QGIS Training Modules

Module 2 Data Visualisation and Query

Data Visualisation and Query (45–60 min)

1. Introduction

This QGIS module focuses on data visualisation and querying. The instructions are written for Q-GIS 3.2 version and above. In this module, you will learn the following:

- Create points
- Labelling
- Data query
- Symbology and Data Visualisation
- Count the number of points in a polygon
- Creating new fields in attribute table

1.1. Data Folder

To access data for this module, please contact Cefas at gissupport@cefas.co.uk and we will share the data with you and a link to a supplementary tutorial video.

The data folder contains the following:

Data Folder:

- training_data_vms.csv
  - fields:
    - speed- fishing speed
    - gear – fishing gear
    - d_harbour – departure harbour
    - r_harbour – return harbour
    - d_date – departure date
    - r_date – return date
    - catch- kg of fish caught
    - lon-easting
    - lat- northing
- coastline.shp
- mpa_scotland.shp
- towns_scotland.shp
- Module2_Data_Visualisation_and_Query.qgs

The description of the data can be found in the section 4.3 Metadata.

2. Instructions

2.1. Open QGIS Project:

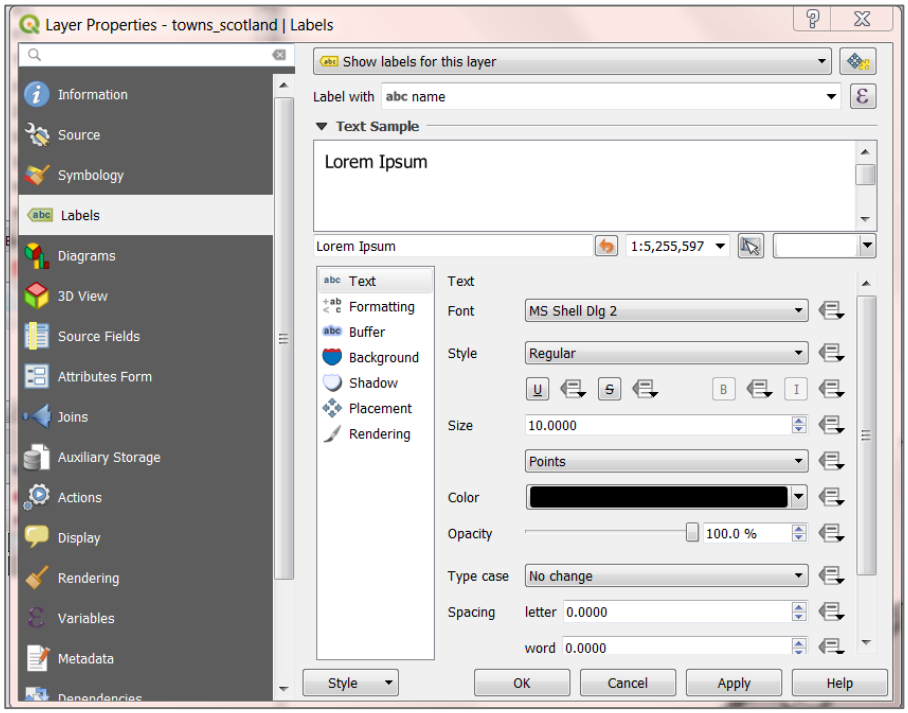
Navigate to the folder where you saved your data and double click on Module2_Data_Visualisation_and_Querying.qgs. The QGISs project contains UK/Irish coastline, MPAs and major Scottish towns shapefiles. If the links to the sources are broken, you will have to navigate to the places where you have saved your data and add a new source link.

