

Maine State Library

**Digital Maine**

---

Transportation Documents

Transportation

---

1-1-2004

**Study of Impacts Caused by Exempting Currently Non-exempt  
Maine Interstate Highways from Federal Truck Weight Limits,  
Appendix A : Weigh-in-Motion (WIM) Station Data Details, January  
2004**

Maine Department of Transportation

Follow this and additional works at: [https://digitalmaine.com/mdot\\_docs](https://digitalmaine.com/mdot_docs)

---

# **Study of Impacts Caused by Exempting Currently Non-exempt Maine Interstate Highways from Federal Truck Weight Limits**

## **Appendix A: Weigh-in-Motion (WIM) Station Data Details**

**January 2004**



## Weigh-in-Motion Station (WIMS) data

For this study, data was extracted from ten Weigh-in-Motion stations (WIMS) in Maine. WIM stations record a variety of statistics for each vehicle passing over sensors imbedded in the pavement, including:

- Number of axles;
- Gross vehicle weight (GVW);
- A calculation of equivalent standard axle load (ESAL P2.5, SN5);
- Vehicle speed.

The WIM stations in Maine were first installed early in 2001. For this analysis records for every vehicle with 5 or more axles were extracted. The time period of the records is from the beginning of station operation through the end of October 2002. The total number of records exceeds 8 million.

All WIM station records for vehicles with 5 or more axles were imported into an ACCESS database and the most recent complete year of data was extracted for each station. A full year of representative data was available for each station, with the exception of one Maine non-turnpike station, where the dataset fell only a few days short of a full year. This data was then ‘filtered’ to capture only 5 axle and 6 axle ‘combination’ tractor-semi-trailer (TST) trucks (class 9 for 5 axle, class 10 for 6 axle). Average annual daily values were then derived from the annual data sets.

The Exhibits on the following pages contain:

- A summary of Average Daily Traffic (ADT) at the WIM stations (**Exhibit A-1 and A-2**).
- Graphics (**Exhibits A-3 through A-14**) showing vehicle counts and resulting ESALs for the turnpike WIM stations; first by total counts for all 5 and 6 axle combination trucks passing the station, then by direction, then by number of axles.
- Detailed statistics for each station (**Exhibits A-15 through A-24**); the introduction to this detail section contains explanations of the data organization, which also applies to the graphs and summary table.

In all cases, the primary organization of the data is by loaded GVW category:

- *below exempt wt* – loaded GVW below exempt weights;
- *exempt weights* – 5 axle with loaded GVW between 80,000 and 88,001 lbs., or 6 axle with loaded GVW between 80,000 and 100,001 lbs.;
- *above exempt wt* – loaded GVW above exempt weights.

To assist visual comparison, the graphics show the proportion of vehicles **at exempt weights** at the bottom of the bars, then vehicles **over exempt weights**, and finally vehicles **under exempt weights** at the top of the bars. All tables list weight categories in their natural order: first vehicles under exempt weights, then exempt, then over exempt.

The stations have been broken into three regional groups to assist comparison:



## **1. Stations on the Turnpike or I-95**

Two of the four stations included in this discussion are on Turnpike segments of I-95 where federal weight limits apply (South ME Turnpike and Central ME Turnpike). And one station is located on I-95. The vehicle weights have been broken into the same weight categories as all other stations, even though at these two stations the weights categorized as 'exempt' would be overweight by federal weight limits, if not specially permitted as an overweight non-divisible load.

The WIM stations located on Turnpike segments of I-95 have the highest traffic volumes (see **Exhibit A-3**) and the ESAL estimates for trucks falling in the federal weight exempt category account for about one-half of the total ESAL estimate.

## **2. North and East Maine Stations**

These three WIM stations are located on US Highways located to the north or east of I-95. All three stations record high ESAL estimates with strong directional flow, however the direction or primarily flow varies by station.

## **3. West and South Maine Stations**

These three stations are located on state highways that connect to I-95 or the Turnpike. A high percentage of ESAL estimates at these stations result from commercial vehicle passes exceeding 80,000 pounds GVW. Two of these stations recorded highly directional flows from vehicles migrating toward the I-95 or the Turnpike. .

*On the following pages, Groups 1 graphs and tables are entitled "Turnpike & I-95 WIM Stations". Groups 2 and 3 are amalgamated into a single set of graphs and tables, entitled "Non-Turnpike/I-95 WIM Stations."*

## **Observations and Assumptions from WIM Data:**

1. The detailed data shown in the table exhibits indicate that significant proportions of the vehicles weighing over 80,000 GVW are 5 axle trucks.
2. It is assumed that vehicles recording GVW in excess of 100,000 are traveling on special permits and would continue on these same routes even if general weight laws changed.
3. In all cases, the direction and volumes of flows at specific points (the WIMS stations) can only be interpolated to impacts at other points in the network by matching these flows to overall commodity flows and their ultimate origins and destinations. This will be the next step for this analysis.



Exhibit A-1: Summary of Turnpike & I-95 WIM Station Average Daily Traffic

Average Annual Daily Traffic - by Direction

STATION	direction	VEHICLE AADT			ESAL AADT			MILLION LBS AADT					
		below exempt	EXEMPT	over exempt	total	below exempt	EXEMPT	over exempt	total	below exempt	EXEMPT	over exempt	total
Turnpike	Central ME Turnpike north	627	145	135	907	322	454	732	1,509	28.4	12.8	14.1	55.4
	Central ME Turnpike south	729	192	73	994	631	562	352	1,545	38.6	16.8	7.5	62.8
	South ME Turnpike north	1,696	101	24	1,820	1,005	296	129	1,430	81.0	8.9	2.4	92.4
	South ME Turnpike south	1,365	465	143	1,974	1,061	1,414	735	3,211	71.9	39.2	14.5	125.6
I-95	Central ME Interstate north	704	82	49	836	427	253	252	932	34.6	6.9	4.7	46.2
	Central ME Interstate south	566	132	69	766	421	413	346	1,180	29.2	11.1	6.5	46.8
	North ME Interstate north	330	27	11	368	232	73	48	354	16.7	2.2	1.0	19.9
	North ME Interstate south	355	24	44	424	373	74	239	686	20.8	2.1	4.2	27.1

Average Annual Daily Traffic - ALL Directions

STATION	direction	VEHICLE AADT			ESAL AADT			MILLION LBS AADT					
		below exempt	EXEMPT	over exempt	total	below exempt	EXEMPT	over exempt	total	below exempt	EXEMPT	over exempt	total
TpK	Central ME Turnpike ALL	1,356	337	208	1,901	953	1,016	1,084	3,053	67.0	29.6	21.6	118.3
	South ME Turnpike ALL	3,061	566	167	3,794	2,066	1,711	864	4,641	152.9	48.1	17.0	218.0
I-95	Central ME Interstate ALL	1,270	214	118	1,602	848	666	598	2,111	63.8	18.0	11.2	93.0
	North ME Interstate ALL	686	51	55	791	605	147	287	1,039	37.4	4.3	5.2	47.0

percent of station total (ALL directions)

