MOTOR CARRIER SAFETY ASSISTANCE PROGRAM (MCSAP) FORMULA WORKING GROUP

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Addendum and Original Recommendations

to the U.S. Department of Transportation for the Development of the New MCSAP Grant Allocation Formula

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December 21, 2018

MOTOR CARRIER SAFETY ASSISTANCE PROGRAM (MCSAP) FORMULA WORKING GROUP

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Addendum

Revised Recommendations to the U.S. Department of Transportation for the Development of the New MCSAP Grant Allocation Formula

.....

December 21, 2018

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Summary of Changes

The Motor Carrier Safety Assistance Program (MCSAP) Formula Working Group revises the following recommendations from the April 7, 2017 report titled, "Recommendations to the U.S. Department of Transportation for the Development of the New MCSAP Grant Allocation Formula" as follows:

- **Recommendation 1:** Decrease the percentage of total MCSAP funds allocated to the Basic Factor Component from 89.85% to 88.51%.
- **Recommendation 15:** Increase the percentage of total MCSAP funds allocated to the Border Component from 9.5% to 11%.
- **Recommendation 16:** Increase the Border Component maximum from 50% of Border Component funding to 55% of Border Component funding.
- **Recommendation 19:** Decrease the percentage of total MCSAP funds allocated to the Territory Component from 0.65% to 0.49%.

Table A-1. Revised MCSAP formula recommendations.

Number	Initial Working Group Recommendation	Revised Recommendation
1	89.85% of total MCSAP funds should be distributed proportionally to the 50 States, the District of Columbia, and the Commonwealth of Puerto Rico according to crash risk, which is determined by five equally-weighted factors as defined by recommendations 2 through 11.	88.51% of total MCSAP funds should be distributed proportionally to the 50 States, the District of Columbia, and the Commonwealth of Puerto Rico according to crash risk, which is determined by five equally-weighted factors as defined by Recommendations 2 through 11.
15	9.5% of total MCSAP funds should be allocated to border States through a component of the formula that specifically focuses on the funding needs of border activities.	11% of total MCSAP funds should be allocated to border States through a component of the formula that specifically focuses on the funding needs of border activities.
16	A State's share of the Border Component should be based on its share of personnel needed for the ports of entry in that State, with a minimum and maximum limit. It should be calculated as follows: 1. Sum the personnel need across all ports in a State, and divide by the national total (see	A State's share of the Border Component should be based on its share of personnel needed for the ports of entry in that State, with a minimum and maximum limit. It should be calculated as follows: 1. Sum the personnel need across all ports in a State, and divide by the national total (see

Number	Initial Working Group Recommendation	Revised Recommendation
	Recommendation 17 for how to calculate personnel need at each port). 2. Apply minimum and maximum limits—each border State should receive no less than 0.075% and no more than 50% of the Border Component of MCSAP funding.	Recommendation 17 for how to calculate personnel need at each port). 2. Apply minimum and maximum limits—each border State should receive no less than 0.075% and no more than 55% of the Border Component of MCSAP funding.
19	0.65% of total MCSAP funds should be allocated by FMCSA to support and develop CMV safety activities and programs within the Territories (Guam, CNMI, the U.S. Virgin Islands, and American Samoa).	0.49% of total MCSAP funds should be allocated by FMCSA to support and develop CMV safety activities and programs within the Territories (Guam, CNMI, the U.S. Virgin Islands, and American Samoa).

Summary of Revised Formula Proposal

Table A-2. Summary of revised formula components.

Component	Basic Factors	Border	Territories
Recipients	50 States, the District of Columbia, and the Commonwealth of Puerto Rico	States with an international land border	Guam, CNMI, U.S. Virgin Islands, and American Samoa
Funding Amount, as a Percentage of Overall MCSAP Funds	88.51% + unallocated Border and Territory funds	Up to 11%	Up to 0.49%
Formula for Calculating Distribution	Allocate proportionally to each State using the following five, equally-weighted basic factors: • Population • All vehicle miles traveled (VMT) • National Highway System (NHS) highway miles • Special fuel consumption • Carrier registrations	Allocate proportionally to each border State based on the personnel needed to provide enforcement at each port of entry in the State. The calculation of personnel need is based on annual CMV crossing volume, and accounts for the differences between the Mexican and Canadian borders.	Allocate based on an assessment of individual program needs and projected activities as provided by the Territories within their respective Commercial Vehicle Safety Plans (CVSPs).
Minimum and Maximum Share	0.44% to 4.944% of Basic Factor Component	0.075% to 55% of Border Component	A minimum is recommended, and should reflect the funding needed to maintain an effective minimal program.
Formula Adjustments	*Hold-Harmless and Cap Provision*: each State should receive no less than 97% or more than 105% of their prior year's share of MCSAP funding (does not apply to Territories).		

I. Background

On April 7, 2017, the MCSAP Formula Working Group submitted their recommendations for a new MCSAP allocation formula to FMCSA in a report titled, "Recommendations to the U.S. Department of Transportation for the Development of the New MCSAP Grant Allocation Formula." FMCSA reviewed the report and agreed with the majority of the Working Group's recommendations, with three exceptions. The FMCSA Administrator requested that the Working Group reconvene for further deliberation on Border Allocation, the Border Maximum Limit, and Territory Allocation.

FMCSA's proposed changes are summarized in Table A-3 below.

Table A-3. FMCSA's proposed changes to the MCSAP Formula Working Group's recommendations.

Topic	Initial Working Group Recommendation	FMCSA Proposal	FMCSA Rationale
Border Allocation	9.5% of total MCSAP funds should be allocated to border States through a component of the formula that specifically focuses on the funding needs of border activities.	Increase 9.5% to either 11% or 12%.	• 11% would maintain current Federal funding levels. • Recent policy changes, including the renegotiation of trade agreements, may lead to changes in border activity. • Overall funding still aligns with crash risk whether Border funding is increased by 11% or 12%. • Border activity has increased in recent years.
Border Maximum Limit	Apply minimum and maximum limits—each border State should receive no less than 0.075% and no more than 50% of the Border Component of MCSAP funding.	Remove the 50% maximum limit.	• It puts unnecessary restrictions on border funding. • The largest border programs require more funding, and removing the maximum allows for greater flexibility if

Topic	Initial Working Group Recommendation	FMCSA Proposal	FMCSA Rationale
			border activity shifts over time.
Territory Allocation	0.65% of total MCSAP funds should be allocated by FMCSA to support and develop CMV safety activities and programs within the Territories (Guam, CNMI, the U.S. Virgin Islands, and American Samoa).	Reduce 0.65% to 0.49% of total MCSAP funds.	0.65% is too high considering current Territory CMV safety needs. 0.49% would maintain current funding levels, and allow for sufficient growth in future years.

II. Process

The MCSAP Formula Working Group met four times via interactive web conferences to discuss and deliberate on FMCSA's proposals. These calls were held on the following dates:

- October 18, 2018
- November 1, 2018
- November 13, 2018
- November 30, 2018

The Working Group followed a process that was similar to the one used to develop the original recommendations. Data was analyzed so that the Working Group could understand and evaluate the potential impact of FMCSA's proposed changes, and all proposed changes were evaluated based on the established guiding principles.

III. Border Allocation Percentage

1. FMCSA Proposal and Rationale

FMCSA proposed increasing the percentage of total MCSAP funds allocated to the Border Component from 9.5% to 11% or 12%. This proposal was made in response to several recent policy changes that may impact border activity, and other observations made based on the data provided in the report, including:

- **Renegotiations of trade agreements:** On May 18, 2017, one month after the Working Group submitted their report, Congress was informed that the President intends to commence negotiations with Canada and Mexico with respect to existing trade

agreements.[1] It is unclear at this time how the result of the trade negotiations may impact the amount of commercial vehicle traffic entering the United States from Mexico and Canada. FMCSA proposes increasing the Border Component to prepare for any potential increase in CMV border crossings.

- **Government-wide focus on ending human trafficking:** The President is taking action to end human trafficking, and the U.S. Department of Transportation (U.S. DOT) is supporting this proposal through both the U.S. DOT's Transportation Leaders Against Human Trafficking (TLAHT) initiative,[2] and the President's Interagency Task Force to Monitor and Combat Trafficking in Persons (PITF),[3] of which the U.S. DOT is a member. Although addressing human trafficking is not a requirement under the MCSAP Grant, some States have been approved to use MCSAP funding towards activities aimed to stop human trafficking. Furthermore, FMCSA realizes that human trafficking is not limited to border activities; however, border States are uniquely positioned to identify the signs of human trafficking, as victims may be transported across U.S. borders.
- **Projected changes in funding:** Despite increases in overall MCSAP funding, some border States were forecasted to receive a smaller proportion of MCSAP funding under the original Working Group's proposed formula.
- **Correlation with crash risk:** Throughout the development of the initial Working Group recommendation, one of the guiding principles and primary objectives of the Working Group was to base the proposed formula on safety. Throughout their endeavor, the Working Group considered FMCSA's primary mission to reduce crashes, injuries, and fatalities involving large trucks and buses. Therefore, the Working Group put crash risk at the forefront of their analysis, especially when choosing factors to include in the formula. Increasing the percentage of funding allocated to the Border Component does not significantly change how well the final funding results correlate with crashes, and therefore the Working Group's primary objective is still met.
- **Maintaining Federal funding levels:** The Working Group arrived at 9.5% by matching the total amount of the Border Enforcement Grant from past years ($32 million). This amount would be made up of 85% Federal funding and 15% State funding, since States will now be required to contribute a 15% match to border funding. FMCSA asked the Working Group to reexamine this rationale, and proposed that the Agency should continue to provide the entire $32 million, which would equal 11% of total MCSAP funds.
- **Recent increases in CMV border crossings:** Historical trends show that CMV (large truck and bus) border crossings have been steadily increasing since 2009 on both borders, and at a faster rate on the Mexican border. See Figure 1 below.

[1] https://ustr.gov/trade-agreements/free-trade-agreements/north-american-free-trade-agreement-nafta
[2] https://www.whitehouse.gov/briefings-statements/president-donald-j-trump-taking-action-end-human-trafficking/
[3] https://www.transportation.gov/TLAHT

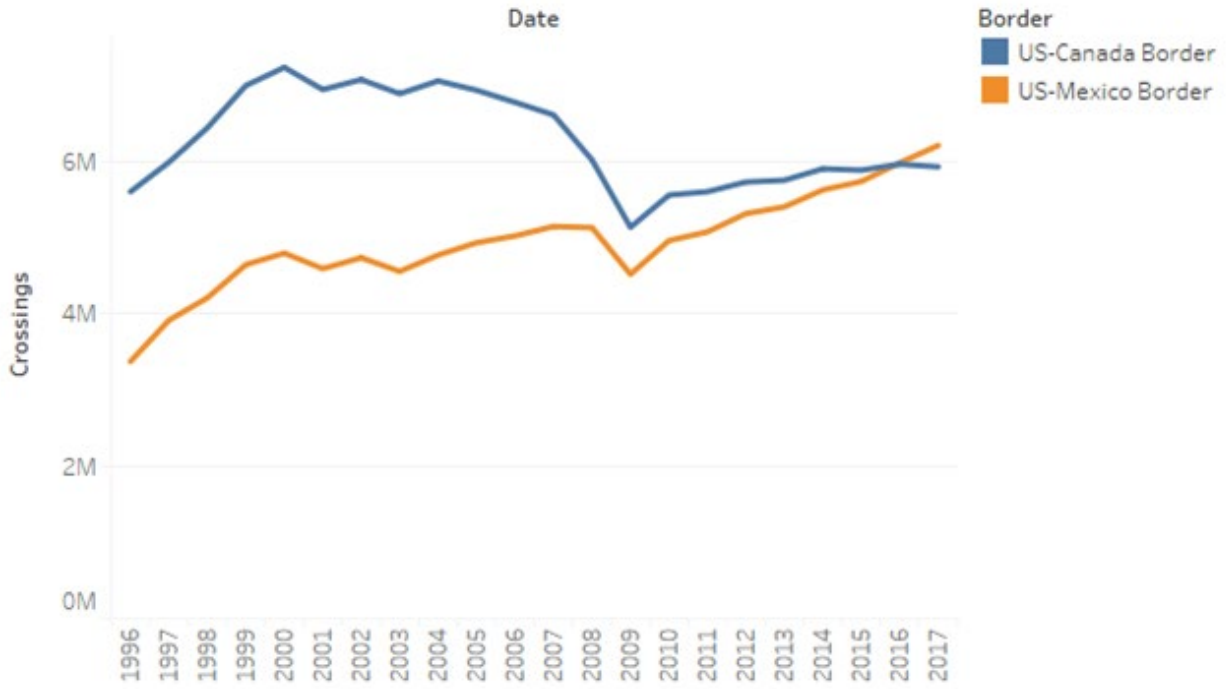

Figure 1. Large truck and bus crossings on the U.S-Canada and U.S.-Mexico borders. Data from Border Crossing/Entry Data, Bureau of Transportation Statistics (2018).

2. Impact Analysis

Both the long-term and short-term impacts on funding were assessed and presented to the Working Group for consideration and discussion. The differences between the short-term and long-term impacts are due to the hold-harmless and cap provisions. These provisions serve to ensure stability in the longer term by limiting the year-to-year change in funding for individual States.

On a national level, increasing the Border Component allocation from 9.5% to 11% shifts money from non-border States (37) to border States (15). The size of this impact in the *short term* is $1.68 million, under Fiscal Year (FY) 2020 funding levels.[4] Over the next 10 years, this impact should not exceed a total of $4.5 million.[5]

Tables A-4 through A-7 in Part VI, Section 2 illustrate the combined short-term impacts of both revised border recommendations.

[4] For the purposes of this summary and the corresponding report, all references to "State" or "States" include the 50 States, the District of Columbia, and the Commonwealth of Puerto Rico. While 49 CFR 350.105 includes Territories in its definition, States are defined differently in this summary due to each entity's treatment in the proposed formula, which is determined according to available data and distinct program characteristics.
[5] Estimated as 1.5% of total FY 2020 MCSAP funding.

3. Working Group Deliberation and Decision

The Working Group evaluated the proposal and decided to increase the Border Component from 9.5% to 11% of total MCSAP funding. The Working Group agreed it was appropriate to maintain previous Federal funding levels, and determined that 11% maintained the existing proportion of Federal funding that was allocated based on border enforcement needs. The Working Group also considered the impact analysis described in the previous section, and determined that increasing the Border Component to 11% aligned with their guiding principles, including the primary objective to continue to base the formula on safety by demonstrating an alignment with crash risk.

4. Revised Recommendation 15

Revised Recommendation 15: 11% of total MCSAP funds should be allocated to border States through a component of the formula that specifically focuses on the funding needs of border activities.

IV. Border Maximum

1. FMCSA Proposal and Rationale

FMCSA proposed removing the 50% maximum limit on the Border Component. This proposal was made due to the following consideration:

- **The 50% limit does not meet the growing needs of the State with the most border activity:** Based on the proposed formula, the State with the most border activity saw an increase in their border need from 51.6% in 2012 to 55.5% in 2017. Assuming the trend in crossings per port continues, their border need will increase to 59.4% by 2027. For the current and foreseeable future, only one State would have their border funding restricted by the 50% maximum limit. When the proposed formula is calculated using current border crossing data and without applying the original 50% recommended maximum, this State would receive 55% of the border component.

2. Impact Analysis

Increasing the Border Component maximum would redistribute money from the other border States to the State with largest border funding needs. The additional 5% of the Border Component awarded to this State would have minimal impacts on all other individual States. One of the remaining border States would have their Border Component funding reduced by less than 4% of total border funds, three States would experience a very minimal funding impact (less than 1% change) and the other ten States would experience no change. In the short term, increasing the maximum leads to an increase of $1.27 million for the State with the largest border funding needs and smaller decreases for other border States—only three States see a decrease of more than $100,000.

Overall, the adjustment to the Border Component maximum has a small *short-term* impact on non-border States equal to 0.09% ($280,000) of total MCSAP funds, due to the implementation of the hold-harmless and cap provisions.[6] As described in the original report, these provisions prevent dramatic gains or losses in funding during the implementation of the new formula and are critical to ensuring program stability.

Changing the Border Component maximum has no *long-term* impact on non-border States, since it only acts to redistribute funds within the Border Component.

Tables A-4 through A-7 below illustrate the **combined** *short-term* impacts of **both** revised border recommendations. Note that the funding impacts calculated in Tables A-4 through A-7 keep the Territory funding at 0.65% to isolate the funding impact of the border recommendation changes. For the combined impact of all changes outlined in this addendum, please see the appendix to this addendum (Appendix A).

Table A-4. Short-term impacts of revised border recommendations on border and non-border States.*

State Category	Original Recommendation *Border Component= 9.5% Border Max = 50%*	Revised Recommendation *Border Component = 11% Border Max = 55%*	Difference
Border States	$112,552,530	$113,707,373	$1,154,843
Northern	$48,864,920	$48,661,969	$(202,951)
Southern	$63,687,610	$65,045,404	$1,357,794
Non-Border States	$189,540,518	$188,385,675	$(1,154,843)
Total	$302,093,048	$302,093,048	$0

**FY 2020 Funding, Territories at 0.65%.*

[6] Comparison of 11% border with 50% maximum to 11% border with 55% or 60% maximum, under FY 2020 funding.

Table A-5. Short-term impacts of revised border recommendations on individual northern border States.

Northern Border State	Original Recommendation *Border Component = 9.5% Border Max = 50%*	Revised Recommendation *Border Component = 11% Border Max = 55%*	Difference
Alaska	$1,257,326	$1,257,326	No change
Idaho	$2,436,607	$2,436,607	No change
Maine	$1,751,636	$1,751,636	No change
Michigan	$9,121,726	$9,064,249	$(57,477)
Minnesota	$6,422,249	$6,422,249	No change
Montana	$2,994,454	$2,994,454	No change
New Hampshire	$1,361,848	$1,347,478	$(14,370)
New York	$13,065,843	$12,934,740	$(131,103)
North Dakota	$2,696,955	$2,696,955	No change
Vermont	$1,298,730	$1,298,730	No change
Washington	$6,457,545	$6,457,545	No change

Table A-6. Short-term impacts of revised border recommendations on individual southern border States.

Southern Border State	Original Recommendation *Border Component = 9.5% Border Max = 50%*	Revised Recommendation *Border Component = 11% Border Max = 55%*	Difference
Arizona	$10,804,840	$10,804,840	No change
California	$18,851,605	$18,940,290	$88,685
New Mexico	$4,107,636	$4,107,636	No change
Texas	$29,923,529	$31,192,638	$1,269,109

Table A-7. Short-term impacts of revised border recommendations on individual non-border States.

Non-Border State	Original Recommendation *Border Component = 9.5% Border Max = 50%*	Revised Recommendation *Border Component = 11% Border Max = 55%*	Difference
Alabama	$5,965,678	$5,965,678	No change
Arkansas	$4,138,170	$4,138,170	No change
Colorado	$4,941,642	$4,875,974	$(65,668)
Connecticut	$2,527,768	$2,527,768	No change
Delaware	$1,180,620	$1,165,470	$(15,150)
District of Columbia	$1,118,593	$1,118,593	No change
Florida	$13,265,871	$13,089,583	$(176,288)
Georgia	$10,169,878	$10,034,732	$(135,146)
Hawaii	$1,099,298	$1,099,298	No change
Illinois	$11,405,157	$11,253,595	$(151,562)
Indiana	$7,286,679	$7,286,679	No change
Iowa	$4,837,215	$4,837,215	No change
Kansas	$4,458,505	$4,458,505	No change
Kentucky	$4,717,925	$4,686,676	$(31,249)
Louisiana	$4,346,759	$4,346,759	No change
Maryland	$4,175,980	$4,175,980	No change
Massachusetts	$4,604,630	$4,604,630	No change
Mississippi	$3,935,453	$3,893,741	$(41,712)
Missouri	$6,849,981	$6,844,323	$(5,658)
Nebraska	$3,626,881	$3,626,881	No change
Nevada	$2,523,913	$2,490,373	$(33,540)
New Jersey	$7,185,475	$7,089,988	$(95,487)
North Carolina	$8,919,442	$8,800,913	$(118,529)

Non-Border State	Original Recommendation *Border Component = 9.5% Border Max = 50%*	Revised Recommendation *Border Component = 11% Border Max = 55%*	Difference
Ohio	$10,046,336	$10,046,336	No change
Oklahoma	$5,769,781	$5,769,781	No change
Oregon	$3,946,430	$3,946,430	No change
Pennsylvania	$10,424,935	$10,424,935	No change
Puerto Rico	$1,180,620	$1,164,931	$(15,689)
Rhode Island	$1,300,175	$1,300,175	No change
South Carolina	$4,806,450	$4,742,578	$(63,872)
South Dakota	$2,253,064	$2,253,064	No change
Tennessee	$6,489,424	$6,489,424	No change
Utah	$3,085,281	$3,085,281	No change
Virginia	$6,979,252	$6,886,506	$(92,746)
West Virginia	$2,187,780	$2,158,706	$(29,074)
Wisconsin	$6,281,706	$6,198,229	$(83,477)
Wyoming	$1,507,775	$1,507,775	No change

3. Working Group Deliberation and Decision

The Working Group remained firm in their initial recommendation that a border maximum at some level is necessary to maintain the balance of the assistance program between larger and smaller border States. A maximum promotes funding stability in the event of major and unexpected shifts in the underlying factors, and promoting stability is in alignment with the Working Group's guiding principles.

The Working Group offered a compromise to increase the border funding maximum to 55%. A maximum of 55% was chosen because it meets the current needs of the State with the most border activity.

4. Revised Recommendation 16

<u>Revised Recommendation 16:</u> A State's share of the Border Component should be based on their share of personnel needed for the ports of entry in that State, with a minimum and maximum limit. It should be calculated as follows:

1. **Sum the personnel need across all ports in a State, and divide by the national total (see Recommendation 17 for how to calculate personnel need at each port).**
2. **Apply minimum and maximum limits—each border State should receive no less than 0.075% and no more than 55% of the Border Component of MCSAP funding.**

V. Territory Allocation

1. FMCSA Proposal and Rationale

FMCSA proposed decreasing the percentage of total MCSAP funds allocated to the Territory Component from 0.65% to 0.49%.

The percentage amount from the original Working Group's recommendation (0.65%) was determined by reviewing the Territories' FY 2016 CVSPs in order to assess necessary program expenses and areas of concern identified by these jurisdictions (e.g., personnel vacancies, lack of equipment, etc.). An estimation of the Territories' funding needs was determined based on the information that could be gathered from the CVSP narratives, and 25% was added to this amount to account for future programmatic growth.

FMCSA determined that 0.65% of funding would be too high and proposed 0.49% as an alternative due to the following considerations:

- **Current Territory needs:** Based on an analysis of historic spending rates, FMCSA determined that current funding levels adequately address CMV safety needs in most of the Territories ($350,000 per Territory).
- **Percentage vs. dollar amount:** FMCSA proposed matching current funding levels (0.49%), and agrees with the Working Group's recommendation to allocate Territory funding as a percentage of overall funding rather than a specific and unchanging dollar amount.
- **Different Territories have different needs:** FMCSA does not propose changing any of the other recommendations relating to the Territories, and is putting forth a proposed formula to distribute funding to the Territories based on population.

