

## EOCap4Africa – 7 Vector Analysis

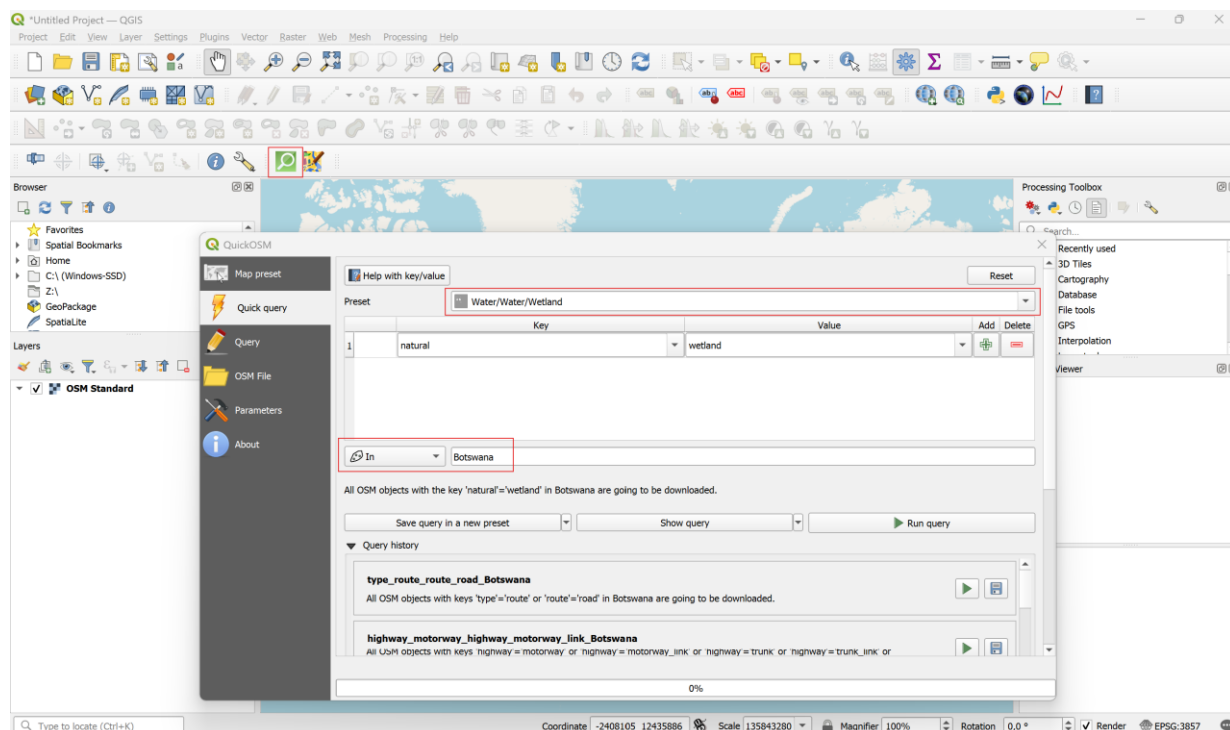
### Sample Solution

#### Project Setup

- Start QGIS and create a new project file.
- Get a background map using **Web -> QuickMapServices -> OSM -> OSM Standard**.
- Load in the **clip** shapefile for later.

