Shoreline Extraction

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- What is shoreline?

- The *shoreline* is the place where a large body of water, like an ocean, lake, or river, meets the land

What is shoreline change?

Shoreline change refers to the loss or gain of land area or changes to the landscape on the marine edge.

The shoreline is constantly influenced by sea level variations, climate and ecosystems that occur over a wide range of time scales.

The processes of erosion, accretion, sedimentation, patterns of wind, wave, and sea level rise caused shoreline changes,
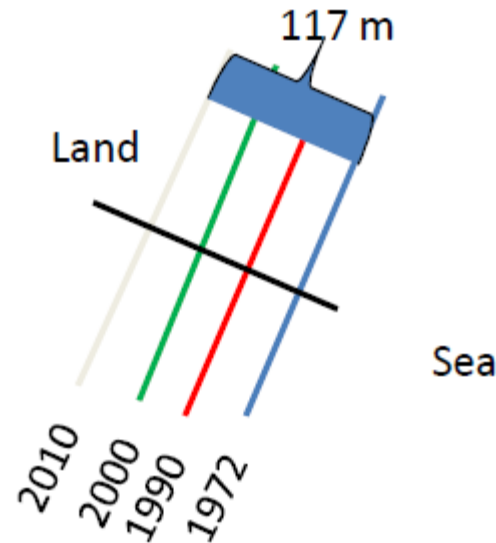
Satellite data selection for shoreline extraction

- Select Cloud-free satellite data (Jan to March)
- Select high tide duration satellite passes (use wxtide software)

http://www.wxtide32.com/

https://semiautomaticclassificationmanual.readthedocs.io/en/latest/faq.html?fbclid=IwAR2zxlsF4gqQw8D5f8RM3bRiSZFu6hnsDKbnc_B0aPxzLXxePkbbjTd7m2s#can-i-use-the-previous-version-7-of-scp

Useful links:
QGIS Older versions: https://download.qgis.org/downloads/
QGIS Plugins: https://plugins.qgis.org/plugins/

https://www.usgs.gov/landsat-missions/landsat-collection-2
https://www.usgs.gov/landsat-missions/landsat-science-products

➢ Go to http://earthexplorer.usgs.gov/ and create new user account ➡ Login

• Select clear and cloud free data
• Download Landsat 8 OLI Level-1 product data set
• After download unzip/uncompress the file

Give the path to save data and click on save

Method 01

Method 02

Go to SCP tool → Band set, → click on Open a file → browse and select bands → Open

Add bands to band set:

After the above step → click on select all bands →click on Add band to band set.
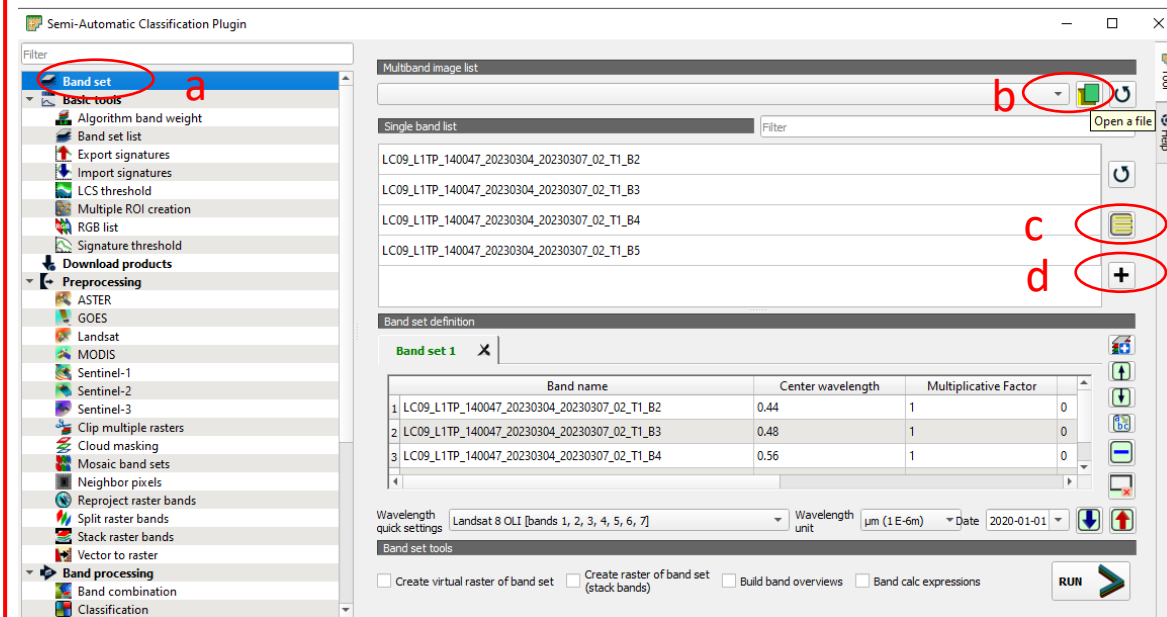
➢ Go to SCP click on band set ⟶ SCP plugin window opens.

In the last slide, one band set is created
If we want to create more band sets and
Add different bands to them.

Create new band set and add bands:

Clock on add a new band set➔ and select
that new band to Add bands to that band set
➔ select Bands and click on add bands
to band set.

Add or remove bands from the band set:

 select bands in the band set to remove
For that band, click on the delete row.

To remove all bands from band set➔ click
on reset.

 Select band set and select bands in single
band and click on add bands to band set.

Method -01
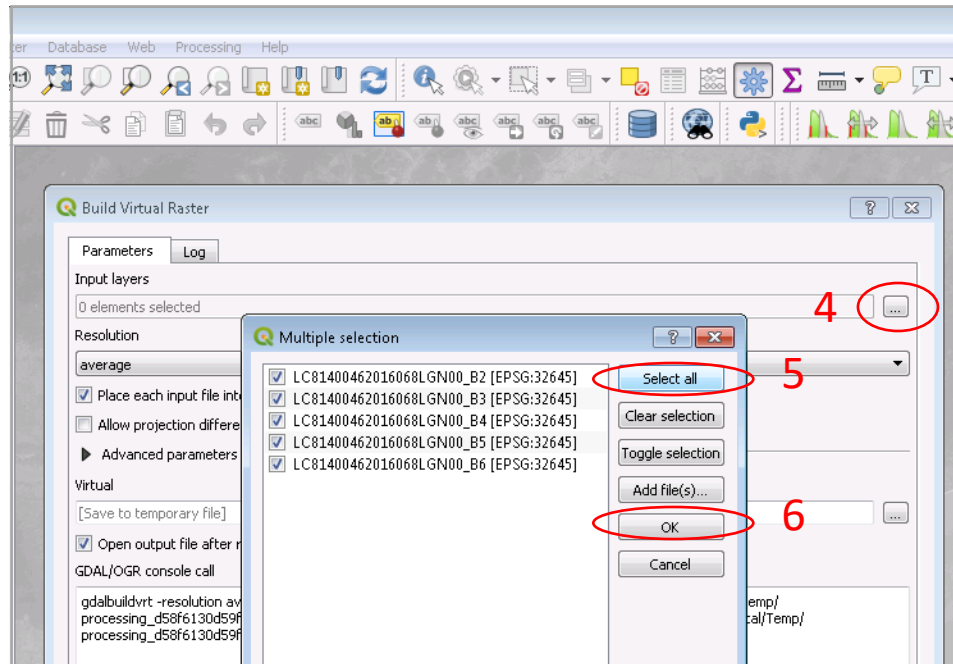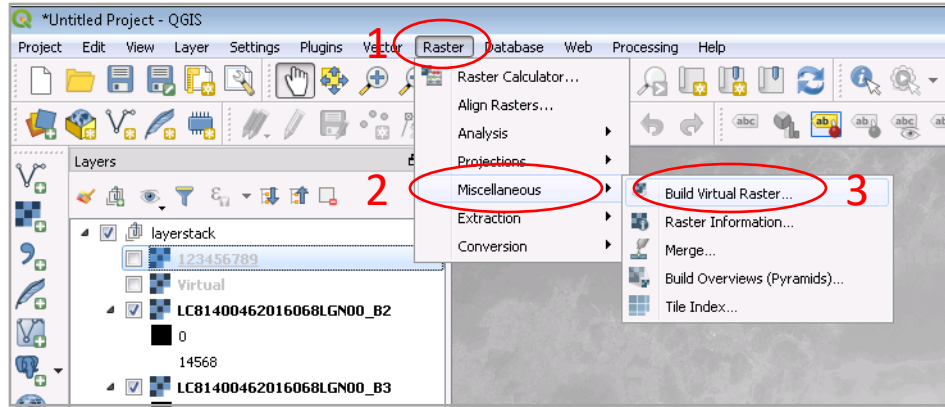
Go to Raster Miscellaneous → Build Virtual Raster →Input layers, select our bands →go to Virtual→ save file → give the name and path → run

