

Exercise 3-2: Creating a prescription map (K_2O)

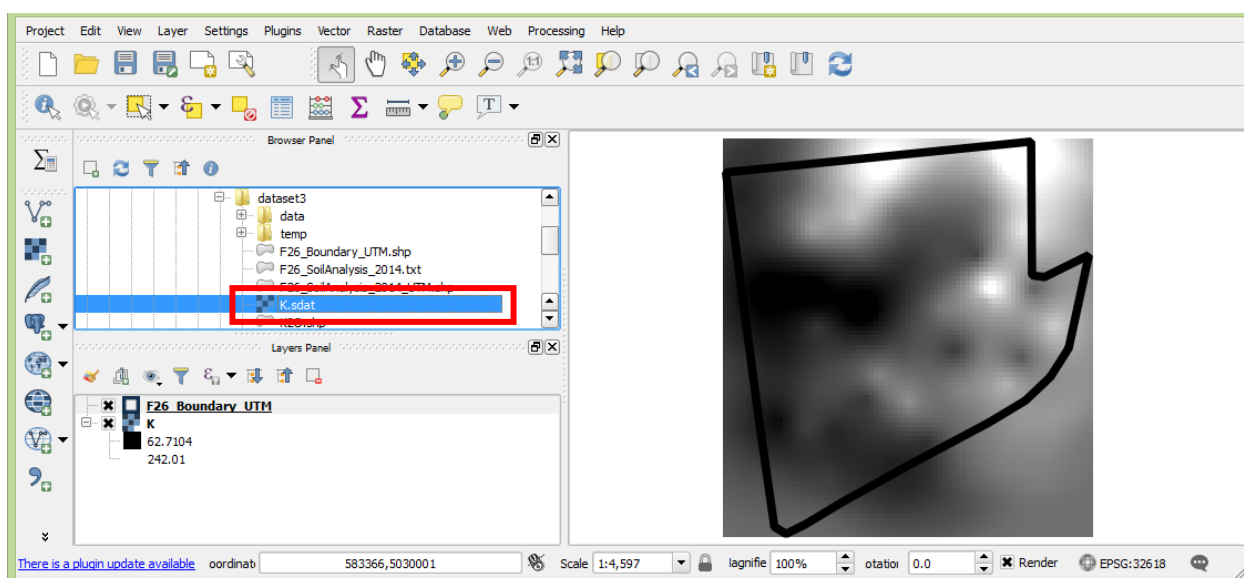
Mapping objectives:

- Create a K_2O prescription map based on the variability of soil potassium (K) levels

Data folder: Dataset3

Part 1: Add the interpolated soil potassium map to QGIS

1. Open the project **set3.qgs**
2. In the Browser Panel, double click **K.sdat** to add this layer into the Layers Panel



Part 2: Create a K_2O (Potassium oxide) prescription map according to soil potassium levels (K ppm)

1. The table used to determine K_2O prescription (kg/ha) rates

In this exercise, the soil potassium level is first converted from ppm to kg/ha. Then, K_2O rate is assigned to field location according to the potassium level in kg/ha.

K (ppm)	K (kg/ha)	K_2O (kg/ha)
0 – 44	0 – 100	80
45 – 89	101 – 200	60
90 – 134	201 – 300	40
135 – 178	301 – 400	40
179 – 223	401 – 500	40
224 <	501 <	0

K: soil potassium content

2. **Converting K level from ppm to kg/ha.** In the Processing Toolbox, enter “reclassify” in Search ...

and then click Reclassify values

- a. In Reclassify values
Use default values, except ...

Grid = **K**

Method = single table

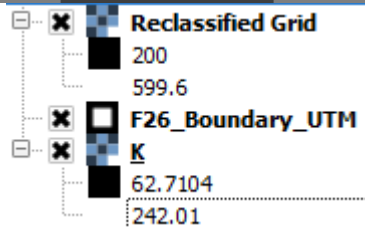
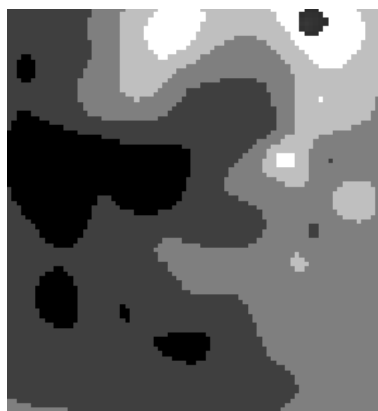
Lookup Table = Fixed table

Uncheck replace no data values

Uncheck replace other values

Click Run

	minimum	maximum	new
1	0	45	100
2	45	90	200
3	90	135	300
4	135	180	400
5	180	225	500
6	225	270	600



3. **Filtering out small pixels.** In Processing Toolbox, enter “majority” in Search ... and then click SAGA > Raster filter > Majority filter

Use default value, except ...

