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GIS and AIDS Density in The United States

By

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Introduction:

AIDS is a life and death issue. To have the AIDS disease is at present a sentence of slow but inevitable death. Many families already lost one member or more to AIDS. Many people already lost friends to AIDS also. AIDS is short for: Acquired Immune Deficiency Syndrome. It is a serious condition in which the body's defenses against some illnesses are broken down. People with AIDS develop many different kinds of diseases which the body would usually fight off quite easily. AIDS is caused by a virus called HIV, which is short for Human Immunodeficiency Virus. HIV can be passed on because it would be present in the sexual fluids and blood of infected people. If infected blood or sexual fluid gets into your blood, then you will become infected. The disease originated somewhere in Africa about 20 years ago. There it first appeared as a mysterious ailment afflicting primarily heterosexuals of both sexes.

During the past decade, more than 400,000 individuals in the United States have been diagnosed with AIDS. Officials from the United States Centers for Disease Control and Prevention reported that the number of deaths from AIDS in the U.S. has dropped by a record 47 percent. Officials attributed the reduction to an extremely effective combination drug treatment that allows people infected with HIV to live longer and healthier lives. Unfortunately, no such decline occurred in the number of new HIV infections in the United States. The infection rate remained at about 40,000 new cases a year.

Geographic Information Systems (GIS) become now days a very powerful tool that everyone one want to use. Geographic Information Systems (GIS) can be used almost in all professional fields. GIS is able to link between features and their attributes, and that made it easier for end users to visualize and analyzes the data.
In this project, I will demonstrate how Geographic Information System (GIS) can be a very useful and powerful tool in some important study cases. I am going to use ArcView GIS, one of the most used GIS software, to prove that some factors might affect the density and distribution of AIDS in the United States, and make it easy to see by using visuals (maps).

The Procedures:

1. Find the main factors that effect the AIDS distribution in the United States. In my opinion, population, Crime rate, Poverty, Migration, and Unemployment are the main factors. After that, I am going to define each one of these factors:

   - **Population:** number of people: the total number of people who inhabit an area, region, or country, or the number of a particular nationality, ethnic group, religion, or class who live in an area.
   - **Crime:** an action prohibited by law or a failure to act as required by law and considered morally wrong.
   - **Poverty:** state of being poor: the state of not having enough money to take care of basic needs such as food, clothing, and housing.

- **Migration:** movement from one place to another: the act or process of moving from one region or country to another.
- **Unemployment:** (the condition of having no job). Number of unemployed: the number of people who are unemployed in an area, often given as a percentage of the total.

2. After finding sufficient data for these factors, see (Table 1, page 7), I am going to run statistical analysis to see what set of data is the best to be used in our study. I am going to use the Correlation. Correlation is a bivariate measure of association (strength) of the relationship between two variables. It varies from 0 (random relationship) to 1 (perfect linear relationship) or -1 (perfect negative linear relationship). It is usually reported in terms of its square (r^2), interpreted as percent of variance explained. For instance, if r^2 is .25, then the independent variable is said to explain 25% of the variance in the dependent variable. Table 2.

	Population	MHHI	Poverty	Migration	Unemployment	AID Count	Crime Rate
Population	1						
MHHI	0.15799461	1					
Poverty	0.98264037	0.06213533	1				
Migration	0.92034666	0.15239026	0.90342866	1			
Unemployment	0.99969756	0.14747068	0.9865024	0.9238958	1		
AID Count	0.8637506	0.18034653	0.87829053	0.79657384	0.86723441	1	
Crime Rate	0.232361	0.02646231	0.24703628	0.28828269	0.23651786	0.31190039	1

