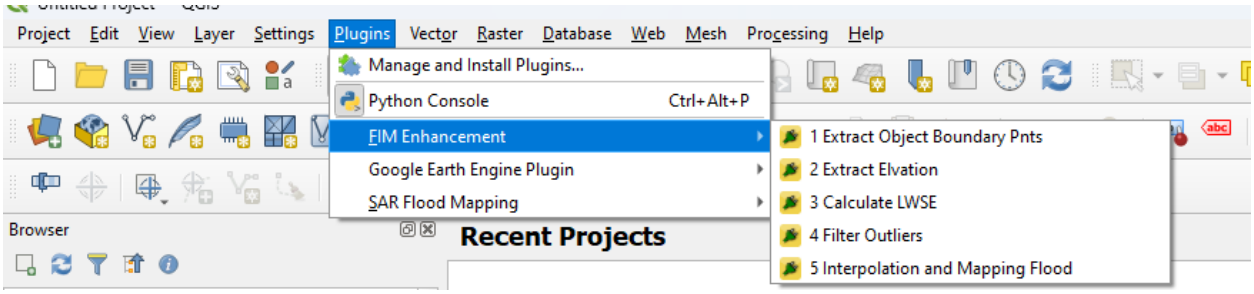
Flood Enhancement QGIS Plugin Instructions

Install the Plugin

- Go to Menu->Plugin, Manage and install plugins
- Select "Install from zip"
- Find the zip file provided as the plugin
- Click "Install Plugin"

