

GEOG 653: Lab 1 (Vector Analysis)

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Overview

As the first lab of the course, this assignment was a nice refresher of some of the capabilities of the ArcGIS suite. I chose to use ArcGIS Pro to familiarize myself with the new software. As a point of reference, I decided to upload my work on GitHub, you can find the repository here: <https://github.com/Argentum133/GEOG653>.

Question 1.

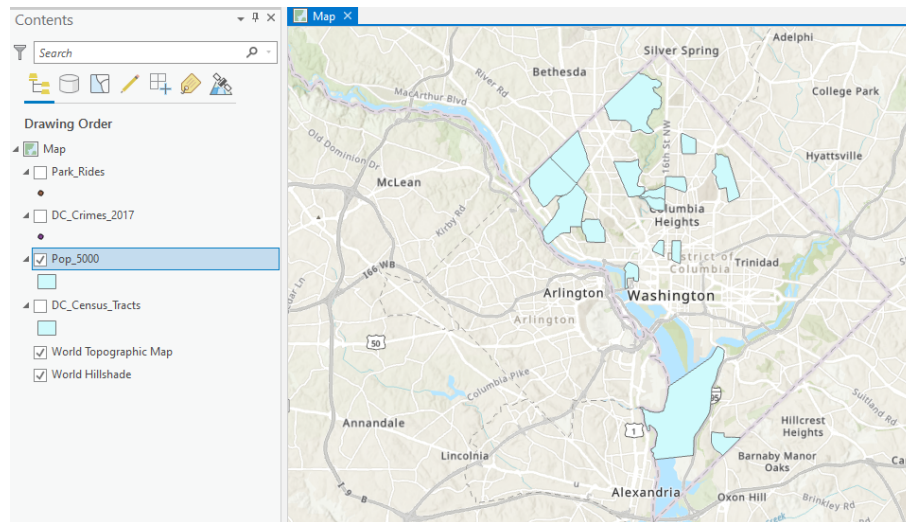


Figure 1: Population layer showing DC Census Tracts with a population of at least 5,000

Question 2.

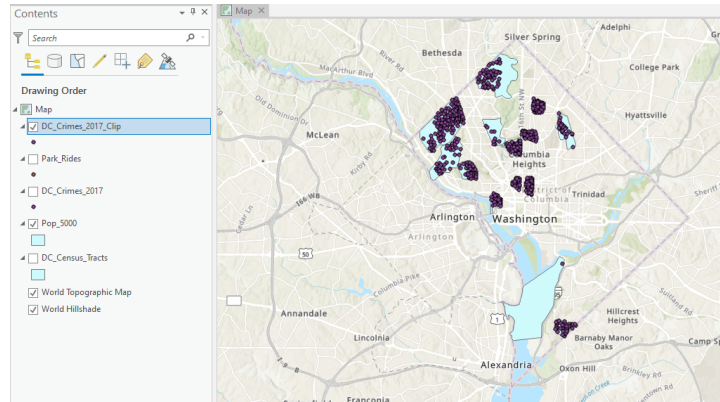


Figure 2: Clip layer, featuring crimes within the Tracts with populations of at least 5,000

Question 3.

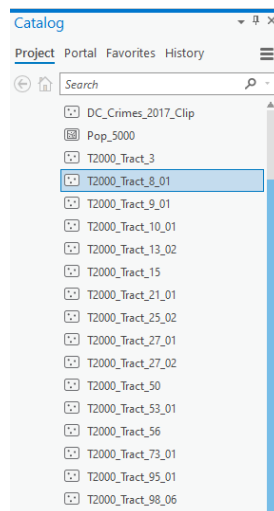


Figure 3: Split layers viewed in ArcGIS Pro's built in Catalog pane

Question 4.