2. Impact Analysis

Decreasing the Territory Component from 0.65% to 0.49% shifts 0.16% of total MCSAP funds from Territories to States, to be distributed through the Basic Component of the proposed formula. At FY 2020 funding levels, this is a total of $486,511, or an average of about $9,000 per State.

The original Working Group proposal did not include a recommendation for a specific formula for Territories. Because a formula grant cannot legally distribute funding on a discretionary basis, FMCSA must develop a formula to allocate funding to the Territories. FMCSA is proposing a formula that would allocate the Territory Component using population as a 50% weighted factor, and subject to a $350,000 minimum.[7] This proposal would allow the formula to

[7] Population data from https://www.cia.gov/library/publications/the-world-factbook/geos/cq.html

adjust based on changes in population, but would also provide some stability since population is only weighted at 50%.

Table A-8. Simulation of funding impacts of changing from 0.65% to 0.49%.*

Territory	Baseline: FY 2017 and FY 2019 Funding	FY 2020 Funding at 0.65%	Difference from Baseline	FY 2020 Funding at 0.49%	Difference from Baseline
American Samoa	$350,000	$381,566	$31,566	$350,000	No Change
Guam	$350,000	$684,135	$334,135	$439,941	$89,941
Northern Marianas	$350,000	$383,549	$33,549	$350,000	No Change
Virgin Islands	$350,000	$527,202	$177,202	$350,000	No Change
Total	$1,400,000	$1,976,452	$576,452	$1,489,941	$89,941

** Includes FMCSA's proposed Territory formula based on population*

3. Working Group Deliberation and Decision

The Working Group agreed to revise their recommendation for the Territory Component allocation based on the facts that FMCSA provided, in particular that current funding levels adequately covered CMV safety needs in the Territories. The Working Group also reminded FMCSA of the other recommendations regarding Territories that suggest additional studies to understand the safety issues and funding needs for Territories, and for establishing more reliable data sources.

4. Revised Recommendation 19

Revised Recommendation 19: 0.49% of total MCSAP funds should be allocated by FMCSA to support and develop CMV safety activities and programs within the Territories (Guam, CNMI, the U.S. Virgin Islands, and American Samoa).

5. Revised Recommendation 1

Because the new Recommendations 15 and 19 will increase the percentage allocated to the Border Component and decrease the Territory Component, the amount leftover (to be allocated to the Basic Factor Component) will also be impacted. Previously, the Working Group had recommended that 9.5% of funding should be allocated to the Border Component and 0.65% should be allocated to the Territories, which left 89.85% for the Basic Factor Component. The revised recommendations allocated 11% for the Border Component and 0.49% for the Territories, which reduces the amount allocated to the Basic Factor Component to 88.51%. The

impact of this change was assessed and discussed in the impact analysis and discussion sections in Parts III, IV, and V of this addendum.

Table A-9. New recommended allocation to each formula component compared to the original April 7, 2017 recommendation.

Formula Component	Original Recommendation	Revised Recommendation
Basic Factor	89.85%	88.51%
Border	9.50%	11.00%
Territory	0.65%	0.49%
Total	100%	100%

Revised Recommendation 1: 88.51% of total MCSAP funds should be distributed proportionally to the 50 States, the District of Columbia, and the Commonwealth of Puerto Rico according to crash risk, which is determined by five equally-weighted factors as defined by Recommendations 2 through 11.

VI. Revised List of Recommendations

Items marked with an asterisk (*) were impacted by the decisions described in this addendum, and differ from the corresponding recommendations originally submitted on April 7, 2017.

Basic Factor Component

*Recommendation 1: 88.51% of total MCSAP funds should be distributed proportionally to the 50 States, the District of Columbia, and the Commonwealth of Puerto Rico according to crash risk, which is determined by five equally-weighted factors as defined by recommendations 2 through 11.

Recommendation 2: A State's population should be one of the five factors that determines the allocation of funding for the Basic Factor Component of the MCSAP formula.

Recommendation 3: A State's population should be calculated using Annual Population Estimates, from the U.S. Census Bureau, Population Division.

Recommendation 4: A State's highway miles should be one of the five factors that determines the allocation of funding for the Basic Factor Component of the MCSAP formula.

Recommendation 5: A State's highway miles should be calculated using National Highway System Road Length, FHWA Highway Statistics Series.

Recommendation 6: A State's VMT should be one of the five factors that determines the allocation of funding for the Basic Factor Component of the MCSAP formula.

Recommendation 7: A State's vehicle miles traveled (VMT) should be calculated using vehicle miles of travel, by functional system, FHWA Highway Statistics Series.

Recommendation 8: A State's special fuel consumption should be one of the five factors that determines the allocation of funding for the Basic Factor Component of the MCSAP formula.

Recommendation 9: A State's special fuel consumption should be calculated using Monthly Special Fuel Reported by States, Compiled for the Calendar Year from State Fuel-Tax Reports, FHWA Highway Statistics Series.

Recommendation 10: A State's carrier registrations—interstate carriers and intrastate hazardous materials carriers—should be one of the five factors that determines the allocation of funding for the Basic Factor Component of the MCSAP formula.

Recommendation 11: A State's carrier registrations should be calculated using the snapshot of the number of active interstate and intrastate HM carriers in the Motor Carrier Management Information System (MCMIS) Database (based on MCS-150 data).

Recommendation 12: Each State should receive a minimum of 0.44% of the Basic Factor Component funds.

Recommendation 13: To provide better evidence for setting the minimum share level, FMCSA should conduct a study to determine the minimum level of funding required to support a CMV safety program that meets the minimum requirements of MCSAP (in both States and Territories). Once completed, the findings of the study should be used to refine the minimum share level in the formula.

Recommendation 14: Each State should receive no more than 4.944% of the Basic Factor Component funds.

Border Component

*Recommendation 15: 11% of total MCSAP funds should be allocated to border States through a component of the formula that specifically focuses on the funding needs of border activities.

*Recommendation 16: A State's share of the Border Component should be based on its share of personnel needed for the ports of entry in that State, with a minimum and maximum limit. It should be calculated as follows:

1. Sum the personnel need across all ports in a State, and divide by the national total (see Recommendation 17 for how to calculate personnel need at each port).
2. Apply minimum and maximum limits—each border State should receive no less than 0.075% and no more than 55% of the Border Component of MCSAP funding.

Recommendation 17: The personnel needed at each port of entry should be calculated as follows:

1. 1.Allocate the minimum required FTE to each port of entry:
    a. 8 FTE per each Mexican port of entry.
    b. 0.25 FTE per each Canadian port of entry with more than 1,000 annual CMV crossings.
2. Allocate FTE according to CMV crossings (if not already covered by the minimum):
    a. 25,000 crossings per FTE for Mexican ports of entry.
    b. 200,000 crossings per FTE for Canadian ports of entry.

Recommendation 18: The annual CMV crossings for each port of entry should be calculated as the sum of truck and bus crossings, based on the Bureau of Transportation Statistics' Border Crossing/Entry Data.

Territories

*Recommendation 19: 0.49% of total MCSAP funds should be allocated by FMCSA to support and develop CMV safety activities and programs within the Territories (Guam, CNMI, the U.S. Virgin Islands, and American Samoa).

Recommendation 20: The Territory Component will be distributed among the Territories based on an assessment of program performance, safety goal achievements, and projected activities as provided by the Territories within their respective Commercial Vehicle Safety Plans (CVSP), and subject to a guaranteed annual minimum for each Territory.

Recommendation 21: In the short term, FMCSA should determine an appropriate minimum share for each Territory after reviewing program needs and past grant performance. This should only be an interim amount, which will be updated when the study mentioned in Recommendation 13 is completed.

Recommendation 22: FMCSA should conduct a study to determine the appropriate share of funding to provide to Territories as a guaranteed minimum, to ensure that each Territory is able to maintain at least an effective minimal program. It should be determined based on evidence. This study can be part of the similar study on an appropriate minimum share for all States mentioned in Recommendation 13.

Recommendation 23: FMCSA should work towards establishing a method for the Territories to provide the data necessary to be included in the Basic Factor Component of the formula. Once reliable data sources are established, FMCSA should analyze the impacts of incorporating the Territories into the Basic Factor Component of the formula, and should implement that change if it is deemed appropriate.

Formula Adjustments

Recommendation 24: In a given year, each State should receive no less than 97% of their prior year's share of MCSAP funding. This should not apply to Territories.

Recommendation 25: In a given year, each State should receive no more than 105% of their prior year's share of MCSAP funding. This should not apply to Territories.

Recommendation 26: Reallocate unused funds from the Territories to States according to the Basic Factor Component.

Recommendation 27: Reallocate unused funds from the Border Component to States according to the Basic Factor Component.

Recommendations for Further Research or Consideration

Recommendation 28: FMCSA should re-evaluate the National Freight Highway Network in five (5) years to see if the data is stable and high quality, and reconsider its use in the formula.

Recommendation 29: FMCSA should evaluate and consider using CMV VMT in lieu of VMT if better data becomes available.

Recommendation 30: FMCSA should conduct a study to determine how to account for MCSAP costs in the allocation formula and, if appropriate, update the formula to do so.

Appendix to the Addendum

Appendix A. Overall Impact of Revised Recommendations

Table A-10 shows the short-term funding impacts of all of the revised recommendations contained in this addendum. The results in the table are an approximation of the changes that States may experience under the revised recommendations, compared to the original recommendation.

The results were generated using the most current factor data.[1] If the new MCSAP formula is implemented before FY2020, actual amounts awarded to States may differ from what is listed below due to changes in the factor data (e.g., carrier registrations, population, etc.). Additionally, no State's share of total MCSAP funding will decrease by more than 3% or increase by more than 5% each year due to the hold-harmless and cap provisions recommended by the Working Group.

Table A-10. Short-term impacts of all revised recommendations.

State/Territory	Original Recommendation *Border Component= 9.5%* *Border Max = 50%* *Territory Component = 0.65%*	Revised Recommendation *Border Component = 11%* *Border Max = 55%* *Territory Component = 0.49%*	Difference
Alabama	$5,965,678	$5,965,678	No change
Alaska	$1,257,326	$1,257,326	No change
American Samoa	$381,566	$350,000	$(31,566)
Arizona	$10,804,840	$10,804,840	No change
Arkansas	$4,138,170	$4,138,170	No change
California	$18,851,605	$18,995,229	$143,624
Colorado	$4,941,642	$4,892,849	$(48,793)
Connecticut	$2,527,768	$2,527,768	No change
Delaware	$1,180,620	$1,168,962	$(11,658)
District of Columbia	$1,118,593	$1,118,593	No change
Florida	$13,265,871	$13,134,886	$(130,985)
Georgia	$10,169,878	$10,069,462	$(100,416)
Guam	$684,135	$439,941	$(244,194)
Hawaii	$1,099,298	$1,099,298	No change
Idaho	$2,436,607	$2,436,607	No change
Illinois	$11,405,157	$11,292,544	$(112,613)

[1] Table A-10 uses the following data: 2016 National Highway System Road Length; 2015 All Vehicle Miles of Travel; July 1, 2016 U.S. Census Population Estimate; 2015 Special Fuels Consumption; Interstate and Intrastate HM Carrier Registrations, Phys. State (June 30, 2017 Snapshot). Border crossing data is the three-year average from 2014 through 2016.

State/Territory	Original Recommendation *Border Component= 9.5% Border Max = 50% Territory Component = 0.65%*	Revised Recommendation *Border Component = 11% Border Max = 55% Territory Component = 0.49%*	Difference
Indiana	$7,286,679	$7,286,679	No change
Iowa	$4,837,215	$4,837,215	No change
Kansas	$4,458,505	$4,458,505	No change
Kentucky	$4,717,925	$4,686,676	$(31,249)
Louisiana	$4,346,759	$4,346,759	No change
Maine	$1,751,636	$1,751,636	No change
Maryland	$4,175,980	$4,175,980	No change
Massachusetts	$4,604,630	$4,604,630	No change
Michigan	$9,121,726	$9,093,626	$(28,100)
Minnesota	$6,422,249	$6,422,249	No change
Mississippi	$3,935,453	$3,896,595	$(38,858)
Missouri	$6,849,981	$6,844,323	$(5,658)
Montana	$2,994,454	$2,994,454	No change
Nebraska	$3,626,881	$3,626,881	No change
Nevada	$2,523,913	$2,498,992	$(24,921)
New Hampshire	$1,361,848	$1,352,097	$(9,751)
New Jersey	$7,185,475	$7,114,526	$(70,949)
New Mexico	$4,107,636	$4,107,636	No change
New York	$13,065,843	$12,978,176	$(87,667)
North Carolina	$8,919,442	$8,831,372	$(88,070)
North Dakota	$2,696,955	$2,696,955	No change
Northern Marianas	$383,549	$350,000	$(33,549)
Ohio	$10,046,336	$10,046,336	No change
Oklahoma	$5,769,781	$5,769,781	No change
Oregon	$3,946,430	$3,946,430	No change
Pennsylvania	$10,424,935	$10,424,935	No change
Puerto Rico	$1,180,620	$1,168,962	$(11,658)
Rhode Island	$1,300,175	$1,300,175	No change
South Carolina	$4,806,450	$4,758,992	$(47,458)
South Dakota	$2,253,064	$2,253,064	No change
Tennessee	$6,489,424	$6,489,424	No change
Texas	$29,923,529	$31,267,758	$1,344,229
Utah	$3,085,281	$3,085,281	No change
Vermont	$1,298,730	$1,298,730	No change
Virgin Islands	$527,202	$350,000	$(177,202)
Virginia	$6,979,252	$6,910,340	$(68,912)

State/Territory	Original Recommendation *Border Component= 9.5% Border Max = 50% Territory Component = 0.65%*	Revised Recommendation *Border Component = 11% Border Max = 55% Territory Component = 0.49%*	Difference
Washington	$6,457,545	$6,457,545	No change
West Virginia	$2,187,780	$2,166,178	$(21,602)
Wisconsin	$6,281,706	$6,219,681	$(62,025)
Wyoming	$1,507,775	$1,507,775	No change

MOTOR CARRIER SAFETY ASSISTANCE PROGRAM (MCSAP) FORMULA WORKING GROUP

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Original Recommendations

to the U.S. Department of Transportation for the Development of the New MCSAP Grant Allocation Formula

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April 7, 2017

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* Stephen C. Owings voluntarily withdrew from the Working Group in February 2017 due to a lack of schedule availability. He contributed to formula design discussions but was unavailable to review this final report. We thank Mr. Owings for his time and effort on this critical project.

EXECUTIVE SUMMARY

1. MCSAP, the FAST Act, and the MCSAP Formula Working Group

The Federal Motor Carrier Safety Administration's (FMCSA) Motor Carrier Safety Assistance Program (MCSAP) is a Federal grant program that provides financial assistance to States, Territories, and the District of Columbia to reduce the number and severity of crashes and hazardous materials (HM) incidents involving commercial motor vehicles (CMVs). MCSAP sets forth the conditions for participation by States and local entities and promotes the adoption and uniform enforcement of State safety rules, regulations, and standards compatible with the Federal Motor Carrier Safety Regulations (FMCSRs) and Federal Hazardous Material Regulations (HMRs) for both interstate and intrastate motor carriers and drivers.

The purpose of MCSAP is to ensure that FMCSA and States work in partnership to establish programs to improve motor carrier, CMV, and driver safety to support a safe and efficient transportation system. MCSAP Grant funds are essential to maintaining FMCSA's national CMV safety enforcement programs and those of the States and Territories.

Congress enacted the Fixing America's Surface Transportation Act (FAST Act), Pub. Law No. 114-94, on December 4, 2015. The FAST Act introduced several provisions impacting MCSAP that focused on the consolidation of grants, the improvement of operational effectiveness, and the fostering of partnerships among all stakeholders involved in enforcing CMV safety. These requirements served to further strengthen national grant program investments, establish clear national safety priorities, and enhance the flexibility for State and local governments.

One critical provision in the FAST Act required the development of a new allocation formula for MCSAP Grant funding intended to traverse many of the above objectives. Under Section 5106 of the Act, Congress required the U.S. Secretary of Transportation to establish a Working Group to analyze requirements and factors for the establishment of a new allocation formula and to make a recommendation to the Secretary.

2. MCSAP Formula Working Group's Process

A. Working Group Formation

The Secretary established the MCSAP Formula Working Group in March 2016, within 180 days of enactment of the FAST Act. The FAST Act mandated that the Working Group be composed of representatives from State CMV safety agencies, an organization representing State CMV enforcement agencies, FMCSA, and any other persons that the Secretary considers necessary. Congress mandated that State safety agency participation must make up at least 51% of the Working Group, and the group is exempt from the Federal Advisory Committee Act.

On behalf of the Secretary, FMCSA openly recruited Working Group members through a public notice posted on the Agency's website and through direct solicitation of MCSAP lead agencies (State agencies responsible for MCSAP administration). Applications were reviewed by a panel

of five FMCSA staff from various offices. The panel sought to create a diverse Working Group to represent the geographic and State size distribution of MCSAP participants, and recommended members to the Secretary based on several criteria, such as commitment to transportation safety and record of collaboration with stakeholders.

Once formed, the Working Group was tasked with delivering advice and recommendations on the most appropriate distribution of MCSAP funds to the States, Territories, and the District of Columbia no later than one year from its establishment.

B. Working Group Guiding Principles

The Working Group first met in person in April 2016. Initial meetings were spent visualizing requirements for the allocation formula and establishing guiding principles for the new formula's design. Based upon these meetings, the Working Group agreed that the new formula should:

- Improve upon the previous formula.
- Address FAST Act grant changes.
- Meet FAST Act formula requirements.
- Be safety-based (primary objective).
- Promote stability in funding.
- Respond to changes in crash risk.
- Use quality data sources.
- Respond to changes in overall funding levels.

From its inception, the Working Group studied the previous MCSAP allocation formula's design and worked to analyze the elements of that formula as well as the data sources used to calculate it. The Working Group considered the previous formula as a baseline for improvement.

The Working Group recognized the FAST Act's changes to MCSAP while creating the new formula to ensure that the formula would continue to support the programs and activities that have now been consolidated into MCSAP. The Working Group also addressed the FAST Act's specific requirements for the factors in the new formula set forth in section 5106.

One of the primary guiding principles of the Working Group was that the new formula must be based on safety. Throughout its endeavor, the Working Group considered FMCSA's primary mission to reduce crashes, injuries, and fatalities involving large trucks and buses. To design a formula that reflects today's safety challenges and maintains valuable safety gains, the Working Group put CMV crash risk at the forefront of their analysis, especially when choosing factors to include in the formula.

The Working Group also considered various provisions to the formula that would prohibit wide swings in State funding from year to year. Stability is crucial to the safety mission—in order to achieve continued success, States need to be able to plan their workforce in a strategic and organized way. The Working Group not only chose stable factors to improve the inherent stability of the formula, but included formula adjustments to add further stability in the event of unexpected changes to a factor.

It is also important that the formula respond to changes in measures of crash risk. The Working Group recognized that the formula must be balanced enough to provide some measure of stability but also respond to any new trends. The proposed formula achieves this by using data sources that are updated annually, and by incorporating provisions that offer greater stability to the States by allowing shifts in funding to occur gradually over the course of several years.

The Working Group established that the data sources used to calculate the proposed formula must meet certain criteria for reliability, longevity, frequency of update, and accuracy in order to facilitate timely, efficient, and precise calculations. The Working Group's recommendations reflect significant research and discussion into the data sources that best meet these standards.

Finally, the Working Group noted that formula calculations should be based on proportions of overall MCSAP funds ("shares") when possible, rather than specifying dollar amounts. This enables the formula to adapt if the overall MCSAP funding fluctuates or is incremented, allowing all jurisdictions to share both benefit and burden as funding is made available to the program.

C. Working Group Analysis Process

To design its recommendations, the Working Group gathered and analyzed information, discussed issues relevant to the MCSAP formula, and deliberated on appropriate formula elements and structure. The development process included various methods of research and analysis to:

- Identify areas in the formula to improve.
- Create alternative formula designs.
- Evaluate impacts with respect to the guiding principles.

The Working Group began by understanding and evaluating the current MCSAP formula, studying the design considerations, and conducting research to make informed recommended changes to the formula. Member expertise was leveraged to identify areas for improvement and inspiration, as were other grant formulas and relevant scientific literature.

To create alternative formula designs, the Working Group followed a rigorous analysis process. The process consisted of qualitative and quantitative research into each area of improvement. The depth of analysis varied between areas depending on their complexity and importance, but the general process remained the same throughout.

This iterative process involved identifying and obtaining data sources, evaluating those data sources to determine if they met the criteria for formula inclusion, reviewing and considering programmatic needs and trends, understanding the varying administrative needs of grant recipients, reviewing published reports and studies, and conducting simulations to evaluate funding impacts.

The guiding principles were then used to evaluate the alternative formula designs in each area of improvement. The Working Group discussed the results and either made a decision or iterated

the process by conducting further research and developing more alternatives. This collaborative decision-making process was used in an effort to obtain the viewpoints of all States and programs for representation and consideration.

3. MCSAP Formula Working Group's Recommendation

The Working Group conducted multiple rigorous analyses to confirm that the proposed formula satisfies the guiding principles described above. In particular, since the primary guiding principle was to develop a formula that allocates funding to the States that need it the most based on crash risk, the Working Group verified through analysis that the proposed formula directs funding to the States with the highest crash risk.

The Working Group recommends that the formula consist of three separately calculated components, with adjustments. The three components are a Basic Factor Component to address nationwide CMV crash risk, a Border Component to support safety activities for CMVs in international commerce, and a Territory Component to support motor carrier safety programs in the Territories. In addition, the formula should apply adjustments to promote funding stability and redistribute unallocated funds.

The Basic Factor Component allocates funding to all participating States, including the District of Columbia and the Commonwealth of Puerto Rico. Border States would receive an additional allocation calculated using the Border Component. The allocation for a Territory would be calculated solely through the Territory Component. Adjustments to these allocated amounts would then be applied to promote funding stability and handle unallocated funds.

The Basic Factor Component, which is the largest, allocates funding based on CMV crash risk. Crash risk is determined based on five equally weighted factors: population, national highway system road length, vehicle miles traveled, special fuel consumption, and carrier registrations (interstate and intrastate HM). The Working Group recommends adding carrier registrations as a new factor because of its stability, correlation with crash risk, and ability to account for new entrant safety audit workload. Recommended adjustments to the formula, such as a hold-harmless provision, funding cap, and minimum and maximum share limits provide an additional measure of equity and program stability over time.

The Border Component aims to maintain the valuable safety gains made through effective border enforcement. Since border funding is primarily used to pay for personnel conducting border activities, the funds in this component should be allocated based on relative need for personnel among border States, with a minimum and maximum limit.

The Territory Component should allocate funding to the Territories (excluding the Commonwealth of Puerto Rico, which is treated as a State) on a need-driven basis. However, it is also necessary to include a reasonable guaranteed minimum amount for the Territories, in order to ensure that each Territory is able to maintain an effective minimal program. This provides reliability, accounts for future growth, and allows FMCSA the flexibility to meet the unique needs of each Territory's motor carrier safety program.

In addition to the allocation formula, the Working Group also recommends additional research to improve the formula at a future date. Several of the concepts, data sources, and formula elements that the Working Group assessed did not meet the criteria for inclusion at this time, but should be further examined or improved for future consideration.

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DEFINITION OF TERMS

Note: Where applicable, these definitions reference the regulation(s) that they were derived from. For consistency and in order to align with the currently accepted vernacular, some of the terminology in these definitions was modified slightly from what is written in the Code of Federal Regulations (CFR).

