ArcGIS Semester Project

Dean, Matthew R
12-9-2019

Problem:

Deforestation has been a problem for many years around the world, but has been even more present in Southern America. The Amazonian Forest is the largest rainforest in the world; however, who knows how long this will take remain true if deforestation still occurs in the future. Deforestation is not the only anthropogenic impact that affects forests everywhere, there are many other land usages that can affect topography and wildlife as well. In this project COMMA I will be looking at the different Land-use and Land- cover (LULC) data for both the 2010 and 2014 Amazonian region to see the differences between land use. This deforested land is used for agriculture, urban expansion, and hydrographic regions.

Data:

The first step of this project was to find data applicable to this problem at hand. I found a dataset online called TerraClass, a project being developed by the Amazon Regional Centerin partnership with Brazil and its agricultural researching. TerraClass was found on the Instituto Nacional de Pesquisas Especiais (INPE) website, where LULC data was gathered and mapped out for classes such as Annual agriculture, Unobserved area, Urban area, Mining, Occupations, Pastures with exposed soils, Clear pastures, dirty pastures, Regeneration of pastures, Reforestation, Secondary vegetation, and others (INPE). The 2010 and 2014 Amazona raster maps (Maps 1 and 2) were downloaded from TerraClass.


Map 1: Amazona region in 2010
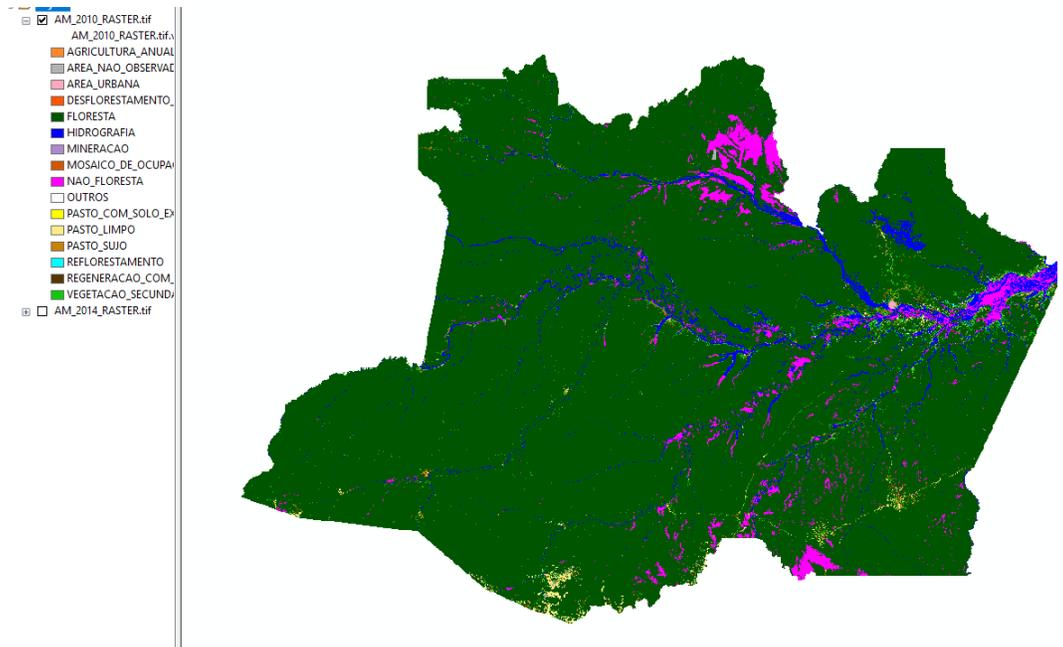
Map 2: Amazona region in 2014
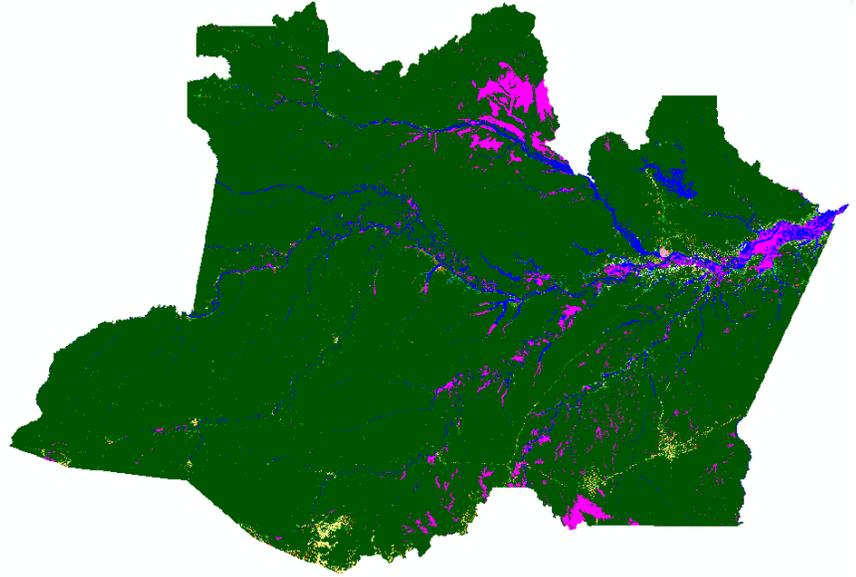
Process:

