MBUFs data source exploration, analysis and calculation

I. INTRODUCTION

It is increasingly unsustainable to use the fuel tax as the main highway funding source is becoming increasingly unsustainable. MBUFs have become one of the most attractive alternatives to the fuel tax. This paper analyzes table relationship from data source U.S. Federal Highway Administration for MBUFs calculation and compares U.S. Federal Highway Administration with U.S. Census Bureau Tiger Shapefiles to see whether these two datasets are matched so we can do county level MBUFs. Then this paper summarizes sources and categories of funds that are collected and disbursed in support of highways by states in the USA. We do this to help states considering mileage-based user fees (MBUFs) or road user charges (RUCs) appreciate how they might use the available data to set appropriate fee levels to transition from fuel taxes. Finally, we proposed four ways to calculate MBUFs for state administrated roads based on highway statistics data: Single MBUFs across all vehicle types and roadway types; Different MBUFs for each type of vehicle; Different MBUFs for all vehicle and different by type of road; Different MBUFs for rural and urban area.

Because of the growing number of electric and hybrid electric and the increasing fuel efficiency of conventional vehicles, fuel tax revenue is decreasing and many U.S. states and localities have diverted specific fees and taxes designed to fund highways[1]. These disadvantages may cause increasing congestion, additional traffic accidents and shorter vehicle lifespans. Therefore, thinking about using mileage-based user fees (MBUF) as a direct activity charge and more sustainable revenue source is an alternative. Some of the benefits of MBUFs include increased cost recovery for new facilities, congestion management and traffic reduction, the ability to privately finance roadways, possible incentives for fuel efficient vehicles through lower rates, and a greater wealth of data for use in improving planning models[2].

II. DATA SOURCE

For our goal of exploring how to set a mileage based user fee, we should figure out what data exists, what data we could use and what kinds of data we care about mostly. So finding proper data source is very important when thinking of MBUFs. Highway statistics series from federal highway administration and U.S. Census Bureau Tiger Shapefiles might be helpful for us.

A. Highway Statistics

The Highway Statistics Series consists of annual reports containing analyzed statistical information on motor fuel, motor vehicle registrations, driver licenses, highway user taxation, highway mileage, travel, and highway finance[3]. This data source contains data from year 1992 to year 2018.

B. U.S. Census Bureau Tiger Shapefiles

The TIGER/Line Shapefiles include information for the fifty states, the District of Columbia, Puerto Rico, and the Island areas (American Samoa, the Commonwealth of the Northern Mariana Islands, Guam, and the United States Virgin Islands). The shapefiles from the Census Bureau include polygon boundaries of geographic areas and features(such as area of hydrography shapefile, landmarks shapefiles etc.), linear features including roads and hydrography, and point features. They do not contain any sensitive data[4]. In this paper, we are using shapefiles for fifty states with county level roads. And we just care about three main roadway types, primary roads, secondary roads and local roads and since the total length of other roadway types are so small so we can just ignore them, such as Alley, Ramp.

III. DATA ILLUSTRATION

Part 1 Highway Statistics Data

A. Mileage Part

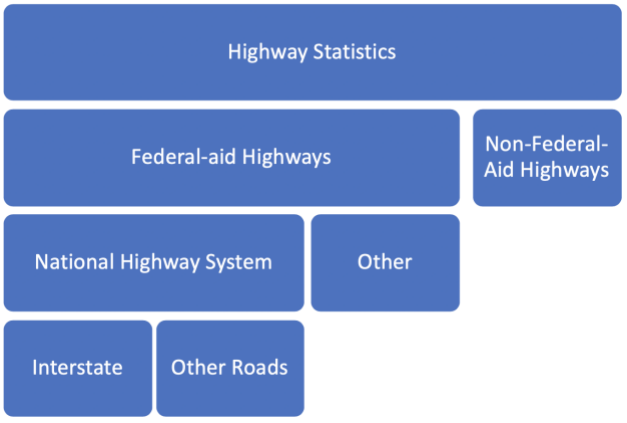
(1) Definition about highway system

Federal-aid highway system contains National Highway System and Interstate System. ~~And federal~~ The National Highway System (NHS) is a network of strategic highways within the United States, including the Interstate Highway System and other roads serving major airports, ports, rail or truck terminals, railway stations, pipeline terminals and other strategic transport facilities. Altogether, it constitutes the largest highway system in the world.

(a) Interstate System.
Interstate System consists of routes of highest importance to the Nation, which connect as directly as practicable the principal metropolitan areas, cities, and industrial centers. And it includes important routes into, through, and around urban areas, serve the national defense and, to the greatest extent possible, connect at suitable border points with routes of continental importance in Canada and Mexico[5].

(b) National Highway System.
National Highway System(NHS) consists of interconnected urban and rural principal arterials and highways (including toll facilities) which serve major population centers, international border crossings, ports, airports, public transportation facilities.[5]

(c) Federal-aid highway system
Federal-aid highways contains highways and roads that not classified as local roads or rural minor collectors[5].
In the following plot, we can easily see the relationship in the three highway systems: All routes on the Interstate System are a part of the National Highway System and Federal-aid highway systems consists of the National Highway System and the Interstate System.



(2)Definition of functional system

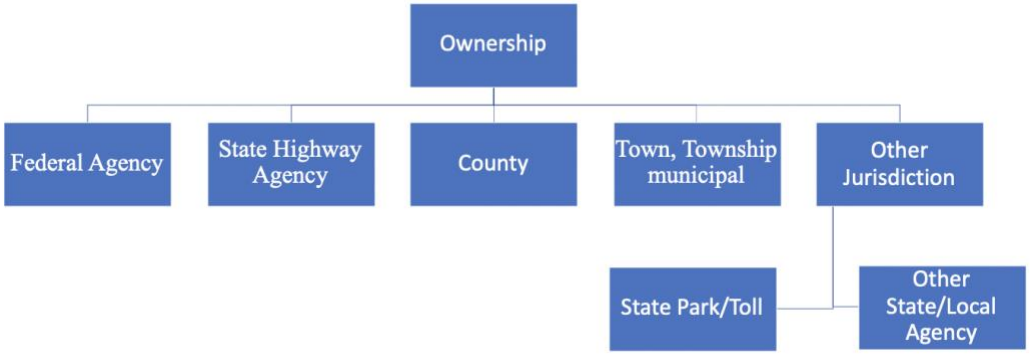
In our highway statistics series, we have seven types of functional system: 1)interstate, 2)minor arterial, 3)other principal arterial, 4)major collector, 5)minor collector, 6)other freeways and expressways, 7)local in our mileage tables. They represent different levels of roads.
Arterial contains principal arterials, interstate, freeways and expressways, and minor arterial.
Collector contains minor collector and major collector.

For function of roads: arterials are used to connect one urban center to another and collectors connect towns to arterials and other kinds of local roads to connect rural facilities and infrastructures.

(3)Ownership:

The Highway Statistics data represent five types of ownership, which is hierarchy of governments claim the possession of roads.

Five kinds of ownership: federal agency, state highway agency, other jurisdictions(Includes State park, State toll, other State agency, other local agency, and other roadways not identified by ownership), county, town township municipal for both national level and state level.



(4) Public roads

A public road is any road under the ownership of and maintained by a public authority (federal, state, county, town or township, local government, etc.) and open to public travel. Public roads does not contain data on private road mileage.

(5)Relationship between public road in National tables and State tables

There are two sections in the Highway Statistics data that generalize the public road length. One is section 4.3 having data for national scale roads information and another is section 4.4 having data for state scale roads inforamtion.

From section 4.3 national tables in highway statistics, there are three tables talking about public road length in different ways (HM-12, HM-16 and HM-18). Table HM-12 in Highway Statistic provides data on different types of surface in different kinds of functional system. For HM-16, it's talking about different kinds of federal-aid highway systems in different ownership. For HM-18, it's talking about different kinds of federal-aid highway systems in different functional system.

From section 4.4, Tables HM-10, HM-20 and HM-50 show data in a state scale, while the public road tables in state tables show all data in a state scale in same formats respectively, by telling us there are how many miles of roads in different ownerships or functional systems in each state.

The common place for two kinds of tables is that they have same numbers of total number, while state section tells us more details (in different states).

Fig. 2 Comparison between HM-10 and HM-16 (from year 2015, HM-10 part) [7]

DECEMBER 2016 — TABLE HM-10

STATE	RURAL: STATE HIGHWAY AGENCY	RURAL: COUNTY	RURAL: TOWN, TOWNSHIP, MUNICIPAL (1)	RURAL: OTHER JURIS-DICTIONS (2)	RURAL: FEDERAL AGENCY (3)	RURAL: TOTAL	URBAN: STATE HIGHWAY AGENCY	URBAN: COUNTY	URBAN: TOWN, TOWNSHIP, MUNICIPAL (1)	URBAN: OTHER JURIS-DICTIONS (2)	URBAN: FEDERAL AGENCY (3)	URBAN: TOTAL	TOTAL UNREPORED	TOTAL
Alabama	8,362	60,150	6,288	169	819	75,788	2,558	2,059	20,931	0	683	26,231	-	102,019
Alaska	4,917	2,314	1,491	2,340	2,234	13,296	694	1,729	329	8	73	2,833	-	16,129
Arizona	5,577	13,720	2,459	4,040	14,003	39,800	1,245	4,247	20,216	376	238	26,322	-	66,122
Arkansas	14,082	64,613	4,637	-	2,148	85,481	2,341	1,398	12,896	-	493	17,128	-	102,609
California	10,407	63,750	1,177	955	10,060	86,349	4,686	21,705	81,932	143	1,019	109,485	-	195,834
Colorado	7,538	51,302	2,073	833	6,526	68,271	1,523	4,747	14,145	20	33	20,469	-	88,740
Connecticut	1,170	-	4,230	264	20	5,683	2,550	-	13,151	71	57	15,829	-	21,512
Delaware	2,845	-	52	41	72	3,010	2,558	-	761	37	50	3,406	-	6,416
Dist. of Columbia	-	-	-	-	-	-	1,374	-	-	31	101	1,507	-	1,507
Florida	5,643	26,454	2,578	81	1,733	36,489	6,473	43,981	35,251	5	459	86,170	-	122,659
Georgia	12,588	58,257	4,078	90	2,775	77,788	5,361	29,156	15,757	31	41	50,346	-	128,134
Hawaii	483	1,023	-	49	113	1,668	459	2,291	-	21	17	2,788	-	4,455
Idaho	4,597	16,038	1,773	14,627	8,196	45,231	395	369	4,271	896	2	5,932	-	51,163
Illinois	10,432	13,846	71,276	414	217	96,185	5,535	2,639	41,056	396	29	49,655	-	145,840
Indiana	8,794	53,920	2,824	522	296	66,356	2,374	11,267	16,353	79	140	30,214	-	96,571
Iowa	7,828	88,130	5,461	435	114	101,968	1,051	1,622	9,581	184	25	12,464	10	114,442
Kansas	9,480	111,296	5,101	173	730	126,780	812	2,041	10,953	66	3	13,874	-	140,654
Kentucky	24,518	37,149	1,878	483	794	64,822	3,118	2,857	8,823	77	159	15,035	-	79,857
Louisiana	12,963	27,966	2,209	21	649	43,808	3,726	4,742	9,123	13	7	17,610	-	61,419
Maine	7,395	369	11,742	241	162	19,910	963	-	1,983	52	2	3,001	-	22,911
Maryland	2,659	9,626	365	106	705	13,461	2,495	11,831	3,955	183	112	18,576	-	32,037
Massachusetts	564	-	5,545	241	19	6,369	2,381	-	27,139	369	80	29,969	85	36,423
Michigan	6,853	72,746	2,837	78	1,808	84,322	2,815	16,766	18,377	6	-	37,964	-	122,286
Minnesota	10,257	43,618	58,546	1,675	2,527	116,624	1,554	2,913	17,635	40	1	22,144	-	138,767
Mississippi	9,499	50,249	3,176	625	362	63,912	1,402	2,703	8,686	14	60	12,865	-	76,777
Missouri	30,762	69,679	5,459	80	1,184	107,165	3,110	3,664	17,520	30	59	24,384	-	131,549
Montana	10,502	42,595	1,180	4,227	12,318	70,822	512	-	3,674	-	-	4,186	-	75,007
Nebraska	9,491	60,517	17,053	114	160	87,335	450	749	5,869	7	71	7,146	-	94,481
Nevada	4,664	26,185	170	18	3,227	34,263	717	3,387	5,457	52	26	9,638	-	43,900
New Hampshire	3,186	-	7,731	18	148	11,083	717	-	4,251	88	-	5,056	-	16,138
New Jersey	352	1,569	3,024	565	174	5,684	1,988	5,081	25,731	447	134	33,381	-	39,065
New Mexico	11,007	37,136	1,531	154	10,885	60,712	969	3,613	3,769	-	6	8,356	-	69,069
New York	9,617	15,552	38,217	668	344	64,398	5,433	4,647	38,678	810	399	49,966	1	114,365
North Carolina	59,229	-	2,375	1,017	2,881	65,502	20,330	-	20,310	22	170	40,832	-	106,334
North Dakota	7,184	10,517	65,737	19	1,546	85,003	223	12	1,890	-	-	2,125	-	87,128
Ohio	13,555	25,144	35,618	989	186	75,492	5,673	4,140	37,388	147	86	47,434	-	122,926
Oklahoma	10,851	75,394	7,551	980	13	94,790	1,406	2,717	13,678	121	-	17,922	-	112,711
Oregon	6,431	29,136	1,252	1,372	20,450	58,641	1,230	3,755	9,775	101	41	14,902	-	73,544
Pennsylvania	28,522	27	42,375	827	740	72,492	11,234	314	35,448	522	81	47,599	-	120,091
Rhode Island	374	-	952	9	25	1,361	717	-	3,843	58	69	4,686	-	6,046
South Carolina	29,792	25,583	523	194	1,589	57,681	11,567	4,345	2,654	1	3	18,569	-	76,250
South Dakota	7,507	34,977	32,894	1,414	2,401	79,193	259	286	2,578	259	2	3,383	-	82,576
Tennessee	10,028	49,126	3,627	384	1,172	64,336	3,851	8,670	18,746	14	20	31,301	-	95,637
Texas	64,729	127,691	10,759	6	2,037	205,222	15,694	19,270	72,444	365	600	108,373	-	313,596
Utah	4,685	23,410	2,283	522	4,347	35,246	1,186	811	9,017	-	38	11,052	-	46,299
Vermont	2,377	-	10,256	-	158	12,791	252	-	1,203	-	7	1,462	-	14,252
Virginia	44,922	28	438	-	1,885	47,273	13,726	1,702	11,404	39	917	27,789	-	75,061
Washington	5,515	32,849	1,387	8,291	8,263	56,305	1,543	6,424	15,551	82	433	24,033	-	80,338
West Virginia	29,964	-	590	239	834	31,627	4,439	-	2,661	43	0	7,143	-	38,770
Wisconsin	9,596	19,073	62,192	-	855	91,716	2,150	1,700	19,724	-	82	23,656	-	115,372
Wyoming	6,239	14,147	732	980	3,886	26,010	459	505	1,722	245	-	2,931	-	28,942
U.S. Total	610,551	1,586,872	557,701	51,596	138,791	2,945,511	170,280	246,856	778,289	6,568	7,127	1,209,120	96	4,154,727
Puerto Rico (4)	1,024	-	2,057	-	23	3,104	3,558	-	10,009	0	7	13,574	13	16,691
Grand Total	611,576	1,586,872	559,758	51,596	138,814	2,948,615	173,838	246,856	788,298	6,568	7,135	1,222,694	109	4,171,418

For footnotes, see Footnotes Page.

DECEMBER 2016 — TABLE HM-16

OWNERSHIP	FEDERAL-AID HIGHWAYS: NATIONAL HIGHWAY SYSTEM: INTERSTATE	NATIONAL HIGHWAY SYSTEM: OTHER	NATIONAL HIGHWAY SYSTEM: TOTAL	OTHER	TOTAL	NON-FEDERAL-AID HIGHWAYS	TOTAL
Rural:							
State Highway Agency	27,630	95,703	123,334	305,686	429,019	181,532	610,551
County	-	387	387	216,105	216,492	1,370,380	1,586,872
Town, Township, Municipal (2)	-	69	69	11,084	11,153	546,548	557,701
Other Jurisdictions (3)	1,360	376	1,735	2,866	4,601	46,997	51,598
Federal Agency	-	139	139	5,902	6,041	132,750	138,791
Total Rural	28,990	96,674	125,664	541,642	667,307	2,278,206	2,945,513
Small Urban Areas:							
State Highway Agency	2,685	13,859	16,544	18,312	34,856	6,335	41,191
County	-	179	179	11,927	12,106	36,043	48,150
Town, Township, Municipal (2)	-	694	694	23,523	24,218	106,909	131,126
Other Jurisdictions (3)	91	25	116	92	207	926	1,133
Federal Agency	-	5	5	300	305	798	1,103
Total Small Urban Area	2,776	14,762	17,538	54,155	71,692	151,011	222,703
Urbanized Areas:							
State Highway Agency	15,047	43,374	58,421	44,312	102,733	26,356	129,089
County	-	4,324	4,324	49,563	53,888	144,818	198,706
Town, Township, Municipal (2)	17	14,462	14,479	109,176	123,655	523,508	647,163
Other Jurisdictions (3)	1,223	1,005	2,228	678	2,907	2,622	5,529
Federal Agency	-	88	88	298	386	5,638	6,024
Total Urbanized Area	16,287	63,253	79,541	204,028	283,569	702,943	986,511
Total Urban:							
State Highway Agency	17,733	57,233	74,965	62,624	137,589	32,691	170,280
County	-	4,504	4,504	61,490	65,994	180,862	246,856
Town, Township, Municipal (2)	17	15,156	15,173	132,700	147,873	630,417	778,289
Other Jurisdictions (3)	1,314	1,030	2,344	770	3,114	3,548	6,662
Federal Agency	-	93	93	599	692	6,436	7,127
Total Urban	19,063	78,015	97,078	258,182	355,261	853,953	1,209,214
Total Rural and Urban	48,053	174,690	222,743	799,825	1,022,567	3,132,160	4,154,727

For footnotes, see Footnotes Page.