- a. Grid = Reclassified Grid

- b. Search Mode = Square

Reclassify values

Parameters Log Run as batch process...

Grid: K [EPSG:32618]

Method: [2] simple table

old value (for single value change): 0.000000

new value (for single value change): 1.000000

operator (for single value change): [0] =

minimum value (for range): 0.000000

maximum value (for range): 1.000000

new value (for range): 2.000000

operator (for range): [0] <=

Lookup Table: Fixed table 6x3

operator (for table): [0] min <= value < max

☐ replace no data values

new value for no data values: 0.000000

☐ replace other values

new value for other values: 0.000000

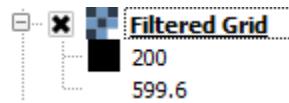
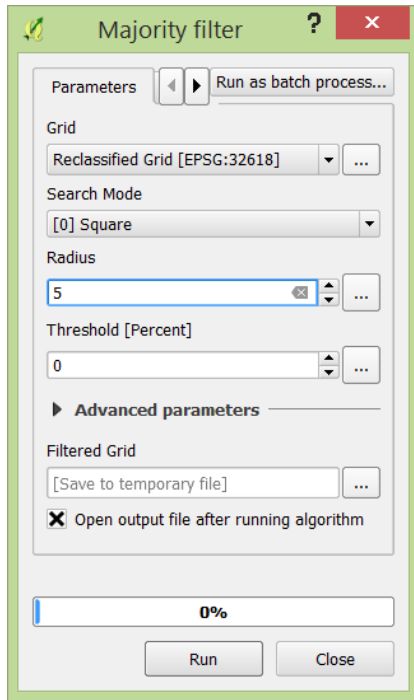
Reclassified Grid: [Save to temporary file]

☒ Open output file after running algorithm

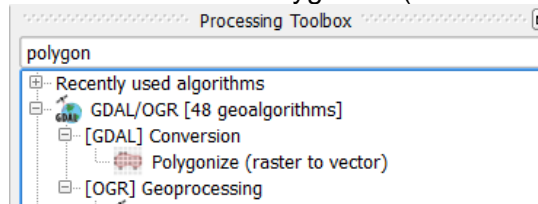
0%

Run Close

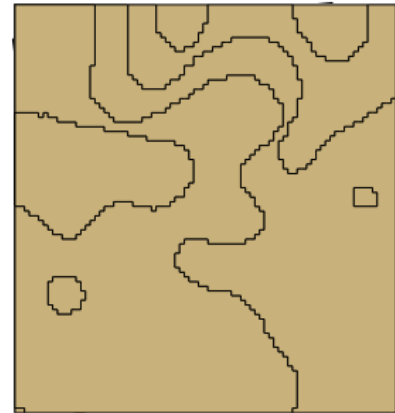
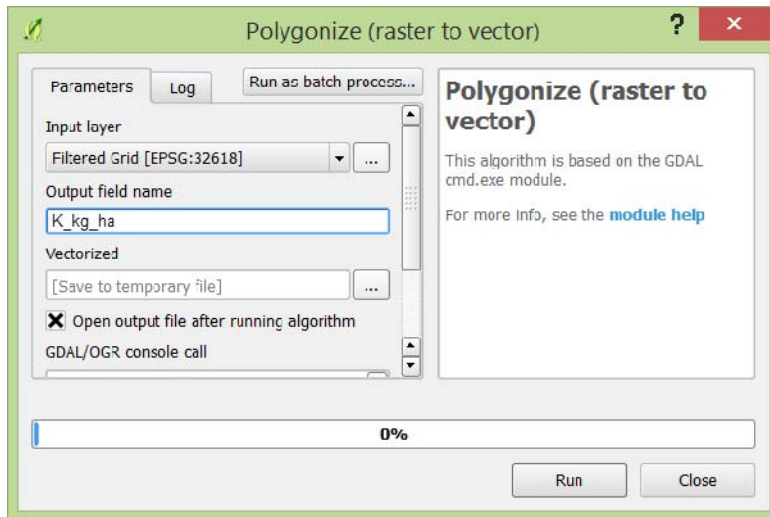
c. Radius = 5
Click Run