2.2. Create VMS points from a csv file:

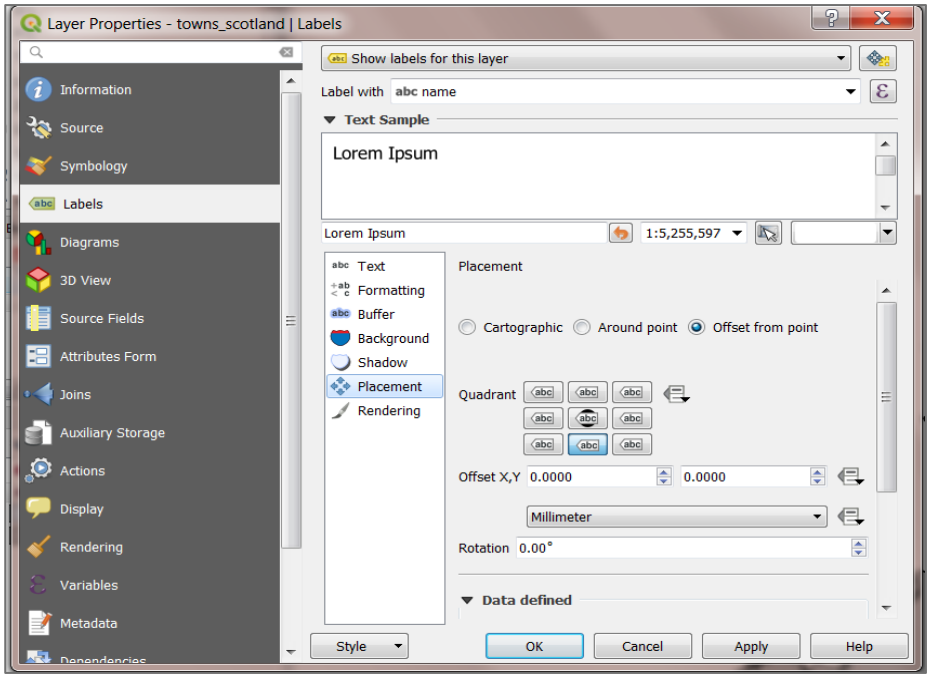
Open Data Source Manager (CTRL+L) or click on  and select Delimited Text  . File Name navigate to 'data 'folder and click on training_data_vms.csv file. Choose Layer Name and in Geometry Definition X field as lon and Y field as lat. Geometry CRS is selected to OSGB 1936 /British National Grid (EPSG: 27700) and click Add, Close. This layer is only virtual. In order to save it go Right click on it in the table of contents (TBO) → Save As . In File Name browse to the 'data' folder location and chose name 'vms.shp' This will be saved as a shapefile and loaded to your map document. You can remove the original layer (Right click-remove).

2.3. Create Labels:

Right click on towns_scotland → Properties →Labels → Show labels for this layer and select the town name column:



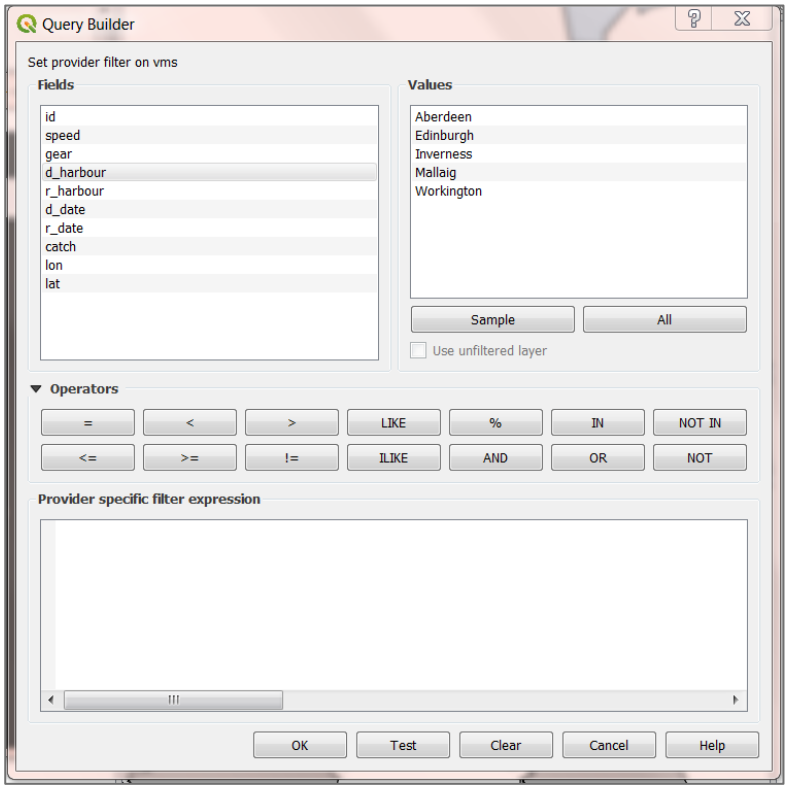
Place the labels below the points: *Placement* → *Offset from point* → *Apply/OK* (screenshot below).



2.4. Change the style of VMS points and querying:

Right click on *vms* → *Properties* → *Symbology* where you can change colour or size of the points. Then click on *Source* → Query Builder and try to type in a query which selects (Task1 - for results see page 7) only the points that depart from Aberdeen and Inverness, have speed between 2-4 and gear type is Boat Dredges (DRB).

(Hint: by left- clicking on the field and then click All, you will get all the attribute values that are present in the field. The result is at the end of this module with more SQL examples.)