Table 2, Correlation coefficient

3. After that we have to convert the data we have to DBF file in order to be able to use it in Arc View.

4. Open project. In the project open new view, add states theme.

5. Open the theme table to view the attributes of states theme. Then, scroll right and left to see the contents of the table. Then, Open (Table 1.) next to the attribute of state table. Then join these two tables together by using the common column (state column). See (Image 1.)
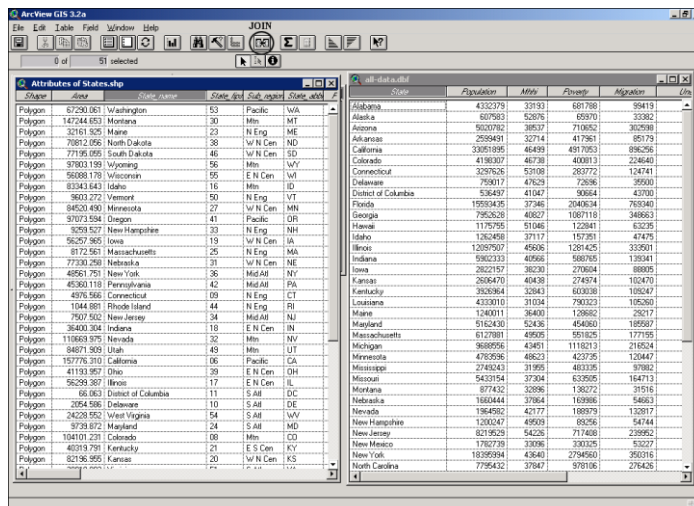

Image 1, Tables joining in ArcView

6. Go to the Legend Editor. Choose "Graduated Color" from the Legend Type list. The Graduated Color legend requires that I choose an attribute to classify. It will assign colors in graduated shades to the symbols for the classes. From the classification list I will choose one of the data sets that I run the correlation on. For example I am going to choose population. See (Image 2.).

7. ArcView applies a default classification method called natural Breaks. I am going to change it to Quantile. In the Quantile classification method, values are divided so that each class contains the same number of features. Quantile classes are perhaps the easiest to understand.

8. Then, I will copy the theme and paste to the same view. Open the Legend Editor and change the legend type to Dot. From the Density list select the AIDS count attribute whose density will be displayed. After that set the value for 200 people for each Dot. ArcView creates a dot density map. This dot density map shows that the Aids count is denser toward the states with higher population. See (Image 3.)
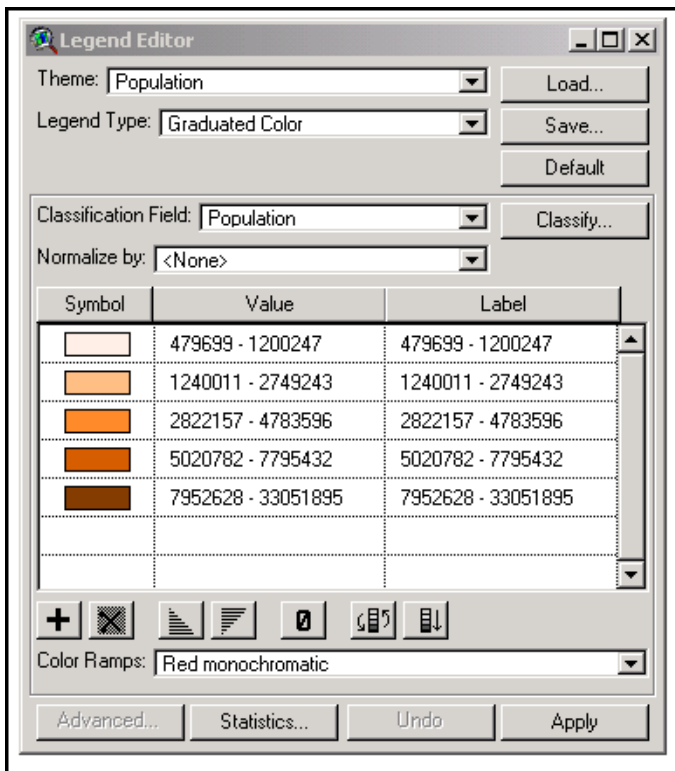