STATION	direction	VEHICLE AADT			ESAL AADT			MILLION LBS AADT				
		below exempt	EXEMPT	over exempt	total	below exempt	EXEMPT	over exempt	total	below exempt	EXEMPT	over exempt
TpK	Central ME Turnpike ALL	71.3%	17.7%	10.9%	31.2%	33.3%	35.5%	56.7%	25.1%	18.3%	18.3%	56.7%
	South ME Turnpike ALL	80.7%	14.9%	4.4%	44.5%	36.9%	18.6%	70.1%	22.1%	7.8%	7.8%	70.1%
I-95	Central ME Interstate ALL	79.3%	13.3%	7.4%	40.2%	31.5%	28.3%	68.5%	19.4%	12.1%	12.1%	68.5%
	North ME Interstate ALL	86.7%	6.4%	6.9%	58.3%	14.2%	27.6%	79.6%	9.2%	11.2%	11.2%	79.6%



Exhibit A-2: Summary of Non-Turnpike/I-95 WIM Station Average Daily Traffic

Average Annual Daily Traffic - by Direction

STATION	direction	VEHICLE AADT			ESAL AADT			MILLION LBS AADT					
		below exempt	EXEMPT	over exempt	total	below exempt	EXEMPT	over exempt	total	below exempt	EXEMPT	over exempt	total
north & east	North ME State	71	27	44	142	15	86	271	371	2.6	2.5	4.8	10.0
	North ME State	94	22	18	133	42	67	92	201	4.2	2.0	1.9	8.1
	North ME US Rte.	179	21	10	209	72	65	51	189	7.6	1.9	1.0	10.5
	North ME US Rte.	128	40	35	203	117	126	188	430	6.8	3.5	3.5	13.8
	Eastern ME State	136	24	18	177	76	70	103	249	6.3	2.1	1.9	10.3
	Eastern ME State	161	57	18	236	192	165	91	449	9.8	5.0	1.9	16.7
central & west	West ME US Rte.	72	65	45	182	46	192	262	500	3.6	6.0	4.9	14.5
	West ME US Rte.	159	13	7	178	51	37	37	125	6.7	1.1	0.7	8.5
	NW ME US Rte	133	17	8	159	41	54	44	139	5.2	1.6	0.9	7.6
	NW ME US Rte	43	59	60	162	42	179	314	535	2.3	5.5	6.4	14.2
	Central ME State	69	21	19	110	30	67	129	226	3.0	1.9	2.1	7.0
	Central ME State	67	42	18	127	40	115	112	267	3.2	3.8	2.0	8.9

Average Annual Daily Traffic - ALL Directions

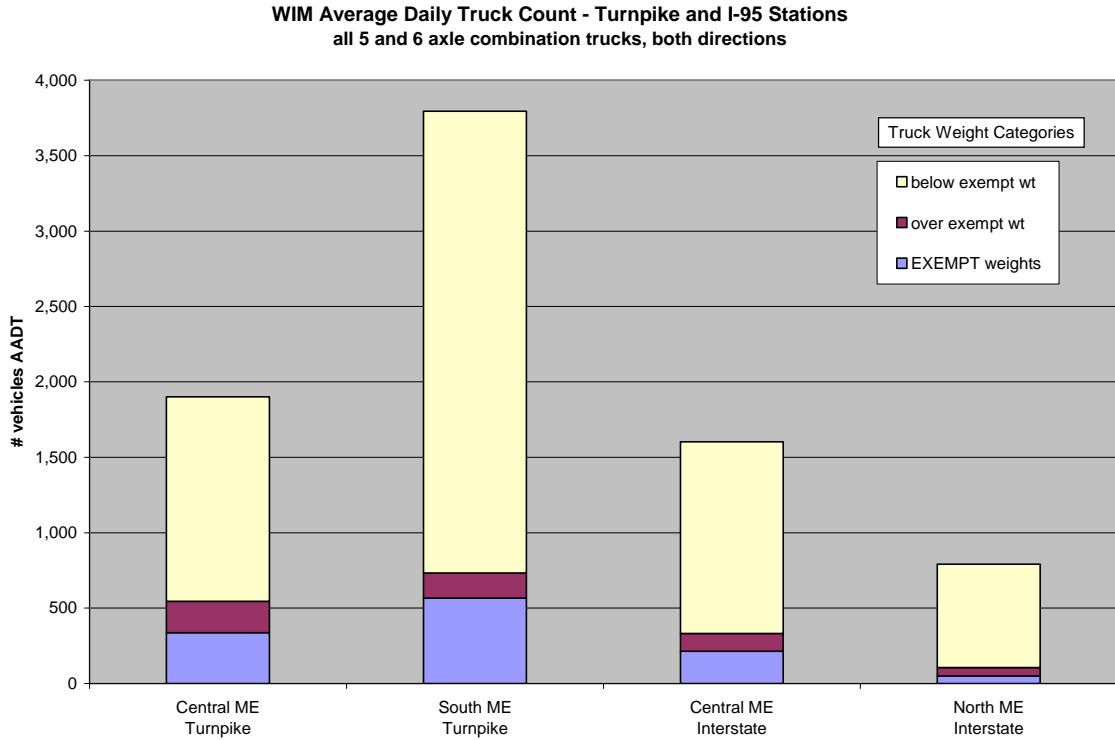
STATION	direction	VEHICLE AADT			ESAL AADT			MILLION LBS AADT					
		below exempt	EXEMPT	over exempt	total	below exempt	EXEMPT	over exempt	total	below exempt	EXEMPT	over exempt	total
U	North ME State	165	49	62	275	57	152	363	572	6.8	4.5	6.7	18.1
Ø	North ME US Rte.	307	61	45	413	189	191	239	619	14.4	5.3	4.5	24.2
Z	Eastern ME State	297	80	36	414	268	236	195	698	16.1	7.1	3.8	27.0
W	West ME US Rte.	231	78	52	360	97	229	299	625	10.3	7.1	5.6	22.9
Ø	NW ME US Rte	176	76	69	320	83	232	359	674	7.5	7.0	7.3	21.8
C	Central ME State	136	63	38	237	70	182	241	493	6.1	5.7	4.1	15.9

percent of station total (ALL directions)