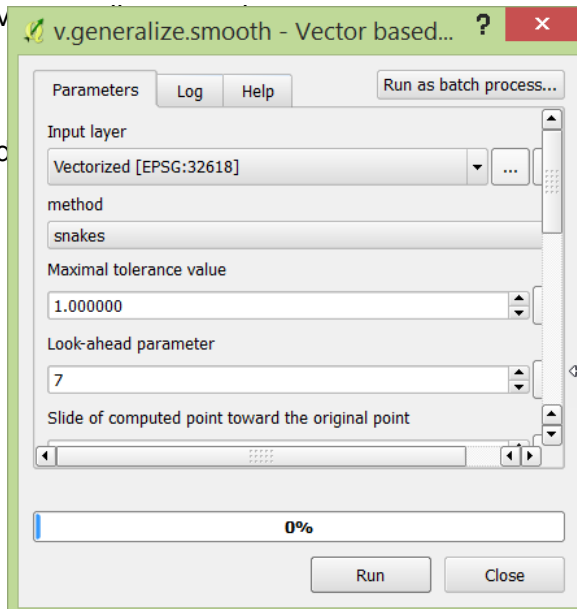
4. **Converting raster to polygon.** In Processing Toolbox, enter “polygon” in Search ... and then click GDAL/OGR > Conversion > Polygonize (raster to vector)



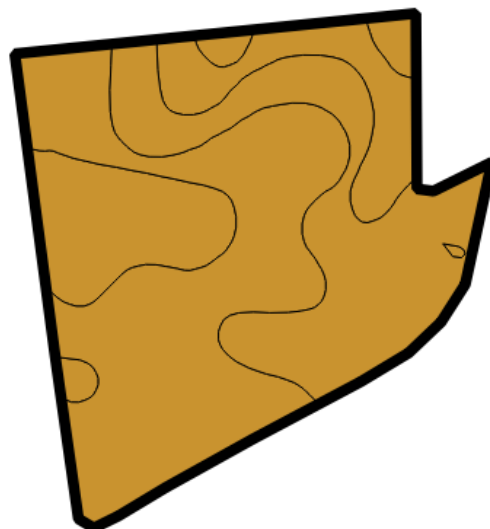
- a. In Polygonize:
Input layer = **Filtered Grid**
Output field name = K_kg_ha
Click Run

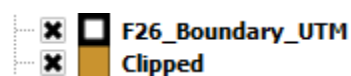
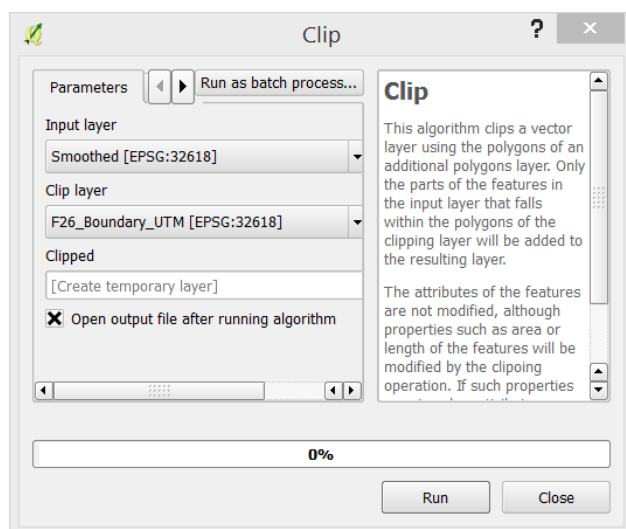


5. **Smoothing polygon outline.** In Processing Toolbox, enter “smooth” in Search ... and then click > GRASS GIS > Vector > v.generalize.smooth. **Use default value, except ...**
- a. Input layer = **Vectorized**
 - b. Method = snake
- Click Run. A Smoothed polygon is added to the map.

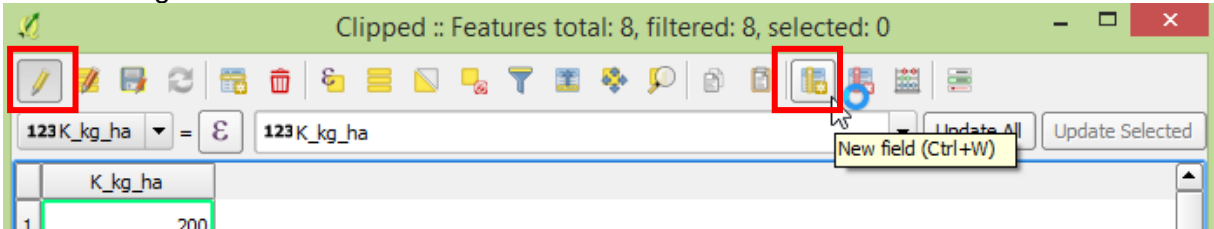


6. **Clipping the vector layer to the field boundary.** In Processing Toolbox, click QGIS geocomponents > Vector overlay tools > Clip
- a. Input layer = Smoothed
 - b. Clip layer = F26_Boundary_UTM
- Click Run

