Climate Change in a Growing, Urbanizing World:
Understanding the Demography of Adaptation
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ADAPTING URBAN SETTLEMENTS TO CLIMATE CHANGE

Local Vulnerability and Adaptive Capacity in the Urban Areas of Malawi and Indonesia

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FRAMEWORK OF USING OF CENSUS AND SURVEY TO PLAN FOR ADAPTATION TO CLIMATE CHANGE

MALAWI CASE STUDY

- Common climate vulnerability indicators
- Hazard specific vulnerability indicators
- Measuring vulnerability: linking vulnerability indicators with climate change hazard exposure

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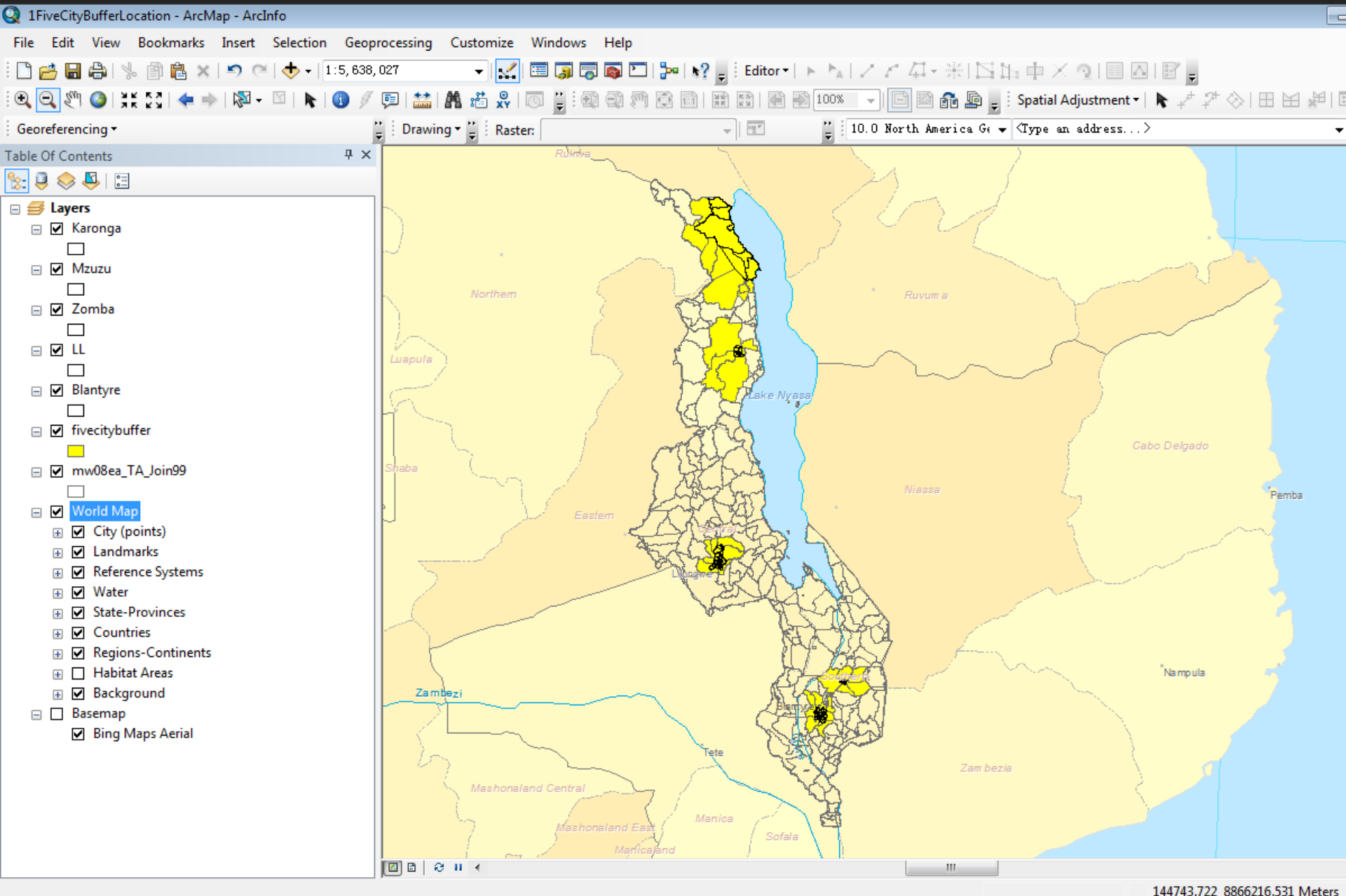
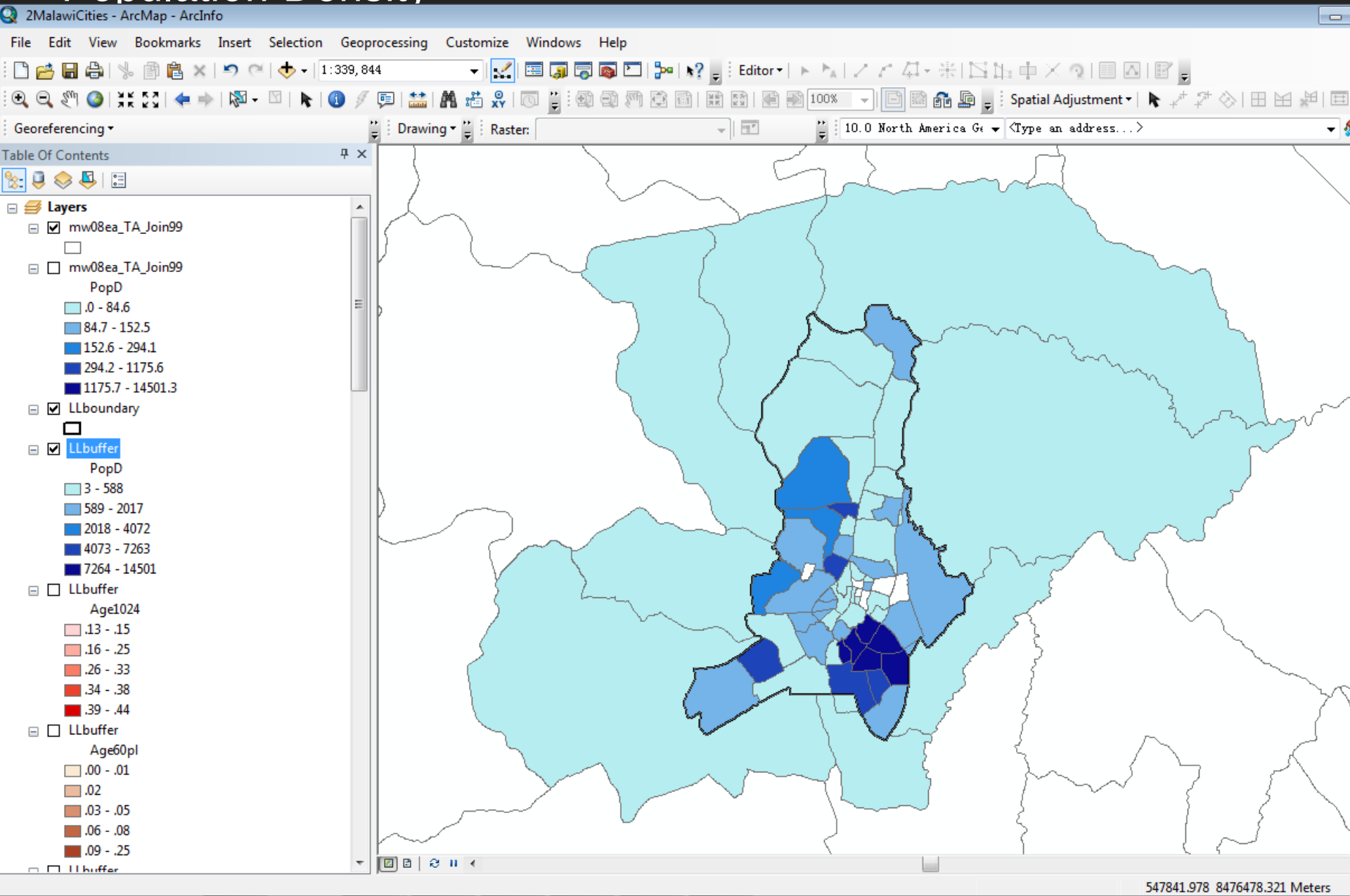
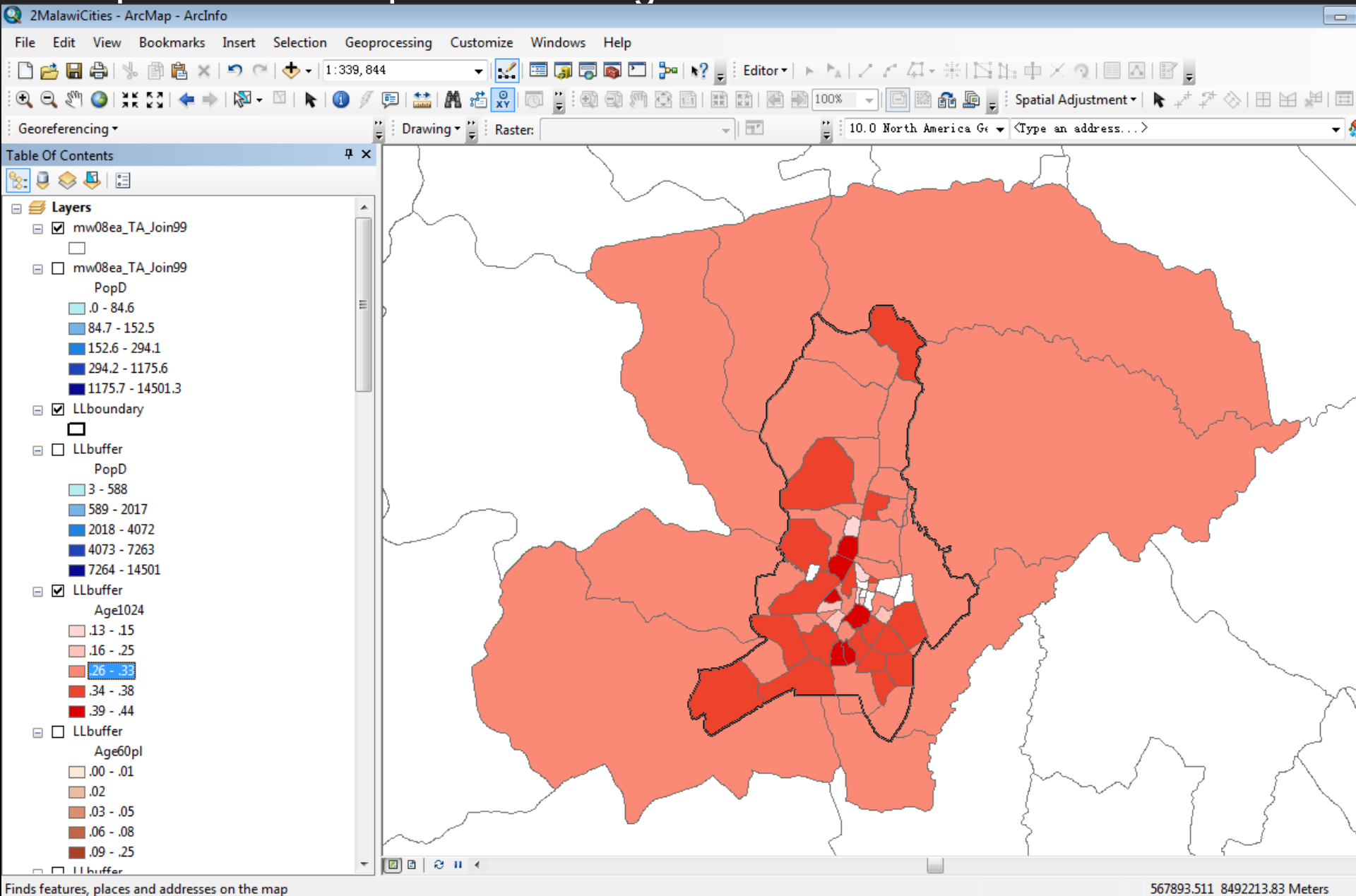
- Case Study of Malawi



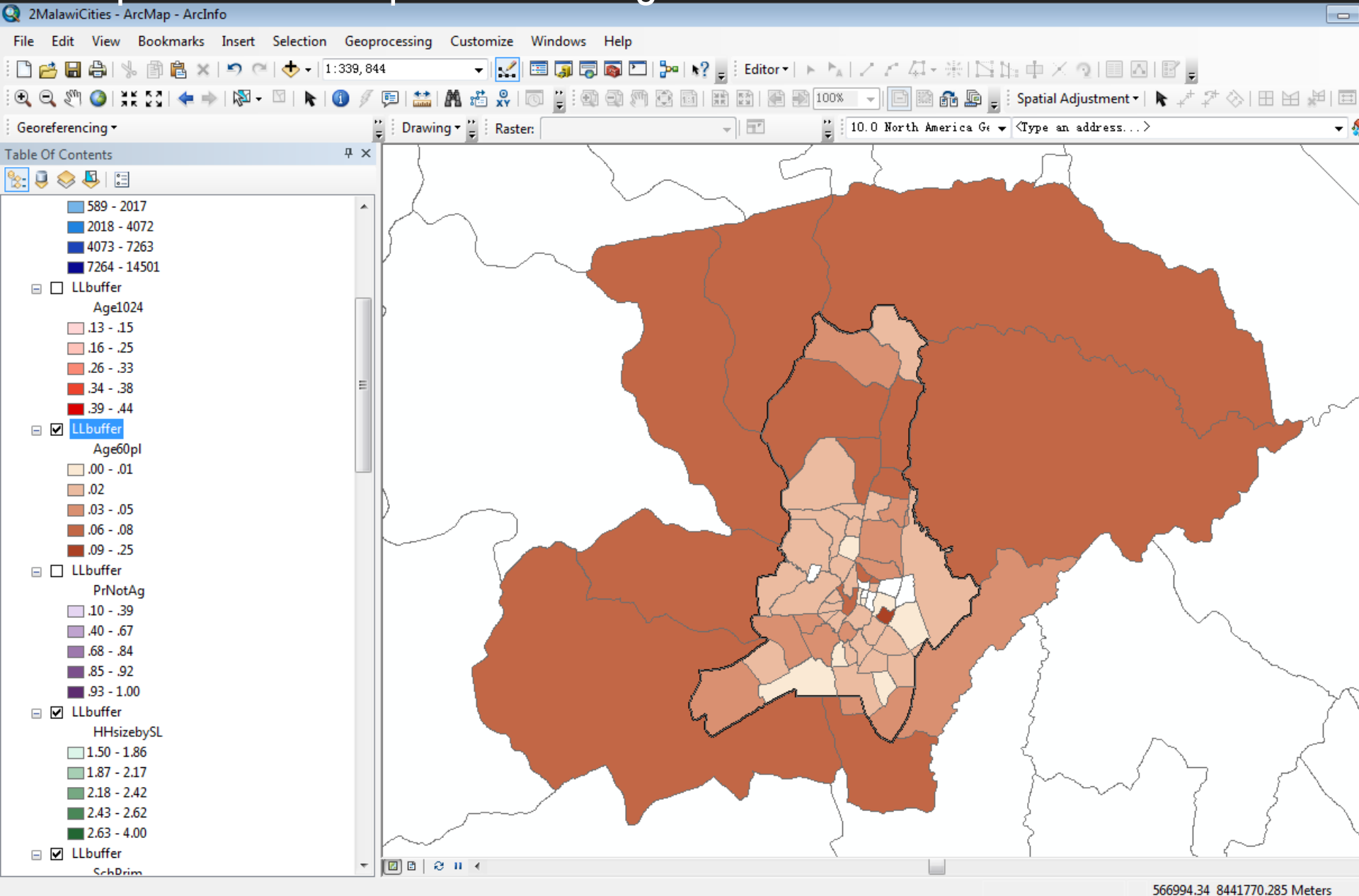
- Case Study of Malawi – Lilongwei City: Population Density