Fig. 3 Comparison between HM-10 and HM-16 (from year 2015, HM-16 part) [8]

DECEMBER 2016 TABLE HM-20

STATE	RURAL								URBAN								TOTAL
	INTERSTATE	OTHER FREEWAYS AND EXPRESSWAYS	OTHER PRINCIPAL ARTERIAL	MINOR ARTERIAL	MAJOR COLLECTOR	MINOR COLLECTOR	LOCAL	TOTAL	INTERSTATE	OTHER FREEWAYS AND EXPRESSWAYS	OTHER PRINCIPAL ARTERIAL	MINOR ARTERIAL	MAJOR COLLECTOR	MINOR COLLECTOR	LOCAL	TOTAL	
Alabama	571	-	2,035	4,015	12,201	6,636	50,330	75,788	430	27	1,298	2,345	3,622	186	18,324	26,231	102,019
Alaska	1,002	-	802	431	1,598	1,209	8,254	13,296	79	-	136	203	252	236	1,927	2,833	16,129
Arizona	917	18	1,210	1,284	4,204	1,882	30,285	39,800	252	214	843	2,635	1,943	216	20,219	26,322	66,122
Arkansas	410	85	1,897	3,070	11,835	6,889	61,295	85,481	293	116	630	1,830	2,175	242	11,842	17,128	102,609
California	1,209	408	3,287	6,057	11,816	7,902	55,670	86,349	1,241	1,576	6,579	11,144	13,024	385	75,535	109,485	195,834
Colorado	648	28	2,569	3,460	5,448	8,872	47,246	68,271	304	324	1,068	1,808	1,856	67	15,042	20,469	88,740
Connecticut	29	36	119	221	857	417	4,005	5,683	317	244	710	1,673	1,814	311	10,760	15,829	21,512
Delaware	-	25	121	105	435	275	2,048	3,010	41	31	194	204	366	54	2,515	3,406	6,416
Dist. of Columbia	-	-	-	-	-	-	-	-	12	16	107	164	156	-	1,053	1,507	1,507
Florida	717	173	2,619	2,191	4,020	3,206	23,562	36,489	778	572	3,975	4,200	6,447	1,869	68,329	86,170	122,659
Georgia	536	-	2,350	4,712	11,667	6,758	51,764	77,788	712	163	2,306	4,963	3,724	685	37,793	50,346	128,134
Hawaii	-	-	78	255	220	88	1,026	1,668	55	34	265	192	262	188	1,791	2,788	4,455
Idaho	521	-	1,751	1,461	5,941	3,892	31,664	45,231	90	-	472	674	736	7	3,953	5,932	51,163
Illinois	1,243	30	2,295	4,570	13,120	3,553	71,374	96,185	942	109	3,150	4,503	5,380	372	35,199	49,655	145,840
Indiana	768	141	1,448	2,238	9,890	8,685	43,187	66,356	498	171	1,676	3,177	3,317	383	20,993	30,214	96,571
Iowa	612	-	3,419	3,891	14,236	16,022	63,790	101,969	176	-	906	1,658	1,297	-	8,436	12,473	114,442
Kansas	639	404	2,627	4,248	22,449	9,394	87,019	126,780	234	187	338	1,358	1,757	372	9,627	13,874	140,654
Kentucky	622	492	1,216	2,338	5,805	9,329	45,020	64,822	220	73	627	1,395	1,289	190	11,243	15,035	79,857
Louisiana	532	24	1,031	1,893	4,720	3,264	32,344	43,808	405	72	1,074	1,959	2,162	215	11,724	17,610	61,419
Maine	299	-	789	953	3,281	2,151	12,438	19,910	66	18	134	236	519	18	2,010	3,001	22,911
Maryland	142	-	335	726	1,326	1,650	9,281	13,461	338	305	1,183	1,551	1,961	121	13,117	18,576	32,037
Massachusetts	64	10	105	315	867	616	4,390	6,369	510	322	1,979	4,032	3,078	-	20,132	30,054	36,423
Michigan	566	344	2,130	4,886	16,372	4,228	55,796	84,322	686	357	2,361	4,952	3,905	93	25,610	37,964	122,286
Minnesota	594	4	3,481	6,533	15,976	11,901	78,135	116,624	320	162	809	2,697	2,434	98	15,624	22,144	138,767
Mississippi	554	-	1,783	3,746	11,940	2,316	43,572	63,912	253	64	956	1,080	1,566	10	8,935	12,865	76,777
Missouri	842	926	2,032	3,987	16,416	6,216	76,746	107,165	538	478	902	2,161	2,462	93	17,748	24,384	131,549
Montana	1,094	-	2,773	2,843	6,875	8,840	48,397	70,822	98	-	254	290	404	54	3,086	4,186	75,007
Nebraska	415	333	2,353	4,141	11,434	8,782	59,877	87,335	67	127	395	791	563	9	5,204	7,146	94,481
Nevada	448	-	1,504	723	2,198	2,436	26,955	34,263	150	55	358	887	50	1,143	6,995	9,638	43,900
New Hampshire	142	9	324	626	1,039	1,067	7,876	11,083	83	74	222	490	536	-	3,651	5,056	16,138
New Jersey	45	35	157	290	772	334	4,050	5,684	387	453	1,804	3,651	2,925	405	23,756	33,381	39,065
New Mexico	847	-	1,941	2,252	4,545	3,151	47,977	60,712	153	11	684	734	847	305	5,622	8,356	69,069
New York	803	113	2,132	2,873	5,590	9,346	43,541	64,398	941	815	3,098	5,569	5,541	233	33,771	49,967	114,365
North Carolina	551	408	1,547	3,092	7,493	6,034	46,377	65,502	720	465	1,976	3,441	3,343	433	30,453	40,832	106,334
North Dakota	511	-	2,963	2,516	11,988	-	67,024	85,003	60	-	188	303	329	-	1,246	2,125	87,128
Ohio	643	331	1,518	2,649	11,029	6,273	53,049	75,492	931	581	2,428	3,977	5,370	598	33,548	47,434	122,926
Oklahoma	646	-	2,252	2,665	21,129	2,986	65,110	94,790	286	198	1,168	2,205	1,491	118	12,455	17,922	112,711
Oregon	495	-	2,658	2,225	8,169	8,037	37,057	58,641	234	57	856	1,286	2,121	495	9,853	14,902	73,544
Pennsylvania	1,112	357	1,563	4,543	7,372	6,980	50,565	72,492	756	527	2,812	4,017	5,478	-	34,009	47,599	120,091
Rhode Island	18	11	97	72	172	149	842	1,361	52	80	343	343	540	33	3,295	4,686	6,046
South Carolina	546	45	1,546	2,986	10,022	2,044	40,492	57,681	304	84	1,064	1,769	2,821	73	12,454	18,569	76,250
South Dakota	591	291	2,593	2,962	12,421	6,246	54,091	79,193	88	18	134	431	351	-	2,360	3,383	82,576
Tennessee	573	-	1,737	2,969	4,933	9,843	44,279	64,336	531	165	1,795	2,710	2,391	1,030	22,679	31,301	95,637
Texas	2,001	4	8,438	10,465	35,080	14,947	134,288	205,222	1,416	1,511	6,083	7,957	15,620	1,067	74,520	108,373	313,595
Utah	684	9	1,194	1,321	3,261	3,558	25,249	35,246	253	44	650	660	1,106	375	7,964	11,052	46,299
Vermont	259	2	312	728	1,988	869	8,634	12,791	62	16	113	151	240	16	864	1,462	14,252
Virginia	469	88	1,297	3,183	7,254	4,875	30,106	47,273	653	359	1,725	2,711	2,733	770	18,838	27,789	75,061
Washington	429	614	1,312	2,021	8,089	6,245	37,595	56,305	335	417	1,441	2,712	2,744	187	16,197	24,033	80,338
West Virginia	309	9	995	1,310	5,366	2,124	21,515	31,627	245	14	416	763	1,050	90	4,565	7,143	38,770
Wisconsin	512	142	2,931	4,746	12,084	8,475	62,824	91,716	363	329	1,942	2,711	2,872	0	15,438	23,656	115,372
Wyoming	808	-	1,983	1,227	2,731	7,000	12,261	26,010	106	3	229	236	516	42	1,800	2,931	28,942
U.S. Total	28,990	5,948	89,618	133,016	409,676	257,993	2,020,272	2,945,513	19,063	12,038	66,855	113,592	129,677	13,885	854,104	1,209,214	4,154,727
Puerto Rico (1)	43	-	44	225	220	242	2,293	3,067	254	47	379	932	1,120	1	11,384	14,116	17,184
Grand Total	29,033	5,948	89,663	133,241	409,896	258,236	2,022,565	2,948,580	19,317	12,085	67,234	114,523	130,797	13,886	865,488	1,223,331	4,171,911

(1) 2014 data.

Fig. 4 Comparison between HM-20 and HM-18 (from year 2015, HM-20 part) [9]

DECEMBER 2016 TABLE HM-18

FUNCTIONAL SYSTEM	FEDERAL-AID HIGHWAYS					NON-FEDERAL-AID HIGHWAYS	TOTAL
	NATIONAL HIGHWAY SYSTEM						
	INTERSTATE	OTHER	TOTAL	OTHER	TOTAL		
Rural:							
Principal Arterial:							
Interstate	28,990	-	28,990	-	28,990	-	28,990
Other Freeways and Expressways	-	5,917	5,917	31	5,948	-	5,948
Other	-	87,487	87,487	2,132	89,618	-	89,618
Subtotal	28,990	93,404	122,394	2,162	124,556	-	124,556
Minor Arterial	-	2,358	2,358	130,658	133,016	-	133,016
Major Collector	-	854	854	408,821	409,676	-	409,676
Minor Collector	-	17	17	-	17	257,976	257,993
Local	-	41	41	-	41	2,020,230	2,020,272
Total Rural	28,990	96,674	125,664	541,642	667,307	2,278,206	2,945,513
Small Urban:							
Principal Arterial:							
Interstate	2,776	-	2,776	-	2,776	-	2,776
Other Freeways and Expressways	-	1,333	1,333	15	1,348	-	1,348
Other	-	12,574	12,574	1,075	13,650	-	13,650
Subtotal	2,776	13,907	16,683	1,090	17,773	-	17,773
Minor Arterial	-	751	751	20,678	21,429	-	21,429
Major Collector	-	79	79	28,380	28,459	-	28,459
Minor Collector	-	7	7	4,006	4,013	-	4,013
Local	-	18	18	-	18	151,011	151,029
Total Small Urban	2,776	14,762	17,538	54,155	71,692	151,011	222,703
Urbanized:							
Principal Arterial:							
Interstate	16,287	-	16,287	-	16,287	-	16,287
Other Freeways and Expressways	-	10,572	10,572	119	10,690	-	10,690
Other	-	50,340	50,340	2,864	53,205	-	53,205
Subtotal	16,287	60,912	77,199	2,983	80,183	-	80,183
Minor Arterial	-	1,768	1,768	90,395	92,163	-	92,163
Major Collector	-	431	431	100,787	101,218	-	101,218
Minor Collector	-	10	10	9,863	9,873	-	9,873
Local	-	133	133	-	133	702,943	703,075
Total Urbanized	16,287	63,253	79,541	204,028	283,569	702,943	986,511
Total Urban:							
Principal Arterial:							
Interstate	19,063	-	19,063	-	19,063	-	19,063
Other Freeways And Expressways	-	11,904	11,904	134	12,038	-	12,038
Other	-	62,915	62,915	3,940	66,855	-	66,855
Subtotal	19,063	74,819	93,882	4,074	97,956	-	97,956
Minor Arterial	-	2,519	2,519	111,073	113,592	-	113,592
Major Collector	-	510	510	129,167	129,677	-	129,677
Minor Collector	-	16	16	13,869	13,885	-	13,885
Local	-	151	151	-	151	853,953	854,104
Total Urban	19,063	78,015	97,078	258,182	355,261	853,953	1,209,214
Total Rural and Urban	48,053	174,690	222,743	799,825	1,022,567	3,132,160	4,154,727

For footnotes, see Footnotes Page.

Fig. 5 Comparison between HM-20 and HM-18 (from year 2015, HM-18 part) [10]

Although tables from other years are not showing in this report, they also match with corresponding tables with the same format.

HM-80 and HM-81 (State highway agency-owned public road in rural and urban miles, estimated lane-miles and daily travel vehicle miles)

If we just care about roads owned by state highway agency, we can use table HM-80 and HM-81 for knowing miles or lane miles for each state.

HM-80 is a table that only shows us the miles in each kind of functional systems that are possessed by state-owned highway agency.

HM-81 is a table that shows us the miles, lane-miles and daily travel vehicle miles of state highway agency-owned public road, and it also shows us the percentage of state highway agency-owned public road in total. In the comments below HM-81, it explains how we can get percentage from statewide totals. Because the numbers of mile, lane- miles and VMT are only state highway agency-owned part, the formula is as below:

$$\%\ of\ statewide\ total\ of\ miles\ and\ lane\ miles = \frac{miles\ or\ lane\ miles\ of\ state\ highway\ agency - owned\ in\ HM81}{miles\ in\ total\ (HM20)\ and\ lane\ miles\ in\ total\ (HM60)}$$

$$\%\ of\ statewide\ total\ of\ DVMT = \frac{DVMT\ in\ HM81\ \times 1000 \times 365}{VMT\ in\ total\ (VM2) \times 100000}$$

DECEMBER 2016 — TABLE HM-80

STATE	RURAL								URBAN								TOTAL
	INTERSTATE	OTHER FREEWAYS AND EXPRESSWAYS	OTHER PRINCIPAL ARTERIAL	MINOR ARTERIAL	MAJOR COLLECTOR	MINOR COLLECTOR	LOCAL	TOTAL	INTERSTATE	OTHER FREEWAYS AND EXPRESSWAYS	OTHER PRINCIPAL ARTERIAL	MINOR ARTERIAL	MAJOR COLLECTOR	MINOR COLLECTOR	LOCAL	TOTAL	
Alabama	571	-	2,033	3,768	1,958	32	1	8,362	430	27	1,177	846	79	-	0	2,558	10,920
Alaska	1,002	-	802	428	1,357	740	588	4,917	79	-	119	156	167	100	73	694	5,611
Arizona	917	18	1,181	1,117	1,795	207	342	5,577	252	203	307	203	70	2	207	1,245	6,822
Arkansas	410	85	1,897	3,015	8,335	239	103	14,082	293	116	602	871	382	7	69	2,341	16,423
California	1,209	405	3,116	4,920	757	-	-	10,407	1,241	1,522	1,323	543	55	1	-	4,686	15,093
Colorado	648	28	2,567	2,829	1,326	119	21	7,538	304	303	612	228	77	0	-	1,523	9,061
Connecticut	29	36	118	219	739	22	7	1,170	317	244	657	942	367	10	13	2,550	3,720
Delaware	-	25	121	105	435	275	1,883	2,845	41	31	193	202	359	50	1,681	2,558	5,402
Dist. of Columbia	-	-	-	-	-	-	-	-	12	13	96	155	150	-	948	1,374	1,374
Florida	717	173	2,587	1,761	405	-	0	5,643	778	561	3,468	1,500	160	4	2	6,473	12,116
Georgia	536	-	2,345	4,635	5,071	-	2	12,588	712	131	2,049	2,075	372	1	21	5,361	17,949
Hawaii	-	-	77	207	186	12	-	483	55	34	238	82	30	13	8	459	942
Idaho	521	-	1,721	1,237	1,112	-	7	4,597	90	-	242	47	16	-	0	395	4,992
Illinois	1,180	30	2,286	4,476	2,113	38	310	10,432	713	108	2,773	1,314	379	9	239	5,535	15,967
Indiana	678	141	1,431	2,152	4,288	32	74	8,794	431	153	1,092	476	174	-	49	2,374	11,169
Iowa	612	-	3,418	3,709	88	-	1	7,828	172	-	833	46	1	-	-	1,051	8,880
Kansas	467	404	2,627	4,223	1,748	7	4	9,480	169	182	288	142	30	-	-	812	10,292
Kentucky	622	492	1,216	2,338	5,752	9,305	4,793	24,518	220	73	605	1,166	682	167	205	3,118	27,636
Louisiana	532	24	1,017	1,885	4,712	3,054	1,739	12,963	405	72	965	1,232	785	212	56	3,726	16,689
Maine	214	-	789	953	3,281	2,151	8	7,395	39	18	134	235	518	18	0	963	8,358
Maryland	133	-	333	716	990	309	179	2,659	267	231	952	622	268	24	131	2,495	5,154
Massachusetts	64	8	102	218	150	5	17	564	510	283	892	622	35	-	39	2,381	2,945
Michigan	561	344	2,130	3,396	412	0	10	6,853	686	357	1,173	570	20	-	9	2,815	9,668
Minnesota	594	4	3,454	5,187	995	20	4	10,257	320	162	684	354	30	-	4	1,554	11,811
Mississippi	554	-	1,764	3,457	3,545	68	111	9,499	253	61	729	219	92	-	48	1,402	10,901
Missouri	842	926	2,029	3,959	16,137	5,943	927	30,762	538	468	654	597	523	22	308	3,110	33,873
Montana	1,094	-	2,773	2,784	3,095	109	646	10,502	98	-	216	132	39	2	25	512	11,014
Nebraska	415	333	2,353	4,135	2,250	3	4	9,491	67	127	228	27	1	-	-	450	9,941
Nevada	448	-	1,493	680	1,511	262	270	4,664	150	34	235	193	29	70	7	717	5,380
New Hampshire	139	9	315	622	1,018	748	335	3,186	51	31	154	221	210	-	50	717	3,902
New Jersey	41	2	148	153	2	-	6	352	282	196	1,198	286	13	-	13	1,988	2,340
New Mexico	847	-	1,923	2,089	3,663	2,249	236	11,007	153	11	443	171	119	65	6	969	11,976
New York	546	103	2,122	2,787	3,534	483	41	9,617	620	673	1,865	1,731	491	16	37	5,433	15,049
North Carolina	551	408	1,547	2,862	7,475	6,030	40,356	59,229	720	462	1,944	3,107	2,861	386	10,848	20,330	79,559
North Dakota	511	-	2,961	2,516	1,155	-	41	7,184	60	-	141	9	10	-	3	223	7,406
Ohio	492	331	1,516	2,593	7,550	1,070	3	13,555	841	577	1,976	1,453	806	18	3	5,673	19,228
Oklahoma	427	-	1,988	2,659	5,777	-	-	10,851	246	133	720	228	79	-	-	1,406	12,257
Oregon	495	-	2,643	1,810	1,318	77	89	6,431	234	54	637	201	67	3	34	1,230	7,661
Pennsylvania	857	332	1,555	4,489	7,148	6,819	7,322	28,522	517	482	2,603	3,252	3,335	-	1,045	11,234	39,756
Rhode Island	18	11	97	72	126	40	10	374	52	72	304	178	96	3	12	717	1,091
South Carolina	546	45	1,546	2,973	9,908	1,902	12,871	29,792	304	84	1,062	1,690	2,505	51	5,871	11,567	41,359
South Dakota	591	291	2,586	2,926	1,110	-	3	7,507	88	18	108	44	1	-	-	259	7,766
Tennessee	573	-	1,737	2,938	4,778	1	0	10,028	531	154	1,674	1,136	346	9	-	3,851	13,878
Texas	2,001	-	8,417	10,379	33,426	10,320	185	64,729	1,416	1,220	4,439	2,531	5,940	-	148	15,694	80,423
Utah	684	9	1,152	1,258	1,543	28	12	4,685	253	44	617	187	70	1	15	1,186	5,871
Vermont	259	2	301	702	1,106	8	-	2,377	62	12	70	66	41	1	-	252	2,629
Virginia	469	88	1,297	3,067	7,196	4,848	27,957	44,922	652	274	1,061	1,309	1,567	575	8,288	13,726	58,648
Washington	429	614	1,310	1,683	1,479	-	-	5,515	335	412	488	262	46	-	-	1,543	7,058
West Virginia	264	9	995	1,310	5,363	2,122	19,900	29,964	203	14	411	715	832	90	2,174	4,439	34,403
Wisconsin	512	142	2,920	4,611	1,387	15	8	9,596	363	329	1,234	216	8	-	-	2,150	11,746
Wyoming	808	-	1,922	951	2,167	205	206	6,259	106	3	214	58	58	3	18	459	6,718
U.S. Total	27,630	5,870	88,774	123,959	182,772	59,915	121,630	610,551	17,733	10,770	46,899	34,849	25,391	1,935	32,704	170,280	780,831
Puerto Rico (2)	42	-	42	231	227	242	241	1,024	240	52	389	946	1,086	-	845	3,558	4,582
Grand Total	27,672	5,870	88,816	124,190	182,999	60,157	121,871	611,576	17,972	10,821	47,289	35,795	26,476	1,935	33,549	173,838	785,413

For footnotes, see Footnotes Page.