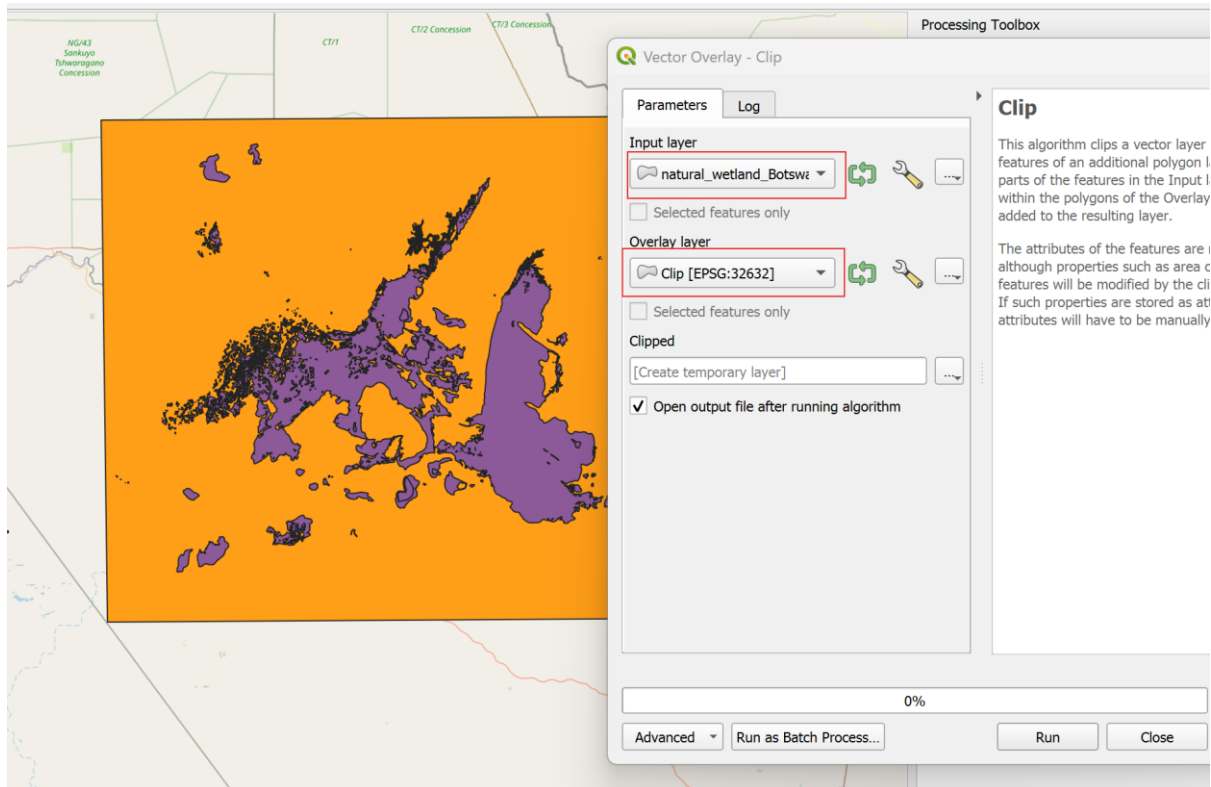
#### Data Preparation

- First, we want to extract wetlands via OSM. Open **QuickOSM** (Vector > QuickOSM) and enter the following:
  - **Key:** natural
  - **Value:** wetland
  - **Location:** Botswana
- Run the query. This may take some time, so be patient.