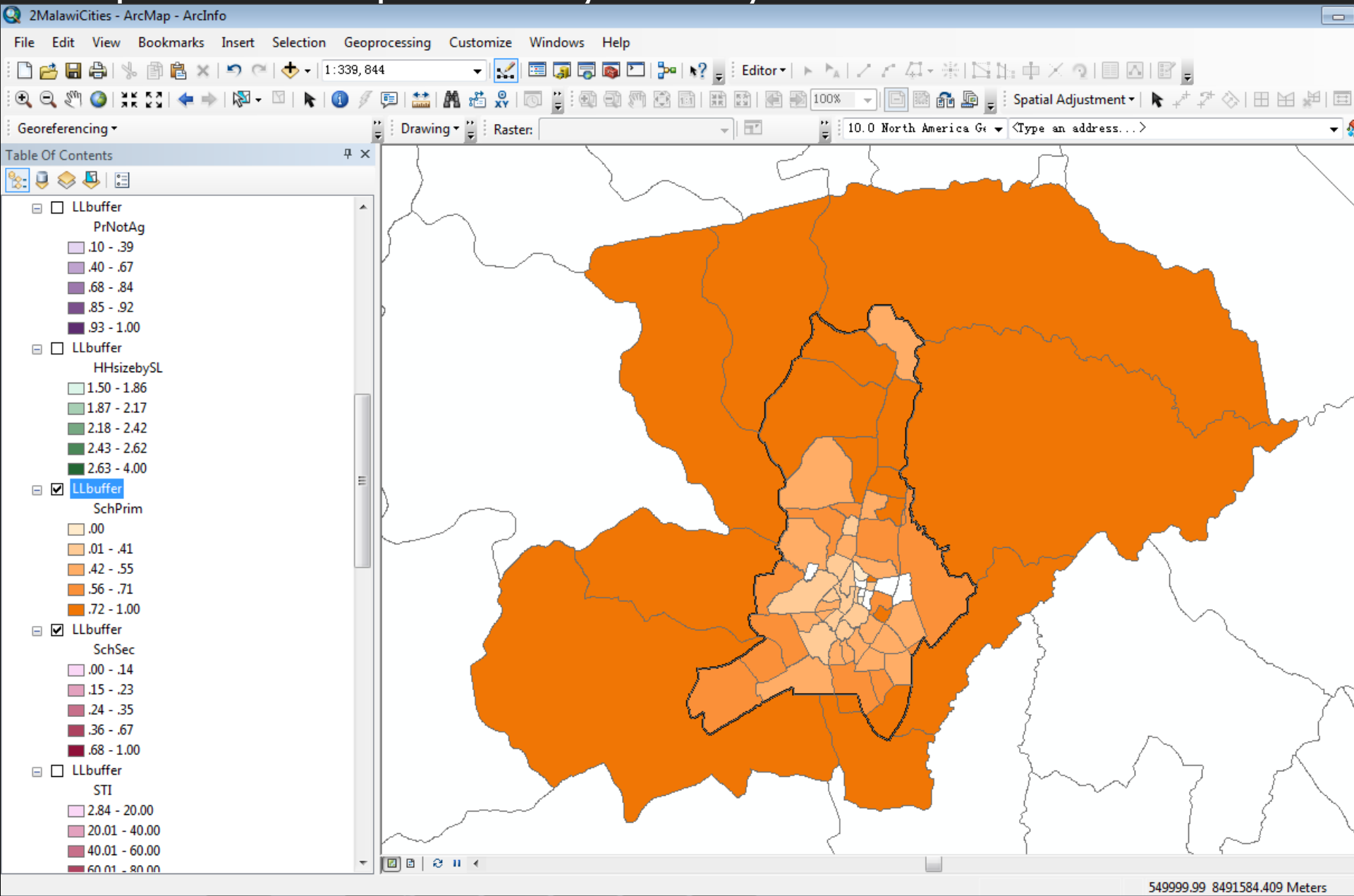
- Case Study of Malawi – Lilongwei City: Population of Population at Age 10-24



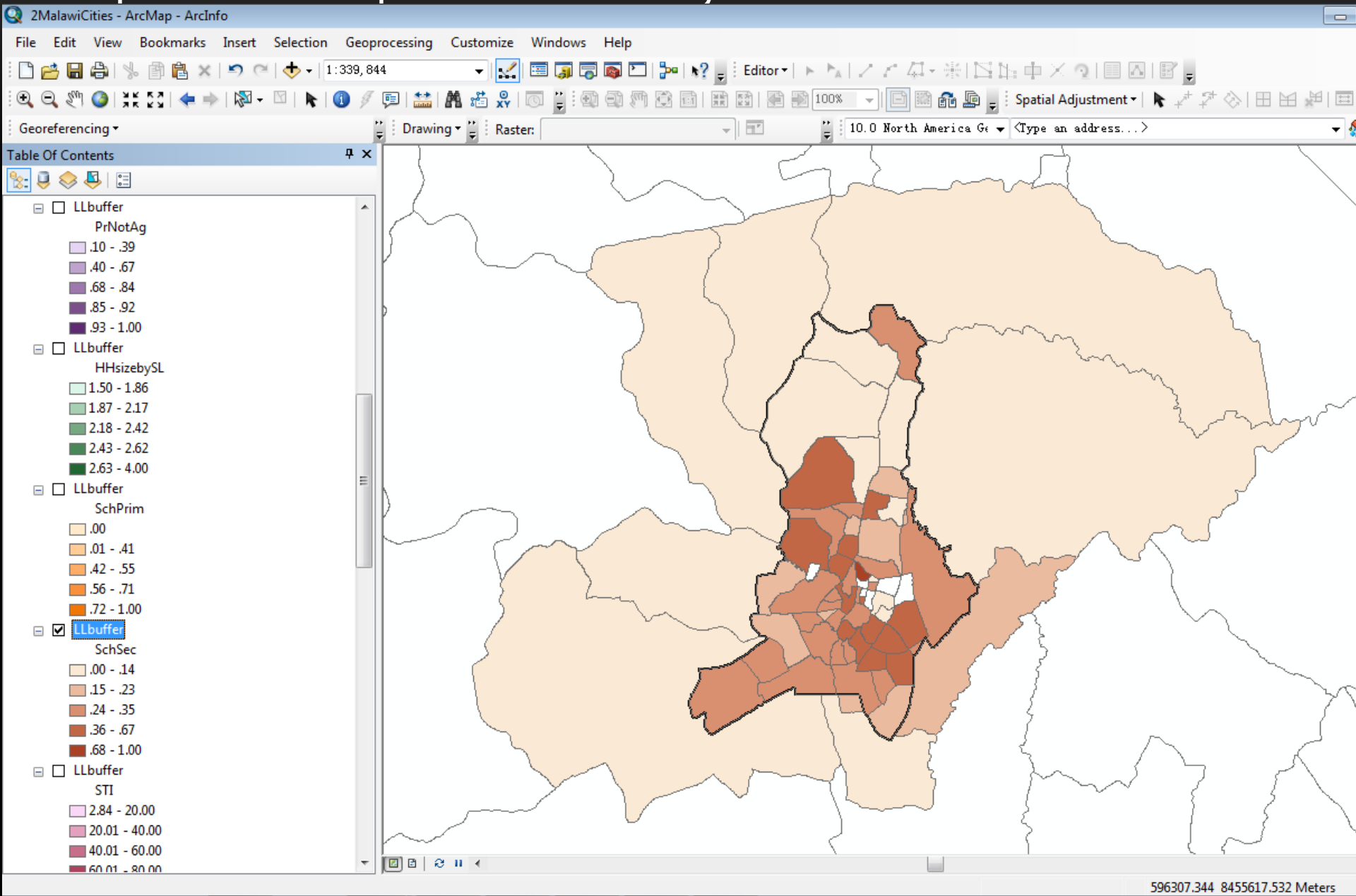
- Case Study of Malawi – Lilongwei City: Population of Population at Age 60+



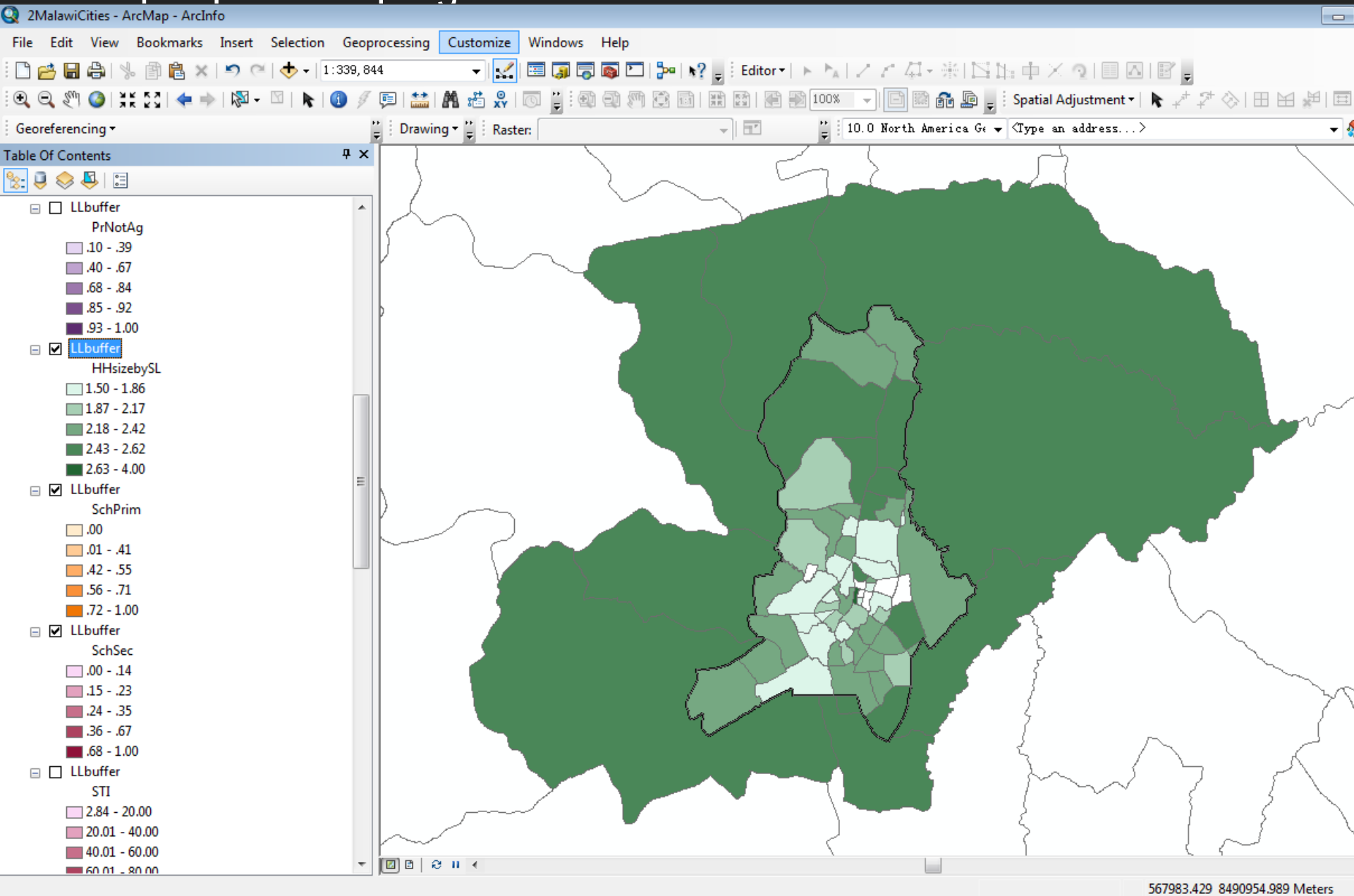
- Case Study of Malawi – Lilongwei City Population of Population Completed Only Primary School Education



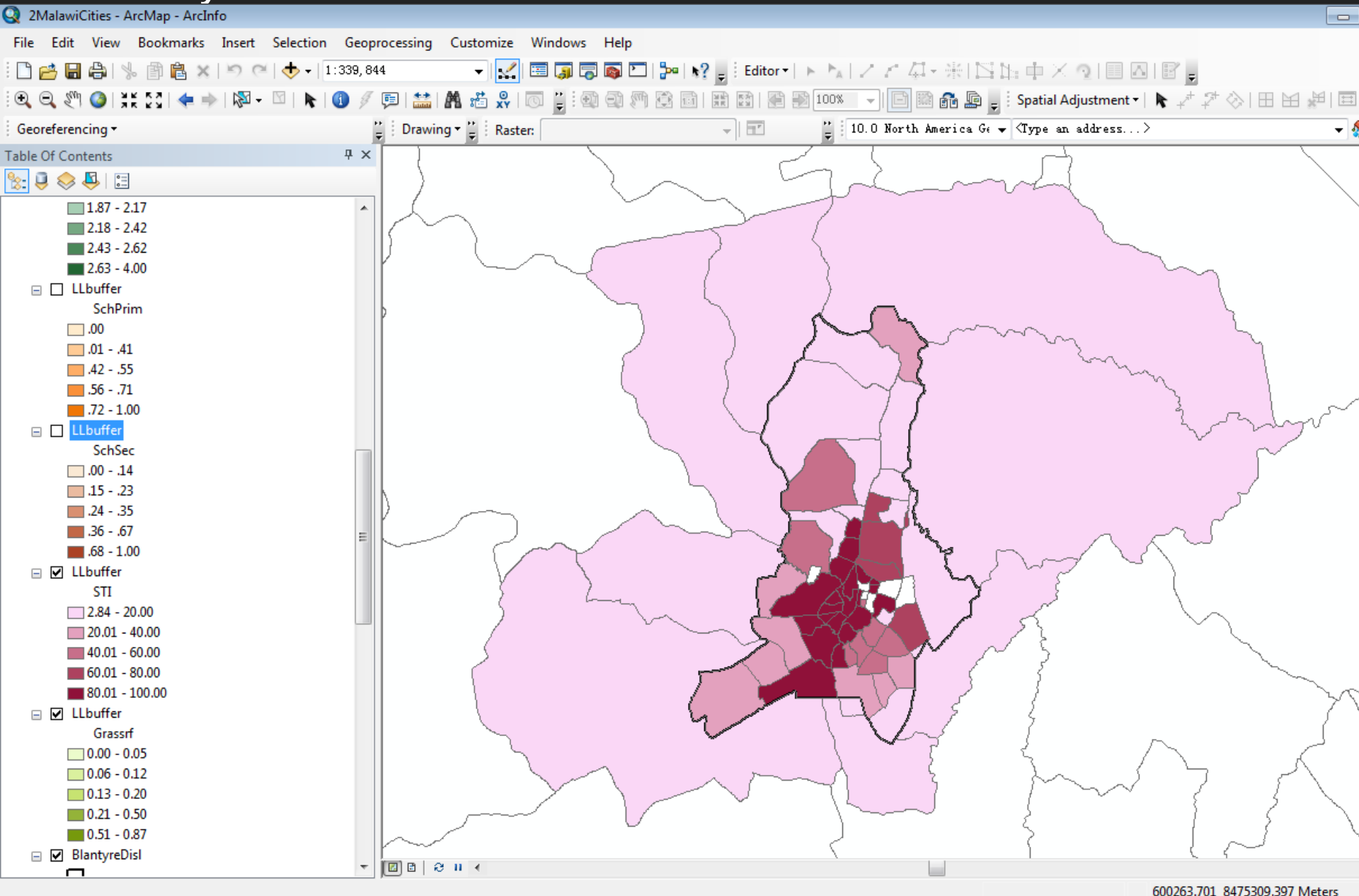
- Case Study of Malawi – Lilongwei City Population of Population Completed Secondary School Education



