

# NHGIS Time Series Tables

## Geographic Census Data Harmonized Across Time

Jonathan Schroeder

*IPUMS Webinar Series – November 20, 2019*

# Webinar plan

1. The basics of NHGIS
2. The basics of time series tables
3. Geographic standardization methods
4. Comparison with alternatives
5. Future plans

# THE BASICS OF NHGIS

# IPUMS

IPUMS provides census and survey data from around the world integrated across time and space. IPUMS integration and documentation makes it easy to study change, conduct comparative research, merge information across data types, and analyze individuals within family and community contexts. Data and services available free of charge.



U.S. Census and American Community Survey microdata from 1850 to the present. [Learn More](#)

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NHGIS Time Series Tables: Geographic Census Data Harmonized Across Time

November 20 | 2:00 p.m. CT

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CENSUS BUREAU DIFFERENTIAL PRIVACY PLANS

Census Bureau released differentially private 2010 demonstration data

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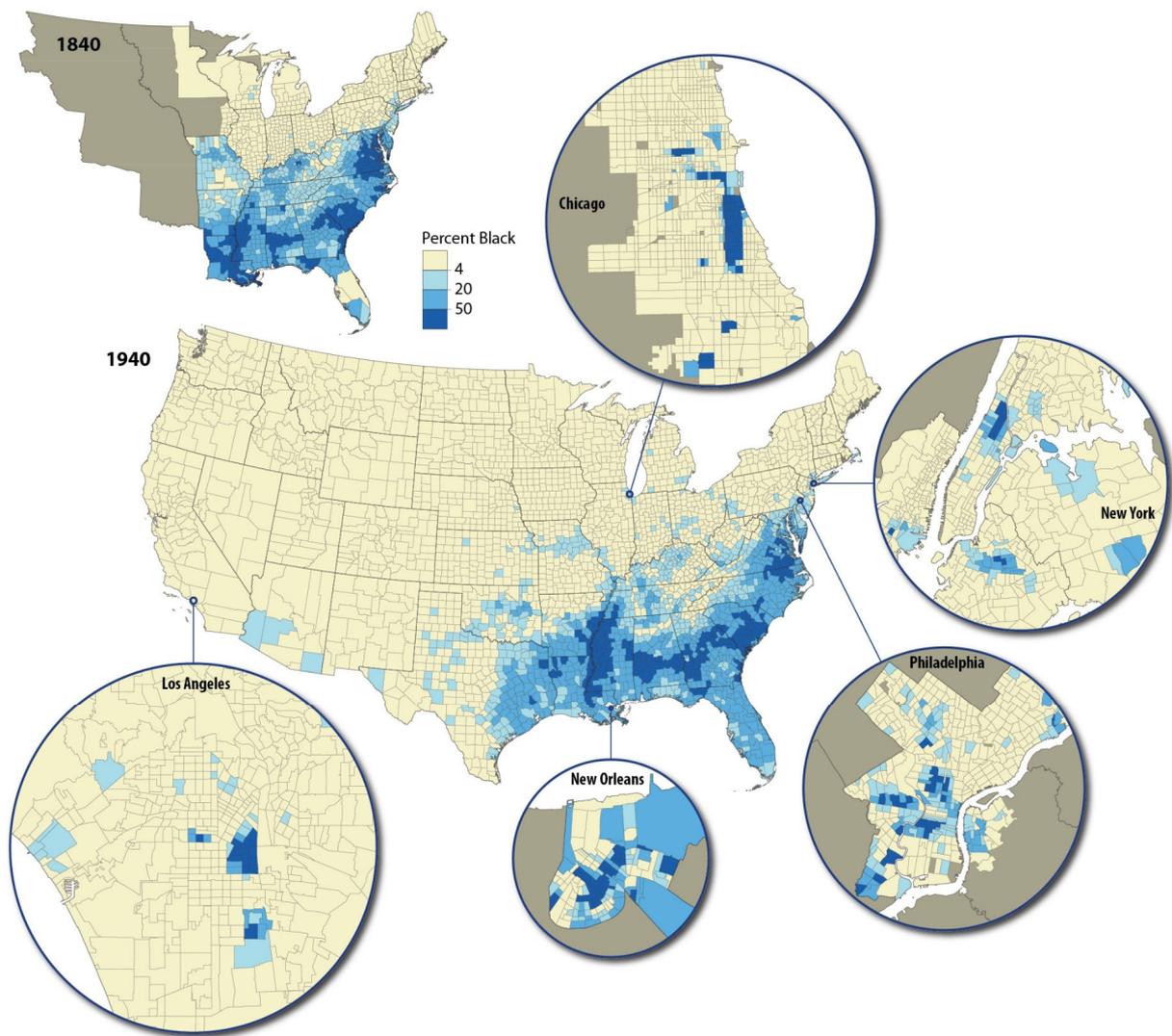
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# NHGIS

- Geographic U.S. census & survey data
- Summary tables *and* GIS files
- 1790 to the present
- All summary levels from nation to census blocks





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DATA AVAILABILITY

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OVERVIEW OF DATASETS

MAPPING OPTIONS

GEOGRAPHIC CROSSWALKS

ENVIRONMENTAL SUMMARIES

## DOCUMENTATION

TABULAR DATA SOURCES

TIME SERIES TABLES

GIS FILES

RELEASE LOG

## RESEARCH

CITATION AND USE

RELATED SITES

## DOWNLOAD U.S. CENSUS DATA TABLES & MAPPING FILES

The **National Historical Geographic Information System (NHGIS)** provides easy access to summary tables and time series of population, housing, agriculture, and economic data, along with GIS-compatible boundary files, for years from 1790 through the present and for all levels of U.S. census geography, including states, counties, tracts, and blocks. [Read more.](#)

START HERE:

Get Data

## WHAT IS IPUMS?

IPUMS provides census and survey data from around the world integrated across time and space. IPUMS integration and documentation makes it easy to study change, conduct comparative research, merge information across data types, and analyze individuals within family and community context. Data and services are available free of charge. [Learn more about IPUMS.](#)

## NHGIS NEWS

[2010 CENSUS DEMONSTRATION DATA FOR DIFFERENTIAL PRIVACY](#)

[1910 AGE 1-YEAR SUMMARY FILE NOW AVAILABLE | MARRIAGE & DIVORCE DATA FOR 1867-2010](#)



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Journey to Work

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## SELECT DATA ?

1786 SOURCE TABLES

7 TIME SERIES TABLES

818 GIS BOUNDARY FILES

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VIEW 1 - 20 OF 1,786

	POPULARITY	TABLE NAME	UNIVERSE	CLASSIFICATIONS	YEAR - DATASET	BREAKDOWNS
+	<div style="width: 100%;"></div>	NT51. Working Persons 14 and Over by Means of Transportation to Work	Workers 14 Years and Over (includes Armed Forces)	<a href="#">Means of Transportation to Work (8)</a>	1960_tPH	
+	<div style="width: 100%;"></div>	NT37. Employed Population by Means of Transportation to Work [from printed report]	Employed Persons	<a href="#">Means of Transportation to Work (8)</a>	1960_tPH	
+	<div style="width: 100%;"></div>	NT36. Means of Transportation to Work	Workers	<a href="#">Means of Transportation to Work (9)</a>	1970_Cnt4Pb	<a href="#">Race/Ethnicity. Spatial</a>
+	<div style="width: 100%;"></div>	NTLOC. Location of Work	Locations of Workplace for Workers 16 Years and Over in Commuter Flow		1980_JTW	<a href="#">Work Location</a>
+	<div style="width: 100%;"></div>	NT001. Workers 16 Years of Age and Older in Commuter Flow	Workers 16 Years and Over in Commuter Flow		1980_JTW	<a href="#">Work Location</a>
+	<div style="width: 100%;"></div>	NT014. Means of Transportation	Workers 16 Years and Over	<a href="#">Means of Transportation to Work (13)</a>	1980_JTW	<a href="#">Work Location</a>
+	<div style="width: 100%;"></div>	NT015. Aggregate Travel Time to Work in Minutes	Workers 16 Years and Over	<a href="#">Means of Transportation to Work (3)</a>	1980_JTW	<a href="#">Work Location</a>
			Workers 16 Years and Over in			



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VIEW 1 - 20 OF 1,786

POPULARITY ▾	TABLE NAME	UNIVERSE	CLASSIFICATIONS	YEAR - DATASET	BREAKDOWNS
+	808301. Means of Transportation to Work	Workers 16 years and over	<a href="#">Means of Transportation to Work (20)</a>	2011_2015_ACS5a	Spatial
+	808303. Travel Time to Work	Workers 16 years and over who did not work at home	<a href="#">Travel Time to Work (12)</a>	2011_2015_ACS5a	Spatial
+	808134. Means of Transportation to Work by Travel Time to Work	Workers 16 years and over who did not work at home	<a href="#">Means of Transportation to Work (12). Travel Time to Work (9)</a>	2011_2015_ACS5a	Spatial
+	808303. Travel Time to Work	Workers 16 years and over who did not work at home	<a href="#">Travel Time to Work (12)</a>	2006_2010_ACS5a	Spatial
+	P030A. Means of Transportation to Work	Workers 16 Years and Over	<a href="#">Means of Transportation to Work (7)</a>	2000_SF3a	Spatial
+	808301. Means of Transportation to Work	Workers 16 years and over	<a href="#">Means of Transportation to Work (20)</a>	2006_2010_ACS5a	Spatial
+	808301. Means of Transportation to Work	Workers 16 years and over	<a href="#">Means of Transportation to Work (20)</a>	2010_2014_ACS5a	Spatial
+	808301. Means of Transportation to Work	Workers 16 years and over	<a href="#">Time Leaving Home to Go</a>		



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## SELECT DATA ?

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	POPULARITY	YEAR	GEOGRAPHIC LEVEL	EXTENT	BASIS
+		1960	Census Tract	United States	<a href="#">2000 TIGER/Line +</a>
+		1960	Census Tract	United States	<a href="#">2008 TIGER/Line +</a>
+		1970	State	United States	<a href="#">2000 TIGER/Line +</a>
+		1970	County	United States	<a href="#">2000 TIGER/Line +</a>
+		1970	County	United States	<a href="#">2008 TIGER/Line +</a>
+		1970	Census Tract	United States	<a href="#">2000 TIGER/Line +</a>
+		1970	Census Tract	United States	<a href="#">2008 TIGER/Line +</a>
+		1970	Place (Points)	United States	<a href="#">GNIS, TIGER/Line &amp; Census Maps</a>
+		1970	Standard Metropolitan Statistical Area (by State)	United States	<a href="#">2000 TIGER/Line +</a>



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	POPULARITY	TABLE NAME ↕	GEOGRAPHIC INTEGRATION	YEARS	GEOGRAPHIC LEVELS
+		<a href="#">Workers of Working Age* by Means of Transportation to Work [9]</a>	Nominal	1970, 1980, 1990, 2000, 2008-2012	<a href="#">STATE</a> , <a href="#">COUNTY</a> , <a href="#">CTY_SUB</a> , <a href="#">PLACE</a>
+		<a href="#">Workers 16 Years and Over by Means of Transportation to Work [18]</a>	Nominal	1980, 1990, 2000, 2008-2012	<a href="#">STATE</a> , <a href="#">COUNTY</a> , <a href="#">CTY_SUB</a> , <a href="#">PLACE</a>
+		<a href="#">Workers 16 Years and Over by Means of Transportation to Work [20]</a>	Nominal	1990, 2000, 2008-2012	<a href="#">NATION</a> , <a href="#">REGION</a> , <a href="#">DIVISION</a> , <a href="#">STATE</a> , <a href="#">COUNTY</a> , <a href="#">TRACT</a> , <a href="#">CTY_SUB</a> , <a href="#">PLACE</a>
+		<a href="#">Total Commuters (Workers 16 Years and Over Who Did Not Work at Home)</a>	Nominal	1980, 1990, 2000, 2008-2012	<a href="#">NATION</a> , <a href="#">REGION</a> , <a href="#">DIVISION</a> , <a href="#">STATE</a> , <a href="#">COUNTY</a> , <a href="#">TRACT</a> , <a href="#">CTY_SUB</a> , <a href="#">PLACE</a>
+		<a href="#">Commuters by Travel Time to Work [8]</a>	Nominal	1980, 1990, 2000, 2008-2012	<a href="#">NATION</a> , <a href="#">REGION</a> , <a href="#">DIVISION</a> , <a href="#">STATE</a> , <a href="#">COUNTY</a> , <a href="#">TRACT</a> , <a href="#">CTY_SUB</a> , <a href="#">PLACE</a>
+		<a href="#">Commuters by Travel Time to Work [12]</a>	Nominal	1990, 2000, 2008-2012	<a href="#">NATION</a> , <a href="#">REGION</a> , <a href="#">DIVISION</a> , <a href="#">STATE</a> , <a href="#">COUNTY</a> , <a href="#">TRACT</a> , <a href="#">CTY_SUB</a> , <a href="#">PLACE</a>
+		<a href="#">Aggregate Travel Time to Work for Commuters</a>	Nominal	1980, 1990, 2000, 2008-2012	<a href="#">NATION</a> , <a href="#">REGION</a> , <a href="#">DIVISION</a> , <a href="#">STATE</a> , <a href="#">COUNTY</a> , <a href="#">TRACT</a> , <a href="#">CTY_SUB</a> , <a href="#">PLACE</a>

# THE BASICS OF TIME SERIES TABLES

nhgis0215\_ts\_state.csv [Read-Only] - Microsoft Excel non-commercial use

File Home Insert Page Layout Formulas Data Review View Add-Ins

A1 GISJOIN

	A	B	C	D	E	F	G	H	I	J	
1	GISJOIN	STATE	STATEA	BL1AA1970	BL1AA1980	BL1AA1990	BL1AA2000	BL1AA125	BL1AA125M	BL1AB1970	
	GIS Join Match Code	State Name	State Code	1970: Persons: Male ~ Never married	1980: Persons: Male ~ Never married	1990: Persons: Male ~ Never married	2000: Persons: Male ~ Never married	2008-2012: Persons: Male ~ Never married	Margin of error: 2008-2012: Persons: Male ~ Never married	1970: Persons: Male ~ Now married	
3	G010	Alabama	10	324572	375515	406140	444450	584355	4261	792229	
4	G020	Alaska	20	38428	53423	67827	78955	105333	1532	69046	
5	G040	Arizona	40	170463	286183	409976	581715	876661	5440	410438	
6	G050	Arkansas	50	170171	200864	209851	245874	330745	3312	464000	
7	G060	California	60	2102965	2938148	4034185	4343790	5778554	18439	4611973	
8	G080	Colorado	80	230115	341985	373157	516816	678866	4145	510105	
9	G090	Connecticut	90	306085	369471	412921	385888	496941	3768	706908	
10	G100	Delaware	100	520000	580000	640000	700000	760000	122851	1650	126479
11	G110	District Of Co	110	990000	1000000	1010000	1020000	1030000	142162	1558	142605
12	G120	Florida	120	596000	650000	700000	750000	800000	2553294	14356	1687636
13	G130	Georgia	130	446917	504696	561250	617487	673224	1299191	7312	1050444
14	G150	Hawaii	150	104625	137448	152188	166715	205985	2060	169920	
15	G160	Idaho	160	69395	86794	91380	128613	172169	2427	169553	
16	G170	Illinois	170	1115952	1318480	1395167	1495795	1838840	9371	2542632	
17	G180	Indiana	180	477592	541264	569459	643222	814989	5228	1222896	
18	G190	Iowa	190	271540	301518	281081	318000	375129	2818	665781	
19	G200	Kansas	200	223168	241362	244866	281338	345753	3010	542632	
20	G210	Kentucky	210	318856	358353	361278	401465	518929	4039	757239	
21	G220	Louisiana	220	370838	450684	464285	514633	633702	4170	793188	
22	G230	Maine	230	97253	116576	126930	132473	163254	1650	227135	
23	G240	Maryland	240	392646	501319	587368	610852	814952	4997	906860	
24	G250	Massachusetts	250	622162	743825	832633	817954	981462	5728	1243732	
25	G260	Michigan	260	872687	1036241	1078995	1159693	1352844	6714	2021198	
26	G270	Minnesota	270	403762	484050	504483	591866	716441	4620	849440	
27	G280	Mississippi	280	222569	252992	275422	319922	388559	3394	480663	

Time varies by column

nhgis0215\_ts\_state

Ready

nhgis0217\_ts\_state.xls [Read-Only] - Microsoft Excel non-commercial use

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A1 GISJOIN

	A	B	C	D	E	F	G	H	I	J	K
1	GISJOIN	YEAR	STATE	STATEA	NAME	BL1AA	BL1AB	BL1AC	BL1AD	BL1AE	BL1AF
	GIS Join Match Code	Row Source Year	State Name	State Code	Area Name	Persons: Male ~ Never married	Persons: Male ~ Now married	Persons: Male ~ Now married-- Not separated	Persons: Male ~ Now married-- Separated	Persons: Male ~ Widowed	Persons: Male ~ Divorced
3	G010	1970	Alabama	1	Alabama	324572	792229	772606	19623	34715	29261
4	G010	1980	Alabama	1	ALABAMA	375515	904748	879413	25335	37370	75051
5	G010	1990	Alabama	1	Alabama	406140	925748	898827	26921	40619	115510
6	G010	2000	Alabama	1	Alabama	444450	1012430	982641	29789	45857	164061
7	G010	2008-2012	Alabama	1	Alabama	584355	996641	957174	39467	52899	207461
8	G020	1970	Alaska	2	Alaska	38428	69046	67768	1278	1604	4579
9	G020	1980	Alaska	2	ALASKA	53423	89520	87025	2495	1834	12561
10	G020	1990	Alaska	2	Alaska				4146	2541	22187
11	G020	2000	Alaska	2	Alaska				4146	3422	26344
12	G020	2008-2012	Alaska	2	Alaska				5476	4942	32300
13	G040	1970	Arizona	4	Arizona	170463	410438	403552	6886	14944	21038
14	G040	1980	Arizona	4	ARIZONA	286183	636243	621664	14579	21708	65500
15	G040	1990	Arizona	4	Arizona	409976	817459	792947	24512	32270	125206
16	G040	2000	Arizona	4	Arizona	581715	1141032	1109792	31240	50333	192952
17	G040	2008-2012	Arizona	4	Arizona	876661	1293932	1255797	38135	62655	263025
18	G050	1970	Arkansas	5	Arkansas	170171	464000	454528	9472	23955	19079
19	G050	1980	Arkansas	5	ARKANSA	200864	558303	544680	13623	24086	44078
20	G050	1990	Arkansas	5	Arkansas	209851	563189	548531	14658	24977	70529
21	G050	2000	Arkansas	5	Arkansas	245874	636346	619624	16722	27611	105763
22	G050	2008-2012	Arkansas	5	Arkansas	330745	630722	607327	23395	33244	134161
23	G060	1970	California	6	California	2102965	4611973	4488984	122989	170209	315630
24	G060	1980	California	6	CALIFORN	2938148	5260299	5049511	210788	194463	640946
25	G060	1990	California	6	California	4034185	6348675	6096047	252628	237667	897477
26	G060	2000	California	6	California	4343790	7205642	6949183	256459	278180	1017057
27	G060	2008-2012	California	6	California	5778554	7400001	7123855	276146	311362	1172808

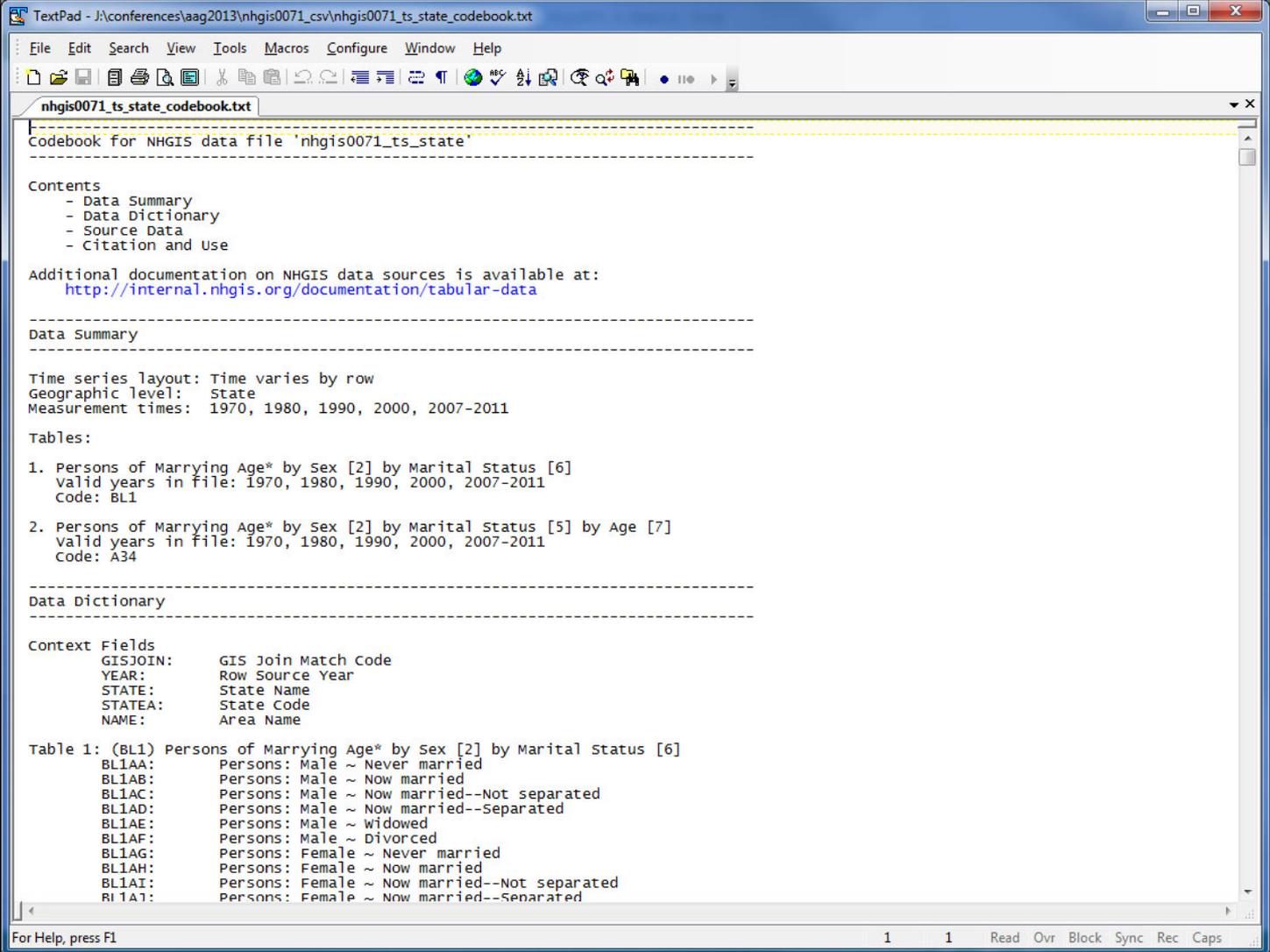
Time varies by row

nhgis0217\_ts\_state

Ready

	A	B	C	D	E	F	G	H	I	J	K
1	GISJOIN	YEAR	STATE	STATEA	NAME	BL1AA1970	BL1AB1970	BL1AC1970	BL1AD1970	BL1AE1970	BL1AF1970
	GIS Join							Persons: Male ~	Persons: Male ~		
2	Match Code	Data File Year	State Name	State Code	Area Name	Persons: Male ~ Never married	Persons: Male ~ Now married	Now married-- Not separated	Now married-- Separated	Persons: Male ~ Widowed	Persons: Male ~ Divorced
3	G010	1970	Alabama		1 Alabama	324572	792229	772606	19623	34715	29261
4	G020	1970	Alaska		2 Alaska	38428	69046	67768	1278	1604	4579
5	G040	1970	Arizona		4 Arizona	170463	410438	403552	6886	14944	21038
6	G050	1970	Arkansas		5 Arkansas	170171	464000	454528	9472	23955	19079
7	G060	1970	California		6 California	2102965	4611973	4488984	122989	170209	315630
8	G080	1970	Colorado		8 Colorado	230115	510105	501665	8440	17989	26060
9	G090	1970	Connectic		9 Connectic	306085	706908	692637	14271	31302	21853
10	G100	1970	Delaware		10 Delaware				4066	5208	4496
11	G110	1970	District Of		11 District Of				16943	9814	10821
12	G120	1970	Florida		12 Florida				45569	81012	83596
13	G130	1970	Georgia		13 Georgia	446917	1050444	1019145	31299	41282	42198
14	G150	1970	Hawaii		15 Hawaii	104625	169920	167778	2142	6433	8198
15	G160	1970	Idaho		16 Idaho	69395	169553	167692	1861	6142	8349
16	G170	1970	Illinois		17 Illinois	1115952	2542632	2486837	55795	122803	108659
17	G180	1970	Indiana		18 Indiana	477592	1222896	1206358	16538	49784	55706
18	G190	1970	Iowa		19 Iowa	271540	665781	660244	5537	31358	21556
19	G200	1970	Kansas		20 Kansas	223168	542632	536569	6063	22798	22475
20	G210	1970	Kentucky		21 Kentucky	318856	757239	745046	12193	34636	31068
21	G220	1970	Louisiana		22 Louisiana	370838	793188	765679	27509	36094	25765
22	G230	1970	Maine		23 Maine	97253	227135	224170	2965	12156	10385
23	G240	1970	Maryland		24 Maryland	392646	906860	869787	37073	36331	31050
24	G250	1970	Massachu		25 Massachu	622162	1243732	1217981	25751	66891	41665
25	G260	1970	Michigan		26 Michigan	872687	2021198	1976907	44291	84358	88150
26	G270	1970	Minnesota		27 Minnesot	403762	849440	840847	8593	37285	27100
27	G280	1970	Mississipp		28 Mississipp	222569	480663	465986	14677	25970	15513

