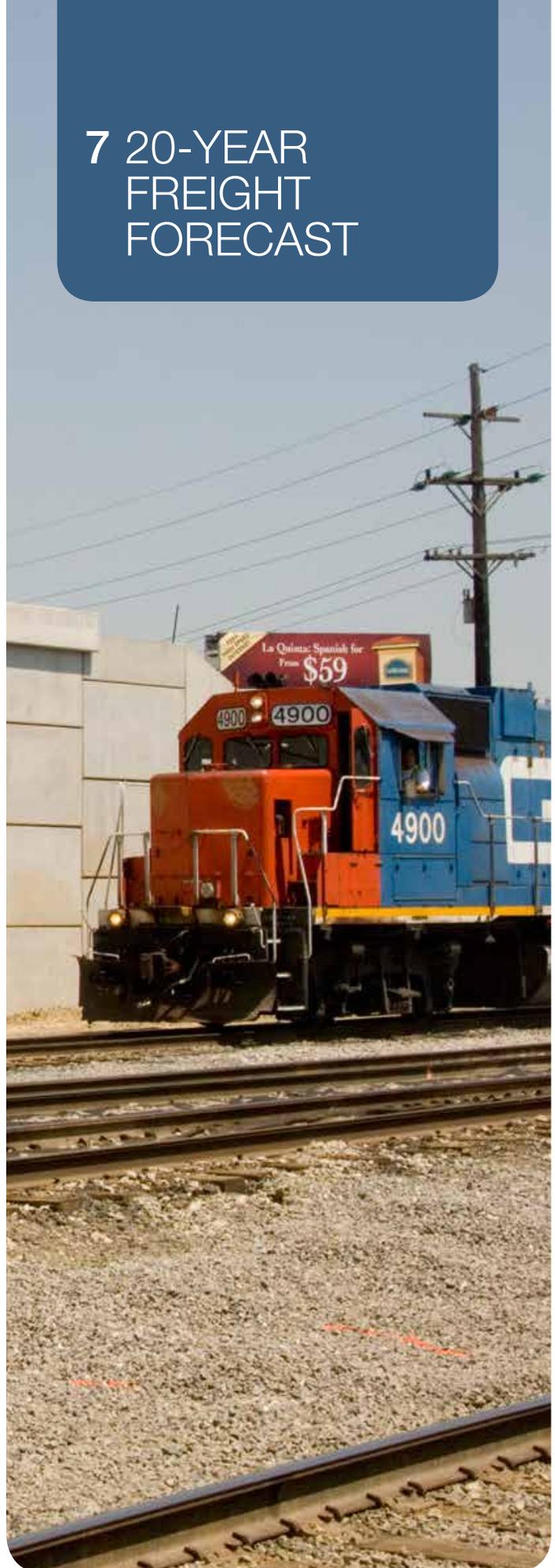


# 7 20-YEAR FREIGHT FORECAST

This section provides a 20-year forecast of freight transportation demands, broken down by mode of transportation and Standard Transportation Commodity Code (STCC), including the projected demands for intrastate, inbound, outbound, and through-interstate transportation of freight. The estimated projections are based on 2009 data from IHS Global Insight.

## HIGHWAY FREIGHT FORECAST

Overall truck freight movements are projected to increase by 55.5 percent by 2030, from 290 million tons in 2009 to 451 million tons in 2030 (Table 6). Intrastate truck freight movements are projected to increase by slightly less at 48.2 percent by 2030, from 112 million tons in 2009 to 167 million tons in 2030 (Table 7). Outbound truck freight movements are projected to increase 59.3 percent by 2030, from 68 million tons in 2009 to 108 million tons in 2030 (Table 8). Inbound truck freight movements are projected to increase 43.5 percent by 2030, from 81 million tons in 2009 to 117 million tons in 2030 (Table 9). Through-truck freight movements, those not stopping in Michigan, are projected to increase 112.3 percent by 2030, from 27 million tons in 2009 to 58 million tons in 2030 (Table 10).



# 7 20-YEAR FREIGHT FORECAST

**Table 6 – Michigan Truck Freight Movements (2009-2030): Overall (Tons)**

Commodity	STCC	2009	2015	2020	2025	2030	Growth % 2009-2030
Agriculture	1	37,168,126	38,366,391	40,250,656	41,113,371	41,764,850	12.4%
Primary Forest Materials	8	40,941	56,151	56,769	55,951	56,141	37.1%
Fresh Fish	9	58,461	69,617	79,109	89,567	101,182	73.1%
Metallic Ores	10	345,146	481,854	422,860	378,313	359,570	4.2%
Coal	11	270,740	299,372	288,058	283,434	282,744	4.4%
Crude Petroleum and Natural Gas	13	6,519,056	8,221,417	9,071,113	9,913,644	10,865,650	66.7%
Nonmetallic Ores and Minerals	14	48,490,181	59,073,359	62,928,065	65,604,860	69,153,323	42.6%
Ordnance	19	50,352	65,971	76,163	83,473	97,062	92.8%
Food Products	20	33,565,166	38,565,192	42,555,693	46,448,057	50,515,068	50.5%
Tobacco Products	21	88,344	63,936	52,751	42,651	33,111	-62.5%
Textiles and Apparel	23	885,484	998,983	999,693	1,056,761	1,167,881	31.9%
Lumber and Wood Products	24	16,965,409	30,565,901	34,043,763	34,667,242	35,450,704	109.0%
Furniture and Fixtures	25	1,554,507	1,981,964	2,456,752	3,043,776	3,853,139	147.9%
Paper and Pulp Products	26	7,151,654	8,829,814	9,781,328	10,544,512	11,400,219	59.4%
Printed Matter	27	3,116,664	2,995,083	3,023,652	3,111,304	3,344,046	7.3%
Chemical Products	28	19,833,861	23,342,506	25,455,418	26,628,812	28,123,472	41.8%
Petroleum or Coal Products	29	19,058,116	18,772,605	18,472,638	18,606,847	19,125,387	0.4%
Rubber and Plastics	30	4,906,676	6,067,477	6,736,038	7,334,548	8,084,819	64.8%
Clay, Cement, Glass, Stone Products	32	13,011,465	16,278,247	17,392,066	18,342,807	19,766,621	51.9%
Primary Metal Products	33	12,805,054	17,179,117	18,610,334	19,427,008	20,715,688	61.8%
Fabricated Metal Products	34	5,751,248	7,108,725	7,194,662	7,219,264	7,432,223	29.2%
Machinery	35	3,675,269	5,295,180	6,065,511	6,834,659	7,893,734	114.8%
Electrical Equipment	36	2,571,981	3,457,220	4,217,800	5,110,198	6,244,940	142.8%
Transportation Equipment	37	8,196,777	12,843,502	12,763,243	13,283,362	14,167,056	72.8%
Technical Instruments and Equipment	38	541,435	686,687	852,766	1,052,837	1,310,649	142.1%
Misc. Manufacturing Products	39	788,792	1,007,640	1,184,148	1,364,095	1,603,562	103.3%
Waste or Scrap Material	40	4,709,126	6,582,927	7,549,561	8,697,219	10,228,954	117.2%
Misc. Freight Shipments	41	1,356,932	1,893,654	2,434,855	3,089,007	3,901,040	187.5%
Mail	43	1,441,708	1,399,322	1,370,689	1,349,511	1,331,276	-7.7%
Secondary Traffic	50	35,417,193	48,079,042	56,111,673	64,089,867	73,142,073	106.5%
<b>Total</b>		<b>290,335,865</b>	<b>360,628,856</b>	<b>392,497,828</b>	<b>418,866,958</b>	<b>451,516,185</b>	<b>55.5%</b>

**Table 7 – Michigan Truck Freight Movements (2009-2030): Michigan to Michigan (Tons)**

Commodity	STCC	2009	2015	2020	2025	2030	Growth % 2009-2030
Agriculture	1	17,636,205	18,135,917	18,879,610	19,064,780	19,051,455	8.0%
Primary Forest Materials	8	1,500	6,397	5,355	3,142	1,435	-4.3%
Fresh Fish	9	468	478	526	572	619	32.3%
Metallic Ores	10	23,336	30,775	26,003	22,358	20,754	-11.1%
Coal	11	187,234	182,000	165,498	155,236	148,836	-20.5%
Nonmetallic Ores and Minerals	14	34,509,447	41,887,259	44,610,705	46,364,233	48,698,097	41.1%
Ordnance	19	25	28	27	21	17	-32.9%
Food Products	20	5,605,864	6,277,030	6,834,891	7,336,680	7,822,032	39.5%
Tobacco Products	21	375	271	226	182	142	-62.0%
Textiles and Apparel	23	7,562	8,274	7,334	6,751	6,521	-13.8%
Lumber and Wood Products	24	11,847,791	23,206,654	26,352,662	26,956,545	27,575,605	132.7%
Furniture and Fixtures	25	8,428	9,269	9,429	9,191	9,081	7.8%
Paper and Pulp Products	26	514,736	656,164	716,187	747,157	783,255	52.2%
Printed Matter	27	292,369	266,526	266,431	271,360	291,243	-0.4%
Chemical Products	28	3,240,503	3,481,662	3,402,140	3,035,973	2,643,888	-18.4%
Petroleum or Coal Products	29	10,773,673	10,285,309	9,992,578	9,961,915	10,169,845	-5.6%
Rubber and Plastics	30	68,358	81,365	84,991	85,667	87,452	27.9%
Clay, Cement, Glass, Stone Products	32	7,644,788	9,562,512	10,040,171	10,359,247	10,907,801	42.7%
Primary Metal Products	33	707,816	913,771	923,933	897,555	906,447	28.1%
Fabricated Metal Products	34	246,690	305,829	294,594	281,787	278,615	12.9%
Machinery	35	6,654	9,970	10,063	9,790	10,144	52.5%
Electrical Equipment	36	3,560	4,396	4,710	4,873	5,207	46.3%
Transportation Equipment	37	66,051	116,341	109,007	108,190	112,620	70.5%
Technical Instruments and Equipment	38	815	1,003	1,245	1,514	1,863	128.6%
Misc. Manufacturing Products	39	2,307	2,807	3,239	3,602	4,105	77.9%
Waste or Scrap Material	40	1,592,220	1,897,247	1,970,431	2,040,138	2,159,176	35.6%
Misc. Freight Shipments	41	96,158	124,078	148,829	170,267	192,794	100.5%
Mail	43	799,693	763,482	741,566	721,063	704,780	-11.9%
Secondary Traffic	50	17,076,980	23,200,456	26,920,553	30,591,007	34,804,067	103.8%
<b>Total</b>		<b>112,961,605</b>	<b>141,417,271</b>	<b>152,522,935</b>	<b>159,210,797</b>	<b>167,397,895</b>	<b>48.2%</b>