Term	Definition
Basic Factor Component	One of three separately calculated allocations in the proposed MCSAP Grant formula. The Basic Factor Component applies to the States (as defined here) and is allocated based on crash risk.
Basic formula	In accordance with 49 CFR 350.323, the Basic formula distributes Basic grant funds proportionally to each State using the following four, equally weighted (25 percent) factors: • 1997 road miles (all highways) • All vehicle miles traveled (VMT) • Population • Special fuel consumption This existed as part of the previous formula prior to FY 2016, and is also used in the Interim formula.
Border Component	One of three separately calculated allocations in the proposed MCSAP Grant formula. The Border Component applies to States that share a land border with Canada or Mexico, and allocates funding based on the relative need for personnel needed to conduct border enforcement activities.
Border Enforcement Grant	A Federal competitive grant program that provides financial assistance to States and entities that share a land border with another country focused on reducing crashes, injuries, and fatalities involving commercial motor vehicles (CMV) by ensuring that motor carriers and drivers operating in international commerce are in compliance with U.S. CMV safety standards and regulations, financial responsibility regulations, registration requirements, and that the drivers of those vehicles are qualified and properly licensed to operate a CMV in the United States. This grant was funded separately from the MCSAP Grant and New Entrant Grant through FY 2016.
border State	A State that shares a land border with Canada or Mexico.

Term	Definition
cap	A stabilizing limit on year-to-year increases in the amounts received by formula recipients, which is intended to help States plan their workforce in a strategic and organized way.
coefficient of determination	A measure used in regression analysis to assess how well a model explains and predicts future outcomes. R^2 ranges from 0 (no correlation) to 1 (a perfect correlation).
Commercial Vehicle Safety Plan	The document outlining the State's CMV safety objectives, strategies, activities, and performance measures.
crash risk	A State's predicted number of crashes occurring based on factors that correlate well with crashes and have a causal relationship with crash risk exposure.
Federal fiscal year	The 12-month period ending on September 30 of that year, having begun on October 1 of the previous calendar year.
High Priority Program	A competitive financial assistance program that supports, enriches, and augments State CMV safety programs through partnerships with States, local governments, federally recognized Indian tribes, other political jurisdictions, and other persons to carry out high priority activities and projects that augment motor carrier safety activities and, projects planned in accordance with the MCSAP. It also promotes the deployment of innovative technology for the CMV information systems and networks (49 CFR 350.101).
highway miles	Abbreviated term used in place of "FHWA National Highway System Road Length, Miles by Ownership (HM-40)."
hold-harmless provision	A stabilizing limit on year-to-year decreases in the amounts received by formula recipients, which is intended to mitigate grantee hardship that would result from dramatic decreases in funding.
Incentive formula	MCSAP Grant formula that allocates additional funding to States that show improvement in any of the five categories listed in 49 CFR 350.327. These categories include achieving reductions in CMV involved fatal accidents, CMV fatal accident rate, or meeting specified CMV safety program performance criteria (49 CFR 350.105). This existed as part of the previous formula prior to FY 2016, and is also used in the Interim formula.

Term	Definition
Innovative Technology Deployment	Funds provided to States for carrying out the deployment of innovative technology initiatives that support CMV information systems and networks (49 CFR 350.105). Previously known as the Commercial Vehicle Information Systems and Networks (CVISN) Grant Program.
Interim formula	The formula used for MCSAP allocation from FY 2017 until the enactment of the new formula. The interim funding amounts are calculated using the sum of: 1. The MCSAP allocation formula used in FY 2016 under 49 U.S.C. 31102 2. The average of the funding awarded or other equitable amounts to a State in fiscal years 2013, 2014, and 2015 for— (i) border enforcement grants under 49 U.S.C. 31107; and (ii) new entrant audit grants under section 31144(g)(5) of that title.
Lead State Agency	The State CMV safety agency designated by the Governor to be responsible for administering the Plan throughout the State (49 CFR 350.105).
MCSAP Formula Working Group (or "Working Group")	The working group prescribed by section 5106(a) of the FAST Act and charged with the development of a new MCSAP allocation formula.
MCSAP Grant allocation formula	The formula used to calculate each State's MCSAP Grant funding.
Motor Carrier Safety Assistance Program	A Federal grant program that provides financial assistance to States to reduce the number and severity of crashes and hazardous materials incidents involving CMVs. The goal of the MCSAP is to reduce CMV-involved crashes, fatalities, and injuries through consistent, uniform, and effective CMV safety programs. Investing grant monies in appropriate safety programs will increase the likelihood that safety defects, driver deficiencies, and unsafe motor carrier practices will be detected and corrected before they become contributing factors to crashes. The MCSAP also sets forth the conditions for participation by States and local jurisdictions and promotes the adoption and uniform enforcement of State safety rules, regulations, and standards compatible with the Federal Motor Carrier Safety Regulations (FMCSRs) and Federal Hazardous Material Regulations (HMRs) for both interstate and intrastate motor carriers and drivers (49 CFR 350.101).

Term	Definition
New Entrant Safety Audit Grant	A Federal competitive grant program that provides financial assistance to reduce the number and severity of crashes, injuries, and fatalities involving CMVs by reviewing new interstate motor carriers to ensure that they have effective safety management programs. This grant was funded separately from the MCSAP Grant and Border Enforcement Grant through FY 2016.
Performance and Registration Information Systems Management	A cooperative Federal-State safety program developed to reduce CMV crashes. PRISM utilizes the CMV registration process of the States to improve motor carrier safety in two ways: 1. By determining the safety fitness of the motor carrier prior to issuing license plates; and, 2. By motivating the carrier to improve its safety performance either through an improvement process or the application of registration sanctions. The PRISM program encompasses two major processes: Registration and Enforcement, which are integrated to identify motor carriers and hold them responsible for the safety of their operations. The performance of unsafe carriers is improved through a comprehensive system of identifications, education, data gathering, safety monitoring, and treatment. This grant was funded separately from MCSAP through FY 2016.
previous formula	The allocation formula used to award MCSAP funding in FY 2016 and prior under section 31102 of title 49, United States Code (49 CFR 350.313, 350.323, 350.327).
proposed formula	The allocation formula recommended by the MCSAP Formula Working Group in response to section 5106 of the FAST Act.
Safety Data Improvement Program	A Federal grant program that provides financial and technical assistance to States to facilitate the collection of accurate, complete, and timely data on all large commercial truck and bus crashes that involve a fatality, injury, or a vehicle towed from the crash scene. This grant was funded separately from MCSAP through FY 2016.
share	A part or portion of a larger amount that is divided among jurisdictions. In this document, a share may refer to: • A State's proportion of all MCSAP funds (including the Basic Factor and Border Components), used to determine the hold-harmless and cap provisions.

Term	Definition
	• Shares of individual components, such as when used to determine the minimum and maximum shares of the Basic Factor and Border Components. • Share of a specific factor, which, when averaged across all factors, is used to determine the overall Basic Factor Component share. It should be noted that shares are percentages of an overall amount, not a dollar value.
State	For the purposes of this report, all references to "State" or "States" include the 50 States, the District of Columbia, and the Commonwealth of Puerto Rico. While 49 CFR 350.105 includes Territories in its definition of States, they are defined differently here due to each entity's treatment in the proposed formula, which is determined according to available data and distinct program characteristics.
Territory	For the purposes of this report, all references to "Territory" or "Territories" include the Commonwealth of the Northern Mariana Islands, American Samoa, Guam, and the U.S. Virgin Islands. The Commonwealth of Puerto Rico is treated as a State and is excluded from this definition. This is due to each entity's treatment in the proposed formula, which is determined according to available data and distinct program characteristics.
Territory Component	One of three separately calculated allocations in the proposed MCSAP Grant formula. The Territory Component applies to Territories (as defined here) and should be allocated on a need-driven basis with guaranteed minimum funding.

ACRONYMS

BEG	Border Enforcement Grant
CDL	Commercial driver's license
CMV	Commercial motor vehicle
CNMI	Commonwealth of the Northern Mariana Islands
CVISN	Commercial Vehicle Information Systems and Networks
CVSP	Commercial Vehicle Safety Plan
DFO	Designated Federal Officer
eCVSP	Electronic Commercial Vehicle Safety Plan
FAST Act	Fixing America's Surface Transportation Act
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
FMCSRs	Federal Motor Carrier Safety Regulations
FTE	Full time employee
FY	Federal fiscal year
HM	Hazardous materials
HMRs	Federal Hazardous Material Regulations
ITD	Innovative Technology Deployment
MAP-21	Moving Ahead for Progress in the 21st Century Act
MCMIS	Motor Carrier Management Information System
MCS-150	Motor Carrier Identification Report, Application for U.S. DOT Number
MCSAP	Motor Carrier Safety Assistance Program
NHFN	National Highway Freight Network
NHS	National Highway System
NRC	National Research Council
O&M	Operations and maintenance
OIG	Office of the Inspector General

OOS	Out-of-service
PRISM	Performance and Registration Information Systems Management
R^2	Coefficient of determination
SaDIP	Safety Data Improvement Program
SMS	Safety Measurement System
U.S. DOT	Department of Transportation
U.S.C.	United States Code
UCR	Unified Carrier Registration
URS	Unified Registration System
VMT	Vehicle miles traveled

I. INTRODUCTION

1. MCSAP Background

The Federal Motor Carrier Safety Administration (FMCSA) was established within the Department of Transportation (U.S. DOT) on January 1, 2000, pursuant to the Motor Carrier Safety Improvement Act of 1999 (49 U.S.C. 113). FMCSA's primary mission is to prevent commercial motor vehicle-related fatalities and injuries. Agency activities contribute to ensuring safety in motor carrier operations through strong enforcement of safety regulations; targeting high-risk carriers and commercial motor vehicle (CMV) drivers; improving safety information systems and CMV technologies; strengthening CMV equipment and operating standards; and increasing safety awareness.

To accomplish these activities, FMCSA works with Federal, State, and local enforcement agencies, the motor carrier industry, labor and safety interest groups, and others. States, in particular, are critical to the implementation of motor carrier safety programs nationwide. They conduct more than 3.2 million roadside CMV inspections along the country's roadways and international borders with Canada and Mexico, accounting for more than 95% of all CMV safety activities nationally in Federal fiscal year (FY) 2015. States are also responsible for a number of other critical safety activities, including:

- Roadside inspections of CMVs.
- CMV and non-CMV traffic enforcement.
- Motor carrier investigations.
- Public education and outreach.
- Data quality improvements.
- Drug and alcohol enforcement.
- Size and weight enforcement (when accompanied by inspection).
- Safety audits of new entrant motor carriers.
- CMV safety activities for CMVs in international commerce (Border Program).
- Other CMV safety-related activities.

FMCSA's Motor Carrier Safety Assistance Program (MCSAP) is a Federal grant program that provides financial assistance to States, Territories, and the District of Columbia to reduce the number and severity of crashes and hazardous materials incidents involving CMVs. The purpose of MCSAP, as stated in 49 CFR 350.103, is to ensure that FMCSA and States work in partnership to establish programs to improve motor carrier, CMV, and driver safety to support a safe and efficient transportation system by:

- Making targeted investments to promote safe CMV transportation, including transportation of passengers and hazardous materials.
- Investing in activities likely to generate maximum reductions in the number and severity of CMV crashes and fatalities resulting from such crashes.

- Adopting and enforcing effective motor carrier, CMV, and driver safety regulations and practices consistent with Federal requirements.
- Assessing and improving statewide performance by setting program goals and meeting performance standards, measures, and benchmarks.

Previously, FMCSA provided funding through the formula-based MCSAP Grant and several competitive grant programs to States and Territories to reduce CMV crashes. Starting in FY 2017, the FAST Act consolidated several grants into two primary financial assistance programs: the MCSAP Grant and the High Priority Grant. MCSAP will now include funding for activities that previously fell within the following separate competitive grant programs: the Border Enforcement Grant (BEG), the New Entrant Safety Audit Grant, Performance and Registration Information Systems Management (PRISM), the Safety Data Improvement Program (SaDIP), and Innovative Technology Deployment (ITD)[1]. These changes served to further strengthen national grant program investments, establish clear national safety priorities, and enhance the flexibility for State and local governments. Without State participation, FMCSA would not be able to achieve its mission of reducing crashes, injuries, and fatalities involving large trucks and buses.

2. Previous Grant Structure and Allocation

Through FY 2016, MCSAP Grant funds were allocated based on two formulas: a Basic formula, which proportionally distributed funds to the States (including the District of Columbia and the Commonwealth of Puerto Rico) using four equally weighted factors in accordance with 49 CFR 350.323, and an Incentive formula, which allocated additional funding to States that demonstrated improvement in any of the five categories listed in 49 CFR 350.327. Territories (Guam, Commonwealth of the Northern Mariana Islands (CNMI), U.S. Virgin Islands, and American Samoa) received a fixed amount of $350,000 per year.

Through FY 2016, border activities and new entrant safety audits were funded separately from MCSAP on a competitive basis through the BEG and New Entrant Safety Audit Grant. In addition, competitive grant funding for PRISM, SaDIP, and ITD was also consolidated into the MCSAP Grant with the enactment of the FAST Act.

The previous allocation methods for the Basic, Incentive, Border Enforcement, and New Entrant Grants are described in table 1.

[1] ITD replaces the Commercial Vehicle Information Systems and Networks (CVISN) program.

Table 1. Previous allocation for MCSAP, Border Enforcement, and New Entrant Grants.

FMCSA Grant	Grant Amount (in FY 2016)	Previous Allocation Method (effective through FY 2016)

MCSAP Basic Funding (49 CFR 350.323)	$158,275,000	• Allocated to States based on four evenly weighted factors:
		  o Population
		  o 1997 road miles
		  o Vehicle miles traveled
		  o Special fuel consumption
		• Minimum State share = 0.44% or $350,000 (whichever is greater)
		• Maximum State share = 4.944%
		• Territories receive a fixed amount of $350,000 per year

MCSAP Incentive Funding (49 CFR 350.327)	$10,000,000	Awarded to States that demonstrate improvement in any or all of the following five categories: • Fatal accidents (5 shares) • Fatal accident rate (4 shares) • Upload of CMV accident reports in accordance with current FMCSA policy guidelines (2 shares) • Verification of CDLs during all roadside inspections (2 shares) • Upload of CMV inspection data in accordance with current FMCSA policy guidelines (2 shares)
Border Enforcement Grants (49 CFR 350.323)	$32,000,000	Awarded by FMCSA on a competitive basis, based on the quality of a State's application
New Entrant Safety Audit Grants (49 CFR 350.323)	$32,000,000	Awarded by FMCSA on a competitive basis, based on the quality of a State's application

3. A New Allocation Formula Under FAST Act

Congress enacted the Fixing America's Surface Transportation Act (FAST Act), Pub. Law No. 114-94, on December 4, 2015, introducing several provisions impacting MCSAP that focused on the consolidation of grants, the improvement of operational effectiveness, and the fostering of partnerships among all the stakeholders involved in enforcing CMV safety. One important Congressional mandate was to develop a new grant allocation formula for MCSAP. While a new allocation formula was necessary to address the changes to MCSAP, such as the consolidation of several other grants into MCSAP, this was also viewed as an opportunity to improve the

formula's ability to allocate funding equitably and in a way that allows MCSAP lead agencies to support the overall safety mission.

Congress required, under section 5106 of the FAST Act that the U.S. Secretary of Transportation establish a Working Group to analyze requirements and factors for the new formula. The Working Group was tasked with delivering advice and recommendations on the most appropriate distribution of MCSAP funds to the States, Territories, and the District of Columbia no later than one year from its establishment.

To support the program during the new formula's creation, an interim formula took effect in FY 2017. The interim formula applies the same allocation formula that was used in FY 2016 to support the Basic and Incentive funds and allocates Border Enforcement and New Entrant grants based on a State's three-year (FY 2013-2015) average of funding awarded.

4. Purpose and Scope of Recommendation

This document contains the Working Group's recommendations for formula design, calculation, and data sources. It also documents the research and analysis performed to reach these recommendations.

Part II of this report explains the Working Group's formation and process. Part III communicates the recommendations of the Working Group, and includes details of the proposed formula, recommendations for future consideration, other elements considered and rejected, and how to calculate the proposed MCSAP allocation. Part IV provides an evaluation of the proposed formula in how it meets key considerations and an analysis of the expected impacts.

II. MCSAP FORMULA WORKING GROUP

1. Formation and Task

Congress required the U.S. Secretary of Transportation to establish a Working Group within 180 days of enactment of the FAST Act. The Working Group was required to consist of representatives of FMCSA, the lead State CMV safety agencies responsible for administering MCSAP, organizations representing State agencies responsible for enforcing a program for inspection of CMVs, and others, as the Secretary considered necessary. In addition, Congress mandated that representatives of the State MCSAP agencies would comprise at least 51% of the membership.

On behalf of the Secretary, FMCSA sought nominations for membership on the Working Group, and received 24 applications. FMCSA then empaneled a group of five staff from various offices within the Agency to review and rate all submitted application materials for consideration to the Working Group. In reviewing applications for membership, the panel sought to recommend a diverse Working Group to the Secretary, which represented the geographic and State size distribution of State MCSAP participants. The panel also considered the applicant's commitment to transportation safety, record of collaboration with stakeholders, and familiarity with data analysis and quality measurements, among other criteria.

The final Working Group members were chosen from among the State MCSAP lead agencies, as designated by the appropriate Governor, members of the Commercial Vehicle Safety Alliance, and others. FMCSA was represented on the Working Group by representatives from the Office of Safety Programs, the Grants Management Office, the Office of the Chief Counsel, and the Office of Field Operations. For a full list of Working Group members, see "Acknowledgements" on page ii.

The Working Group was tasked with delivering advice and recommendations on the most appropriate distribution of MCSAP funds to the States, Territories, and the District of Columbia no later than one year from its establishment. As such, Working Group members were charged with attending meetings, gathering information as necessary to discuss issues presented by the Designated Federal Officer (DFO), providing input and deliberating on issues relevant to the MCSAP formula, and providing written consensus advice to the U.S. DOT and FMCSA.

2. Working Group Process

The Working Group was officially established in March 2016 and met regularly over the course of a year to produce the formula recommendations. Throughout its tenure, the Working Group systematically developed recommendations through a process that included analyzing the current formula, identifying areas for improvement, establishing objectives for the new formula, and evaluating potential formula elements and designs.

The Working Group met in person a total of six times over the course of 12 months, and called additional web-based meetings as needed. In-person meetings were open to the public and held

at locations across all four of FMCSA's Service Centers to encourage dialogue with States and other stakeholders. Its initial meeting was held on April 1, 2016, in St. Louis, Missouri. FMCSA's Office of Safety Programs provided necessary funding, logistics, and administrative support for the Working Group.

The Working Group began its endeavor by understanding and evaluating the current MCSAP formula. Working Group members learned about the design considerations behind the previous formula through resources such as the report of the working group that originally developed it and the Notice of Proposed Rulemaking.[2,3] These reports also described areas for future improvement, such as data sources that could be used for the formula calculation if the quality were better.

Simultaneously, the Working Group identified areas for improvement for the new formula. These were based on the Working Group members' various expertise in working with the grant programs, and the FAST Act's changes to the grant program, such as the inclusion of the Border Enforcement and New Entrant grants. The Working Group also studied the legislative history of the individual grant programs now combined under MCSAP to understand their purpose and intent. The Working Group also turned to other grant formulas and relevant scientific literature for inspiration on ways to improve the MCSAP formula.

Through this research and discussion, the Working Group established an initial set of goals and guiding principles for the new formula. During the analysis process, the Working Group used these principles to make decisions about the formula while at the same time refining them as new information was brought to light. The final set of goals and principles are described in Part II, Section 3: Guiding Principles for Formula Design.

The analysis process consisted of qualitative and quantitative research into each area of improvement. While the depth of analysis varied between areas depending on their complexity and importance, the general process was the same. The Working Group began by analyzing the importance and relevance of the area to the formula and the CMV safety programs. Several alternative formula designs relating to that area were developed and evaluated against the guiding principles. The Working Group then discussed and either made a decision, or iterated the process and conducted further research. This collaborative decision-making process was used in an effort to obtain the viewpoints of all States and programs for representation and consideration (e.g., small States, Territories, local needs/restrictions on types of enforcement), and each decision was made in a thoughtful and deliberate manner.

Various methods of research and analysis were used to understand each area of improvement, create alternative formula designs, and evaluate their impacts with respect to the guiding principles. These efforts included:

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[2] *Revision of the MCSAP Allocation Formula: Summary Report*, 2000. http://cta.ornl.gov/cta/Publications/Reports/ORNL_TM_2000_204.pdf

[3] *49 CFR Part 350 [FHWA Docket No. FHWA–98–4878]*, 1999. https://www.gpo.gov/fdsys/pkg/FR-1999-03-09/pdf/99-5682.pdf

- Identifying and obtaining data sources.
- Evaluating data sources to determine if they met the criteria for formula inclusion, e.g., through statistical analysis.
- Reviewing and considering programmatic needs and trends.
- Understanding the varying administrative needs of grant recipients.
- Understanding the investments that recipients made with grant funding (e.g. personnel and benefits, contract services, equipment, etc.).
- Reviewing published reports by the Office of the Inspector General (OIG), the National Research Council (NRC), and a previous MCSAP formula evaluation by Oak Ridge National Laboratory.
- Conducting simulations to evaluate funding impacts.

Three subgroups were established to focus on the various aspects of the Working Group's task. The subgroups consisted of a Factor Research Subgroup, a Formula Structure Subgroup, and a Communications Subgroup. The many areas for improvement that the Working Group considered were first analyzed by the appropriate subgroup, and then discussed with the full Working Group. The Factor Research Subgroup focused on evaluating individual data sources to be used in the new formula, while the Formula Structure Subgroup addressed issues pertaining to the overall formula (such as a hold-harmless provision). The Communications Subgroup focused on external communication strategy. The subgroups met in person and via webinar, and reported their recommendations and advice to the full Working Group for further deliberation and discussion.

While the submission of these recommendations to the Secretary signifies the conclusion of Working Group meetings, members remain champions of the formula recommendations proposed here, and will remain available to provide input and feedback as members of the Working Group. The Working Group charter officially terminates when FMCSA issues a notice of proposed rulemaking for a new formula.

3. Guiding Principles for Formula Design

A. Improves Upon Previous Formula

From its inception, the Working Group considered the previous MCSAP Grant allocation formula's design and worked to analyze the elements of that formula as well as the data sources used to calculate it. The Working Group treated the previous formula as a baseline and used the iterative process described above to create a better formula for the future.

B. Address Changes to the MCSAP Grant

Starting in FY 2017, the FAST Act consolidates several grant programs into two primary financial assistance programs: the formula-based MCSAP Grant and the competitive High Priority Grant. The MCSAP Grant will now include funding for activities that previously fell within the BEG, New Entrant Safety Audit Grant, SaDIP, ITD (formerly CVISN), and PRISM

grant programs. As part of this grant consolidation, the FAST Act expanded the list of activities required for full participation in MCSAP. These changes served to further strengthen national grant program investments, establish clear national safety priorities, and enhance the flexibility for State and local governments.

The States' match requirement for these grants also changed under the FAST Act. Prior to the FAST Act, States were required to provide a 20% match to receive their Basic and Incentive grants. Border Enforcement and New Entrant grants, however, did not require a match. The FAST Act now requires a 15% match for MCSAP, which includes these programs. The Territories, however, are not required to provide a match, and this requirement did not change under the FAST Act (49 CFR 350.305).