Method -02

Go to SCP tools → bands are added to band set →click on create raster of band set (stack bands) → click on run → give output folder

or

Go to Preprocessing →Stack Raster Bands→ Select bands set →Run → Give path and name.
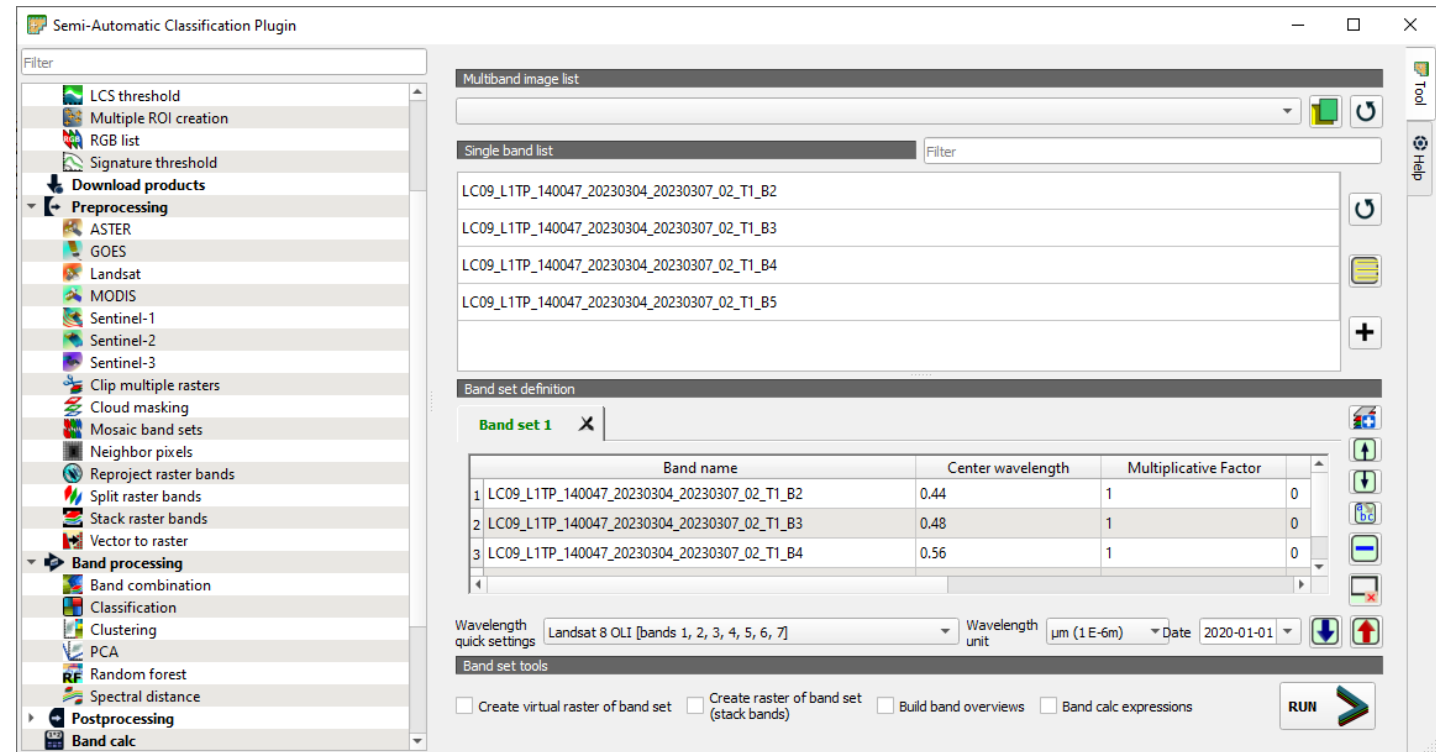
➢Select the FCC image ⟶ right click ⟶ properties
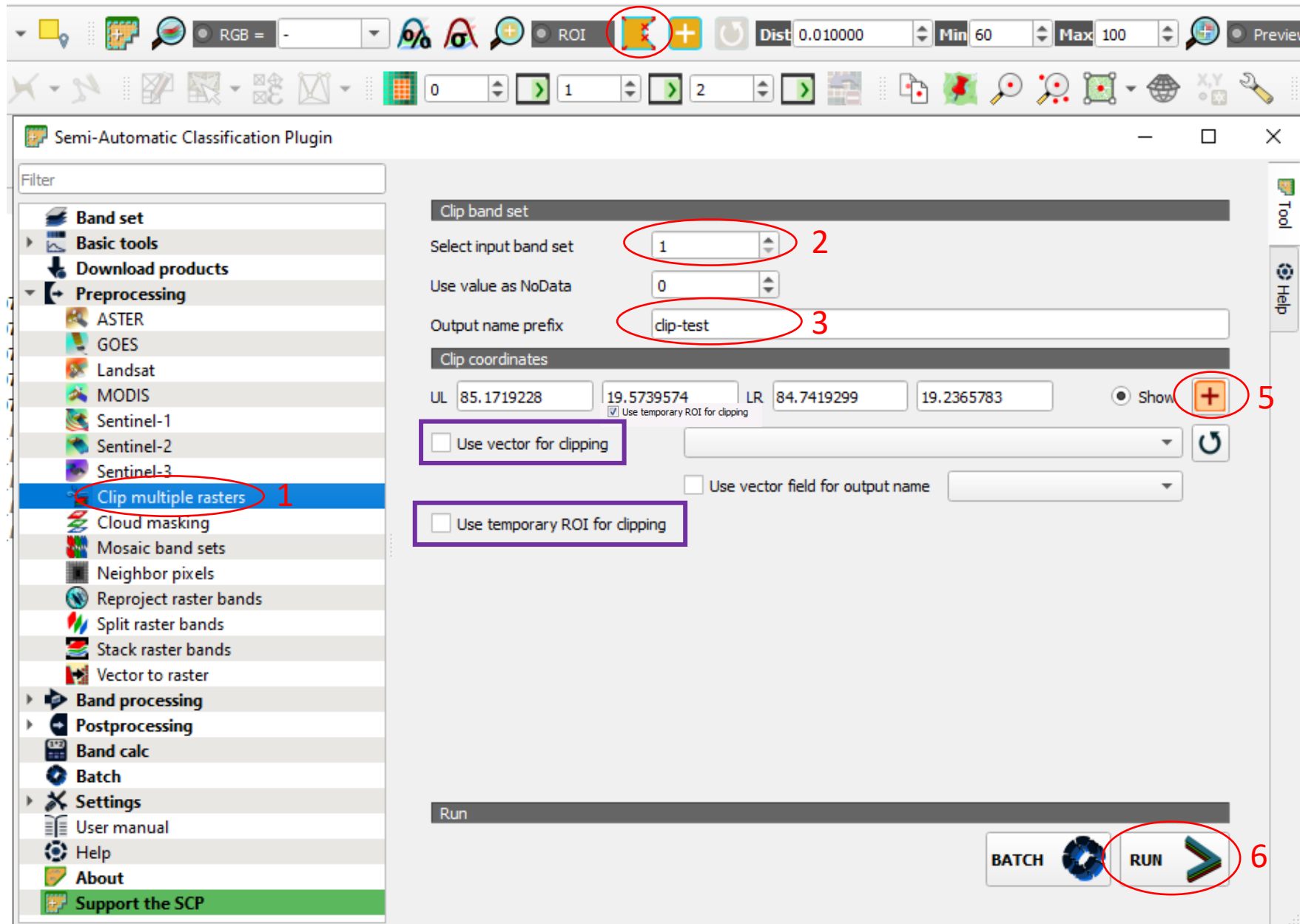
➢Go to SCP ➔ preprocessing ➔Clip multiple rasters ➔ Select band set ➔ Use value as no data: 0 ➔ O/P name: give any name ➔to select RIO click on set an area in the map, ➔ put points on the map, ➔ click on the run ➔ give output folder name.