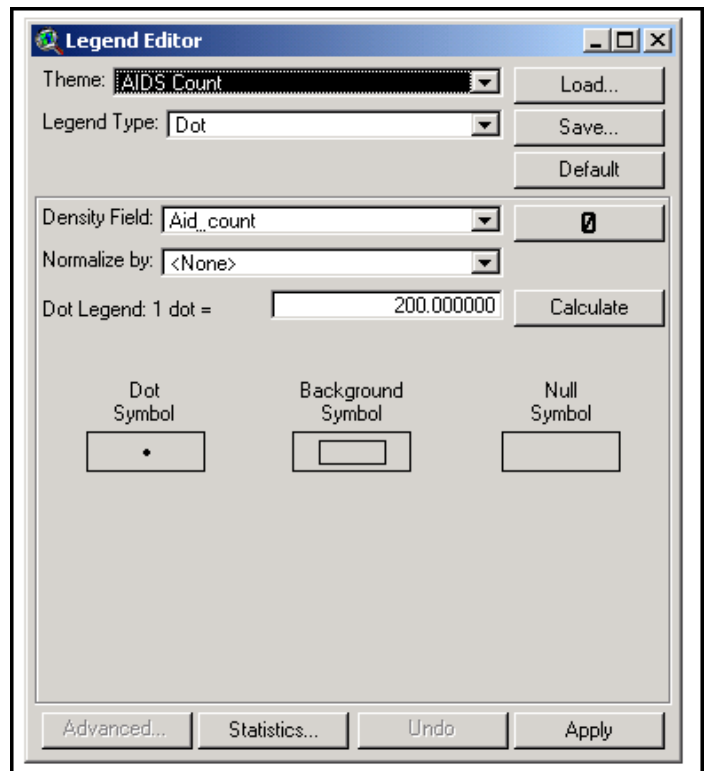Image 3, Legend Editor (Graduate color)

Image 4, Legend Editor (Dot)

9. Now we have the final view for AIDS density with relation to population. See (Image 4.).
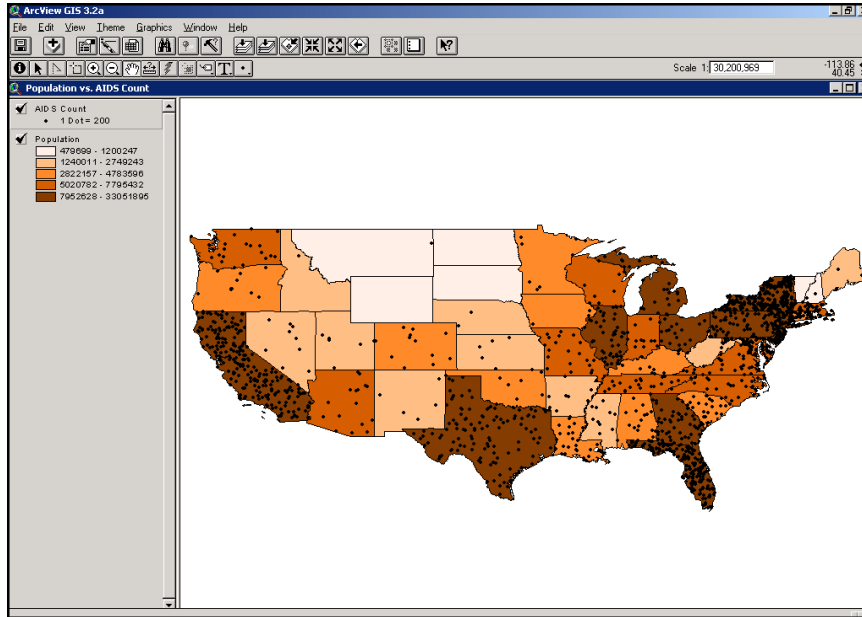
Image 4, Full View