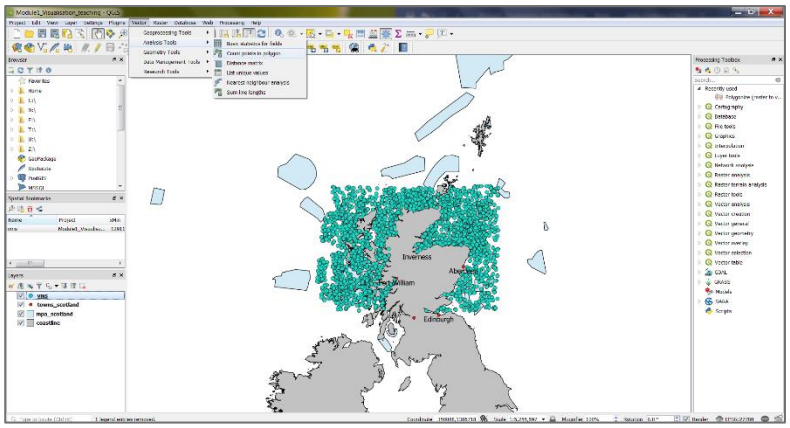
You can explore the result of which VMS points belong to the specific ports and use different SQL statements and see how they change the output. More SQL tasks below with answers at the end. For the purpose of this module, however, we are going to use all the data. Therefore, you can delete the statement in *Query Builder and* click *Apply/OK.*

Task 2:

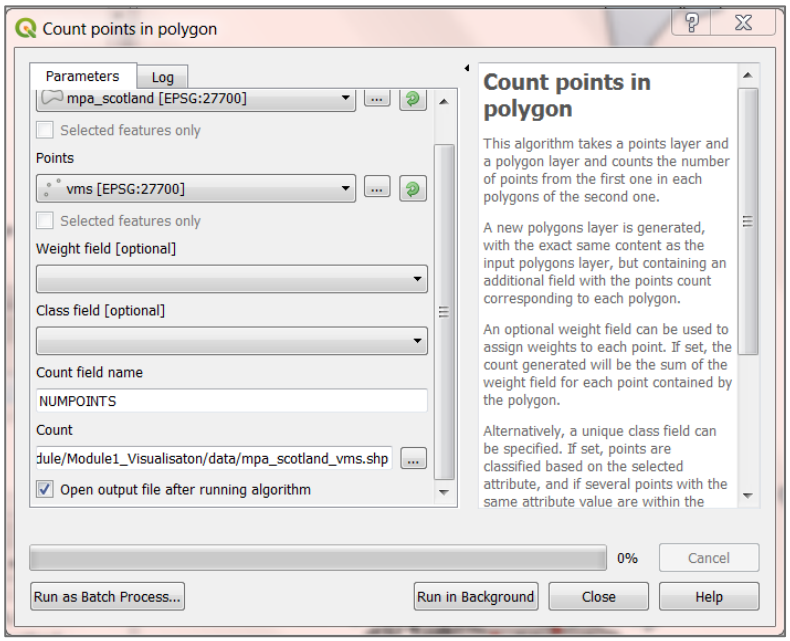
Select all the data points where the ships fished between 1st January 2015 and 15th February 2015 and they landed in Mallaig (Results at page 8).

2.5. Count the number of points within MCZ:

Vector → Analysis Tool → Count points in polygon



Add the following fields and save the new shapefile in your 'data' folder. Uncheck 'Open output file after running algorithm':