- Case Study of Malawi – Lilongwei City: Number of People per Sleeping Rooms



- Case Study of Malawi – Lilongwei City Security Tenure Index



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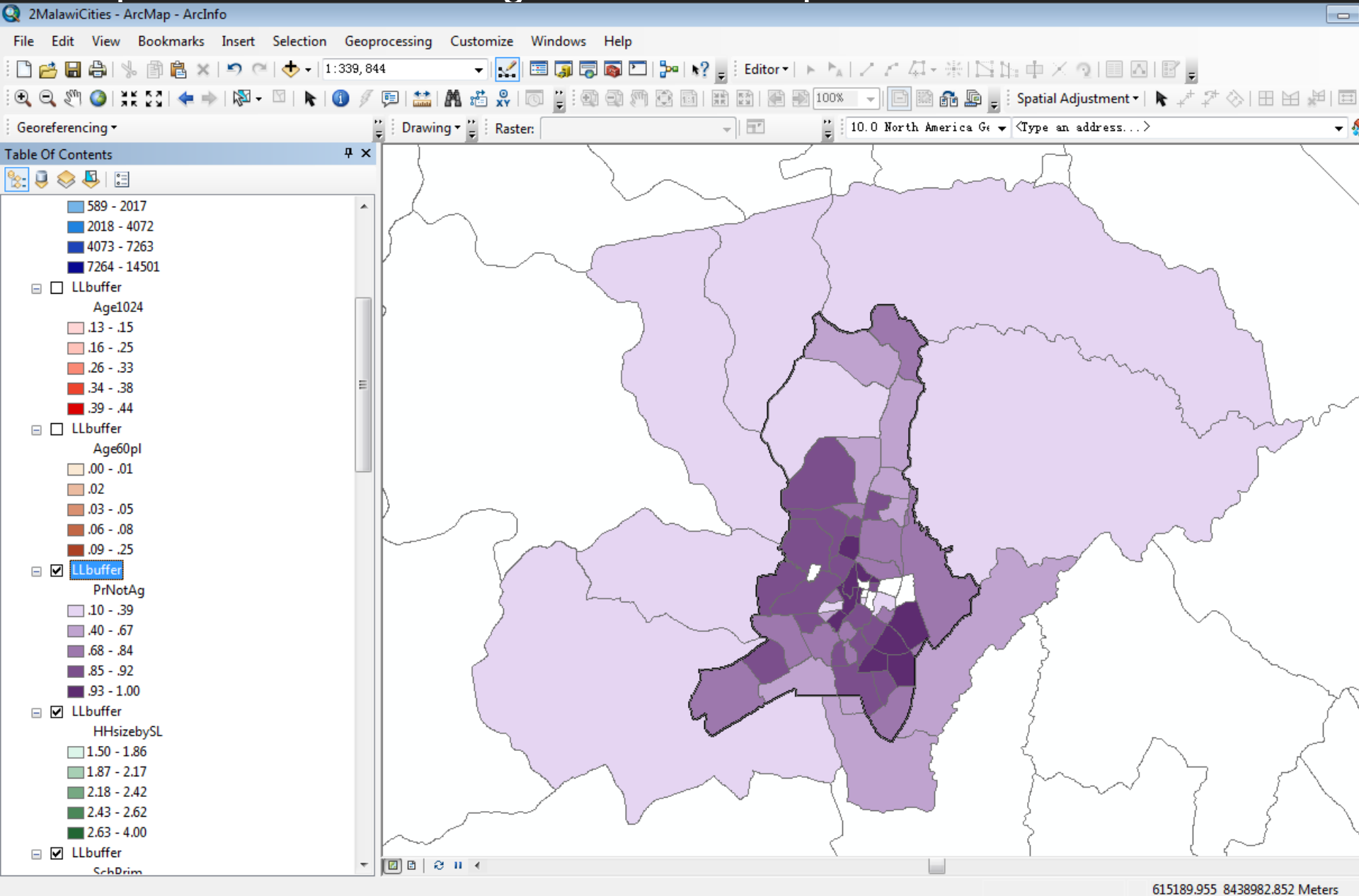
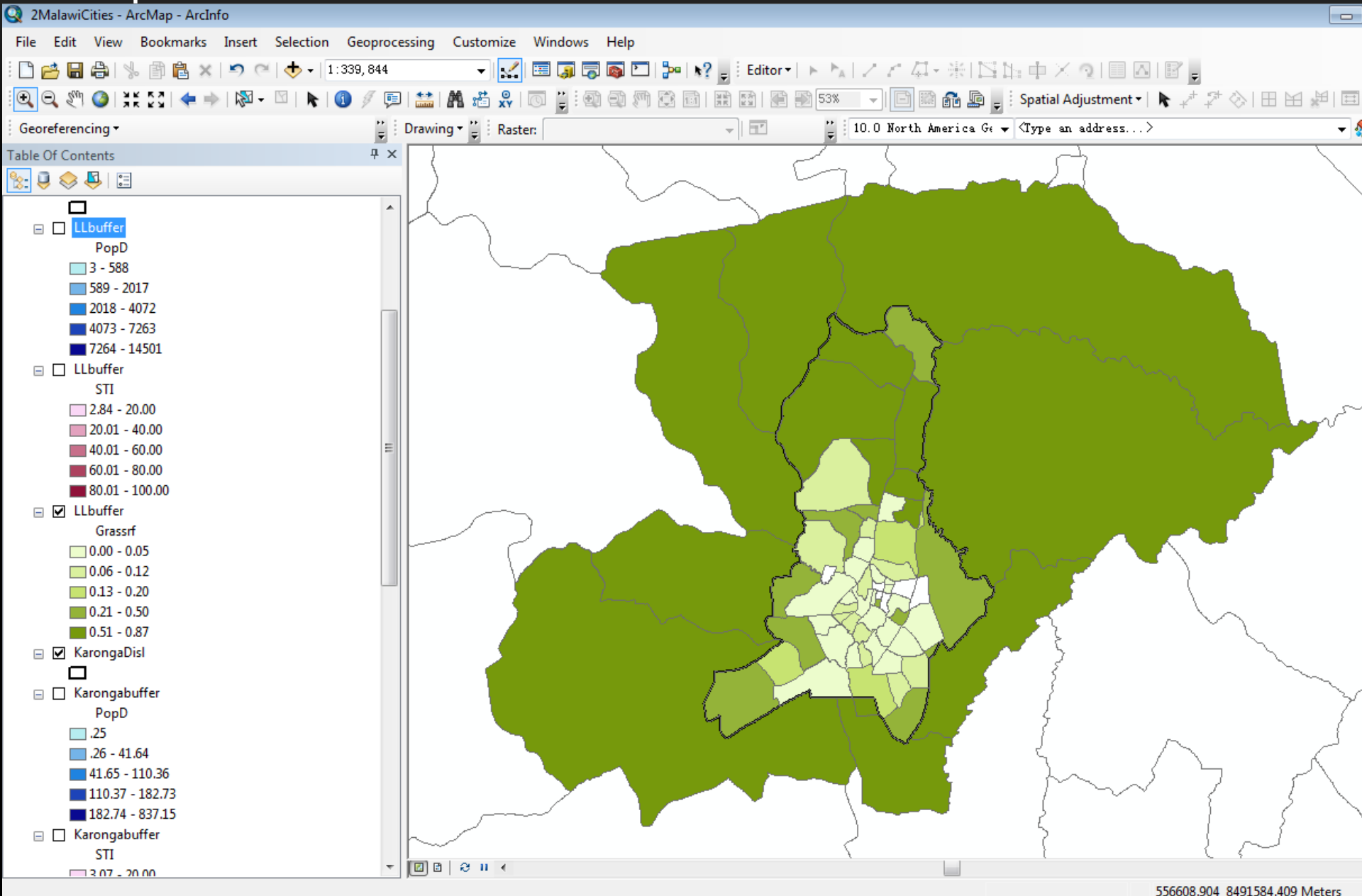
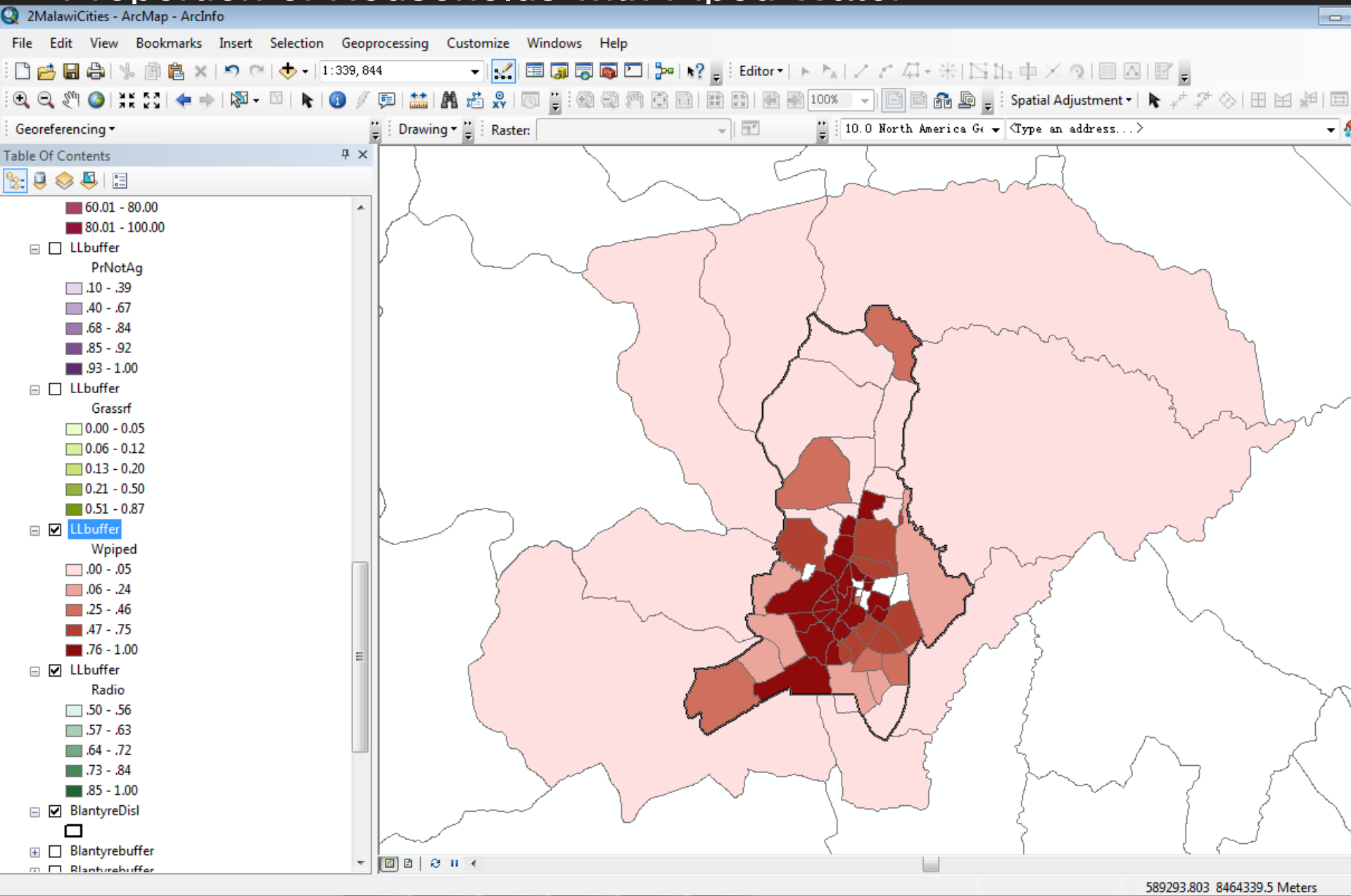
- Case Study of Malawi – Lilongwei City: Proportion of Population with Non-Agriculture Occupation



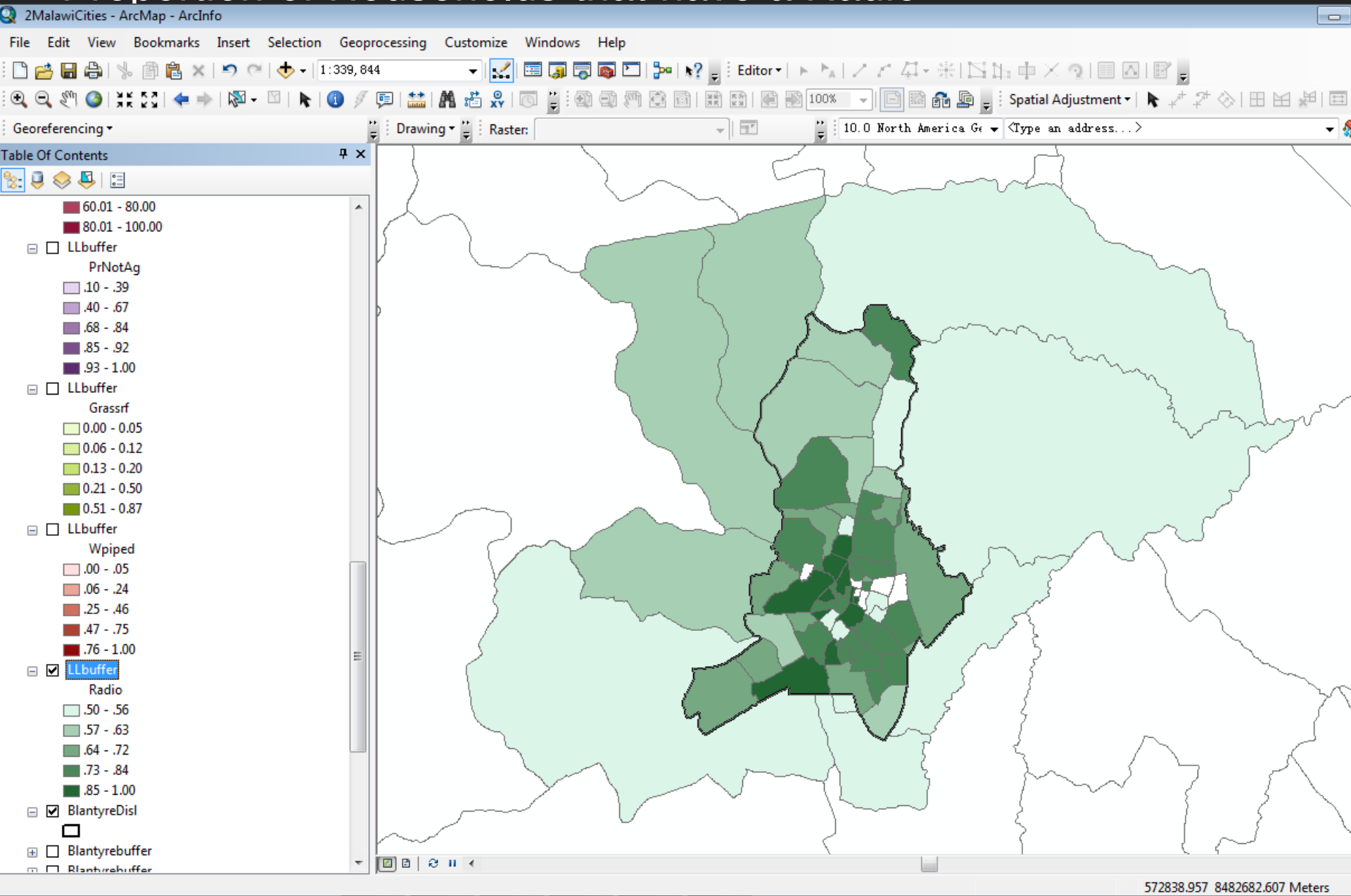
- Case Study of Malawi – Lilongwei City
  Proportion of Households with Grass Roof