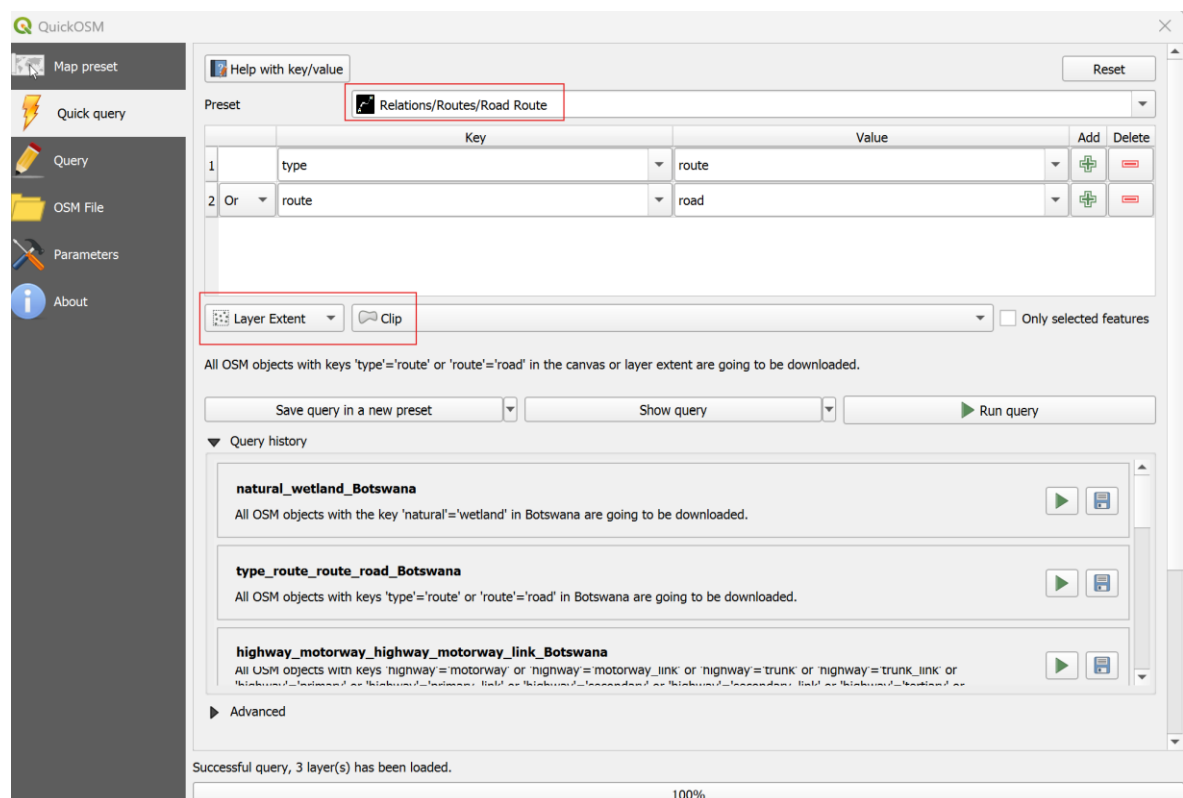


- Next, clip the wetlands to the predefined study area using the **clip.shp**:
  - Open **Vector > Geoprocessing Tools > Clip**
  - **Input Layer:** Extracted wetlands

- **Clip Layer:** clip.shp
- **Click Run**



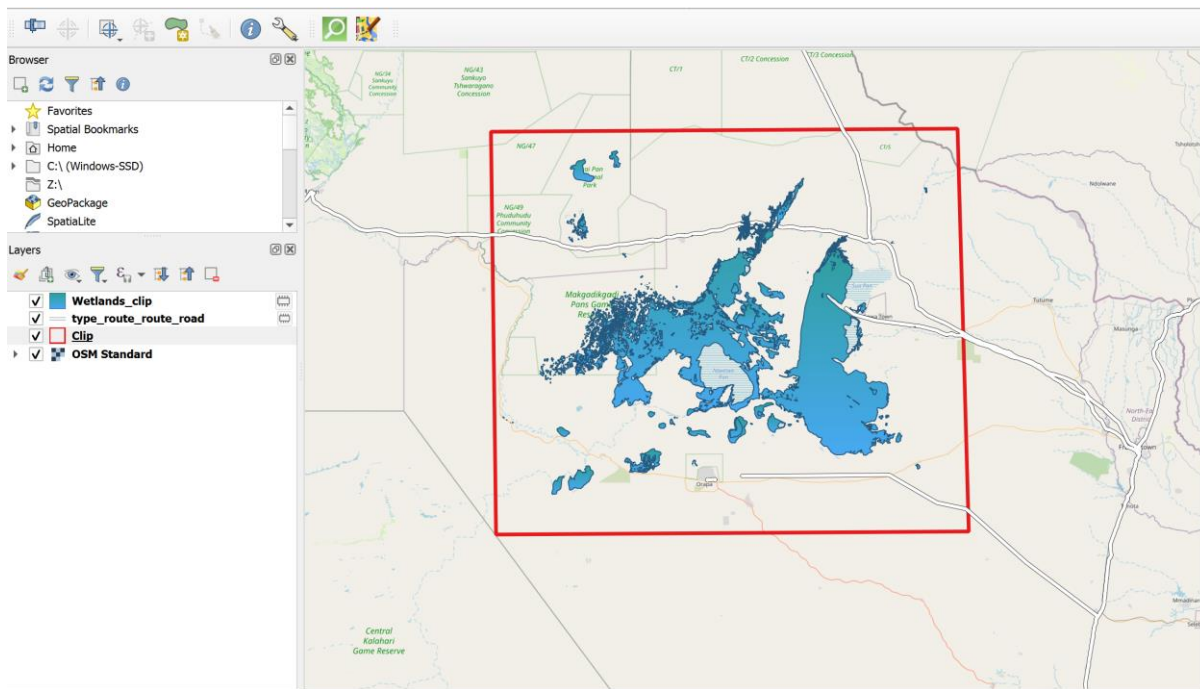
- Now, extract the road network in the area using OSM:
  - If we know our study area, we can directly extract OSM data only within our area of interest (AOI).
  - In **QuickOSM**, use the clip shapefile in the **OSM location tab**.
  - Run the query.



