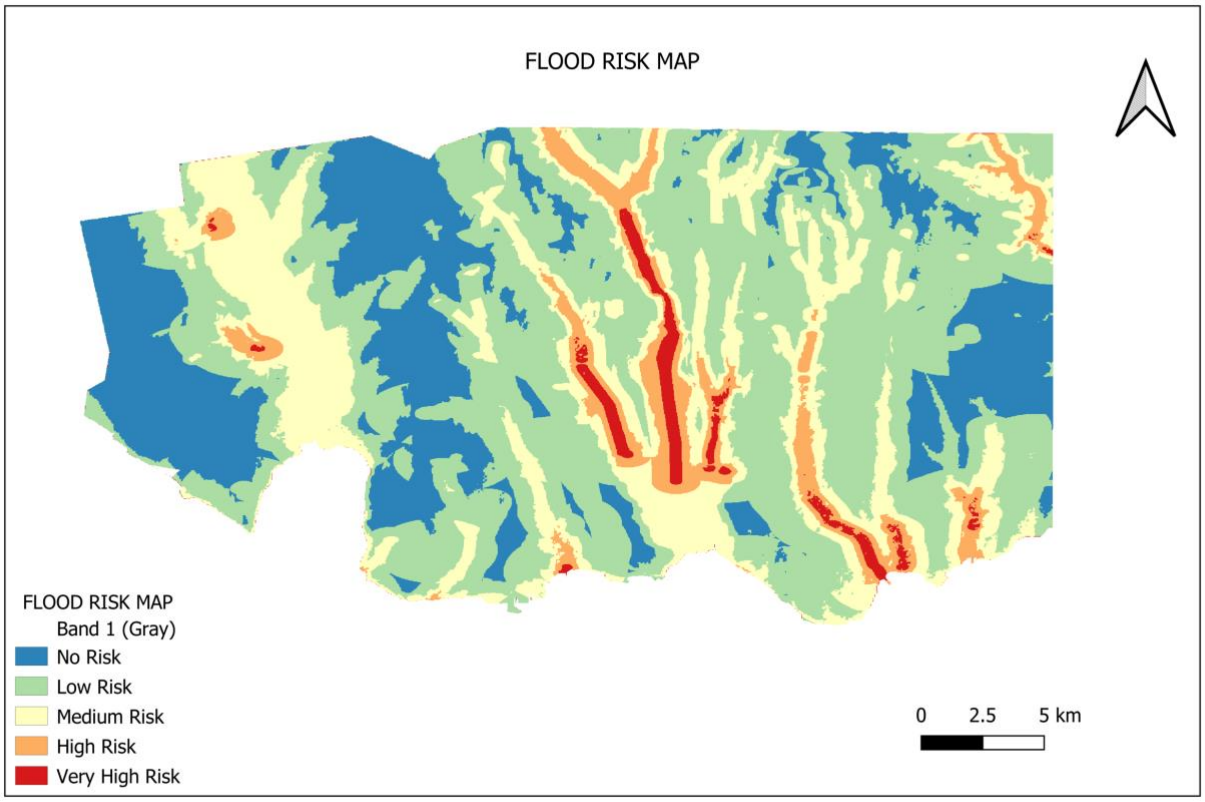
# *FLOOD RISK ANALYSES*




*created by Emre Borazan*

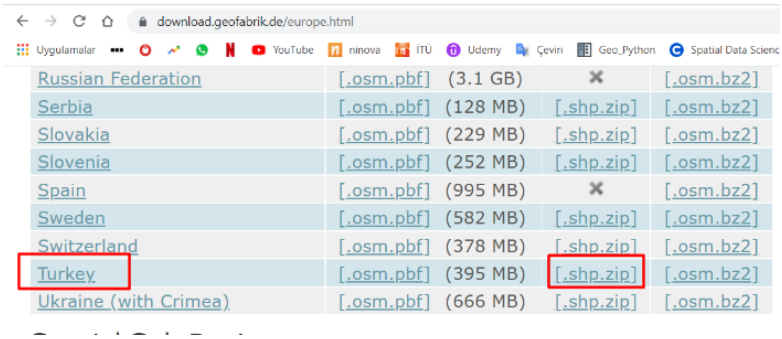
PREPARED BY

EMRE BORAZAN

# Aim of The Project

To predict and determine the possible effects of a flood event, it is important to consider different types of spatial data and analysis techniques.

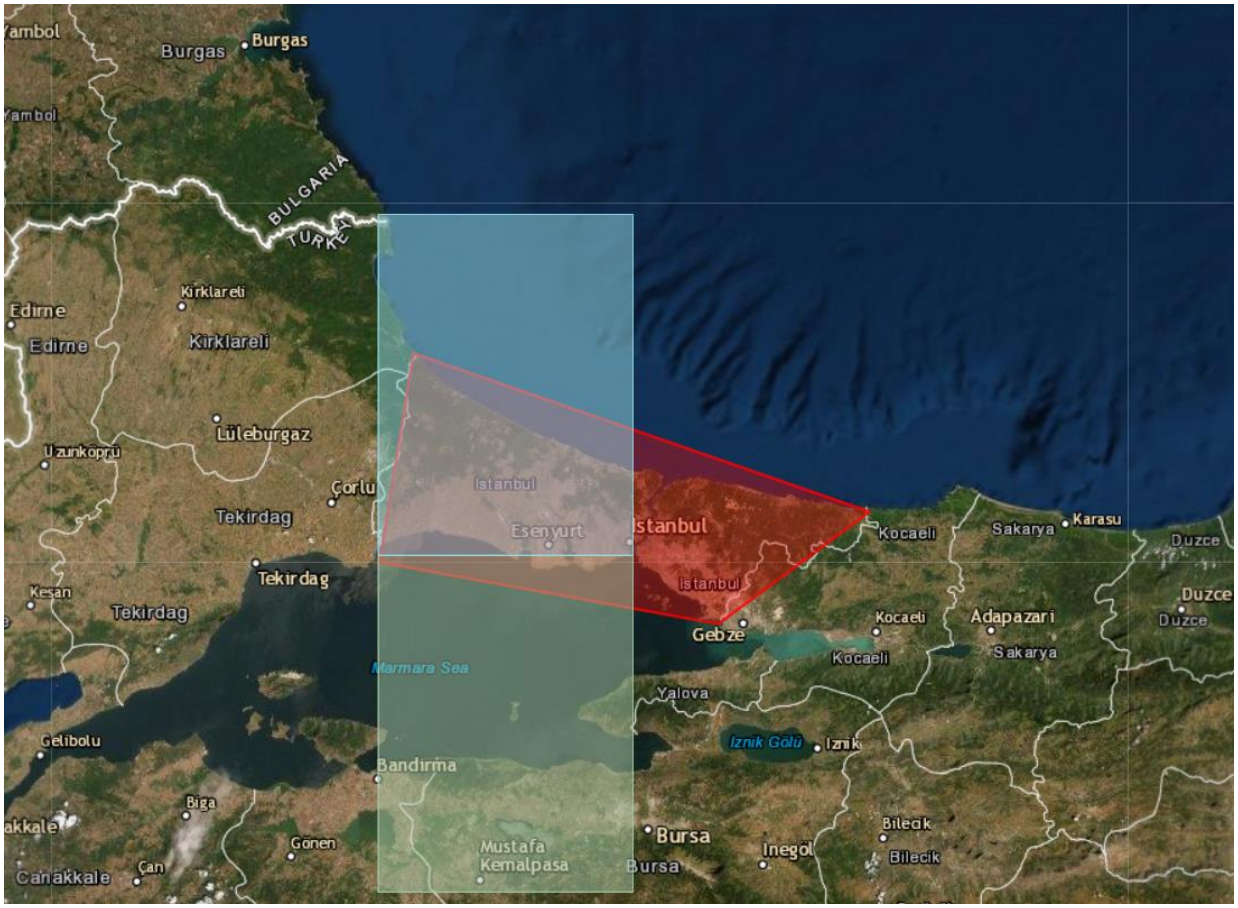
- Download the necessary spatial data by using given sources.