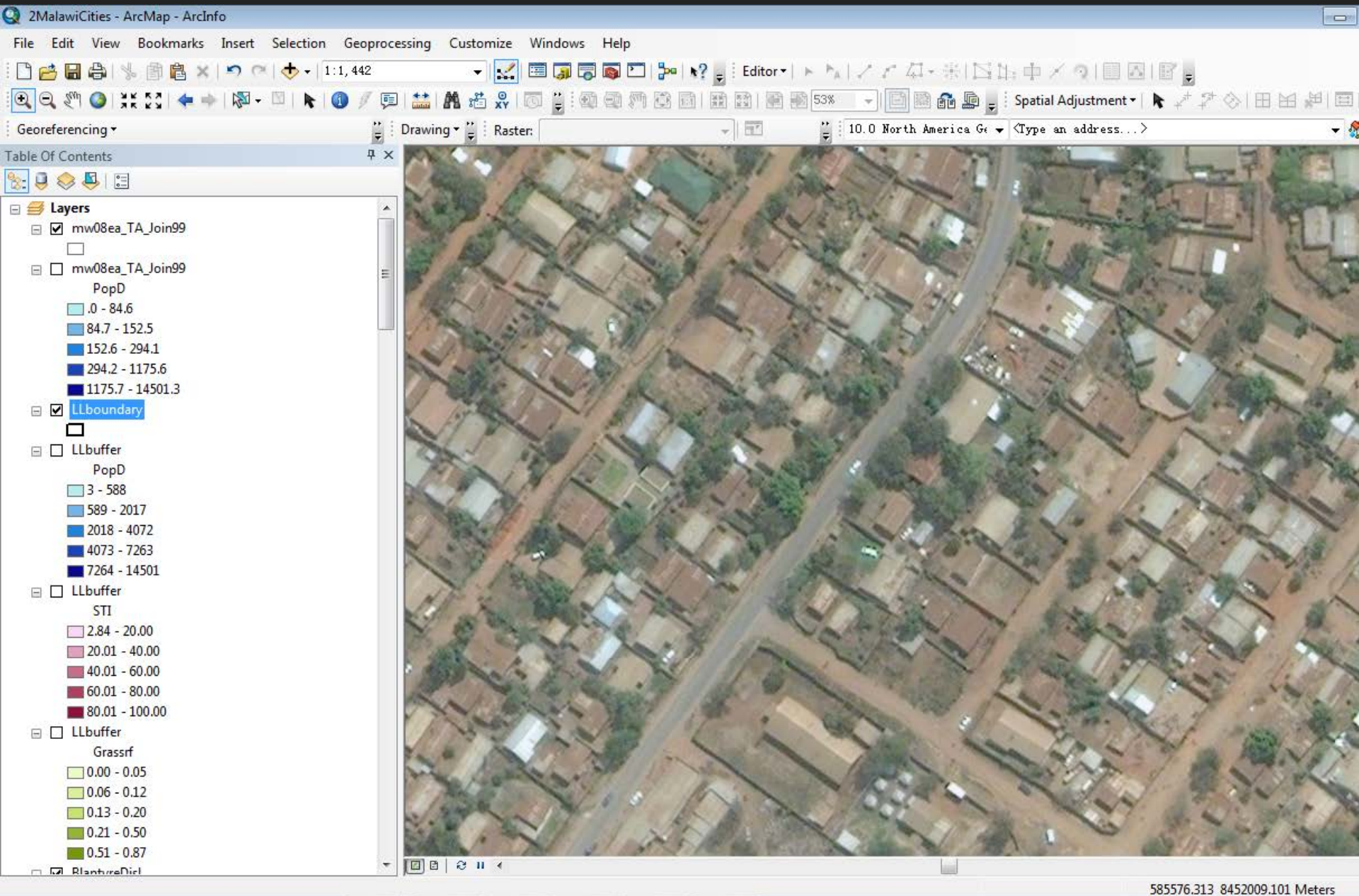
- Case Study of Malawi – Lilongwei City
  Proportion of Households with Piped Water



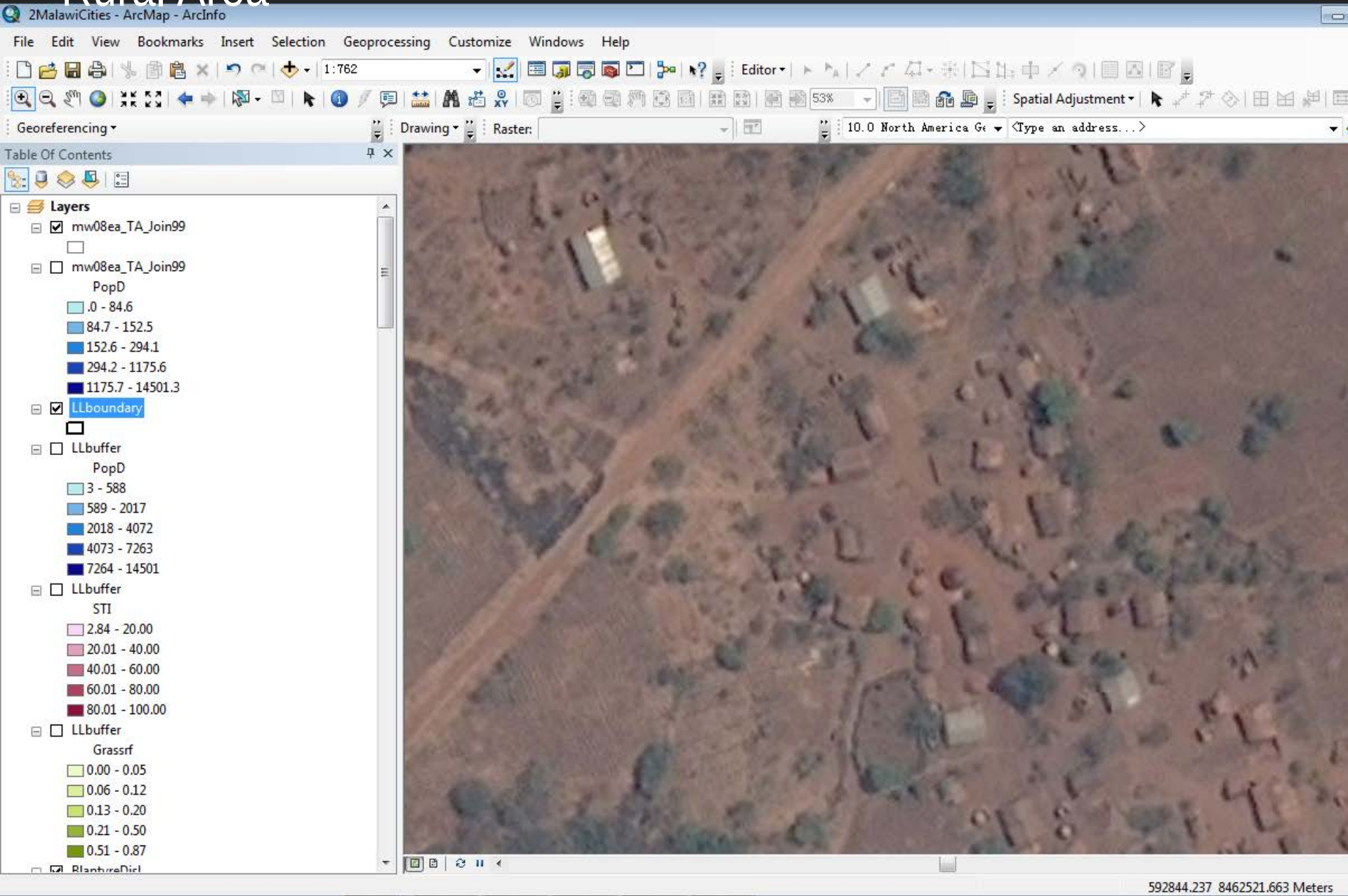
- Case Study of Malawi – Lilongwei City
  Proportion of Households that have a Radio



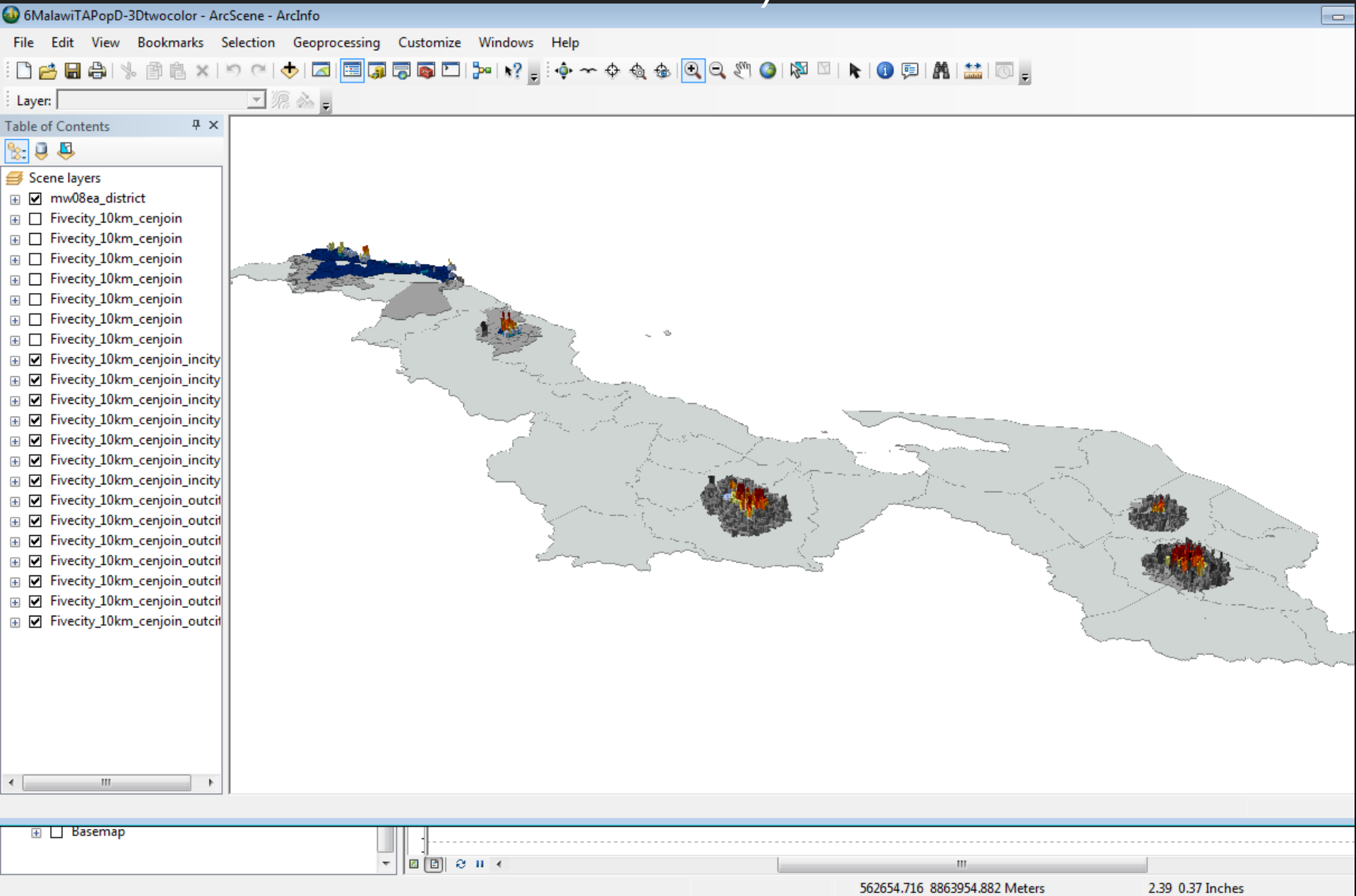
- Case Study of Malawi – Lilongwei City: Urban Area



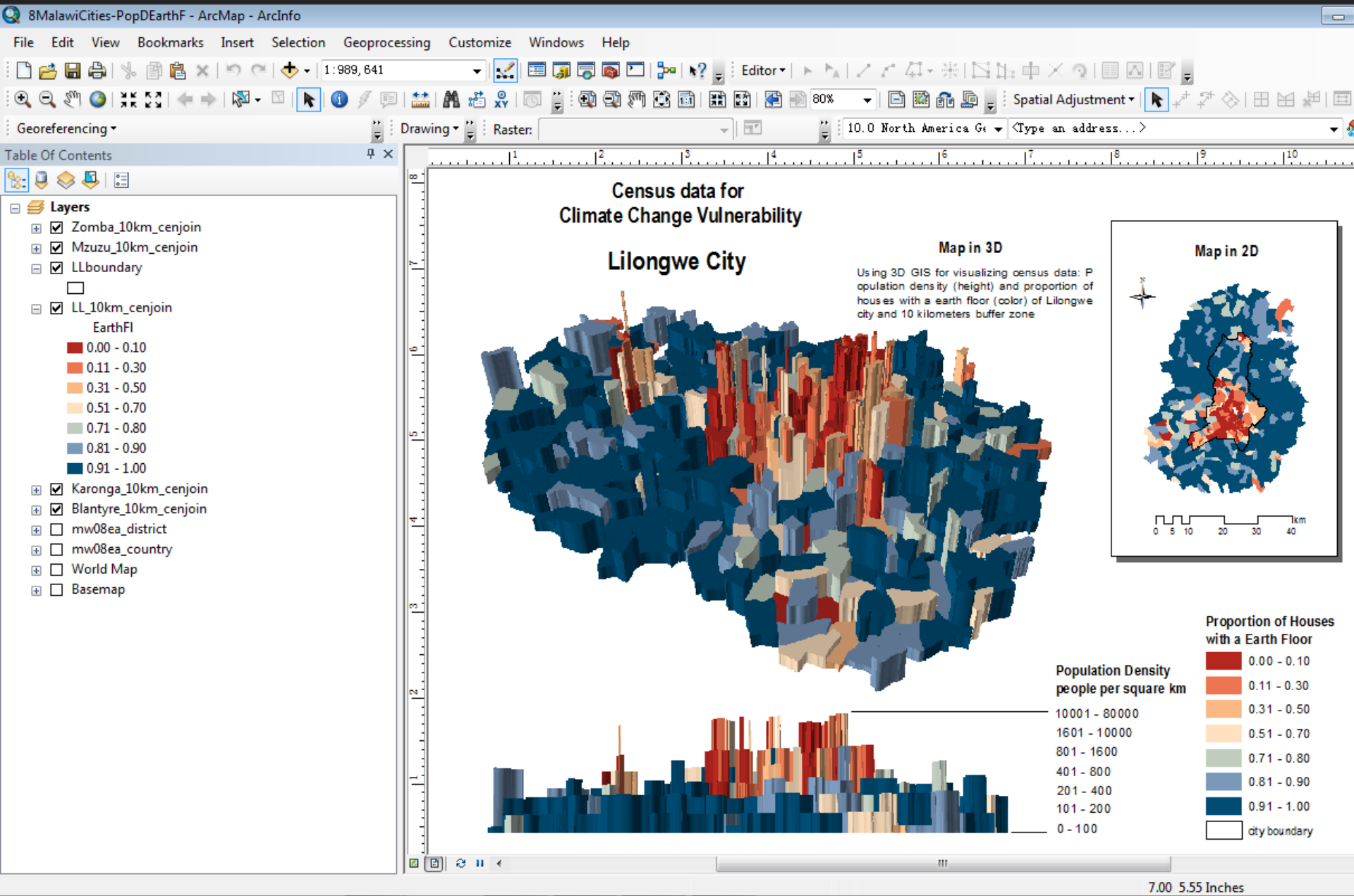
- Case Study of Malawi – Lilongwei City: Rural Area



- Case Study of Malawi – Population Density (In and Outside Urban Areas in Five Selected Cities)



Case Study of Malawi – Population Density and Proportion of Households with a Earth Floor