The Working Group considered the impacts of the grant consolidation and new matching requirement while creating the formula with the goal of continuing to provide adequate funding for the programs that have now been combined into MCSAP. However, it should be noted that the actual percentage of the States' matching requirement was not part of the Working Group's discussion as this amount had already been set forth by the FAST Act.

C. Meet MCSAP Formula Requirements Promulgated by the FAST Act

The Working Group also acknowledged legislation designating the required considerations for the formula.

Section 5106 of the FAST Act, Motor Carrier Safety Assistance Program Allocation, sets forth the following requirements:

> "The Secretary shall ensure that the new allocation formula for the motor carrier safety assistance program is based on factors that reflect, at a minimum—
>
> (1) the relative needs of the States to comply with section 31102 of title 49, United States Code;
> (2) the relative administrative capacities of and challenges faced by States in complying with that section;
> (3) the average of each State's new entrant motor carrier inventory for the 3-year period prior to the date of enactment of this Act;
> (4) the number of international border inspection facilities and border crossings by commercial vehicles in each State; and
> (5) any other factors the Secretary considers appropriate."

Table 2 indicates where these FAST Act requirements are addressed in this report.

The Working Group interpreted "reflect" to mean that Congress intended that the chosen factors should correlate well with the items listed above (for example, the Working Group determined that the formula does not need to include the three-year average of each State's new entrant motor carrier inventory as long as the selected factors correlate well with new entrant motor carrier inventory).

Table 2. Where FAST Act requirements are addressed in this report.

FAST Act Requirement	Report Sections that Address the Requirement
(1) The relative needs of the States to comply with section 31102 of title 49, United States Code.	Section 2 – Basic Factor Component Section 4 – Territory Component
(2) The relative administrative capacities of and challenges faced by States in complying with section 31102 of title 49, United States Code.	Section 2 – Basic Factor Component Section 4 – Territory Component Section 5 – Formula Adjustments
(3) The average of each State's new entrant motor carrier inventory for the 3-year period prior to the date of enactment of the FAST Act.	Section 2 – Basic Factor Component Section 6 – Elements Considered and Rejected
(4) The number of international border inspection facilities and border crossings by commercial motor vehicles in each State.[4]	Section 3 – Border Component
(5) Any other factors the Secretary considers appropriate.	Section 6 – Elements Considered and Rejected

D. Based on Safety

One of the primary objectives of the Working Group was to base the proposed formula on safety. Throughout its endeavor, the Working Group considered FMCSA's primary mission to reduce crashes, injuries, and fatalities involving large trucks and buses. The Working Group noted that the new formula should more accurately reflect today's safety challenges and maintain valuable safety gains, and therefore put crash risk at the forefront of their analysis, especially when choosing factors to include in the formula. The Working Group agreed that the factors should correlate well with crashes and have a causal relationship with crash risk exposure (for example, a larger population is causally linked to crash risk exposure because large populations generally lead to increased CMV traffic).

E. Promotes Stability in Funding

The Working Group noted that in order for States to use funding effectively, there must be a certain level of stability in grant funding. The success of any State's CMV safety program is

[4] For consistency within this document and the currently accepted vernacular, "commercial vehicles" was changed to "commercial motor vehicles." This same change was made to other references to section 5106(c)(4) of the FAST Act throughout this document.

dependent on the personnel funded by the MCSAP Grant. In order to achieve continued success year to year, States need to be able to plan their workforce in a strategic and organized way. Given that, on average, 85% of a State's MCSAP funding is directed towards personnel costs, large or unexpected shifts in funding could significantly and negatively impact a State's CMV safety program. States cannot accurately plan for or maintain programs, hire personnel, train personnel, or plan MCSAP activities if they cannot rely on a relatively stable source of funding.

The Working Group recognized that in order to improve the inherent stability of the formula, stable factors should be chosen. A factor's stability can be evaluated by measuring the typical change of a State's share of that factor from year to year (see Appendix D: Histograms of Formula Factors Over Time for an in-depth analysis of the stability of formula factors). Additionally, the Working Group included other formula adjustments to add further stability in the event of unexpected changes to the factors.

F. Responds to Changes in Crash Risk

In addition, it is also important that the formula respond to changes in measures of crash risk. The proposed formula achieves this by using stability provisions in moderation and using the most up-to-date data sources. The stability measures in the proposed formula strike a balance between stability and responsiveness by allowing States to experience any large changes gradually over the course of several years. The proposed formula also reacts to changes in crash risk quickly because it utilizes data sources which are updated annually. For example, the previous MCSAP Basic formula used a fixed year for one of its formula factors, while the proposed formula uses the most current available data for all of its data sources.

G. Uses Quality Data Sources

The Working Group established that the data sources used to calculate the proposed formula must meet certain criteria for reliability, longevity, frequency of update, and accuracy in order to facilitate timely, efficient, and precise calculations. The Working Group's recommendations reflect significant research and discussion into the data sources that best meet these standards.

Recommended data sources should be easily accessible and dependable over time. These data sources should also provide accurate and reliable data. Additionally, the Working Group considered the frequency with which data sources were updated, and selected data sources that are updated on an annual basis. Annually updated data sources ensure that the formula is up to date and responsive to States' changes in crash risk.

H. Responds to Changes in Overall Funding Level: Share-based Calculations

Calculations are based on proportions of overall MCSAP funds ("shares") when possible, rather than specifying dollar amounts. Examples of where shares are used are in minimum and maximum limits, the hold-harmless provision, and the cap.

This allows for the formula to adapt if the overall MCSAP funding increases or decreases, allowing all jurisdictions to benefit from increases in overall funding and share the burden if funding decreases.

III. PROPOSED FORMULA

The proposed formula presented in Part III includes consensus recommendations from the MCSAP Formula Working Group and, as such, is presented in the voice of the Working Group.

1. Formula Overview

The following section provides an overview of the MCSAP formula recommendations. Each recommendation is proposed and explained in more detail in Part III, Section 2: Basic Factor Component through Part III, Section 6: Elements Considered and Rejected (see Appendix B: Full List of Recommendations for a full list of formula recommendations).

A. Formula Components

The formula should consist of three separately calculated allocations, or components, with adjustments. The three components are a Basic Factor Component to address nationwide CMV crash risk, a Border Component to support safety activities for CMVs in international commerce, and a Territory Component to support motor carrier safety programs in the Territories.

The Basic Factor Component allocates funding to all participating States, including the District of Columbia and the Commonwealth of Puerto Rico. Border States would receive an additional allocation calculated using the Border Component. (Although funding for border activities is accounted for by the Border Component, actual spending on border activities does not need to align with the Border Component allocation.) The allocation for a Territory would be calculated solely through the Territory Component. Adjustments to these allocated amounts would then be applied to promote funding stability and to handle unallocated funds.

The Basic Factor Component, which is the largest, allocates funding based on factors that represent CMV crash risk. The Border Component allocates funding to border States based on the personnel needed to provide enforcement at each port of entry in the State. The Territory Component allocates funding to the Territories on a need-driven basis and includes a reasonable guaranteed minimum amount. A summary of each component can be found in table 3, and the design and rationale of these three formula components are more thoroughly discussed in the following sections of Part III.

Table 3. Summary of proposed formula components.

	Basic Factors	Border	Territories
Section Reference	Part III, Section 2: Basic Factor Component	Part III, Section 3: Border Component	Part III, Section 4: Territory Component
Recipients	50 States, the District of Columbia, and the Commonwealth of Puerto Rico	States with an international land border	Guam, CNMI, U.S. Virgin Islands, and American Samoa
Funding Amount, as a Percentage of Overall MCSAP Funds	89.85% + unallocated Border and Territory funds	Up to 9.5%	Up to 0.65%
Formula for Calculating Distribution	Allocate proportionally to each State using the following five, equally-weighted basic factors: • Population • All vehicle miles traveled • National Highway System (NHS) highway miles • Special fuel consumption • Carrier registrations	Allocate proportionally to each border State based on the personnel needed to provide enforcement at each port of entry in the State. The calculation of personnel need is based on annual CMV crossing volume, and accounts for the differences between the Mexican and Canadian borders.	Allocate based on an assessment of individual program needs and projected activities as provided by the Territories within their respective Commercial Vehicle Safety Plans (CVSPs).
Minimum and Maximum Share	0.44% to 4.944% of Basic Factor Component	0.075% to 50% of Border Component	A minimum is recommended, and should reflect the funding needed to maintain an effective minimal program.

B. Formula Adjustments

The formula should apply adjustments to the allocation calculated through the components described above to promote funding stability and handle unallocated funds.

Adjustment for Stability: Hold-Harmless and Cap

To promote stability in funding, the formula should limit year-to-year changes (positive and negative) in a State's allocation through both a hold-harmless and cap provision. Each State should receive no less than 97% or more than 105% of their prior year's share of MCSAP funding. This constraint should apply to each year of the new MCSAP formula, including the first year that it is implemented. Territories are not included in this constraint.

Adjustment for Unallocated Funds: Reallocation

Any unallocated funds should be reallocated to participating States according to the Basic Factor Component. For more information regarding the reallocation of funds, see Part III, Section 5C: Reallocation.

C. Summary of Changes from Previous Formula

The following list provides a brief overview of how the proposed formula differs from the grant allocation methods prior to the FAST Act:

- **Basic Factor Component**
  - Three of the factors remain unchanged, but carrier registrations was added and 1997 road miles was changed to the most recent highway miles data available.
  - Previously, the minimum allocation was determined by the larger of a share of funds or dollar amount. The proposed recommendation is to determine the minimum allocation based only on a share of funds, not a dollar amount. The minimum share of funds (0.44%) remains the same.
- **Incentive Formula**
  - The proposed MCSAP Grant allocation formula does not have an incentive portion.
- **Border Enforcement Grant**
  - Up to 9.5% of total MCSAP funds will be allocated proportionally to the border States based on the personnel needed to provide adequate enforcement at each port of entry in the State. The calculation of personnel need is based on annual CMV crossing volume, and accounts for the differences between the Mexican and Canadian borders.
  - Minimum share: 0.075% of Border Component.
  - Maximum share: 50% of Border Component.
  - Border enforcement activities were previously funded through a competitive grant.

- **New Entrant Safety Audit Grant**
  - Funding for new entrant safety audits is accounted for in the Basic Factor Component. Carrier registrations, a factor in the Basic Factor Component, is intended to reflect the new entrant safety audit workload.
  - New entrant safety audits were previously funded through a competitive grant.
- **Other Considerations**
  - Instead of allocating a fixed amount to each Territory, a maximum of 0.65% of total MCSAP funds will be allocated to the Territories as a whole. Allocations for individual Territories would be determined by FMCSA on a need-driven basis, with a guaranteed minimum amount.
  - New provisions to promote stability were added: a State's share cannot be less than 97% or more than 105% of the prior year's share.

2. Basic Factor Component

The following section contains recommendations pertaining to the Basic Factor Component of the proposed MCSAP formula. The factors in this component apply to the States, as defined herein. These factors (with minimum and maximum limits) will determine the allocation of 89.85% of total MCSAP funding.

FAST Act Requirements Addressed in this Section:

(1) The relative needs of the States to comply with section 31102 of title 49, United States Code.
The proposed formula will estimate the relative need of States to comply with section 31102 of title 49, United States Code, by estimating each State's crash risk. Crash risk is determined by the five factors described in this section.

(2) The relative administrative capacities of and challenges faced by States in complying with section 31102 of title 49, United States Code.
The minimum and maximum funding shares described in this section address the relative administrative capacities of and challenges faced by States.

(3) The average of each State's new entrant motor carrier inventory for the 3-year period prior to the date of enactment of the FAST Act.
The carrier registrations factor, described in this section, addresses the need to account for new entrant motor carrier inventory.

A. Basic Factor Component Overview

Funds allocated according to the Basic Factor Component should be based on a State's crash risk. Recommendations 2 through 11 define the factors that best represent crash risk in a State, and the best data sources for each factor. A table summarizing the five factors and their correlation to crash risk can also be found in Appendix C: Summary of Five Basic Factors.

This formula recommendation includes multiple factors that all logically relate to crash risk, but in a slightly different way. This allows for more accurate prediction of crash risk than each factor individually, and it also adds stability. For more information about the weighting of the five factors see Part III, Section 6E: Different Weights for Each Factor.

The Basic Factor Component funds should only be directed to States that participate in MCSAP. If a State's MCSAP allocation is withheld or reduced due to non-participation, then the unallocated funds will be reallocated to the remaining States based on the formula. For more information about reallocation of funds, see Part III, Section 5C: Reallocation.

The exact percentage (89.85%) was determined after deciding the amount to set aside for the Border and Territory Components (described in Part III, Section 3: Border Component and Part III, Section 4: Territory Component).

Recommendation 1: 89.85% of total MCSAP funds should be distributed proportionally to the 50 States, the District of Columbia, and the Commonwealth of Puerto Rico according to crash risk, which is determined by five equally weighted factors as defined by recommendations 2-11.

B. Population

Population is recommended as a factor because areas with a large population will have a higher demand for CMV traffic, and this will increase the likelihood of CMV crashes. Population was also used as a factor in the previous MCSAP formula. It should remain a factor due to its stability and high correlation with crashes.

Population is stable, and generally only experiences minor changes year to year. From 2011–2015 the largest change in population share was -2.46%. In fact, the vast majority (92%) of the annual changes for each State from 2011–2015 were within -1% and 1% (see Appendix D: Histograms of Formula Factors Over Time).

The relationship between population and crashes was considered through a comparison of population data from 2011–2014 to crash data from 2012–2015. Population and crashes are positively correlated, with a coefficient of determination (R^2 value) between 0.72 and 0.81, shown for each year in table 4 (see Appendix E: Scatterplots of Factors vs. Crashes for more information).

Table 4. CMV crashes vs. population – coefficient of determination (U.S. Census Estimates 2011-2014 and Motor Carrier Management Information System [MCMIS] Crash Database 2012-2015).

Population Year	Crash Data Year	Population R^2 Value
2011	2012	0.7175
2012	2013	0.764
2013	2014	0.7965
2014	2015	0.809
2015	2016	0.8185

Recommendation 2: A State's population should be one of the five factors that determines the allocation of funding for the Basic Factor Component of the MCSAP formula.

At the time of this report, the preferred data source is the U.S. Census Bureau's population estimates, available in a report titled "Population, population change, and estimated components of population change: April 1, 2010 to July 1, 2016 (NST-EST2016-01)."[5] Data used in formula calculations should be the most current data available at the time of the calculation. If the suggested data source is no longer available at a future date, an equivalent, reliable, and up-to-date source of population data can be substituted.

Recommendation 3: A State's population should be calculated using Annual Population Estimates, from the U.S. Census Bureau, Population Division.

C. Highway Miles

The National Highway System Road Length ("highway miles") is recommended as a factor because the increased presence of highways inherently increases the exposure for crash risk. Public road miles were used as a factor in the previous MCSAP formula, and were considered for this formula. However, highway miles is a preferable factor due to its better correlation with crashes and its stability.

Highway miles are significantly more correlated with crashes than public road miles, with an R^2 value between 0.75 and 0.84, as opposed to between 0.67 and 0.69 for public road miles (see table 5 and Appendix E. Scatterplots of Factors vs. Crashes). This is likely due to the causal relationship between highway miles and CMV traffic, in that CMVs are more likely to travel on highways than any public road.

[5] "Population, population change, and estimated components of population change: April 1, 2010 to July 1, 2016 (NST-EST2016-01)." *United States Census Bureau.* http://www.census.gov/programs-surveys/popest.html

Highway miles are also stable. Considering data from 2011–2014, 72% of States' changes from one year to the next is within +/- 5%. When the change from 2011–2012 is excluded, the percentage of changes within +/- 5% jumps to 93%. This is largely due to an expansion of the National Highway System (NHS) brought about by the Moving Ahead for Progress in the 21st Century Act (MAP-21). Section 1104 of MAP-21 (Pub. Law No. 112-141 [2012]) expanded the NHS to include urban and rural principal arterials that were not included in the NHS before October 1, 2012.[6] This suggests that a count of highway miles is a stable factor, with very little change from year to year except in years when regulatory changes may cause the NHS to expand or contract (see Appendix D. Histograms of Formula Factors Over Time).

The National Highway Freight Network (NHFN)[7] was also considered as a factor due to its possible correlation with CMV crash risk. It was ultimately rejected because it was created too recently, and since there was only one year of data available it could not be reliably evaluated. However, FMCSA should re-evaluate the NHFN in five years for possible inclusion in the formula (see Part III, Section 6F: National Highway Freight Network [NHFN] for more information).

Table 5. CMV crashes vs. road miles and highway miles - coefficient of determination (FHWA Public Road Length, Miles by Ownership [HM-10] 2011-2014, FHWA National Highway System Road Length, Miles by Ownership [HM-40] 2011-2014, and MCMIS Crash Database 2012-2015).

Road/Highway Miles Year	Crash Data Year	Road Miles R^2 Value	Highway Miles R^2 Value
2011	2012	0.6651	0.7548
2012	2013	0.6857	0.8380
2013	2014	0.6672	0.7692
2014	2015	0.6782	0.7516
2015	2016	0.6419	0.8047

<u>Recommendation 4:</u> A State's highway miles should be one of the five factors that determines the allocation of funding for the Basic Factor Component of the MCSAP formula.

At the time of this report, the recommended data source for highway miles is the Federal Highway Administration (FHWA) National Highway System Road Length, Miles by Ownership

[6] "Memorandum: Updated National Highway System Maps." *Federal Highway Administration,* 2012. https://www.fhwa.dot.gov/planning/national_highway_system/nhs_maps/updatenhsgm.cfm
[7] "National Highway Freight Network." *FHWA Freight Management and Operations.* http://ops.fhwa.dot.gov/freight/infrastructure/nfn/index.htm

table (HM-40), which is updated annually.[8] Data used in formula calculations should be the most current data available at the time of the calculation. If the suggested data source is no longer available at a future date, an equivalent, reliable, and up-to-date source of highway miles data can be substituted.

Recommendation 5: A State's highway miles should be calculated using National Highway System Road Length, FHWA Highway Statistics Series.

D. Vehicle Miles Traveled

Vehicle miles traveled (VMT) is recommended as a factor because it accounts for the number of vehicles on the road in a given jurisdiction. Generally speaking, more traffic will increase the risk of CMV crashes.

VMT was used as a factor in the previous MCSAP formula. It should remain a factor due to its stability and high correlation with crashes.

VMT is stable, and 98% of annual changes for each State from 2010 through 2014 were within +/- 5% (see Appendix D. Histograms of Formula Factors Over Time).

There is also a strong correlation between VMT and crashes with an R^2 value between 0.76 and 0.86, shown for each year in table 6 (see also Appendix E. Scatterplots of Factors vs. Crashes).

CMV VMT was also considered but ultimately rejected due to a lack of available data (see Part III, Section 6G: Commercial Motor Vehicle VMT for more information).

Table 6. CMV crashes vs. VMT - coefficient of determination (FHWA Vehicle-Miles of Travel, by Functional System [VM-2] 2011-2014 and MCMIS Crash Database 2012-2015).

VMT Year	Crash Data Year	VMT R^2 Value
2011	2012	0.7632
2012	2013	0.8209
2013	2014	0.8457
2014	2015	0.8555
2015	2016	0.8709

[8] "Highway Statistics Series." *U.S. Department of Transportation/Federal Highway Administration*. https://www.fhwa.dot.gov/policyinformation/statistics.cfm

<u>Recommendation 6:</u> A State's VMT should be one of the five factors that determines the allocation of funding for the Basic Factor Component of the MCSAP formula.

<u>Recommendation 7:</u> A State's vehicle miles traveled (VMT) should be calculated using vehicle miles of travel, by functional system, FHWA Highway Statistics Series.

At the time of this report, the recommended data source for VMT is FHWA's table of vehicle miles of travel, by functional system (VM-2), which is updated annually.[9] Data used in formula calculations should be the most current data available at the time of the calculation. If the suggested data source is no longer available at a future date, an equivalent, reliable, and up-to-date source of VMT data can be substituted.

E. Special Fuel Consumption

Special fuel consumption is recommended as a factor because special fuels are largely consumed by CMVs, so this is a good measure of CMV activity and therefore crash exposure.

Special fuel consumption was used as a factor in the previous MCSAP formula. It should continue to be used due to its high correlation with crashes.

There was some discussion as to whether or not special fuel consumption was an accurate predictor of CMV crash risk due to the fact that the definition of special fuels[10] includes any fuel other than gasoline or gasohol, so this factor could include vehicles that are not regulated by FMCSA. Additionally, fuel taxes vary by State, and there was some initial concern that small States with high fuel taxes would have a low special fuel consumption number due to the fact that CMV drivers would intentionally fuel up in other States. However, it was decided that special fuel consumption should be included due to its strong correlation with CMV crashes.

Special fuel consumption is stable, and generally does not vary widely from year to year. When studied over five years, a State's share of the national special fuel consumption stays within +/- 5% of the prior year's share 76% of the time (see Appendix D. Histograms of Formula Factors Over Time). The relationship between special fuel consumption and crashes was also considered, and there is a strong correlation between special fuel consumption and crashes with an R^2 value between 0.87 and 0.93. The results are shown for each year in table 7, below (see also Appendix E: Scatterplots of Factors vs. Crashes).

[9] "Highway Statistics Series." *U.S. Department of Transportation/Federal Highway Administration.* https://www.fhwa.dot.gov/policyinformation/statistics.cfm

[10] According to the *FHWA Highway Statistics 2014 User Guide*, the term "special fuels" includes all fuels other than gasoline and gasohol. This includes: diesel, kerosene, liquefied petroleum gas (propane), liquefied natural gas, compressed natural gas, E85, and M85. https://www.fhwa.dot.gov/policyinformation/statistics/2014/userguide.cfm

Table 7. CMV crashes vs. special fuel consumption - coefficient of determination (FHWA monthly special fuel reported by States, compiled for the calendar year from State fuel-tax reports [MF-33SF] 2011-2014 and MCMIS Crash Database 2012-2015).

Special Fuel Consumption Year	Crash Data Year	Special Fuel Consumption R^2 Value
2011	2012	0.9322
2012	2013	0.9316
2013	2014	0.9078
2014	2015	0.8743
2015	2016	0.8794

Recommendation 8: A State's special fuel consumption should be one of the five factors that determines the allocation of funding for the Basic Factor Component of the MCSAP formula.

At the time of this report, the recommended data source for special fuel consumption is FHWA's table of Monthly Special Fuel Reported by States, Compiled for the Calendar Year from State Fuel-Tax Reports (MF-33SF), which is updated annually.[11] Data used in formula calculations should be the most current data available at the time of the calculation. If the suggested data source is no longer available at a future date, an equivalent, reliable, and up-to-date source of special fuel consumption data can be substituted.

Recommendation 9: A State's special fuel consumption should be calculated using Monthly Special Fuel Reported by States, Compiled for the Calendar Year from State Fuel-Tax Reports, FHWA Highway Statistics Series.

F. Carrier Registrations

Carrier registrations for interstate carriers as well as intrastate HM carriers should be included in the proposed formula. This new factor aims to account for the additional workload and cost incurred by States that have a high CMV carrier population.