Select ROI using a vector file:

If you have an ROI vector file we can use that file to clip the raster image ➔ open the vector file in map window ➔just check the use vector for clipping: select our vector file ➔ and run give o/p path.

Select ROI using temporary ROI:

Using the ROI tool in the map window draw ROI on the map/ image. Now in SCP Check use temporary ROI for clipping➔ run ➔ give output path.

➢ Go to layer ⟶ Create Layer ⟶ New shapefile Layer
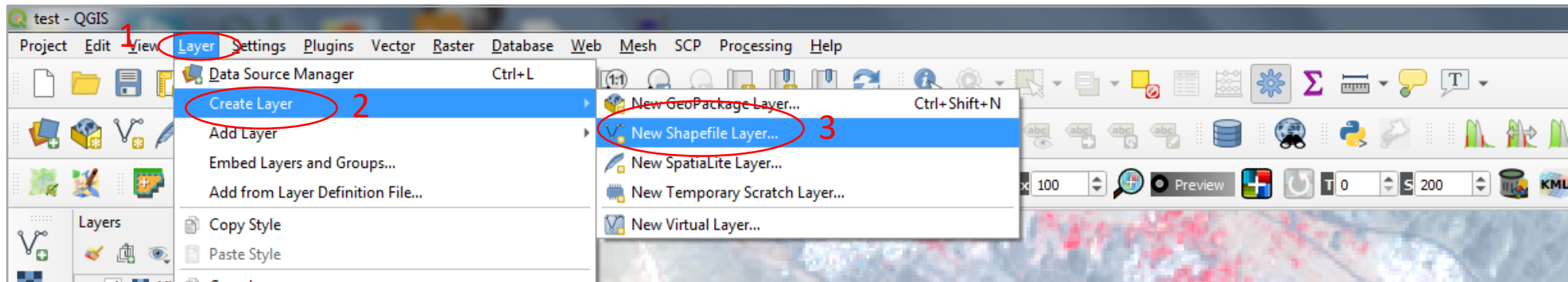
Direct click on create new shape file icon

➢Select line shape file

➢Click on Toggle editing ⟶ add line feature ⟶ draw a line on image

Draw a line and to complete line right click on mouse
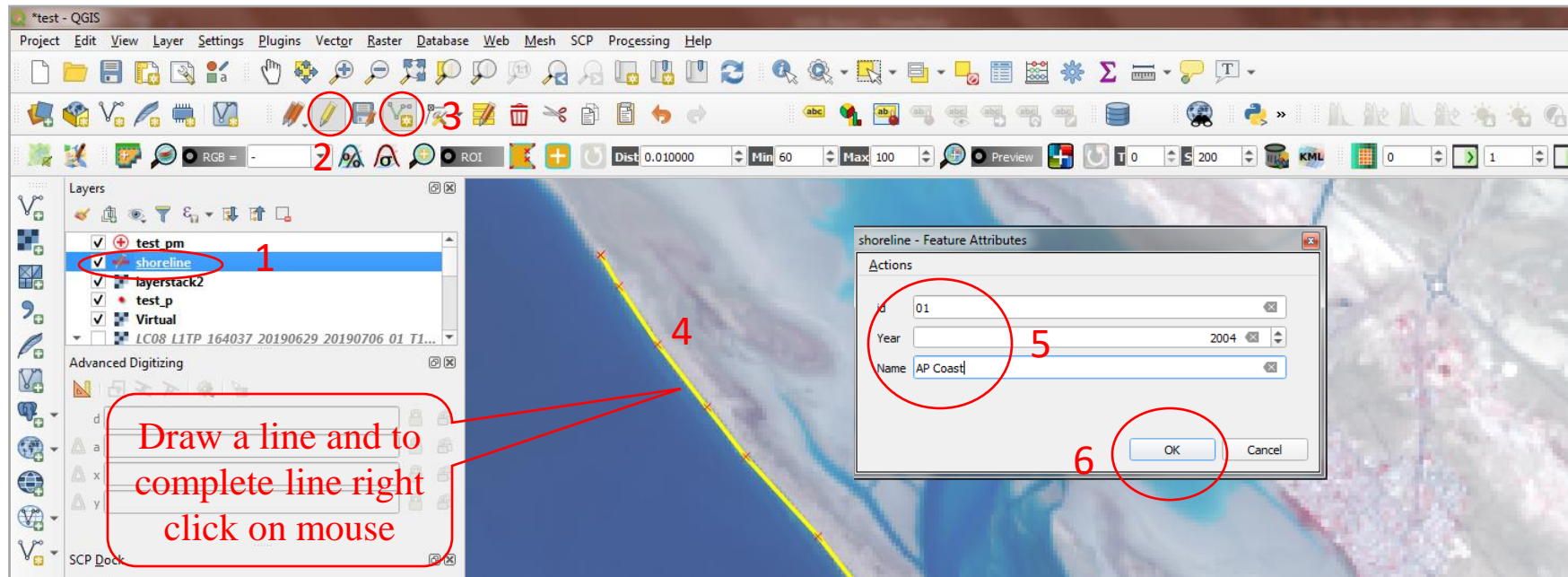
➢ To save edited data click on save layer edits.
➢ To stop editing click on Toggle editing
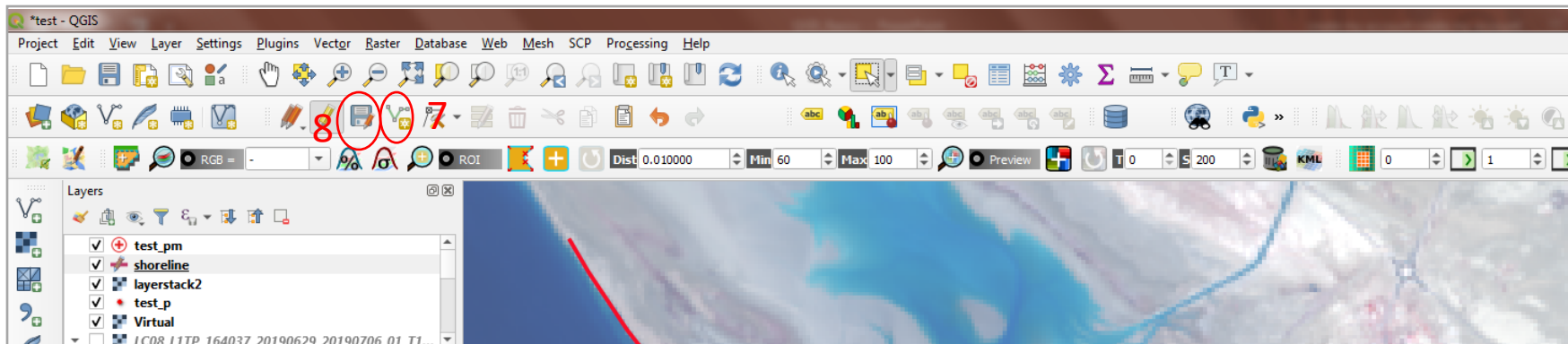
Split line feature :