10. After that I will use the ArcView to create a presentation-quality map using the Layout. We can add views images, table, north arrow, borders, scale bars, charts, tables and any graphic elements you want in one document. Steps 6-11 will be repeated with the rest of the data sets. See (Images 5-8).
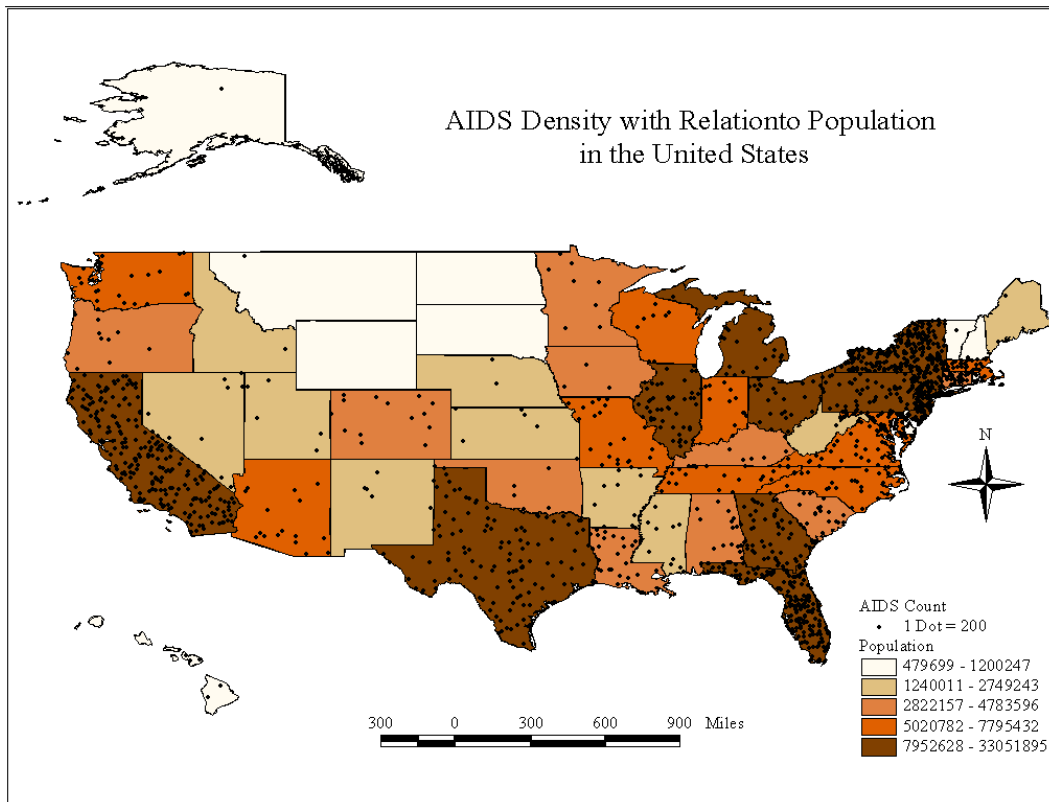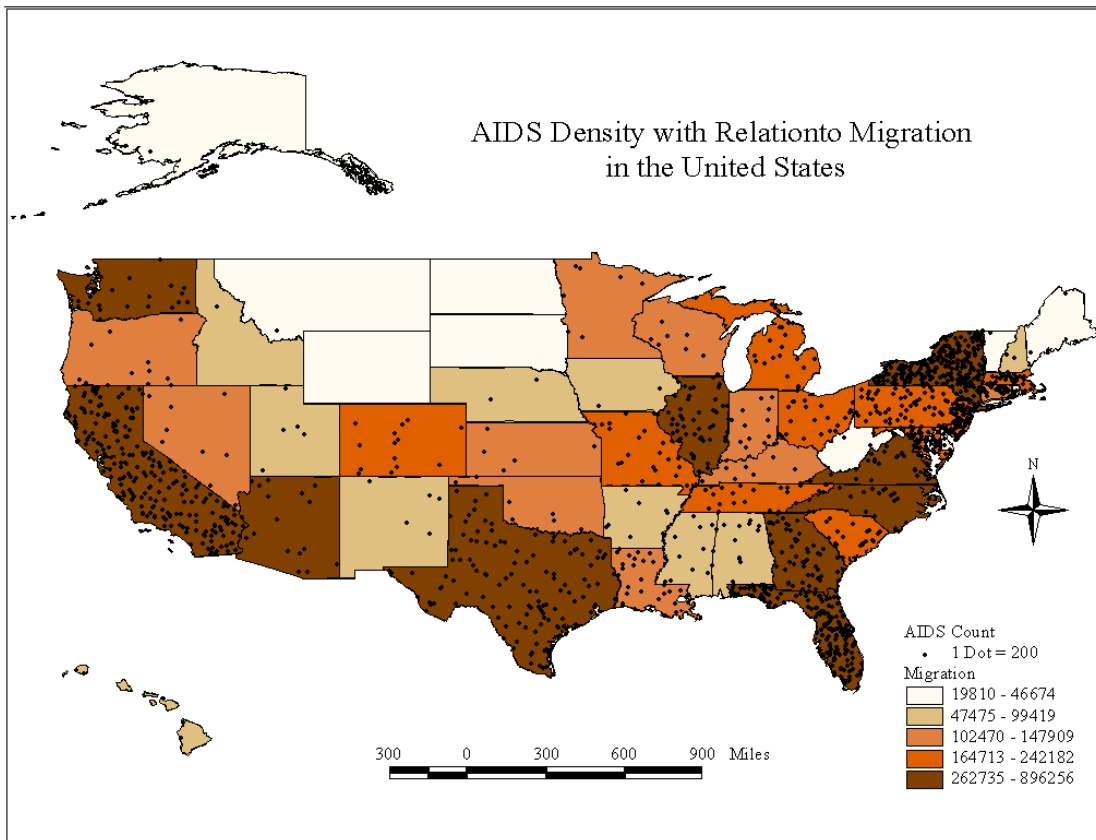