When the previous formula was created, carrier registration data was considered as a factor but ultimately rejected due to a lack of a reliable data source. Since the development of the previous formula better carrier registration data have become available due to the creation of the Unified Carrier Registration (UCR) system in 2005 (UCR Act - 49 United States Code [U.S.C.] section

[11] "Highway Statistics Series." *U.S. Department of Transportation/Federal Highway Administration.* https://www.fhwa.dot.gov/policyinformation/statistics.cfm

14504a), followed by the implementation of the Unified Registration System (URS) in December of 2015.

The FAST Act also required that the new allocation formula include a factor (or factors) that reflect the average of each State's new entrant motor carrier inventory for the 3-year period prior to the date of enactment of the Act. Using carrier registrations as a factor in this formula accurately reflects new entrant inventory. Since the inventory of new entrant carriers is proportional to the number of carriers registered in a State, this factor can serve as a valid proxy for new entrant inventory (see Part III, Section 6B: New Entrant Inventory for more information).

In addition, carrier registrations are both stable and well correlated with crashes. Over the course of five years from 2011–2015, 93% of changes in States' carrier registration shares were within +/- 5%, and there is a strong correlation with CMV crashes (R^2 between 0.80–0.84) (see table 8, Appendix D: Histograms of Formula Factors Over Time, and Appendix E: Scatterplots of Factors vs. Crashes, for more information).

Table 8. CMV crashes vs. carrier registrations – coefficient of determination (June snapshots of interstate and intrastate HM carriers in the MCMIS Database 2011-2014 and MCSMIS Crash Database 2012-2015).

Carrier Registrations Snapshot Year	Crash Data Year	Carrier Registrations R^2 Value
2011	2012	0.7978
2012	2013	0.8172
2013	2014	0.8381
2014	2015	0.8428
2015	2016	0.8574

<u>Recommendation 10:</u> A State's carrier registrations—interstate carriers and intrastate hazardous materials carriers—should be one of the five factors that determines the allocation of funding for the Basic Factor Component of the MCSAP formula.

Carrier registration data can be accessed through FMCSA's Safety Measurement System (SMS) Summary Reports website.[12] The total carrier registrations should be based on the physical state of the carrier, and calculated as the sum of interstate carriers and intrastate HM carriers. Data used in formula calculations should be the most current data available at the time of the calculation, but to support consistency between years, the snapshot used should be from roughly

[12] "Safety Measurement System - Summary Report." *FMCSA Analysis & Information Online.* https://ai.fmcsa.dot.gov/SMS/Tools/Reports.aspx

the same time in the year (e.g., end of June). If the suggested data source is no longer available at a future date, an equivalent, reliable, and up-to-date source of carrier registrations data can be substituted.

Recommendation 11: A State's carrier registrations should be calculated using the snapshot of the number of active interstate and intrastate HM carriers in the Motor Carrier Management Information System (MCMIS) Database (based on MCS-150 data).

G. Minimum Share of Basic Factor Component

In order to provide every State the opportunity to participate in MCSAP, each State should be guaranteed a minimum share of the funding in this component. Based on formula simulation results alone, some States with low crash risk would not receive enough funding to maintain a program that meets the MCSAP requirements. In the absence of a minimum, some States would receive as little as 0.11%–0.40% of Basic MCSAP funds (see Appendix F: Comparison of CMV Crashes vs. Proposed Funding Shares for the projected dollar value impact of including a minimum share). The minimum should be based on a share of overall funds according to this component (as opposed to a set dollar amount) to ensure that the minimum amount would increase and decrease along with the total amount of funding awarded by Congress in a given year. This minimum share will apply only to the portion of MCSAP funding designated for the Basic Factor Component. The minimum share value was carried over from the previous formula (0.44%) because the Working Group could not determine a justifiable reason to change historic values.

Recommendation 12: Each State should receive a minimum of 0.44% of the Basic Factor Component funds.

The minimum share level should be determined based on evidence. At this time, however, there is no strong evidence available. Therefore, FMCSA should conduct a study on this topic and use the findings to refine the minimum share level in the formula at a future date.

Recommendation 13: To provide better evidence for setting the minimum share level, FMCSA should conduct a study to determine the minimum level of funding required to support a CMV safety program that meets the minimum requirements of MCSAP (in both States and Territories). Once completed, the findings of the study should be used to refine the minimum share level in the formula.

H. Maximum Share of Basic Factor Component

The value of the maximum share (4.944%) was carried over from the previous formula. Again, this should be applied to the portion of MCSAP funding designated for the Basic Factor Component of the formula. The purpose of the maximum is to prevent a small number of States from receiving a large portion of the MCSAP funding at the expense of all other States. A maximum funding level is a necessary constraint because without it there would likely not be enough funding remaining for all other States to maintain a CMV safety program. In the absence of a maximum limit, the top three highest-funded States would receive an estimated 23%,

roughly one-quarter, of MCSAP Basic funds (see Appendix F: Comparison of CMV Crashes vs. Proposed Funding Shares for the projected dollar value impact of including a maximum share). The Working Group assessed possible maximum share values and could not determine a justifiable reason to change the historic value.

Recommendation 14: Each State should receive no more than 4.944% of the Basic Factor Component funds.

3. Border Component

The following section contains recommendations pertaining to the Border Component of the proposed MCSAP formula. Since the late 1990s, border enforcement activities have improved the safety of motor carriers and drivers operating CMVs in international commerce. Not only does national safety compel FMCSA to maintain the safety gains from these activities, but Congress has also expressed this goal through legislation. Therefore, the proposed formula allocates a portion of MCSAP Grant funding through a component that specifically focuses on the funding needs of border activities. The details of this calculation and associated recommendations are explained in this section.

FMCSA's BEG program has been merged into MCSAP, so funds that were previously distributed through a competitive grant will now be distributed via a formula.

The BEG was awarded to States to conduct CMV enforcement in and around international borders. The funding was used to support salaries, equipment, travel, and training. It was a competitive program, where applicants competed for funds via applications that outlined program goals and implementation plans. A total of $32 million was distributed through BEG annually.

FAST Act Requirement Addressed in this Section:

> **(4) The number of international border inspection facilities and border crossings by commercial motor vehicles in each State.**
> The proposed formula below complies with this requirement by directly using annual CMV crossings as a data source and by indirectly representing the number of international border inspection facilities by allocating for a minimum level of workforce at each CMV port of entry.

A. Maintain Safety Gains of Existing Border Activities

A goal of the proposed formula is to maintain the valuable safety gains made through effective border enforcement. Border activities are important for national safety, and Congress has expressed this goal through legislation.

Border activities aim to reduce CMV crashes by ensuring that drivers and CMVs involved in international commerce comply with safety standards and regulations. Border activities largely consist of roadside inspections of CMVs at or near border crossings, either at a fixed facility or

as part of a strike force (an enforcement detail at a specific location, typically lasting several days). At most (if not all) ports of entry on the Mexican border, both FMCSA and State enforcement personnel are present to inspect the CMVs crossing the border.

Existing border activities have been effective in improving safety and compliance of motor carriers and drivers operating CMVs in international commerce. Evidence for this can be found in the correlation between increasing border inspection levels with decreasing out-of-service (OOS) rates, especially during the period where the border enforcement program was established in the early 2000s.

A series of audits of the border enforcement program by OIG found that inspection resources at the border improved the condition of Mexican commercial vehicles entering U.S. commercial zones.[13] The vehicle OOS rate for Mexican trucks declined from 40% of inspections in FY 1999 to 23% in FY 2003. Since then, vehicle OOS rates have remained low—in FY 2016, they were 19% for vehicle inspections of Mexican motor carriers. In comparison, the OOS rate for U.S. vehicle inspections in FY 2016 was 20%. This improvement in safety corresponded to the period when border enforcement activities ramped up to address safety concerns regarding cross-border CMV traffic. From 1997–2001, FHWA (FMCSA was formerly a part of FHWA) provided grants to States on the Mexican border to support border enforcement and inspections increased from roughly 40,000 to 140,000. This correlation between increasing border inspections with decreasing OOS rates is evidence of the safety gains of existing border activities.

In support of improving CMV safety at the border, Congress has issued several statutes since the late 1990s that have called for a continued focus on CMV inspections in border areas:

- The note regarding Border Staffing Standards in 49 U.S.C. 31133 calls for a maintenance of a CMV inspection presence in border areas. It was originally passed in 1999 and later amended by the FAST Act in 2015.
- Every DOT Appropriations Act since 2002 (Pub. Law No. 107-87 [2001]) has included Part 350, which sets specific standards for FMCSA's enforcement on cross-border trucking, specifically between U.S. and Mexico.
- In 2005, to improve the standard for safety of international CMV traffic, Congress established the BEG as a standalone program.
- In 2007, Congress required FMCSA to implement a pilot program for Mexican cross-border commercial traffic in section 6901 of Pub. Law No. 110-28.

The legislative intent to maintain the safety gains from existing border activities is clear, so the formula is designed to achieve this goal.

B. Allocation Formula for Border Component

Up to 9.5% of total MCSAP funds should be allocated through the Border Component of the formula to provide funding for border activities nationwide. This amount should be divided

[13] *Audit Reports, Office of the Inspector General,* 1999, 2005. https://www.oig.dot.gov/library-item/30308

among the border States based on their funding needs for border activities, which can be calculated as the relative need for border personnel to oversee international CMV traffic at the ports of entry in the State. This level of complexity is needed in the formula to be sure that funds for border activities are allocated fairly and prudently.

Recommendation 15: 9.5% of total MCSAP funds should be allocated to border States through a component of the formula that specifically focuses on the funding needs of border activities.

FMCSA should maintain the safety gains of border activities by providing for the same level of total spending as in the past. However, to determine the appropriate proportion of total MCSAP funds to allocate towards border activities, FMCSA must consider that the grant restructuring mandated by the FAST Act created a new matching requirement for funds for border activities. This means that to maintain the same level of total spending, the sum of the Federal share and the State share should equal the dollar amount historically given through the BEG. The BEG was $32 million in FY 2016, so the new Federal share to allocate for border activities in the proposed formula (the Border Component) should be 85% of that amount ($27.2 million), which is roughly 9.5% of the total MCSAP funds in FY 2017 ($288.2 million). This calculation is summarized in table 9.

The size of the Border Component should be defined as a share of total funds rather than a specified dollar amount so that it changes proportionally to increases or decreases in overall MCSAP funding. This promotes fairness between the Border Component and Basic Factor Component of the formula (e.g., other MCSAP activities).

Table 9. Calculation of total border allocation.

Row	Calculation Step	Formula	Amount
1	Original Dollar Amount		$32,000,000
2	Federal Share of Funding		85%
3	New Federal Dollar Amount	(1) × (2)	$27,200,000
4	FY 2017 Total Amount (After Takedown)		$288,211,000
5	Federal Dollar Amount as % of FY 2017	(3) ÷ (4)	9.44%
6	% of FY 2017 for Border, Rounded		9.5%

The Congressional intent of the FAST Act is to increase flexibility and improve efficiency for the State administration of grants. Therefore, although funding for border activities is accounted for by the Border Component, actual spending on border activities does not need to align with the Border Component allocation. As long as a State that receives an allocation for border activities maintains a reasonable level of border and other required MCSAP safety activities, as

measured by performance metrics, the allocation amount does not need to, dollar for dollar, align with actual spending on border enforcement activities.

Recommendation 16: A State's share of the Border Component should be based on its share of personnel needed for the ports of entry in that State, with a minimum and maximum limit. It should be calculated as follows:

1. **Sum the personnel need across all ports in a State, and divide by the national total (see Recommendation 17 for how to calculate personnel need at each port).**
2. **Apply minimum and maximum limits—each border State should receive no less than 0.075% and no more than 50% of the Border Component of MCSAP funding.**

Since funding for border activities is mostly used to pay for personnel conducting border activities, the funding should be divided based on relative need for personnel between border States. The need for personnel should be estimated on a port-by-port basis. This calculation is described further in Part III, Section 3C: Border Personnel Needs.

Minimum and maximum limits on the share of border funding are necessary so that funding is available for all border States to participate in the border enforcement program.

Each State that shares a land border with Canada or Mexico should receive a minimum of 0.075% of the Border Component of MCSAP funding. This minimum provides for States that share an international land border but have low or zero ports of entry or CMV crossings to participate in border enforcement activities, at least to a minimum degree. Therefore, a minimum fraction of the Border Component corresponding to roughly $20,000 is afforded to them. This corresponds to roughly 0.075% of a 9.5% Border Component of FY 2017 MCSAP funding.

Each State that shares a land border with Canada or Mexico should receive no more than 50% of the Border Component of MCSAP funding. This maximum limit allows funding for border enforcement activities across all States, rather than allowing funds to be concentrated in just a few States. The anticipated impact based on current data is small, but the provision would promote a balanced program in the future if cross-border traffic patterns or ports of entry were to shift dramatically.

C. Border Personnel Needs

Recommendation 17: The personnel needed at each port of entry should be calculated as follows:

1. **Allocate the minimum required FTE to each port of entry:**
    a. **8 FTE per each Mexican port of entry.**
    b. **0.25 FTE per each Canadian port of entry with more than 1,000 annual CMV crossings.**
2. **Allocate FTE according to CMV crossings (if not already covered by the minimum):**
    a. **25,000 crossings per FTE for Mexican ports of entry.**
    b. **200,000 crossings per FTE for Canadian ports of entry.**

To calculate personnel needs, the formula uses both a ratio of personnel to crossing volume and a minimum limit of personnel per port of entry. This follows the same framework from an OIG report that recommended adequate staffing levels.[14] Both elements are necessary.

More personnel are needed to handle larger volumes of traffic. Since the main output of border enforcement personnel is to perform CMV inspections, there needs to be enough enforcement presence to inspect the CMV traffic in order to have a safety impact. Without enough personnel, CMVs may pass through the border uninspected. The ratio of personnel needed to CMV crossing volume should be determined by the ratio in existing enforcement programs.

The nature of border enforcement operations also requires a minimum limit per port of entry, although the reason differs between Mexican and Canadian borders. Frequently, ports on the Mexican border have fixed inspection facilities. To operate during their open hours, they need to be staffed. This provides the basis for the minimum per port. On the Canadian border, enforcement usually relies on strike forces or occurs further away from the border, where traffic from multiple ports feeds into denser traffic on larger highways. Research was conducted on the typical strike force needs across existing border enforcement programs to determine the minimum acceptable level of enforcement presence for Canadian ports of entry.

It is important to note that ports of entry lower than 1,000 CMV crossings are not included in the minimum for Canadian ports. States did not allocate enforcement resources to ports with such low levels of traffic. These parameters were based on States' FY 2017 Commercial Vehicle Safety Plans—a document that outlines the enforcement activities planned for that year's grant.

Further detail is provided in Appendix G: Calculation of Parameters for Border Component.

Recommendation 18: The annual CMV crossings for each port of entry should be calculated as the sum of truck and bus crossings, based on the Bureau of Transportation Statistics' Border Crossing/Entry Data.

At the time of this report, the preferred data source is the Bureau of Transportation Statistics' Border Crossing/Entry Data.[15] Data used in formula calculations should be the most current data available at the time of the calculation. If the suggested data source is no longer available at a future date, an equivalent, reliable, and up-to-date source of border crossing/entry data can be substituted.

Different organizations may define "port of entry" differently, e.g., two ports of entry may be grouped together as one. The formula should use the same definition for port of entry as this data source.

[14] "Motor Carrier Safety Program for Commercial Trucks at U.S. Borders (Report Number: TR-1999-034)." *Office of the Secretary and Federal Highway Administration*, 1999. https://www.oig.dot.gov/sites/default/files/tr1999034.pdf

[15] "Border Crossing/Entry Data." *U.S. Customs and Border Protection and the Bureau of Transportation Statistics*. https://transborder.bts.gov/programs/international/transborder/TBDR_BC/TBDR_BC_Index.html

D. Border Component Summary

Table 10 summarizes the parameters for the Border Component of the formula. Note that a higher percentage of crossings should be inspected on the Mexican border than on the Canadian border, in order to promote compliance with U.S. safety regulations.

Table 10. Summary of the Border Component formula parameters.

	For States on the Canadian Border	For States on the Mexican Border
CMV Crossings per FTE	200,000	25,000
Minimum FTE per Port of Entry	0.25 (for ports with >1,000 CMV crossings)	8
Minimum Share	0.075%	0.075%
Maximum Share	50%	50%

4. Territory Component

FAST Act Requirements Addressed in this Section:

(1) The relative needs of the States to comply with section 31102 of title 49, United States Code.
This section describes the Working Group's proposal to address the relative needs of the Territories.

(2) The relative administrative capacities of and challenges faced by States in complying with section 31102 of title 49, United States Code.
This section describes how funding will be allocated to the Territories in a way that addresses their unique administrative capacities and challenges.

A. Territory Set-Aside Recommendation and Rationale

Previously, the MCSAP allocation formula funded Territories, with the exception of the Commonwealth of Puerto Rico, at a fixed amount of $350,000 per year in lieu of the standard allocation formula calculation applied to the States. This process was established to provide Territories with sufficient funds to address the CMV safety needs and priorities within these jurisdictions in recognition of the geographic and highway safety challenges presented in these regions. While this fixed monetary amount has aided in improving CMV safety within the

Territories, the use of a fixed amount restricts the ability to allocate funding in a manner that addresses the evolving safety needs of these jurisdictions.

The Working Group examined and discussed the needs of the Territories as compared to States based on the above information. While strong conclusions regarding the use of the Basic Factor Component formula for State funding calculation were established, inclusion of the Territories within the Basic Factor Component was not recommended as the established data sources used for that calculation (FHWA, Census) are not collected for the Territories. Furthermore, the Territories differ from each other in levels of CMV activity, as evidenced by their differing populations and economic factors.

Due to the lack of available data and differing program requirements, it was determined that the Territories' needs would be best served if funding were to be calculated according to an alternate approach in lieu of the previously used "one size fits all" methodology.

The Working Group recommended that 0.65% of overall funds should be set aside for distribution to the Territories by FMCSA as a base formula calculation. The percentage amount (0.65%) was determined by reviewing the Territories' FY 2016 CVSPs, in order to assess necessary program expenses and areas of concern identified by these jurisdictions (e.g., personnel vacancies, lack of equipment, etc.). An estimation of the Territories' funding needs was determined based on their narratives, and 25% was added to this amount to account for future programmatic growth. The resulting sum was approximately 0.65% of the expected FY 2019 funding amount.

It should also be noted that the Territories are not required to provide a match for their Federal MCSAP funding (49 CFR 350.305). This requirement remains unchanged under the FAST Act.

Recommendation 19: 0.65% of total MCSAP funds should be allocated by FMCSA to support and develop CMV safety activities and programs within the Territories (Guam, CNMI, the U.S. Virgin Islands, and American Samoa).

FMCSA should allocate this 0.65% among each Territory based on a thorough review of factors relating to MCSAP reportable statistics, CMV safety performance, and proposed project activities as contained within the individual Territory's CVSP as submitted to FMCSA. This not only allows the amount of funding to increase along with overall funds, but it also allows for the allocation of funding amounts to each Territory based on program performance and specific need.

Recommendation 20: The Territory Component will be distributed among the Territories based on an assessment of program performance, safety goal achievements, and projected activities as provided by the Territories within their respective Commercial Vehicle Safety Plans (CVSP), and subject to a guaranteed annual minimum for each Territory.

A specific guaranteed minimum share for each Territory should be included in these recommendations in order to promote funding reliability and enable participation in MCSAP each year. The minimum share should be determined based on evidence. Unfortunately, at the

time of this recommendation, no data were available for creating an accurate and appropriate minimum share for the Territories. Therefore, no specific minimum share amount is included in this recommendation. FMCSA should determine the minimum share after reviewing program needs and past grant performance.

Recommendation 21: In the short term, FMCSA should determine an appropriate minimum share for each Territory after reviewing program needs and past grant performance. This should only be an interim amount, which will be updated when the study mentioned in Recommendation 13 is completed.

Recommendation 22: FMCSA should conduct a study to determine the appropriate share of funding to provide to Territories as a guaranteed minimum, to ensure that each Territory is able to maintain at least an effective minimal program. It should be determined based on evidence. This study can be part of the similar study on an appropriate minimum share for all States mentioned in Recommendation 13.

Recommendation 23: FMCSA should work towards establishing a method for the Territories to provide the data necessary to be included in the Basic Factor Component of the formula. Once reliable data sources are established, FMCSA should analyze the impacts of incorporating the Territories into the Basic Factor Component of the formula, and should implement that change if it is deemed appropriate.

5. Formula Adjustments

FAST Act Requirements Addressed in this Section:

> **(2) The relative administrative capacities of and challenges faced by States in complying with section 31102 of title 49, United States Code.**
> The new formula will take into account the relative administrative capacities of and challenges faced by States in complying with section 31102 of title 49, United States Code through the implementation of formula adjustments to distribute funds in a way that mitigates large and unexpected losses or gains in funding year to year.

A. Hold-Harmless Provision

Recommendation 24: In a given year, each State should receive no less than 97% of their prior year's share of MCSAP funding. This should not apply to Territories.

As discussed in Part II, Section 3E: Promotes Stability in Funding, it is critical for States to be able to plan their workforce in a strategic and organized way.

The recommended factors have been historically stable over time, which avoids large swings in funding from year to year. In addition to this inherent stability, a hold-harmless provision aims to further protect States from experiencing significant and unpredictable losses. To limit the effect of losses, a hold-harmless provision of 97% of the prior year's funding share should be included

in the formula calculation. For example, a State that receives 1% of the total MCSAP funding can receive no less than 0.97% of the MCSAP funding the next year.

The hold-harmless provision should be based on share rather than dollar amount to avoid scenarios where it would be mathematically impossible to institute a monetary hold-harmless (if overall funding decreases dramatically).

When developing the interim formula, States reported that they would be able to budget and prepare for losses up to 3%, and any loss beyond that amount would be harmful to their programs. Therefore, a 97% hold-harmless provision would allow States to adequately prepare for losses.

A research report published by the NRC helps illustrate the conflicting goals of a formula that is both stable and also reacts to changing needs in States.[16] Ultimately, the ability for States to plan and budget effectively, and the protection from large, unanticipated losses is more important than the formula's ability to respond quickly to changing needs in States. The provision also mitigates the effects of an isolated, one-year data fluctuation.

This hold-harmless provision should be applied to a State's total MCSAP share, including the amount allocated for border activities. Additionally, this constraint should be applied in the first year that the new formula is implemented because stability of funding is just as important during the transition to the new formula.

B. Cap

<u>Recommendation 25:</u> In a given year, each State should receive no more than 105% of their prior year's share of MCSAP funding. This should not apply to Territories.

In addition to the hold-harmless provision, there should also be a cap on the year-to-year growth in funding that a State may experience. This will provide an additional measure of stability to States. The growth of a State's share of funding should be limited to 105% of the prior year's share. For example, a State that receives 1% of the total MCSAP funding can receive no more than 1.05% of the MCSAP funding in the next year.

The rationale for a share-based cap is to avoid scenarios where it would be mathematically impossible to institute a monetary cap (if overall funding increases dramatically).

A hold-harmless adjustment should not be implemented in the absence of a cap. If decreases are being limited, then increases should be limited as well to mitigate the "ratcheting" effect (the steady and irreversible upward trend) discussed in the NRC report.