Time varies by file



```
TextPad - J:\conferences\laag2013\nhgis0071_csv\nhgis0071_ts_state_codebook.txt
File Edit Search View Tools Macros Configure Window Help
nhgis0071_ts_state_codebook.txt
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Source Data
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Table 1: (BL1) Persons of Marrying Age* by Sex [2] by Marital Status [6]

Time series AA: Persons: Male ~ Never married
Year: 1970
  Source dataset: 1970 Census: Count 2 - 100% Data [Tracts, Urban Areas, Metro Areas, etc.]
  Source table: NT5A. Sex by Age by Marital Status
  Universe: Persons 14 Years and Over
  Variable: [CII005] Male >> 14-19 years >> Never married
  Variable: [CII010] Male >> 20-24 years >> Never married
  Variable: [CII015] Male >> 25-34 years >> Never married
  Variable: [CII020] Male >> 35-44 years >> Never married
  Variable: [CII025] Male >> 45-54 years >> Never married
  Variable: [CII030] Male >> 55-64 years >> Never married
  Variable: [CII035] Male >> 65 years and over >> Never married
Year: 1980
  Source dataset: 1980 Census: STF 1 - 100% Data
  Source table: NT14. Sex by Marital Status
  Universe: Persons 15 Years and Over
  Variable: [C7F001] Male >> Single
Year: 1990
  Source dataset: 1990 Census: STF 1 - 100% Data
  Source table: NP14. Sex by Marital Status
  Universe: Persons 15 Years and Over
  Variable: [ET6001] Male >> Never married
Year: 2000
  Source dataset: 2000 Census: SF 3a - Sample-Based Data [Areas Larger Than Block Groups]
  Source table: NP018C. Population 15 Years and Over by Sex by Marital Status
  Universe: Persons 15 Years and Over
  Variable: [GIZ001] Male >> Never married
Year: 2007-2011
  Source dataset: 2011 American Community Survey: 5-Year Data [2007-2011, Block Groups & Larger Areas]
  Source table: B12001. Sex by Marital Status for the Population 15 Years and Over
  Universe: Population 15 years and over
  Variable: [MPG003] Male: Never married

Time series AB: Persons: Male ~ Now married
Year: 1970
  Source dataset: 1970 Census: Count 2 - 100% Data [Tracts, Urban Areas, Metro Areas, etc.]
  Source table: NT5A. Sex by Age by Marital Status
  Universe: Persons 14 Years and Over
  Variable: [CII001] Male >> 14-19 years >> Now married (excludes separated)
  Variable: [CII004] Male >> 14-19 years >> Separated
  Variable: [CII006] Male >> 20-24 years >> Now married (excludes separated)
  Variable: [CII009] Male >> 20-24 years >> Separated
  Variable: [CII011] Male >> 25-34 years >> Now married (excludes separated)
  Variable: [CII014] Male >> 25-34 years >> Separated
  Variable: [CII016] Male >> 35-44 years >> Now married (excludes separated)
  Variable: [CII019] Male >> 35-44 years >> Separated

1 1 Read Ovr Block Sync Rec Caps
```



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	POPULARITY	TABLE NAME	GEOGRAPHIC INTEGRATION	YEARS	GEOGRAPHIC LEVELS
+	<div style="width: 100%;"></div>	<a href="#">Workers of Working Age* by Means of Transportation to Work [9]</a>	Nominal	1970, 1980, 1990, 2000, 2008-2012	<a href="#">STATE</a> , <a href="#">COUNTY</a> , <a href="#">CTY_SUB</a> , <a href="#">PLACE</a>
+	<div style="width: 100%;"></div>	<a href="#">Workers 16 Years and Over by Means of Transportation to Work [18]</a>	Nominal	1980, 1990, 2000, 2008-2012	<a href="#">STATE</a> , <a href="#">COUNTY</a> , <a href="#">CTY_SUB</a> , <a href="#">PLACE</a>
+	<div style="width: 100%;"></div>	<a href="#">Workers 16 Years and Over by Means of Transportation to Work [20]</a>	Nominal	1990, 2000, 2008-2012	<a href="#">NATION</a> , <a href="#">REGION</a> , <a href="#">DIVISION</a> , <a href="#">STATE</a> , <a href="#">COUNTY</a> , <a href="#">TRACT</a> , <a href="#">CTY_SUB</a> , <a href="#">PLACE</a>
+	<div style="width: 100%;"></div>	<a href="#">Total Commuters (Workers 16 Years and Over Who Did Not Work at Home)</a>	Nominal	1980, 1990, 2000, 2008-2012	<a href="#">NATION</a> , <a href="#">REGION</a> , <a href="#">DIVISION</a> , <a href="#">STATE</a> , <a href="#">COUNTY</a> , <a href="#">TRACT</a> , <a href="#">CTY_SUB</a> , <a href="#">PLACE</a>
+	<div style="width: 100%;"></div>	<a href="#">Commuters by Travel Time to Work [8]</a>	Nominal	1980, 1990, 2000, 2008-2012	<a href="#">NATION</a> , <a href="#">REGION</a> , <a href="#">DIVISION</a> , <a href="#">STATE</a> , <a href="#">COUNTY</a> , <a href="#">TRACT</a> , <a href="#">CTY_SUB</a> , <a href="#">PLACE</a>
+	<div style="width: 100%;"></div>	<a href="#">Commuters by Travel Time to Work [12]</a>	Nominal	1990, 2000, 2008-2012	<a href="#">NATION</a> , <a href="#">REGION</a> , <a href="#">DIVISION</a> , <a href="#">STATE</a> , <a href="#">COUNTY</a> , <a href="#">TRACT</a> , <a href="#">CTY_SUB</a> , <a href="#">PLACE</a>
+	<div style="width: 100%;"></div>	<a href="#">Aggregate Travel Time to Work for Commuters</a>	Nominal	1980, 1990, 2000, 2008-2012	<a href="#">NATION</a> , <a href="#">REGION</a> , <a href="#">DIVISION</a> , <a href="#">STATE</a> , <a href="#">COUNTY</a> , <a href="#">TRACT</a> , <a href="#">CTY_SUB</a> , <a href="#">PLACE</a>

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DATA CART

### TIME SERIES TABLE DETAILS

[About time series tables](#)

Table: Ac2. Workers 16 Years and Over by Means of Transportation to Work [18]

Years: 1980, 1990, 2000, 2008-2012

**Geographic integration:** Nominal

**Time series in table (18) :**

- Persons: Worker ~ 16 years and over ~ Car, truck, or van
- Persons: Worker ~ 16 years and over ~ Car, truck, or van--Drove alone
- Persons: Worker ~ 16 years and over ~ Car, truck, or van--Carpooled
- Persons: Worker ~ 16 years and over ~ Car, truck, or van--Carpooled--In 2-person carpool
- Persons: Worker ~ 16 years and over ~ Car, truck, or van--Carpooled--In 3-person carpool
- Persons: Worker ~ 16 years and over ~ Car, truck, or van--Carpooled--In 4-person carpool
- Persons: Worker ~ 16 years and over ~ Car, truck, or van--Carpooled--In 5- or 6-person carpool
- Persons: Worker ~ 16 years and over ~ Car, truck, or van--Carpooled--In 7-or-more-person carpool
- Persons: Worker ~ 16 years and over ~ Public transportation (excluding ferryboat and taxicab)
- Persons: Worker ~ 16 years and over ~ Public transportation (excluding ferryboat and taxicab)--Bus or streetcar
- Persons: Worker ~ 16 years and over ~ Public transportation (excluding ferryboat and taxicab)--Subway or elevated train
- Persons: Worker ~ 16 years and over ~ Public transportation (excluding ferryboat and taxicab)--Railroad
- Persons: Worker ~ 16 years and over ~ Taxicab
- Persons: Worker ~ 16 years and over ~ Motorcycle
- Persons: Worker ~ 16 years and over ~ Bicycle
- Persons: Worker ~ 16 years and over ~ Walked
- Persons: Worker ~ 16 years and over ~ Other means (including ferryboat)
- Persons: Worker ~ 16 years and over ~ Worked at home

**Available geographic levels (4) :**

- State

Aggregate Travel Time to Work for Commuters	Nominal	1980, 1990, 2000, 2008-2012	NATION, REGION, DIVISION, STATE, COUNTY, TRACT, CTY, SUB, PLACE
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<https://www.nhgis.org/documentation/time-series>

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DATA CART

### TIME SERIES TABLE DETAILS

[About time series tables](#)

Table: cs4. Workers of Working Age\* by Means of Transportation to Work [9]

Years: 1970, 1980, 1990, 2000, 2008-2012

**Geographic integration:** Nominal

**Time series in table (9) :**

- Persons: Worker ~ Of working age\* ~ Private auto (1970) or car, truck, or van (since 1980)
- Persons: Worker ~ Of working age\* ~ Public transportation (excluding ferryboat and taxicab)
- Persons: Worker ~ Of working age\* ~ Public transportation (excluding ferryboat and taxicab)--Bus or streetcar
- Persons: Worker ~ Of working age\* ~ Public transportation (excluding ferryboat and taxicab)--Subway or elevated train
- Persons: Worker ~ Of working age\* ~ Public transportation (excluding ferryboat and taxicab)--Railroad
- Persons: Worker ~ Of working age\* ~ Taxicab
- Persons: Worker ~ Of working age\* ~ Walked
- Persons: Worker ~ Of working age\* ~ Other means (including ferryboat, motorcycle, and bicycle)
- Persons: Worker ~ Of working age\* ~ Worked at home

**Available geographic levels (4) :**

- State
- County
- County Subdivision
- Place

**Data sources:**

Dataset	Table
1970 Census: Count 4Pb - Sample-Based Population Data with Race/Ethnicity Breakdown	NT36. Means of Transportation to Work
1980 Census: STF 3 - Sample-Based Data	NT40. Means of Transportation

Aggregate Travel Time to Work for Commuters | Nominal | 1980, 1990, 2000, 2008-2012

<https://www.nhgis.org/documentation/time-series>

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### TIME SERIES TABLE DETAILS

Data sources:

Dataset	Table
1970 Census: Count 4Pb - Sample-Based Population Data with Race/Ethnicity Breakdown	NT36. Means of Transportation to Work
1980 Census: STF 3 - Sample-Based Data	NT40. Means of Transportation to Work
1980 Census: STF 4Pb - Sample-Based Detailed Population Data with Race/Ethnicity Breakdown	NTPB39. Means of Transportation to Work
1990 Census: STF 3 - Sample-Based Data	NP49. Means of Transportation to Work
2000 Census: SF 3a - Sample-Based Data [Areas Larger Than Block Groups]	NP030A. Means of Transportation to Work
2000 Census: SF 3a - Sample-Based Data [Areas Larger Than Block Groups]	NP030C. Means of Public Transportation
2012 American Community Survey: 5-Year Data [2008-2012, Block Groups & Larger Areas]	B08301. Means of Transportation to Work

Notes:

**1970 Negative Values:** The 1970 data for this table may include some negative values, which indicate suppressed data. For more information on 1970 suppression codes, see pp. 3-5 in the Electronic Data Processing (EDP) Series section of the *1970 Census Users' Guide*.

Measured features:

- Persons

Classification dimensions:

- Labor Force and Employment Status

No known comparability issues for this time period.

Aggregate Travel Time to Work for Commuters | Nominal | 1980, 1990, 2000, 2008-2012

COUNTY, TRACT, CITY, SUBDIVISION, STATE, REGION, DIVISION, COUNTY, TRACT, CTY, SUB, PLACE







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- [How to access time series tables](#)
- [An example: \*Persons by Sex\* tables](#)
- [Integration methods](#)
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## WHAT ARE TIME SERIES TABLES?

An NHGIS *time series table* links together comparable statistics from multiple U.S. censuses in one downloadable bundle. A table is comprised of one or more related *time series*, each of

series instance at a single time.

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## CURRENT TABLE DETAILS

For each time series table, NHGIS provides a complete listing of table contents, coverage, and sources, along with notes describing any known comparability issues and links to relevant source documentation. These details can be accessed by clicking on a table name in the [Data Finder](#). The complete set of all table details is also available here:

- [NHGIS Time Series Tables Details](#) (PDF)

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## CREDITS

The initial definition, documentation, and dissemination of NHGIS time series tables was a central component of the Integrated Spatio-Temporal Aggregate Data Series (ISTADS) project at the Minnesota Population Center, with funding provided by the Eunice Kennedy Shriver National Institute of Child Health & Human Development (NICHD) at the National Institutes of Health. Two current grants from the National Science Foundation and the NICHD support the geographic standardization and expansion of NHGIS time series tables.

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POPULARITY	TABLE NAME	GEOGRAPHIC INTEGRATION	YEARS	GEOGRAPHIC LEVELS
	<a href="#">Total Population</a>	Nominal	1970, 1980, 1990, 2000, 2010, 2008-2012	<a href="#">STATE</a> , <a href="#">COUNTY</a> , <a href="#">TRACT</a> , <a href="#">CTY_SUB</a> , <a href="#">PLACE</a>
	<a href="#">Total Population</a>	Nominal	1980, 1990, 2000, 2010, 2008-2012	<a href="#">NATION</a> , <a href="#">REGION</a> , <a href="#">DIVISION</a> , <a href="#">STATE</a> , <a href="#">COUNTY</a> , <a href="#">TRACT</a> , <a href="#">CTY_SUB</a> , <a href="#">PLACE</a>
	<a href="#">Total Population</a>	Standardized to 2010	1990, 2000, 2010	<a href="#">STATE</a> , <a href="#">COUNTY</a> , <a href="#">TRACT</a> , <a href="#">BLCK_GRP</a> , <a href="#">CTY_SUB</a> , <a href="#">PLACE</a> , <a href="#">CD110TH-112TH</a> , <a href="#">CBSA_URB_AREA</a> , <a href="#">ZCTA</a>
	<a href="#">Persons by Urban/Rural Status [4]</a>	Nominal	1980, 1990, 2000, 2010	<a href="#">NATION</a> , <a href="#">REGION</a> , <a href="#">DIVISION</a> , <a href="#">STATE</a> , <a href="#">COUNTY</a> , <a href="#">TRACT</a> , <a href="#">CTY_SUB</a> , <a href="#">PLACE</a>
	<a href="#">Persons by Urban/Rural Status [4]</a>	Standardized to 2010	1990, 2000, 2010	<a href="#">STATE</a> , <a href="#">COUNTY</a> , <a href="#">TRACT</a> , <a href="#">BLCK_GRP</a> , <a href="#">CTY_SUB</a> , <a href="#">PLACE</a> , <a href="#">CD110TH-112TH</a> , <a href="#">CBSA_URB_AREA</a> , <a href="#">ZCTA</a>
	<a href="#">Persons by Sex [2]</a>	Nominal	1970, 1980, 1990, 2000, 2010, 2008-2012	<a href="#">STATE</a> , <a href="#">COUNTY</a> , <a href="#">TRACT</a> , <a href="#">CTY_SUB</a> , <a href="#">PLACE</a>
	<a href="#">Persons by Sex [2]</a>	Standardized to 2010	1990, 2000, 2010	<a href="#">STATE</a> , <a href="#">COUNTY</a> , <a href="#">TRACT</a> , <a href="#">BLCK_GRP</a> , <a href="#">CTY_SUB</a> , <a href="#">PLACE</a> , <a href="#">CD110TH-112TH</a>

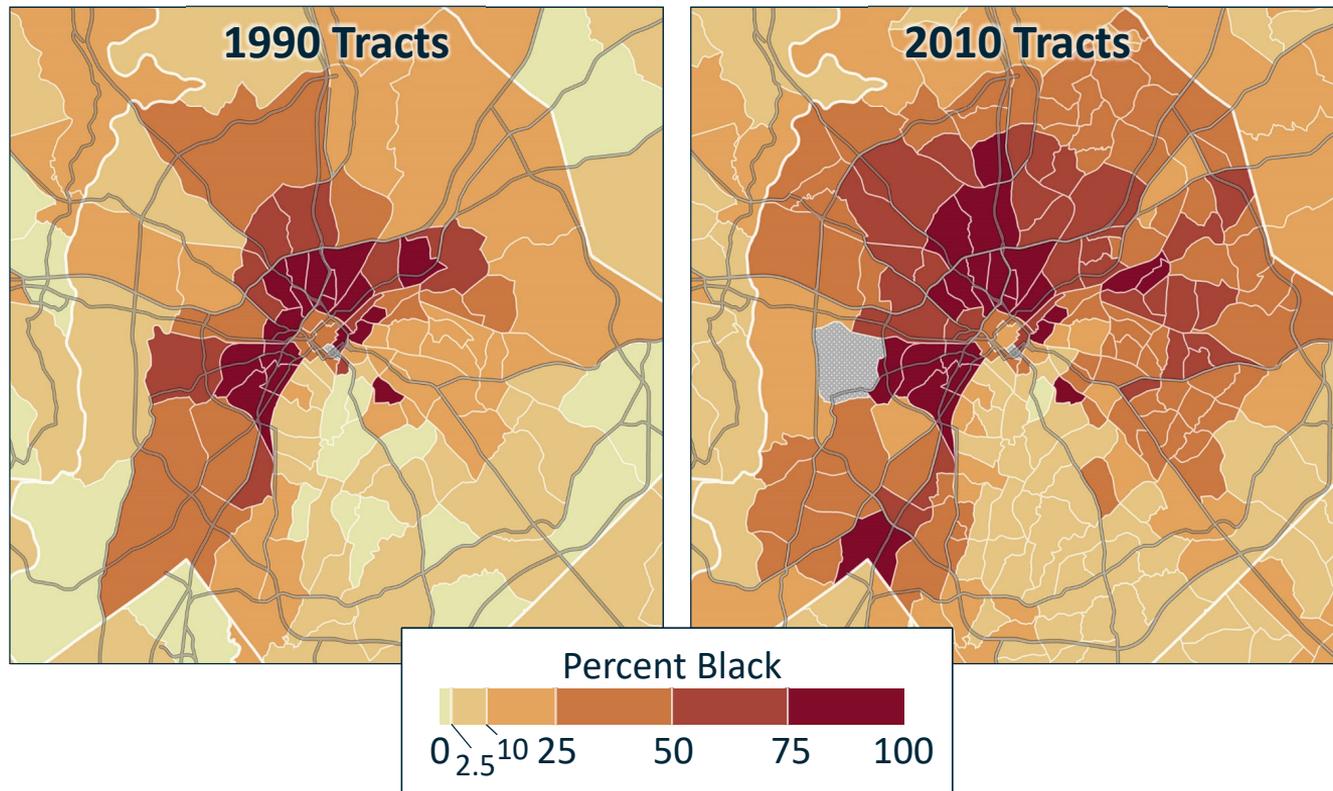
# Nominal integration

	GIS Join Match	State	1970: Persons: Male ~ Never married	1980: Persons: Male ~ Never married	1990: Persons: Male ~ Never married	2000: Persons: Male ~ Never married	2008-2012: Persons: Male ~ Never married	Margin of error: 2008-2012: Persons: Male ~ Never married	1970: Persons: Male ~ Now married	
2	Code	State Name	Code							
3	G010	Alabama	10	324572	375515	406140	444450	584355	4261	792229
4	G020	Alaska	20	38428	53423	67827	78955	105333	1532	69046
5	G040	Arizona	40	170463	286183	409976	581715	876661	5440	410438
6	G050	Arkansas	50	170171	200864	209851	245874	330745	3312	464000
7	G060	California	60	2102965	2938148	4034185	4343790	5778554	18439	4611973
8	G080	Colorado	80	230115	341985	373157	516816	678866	4145	510105
9	G090	Connecticut	90	306085	369471	412921	385888	496941	3768	706908
10	G100	Delaware	100	52624	67052	76997	87154	122851	1650	126479
11	G110	District Of Co	110	99908	112013	118273	112516	142162	1558	142605
12	G120	Florida	120	596651	950049	1336469	1702648	2553294	14356	1687636
13	G130	Georgia	130	446917	564696	716125	940487	1299191	7312	1050444
14	G150	Hawaii	150	104625	137448	152188	166715	205985	2060	169920
15	G160	Idaho	160	69395	86794	91380	128613	172169	2427	169553
16	G170	Illinois	170	1115952	1318480	1395167	1495795	1838840	9371	2542632
17	G180	Indiana	180	477592	541264	569459	643222	814989	5228	1222896
18	G190	Iowa	190	271540	301518	281081	318000	375129	2818	665781
19	G200	Kansas	200	223168	241362	244866	281338	345753	3010	542632
20	G210	Kentucky	210	318856	358353	361278	401465	518929	4039	757239
21	G220	Louisiana	220	370838	450684	464285	514633	633702	4170	793188
22	G230	Maine	230	97253	116576	126930	132473	163254	1650	227135
23	G240	Maryland	240	392646	501319	587368	610852	814952	4997	906860
24	G250	Massachusetts	250	622162	743825	832633	817954	981462	5728	1243732
25	G260	Michigan	260	872687	1036241	1078995	1159693	1352844	6714	2021198
26	G270	Minnesota	270	403762	484050	504483	591866	716441	4620	849440
27	G280	Mississippi	280	222569	252992	275422	319922	388559	3394	480663

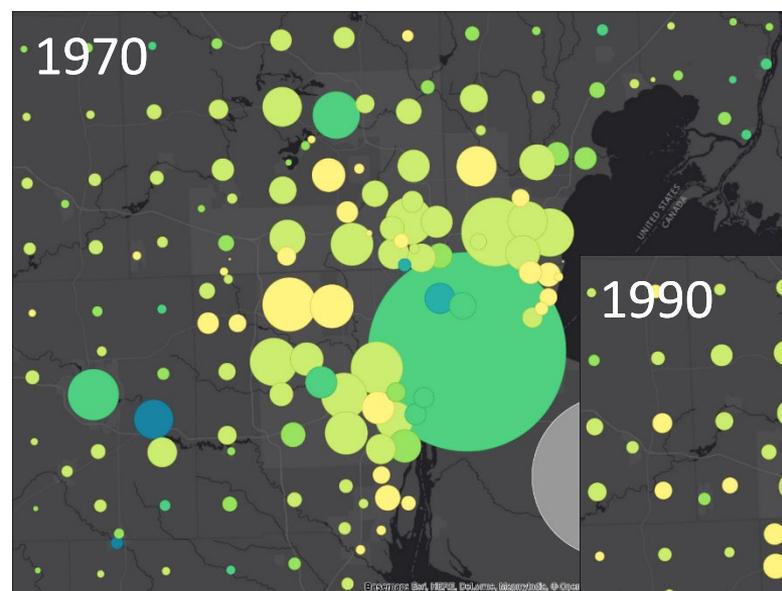
# Nominal integration

2	NHGIS Integrated Geographic Unit Code	NHGIS Integrated State Name	FIPS State Code	NHGIS Integrated State Code	NHGIS Integrated County Name	FIPS County Code	NHGIS Integrated County Code	NHGIS Integrated Census Tract Code	1970: Persons: Total	1980: Persons: Total	1990: Persons: Total	2000: Persons: Total	2010: Persons: Total
73390	G3701190001400	North Carolina	37	370	Mecklenburg	119	1190	1400	3338	2799	2400	2656	2607
73391	G3701190001501	North Carolina	37	370	Mecklenburg	119	1190	1501	4660	6891	9260		
73392	G3701190001502	North Carolina	37	370	Mecklenburg	119	1190	1502	7506				
73393	G3701190001503	North Carolina	37	370	Mecklenburg	119	1190	1503		5047	7081	9191	
73394	G3701190001504	North Carolina	37	370	Mecklenburg	119	1190	1504		4728	4629	4806	6401
73395	G3701190001505	North Carolina	37	370	Mecklenburg	119	1190	1505				2906	3678
73396	G3701190001506	North Carolina	37	370	Mecklenburg	119	1190	1506				6423	
73397	G3701190001507	North Carolina	37	370	Mecklenburg	119	1190	1507					4004
73398	G3701190001508	North Carolina	37	370	Mecklenburg	119	1190	1508					6061
73399	G3701190001509	North Carolina	37	370	Mecklenburg	119	1190	1509					2976
73400	G3701190001510	North Carolina	37	370	Mecklenburg	119	1190	1510					3047
73401	G3701190001601	North Carolina	37	370	Mecklenburg	119	1190	1601	7408				
73402	G3701190001602	North Carolina	37	370	Mecklenburg	119	1190	1602	5815	5401	6735	8346	
73403	G3701190001603	North Carolina	37	370	Mecklenburg	119	1190	1603		3351	3675	4082	4598
73404	G3701190001604	North Carolina	37	370	Mecklenburg	119	1190	1604		4028	6191	6993	
73405	G3701190001605	North Carolina	37	370	Mecklenburg	119	1190	1605					1776
73406	G3701190001606	North Carolina	37	370	Mecklenburg	119	1190	1606					4295
73407	G3701190001607	North Carolina	37	370	Mecklenburg	119	1190	1607					2613
73408	G3701190001608	North Carolina	37	370	Mecklenburg	119	1190	1608					3933
73409	G3701190001609	North Carolina	37	370	Mecklenburg	119	1190	1609					3168
73410	G3701190001700	North Carolina	37	370	Mecklenburg	119	1190	1700	6784	7399			
73411	G3701190001701	North Carolina	37	370	Mecklenburg	119	1190	1701				4111	3749
73412	G3701190001702	North Carolina	37	370	Mecklenburg	119	1190	1702				5151	4881
73413	G3701190001798	North Carolina	37	370	Mecklenburg	119	1190	1798			7840		
73414	G3701190001800	North Carolina	37	370	Mecklenburg	119	1190	1800	5485	4031		4380	

