



มหาวิทยาลัยราชภัฏนครปฐม



7202304

Fundamentals of Geographic Information System



Chapter 9: Buffer Analysis

Course: Fundamentals of GIS (QGIS-based)

Topic: Distance-Based Spatial Analysis

Duration: 3 Hours (Lecture + Lab)



Learning Objectives

Explain the concept of buffer analysis

Differentiate fixed and multiple ring buffers

Perform buffer operations in QGIS

Interpret buffer results

Apply buffer in real-world scenarios



What is Buffer Analysis?

Buffer Analysis is a spatial analysis technique used in GIS to create a zone around geographic features at a specified distance.

It helps identify areas that are within a certain distance from a feature.



Types of Buffer

Point Buffer (e.g., hospital service area)

Line Buffer (e.g., road impact zone)

Polygon Buffer (e.g., protected area boundary)

Point Buffer



Line Buffer



Polygon Buffer





Single vs Multiple Ring Buffer

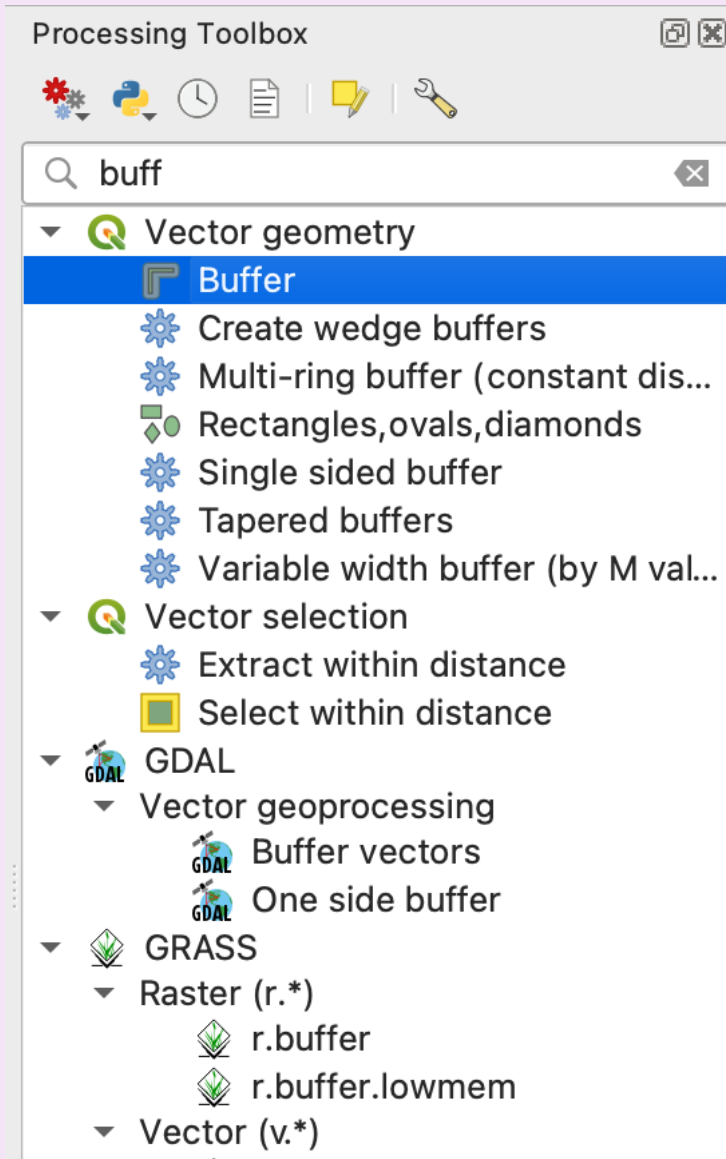
Single Distance Buffer (e.g., 1 km)

Multiple Ring Buffer (e.g., 1 km, 3 km, 5 km)