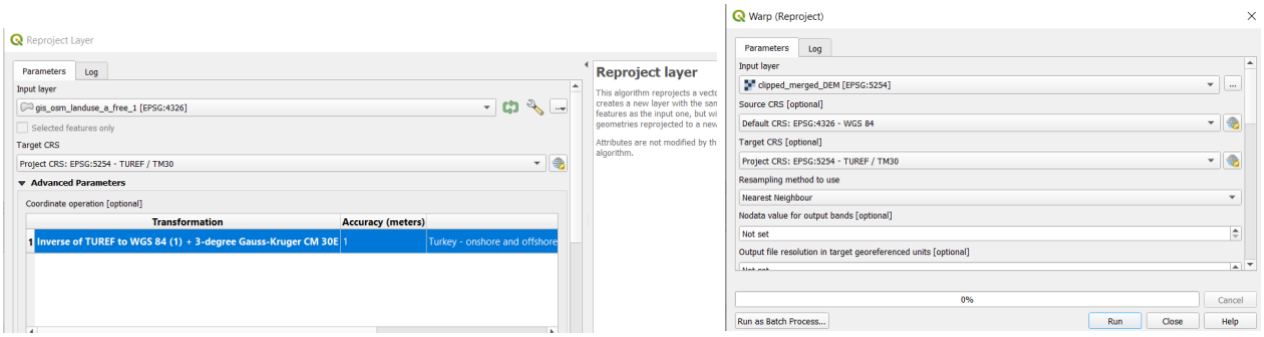



| | | | | |
|---|---|---|---|---|
| Russian Federation | [.osm.pbf] | (3.1 GB) | ✖ | [.osm.bz2] |
| Serbia | [.osm.pbf] | (128 MB) | [.shp.zip] | [.osm.bz2] |
| Slovakia | [.osm.pbf] | (229 MB) | [.shp.zip] | [.osm.bz2] |
| Slovenia | [.osm.pbf] | (252 MB) | [.shp.zip] | [.osm.bz2] |
| Spain | [.osm.pbf] | (995 MB) | ✖ | [.osm.bz2] |
| Sweden | [.osm.pbf] | (582 MB) | [.shp.zip] | [.osm.bz2] |
| Switzerland | [.osm.pbf] | (378 MB) | [.shp.zip] | [.osm.bz2] |
| Turkey | [.osm.pbf] | (395 MB) | [.shp.zip] | [.osm.bz2] |
| Ukraine (with Crimea) | [.osm.pbf] | (666 MB) | [.shp.zip] | [.osm.bz2] |

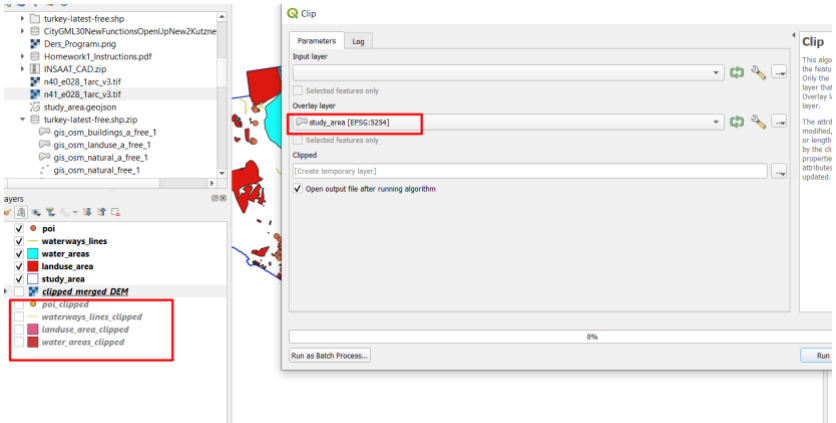
Data downloaded from https://earthexplorer.usgs.gov/ and https://download.geofabrik.de/.

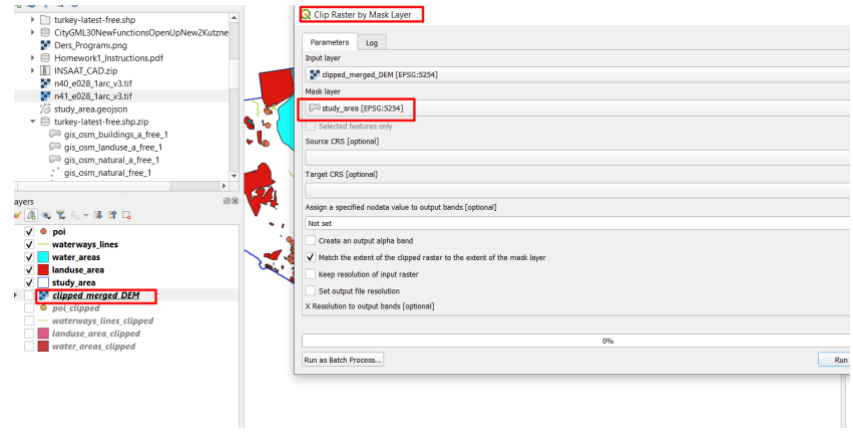
- Raster and Vector data coordinate systems are determined and changed with reporejection.

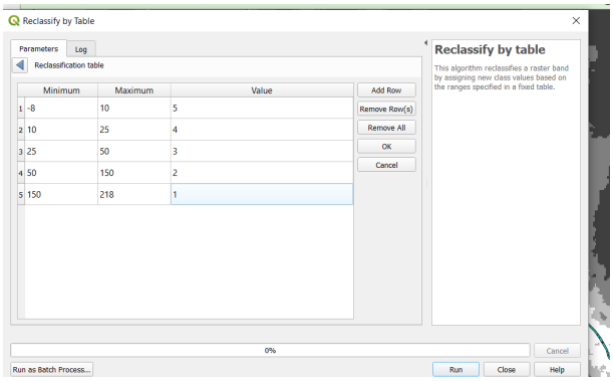


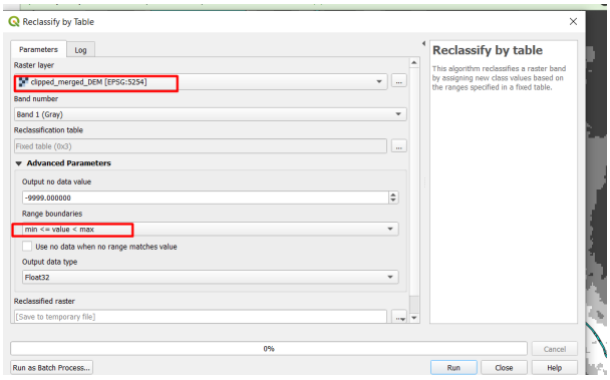



- Subsetted the data according to the given study area's extent. Raster and vector data is clipped according to study area.