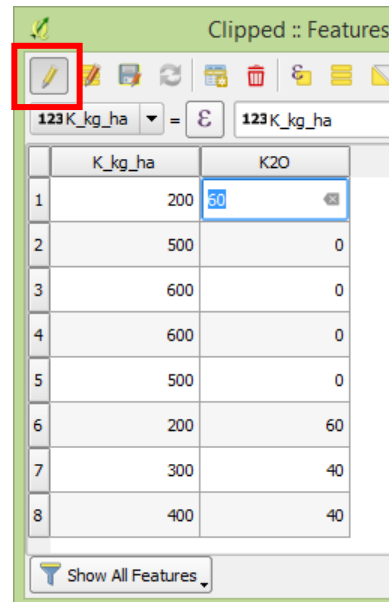
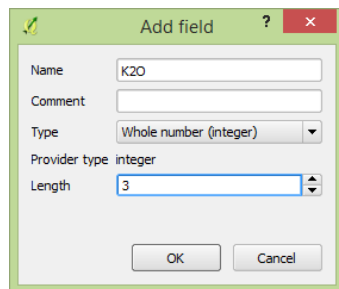




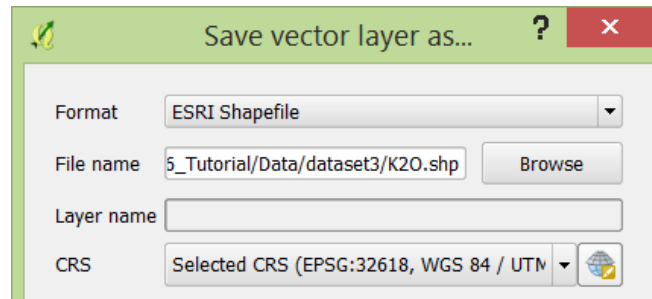
7. **Adding a new field to store K2O values in the attribute table.** In Layers Panel, right click **Clipped** and then click Open Attribute Table. In the attribute table, click Toggle editing mode and then click New field.



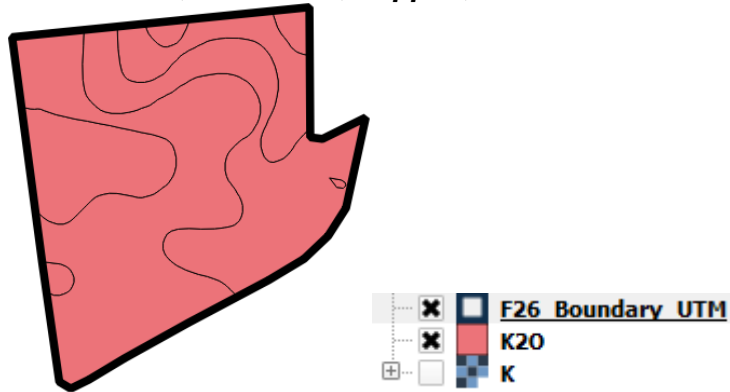
- a. In Add field:
Name = K2O
Type = Whole number (integer)
Length = 3
Click OK to close this window
8. Back to the attribute table; click the cells under the column of K2O to manually enter the values as shown below. Once finished, click Toggle editing mode to exit and save the new edits.



9. **Storing the temperate file as a shapefile in the system.** In the Layers Panel, right click **Clipped** and then click Save as ...
- a. Format = ESRI shapefile
b. File name = K2O.shp
c. CRS = Selected CRS (EPSG:32618, WGS 84 / UTM zone 18 N)
Click OK