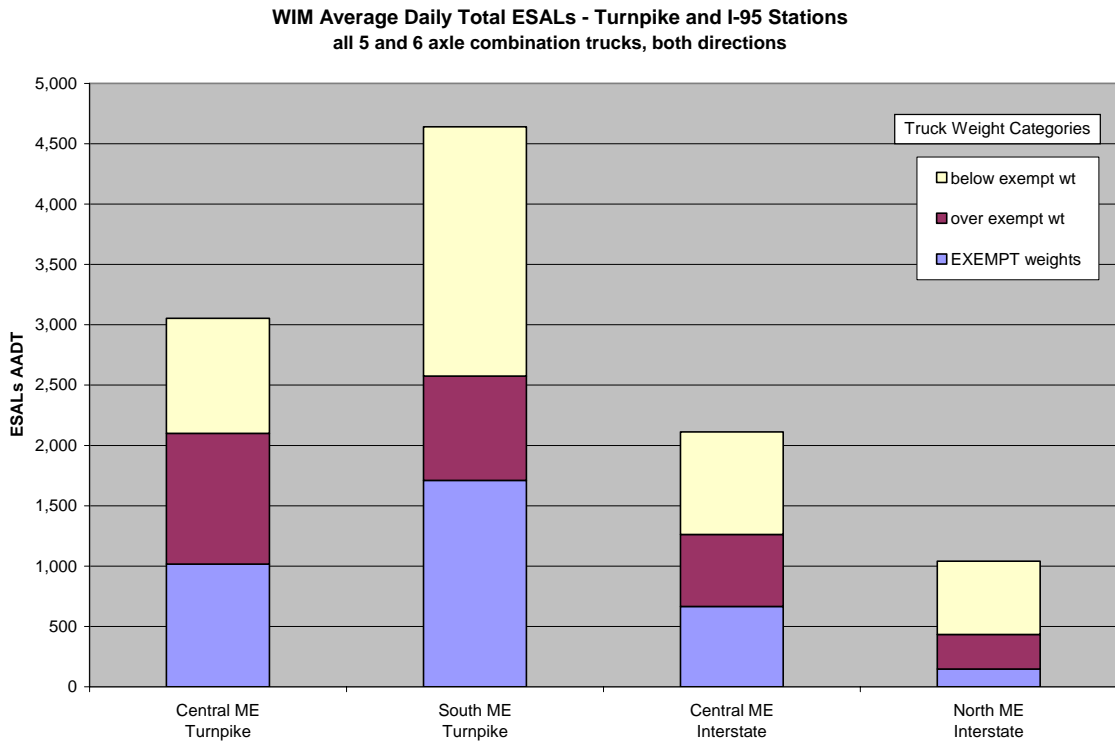
STATION	direction	VEHICLE AADT			ESAL AADT			MILLION LBS AADT					
		below exempt	EXEMPT	over exempt	total	below exempt	EXEMPT	over exempt	total	below exempt	EXEMPT	over exempt	total
U	North ME State	60.0%	17.6%	22.4%	27.5%	10.0%	26.6%	63.4%	37.2%	37.8%	25.0%	37.2%	37.2%
Ø	North ME US Rte.	74.3%	14.9%	10.8%	41.3%	30.5%	30.8%	38.6%	18.6%	59.4%	22.1%	18.6%	18.6%
Z	Eastern ME State	71.8%	19.4%	8.7%	41.4%	38.3%	33.8%	27.9%	14.0%	59.7%	26.3%	14.0%	14.0%
W	West ME US Rte.	64.0%	21.6%	14.3%	36.0%	15.5%	36.6%	47.9%	24.3%	44.8%	30.9%	24.3%	24.3%
Ø	NW ME US Rte	54.8%	23.8%	21.4%	32.0%	12.3%	34.5%	53.2%	33.4%	34.3%	32.2%	33.4%	33.4%
C	Central ME State	57.4%	26.7%	15.9%	23.7%	14.3%	36.9%	48.8%	25.6%	38.4%	36.0%	25.6%	25.6%



