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National Neighborhood Data Archive (NaNDA): Traffic Volume by Census Tract and ZIP Code Tabulation Area, United States, 1963-2019

P.I. Documentation for Traffic Volume by Census Tract Data

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Overview and Data Dictionary

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Dataset Overview

Description

This dataset contains measures of traffic volume per census tract in the United States from 1963 to 2019 (primarily 1997 to 2019). High traffic volume may be used as a proxy for heavy traffic, high traffic speeds, and impediments to walking or biking. The dataset contains measures of the average, maximum, and minimum traffic volume per tract per year. These figures are available for all streets, highways, and non-highways.

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Data Sources

Traffic volume measurements are derived from Kalibrate's TrafficMetrix database accessed via Esri Demographics (Kalibrate, 2019). Kalibrate collects traffic counts from multiple sources, such as city governments, engineering firms, and highway and transportation departments (Kalibrate, n.d.). Traffic counts include a latitude and longitude and up to five estimates of traffic volume at that location over multiple years. Traffic estimates are based on short-term measurements but are adjusted to approximate average traffic volume over time.

Census tract boundaries come from the 2010 TIGER/Line shapefiles (U.S. Census Bureau, 2010).

Coverage

The dataset contains one observation per year per census tract in the United States, excluding U.S. island territories.

Note that data is not available for every tract and year because traffic measurements are not available for every year. Most observations are from 1993 and later. Years-long gaps between measures are common. See Appendices A and B for distributions of data by year and state.

Methodology

This dataset is one of several created to investigate the impact of disamenities (Weiss et al., 2011) on neighborhood walkability. Walkability blends geography, urban planning, and public health to measure how friendly an area is to walking through built and social environmental features such as pedestrian street design, transit nodes, land use mix, parks, greenspace, and welcoming public spaces (Sallis et al., 2009, Chudyk et al. 2017). However, neighborhood disamenities such as crime, pedestrian safety (e.g. due to high volumes of traffic), and noxious land uses might inhibit walkability by dissuading people from using neighborhood resources such as parks and recreational facilities (Weiss et al., 2011). Studies have found an inverse relationship between perceptions of traffic/busy roads and walking for transit and recreation (Owen et al., 2004). High traffic volume especially limits walkability for older adults and people with disabilities (Rosenberg et al., 2013, Early et al., 2021). In addition, residence in

neighborhoods with a high density of traffic and industrial facilities has been shown to contribute to chronic respiratory morbidity in children, which may have broad implications for other urban populations that commonly have high asthma prevalence and exposure to a high density of traffic and stationary air pollution sources (Patel, 2011).

This dataset aims to characterize the average volume of traffic passing through a census tract in a given year. To create this data, we used three different types of traffic counts within TrafficMetrix:

Count Type	Definition	Portion of Data
Average annual daily traffic (AADT)	Traffic counts that are both seasonally adjusted to represent an average day of the year, and day-of-week adjusted to represent both weekday and weekend traffic.	91%
Average annual weekday traffic (AAWDT)	Traffic counts that are seasonally adjusted to represent an average day of the year, but are taken Monday-Friday only.	2%
Average daily traffic (ADT)	Traffic counts that are day-of-week adjusted to represent both weekday and weekend traffic, but are not seasonally adjusted.	7%

For each location corresponding to one of these counts, we obtained its latitude and longitude and whether the location is on a highway. We assigned the latitudes and longitudes to census tracts, then determined the average, maximum, minimum, and number of traffic volume measurements across all locations in the tract in a given year. We also created these measures for highway traffic only and for non-highway traffic only.

Usage Notes

Interpolated Data Not Available

In the ZIP code tabulation area version of this dataset, traffic volume is interpolated in years for which no source data is available. Interpolated data is not yet available at the census tract level, but will be added in a future update.

