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Geography 355
FINAL PROJECT

Introduction

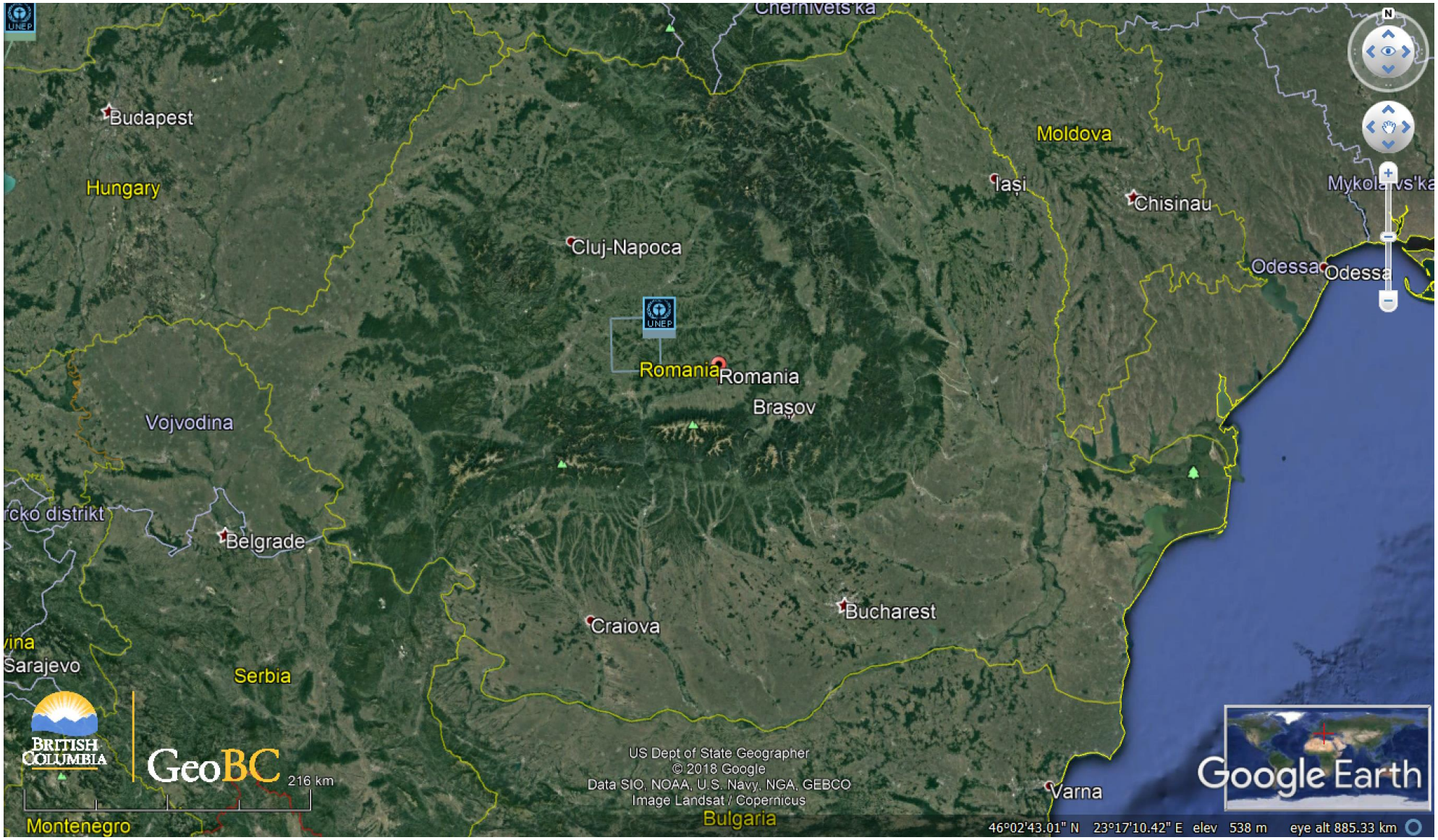
- My intention with this project is to help with a problem in my home country, Romania.
- When Romania became communist many people were forced to move from the countryside and this left many dogs abandoned.
- In 2014 it was reported that there were 60,000 stray dogs just in the capital city of Bucharest.
- The government has not done a good job with fixing this problem. The catch and kill method was implemented but was not successful.
- The poor Romanian economy makes people from rural areas leave and abandon their dogs. This is very much a present day issue.