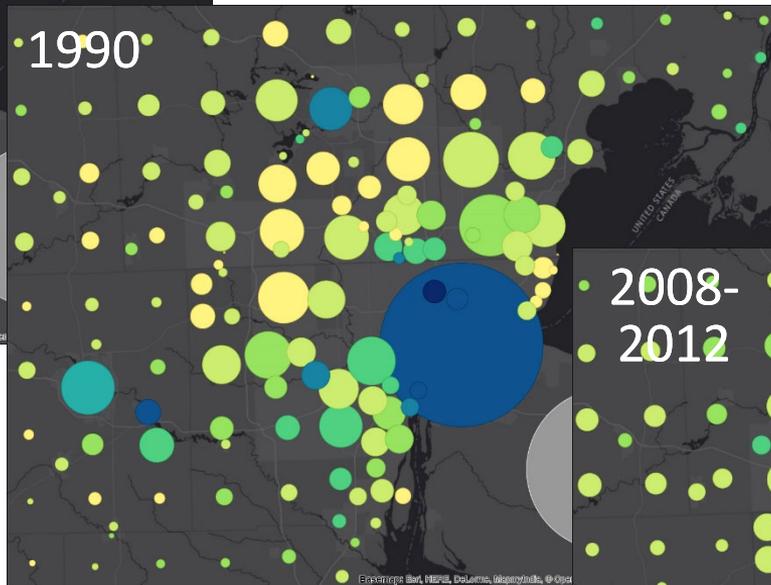
# Racial Segregation in Charlotte, NC



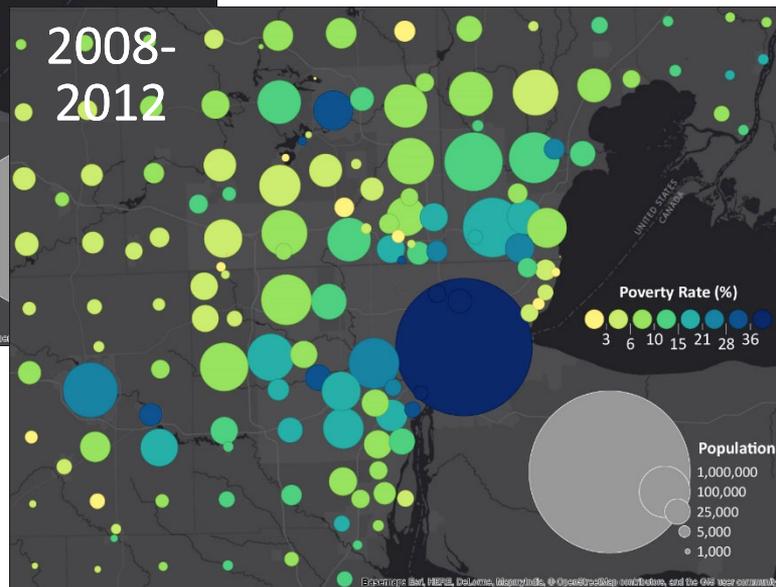
1970



1990

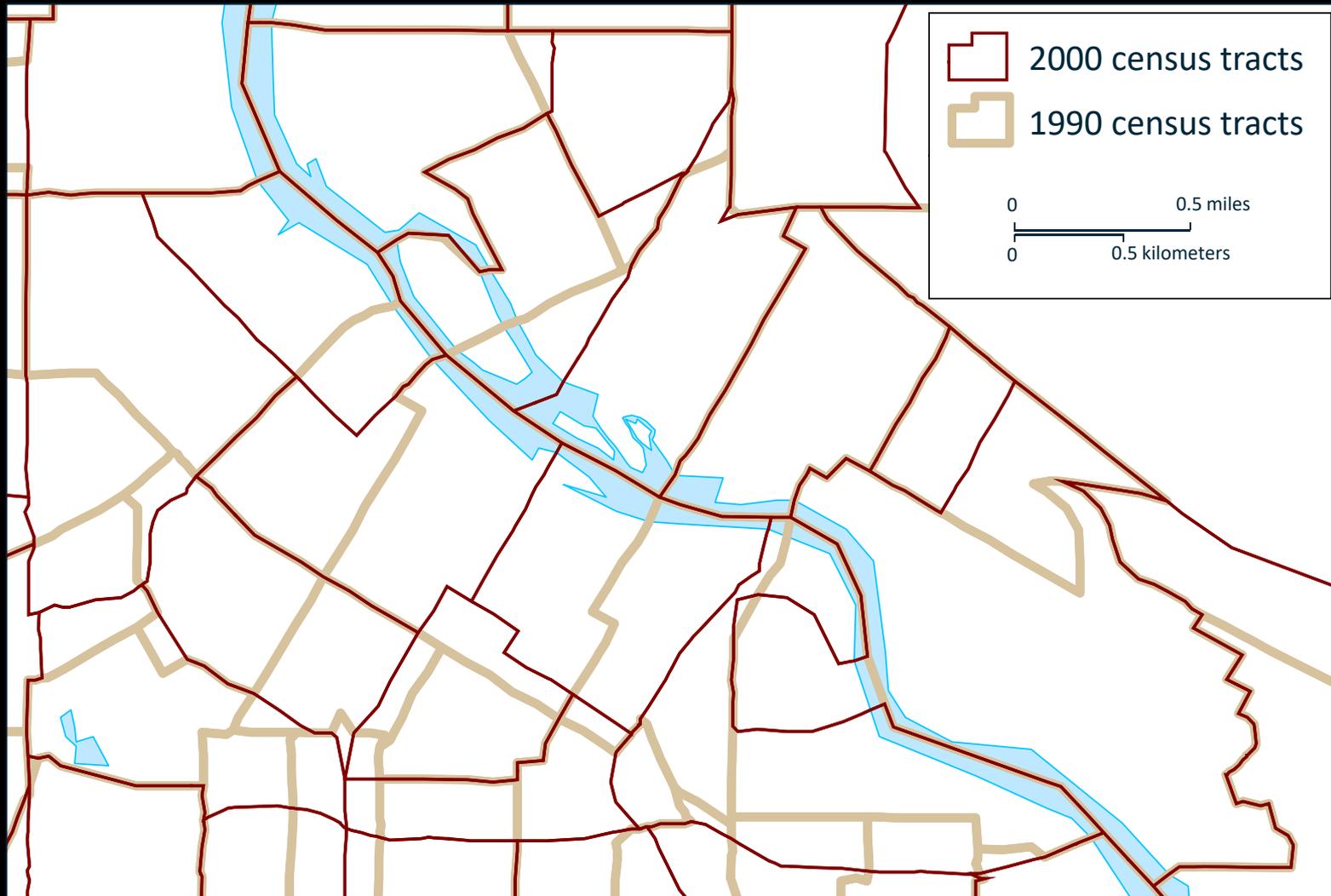


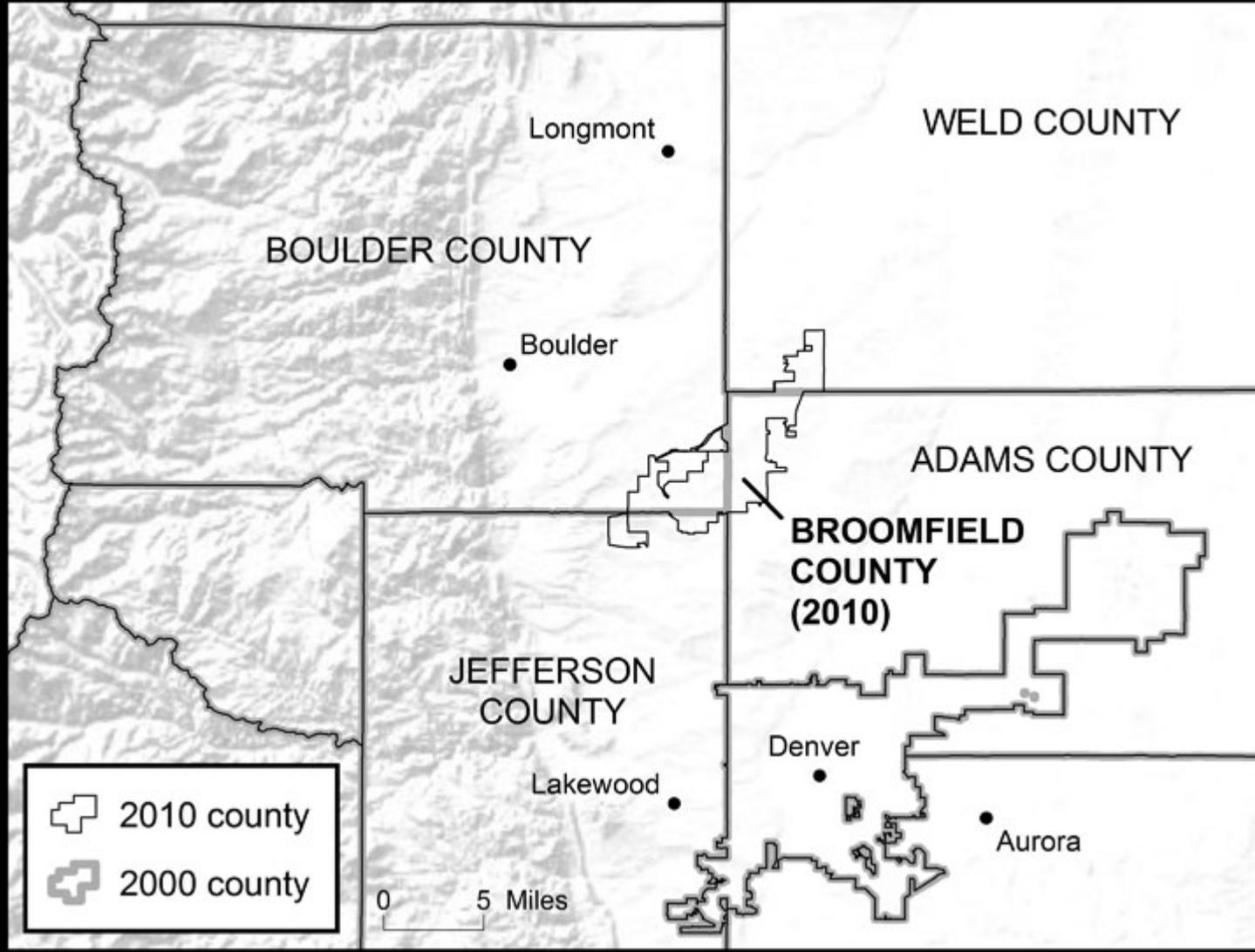
2008-  
2012



# Detroit Area Poverty Rates by County Subdivision

How to  
measure  
population  
changes?

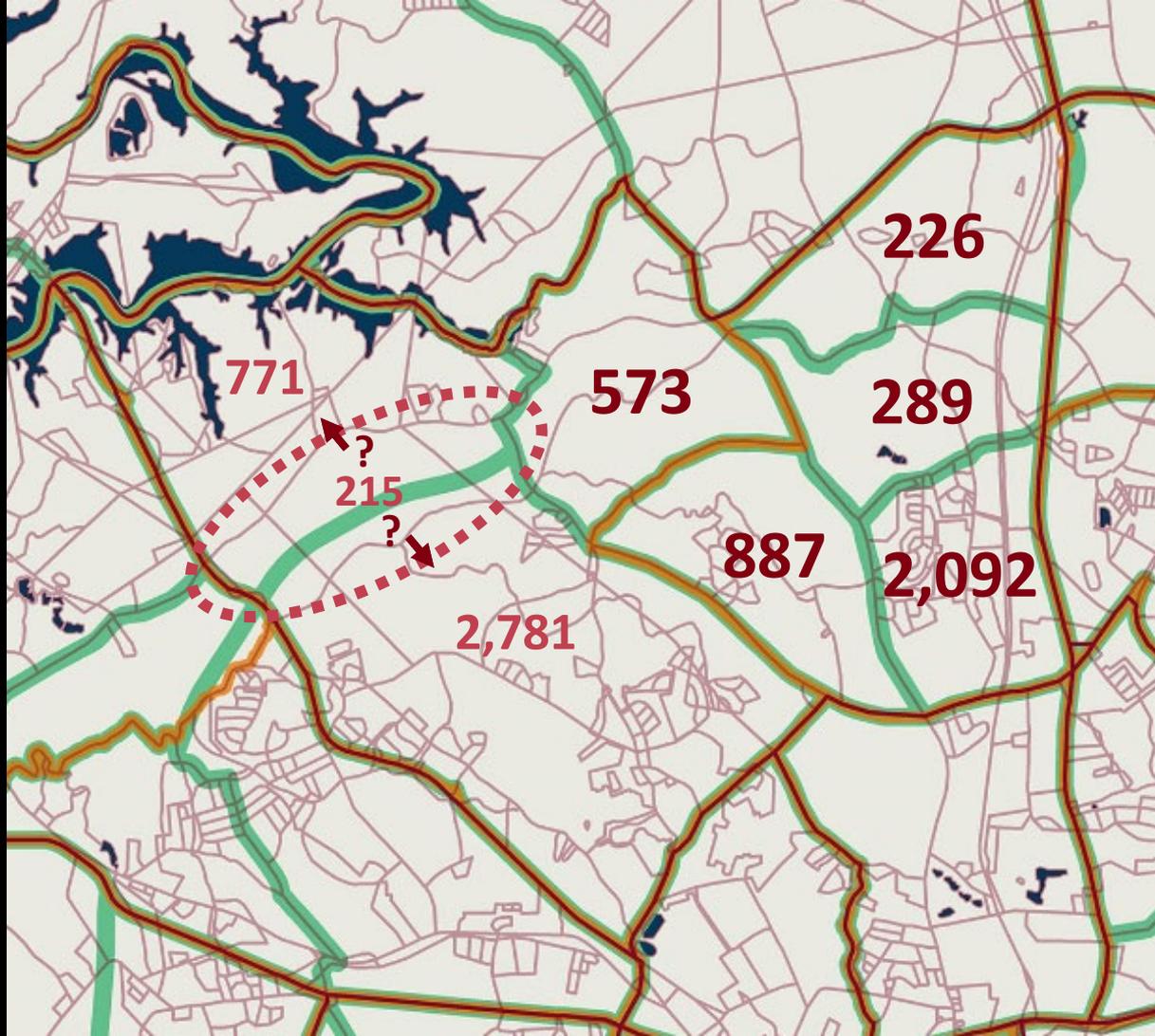
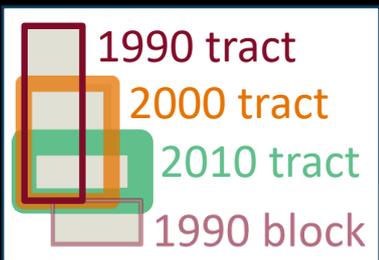




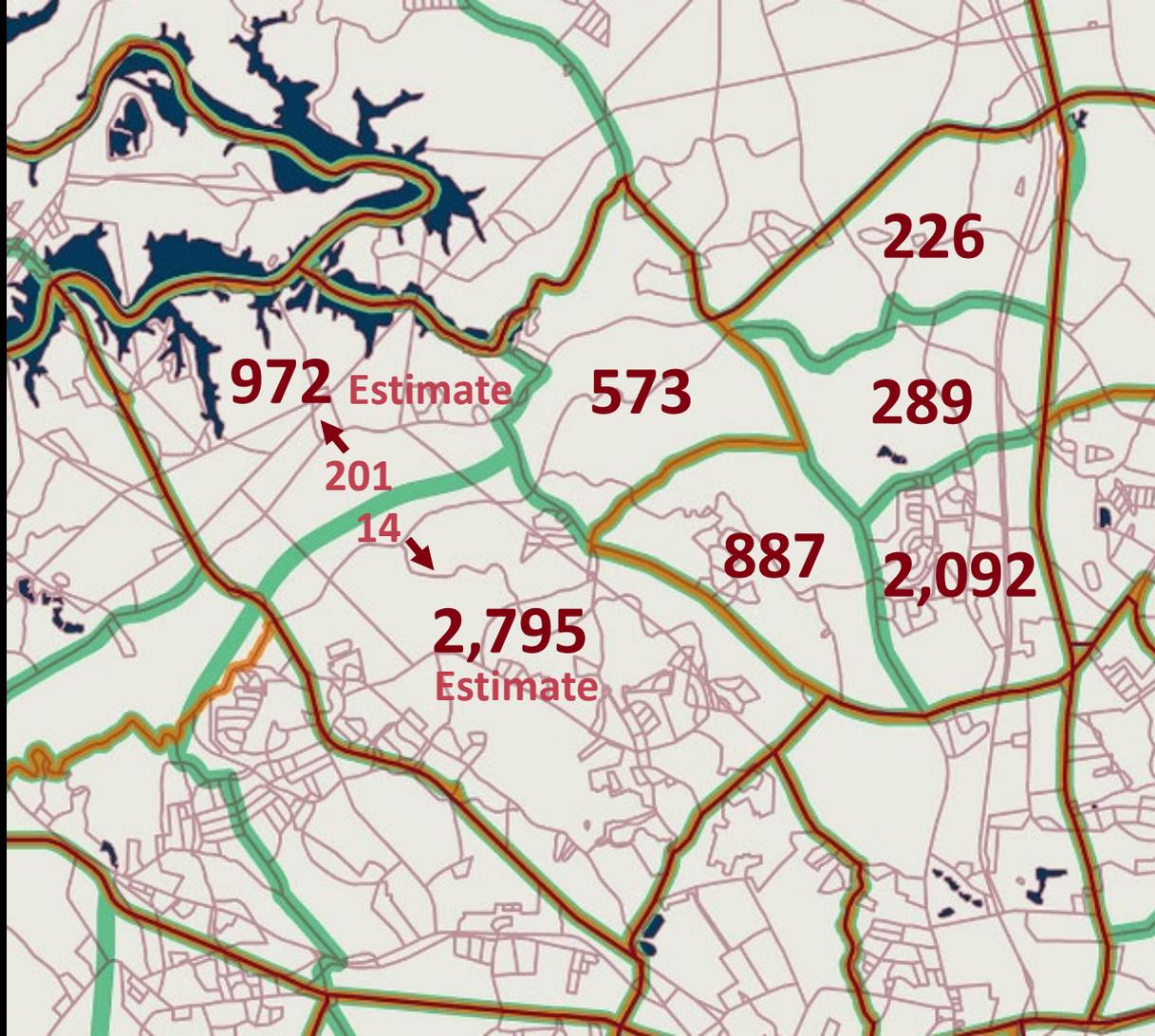
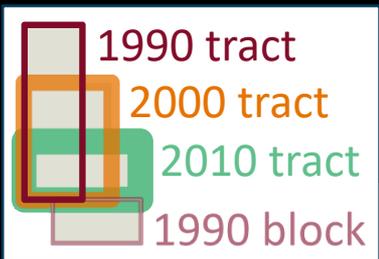
# Geographic standardization

2	GIS Join Match Code	Geography Year	State Name	State Code	County Name	County Code	Census Tract Code	1990: Persons: Total	Lower bound: 1990: Persons: Total	Upper bound: 1990: Persons: Total	2000: Persons: Total	Lower bound: 2000: Persons: Total	Upper bound: 2000: Persons: Total	2010: Persons: Total
49315	G3701190001400	2010	North Carolina	37	Mecklenburg Co	119	1400	2389.68	2366	2391	2652.31	2640	2653	2607
49316	G3701190001504	2010	North Carolina	37	Mecklenburg Co	119	1504	4629	4629	4629	4806	4806	4806	6401
49317	G3701190001505	2010	North Carolina	37	Mecklenburg Co	119	1505	2901	2901	2901	2906	2906	2906	3678
49318	G3701190001507	2010	North Carolina	37	Mecklenburg Co	119	1507	3419	3419	3419	4791	4791	4791	4004
49319	G3701190001508	2010	North Carolina	37	Mecklenburg Co	119	1508	3662	3662	3662	4400	4400	4400	6061
49320	G3701190001509	2010	North Carolina	37	Mecklenburg Co	119	1509	3213	3213	3213	3229	3229	3229	2976
49321	G3701190001510	2010	North Carolina	37	Mecklenburg Co	119	1510	3146.1	3146	3211	3194.36	3194	3367	3047
49322	G3701190001603	2010	North Carolina	37	Mecklenburg Co	119	1603	3660	3660	3660	4065	4065	4065	4598
49323	G3701190001605	2010	North Carolina	37	Mecklenburg Co	119	1605	1389	1389	1389	1978	1978	1978	1776
49324	G3701190001606	2010	North Carolina	37	Mecklenburg Co	119	1606	3822	3822	3822	4154	4154	4154	4295
49325	G3701190001607	2010	North Carolina	37	Mecklenburg Co	119	1607	1524	1524	1524	2214	2214	2214	2613
49326	G3701190001608	2010	North Carolina	37	Mecklenburg Co	119	1608	3872	3872	3872	4321	4321	4321	3933
49327	G3701190001609	2010	North Carolina	37	Mecklenburg Co	119	1609	2251.16	1687	2334	2445.55	2137	2635	3168
49328	G3701190001701	2010	North Carolina	37	Mecklenburg Co	119	1701	3303	3303	3303	4111	4111	4111	3749
49329	G3701190001702	2010	North Carolina	37	Mecklenburg Co	119	1702	4537	4537	4537	5151	5151	5151	4881
49330	G3701190001801	2010	North Carolina	37	Mecklenburg Co	119	1801	1813.95	1349	1814	1706.96	1702	1707	1249
49331	G3701190001802	2010	North Carolina	37	Mecklenburg Co	119	1802	2775	2775	2775	2673	2673	2673	2892
49332	G3701190001910	2010	North Carolina	37	Mecklenburg Co	119	1910	4277	4277	4277	4614	4614	4614	5117
49333	G3701190001911	2010	North Carolina	37	Mecklenburg Co	119	1911	4613	4613	4613	5041	5041	5041	5441
49334	G3701190001912	2010	North Carolina	37	Mecklenburg Co	119	1912	5096.84	5014	5661	5506.45	5317	5815	6565
49335	G3701190001914	2010	North Carolina	37	Mecklenburg Co	119	1914	3295	3295	3295	3965	3965	3965	3485
49336	G3701190001915	2010	North Carolina	37	Mecklenburg Co	119	1915	4403	4403	4403	5460	5460	5460	6293
49337	G3701190001916	2010	North Carolina	37	Mecklenburg Co	119	1916	3003.8	2465	3050	3005.23	2508	3009	3725
49338	G3701190001917	2010	North Carolina	37	Mecklenburg Co	119	1917	3050.2	3004	3589	3294.77	3291	3792	3567
49339	G3701190001918	2010	North Carolina	37	Mecklenburg Co	119	1918	2842.4	698	3700	3129	3129	3129	3527
49340	G3701190001919	2010	North Carolina	37	Mecklenburg Co	119	1919	3243.6	2386	5388	3837	3837	3837	3379

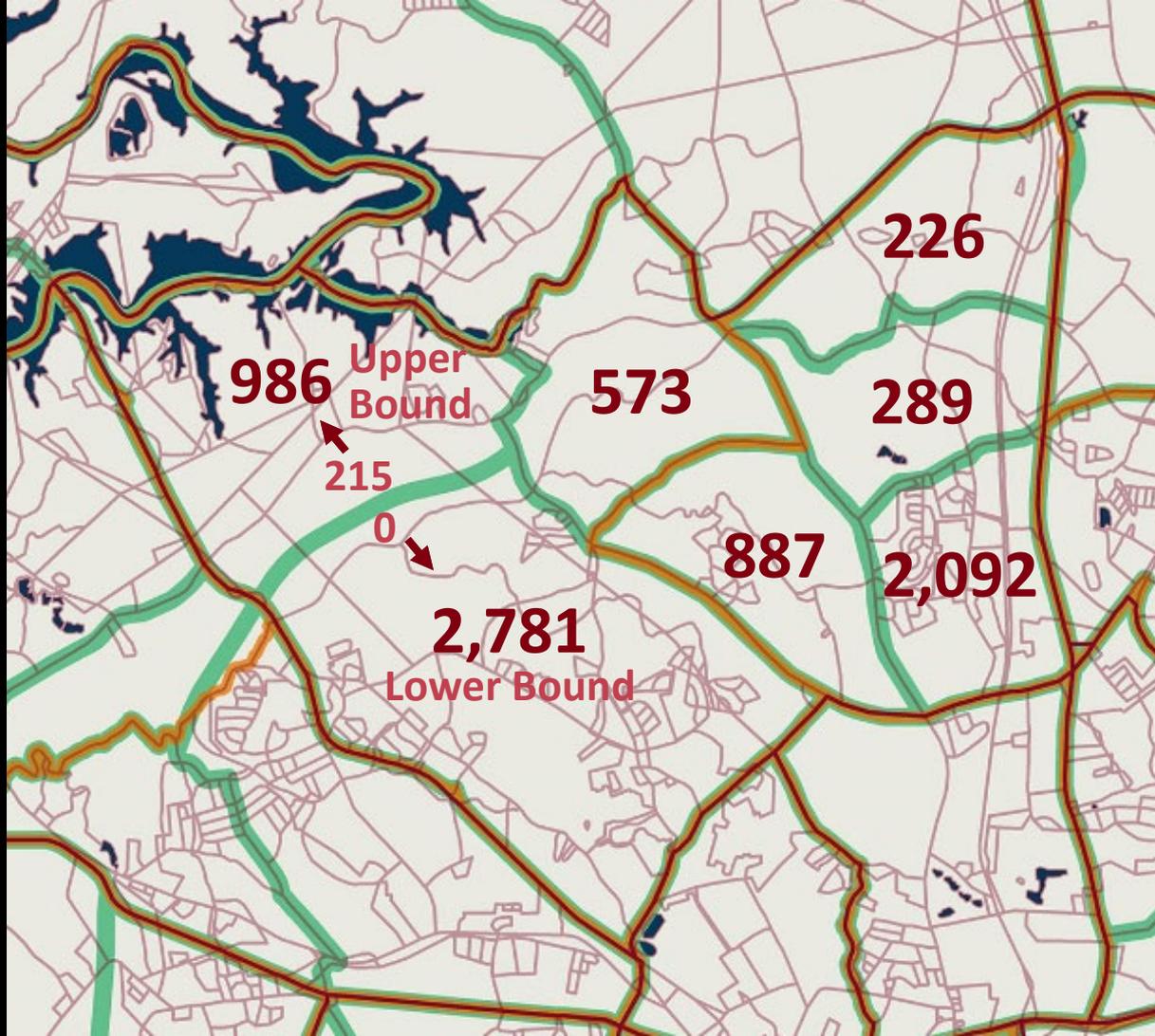
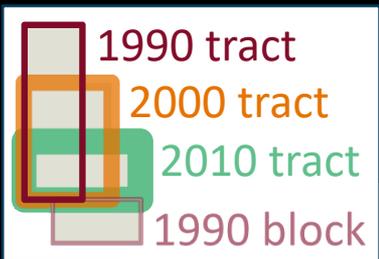
# 1990 populations of 2010 tracts?