Image 5, Map 1 (final layout)

Image 6, Map 2 (final layout)
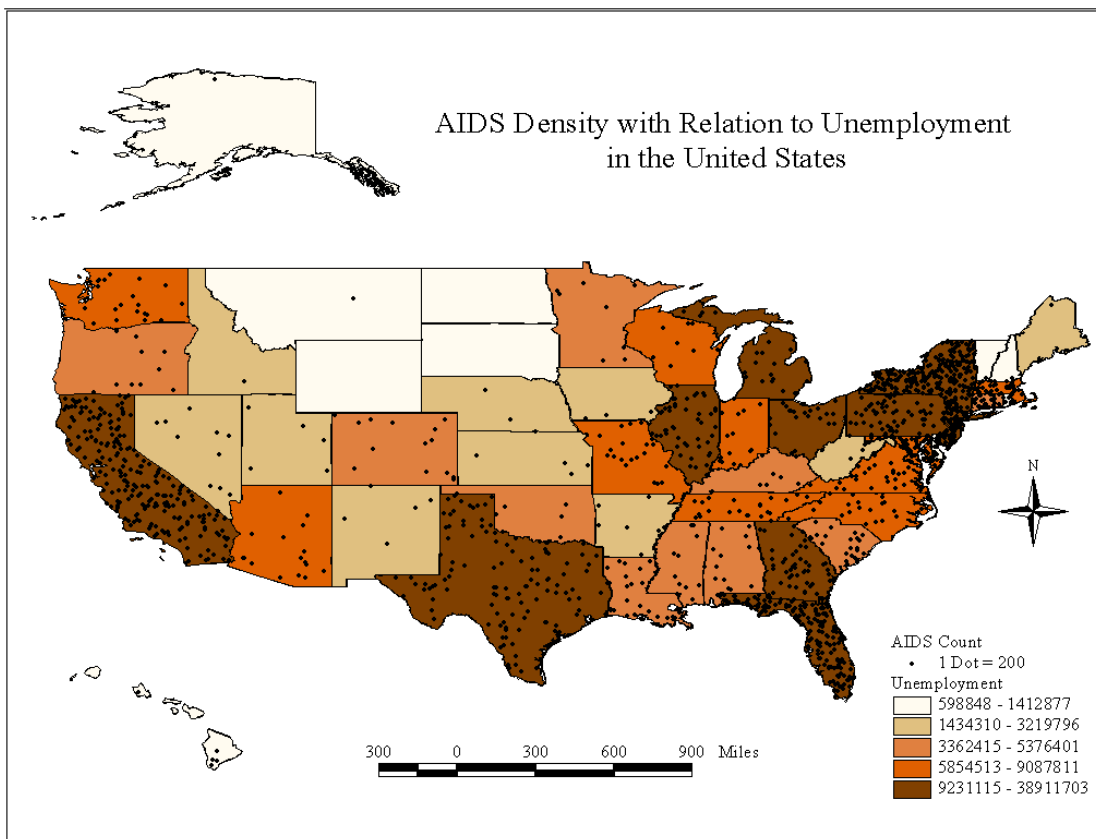
Image 7, Map 7 (final layout)
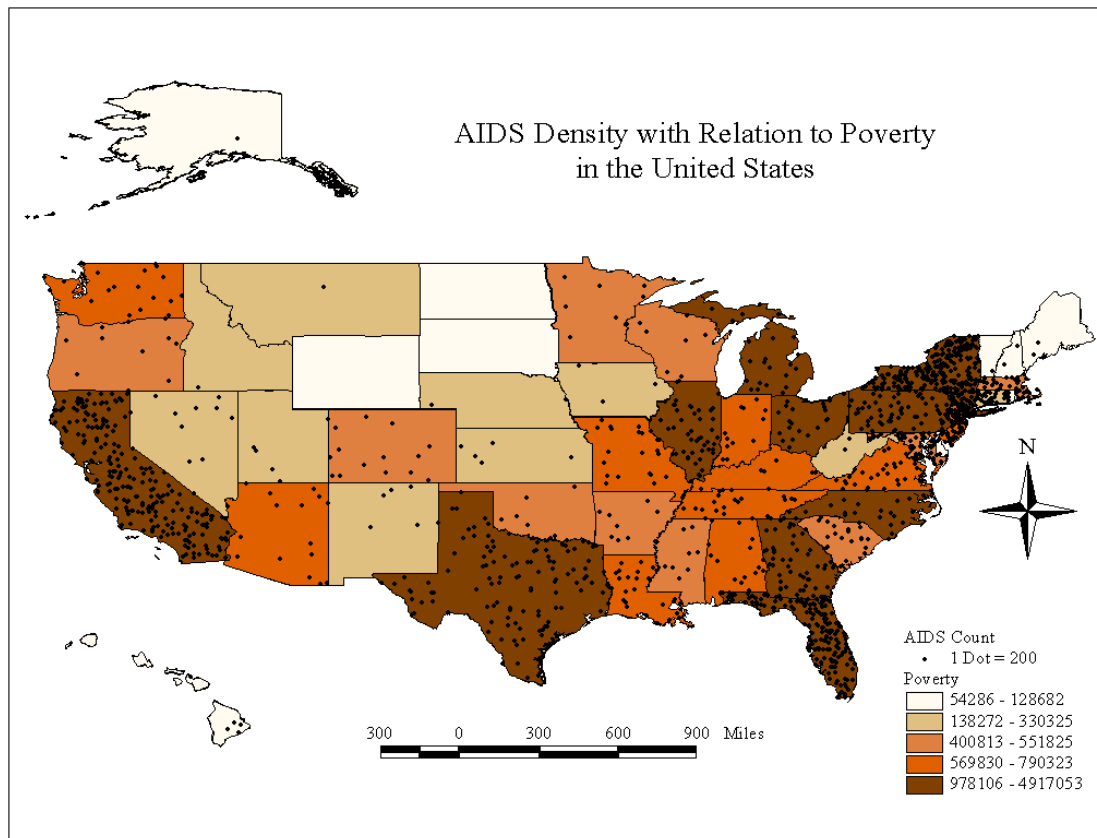
Image 6, Map 8 (final layout)

In conclusion, GIS let us create map displays and maps for presentation simply by pointing and clicking. GIS let us visualize and analyze information in new ways, revealing previously hidden relationships, patterns, and trends.

GIS helped us managing information, and link this information to geographic locations, then organize that information in news was so that you can make new discoveries and get more out of the information you have. GIS is a very powerful tool and there are no limits for what can be done while using it.