# 7 20-YEAR FREIGHT FORECAST

**Table 8 – Michigan Truck Freight Movements (2009-2030): Michigan to Other (Tons)**

Commodity	STCC	2009	2015	2020	2025	2030	Growth % 2009-2030
Agriculture	1	5,404,059	5,611,556	5,888,133	6,101,291	6,277,017	16.2%
Primary Forest Materials	8	8,385	11,037	11,604	12,167	12,806	52.7%
Fresh Fish	9	5,096	5,403	6,036	6,723	7,521	47.6%
Metallic Ores	10	1,700	2,585	2,820	3,056	3,329	95.8%
Coal	11	15,099	20,409	20,876	21,354	21,822	44.5%
Crude Petroleum and Natural Gas	13	3,778,586	4,766,024	5,272,832	5,774,256	6,340,777	67.8%
Nonmetallic Ores and Minerals	14	4,970,955	6,363,693	6,865,695	7,350,809	7,998,717	60.9%
Ordnance	19	15,016	20,687	24,749	26,601	30,158	100.8%
Food Products	20	11,904,776	13,634,904	14,854,185	16,041,211	17,281,822	45.2%
Tobacco Products	21	356	268	220	179	142	-60.2%
Textiles and Apparel	23	143,109	154,977	147,338	149,287	157,880	10.3%
Lumber and Wood Products	24	3,470,899	4,761,794	4,726,278	4,553,822	4,508,266	29.9%
Furniture and Fixtures	25	545,776	632,170	701,607	743,010	796,371	45.9%
Paper and Pulp Products	26	2,309,671	2,785,500	3,039,302	3,210,408	3,390,096	46.8%
Printed Matter	27	1,126,526	1,082,107	1,094,337	1,133,790	1,224,899	8.7%
Chemical Products	28	6,480,737	7,636,002	8,400,141	8,829,440	9,247,458	42.7%
Petroleum or Coal Products	29	2,882,709	3,131,248	3,202,987	3,292,629	3,399,620	17.9%
Rubber and Plastics	30	1,959,092	2,365,743	2,612,732	2,791,195	2,997,292	53.0%
Clay, Cement, Glass, Stone Products	32	1,270,449	1,557,873	1,739,909	1,927,525	2,166,559	70.5%
Primary Metal Products	33	4,090,410	5,545,113	6,013,390	6,249,147	6,582,411	60.9%
Fabricated Metal Products	34	2,292,298	2,772,893	2,774,416	2,740,743	2,747,713	19.9%
Machinery	35	1,375,135	1,993,638	2,219,524	2,399,695	2,653,687	93.0%
Electrical Equipment	36	749,608	928,573	1,071,353	1,200,387	1,354,290	80.7%
Transportation Equipment	37	3,459,036	5,735,320	5,725,748	6,059,772	6,545,058	89.2%
Technical Instruments and Equipment	38	213,014	267,032	332,478	410,436	508,832	138.9%
Misc. Manufacturing Products	39	245,984	304,247	346,794	382,146	428,638	74.3%
Waste or Scrap Material	40	1,980,537	3,199,167	3,982,944	4,944,271	6,219,514	214.0%
Misc. Freight Shipments	41	153,836	205,889	251,359	297,933	351,192	128.3%
Mail	43	550,839	549,109	545,311	547,430	547,678	-0.6%
Secondary Traffic	50	6,951,486	9,411,247	11,209,798	13,066,313	15,083,640	117.0%
<b>Total</b>		<b>68,355,180</b>	<b>85,456,205</b>	<b>93,084,897</b>	<b>100,267,026</b>	<b>108,885,206</b>	<b>59.3%</b>

**Table 9 – Michigan Truck Freight Movements (2009-2030): Other to Michigan (Tons)**

Commodity	STCC	2009	2015	2020	2025	2030	Growth % 2009-2030
Agriculture	1	11,649,245	11,584,893	11,959,634	11,885,851	11,740,156	0.8%
Primary Forest Materials	8	24,298	29,670	29,469	28,875	28,470	17.2%
Fresh Fish	9	30,229	36,004	41,346	47,200	53,762	77.8%
Metallic Ores	10	312,310	436,398	380,244	337,372	317,970	1.8%
Coal	11	42,669	63,005	66,985	71,430	75,953	78.0%
Crude Petroleum and Natural Gas	13	83,511	103,154	104,261	106,039	108,020	29.3%
Nonmetallic Ores and Minerals	14	7,959,627	9,630,627	10,188,691	10,554,844	11,040,110	38.7%
Ordnance	19	22,231	26,867	28,429	28,435	31,658	42.4%
Food Products	20	11,978,477	13,618,388	14,994,938	16,256,581	17,496,862	46.1%
Tobacco Products	21	87,145	62,944	51,897	41,920	32,492	-62.7%
Textiles and Apparel	23	556,656	609,754	586,313	604,892	662,868	19.1%
Lumber and Wood Products	24	1,144,379	1,949,824	2,237,567	2,343,087	2,455,235	114.5%
Furniture and Fixtures	25	527,937	689,582	859,068	1,083,807	1,407,474	166.6%
Paper and Pulp Products	26	2,352,619	2,969,594	3,257,472	3,431,231	3,619,140	53.8%
Printed Matter	27	1,531,186	1,437,050	1,434,205	1,457,014	1,555,665	1.6%
Chemical Products	28	6,819,644	7,569,211	7,780,117	7,414,380	7,010,996	2.8%
Petroleum or Coal Products	29	4,874,839	4,695,210	4,549,078	4,545,832	4,655,846	-4.5%
Rubber and Plastics	30	1,968,917	2,405,505	2,558,228	2,655,403	2,810,648	42.8%
Clay, Cement, Glass, Stone Products	32	3,393,726	4,197,851	4,384,349	4,506,579	4,732,594	39.5%
Primary Metal Products	33	4,973,010	6,665,518	6,908,888	6,738,989	6,760,491	35.9%
Fabricated Metal Products	34	2,606,319	3,276,275	3,244,710	3,173,031	3,210,786	23.2%
Machinery	35	1,342,851	2,019,236	2,226,489	2,413,106	2,701,979	101.2%
Electrical Equipment	36	1,219,427	1,697,065	2,083,640	2,566,232	3,179,757	160.8%
Transportation Equipment	37	3,189,738	5,152,244	4,901,972	4,881,251	5,036,125	57.9%
Technical Instruments and Equipment	38	252,708	310,329	378,674	460,968	569,591	125.4%
Misc. Manufacturing Products	39	410,247	516,139	600,185	685,707	802,879	95.7%
Waste or Scrap Material	40	530,627	671,470	702,198	733,843	773,887	45.8%
Misc. Freight Shipments	41	334,694	478,816	621,649	806,718	1,033,264	208.7%
Mail	43	91,171	86,726	83,807	81,014	78,815	-13.6%
Secondary Traffic	50	11,387,389	15,465,601	17,979,232	20,430,098	23,251,548	104.2%
<b>Total</b>		<b>81,697,825</b>	<b>98,454,949</b>	<b>105,223,735</b>	<b>110,371,731</b>	<b>117,235,041</b>	<b>43.5%</b>

# 7 20-YEAR FREIGHT FORECAST

**Table 10 – Michigan Truck Freight Movements (2009-2030): Through (Tons)**

Commodity	STCC	2009	2015	2020	2025	2030	Growth % 2009-2030
Agriculture	1	2,478,617	3,034,025	3,523,279	4,061,449	4,696,221	89.5%
Primary Forest Materials	8	6,757	9,047	10,341	11,768	13,431	98.8%
Fresh Fish	9	22,669	27,733	31,202	35,072	39,281	73.3%
Metallic Ores	10	7,799	12,096	13,793	15,527	17,517	124.6%
Coal	11	25,738	33,959	34,699	35,414	36,133	40.4%
Crude Petroleum and Natural Gas	13	2,656,959	3,352,239	3,694,020	4,033,349	4,416,853	66.2%
Nonmetallic Ores and Minerals	14	1,050,152	1,191,780	1,262,974	1,334,974	1,416,399	34.9%
Ordnance	19	13,081	18,389	22,958	28,415	35,230	169.3%
Food Products	20	4,076,048	5,034,870	5,871,679	6,813,584	7,914,352	94.2%
Tobacco Products	21	469	452	409	369	334	-28.8%
Textiles and Apparel	23	178,157	225,978	258,707	295,831	340,612	91.2%
Lumber and Wood Products	24	502,339	647,629	727,256	813,787	911,598	81.5%
Furniture and Fixtures	25	472,367	650,943	886,648	1,207,768	1,640,213	247.2%
Paper and Pulp Products	26	1,974,628	2,418,556	2,768,367	3,155,717	3,607,727	82.7%
Printed Matter	27	166,583	209,401	228,679	249,139	272,239	63.4%
Chemical Products	28	3,292,977	4,655,631	5,873,020	7,349,019	9,221,130	180.0%
Petroleum or Coal Products	29	526,895	660,839	727,994	806,471	900,076	70.8%
Rubber and Plastics	30	910,308	1,214,865	1,480,087	1,802,282	2,189,427	140.5%
Clay, Cement, Glass, Stone Products	32	702,503	960,011	1,227,637	1,549,456	1,959,667	179.0%
Primary Metal Products	33	3,033,819	4,054,715	4,764,124	5,541,317	6,466,340	113.1%
Fabricated Metal Products	34	605,941	753,728	880,942	1,023,704	1,195,109	97.2%
Machinery	35	950,629	1,272,336	1,609,435	2,012,068	2,527,923	165.9%
Electrical Equipment	36	599,386	827,187	1,058,097	1,338,706	1,705,686	184.6%
Transportation Equipment	37	1,481,953	1,839,597	2,026,515	2,234,148	2,473,252	66.9%
Technical Instruments and Equipment	38	74,899	108,323	140,369	179,920	230,362	207.6%
Misc. Manufacturing Products	39	130,253	184,447	233,930	292,639	367,941	182.5%
Waste or Scrap Material	40	605,742	815,042	893,987	978,966	1,076,378	77.7%
Misc. Freight Shipments	41	772,243	1,084,871	1,413,018	1,814,089	2,323,789	200.9%
Mail	43	5	4	4	4	4	-13.7%
Secondary Traffic	50	1,338	1,738	2,090	2,449	2,819	110.7%
<b>Total</b>		<b>27,321,255</b>	<b>35,300,430</b>	<b>41,666,261</b>	<b>49,017,403</b>	<b>57,998,043</b>	<b>112.3%</b>

## WATERBORNE FREIGHT FORECAST

Overall waterborne freight movements are projected to increase 38.5 percent by 2030, from 74 million tons in 2009 to 102 million tons in 2030 (Table 11). Intrastate waterborne freight movements, those moving from one Michigan port to another, are projected to increase by slightly less at 22.3 percent by 2030, from 11 million tons in 2009 to 14 million tons in 2030 (Table 12). Outbound waterborne freight movements are projected to increase roughly 58.6 percent by 2030, from 34 million tons in 2009 to 54 million tons in 2030 (Table 13). Inbound waterborne freight movements are projected to increase 20.7 percent by 2030, from 28 million tons in 2009 to 34 million tons in 2030 (Table 14).