Introduction – Problem and Solution

- Public dog pounds are overcrowded and euthanizing dogs does not help reduce stray dog populations.
- Stray dogs are not vaccinated and can be dangerous to the public.
- In 2013 a 4 year old boy was mauled to death by stray dogs. Caused public outrage and increased violence against dogs.
- The solution: sterilizing the female dogs. It is very effective at reducing stray dog populations and cheaper than catch & kill method.
- Sterilization of female dogs reduces the chance they are abandoned
- The solution is to build more animal shelters that are focused on sterilization as their primary goal.

The unfortunate problem

What is the study area?



Romania is in Southeastern Europe, bordering the Black Sea and is between Bulgaria and Ukraine. The total land it covers is 229,891 sq km and it has a population of 21,457,116.

Data Acquisition

- I will be analyzing the best potential locations for a new animal shelter in Romania. By using a EU open data catalogue I was able to download a TIF file of the different land categories, and vector data for the roads and railways.
- ArcMap allowed me to convert the data in raster and set the reference system to UTM 34N.
- After everything was converted to raster I used TerrSet to perform my spatial analysis.

TerrSet analysis

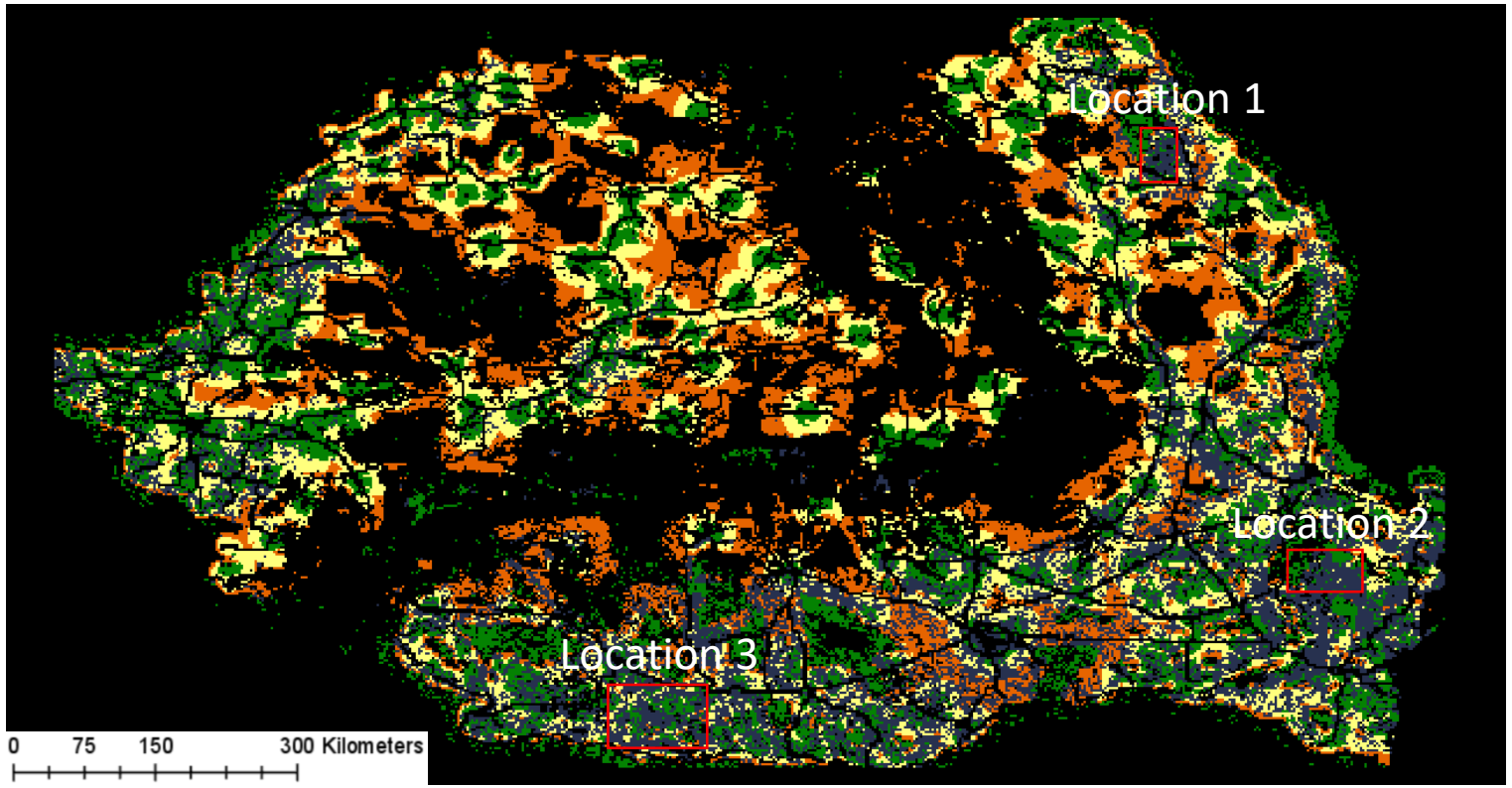
- Step 1: RECLASS module used in order to make the land-use classes that will benefit me for this report.
- Step 2: EDIT/ASSIGN to make a Boolean image of the land-use classes that will be available for new construction. (called LandBOOL)
- Step 3: Using the PROJECT module to make the same number of rows and columns in my 3 raster files (Landuse, roads and railways).
- Step 4: Using the DISTANCE module to create a buffer distance around roads that would include most areas just inside Romania.
- Step 5: OVERLAY module was used to subtract the roads buffer from the rails buffer because construction can’t take place on a railway. The new Boolean image was multiplied with landBOOL for the final Boolean image.