Related Datasets

Data users interested in walkability and neighborhood disamenities (such as pollution and traffic) might find useful data in these other NaNDA datasets:
- Polluting sites by census tract, United States, 2000-2018
- Primary and secondary roads by census tract, United States, 2010
- Street connectivity by census tract, United States, 2010

Data users interested in other resources that contribute to walkability, such as parks, public transit, and retail and other destinations, may find the following additional NaNDA datasets to be of use:

- [Arts, entertainment, and recreation services by census tract, United States, 2003-2017](#)
- [Eating and drinking places by census tract, United States, 2003-2017](#)
- [Retail establishments by census tract, United States, 2003-2017](#)
- [Parks by census tract, United States, 2018](#)
- [Public transit stops by census tract, United States, 2016-2018](#)

Variables

Variable	Type	Obs	Unique	Mean	Min	Max	Label
tract_fips10	string	671735	71594	.	.	.	Census tract FIPS code (2010 TIGER/Line shapefiles)
year	int	671735	57	2006.384	1963	2019	Traffic count year
mean_traffic	float	671735	259091	15167.43	1	429000	Mean of average daily traffic counts in tract
min_traffic	float	671735	43729	9686.804	1	429000	Lowest average daily traffic count in tract
max_traffic	float	671735	70738	25161.82	1	1785989	Highest average daily traffic count in tract
count_traffic	float	671735	404	6.658227	1	608	# traffic measurements in tract
total_traffic	float	671735	152020	62120.73	1	7010088	Sum of average daily traffic counts in tract
mean_hw_traffic	float	117859	50967	51491.52	4	674123	Mean of average daily highway traffic counts in tract
min_hw_traffic	float	117859	32866	45806.72	1	674123	Lowest average daily highway traffic count in tract
max_hw_traffic	float	117859	37199	58310.76	4	674123	Highest average daily highway traffic count in tract
count_hw_traffic	float	671735	48	0.401644	0	94	# highway traffic measurements in tract
total_hw_traffic	float	671735	45765	15868.75	0	6405830	Sum of average daily highway traffic counts in tract
mean_nonhw_traffic	float	650400	236382	11517.5	1	429000	Mean of average daily non-highway traffic counts in tract
min_nonhw_traffic	float	650400	38996	7501.606	1	429000	Lowest average daily non-highway traffic count in tract
max_nonhw_traffic	float	650400	57430	17877.48	1	1785989	Highest average daily non-highway traffic count in tract
count_nonhw_traffic	float	671735	399	6.256583	0	608	# non-highway traffic measurements in tract
total_nonhw_traffic	float	671735	132328	46251.99	0	6443664	Sum of average daily non-highway traffic counts in tract
count_intersections	float	668607	2422	248.6095	0	15966	# intersections in tract
mean_traffic_ per_intersection	float	668430	556919	163.85	0.001742	55500	Avg daily traffic per intersection (mean_traffic/count_intersections)
mean_hw_traffic_ per_intersection	float	117121	103358	428.8096	0.004199	55500	Avg daily highway traffic per intersection (mean_hw_traffic/count_intersections)
mean_nh_traffic_ per_intersection	float	647307	534600	128.5687	0.001742	38750	Avg daily non-highway traffic per intxn (mean_nonhw_traffic/count_intersections)

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Appendices

Appendix A. Observations per Tract by Year

n=73,057 census tracts in 2010 (U.S. Census Bureau, 2021).

Year	Tracts with Traffic Measurements	
	n	*%*
1963	1	0.00%
1964	3	0.00%
1965	5	0.01%
1966	20	0.03%
1967	7	0.01%
1968	2	0.00%
1969	11	0.02%
1970	5	0.01%
1971	8	0.01%
1972	46	0.06%
1973	111	0.15%
1974	15	0.02%
1975	41	0.06%
1976	54	0.07%
1977	106	0.15%
1978	158	0.22%
1979	68	0.09%
1980	196	0.27%
1981	252	0.34%
1982	368	0.50%
1983	339	0.46%
1984	560	0.77%
1985	896	1.23%
1986	1,384	1.89%
1987	1,657	2.27%
1988	2,069	2.83%
1989	2,831	3.88%
1990	3,626	4.96%
1991	4,396	6.02%
1992	7,114	9.74%
1993	8,041	11.01%
1994	12,532	17.15%
1995	14,669	20.08%
1996	18,659	25.54%
1997	32,465	44.44%