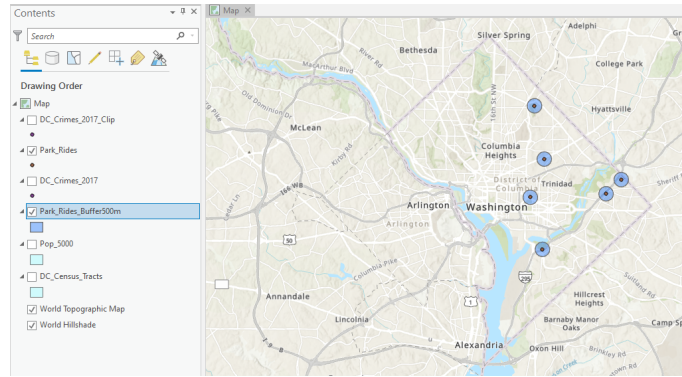


Figure 4: Park and Ride with buffer distance of 500 metres

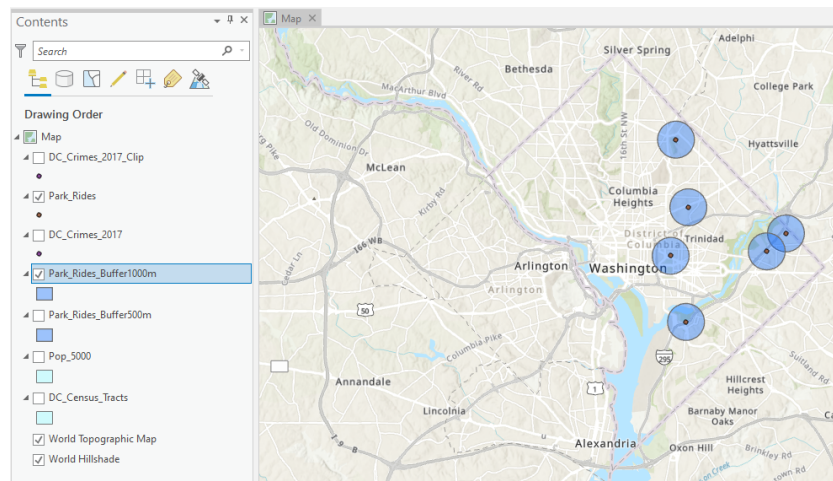


Figure 5: Park and Ride with buffer distance of 1000 metres

Question 5.

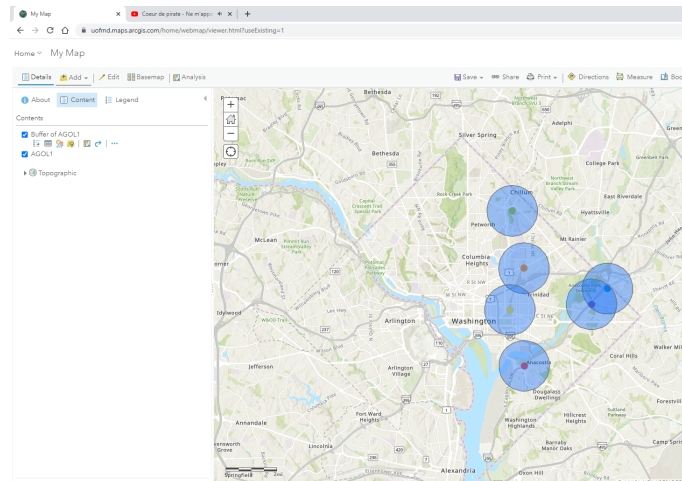


Figure 6: Buffer Map on ArcGIS Online

Question 6.

