# Working with Attributes

## QGIS Tutorials and Tips



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# Lucrul cu atribute

GIS data has two parts – features and attributes. Attributes are structured data about each feature. This tutorial shows how to view the attributes and do basic queries on them QGIS.

## Privire de ansamblu asupra activității

The dataset for this tutorial contains information about populated places of the world. The task is to query and find all the capital cities in the world that have a population greater than 10,00,000.

## Obținerea datelor
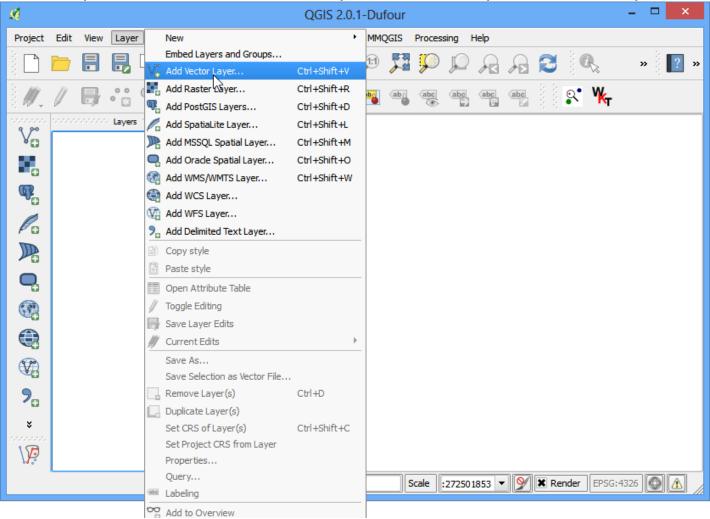
We will use the Populated Places dataset from Natural Earth.

Download the Natural Earth Populated Places shapefile..

Sursa de date [NATURALEARTH]

## Procedura

1. Once you have downloaded the data, open QGIS. Go to Layer ‣ Add Vector Layer.

2. Click on Browse and navigate to the folder where you downloaded the data.



3. Locate the downloaded zip file **_ne_10m_populated_places_simple.zip_**. You do not need to unzip the file. QGIS has the ability to read zip files directly. Select the file and click Open.



4. You will get a dialog asking you to select the layer to open. Select **_ne_10m_populated_places_simple.shp_** and click OK.

5. The selected layer will now be loaded in QGIS and you will see many points representing the populated places of the world.



6. To see the attributes of right-click the layer and select Open Attribute Table.

7. Explore the various attributes and their values.

8. We are interested in the population of each feature, so **pop_max** is the field we are looking for. You can click twice on the field header to sort the column in descending order.