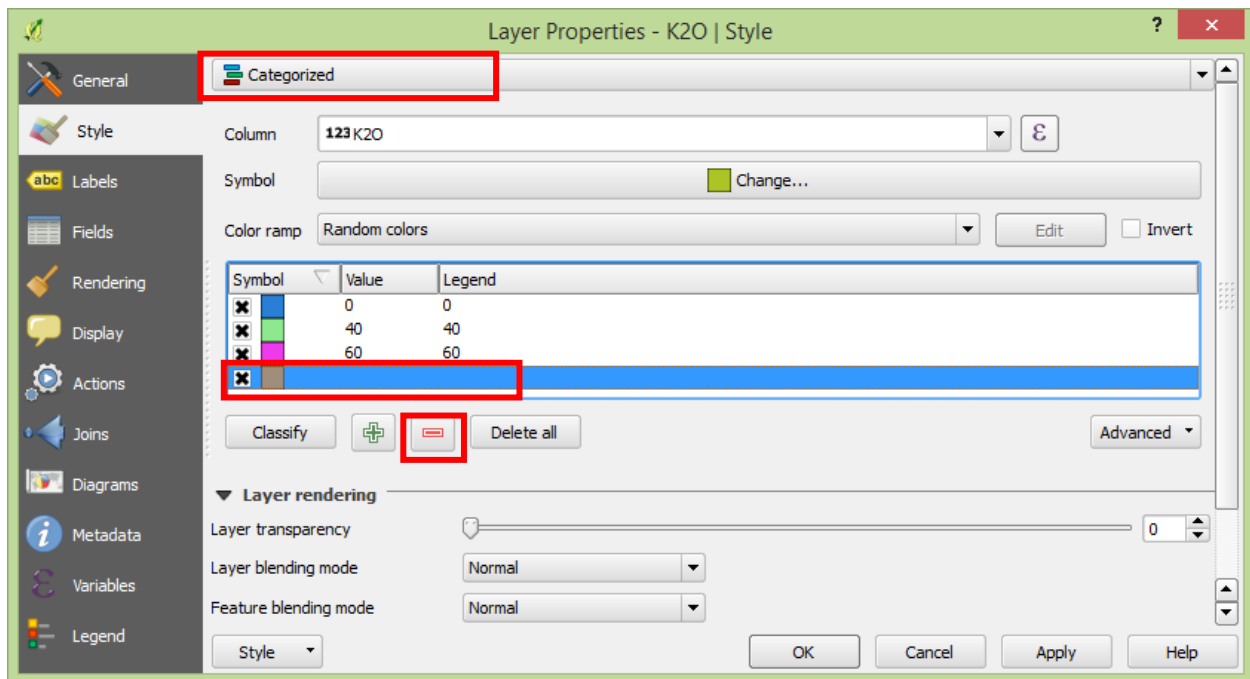


10. **Remove the unneeded layers.** In the Layers Panel, remove the layers **Clipped**, **Vectorized**, **Filtered Grid**, **Smoothed**, **Clipped**, and **Reclassified Grid**

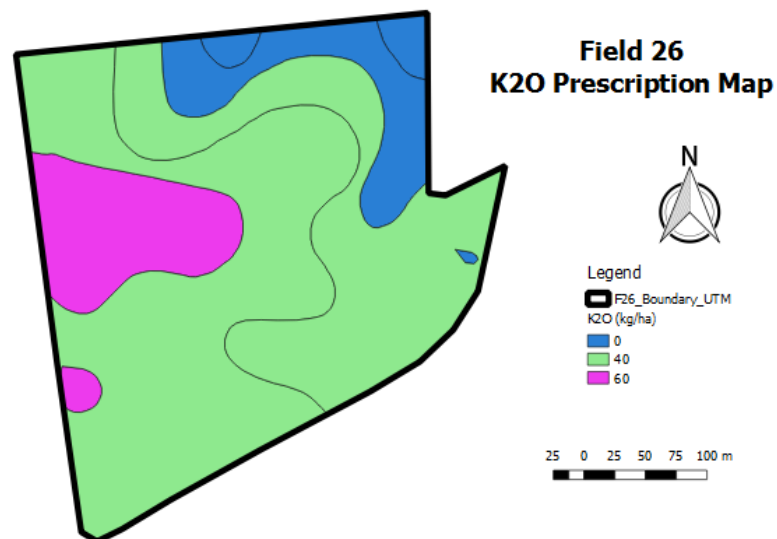


Part 3: Produce a K₂O layout map

1. In the Layer Panel, right click K₂O layer and click Properties
 - a. Style = Categorized
 - b. Column = K₂O
 - c. Color ramp = Random colors
Click Classify
 - d. Click the unassigned category and then click Delete
- Click OK



2. In Layers Panel, right click **K20** and rename this layer as **K20 (kg/ha)**
3. Create a K2O prescription layout map following the same steps described in exercise 3-1.



4. Save the project