Fig. 6 Comparison between HM-80 and HM-81 (from 2015, HM-80 part)

DECEMBER 2016 TABLE HM-81

STATE	RURAL							URBAN							RURAL AND URBAN						
					% OF STATEWIDE TOTAL RURAL (2)							% OF STATEWIDE TOTAL URBAN (2)							% OF STATEWIDE TOTAL (2)		
	MILES	LANE-MILES (3)	DVMT (4)	AADT/ LANE (5)	MILES	LANE-MILES	DVMT	MILES	LANE-MILES (3)	DVMT (4)	AADT/ LANE (5)	MILES	LANE-MILES	DVMT	MILES	LANE-MILES (3)	DVMT (4)	AADT/ LANE (5)	MILES	LANE-MILES	DVMT
Alabama	8,362	20,442	45,596	2,231	11.0	13.2	58.8	2,558	9,126	56,084	6,146	9.8	15.8	52.5	10,920	29,568	101,680	3,439	10.7	13.9	55.2
Alaska	4,917	10,187	4,146	407	37.0	37.8	71.2	694	1,719	5,930	3,450	24.5	28.4	74.1	5,611	11,906	10,076	846	34.8	36.1	72.9
Arizona	5,577	14,158	32,686	2,309	14.0	17.1	76.5	1,245	5,454	50,334	9,228	4.7	8.9	37.1	6,822	19,612	83,021	4,233	10.3	13.6	46.6
Arkansas	14,082	30,622	36,493	1,192	16.5	17.7	79.0	2,341	7,018	33,725	4,806	13.7	19.0	68.3	16,423	37,640	70,218	1,866	16.0	17.9	73.4
California	10,407	26,704	100,786	3,774	12.1	14.9	68.5	4,686	24,982	400,961	16,050	4.3	9.9	51.9	15,093	51,686	501,747	9,708	7.7	12.0	54.6
Colorado	7,538	17,158	29,709	1,732	11.0	12.4	73.7	1,523	5,771	54,143	9,383	7.4	12.5	55.3	9,061	22,928	83,852	3,657	10.2	12.4	60.7
Connecticut	1,170	2,517	6,400	2,543	20.6	21.8	74.0	2,550	7,315	58,870	8,048	16.1	21.3	75.6	3,720	9,832	65,271	6,638	17.3	21.5	75.4
Delaware	2,845	5,936	6,583	1,109	94.5	94.7	80.1	2,558	5,923	16,424	2,773	75.1	77.7	86.5	5,402	11,859	23,007	1,940	84.2	85.4	84.6
Dist. of Columbia								1,374	3,138	6,961	2,219	91.2	91.3	71.4	1,374	3,138	6,961	2,219	91.2	91.3	71.4
Florida	5,643	15,748	60,344	3,832	15.5	20.3	66.5	6,473	28,011	247,977	8,853	7.5	14.3	52.1	12,116	43,759	308,321	7,046	9.9	16.0	54.4
Georgia	12,588	30,189	58,323	1,932	16.2	18.8	74.5	5,361	18,884	135,799	7,191	10.6	17.0	55.4	17,949	49,074	194,122	3,956	14.0	18.1	60.0
Hawaii	483	968	2,500	2,581	29.0	29.0	51.5	459	1,518	13,155	8,663	16.5	23.7	56.3	942	2,487	15,655	6,295	21.2	25.5	55.5
Idaho	4,597	10,937	16,377	1,497	10.2	11.9	62.7	395	1,405	8,497	6,048	6.7	11.1	43.5	4,992	12,341	24,873	2,015	9.8	11.8	54.5
Illinois	10,432	23,982	47,765	1,992	10.8	12.3	69.7	5,535	18,253	109,258	5,986	11.1	16.5	49.7	15,967	42,235	157,023	3,718	10.9	13.8	54.5
Indiana	8,794	20,733	50,215	2,422	13.3	15.2	64.9	2,374	8,037	53,966	6,715	7.9	12.2	38.9	11,169	28,769	104,181	3,621	11.6	14.2	48.2
Iowa	7,828	18,953	37,183	1,962	7.7	9.1	70.4	1,051	3,786	18,866	4,983	8.4	13.8	49.6	8,880	22,739	56,049	2,465	7.8	9.7	61.7
Kansas	9,480	21,015	25,862	1,231	7.5	8.2	63.0	812	2,981	18,510	6,209	5.9	9.6	41.2	10,292	23,996	44,372	1,849	7.3	8.4	51.6
Kentucky	24,518	52,885	56,914	1,076	37.8	39.6	79.5	3,118	9,102	49,174	5,403	20.7	27.5	79.6	27,636	61,987	106,088	1,711	34.6	37.2	79.6
Louisiana	12,963	28,544	41,121	1,441	29.6	31.6	81.0	3,726	10,789	64,331	5,963	21.2	27.1	79.2	16,689	39,332	105,452	2,681	27.2	30.2	79.9
Maine	7,395	15,323	19,453	1,269	37.1	37.7	67.3	963	2,225	9,185	4,129	32.1	35.0	82.2	8,358	17,548	28,638	1,632	36.5	37.4	71.4
Maryland	2,659	6,104	19,427	3,183	19.8	22.0	68.4	2,495	8,659	83,004	9,586	13.4	20.3	64.3	5,154	14,763	102,432	6,939	16.1	21.0	65.0
Massachusetts	564	1,317	4,355	3,307	8.9	10.2	56.3	2,381	7,985	82,697	10,356	7.9	12.5	53.5	2,945	9,302	87,052	9,358	8.1	12.1	53.6
Michigan	6,853	16,067	45,605	2,838	8.1	9.4	57.2	2,815	11,377	95,279	8,375	7.4	13.2	50.6	9,668	27,444	140,885	5,134	7.9	10.7	52.6
Minnesota	10,257	23,464	40,066	1,708	8.8	9.9	62.4	1,554	5,796	50,721	8,751	7.0	11.9	54.5	11,811	29,260	90,787	3,103	8.5	10.3	57.7
Mississippi	9,499	23,299	40,143	1,723	14.9	17.6	66.1	1,402	4,776	25,704	5,382	10.9	16.8	52.9	10,901	28,075	65,846	2,345	14.2	17.5	60.2
Missouri	30,762	65,811	62,769	954	28.7	30.1	77.8	3,110	10,478	70,972	6,774	12.8	19.3	61.0	33,873	76,289	133,741	1,753	25.7	27.9	67.9
Montana	10,502	23,607	18,010	763	14.8	16.4	77.1	512	1,518	5,513	3,630	12.2	17.0	52.7	11,014	25,125	23,523	936	14.7	16.4	69.5
Nebraska	9,491	20,737	24,992	1,205	10.9	11.8	80.1	450	1,771	10,823	6,110	6.3	11.3	45.3	9,941	22,508	35,816	1,591	10.5	11.7	65.0
Nevada	4,664	10,717	11,561	1,079	13.6	15.3	84.2	717	2,880	23,502	8,159	7.4	12.5	41.0	5,380	13,598	35,064	2,579	12.3	14.6	49.4
New Hampshire	3,186	6,699	11,398	1,701	28.7	29.8	80.5	717	1,705	9,752	5,719	14.2	15.9	44.9	3,902	8,405	21,150	2,516	24.2	25.3	59.0
New Jersey	352	925	5,589	6,040	6.2	7.9	42.2	1,988	7,629	77,129	10,109	6.0	10.4	39.9	2,340	8,555	82,718	9,669	6.0	10.0	40.0
New Mexico	11,007	26,197	27,944	1,067	18.1	20.9	65.7	969	3,307	16,069	4,860	11.6	17.4	49.3	11,976	29,504	44,014	1,492	17.3	20.4	58.6
New York	9,617	21,217	35,763	1,686	14.9	16.1	42.3	5,433	17,103	124,256	7,265	10.9	15.5	47.1	15,049	38,320	160,019	4,176	13.2	15.9	45.9
North Carolina	59,229	122,574	72,228	589	90.4	90.7	70.1	20,330	49,114	155,078	3,158	49.8	54.0	76.2	79,559	171,687	227,306	1,324	74.8	75.9	74.2
North Dakota	7,184	16,432	14,186	863	8.5	9.5	71.0	223	785	3,242	4,129	10.5	16.8	43.1	7,406	17,217	17,428	1,012	8.5	9.7	63.4
Ohio	13,555	30,400	61,448	2,021	18.0	19.6	66.4	5,673	19,016	122,525	6,443	12.0	17.7	56.0	19,228	49,416	183,974	3,723	15.6	18.8	59.1
Oklahoma	10,851	25,003	38,449	1,538	11.4	12.9	66.3	1,406	5,352	31,605	5,905	7.8	13.2	43.5	12,257	30,356	70,054	2,308	10.9	13.0	53.6
Oregon	6,431	14,589	25,670	1,760	11.0	12.3	65.5	1,230	4,005	31,467	7,857	8.3	12.5	52.9	7,661	18,594	57,137	3,073	10.4	12.3	57.9
Pennsylvania	28,522	60,405	69,006	1,142	39.3	40.6	71.2	11,234	27,893	130,277	4,671	23.6	27.5	72.5	39,756	88,297	199,283	2,257	33.1	35.3	72.1
Rhode Island	374	837	2,231	2,666	27.5	29.8	91.7	717	2,011	14,388	7,153	15.3	20.2	75.6	1,091	2,848	16,619	5,835	18.0	22.3	77.4
South Carolina	29,792	62,736	55,630	887	51.6	52.9	86.0	11,567	27,728	70,054	2,526	62.3	66.2	90.9	41,359	90,465	125,684	1,389	54.2	56.4	88.7
South Dakota	7,507	16,984	13,697	806	9.5	10.6	76.8	259	937	3,422	3,652	7.7	12.6	44.4	7,766	17,921	17,119	955	9.4	10.7	67.0
Tennessee	10,028	23,789	52,630	2,212	15.6	18.0	75.4	3,851	13,431	89,991	6,700	12.3	19.1	64.1	13,878	37,220	142,620	3,832	14.5	18.4	67.9
Texas	64,729	144,138	170,190	1,181	31.5	33.9	90.2	15,694	51,618	341,620	6,618	14.5	20.4	65.9	80,423	195,756	511,809	2,615	25.6	28.9	72.4
Utah	4,685	11,270	16,907	1,500	13.3	15.6	74.5	1,186	4,857	36,862	7,589	10.7	19.3	63.1	5,871	16,127	53,769	3,334	12.7	16.5	66.3
Vermont	2,377	5,320	9,730	1,829	18.6	20.3	68.3	252	683	3,085	4,518	17.2	21.9	53.2	2,629	6,003	12,816	2,135	18.4	20.5	64.0
Virginia	44,922	93,574	54,375	581	95.0	95.2	84.1	13,726	33,684	110,355	3,276	49.4	52.1	68.2	58,648	127,258	164,730	1,294	78.1	78.1	72.8
Washington	5,515	12,505	30,409	2,432	9.8	11.0	67.2	1,543	5,973	60,941	10,203	6.4	11.3	51.6	7,058	18,478	91,351	4,944	8.8	11.1	55.9
West Virginia	29,964	61,059	21,386	350	94.7	94.7	80.3	4,439	9,929	23,289	2,346	62.1	64.3	84.1	34,403	70,987	44,675	629	88.7	88.8	82.2
Wisconsin	9,596	22,094	51,617	2,336	10.5	11.9	58.7	2,150	7,575	47,679	6,294	9.1	14.5	58.1	11,746	29,669	99,296	3,347	10.2	12.4	58.4
Wyoming	6,259	14,303	13,791	964	24.1	26.6	75.7	459	1,422	3,751	2,637	15.7	21.9	46.5	6,718	15,726	17,543	1,116	23.2	26.1	66.7
U.S. Total	610,551	1,351,173	1,799,661	1,332	20.7	22.4	70.7	170,280	526,435	3,367,203	6,396	14.1	19.4	56.7	780,831	1,877,608	5,166,865	2,752	18.8	21.5	60.9
Puerto Rico (6)	1,026	2,166	3,297	1,522	33.0	34.3	92.6	3,549	8,517	41,972	4,928	26.4	29.9	85.8	4,575	10,683	45,269	4,238	27.6	30.7	86.3
Grand Total	611,577	1,353,339	1,802,958	1,332	20.7	22.4	70.8	173,829	534,952	3,409,175	6,373	14.2	19.3	57.1	785,406	1,888,291	5,212,134	2,760	18.8	21.5	61.2

For footnotes, see Footnotes Page.

Fig. 7 Comparison between HM-80 and HM-81 (from 2015, HM-81 part)

From the comparison above, we can make a conclusion that HM-81 is just a total summary of HM-80.

DECEMBER 2016 TABLE HM-81

STATE	RURAL							URBAN							RURAL AND URBAN						
					% OF STATEWIDE TOTAL RURAL (2)							% OF STATEWIDE TOTAL URBAN (2)							% OF STATEWIDE TOTAL (2)		
	(1) MILES	LANE-MILES (3)	DVMT (4)	AADT/ LANE (5)	(3) MILES	LANE-MILES	DVMT	MILES	LANE-MILES (3)	DVMT (4)	AADT/ LANE (5)	MILES	LANE-MILES	DVMT	MILES	LANE-MILES (3)	DVMT (4)	AADT/ LANE (5)	MILES	LANE-MILES	DVMT
Alabama	8,362	20,442	45,59	2,231	11.0	13.2	58.8	2,558	9,126	56,084	6,146	9.8	15.8	52.5	10,920	29,568	101,680	3,439	10.7	13.9	55.2
Alaska	4,917	10,187	4,14	407	37.0	37.8	71.2	694	1,719	5,930	3,450	24.5	28.4	74.1	5,611	11,906	10,076	846	34.8	36.1	72.9
Arizona	5,577	14,158	32,68	2,309	14.0	17.1	76.5	1,245	5,454	50,334	9,228	4.7	8.9	37.1	6,822	19,612	83,021	4,233	10.3	13.6	46.6
Arkansas	14,082	30,622	36,49	1,192	16.5	17.7	79.0	2,341	7,018	33,725	4,806	13.7	19.0	68.3	16,423	37,640	70,218	1,866	16.0	17.9	73.4
California	10,407	26,704	100,78	3,774	12.1	14.9	68.5	4,686	24,982	400,961	16,050	4.3	9.9	51.9	15,093	51,686	501,747	9,708	7.7	12.0	54.6
Colorado	7,538	17,158	29,70	1,732	11.0	12.4	73.7	1,523	5,771	54,143	9,383	7.4	12.5	55.3	9,061	22,928	83,852	3,657	10.2	12.4	60.7
Connecticut	1,170	2,517	6,40	2,543	20.6	21.8	74.0	2,550	7,315	58,870	8,048	16.1	21.3	75.6	3,720	9,832	65,271	6,638	17.3	21.5	75.4
Delaware	2,845	5,936	6,58	1,109	94.5	94.7	80.1	2,558	5,923	16,424	2,773	75.1	77.7	86.5	5,402	11,859	23,007	1,940	84.2	85.4	84.6
Dist. of Columbia								1,374	3,138	6,961	2,219	91.2	91.3	71.4	1,374	3,138	6,961	2,219	91.2	91.3	71.4
Florida	5,643	15,748	60,34	3,832	15.5	20.3	66.5	6,473	28,011	247,977	8,853	7.5	14.3	52.1	12,116	43,759	308,321	7,046	9.9	16.0	54.4
Georgia	12,588	30,189	58,32	1,932	16.2	18.8	74.5	5,361	18,884	135,799	7,191	10.6	17.0	55.4	17,949	49,074	194,122	3,956	14.0	18.1	60.0
Hawaii	483	968	2,50	2,581	29.0	29.0	51.5	459	1,518	13,155	8,663	16.5	23.7	56.3	942	2,487	15,655	6,295	21.2	25.5	55.5
Idaho	4,597	10,937	16,37	1,497	10.2	11.9	62.7	395	1,405	8,497	6,048	6.7	11.1	43.5	4,992	12,341	24,873	2,015	9.8	11.8	54.5
Illinois	10,432	23,982	47,76	1,992	10.8	12.3	69.7	5,535	18,253	109,258	5,986	11.1	16.5	49.7	15,967	42,235	157,023	3,718	10.9	13.8	54.5
Indiana	8,794	20,733	50,21	2,422	13.3	15.2	64.9	2,374	8,037	53,966	6,715	7.9	12.2	38.9	11,169	28,769	104,181	3,621	11.6	14.2	48.2
Iowa	7,828	18,953	37,18	1,962	7.7	9.1	70.4	1,051	3,786	18,866	4,983	8.4	13.8	49.6	8,880	22,739	56,049	2,465	7.8	9.7	61.7
Kansas	9,480	21,015	25,86	1,231	7.5	8.2	63.0	812	2,981	18,510	6,209	5.9	9.6	41.2	10,292	23,996	44,372	1,849	7.3	8.4	51.6
Kentucky	24,518	52,885	56,91	1,076	37.8	39.6	79.5	3,118	9,102	49,174	5,403	20.7	27.5	79.6	27,636	61,987	106,088	1,711	34.6	37.2	79.6
Louisiana	12,963	28,544	41,12	1,441	29.6	31.6	81.0	3,726	10,789	64,331	5,963	21.2	27.1	79.2	16,689	39,332	105,452	2,681	27.2	30.2	79.9
Maine	7,395	15,323	19,45	1,269	37.1	37.7	67.3	963	2,225	9,185	4,129	32.1	35.0	82.2	8,358	17,548	28,638	1,632	36.5	37.4	71.4
Maryland	2,659	6,104	19,42	3,183	19.8	22.0	68.4	2,495	8,659	83,004	9,586	13.4	20.3	64.3	5,154	14,763	102,432	6,939	16.1	21.0	65.0
Massachusetts	564	1,317	4,35	3,307	8.9	10.2	56.3	2,381	7,985	82,697	10,356	7.9	12.5	53.5	2,945	9,302	87,052	9,358	8.1	12.1	53.6
Michigan	6,853	16,067	45,60	2,838	8.1	9.4	57.2	2,815	11,377	95,279	8,375	7.4	13.2	50.6	9,668	27,444	140,885	5,134	7.9	10.7	52.6
Minnesota	10,257	23,464	40,06	1,708	8.8	9.9	62.4	1,554	5,796	50,721	8,751	7.0	11.9	54.5	11,811	29,260	90,787	3,103	8.5	10.3	57.7
Mississippi	9,499	23,299	40,14	1,723	14.9	17.6	66.1	1,402	4,776	25,704	5,382	10.9	16.8	52.9	10,901	28,075	65,846	2,345	14.2	17.5	60.2
Missouri	30,762	65,811	62,76	954	28.7	30.1	77.8	3,110	10,478	70,972	6,774	12.8	19.3	61.0	33,873	76,289	133,741	1,753	25.7	27.9	67.9
Montana	10,502	23,607	18,01	763	14.8	16.4	77.1	512	1,518	5,513	3,630	12.2	17.0	52.7	11,014	25,125	23,523	936	14.7	16.4	69.5
Nebraska	9,491	20,737	24,99	1,205	10.9	11.8	80.1	450	1,771	10,823	6,110	6.3	11.3	45.3	9,941	22,508	35,816	1,591	10.5	11.7	65.0
Nevada	4,664	10,717	11,56	1,079	13.6	15.3	84.2	717	2,880	23,502	8,159	7.4	12.5	41.0	5,380	13,598	35,064	2,579	12.3	14.6	49.4
New Hampshire	3,186	6,699	11,39	1,701	28.7	29.8	80.5	717	1,705	9,752	5,719	14.2	15.9	44.9	3,902	8,405	21,150	2,516	24.2	25.3	59.0
New Jersey	352	925	5,58	6,040	6.2	7.9	42.2	1,988	7,629	77,129	10,109	6.0	10.4	39.9	2,340	8,555	82,718	9,669	6.0	10.0	40.0
New Mexico	11,007	26,197	27,94	1,067	18.1	20.9	65.7	969	3,307	16,069	4,860	11.6	17.4	49.3	11,976	29,504	44,014	1,492	17.3	20.4	58.6
New York	9,617	21,217	35,76	1,686	14.9	16.1	42.3	5,433	17,103	124,256	7,265	10.9	15.5	47.1	15,049	38,320	160,019	4,176	13.2	15.9	45.9
North Carolina	59,229	122,574	72,22	589	90.4	90.7	70.1	20,330	49,114	155,078	3,158	49.8	54.0	76.2	79,559	171,687	227,306	1,324	74.8	75.9	74.2
North Dakota	7,184	16,432	14,18	863	8.5	9.5	71.0	223	785	3,242	4,129	10.5	16.8	43.1	7,406	17,217	17,428	1,012	8.5	9.7	63.4
Ohio	13,555	30,400	61,44	2,021	18.0	19.6	66.4	5,673	19,016	122,525	6,443	12.0	17.7	56.0	19,228	49,416	183,974	3,723	15.6	18.8	59.1
Oklahoma	10,851	25,003	38,44	1,538	11.4	12.9	66.3	1,406	5,352	31,605	5,905	7.8	13.2	43.5	12,257	30,356	70,054	2,308	10.9	13.0	53.6
Oregon	6,431	14,589	25,67	1,760	11.0	12.3	65.5	1,230	4,005	31,467	7,857	8.3	12.5	52.9	7,661	18,594	57,137	3,073	10.4	12.3	57.9
Pennsylvania	28,522	60,405	69,00	1,142	39.3	40.6	71.2	11,234	27,893	130,277	4,671	23.6	27.5	72.5	39,756	88,297	199,283	2,257	33.1	35.3	72.1
Rhode Island	374	837	2,23	2,666	27.5	29.8	91.7	717	2,011	14,388	7,153	15.3	20.2	75.6	1,091	2,848	16,619	5,835	18.0	22.3	77.4
South Carolina	29,792	62,736	55,63	887	51.6	52.9	86.0	11,567	27,728	70,054	2,526	62.3	66.2	90.9	41,359	90,465	125,684	1,389	54.2	56.4	88.7
South Dakota	7,507	16,984	13,69	806	9.5	10.6	76.8	259	937	3,422	3,652	7.7	12.6	44.4	7,766	17,921	17,119	955	9.4	10.7	67.0
Tennessee	10,028	23,789	52,63	2,212	15.6	18.0	75.4	3,851	13,431	89,991	6,700	12.3	19.1	64.1	13,878	37,220	142,620	3,832	14.5	18.4	67.9
Texas	64,729	144,138	170,19	1,181	31.5	33.9	90.2	15,694	51,618	341,620	6,618	14.5	20.4	65.9	80,423	195,756	511,809	2,615	25.6	28.9	72.4
Utah	4,685	11,270	16,90	1,500	13.3	15.6	74.5	1,186	4,857	36,862	7,589	10.7	19.3	63.1	5,871	16,127	53,769	3,334	12.7	16.5	66.3
Vermont	2,377	5,320	9,73	1,829	18.6	20.3	68.3	252	683	3,085	4,518	17.2	21.9	53.2	2,629	6,003	12,816	2,135	18.4	20.5	64.0
Virginia	44,922	93,574	54,37	581	95.0	95.2	84.1	13,726	33,684	110,355	3,276	49.4	52.1	68.2	58,648	127,258	164,730	1,294	78.1	78.1	72.8
Washington	5,515	12,505	30,40	2,432	9.8	11.0	67.2	1,543	5,973	60,941	10,203	6.4	11.3	51.6	7,058	18,478	91,351	4,944	8.8	11.1	55.9
West Virginia	29,964	61,059	21,38	350	94.7	94.7	80.3	4,439	9,929	23,289	2,346	62.1	64.3	84.1	34,403	70,987	44,675	629	88.7	88.8	82.2
Wisconsin	9,596	22,094	51,61	2,336	10.5	11.9	58.7	2,150	7,575	47,679	6,294	9.1	14.5	58.1	11,746	29,669	99,296	3,347	10.2	12.4	58.4
Wyoming	6,259	14,303	13,79	964	24.1	26.6	75.7	459	1,422	3,751	2,637	15.7	21.9	46.5	6,718	15,726	17,543	1,116	23.2	26.1	66.7
U.S. Total	610,551	1,351,173	1,799,66	1,332	20.7	22.4	70.7	170,280	526,435	3,367,203	6,396	14.1	19.4	56.7	780,831	1,877,608	5,166,865	2,752	18.8	21.5	60.9