| | longitude | changed | namediff | diffnote | pop_max | pop_min | pop_other |
|---|---|---|---|---|---|---|---|
| 7312 | 139.75140742900 | 0.00000000000 | 0 | NULL | 35676000 | 8336599 | 12945252 |
| 7297 | -73.98001692880 | 0.00000000000 | 0 | NULL | 19040000 | 8008278 | 9292603 |
| 7303 | -99.13098820170 | 0.00000000000 | 0 | NULL | 19028000 | 10811002 | 10018444 |
| 7313 | 72.85698929740 | 0.00000000000 | 0 | NULL | 18978000 | 12691836 | 12426085 |
| 7318 | -46.62501998040 | 0.00000000000 | 0 | NULL | 18845000 | 10021295 | 11522944 |
| 7221 | 77.23000402720 | 4.00000000000 | 0 | Changed featur... | 15926000 | 7633213 | 6747384 |
| 7311 | 121.43650467800 | 0.00000000000 | 0 | NULL | 14987000 | 14608512 | 16803572 |
| 7316 | 88.32467565810 | 4.00000000000 | 1 | Name changed... | 14787000 | 4631392 | 7783716 |
| 7248 | 90.40857946670 | 5.00000000000 | 0 | Changed scale ... | 12797394 | 7000940 | 14995538 |
| 7290 | -58.39753137370 | 0.00000000000 | 0 | NULL | 12795000 | 10929146 | 10271457 |
| 7295 | -118.17998051100 | 0.00000000000 | 0 | NULL | 12500000 | 3694820 | 142265 |
| 7168 | 66.99000891000 | 5.00000000000 | 0 | Changed scale ... | 12130000 | 11624219 | 11570278 |
| 7310 | 31.24996821970 | 0.00000000000 | 0 | NULL | 11893000 | 7734614 | 13720557 |
| 7317 | -43.22502079420 | 0.00000000000 | 0 | NULL | 11748000 | 2010175 | 1821489 |
| 7280 | 135.46014481500 | 4.00000000000 | 0 | Changed featur... | 11294000 | 2592413 | 9630783 |
| 7306 | 116.38828568400 | 0.00000000000 | 0 | NULL | 11106000 | 7480601 | 9033231 |
| 7274 | 120.98221716200 | 0.00000000000 | 0 | NULL | 11100000 | 3077575 | 2381280 |
| 7302 | 37.61552282590 | 0.00000000000 | 0 | NULL | 10452000 | 10452000 | 10585385 |
| 7299 | 29.01000158560 | 0.00000000000 | 0 | NULL | 10061000 | 9945610 | 9651488 |
| 7314 | 2.33333532574 | 0.00000000000 | 0 | NULL | 9904000 | 11177 | 7142744 |
| 7273 | 126.99973099700 | 0.00000000000 | 0 | NULL | 9796000 | 9796000 | 12018058 |
| 7304 | 3.39153107121 | 4.00000000000 | 0 | Location adjust... | 9466000 | 1536 | 6567892 |

Show All Features

9. Now we are ready to perform our query on these attributes. Select features using an expression.