### Exhibit A-3: Turnpike/I-95 WIM Stations – Total ADTT

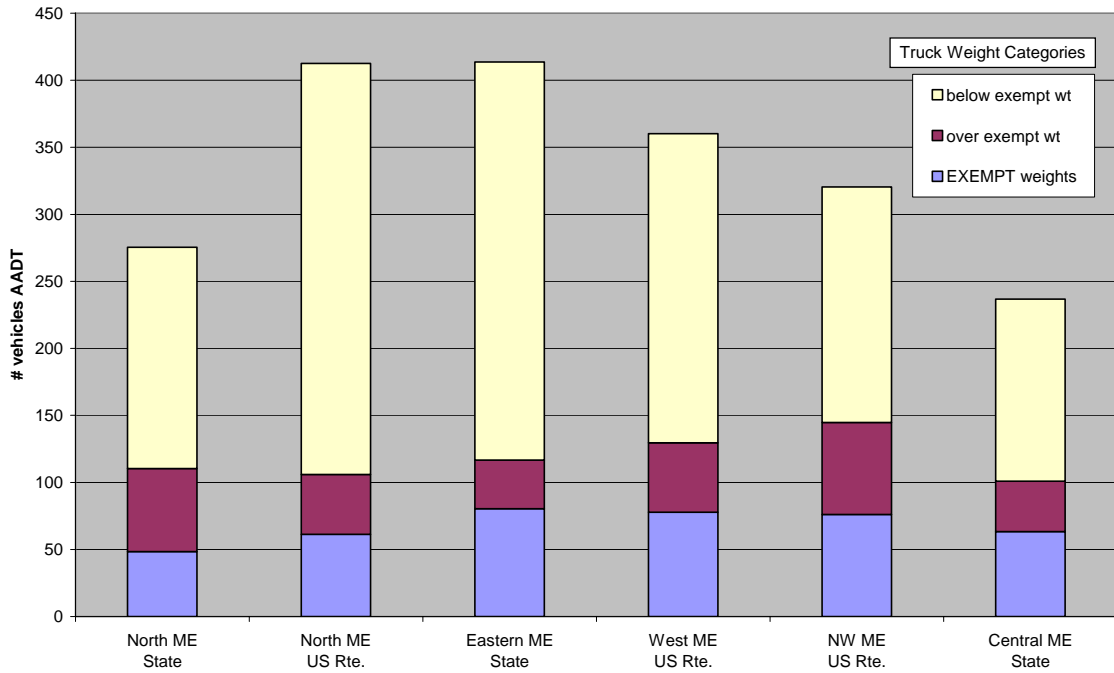


### Exhibit A-4: Turnpike/I-95 WIM Stations – Total Avg. Daily ESALs



## Exhibit A-5: Non-Turnpike/I-95 WIM Stations – Total ADTT

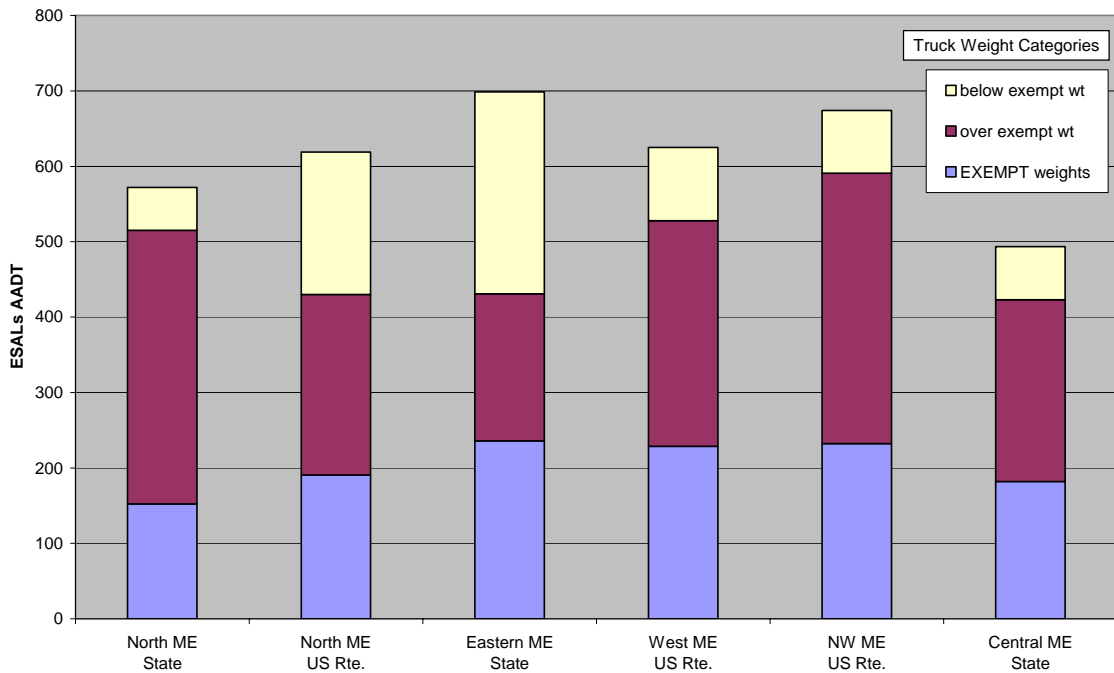
WIM Average Daily Truck Count - Non-Turnpike/I-95 Stations  
all 5 and 6 axle combination trucks, both directions



Note: Scale differs from previous page

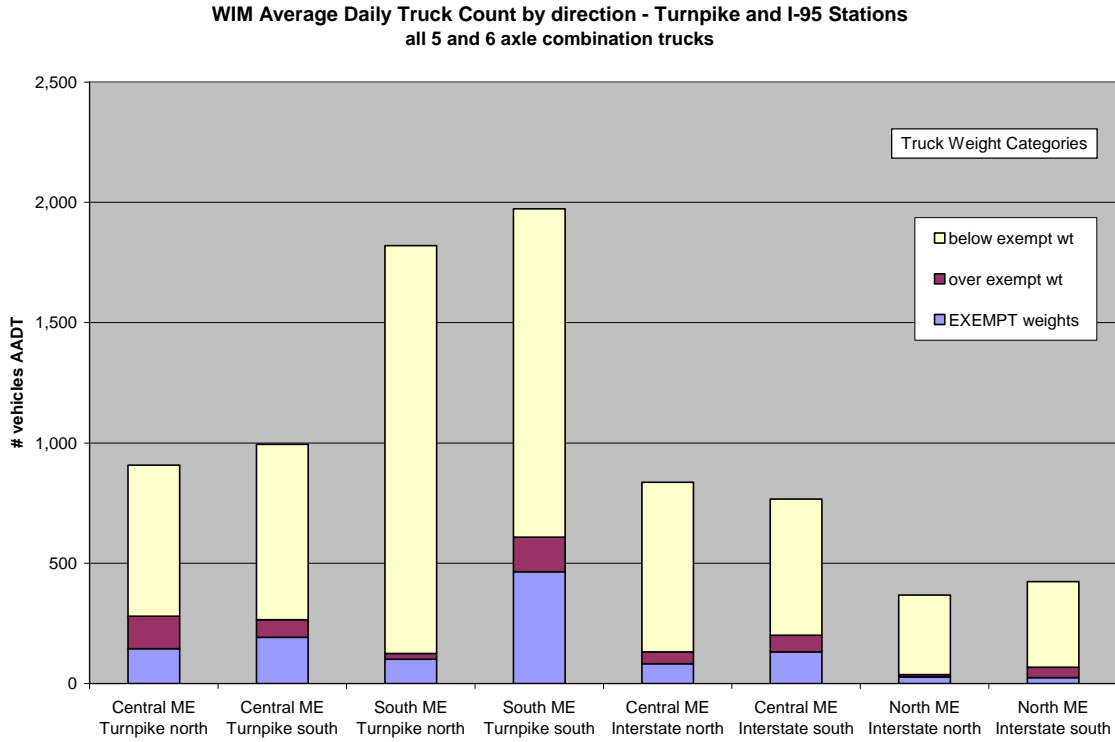
## Exhibit A-6: Non-Turnpike/I-95 WIM Stations – Total Avg. Daily ESALs

WIM Average Daily Total ESALs - Non-Turnpike/I-95 Stations  
all 5 and 6 axle combination trucks, both directions