**Tip!** To keep QGIS efficient, remove shapefiles you will no longer use. OSM outputs multiple types of data, but for this analysis, we only need:

- The **extent of our study area**
- The **wetlands as polygons**
- The **roads as a line layer**

**I also adjusted the visualization of the shapes to improve readability and renamed the files for easier data handling. My cleaned-up file looks like this:**



## Vector Analysis in QGIS

- To buffer data properly, you need to **reproject the data to a UTM projection** to perform accurate calculations.
- Save the wetlands polygon as a new shapefile with the correct coordinate system:
  - Right-click the wetlands layer > **Export > Save Features As...**
  - Choose a **UTM coordinate system** appropriate for Botswana
  - Click **Run**

Save Vector Layer as...

Format: ESRI Shapefile

File name: cuments\Berufliches\Hiwi EOCap4Africa\Geodata\_tasks\7. Vector Analysis\Wetlands.shp

Layer name:

CRS: EPSG:32632 - WGS 84 / UTM zone 32N

Encoding: UTF-8

☐ Save only selected features

► Select fields to export and their export options

☒ Persist layer metadata

▼ Geometry

Geometry type: Automatic

☐ Force multi-type

☐ Include z-dimension

► ☐ Extent (current: none)

▼ Layer Options

RESIZE: NO

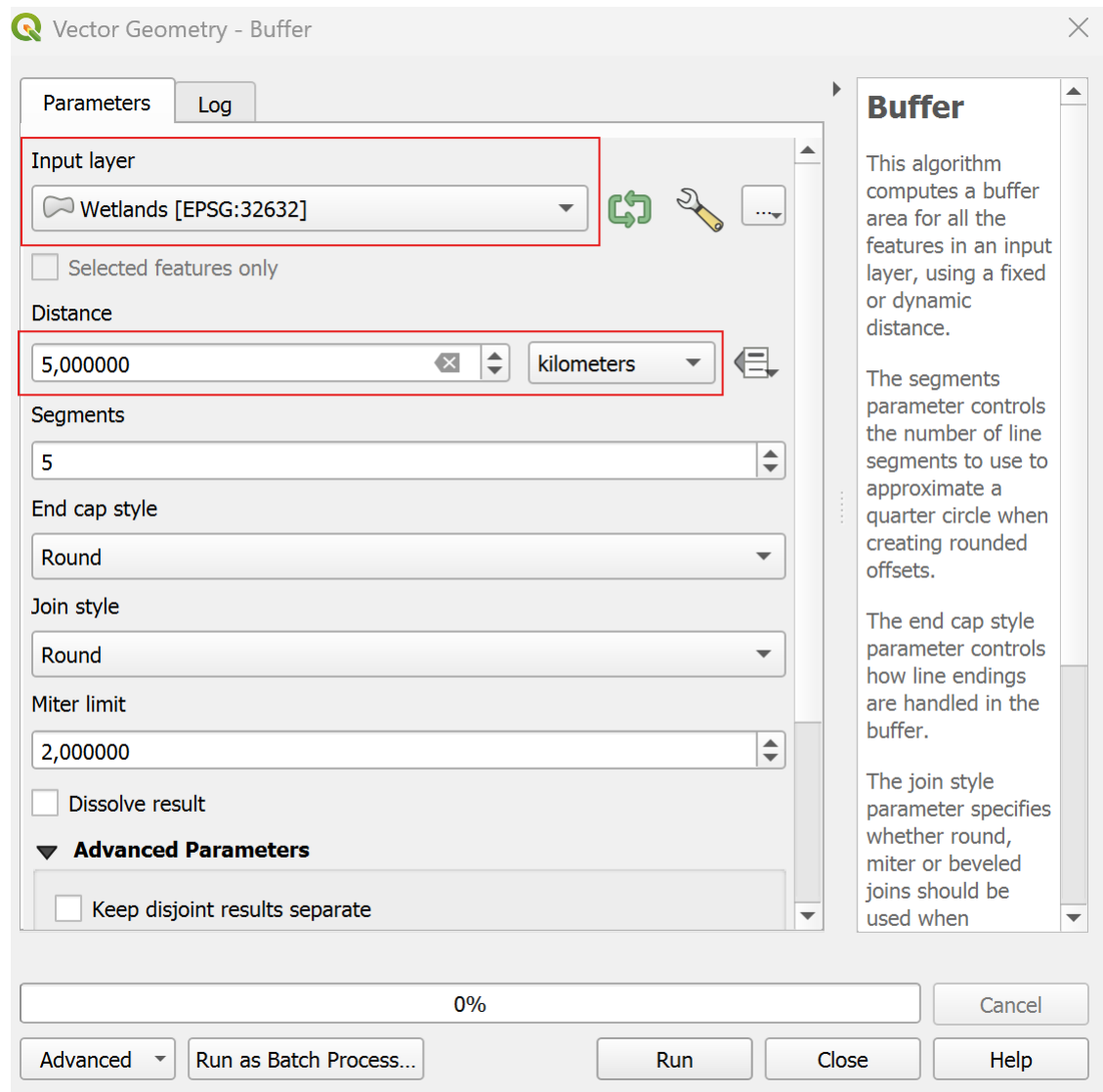
SHPT:

► Custom Options

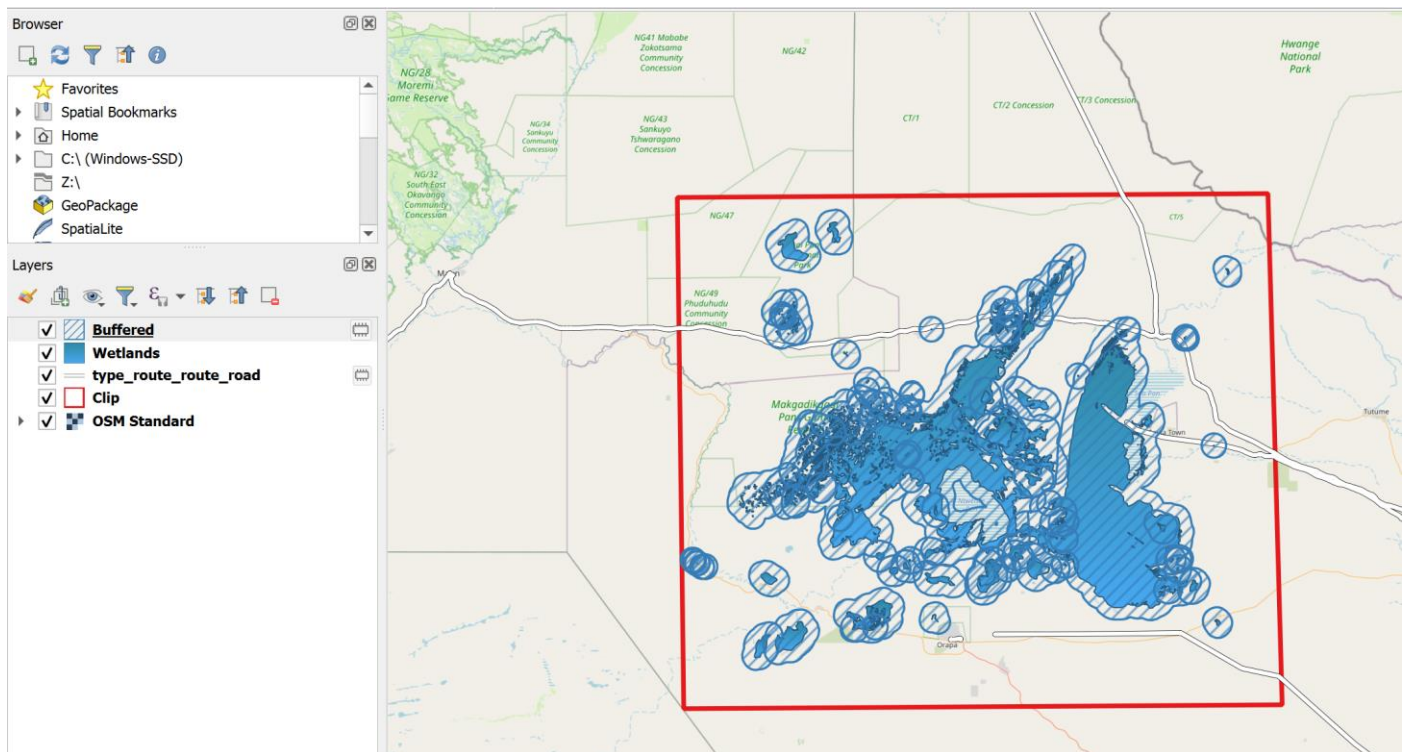
☒ Add saved file to map

OK Cancel Help

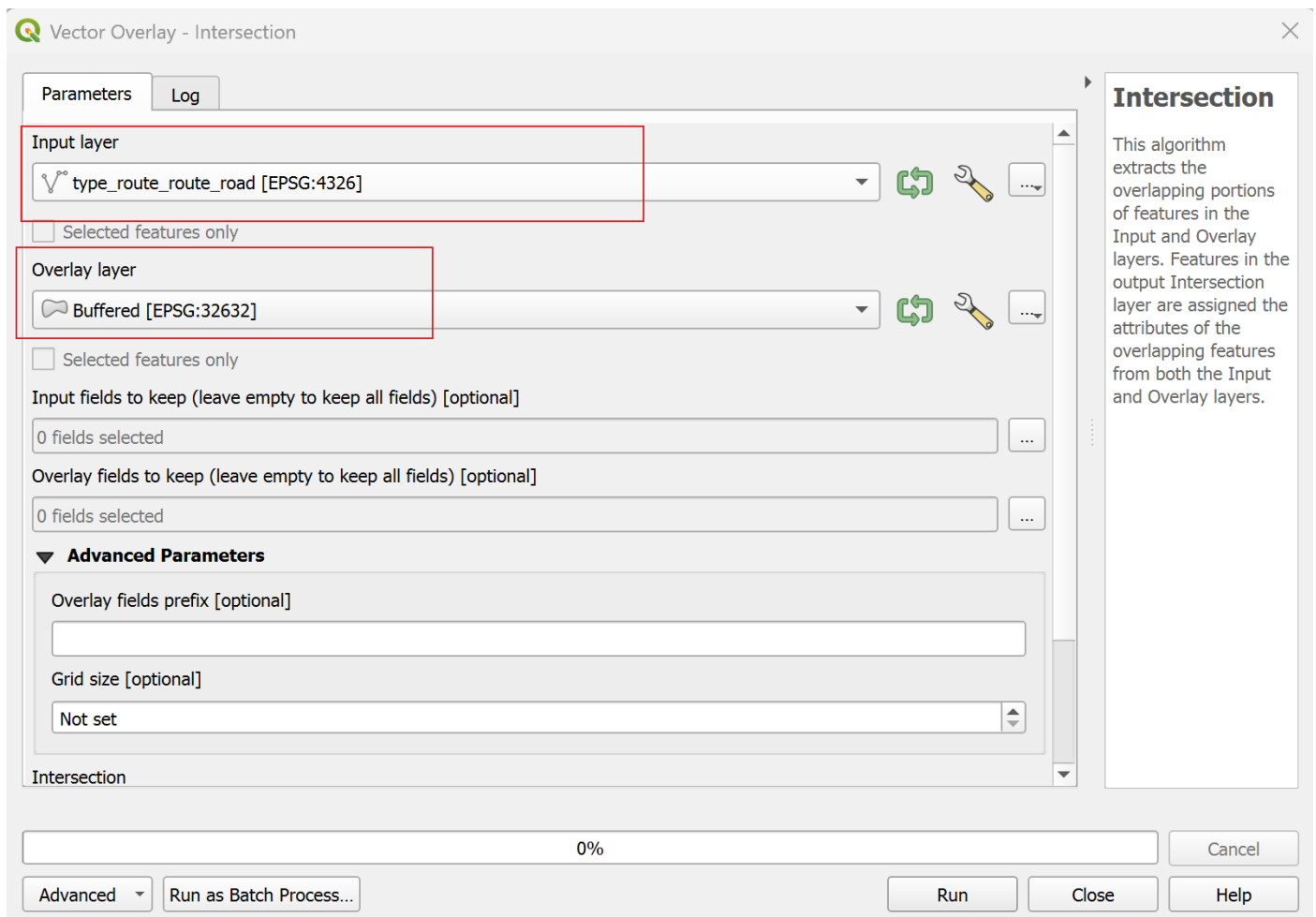
- Apply the buffer to the dataset:
  - Open **Vector > Geoprocessing Tools > Buffer**
  - **Input Layer:** Reprojected wetlands
  - **Distance:** 2000 meters (2 km)
  - Click **Run**
  - Buffer creation might take a moment, depending on your PC's performance.