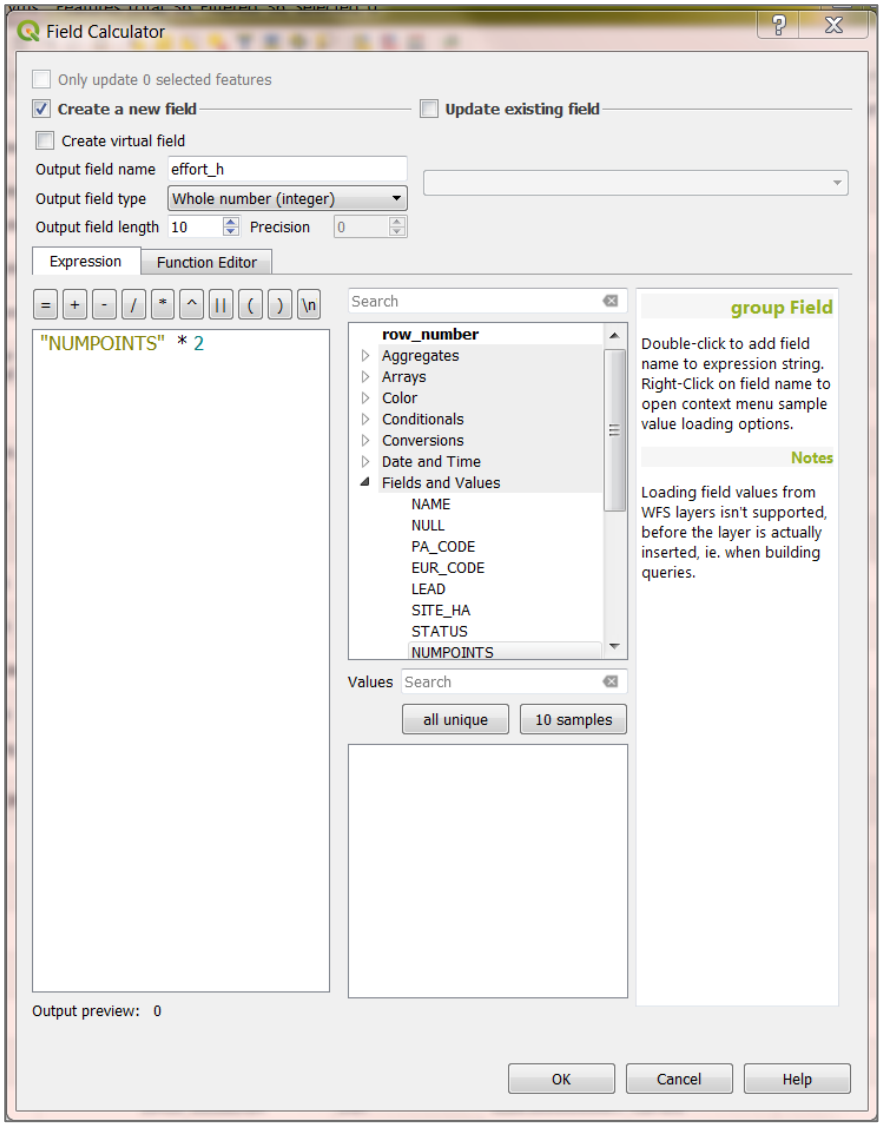
2.6. Add mpa_scotland_vms.shp:

CTRL+L and click add vector and navigate to your 'data' folder where count points in polygon function was saved.

2.7. Open attribute table and add a new field:

Right click on mpa_scotland_vms → Open Attribute Table → *Edit mode*

Open field calculator and create the following field:

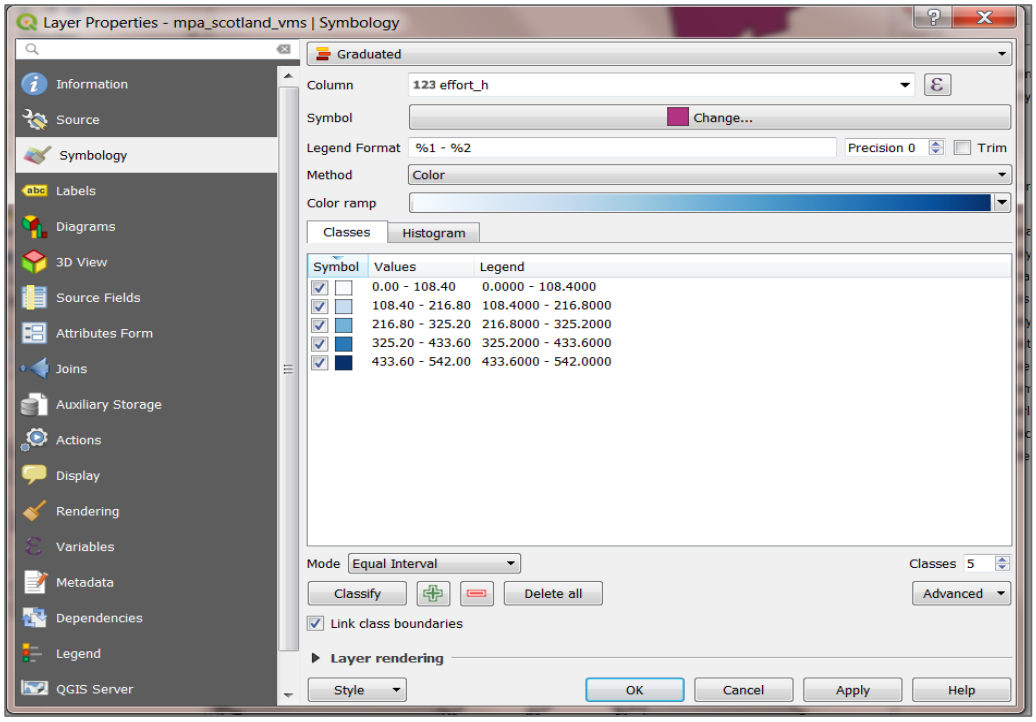


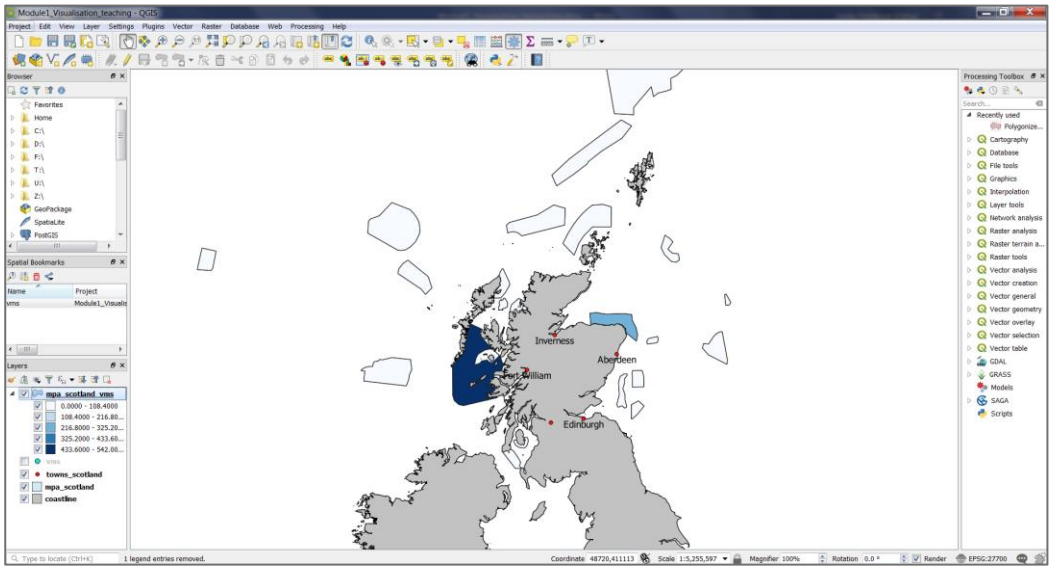
Click the editing tool again to navigate out of the editing session and click save edits.

We calculated fishing effort per MPA as each point has temporal resolution of 2 hours (number of points per MPA * 2).

2.8. Change symbology of MPAs:

Right click mpa_scotland_vms → Properties → Symbology → Graduated. Pick effort_h column and click on *Classify* and Apply/*OK*. You can also change the colour ramp.