State	Population	MHHI	Poverty	Migration	Unemployment	AID Count	Crime Rate
Alabama	4,332,379	33193	681,788	99419	5146779	2901	490
Alaska	607,583	52876	65,970	33382	759811	217	632
Arizona	5,020,782	38537	710,652	302598	6072569	3195	551
Arkansas	2,599,491	32714	417,961	85179	3135345	1522	425
California	33,051,895	46499	4,917,053	896256	38911703	45220	627
Colorado	4,198,307	46738	400,813	224640	4870498	2798	341
Connecticut	3,297,626	53108	283,772	124741	3759247	5778	346
Delaware	759,017	47629	72,696	35500	914842	1128	734
District of Columbia	536,497	41047	90,664	43700	711908	6132	1628
Florida	15,593,435	37346	2,040,634	769340	18440755	34074	854
Georgia	7,952,628	40827	1,087,118	348663	9429236	10195	534
Hawaii	1,175,755	51046	122,841	63235	1412877	948	235
Idaho	1,262,458	37117	157,351	47475	1504401	216	245
Illinois	12,097,507	45606	1,281,425	333501	13758039	9889	733
Indiana	5,902,333	40566	588,765	139341	6671005	2528	375
Iowa	2,822,157	38230	270,604	88805	3219796	593	280
Kansas	2,606,470	40438	274,974	102470	3024352	948	383
Kentucky	3,926,964	32843	603,038	109247	4672092	1561	301
Louisiana	4,333,010	31034	790,323	105260	5259627	5313	733
Maine	1,240,011	36400	128,682	29217	1434310	439	112
Maryland	5,162,430	52436	454,060	185587	5854513	9821	743
Massachusetts	6,127,881	49505	551,825	177155	6906366	6975	551
Michigan	9,688,556	43451	1,118,213	216524	11066744	4567	575
Minnesota	4,783,596	48623	423,735	120447	5376401	1569	274
Mississippi	2,749,243	31955	483,335	97882	3362415	1941	349
Missouri	5,433,154	37304	633,505	164713	6268676	4142	500
Montana	877,432	32896	138,272	31516	1080116	162	207
Nebraska	1,660,444	37864	169,986	54663	1922957	446	430
Nevada	1,964,582	42177	188,979	132817	2328555	1979	570
New Hampshire	1,200,247	49509	89,256	54744	1393756	473	97
New Jersey	8,219,529	54226	717,408	239952	9231115	14678	412
New Mexico	1,782,739	33096	330,325	53227	2199387	944	835
New York	18,395,994	43640	2,794,560	350316	21584510	54971	589
North Carolina	7,795,432	37847	978,106	276426	9087811	4370	542
North Dakota	618,569	34457	80,381	20885	754292	44	67
Ohio	11,054,019	39480	1,202,277	208655	12504431	4355	316
Oklahoma	3,338,278	33448	533,108	137831	4042665	1451	508
Oregon	3,343,908	39305	400,952	147909	3932074	2030	375
Pennsylvania	11,847,752	39562	1,277,442	242182	13406938	11402	421
Rhode Island	1,009,503	43185	103,831	34587	1191106	885	287
South Carolina	3,876,975	36385	550,127	173030	4636517	4421	847
South Dakota	726,426	35202	94,379	21847	877854	66	167
Tennessee	5,541,336	36145	715,433	195481	6488395	4426	695
Texas	20,290,713	39120	3,102,571	672725	24105129	23624	560
Utah	2,192,690	45654	213,244	86150	2537738	917	276
Vermont	588,067	39317	56,547	19810	703741	180	114
Virginia	6,847,117	46693	696,205	316296	7906311	5725	315
Washington	5,757,739	45310	569,830	262735	6635614	3990	377
West Virginia	1,765,197	28569	302,049	46754	2144089	459	351
Wisconsin	5,207,717	42166	462,809	142498	5855190	1522	246
Wyoming	479,699	38186	54,286	26677	598848	75	232

Table 1, The complete data set

Bibliography