- Ensure that the buffer correctly expands around the wetlands before proceeding:



- Last, extract roads that are too close to the buffer using the **Intersect tool**:
  - Open **Vector > Geoprocessing Tools > Intersect**
  - **Input Layer:** Buffer
  - **Overlay Layer:** Road network
  - Click **Run**

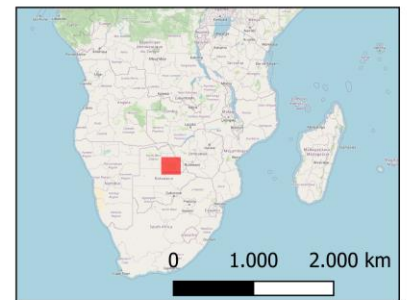
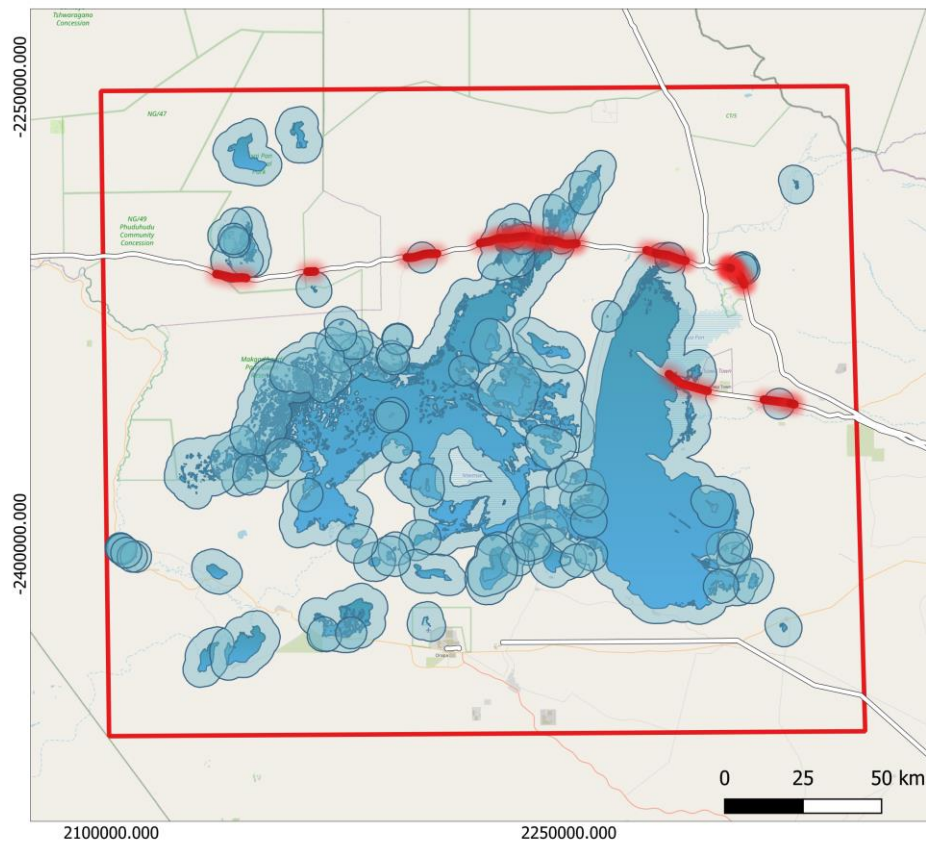


## Visualizing the Results

- Open **Project > New Print Layout**, name it, and click **OK**.
- Add the map by selecting **Add Map** and drawing a rectangle in the layout.
- Add the following elements using **Add Item**:
  - **Title**: Use a clear, descriptive name.
  - **North Arrow**: Found under **Item Properties**.
  - **Scale Bar**: Adjust placement and units.
  - **Legend**: Ensure symbology is properly explained.
  - **Source & Date**: Add a reference to the data sources.



## Roads intersecting Wetlands in Botswana



### Legend

- Intersections of Roads and Wetlands
- 2km Wetlands Buffer
- Wetlands
- Roads
- Area of Interest
- OSM Standard

Projection: UTM 32S  
Data Source: OSM  
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