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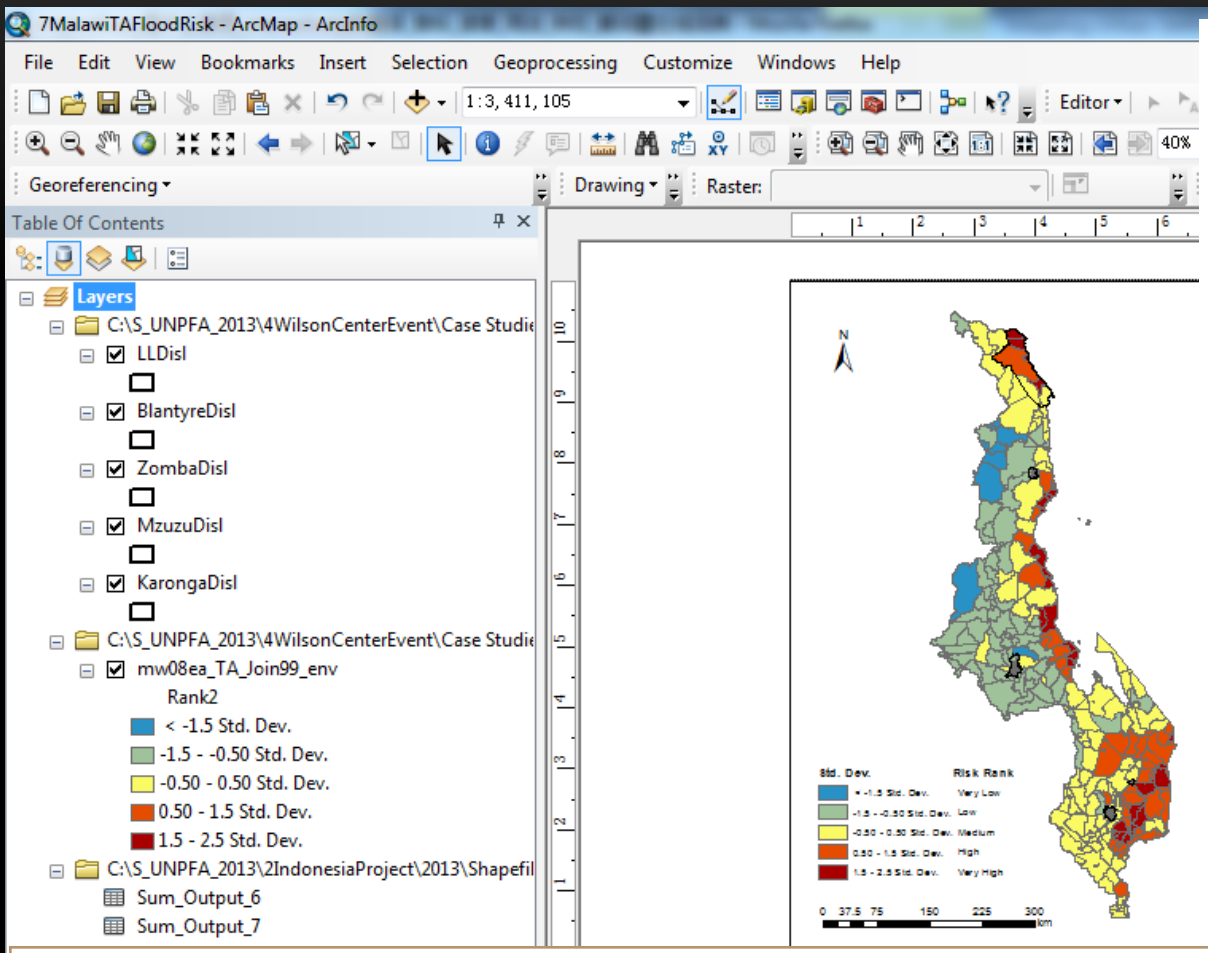
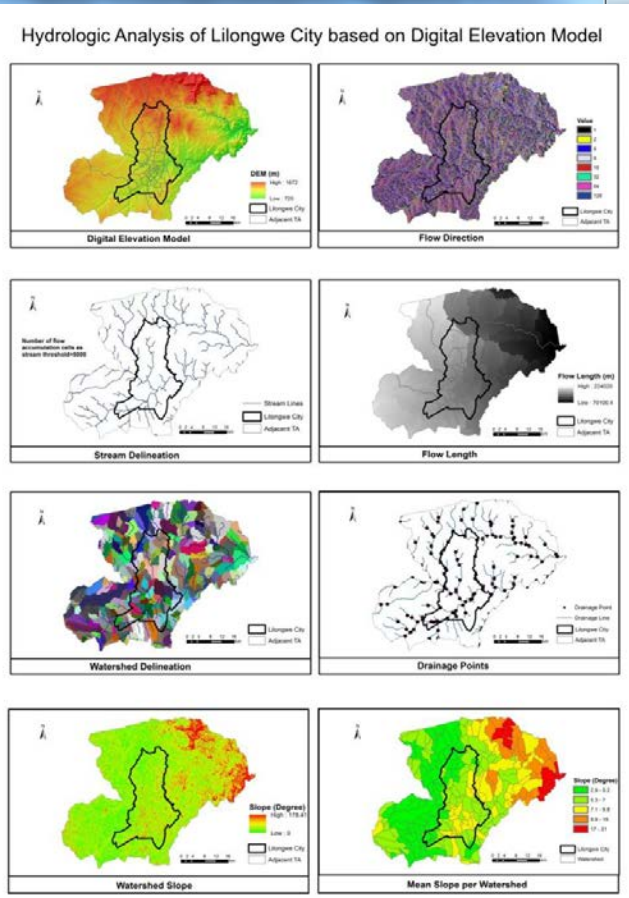
Case Study of Malawi: Flood Risk Exposure Evaluation





RiskRank	NumTA	Age60+	FemHeaded	SchSec	NonAgricul	HaveRadio	ElectricityL	ImpToi	PipedWat	WatAcDrin	Grassroof	PopDensity	STI
1	11	0.04	0.20	0.21	0.31	0.68	0.10	0.12	0.15	0.20	0.62	276.70	17.47
2	108	0.04	0.21	0.20	0.41	0.65	0.17	0.13	0.20	0.35	0.58	1045.42	23.00
3	132	0.05	0.25	0.22	0.40	0.65	0.22	0.19	0.25	0.39	0.54	1100.92	27.59
4	61	0.05	0.27	0.19	0.38	0.63	0.16	0.12	0.17	0.33	0.60	927.52	21.57
5	32	0.05	0.27	0.19	0.35	0.63	0.14	0.12	0.18	0.32	0.60	796.81	21.42

INDONESIA CASE STUDY

- High Flood Risk Area in Low Elevation Costal Zone
- Vulnerability indicators from census data
- Identification the most vulnerable villages
- Link to policy – full profile of the most vulnerable villages
- Integration with infrastructure and survey data

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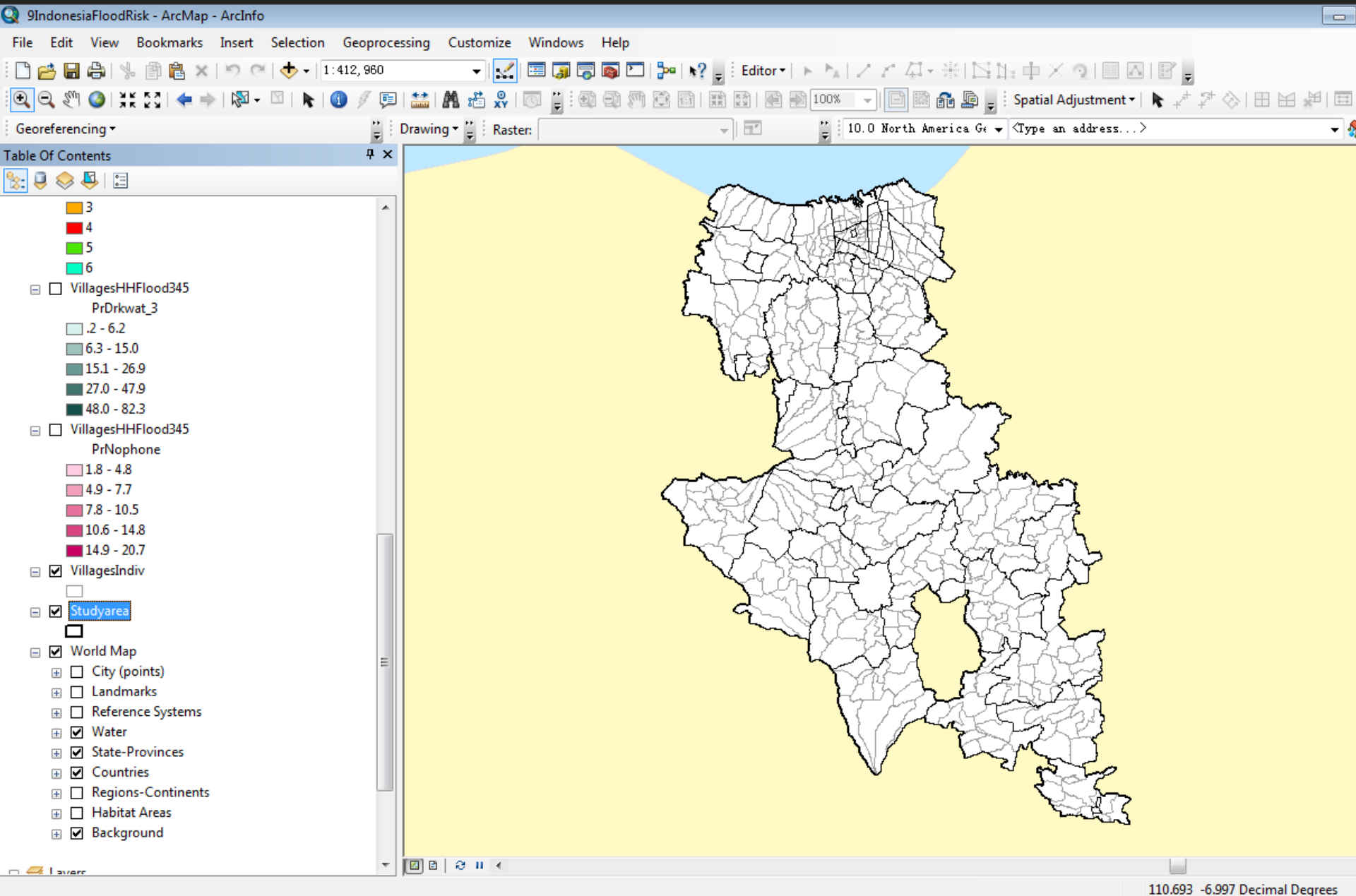
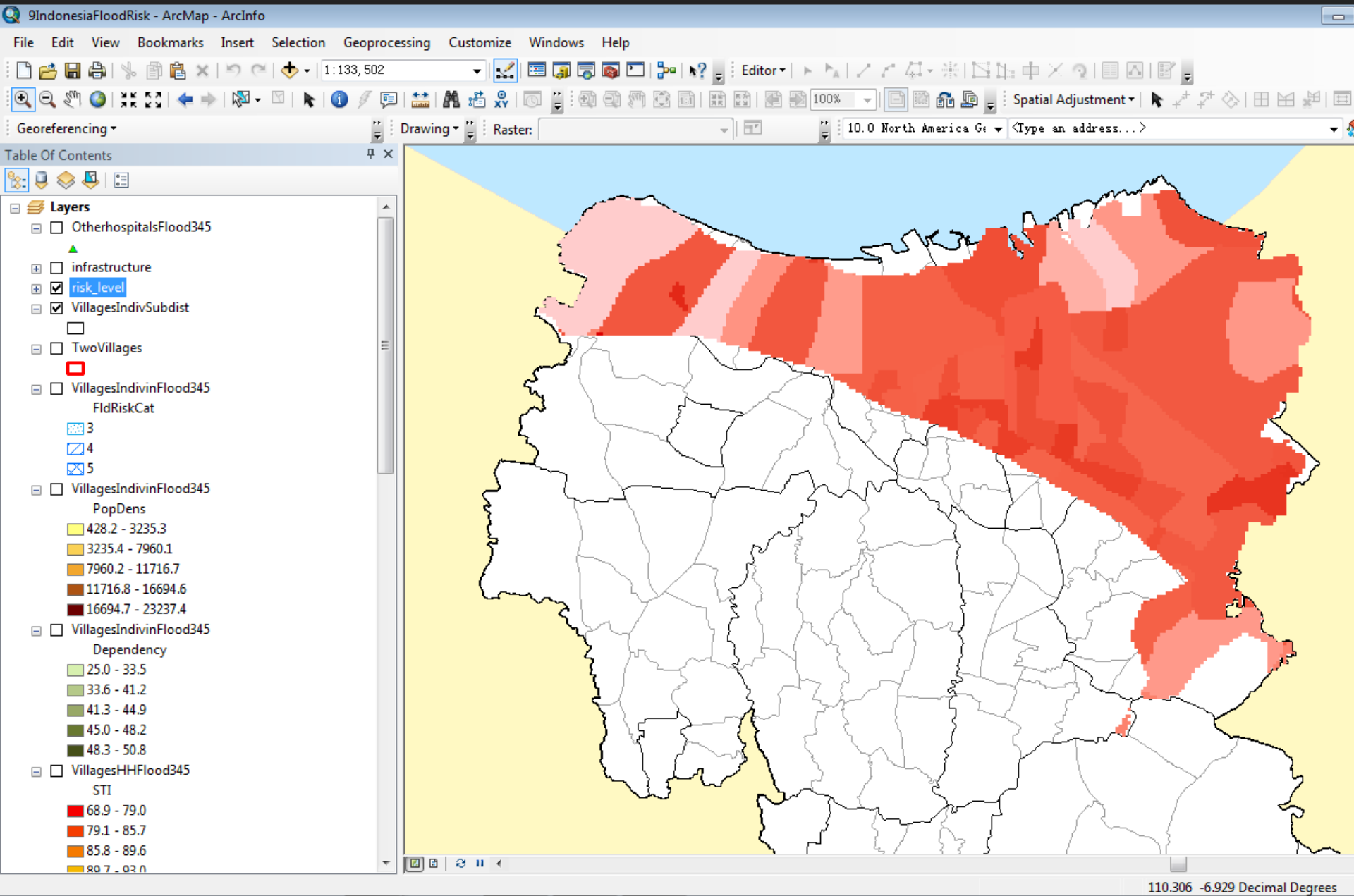
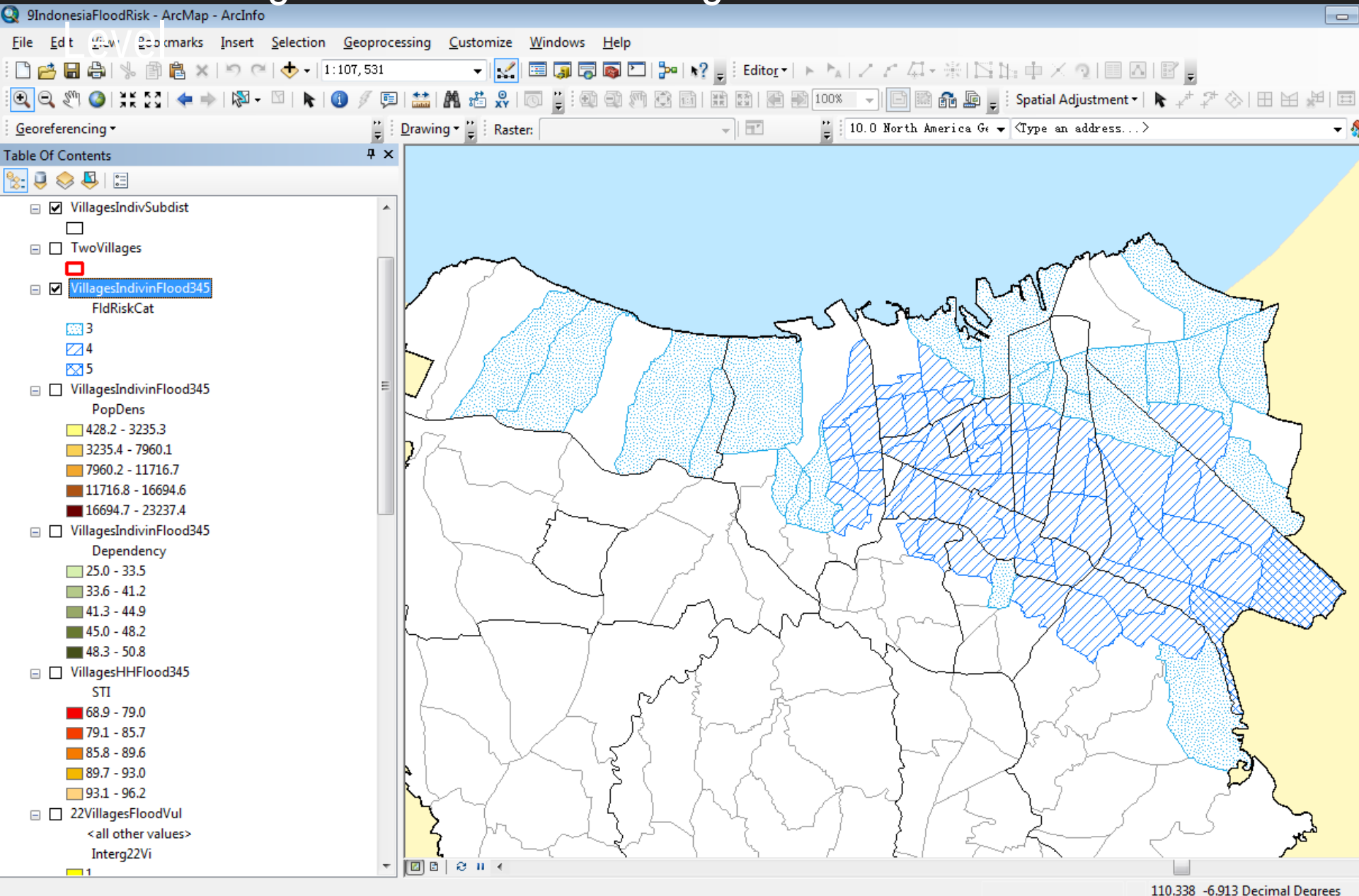
- Case Study of Semarang, Indonesia: Study Area