This cap should be applied to a State's total MCSAP share, which includes the amount allocated for border activities. Additionally, this constraint should be applied in the first year that the new

[16] *Statistical Issues in Allocating Funds by Formula,* 2003. https://www.nap.edu/catalog/10580/statistical-issues-in-allocating-funds-by-formula

formula is implemented because stability of funding is just as important during the transition to the new formula.

C. Reallocation

Any unallocated funds from the Territory and Border Components should be reallocated to participating States according to the Basic Factor Component. There are several cases where funds may be unallocated:

1. The combined allocation for all Territories is less than the maximum amount set aside for them (0.65% of overall MCSAP funds).
2. A border State forfeits its allocation calculated through the Border Component by not conducting the required border activities.

Recommendation 26: Reallocate unused funds from the Territories to States according to the Basic Factor Component.

Recommendation 27: Reallocate unused funds from the Border component to States according to the Basic Factor Component.

6. Elements Considered and Rejected

FAST Act Requirements Addressed in this Section:

(3) The average of each State's new entrant motor carrier inventory for the 3-year period prior to the date of enactment of the FAST Act.
The Working Group considered including new entrant motor carrier inventory as a factor, but decided instead to include carrier registrations. Although new entrant motor carrier inventory is not included in the proposed formula, the FAST Act called for "factors that reflect" new entrant inventory, and the number of carrier registrations in each State accurately reflects new entrant inventory for that State because new entrants are a subset of carrier registrations, and the proportion of new entrants within a State's carrier registration population is relatively consistent from State to State (see Part III, Section 6B: New Entrant Inventory for more information).

(5) Any other factors the Secretary considers appropriate.
The Working Group does not recommend any additional factors. The group considered many other factors and formula characteristics, and ruled them out based on the rationale presented in this section.

A. Incentive Formula

Incentive-based allocations should be eliminated in favor of a risk-based and consistent formula, in alignment with the goals of the Working Group and the FAST Act. Funding can have a greater safety impact by allocating it to recipients who need it to address safety issues, rather than when it is used as an incentive for certain program areas.

Non-performance or non-compliance issues should be addressed through FMCSA's grants management, and not through grant allocation. Through the FAST Act, Congress increased FMCSA's flexibility to enforce requirements for participation in MCSAP. Therefore, the need to use the allocation formula to enforce such requirements has diminished.

Furthermore, the existing program-oriented incentive factors are no longer relevant. In the past, they have helped improve compliance in certain program areas (especially data quality), but those areas are no longer the focus for improvement (almost all States have good data quality now). Furthermore, the FAST Act expanded MCSAP participation requirements so that program aspects that previously required incentivizing are now basic participation requirements, and can thus be addressed through grants management.

Funding needs to be consistent in order to be used effectively. The past Incentive formula was inconsistent, especially the crash reduction factors in small States. The funding made available during these fluctuations was difficult for States to spend effectively since they could not be depended upon to support the program in the future.

Factors that were considered for an incentive portion but ultimately were rejected for the aforementioned reasons include: reduction in crashes and/or crash rate, data quality measures, and new entrant on-time audit rate.

B. New Entrant Inventory

New entrant safety audits are a new requirement under MCSAP due to the FAST Act changes, and the additional workload should be accounted for in the formula. While using new entrant inventory as a factor could account for this workload, the Working Group determined that it is better to use carrier registrations. Carrier registrations not only correlates well with new entrant inventory, it also is a better formula factor overall because of its reliability, and correlation with crash risk and stability, as mentioned earlier in Part III, Section 2F: Carrier Registrations.

New entrant inventory is extremely well correlated with carrier registrations. New entrant inventory and carrier registrations were compared over a five-year period using a mid-year snapshot of the MCMIS database from each year. Each year, new entrants make up roughly 11-12% of the national carrier population (see table 11 for a summary of the five-year analysis, and figure 1 for the scatter plot of the 2015 data). Because of this extremely high correlation and because new entrants are a subset of carrier registrations, if the formula were to include both carrier registrations and new entrant inventory, the new entrant inventory would essentially be double-counted in the formula. Furthermore, the FAST Act did not strictly require that new entrant inventory be used as a factor. Instead, it called for factors that reflect new entrant inventory, and the carrier registrations factor undoubtedly meets that requirement.

Additionally, the metric referenced in the FAST Act is "the average of each State's new entrant motor carrier inventory for the 3-year period prior to the date of enactment of the FAST Act." The FAST Act was signed in December of 2015. This would keep the new entrant inventory factor stagnant every year that this new formula will be in use, instead of adapting to changes in the numbers of carriers in each State. The use of a static three-year inventory was considered and

deliberated by the Working Group, but the recommendation is to instead use a single year of carrier registrations data, which updates each year. Using a static factor has negative impacts on responsiveness. For example, use of 1997 road miles as a stagnant factor in the previous formula neglected to effectively meet the needs of States with growing infrastructures, and therefore any factors used in the formula should adapt to meet States' changing needs over time.

Table 11. R^2 values for carrier registrations vs. new entrant inventory (MCMIS Database 2011-2015).

Year	R^2 Value	Percent of Carrier Registrations that Are New Entrants
2011	0.9068	12.3%
2012	0.9313	12.4%
2013	0.9406	12.0%
2014	0.9579	11.6%
2015	0.9673	11.3%

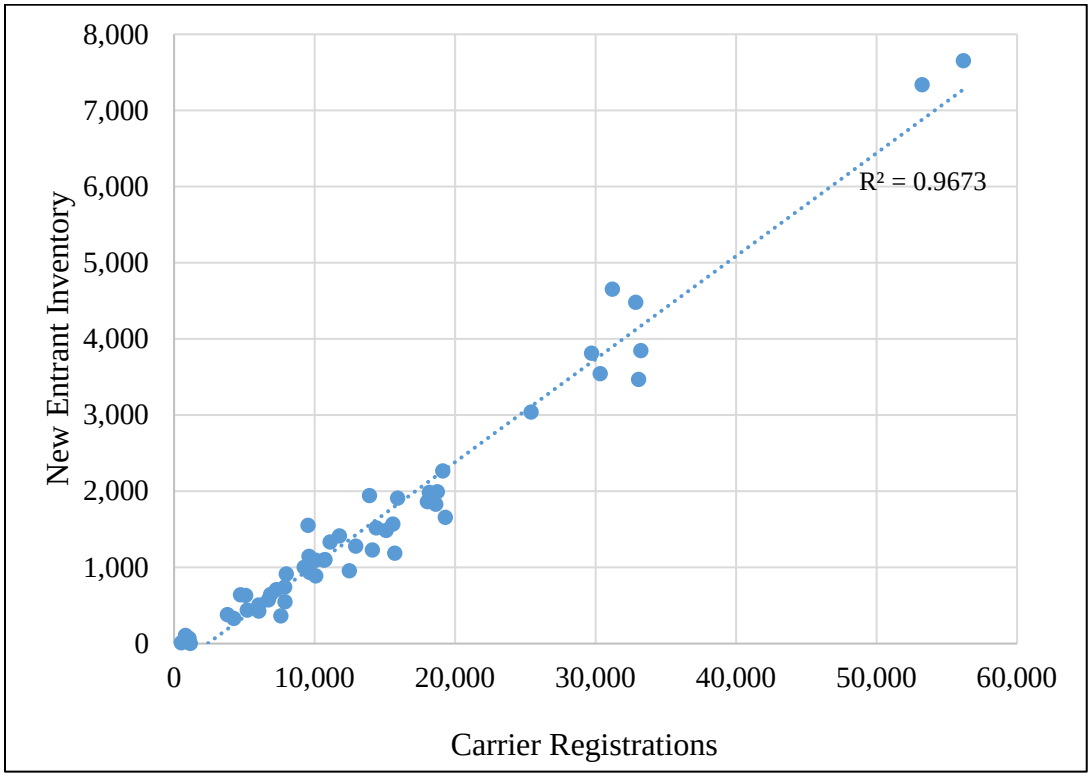


Figure 1. 2015 carrier registrations vs. new entrant inventory (MCMIS Database 2011-2015).

C. CMV Crashes as a Factor

CMV crashes are one direct measure of the CMV safety risk in a State. However, using CMV crashes as a factor in the allocation formula has undesired impacts, such as punishing States for having an effective CMV safety program that reduces crashes. Instead of allocating funding based on the number of crashes, funding should be allocated based on factors that indicate a State's level of underlying crash risk (see Part III, Section 2: Basic Factor Component).

There are multiple reasons why a State may have a high number of CMV crashes. One reason, which the proposed formula aims to address, is that the State may have a high underlying crash risk based on certain characteristics of that State. Another factor to consider is the role of Federal and State enforcement in that State. Even if the underlying crash risk is high, Federal and State enforcement may be effectively keeping the number of crashes low. Although using crashes as a factor would generally allocate money towards States with a high crash risk, it would also essentially penalize States for having strong safety programs.

To illustrate this concept, consider a hypothetical example where State A and State B have the same underlying crash risk, but fewer CMV crashes occur in State A than State B because State A's effective CMV safety programs prevented a large number of them. In this example, using CMV crashes as a factor would negatively impact State A by reducing their grant funding as a result of their program's effectiveness.

D. High-Risk Carrier Population

One method the Working Group considered to estimate safety risk in a State is to count the number of high-risk motor carriers domiciled in the State, since FMCSA already has a method to identify them. However, the number of high-risk motor carriers in each State should not be used as a factor in the allocation formula because it is not stable enough.

On an ongoing basis, FMCSA uses roadside performance data and investigation results to identify carriers that pose the greatest safety risk—so-called "high-risk carriers." Using this as a factor in the formula could potentially improve the formula's correlation with crash risk by accounting for the safety posture of carriers in that State.

However, it is not stable enough to be used as a formula factor. The criteria for identifying high-risk carriers change over time, most recently in 2016. More importantly, there are not many high-risk carriers in some States—small States can have 0 to 5 high-risk carriers at any given time—and the natural variation in these small numbers would lead to large year-to-year percentage variations in this formula factor.

Additionally, high-risk carriers are not confined to operate only within their State of domicile, and therefore the concentration of high-risk carriers in a State does not necessarily reflect the crash risk within that State. Although it may seem that this same logic could be applied to carrier registrations since carriers registered in a State may operate elsewhere, there is a reliable and accurate data source for carrier registrations that has demonstrated a strong correlation with crash risk within the State of domicile (see Part III, Section 2F: Carrier Registrations). High-risk

carriers are not as highly correlated with crash risk within their State of domicile, most likely due to the limited number of them, and therefore high-risk carrier population was not recommended for use in the proposed formula.

E. Different Weights for Each Factor

The formula's correlation with crashes could theoretically be improved if different weights for each factor in the Basic Factor Component were allowed. However, the improvement would be negligible and the added complexity would be difficult to justify.

To determine optimal weights for each factor, a linear regression analysis was conducted based on 2014 factor data and 2015 crashes. Although each of the basic factors correlates well with crashes when examined independently, linear regression shows how well each of the factors predicts crashes in the presence of the other factors. The regression analysis provides a formula with coefficients for each factor. The resulting formula had a R^2 value of 0.95, which is only a slight improvement over the unweighted formula ($R^2 = 0.91$).

Ultimately, an evenly weighted formula is preferable for the following reasons:

- The regression analysis showed that only a minor improvement is possible.
- The results of the regression analysis are subject to change in future years as the data continues to change. By weighting the factors, FMCSA would be creating a formula that is too precise to adapt to future data changes.
- If one factor were to be weighted more or less, it would be important to have a strong, justifiable reason to do that. Given the current data and the aforementioned analysis, no such reason exists.
- Including multiple, evenly weighted, and stable factors increases the formula's stability (if one factor changes drastically the other four will serve as a stabilizing force).

F. National Highway Freight Network (NHFN)

The National Highway Freight Network[17] was considered as a factor, either to replace highway miles or to be averaged with highway miles. However, this factor was rejected due to the fact that it was created in December of 2015 when the FAST Act was enacted, and has only been in existence for a little more than one year at the time of this recommendation. Additionally, the Working Group noted that fatality rates by class of highway system are lowest on the interstates and highest on rural roads and six other classes of roadways.[18] Because it is a more restrictive

[17] "National Highway Freight Network." *FHWA Freight Management and Operations.* http://ops.fhwa.dot.gov/freight/infrastructure/nfn/index.htm; for additional reference see section 1116 of FAST Act (Guidance and Q&A) and/or 23 U.S.C. 167

[18] According to FMCSA's "Large Truck and Bus Crash Facts 2014," approximately 61% of all fatal crashes involving large trucks occurred on rural roads and 26% on rural or urban Interstate highways. https://www.fmcsa.dot.gov/safety/data-and-statistics/large-truck-and-bus-crash-facts-2014

definition than highway miles, using the NHFN as a formula factor would give more weight to safer classes of roads.

Recommendation 28: FMCSA should re-evaluate the National Freight Highway Network in five (5) years to see if the data is stable and high quality, and reconsider its use in the formula.

G. Commercial Motor Vehicle VMT

The Working Group considered but ultimately rejected CMV VMT as a factor due to a lack of available and reliable data nationwide. If a reliable data source becomes available, CMV VMT should be evaluated and considered for use in lieu of the proposed all-vehicle VMT factor to more accurately reflect the amount of CMV traffic in each State.

Recommendation 29: FMCSA should evaluate and consider using CMV VMT in lieu of VMT if better data becomes available.

H. Cost of Operating a CMV Safety Program

The Working Group considered ways to incorporate into the formula various costs associated with operating a CMV safety program, because these costs (such as labor or equipment) can vary from State to State. Therefore, the same amount of MCSAP funding has different relative amounts of spending power in different States. Ultimately, it was determined that there were no data sources consistent and reliable enough to account for variances in program cost in the formula. However, in the interest of CMV safety, FMCSA should conduct a study on program costs funded through MCSAP and incorporate it into the formula at a future date, if appropriate.

Two types of costs were studied in detail: salaries, and operations and maintenance (O&M) costs. Differences in salaries between States were considered at length, since salaries constitute a majority of program costs funded through MCSAP and can vary widely among States. A stipend-based approach was considered to account for other program costs, such as O&M of information technology systems. O&M costs were a topic of concern because they were changing significantly due to the consolidation of PRISM and SaDIP grants into MCSAP under the FAST Act.

The Working Group considered ways to incorporate the relative cost of salaries into the formula, because the cost of labor and equipment can vary significantly from State to State. To address this, the Working Group looked at including a cost of living factor. Cost of living typically refers to the average cost of food, housing, and other commodities in a given locale. Data sources examined for possible inclusion of cost of living included Regional Price Parities and mean hourly wages published by the Bureau of Labor Statistics. However, no existing cost of living indices accurately reflect the cost of running a CMV safety program in each State, since the cost of food, clothing, and housing have little to do with the salaries of personnel funded through MCSAP.

After much research, it was determined that there is no consistent, reliable data source to measure the varying costs of labor and equipment as funded through MCSAP. Although cost of living indices exist for the general labor force, it was determined that due to the differences in the way programs are organized in each State there was no viable data source to accurately represent different costs of labor in each State.

A stipend-based approach to account for specific program costs, such as O&M, was considered but rejected due to a lack of data. A stipend-based approach would have allocated funds to States to cover program costs. Since O&M costs vary between States depending on whether O&M is performed by the MCSAP Lead State Agency or a sub-grantee, such a stipend-based approach would mitigate the variances between States.

Ultimately, research showed that such costs are impractical to measure accurately and account for in the formula. There is no consistent and reliable data source across all States that measures the money spent on activities with this level of detail, especially since the categorization of costs by these activities is not consistent. The effort and complexity involved to accurately estimate them makes it impractical to include in the formula. The proposed formula, which allocates funding based on CMV crash risk by jurisdiction, should provide sufficient funding and spending flexibility to cover such costs.

Recommendation 30: FMCSA should conduct a study to determine how to account for MCSAP costs in the allocation formula and, if appropriate, update the formula to do so.

I. Other Rejected Factors

In the initial Working Group meetings, the Working Group discussed and deliberated other factors, which were ultimately rejected. These factors and the reason they were not included in the proposed formula can be found in the table below.

Table 12. Additional factors considered and rejected.

Factor(s) Considered	Reason(s) Rejected
Number of Logistics Hubs	Impact on CMV crash risk is too convoluted to use in the formula, and there is no reliable data source to identify them.
Weather, Geography, and State of Infrastructure	While these factors may have an impact on CMV crash risk (e.g., icy roads or rough terrain could increase crash risk), these factors are difficult to quantify and use in the formula.
Number of Commercial Motor Vehicles	Data quality concerns: MCMIS relies on carrier input and intrastate carriers are not consistently recorded.

Factor(s) Considered	Reason(s) Rejected
Traffic Density/Congestion (e.g., Vehicles per Mile per Lane)	The five proposed formula factors already reflect the amount of CMV traffic in a State, so this factor would be redundant. Additionally, crash risk may actually be lower in high-congestion States if traffic is moving at a slower pace (e.g., Massachusetts consistently has a low fatality rate). Furthermore, VMT and Highway miles are readily available from FHWA, whereas traffic density is not.
Commercial Driver's Licenses	No additional value added by this factor; carrier registrations provide a measure of workload and crash risk.
Foreign Carrier Registrations	This was considered for the Border Component, but the data is not reliable and it is not an accurate indicator of crash risk posed by international CMV traffic.
Foreign Domiciled Crashes	Due to most Mexican carriers' restrictions to only travel within commercial zones, the number of foreign domiciled crashes does not accurately reflect the risk mitigated by border activities.
Ability to Spend	This factor is difficult to quantify and include in a formula. Additionally, there was concern that this strategy could negatively and unfairly impact States' safety programs. (If a State has trouble spending their funding in one year, that doesn't necessarily mean they would have the same issues the following year.

Factor(s) Considered	Reason(s) Rejected
MCSAP Activities (Traffic Enforcement, Compliance Reviews, Number of Citations to CDL Holders, etc.), New Entrant Activities, and BEG Activities	These factors were all considered and rejected because they are MCSAP outputs and they should not be treated as formula inputs. States are required to do certain activities with their MCSAP funding, and the quantity of these output activities should not reflect their funding levels for the following years. This has the potential to negatively impact States' safety programs (e.g., if the number of activities decreases, the funding will decrease, which could cause activities to further decrease, causing the safety program to continue shrinking indefinitely). By not including these factors this also allows States the flexibility to set their own goals and priorities.

7. Formula Calculation

This section explains how to implement a formula that meets the requirements laid out above. The goal is to explain the proposed formula in unambiguous detail, and provide more concrete explanation of how the formula would work so that it can be implemented as the Working Group envisioned it.

The allocations should be calculated in the following steps:

1. Territory Component
    a. Allocate dollar amounts to each Territory.
    b. Set aside any leftover funds for reallocation.
2. Border Component
    a. Calculate each State's share of the border workforce need ("border share") (see Part III, Section 3: Border Component for more details).
    b. Apply minimum and maximum limits on each State's **border share**. As funds become available (or deficient) due to imposing these limits on certain States, adjust the border shares of the other non-limited States to compensate. Make such adjustments proportionally with those States' **border share**.
    c. If any States are excluded from the Border Component, set those States' shares aside for reallocation according to the Basic Factor Component.
3. Basic Factor Component
    a. Calculate each State's average of its shares of each of the five basic factors ("basic factor share").

   b. Apply minimum and maximum limits on each State's **basic factor share**. As funds become available (or deficient) due to imposing these limits on certain States, adjust the basic factor shares of the other non-limited States to compensate. Make such adjustments proportionally with those States' **basic factor shares**.
4. Reallocation
   a. Calculate the total amount to reallocate (the sum of unused Territory and border funds).
   b. Distribute that total to all States proportionally with their basic factor shares.
5. Hold-Harmless and Cap
   a. Calculate each State's share of total MCSAP funds by adding up their border share, basic factor share, and reallocation share, taking into account the amount of funding reserved for each component.
   b. Calculate each State's total share in the previous year, which will be the basis for the hold-harmless and cap limits.
   c. Apply hold-harmless and cap limits on each State's **total share**. As funds become available (or deficient) due to imposing these limits on certain States, adjust the total shares of the other non-limited States to compensate. Make such adjustments proportionally with those States' **total shares**.
      i. Note that enforcing hold-harmless or cap limits may sometimes lead to violating the minimum and maximum limits for either the basic factor or border shares. This is the intent of the design, since the hold-harmless and cap limits are more important to adhere to.

Reductions in MCSAP funding due to non-participation should be calculated separately from the allocation formula described above. A proportional reduction in a State's MCSAP funding can be calculated after the above steps, with the unused amount reallocated proportionally to the other States.

For each State, the amounts listed below should be calculated as intermediate steps of the formula. There are no intermediate steps for the Territories because the allocation amount is directly assigned.

1. Border Component:
   a. Share of border workforce need.
   b. Whether minimum or maximum limits are applied.
   c. Whether the State is excluded from border funding.
   d. Final share of Border Component, for the State or for reallocation.
2. Basic Factor Component:
   a. Average of the State's share in each of the five basic factors.
   b. Whether minimum or maximum limits are applied.
   c. Final share of Basic Factor Component.
3. Total Share:
   a. Contribution of Border Component to total share.

b. Contribution of Basic Factor Component to total share.
c. Contribution of reallocation component to total share.
d. Previous year's total share.
e. Whether hold-harmless or cap limits are applied.
f. Final share of total MCSAP Grant funding.

IV. FORMULA EVALUATION

1. How the Formula Meets Key Considerations

Multiple rigorous analyses were conducted to confirm that the proposed formula is in fact a good formula that satisfies the goal of allocating funding to the States that need it most based on crash risk and border enforcement activities. Through all of these analyses, the proposed formula continued to show that it directs funding to the highest crash risk States.

A. Evaluation of Expected Changes and Impacts

With the adoption of this proposed formula, States should expect some changes to their current funding amounts. The hold-harmless provision and cap aim to alleviate drastic changes in the first year, but States may experience gradual changes over the first several years until they reach the funding level proposed by the formula. There are several key reasons why a State's funding levels may change, which are explained below.

Updating 1997 Road Miles to Current Year Highway Miles

The previous formula used 1997 road miles as a factor. This factor remained stagnant regardless of the year. Simply updating the data to use the current year's public road miles would cause significant changes in some States. Furthermore, this factor would not only be updated but the metric would also change from public road miles to highway miles. This change would also create fluctuations in funding in some States, but since highway miles are better correlated with crashes, these changes are justified.

Carrier Registrations

Including carrier registrations as a factor would cause changes in some States since this factor is new to the formula. Carrier registrations is highly correlated with CMV crashes and is also stable, so it's not surprising that adding the carrier registrations factor supports the goal of allocating more funding to higher crash risk States.

Incorporating Competitive Funds into a Formula

Previously, New Entrant and Border Enforcement grant funding were allocated to States on a competitive basis. Therefore, there were often wide swings in funding from year to year based on the quality of a State's application, changes in FMCSA administrative practices, and funding changes intended to correct for a prior year's over-funding or under-funding. Furthermore, some States that did not previously conduct new entrant safety audits will now be required to do so in order to receive MCSAP Grant funding.

By incorporating these previously application-based grants into a formula, these funding allocations will now be based on data instead of an application process. For this reason, there may be some initial changes from the current funding levels, but any changes in the first year will be limited to a manageable level because of the hold-harmless provision and cap. The

formula will eventually be more stable than competitive funding because it will be responsive to changes in data sources that are relatively stable (carrier registrations, CMV border crossings, and ports of entry).