Fig. 8 Relationship between HM-81 and HM-20, HM-60, VM-2 (from 2015, HM-81 part)

DECEMBER 2016 TABLE HM-20

STATE	RURAL INTERSTATE	RURAL OTHER FREEWAYS AND EXPRESSWAYS	RURAL OTHER PRINCIPAL ARTERIAL	RURAL MINOR ARTERIAL	RURAL MAJOR COLLECTOR	RURAL MINOR COLLECTOR	RURAL LOCAL	RURAL TOTAL	URBAN INTERSTATE	URBAN OTHER FREEWAYS AND EXPRESSWAYS	URBAN OTHER PRINCIPAL ARTERIAL	URBAN MINOR ARTERIAL	URBAN MAJOR COLLECTOR	URBAN MINOR COLLECTOR	URBAN LOCAL	URBAN TOTAL	(2) TOTAL
Alabama	571	-	2,035	4,015	12,201	6,636	50,330	75,788	430	27	1,298	2,345	3,622	186	18,324	26,231	102,019
Alaska	1,002	-	802	431	1,598	1,209	8,254	13,296	79	-	136	203	252	236	1,927	2,833	16,129
Arizona	917	18	1,210	1,284	4,204	1,882	30,285	39,800	252	214	843	2,635	1,943	216	20,219	26,322	66,122
Arkansas	410	85	1,897	3,070	11,835	6,889	61,295	85,481	293	116	630	1,830	2,175	242	11,842	17,128	102,609
California	1,209	408	3,287	6,057	11,816	7,902	55,670	86,349	1,241	1,576	6,579	11,144	13,024	385	75,535	109,485	195,834
Colorado	648	28	2,569	3,460	5,448	8,872	47,246	68,271	304	324	1,068	1,808	1,856	67	15,042	20,469	88,740
Connecticut	29	36	119	221	857	417	4,005	5,683	317	244	710	1,673	1,814	311	10,760	15,829	21,512
Delaware	-	25	121	105	435	275	2,048	3,010	41	31	194	204	366	54	2,515	3,406	6,416
Dist. of Columbia	-	-	-	-	-	-	-	-	12	16	107	164	156	-	1,053	1,507	1,507
Florida	717	173	2,619	2,191	4,020	3,206	23,562	36,489	778	572	3,975	4,200	6,447	1,869	68,329	86,170	122,659
Georgia	536	-	2,350	4,712	11,667	6,758	51,764	77,788	712	163	2,306	4,963	3,724	685	37,793	50,346	128,134
Hawaii	-	-	78	255	220	88	1,026	1,668	55	34	265	192	262	188	1,791	2,788	4,455
Idaho	521	-	1,751	1,461	5,941	3,892	31,664	45,231	90	-	472	674	736	7	3,953	5,932	51,163
Illinois	1,243	30	2,295	4,570	13,120	3,553	71,374	96,185	942	109	3,150	4,503	5,380	372	35,199	49,655	145,840
Indiana	768	141	1,448	2,238	9,890	8,685	43,187	66,356	498	171	1,676	3,177	3,317	383	20,993	30,214	96,571
Iowa	612	-	3,419	3,891	14,236	16,022	63,790	101,969	176	-	906	1,658	1,297	-	8,436	12,473	114,442
Kansas	639	404	2,627	4,248	22,449	9,394	87,019	126,780	234	187	338	1,358	1,757	372	9,627	13,874	140,654
Kentucky	622	492	1,216	2,338	5,805	9,329	45,020	64,822	220	73	627	1,395	1,289	190	11,243	15,035	79,857
Louisiana	532	24	1,031	1,893	4,720	3,264	32,344	43,808	405	72	1,074	1,959	2,162	215	11,724	17,610	61,419
Maine	299	-	789	953	3,281	2,151	12,438	19,910	66	18	134	236	519	18	2,010	3,001	22,911
Maryland	142	-	335	726	1,326	1,650	9,281	13,461	338	305	1,183	1,551	1,961	121	13,117	18,576	32,037
Massachusetts	64	10	105	315	867	616	4,390	6,369	510	322	1,979	4,032	3,078	-	20,132	30,054	36,423
Michigan	566	344	2,130	4,886	16,372	4,228	55,796	84,322	686	357	2,361	4,952	3,905	93	25,610	37,964	122,286
Minnesota	594	4	3,481	6,533	15,976	11,901	78,135	116,624	320	162	809	2,697	2,434	98	15,624	22,144	138,767
Mississippi	554	-	1,783	3,746	11,940	2,316	43,572	63,912	253	64	956	1,080	1,566	10	8,935	12,865	76,777
Missouri	842	926	2,032	3,987	16,416	6,216	76,746	107,165	538	478	902	2,161	2,462	93	17,748	24,384	131,549
Montana	1,094	-	2,773	2,843	6,875	8,840	48,397	70,822	98	-	254	290	404	54	3,086	4,186	75,007
Nebraska	415	333	2,353	4,141	11,434	8,782	59,877	87,335	67	127	395	791	553	9	5,204	7,146	94,481
Nevada	448	-	1,504	723	2,198	2,436	26,955	34,263	150	55	358	887	50	1,143	6,995	9,638	43,900
New Hampshire	142	9	324	626	1,039	1,067	7,876	11,083	83	74	222	490	536	-	3,651	5,056	16,138
New Jersey	45	35	157	290	772	334	4,050	5,684	387	453	1,804	3,651	2,925	405	23,756	33,381	39,065
New Mexico	847	-	1,941	2,252	4,545	3,151	47,977	60,712	153	11	684	734	847	305	5,622	8,356	69,069
New York	803	113	2,132	2,873	5,590	9,346	43,541	64,398	941	815	3,098	5,569	5,541	233	33,771	49,967	114,365
North Carolina	551	408	1,547	3,092	7,493	6,034	46,377	65,502	720	465	1,976	3,441	3,343	433	30,453	40,832	106,334
North Dakota	511	-	2,963	2,516	11,988	-	67,024	85,003	60	-	188	303	329	-	1,246	2,125	87,128
Ohio	643	331	1,518	2,649	11,029	6,273	53,049	75,492	931	581	2,428	3,977	5,370	598	33,548	47,434	122,926
Oklahoma	646	-	2,252	2,665	21,129	2,986	65,110	94,790	286	198	1,168	2,205	1,491	118	12,455	17,922	112,711
Oregon	495	-	2,658	2,225	8,169	8,037	37,057	58,641	234	57	856	1,286	2,121	495	9,853	14,902	73,544
Pennsylvania	1,112	357	1,563	4,543	7,372	6,980	50,565	72,492	756	527	2,812	4,017	5,478	-	34,009	47,599	120,091
Rhode Island	18	11	97	72	172	149	842	1,361	52	80	343	343	540	33	3,295	4,686	6,046
South Carolina	546	45	1,546	2,986	10,022	2,044	40,492	57,681	304	84	1,064	1,769	2,821	73	12,454	18,569	76,250
South Dakota	591	291	2,593	2,962	12,421	6,246	54,091	79,193	88	18	134	431	351	-	2,360	3,383	82,576
Tennessee	573	-	1,737	2,969	4,933	9,843	44,279	64,336	531	165	1,795	2,710	2,391	1,030	22,679	31,301	95,637
Texas	2,001	4	8,438	10,465	35,080	14,947	134,288	205,222	1,416	1,511	6,083	7,957	15,820	1,067	74,520	108,373	313,596
Utah	684	9	1,164	1,321	3,261	3,558	25,249	35,246	253	44	650	660	1,106	375	7,964	11,052	46,299
Vermont	259	2	312	728	1,988	869	8,634	12,791	62	16	113	151	240	16	864	1,462	14,252
Virginia	469	88	1,297	3,183	7,254	4,875	30,106	47,273	653	359	1,725	2,711	2,733	770	18,838	27,789	75,061
Washington	429	614	1,312	2,021	8,089	6,245	37,595	56,305	335	417	1,441	2,712	2,744	187	16,197	24,033	80,338
West Virginia	309	9	995	1,310	5,366	2,124	21,515	31,627	245	14	416	763	1,050	90	4,565	7,143	38,770
Wisconsin	512	142	2,931	4,746	12,084	8,475	62,824	91,716	363	329	1,942	2,711	2,872	0	15,438	23,656	115,372
Wyoming	808	-	1,983	1,227	2,731	7,000	12,261	26,010	106	3	229	236	516	42	1,800	2,931	28,942
U.S. Total	28,990	5,948	89,618	133,016	409,676	257,993	2,020,272	2,945,513	19,063	12,038	66,855	113,592	129,677	13,885	854,104	1,209,214	4,154,727

Fig. 9 Relationship between HM-81 and HM-20, HM-60, VM-2 (from 2015, HM-20 part)

STATE	INTERSTATE	OTHER FREEWAYS AND EXPRESSWAYS	OTHER PRINCIPAL ARTERIAL	MINOR ARTERIAL	MAJOR COLLECTOR	MINOR COLLECTOR (2)	LOCAL (2)	TOTAL	INTERSTATE	OTHER FREEWAYS AND EXPRESSWAYS	OTHER PRINCIPAL ARTERIAL	MINOR ARTERIAL	MAJOR COLLECTOR	MINOR COLLECTOR	LOCAL (2)	TOTAL	TOTAL LANE MILES
Alabama	2,401	-	6,065	8,482	24,524	13,272	100,661	155,405	2,157	127	4,886	5,988	7,545	372	36,648	57,722	213,127
Alaska	2,044	-	1,623	1,091	3,263	2,418	16,508	26,947	242	-	491	487	512	475	3,854	6,060	33,007
Arizona	3,708	70	3,398	2,646	8,557	3,764	60,570	82,713	1,462	1,540	3,693	9,260	4,375	441	40,439	61,209	143,922
Arkansas	1,638	339	4,995	6,368	23,709	13,778	122,591	173,419	1,353	482	2,209	4,325	4,424	487	23,684	36,963	210,382
California	5,387	1,676	8,417	12,379	23,762	15,804	111,340	178,765	9,656	9,466	23,426	30,277	28,638	785	151,070	253,319	432,084
Colorado	2,628	112	5,774	6,982	10,904	17,743	94,492	138,636	1,512	1,364	4,094	4,828	4,015	139	30,083	46,035	184,671
Connecticut	150	141	249	445	1,716	835	8,009	11,544	1,718	998	1,889	3,751	3,768	627	21,520	34,271	45,815
Delaware	-	108	403	238	871	551	4,096	6,266	256	139	762	570	757	111	5,030	7,625	13,892
Dist. of Columbia	-	-	-	-	-	-	-	-	78	69	441	437	305	-	2,106	3,438	3,438
Florida	3,376	673	7,356	4,527	8,123	6,413	47,124	77,592	4,774	2,843	17,485	14,170	15,484	4,170	136,659	195,585	273,177
Georgia	2,559	-	7,601	10,003	23,395	13,517	103,529	160,604	4,419	751	8,512	12,441	7,905	1,392	75,586	111,006	271,611
Hawaii	-	-	157	512	441	177	2,051	3,338	342	152	822	535	574	394	3,582	6,400	9,738
Idaho	2,084	-	4,073	3,015	11,924	7,785	63,329	92,209	447	-	1,311	1,460	1,490	13	7,906	12,627	104,836
Illinois	5,042	120	5,130	9,219	26,264	7,106	142,748	195,629	4,880	456	10,659	11,899	11,645	754	70,398	110,692	306,320
Indiana	3,111	555	3,943	4,729	20,014	17,370	86,373	136,094	2,459	664	5,621	7,453	6,901	783	41,985	65,866	201,961
Iowa	2,443	-	8,841	7,858	28,453	32,044	127,579	207,218	830	-	3,108	4,029	2,682	-	16,872	27,520	234,738
Kansas	2,580	1,602	5,455	8,613	44,907	18,787	174,037	255,982	1,128	758	1,124	4,064	3,976	790	19,254	31,094	287,076
Kentucky	2,897	1,895	3,452	4,886	11,665	18,658	90,041	133,493	1,231	290	2,390	3,670	2,651	378	22,485	33,095	166,588
Louisiana	2,215	97	3,247	4,018	9,469	6,528	64,688	90,262	1,831	296	3,920	5,116	4,733	430	23,447	39,773	130,035
Maine	1,277	-	1,624	1,944	6,583	4,301	24,875	40,604	274	68	351	559	1,051	37	4,020	6,360	46,964
Maryland	673	-	1,086	1,468	2,659	3,300	18,563	27,748	2,145	1,397	4,401	3,996	4,232	246	26,234	42,651	70,399
Massachusetts	278	35	224	646	1,727	1,233	8,779	12,922	2,925	1,327	4,681	8,423	6,114	-	40,264	63,734	76,657
Michigan	2,369	1,378	4,524	9,990	32,773	8,456	111,592	171,083	3,706	1,592	8,939	12,236	8,116	168	51,220	85,976	257,059
Minnesota	2,385	13	8,681	13,114	31,979	23,801	156,271	236,244	1,645	732	2,818	6,995	5,205	196	31,248	48,838	285,083
Mississippi	2,219	-	6,522	7,645	24,004	4,631	87,143	132,166	1,139	252	3,245	2,577	3,246	21	17,870	28,351	160,516
Missouri	3,390	3,701	4,693	8,024	32,901	12,433	153,491	218,632	2,920	2,043	3,163	5,363	5,201	186	35,497	54,373	273,005
Montana	4,377	-	5,925	5,717	13,690	17,679	96,794	144,183	391	-	812	627	818	108	6,172	8,928	153,110
Nebraska	1,715	1,329	4,855	8,337	22,885	17,565	119,755	176,439	384	538	1,371	1,874	1,146	17	10,409	15,739	192,178
Nevada	1,840	-	3,408	1,496	4,408	4,872	53,911	69,935	786	252	1,587	3,344	107	2,983	13,990	23,048	92,983
New Hampshire	567	37	674	1,263	2,085	2,133	15,753	22,513	431	315	550	1,072	1,080	-	7,301	10,750	33,263
New Jersey	278	176	364	605	1,553	668	8,101	11,745	2,695	2,513	5,940	8,122	5,959	832	47,513	73,573	85,318
New Mexico	3,431	-	6,076	4,731	9,145	6,302	95,954	125,640	747	49	2,632	1,888	1,801	629	11,244	18,990	144,629
New York	3,279	478	4,718	5,934	11,222	18,692	87,082	131,405	4,785	3,798	9,253	12,962	11,323	467	67,543	110,132	241,537
North Carolina	2,271	1,622	4,711	6,581	15,113	12,068	92,754	135,120	3,785	1,975	7,263	8,948	7,174	882	60,906	90,934	226,054
North Dakota	2,045	-	6,968	5,032	23,979	-	134,049	172,073	252	-	602	659	666	-	2,493	4,672	176,746
Ohio	2,997	1,322	4,169	5,408	22,288	12,546	106,097	154,829	5,169	2,440	8,115	10,821	12,512	1,262	67,096	107,416	262,244
Oklahoma	2,596	-	6,665	5,866	42,526	5,973	130,220	193,846	1,386	947	4,185	5,520	3,213	250	24,910	40,411	234,257
Oregon	2,021	-	5,907	4,545	16,349	16,075	74,113	119,010	1,108	250	2,745	2,995	4,290	994	19,706	32,088	151,099
Pennsylvania	4,526	1,448	3,719	9,351	14,813	13,959	101,130	148,947	3,360	2,178	8,160	8,744	11,021	-	68,018	101,480	250,428
Rhode Island	71	43	209	146	358	298	1,683	2,809	307	326	901	713	1,077	64	6,590	9,978	12,787
South Carolina	2,226	187	4,616	6,302	20,129	4,088	80,983	118,532	1,583	368	4,074	4,872	5,905	145	24,907	41,855	160,386
South Dakota	2,364	1,155	5,365	5,958	24,846	12,491	108,181	160,360	349	72	470	1,084	728	-	4,720	7,423	167,783
Tennessee	2,346	-	5,512	6,392	9,911	19,687	88,558	132,406	2,833	736	6,725	7,367	5,085	2,063	45,359	70,168	202,574
Texas	8,149	7	25,350	22,599	70,583	29,893	268,576	425,158	8,227	7,352	24,560	25,384	35,592	2,265	149,039	252,418	677,577
Utah	2,771	36	2,696	2,731	6,548	7,117	50,498	72,396	1,611	166	2,556	1,804	2,355	759	15,929	25,180	97,575
Vermont	1,034	3	663	1,463	3,981	1,738	17,268	26,150	247	42	280	306	484	31	1,729	3,119	29,269
Virginia	1,937	351	4,615	6,772	14,651	9,749	60,213	98,290	3,451	1,550	6,783	7,489	6,066	1,632	37,676	64,647	162,937
Washington	1,921	1,583	2,671	4,058	16,188	12,489	75,190	114,100	2,104	1,593	4,886	5,907	5,548	375	32,393	52,807	166,908
West Virginia	1,260	35	2,540	2,638	10,736	4,248	43,029	64,485	1,061	52	1,316	1,586	2,117	180	9,130	15,441	79,926
Wisconsin	2,141	568	7,316	9,534	24,204	16,951	125,649	186,362	1,730	1,337	6,022	6,335	5,947	1	30,875	52,247	238,609
Wyoming	3,232	-	4,084	2,491	5,477	14,000	24,521	53,806	423	11	756	578	1,048	89	3,600	6,505	60,311
U.S. Total	118,252	22,896	231,326	274,794	822,257	515,986	4,040,544	6,026,054	104,738	56,669	236,981	295,909	278,606	29,422	1,708,209	2,710,533	8,736,587

Fig. 10 Relationship between HM-81 and HM-20, HM-60, VM-2 (from 2015, HM-60 part)