➢ Select the line which you want to split using select features by area or a single click

➢ Click on split features ➡ draw a line where you want to split and right-click to complete the line

Reshape Line feature:

➢ Select the line which you want to split using select features by area or a single click

➢ Click on the reshape feature ➡ draw a line where you want to split and right-click to complete the line

Note: Drawing a line in reshape the feature line first point and the last point should touch the line feature
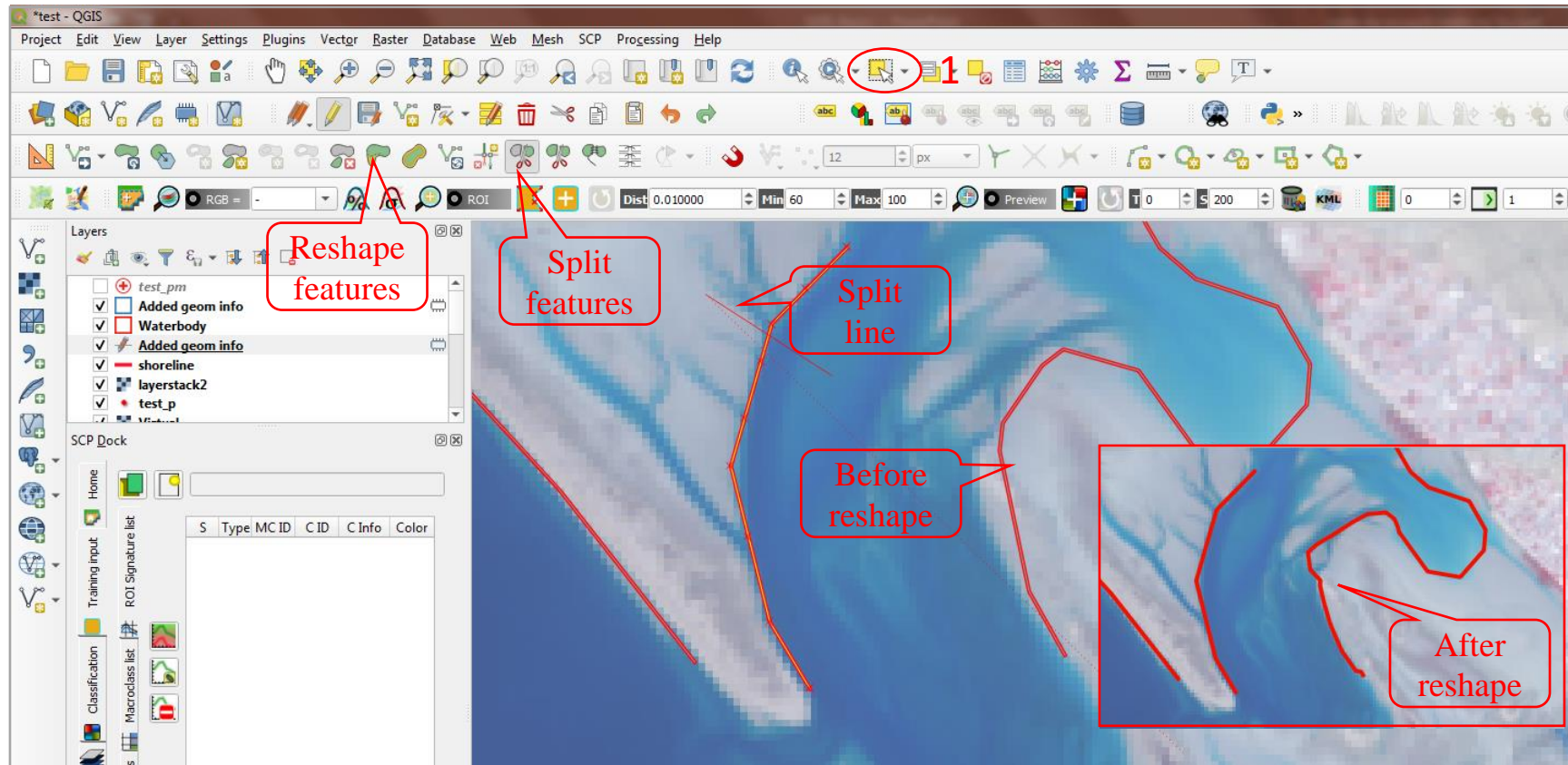
Method: 02

NDWI Calculation:

NDWI= (Green-NIR)/(Green + NIR)

Convert to binary: NDWI>0.01 /-0.03
Convert binary to shapefile
Convert raster to Vector
Smooth line and edit

NDWI Calculation:

Method: 01

Go to SCP → post-processing → Band calc → write NDWI formula

NDWI formula = (Green-NIR)/(Green + NIR) → click on Run → Give name and output path.

Method:02

Go to processing toolbox → Raster Analysis → Raster Calculator → Write NDWI formula or go to NDVI Click on Add → select green band at Red and NIR at NIR → ok → Run.
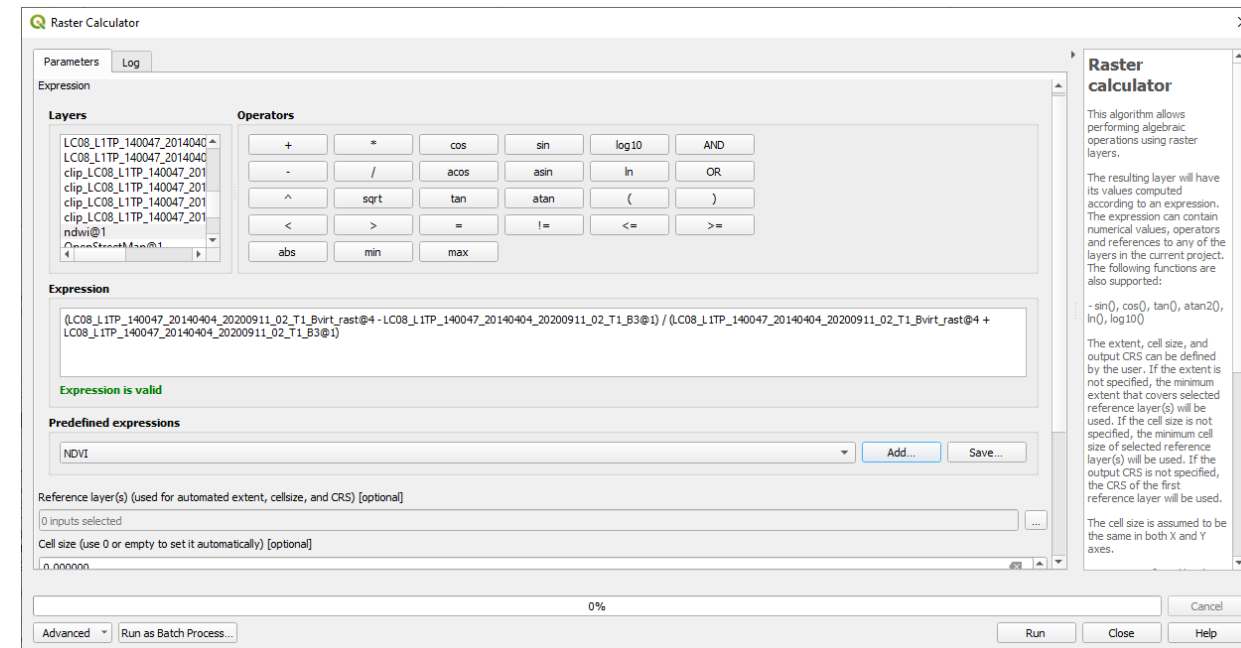
Now set the water and land NDWI range → and convert it into binary(0,1) data.