**Table 11 – Michigan Marine Freight Movements (2009-2030): Overall (Tons)**

Commodity	STCC	2009	2015	2020	2025	2030	Growth % 2009-2030
Agriculture	1	123,547	139,108	149,515	158,621	169,880	37.5%
Fresh Fish	9	50	63	70	78	86	71.7%
Metallic Ores	10	17,402,758	30,866,095	33,124,716	32,417,458	31,763,899	82.5%
Coal	11	23,196,106	27,900,644	26,788,444	25,789,356	25,282,754	9.0%
Crude Petroleum and Natural Gas	13	69,009	85,783	94,684	102,278	105,702	53.2%
Nonmetallic Ores and Minerals	14	26,122,361	31,061,151	32,308,755	33,168,274	34,065,340	30.4%
Food Products	20	18,097	22,465	25,146	27,564	30,211	66.9%
Textiles and Apparel	23	25	29	28	30	32	25.5%
Lumber and Wood Products	24	10,658	17,225	20,414	23,085	25,600	140.2%
Furniture and Fixtures	25	75	92	123	161	212	184.0%
Paper and Pulp Products	26	850	1,011	1,237	1,481	1,783	109.7%
Printed Matter	27	24	30	32	36	39	59.6%
Chemical Products	28	318,313	349,404	356,315	355,678	357,201	12.2%
Petroleum or Coal Products	29	2,117,476	2,365,853	2,420,060	2,507,951	2,607,616	23.1%
Rubber and Plastics	30	323	386	453	523	607	88.2%
Clay, Cement, Glass, Stone Products	32	4,038,682	5,178,228	5,872,868	6,408,736	6,985,328	73.0%
Primary Metal Products	33	619,342	771,142	860,595	954,952	1,058,061	70.8%
Fabricated Metal Products	34	17,338	23,014	22,479	21,211	20,413	17.7%
Machinery	35	1,233	1,653	1,983	2,381	2,893	134.6%
Electrical Equipment	36	332	426	491	576	701	111.2%
Transportation Equipment	37	8,096	10,447	11,220	12,095	13,121	62.1%
Technical Instruments and Equipment	38	47	61	78	99	126	169.6%
Misc. Manufacturing Products	39	26,012	32,586	36,990	41,176	46,250	77.8%
Waste or Scrap Material	40	144,374	215,499	235,005	254,875	277,376	92.1%
Misc. Freight Shipments	41	36,908	44,212	49,274	55,092	62,227	68.6%
<b>Total</b>		<b>74,272,036</b>	<b>99,086,605</b>	<b>102,380,976</b>	<b>102,303,765</b>	<b>102,877,460</b>	<b>38.5%</b>

# 7 20-YEAR FREIGHT FORECAST

**Table 12 – Michigan Marine Freight Movements (2009-2030): Michigan to Michigan (Tons)**

Commodity	STCC	2009	2015	2020	2025	2030	Growth % 2009-2030
Metallic Ores	10	2,294,635	3,695,199	3,969,257	3,842,833	3,722,312	62.2%
Coal	11	500,166	592,223	578,952	572,315	564,149	12.8%
Nonmetallic Ores and Minerals	14	7,538,217	8,343,973	8,473,014	8,488,487	8,576,024	13.8%
Textiles	23	4	2	0	0	0	-100.0%
Lumber and Wood Products	24	1,866	4,602	5,757	6,758	7,874	322.1%
Chemical Products	28	49,786	53,378	50,695	45,358	39,705	-20.2%
Petroleum or Coal Products	29	413,640	391,604	381,152	382,089	384,549	-7.0%
Rubber and Plastics	30	9	10	10	11	11	25.0%
Clay, Cement, Glass, Stone Products	32	686,435	803,618	813,279	786,316	768,677	12.0%
Primary Metal Products	33	19,924	31,488	32,166	31,636	30,642	53.8%
Fabricated Metal Products	34	8,578	11,447	10,919	9,956	9,182	7.0%
Machinery	35	259	335	330	333	358	38.4%
Electrical Equipment	36	210	265	292	338	412	95.8%
Transportation Equipment	37	293	421	327	300	299	2.2%
Technical Instruments and Equipment	38	7	9	11	15	20	194.0%
Misc. Manufacturing Products	39	10,751	13,712	15,672	17,699	19,985	85.9%
Waste or Scrap Material	40	4,919	6,971	7,404	7,851	8,355	69.8%
Misc. Freight Shipments	41	13,134	15,297	16,621	18,378	20,724	57.8%
<b>Total</b>		<b>11,542,833</b>	<b>13,964,553</b>	<b>14,355,860</b>	<b>14,210,672</b>	<b>14,153,278</b>	<b>22.6%</b>

**Table 13 – Michigan Marine Freight Movements (2009-2030): Michigan to Other (Tons)**

Commodity	STCC	2009	2015	2020	2025	2030	Growth % 2009-2030
Agriculture	1	123,547	139,108	149,515	158,621	169,880	37.5%
Fresh Fish	9	50	63	70	78	86	71.7%
Metallic Ores	10	8,572,376	16,626,603	17,830,226	17,608,423	17,417,871	103.2%
Coal	11	6,513,528	9,183,682	9,276,780	9,327,575	9,381,026	44.0%
Crude Petroleum and Natural Gas	13	69,009	85,783	94,684	102,278	105,702	53.2%
Nonmetallic Ores and Minerals	14	14,870,030	18,273,607	19,295,874	20,036,743	20,709,139	39.3%
Food Products	20	17,628	21,887	24,425	26,673	29,119	65.2%
Textiles and Apparel	23	21	26	28	30	32	49.8%
Lumber and Wood Products	24	8,792	12,623	14,657	16,327	17,726	101.6%
Furniture and Fixtures	25	65	80	107	138	182	178.4%
Paper and Pulp Products	26	848	1,009	1,235	1,478	1,781	109.8%
Chemical Products	28	233,694	258,673	265,324	266,749	270,249	15.6%
Petroleum or Coal Products	29	998,680	1,265,666	1,333,533	1,403,581	1,477,349	47.9%
Rubber and Plastics	30	297	354	416	481	558	88.0%
Clay, Cement, Glass, Stone Products	32	2,760,340	3,582,841	4,039,246	4,316,420	4,549,913	64.8%
Primary Metal Products	33	12,433	18,250	22,169	26,365	31,541	153.7%
Fabricated Metal Products	34	2,125	2,692	3,094	3,556	4,156	95.6%
Machinery	35	490	647	799	967	1,180	140.9%
Electrical Equipment	36	121	161	198	238	289	137.9%
Transportation Equipment	37	7,022	9,024	9,777	10,557	11,451	63.1%
Technical Instruments and Equipment	38	40	52	66	83	106	165.5%
Misc. Manufacturing Products	39	15,233	18,837	21,274	23,424	26,203	72.0%
Waste or Scrap Material	40	68,827	110,055	123,905	138,089	154,340	124.2%
Misc. Freight Shipments	41	13,695	17,042	19,244	21,159	23,061	68.4%
<b>Total</b>		<b>34,288,893</b>	<b>49,628,765</b>	<b>52,526,647</b>	<b>53,490,035</b>	<b>54,382,937</b>	<b>58.6%</b>

# 7 20-YEAR FREIGHT FORECAST

Table 14 – Michigan Marine Freight Movements (2009-2030): Other to Michigan (Tons)

Commodity	STCC	2009	2015	2020	2025	2030	Growth % 2009-2030
Metallic Ores	10	6,535,747	10,544,293	11,325,232	10,966,202	10,623,716	62.5%
Coal	11	16,182,413	18,124,739	16,932,713	15,889,467	15,337,580	-5.2%
Nonmetallic Ores and Minerals	14	3,714,113	4,443,570	4,539,867	4,643,044	4,780,177	28.7%
Food Products	20	468	578	721	891	1,093	133.3%
Furniture and Fixtures	25	9	12	16	22	30	222.7%
Paper and Pulp Products	26	2	2	2	3	3	63.1%
Printed Matter	27	24	30	32	36	39	59.6%
Chemical Products	28	34,833	37,353	40,296	43,572	47,248	35.6%
Petroleum or Coal Products	29	705,156	708,583	705,375	722,282	745,718	5.8%
Rubber and Plastics	30	17	22	26	32	38	125.0%
Clay, Cement, Glass, Stone Products	32	591,907	791,769	1,020,343	1,306,000	1,666,738	181.6%
Primary Metal Products	33	586,984	721,404	806,260	896,951	995,879	69.7%
Fabricated Metal Products	34	6,635	8,875	8,466	7,699	7,074	6.6%
Machinery	35	485	671	853	1,081	1,355	179.5%
Transportation Equipment	37	781	1,002	1,115	1,237	1,370	75.4%
Misc. Manufacturing Products	39	29	38	44	52	62	115.8%
Waste or Scrap Material	40	70,628	98,474	103,695	108,935	114,682	62.4%
Misc. Freight Shipments	41	10,079	11,873	13,410	15,555	18,442	83.0%
<b>Total</b>		<b>28,440,310</b>	<b>35,493,286</b>	<b>35,498,469</b>	<b>34,603,059</b>	<b>34,341,244</b>	<b>20.7%</b>

## RAIL FREIGHT FORECAST

Overall rail freight movements are projected to increase by 58.1 percent by 2030, from 83 million tons in 2009 to 132 million tons in 2030 (Table 15). Intrastate rail freight movements are projected to increase by 174.5 percent by 2030, from 9.5 million tons in 2009 to 26 million tons in 2030 (Table 16). Outbound rail freight movements are projected to increase 37.6 percent by 2030, from 15.5 million tons in 2009 to 21 million tons in 2030 (Table 17). Inbound rail freight movements are projected to increase 2.7 percent by 2030, from 30.9 million tons in 2009 to 31.8 million tons in 2030 (Table 18). Through-rail freight movements, those not stopping in Michigan, are projected to increase 91.5 percent by 2030, from 27 million tons in 2009 to 53 million tons in 2030 (Table 19).