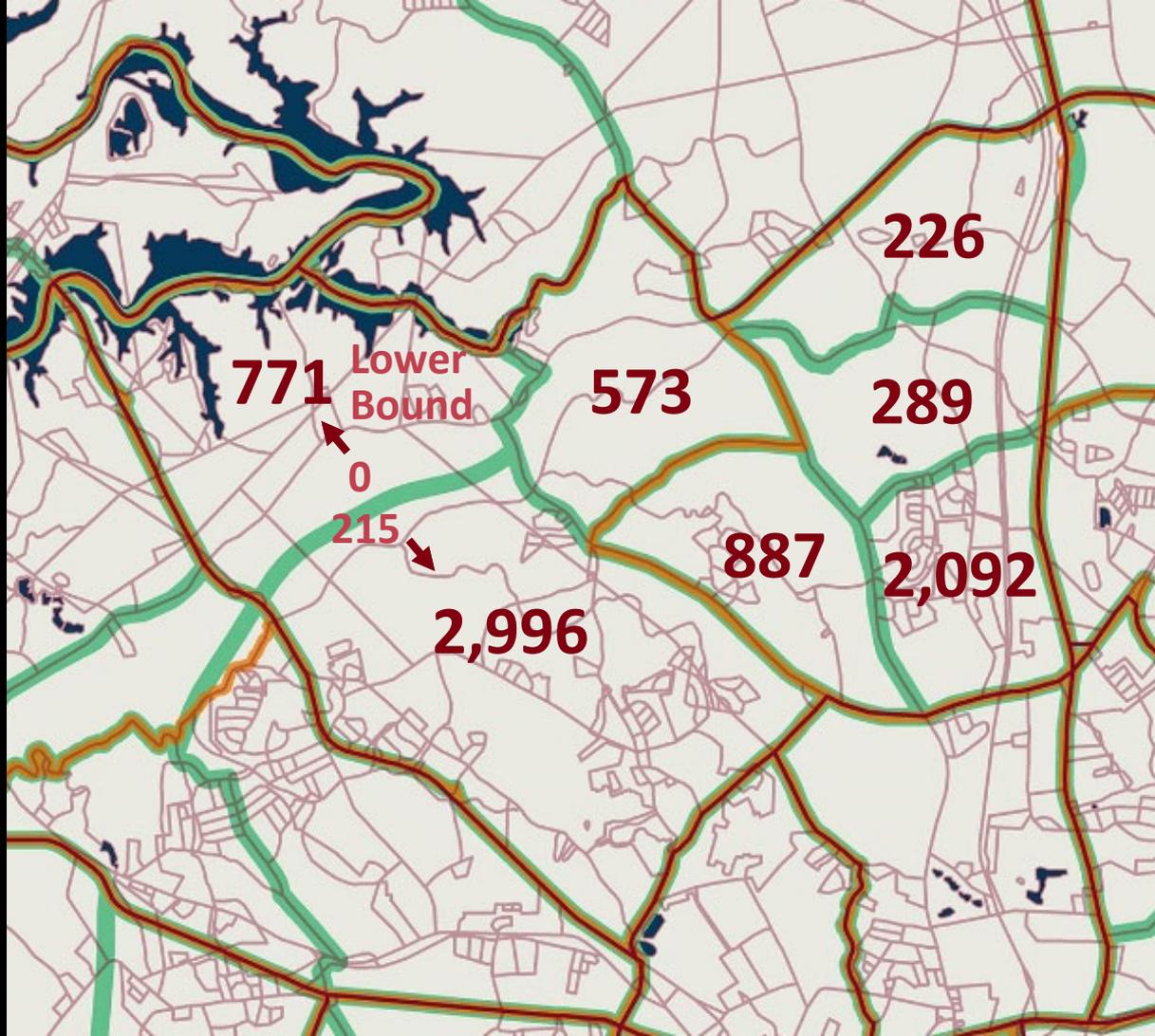
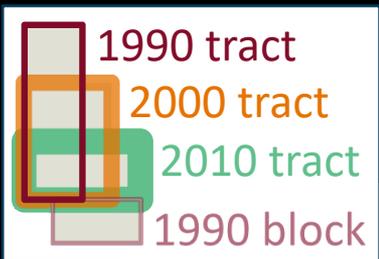
# 1990 populations of 2010 tracts?



# 1990 populations of 2010 tracts?



# 1990 populations of 2010 tracts?



# Geographic standardization

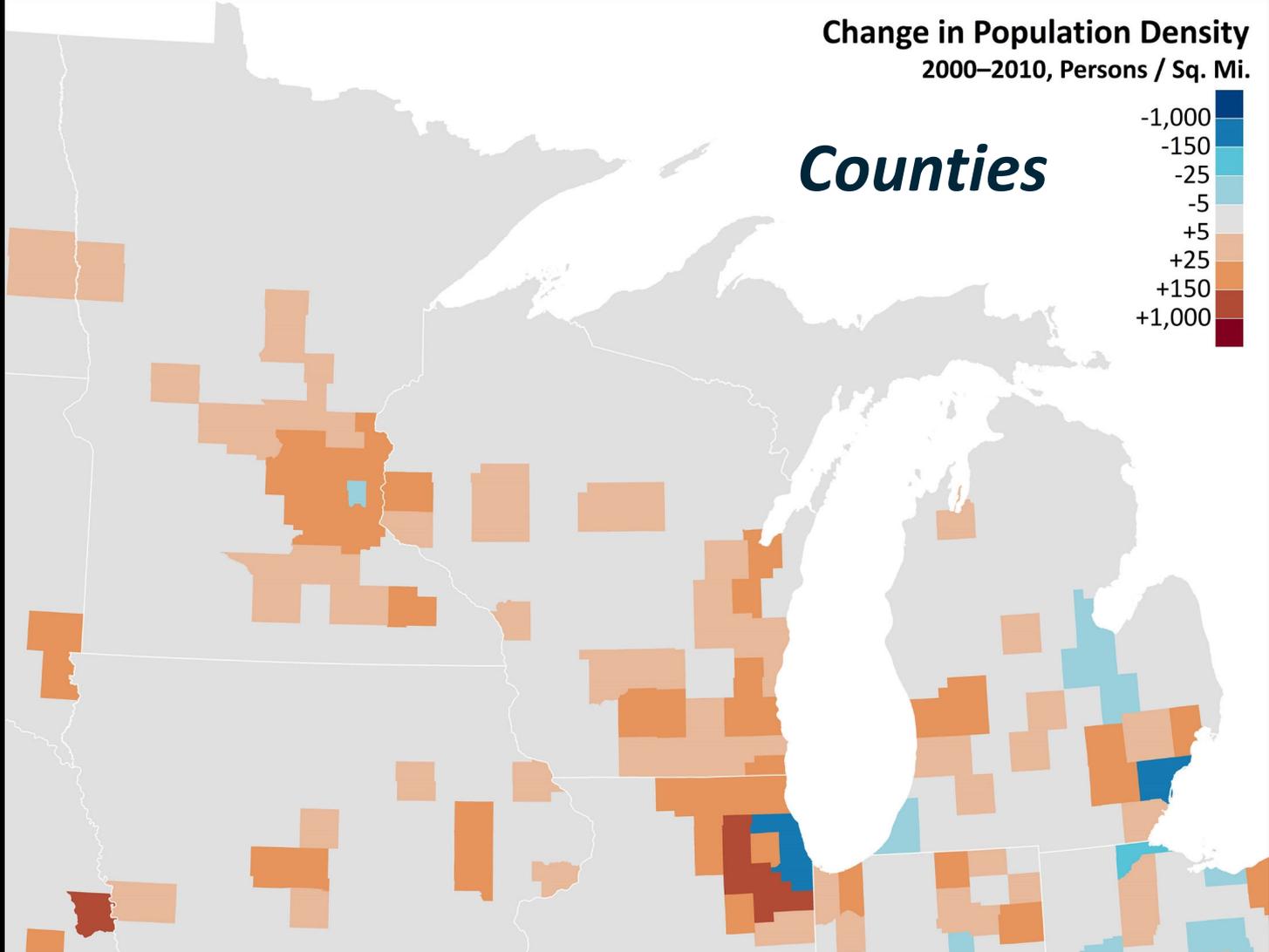
2	GIS Join Match Code	Geography Year	State State Name	State Code	County County Name	County Code	Census Tract Code	1990: Persons: Total	Lower bound: 1990: Persons: Total	Upper bound: 1990: Persons: Total	2000: Persons: Total	Lower bound: 2000: Persons: Total	Upper bound: 2000: Persons: Total	2010: Persons: Total
49315	G3701190001400	2010	North Carolina	37	Mecklenburg Co	119	1400	2389.68	2366	2391	2652.31	2640	2653	2607
49316	G3701190001504	2010	North Carolina	37	Mecklenburg Co	119	1504	4629	4629	4629	4806	4806	4806	6401
49317	G3701190001505	2010	North Carolina	37	Mecklenburg Co	119	1505	2901	2901	2901	2906	2906	2906	3678
49318	G3701190001507	2010	North Carolina	37	Mecklenburg Co	119	1507	3419	3419	3419	4791	4791	4791	4004
49319	G3701190001508	2010	North Carolina	37	Mecklenburg Co	119	1508	3662	3662	3662	4400	4400	4400	6061
49320	G3701190001509	2010	North Carolina	37	Mecklenburg Co	119	1509	3213	3213	3213	3229	3229	3229	2976
49321	G3701190001510	2010	North Carolina	37	Mecklenburg Co	119	1510	3146.1	3146	3211	3194.36	3194	3367	3047
49322	G3701190001603	2010	North Carolina	37	Mecklenburg Co	119	1603	3660	3660	3660	4065	4065	4065	4598
49323	G3701190001605	2010	North Carolina	37	Mecklenburg Co	119	1605	1389	1389	1389	1978	1978	1978	1776
49324	G3701190001606	2010	North Carolina	37	Mecklenburg Co	119	1606	3822	3822	3822	4154	4154	4154	4295
49325	G3701190001607	2010	North Carolina	37	Mecklenburg Co	119	1607	1524	1524	1524	2214	2214	2214	2613
49326	G3701190001608	2010	North Carolina	37	Mecklenburg Co	119	1608	3872	3872	3872	4321	4321	4321	3933
49327	G3701190001609	2010	North Carolina	37	Mecklenburg Co	119	1609	2251.16	1687	2334	2445.55	2137	2635	3168
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49329	G3701190001702	2010	North Carolina	37	Mecklenburg Co	119	1702	4537	4537	4537	5151	5151	5151	4881
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49332	G3701190001910	2010	North Carolina	37	Mecklenburg Co	119	1910	4277	4277	4277	4614	4614	4614	5117
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49334	G3701190001912	2010	North Carolina	37	Mecklenburg Co	119	1912	5096.84	5014	5661	5506.45	5317	5815	6565
49335	G3701190001914	2010	North Carolina	37	Mecklenburg Co	119	1914	3295	3295	3295	3965	3965	3965	3485
49336	G3701190001915	2010	North Carolina	37	Mecklenburg Co	119	1915	4403	4403	4403	5460	5460	5460	6293
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49338	G3701190001917	2010	North Carolina	37	Mecklenburg Co	119	1917	3050.2	3004	3589	3294.77	3291	3792	3567
49339	G3701190001918	2010	North Carolina	37	Mecklenburg Co	119	1918	2842.4	698	3700	3129	3129	3129	3527
49340	G3701190001919	2010	North Carolina	37	Mecklenburg Co	119	1919	3243.6	2386	5388	3837	3837	3837	3379

# Geographically standardized time series

- 1990, 2000 & 2010 data for 2010 units
- 10 geographic levels: states, counties, tracts, block groups, county subdivisions, places, congressional districts, CBSAs, urban areas, ZCTAs
- ~1,600 time series in 109 tables
- “Short-form” counts only
  - Race, ethnicity, age, sex, household size & relationships, housing occupancy & tenure
  - *Not* income, education, employment, ...

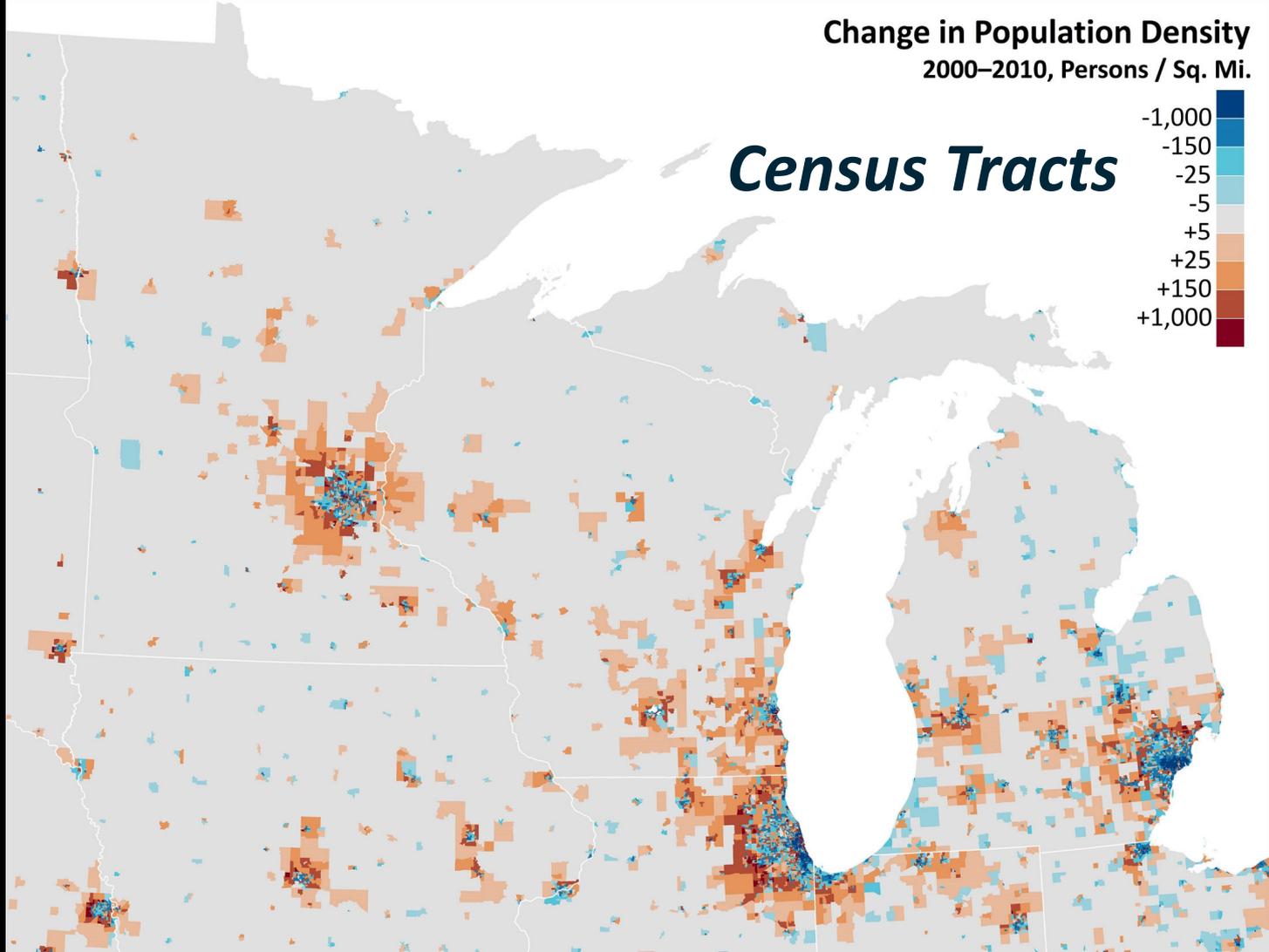
**Change in Population Density**  
2000–2010, Persons / Sq. Mi.

***Counties***



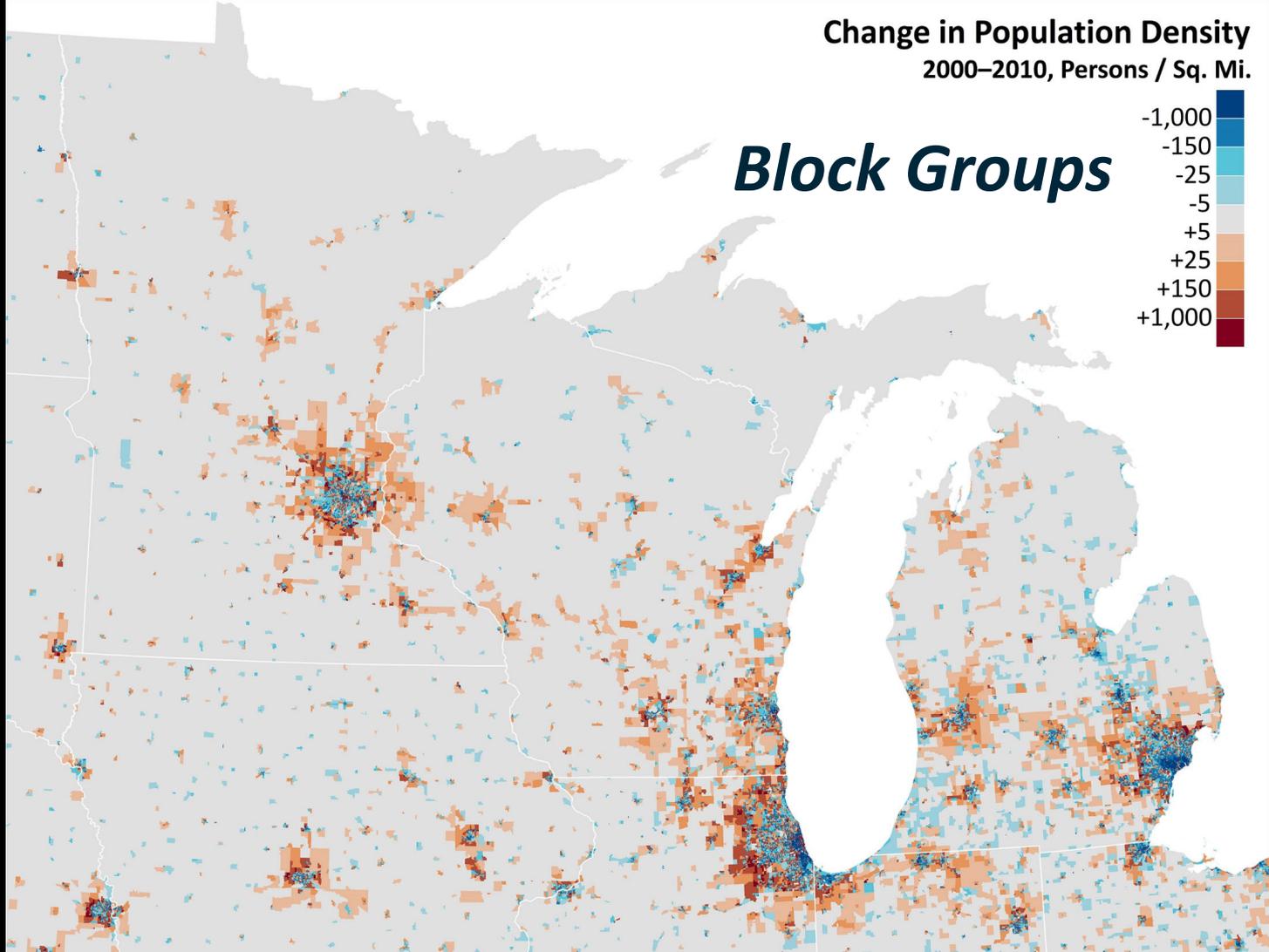
Change in Population Density  
2000–2010, Persons / Sq. Mi.

# *Census Tracts*



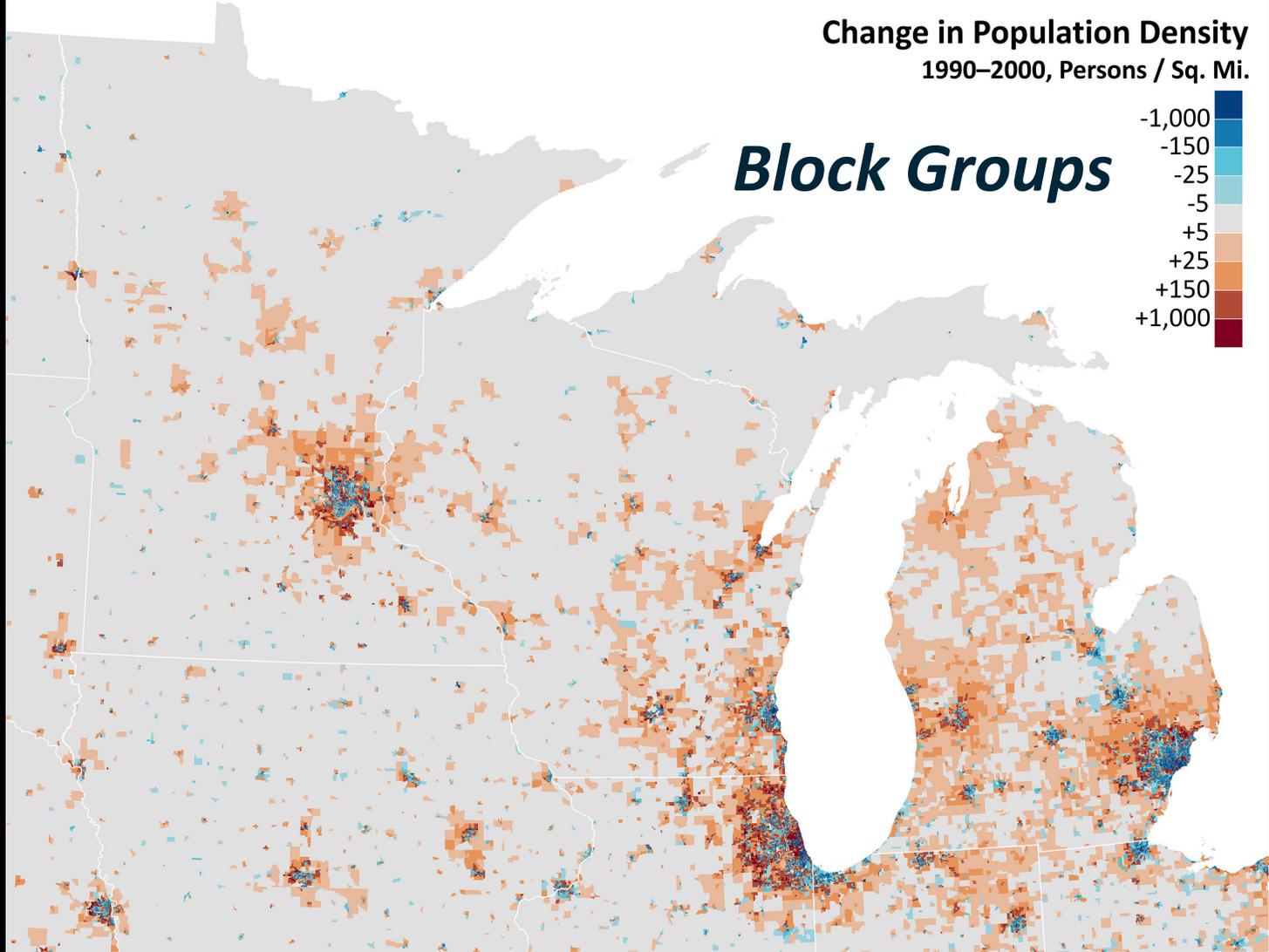
Change in Population Density  
2000–2010, Persons / Sq. Mi.

*Block Groups*

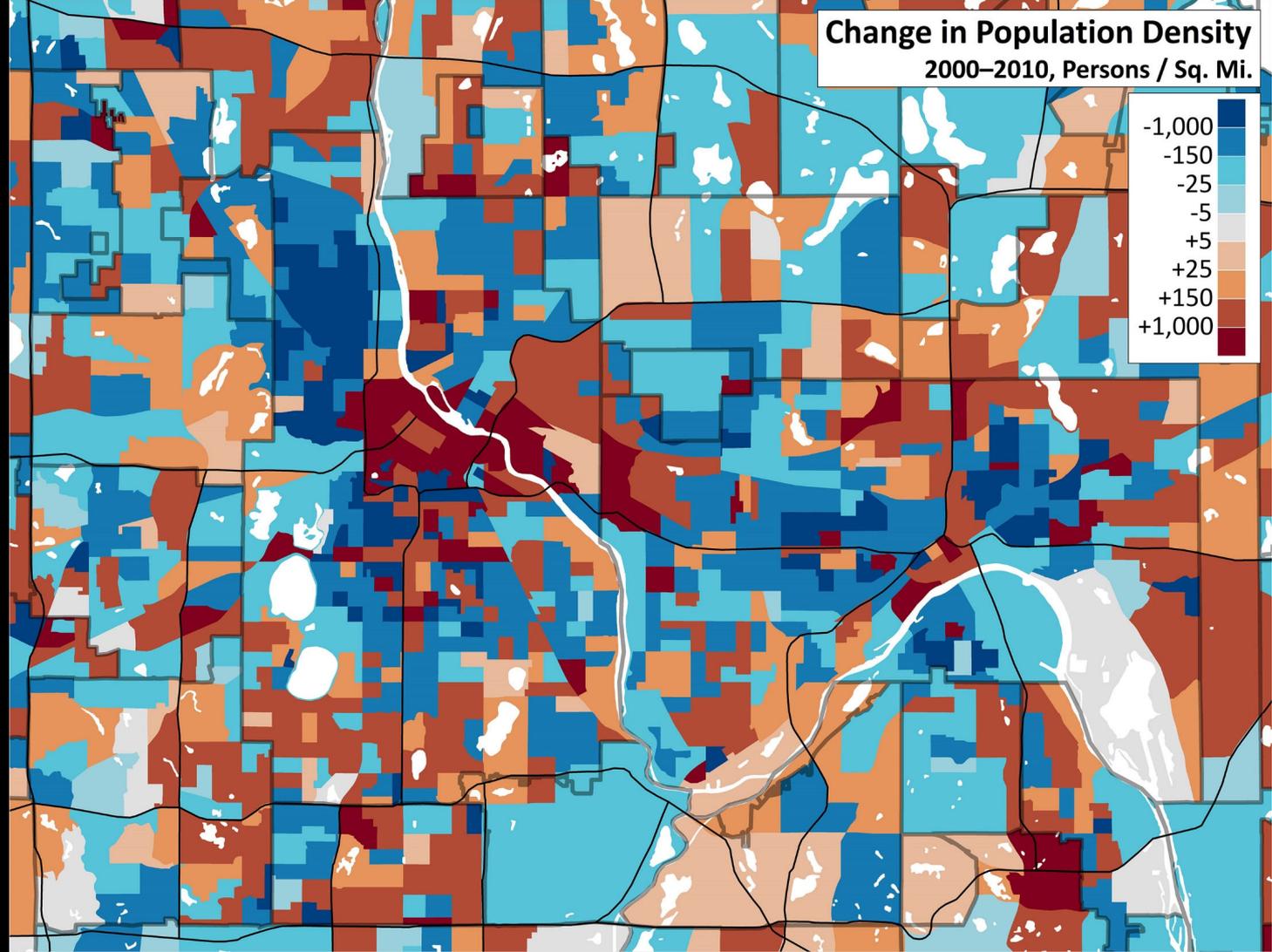
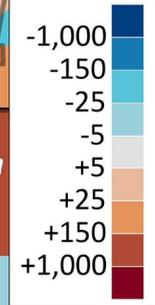


Change in Population Density  
1990–2000, Persons / Sq. Mi.