Because these raster maps show such a large amount of data, any form of raster calculation took upwards of 10-15 minutes in total. Finding the differences in these two raster maps proved to be too time consuming and not worth the time so I have decided to focus on looking on the differences in deforested areas of Map 1 and Map 2. I used the raster calculator tool to find the differences between the deforested area of 2010 vs the deforested area of 2014, as shown in Figure 1.

Figure 1: Using Raster Calculator to find deforestation differences between rasters
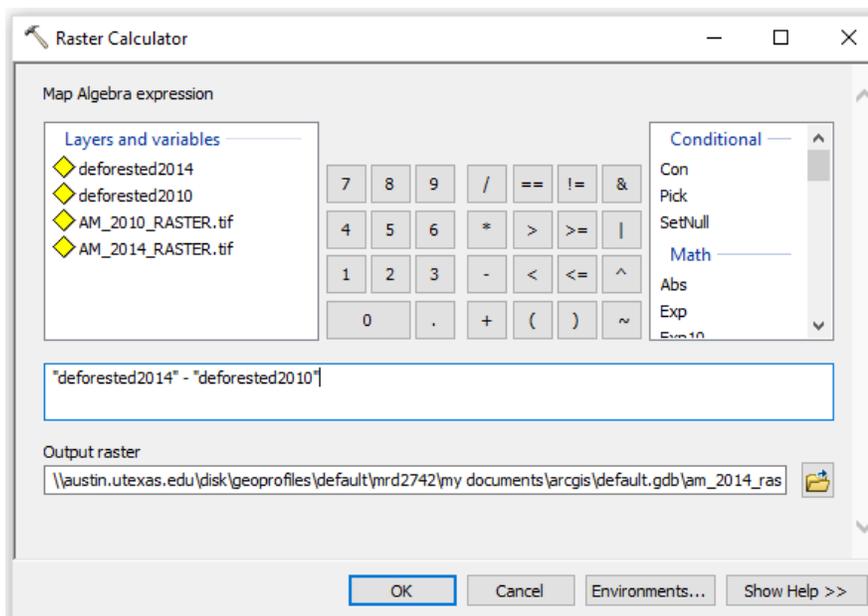
However, before this process can be completed, I must use the editing tool to delete all of the data from the attribute table, except for the deforested land, from both Maps 1 and 2 shown in Figure 2. This allows for the raster calculation to move much more quickly, as it does not need to go through each data point.

Figure 2: Using the editing tool to delete data from the attribute table

OID	Value	Count	tc_2014
1	2	1099157	AREA_NAO_OBSERVADA
2	3	1592927092	FLORESTA
3	4	3934385	MOSAICO_DE_OCUPACOES
4	5	8291095	PASTO_LIMPO
5	6	1967000	PASTO_SUJO
6	7	804791	AREA_URBANA
7	8	17666583	VEGETACAO_SECUNDARIA
8	9	2203645	REGENERACAO_COM_PASTO
9	10	2082331	OUTROS
10	11	58276269	HIDROGRAFIA

Because the Amazon is such a large region, each of these seemingly small pixels make up 900 square meters in area. I have decided to look at just a small area of the whole Amazon map, where the deforestation is most prevalent.