**Table 15 – Michigan Rail Freight Movements (2009-2030): Overall (Tons)**

Commodity	STCC	2009	2015	2020	2025	2030	Growth % 2009-2030
Agriculture	1	3,968,383	4,126,177	4,249,975	4,253,302	4,223,524	6.4%
Fresh Fish	9	2,720	3,327	3,706	4,099	4,544	67.1%
Metallic Ores	10	9,954,685	18,328,311	22,564,579	25,523,482	27,860,272	179.9%
Coal	11	19,765,846	18,356,080	17,749,871	16,798,868	15,739,409	-20.4%
Crude Petroleum and Natural Gas	13	363,844	442,919	463,685	484,360	505,670	39.0%
Nonmetallic Ores and Minerals	14	1,971,732	2,210,322	2,195,322	2,182,578	2,195,815	11.4%
Ordnance	19	1,960	2,190	2,905	2,637	2,116	7.9%
Food Products	20	4,119,492	4,799,384	5,307,620	5,840,703	6,434,960	56.2%
Textiles and Apparel	23	5,680	7,183	8,151	9,268	10,549	85.7%
Lumber and Wood Products	24	2,946,180	4,186,731	4,548,198	4,803,535	5,103,724	73.2%
Furniture and Fixtures	25	16,240	22,231	30,010	40,230	54,055	232.8%
Paper and Pulp Products	26	4,228,360	5,251,919	5,589,096	5,823,328	6,125,475	44.9%
Printed Matter	27	680	1,013	1,411	1,953	2,654	290.3%
Chemical Products	28	11,087,278	14,216,221	16,396,573	18,751,957	21,632,998	95.1%
Petroleum or Coal Products	29	4,448,833	5,075,702	5,206,305	5,337,703	5,497,340	23.6%
Rubber and Plastics	30	92,640	124,926	152,489	185,788	225,412	143.3%
Clay, Cement, Glass, Stone Products	32	3,261,800	4,292,195	5,097,544	6,030,872	7,257,419	122.5%
Primary Metal Products	33	4,737,281	6,200,109	6,766,559	7,207,763	7,824,501	65.2%
Fabricated Metal Products	34	41,200	53,696	64,821	78,307	94,791	130.1%
Machinery	35	28,200	38,361	46,747	56,269	69,058	144.9%
Electrical Equipment	36	56,160	74,160	90,987	108,547	131,284	133.8%
Transportation Equipment	37	5,608,256	8,425,664	8,253,216	8,532,351	9,000,374	60.5%
Technical Instruments/ Equipment	38	920	1,346	1,700	2,108	2,640	187.0%
Misc. Manufacturing Products	39	16,400	22,304	28,636	36,428	46,375	182.8%
Waste or Scrap Material	40	2,407,524	3,150,184	3,346,650	3,544,778	3,764,321	56.4%
Misc. Freight Shipments	41	170,335	214,732	256,103	295,307	337,147	97.9%
Shipping Containers	42	214,004	269,825	298,312	323,164	356,024	66.4%
Freight Forwarder Traffic	44	18,680	23,011	25,657	28,476	32,108	71.9%
Shipper Association Traffic	45	6,960	8,347	9,087	9,856	10,850	55.9%
Misc. Mixed Shipments	46	4,109,520	5,197,722	5,945,403	6,765,669	7,757,636	88.8%
Hazardous Waste	48	158,516	189,931	201,028	205,700	211,177	33.2%
<b>Total</b>		<b>83,810,309</b>	<b>105,316,222</b>	<b>114,902,346</b>	<b>123,269,383</b>	<b>132,514,219</b>	<b>58.1%</b>

# 7 20-YEAR FREIGHT FORECAST

**Table 16 – Michigan Rail Freight Movements (2009-2030): Michigan to Michigan (Tons)**

Commodity	STCC	2009	2015	2020	2025	2030	Growth % 2009-2030
Agriculture	1	32,112	31,030	31,214	30,140	29,043	-9.6%
Metallic Ores	10	8,334,341	15,810,409	19,841,871	22,602,232	24,722,228	196.6%
Nonmetallic Ores/Minerals	14	562,240	530,091	467,294	432,721	415,277	-26.1%
Food Products	20	12,200	13,412	14,259	15,156	16,117	32.1%
Lumber or Wood Products	24	269,520	532,905	604,988	615,179	625,543	132.1%
Paper and Pulp Products	26	58,800	101,237	105,232	96,977	87,379	48.6%
Chemical Products	28	61,360	62,657	62,661	57,386	51,067	-16.8%
Petroleum or Coal Products	29	66,708	65,042	62,255	60,248	59,699	-10.5%
Primary Metal Products	33	9,752	12,496	12,148	10,773	9,889	1.4%
Transportation Equipment	37	132,200	226,855	196,770	181,175	176,342	33.4%
Waste or Scrap Material	40	4,080	6,008	6,616	7,258	8,003	96.1%
Misc. Freight Shipments	41	5,080	6,238	7,172	7,861	8,491	67.1%
Shipping Containers	42	504	573	596	598	603	19.6%
<b>Total</b>		<b>9,548,897</b>	<b>17,398,953</b>	<b>21,413,075</b>	<b>24,117,702</b>	<b>26,209,680</b>	<b>174.5%</b>

**Table 17 – Michigan Rail Freight Movements (2009-2030): Michigan to Other (Tons)**

Commodity	STCC	2009	2015	2020	2025	2030	Growth % 2009-2030
Agriculture	1	2,395,983	2,401,574	2,429,175	2,365,203	2,264,180	-5.5%
Metallic Ores	10	1,460,308	2,269,764	2,444,379	2,612,025	2,793,444	91.3%
Crude Petroleum and Natural Gas	13	3,240	3,774	4,045	4,272	4,529	39.8%
Nonmetallic Ores and Minerals	14	981,952	1,161,153	1,184,238	1,189,154	1,204,350	22.6%
Ordnance	19	1,800	2,004	2,725	2,499	2,009	11.6%
Food Products	20	652,684	762,463	831,113	897,329	963,700	47.7%
Lumber and Wood Products	24	624,360	773,420	732,663	687,242	654,898	4.9%
Furniture and Fixtures	25	320	424	563	729	959	199.6%
Paper and Pulp Products	26	1,048,440	1,339,014	1,342,050	1,273,477	1,221,488	16.5%
Chemical Products	28	972,280	1,062,894	1,059,604	999,630	937,224	-3.6%
Petroleum or Coal Products	29	865,894	935,581	934,867	920,187	907,473	4.8%
Rubber and Plastics	30	120	153	191	232	286	138.0%
Clay, Cement, Glass, Stone Products	32	561,960	673,329	740,928	812,484	901,140	60.4%
Primary Metal Products	33	480,236	671,430	686,025	634,039	583,948	21.6%
Machinery	35	160	195	204	204	203	27.1%
Electrical Equipment	36	1,640	2,155	2,654	3,242	3,982	142.8%
Transportation Equipment	37	3,113,088	4,952,621	4,678,780	4,747,959	4,942,729	58.8%
Waste or Scrap Material	40	1,350,160	1,860,865	1,984,000	2,107,931	2,245,144	66.3%
Misc. Freight Shipments	41	74,640	94,745	114,225	131,816	149,781	100.7%
Shipping Containers	42	85,620	107,595	112,997	115,183	120,536	40.8%
Freight Forwarder Traffic	44	5,560	6,643	7,184	7,679	8,284	49.0%
Misc. Mixed Shipments	46	889,760	1,117,039	1,246,320	1,364,829	1,506,681	69.3%
Hazardous Waste	48	9,560	11,134	11,935	12,605	13,365	39.8%
<b>Total</b>		<b>15,579,765</b>	<b>20,209,970</b>	<b>20,550,865</b>	<b>20,889,950</b>	<b>21,430,335</b>	<b>37.6%</b>

# 7 20-YEAR FREIGHT FORECAST

**Table 18 – Michigan Rail Freight Movements (2009-2030): Other to Michigan (Tons)**

Commodity	STCC	2009	2015	2020	2025	2030	Growth % 2009-2030
Agriculture	1	121,844	121,663	125,051	122,153	118,336	-2.9%
Fresh Fish	9	400	462	524	596	679	69.7%
Metallic Ores	10	11,960	20,437	20,186	20,003	19,831	65.8%
Coal	11	19,742,506	18,326,453	17,720,051	16,768,966	15,709,435	-20.4%
Nonmetallic Ores and Minerals	14	186,484	227,498	239,348	245,080	246,971	32.4%
Food Products	20	527,928	579,420	625,950	669,071	713,910	35.2%
Lumber and Wood Products	24	869,760	1,278,964	1,433,844	1,548,657	1,675,165	92.6%
Paper and Pulp Products	26	439,840	532,952	593,697	639,205	683,554	55.4%
Chemical Products	28	1,740,528	1,942,974	1,994,295	1,890,546	1,766,068	1.5%
Petroleum or Coal Products	29	1,195,675	1,211,667	1,193,591	1,181,526	1,184,502	-0.9%
Clay, Cement, Glass, Stone Products	32	804,640	1,064,933	1,154,804	1,245,861	1,398,400	73.8%
Primary Metal Products	33	2,074,765	2,706,824	2,835,316	2,861,790	2,991,619	44.2%
Machinery	35	5,000	7,321	7,518	7,365	7,722	54.4%
Electrical Equipment	36	10,000	13,599	16,007	18,799	22,656	126.6%
Transportation Equipment	37	1,151,740	1,696,684	1,675,339	1,739,609	1,844,323	60.1%
Waste or Scrap Material	40	530,420	592,831	614,712	637,048	661,828	24.8%
Misc. Freight Shipments	41	78,055	95,942	111,548	125,736	140,579	80.1%
Shipping Containers	42	113,600	141,680	157,334	170,265	185,084	62.9%
Freight Forwarder Traffic	44	11,440	13,866	14,988	15,974	17,267	50.9%
Shipper Association Traffic	45	6,960	8,347	9,087	9,856	10,850	55.9%
Misc. Mixed Shipments	46	1,331,040	1,653,549	1,871,749	2,110,263	2,401,088	80.4%
Hazardous Waste	48	42,076	47,793	49,802	49,046	48,475	15.2%
<b>Total</b>		<b>30,996,661</b>	<b>32,285,857</b>	<b>32,464,742</b>	<b>32,077,417</b>	<b>31,848,341</b>	<b>2.7%</b>