Used to analyze distance zones



Steps: Buffer in QGIS



Open Processing Toolbox

Select 'Buffer' tool

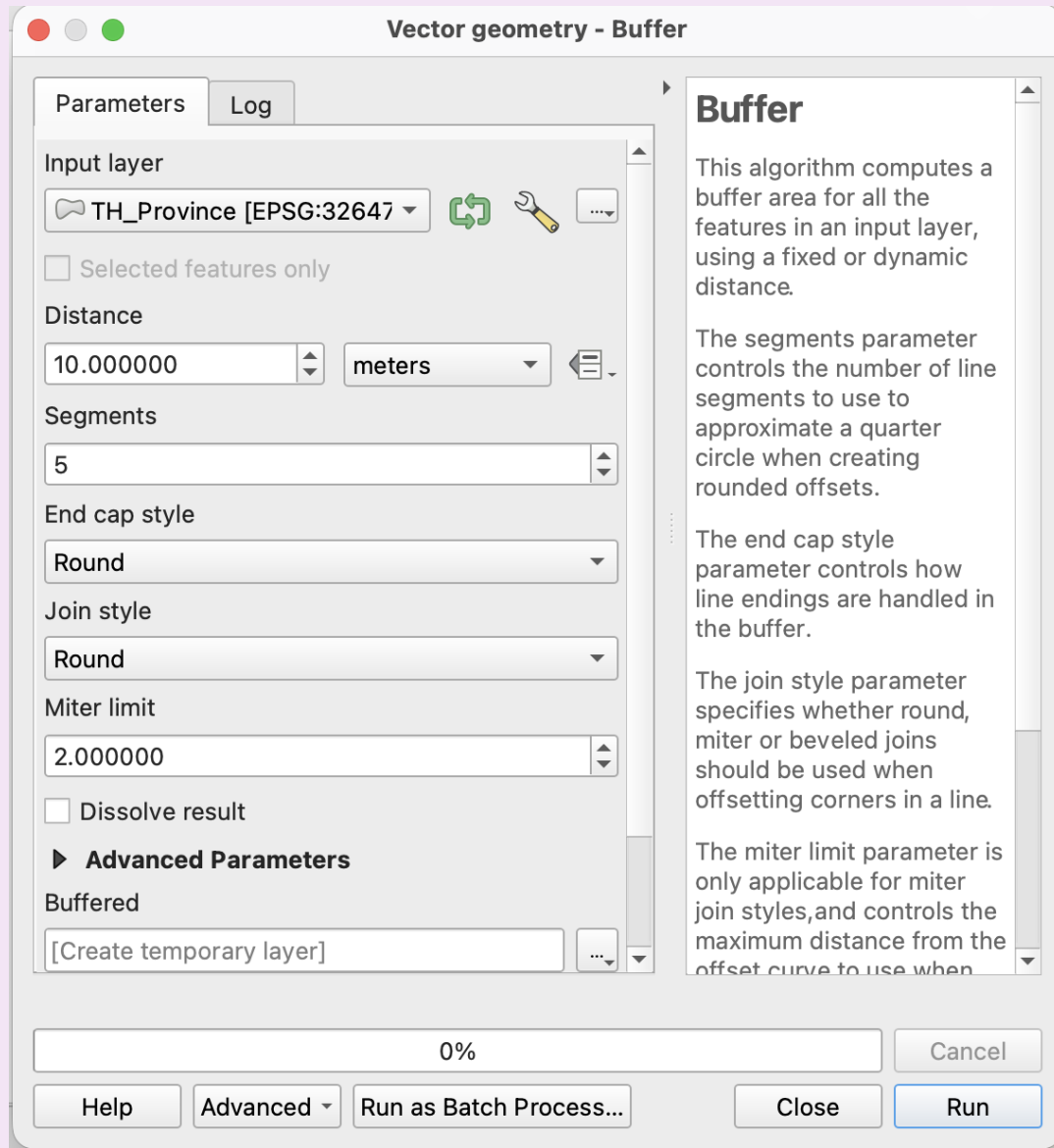
Choose input layer

Set buffer distance

Run and review output



Practical Examples



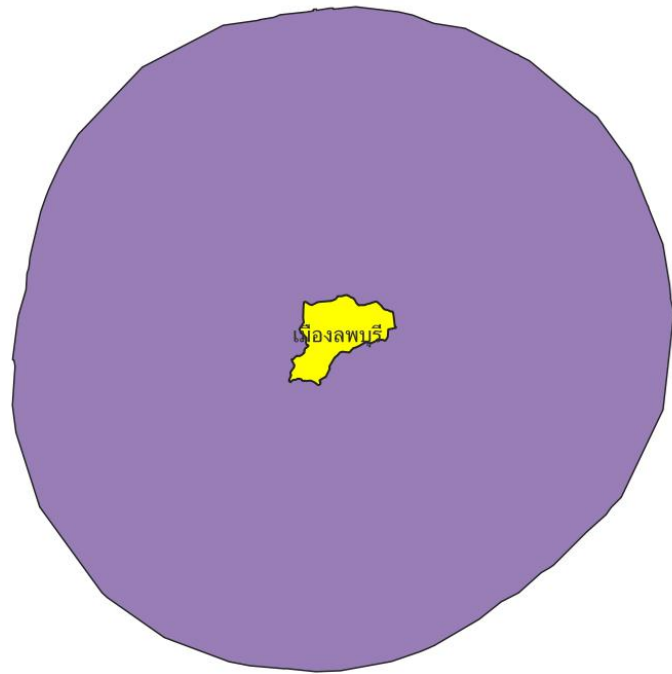
Hospitals within 5 km service area

Flood risk zone near rivers (500 m buffer)

Noise impact zone along highways



Lab Activity (60 Minutes)



Create 1 km buffer around schools

Create 500 m buffer along main roads

Overlay buffer with residential areas

Export result as new layer



Common Mistakes

Incorrect CRS (distance distortion)

Wrong distance unit

Overlapping buffers not dissolved



Assessment Criteria

Correct buffer distance

Proper CRS selection

Accurate overlay result

Clear interpretation



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