DECEMBER 2016 (MILLIONS) TABLE VM-2

STATE	RURAL								URBAN								TOTAL
	INTERSTATE	OTHER FREEWAYS AND EXPRESSWAYS	OTHER PRINCIPAL ARTERIAL	MINOR ARTERIAL	MAJOR COLLECTOR	MINOR COLLECTOR	LOCAL	TOTAL	INTERSTATE	OTHER FREEWAYS AND EXPRESSWAYS	OTHER PRINCIPAL ARTERIAL	MINOR ARTERIAL	MAJOR COLLECTOR	MINOR COLLECTOR	LOCAL	TOTAL	
Alabama	6,012	-	5,371	4,415	4,281	1,350	6,853	28,283	8,736	532	9,508	7,093	4,177	63	8,867	38,974	67,257
Alaska	835	-	305	117	301	144	424	2,126	750	-	927	539	239	129	337	2,920	5,045
Arizona	6,361	30	3,301	1,566	2,440	448	1,444	15,589	7,468	7,617	8,057	15,555	4,100	141	6,518	49,455	65,045
Arkansas	3,860	369	3,585	2,786	3,444	652	2,167	16,864	5,072	1,041	3,686	4,470	1,787	64	1,912	18,033	34,897
California	15,463	5,225	10,007	7,547	7,604	2,523	5,311	53,680	72,627	60,406	53,076	48,893	24,614	302	21,941	281,859	335,539
Colorado	4,444	236	4,081	1,992	1,747	735	1,471	14,707	9,030	5,219	9,087	6,158	2,619	45	3,574	35,730	50,437
Connecticut	469	297	441	408	807	145	592	3,158	9,926	4,147	3,803	5,153	2,598	234	2,573	28,434	31,592
Delaware	-	610	865	321	606	170	428	3,000	1,351	603	2,118	1,077	794	51	936	6,931	9,931
Dist. of Columbia	-	-	-	-	-	-	-	-	457	374	991	704	261	-	770	3,557	3,557
Florida	9,589	1,815	7,745	3,476	3,479	1,427	5,599	33,130	28,456	13,367	43,386	27,845	18,199	3,414	39,186	173,852	206,982
Georgia	7,091	-	5,872	5,620	4,931	980	4,095	28,590	23,497	3,526	15,901	17,530	5,706	385	22,972	89,517	118,107
Hawaii	-	-	323	541	153	34	722	1,773	1,877	505	2,084	998	688	257	2,119	8,527	10,301
Idaho	2,484	-	2,271	958	1,297	228	2,300	9,537	1,488	-	2,360	1,679	687	4	907	7,124	16,662
Illinois	8,747	103	3,552	4,385	4,479	420	3,344	25,030	23,835	1,159	19,831	15,499	8,142	170	11,557	80,193	105,223
Indiana	7,360	735	4,063	3,853	5,398	2,062	4,752	28,223	10,875	1,386	10,134	8,893	4,262	417	14,630	50,596	78,819
Iowa	4,966	-	6,043	2,613	3,365	817	1,485	19,289	3,105	-	4,103	3,548	1,120	-	1,996	13,872	33,161
Kansas	3,545	1,251	3,125	2,260	2,662	337	1,800	14,980	4,047	1,909	1,428	4,266	2,140	229	2,379	16,399	31,379
Kentucky	7,965	1,834	3,411	3,547	4,034	2,212	3,130	26,132	6,604	872	4,644	5,606	2,122	146	2,550	22,543	48,675
Louisiana	5,681	204	2,886	3,162	3,295	1,089	2,202	18,520	9,352	766	8,238	6,523	2,951	218	1,612	29,660	48,180
Maine	2,293	-	1,881	1,760	2,269	865	1,481	10,550	839	143	682	989	954	25	448	4,080	14,629
Maryland	2,063	-	2,218	1,863	1,589	936	1,701	10,369	15,039	6,240	11,463	6,975	4,175	134	3,121	47,146	57,516
Massachusetts	806	64	269	461	538	124	561	2,822	16,488	5,798	12,047	10,695	3,389	-	8,018	56,435	59,257
Michigan	5,030	2,386	4,045	6,566	7,924	921	2,244	29,116	17,147	6,150	17,206	15,590	4,982	28	7,624	68,727	97,843
Minnesota	3,850	9	6,850	4,757	4,098	1,297	2,591	23,452	8,807	3,568	5,273	8,892	2,782	41	4,579	33,942	57,395
Mississippi	4,256	-	5,047	3,471	3,980	416	4,989	22,160	4,069	451	5,153	2,593	1,744	6	3,714	17,730	39,890
Missouri	6,819	3,818	4,026	3,453	5,071	691	5,567	29,444	13,893	5,170	5,814	6,353	3,253	48	7,943	42,474	71,918
Montana	2,473	-	2,422	1,053	926	448	1,206	8,529	597	-	1,215	652	421	27	906	3,816	12,345
Nebraska	2,845	985	2,348	2,371	1,504	237	1,093	11,383	1,534	1,196	2,149	1,976	632	2	1,229	8,718	20,101
Nevada	2,118	-	1,509	388	333	231	432	5,011	4,165	1,686	3,091	4,620	45	1,915	5,392	20,915	25,925
New Hampshire	1,044	142	1,034	1,111	992	481	362	5,166	1,913	1,347	1,316	1,682	877	-	793	7,928	13,094
New Jersey	1,180	426	704	660	821	167	877	4,835	14,545	12,135	16,367	11,156	4,536	724	11,094	70,558	75,393
New Mexico	4,392	-	3,442	1,691	1,647	573	3,787	15,532	2,629	81	4,073	1,910	1,125	322	1,764	11,903	27,435
New York	5,717	539	3,889	3,448	3,710	9,181	4,402	30,886	20,655	16,810	19,092	17,637	7,423	159	14,569	96,344	127,230
North Carolina	5,803	2,367	5,641	5,742	6,916	2,813	8,350	37,633	18,260	5,550	15,053	13,602	6,828	587	14,366	74,246	111,879
North Dakota	1,517	-	2,539	871	1,204	-	1,160	7,291	472	-	855	617	294	-	508	2,745	10,036
Ohio	8,348	1,704	4,317	4,250	7,764	1,706	5,695	33,783	23,045	5,997	13,660	13,740	9,997	449	13,002	79,890	113,673
Oklahoma	5,124	-	5,040	2,840	5,422	171	2,572	21,169	5,514	3,108	5,721	4,854	1,456	114	5,776	26,544	47,713
Oregon	3,758	-	4,022	1,756	1,773	774	2,221	14,303	5,537	1,387	5,474	4,278	2,629	268	2,122	21,695	35,999
Pennsylvania	11,126	2,084	4,113	6,497	4,162	1,824	5,589	35,395	14,992	6,775	15,799	12,056	7,431	-	8,497	65,550	100,945
Rhode Island	305	65	223	103	146	25	22	888	1,858	1,189	1,842	1,041	611	19	384	6,945	7,833
South Carolina	7,724	230	4,107	3,925	4,409	245	2,970	23,610	7,310	714	7,787	6,559	3,681	32	2,034	28,116	51,726
South Dakota	1,945	412	1,503	985	1,064	146	457	6,512	715	64	483	980	288	-	283	2,813	9,324
Tennessee	7,446	-	4,836	4,306	2,714	3,593	2,572	25,467	14,257	2,322	12,541	9,245	3,383	686	8,770	51,203	76,670
Texas	17,046	7	21,976	11,357	12,189	1,835	4,479	68,889	47,986	32,941	41,207	30,193	25,750	657	10,499	189,233	258,122
Utah	3,082	77	1,775	778	910	504	1,161	8,287	7,445	413	5,191	2,437	1,739	233	3,858	21,317	29,604
Vermont	1,219	5	706	973	1,142	219	936	5,199	539	58	485	366	275	11	381	2,115	7,314
Virginia	6,460	545	4,906	4,596	3,512	993	2,590	23,602	18,772	5,156	13,861	10,762	4,560	558	5,353	59,023	82,625
Washington	4,609	1,753	2,285	2,130	3,509	1,073	1,156	16,514	11,832	5,719	9,594	7,677	3,463	107	4,745	43,138	59,653
West Virginia	2,190	44	2,197	1,444	2,403	329	1,115	9,722	3,510	84	2,475	2,174	1,077	48	737	10,104	19,827
Wisconsin	5,788	844	6,743	5,021	7,722	2,059	3,943	32,120	7,731	3,190	8,717	5,292	2,522	0	2,502	29,954	62,073
Wyoming	2,517	-	1,627	536	627	720	624	6,652	538	12	792	448	398	33	725	2,945	9,597
U.S. Total	235,766	31,214	185,488	140,728	157,315	51,370	127,024	928,905	541,186	238,878	469,837	400,070	199,926	13,499	303,071	2,166,468	3,095,373

Fig. 11 Relationship between HM-81 and HM-20, HM-60, VM-2 (from 2015, VM-2 part)

The four tables' screenshot is used to explain how we get the percentage of statewide total. Using mileage data as example, we use red column (1) in Fig. 8 to divide by red column (2) in Fig. 9, which is the total miles of state-owned highway agency divided by total miles of all kinds of ownership, to get the percentage. We use this method to get corresponding lane miles percentage and VMT percentage as well.

Exploratory data analysis

By making exploratory data analysis for the relationship between ownership, functional system with federal-aid highway system and national highway system, I get conclusions below:

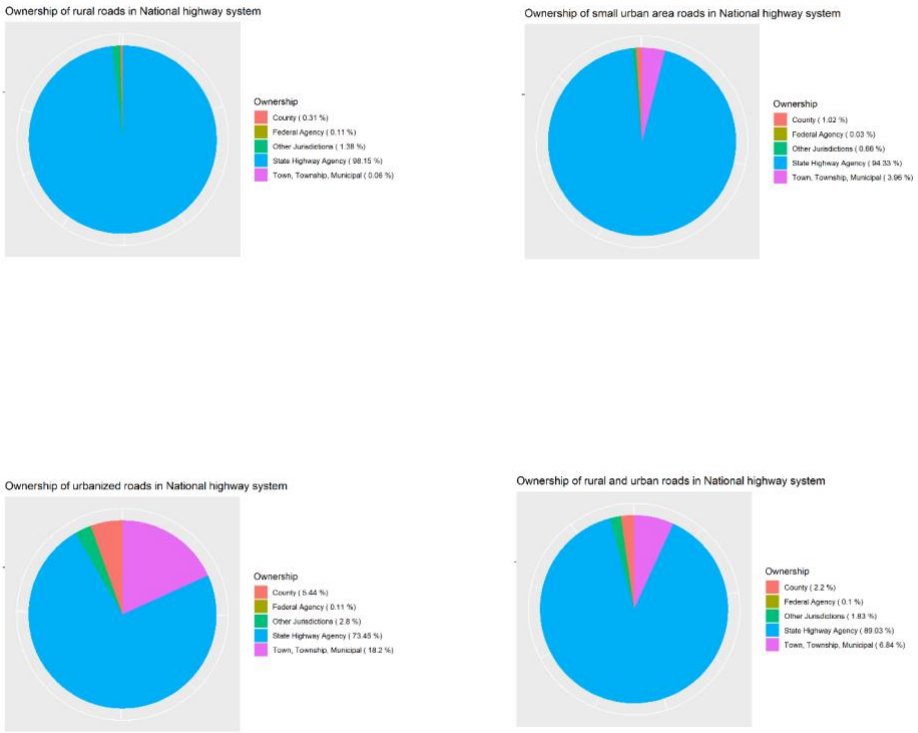


Fig. 12 The proportion of ownership in National highway system in different areas

For national highway system, wherever the road is in rural, small urban area or urbanized area, nearly over 70% of the road in national highway system program are possessed by state highway agency. The proportion of state highway agency-owned roads in rural area are tremendous majority part over 98%. Except for state highway agency-owned roads, other majority part is town or township-owned roads. Town-owned roads take about 7% from total in national highway system assisted roads.

(1) Ownership & highway system(National/federal highway system); (2)functional system & highway system; (3) functional system & ownership(state/federal agency)

The proportion of ownership in National highway system in different areas(rural, small urban, urbanized)
The proportion of ownership in Federal highway system in different areas
The proportion of functional system in National highway system in different areas
The proportion of functional system in Federal highway system in different areas
The proportion of functional system possessed by state-owned highway agency in different areas
The proportion of functional system possessed by federal agency in different areas

Fig. 13 The proportion of ownership in Federal highway system in different areas

For federal highway system, it shows different when it assists rural area and urban area. For rural area, it mostly assists with county-owned roads. While in urban area, it mostly assists with town-owned roads. For both rural and urban roads, county-owned roads and town-owned roads are two majority part that federal highway system gives financial assistance.

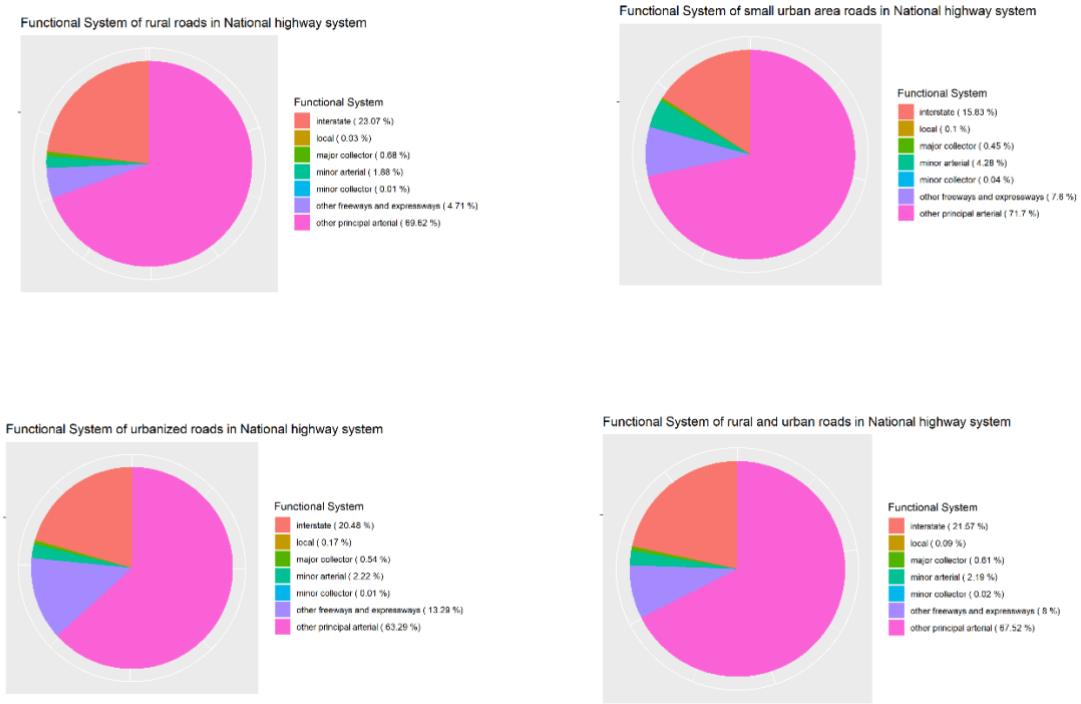


Fig. 14 The proportion of functional system in National highway system in different areas

For roads that sponsored by national highway system, most of the roads that received financial assistance are other principal arterials and interstates. Additionally, other freeways and expressways also takes a significant part compared with collectors and other local roads. All the principal arterials together received over 80% of the financial support from national highway system.

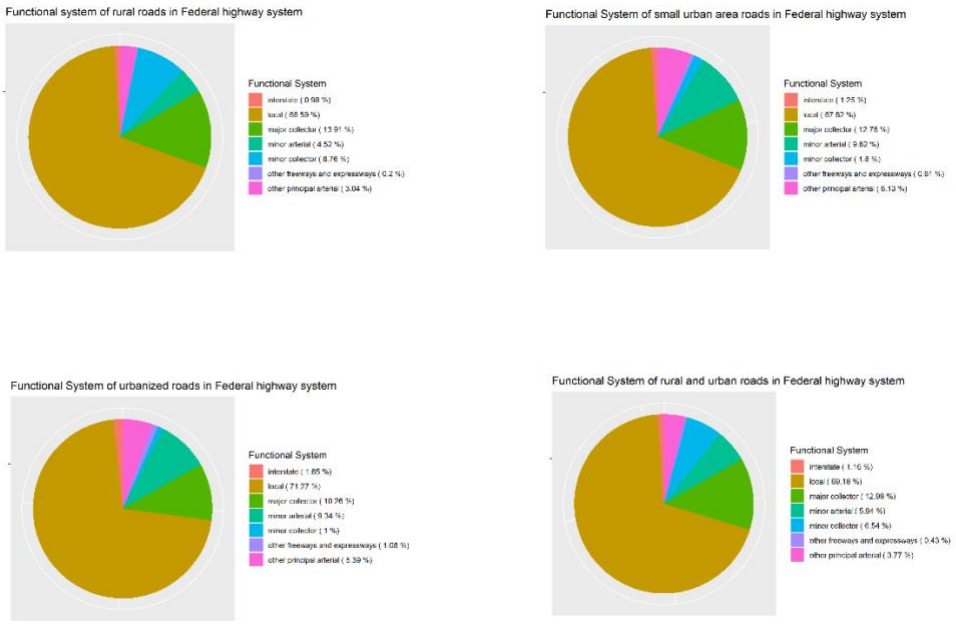


Fig. 15 The proportion of functional system in Federal highway system in different areas

For roads that sponsored by federal highway system, both in rural and urban area are local roads,

other principal arterials and collectors take a minority part.

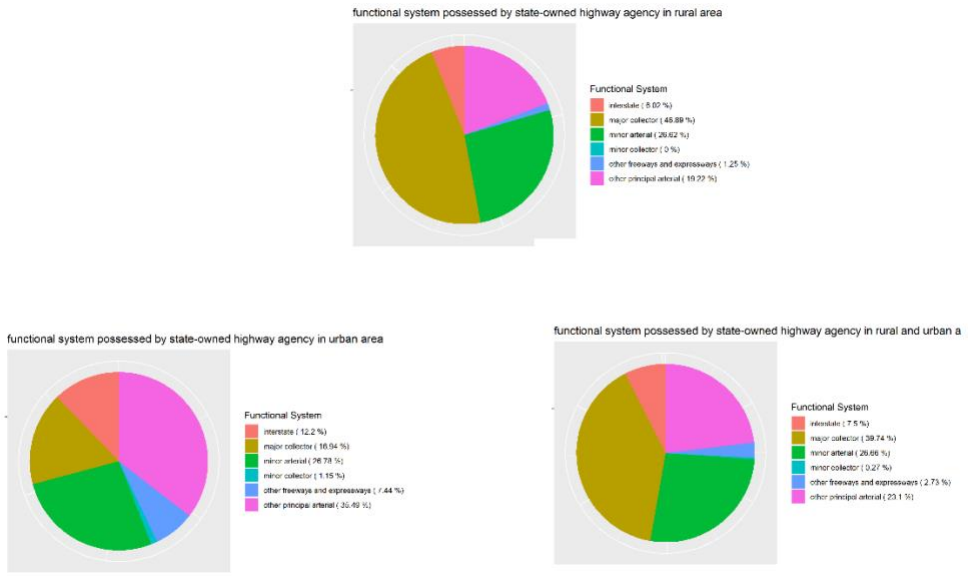


Fig. 16 The proportion of functional system possessed by state-owned highway agency in different areas

Among all the road that possessed by state highway agency, major collector takes a majority part in rural area with 46.89% while other principal arterial roads ranks first in urban area with 35.89%. However, when we sum all principal arterials besides interstate and other freeways and expressways all together, state highway agency owns over 50% of principal arterials in urban area.

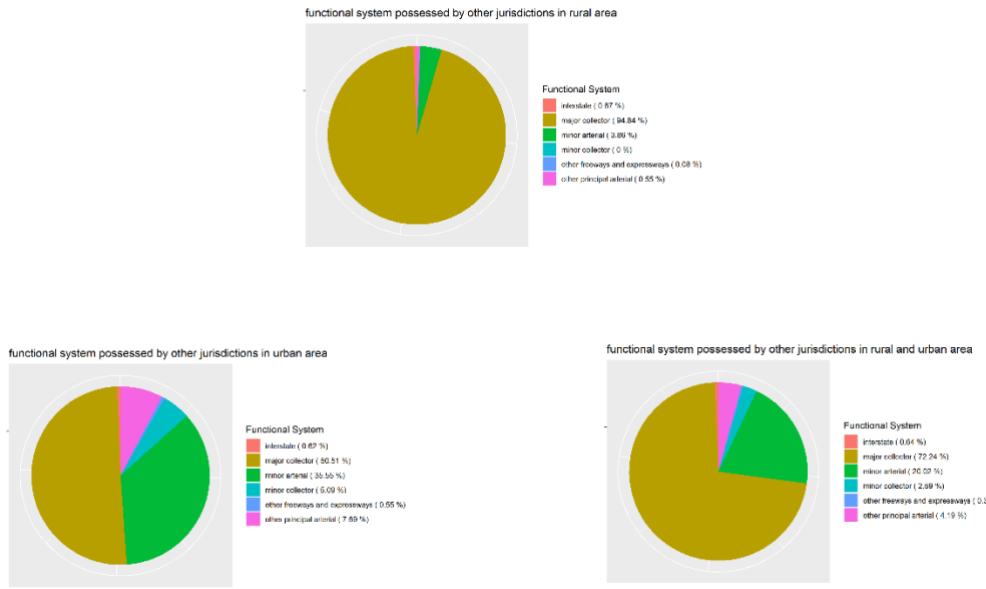


Fig. 16 The proportion of functional system possessed by other jurisdiction in different areas

Among all the road that possessed by other jurisdictions, most of the roads are major collector and minor arterials.

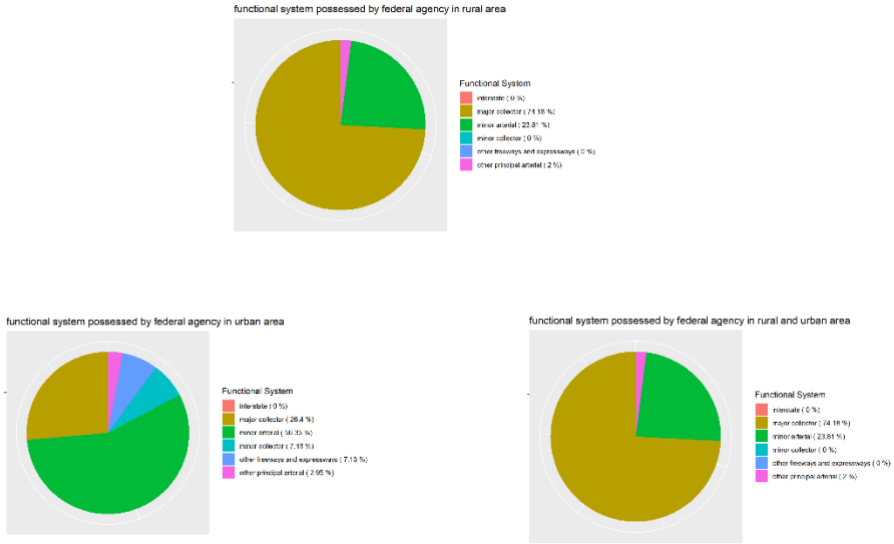


Fig. 16 The proportion of functional system possessed by federal agency in different areas

For federal agency-owned roads, most of them are major collector in rural area but minor arterial takes a large part in urban area.