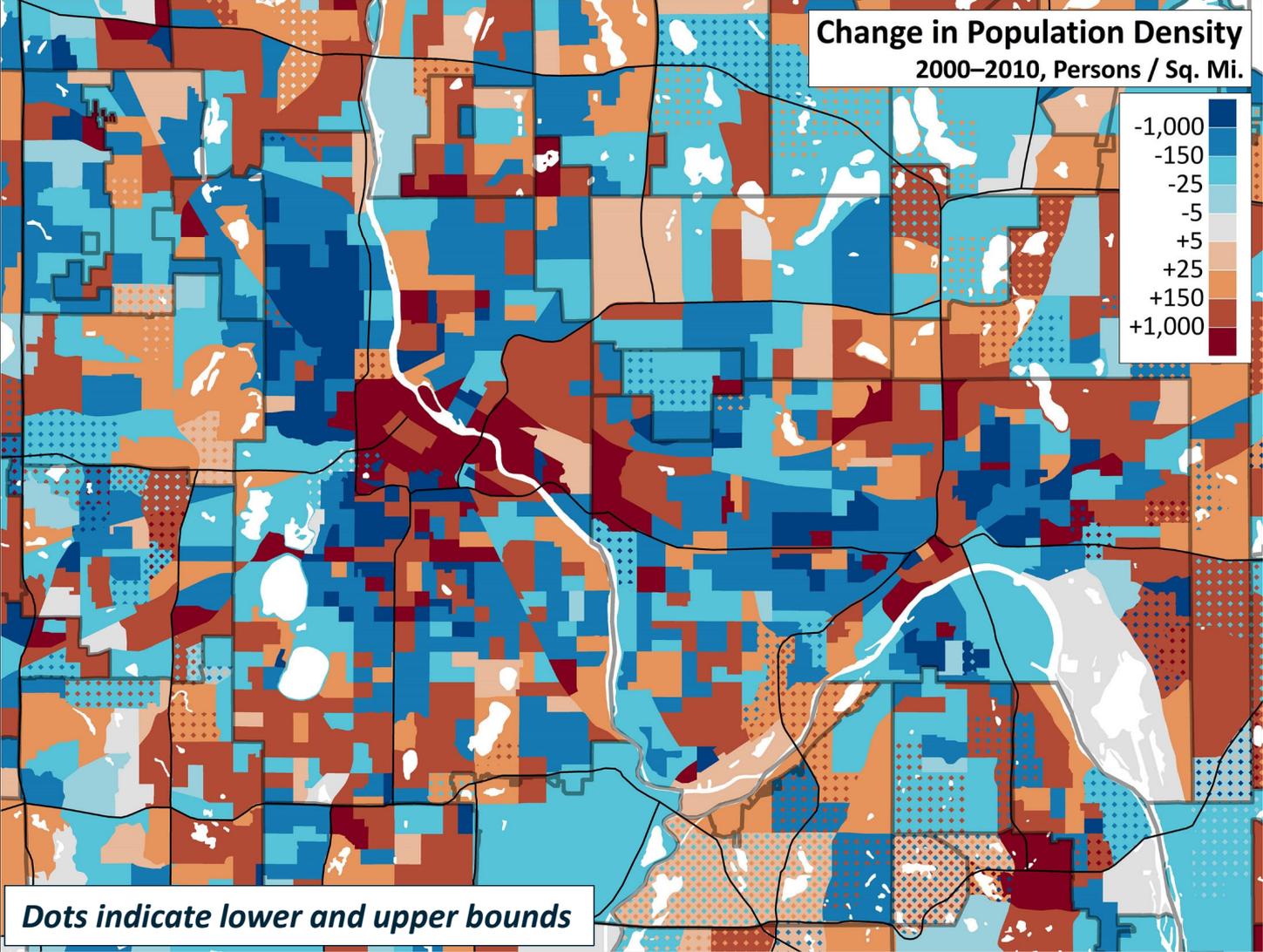
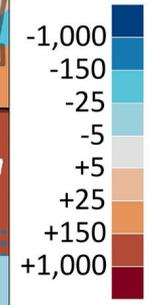
*Block Groups*



# Change in Population Density 2000–2010, Persons / Sq. Mi.



# Change in Population Density 2000–2010, Persons / Sq. Mi.



*Dots indicate lower and upper bounds*

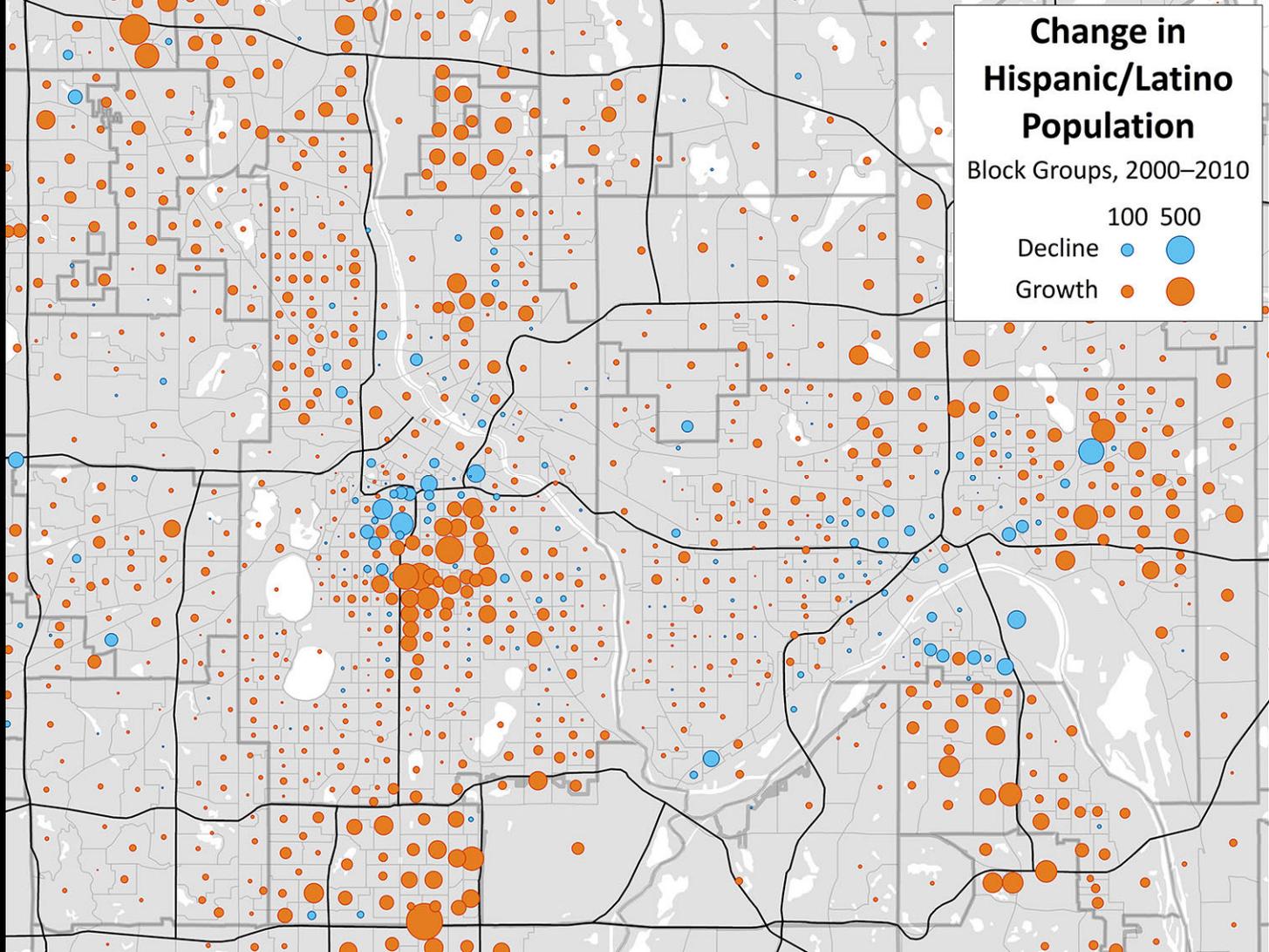
# Change in Hispanic/Latino Population

Block Groups, 2000–2010

100 500

Decline ● ●

Growth ● ●



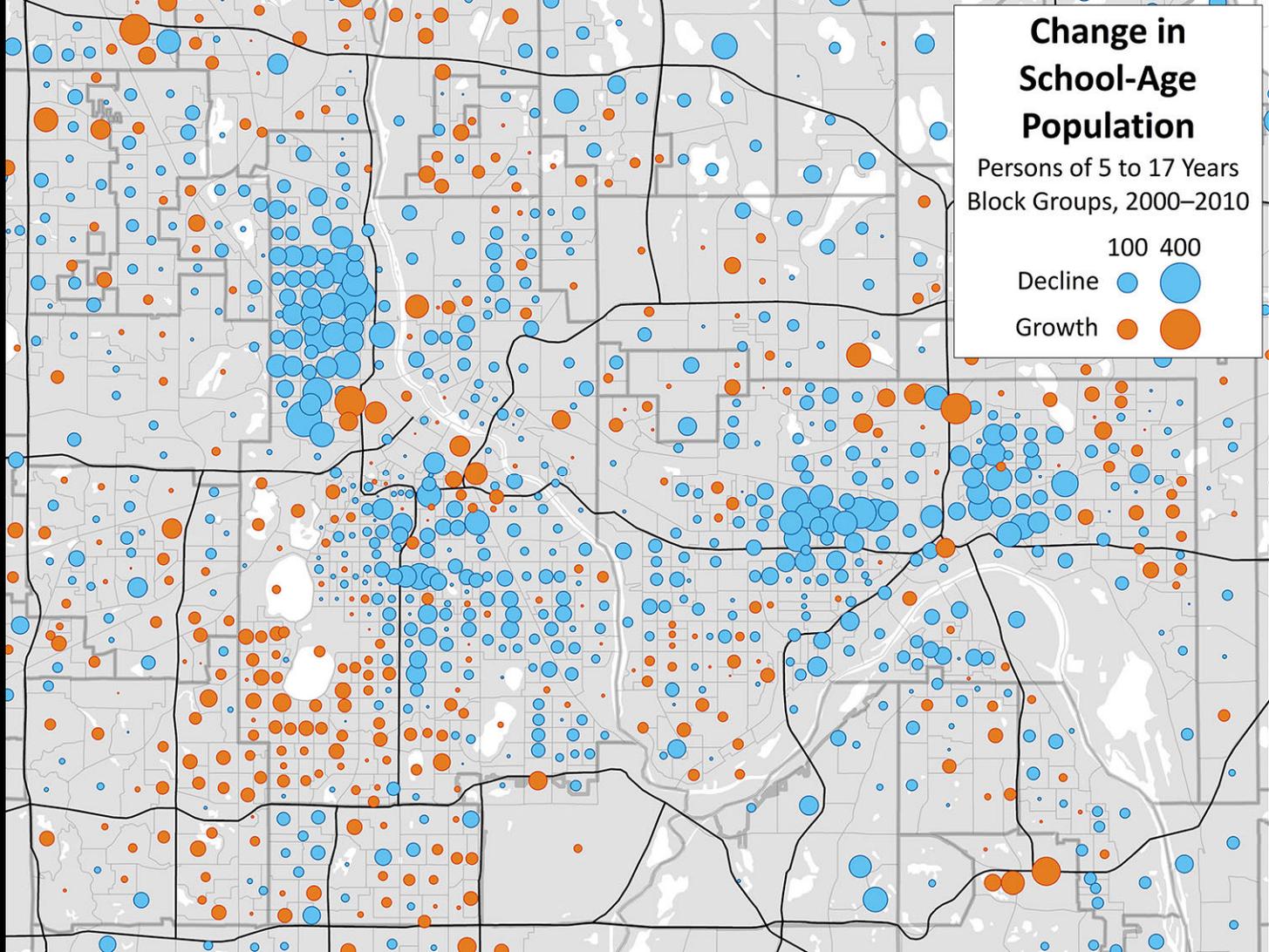
# Change in School-Age Population

Persons of 5 to 17 Years  
Block Groups, 2000–2010

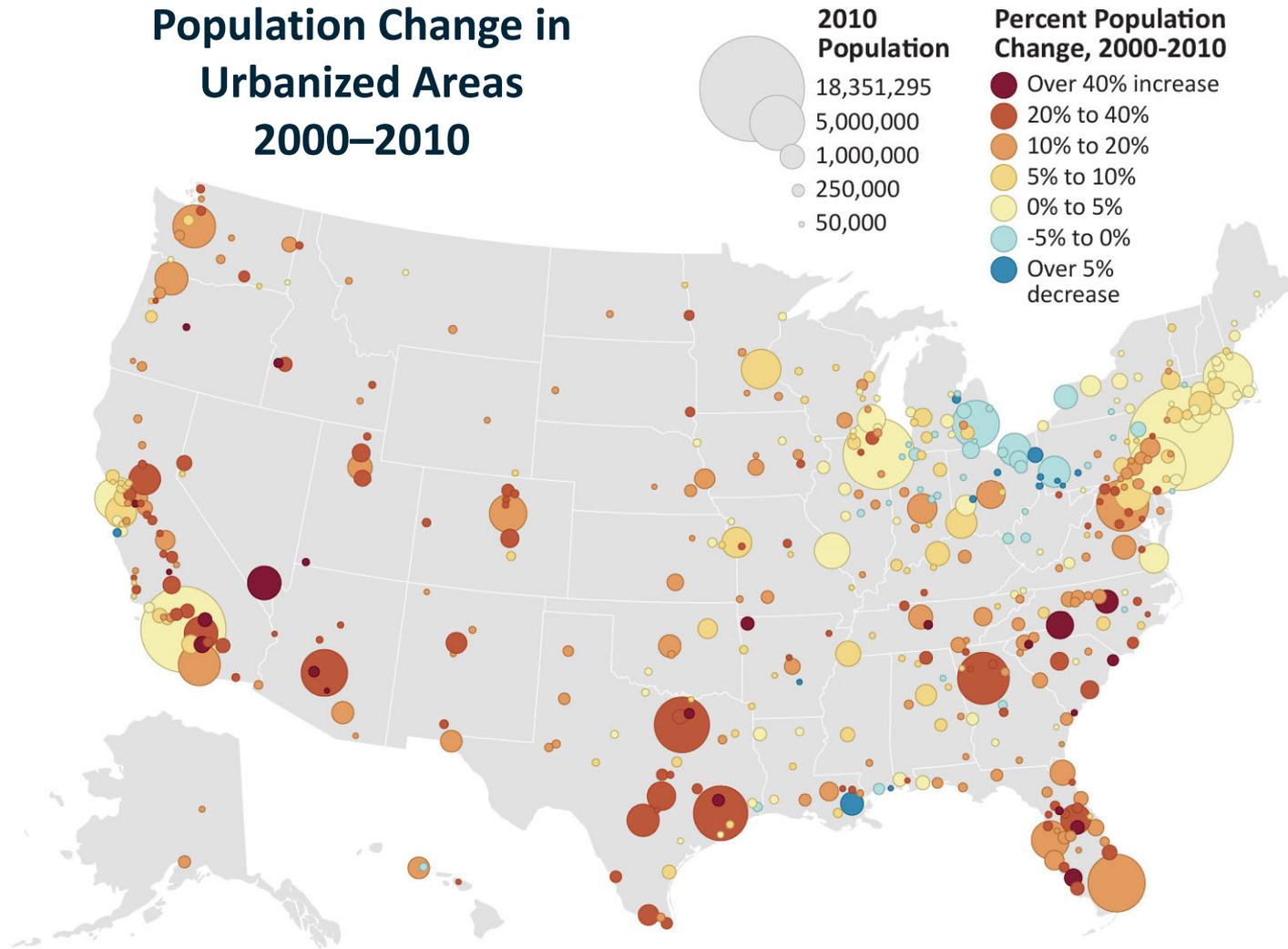
100 400

Decline  

Growth  



# Population Change in Urbanized Areas 2000–2010



# Nominally integrated time series

- ~5,700 time series in 271 tables
- 8 geographic levels:  
nation, regions, divisions, states, counties, tracts,  
county subdivisions, places
- Years mainly in 1970-2010 range
  - *Total Population* back to 1790 &  
*Persons by Sex* back to 1820
  - “Long-form” tables use 2008-2012 ACS

## Tables by tabulation type — *Short-form subjects*

# Nom.	# Std.	Tabulation Type
3	1	Total Persons <i>(1790-2012)</i>
2	1	Persons by Urban/Rural Status
2	1	Persons by Sex <i>(1820-2012)</i>
4	4	Persons by Age
1	0	Median Age of Persons
4	4	Persons by Sex by Age
1	0	Median Age of Persons by Sex
10	3	Persons by Race
4	1	Persons by Hispanic or Latino Origin
7	5	Persons by Hispanic or Latino Origin by Race
3	2	Persons by Race by Sex
29	13	Persons by Race by Age
14	12	Persons by Race by Sex by Age
1	1	Persons by Hispanic or Latino Origin by Sex
4	2	Persons by Hispanic or Latino Origin by Age
2	2	Persons by Hispanic or Latino Origin by Sex by Age
1	1	Persons by Hispanic or Latino Origin by Race by Sex
3	2	Persons by Hispanic or Latino Origin by Race by Age
8	1	Persons by Hispanic or Latino Origin by Race by Sex by Age
6	4	Persons by Household, Family and Group Quarters Type
5	4	Persons by Household and Group Quarters Type by Sex
11	7	Persons by Household and Group Quarters Type by Age
9	4	Persons by Household and Group Quarters Type by Sex by Age

# Nom.	# Std.	Tabulation Type
1	1	Total Households
1	1	Households by Household Type
2	2	Households by Household Type by Household Size
1	1	Total Families
2	1	Persons in Families
2	1	Families by Family Type by Presence and Age of Own Children
10	2	Persons by Household Type by Relationship to Householder
11	6	Persons by Household Type by Relationship to Householder by Age
1	1	Total Housing Units
2	1	Housing Units by Urban/Rural Status
6	3	Housing Units by Occupancy/Vacancy/Tenure
2	1	Persons by Housing Tenure
7	5	Occ. Housing Units (by Tenure) by Race of Householder
4	2	Occ. Housing Units (by Tenure) by Hispanic or Latino Origin of Householder
5	4	Occ. Housing Units (by Tenure) by Hispanic or Latino Origin and Race of Householder
6	2	Occ. Housing Units (by Tenure) by Household Size

## Tables by tabulation type — *Long-form subjects*

# Nom.	Tabulation Type
7	Persons by Marital Status by Sex (by Age)
1	Persons by Nativity
13	Persons by Nativity by Place of Birth
5	Persons by Educational Attainment
7	Persons by Educational Attainment by Sex (by Age)
5	Persons by Labor Force, Employment and Armed Forces Status (by Age)
6	Persons by Labor Force, Employment and Armed Forces Status by Sex (by Age)
4	Workers by Means of Transportation to Work
2	Commuters by Travel Time to Work
1	Aggregate Travel Time to Work

# Nom.	Tabulation Type
4	Households by Income in Previous Year
1	Median Household Income in Previous Year
4	Families by Income in Previous Year
1	Median Family Income in Previous Year
1	Per Capita Income in Previous Year
1	Persons for Whom Poverty Status is Determined
2	Persons by Poverty Status in Previous Year
3	Persons by Ratio of Income to Poverty Level in Previous Year
6	Persons by Poverty Status in Previous Year by Age

58 tabulation types,  
37 types geographically  
standardized

*A look under the hood...*

# **GEOGRAPHIC STANDARDIZATION METHODS**

NHGIS GEOMARKER  
NATIONAL HISTORICAL GIS[HOME](#) | [SELECT DATA](#) | [MY DATA](#) | [FAQ](#) | [HELP](#) | [LOG IN](#)

## DATA

[SELECT DATA](#)[MY DATA HISTORY](#)

## USER RESOURCES

[ABOUT NHGIS](#)[FAQ](#)[DATA AVAILABILITY](#)[USER'S GUIDE](#)[OVERVIEW OF DATASETS](#)[MAPPING OPTIONS](#)

## GEOGRAPHIC CROSSWALKS

[ENVIRONMENTAL SUMMARIES](#)

## DOCUMENTATION

[TABULAR DATA SOURCES](#)[TIME SERIES TABLES](#)[GIS FILES](#)[RELEASE LOG](#)

## RESEARCH

[CITATION AND USE](#)[RELATED SITES](#)

## GEOGRAPHIC CROSSWALKS

NHGIS geographic crosswalk files describe how U.S. census geographic units from one census year correspond to units from another year. Currently, NHGIS provides crosswalks for two settings: 2000 blocks to 2010 blocks and 1990 blocks to 2010 blocks.

- [Overview](#)
- [Technical Details](#)
- [Download](#)
- [Citation and Use](#)

## OVERVIEW

NHGIS crosswalks are similar to the [U.S. Census Bureau's Relationship Files](#), but NHGIS crosswalks include interpolation weights, derived from advanced models, to support the allocation of summary data from one census's units (the "source zones") to another (the "target zones"). Each interpolation weight indicates the approximate proportion of a source zone's characteristics that should be allocated to a given target zone.