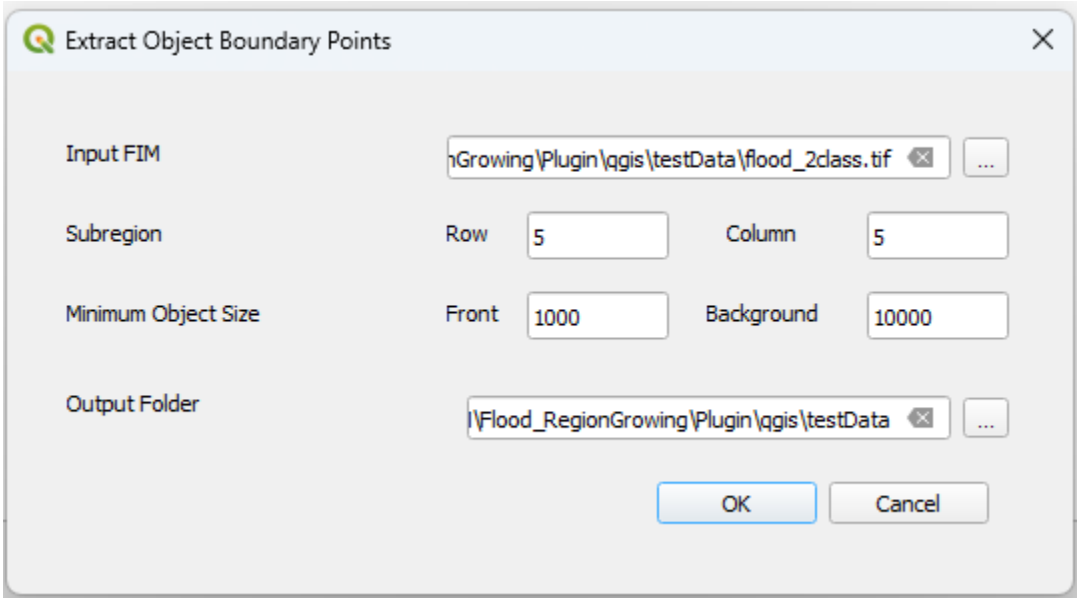
Run the Plugin

Go to menu->Plugins, FIM Enhancement



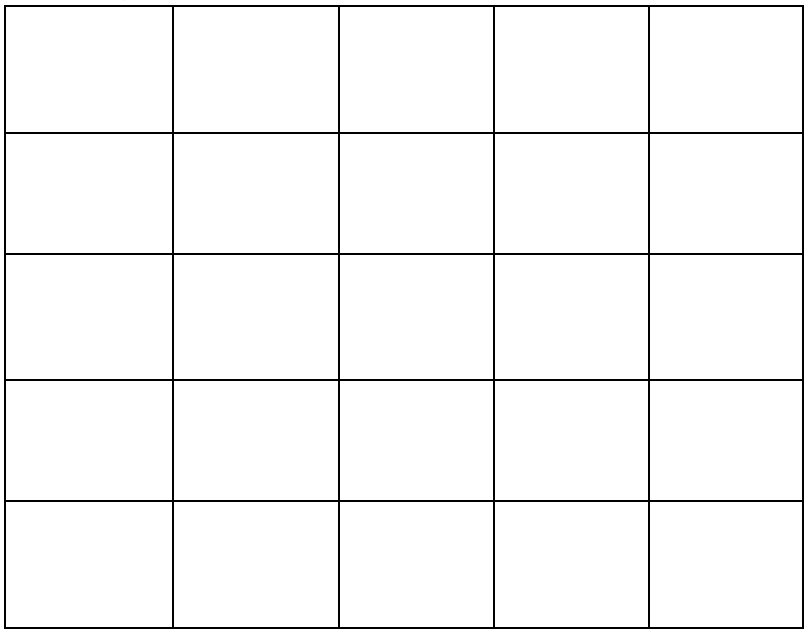
1. Extract Object Boundary Points

Divide study area into subregions and group connected flood pixels into objects. Extract boundary pixels for all the objects and generate centroid points for all the objects.



Input

1. Input FIM: 2-class remote sensing flood map (0: no flood, 1: flood)
2. How to divide the study area to subregions
   For example: 5 rows and 5 columns



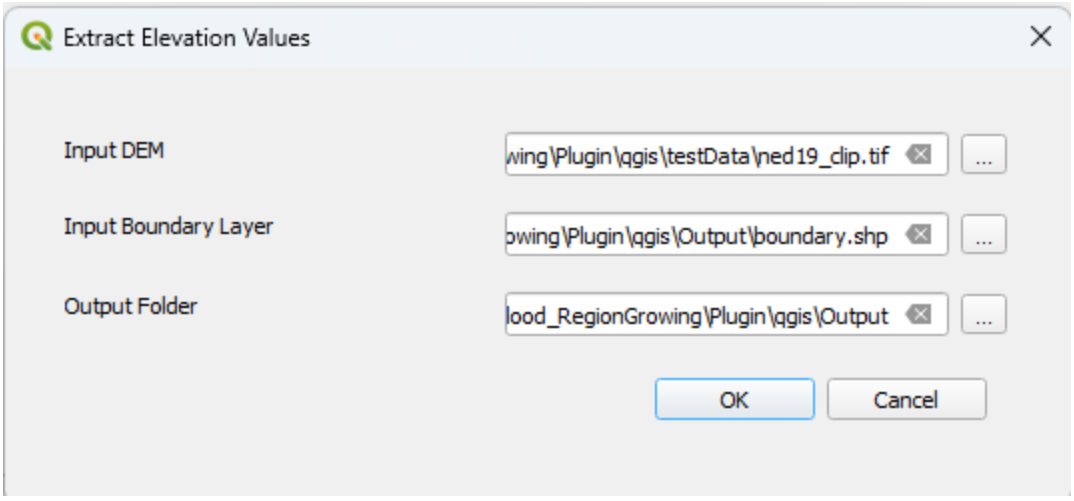
3. Threshold of pixel number to remove small objects
   For example: for front class (flood): 1000; for background class (non-flood): 10000
   Depends on the spatial resolution and size of the study area.
4. A folder to save the outputs.

Output

1. A point layer of “boundary.shp” with all the boundary points of the flood objects.
2. A point layer of “centroid.shp” with the centroids of all the flood objects.

2. Extract values

Extract elevation values from the DEM layer to the boundary points.