B. Revenue Part

Summary tables about highway user revenues

For revenue part, we have three summary table telling about highway user revenues in three different ways.

Table HDF, This table summarizes highway-user revenues and their disposition for all levels of government and it's telling us about gross revenues, which is sum total of highway user revenues, collection expenses and non-highway purpose.

Highway Statistics Series

Highway Statistics 2011

Disposition Of Highway-User Revenues, All Levels Of Government - 2010 1/

April 2013
Table HDF

Printable Excel Version [47 KB]
Printable PDF Version [54 KB]

To view PDF files, you can use the Acrobat® Reader®.
To view XLS files, you can use the Excel Viewer

(Thousands of Dollars)

STATE	HIGHWAY-USER REVENUES AVAILABLE FOR DISTRIBUTION				DISPOSITION OF HIGHWAY-USER REVENUES									
					BY FEDERAL GOVERNMENT				BY STATE AND LOCAL GOVERNMENTS					
	FEDERAL FUEL AND VEHICLE TAXES 2/	STATE AND LOCAL FUEL AND VEHICLE TAXES	STATE AND LOCAL TOLLS	TOTAL	FOR HIGHWAY PURPOSES 3/	FOR MASS TRANSIT PURPOSES 3/ 4/	TO (FROM) OTHER STATES OR FOR GENERAL PURPOSES 5/	TOTAL DISTRIBUTED	FOR HIGHWAY PURPOSES	FOR COLLECTION EXPENSES	FOR MASS TRANSIT PURPOSES	FOR GENERAL PURPOSES 6/	TOTAL DISTRIBUTED	GRAND TOTAL DISTRIBUTED
Alabama	677,894	976,477	-	1,654,371	254,215	18,498	405,181	677,894	878,885	88,741	8,851	-	976,477	1,654,371
Alaska	118,189	82,764	43,840	244,793	137,466	52,129	(71,406)	118,189	130,390	16,201	(19,987)	-	126,604	244,793
Arizona	716,302	940,277	-	1,656,579	169,737	76,495	470,070	716,302	785,172	7,285	44,233	103,587	940,277	1,656,579
Arkansas	430,284	641,562	-	1,071,846	146,383	7,889	276,012	430,284	570,214	21,800	16,106	33,442	641,562	1,071,846
California	3,527,501	11,705,634	847,340	16,080,475	747,332	742,446	2,037,723	3,527,501	10,900,662	478,126	887,228	286,958	12,552,974	16,080,475
Colorado	541,324	1,556,779	102,626	2,200,729	151,228	83,807	306,289	541,324	1,323,026	34,719	301,660	-	1,659,405	2,200,729
Connecticut	349,952	1,436,568	151	1,786,671	164,657	23,322	161,973	349,952	974,245	-	461,490	984	1,436,719	1,786,671
Delaware	94,878	240,272	425,389	760,539	67,366	7,498	20,014	94,878	563,724	-	101,937	-	665,661	760,539
Dist. of Col.	25,981	100,961	-	126,942	61,590	19,838	(55,447)	25,981	13,928	-	86,627	406	100,961	126,942
Florida	1,860,728	4,488,883	1,140,198	7,489,809	394,442	102,973	1,363,313	1,860,728	4,089,142	-	314,697	1,225,242	5,629,081	7,489,809
Georgia	1,230,256	590,728	21,757	1,842,741	366,073	141,418	722,765	1,230,256	404,644	24,560	109,165	74,116	612,485	1,842,741
Hawaii	95,035	419,454	-	514,489	67,242	10,997	16,796	95,035	397,468	6,391	3,355	12,240	419,454	514,489
Idaho	183,752	405,894	-	589,646	126,667	7,942	49,143	183,752	367,119	12,436	1,629	24,710	405,894	589,646
Illinois	1,301,571	2,591,629	666,000	4,559,200	362,128	184,580	754,863	1,301,571	2,403,809	203,155	649,635	1,030	3,257,629	4,559,200
Indiana	917,203	1,095,422	165,068	2,177,693	317,989	43,537	555,677	917,203	1,198,032	-	62,458	-	1,260,490	2,177,693
Iowa	460,309	949,245	-	1,409,554	164,178	(94,414)	390,545	460,309	864,221	24,511	48,249	12,264	949,245	1,409,554
Kansas	367,258	639,400	84,368	1,091,026	181,802	12,543	172,913	367,258	618,018	64,418	3,847	37,485	723,768	1,091,026
Kentucky	615,943	1,258,793	-	1,874,736	211,646	22,698	381,599	615,943	1,067,348	25,325	111,110	55,010	1,258,793	1,874,736
Louisiana	580,815	729,635	37,030	1,347,480	251,695	13,423	315,697	580,815	727,478	23,709	15,478	-	766,665	1,347,480
Maine	170,749	529,687	138,955	839,391	65,781	12,017	92,951	170,749	657,507	690	10,445	-	668,642	839,391

Fig. 17 HDF, Disposition of Highway-User Revenues, all levels of government
(from year 2011, units: thousands of dollars)

Table HF-1, it is revenues of all levels of government, it is telling us highway user tax revenues without collection expenses and non-highway purpose. And it also categorizes revenues into three different parts, federal, state and local, showing us which level of government the revenues belong to. And we compare the red circled column called 'total' in Fig. 17 and the red circled column called 'total' in Fig. 18, the first one is larger than the second because it has revenues about collection expenses and non-highway purpose.

Highway Statistics Series

Highway Statistics 2011

Revenues Used for Highways, All Levels of Government - 2010 1/

April 2012
Table HF-1

Printable Excel Version [45 KB]
Printable PDF Version [39 KB]

To view PDF files, you can use the Acrobat® Reader®.
To view XLS files, you can use the Excel Viewer

(Thousands of Dollars)

STATE	HIGHWAY-USER TAX REVENUES 2/				ROAD AND CROSSING TOLLS	APPROPRIATIONS FROM GENERAL FUNDS	PROPERTY TAXES	OTHER IMPOSTS	MISCELLANEOUS RECEIPTS 4/	BOND RECEIPTS 5/	TOTAL RECEIPTS
	FEDERAL 3/	STATE	LOCAL	TOTAL							
Alabama	527,638	766,884	131,472	1,425,994	-	540,254	74,044	105,968	187,517	5,079	2,338,855
Alaska	254,723	67,839	3,922	326,484	23,590	322,406	44,364	45,706	265,789	404	1,028,743
Arizona	421,187	707,744	-	1,128,931	-	278,104	13,798	1,216,011	349,907	842,088	3,828,839
Arkansas	294,625	549,455	-	844,080	-	383,789	77,094	102,610	103,595	-	1,511,169
California	1,933,981	6,562,964	-	8,496,945	571,209	7,648,182	298,321	702,788	2,182,942	989,184	20,889,571
Colorado	618,721	1,262,077	-	1,880,798	93,913	676,562	127,284	352,298	254,384	165,396	3,550,634
Connecticut	349,588	502,947	480,468	1,333,003	183	214,025	-	7	93,244	258,868	1,899,330
Delaware	129,869	207,465	-	337,334	146,118	104,575	4,278	14,227	30,420	72,952	709,904
Dist. of Col.	4,568	99,441	N/A	104,009	-	1,656	N/A	163	16	-	105,844
Florida	1,331,711	2,411,792	639,229	4,382,732	1,132,579	2,572,356	413,162	1,231,832	852,618	1,374,534	11,959,812
Georgia	831,192	1,130,315	-	1,961,507	28,321	1,431,847	31,386	255,361	206,168	840,011	4,754,601
Hawaii	171,824	174,944	161,256	508,024	-	80,736	-	82,322	55,234	169,647	895,963
Idaho	224,723	341,312	6,967	573,002	-	123,645	92,874	76,903	51,825	206,990	1,125,238
Illinois	888,440	2,572,383	34,234	3,495,057	894,396	416,744	1,091,707	480,304	287,495	728,533	7,394,237
Indiana	770,776	1,008,628	43,430	1,822,834	149,246	1,068,000	134,183	237,563	373,002	586,030	4,370,858
Iowa	371,981	846,490	118	1,218,589	-	239,302	180,570	394,936	57,607	209,054	2,300,058
Kansas	305,914	504,319	23,918	834,151	78,515	579,998	186,722	332,777	(23,873)	114,303	2,102,594
Kentucky	385,533	1,125,579	15,835	1,526,947	-	476,858	-	21,537	187,316	-	2,212,658
Louisiana	659,997	835,647	-	1,495,644	39,808	1,763,154	78,913	295,458	79,721	-	3,752,698
Maine	108,634	278,408	197,270	584,312	109,277	136,135	82,427	99	20,226	59,834	992,309
Maryland	346,714	842,743	-	1,189,457	243,087	469,456	1,169	200,345	166,920	1,202,229	3,472,664
Massachusetts	479,514	538,917	-	1,018,431	523,961	203,762	889,731	892,039	187,643	477,839	4,193,406
Michigan	749,721	1,578,039	-	2,327,760	36,677	1,709,381	48,605	75,390	465,439	96,800	4,760,052
Minnesota	471,851	992,032	-	1,463,883	-	1,573,571	339,677	300,504	98,860	298,809	4,075,305

Fig. 18 HF-1, Disposition of Highway-User Revenues, all levels of government
(from year 2011, units: thousands of dollars)

Table SF-1, it's telling us highway user revenues that expended on state and local roads. it shows the receipts State for highways. It also categories this part of revenues into 'motor-fuel taxes' part, 'motor vehicle and motor carrier taxes' part and 'road and crossing toll' part. It shows which kind of taxes the revenues belong to rather than government. And We compare the red circled column called 'state' in Fig. 18 and the red circled column called 'total' in Fig. 19, they are very close and there is not a specific annotation about this tiny difference.

Highway Statistics Series

Highway Statistics 2011

Revenues Used By States For Highways - 2010 1/

November 2012
Table SF-1

Printable Excel Version [43 KB]
Printable PDF Version [46 KB]

To view PDF files, you can use the Acrobat® Reader®.
To view XLS files, you can use the Excel Viewer

(Thousands of Dollars)

STATE	BALANCE BEGINNING OF YEAR 2/			HIGHWAY-USER REVENUES 3/				APPROPRI- ATIONS FROM GENERAL FUNDS 4/	OTHER STATE IMPOSTS	MISCEL- LANEOUS	BOND PROCEEDS		PAYMENTS FROM OTHER GOVERNMENTS			TOTAL RECEIPTS
													FEDERAL FUNDS			
	RESERVES FOR CURRENT HIGHWAY WORK	RESERVES FOR DEBT SERVICE	TOTAL	MOTOR-FUEL TAXES	MOTOR- VEHICLE AND MOTOR-CARRIER TAXES	ROAD AND CROSSING TOLLS	TOTAL				ORIGINAL ISSUES	REFUNDING ISSUES	FEDERAL HIGHWAY ADMINIS-TRATION	OTHER AGENCIES	FROM LOCAL GOVERN-MENTS	
Alabama	324,873	-	324,873	592,221	142,785	-	735,006	161,321	47,566	7,203	-	-	837,981	75,503	2,078	1,866,658
Alaska	-	-	-	30,056	36,993	45,045	112,094	242,768	-	4,200	-	-	403,618	37,719	-	800,399
Arizona	1,051,189	-	1,051,189	543,269	270,358	-	813,627	79	673,338	29,581	377,461	-	870,958	36,872	4,754	2,806,670
Arkansas	649,373	-	649,373	400,335	134,192	-	534,527	46,241	57,767	22,242	-	-	504,043	56,612	23,243	1,244,675
California	18,766,325	-	18,766,325	5,407,765	1,834,126	32,399	7,274,290	1,649,038	831,444	268,872	3,664,890	-	2,943,157	312,418	269,639	17,213,748
Colorado	2,081,184	-	2,081,184	503,567	876,616	-	1,380,183	1,000	-	28,392	17,292	106,070	678,973	20,021	-	2,231,931
Connecticut	1,203,549	-	1,203,549	214,181	105,690	149	320,020	101,537	71,943	79,121	628,468	150,646	537,279	10,850	1,573	1,901,437
Delaware	1,123,977	-	1,123,977	69,475	83,569	269,559	422,603	58,009	-	454,486	202,236	42,114	175,271	22,350	5,415	1,382,484
Dist. of Col.	13,927	-	13,927	2,680	7,687	-	10,367	-	39,651	-	239,087	-	156,280	3,454	-	448,839
Florida	2,300,010	85,568	2,385,578	1,174,998	1,028,723	1,076,814	3,280,535	-	201,214	769,769	907,955	76,833	1,405,643	647,875	244,685	7,534,509
Georgia	1,528,902	16,181	1,545,083	437,124	211,298	19,940	668,362	173,323	379,857	74,620	112,645	371,655	1,578,778	107,564	17,031	3,483,835
Hawaii	274,238	-	274,238	82,302	93,682	-	175,984	-	-	10,986	-	-	180,279	3,554	-	370,803
Idaho	153,805	-	153,805	205,380	163,048	-	368,428	-	-	47,569	75,520	-	373,690	42,320	3,991	911,518
Illinois 5/	1,647,204	317,511	1,964,715	844,383	857,823	683,081	2,385,287	540,802	280	37,249	28,125	287,300	1,232,205	27,020	829	4,539,097
Indiana	28,854	-	28,854	784,824	233,866	165,767	1,184,457	20,146	58,321	639,343	54,721	96,293	1,129,531	10,446	-	3,193,258
Iowa	143,478	-	143,478	409,171	494,982	-	904,153	48,352	288,025	10,784	-	-	451,198	112,346	-	1,814,858
Kansas	809,475	47,554	857,029	252,832	69,501	84,405	406,738	-	314,439	26,968	-	-	488,590	11,421	22,134	1,270,290
Kentucky	72,162	-	72,162	657,688	555,871	-	1,213,559	4,506	-	144,563	61,757	60,475	675,401	8,827	-	2,169,088
Louisiana	1,770,555	-	1,770,555	603,621	119,896	36,727	760,244	112,303	51,366	93,869	438,191	32,988	1,154,503	51,528	-	2,694,992
Maine	152,455	-	152,455	236,801	82,641	133,701	453,143	-	-	16,496	22,125	-	176,029	4,718	-	672,511
Maryland	1,478,866	-	1,478,866	193,707	274,329	338,189	806,225	-	384,740	47,688	683,497	-	490,519	9,129	178,593	2,600,391

Fig. 19 SF-1, Disposition of Highway-User Revenues, all levels of government
(from year 2011, units:thousands of dollars)

Relationship between state receipts and disbursement

Additionally, table SF-21 summarizes the State receipts and disbursements for highways shown in tables SF-1(receipts) and SF-2 (disbursements). This table is one of a series on State highway finance.

The column 'state highway-user tax revenues' in SF-21 matches with the column 'highway-user revenues total' in SF-1, which is the most important part of highway revenues that excluded other unnecessary items. SF-21 is also showing us payment balance situation of each state. However, some state contains 'state tolls' as one part of state highway-user tax revenues while some states not. This is the reason why total number is not exactly the same in SF-1 and SF-21.

FHWA Home / Policy & Governmental Affairs / Highway Policy Information / Office of Highway Policy Information

Highway Statistics Series

Highway Statistics 2011

State Funding for Highways - 2011 1/

February 2013
Table SF-21

Printable Excel Version [54 KB]
Printable PDF Version [52 KB]

To view PDF files, you can use the Acrobat® Reader®.
To view XLS files, you can use the Excel Viewer

(Thousands of Dollars)

STATE	RECEIPTS								DISBURSEMENTS								
						PAYMENTS FROM			CAPITAL OUTLAY								
									FEDERAL-AID HIGHWAYS 5/								
	STATE HIGHWAY-USER TAX REVENUES 2/	ROAD AND CROSSING TOLLS 2/	OTHER IMPOSTS AND GENERAL FUNDS 3/	MISCELLANEOUS INCOME	BOND PROCEEDS 4/	FEDERAL GOVERNMENT	LOCAL GOVERNMENTS	TOTAL RECEIPTS	NATIONAL HIGHWAY SYSTEM 6/	OTHER	OTHER ROADS AND STREETS	TOTAL	MAINTENANCE AND HIGHWAY SERVICES	ADMINISTRATION, HIGHWAY POLICE AND SAFETY	INTEREST	BOND RETIREMENT 4/	GRANTS IN-AID TO LOCAL GOVERN-MENTS
Alabama	735,006	-	208,887	7,203	-	913,484	2,078	1,866,658	468,161	317,146	248,344	1,033,651	177,393	392,002	-	13,605	223,414
Alaska	67,049	45,045	242,768	4,200	-	441,337	-	800,399	161,211	80,157	173,481	414,849	220,729	124,841	11,824	18,723	15,430
Arizona	813,627	-	673,417	29,581	377,461	907,830	4,754	2,806,670	121,389	312,172	720,956	1,154,517	133,191	382,101	146,957	188,310	718,080
Arkansas	534,527	-	104,008	22,242	-	560,655	23,243	1,244,675	295,139	175,592	273,839	744,570	297,815	121,320	15,175	162,240	-
California	9,845,975	32,399	2,480,482	268,872	3,664,890	651,491	269,639	17,213,748	1,032,733	650,484	2,493,771	4,176,988	1,641,942	2,496,188	418,373	123,039	7,728,401
Colorado	1,380,183	-	1,000	28,392	17,292	698,994	-	2,125,861	407,563	106,416	158,892	672,871	400,256	357,126	56,193	119,685	865,289
Connecticut	319,871	149	173,480	79,121	628,468	548,129	1,573	1,750,791	494,046	205,675	60,456	760,177	114,784	339,358	173,333	162,579	31,752
Delaware	153,044	269,559	58,009	454,486	202,236	197,621	5,415	1,340,370	93,377	98,023	99,246	290,646	402,683	137,149	165,881	152,966	-
Dist. of Col.	10,367	-	39,651	-	239,087	159,734	-	448,839	128,683	119,969	72,725	321,377	23,973	30,745	-	36,535	-
Florida	2,203,721	1,076,814	201,214	769,769	907,955	2,053,518	244,685	7,457,676	1,122,913	678,403	2,429,796	4,231,112	927,192	615,022	430,554	289,934	395,615
Georgia	648,422	19,940	553,180	74,620	112,645	1,686,342	17,031	3,112,180	467,041	422,094	511,365	1,400,500	227,666	606,053	191,364	324,310	1,650
Hawaii	175,984	-	-	10,986	-	183,833	-	370,803	150,565	51,528	13,016	215,109	39,612	82,971	18,256	31,027	27,366
Idaho	368,428	-	-	47,569	75,520	416,010	3,991	911,518	287,210	56,153	147,574	490,937	124,609	65,513	25,682	19,815	149,973
Illinois 7/	1,702,206	683,081	541,082	37,249	28,125	1,259,225	829	4,251,797	1,224,946	1,078,659	113,365	2,416,970	688,297	509,545	312,096	141,548	572,420
Indiana	1,018,690	165,767	78,467	639,343	54,721	1,139,977	-	3,096,965	772,421	422,133	536,148	1,730,702	585,682	294,021	245,885	69,776	282
Iowa	904,153	-	336,377	10,784	-	563,544	-	1,814,858	312,535	189,245	83,239	585,019	202,615	174,943	-	-	735,854
Kansas	322,333	84,405	314,439	26,968	-	500,011	22,134	1,270,290	417,221	258,686	107,480	783,387	169,037	132,521	126,534	119,515	146,734
Kentucky	1,213,559	-	4,506	144,563	61,757	684,228	-	2,108,613	541,721	469,848	274,757	1,286,326	471,418	117,508	97,906	37,330	1,748
Louisiana	723,517	36,727	163,669	93,869	438,191	1,206,031	-	2,662,004	923,937	457,448	228,296	1,609,681	165,261	313,698	133,035	26,834	1,717
Maine 7/	319,442	133,701	-	16,496	22,125	180,747	-	672,511	275,806	5,130	117,531	398,467	211,599	46,678	35,192	13,415	77
Maryland	468,036	338,189	384,740	47,688	683,497	499,648	178,593	2,600,391	582,121	579,714	259,824	1,421,659	405,375	189,597	189,765	154,679	157,545
Massachusetts 7/	449,829	310,232	1,024,840	290,765	684,681	530,545	-	3,290,892	860,206	396,209	89,391	1,345,806	286,495	477,303	349,534	295,437	168,447

Fig. 20 SF-21, State Funding for highways (from year 2011, units: thousands of dollars)

To conclude, ‘H series’ tables are all about all units of government and ‘S series’ tables are all about states. And we think all the red circled columns are a matching group, but due to different summary methods, they get different numbers.

C. Disbursement part

For the disbursement part, HF-2 is a summary table of disbursement of all units of government. It includes the disbursement of state-administrated road, local-administrated road and federal road, the money of all three kinds of road comes from state, local and federal government.