- Case Study of Semarang, Indonesia: Flood Risk in Low Elevation Costal Zone



- Case Study of Semarang, Indonesia: Med- to High- Flood Risk at Village level



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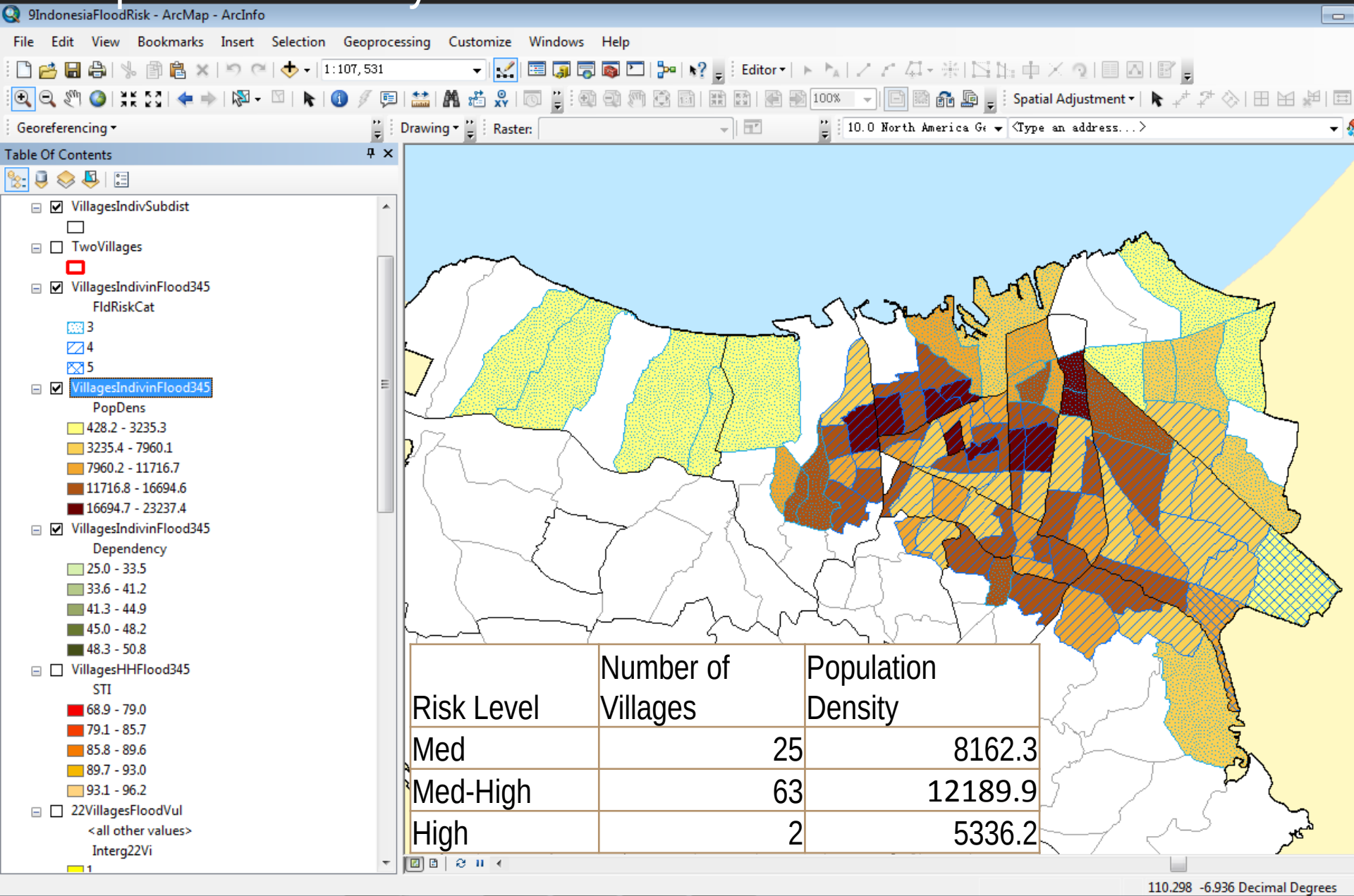
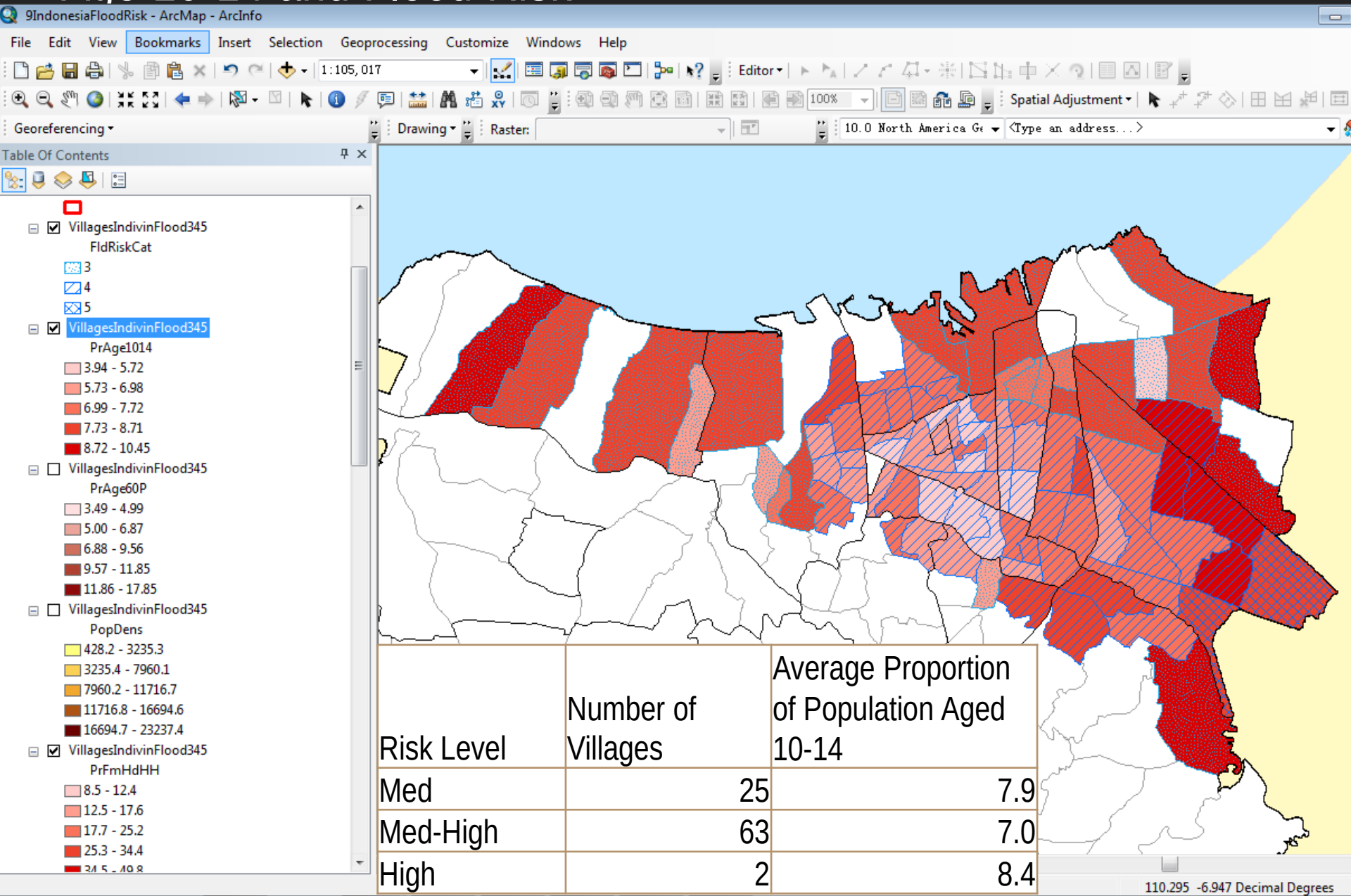
- Case Study of Semarang, Indonesia: Population Density and Flood Risk



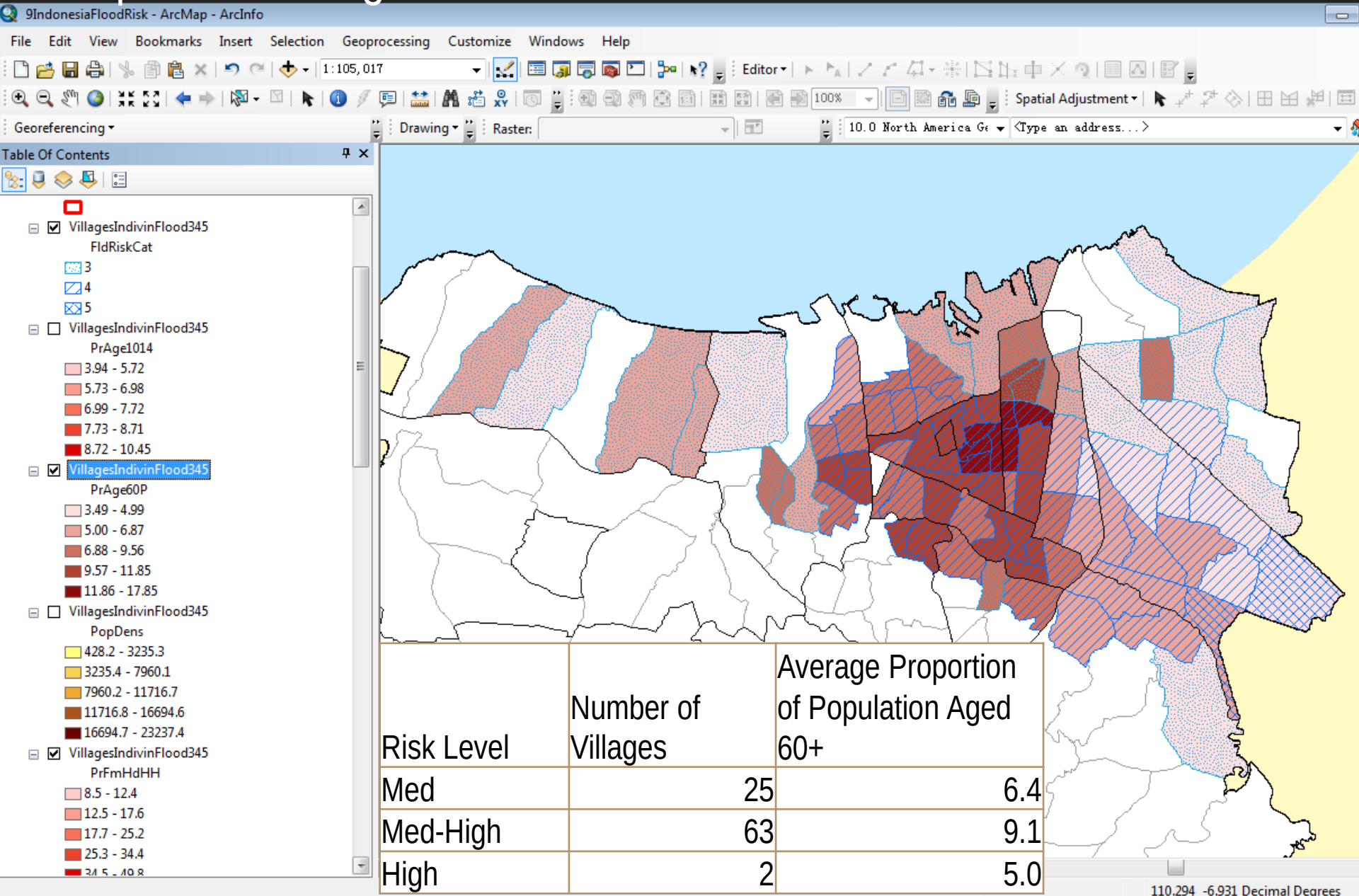
Risk Level	Number of Villages	Population Density
Med	25	8162.3
Med-High	63	12189.9
High	2	5336.2

- Case Study of Semarang, Indonesia: Proportion of Youth at Age 10-14 and Flood Risk