Go to processing toolbox → Raster Analysis → Raster Calculator → Write threshold (ex: "ndwi@1" > -0.03) → Reference → select our layer CRS → give output Name and path → Run
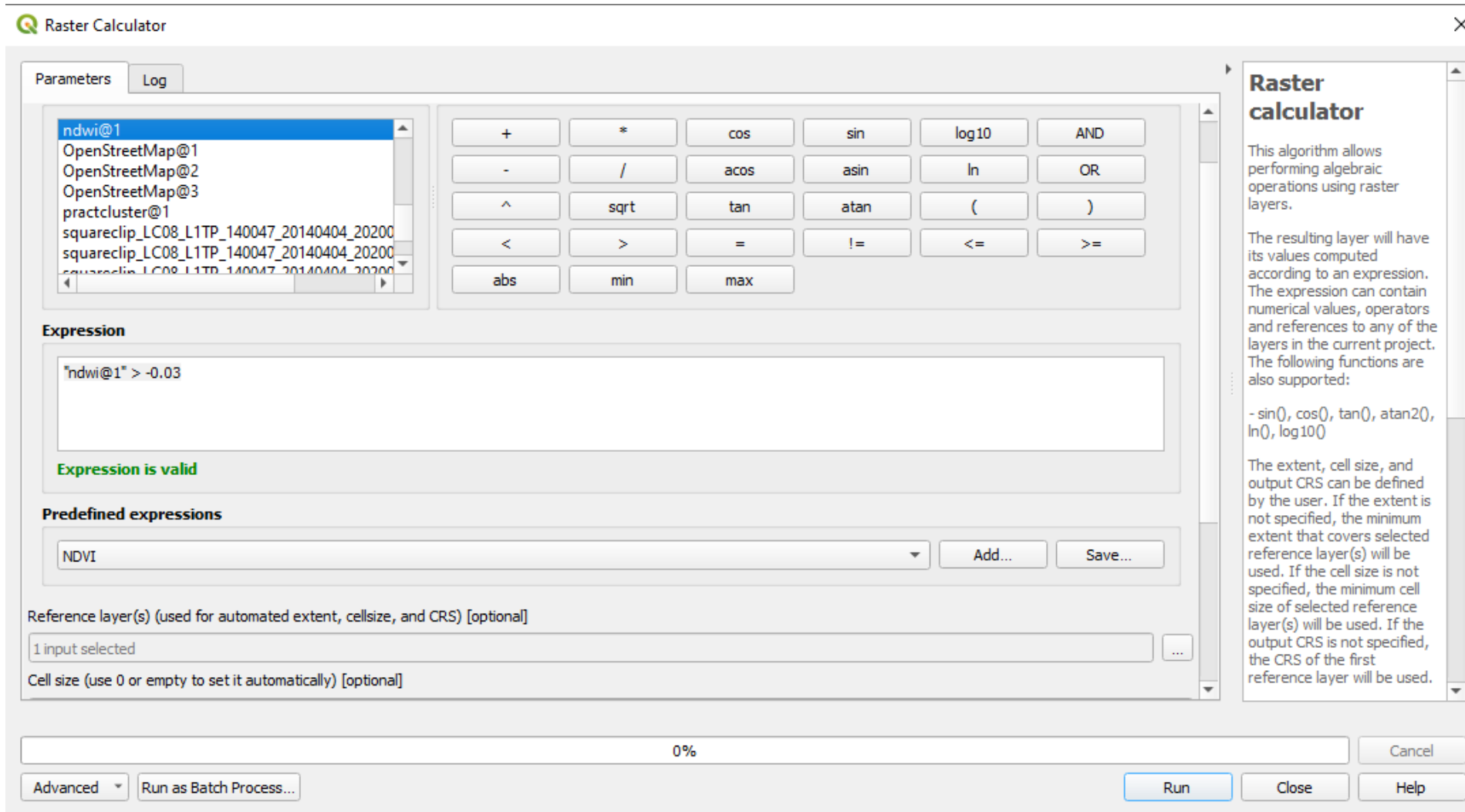
NDWI to Binary conversion output. Here zero is the ocean (water body) part and one is the land part
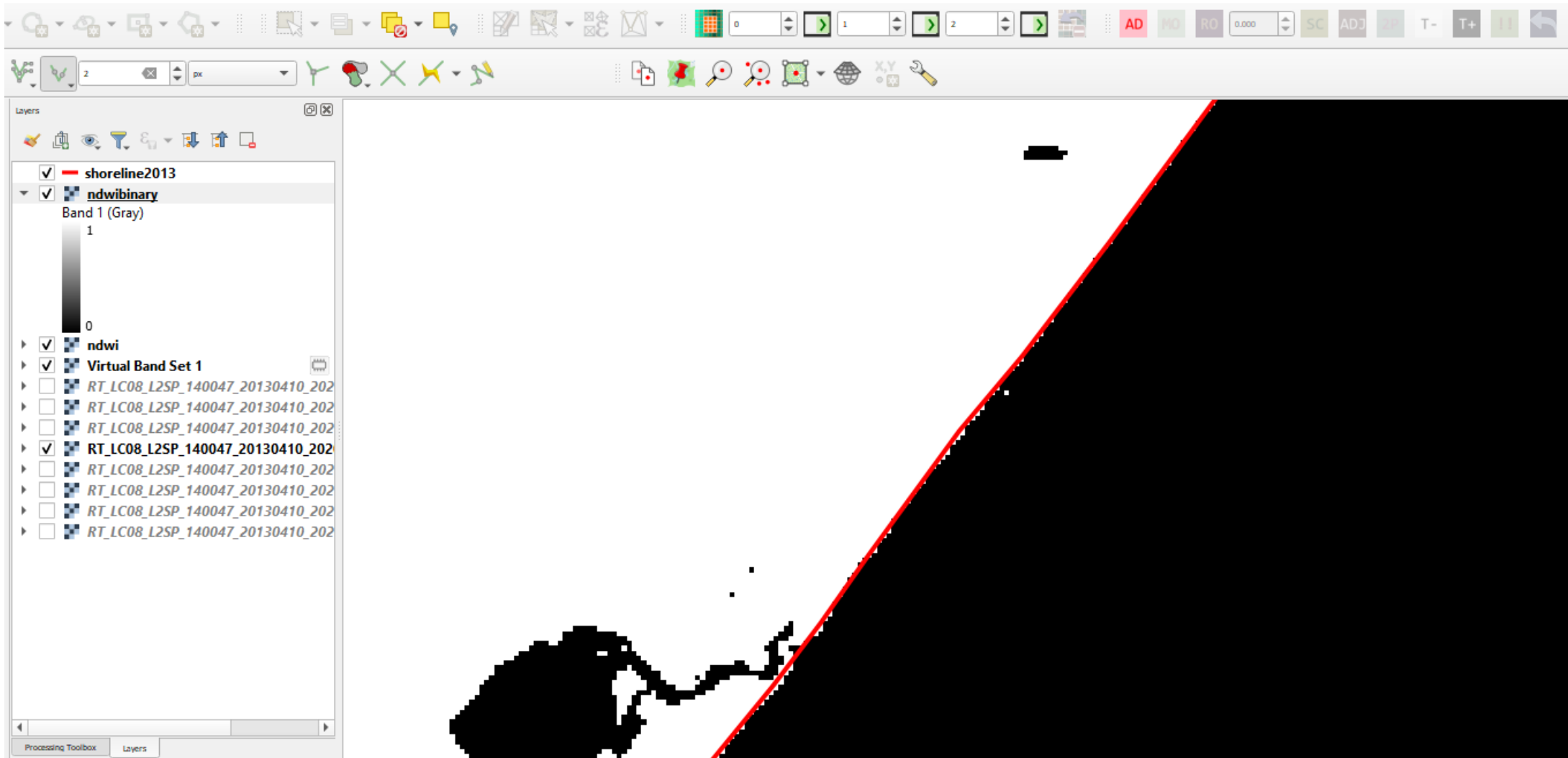
Convert from binary to polygon: Go to Raster → Conversion→ Polygonise (Raster to Vector)→ input select our ndwibinary file, give output path and name → run
Or
Directly convert raster to line feature: Go to processing toolbox → whitebox tools → data tools → RaterToVectorLines