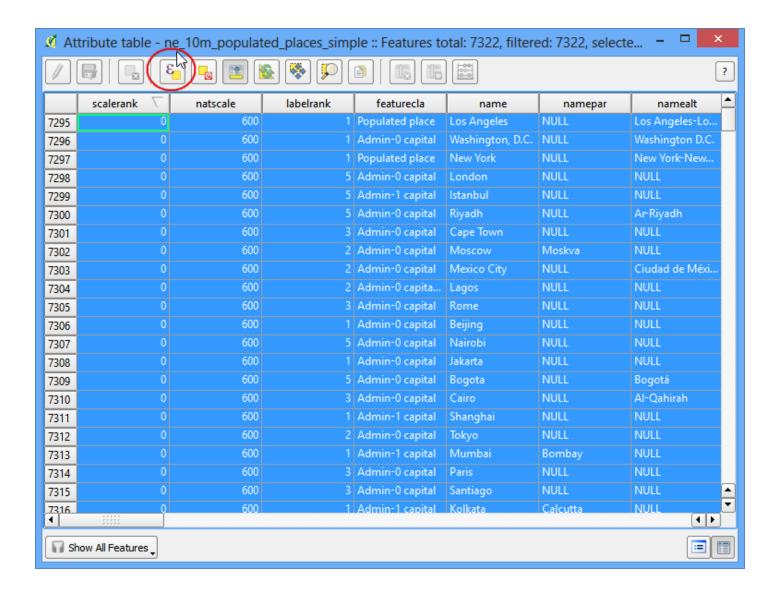| | longitude | | | diffnote | pop_max ▽ | pop_min | pop_other |
|---|---|---|---|---|---|---|---|
| 7312 | 139.75140742900 | 0.00000000000 | 0 | NULL | 35676000 | 8336599 | 12945252 |
| 7297 | -73.98001692880 | 0.00000000000 | 0 | NULL | 19040000 | 8008278 | 9292603 |
| 7303 | -99.13098820170 | 0.00000000000 | 0 | NULL | 19028000 | 10811002 | 10018444 |
| 7313 | 72.85698929740 | 0.00000000000 | 0 | NULL | 18978000 | 12691836 | 12426085 |
| 7318 | -46.62501998040 | 0.00000000000 | 0 | NULL | 18845000 | 10021295 | 11522944 |
| 7221 | 77.23000402720 | 4.00000000000 | 0 | Changed featur... | 15926000 | 7633213 | 6747384 |
| 7311 | 121.43650467800 | 0.00000000000 | 0 | NULL | 14987000 | 14608512 | 16803572 |
| 7316 | 88.32467565810 | 4.00000000000 | 1 | Name changed... | 14787000 | 4631392 | 7783716 |
| 7248 | 90.40857946670 | 5.00000000000 | 0 | Changed scale ... | 12797394 | 7000940 | 14995538 |
| 7290 | -58.39753137370 | 0.00000000000 | 0 | NULL | 12795000 | 10929146 | 10271457 |
| 7295 | -118.17998051100 | 0.00000000000 | 0 | NULL | 12500000 | 3694820 | 142265 |
| 7168 | 66.99000891000 | 5.00000000000 | 0 | Changed scale ... | 12130000 | 11624219 | 11570278 |
| 7310 | 31.24996821970 | 0.00000000000 | 0 | NULL | 11893000 | 7734614 | 13720557 |
| 7317 | -43.22502079420 | 0.00000000000 | 0 | NULL | 11748000 | 2010175 | 1821489 |
| 7280 | 135.46014481500 | 4.00000000000 | 0 | Changed featur... | 11294000 | 2592413 | 9630783 |
| 7306 | 116.38828568400 | 0.00000000000 | 0 | NULL | 11106000 | 7480601 | 9033231 |
| 7274 | 120.98221716200 | 0.00000000000 | 0 | NULL | 11100000 | 3077575 | 2381280 |
| 7302 | 37.61552282590 | 0.00000000000 | 0 | NULL | 10452000 | 10452000 | 10585385 |
| 7299 | 29.01000158560 | 0.00000000000 | 0 | NULL | 10061000 | 9945610 | 9651488 |
| 7314 | 2.33333532574 | 0.00000000000 | 0 | NULL | 9904000 | 11177 | 7142744 |
| 7273 | 126.99973099700 | 0.00000000000 | 0 | NULL | 9796000 | 9796000 | 12018058 |
| 7304 | 3.39153107121 | 4.00000000000 | 0 | Location adiust... | 9466000 | 1536 | 6567892 |