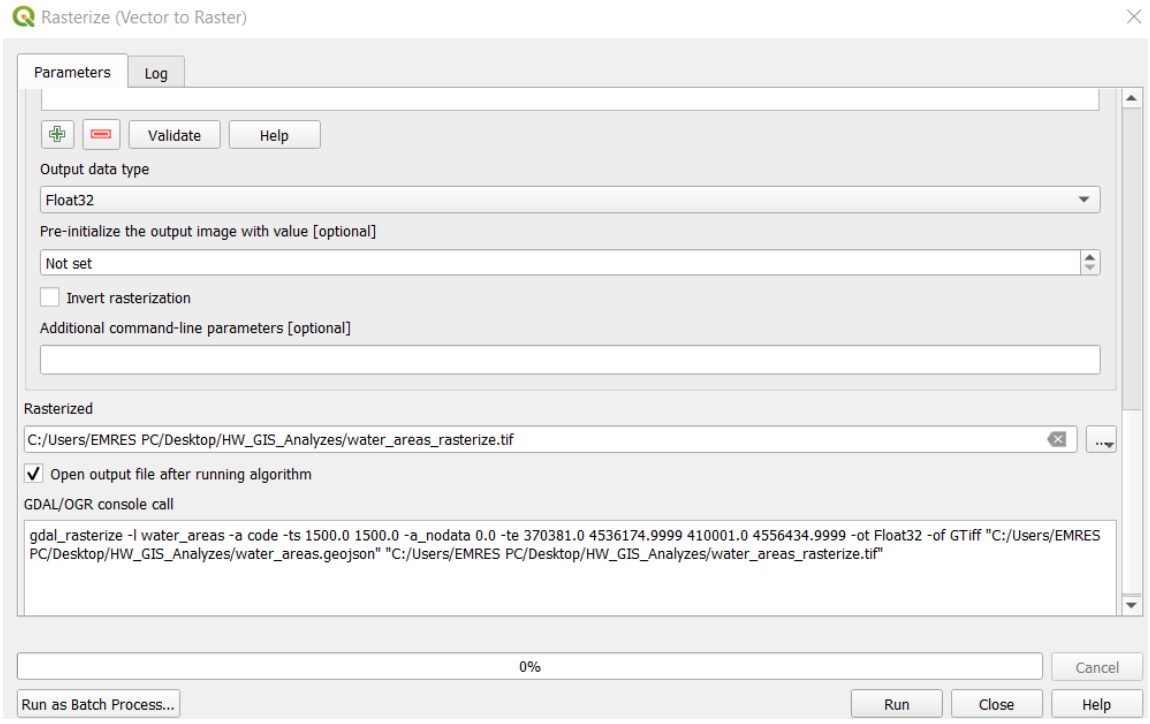





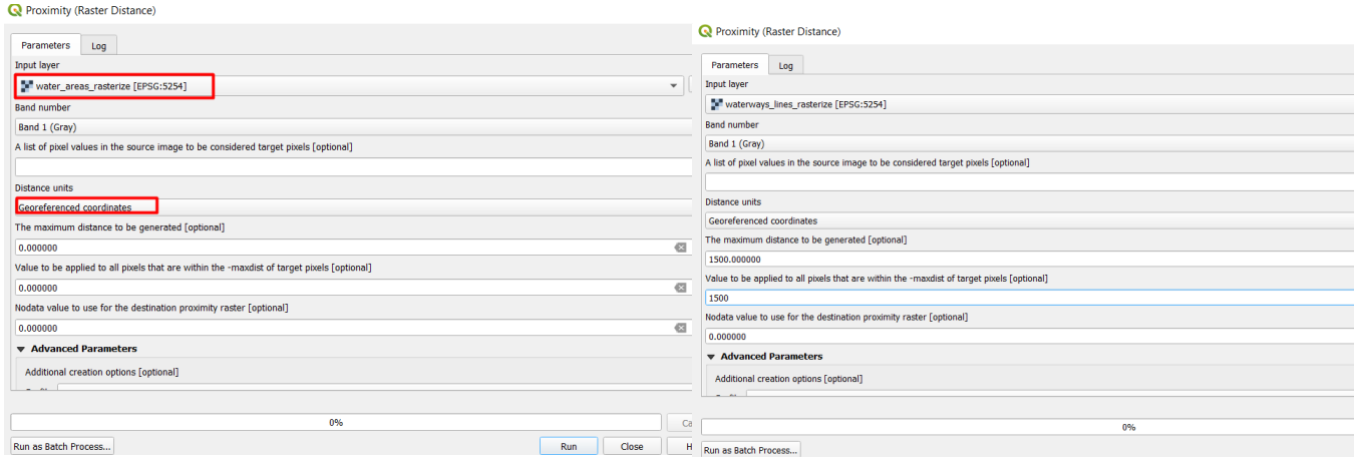




DEM data are reclassified according to Table 2.

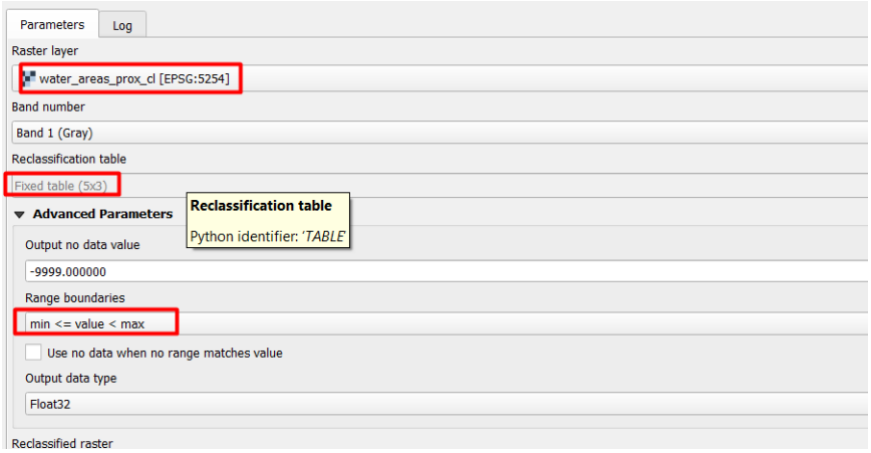
## Rasterized Process

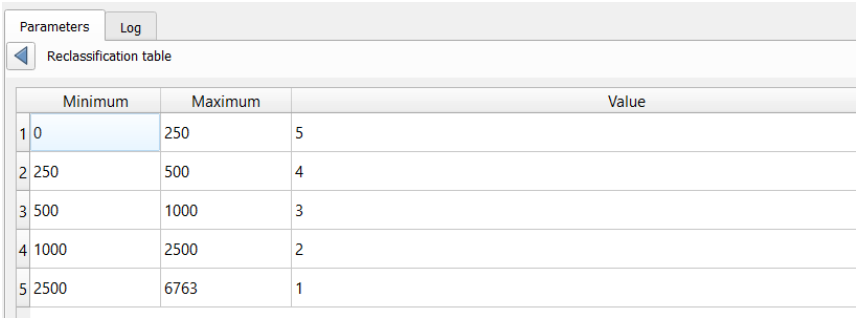



Water areas and waterways are rasterized to apply proximity analyses. Output extend is selected by study area.