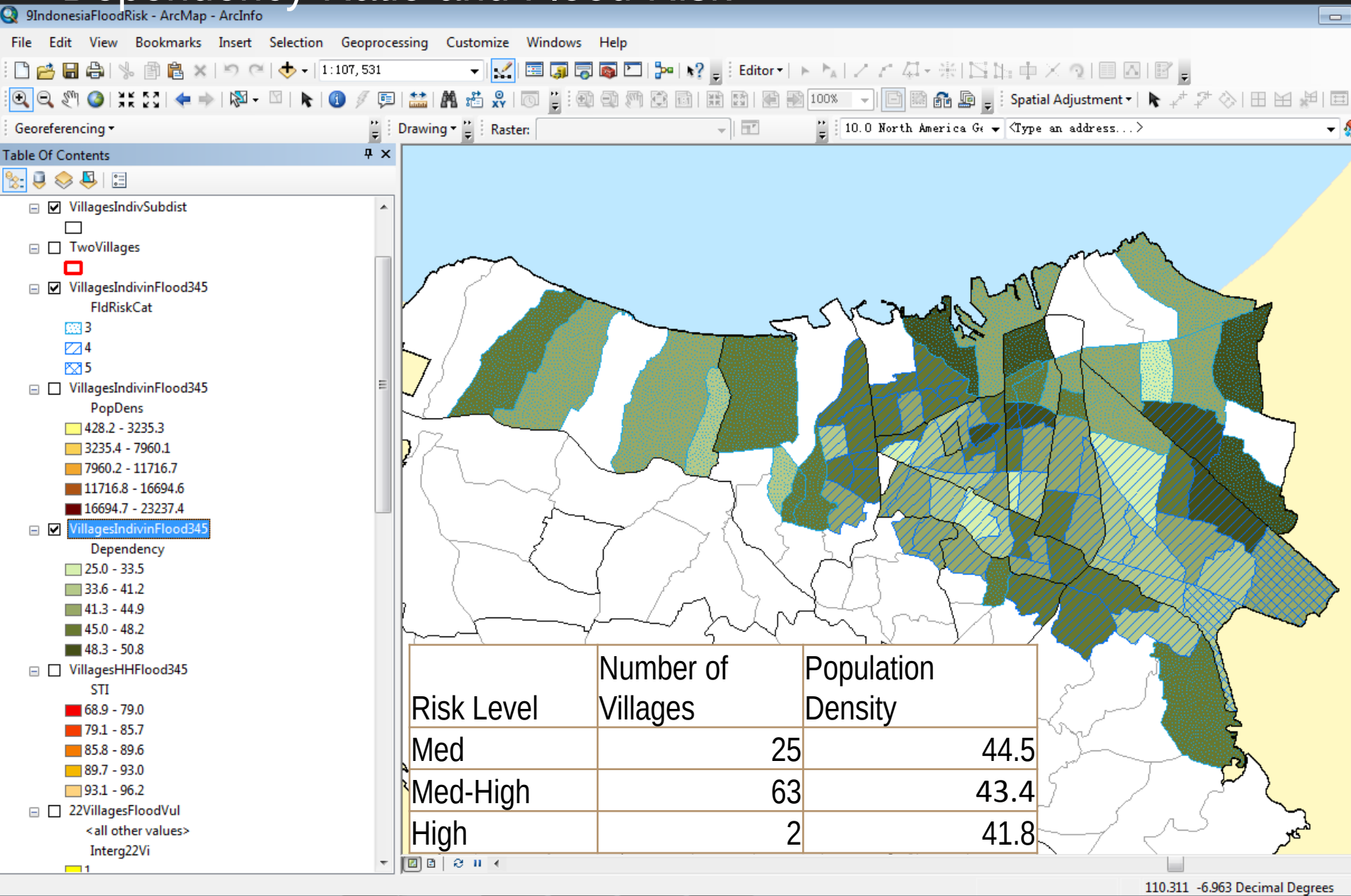
Risk Level	Number of Villages	Average Proportion of Population Aged 10-14
Med	25	7.9
Med-High	63	7.0
High	2	8.4

Case Study of Semarang, Indonesia: Proportion of Population at Age 60+ and Flood Risk



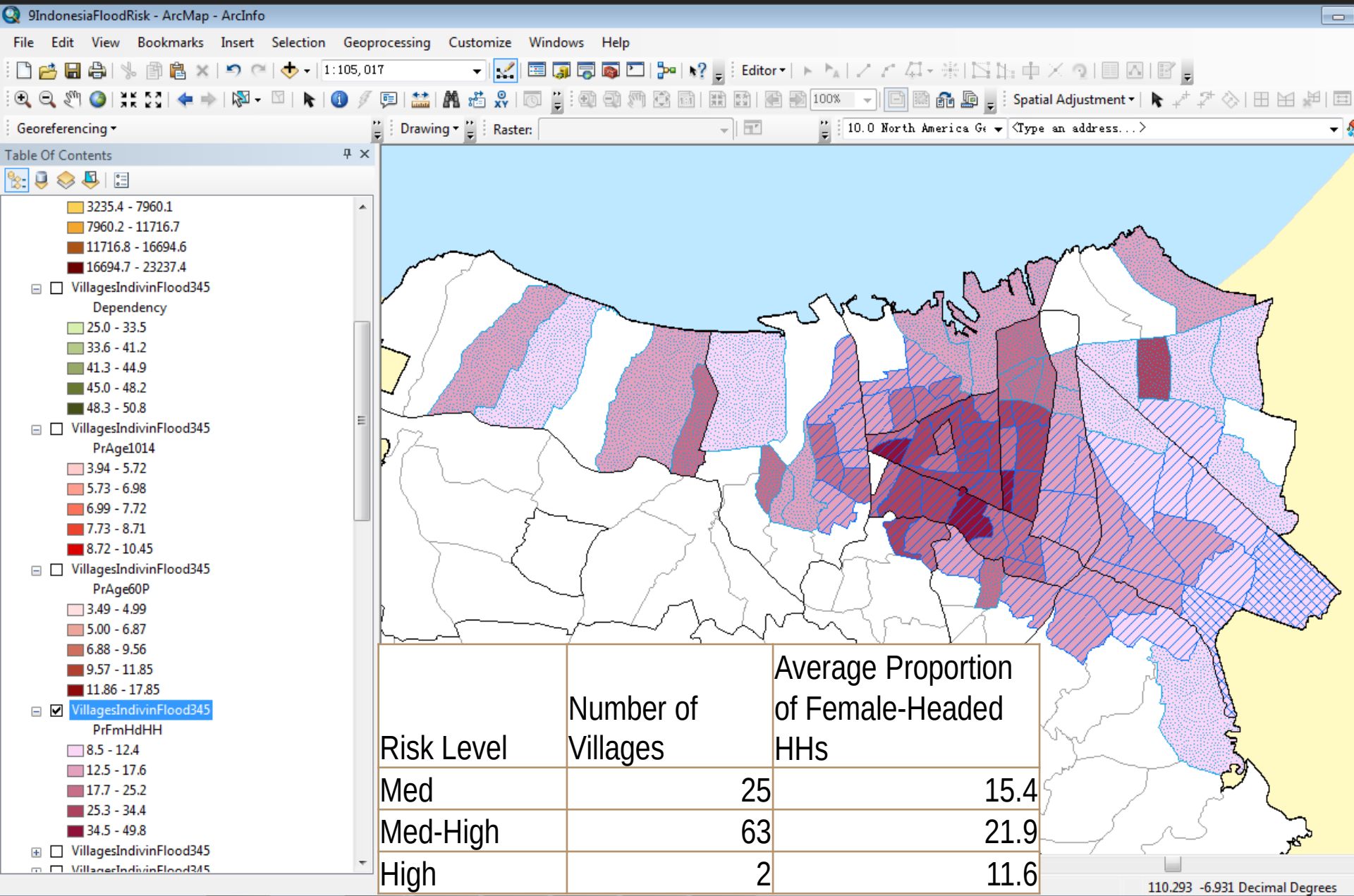
Risk Level	Number of Villages	Average Proportion of Population Aged 60+
Med	25	6.4
Med-High	63	9.1
High	2	5.0

- Case Study of Semarang, Indonesia: Dependency Ratio and Flood Risk



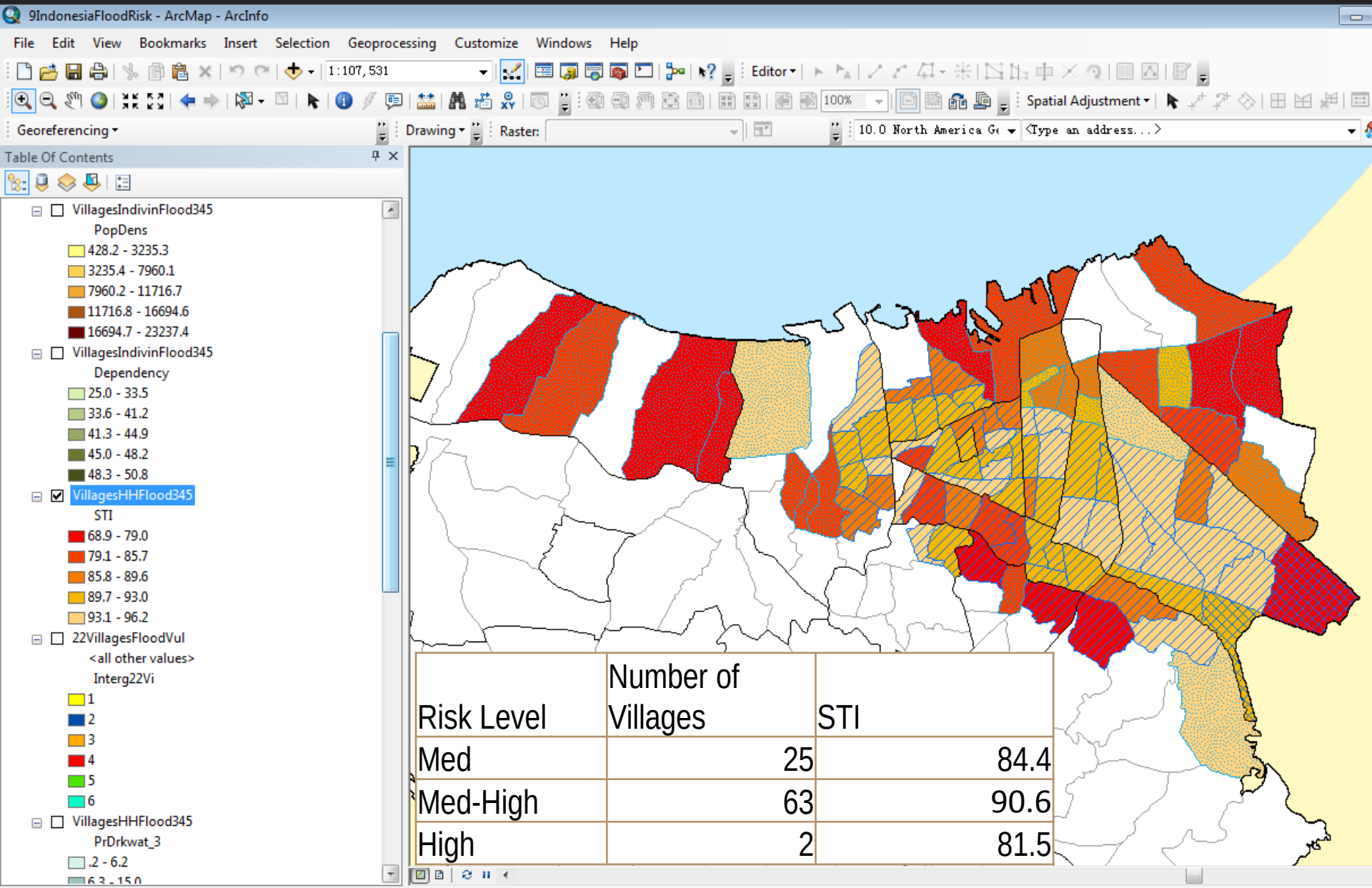
Risk Level	Number of Villages	Population Density
Med	25	44.5
Med-High	63	43.4
High	2	41.8

- Case Study of Semarang, Indonesia: Proportion of Female-Headed Households and Flood Risk



Risk Level	Number of Villages	Average Proportion of Female-Headed HHs
Med	25	15.4
Med-High	63	21.9
High	2	11.6

- Case Study of Semarang, Indonesia: Security Tenure Index and Flood Risk



Risk Level	Number of Villages	STI
Med	25	84.4
Med-High	63	90.6
High	2	81.5

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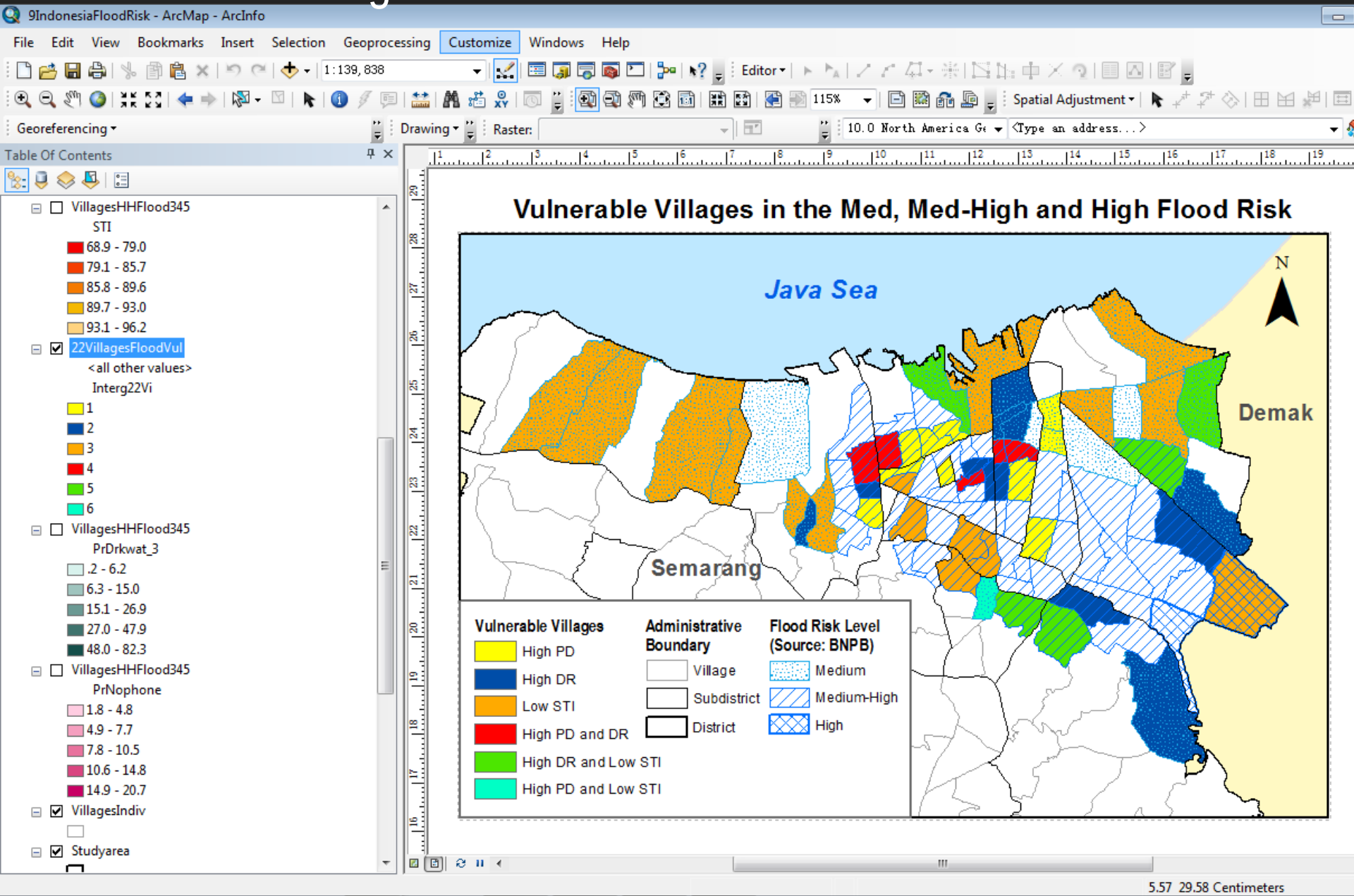
Case Study of Semarang, Indonesia: Identification of Vulnerable Villages