WhiteboxTools
  Data Tools
    ConvertRasterFormat
    NewRasterFromBase
    RasterToVectorLines
    RasterToVectorPoints
    RasterToVectorPolygons

Output of the raster to vector conversion

Polygonize (Raster to Vector)

Parameters | Log
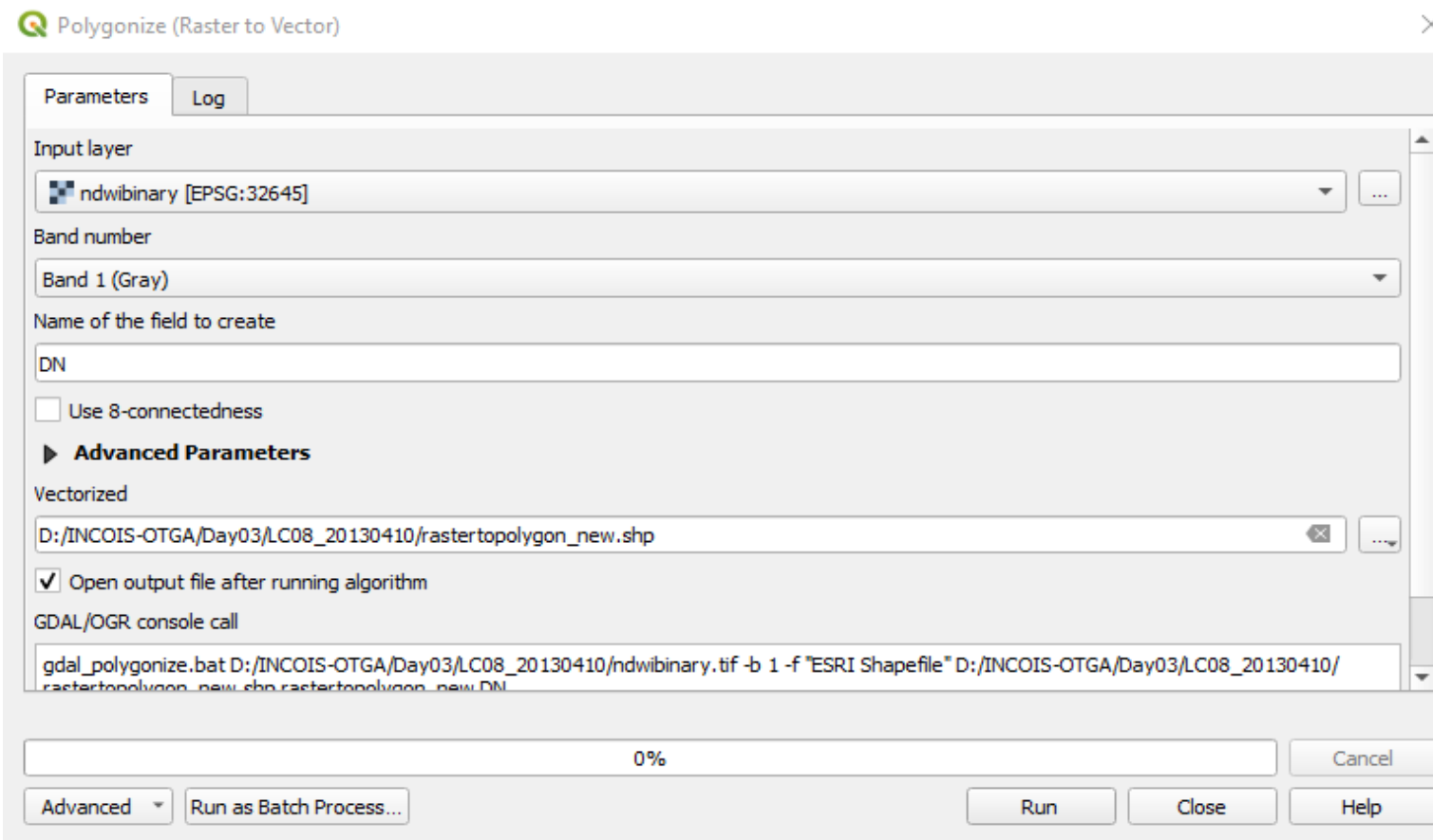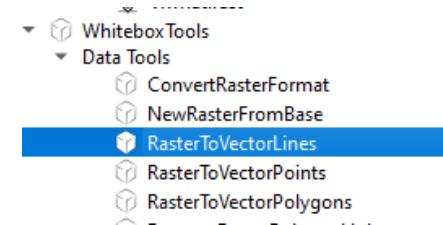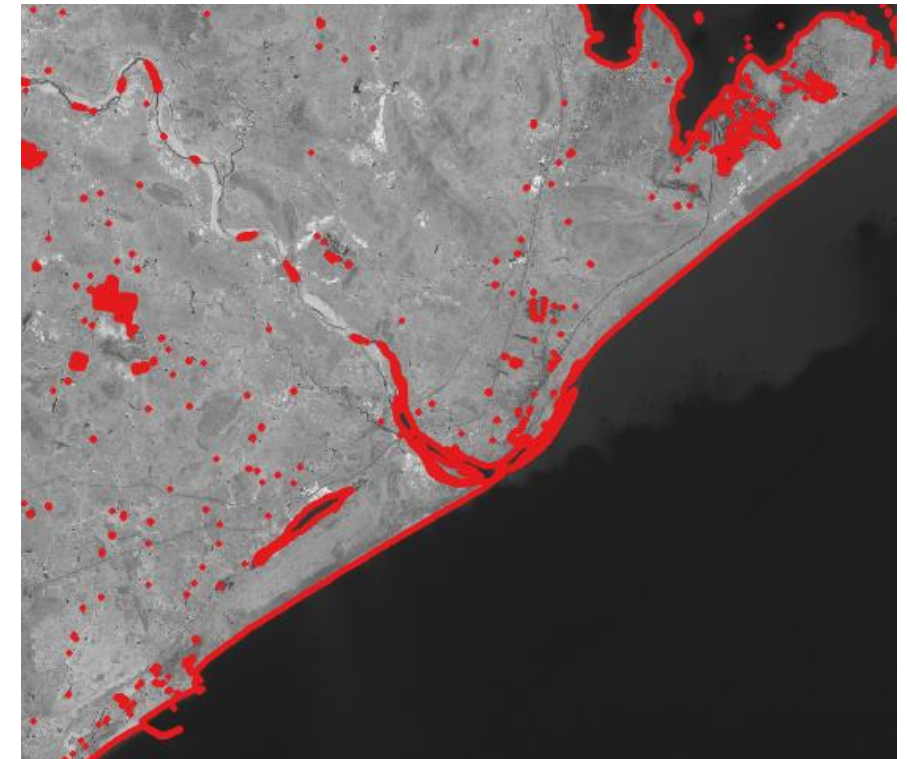
Input layer
ndwibinary [EPSG:32645]