Highway Statistics Series

Highway Statistics 2011

Total Disbursements for Highways, All Units of Government – 2010 1/

April 2013
Table HF-2

Printable **Excel Version** [36 KB]
Printable **PDF Version** [44 KB]

To view PDF files, you can use the Acrobat® Reader®.
To view XLS files, you can use the Excel Viewer

(Thousands of Dollars)

STATE	CAPITAL OUTLAY				MAINTENANCE AND SERVICES				ADMIN- ISTRATION AND MISCEL-LANEOUS	HIGHWAY LAW ENFORCEMENT AND SAFETY	INTEREST	BOND RETIREMENT 2/	TOTAL DISBURSE-MENTS
	STATE ADMINISTERED HIGHWAYS	LOCALLY ADMINISTERED ROADS	FEDERAL ROADS AND UNCLASSIFIED	TOTAL	STATE ADMINISTERED HIGHWAYS	LOCALLY ADMINISTERED ROADS	FEDERAL ROADS AND UNCLASSIFIED	TOTAL					
Alabama	921,552	319,267	1,895	1,242,714	145,144	351,117	20	496,281	239,994	327,920	38,588	105,601	2,451,098
Alaska	401,372	86,060	9,676	497,108	199,168	95,006	103	294,277	69,441	85,763	21,818	16,049	984,456
Arizona	1,159,595	570,861	9,789	1,740,245	112,815	351,183	104	464,102	290,451	270,111	203,481	304,108	3,272,498
Arkansas	579,462	102,326	991	682,779	176,036	336,440	11	512,487	110,773	223,921	23,174	329,199	1,882,333
California	5,924,164	7,836,480	30,289	13,790,933	2,665,891	2,053,815	321	4,720,027	2,095,656	1,979,498	807,826	525,391	23,919,331
Colorado	626,143	207,520	28,931	862,594	373,047	671,257	307	1,044,611	315,939	300,449	151,896	309,506	2,984,995
Connecticut	817,795	258,101	-	1,075,896	104,496	250,815	-	355,311	347,561	50,748	150,884	285,730	2,266,130
Delaware	452,803	6,631	9	459,443	438,691	22,203	0	460,894	72,606	99,321	154,336	186,844	1,433,444
Dist. of Col.	-	378,477	1,685	380,162	-	66,242	18	66,260	32,567	-	-	27,216	506,205
Florida	4,603,339	1,649,793	1,738	6,254,870	901,885	1,083,899	18	1,985,802	404,518	950,672	598,648	457,934	10,652,444
Georgia	1,673,095	586,900	511	2,260,506	178,810	373,784	5	552,599	475,406	377,020	193,190	356,247	4,214,968
Hawaii	249,537	133,953	14,390	397,880	62,413	88,779	153	151,345	115,290	56,312	54,639	48,490	823,956
Idaho	515,630	167,878	19,860	703,368	106,633	179,766	211	286,610	68,418	41,132	25,375	21,156	1,146,059
Illinois	2,852,653	596,502	43	3,449,198	788,154	1,325,123	0	2,113,277	572,075	819,461	317,305	376,710	7,648,026
Indiana	1,341,529	587,794	170	1,929,493	570,837	405,519	2	976,358	525,790	10,833	249,148	496,803	4,188,425
Iowa	763,931	404,099	2	1,168,032	199,819	573,197	0	773,016	120,306	113,917	46,753	170,893	2,392,917
Kansas	639,070	509,883	72	1,149,025	148,208	237,556	1	385,765	161,955	369,418	125,493	267,355	2,459,011
Kentucky	1,338,098	662,819	551	2,001,468	411,570	52,913	6	464,489	35,465	85,409	35,574	268,821	2,891,226
Louisiana	1,773,985	136,468	193	1,910,646	377,320	271,962	2	649,284	156,084	252,345	169,219	48,765	3,186,343
Maine	351,451	52,412	390	404,253	208,588	316,991	4	525,583	61,080	74,969	25,488	21,213	1,112,586
Maryland	1,005,289	433,007	1,926	1,440,222	484,278	349,135	20	833,433	178,032	223,907	199,593	190,653	3,065,840
Massachusetts	1,064,039	614,580	253	1,678,872	286,495	653,540	3	940,038	467,160	400,901	374,678	353,968	4,215,617
Michigan	1,446,347	1,447,355	3,154	2,896,856	282,815	1,187,197	33	1,470,045	204,616	242,840	152,963	128,526	5,095,846
Minnesota	973,934	1,180,127	1,918	2,155,979	442,432	807,628	20	1,250,080	257,394	347,647	96,369	490,352	4,597,821
Mississippi	807,275	194,094	13,045	1,014,414	118,314	293,664	138	412,116	82,309	62,973	52,955	145,086	1,769,853
Missouri	1,409,407	499,987	2,358	1,911,752	529,538	437,147	25	966,710	168,304	375,267	147,272	130,227	3,699,532
Montana	513,614	105,840	6,598	626,052	113,926	175,739	70	289,735	59,363	126,056	13,135	23,730	1,138,071
Nebraska	408,559	482,032	920	891,511	159,507	297,961	10	457,478	240,295	76,330	7,930	8,747	1,682,291

Fig. 20 HF-2, Total Disbursement for Highways, all units of government (from year 2011, units: thousands of dollars)

SF-2 is telling us the disbursement of state government (spend money on state administered highways and local roads and streets), LGF-2 is telling us the disbursement of local government.

Highway Statistics Series

Highway Statistics 2011

State Disbursements For Highways - 2011 1/

November 2012
Table SF-2

Printable **Excel Version** [298 KB]
Printable **PDF Version** [59 KB]

To view PDF files, you can use the Acrobat® Reader®.
To view XLS files, you can use the Excel Viewer

(Thousands of Dollars)

STATE	CAPITAL OUTLAY			MAINTENANCE AND SERVICES			ADMINISTRATION, RESEARCH AND PLANNING	HIGHWAY LAW ENFORCEMENT AND SAFETY	INTEREST 3/	BOND RETIREMENT		GRANTS-IN-AID TO LOCAL GOVERNMENTS	TOTAL DISBURSEMENTS	BALANCES END OF YEAR		
	STATE ADMINISTERED HIGHWAYS 2/	LOCAL ROADS AND STREETS	TOTAL	STATE ADMINISTERED HIGHWAYS 2/	LOCAL ROADS AND STREETS	TOTAL				CURRENT REVENUES OR SINKING FUNDS	REFUNDING BONDS 3/			RESERVES FOR CURRENT HIGHWAY WORK	RESERVES FOR DEBT SERVICE	TOTAL
Alabama	827,721	205,930	1,033,651	177,393	-	177,393	171,800	220,202	-	13,605	-	223,414	1,840,065	351,466	-	351,466
Alaska	414,849	-	414,849	220,729	-	220,729	67,820	57,021	11,824	18,723	-	15,430	806,396	(5,997	-	(5,997
Arizona	987,160	167,357	1,154,517	133,191	-	133,191	196,078	186,023	146,957	188,310	-	718,080	2,723,156	1,134,703	-	1,134,703
Arkansas	668,795	75,775	744,570	184,153	113,662	297,815	32,722	88,598	15,175	162,240	-	-	1,341,120	329,556	223,372	552,928
California	4,067,548	109,440	4,176,988	1,580,175	61,767	1,641,942	738,460	1,757,728	418,373	123,039	-	7,728,401	16,584,931	19,395,142	-	19,395,142
Colorado	597,287	75,584	672,871	400,256	-	400,256	199,735	157,391	56,193	119,685	106,070	865,289	2,577,490	1,735,625	-	1,735,625
Connecticut	759,837	340	760,177	114,784	-	114,784	323,329	16,029	173,333	162,579	150,646	31,752	1,732,629	1,082,987	289,370	1,372,357
Delaware	290,646	-	290,646	402,683	-	402,683	66,868	70,281	165,881	152,966	42,114	-	1,191,439	1,248,359	66,663	1,315,022
Dist. of Col.	-	321,377	321,377	-	23,973	23,973	30,745	-	-	36,535	-	-	412,630	50,136	-	50,136
Florida	4,049,481	181,631	4,231,112	927,192	-	927,192	241,203	373,819	430,554	289,934	76,833	395,615	6,966,262	2,942,964	10,861	2,953,825
Georgia	1,328,915	71,585	1,400,500	227,666	-	227,666	402,330	203,723	191,364	324,310	371,655	1,650	3,123,198	1,885,447	20,273	1,905,720
Hawaii	215,109	-	215,109	39,612	-	39,612	74,220	8,751	18,256	31,027	-	27,366	414,341	230,700	-	230,700
Idaho	442,950	47,987	490,937	124,609	-	124,609	27,753	37,760	25,682	19,815	-	149,973	876,529	188,794	-	188,794
Illinois 4/	2,268,657	148,313	2,416,970	676,457	11,840	688,297	251,845	257,700	312,096	141,548	287,300	572,420	4,928,176	1,099,643	475,993	1,575,636
Indiana	1,342,541	388,161	1,730,702	585,682	-	585,682	283,614	10,407	245,885	69,776	96,293	282	3,022,641	199,471	-	199,471
Iowa	585,019	-	585,019	202,615	-	202,615	54,290	120,653	-	-	-	735,854	1,698,431	259,905	-	259,905
Kansas	681,076	102,311	783,387	169,037	-	169,037	51,315	81,206	126,534	119,515	-	146,734	1,477,728	607,340	42,251	649,591
Kentucky	1,046,402	239,924	1,286,326	416,493	54,925	471,418	26,259	91,249	97,906	37,330	60,475	1,748	2,072,711	126,814	41,725	168,539
Louisiana	1,572,893	36,788	1,609,681	161,332	3,929	165,261	219,535	94,163	133,035	26,834	32,988	1,717	2,283,214	2,182,333	-	2,182,333
Maine	380,032	18,435	398,467	211,599	-	211,599	20,954	25,724	35,192	13,415	-	77	705,428	119,538	-	119,538
Maryland	1,323,359	98,300	1,421,659	405,375	-	405,375	89,468	100,129	189,765	154,679	-	157,545	2,518,620	1,560,637	-	1,560,637
Massachusetts 4/	1,064,039	281,767	1,345,806	286,495	-	286,495	274,098	203,205	349,534	295,437	-	168,447	2,923,022	1,018,604	-	1,018,604
Michigan	1,174,792	971,391	2,146,183	285,529	-	285,529	84,809	238,336	123,551	100,188	-	36,609	3,015,205	815,747	-	815,747
Minnesota	1,239,606	-	1,239,606	492,018	-	492,018	142,106	138,011	37,050	12,075	233,910	1,041,564	3,336,340	674,670	68,855	743,525
Mississippi	759,482	95,846	855,328	108,459	-	108,459	75,850	36,096	37,952	51,613	-	96,386	1,261,684	70,713	58,035	128,748
Missouri	1,286,201	181,779	1,467,980	524,051	-	524,051	74,263	252,047	156,545	137,015	141,300	253,826	3,007,027	1,508,015	-	1,508,015

Fig. 21 SF-2, State Disbursement For highways (from year 2011, units: thousands of dollars)

Highway Statistics Series

Highway Statistics 2011

Local Government Disbursements for Highways – 2010 1/ 2/

October 2012
Table LGF-2

Printable **Excel Version** [52 KB]
Printable **PDF Version** [47 KB]

To view PDF files, you can use the Acrobat® Reader®.
To view XLS files, you can use the Excel Viewer

(Thousands of Dollars)

STATE	CAPITAL OUTLAY				TRAFFIC SERVICES			ADMINIS-TRATION AND MISCEL-LANEOUS	HIGHWAY LAW ENFORCE- MENT AND SAFETY	INTEREST	BOND RETIREMENT 3/		TRANSFERS TO STATE GOVERN-MENTS	TOTAL DISBURSE-MENTS
	ACQUISITION OF RIGHT- OF-WAY	PRELIMINARY AND CON-STRUCTION ENGINEERING 3/	ROAD & STREET CONSTRUCTION AND SYSTEM PRESERVATION	TOTAL	MAINTENANCE	SNOW REMOVAL	OTHER				CURRENT REVENUES OR SINKING FUNDS	REFUNDING BONDS		
Alabama	8,423	15,869	99,413	123,705	278,141	314	72,662	65,334	191,766	38,588	92,591	-	5,437	868,538
Alaska 5/	2,244	13,519	70,297	86,060	48,262	35,775	10,969	8,015	33,153	10,518	1,454	-	-	234,206
Arizona	53,680	109,355	332,879	495,914	247,615	3,347	100,221	126,997	87,397	59,720	177,483	10,130	953	1,309,777
Arkansas 5/	-	5,010	63,583	68,593	226,808	-	-	53,640	132,670	7,735	20,554	-	11,197	521,197
California	2,071,385	1,537,125	3,813,151	7,421,661	974,933	38,029	465,133	620,770	619,408	463,551	34,105	-	1,258,061	11,895,651
Colorado 5/	25,576	44,999	53,940	124,515	411,595	65,163	194,499	123,099	159,617	98,397	195,931	-	41,196	1,414,012
Connecticut 5/	7,983	30,339	219,779	258,101	157,660	29,332	63,823	40,529	35,867	332	415	-	8,105	594,164
Delaware 5/	-	1,955	4,676	6,631	13,030	420	8,753	1,479	21,004	2,133	27,418	-	9,185	90,053
Florida	162,897	165,446	1,151,530	1,479,873	762,894	-	321,005	216,346	624,141	170,000	265,454	67,724	317,141	4,224,578
Georgia 5/	62,561	70,358	410,409	543,328	315,125	66	58,593	211,984	173,939	9,750	60,820	-	21,138	1,394,743
Hawaii	2,422	24,220	107,311	133,953	64,250	-	24,529	38,546	47,176	35,286	22,019	-	-	365,759
Idaho	9,376	13,353	76,811	99,540	165,230	14,536	-	38,584	-	740	226	-	7,824	326,680
Illinois 5/	14,020	95,802	338,367	448,189	1,153,269	159,167	847	321,380	561,933	52,024	139,077	-	829	2,836,715
Indiana 5/	809	-	281,810	282,619	361,359	-	44,160	222,929	-	8,520	431,414	-	-	1,351,001
Iowa 5/	9,452	66,473	328,174	404,099	470,475	67,294	35,428	60,541	-	46,753	170,893	-	-	1,255,483
Kansas 5/	-	146,893	155,750	302,643	205,012	-	32,544	93,873	278,790	30,767	93,810	-	57,434	1,094,873
Kentucky 5/	-	443,818	-	443,818	-	-	-	-	-	312	419	-	-	444,549
Louisiana 5/	661	33,690	102,117	136,468	271,711	-	251	94,556	172,559	45,115	12,661	-	-	733,321
Maine	-	2,080	50,332	52,412	225,939	75,920	15,132	37,257	38,480	395	538	-	-	446,073
Maryland	3,393	29,199	337,350	369,942	221,079	84,558	43,498	61,609	77,488	50,094	45,564	-	1,330	955,162
Massachusetts 5/	3,084	18,063	311,666	332,813	305,256	230,627	117,657	193,062	197,696	25,144	58,531	-	-	1,460,786
Michigan 5/	-	55,458	422,048	477,506	831,393	203,876	151,928	85,797	-	20,988	25,584	-	16,266	1,813,338
Minnesota	38,077	90,956	1,051,094	1,180,127	549,102	121,267	137,259	117,933	216,723	67,163	413,867	1,415	210,138	3,014,994
Mississippi 5/	3,138	5,185	57,757	66,080	276,802	-	16,862	2,076	27,363	20,489	101,175	-	114,468	625,315
Missouri 5/	18,024	33,289	326,549	377,862	299,328	25,428	112,391	94,786	171,726	8,614	41,942	-	39,372	1,171,449
Montana 5/	1,530	7,007	97,303	105,840	121,667	24,484	29,588	31,790	69,115	6,494	14,390	-	2,717	406,085

Fig. 22 LGF-2, Local government disbursement for Highways (from year 2011, units: thousands of dollars)

We make a conclusion that we can subtract the total disbursement from state government in SF-2 and total disbursement from local government in LGF-2 from total disbursement in HF-2, then we get how much the federal government spends because there's no table tells any information: (total disbursement in HF-2) – (total disbursement in SF-2) – (total disbursement in LGF-2) = capital money and maintenance money spent by Federal.

Table SF-12 are telling how state spend money in different types of roads. SF-12 is about functional system, which is important for calculate MBUF in different types of roads.

State Highway Agency Capital Outlay and Maintenance - 2015 1/
Total For All Areas - Classified by Functional Systems

October 2018
Table SF-12
Sheet 4 of 4

(Thousands of Dollars)

STATE	CAPITAL OUTLAY								MAINTENANCE							
	INTERSTATE		OTHER PRINCIPAL ARTERIAL 3/	MINOR ARTERIAL	MAJOR AND MINOR COLLECTOR		LOCAL	TOTAL	INTERSTATE		OTHER PRINCIPAL ARTERIAL 3/	MINOR ARTERIAL	MAJOR AND MINOR COLLECTOR		LOCAL	TOTAL
Alabama	249,677	136,786	156,185	260,638	257,424	63,827	25,842	1,150,379	4,929	-	-	-	-	-	255	5,184
Alaska	196,283	37,124	69,667	57,392	70,151	51,578	310,354	792,549	4,017	1,525	1,785	1,915	2,490	2,978	16,265	30,975
Arizona	195,060	255,320	345,609	71,970	32,391	6,812	-	907,162	51,252	20,043	25,354	13,871	18,137	2,714	1	131,372
Arkansas 4/	404,133	-	314,343	130,355	71,797	-	463,174	1,383,802	11,545	-	108,110	20,674	7,918	-	76,739	224,986
California	567,039	214,068	304,690	779,791	534,992	827,269	34,430	3,262,279	41,932	84,511	120,429	308,214	211,457	306,349	389,724	1,462,616
Colorado	77,929	826,220	30,468	90,384	-	8,243	19,773	1,053,017	65,864	80,313	9,382	28,281	-	14,671	15,192	213,703
Connecticut	347,733	152,771	57,997	117,250	102,259	57,204	2,069	837,283	8,011	9,077	15,132	26,818	26,064	1,028	2	86,132
Delaware 4/	22,130	-	153,752	17,365	26,503	-	19,771	239,521	13	-	76,330	10,402	9,152	-	10,819	106,716
Dist. of Col. 4/	14,041	-	133,496	50,264	16,227	-	64,317	278,345	1,867	-	22,691	9,018	2,453	-	18,564	54,593
Florida	2,052,771	113,674	2,279,981	779,842	144,352	187,431	127,963	5,686,014	112,216	7,075	247,412	224,270	34,932	11,469	(2	637,372
Georgia	430,217	187,317	255,116	366,978	48,721	17,749	39,092	1,345,190	79,277	21,588	31,832	40,899	11,308	14,531	49,877	249,312
Hawaii	81,747	87,634	79,646	38,313	24,801	4,042	4,275	320,458	16,137	11,348	7,842	9,335	3,685	325	-	48,672
Idaho	126,096	89,654	44,219	72,646	46,792	596	58,246	438,249	41,848	821	9,812	16,615	9,381	140	30,007	108,624
Illinois	2,196,611	125,298	1,033,096	573,563	199,391	330,923	3	4,458,885	227,069	5,069	103,791	101,104	54,820	59,701	(1	551,553
Indiana	556,307	14,112	7,044	276,553	66,160	211,317	285,534	1,417,027	296,288	7,622	3,809	183,551	35,665	85,015	97,679	709,629
Iowa	444,157	127,304	-	173,510	-	101,456	161,627	1,008,054	86,795	24,844	-	16,334	-	17,881	37,571	183,425
Kansas	171,545	221,137	63,073	72,529	28,199	28,862	309,868	895,213	52,359	46,826	8,626	19,170	2,986	249	4	130,220
Kentucky	705,614	40,628	510,524	313,408	314,669	74,942	97,636	2,057,421	35,337	3,512	53,373	59,924	95,503	153,541	60,829	462,019
Louisiana	315,176	59,142	153,832	138,513	93,272	191,152	109,887	1,060,974	2,817	-	-	-	-	-	362,039	364,856
Maine 4/	160,512	-	117,936	-	-	-	73,003	351,451	30,519	-	90,000	-	-	-	9,037	129,556
Maryland	494,885	269,909	218,886	245,527	72,495	85,279	55,252	1,442,233	78,172	-	-	-	-	-	95,187	173,359
Massachusetts	299,631	-	505,987	153,373	35,664	-	351,151	1,345,806	86,041	-	15,117	3,820	880	-	41,615	147,473
Michigan 4/	655,405	-	548,899	239,360	17,327	-	737,748	2,198,739	72,606	-	58,493	25,604	2,053	-	-	158,756
Minnesota	318,721	381,183	141,506	109,554	-	209,420	65,559	1,225,943	109,368	130,801	48,557	37,593	-	71,860	30,007	428,186
Mississippi	88,137	435,326	18,811	148,956	71,753	9,059	62,982	835,024	6,083	8,359	2,047	16,747	16,000	904	209	50,349
Missouri	369,493	244,239	-	90,918	-	79,762	225,182	1,009,594	32,467	28,186	-	11,590	-	45,764	243,803	361,810
Montana	127,844	111,344	-	18,258	-	105,755	90,664	453,865	28,891	20,335	-	303	-	26,779	11,078	87,386

Fig. 22 LGF-2, State capital outlay and maintenance, classified by functional system and area (from year 2015, units: thousands of dollars)

SF-4 is about different reasons and it is just about state administered highways, not include local roads and streets (SF-2 include this).