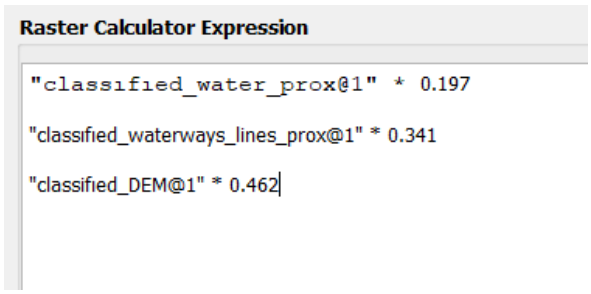



Then proximity analyses is applied raster data of water areas and waterways lines, then output is reclassification according to table 3 in homework instruction pdf.

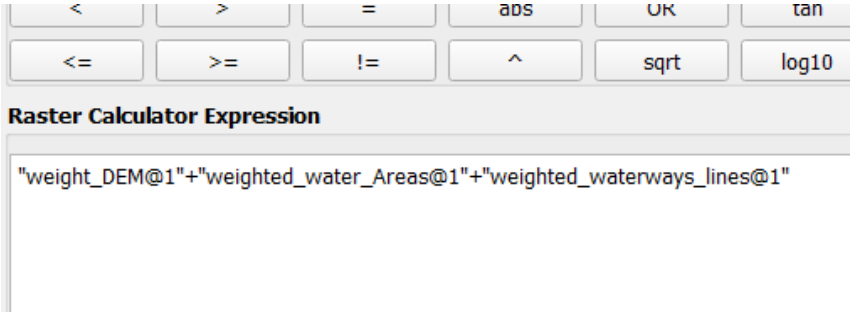


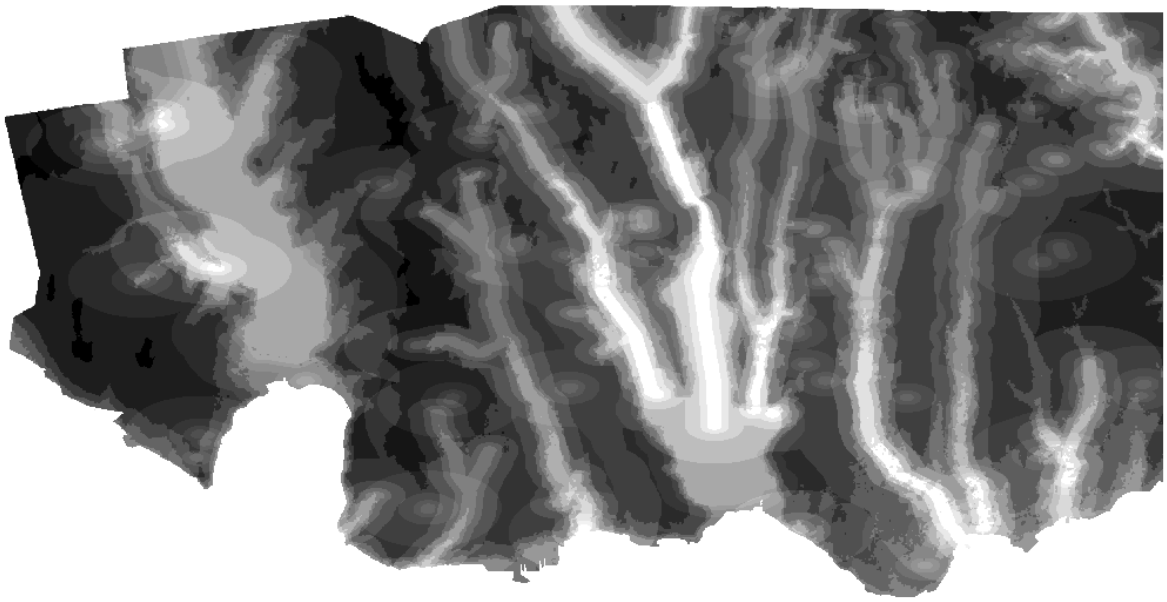

| | Minimum | Maximum | Value |
|---|---|---|---|
| 1 | 0 | 250 | 5 |
| 2 | 250 | 500 | 4 |
| 3 | 500 | 1000 | 3 |
| 4 | 1000 | 2500 | 2 |
| 5 | 2500 | 6763 | 1 |




Reclassified DEM, Proximity Water Bodies and Waterways are weighted separately with raster calculator.




Classıfied weighted data are calculated to total weighted.



*Total Weighted Raster Data*

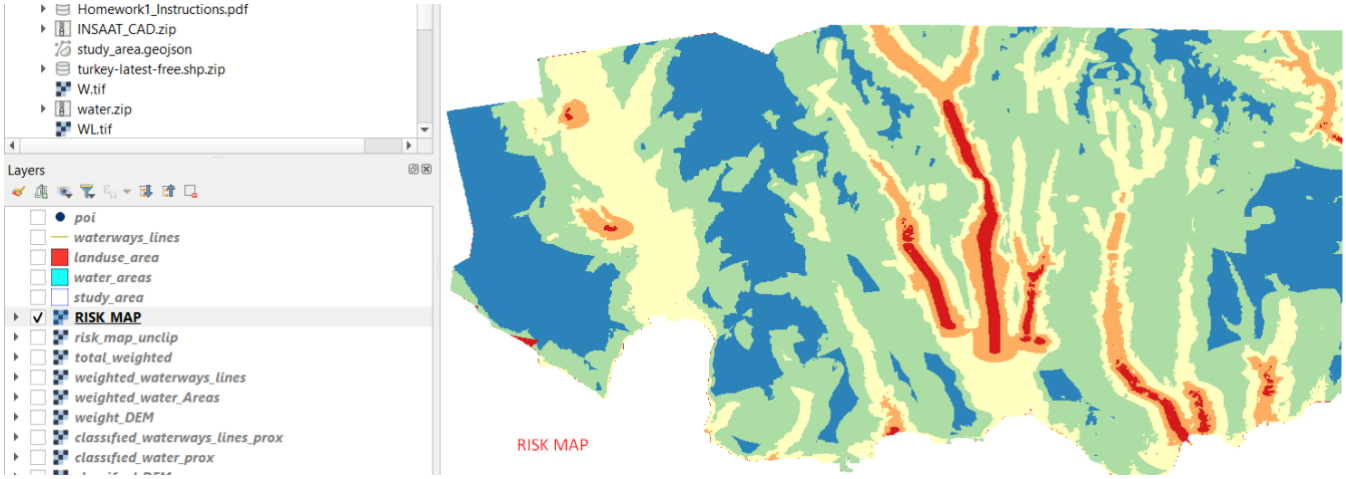
Total weighted raster data is observed. After total weighted data is reclassified according to parameters for risky areas.