2014 Deforestation count: 566323 pixels

2010 Deforestation count: 717051 pixels

We calculated that each of these pixels make up roughly 900 square meters, meaning that the total amount of area that is deforested in each of these years are

2014: 566323 x 900 sq m = 509,690,700 square meters or 509.69 km^2

2010: 717051 x 900 sq m = 645,345,900 square meters or 645.35 km^2

I was not able to find a polygon of the Amazonas region of Brazil, meaning that the boundary seen in the top right of the map is of the entire Amazon Ecoregion, which was found on ArcGIS online.

Conclusion:

As we can see by these two maps, the deforestation continues to grow in the Amazon regions. It may not look like much is changing due to the format of these maps, but looking at the scale gives you a bigger picture of just how large these areas are. Deforestation is a big issue, and it will continue to be one if more precautions are not taken across the world. This becomes a problem because people are forced to cut down these forests, but it is how they make a living.

Deforested land of Amazonas in 2010

Matthew Dean
12/9/2019

N

0 1.5 3   6   9
                        KM

Legend
Amazon Boundary
Deforested Land
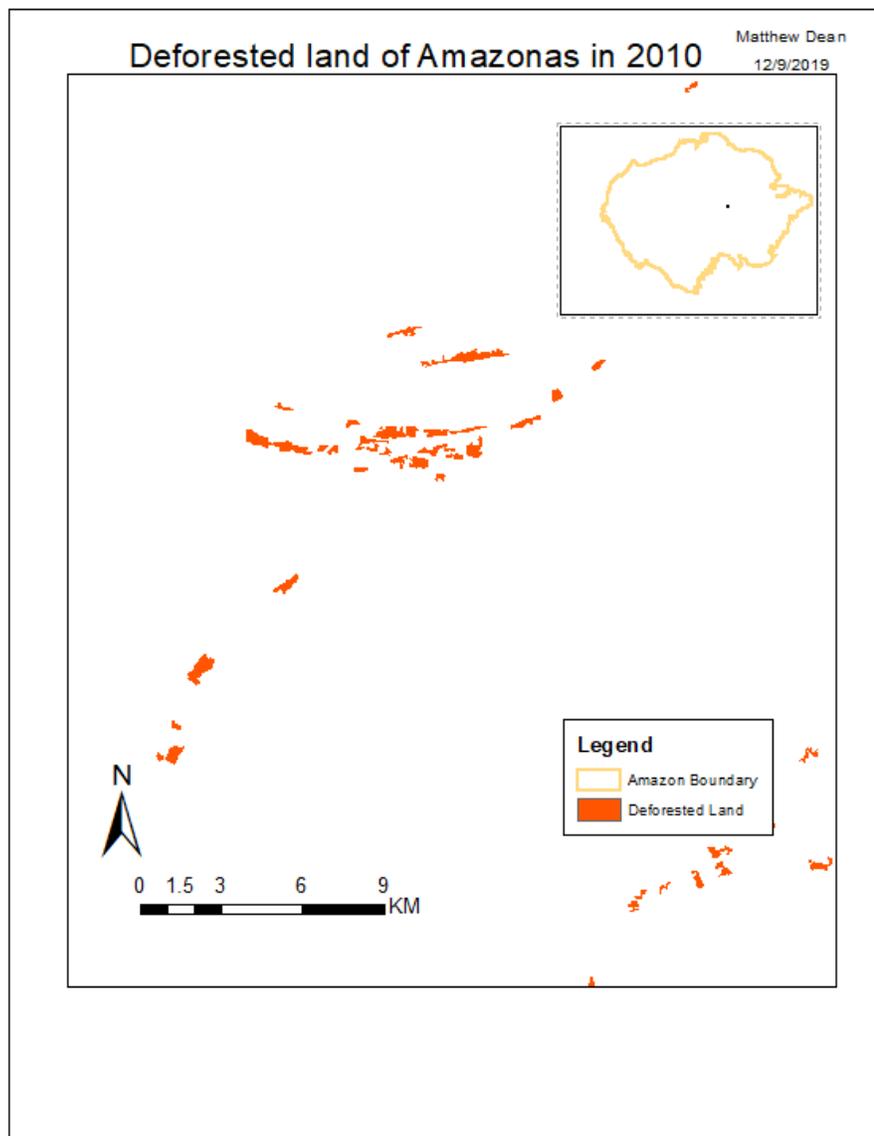
Deforested Land of Amazonas in 2014

Matthew Dean
12/9/2019

N

0 1.5 3   6   9
KM

Legend
Amazon Boundary
Deforested Land