Input

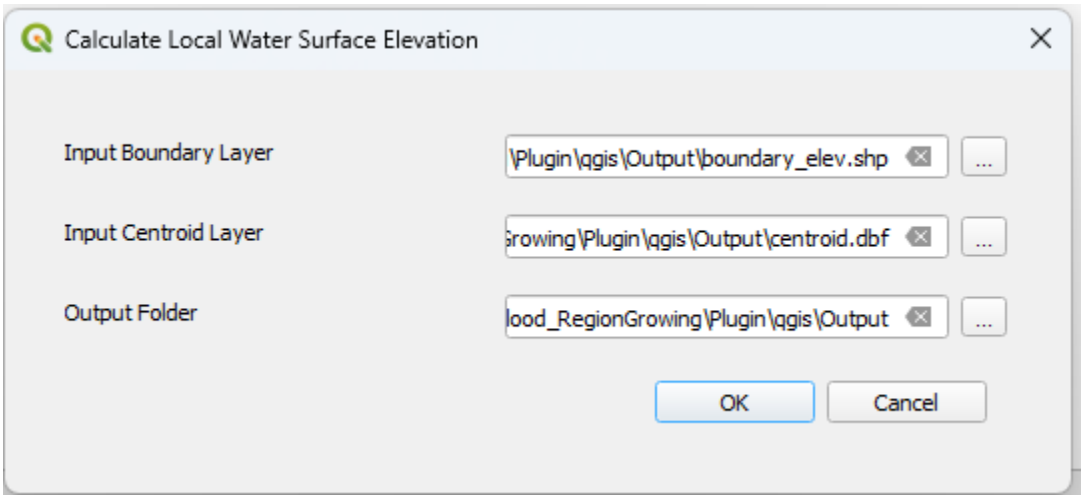
1. Input DEM (e.g., net_19_clip.tif)
2. Input Boundary Layer: the points to extract elevation from the previous DEM layer. (e.g., boundary.shp, one of the outputs of step 1.)
3. Output Folder: location to save outputs.

Output

- A point layer called “boundary_elev.shp”, which includes all the points in “boundary.shp” layer but with a field of “Elev” with the extracted elevation value.

3. Calculate LWSE

Based on the elevation of boundary pixels of each flood object, calculate the local water surface elevation (LWSE) for each of the flood objects, and add the value to the centroid points.



Input

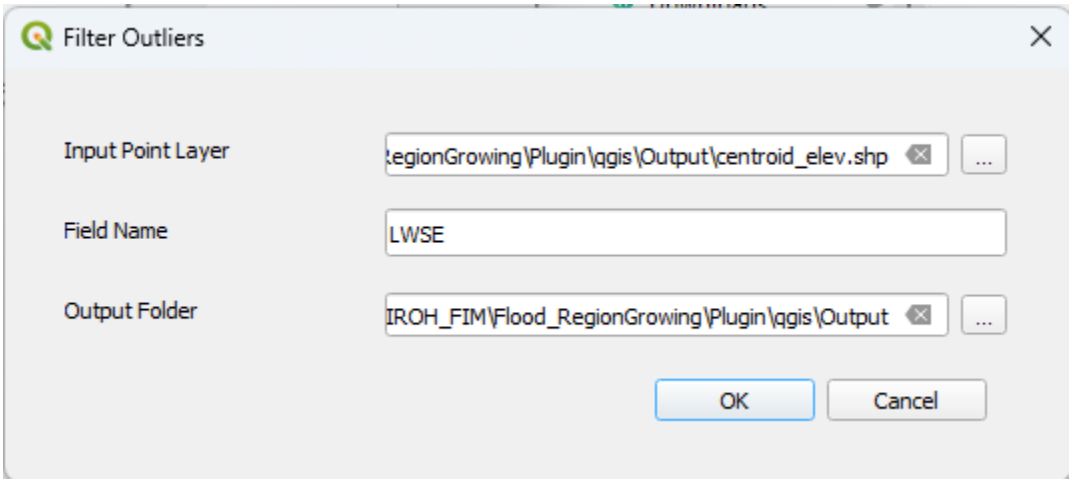
1. Input boundary layer: the boundary points with elevation values (“boundary_elev.shp”)
2. Input centroid layer: the centroid layer to accept the calculated LWSE values (“centroid.shp”)
3. Output folder to save the output file.