For example, in the crosswalk from 1990 blocks to 2010 blocks, each record identifies a possible intersection between a single 1990 block and 2010 block, along with an interpolation weight (ranging between 0 and 1) identifying *approximately* what portion of the 1990 block's population and housing units were located in the intersection. To interpolate count data from 1990 to 2010 blocks using this crosswalk, first join the crosswalk to 1990 block data of interest;

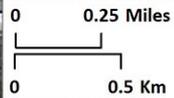


Cedar Park

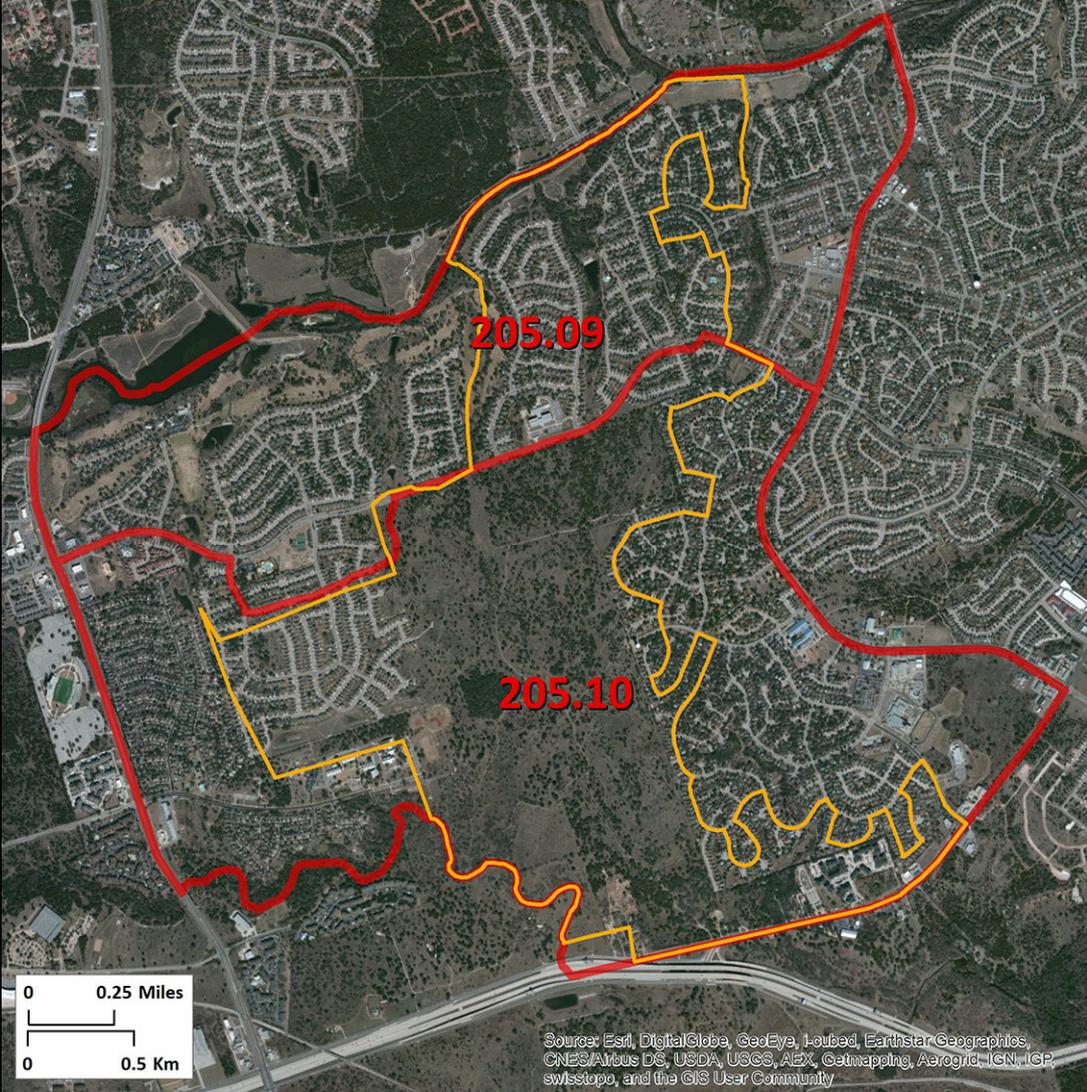
Brushy Creek

Austin

2000 block  
population  
: 1,624

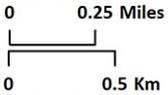


Source: Esri, DigitalGlobe, GeoEye, I-gated, Earthstar, Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



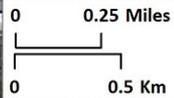
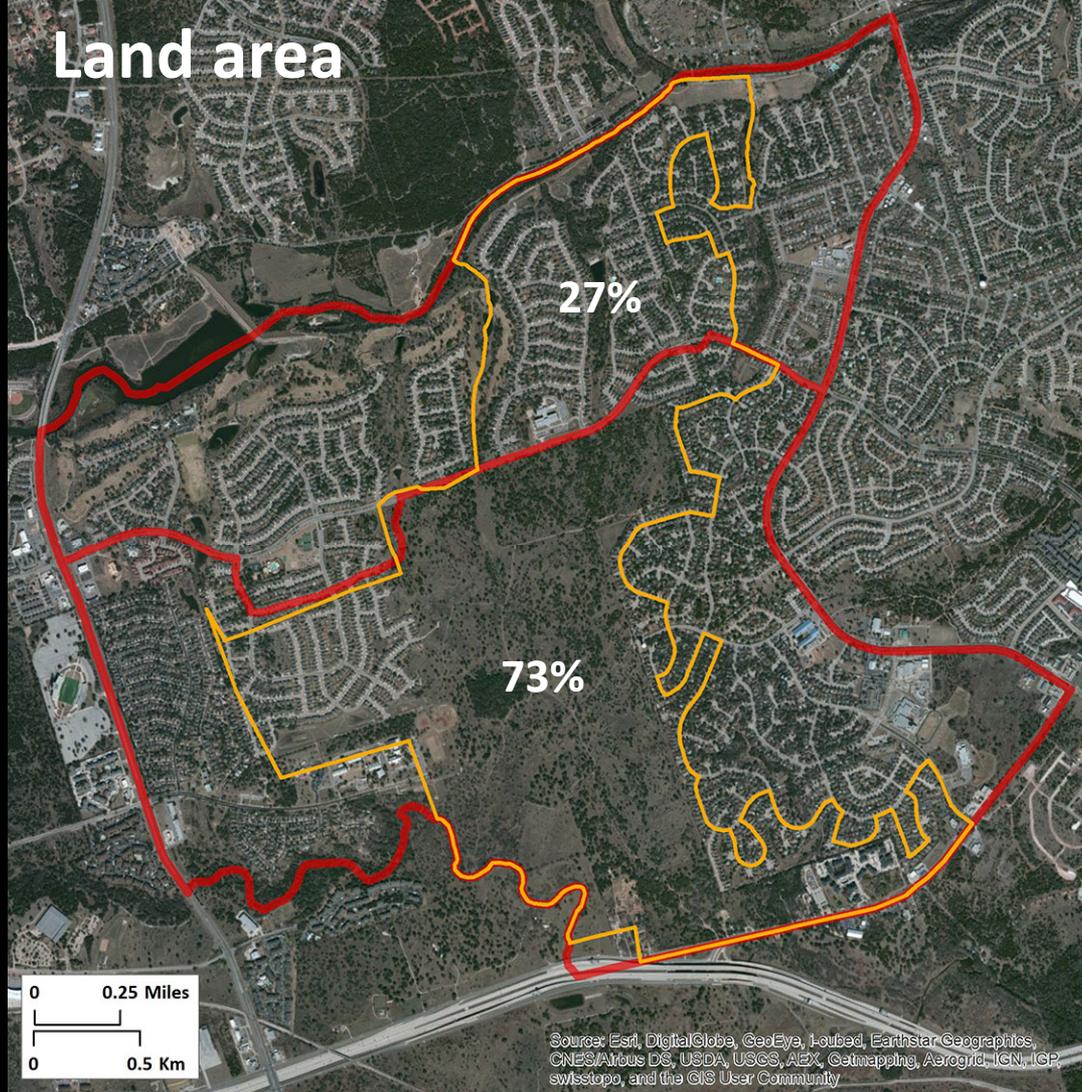
**205.09**

**205.10**



Source: Esri, DigitalGlobe, GeoEye, I-gubed, Earthstar, Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

# Land area

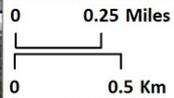
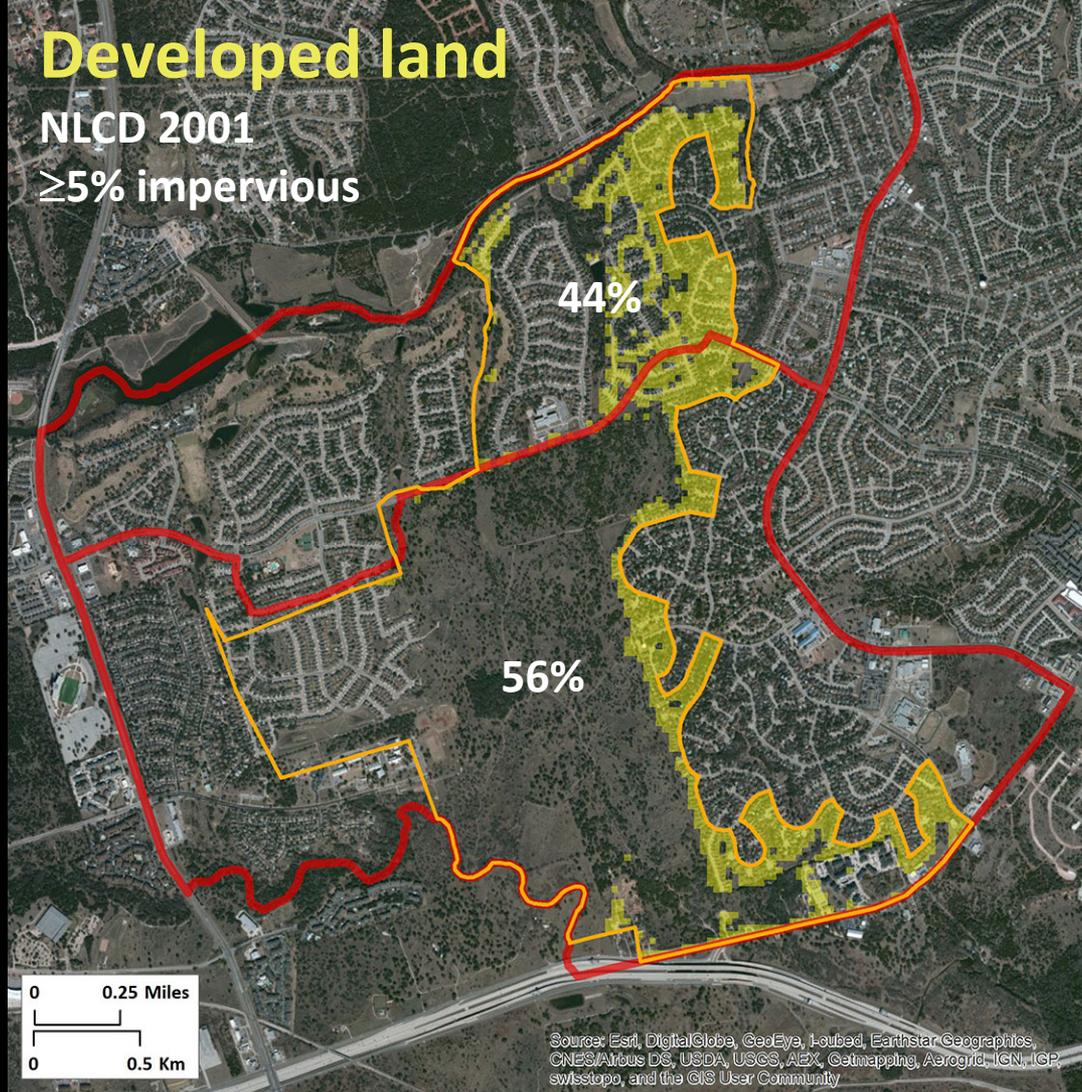


Source: Esri, DigitalGlobe, GeoEye, I-gubed, Earthstar, Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

# Developed land

NLCD 2001

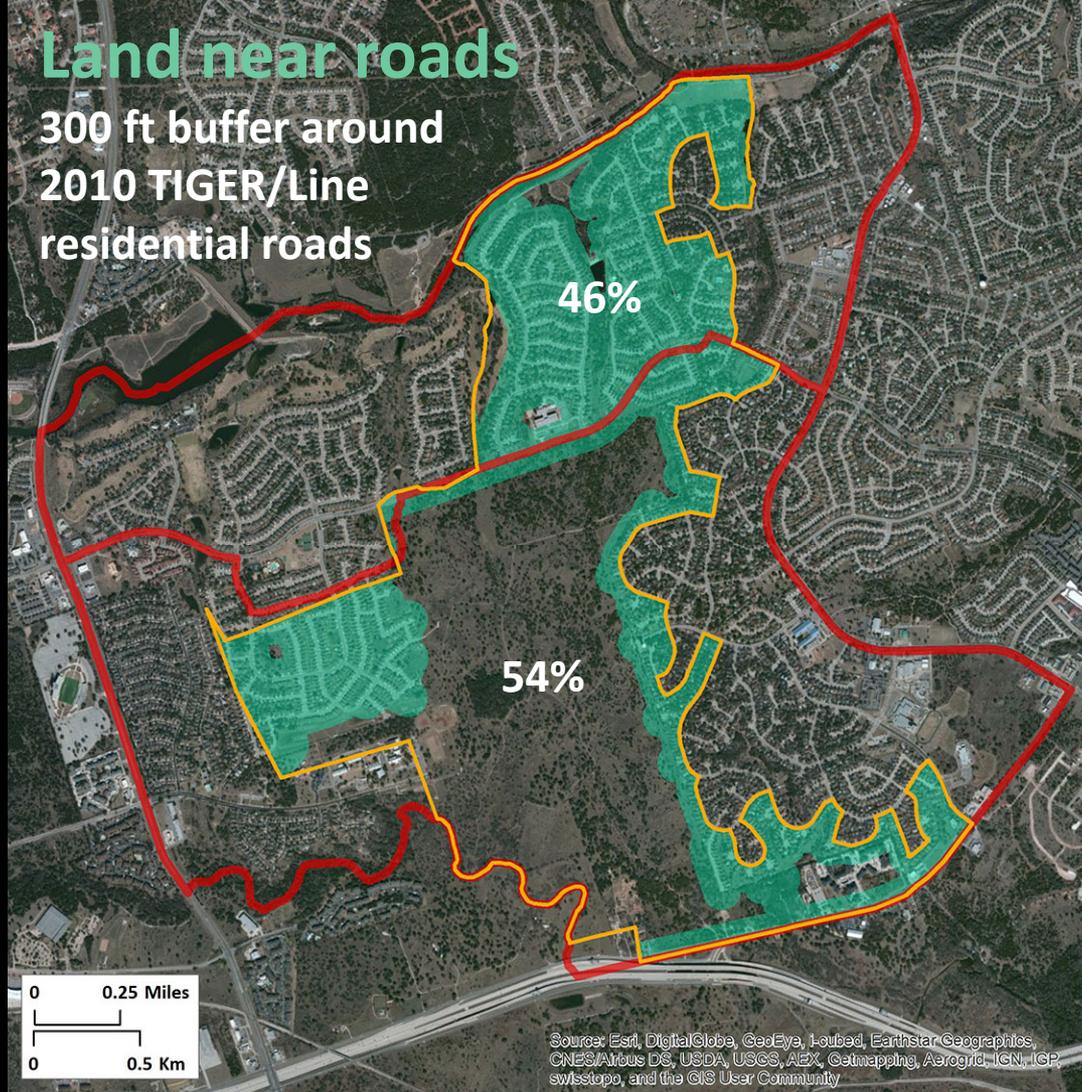
≥5% impervious



Source: Esri, DigitalGlobe, GeoEye, I-gubed, Earthstar, Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

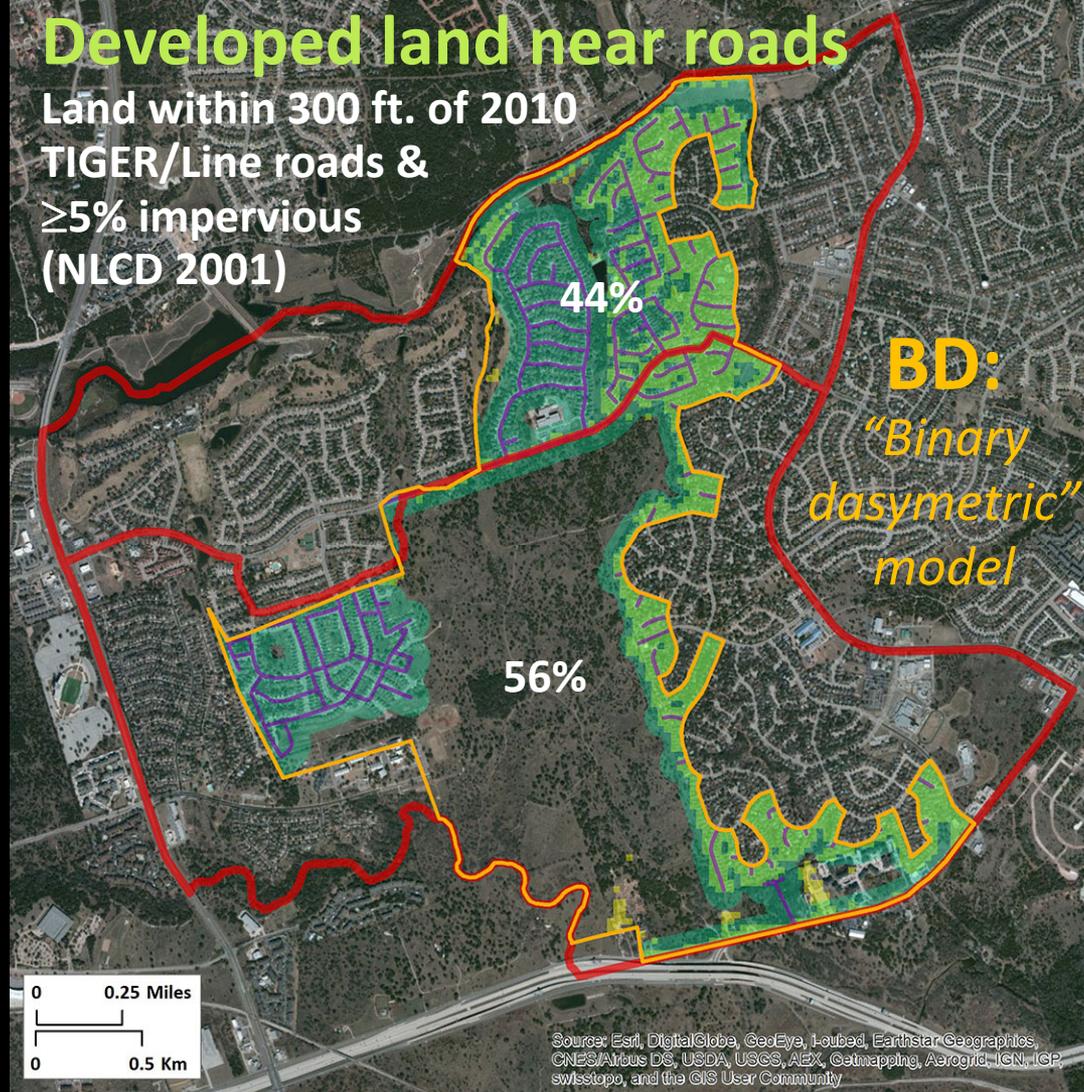
# Land near roads

300 ft buffer around  
2010 TIGER/Line  
residential roads



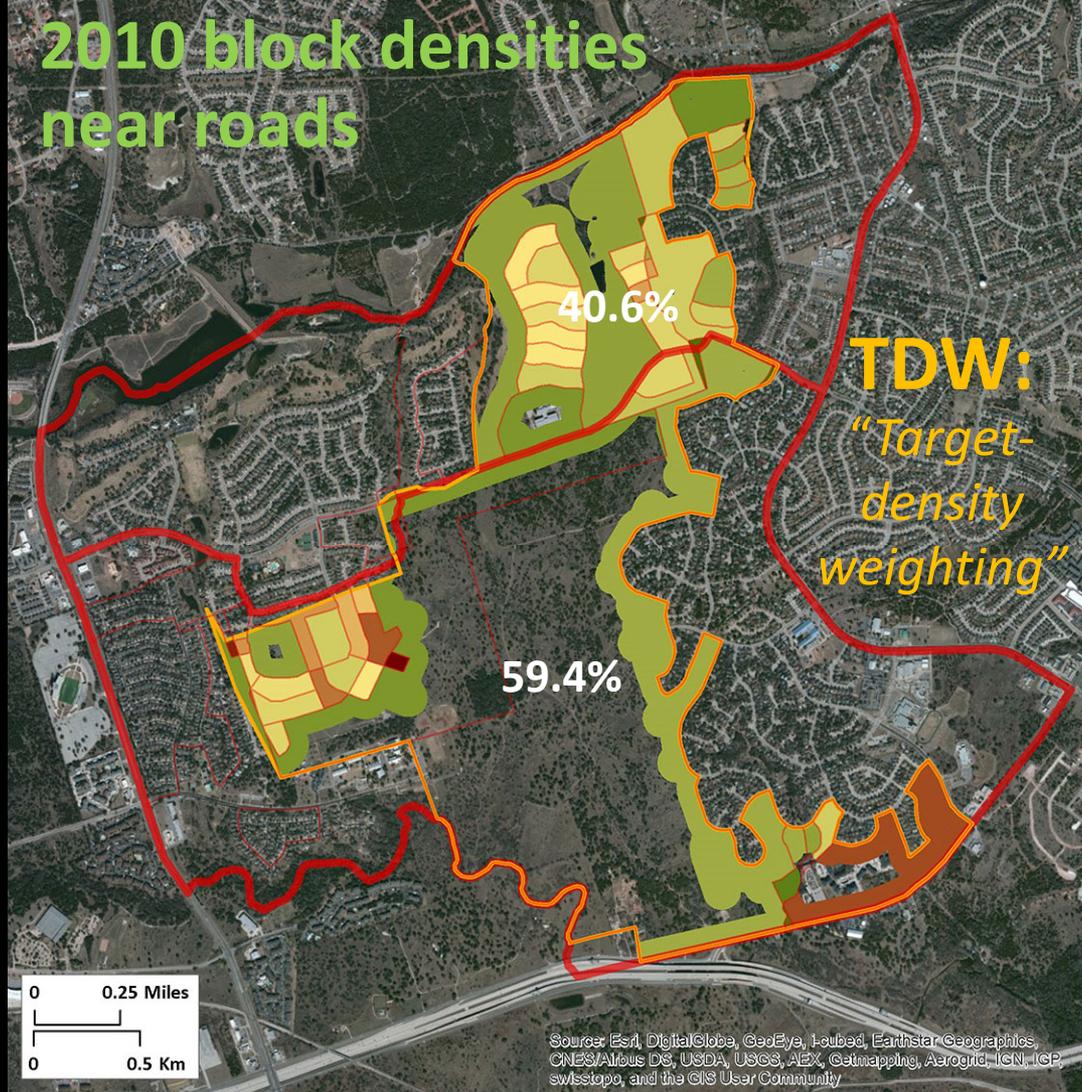
# Developed land near roads

Land within 300 ft. of 2010  
TIGER/Line roads &  
≥5% impervious  
(NLCD 2001)



Source: Esri, DigitalGlobe, GeoEye, I-gated, Earthstar, Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

# 2010 block densities near roads



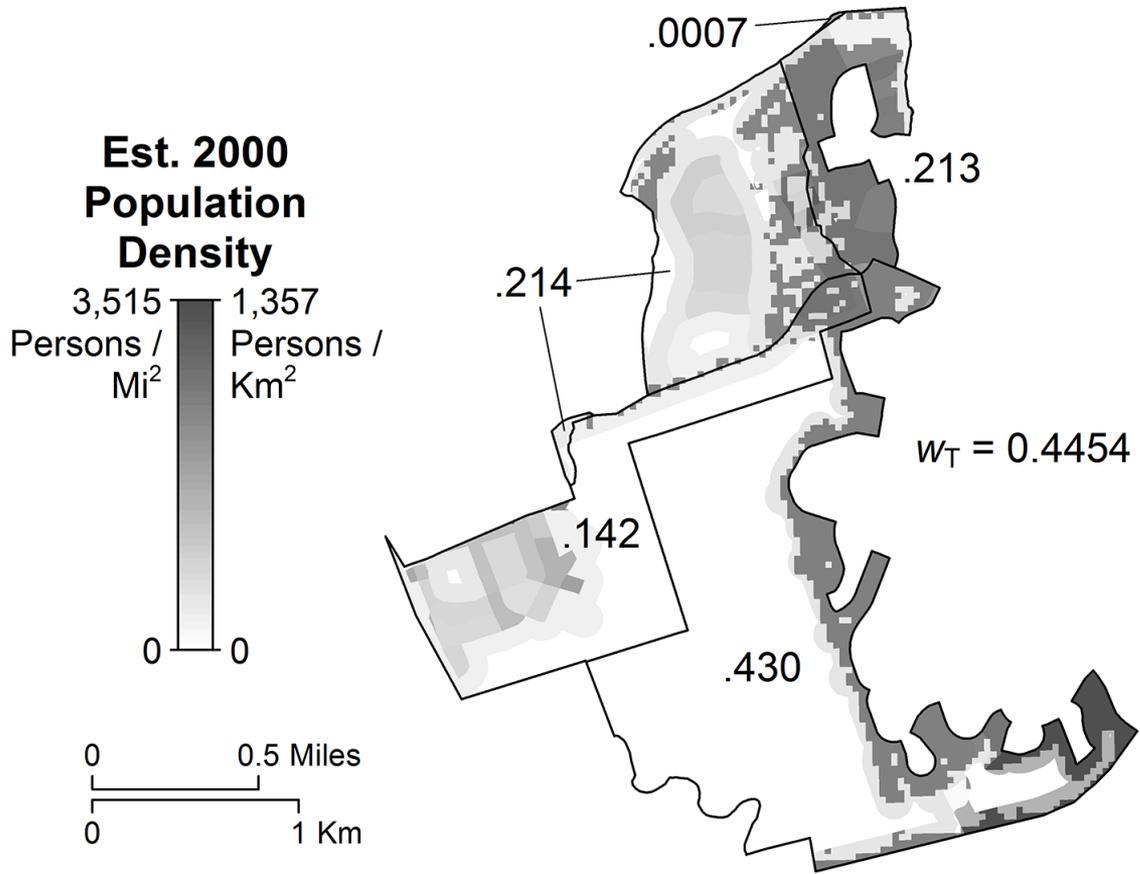
# Hybrid model

- Weighted average of TDW & BD estimates:

$$\hat{p}_H = w_T \hat{p}_T + (1 - w_T) \hat{p}_B$$

- Weight is a linear function of change in population + housing, 2000–2010, fitted on block pair data

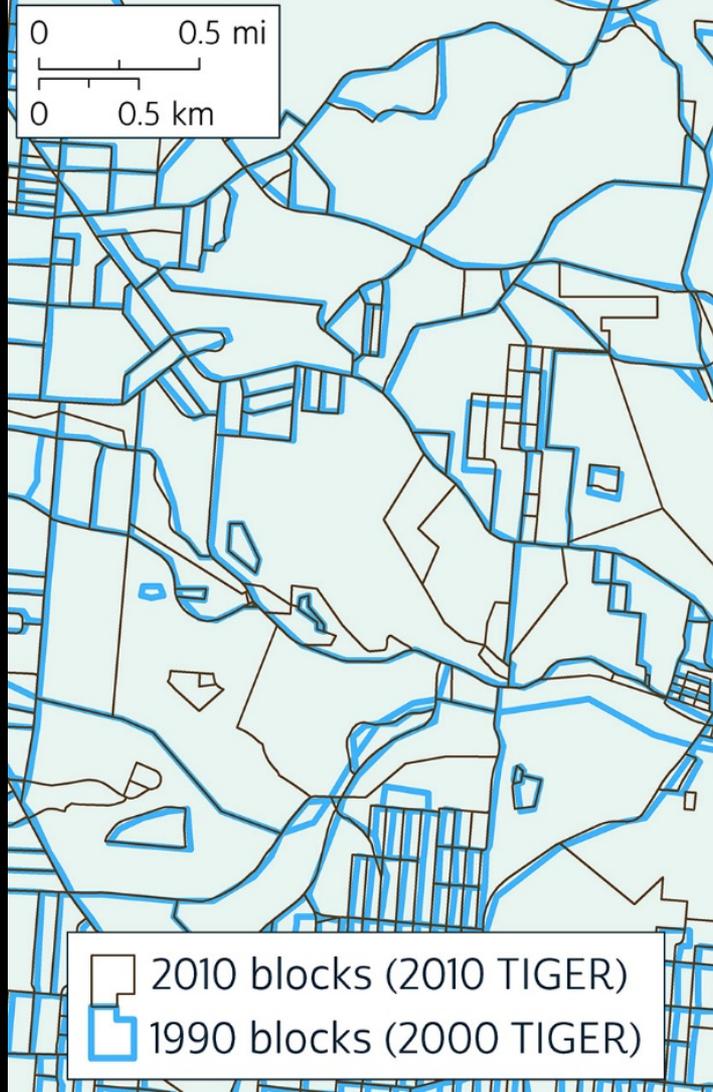
$$w_T = 0.919 - 0.806 \left| \frac{\hat{z} - y}{\hat{z} + y} \right|$$



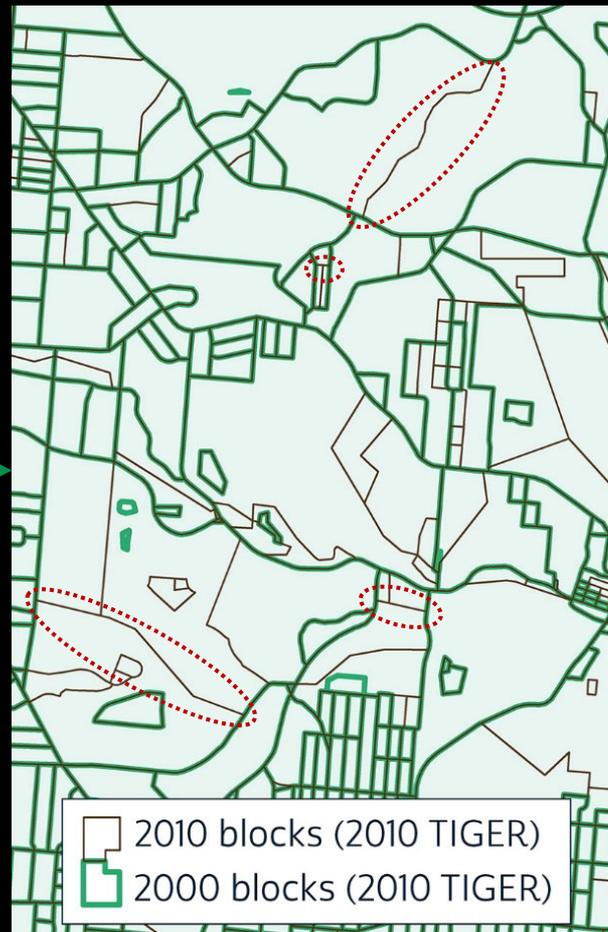
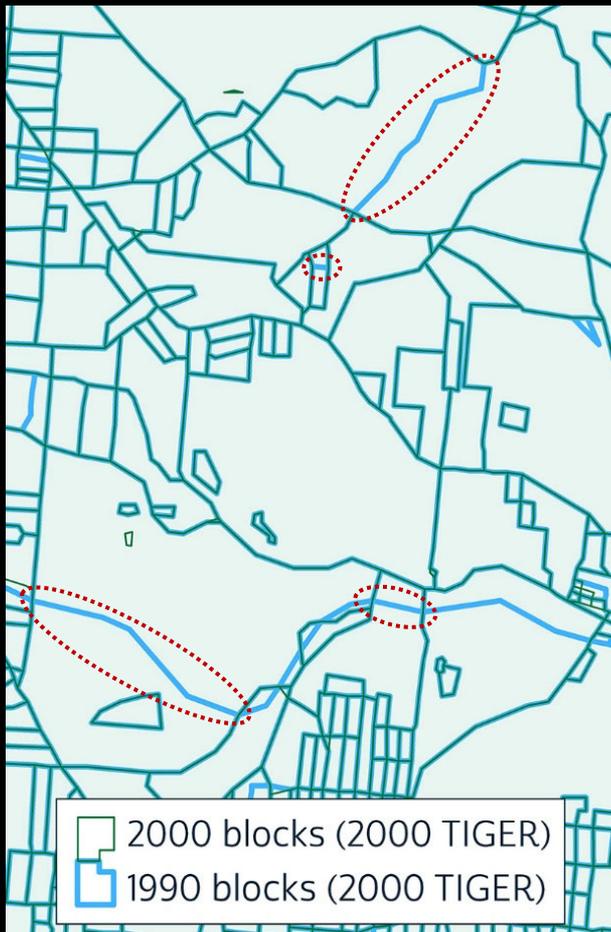
Schroeder, J. P. (2017). Hybrid areal interpolation of census counts from 2000 blocks to 2010 geographies. *Computers, Environment and Urban Systems*, 62, 53-63.