Absence of Incentive Funding

The previous formula included an Incentive portion in addition to the Basic formula. However, the proposed formula does not include an Incentive portion because, as discussed in Part III, Section 6A: Incentive Formula, funding can have a greater safety impact by allocating it to recipients who need it to address safety issues, rather than when it is used as an incentive for certain program areas. This will inevitably result in some funding changes, though these funding changes are justified because they align with the goal of the Working Group to allocate funding based on need.

Hold-Harmless Provision and Cap

The application of a hold-harmless provision and cap also has the potential to impact States' funding. The impacts will likely be more substantial in the first year of the new formula, and it may take several years for the formula to reach its "steady state" where it is no longer impacted by the previous formula's results.

After the initial change to the new, proposed formula, the hold-harmless provision and cap will continue to impact States. In order to better understand this impact, hypothetical funding shares were calculated based on the proposed formula, using historical data from 2011 through 2014. The number of States limited by the hold-harmless provision and cap each year is shown in table 13, below.

Table 13. Count of States limited by the hold-harmless provision and cap.

Year	Number of States Limited by Hold-Harmless Provision	Number of States Limited by Cap
2012	11	2
2013	6	1
2014	3	1

In general, the hold-harmless provision and cap only limit a small number of States each year since the formula factors are inherently stable. The reason a larger number of States were affected in 2012 is a result of the expansion of the NHS brought about by MAP-21, which was discussed in Part III, Section 2C: Highway Miles. This caused the highway miles factor to vary much more widely than in most years. Of the 11 States limited by the hold-harmless provision in 2012, only six are limited again in 2013, and only two of those States continue to be limited in the following year (and a new State is limited in 2014).

In addition to the MAP-21 definition change, some States experienced isolated changes to their factors. The two States most dramatically impacted by the hold-harmless provision and cap (Commonwealth of Puerto Rico and South Dakota) had major changes to one of their factors (special fuels and highway miles, respectively).

These simulations demonstrate that the hold-harmless provision succeeds in mitigating the impacts of unexpected changes in factors, whether the changes are limited to one isolated State or even in the event of a nationwide definition change. The fact that most States are only limited for a year or two indicates that the hold-harmless provision and cap will most likely not interfere with the formula's ability to reflect changes in a State's crash risk.

B. Is Funding Directed to the States that Need It the Most?

A key consideration for the new formula is whether the funding is being directed to the States that need it the most. To answer that question, the Working Group first considered the five proposed factors to see if they were diverting funds to low crash risk States at the expense of States with a high crash risk.

The share of the Basic Factor Component was calculated by determining each State's share of each of the five factors, and then averaging the five shares evenly to get a total Basic Factor Component share. Then, the States were ranked in order of Basic Factor Component share (high to low), and the resulting list was compared to the crash rank for each State based on the three-year crash average (2013-2015). The results are shown in Appendix F: Comparison of CMV Crashes vs. Proposed Funding Shares, and the table shows that the top crash States are also the States that receive the highest shares of funding using the proposed Basic Factor Component.

Once the Working Group determined that the five, evenly weighted factors were a justifiable way of allocating funds to the highest risk States, they analyzed the funding changes that occurred at each step in the formula calculation. Appendix F: Comparison of CMV Crashes vs. Proposed Funding Shares shows the hypothetical allocation of FY 2017 dollars at each stage in the formula calculation. Through each stage in the calculation, the proposed formula continues to direct funding to the States with the highest crash risk, which confirms that the proposed formula does direct funding towards the States that need it the most.

2. Future Considerations

The allocation formula should continually improve as advances are made in data and in best practices for promoting CMV safety. During the process of developing the proposed formula, the Working Group identified three areas for future consideration that would improve the allocation formula. These recommendations appeared earlier in this document during the discussion of the pertinent topic, and are repeated here for clarity.

- Recommendation 13: To provide better evidence for setting the minimum share level, FMCSA should conduct a study to determine the minimum level of funding required to support a CMV safety program that meets the minimum requirements of MCSAP (in both States and Territories). Once completed, the findings of the study should be used to refine the minimum share level in the formula.
- Recommendation 22: FMCSA should conduct a study to determine the appropriate share of funding to provide to Territories as a guaranteed minimum, to ensure that each Territory is able to maintain at least an effective minimal program. It should be determined based on evidence. This study can be part of the similar study on an appropriate minimum share for all States mentioned in Recommendation 13.
- Recommendation 23: FMCSA should work towards establishing a method for the Territories to provide the data necessary to be included in the Basic Factor Component of the formula. Once reliable data sources are established, FMCSA should analyze the impacts of incorporating the Territories into the Basic Factor Component of the formula, and should implement that change if it is deemed appropriate.
- Recommendation 28: FMCSA should re-evaluate the National Freight Highway Network in five (5) years to see if the data is stable and high quality, and reconsider its use in the formula.
- Recommendation 29: FMCSA should evaluate and consider using CMV VMT in lieu of VMT if better data becomes available.
- Recommendation 30: FMCSA should conduct a study to determine how to account for MCSAP costs in the allocation formula and, if appropriate, update the formula to do so.

V. CONCLUSION

The Working Group recommends the proposed formula described herein without reservation. The Working Group is confident that the proposed formula not only meets all of the Congressional requirements set forth in section 5106 of the FAST Act, but it also aligns with the Working Group's goal to address the safety and administrative needs of the States by responding to crash risk while also providing stability.

The Working Group was comprised of a wide mix of stakeholders and expertise, including representatives of different States and safety advocates, across many FMCSA departments, to ensure that this proposed formula was built by a partnership of all stakeholders impacted.

The Working Group developed this formula through an organized and thoughtful process over the course of 12 months. Over this time, the current formula was analyzed, potential changes were recommended and deliberated, the impacts of proposed changes were evaluated, and the Working Group ultimately agreed to the formula set forth in this recommendation.

The Formula Working Group was designated to formally exist for 12 to 18 months, to encompass the period of formula development, although members may also be called upon to provide input and feedback as part of the Working Group after it submits its recommendations to the U.S. DOT Secretary for approval; this period may also encompass the development of the subsequent Part 350 notice of proposed rulemaking.

In conclusion, the MCSAP Formula Working Group respectfully submits these recommendations for the development of the new MCSAP allocation formula to the Office of the Secretary of Transportation for consideration.

APPENDICES

Appendix A. MCSAP Working Group Members

Name	Organization
Nancy Anne Baugher	*FMCSA*
Lt. Donald Bridge, Jr.	*Connecticut Department of Motor Vehicles*
Caitlin Cullitan	*FMCSA*
Lt. Thomas Fitzgerald	*Massachusetts State Police*
Adrienne Gildea	*Commercial Vehicle Safety Alliance (CVSA)*
Thomas Liberatore*	*FMCSA*
Michelle N. Lopez	*Colorado State Patrol*
Alan R. Martin	*Ohio Public Utilities Commission*
Dan Meyer	*FMCSA*
Lt. Brent Moore	*Georgia Department of Public Safety*
Stephen C. Owings**	*Road Safe America*
Capt. Brian Preston	*Arizona Department of Public Safety*
John E. Smoot	*Kentucky State Police*
Courtney Stevenson	*FMCSA*
Col. Leroy Taylor	*South Carolina Department of Public Safety*

*Thomas Liberatore, Chief, State Programs Division, served as the committee chairperson and Designated Federal Officer (DFO).

**Stephen C. Owings voluntarily withdrew from the Working Group in February 2017 due to a lack of schedule availability. He contributed to formula design discussions but was unavailable to review this final report. We thank Mr. Owings for his time and effort on this critical project.

Appendix B. Full List of Recommendations

Basic Factor Component

Recommendation 1: 89.85% of total MCSAP funds should be distributed proportionally to the 50 States, the District of Columbia, and the Commonwealth of Puerto Rico according to crash risk, which is determined by five equally-weighted factors as defined by recommendations 2 through 11.

Recommendation 2: A State's population should be one of the five factors that determines the allocation of funding for the Basic Factor Component of the MCSAP formula.

Recommendation 3: A State's population should be calculated using Annual Population Estimates, from the U.S. Census Bureau, Population Division.

Recommendation 4: A State's highway miles should be one of the five factors that determines the allocation of funding for the Basic Factor Component of the MCSAP formula.

Recommendation 5: A State's highway miles should be calculated using National Highway System Road Length, FHWA Highway Statistics Series.

Recommendation 6: A State's VMT should be one of the five factors that determines the allocation of funding for the Basic Factor Component of the MCSAP formula.

Recommendation 7: A State's vehicle miles traveled (VMT) should be calculated using vehicle miles of travel, by functional system, FHWA Highway Statistics Series.

Recommendation 8: A State's special fuel consumption should be one of the five factors that determines the allocation of funding for the Basic Factor Component of the MCSAP formula.

Recommendation 9: A State's special fuel consumption should be calculated using Monthly Special Fuel Reported by States, Compiled for the Calendar Year from State Fuel-Tax Reports, FHWA Highway Statistics Series.

Recommendation 10: A State's carrier registrations—interstate carriers and intrastate hazardous materials carriers—should be one of the five factors that determines the allocation of funding for the Basic Factor Component of the MCSAP formula.

Recommendation 11: A State's carrier registrations should be calculated using the snapshot of the number of active interstate and intrastate HM carriers in the Motor Carrier Management Information System (MCMIS) Database (based on MCS-150 data).

Recommendation 12: Each State should receive a minimum of 0.44% of the Basic Factor Component funds.

Recommendation 13: To provide better evidence for setting the minimum share level, FMCSA should conduct a study to determine the minimum level of funding required to support a CMV safety program that meets the minimum requirements of MCSAP (in both States and Territories). Once completed, the findings of the study should be used to refine the minimum share level in the formula.

Recommendation 14: Each State should receive no more than 4.944% of the Basic Factor Component funds.

Border Component

Recommendation 15: 9.5% of total MCSAP funds should be allocated to border States through a component of the formula that specifically focuses on the funding needs of border activities.

Recommendation 16: A State's share of the Border Component should be based on its share of personnel needed for the ports of entry in that State, with a minimum and maximum limit. It should be calculated as follows:

1. Sum the personnel need across all ports in a State, and divide by the national total (see Recommendation 17 for how to calculate personnel need at each port).
2. Apply minimum and maximum limits—each border State should receive no less than 0.075% and no more than 50% of the Border Component of MCSAP funding.

Recommendation 17: The personnel needed at each port of entry should be calculated as follows:

1. Allocate the minimum required FTE to each port of entry:
    a. 8 FTE per each Mexican port of entry.
    b. 0.25 FTE per each Canadian port of entry with more than 1,000 annual CMV crossings.
2. Allocate FTE according to CMV crossings (if not already covered by the minimum):
    a. 25,000 crossings per FTE for Mexican ports of entry.
    b. 200,000 crossings per FTE for Canadian ports of entry.

Recommendation 18: The annual CMV crossings for each port of entry should be calculated as the sum of truck and bus crossings, based on the Bureau of Transportation Statistics' Border Crossing/Entry Data.

Territories

Recommendation 19: 0.65% of total MCSAP funds should be allocated by FMCSA to support and develop CMV safety activities and programs within the Territories (Guam, CNMI, the U.S. Virgin Islands, and American Samoa).

Recommendation 20: The Territory Component will be distributed among the Territories based on an assessment of program performance, safety goal achievements, and projected activities as provided by the Territories within their respective Commercial Vehicle Safety Plans (CVSP), and subject to a guaranteed annual minimum for each Territory.

Recommendation 21: In the short term, FMCSA should determine an appropriate minimum share for each Territory after reviewing program needs and past grant performance. This should only be an interim amount, which will be updated when the study mentioned in Recommendation 13 is completed.

Recommendation 22: FMCSA should conduct a study to determine the appropriate share of funding to provide to Territories as a guaranteed minimum, to ensure that each Territory is able to maintain at least an effective minimal program. It should be determined based on evidence. This study can be part of the similar study on an appropriate minimum share for all States mentioned in Recommendation 13.

Recommendation 23: FMCSA should work towards establishing a method for the Territories to provide the data necessary to be included in the Basic Factor Component of the formula. Once reliable data sources are established, FMCSA should analyze the impacts of incorporating the Territories into the Basic Factor Component of the formula, and should implement that change if it is deemed appropriate.

Formula Adjustments

Recommendation 24: In a given year, each State should receive no less than 97% of their prior year's share of MCSAP funding. This should not apply to Territories.

Recommendation 25: In a given year, each State should receive no more than 105% of their prior year's share of MCSAP funding. This should not apply to Territories.

Recommendation 26: Reallocate unused funds from the Territories to States according to the Basic Factor Component.

Recommendation 27: Reallocate unused funds from the Border Component to States according to the Basic Factor Component.

Recommendations for Further Research or Consideration

Recommendation 28: FMCSA should re-evaluate the National Freight Highway Network in five (5) years to see if the data is stable and high quality, and reconsider its use in the formula.

Recommendation 29: FMCSA should evaluate and consider using CMV VMT in lieu of VMT if better data becomes available.

Recommendation 30: FMCSA should conduct a study to determine how to account for MCSAP costs in the allocation formula and, if appropriate, update the formula to do so.

Appendix C. Summary of Five Basic Factors

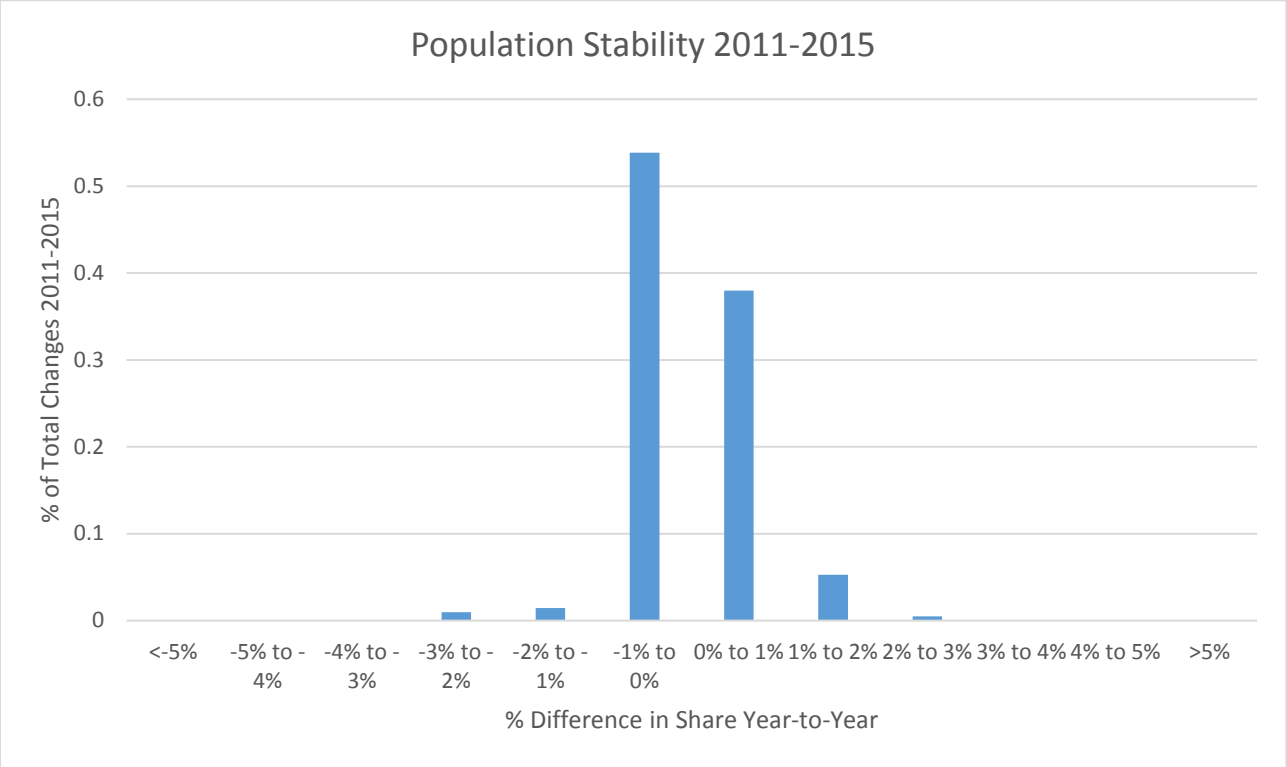
The data sources, stability, and correlation with crashes for each proposed factor are summarized in table 14, below.

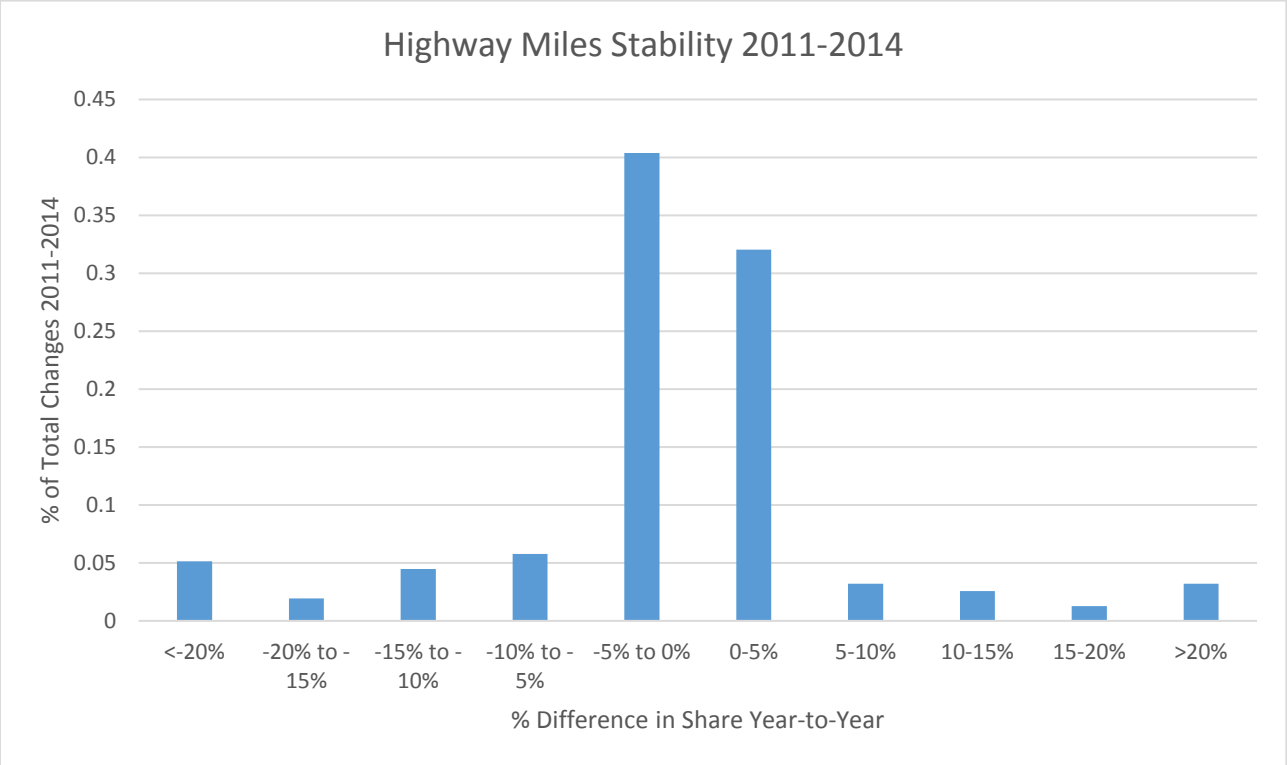
Table 14. Summary of five basic factors.

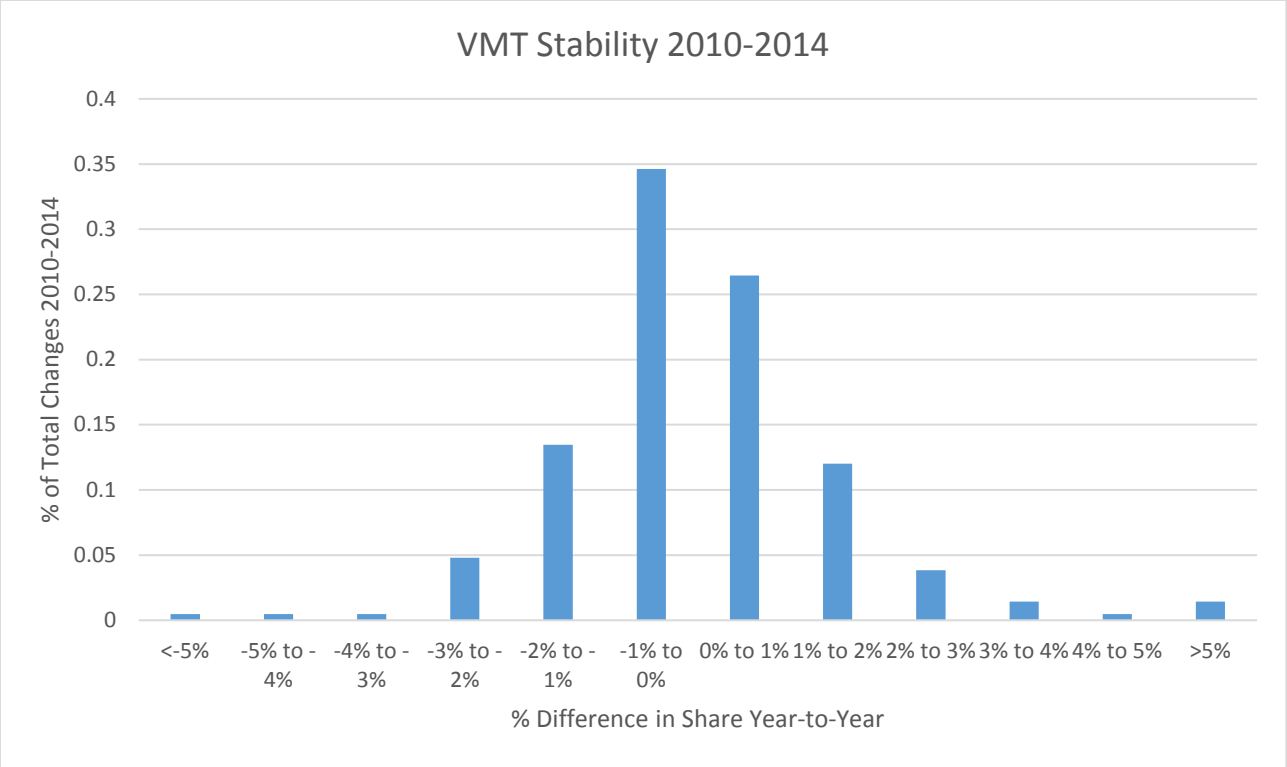
Factor	Data Source	Stability (% of changes within +/- 5% over the years examined)	Correlation with Crashes (R^2)
Population	Annual Population Estimates, from the U.S. Census Bureau, Population Division	100%	0.72 - 0.81
Highway Miles	National Highway System Road Length, FHWA Highway Statistics Series.	93%*	0.75 - 0.84
Vehicle Miles Traveled	Vehicle-miles of travel, by functional system, FHWA Highway Statistics Series	98%	0.76 - 0.86
Special Fuel Consumption	Monthly Special Fuel Reported by States, Compiled for the Calendar Year from State Fuel-Tax Reports, FHWA Highway Statistics Series	76%	0.87 - 0.93
Carrier Registrations	Snapshot of the Number of Interstate and Intrastate HM Carriers, MCMIS Database (based on MCS-150 data)	93%	0.80 - 0.84