Output

- The new centroid layer with calculated LWSE values. A layer named “centroid_elev.shp” with a field of “LWSE”.

4. Filter Outliers

Find the outliers in the object LWSE and change them based on the values of their neighbors.



Input

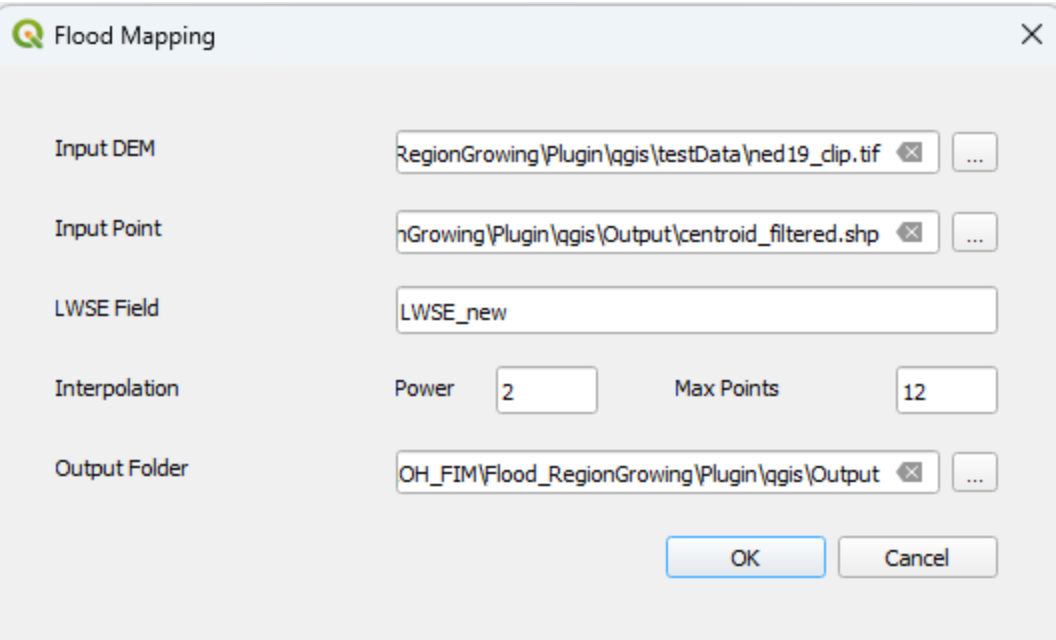
1. Input point layer: the centroid layer with LWSE values. (“centroid_elev.shp”)
2. Field Name: the field of the LWSE values. (“LWSE”)
3. Output folder.

Output

1. The new centroid layer with the filtered LWSE values for the outliers. (Layer “centroid_filtered.shp” with field “LWSE_new”)

5. Interpolation and Mapping Flood

Interpolate the LWSE_new values to the entire area and map the flooded areas and flood depth based on the relationship between the LWSE and earth surface elevation (DEM) values.



Input

1. Input DEM (e.g., ned19_clip.tif)
2. Input point: the centroid point layer with the filtered LWSE values. (centroid_filtered.shp)
3. LWSE Field: the field with the new LWSE values. (“LWSE_new”)
4. Interpolation parameters: power (default: 2), max point (default: 12)
5. Output folder.

Output

1. A point layer of “reprojected_shapefile.shp” saved the input point layer in the coordinate system same with the DEM layer.
2. A raster layer of “idw_temp.tif” save the interpolation results, which is the WSE field for the entire study area.
3. A raster layer of “flood_Depth.tif” showing the enhanced flooded areas and water depth.