Highway Statistics Series

Highway Statistics 2011

Disbursements For State-Administered Highways - 2011 1/

November 2012
Table SF-4

Printable **Excel Version** [54 KB]
Printable **PDF Version** [38 KB]

To view PDF files, you can use the Acrobat® Reader®.
To view XLS files, you can use the Excel Viewer

(Thousands of Dollars)

STATE	CAPITAL OUTLAY FOR ROADS AND BRIDGES 2/	MAINTENANCE AND HIGHWAY SERVICES 2/	ADMINISTRATION, RESEARCH AND PLANNING 2/	HIGHWAY LAW ENFORCEMENT AND SAFETY	INTEREST	BOND RETIREMENT 3/	TOTAL DISBURSEMENTS	BALANCES END OF YEAR		
								RESERVES FOR CURRENT HIGHWAY WORK	RESERVES FOR DEBT SERVICE	TOTAL
Alabama	827,721	177,393	171,800	220,202	-	13,605	1,410,721	351,466	-	351,466
Alaska	414,849	220,729	67,820	57,021	11,824	18,723	790,966	(5,997	-	(5,997
Arizona	987,160	133,191	195,463	186,023	146,957	188,310	1,837,104	1,134,703	-	1,134,703
Arkansas	668,795	184,153	32,722	88,598	15,175	162,240	1,151,683	329,556	223,372	552,928
California	4,067,548	1,580,175	737,148	1,757,728	418,373	123,039	8,684,011	19,395,142	-	19,395,142
Colorado	597,287	400,256	199,735	157,391	56,193	225,755	1,636,617	1,735,625	-	1,735,625
Connecticut	759,837	114,784	323,329	16,029	173,333	313,225	1,700,537	1,082,987	289,370	1,372,357
Delaware	290,646	402,683	66,868	70,281	165,881	195,080	1,191,439	1,248,359	66,663	1,315,022
Florida	4,049,481	927,192	241,203	373,819	430,554	366,767	6,389,016	2,942,964	10,745	2,953,709
Georgia	1,328,915	227,666	398,280	203,723	191,364	695,965	3,045,913	1,885,447	20,273	1,905,720
Hawaii	215,109	39,612	74,220	8,751	18,256	31,027	386,975	230,700	-	230,700
Idaho	442,950	124,609	27,753	37,760	25,682	19,815	678,569	188,794	-	188,794
Illinois 4/	2,268,657	676,457	251,845	257,700	312,096	428,848	4,195,603	1,099,643	475,993	1,575,636
Indiana	1,342,541	585,682	283,614	10,407	245,885	166,069	2,634,198	199,471	-	199,471
Iowa	585,019	202,615	54,290	120,653	-	-	962,577	259,905	-	259,905
Kansas	681,076	169,037	51,315	81,206	126,534	119,515	1,228,683	607,340	42,251	649,591
Kentucky	1,046,402	416,493	23,306	91,249	97,906	97,805	1,773,161	126,814	41,725	168,539
Louisiana	1,572,893	161,332	219,535	94,163	133,035	59,822	2,240,780	2,182,333	-	2,182,333
Maine	380,032	211,599	20,954	25,724	35,192	13,415	686,916	119,538	-	119,538
Maryland	1,323,359	405,375	89,468	100,129	189,765	154,679	2,262,775	1,560,637	-	1,560,637
Massachusetts 4/	1,064,039	286,495	274,098	203,205	349,534	295,437	2,472,808	1,018,604	-	1,018,604
Michigan	1,174,792	285,529	84,809	238,336	123,551	100,188	2,007,205	815,747	-	815,747
Minnesota	1,239,606	492,018	142,106	138,011	37,050	245,985	2,294,776	674,670	42,820	717,490

Fig. 23 SF-4 from2011

State Highway Agency Capital Outlay and Maintenance - 2015 1/
Total For All Areas - Classified by Functional Systems

October 2018
Table SF-12
Sheet 4 of 4

(Thousands of Dollars)

STATE	CAPITAL OUTLAY								MAINTENANCE							
	INTERSTATE		OTHER PRINCIPAL ARTERIAL 2/	MINOR ARTERIAL	MAJOR AND MINOR COLLECTOR		LOCAL	TOTAL	INTERSTATE		OTHER PRINCIPAL ARTERIAL 2/	MINOR ARTERIAL	MAJOR AND MINOR COLLECTOR		LOCAL	TOTAL
Alabama	249,677	136,786	156,185	260,638	257,424	63,827	25,842	1,150,379	4,929	-	-	-	-	-	255	5,184
Alaska	196,283	37,124	69,667	57,392	70,151	51,578	310,354	792,549	4,017	1,525	1,785	1,915	2,490	2,978	16,265	30,975
Arizona	195,060	255,320	345,609	71,970	32,391	6,812	-	907,162	51,252	20,043	25,354	13,871	18,137	2,714	1	131,372
Arkansas 4/	404,133	-	314,343	130,355	71,797	-	463,174	1,383,802	11,545	-	108,110	20,674	7,918	-	76,739	224,986
California	567,039	214,068	304,690	779,791	534,992	827,269	34,430	3,262,279	41,932	84,511	120,429	308,214	211,457	306,349	389,724	1,462,616
Colorado	77,929	826,220	30,468	90,384	-	8,243	19,773	1,053,017	65,864	80,313	9,382	28,281	-	14,671	15,192	213,703
Connecticut	347,733	152,771	57,997	117,250	102,259	57,204	2,069	837,283	8,011	9,077	15,132	26,818	26,064	1,028	2	86,132
Delaware 4/	22,130	-	153,752	17,365	26,503	-	19,771	239,521	13	-	76,330	10,402	9,152	-	10,819	106,716
Dist. of Col. 4/	14,041	-	133,496	50,264	16,227	-	64,317	278,345	1,867	-	22,691	9,018	2,453	-	18,564	54,593
Florida	2,052,771	113,674	2,279,981	779,842	144,352	187,431	127,963	5,686,014	112,216	7,075	247,412	224,270	34,932	11,469	(2	637,372
Georgia	430,217	187,317	255,116	366,978	48,721	17,749	39,092	1,345,190	79,277	21,588	31,832	40,899	11,308	14,531	49,877	249,312
Hawaii	81,747	87,634	79,646	38,313	24,801	4,042	4,275	320,458	16,137	11,348	7,842	9,335	3,685	325	-	48,672
Idaho	126,096	89,654	44,219	72,646	46,792	596	58,246	438,249	41,848	821	9,812	16,615	9,381	140	30,007	108,624
Illinois	2,196,611	125,298	1,033,096	573,563	199,391	330,923	3	4,458,885	227,069	5,069	103,791	101,104	54,820	59,701	(1	551,553
Indiana	556,307	14,112	7,044	276,553	66,160	211,317	285,534	1,417,027	296,288	7,622	3,809	183,551	35,665	85,015	97,679	709,629
Iowa	444,157	127,304	-	173,510	-	101,456	161,627	1,008,054	86,795	24,844	-	16,334	-	17,881	37,571	183,425
Kansas	171,545	221,137	63,073	72,529	28,199	28,862	309,868	895,213	52,359	46,826	8,626	19,170	2,986	249	4	130,220
Kentucky	705,614	40,628	510,524	313,408	314,669	74,942	97,636	2,057,421	35,337	3,512	53,373	59,924	95,503	153,541	60,829	462,019
Louisiana	315,176	59,142	153,832	138,513	93,272	191,152	109,887	1,060,974	2,817	-	-	-	-	-	362,039	364,856
Maine 4/	160,512	-	117,936	-	-	-	73,003	351,451	30,519	-	90,000	-	-	-	9,037	129,556
Maryland	494,885	269,909	218,886	245,527	72,495	85,279	55,252	1,442,233	78,172	-	-	-	-	-	95,187	173,359
Massachusetts	299,631	-	505,987	153,373	35,664	-	351,151	1,345,806	86,041	-	15,117	3,820	880	-	41,615	147,473
Michigan 4/	655,405	-	548,899	239,360	17,327	-	737,748	2,198,739	72,606	-	58,493	25,604	2,053	-	-	158,756
Minnesota	318,721	381,183	141,506	109,554	-	209,420	65,559	1,225,943	109,368	130,801	48,557	37,593	-	71,860	30,007	428,186
Mississippi	88,137	435,326	18,811	148,956	71,753	9,059	62,982	835,024	6,083	8,359	2,047	16,747	16,000	904	209	50,349
Missouri	369,493	244,239	-	90,918	-	79,762	225,182	1,009,594	32,467	28,186	-	11,590	-	45,764	243,803	361,810
Montana	127,844	111,344	-	18,258	-	105,755	90,664	453,865	28,891	20,335	-	303	-	26,779	11,078	87,386

Fig. 24 Sf-12

The total capital outlay or maintenance disbursement in SF-12 matches with same column of disbursement in SF-2.

To conclude, we would use sf-12(money on different types of roads) and hm-60(lane miles) in each year and we figured out that just 2009, 2012, 2013, 2014 and 2015 have sf-12 in the last ten years.The above conclusion is based on different years.

IV. USE OF DATA FOR MBUF MODELING CONCLUSION

In part three data illustration, it introduces a lot of detailed information and table comparison and matching problems for mileage, revenue and disbursement respectively. If we want to do analyses about different types of MBUFs, we should care about disbursement on roads and find relationship between disbursement and revenue to know the source of disbursement and mileage that are useful for us in national scale and state scale. So, in this part, section A concludes the main ownership and functional system for federal highway system/national highway system, and the main functional highway system for state highway agency ownership. Section B concludes Categories about revenue and disbursement and relationship between the two. Section C concludes tables about mileage that is useful for setting a MBUFs. Section D and E conclude

tables useful for us about revenue and disbursement. Section F concludes MBUF for state administrated road and introduce four ways calculating MBUFs.

A. Highway system and functional system

For Federal highway system, it provides a more generalized financial assistants to all kinds of roads. Most of the roads assisted by federal highway systems are county-owned or town-owned roads and belongs to local and collector functional system.

For National highway system, it focuses strongly on interstate and other principal arterials, over 70% of it's financial assistance are given to arterials especially in urban area.

For state highway agency-owned roads, it possesses more principal arterials such as interstate and other kinds of arterials than other types of possessions, which means state highway agency plays an important part in managing highway and arterials.

For other jurisdiction and federal agency, they focus more on collectors and local roads.

B. Categories about revenue and disbursement

This part summary relates to the ways in which revenue (inflows of money available to be spent on highways) and disbursements (outflows of money for various expense categories) are typically tracked.

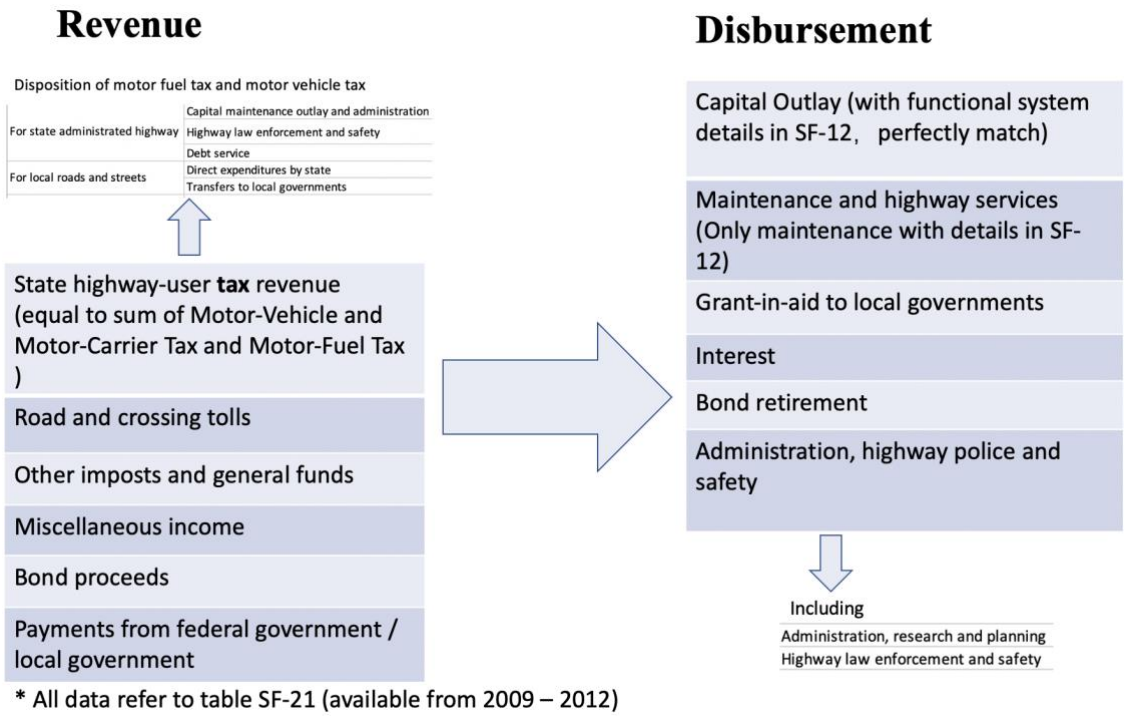


Figure 25. Categories about revenue and disbursement

In figure 25, we can see that revenue has six sources and for state highway-user tax revenue that we care about most, it is equal to sum of Motor-Vehicle and Motor-Carrier Tax and Motor-Fuel Tax. t most, it is equal to sum of Motor-Vehicle and Motor-Carrier Tax and Motor-Fuel Tax. For motor fuel tax, we can know it includes capital maintenance outlay and administration, highway law enforcement and safety, debt service these three part for state administrated highway, and direct expenditures by state, transfers to local governments for local roads and streets (all these

information obtained from MF-3). And for Motor-Vehicle and Motor-Carrier Tax, it includes the same part as mortor fuel tax shown in MV-3. ‘State highway-user tax revenue’ and ‘road and crossing tolls’ represents only those highway-user revenues that were expended on State or local roads, and amounts expended on nonhighway purposes are excluded.

Capital and maintenance in sf21 are perfectly matched with sf12 and in sf12 it has details about functional system (roadway type). For the rest four parts in disbursement, we just have a total number for them in sf21.

To conclude in the revenue and disbursement part, now we are assuming we just use capital and maintenance as the disbursement on roads of state highway agency. And from sf-21, we are for sure that disbursement are from six sources, state highway tax revenue is just one source, and there is no table showing that revenue from state highway tax revenue are spent in which specific part. And for capital and maintenance, after comparing data, we are sure that these two part in disbursement are from different source revenue, but we can not know any detail about which part in revenue is assigned to capital and maintemance.

C. Tables about mileage part

This part discusses all the tables that what we have and we could use for different road ownership, Federal-aid Highway System, national highway system and state highway agency.

Mileage part detail table

Road Ownership		Mileage	Lane mile	VMT
Federal-aid Highway System	Rural Roads	HM-15	HM-48	No data available
	Urban Roads	HM-15	HM-48	No data available
National Highway System	Rural Roads	HM-41	HM-43	No data available
	Urban Roads	HM-41	HM-43	No data available
State highway agency-owned	Rural Roads	HM-80	HM-81(only total number)	VM-1* **VM-2**
	Urban Roads	HM-80	HM-81(only total number)	VM-1* **VM-2**

Figure 26. Table about mileage part

In figure 2, it shows us all the tables that we have and we could use for different road ownership, Federal-aid Highway System, national highway system and state highway agency.

The yellow shadow means we have data but for now we do not use them. Red shadow means we do not have available data. Green shadow means we have data and we would use these tables. And it is worth to mention VM-1 show data in a national scale, with vehicle type and functional system, but no state details.

VM-2 show data in a state scale, with functional system but no vehicle type.

D. Tables about revenue part

In this section, we list all the tables we have that are relevant to revenue with differnet scale, national, state and local, corresponding to different ownership, all units of government, state and local respectively. And the red square circled tables that are useful for us to calculate MBUFs if we just care about state scale.

Revenue part detail table

	Revenue ownership		
Statistics Scale	All units of government	State	Local
National	No data available	No data available	No data available
State	HF-1(highway tax revenues from federal, state and local, and includes tolls or other sources)	SF-1 SF-3 (for only state-administrated)*	No data available
Local	No data available	No data available	LGF-1

Figure 27. Tables about revenue part

The meaning of different color in this figure is the same as figure 2.
Hf-1 is in state scale with all units of government and sf-1 is just about receipts and disbursements for State-administered roads and bridges.

E. Tables about disbursement

In this section, we summarize all tables that are relevant to disbursement with different scales, national, state and local respectively corresponding different ownership, all units of government, state and local respectively.

Disbursement part detail table

	Disbursement ownership		
Statistics Scale	All units of government	State	Local
National	No data available	No data available	No data available
State	HF-2	SF-2 SF-4 SF-4C **SF-12 (final disbursement we select) ***	No data available
Local	No data available	No data available	LGF-2

Figure 28. Tables about disbursement part

The meaning of different color in this figure is the same as figure 2.
SF-2 shows state disbursements for highways, and SF-4 and SF-12 are details only for state-administrated roads. The difference between SF-4 and SF-12 is that SF-12 categories each disbursement by functional systems while SF-4 don't do it. And we would use sf-12 as disbursement table.

F. MBUF for state administrated road

This final section summarizes the levels of detail available from national data sources pertaining to disbursements that might be useful in framing the discussions about aggregate funds needed for MBUFs, as well as those that might be used to help set different types of MBUFs.

We have different ways to calculate dollars per mile/ lane mile/ VMT fee, with roadway type, vehicle type and urban/rural area of state administrated road.

	Dollars per mile	Dollars per lane mile	Dollars per VMT
With roadway type	√ (SF-12 / HM-80) SF-12: 2009, 2012-2015 HM-80: 2009-2018	× No table for roadway type detail	√ (SF-12 / VM - 2) VM-2: 2009-2018
With vehicle type	× No need for vehicle type	× No need for vehicle type	? (SF-12 / VM-1) VM-1: 2009-2018
With urban/rural area	√ (SF-12 / HM-80)	× No table for urban/rural area detail	√ (SF-12 / VM - 2)
Without three options of categories Only total number for each state	√ (SF-12 / HM-80)	√ (SF-12 / HM-81) HM-81: 2011-2018	√ (SF-12 / VM - 2)

Figure 29. Ways of calculating MBUF for state administrated road

Green shadow means we calculate MBUF fee through the listed table, red shadow means we do not need to calculate MBUF that way. Yellow shadow means we can calculate but can not do it for each state, it is about national data(VM-1).

The first row, showing the way to calculate MBUF fee, is with different roadway types, we can calculate dollars per mile/ per VMT.

The second row shows we can calculate dollars per VMT with different vehicle types and we do not care about roadway type, or we can use sf-12 and vm-1 to calculate MBUFs with different roadway types and vehicle types, but VM-1 is a national scale table.

The third row shows we can calculate dollars per mile/ per VMT in urban and rural area respectively.

The fourth row shows we do not care about roadway type, vehicle type and area. This is the easiest way, we just calculate a total number for dollars per mile/ lane mile/VMT.

Thus we have four ways to calculate MBUF. And now it is not sure whether we should just use sf-12 as disbursement.

REFERENCES

[1] FREQUENTLY ASKED QUESTIONS: MILEAGE-BASED USER FEES
[2] Comprehensive Equity Analysis of Mileage Based User Fees: Taxation and Expenditures for Roadways and Transit
[3] https://www.fhwa.dot.gov/policyinformation/statistics.cfm
[4]https://www2.census.gov/geo/pdfs/mapsdata/data/tiger/tgrshp2017/TGRSHP2017_TechDoc.pdf
[5] https://www.fhwa.dot.gov/legsregs/directives/fapg/cfr0470a.htm
[6] https://www.fhwa.dot.gov/planning/national_highway_system/
[7]https://www.fhwa.dot.gov/policyinformation/pubs/pl08021/pdf/onh_chap1.pdf
[8] https://www.fhwa.dot.gov/policyinformation/statistics/2015/hm10.cfm
[9] https://www.fhwa.dot.gov/policyinformation/statistics/2015/hm16.cfm
[10] https://www.fhwa.dot.gov/policyinformation/statistics/2015/hm20.cfm
[11] https://www.fhwa.dot.gov/policyinformation/statistics/2015/hm18.cfm