Reclassify by Table

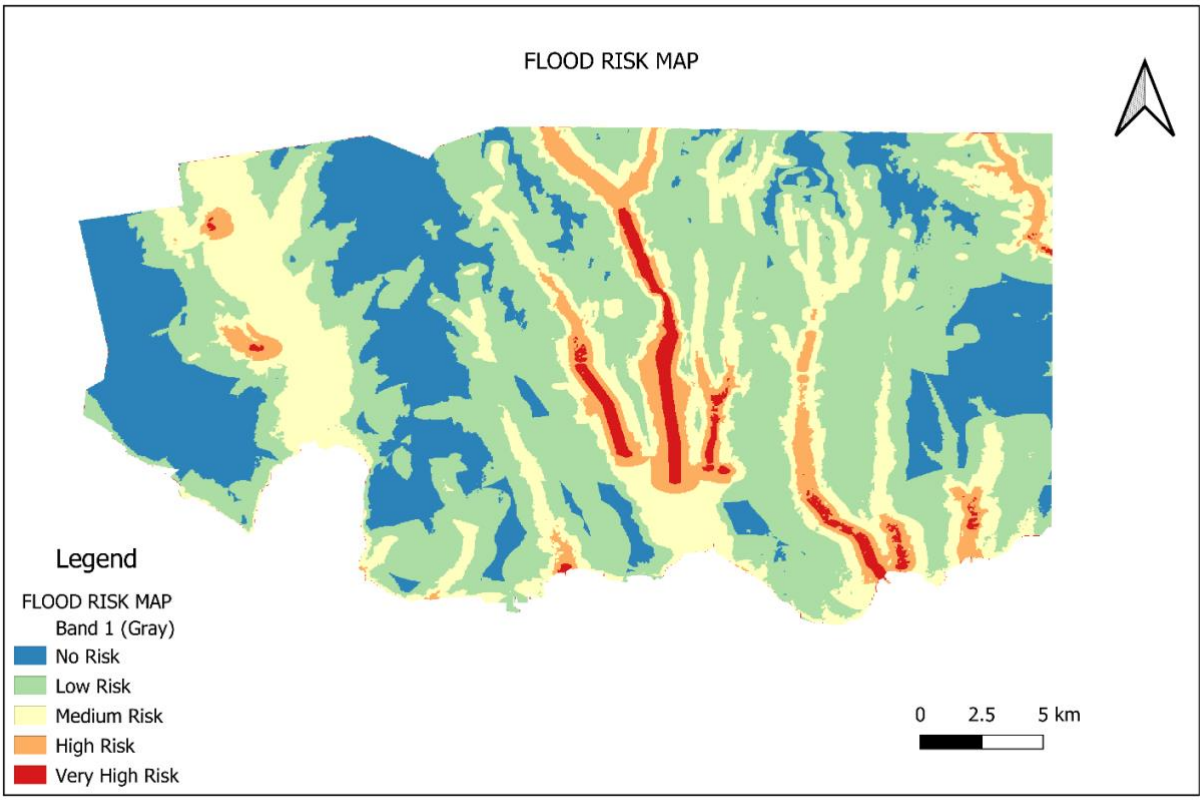
Parameters | Log

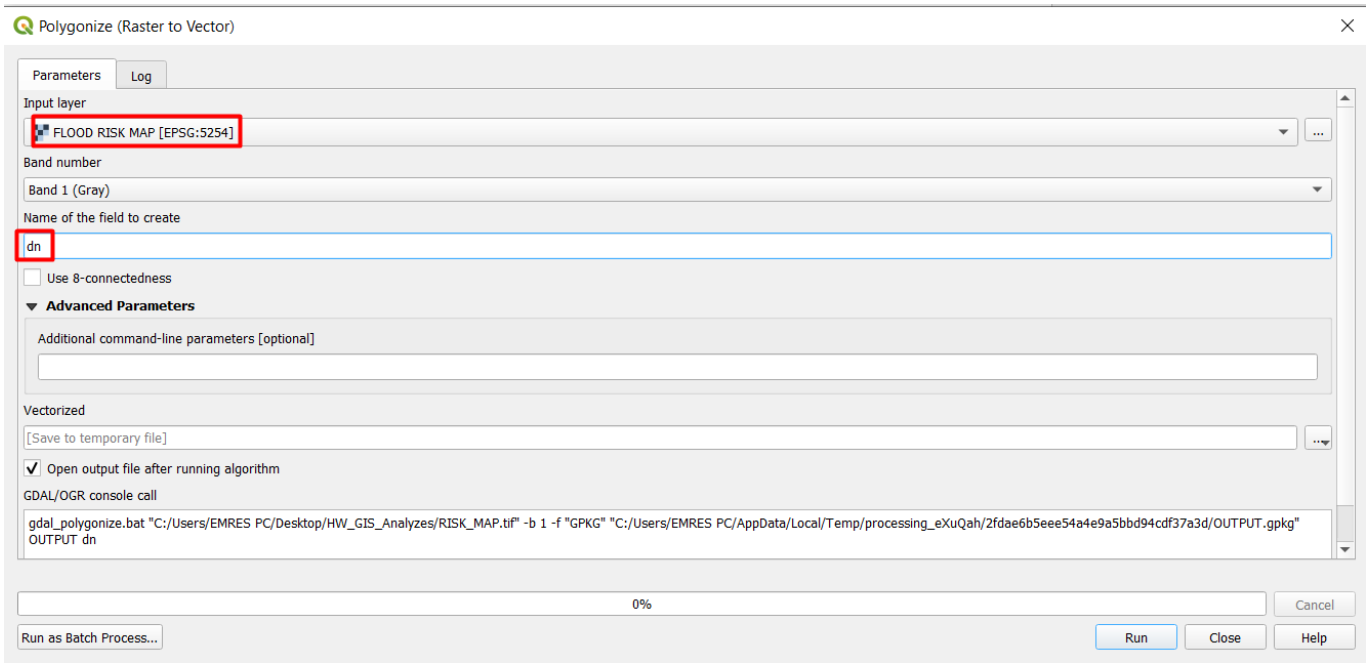
Reclassification table

| | Minimum | Maximum | Value |
|---|---|---|---|
| 1 | 0 | 2 | 1 |
| 2 | 2 | 3 | 2 |
| 3 | 3 | 4 | 3 |
| 4 | 4 | 5 | 4 |
| 5 | 5 | 6 | 5 |