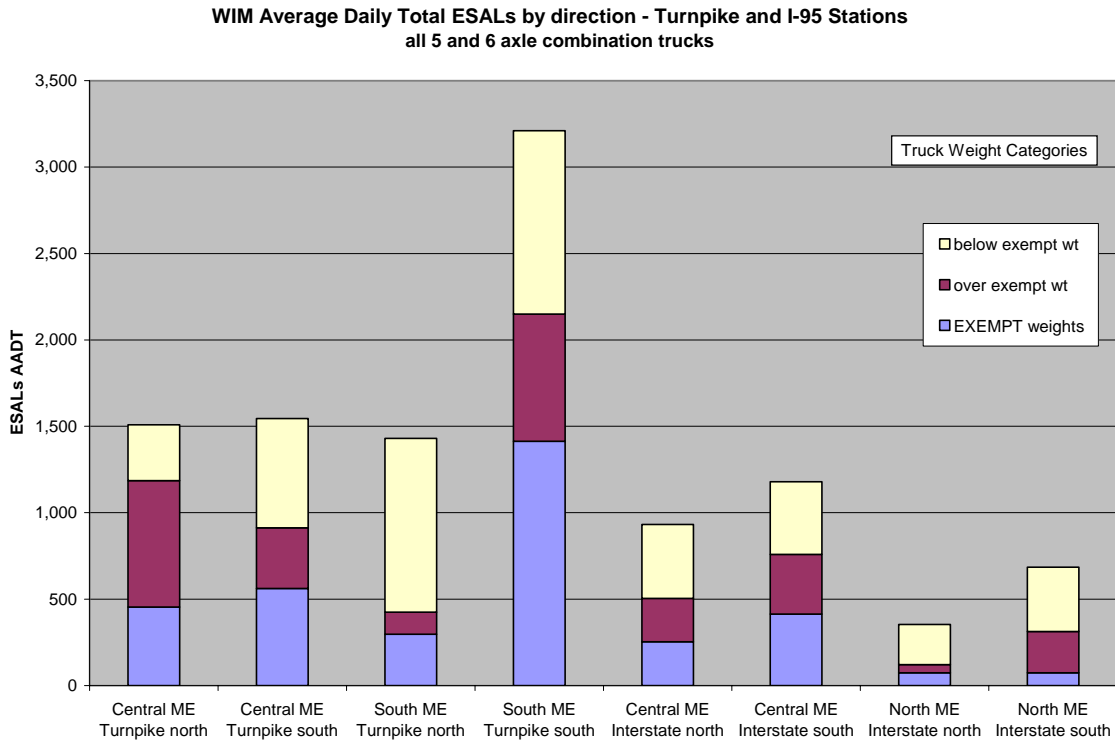




### Exhibit A-7: Turnpike & I-95 WIM Stations – ADTT by direction

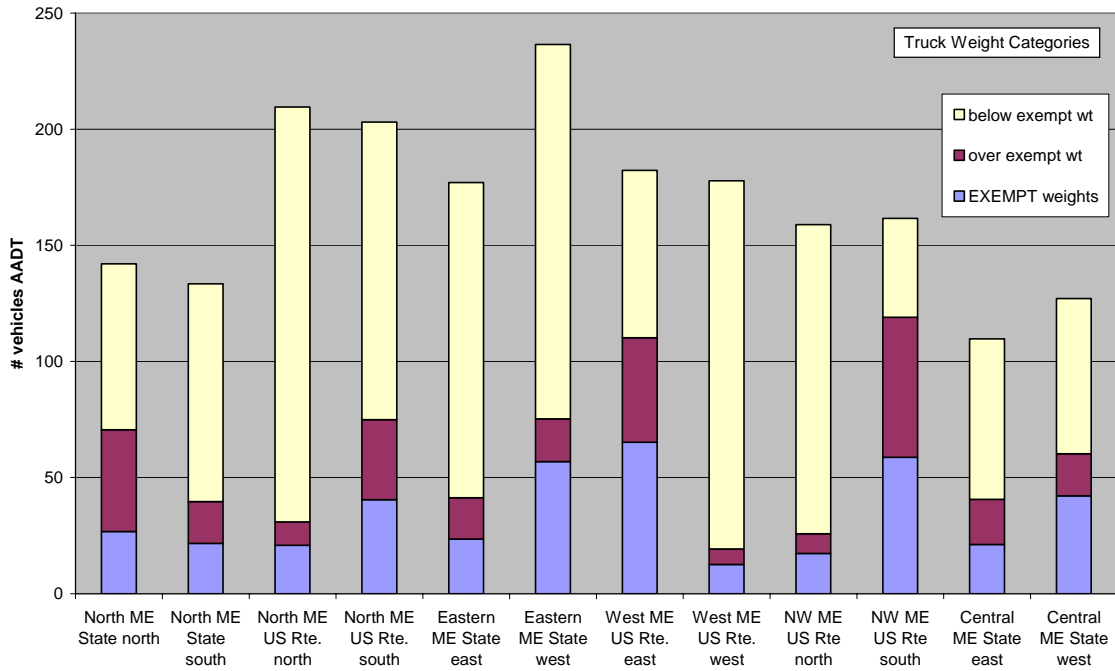


### Exhibit A-8: Turnpike & I-95 WIM Stations - ESALs by direction



## Exhibit A-9: Non-Turnpike/I-95 WIM Stations – ADTT by direction

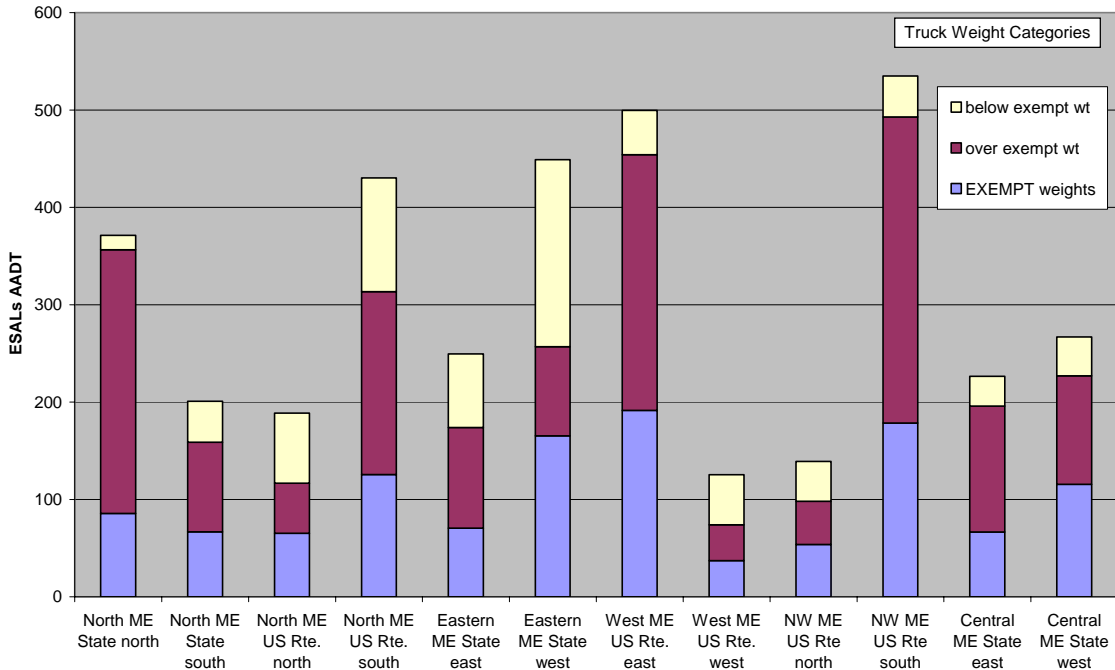
WIM Average Daily Truck Count by direction - Non-Turnpike/I-95 Stations  
all 5 and 6 axle combination trucks