Show All Features

10. In the Select By Expression window, expand the Fields and Values section and double-click the *pop_max* label. You will notice that it is added to the expression section at the bottom. If you aren't sure about the field values, you can click the Load all unique values to see what the attribute values are present in the dataset. For this exercise, we are looking to find all features that have a population greater than 10,00,000. So complete the expression as *"pop_max" > 1000000* and click Select.
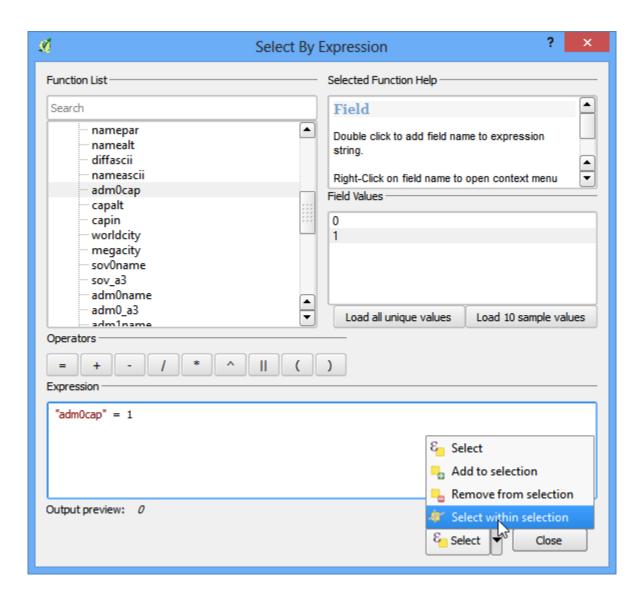
11. Click on Close and return to the main QGIS window. You will notice that a subset of points is now rendered in yellow. This is the result of our query and you are seeing all places from the dataset that have the **_pop_max_** attribute value greater than 10,00,000.
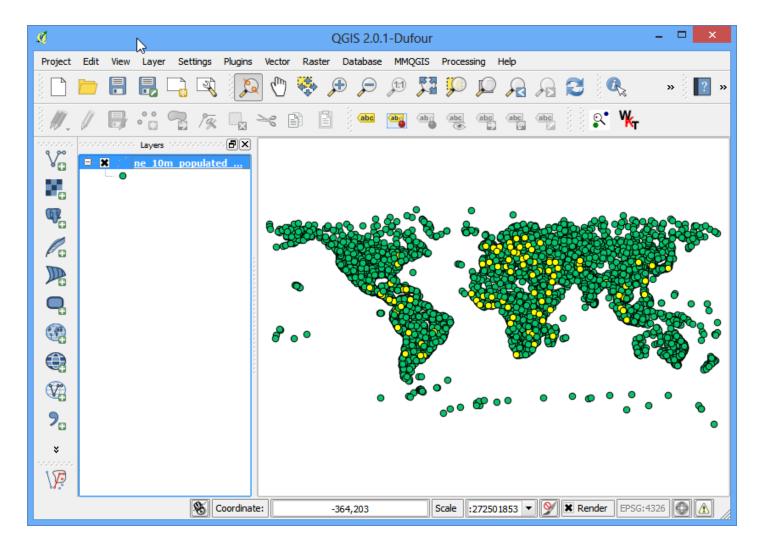
12. The goal for this exercise is to find the places that are country capitals. Let's refine our query to select only those places which are capitals. Click on the Select feature using an expression button in the attribute table.
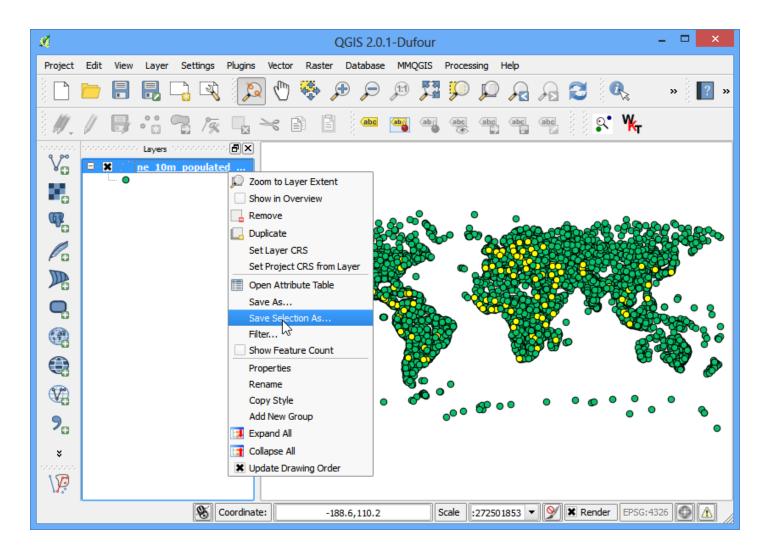
| | scalerank ▽ | natscale | labelrank | featurecla | name | namepar | namealt |
|---|---|---|---|---|---|---|---|
| 7295 | 0 | 600 | 1 | Populated place | Los Angeles | NULL | Los Angeles-Lo... |
| 7296 | 0 | 600 | 1 | Admin-0 capital | Washington, D.C. | NULL | Washington D.C. |
| 7297 | 0 | 600 | 1 | Populated place | New York | NULL | New York-New... |
| 7298 | 0 | 600 | 5 | Admin-0 capital | London | NULL | NULL |
| 7299 | 0 | 600 | 5 | Admin-1 capital | Istanbul | NULL | NULL |
| 7300 | 0 | 600 | 5 | Admin-0 capital | Riyadh | NULL | Ar-Riyadh |
| 7301 | 0 | 600 | 3 | Admin-0 capital | Cape Town | NULL | NULL |
| 7302 | 0 | 600 | 2 | Admin-0 capital | Moscow | Moskva | NULL |
| 7303 | 0 | 600 | 2 | Admin-0 capital | Mexico City | NULL | Ciudad de Méxi... |
| 7304 | 0 | 600 | 2 | Admin-0 capita... | Lagos | NULL | NULL |
| 7305 | 0 | 600 | 3 | Admin-0 capital | Rome | NULL | NULL |
| 7306 | 0 | 600 | 1 | Admin-0 capital | Beijing | NULL | NULL |
| 7307 | 0 | 600 | 5 | Admin-0 capital | Nairobi | NULL | NULL |
| 7308 | 0 | 600 | 1 | Admin-0 capital | Jakarta | NULL | NULL |
| 7309 | 0 | 600 | 5 | Admin-0 capital | Bogota | NULL | Bogotá |
| 7310 | 0 | 600 | 3 | Admin-0 capital | Cairo | NULL | Al-Qahirah |
| 7311 | 0 | 600 | 1 | Admin-1 capital | Shanghai | NULL | NULL |
| 7312 | 0 | 600 | 2 | Admin-0 capital | Tokyo | NULL | NULL |
| 7313 | 0 | 600 | 1 | Admin-1 capital | Mumbai | Bombay | NULL |
| 7314 | 0 | 600 | 3 | Admin-0 capital | Paris | NULL | NULL |
| 7315 | 0 | 600 | 3 | Admin-0 capital | Santiago | NULL | NULL |
| 7316 | 0 | 600 | 1 | Admin-1 capital | Kolkata | Calcutta | NULL |