Band number
Band 1 (Gray)

Name of the field to create
DN

☐ Use 8-connectedness

▶ **Advanced Parameters**

Vectorized
D:/INCOIS-OTGA/Day03/LC08_20130410/rastertopolygon_new.shp

☑ Open output file after running algorithm

GDAL/OGR console call
gdal_polygonize.bat D:/INCOIS-OTGA/Day03/LC08_20130410/ndwibinary.tif -b 1 -f "ESRI Shapefile" D:/INCOIS-OTGA/Day03/LC08_20130410/rastertopolygon_new.shp rastertopolygon_new DN

0%   Cancel

Advanced ▾ | Run as Batch Process... | Run | Close | Help

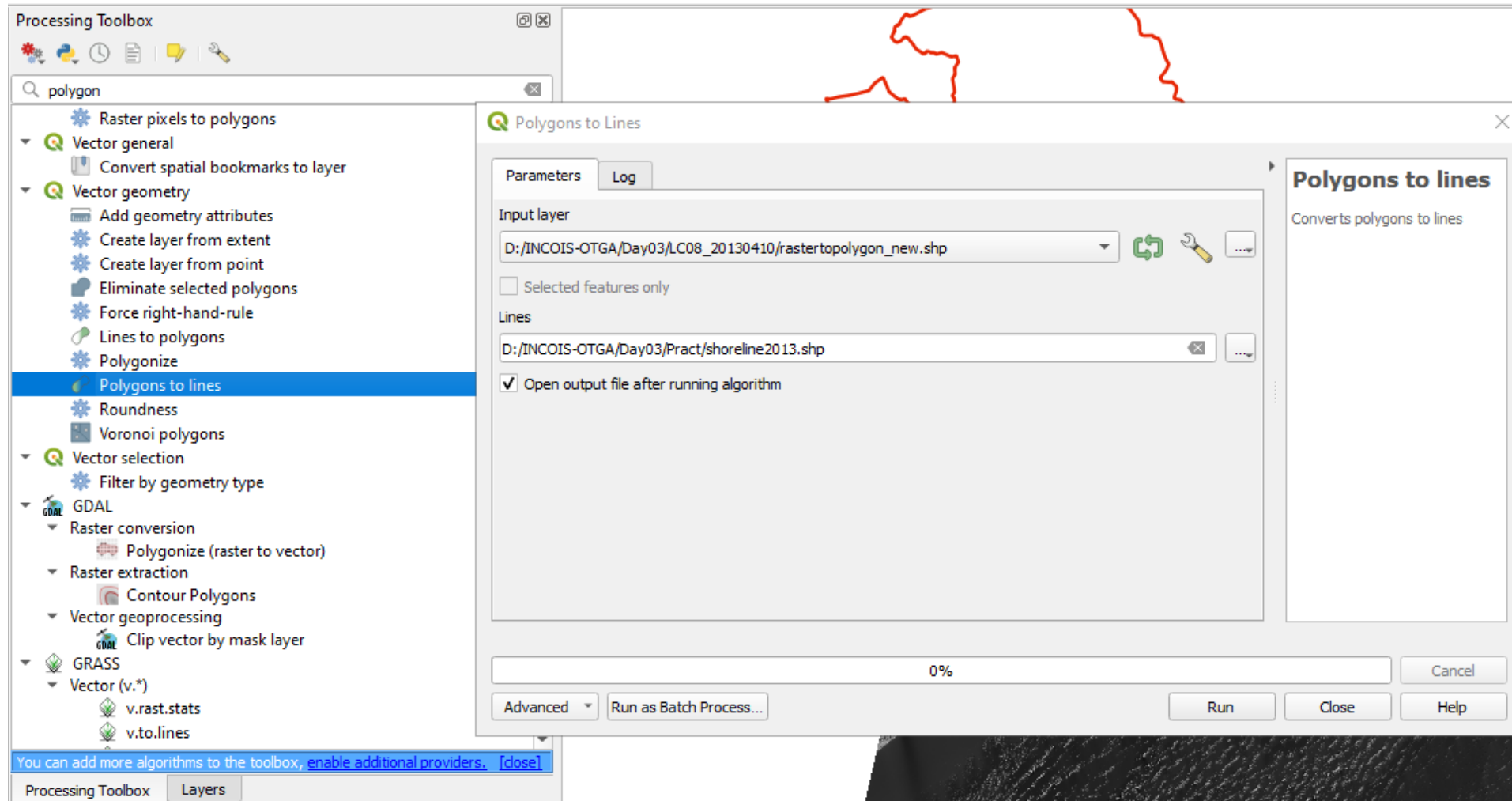Now select rastertovector polygon file → click on toggle editing → select