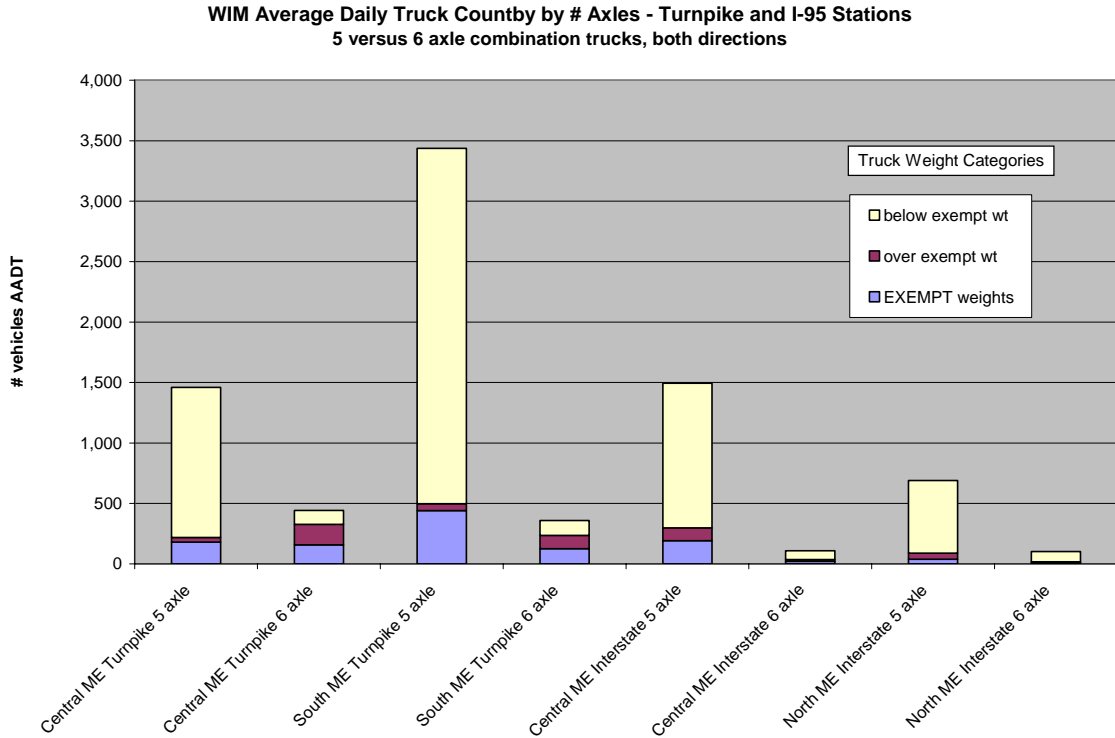
Note: Scale differs from previous page

## Exhibit A-10: Non-Turnpike/I-95 WIM Stations – ESALs by direction

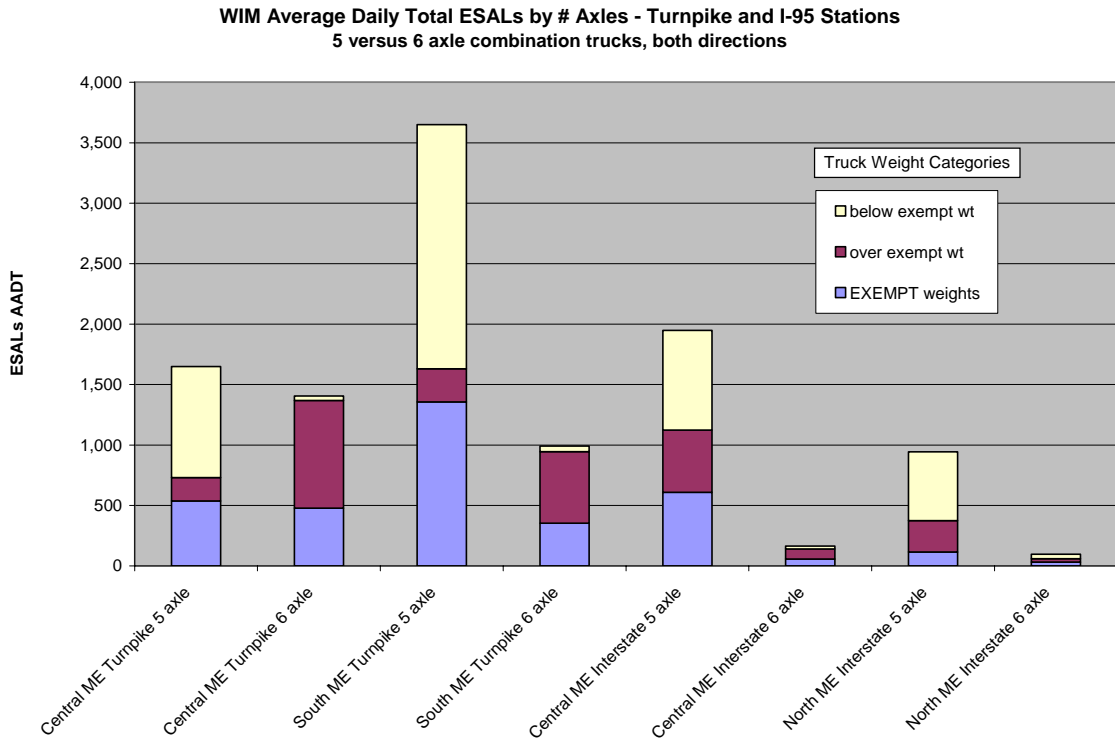
WIM Average Daily Total ESALs by direction - Non-Turnpike/I-95 Stations  
all 5 and 6 axle combination trucks