**Table 19 – Michigan Rail Freight Movements (2009-2030): Through (Tons)**

Commodity	STCC	2009	2015	2020	2025	2030	Growth % 2009-2030
Agriculture	1	1,418,444	1,571,910	1,664,535	1,735,806	1,811,965	27.7%
Fresh Fish	9	2,320	2,865	3,182	3,503	3,866	66.6%
Metallic Ores	10	148,076	227,701	258,143	289,221	324,768	119.3%
Coal	11	23,340	29,628	29,820	29,902	29,974	28.4%
Crude Petroleum and Natural Gas	13	360,604	439,145	459,640	480,088	501,140	39.0%
Nonmetallic Ores and Minerals	14	241,056	291,580	304,442	315,622	329,217	36.6%
Ordnance	19	160	185	180	138	107	-33.4%
Food Products	20	2,926,680	3,444,089	3,836,298	4,259,147	4,741,232	62.0%
Textiles and Apparel	23	5,680	7,183	8,151	9,268	10,549	85.7%
Lumber and Wood Products	24	1,182,540	1,601,442	1,776,702	1,952,457	2,148,118	81.7%
Furniture and Fixtures	25	15,920	21,807	29,447	39,501	53,096	233.5%
Paper and Pulp Products	26	2,681,280	3,278,717	3,548,117	3,813,670	4,133,055	54.1%
Printed Matter	27	680	1,013	1,411	1,953	2,654	290.3%
Chemical Products	28	8,313,110	11,147,696	13,280,014	15,804,395	18,878,638	127.1%
Petroleum or Coal Products	29	2,320,556	2,863,412	3,015,592	3,175,743	3,345,666	44.2%
Rubber and Plastics	30	92,520	124,773	152,298	185,555	225,126	143.3%
Clay, Cement, Glass, Stone Products	32	1,895,200	2,553,933	3,201,812	3,972,526	4,957,879	161.6%
Primary Metal Products	33	2,172,528	2,809,358	3,233,069	3,701,160	4,239,045	95.1%
Fabricated Metal Products	34	41,200	53,696	64,821	78,307	94,791	130.1%
Machinery	35	23,040	30,845	39,025	48,700	61,133	165.3%
Electrical Equipment	36	44,520	58,406	72,326	86,506	104,646	135.1%
Transportation Equipment	37	1,211,228	1,549,503	1,702,327	1,863,608	2,036,980	68.2%
Technical Instruments and Equipment	38	920	1,346	1,700	2,108	2,640	187.0%
Misc. Manufacturing Products	39	16,400	22,304	28,636	36,428	46,375	182.8%
Waste or Scrap Material	40	522,864	690,480	741,322	792,542	849,346	62.4%
Misc. Freight Shipments	41	12,560	17,807	23,158	29,895	38,296	204.9%
Shipping Containers	42	14,280	19,977	27,385	37,118	49,801	248.7%
Freight Forwarder Traffic	44	1,680	2,502	3,485	4,824	6,557	290.3%
Misc. Mixed Shipments	46	1,888,720	2,427,134	2,827,334	3,290,578	3,849,867	103.8%
Hazardous Waste	48	106,880	131,004	139,291	144,049	149,338	39.7%
<b>Total</b>		<b>27,684,986</b>	<b>35,421,442</b>	<b>40,473,664</b>	<b>46,184,314</b>	<b>53,025,864</b>	<b>91.5%</b>

## AIR FREIGHT FORECAST

Statistics necessary to support accurate 20-year air freight forecasts for Michigan are insufficient at this time. Airmail volumes are expected to decrease as electronic correspondence for both personal and business purposes continues to grow. The air cargo industry is heavily impacted by the cost of fuel. Boeing, in its most recent World Air Cargo Forecast 2012-2013, predicts an average 5.2 percent annual growth rate for world air cargo traffic, and an increase by more than 80 percent in the air freighter fleet in the next 20 years.<sup>10</sup>

<sup>10</sup> Boeing, World Air Cargo Forecast 2012-2013, <http://www.boeing.com/assets/pdf/commercial/cargo/wacf.pdf>

## 8 OVERVIEW OF TRENDS, NEEDS, AND ISSUES

**A**s specified in Section 1118 of MAP-21, a state freight plan must identify significant freight system trends, needs, and issues in the state. MDOT included an extensive multi-modal discussion of freight-related trends, issues, and strategies, including the use of ITS to improve safety and efficiency, in the [Michigan Freight Profile White Paper](#). A recap is included in the following section.

### FREIGHT TRENDS

The trends reported in the updated [Michigan Freight Profile White Paper](#) include a significant reduction in both the value and tonnage of freight moved throughout Michigan. The economic recession hit the state especially hard, as Michigan experienced a massive restructuring of the auto manufacturing industry, one of the state's major economic drivers. The value of all freight movements in Michigan in 2009 was more than \$520 billion, just more than half of the approximately \$1 trillion in 2003. The drop in value is greater than the decrease in tonnage, most of which can be attributed to fewer movements of transportation equipment and motorized vehicles, both extremely high-value products.

In the midst of less than favorable statistics, freight movement throughout the state is recovering and projections indicate that Michigan remains on track to benefit from increased economic activity in the years to come. Looking at national and regional economic forecasts and using past trends, MDOT can better prepare itself for future freight concerns. General freight expectations can be made, including:

- **The private sector will continue to control the movement of freight using both privately and publicly owned infrastructure.**
- **Trucks will continue to move more freight than any other mode.**
- **Highway congestion will continue in the future. Truck freight will continue to experience predictable and unpredictable delays.**
- **Productivity gains are expected to be realized through the use of more efficient truck configurations.**
- **Rail intermodal traffic will continue to grow in major traffic corridors.**
- **Consistent with a national trend, Michigan's rail infrastructure is increasingly owned and operated by short-line, regional, and switching/terminal railroads.**
- **If/when mergers occur between eastern and western U.S. railroads, additional Michigan intermodal traffic will be shifted to rail.**
- **Michigan's ports will continue to handle predominantly bulk cargoes.**
- **Custom delivery and current supply chain methods are expensive. High fuel costs and driver shortages will likely result in an evolution back to larger deliveries and more emergency stock on hand (in manufacturing and in retail), especially if interest rates are low.**
- **Increased consumer demand for online shopping and overnight delivery of purchases will increase air cargo volumes.**

## STATEWIDE INVESTMENT NEEDS

Michigan has a strong transportation network that has served the general populace and business community well for many years. Due to the lack of adequate funding at the state and federal level, the diminishing purchasing power of existing funding, and the rise in transportation material costs and gas prices, the condition of the transportation network is deteriorating. In order to preserve the existing transportation network, adequate funding is absolutely essential. Today, the system is adequate to meet the goals of the present, but little can be done to prepare for the transportation needs of the future without increased funding.

When adequate funding is made available, a number of significant infrastructure projects will be able to move forward that can improve the movement of freight throughout Michigan.

## ISSUES AND PERFORMANCE BARRIERS

MDOT included an extensive multi-modal discussion of freight-related issues and strategies to address them in the [Michigan Freight Profile White Paper](#). The issues are included in the following section, with more detailed information about the strategies in place to address them included in the white paper.

When traffic delay due to congestion is predictable, it is possible for shippers to adjust to accommodate a different timetable or a longer delivery time. However, unpredictable delay, often weather-related or crash-induced, can cause higher costs in plant operations and supply chains, bringing a stop to manufacturing activity and damaging the viability of Michigan's freight-dependent industries. Construction zones also can tie up traffic and cause delay, and multiple construction zones within one statewide corridor add significant time to trips of long distances that are common for freight shipments.

Prevention and efficient management of incidents associated with sporadic delays on the highway, aviation, port, and rail systems are likely to enhance the efficiency of freight movement in Michigan, removing freight barriers to Michigan's optimal economic performance.



# 8 OVERVIEW OF TRENDS, NEEDS, AND ISSUES

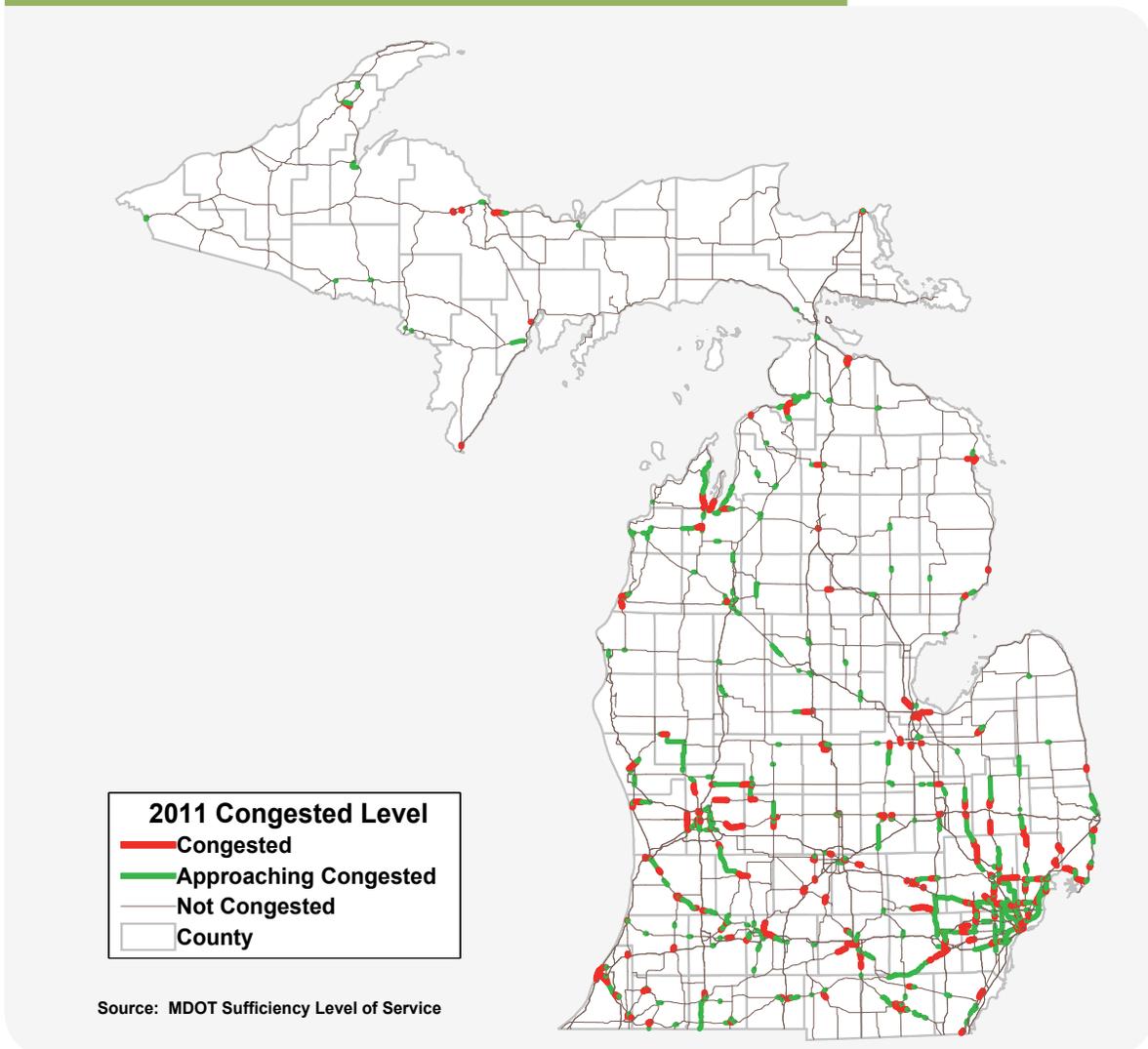
## HIGHWAY ISSUES AND STRATEGIES

### Travel Time/Congestion

Michigan has congested corridors, mainly during peak-hour traffic in urban areas (Figure 17).

On an annual basis, MDOT calculates the level of service (LOS) of highway facilities in order to effectively monitor congested roadways. LOS is represented using an A-F scale as described in the Highway Capacity Manual (2010 Edition), with “A” representing the best operating conditions and “F” representing the worst. Figure 17 portrays trunkline congested segments rated “F” for freeways and “E” or “F” for other highways and arterials. Freeways that are labeled LOS “D” or “E” are considered to be “approaching congestion,” as are other highways and arterials labeled as LOS “D.”