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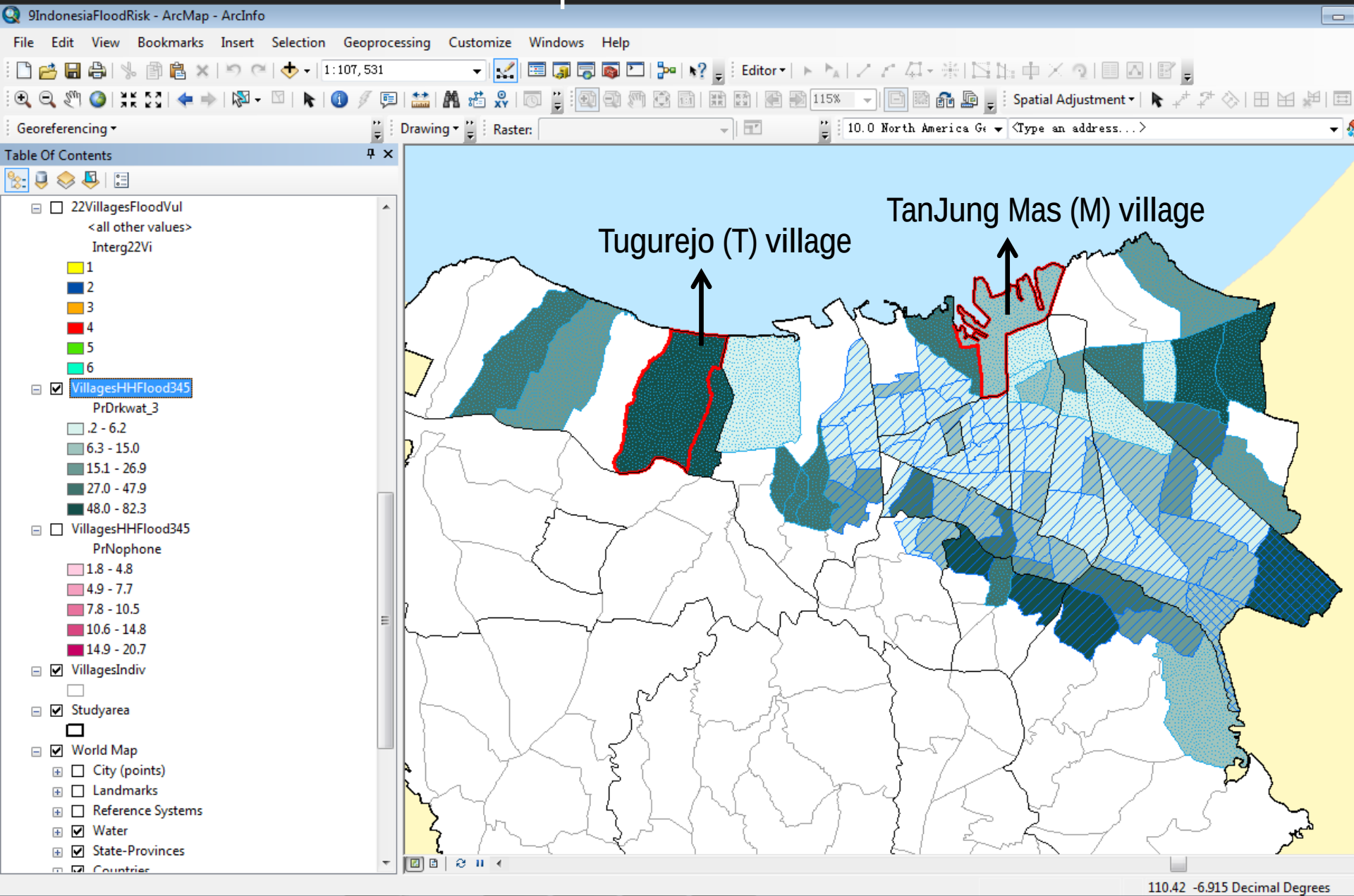
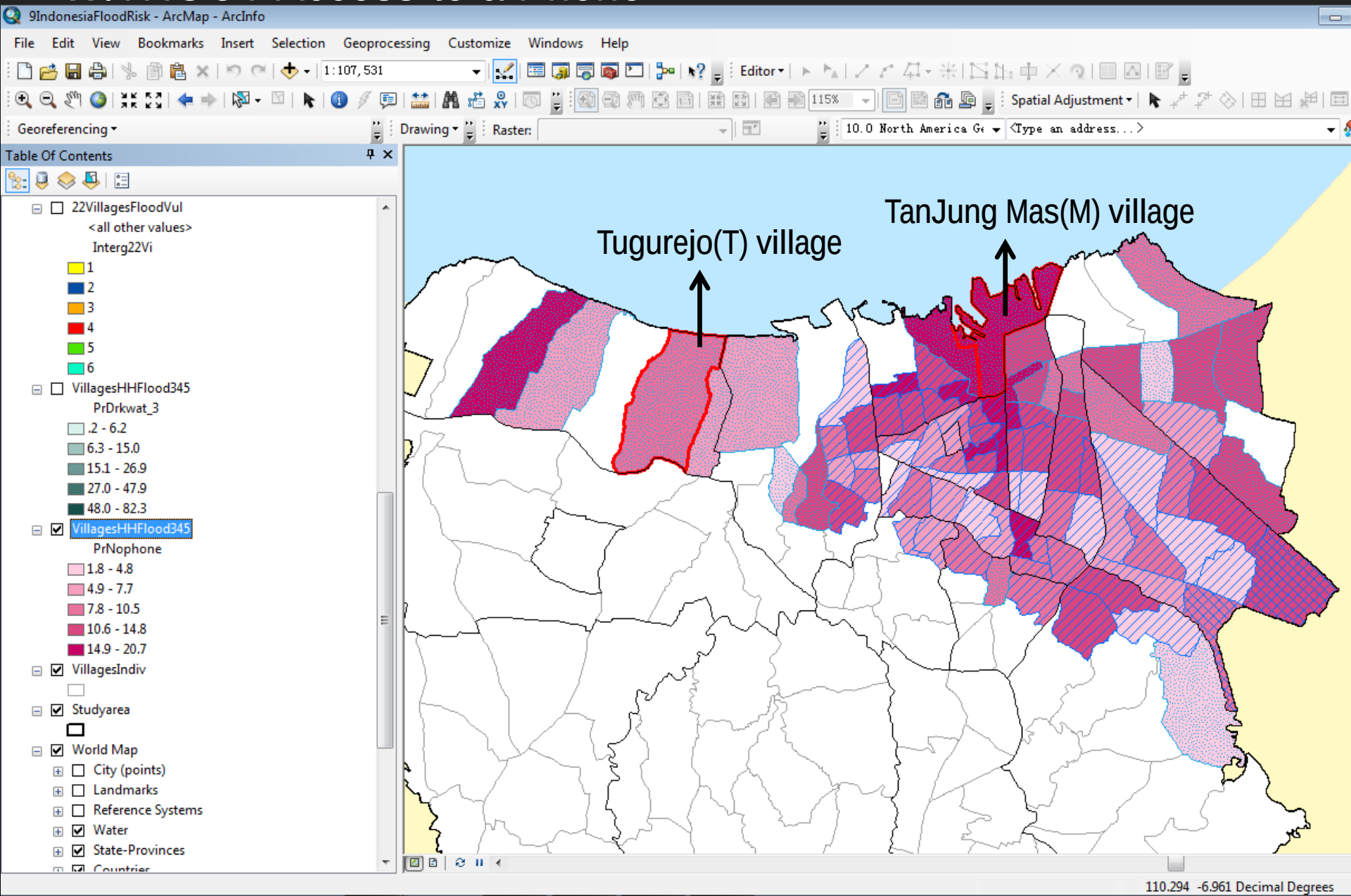
- Case Study of Semarang, Indonesia: Proportion of Households WITHOUT Access to a Piped Water



- Case Study of Semarang, Indonesia: Proportion of Households WITHOUT Access to a Phone



	Tugurejo (T) village	TanJung Mas (M) village
Climate Change Risks		
Low Elevation Costal Zone	Within	Within
Flood Risk Level	Medium	Medium
Drought Level	Med-High	Medium
Landslide Risk Level	Low	Low

	Tugurejo (T) village	TanJung Mas (M) village
Population Indicators		
Total population	6,590	27,801
Population density	1,085.0	7,743.2
% female headed households	13.6	16.1
% Age 0-9 children	15.0	14.8
% of population aged 10-14	8.5	8.0
% of population aged 60+	5.4	6.1
% of population who have never/not yet attended school	3.8	3.6
% of population who are currently attending school	25.0	22.7
% of population who are no longer attending school	71.2	73.8
% of population who has completed junior high	61.1	55.3
% of migrants	0.6	0.6
Dependency ratio	42.2	42.7

	Tugurejo (T) village	TanJung Mas (M) village
Household indicators		
Total Households	1,689	7,233
% households with Earth floor	3.6	8.5
% households with charcoal/wood for cooking	3.0	0.7
% households without bottled/piped water	69.4	9.8
% households without improved toilet	13.6	41.0
% households without a phone	7.9	16.0
% households without Internet	73.2	81.9
STI	75.4	85.3

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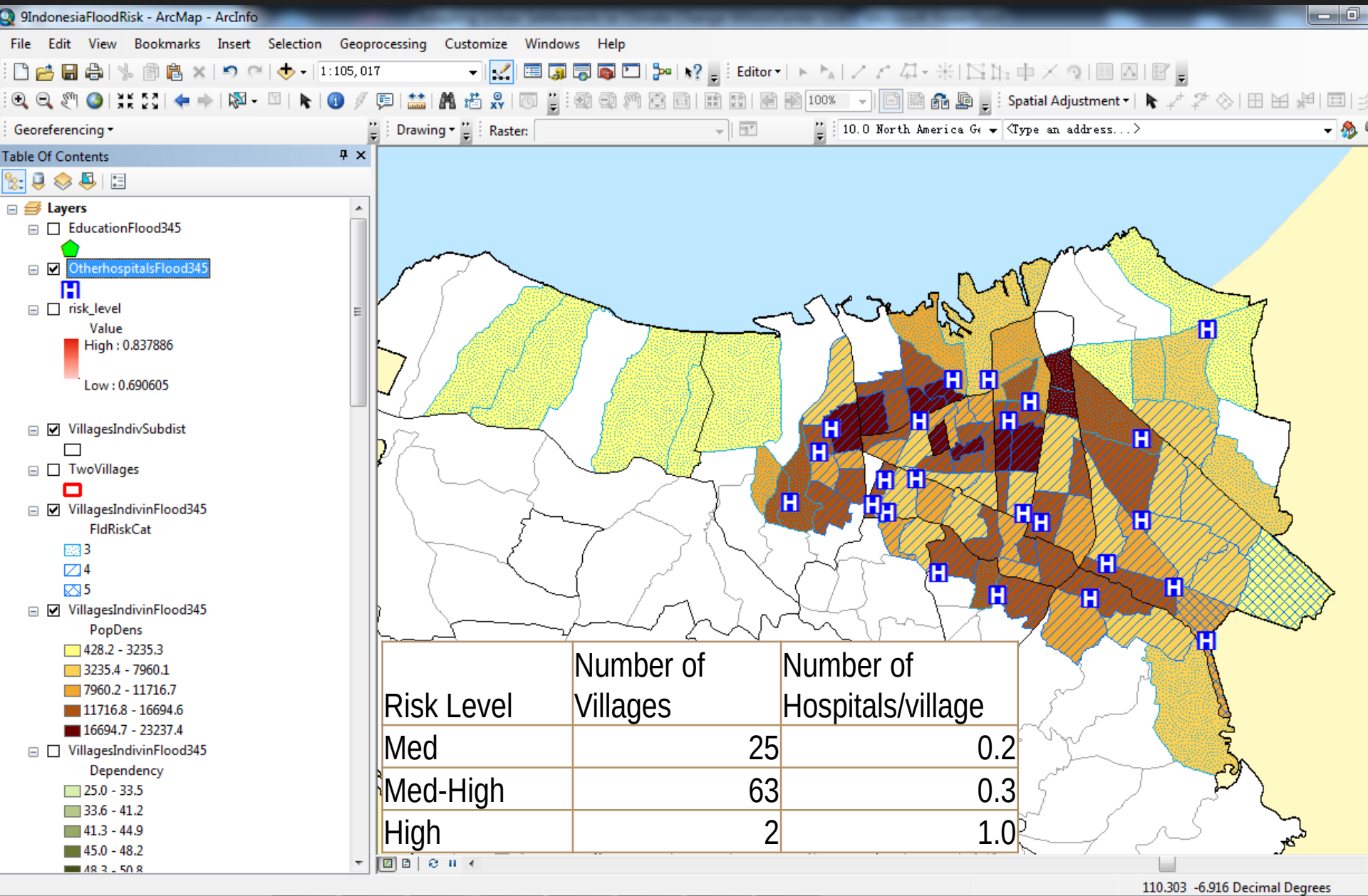
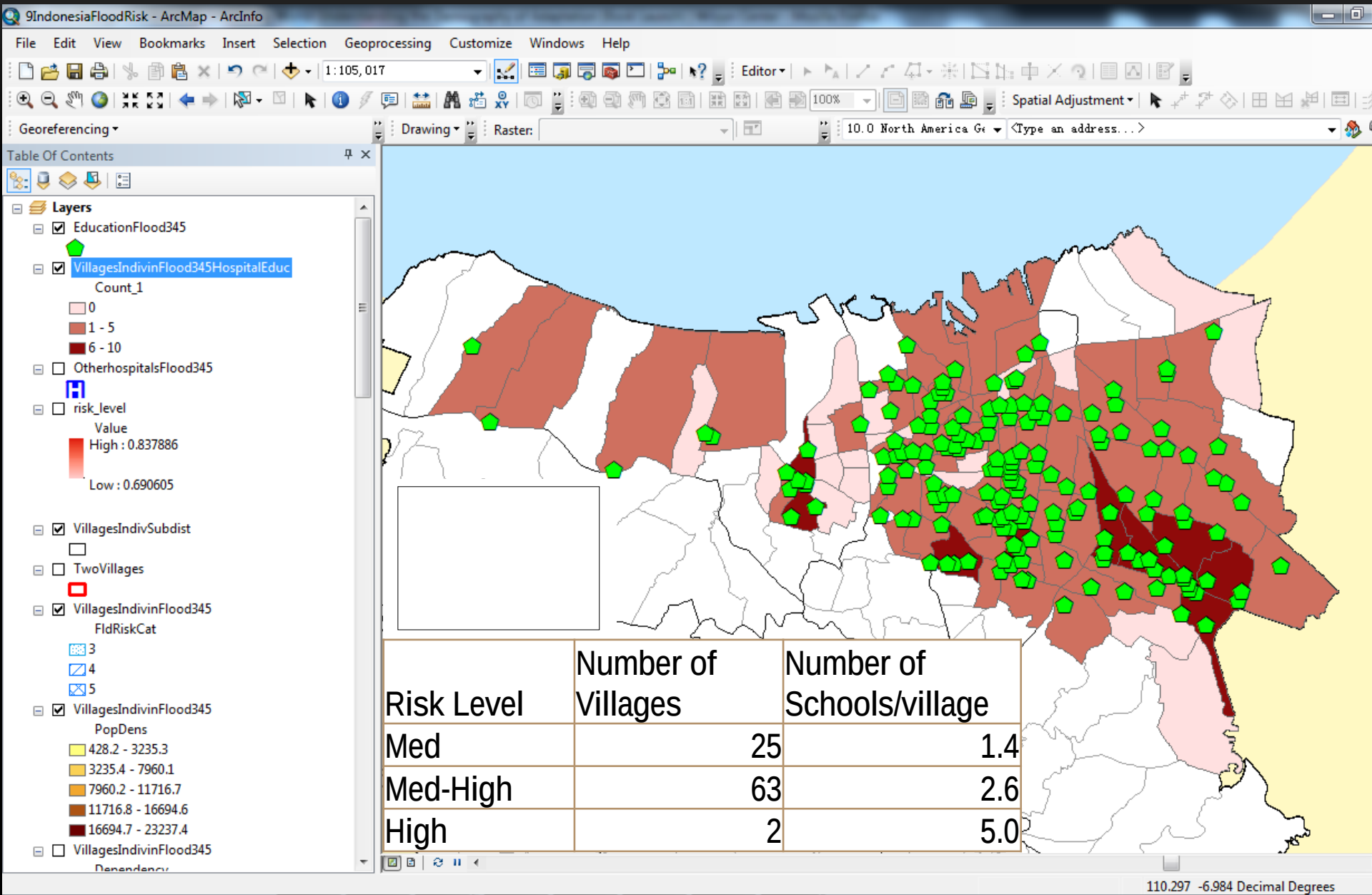
- Case Study of Semarang, Indonesia: Population Density and Hospitals Locations



Risk Level	Number of Villages	Number of Hospitals/village
Med	25	0.2
Med-High	63	0.3
High	2	1.0

- Case Study of Semarang, Indonesia: School Locations and Characteristics of Spatial Distribution



Risk Level	Number of Villages	Number of Schools/village
Med	25	1.4
Med-High	63	2.6
High	2	5.0

CHANGING THE ADAPTATION

Incorporating population dynamics into adaptation can help in understanding who is most vulnerable, why, and how to target policies to decrease that vulnerability