### Exhibit A-11: Turnpike/I-95 WIM Stations – AADT by # of Axles

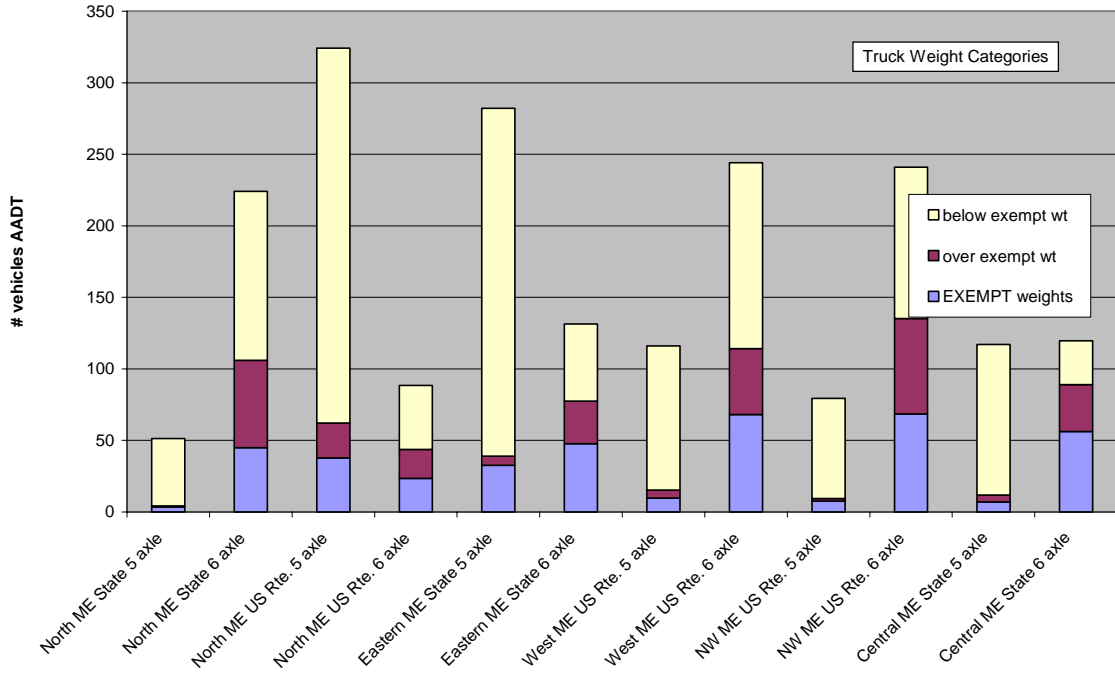


### Exhibit A-12: Turnpike/I-95 WIM Stations – ESALS by # of Axles



### Exhibit A-13: Non-Turnpike/I-95 WIM Stations – AADT by # of Axles

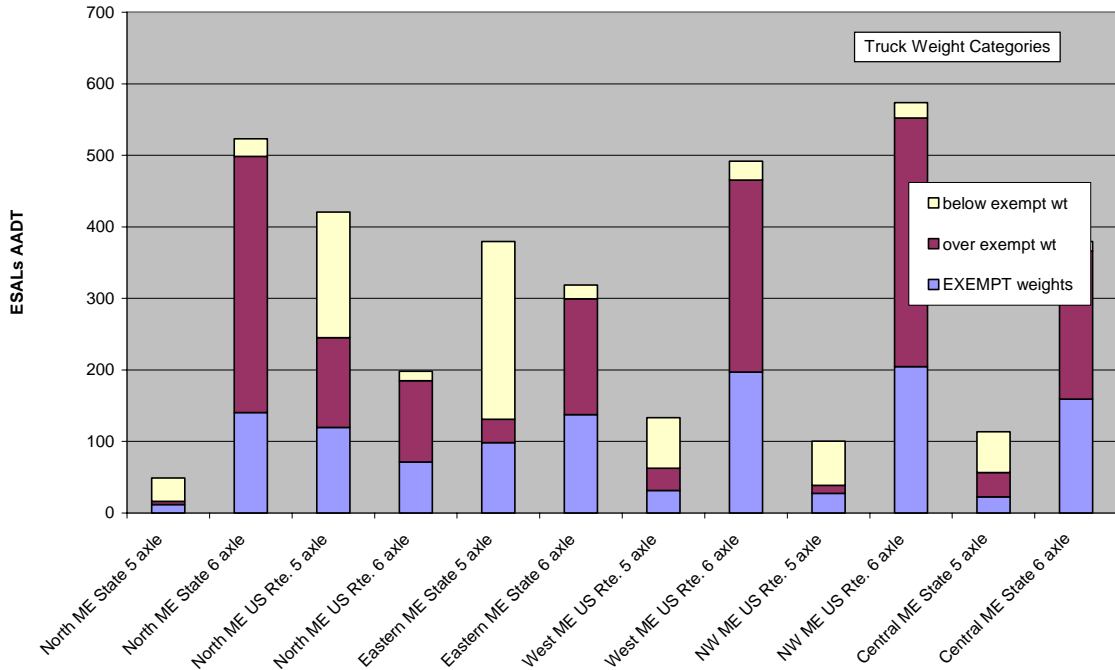
WIM Average Daily Truck Count by # Axles - Non-Turnpike/I-95 Stations  
5 versus 6 axle combination trucks, both directions



Note: Scale differs from previous page

### Exhibit A-14: Non-Turnpike/I-95 WIM Stations – ESALs by # of Axles

WIM Average Daily Total ESALs by # Axles - Non-Turnpike/I-95 Stations  
5 versus 6 axle combination trucks, both directions



## Detailed Average Annual Traffic by Station

On the following pages, detailed directional statistics are presented for WIM stations in Maine. The statistics are broken down by number of axles: either 5 or 6 axle.

The tables represent **average annual daily values** for all figures. Within each direction/axle grouping, rows of data are presented for all vehicles in the axle/weight category indicated by the row and column, consisting of *total average annual daily values for*:

1. vehicle count (i.e. average daily number of 5 axle or 6 axle combination trucks);
2. ESALs; and,
3. weight (the sum of the loaded weights of the vehicles, in **millions of pounds**).

The **weight category** columns divide the data by loaded GVW category:

- *below exempt wt* – loaded GVW below exempt weights;
- *exempt weights* – 5 axle with loaded GVW between 80,000 and 88,001 lbs., or 6 axle with loaded GVW between 80,000 and 100,001 lbs.;
- *above exempt wt* – loaded GVW above exempt weights.

NOTE that **zero values** in the vehicle count rows are often a result of rounding daily values that are less than one vehicle, on average, per day in that weight/axle category.



## Turnpike & I-95 Stations

### Exhibit A-15: Central ME Turnpike WIM Station Avg. Daily Traffic

Central ME Turnpike		weight category			Total
number of axles		below exempt wt	exempt	over exempt wt	
<b>5 axle</b>	AADT	1,241	180	38	1,460
	ESALs	917	538	194	1,649
	million lbs	62	15	4	81
<b>6 axle</b>	AADT	115	157	170	442
	ESALs	36	478	890	1,405
	million lbs	5	15	18	38
<b>station TOTAL</b>					
	<b>AADT</b>	1,356	<b>337</b>	208	<b>1,901</b>
	<b>ESALs</b>	953	<b>1,016</b>	1,084	<b>3,053</b>
	<b>million lbs</b>	67	<b>30</b>	22	<b>118</b>
<b>PERCENT of total</b>					
	<b>AADT</b>	64%	<b>22%</b>	14%	
	<b>ESALs</b>	16%	<b>37%</b>	48%	
	<b>million lbs</b>	45%	<b>31%</b>	24%	

### Exhibit A-16: South ME Turnpike WIM Station Avg. Daily Traffic

South ME Turnpike		weight category			Total
number of axles		below exempt wt	exempt	over exempt wt	
<b>5 axle</b>	AADT	2,939	441	56	3,436
	ESALs	2,019	1,356	274	3,650
	million lbs	147	37	5	189
<b>6 axle</b>	AADT	122	125	111	358
	ESALs	47	354	590	991
	million lbs	6	11	12	29
<b>station TOTAL</b>					
	<b>AADT</b>	3,061	<b>566</b>	167	<b>3,794</b>
	<b>ESALs</b>	2,066	<b>1,711</b>	864	<b>4,641</b>
	<b>million lbs</b>	153	<b>48</b>	17	<b>218</b>
<b>PERCENT of total</b>					
	<b>AADT</b>	64%	<b>22%</b>	14%	
	<b>ESALs</b>	16%	<b>37%</b>	48%	
	<b>million lbs</b>	45%	<b>31%</b>	24%	



**Exhibit A-17: Central ME Interstate WIM Station Avg. Daily Traffic**

Central ME Interstate		weight category			Total
number of axles		below exempt wt	exempt	over exempt wt	
<b>5 axle</b>	AADT	1,198	192	105	1,494
	ESALs	823	609	515	1,947
	million lbs	60	16	10	86
<b>6 axle</b>	AADT	73	22	14	108
	ESALs	25	57	83	164
	million lbs	3	2	1	7
<b>station TOTAL</b>					
	<b>AADT</b>	1,270	<b>214</b>	118	<b>1,602</b>
	<b>ESALs</b>	848	<b>666</b>	598	<b>2,111</b>
	<b>million lbs</b>	64	<b>18</b>	11	<b>93</b>
<b>PERCENT of total</b>					
	<b>AADT</b>	64%	<b>22%</b>	14%	
	<b>ESALs</b>	16%	<b>37%</b>	48%	
	<b>million lbs</b>	45%	<b>31%</b>	24%	