TerrSet analysis

- Step 6: FUZZY module was used to create the factors that would find the most ideal location for a new animal shelter. The proximity to the town, roads, and urban areas were taken into account
- Step 7: WEIGHT module was used to specify the level of importance for each factor.
- Step 8: Multi-Criteria Evaluation (MCE module) was used with a Weighted Linear Combination procedure to find the areas that are most suited for a new animal shelter.

MULTICRITERIA (MCE) EVALUATION FOR A NEW ANIMAL SHELTER WITHIN ROMANIA

Map of suitable areas for a new animal shelter



Unsuitable
Low
Medium
High
Excellent
Recommended locations

The eigenvector of weights is :

roadFUZZ	0.2846
townFUZZ	0.1357
UrbanFUZZ	0.0570
MCE_landuse_type	0.5227

Consistency ratio = 0.06

Consistency is acceptable.

Criteria	Modules	Membership function	Parameters
Land-type constraint	Edit/Assign (Boolean)	contains	Shrubland, grasses or cropland
Roads and rails constraint	Distance & Overlay (Boolean)	Contains roads not rails	In road proximity, not on rails
Land-use factor	Edit/Assign and Fuzzy (MCE)	Continuous scale from 0 - 1.0	Grasses = 1.0 Shrubland=0.75 Cropland = 0.5
Town proximity factor	Fuzzy (MCE)	Linear & mono decreasing	Point c=0 Point d=848.7
Road proximity factor	Fuzzy (MCE)	J-shape & mono decreasing	Point c=100m Point d=800m
Urban areas proximity factor	Fuzzy (MCE)	Linear & mono decreasing	Point c=0 Point d=2005.1

Results

- The importance of the different factors were based on my research of the most ideal animal shelter locations
- The land-use type was taken into consideration the most in order ot keep the building costs cheap. Building on grasslands, shrublands, or croplands requires no logging. This provided sufficient area to work with as these land-types cover most of Romania.
- Road proximity factor was important because being able to transport dogs quickly between different locations is useful in case of emergencies.
- Stray dogs tend to roam around large towns and around urban environments. Urban environments is where the majority of their population comes from and grows so being near these factors will be ideal in catching and neutering the most amount of female dogs

Discussion

- Some limitations to this project were finding enough data. I looked around for reports of stray dog incidents and their locations but was not able to find this. This project could be improved if I had data points of where stray dogs have attacked humans, because I would have conducted an analysis on where the best place would be to find the stray dogs.
- Overall I am proud of my results because I was able to find 3 large locations that are very suitable for a new animal shelter. If these shelters focus on neutering female dogs then it could make a big difference in reducing the number of stray dogs.

Conclusion

- The problem of stray dogs is relevant in the present day
- Building more animal shelters that focus on neutering female dogs will reduce the suffering of innocent dogs and make the population more safe.
- Romania is a very beautiful country and it is a shame that some tourists are scared to visit because of stray dog incidents.
- The locations I have selected as most suitable were conducted with advanced GIS technology and should be considered by the Romanian government.

References

- Remote sensing data from : http://www.diva-gis.org/gdata

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