1990 to  
2010?

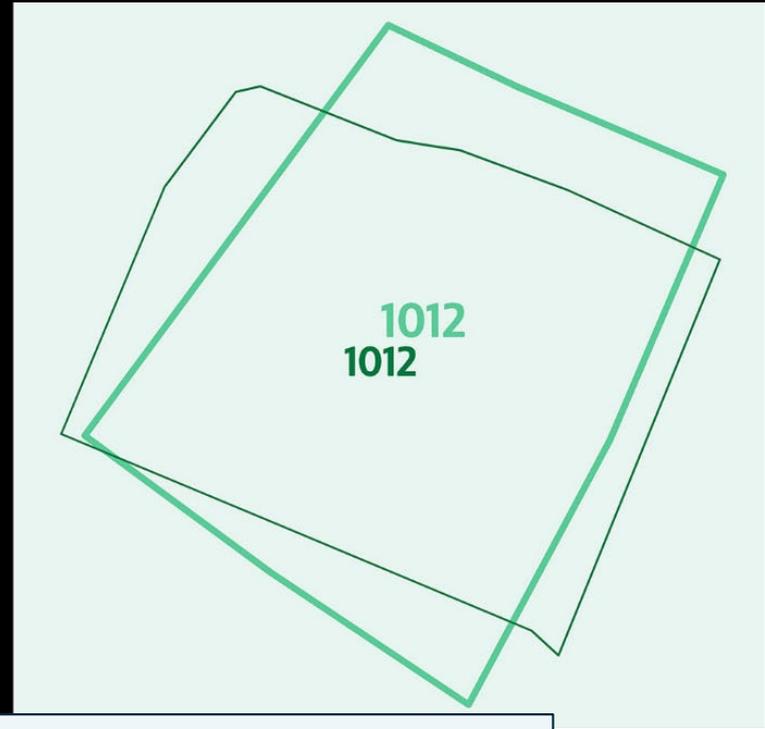
Option 1:  
Direct  
overlay



## Option 2: Indirect overlay via 2000 blocks



### Option 3: *Constrained direct overlay*



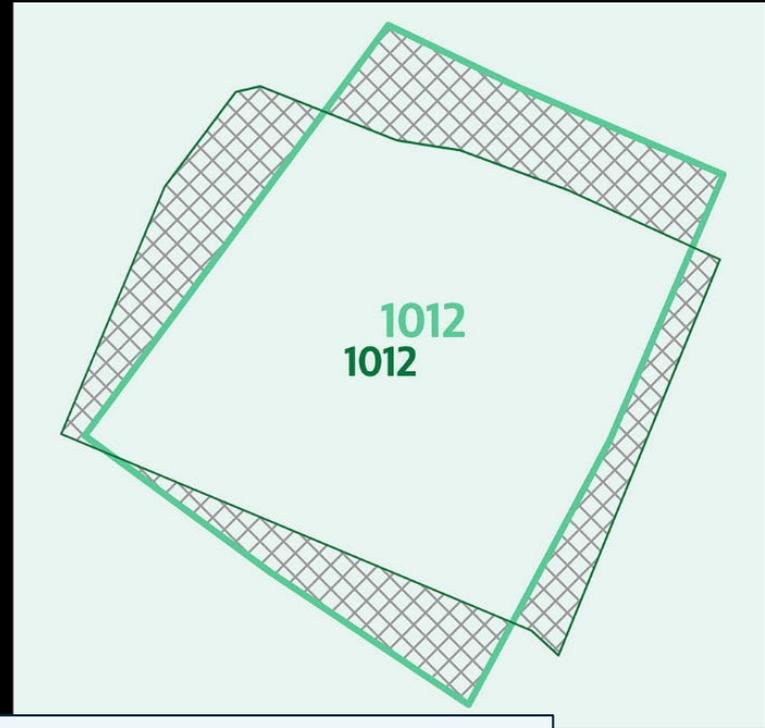
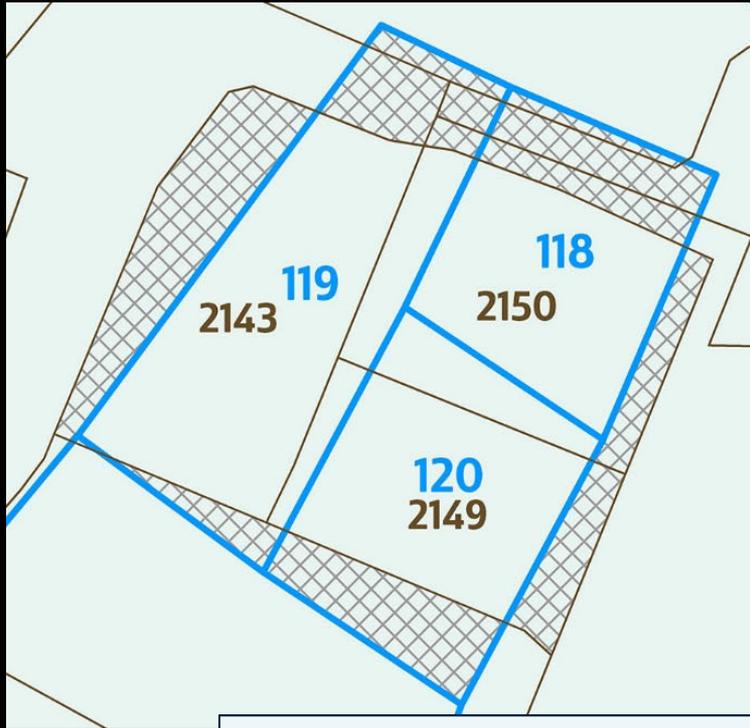
 1990 blocks

 2010 blocks

 2000 blocks (2000 TIGER)

 2000 blocks (2010 TIGER)

### Option 3: *Constrained direct overlay*

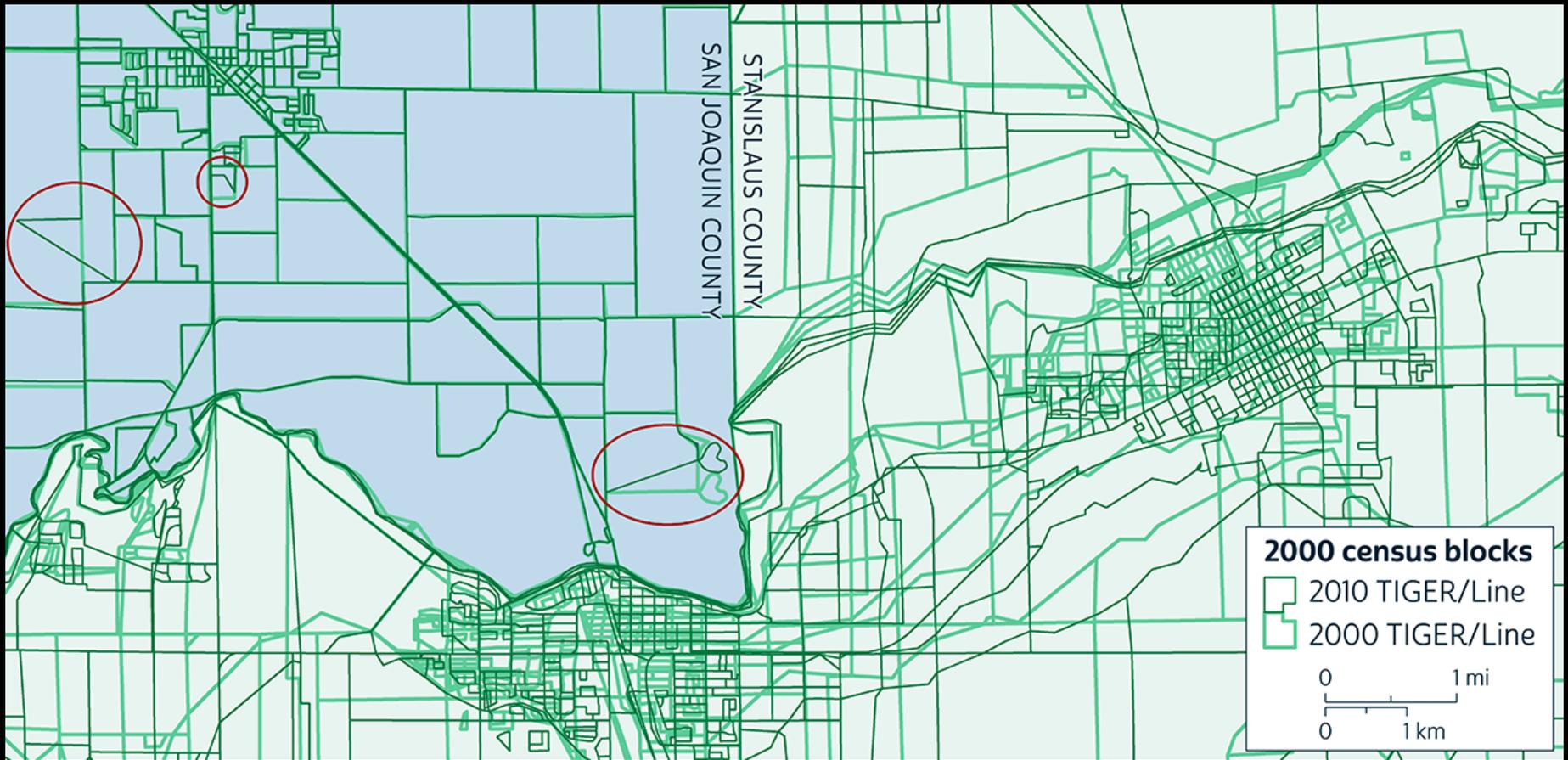


 1990 blocks

 2010 blocks

 2000 blocks (2000 TIGER)

 2000 blocks (2010 TIGER)



**Option 4: *Balanced overlay***

**= Combination of indirect & constrained direct**

Jonathan

1990 Block Data Standard

Secure | https://www.nhgis.org/documentation/time-series/1990-blocks-to-2010-geog

## 1990 BLOCK DATA STANDARDIZED TO 2010 GEOGRAPHY

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### SUMMARY

In time series tables that are standardized to 2010 census geography, NHGIS produces 1990 statistics by reaggregating census block data from [1990 Census Summary Tape File 1](#) (NHGIS dataset [1990\\_STF1](#)).

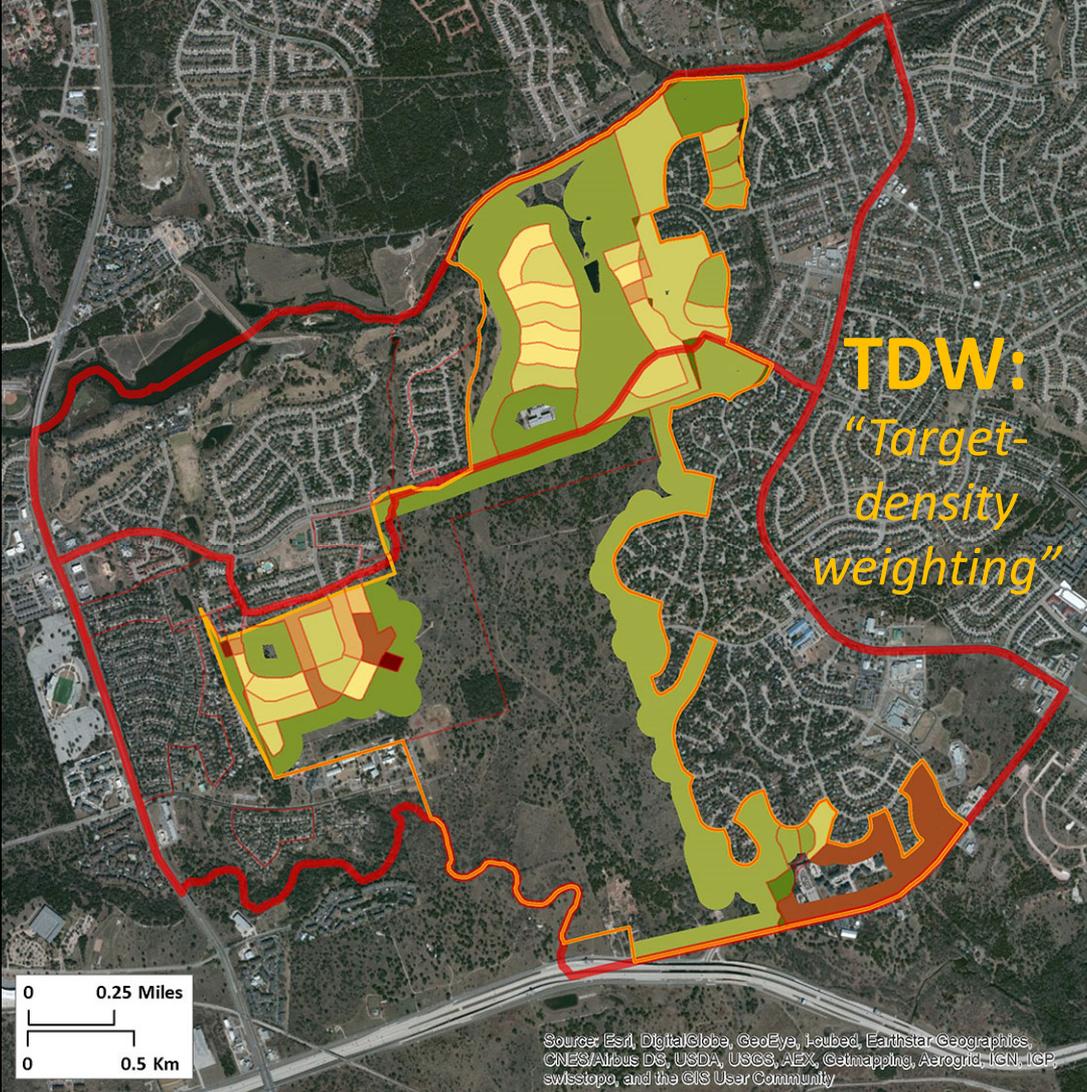
NHGIS first allocates census counts from 1990 blocks to 2010 blocks and then sums the reallocated counts for all 2010 blocks that lie within each target 2010 unit. In cases where a 1990 block may intersect multiple 2010 blocks, NHGIS applies [interpolation](#) to estimate how 1990 block characteristics are distributed among the intersecting 2010 blocks, primarily using the population

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RESEARCH  
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JUNE PUBLICATION



# COMPARISON WITH ALTERNATIVES

## Sources of geographically standardized data

Geolytics NCDB	LTDB	Social Explorer	NHGIS
Tracts <sup>1</sup> with codes for larger areas	Tracts with codes for larger areas	Tracts, counties, states	10 levels: tracts, BGs, ZCTAs, places...
1970–2010	1970–2010	1970–2010	1990–2010

<sup>1</sup>Geolytics also provides datasets w/ 1980, 1990, 2000 data for several 2010 geographies including block groups & ZCTA's

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~1,000 variables, <i>specific to source year</i>	83 variables, <i>aligned categories</i>  + tract-to-tract crosswalk	1970 Count 4; 1980, 1990, 2000 <sub>1</sub> SF1 & SF3; 2000: 114 <i>aligned</i> tables	~1,600 variables in 109 <i>aligned</i> tables  + block-to-block crosswalk

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No error bounds	No error bounds	No error bounds	Lower, upper bounds
			<b><i>Block source</i></b> , guided by 2000 & 2010 block info, road buffers, land cover

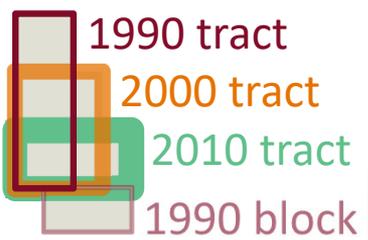
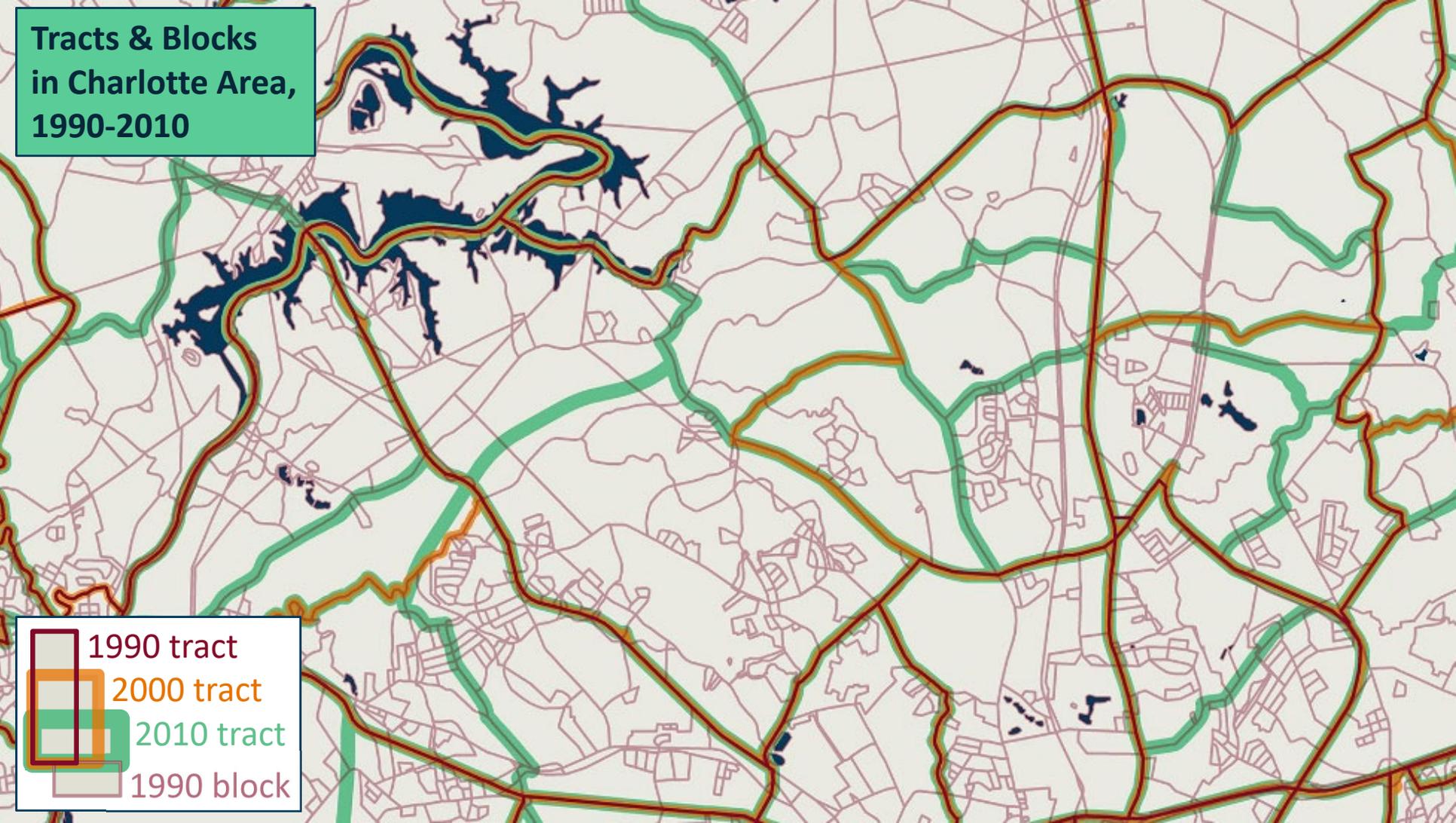
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No error bounds	No error bounds	No error bounds	Lower, upper bounds
	Tract source, guided by land areas & 2000 block populations	<i>LTDB crosswalks</i>	<b><i>Block source</i></b> , guided by 2000 & 2010 block info, road buffers, land cover

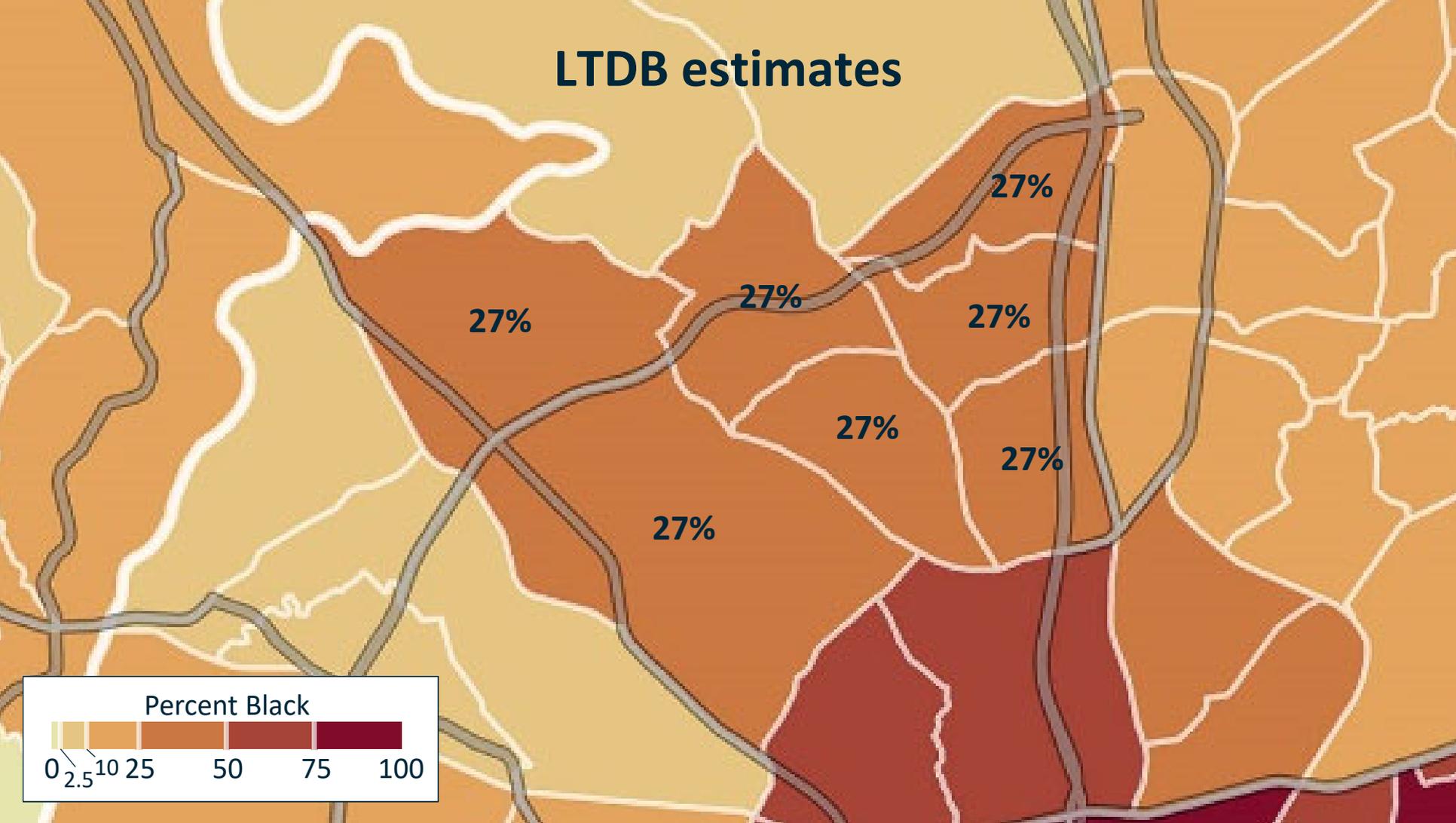
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No error bounds	No error bounds	No error bounds	Lower, upper bounds
Tract source, area-weighted (including water!)	Tract source, guided by land areas & 2000 block populations	<i>LTDB crosswalks</i>	<b><i>Block source</i></b> , guided by 2000 & 2010 block info, road buffers, land cover

