

## Assignment 5: Raster Analysis

**(60 Points Total)**

Data available under [Resources>UK Data](#).

The following raster layers have been provided for the entire extent of the United Kingdom. Both grids have been resampled to a 100 m cell size to reduce processing time.

**uk\_lc.tif:** land cover grid derived from the CORINE 2018 land cover product (<https://land.copernicus.eu/pan-european/corine-land-cover/clc2018>)

**uk\_dem100m.tif:** digital elevation model with units in meters (<https://www.eea.europa.eu/data-and-maps/data/copernicus-land-monitoring-service-eu-dem>)

The provided **uk\_data.gpkg** GeoPackage contains the United Kingdom country boundaries and are from the United Kingdom Data Service.

**countries\_bound:** boundaries of England, Wales, Scotland, and Northern Ireland

### Description of Problem

An invasive plant species is threatening the United Kingdom. The plant is known to occur:

1. At **elevations** less than **600 meters**
2. On **slopes** less than **20 degrees**
3. In **agricultural land cover**
4. Within **20 kilometers** of **urban** or **developed land cover**.

Using raster analysis techniques, create a binary output where all cells that meet all for criteria are coded to 1 and all other cells are coded to 0. The results should cover the full spatial extent of the United Kingdom and have a cell size of 100 meters.

Some hints:

1. In the **land cover** data codes 12 through 21 represent agricultural lands. Codes 1 through 11 represent urban areas.
2. The entire analysis can be completed using just the raster data and raster analysis techniques.

### **Deliverables**

- Provide a write up that clearly explains the methods that you used to create the model. A reader should be able to replicate your process from the write up. **(20 Points)**
- Create a map layout of your results exported to PDF format. The layout should: **(20 Points Total)**

- Have areas that were identified as being at risk clearly identified. **(4 Points)**
- Contain a descriptive legend. **(4 Points)**
- Include the boundaries for England, Scotland, Wales, and Northern Ireland. **(2 Points)**
- Be masked to the extent of the United Kingdom. **(2 Points)**
- Include a scale bar, north arrow, and title. **(4 Points)**
- The map should be overall neat, well organized, and use the space well. **(4 Points)**
- Summarize the results for each country to calculate the land area and percentage of potentially threatened land in each country. Present your results as a table. **(20 Points)**