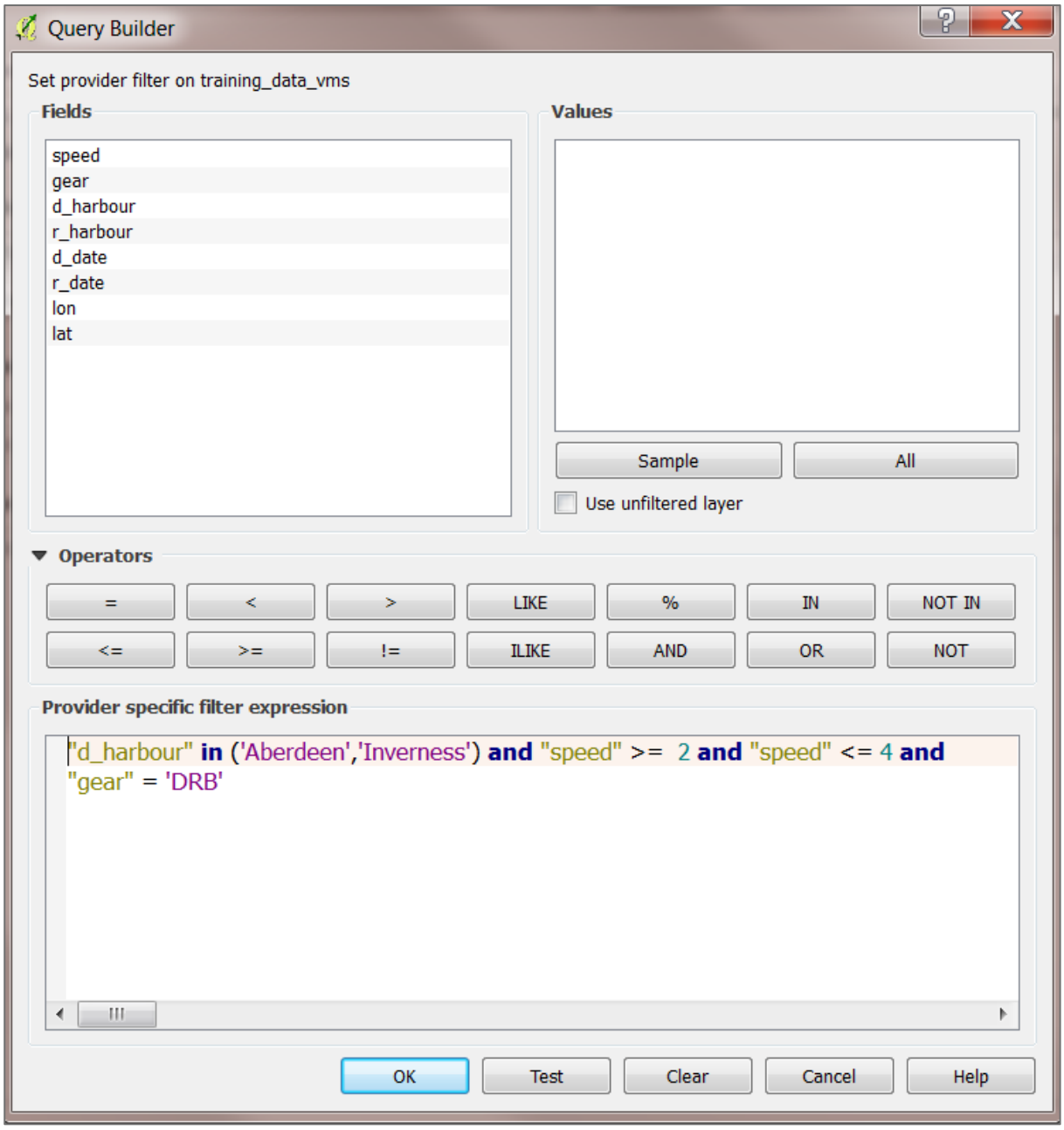
This step visually differentiates MPAs from each other depending on the fishing effort occurring in them. You can use identify tool  to find out how much fishing effort is in a specific MPA. For the identify tool to work, you must highlight mpa_scotland_vms layer in the table of contents first (right click).

Task 3:

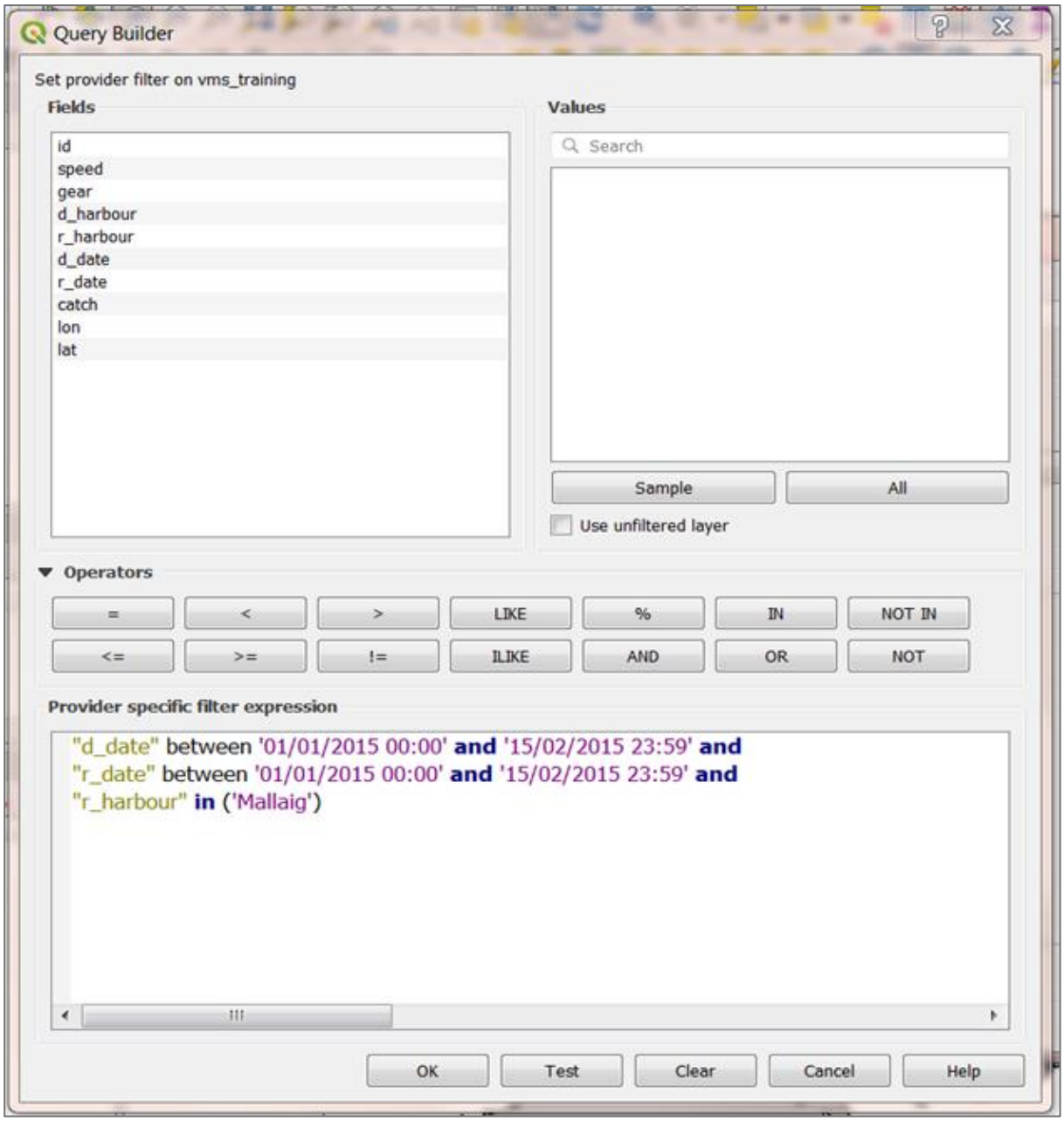
Select MPAs that have effort greater or equal to 100 and their STATUS is proposed. The result is in the answers (Results at page 9).