the and part polygons and delete, keeping only ocean part polygons→ click on save→ click on toggle edit to stop edit.
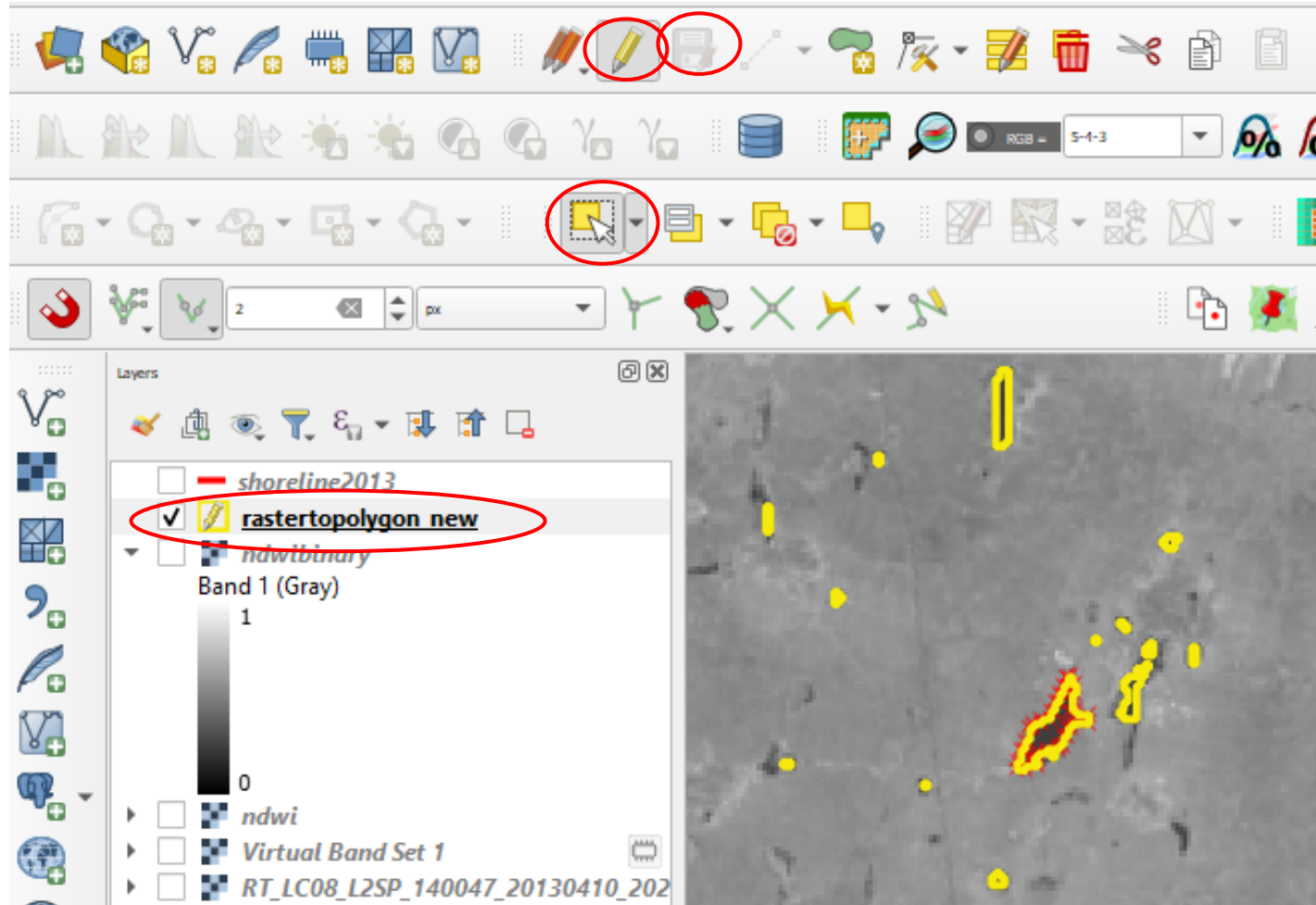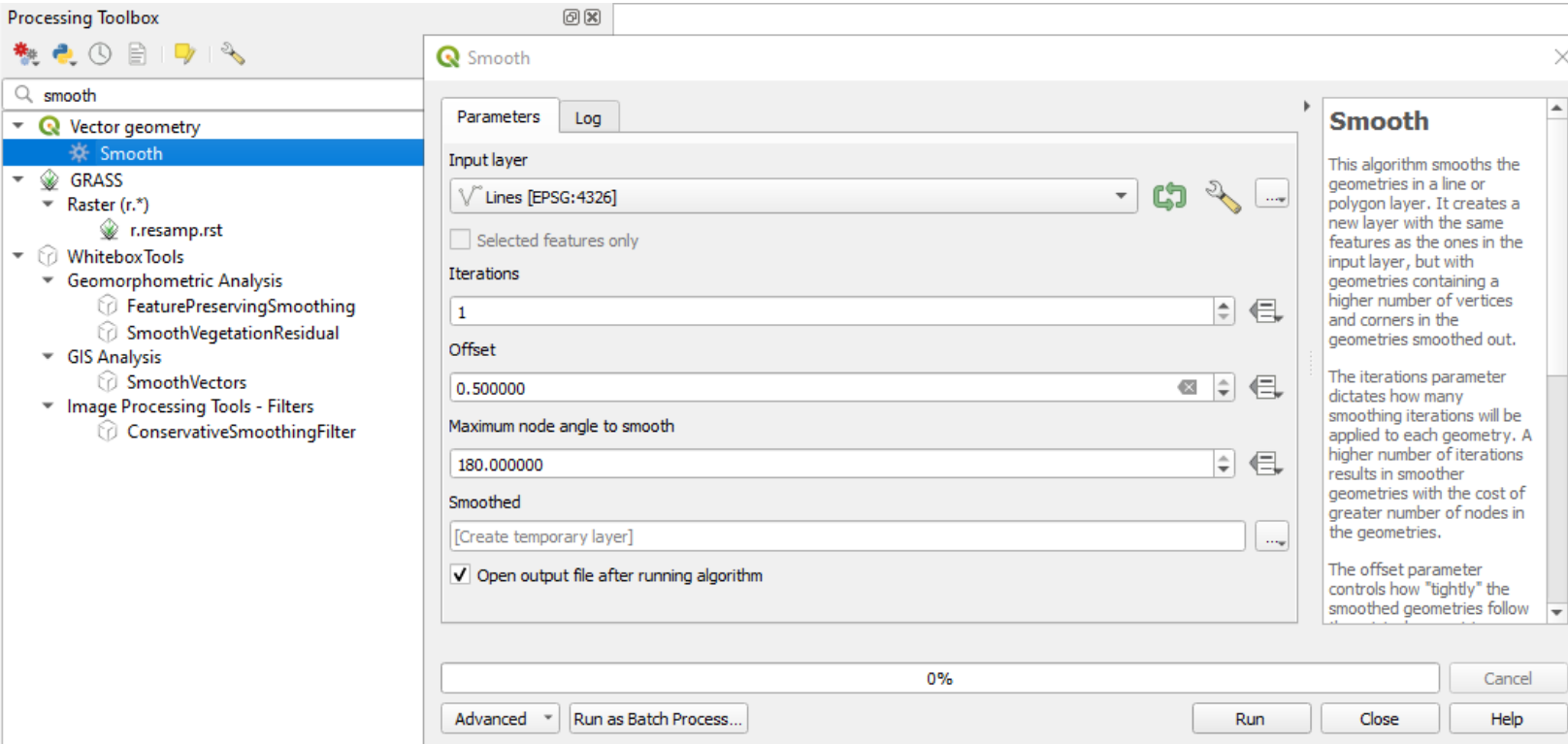
Now convert the polygon file to a line file: Go to processing toolbox → Vector geometry → select input fille (raster to vector) → give path and output → run
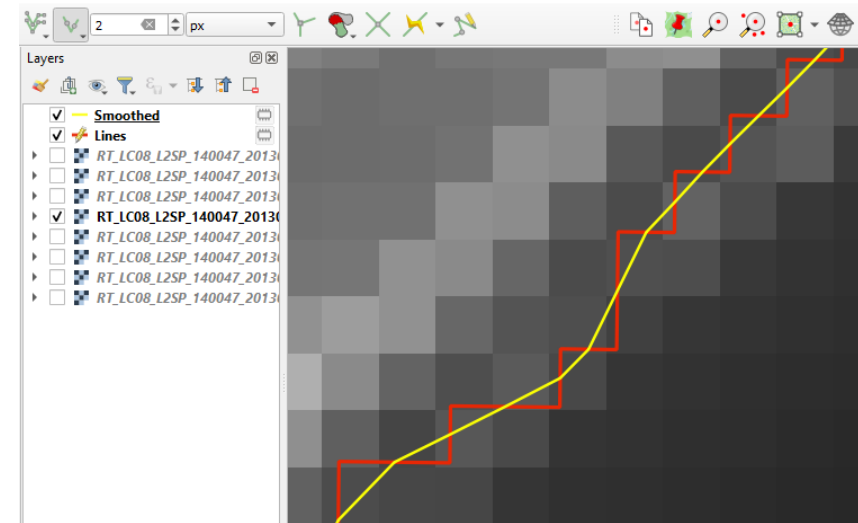
Line smooth: Go to processing toolbox → Vector geometry → smooth → give input our line (shore line) feature → give offset 0.25 or 0.5 (see the changes) → give output path and name → run

Line smooth Output

Thank You