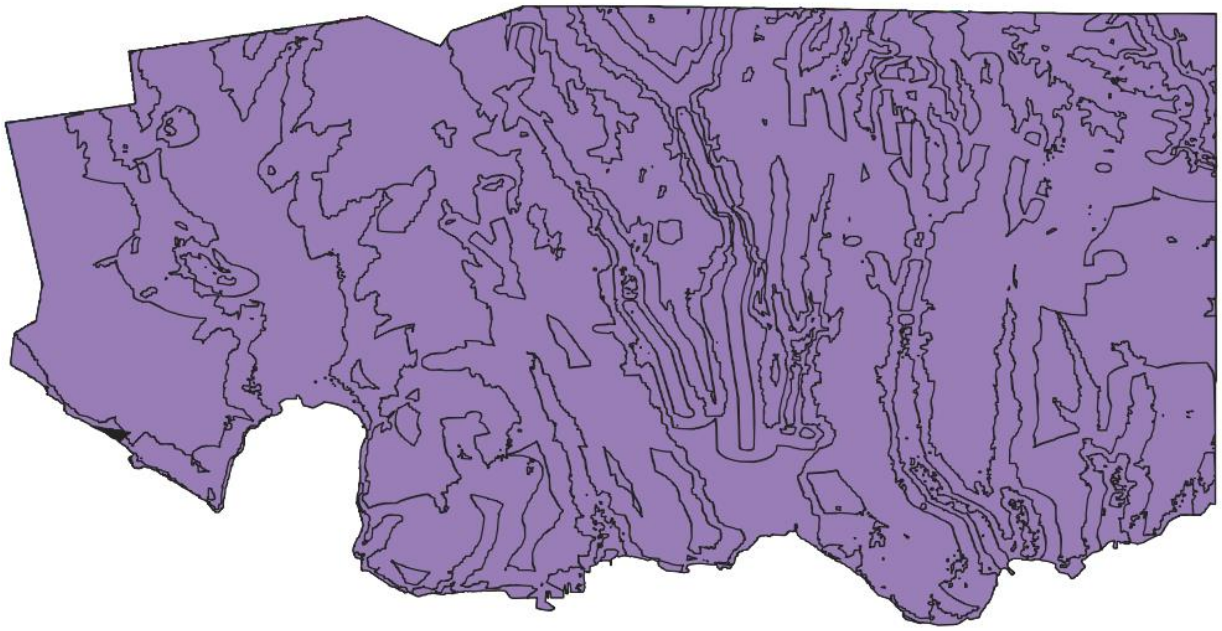



With usıng symbology risk maps obtain according table 1.



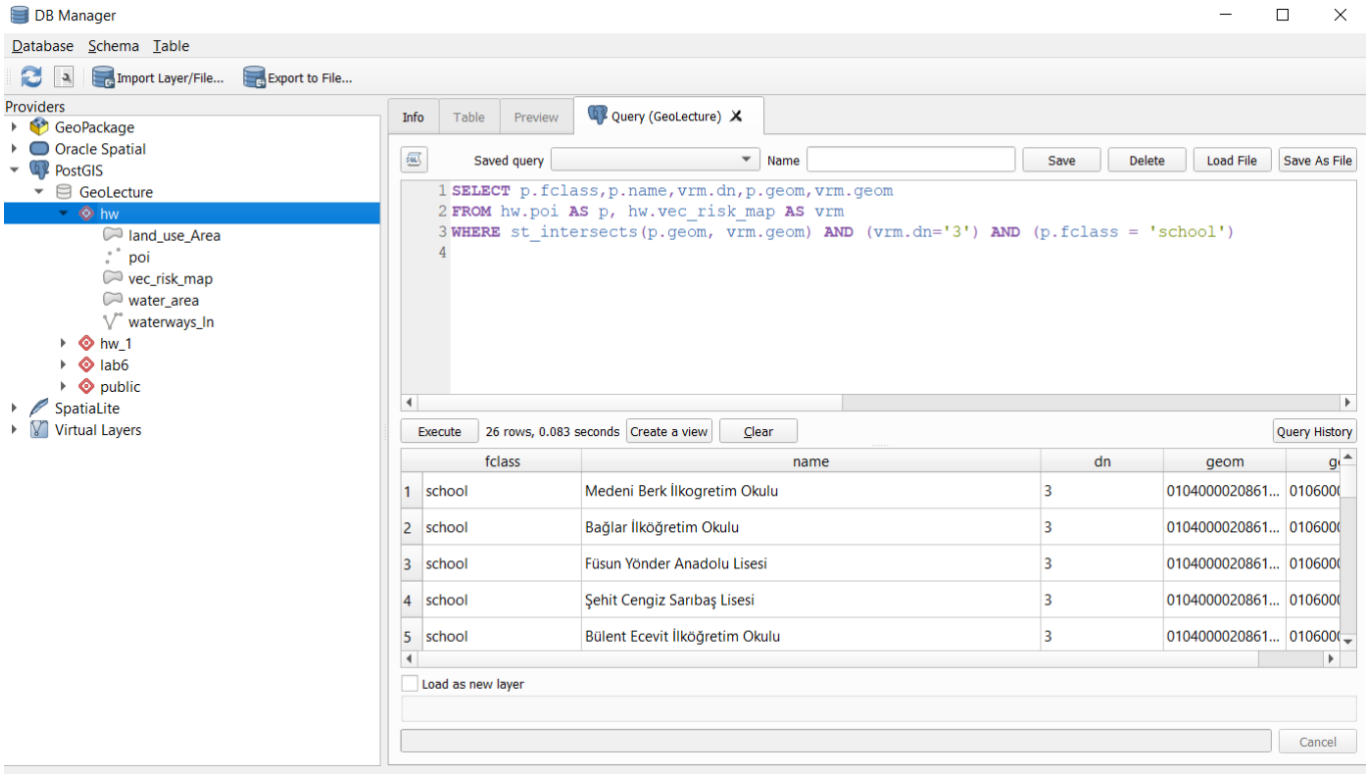




Vectorising is applied to Risk Map thus risk map converted to upload able to PostGIS. Therefore, to convert with each ısland as separate polygon each risk level detectable.



Queries

- Import required data and the result of the analysis into PostGIS environment and perform spatial queries (by using SQL) to answer the following questions:
- Which schools are located in Medium Risk areas?




QUERY

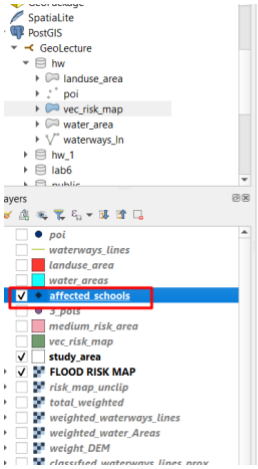
SELECT p.fclass,p.name,vrm.dn,p.geom,vrm.geom

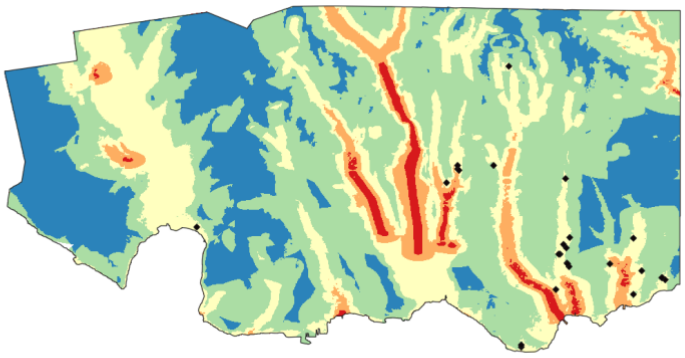
FROM hw.poi AS p, hw.vec_risk_map AS vrm

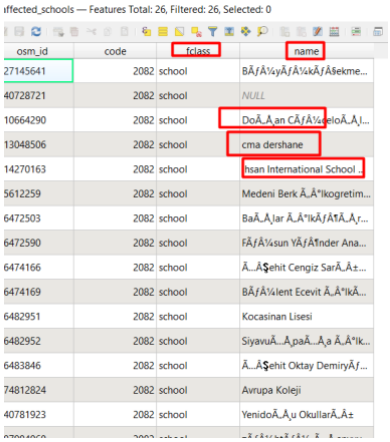
WHERE st_intersects(p.geom, vrm.geom) AND (vrm.dn='3') AND (p.fclass = 'school')

Query is executed.