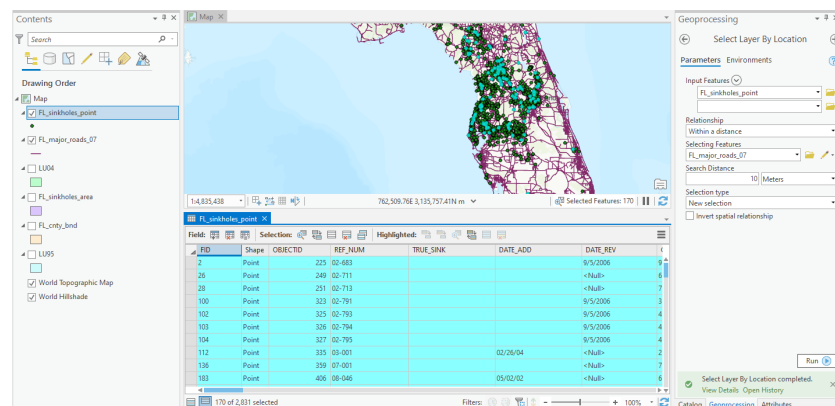


Figure 7: Spatial Query of sinkholes within 10 m. of major roads in Florida (170 total)

Question 7.

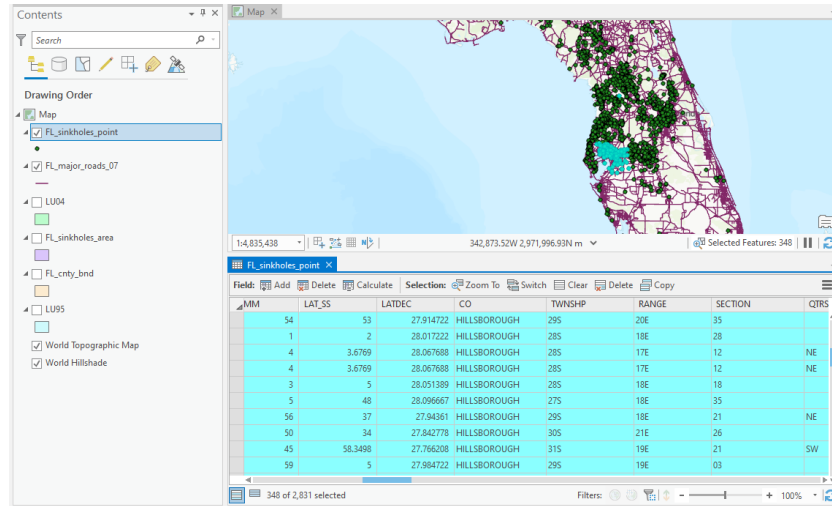


Figure 8: Sinkholes located within Hillsborough County (348 Total)

Question 8.

The Spatial Join procedure actually gave me some trouble in the beginning. ArcGIS Pro puts "Intersect" as the default option, but obviously the spatial distributions of a sinkhole would rarely perfectly coincide on a road. The correct option is by "Closest", however unlike ArcMaps, ArcGIS Pro will not correctly render the join unless a "distance" field is named. I neglected this part as I didn't realize I had to scroll down to find the field naming box. The total I came up with was 145, I will try to attach the exported table as an excel file on ELMS.

OBJECTID_1	Shape	Join_Count	Distance	TARGET_FID	OBJECTID	ROADWAY	BEGIN_POST	END_PC
93	Polyline	1	6.400678	92	29	02620000	7.726	
285	Polyline	1	7.760413	284	221	02000026	0	
286	Polyline	1	4.955987	285	222	02030000	14.203	
298	Polyline	1	2.389668	297	234	02090000	0	
504	Polyline	1	3.365084	503	325	02050000	0	
592	Polyline	1	9.400433	591	413	03590000	7.984	
822	Polyline	1	2.054507	821	1129	08580000	4.897	
839	Polyline	1	0.805682	838	1146	08508000	0	

Figure 9: Partial screenshot of the joined table

Question 9.

OBJECTID_1	FREQUENCY	SUM_Join_Count	MEAN_Join_Count	RANGE_Join_Count	COUNT_Join_Count	STD_Join_Count	VARIANCE_Join_Count
1	67	2831	42.253731	348	67	84.987226	7222.828

Figure 10: Summary Table of the Containment procedure

Question 10.