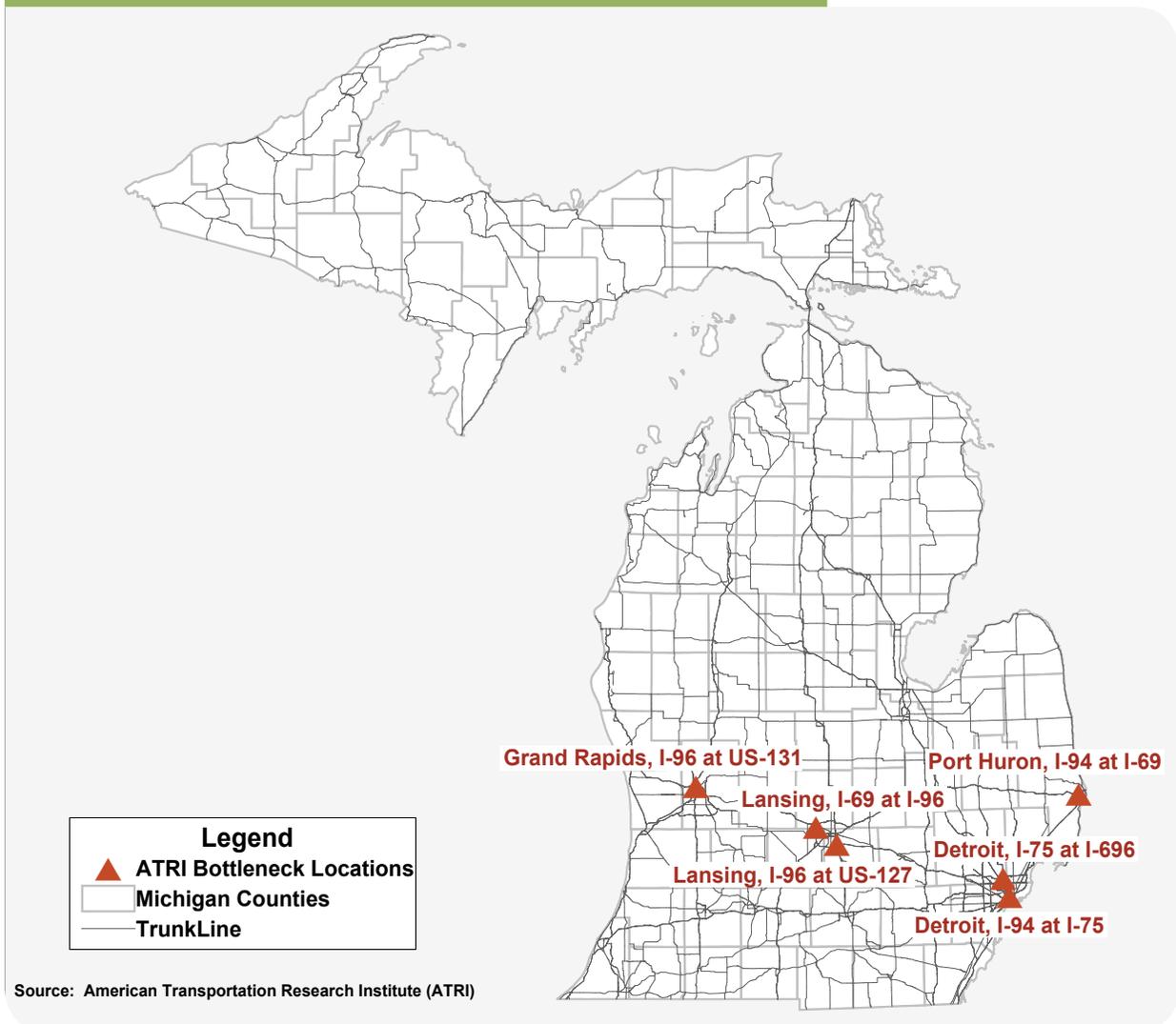
Figure 17: Michigan Congested Roadways (2011)



## Highway Bottlenecks

Highway bottlenecks resulting in user-delay costs are monitored by MDOT. The American Transportation Research Institute (ATRI) monitors travel speeds and delay at 250 of the top highway bottleneck locations in the country. Six of these are in Michigan, and the map below shows these locations (Figure 18). In addition, MDOT's Operations Division is using a new tool called the Regional Integrated Transportation Information System (RITIS) to locate bottlenecks and calculate user cost-delay figures. RITIS was originally implemented along the I-94 corridor, but its use is being expanded statewide on many other Michigan freeways. Reports are created on a variety of performance measures, including average peak period speeds, several reliability indexes, hours of speeds below 45 mph, and user-delay costs for passenger and freight vehicles. This information will help MDOT identify high-impact areas that require further investigation and analysis.

Figure 18 - Michigan Highway Freight Bottlenecks



## 8 OVERVIEW OF TRENDS, NEEDS, AND ISSUES

**Strategy:** MDOT originally established the I-94 Corridor Operations Partnership to improve traffic operations along I-94. The partnership has been so successful that it was expanded to most of the freeways in Michigan. The goal remains the same: to optimize operations to promote travel reliability, safe mobility, employee alignment, and stakeholder engagement to collaboratively improve corridor operations. MDOT officials are currently taking actions to reduce user-delay costs incurred by travelers and companies as a result of slow travel speeds caused by winter weather, work zones, or traffic incidents. Goals have been set to limit total user-delay costs to \$304.4 million in 2013 on various freeways throughout the state.

**Strategy:** MDOT continues to repair and reconstruct poor highway pavements and bridges each year. Improvements to highway infrastructure help create travel-time savings for households and businesses. This investment creates jobs, provides economic benefits for Michigan, and helps support a transportation system attractive to the freight industry.

**Strategy:** There are currently three transportation management centers in Michigan: in Detroit, in Grand Rapids, and a statewide one in Lansing. Each center uses closed-circuit television cameras, detection equipment, and dynamic message signs to manage traffic on regional and statewide freeways. The centers are focused on incident management activities and traveler information with the goal of improving the safety and mobility of the traveling public. ITS helps improve commercial freight movement travel times by warning shippers of problems and providing travel options in congested areas.

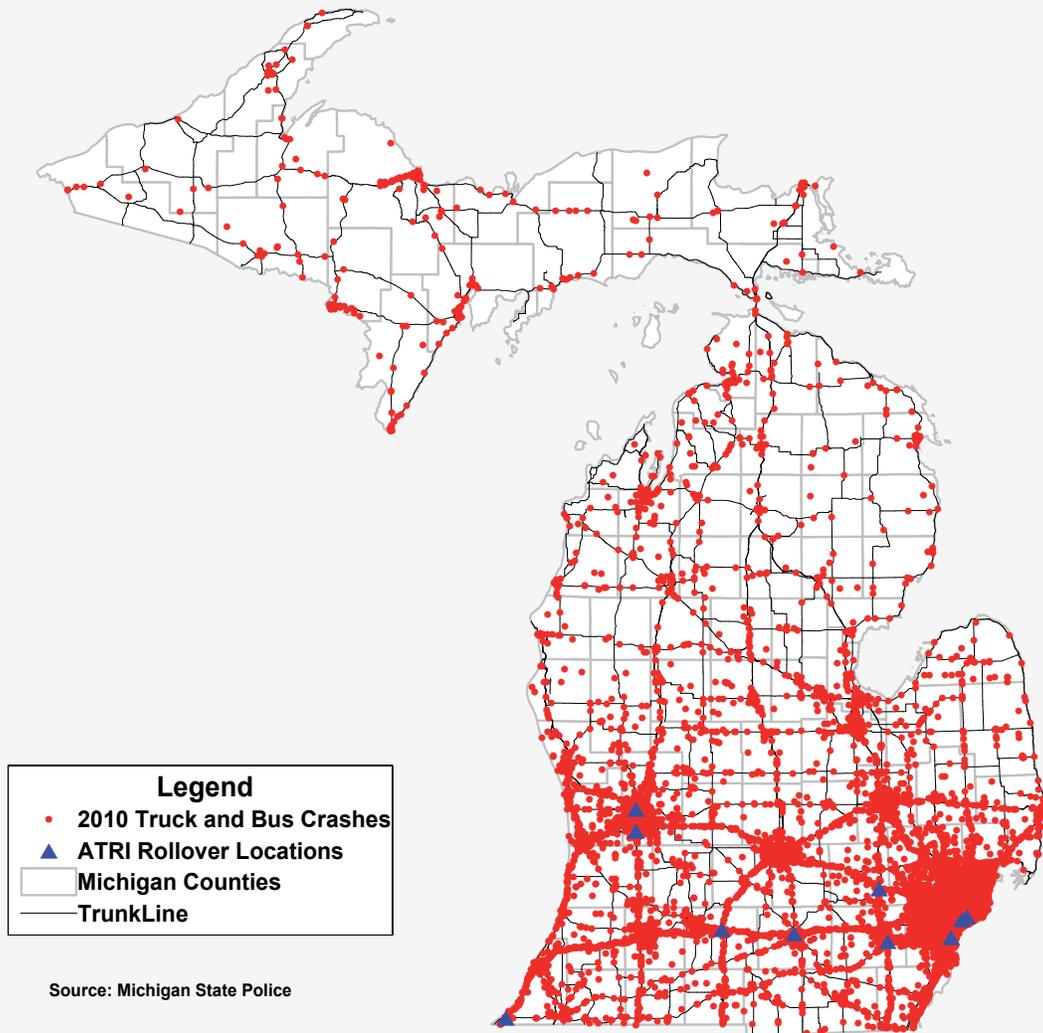
**Strategy:** An interdepartmental committee consisting of representatives from MDOT, the Michigan State Police (MSP), FHWA, and the Federal Motor Carrier Safety Administration (FMCSA) has been established to review truck speed limits and determine if changes are justified that might reduce travel time and alleviate congestion.

### Highway Safety

In 2011, the number of crashes involving a truck in Michigan numbered more than 10,500, with 69 being fatal. This is a significant reduction from the 16,600 truck crashes and 121 fatalities recorded in 2004. While MDOT has made impressive progress in improving safety, more can be done.

MDOT maintains a crash database of all incidents reported to MSP. Figure 19 shows the location of truck or bus crashes in 2010. The department updates this information annually and uses the database to determine high-risk areas for further review. Also included in the map are the top rollover locations identified by ATRI from crash data between 2001 and 2009.

Figure 19 - Truck and Bus Crashes and ATRI Rollover Locations (2010)



**Strategy:** Since implementing a cable median barrier program in 2008, MDOT has installed 280 of the planned 350 miles of barrier. The department will continue to install the barriers in the future as needed. Results from other states that have had the barriers for a longer period of time than Michigan have shown a 90 percent reduction in median-crossing crashes, which are some of the more severe and fatal highway crashes. MDOT expects the cable barriers to save 13 lives and prevent 51 serious injuries a year. MDOT and Wayne State University are in the middle of a three-year study on the effectiveness of cable median barrier on Michigan roadways.