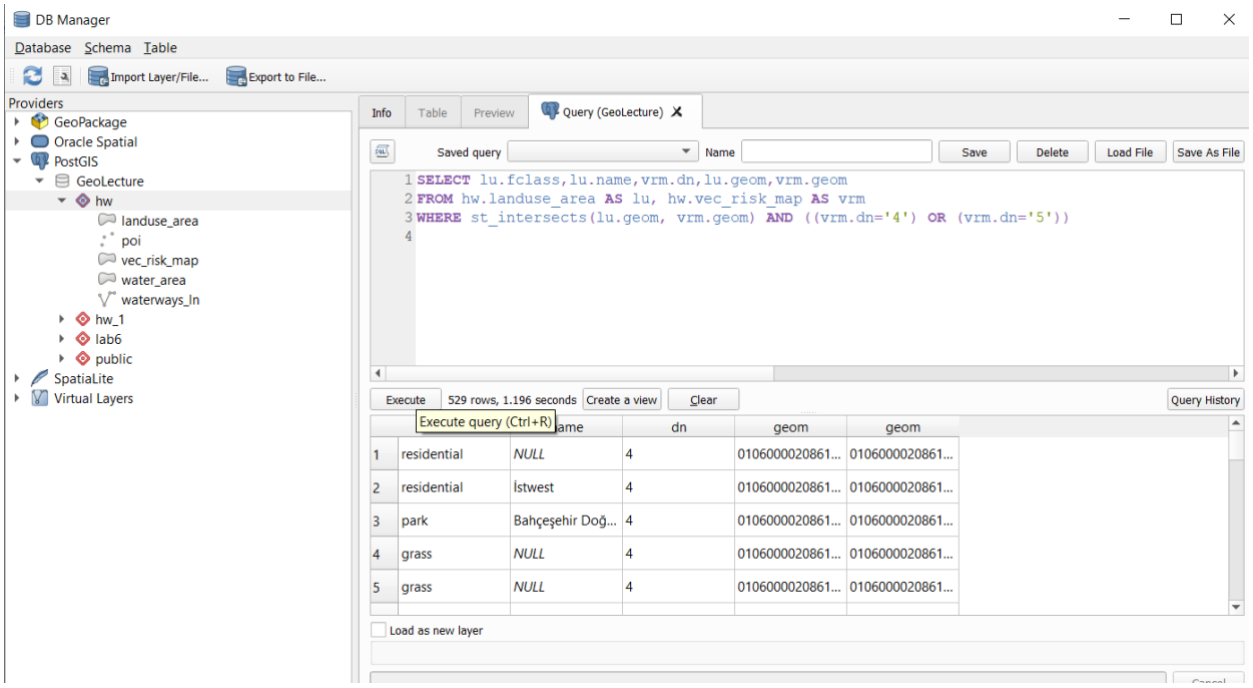
This output obtained with extract by location and extract selected feature tools and field calculator.






- What is the total area of residential areas intersected with High-Risk or Very High-Risk areas?