Show All Features

13. The field containing this data is **adm0cap**. The value **1** indicates that the place is a capital. Enter the expression as **"adm0cap" = 1**. Since we want to search only within our previous query results, select Select within selection.
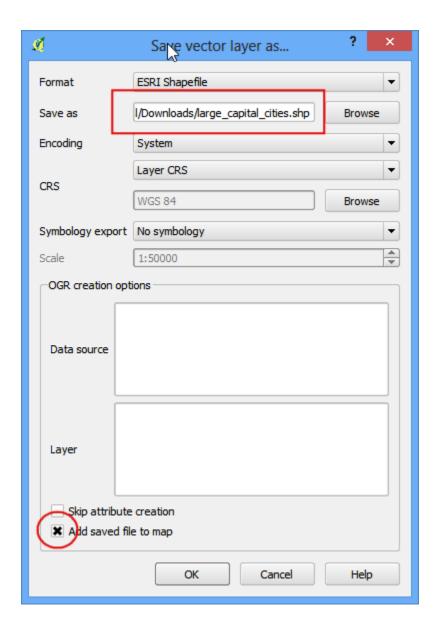
**Select By Expression**

Function List

Search

- namepar
- namealt
- diffascii
- nameascii
- **adm0cap**
- capalt
- capin
- worldcity
- megacity
- sov0name
- sov_a3
- adm0name
- adm0_a3
- adm1name

Selected Function Help

**Field**

Double click to add field name to expression string.

Right-Click on field name to open context menu

Field Values

0
1

Load all unique values    Load 10 sample values

Operators

=    +    -    /    *    ^    ||    (    )

Expression

"adm0cap" = 1

ε  Select
   Add to selection
   Remove from selection
   Select within selection
ε  Select    Close

Output preview:   0

14. Click on Close and return to the main QGIS window. Now you will see a smaller subset of the points selected. This is the result of the second query and shows all places from the dataset that are country capitals as well as have population greater than 10,00,000.

15. Let's save these results to a separate layer. Right-click on the layer and select Save Selection As.

16. Keep the format selection as **ESRI Shapefile** and enter the output name as **large_capital_cities.shp**. Check the box next to Add saved file to map and click OK.

17. The newly created shapefile will be automaticlally loaded into QGIS. Turn off the populated places layer by un-checking the box next to it. Now, you will see only the features from the newly created layer containing capital cities of the world that have population greater than 10,00,000.