**Strategy:** The department began installing rumble strips on Michigan's state trunkline system in 2008. Rumble strips are a proven and cost-effective countermeasure to lane departure crashes brought on by driver drowsiness, distraction, and/or inattention. To date, 5,700 miles of centerline and 1,700 miles of shoulder rumble strips have been placed.

**Strategy:** MDOT's Operations Field Services Division is reviewing the list of top rollover locations in Michigan provided by ATRI, and inspects the locations to identify possible changes in speed, design, sign placement and use, sightlines, or other factors in order to improve safety.

# 8 OVERVIEW OF TRENDS, NEEDS, AND ISSUES

## Truck Size and Weight

Overweight vehicles on state roadways can severely harm pavement quality and reduce the life expectancy of the road. At the same time, MDOT wants to encourage the efficient movement of heavy commodities that are typical of Michigan's major industries. Allowing greater truck weights, supported by more axles, allows trucks to move more goods at reduced costs while limiting pavement damage.

**Strategy:** The Commercial Vehicle Strategy Team (CVST) was established in 2005 to strengthen the partnership between MDOT and the MSP Commercial Vehicle Enforcement Division. The team's Infrastructure Subcommittee has investigated new practices and technologies, enabling a more efficient enforcement of overweight trucks. The team establishes priorities among projects that advance enforcement strategies, such as weigh-in-motion (WIM) equipment, wireless WIM monitoring, the Truck Weight Information System, and weigh station infrastructure upgrades. The group is currently reviewing the efficiency and effectiveness of current weigh station operations and alternative enforcement strategies. When weigh station operations are inefficient, the activities of shippers and carriers are affected by the delay.

**Strategy:** An interdepartmental committee consisting of representatives from MDOT, MSP, FHWA, and FMCSA has been established to review trailer lengths and axle configurations for certain commercial vehicles to determine if efficiency can be improved without conflicting with existing federal law. The state Legislature enacted some of the committee's recommended changes in state law in early 2012 and additional recommendations will be offered by the committee in the near future.

## Truck Parking

With the end of the recession and increases in commercial volumes, the issue of truck parking has been reignited within the trucking industry. New hours of service rules for truckers have put more of a strain on the limited number of truck parking spaces available at some locations in Michigan.

**Strategy:** MDOT has received a grant to develop the I-94 Truck Parking Management and Information System. This system will include alerts and message signs to drivers indicating parking space vacancies available along the corridor at rest areas and truck stops. The information will be available online and through industry logistics networks. With a successful effort, the system could be initiated on other corridors in the state.

## Jurisdictional Roadway Issues

Trucks pay taxes for the use of road facilities. However, trucks are not permitted on all roadways due to local ordinances. A lack of consistency in access to trade centers with special regulations on trucks creates a barrier for the movement of goods to markets utilizing these goods.

**Strategy:** MDOT has established procedures for ensuring compliance with federal requirements in the law. MDOT reviews complaints regarding reasonable access to the truck network on roadways under local jurisdiction and issues decisions on their findings regarding safety and size restrictions.

## Pavement Condition

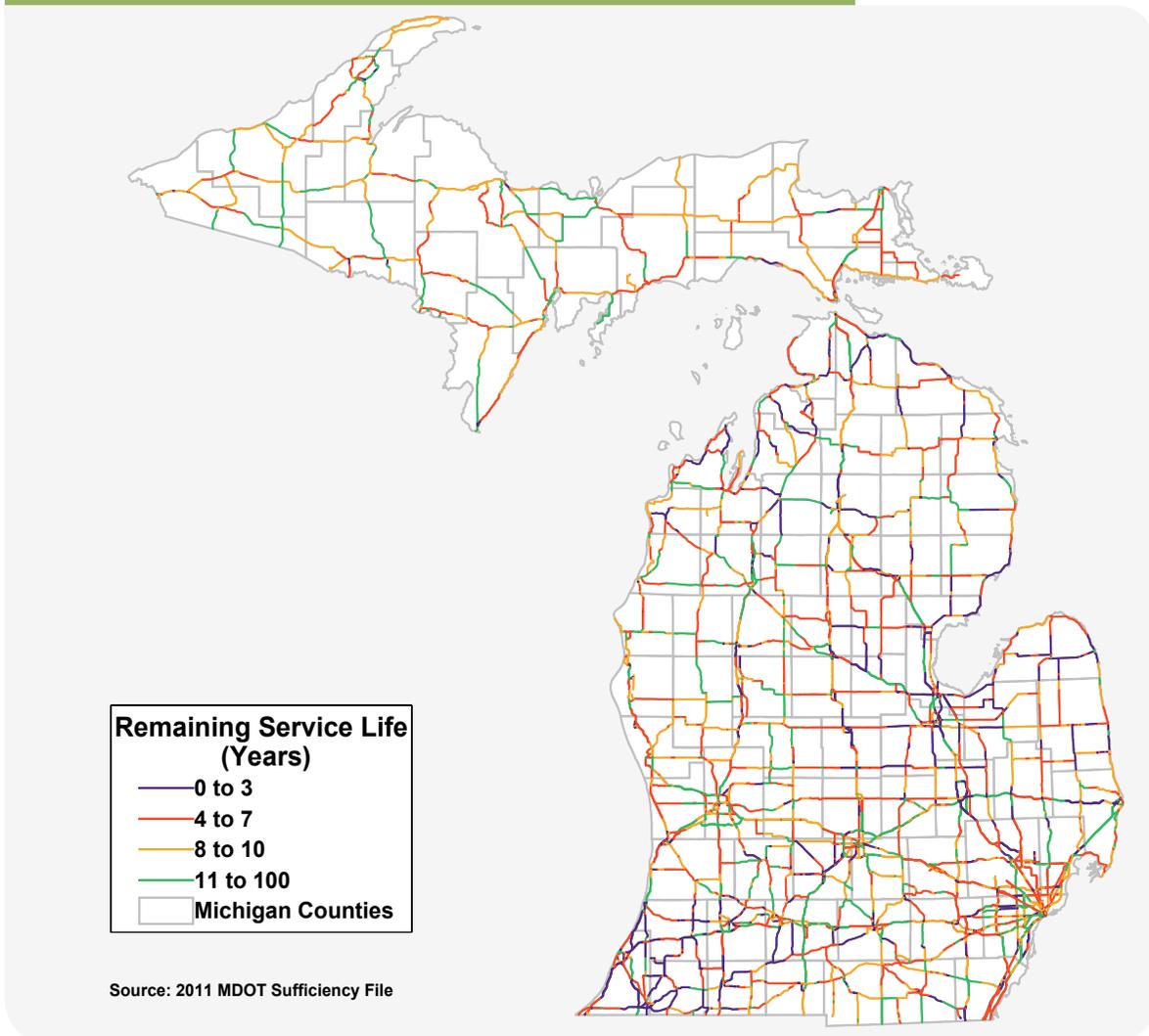
MDOT has made substantial progress toward improving pavement condition since 1997, when the last state revenue increase was enacted. At that time, the STC set a goal for the department to improve freeway and non-freeway pavement conditions to 90 percent good or fair condition by 2007. MDOT met that goal with the help of a strong asset management program, along with subsequent increases in federal funding, bond initiative investments (Preserve First and Jobs Today), and federal initiatives (the American Recovery and Reinvestment Act). However, projections reveal that at current funding levels, 50 percent of the state trunkline system, Michigan's most traveled roads, will be in poor condition by 2018.

The key road performance measure used by MDOT is called Remaining Service Life (RSL). It is defined as the estimated number of years until it is no longer cost-effective to

perform preventive maintenance on a pavement section. The performance measure of RSL and condition measures, such as Sufficiency Surface Condition, International Roughness Index, Distress Index, Pavement Surface Evaluation Rating system (PASER), and other measures, are used together to help transportation professionals cost-effectively preserve Michigan's trunkline highway network.<sup>11</sup> In addition, the Road Quality Forecasting System (RQFS) uses annually updated pavement data to develop pavement strategies that maximize pavement condition and minimize costs.

The increase in the number of MDOT trunkline miles that have an RSL of zero to three years can be directly attributed to the lack of adequate funding at the local, state, and federal levels for highway maintenance and preservation efforts. MDOT reached its preservation goal of the trunkline system in "good" condition in 2007 and sustained it through 2010; but since then, pavement condition has begun to decline due to funding deficiencies (Figure 20).

Figure 20 - Trunkline Remaining Service Life (RSL) (2011)



<sup>11</sup> MDOT Project Scoping Manual, 2009, Chapter 4, Condition Rating and Measurement Systems, [http://michigan.gov/mdot/0,4616,7-151-9625\\_21540\\_36037-243045--,00.html](http://michigan.gov/mdot/0,4616,7-151-9625_21540_36037-243045--,00.html)

# 8 OVERVIEW OF TRENDS, NEEDS, AND ISSUES

## Bridge Condition

MDOT's Bridge Management System (BMS) is an important part of the overall asset management process. BMS is a strategic approach to linking data, strategies, programs, and projects into a systematic process to ensure achievement of desired results. An important BMS tool used by MDOT to develop preservation policies is the the Bridge Condition Forecasting System (BCFS). Working from the current bridge condition, bridge deterioration rate, project cost, expected inflation, and fix strategies, BCFS estimates the future condition of the state trunkline bridge system. Projections show that Michigan will reach a freeway bridge condition of

more than 94 percent good/fair by the end of 2013. MDOT has made steady progress toward its freeway bridge goal; but projections indicate that, without additional funding, Michigan will fall short of achieving the freeway bridge goal of 95 percent in good/fair condition. After 2013, the freeway bridge condition is projected to decline.

Bridge condition is very important to the reliable movement of truck freight on the system. The most recently updated statistics in June 2012 show that 279 bridges were determined to be structurally deficient out of the 4,406 bridges on the state highway system. The following map depicts the locations of all bridges under MDOT jurisdiction, and those that are in need of repair as of 2011 (Figure 21).

Figure 21 - MDOT Bridge Ratings (2011)



## RAIL ISSUES AND STRATEGIES

The [Michigan State Rail Plan](#), adopted in 2011, provides a complete assessment of system issues in Michigan and recommendations for improvements. Below is a brief summary of some of the most important rail issues in the state.

### Rail Capacity

Like most large cities in the United States, the Detroit region possesses historical impediments to the smooth and efficient movement of rail freight within the urbanized area. The throughput and efficiency of the multiple existing terminals are inadequate to meet future demand of intermodal rail freight. Also, the existing Detroit River Rail Tunnel cannot accommodate certain double-stack containers and taller Automax railcars. Growth in demand from the auto industry and from existing and potential customers is hampered by this inefficiency.

**Strategy:** MDOT partnered with Class I railroads to develop the DIFT. This project will expand throughput capacity by consolidating multiple terminals and providing equipment and infrastructure upgrades needed in this competitive industry.