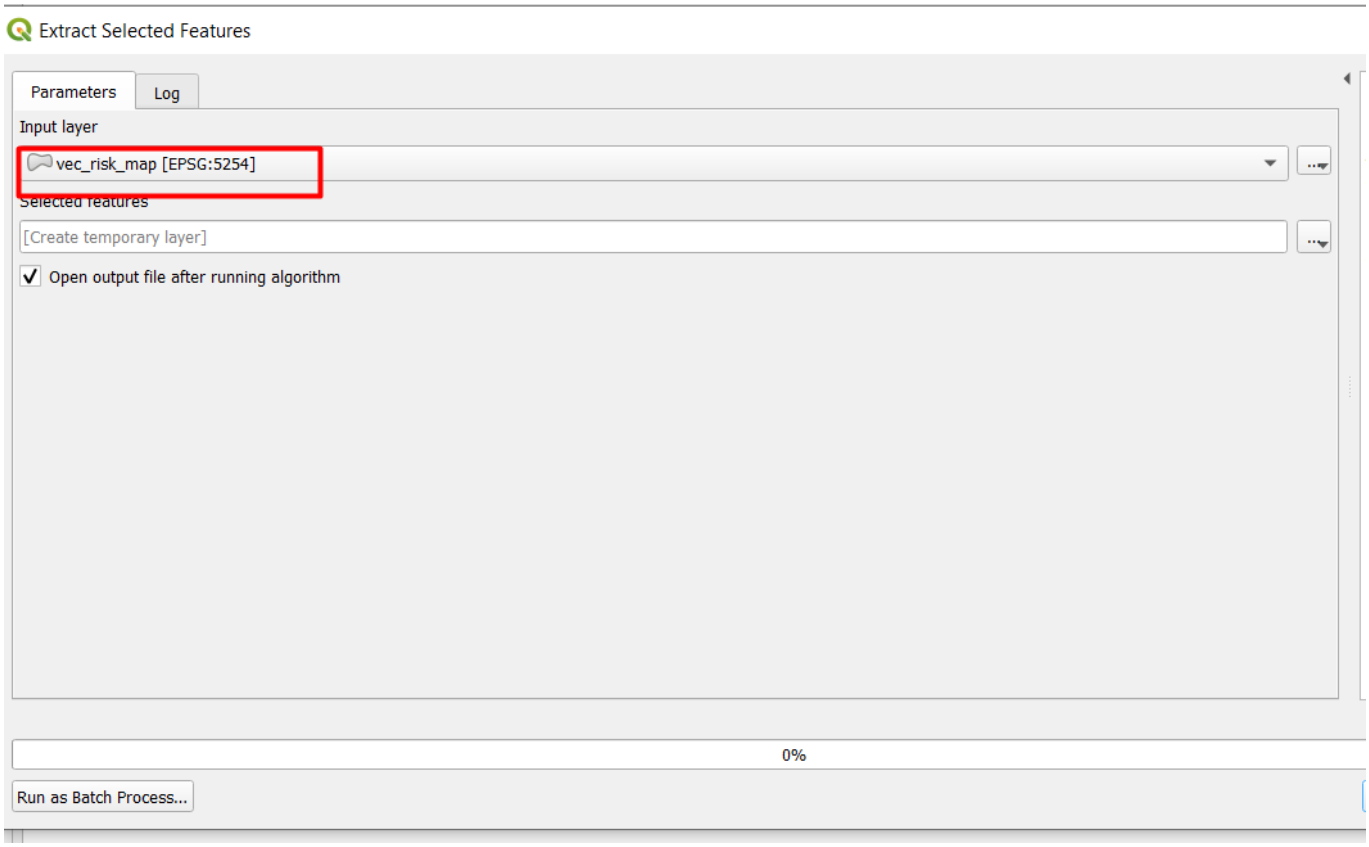
SQL CODES

SELECT lu.fclass,lu.name,vrm.dn,lu.geom,vrm.geom

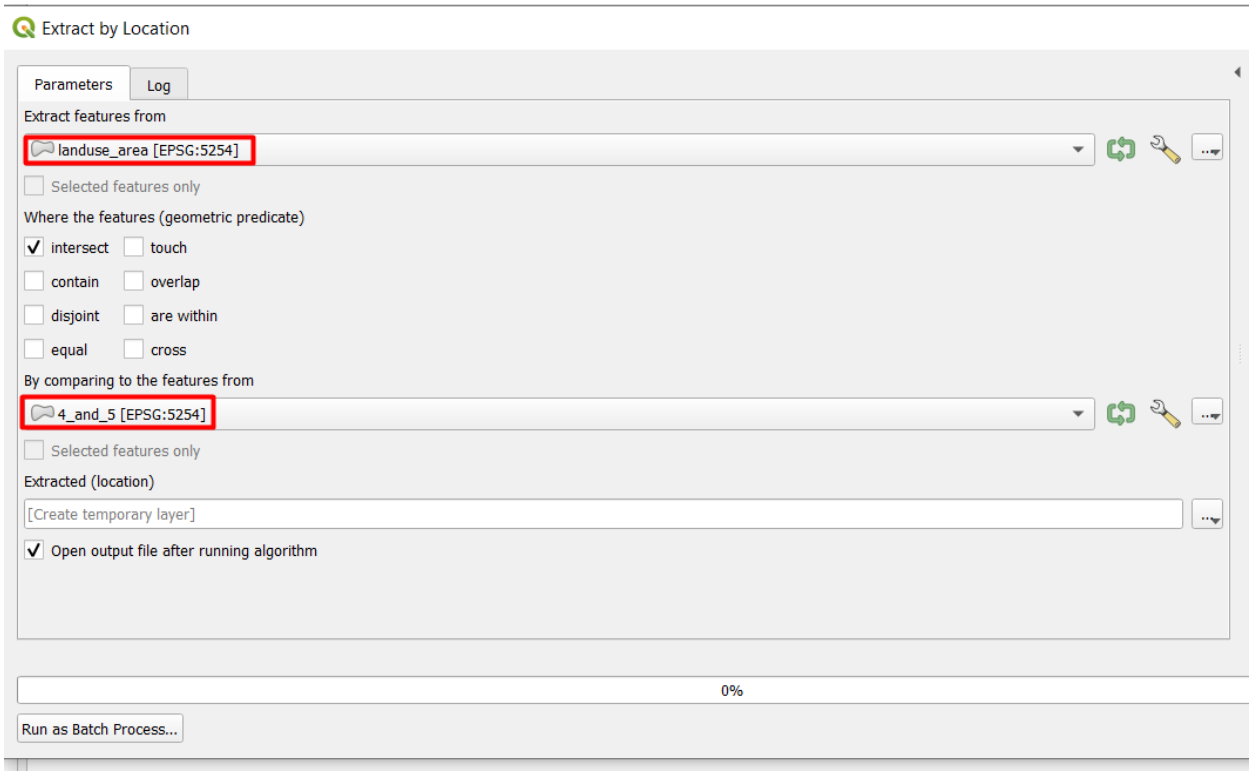
FROM hw.landuse_area AS lu, hw.vec_risk_map AS vrm

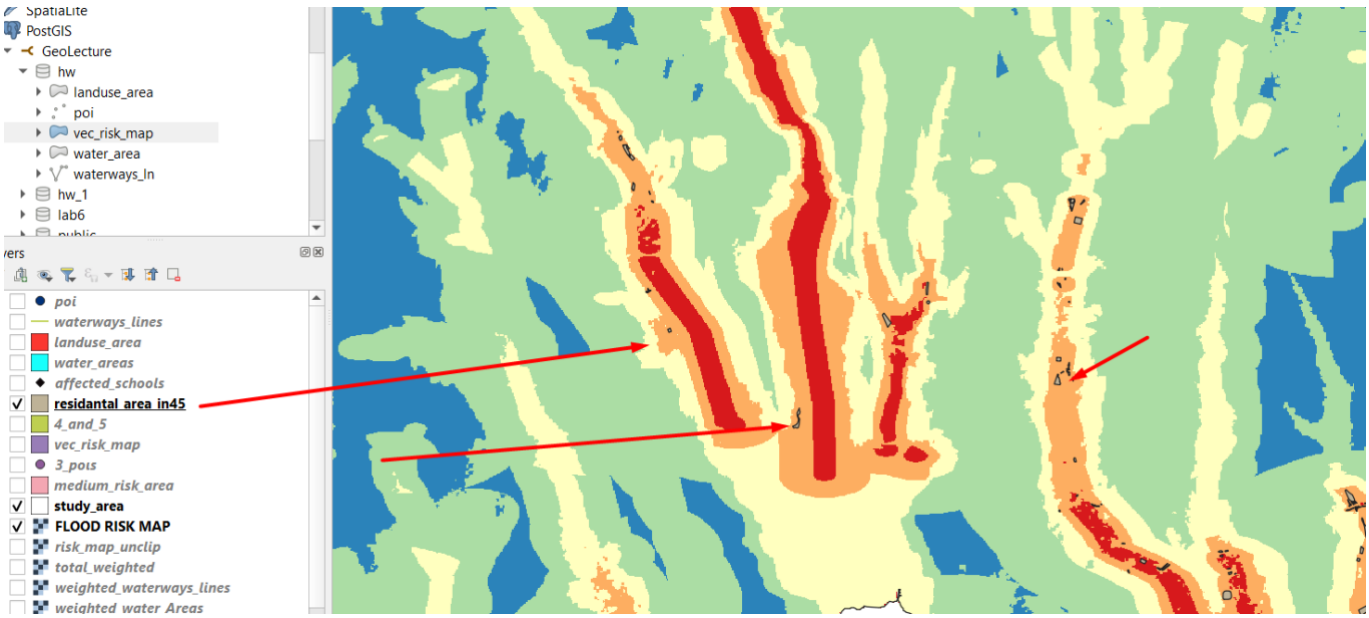
WHERE st_intersects(lu.geom, vrm.geom) AND ((vrm.dn='4') OR (vrm.dn='5'))

The calculation of total area of residential areas is calculated manually calculations.



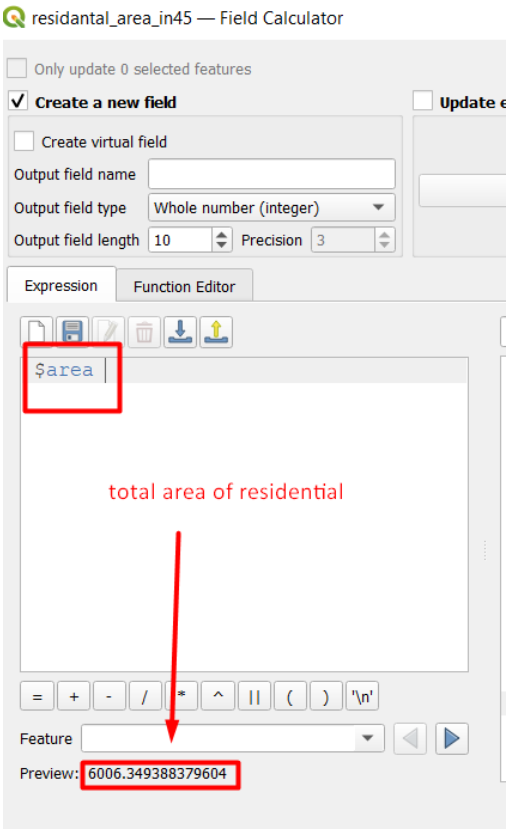
High and Very high risky areas are select features by vectorized risky map.




Residential areas intersected with High-Risk or Very High-Risk areas are observed.

Total residential area is calculated by field calculater.


residantal_area_in45 — Field Calculator
Only update 0 selected features
Create a new field
Update e
Create virtual field
Output field name
Output field type
Whole number (integer)
Output field length
10
Precision
3
Expression
Function Editor
$area
total area of residential
=
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Feature
Preview:
6006.349388379604