OBJECTID_1	AREA_DESC	FREQUENCY	SUM_Join_Count	MEAN_Join_Count
1	AREA I	4654	939	0.201762
2	AREA II	1897	464	0.244597
3	AREA III	215	1330	6.186047
4	AREA IV	2169	95	0.043799

Figure 11: Summary Table featuring the Spatial Join by Area types

Question 11.

In the Intersect method, we yield 2,831 total results. From Question 10, if we add up all 4 areas, we see that the spatial join method yields 2,828 results, a discrepancy of 3 points. This is probably due to the fact that spatial join will not "split" features inside other areas unlike the Intersect method.

OBJECTID_1	Shape	FID_FL_cnty_bnd	FIPS	NAME_1	TOTAL_POP	MALE	FEMALE	AGE_UNDEF
1	Point	43 087	087	MONROE	79589	42379	37210	1
2	Point	42 086	086	MIAMI - DADE	2253362	1088895	1164467	1
3	Point	5 011	011	BROWARD	1623018	783232	839786	1
4	Point	5 011	011	BROWARD	1623018	783232	839786	1
5	Point	5 011	011	BROWARD	1623018	783232	839786	1
6	Point	10 021	021	COLLIER	251377	125856	125521	1
7	Point	49 099	099	PALMBEACH	1131184	546739	584445	1
8	Point	10 021	021	COLLIER	251377	125856	125521	1

Figure 12: Table results from Intersect Method

Question 12.

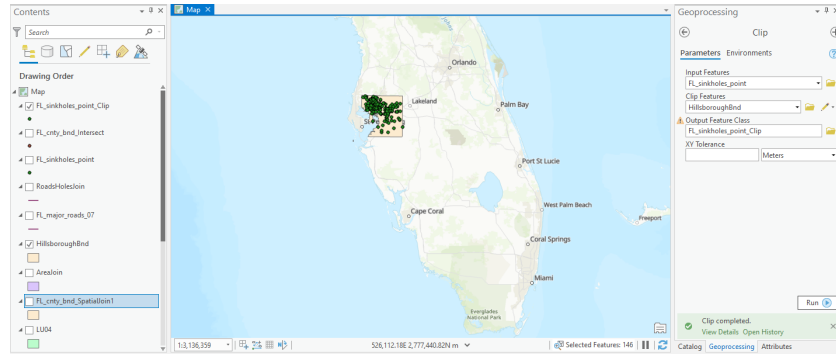


Figure 13: Clipped Layer of sinkholes within Hillsborough County

Question 14.

Question 14 was an interesting exercise. I think compared to my colleagues, I may have arrived at a slightly different approach. With the 2 LULC layers, I selected only for the 4 categories of land. Seeing that the area was in strange units, I used the "Calculate Geometric Attributes" feature to arrive at square kilometres. I immediately performed an "Erase" overlay to calculate land changes between the years. This operation could easily yield land changes only between the same type of land area. For the rest of the LULC boxes, I decided to create layers according to year and land area type. A simple intersection between all the combinations of LULC areas would yield the amount of changes. From a logical point of view, we could expect land dedicated to crops to result in more changes as population growth has created more demand for food. As we can see in the 2004 column for Row Crops, we see the largest amounts of land change, almost far larger than any other column.

		LULC 2004			
		Crop/Pasture Land	Mixed Rangeland	Row Crops	Shrub and Brushland
LULC 1995	Cropland and Pastureland	0.13272089 km ²	0.000038 km ²	14.10403021 km ²	5.96149497 km ²
	Mixed Rangeland	0 km ²	0.00355294 km ²	.00740822 km ²	0 km ²
	Row Crops	2.71750663 km ²	0 km ²	.17349491 km ²	4.91389698 km ²
	Shrub and Bushland	3.81669167 km ²	0.20999014 km ²	11.29303541 km ²	1.33101916 km ²

Figure 14: LULC Table showing changes from 1995 in 2004