Year	Tracts with Traffic Measurements	
	n	*%*
1998	28,306	38.75%
1999	20,380	27.90%
2000	17,596	24.09%
2001	19,912	27.26%
2002	28,855	39.50%
2003	25,436	34.82%
2004	24,818	33.97%
2005	26,983	36.93%
2006	23,003	31.49%
2007	21,477	29.40%
2008	24,770	33.91%
2009	25,889	35.44%
2010	30,517	41.77%
2011	28,197	38.60%
2012	28,645	39.21%
2013	26,109	35.74%
2014	24,944	34.14%
2015	26,213	35.88%
2016	19,899	27.24%
2017	20,740	28.39%
2018	47,915	65.59%
2019	18,416	25.21%

Appendix B. Observations by State and Interpolation Status

Source for number of tracts per state: U.S. Census Bureau (2021). "Max Possible Values" is the number of tracts in the state multiplied by the total number of observation years (57).

State FIPS Code	State Name	Census Tracts	Max Possible Values	Tracts with Traffic Measurements	
				n	*%*
01	Alabama	1,181	67,317	6,376	9.47%
02	Alaska	167	9,519	1,200	12.61%
04	Arizona	1,526	86,982	16,633	19.12%
05	Arkansas	686	39,102	6,431	16.45%
06	California	8,057	459,249	82,023	17.86%
08	Colorado	1,249	71,193	16,656	23.40%
09	Connecticut	833	47,481	6,738	14.19%
10	Delaware	218	12,426	1,432	11.52%
11	District of Columbia	179	10,203	1,872	18.35%
12	Florida	4,245	241,965	35,191	14.54%
13	Georgia	1,969	112,233	22,468	20.02%
15	Hawaii	351	20,007	1,928	9.64%
16	Idaho	298	16,986	2,154	12.68%
17	Illinois	3,123	178,011	26,014	14.61%
18	Indiana	1,511	86,127	13,977	16.23%
19	Iowa	825	47,025	5,768	12.27%
20	Kansas	770	43,890	5,076	11.57%
21	Kentucky	1,115	63,555	11,241	17.69%
22	Louisiana	1,148	65,436	7,359	11.25%
23	Maine	358	20,406	2,239	10.97%
24	Maryland	1,406	80,142	12,663	15.80%
25	Massachusetts	1,478	84,246	15,355	18.23%
26	Michigan	2,813	160,341	32,908	20.52%
27	Minnesota	1,338	76,266	12,379	16.23%
28	Mississippi	664	37,848	3,630	9.59%
29	Missouri	1,393	79,401	13,143	16.55%
30	Montana	271	15,447	1,397	9.04%
31	Nebraska	532	30,324	4,697	15.49%
32	Nevada	687	39,159	6,638	16.95%
33	New Hampshire	295	16,815	2,999	17.84%
34	New Jersey	2,010	114,570	18,588	16.22%
35	New Mexico	499	28,443	2,484	8.73%
36	New York	4,919	280,383	38,568	13.76%
37	North Carolina	2,195	125,115	14,709	11.76%
38	North Dakota	205	11,685	1,913	16.37%
39	Ohio	2,952	168,264	32,885	19.54%

State FIPS Code	State Name	Census Tracts	Max Possible Values	Tracts with Traffic Measurements	
				n	%
40	Oklahoma	1,046	59,622	9,540	16.00%
41	Oregon	834	47,538	10,005	21.05%
42	Pennsylvania	3,218	183,426	36,330	19.81%
44	Rhode Island	244	13,908	1,386	9.97%
45	South Carolina	1,103	62,871	8,084	12.86%
46	South Dakota	222	12,654	1,262	9.97%
47	Tennessee	1,497	85,329	9,389	11.00%
48	Texas	5,265	300,105	45,871	15.28%
49	Utah	588	33,516	5,642	16.83%
50	Vermont	184	10,488	1,246	11.88%
51	Virginia	1,907	108,699	17,720	16.30%
53	Washington	1,458	83,106	19,300	23.22%
54	West Virginia	484	27,588	2,769	10.04%
55	Wisconsin	1,409	80,313	15,081	18.78%
56	Wyoming	132	7,524	378	5.02%