Answers

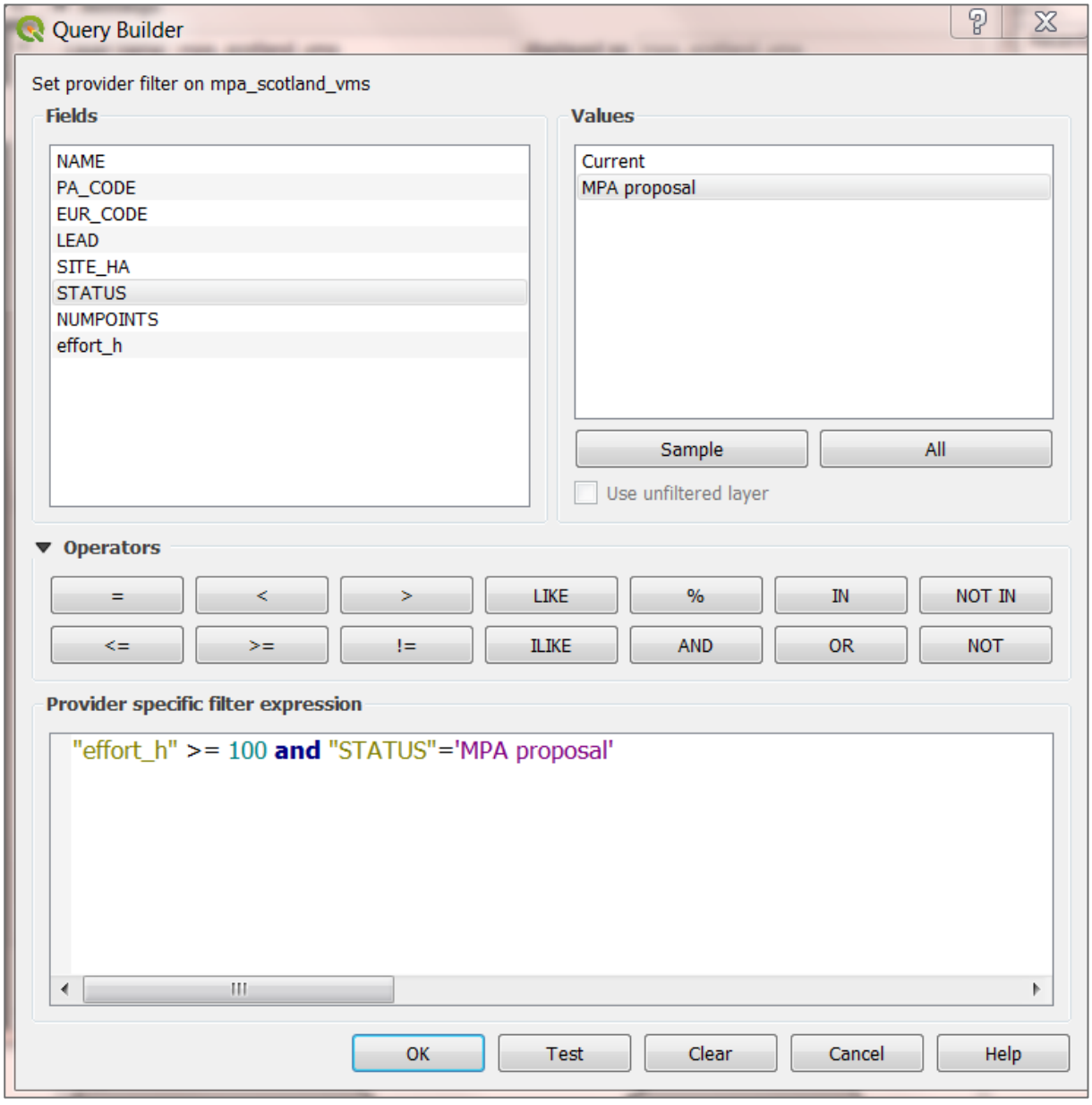
Task 1:



Task 2:


Query Builder
Set provider filter on vms_training
Fields
id
speed
gear
d_harbour
r_harbour
d_date
r_date
catch
lon
lat
Values
Search
Sample
All
Use unfiltered layer
Operators
=
<
>
LIKE
%
IN
NOT IN
<=
>=
!=
ILIKE
AND
OR
NOT
Provider specific filter expression
"d_date" between '01/01/2015 00:00' and '15/02/2015 23:59' and
"r_date" between '01/01/2015 00:00' and '15/02/2015 23:59' and
"r_harbour" in ('Mallaig')
OK
Test
Clear
Cancel
Help

Task 3 :


Query Builder
Set provider filter on mpa_scotland_vms
Fields
NAME
PA_CODE
EUR_CODE
LEAD
SITE_HA
STATUS
NUMPOINTS
effort_h
Values
Current
MPA proposal
Sample
All
Use unfiltered layer
Operators
=
<
>
LIKE
%
IN
NOT IN
<=
>=
!=
ILIKE
AND
OR
NOT
Provider specific filter expression
"effort_h" >= 100 and "STATUS"='MPA proposal'
OK
Test
Clear
Cancel
Help

3. Additional Resources

https://docs.qgis.org/3.10/en/docs/training_manual/basic_map/symbology.html#basic-ty

https://www.qgistutorials.com/en/docs/3/basic_vector_styling.html

4. Acknowledgement

4.1. Authors

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4.2. Links

Material for cover page:

1. https://images.app.goo.gl/oqQ2ies3WvbBNZDA9
2. https://moderndiplomacy.eu/2019/02/26/seize-the-opportunities-of-digital-technology-to-improve-well-being-but-also-address-the-risks/

4.3. Metadata

Nature of Data	Name	Source	Citation	Licence	Source Link	Data Processing	Date Accessed
Fishing effort	training_data_vms.csv	Cefas	Please note that the data/ dataset is fictional and has been created solely for the purposes of training and must only be used for this training module. Resemblance or links to any person or natural entity directly or indirectly is purely coincidental.	Training Module Purposes only	http://mdrviewer/#/View/20973	Information in the source link	N/A
UK Coastline	coastline.shp	NOAA	COPYINGv3 and COPYING.LESSERv3.	GNU Lesser General Public License (LGPL) **	https://shoreline.noaa.gov/data/datasheets/wvs.html	UK and Ireland extracted	2019
Scottish Marine Protected Areas	mpa_scotland.shp	JNCC	Contains Joint Nature Conservation Committee data © copyright and database right [2019]. Contains	OGL*	https://jncc.gov.uk/our-work/marine-protected-	No	2019

			Scottish Natural Heritage Data © copyright and database right [2019]. Contains UK Hydrographic Office data © copyright and database right [2019].		area-mapper/ https://hub.jncc.gov.uk/assets/6a218344-4eb4-46a3-ae0f-e5d266f1dbae		
Towns in Scotland	towns_scotland.shp	Cefas	Please note that the data/ dataset is fictional and has been created solely for the purposes of training and must only be used for this training module. Resemblance or links to any person or natural entity directly or indirectly is purely coincidental.	Training Module Purposes only	http://mdrviewer/#/View/20973	Information in the source link	N/A