# Tracts & Blocks in Charlotte Area, 1990-2010



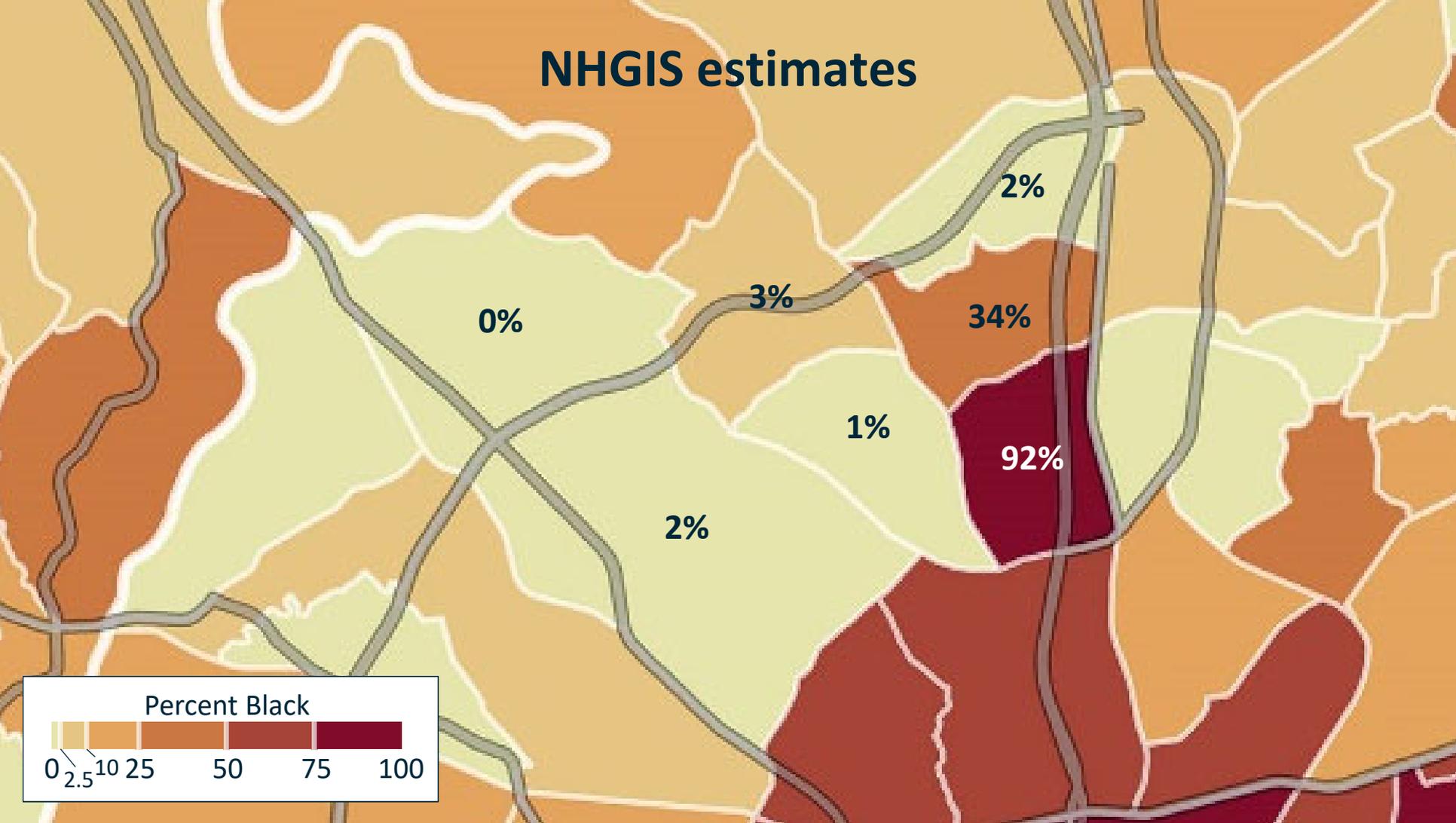
# LTDB estimates



Percent Black

0 2.5 10 25 50 75 100

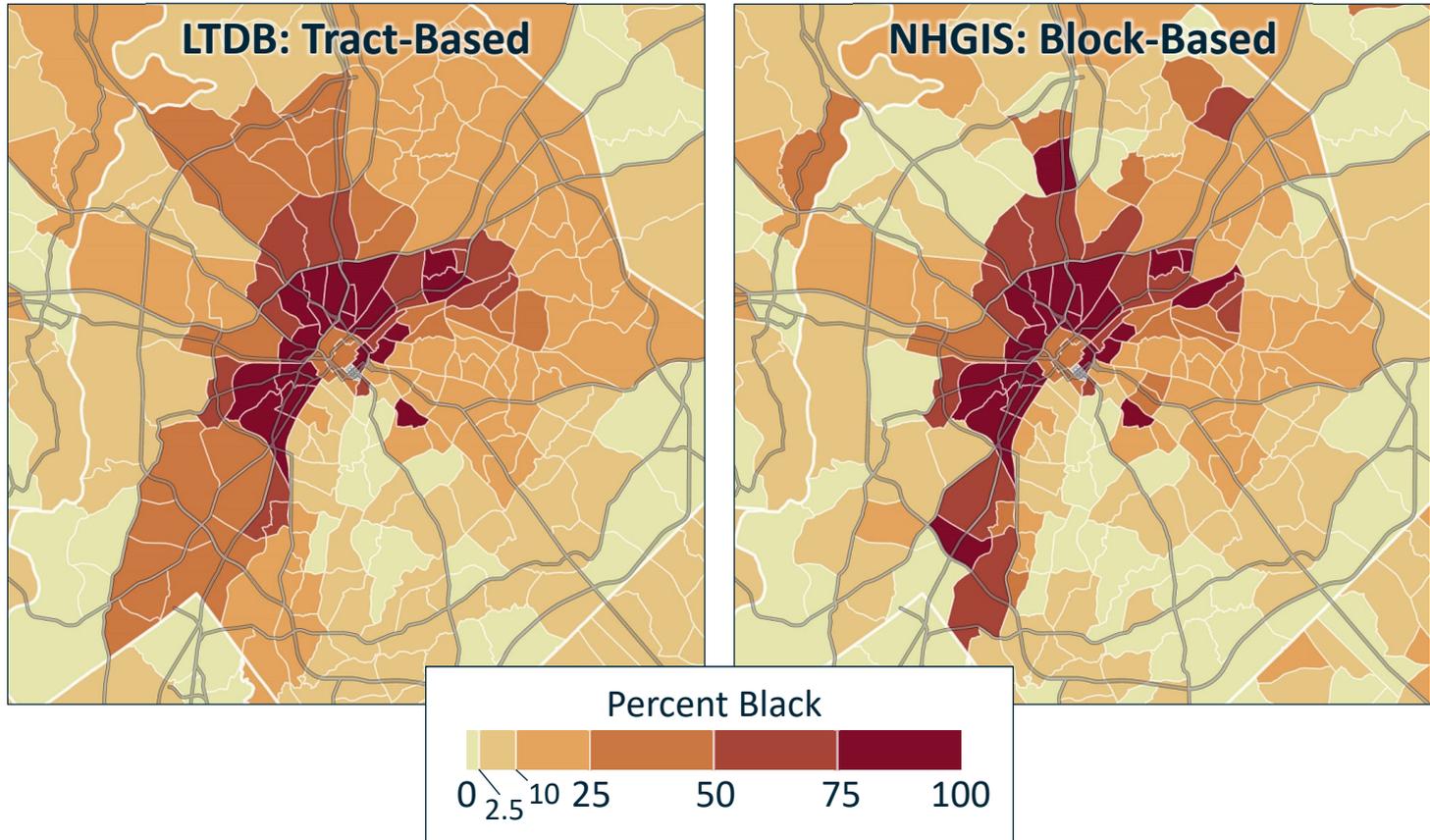
# NHGIS estimates



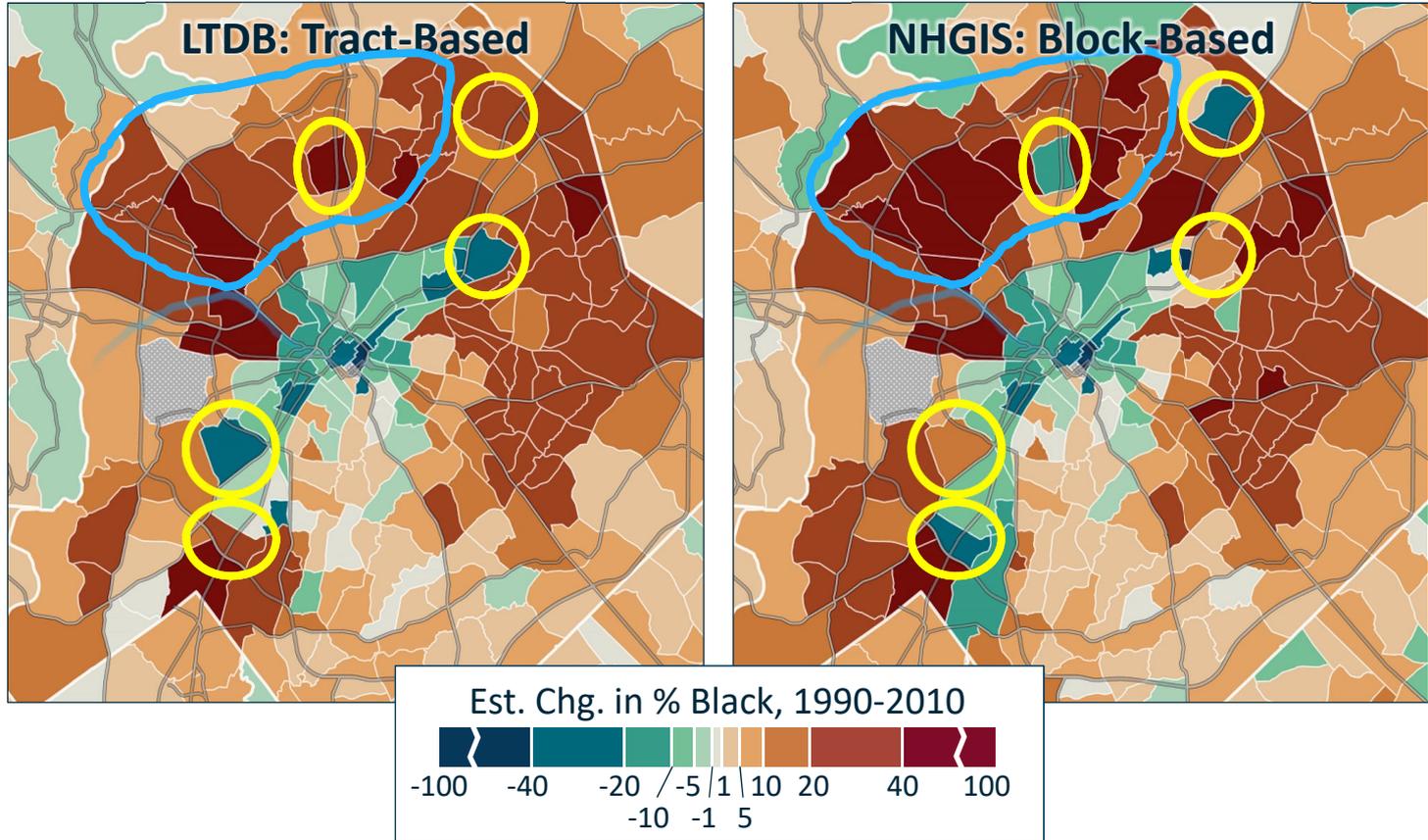
Percent Black

0 2.5 10 25 50 75 100

# 1990 Percent Black in 2010 Tracts



# Change in Percent Black, 1990-2010



# NHGIS-LTDB differences

Characteristic	Pct. tracts abs. diff. > 10	
	2000	1990
% White, non-HL	2.7	4.3
% Black, non-HL	1.2	2.2
% Asian & PI, non-HL	0.2	0.3
% Hispanic/Latino	1.2	1.8
% age < 18	0.8	1.5
% age ≥ 75	0.4	0.5
% vacant housing	1.2	2.4
% owner-occupied housing	5.8	10.7

# NHGIS-LTDB differences

Characteristic	Pct. tracts abs. diff. > 10		Pct. tracts rel. diff. > 2x	
	2000	1990	2000	1990
% White, non-HL	2.7	4.3	0.4	0.7
% Black, non-HL	1.2	2.2	3.5	10.9
% Asian & PI, non-HL	0.2	0.3	2.8	8.9
% Hispanic/Latino	1.2	1.8	1.9	4.3
% age < 18	0.8	1.5	0.7	1.2
% age ≥ 75	0.4	0.5	2.7	5.8
% vacant housing	1.2	2.4	2.4	4.3
% owner-occupied housing	5.8	10.7	0.9	1.7

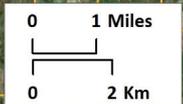
## NHGIS-LTDB differences: 2000 population totals

Size of abs. difference	N tracts	% tracts
> 10	6,346	8.7
> 100	991	1.4
> 1000	35	0.05
> 2%	1,811	2.5
> 20%	398	0.5
> 100%	184	0.3

**LTDB website:** “The NHGIS and LTDB estimates are very similar.”

# Fort Sills, Oklahoma

3,882 → 621  
-84%



# NHGIS-LTDB differences

Size of difference	2000 population		2000 housing units	
	N	%	N	%
> 10	6,346	8.7	16,172	22.2
> 100	991	1.4	5,761	7.9
> 1000	35	0.0	71	0.1
> 2%	1,811	2.5	13,046	17.9
> 20%	398	0.5	2,300	3.2
> 100%	184	0.3	436	0.6

**20% of LTDB 2000 H.U. counts\***  
are outside of block-based bounds

\*rounded to nearest integer

# NHGIS-LTDB differences

Size of difference	2000 population		1990 population	
	N	%	N	%
> 10	6,346	8.7	38,296	52.7
> 100	991	1.4	25,587	35.2
> 1000	35	0.0	7,102	9.8
> 2%	1,811	2.5	29,234	40.2
> 20%	398	0.5	14,115	19.4
> 100%	184	0.3	4,766	6.6

**43%** of LTDB 1990 populations\*  
are outside of block-based bounds

\*rounded to nearest integer

# Tips for Standardized Time Series

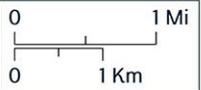
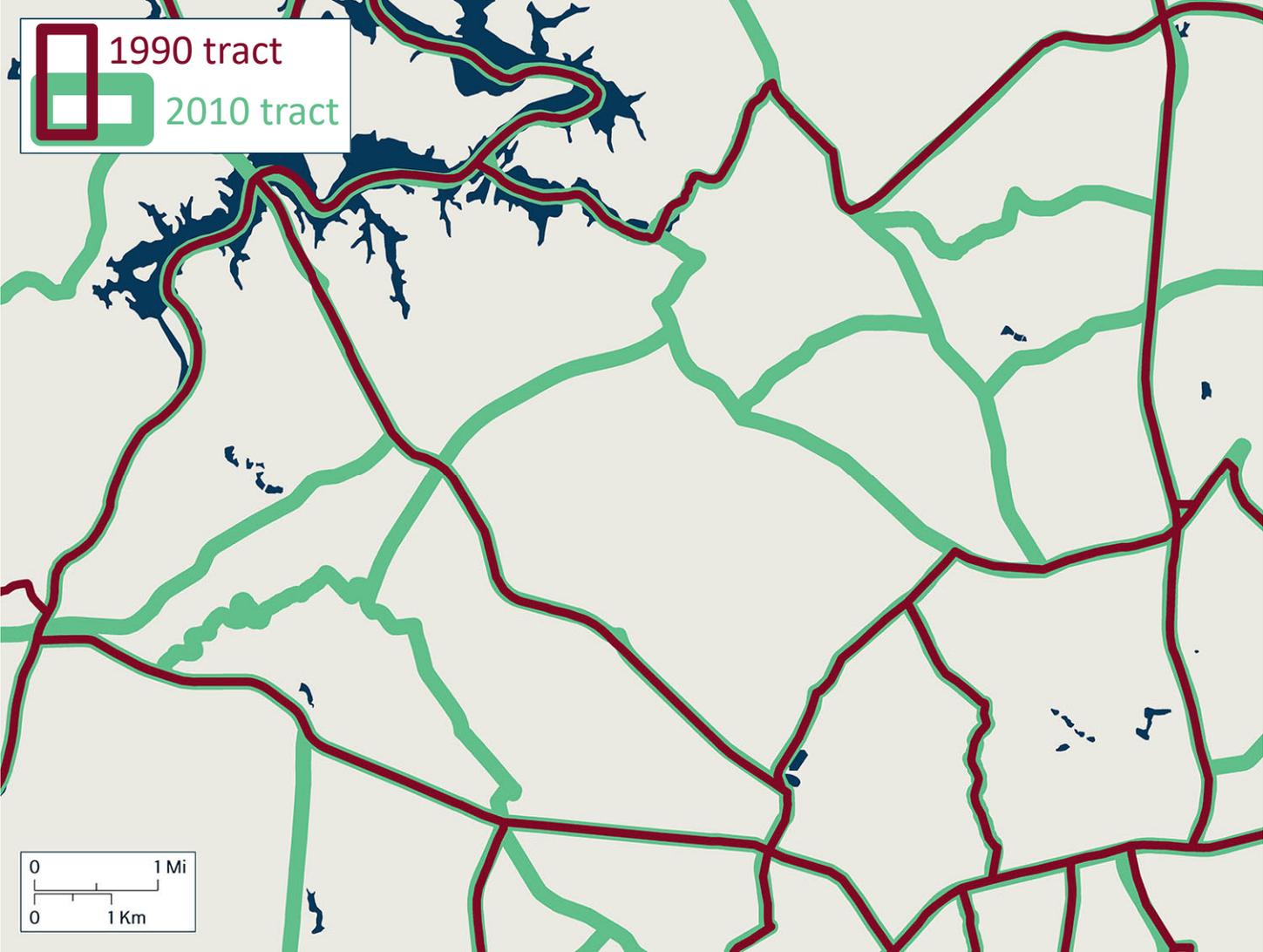
- If you can, use block-based estimates (NHGIS)
  - And even then, pay attention to the bounds
- If you need 1990 or 2000 long-form data...
  - First disaggregate to blocks
  - Then use NHGIS block-to-block crosswalks
- If you need 1970 or 1980 data, LTDB is best option, but beware!
  - *Many* counts not reliable
  - Artificially uniform rates within source tracts

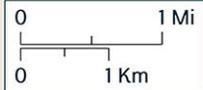
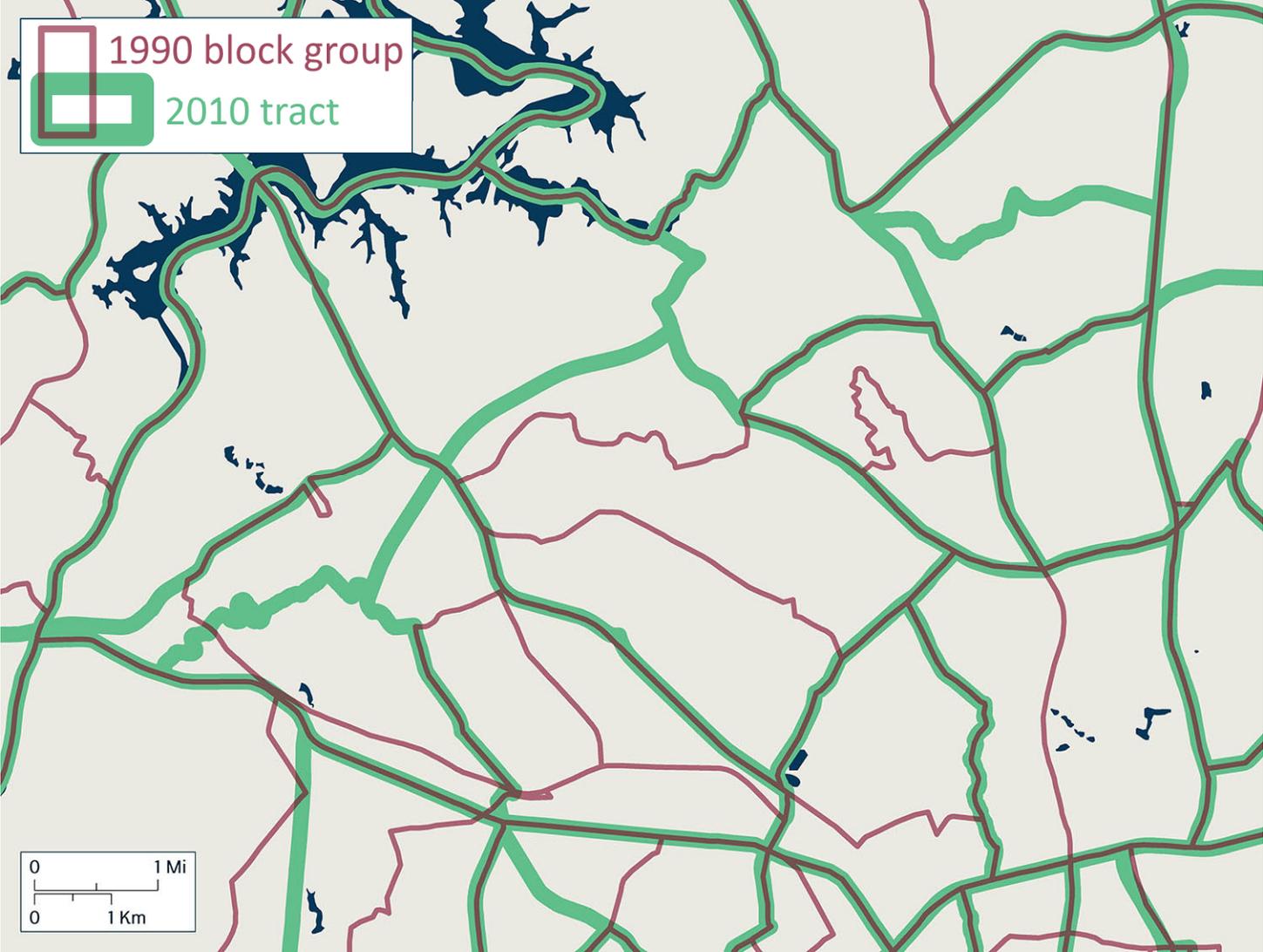
# **FUTURE PLANS**

# Frontiers

## 1. Include long-form data in standardized time series

- *First*, add block-group crosswalks
  - E.g., 1990 BGs to 2017 units,  
including block-based interpolation weights  
for multiple base characteristics:
    - Total population*
    - Total households*
    - Total families*
    - Total housing units*
    - Population age # and over, ...*





# Frontiers

## 1. Standardized long-form data

- *First*, add block-group crosswalks
- *Second*, add time series tables using new crosswalks
  - Initially limited to subjects available at block-group level
  - 1990, 2000, 5-year ACS periods...

# Frontiers

2. Extend ACS coverage beyond 2008-2012
  - Add all 5-year periods since 2006-2010
    - First batch:  
30-50 tables for the most popular ACS subjects
    - Include both short-form & long-form subjects
  - Enable year selection for data requests

Total Population

Persons by Sex [2]

Persons of Marrying Age\* b

YEARS FOR ALL TIME SERIES TABLES



? SELECTED YEARS

USE SELECTED YEARS FOR ALL AVAILABLE TIME SERIES TABLES

- 1970
- 1980
- 1990
- 2000
- 2010
- 2006-2010
- 2007-2011
- 2008-2012
- 2009-2013
- 2010-2014
- 2011-2015
- 2012-2016
- 2013-2017

1: TOTAL POPULATION (NOMINAL)			
2: PERSONS BY SEX [2] (NOMINAL)			
3: PERSONS OF MARRYING AGE* BY SEX [2] BY MARITAL STATUS [6] (NOMINAL)			
1	2	3	YEARS
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> 1970
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> 1980
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<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> 2006-2010
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<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> 2008-2012

CANCEL

SUBMIT

CLEAR X

CONTINUE

GRAPHIC LEVELS

SELECT LEVELS

Total Population

Persons by Sex [2]

Persons of Marrying Age\* b

YEARS FOR ALL TIME SERIES TABLES



? SELECTED YEARS

USE SELECTED YEARS FOR ALL AVAILABLE TIME SERIES TABLES

- 1970
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CANCEL

SUBMIT

CLEAR X

TABLES  
S TABLES

TIONS

CONTINUE

GRAPHIC LEVELS

LECT LEVELS

# Frontiers

## 3. Standardized data for 1980 & 1970

- → Lack of pre-1990 digital block boundaries
- *First*, digitize 1980 and 1970 block boundaries
- *Then* complete block-based standardization

# Frontiers

4. Include 2020 census data
  - Standardize *backward* to 2010 units & *forward* to 2020 units
5. Cover more subjects
6. Cover more years before 1970

# Acknowledgments

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NIH-R24HD041023]

National Science Foundation

[SES-1324875]

## *For more...*

- Training exercises (see Exercise 2 for time series):  
<https://www.ipums.org/exercises.shtml>
- API: <https://developer.ipums.org/>
- Twitter: @nhgis
- Email: [nhgis@umn.edu](mailto:nhgis@umn.edu)