,6965...	3401,499758...	J1	1	Zgrade u gradovi...	1	1	Nepovezana gradska pod...
23	1441	HR-26627	112	31,091625099...	NULL	NULL	NULL	NULL	310916,2500...	4620,940661...	J1	1	Zgrade u gradovi...	1	1	Nepovezana gradska pod...
24	1440	HR-26626	112	47,187330539...	NULL	NULL	NULL	NULL	471873,3066...	5138,414055...	J1	1	Zgrade u gradovi...	1	1	Nepovezana gradska pod...
25	1439	HR-26625	112	26,78120450...	NULL	NULL	NULL	NULL	267812,8037...	3186,335806...	J1	1	Zgrade u gradovi...	1	1	Nepovezana gradska pod...
26	1438	HR-26624	112	91,432098249...	NULL	NULL	NULL	NULL	914320,9816...	8297,194915...	J1	1	Zgrade u gradovi...	1	1	Nepovezana gradska pod...



# Map production

- New Print Layout
- Panels and Toolbars
- Adding a new map
- Adding the map elements: legend, scalebar, north arrow



## Further reading and other sources

- Skunca M. (2020): **Ecosystem Services and QGIS: A brief introduction for site managers**. Eurosite Economics and Ecosystem Services Working Group. Available at <https://www.eurosite.org/wp-content/uploads/ECOSYSTEM-SERVICES-AND-QGIS-Final.pdf>
- **A Gentle Introduction to GIS** prepared by the QGIS Project and available at [https://docs.qgis.org/3.10/en/docs/gentle\\_gis\\_introduction/index.html](https://docs.qgis.org/3.10/en/docs/gentle_gis_introduction/index.html)
- **QGIS Training Manual** (release 3.10) prepared by the QGIS Project and available at [https://docs.qgis.org/3.10/en/docs/training\\_manual/index.html](https://docs.qgis.org/3.10/en/docs/training_manual/index.html)
- **QGIS User Guide** (release 3.10) prepared by the QGIS Project as the original user guide of the described software [https://docs.qgis.org/3.10/en/docs/user\\_manual/index.html](https://docs.qgis.org/3.10/en/docs/user_manual/index.html)
- **Mapping Ecosystem Services** (2017) by Benjamin Burkhard and Joachim Maes (Eds) - Chapter 3 '*Background mapping*' gives a very good overview of basics of cartography and mapping techniques. Available at <https://ab.pensoft.net/articles.php?id=12837>
- **Bioportal (2020)**: Internet portal of the nature protection information system of the Croatian Environment and Nature Agency (nowadays: Ministry of Environment and Energy); includes WMS / WFS services. Available at: <http://www.bioportal.hr>
- **Map data ©2015 Google**

# Download and installation

- <https://download.qgis.org>
- **standard installers:** MS Windows and macOS
- **other operating systems:** packages or software repositories
- **latest LTR** (i.e. long term release) version is the most stable one

A green-tinted map of a city, likely Hannover, with a large white text overlay. The text reads "QGIS 3.16 Hannover" in a large, bold, sans-serif font, and "has been released!" in a smaller, bold, sans-serif font below it. The QGIS logo is integrated into the text, with the letters "GIS" being larger and more prominent. The background is a detailed map showing streets, buildings, and green spaces.

QGIS 3.16 Hannover  
has been released!



Thank you and keep in touch!

- Visit [www.eurosite.org](http://www.eurosite.org) for more information
- Contact us at [geonatura@geonatura.hr](mailto:geonatura@geonatura.hr)