**Exhibit A-18: North ME Interstate WIM Station Avg. Daily Traffic**

North ME Interstate		weight category			Total
number of axles		below exempt wt	exempt	over exempt wt	
<b>5 axle</b>	AADT	600	38	50	689
	ESALs	569	115	259	943
	million lbs	33	3	5	41
<b>6 axle</b>	AADT	85	13	5	103
	ESALs	36	32	28	96
	million lbs	4	1	1	6
<b>station TOTAL</b>					
	<b>AADT</b>	686	<b>51</b>	55	<b>791</b>
	<b>ESALs</b>	605	<b>147</b>	287	<b>1,039</b>
	<b>million lbs</b>	37	<b>4</b>	5	<b>47</b>
<b>PERCENT of total</b>					
	<b>AADT</b>	64%	<b>22%</b>	14%	
	<b>ESALs</b>	16%	<b>37%</b>	48%	
	<b>million lbs</b>	45%	<b>31%</b>	24%	



## Non-Turnpike/I-95 Stations

### Exhibit A-19: North ME State Road WIM Station Avg. Daily Traffic

North ME State		weight category			Total
number of axles		below exempt wt	exempt	over exempt wt	
<b>5 axle</b>	AADT	47	3	1	51
	ESALs	33	12	5	49
	million lbs	2	0	0	3
<b>6 axle</b>	AADT	118	45	61	224
	ESALs	24	140	358	523
	million lbs	5	4	7	16
<b>station TOTAL</b>	<b>AADT</b>	165	<b>49</b>	62	<b>275</b>
	<b>ESALs</b>	57	<b>152</b>	363	<b>572</b>
	<b>million lbs</b>	7	<b>5</b>	7	<b>18</b>
<b>PERCENT of total</b>	<b>AADT</b>	64%	<b>22%</b>	14%	
	<b>ESALs</b>	16%	<b>37%</b>	48%	
	<b>million lbs</b>	45%	<b>31%</b>	24%	

### Exhibit A-20: North ME US Route WIM Station Avg. Daily Traffic

North ME US Rte.		weight category			Total
number of axles		below exempt wt	exempt	over exempt wt	
<b>5 axle</b>	AADT	262	38	24	324
	ESALs	176	119	126	421
	million lbs	12	3	2	18
<b>6 axle</b>	AADT	45	24	20	88
	ESALs	13	71	114	198
	million lbs	2	2	2	6
<b>station TOTAL</b>	<b>AADT</b>	307	<b>61</b>	45	<b>413</b>
	<b>ESALs</b>	189	<b>191</b>	239	<b>619</b>
	<b>million lbs</b>	14	<b>5</b>	4	<b>24</b>
<b>PERCENT of total</b>	<b>AADT</b>	64%	<b>22%</b>	14%	
	<b>ESALs</b>	16%	<b>37%</b>	48%	
	<b>million lbs</b>	45%	<b>31%</b>	24%	





**Exhibit A-21: Eastern ME State Road WIM Station Avg. Daily Traffic**

Eastern ME State		weight category			Total
number of axles		below exempt wt	exempt	over exempt wt	
<b>5 axle</b>	AADT	243	33	6	282
	ESALs	249	98	33	380
	million lbs	14	3	1	17
<b>6 axle</b>	AADT	54	48	30	131
	ESALs	19	138	162	319
	million lbs	2	4	3	10
<b>station TOTAL</b>					
	<b>AADT</b>	297	<b>80</b>	36	<b>414</b>
	<b>ESALs</b>	268	<b>236</b>	195	<b>698</b>
	<b>million lbs</b>	16	<b>7</b>	4	<b>27</b>
<b>PERCENT of total</b>					
	<b>AADT</b>	64%	<b>22%</b>	14%	
	<b>ESALs</b>	16%	<b>37%</b>	48%	
	<b>million lbs</b>	45%	<b>31%</b>	24%	

**Exhibit A-22: West ME US Route WIM Station Avg. Daily Traffic**

West ME US Rte.		weight category			Total
number of axles		below exempt wt	exempt	over exempt wt	
<b>5 axle</b>	AADT	101	10	6	116
	ESALs	71	32	31	133
	million lbs	5	1	1	6
<b>6 axle</b>	AADT	130	68	46	244
	ESALs	27	197	268	492
	million lbs	5	6	5	17
<b>station TOTAL</b>					
	<b>AADT</b>	231	<b>78</b>	52	<b>360</b>
	<b>ESALs</b>	97	<b>229</b>	299	<b>625</b>
	<b>million lbs</b>	10	<b>7</b>	6	<b>23</b>
<b>PERCENT of total</b>					
	<b>AADT</b>	64%	<b>22%</b>	14%	
	<b>ESALs</b>	16%	<b>37%</b>	48%	
	<b>million lbs</b>	45%	<b>31%</b>	24%	



**Exhibit A-23: NW ME US Route WIM Station Avg. Daily Traffic**

NW ME US Rte		weight category			Total
number of axles		below exempt wt	exempt	over exempt wt	
<b>5 axle</b>	AADT	70	8	2	79
	ESALs	62	28	11	100
	million lbs	3	1	0	4
<b>6 axle</b>	AADT	106	68	67	241
	ESALs	21	205	348	574
	million lbs	4	6	7	18
<b>station TOTAL</b>					
	<b>AADT</b>	176	<b>76</b>	69	<b>320</b>
	<b>ESALs</b>	83	<b>232</b>	359	<b>674</b>
	<b>million lbs</b>	7	<b>7</b>	7	<b>22</b>
<b>PERCENT of total</b>					
	<b>AADT</b>	64%	<b>22%</b>	14%	
	<b>ESALs</b>	16%	<b>37%</b>	48%	
	<b>million lbs</b>	45%	<b>31%</b>	24%	

**Exhibit A-24: Central ME State Road WIM Station Avg. Daily Traffic**

Central ME State		weight category			Total
number of axles		below exempt wt	exempt	over exempt wt	
<b>5 axle</b>	AADT	105	7	5	117
	ESALs	57	23	34	114
	million lbs	5	1	0	6
<b>6 axle</b>	AADT	31	56	33	120
	ESALs	14	159	207	380
	million lbs	1	5	4	10
<b>station TOTAL</b>					
	<b>AADT</b>	136	<b>63</b>	38	<b>237</b>
	<b>ESALs</b>	70	<b>182</b>	241	<b>493</b>
	<b>million lbs</b>	6	<b>6</b>	4	<b>16</b>
<b>PERCENT of total</b>					
	<b>AADT</b>	64%	<b>22%</b>	14%	
	<b>ESALs</b>	16%	<b>37%</b>	48%	
	<b>million lbs</b>	45%	<b>31%</b>	24%	