**Strategy:** MDOT has long supported the construction of a replacement rail tunnel between Detroit and Windsor. Numerous meetings have been held with the owners of the existing tunnel to address technical issues and potential funding sources.

### Rail Congestion/Travel Times

Bottlenecks in the rail system have hindered movements, mainly in the urbanized communities in the Detroit region. Freight trains often wait at locations for other trains to pass before being able to continue.

**Strategy:** As part of the DIFT project, connections will be improved to alleviate long delays at several junctions in Metro Detroit. Multiple train movements will be enabled at junctions where trains are frequently delayed for hours while waiting for other trains to pass. Also, improved highway access to the DIFT will provide a more efficient flow of trucks into and out of the facility, improving rail intermodal operations.

### Safety

At-grade crossings are locations where car-train crashes can occur even when automated, protective barriers are functioning. While the number of crashes at railroad crossings continues to decline, car-train crashes are 30 times more likely to result in a fatality than crashes between vehicles.

**Strategy:** MDOT partners with the railroads for surface improvements to rail crossings on state trunklines and upgrades crossing devices with input from local authorities. MDOT's local grade crossing program partners with local agencies and provides funding for improvements to rail crossings identified as dangerous. MDOT also keeps an active inventory of crossings and rail infrastructure, and notifies railroads of deficiencies and potential problem locations as they are identified.

## 8 OVERVIEW OF TRENDS, NEEDS, AND ISSUES

### Railcar Shortage

Shippers have found that after moving their product to market, it is increasingly hard to get empty railcars returned for the next market cycle. This is primarily a problem for the agriculture industry. Often, different industries compete for the same cars. Agricultural users, with heavy seasonal needs, must compete for car supply with other shippers with more consistent demands. Covered hoppers, for instance, also are used to carry sand for the hydraulic fracturing, or fracking, industry.

**Strategy:** The department continues to study the extent of the railcar shortage in Michigan and its cost to agricultural shippers, and is working with railroads and shippers to find a resolution.

### Rail Accessibility

As a peninsula, accessibility to rail service for rail-dependent businesses in Michigan has been problematic, especially for those businesses located in the rural, northern part of the Lower Peninsula. Through-lines, such as those situated in the southern part of the state or the Upper Peninsula, are not available in this part of the state. Many of the rural lines that existed in the past were abandoned or sold by the major rail carriers as they became less economically viable.

**Strategy:** MDOT has purchased some of these rail lines to continue to make rail accessible to businesses and has upgraded rail infrastructure in disrepair to accommodate continued service. MDOT currently owns 665 miles of active track and contracts with five private rail operators to maintain service on those lines. Three of the lines are scheduled to be returned to the private sector over the next several years as part of a legislatively mandated divestiture process.

**Strategy:** MDOT maintains two competitive financial assistance programs designed to enhance existing infrastructure and help rail users gain access to or make greater use of the freight rail system. The Freight Economic Development Program assists rail users in constructing new or expanded spur tracks, rail yards, or transload facilities. The second program, the MiRLAP, is geared toward preserving or improving existing infrastructure and keeping rail lines viable. Both programs are intended to improve Michigan's climate for rail-dependent businesses.

### Rail Track Limitations

Railcars capable of carrying 286,000 pounds are becoming the nationwide standard for certain commodities, particularly agricultural products. Some are now even moving to 315,000 pounds. This allows for more efficient handling of products for shippers but requires upgraded infrastructure. The requirement for upgraded infrastructure is more likely to be a problem for lines owned or operated by short-line or regional carriers. Without infrastructure improvements, shippers may not be able to reach the existing market for their products.

**Strategy:** MDOT's MiRLAP program is available for the improvement of existing railroad infrastructure, including upgrading track to accommodate heavier railcars.

**Strategy:** Two studies expected to be completed in FY 2014 will inventory the track infrastructure in the northern Lower Peninsula and Upper Peninsula and identify track limitations for heavier rail cars.

## AIR ISSUES AND STRATEGIES

### Willow Run Airport Limitations

Willow Run Airport is the primary freight-handling aviation facility in the state. Due to the short length of its runways, fully loaded wide-body aircraft must take off from Willow Run with only enough fuel to get them off the ground and fly to Detroit Metro Airport, 10 miles away, where the plane can obtain a full tank of fuel and use the longer runways to continue flying. This is costly but, due to the availability of the surrounding land, lengthening the runways may prove difficult.

**Strategy:** MDOT has studied the feasibility and cost of obtaining property surrounding Willow Run needed for expansion. However, financial and political obstacles continue to be major barriers, as they have been in the past. The current 10-year development plan for the airport calls for reconstructing the main runway, the addition of new taxi-ways to improve airport efficiency, and the expansion of one 7,200-foot-long runway to 9,550 feet. Only the reconstruction of the main runway has been funded at this time.

### Retaining Cargo Services

The economic downturn and cost of fuel have negatively impacted air cargo services at many airports. Retaining and recruiting air services continues to be a challenge for the industry.

**Strategy:** MDOT has reinstated funding for the Air Service Program, which had been discontinued for a number of years due to funding constraints. This program is a state and local program that aims to retain cargo services by giving grants to airports for capital improvements and enhancing facilities. The program also increases airport marketability for the recruitment of new business to the air cargo industry.

### All-Weather Airports

Airports that are not available in bad weather hamper the movement of freight, as seasonal changes can reduce certain freight movements.

**Strategy:** MDOT has continued an initiative to make more Michigan airports all-weather accessible by employing Global Positioning System (GPS) instrument approach systems and automated weather observation systems (AWOS). GPS systems alleviate the need for expensive ground navigation aids; and the AWOS provides readily available weather information to aircraft. MDOT continues to work with airport communities to assist those in need of accessibility. Approximately 70 percent of eligible airports in the state are now all-weather accessible.

# 8 OVERVIEW OF TRENDS, NEEDS, AND ISSUES

## MARINE ISSUES AND STRATEGIES

### Dredging Backlog

While the Michigan Freight Plan primarily identifies capital needs, maintenance of the commercial navigation channels in Michigan's ports is the most significant issue facing marine transportation in Michigan. Sedimentation from coastal and land processes is continually deposited into the navigation channels and must be removed by annual or periodic dredging. Most of the commercial ports are federal navigation projects for which the U.S. Army Corps of Engineers is responsible for maintenance dredging. The Harbor Maintenance Trust Fund, which is funded by the Harbor Maintenance Tax imposed on commercial cargoes, was established to provide funding for maintenance dredging. Unfortunately, only approximately half of the tax revenues collected are being spent as authorized by Congress, leaving many of Michigan's commercial ports inadequately maintained. Commercial navigation is negatively impacted and eventually some ports could be forced to cease commercial operations.

**Strategy:** Michigan will continue to work with Congress, regional agencies, other states, and the shipping industry to encourage the federal government to use the funds in the Harbor Maintenance Trust Fund for their intended purpose. In 2013, Michigan appropriated \$20.9 million in emergency funds through Public Act 9 of 2013<sup>12</sup> to dredge several recreational harbors, but these funds were not available for commercial port dredging.

### Soo Locks

Congress has authorized construction of a new large lock that will replace two functionally obsolete locks constructed during World War I that are now closed. This new lock will be similar in size to the existing Poe Lock, the only lock capable of accommodating 1,000-foot-long vessels in the St. Mary's Falls Canal. This will create much needed redundancy for the waterway as any failure of or problem with the Poe Lock would create delays that would be long and financially detrimental to shippers.

**Strategy:** MDOT was involved in the planning aspects for the project and has fulfilled the state's role in all efforts to date. The department will continue to work with the Great Lakes community to promote the advancement of this project. Preliminary construction has begun on the project and efforts continue to secure the remaining funding from Congress.

### Navigation Policy

There are federal policies and regulations that affect marine transportation, some of which hinder further development of domestic short-sea shipping or international shipping. It is important that protective federal and international maritime standards are applied consistently and implemented in a timely manner to the shipping industry so as not to place individual states or regions at a competitive disadvantage.

**Strategy:** MDOT and other Michigan officials will continue to monitor these issues and federal policies and work with Congress and appropriate federal agencies to develop funding and regulatory policies at the national and international level in order to "level the playing field" for Great Lakes shippers. When issues of funding and regulatory problems are resolved at the national or international level, barriers arising for Michigan's waterborne shippers may be alleviated.

12 Public Act 9 of 2013, <http://www.legislature.mi.gov/documents/2013-2014/billanalysis/Senate/pdf/2013-SFA-0233-N.pdf>.

## BORDER CROSSING ISSUES AND STRATEGIES

### Border Delay/Congestion

Michigan has four highway border crossings with Canada. The Ambassador Bridge in Detroit and the Blue Water Bridge in Port Huron are ranked first and second, respectively, in the number of truck crossings each year of all U.S.-Canada border locations. Heightened security risks due to world events have led the Department of Homeland Security to impose stricter inspections of trucks, resulting in longer wait times and higher costs for shippers. Trucks crossing the border can experience several hours of delay, waiting to clear customs inspection and in long queues leading to the bridges. This delay costs companies that do business in the United States and Canada tremendously.

**Strategy:** The New International Trade Crossing (NITC), a planned second bridge from Detroit to Windsor, Ontario, will provide additional border-crossing capacity for passengers and freight. The new bridge also will create a redundancy in the system to alleviate the risk of any potential closures of the Ambassador Bridge. Moving international freight improves immensely with this project. NITC's Environmental Impact Statement has been completed and a Record of Decision has been granted. On June 15, 2012, Gov. Rick Snyder and Canadian Prime Minister Steven Harper signed an agreement that will begin moving this project toward construction. This project is currently in the process of acquiring the necessary permits to proceed with construction. On April 11, 2013, the U.S. Department of State issued a Presidential Permit to the State of Michigan to construct, connect, operate, and maintain the bridge.

**Strategy:** MDOT has planned an expansion of the Blue Water Bridge plaza to improve traffic flow in Port Huron. The proposed expansion will provide a new customs processing and inspection area for commercial vehicles, including 12 new primary inspection lanes. It also includes 15 commercial vehicle loading/unloading docks that will allow Customs and Border Patrol (CBP) officers to unload and inspect the contents of a commercial vehicle. This should drastically reduce delays at this crossing.

**Strategy:** The Free and Secure Trade (FAST) program is a joint program between the United States, Canada, and Mexico. The Free and Secure Trade (FAST) program allows quicker processing for commercial carriers who have completed background checks and fulfilled certain eligibility requirements. Benefits include dedicated lanes for greater speed and efficiency in processing trans-border shipments; reduced number of inspections resulting in reduced delays at the border; and priority, front-of-the-line processing CBP inspections. Also, the Automated Commercial Environment (ACE) program continues to be expanded by the CBP. ACE modernizes and enhances trade processing with features that will consolidate and automate border processing, and provides a centralized online access point to connect CBP and the trade community. While both are federal programs, MDOT promotes their benefits in order to reduce border delays.