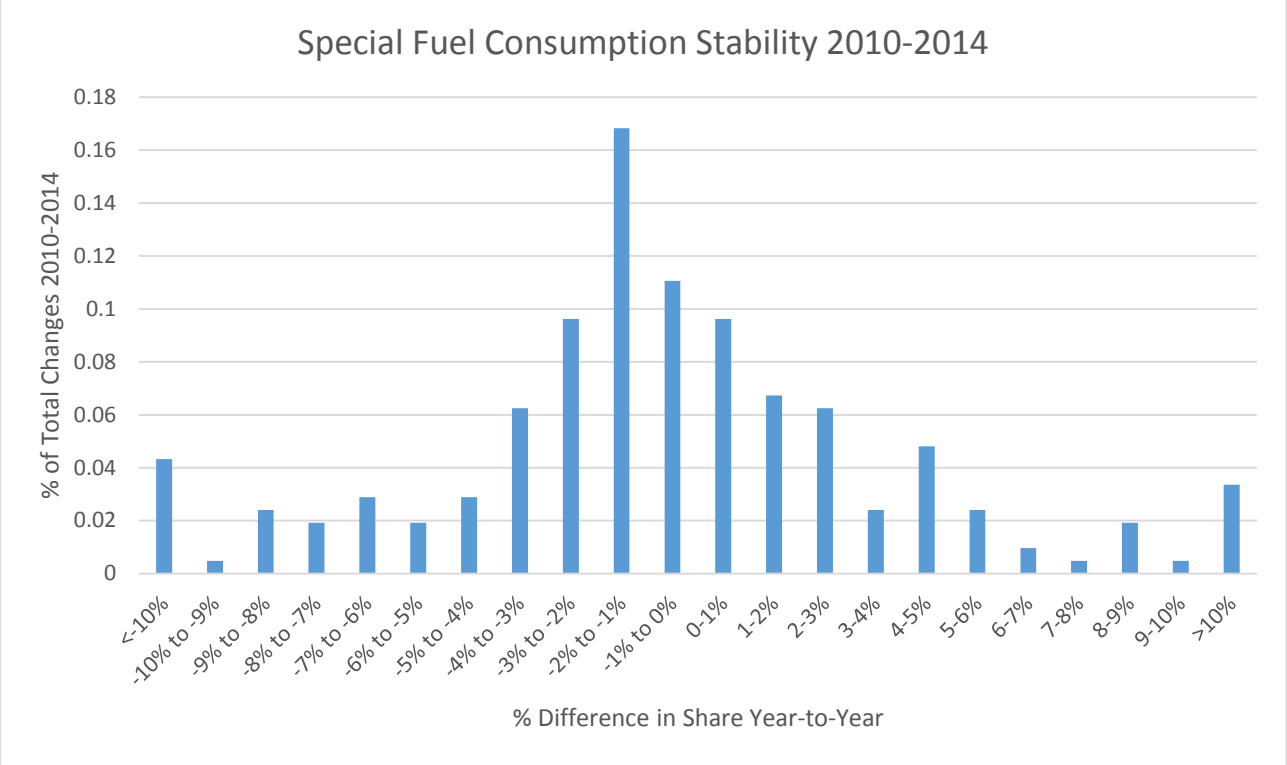
* 72% if the year prior to the MAP-21 expansion of the NHS is included

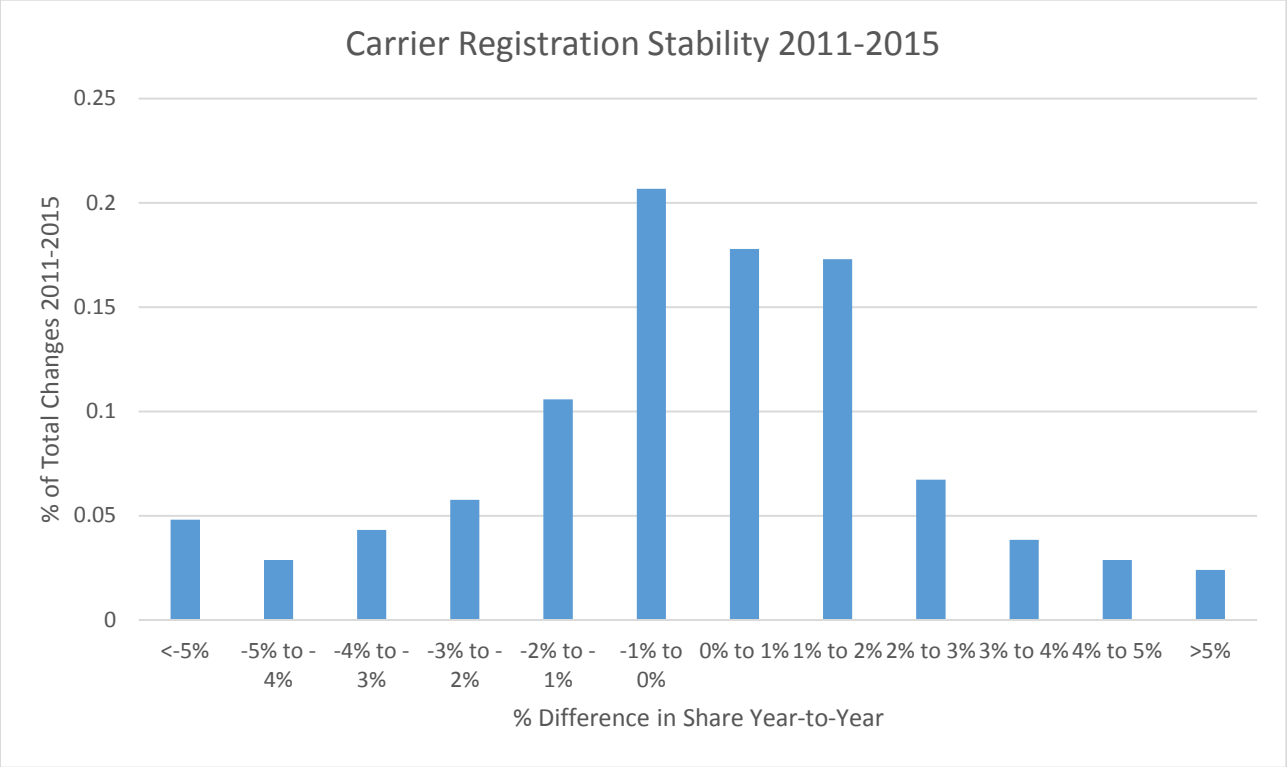
Appendix D. Histograms of Formula Factors Over Time






VMT Stability 2010-2014
% of Total Changes 2010-2014
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
<-5%
-5% to -4%
-4% to -3%
-3% to -2%
-2% to -1%
-1% to 0%
0% to 1%
1% to 2%
2% to 3%
3% to 4%
4% to 5%
>5%
% Difference in Share Year-to-Year

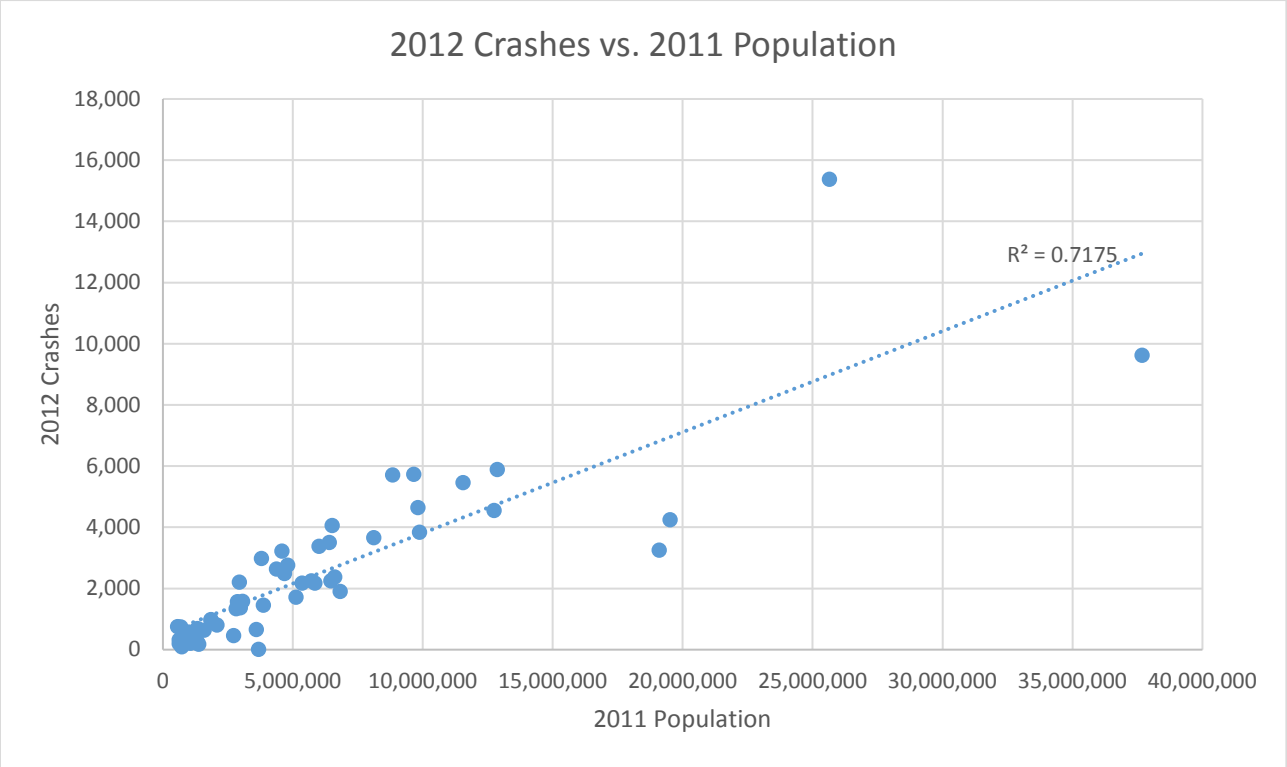

Special Fuel Consumption Stability 2010-2014
% of Total Changes 2010-2014
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
<-10%
-10% to -9%
-9% to -8%
-8% to -7%
-7% to -6%
-6% to -5%
-5% to -4%
-4% to -3%
-3% to -2%
-2% to -1%
-1% to 0%
0-1%
1-2%
2-3%
3-4%
4-5%
5-6%
6-7%
7-8%
8-9%
9-10%
>10%
% Difference in Share Year-to-Year

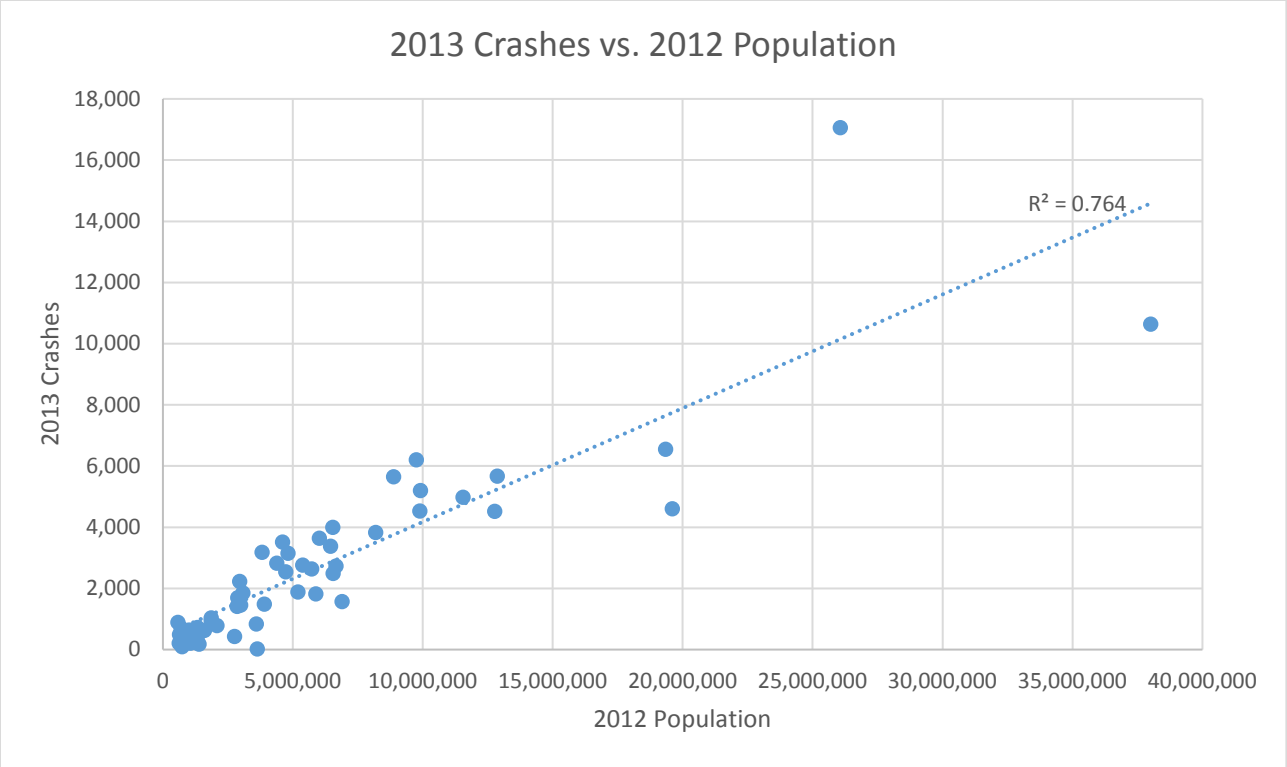

Carrier Registration Stability 2011-2015
0.25
0.2
0.15
0.1
0.05
0
% of Total Changes 2011-2015
<-5%
-5% to -4%
-4% to -3%
-3% to -2%
-2% to -1%
-1% to 0%
0% to 1%
1% to 2%
2% to 3%
3% to 4%
4% to 5%
>5%
% Difference in Share Year-to-Year

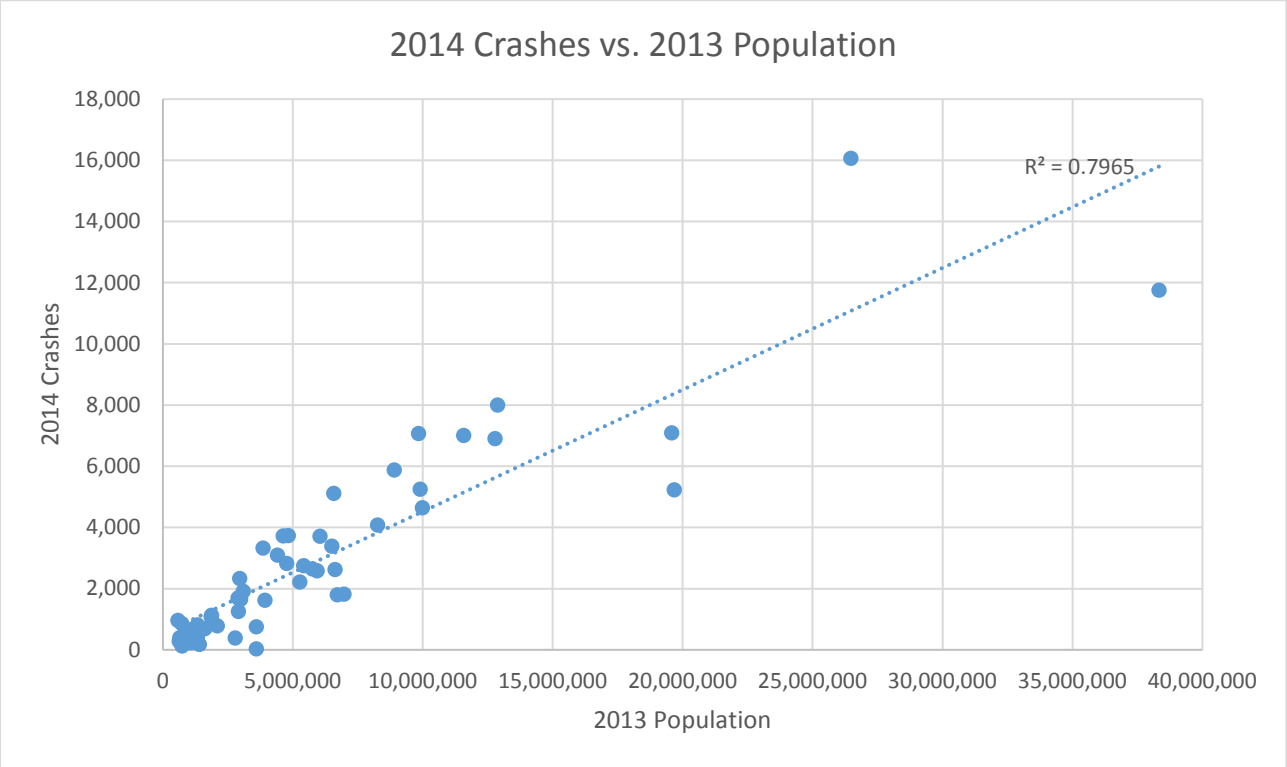
Appendix E. Scatterplots of Factors vs. Crashes

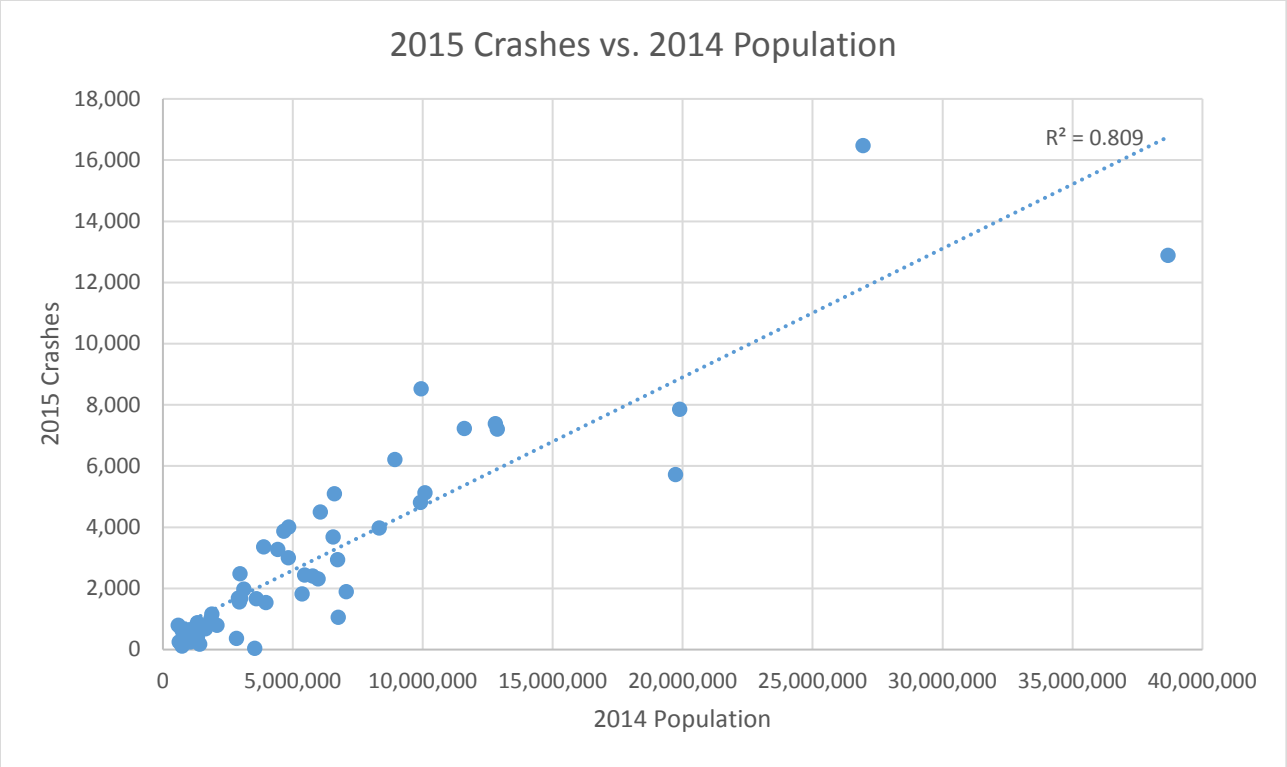
Note: The States of Texas and California are the two highest crash States by far every year from 2012 through 2016. Therefore, these two States appear as outliers in the top right of all of the following scatter plots.

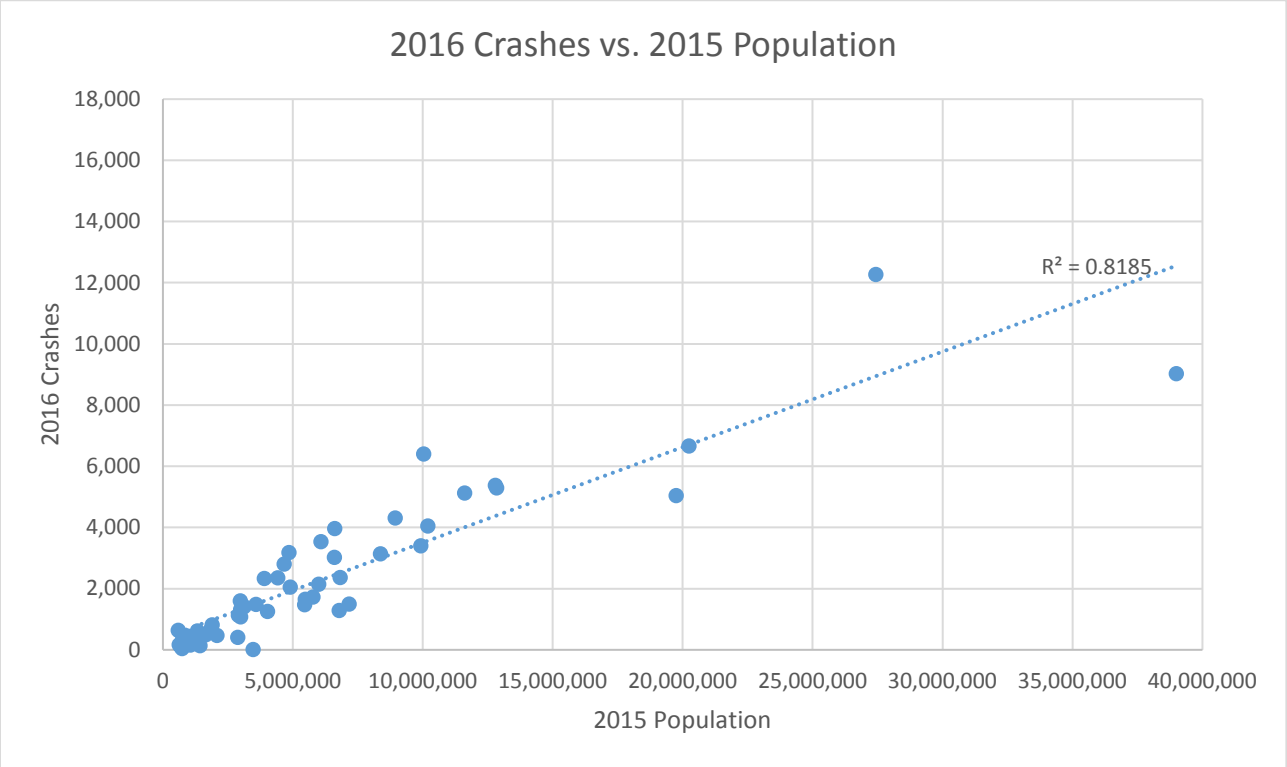
A. Population



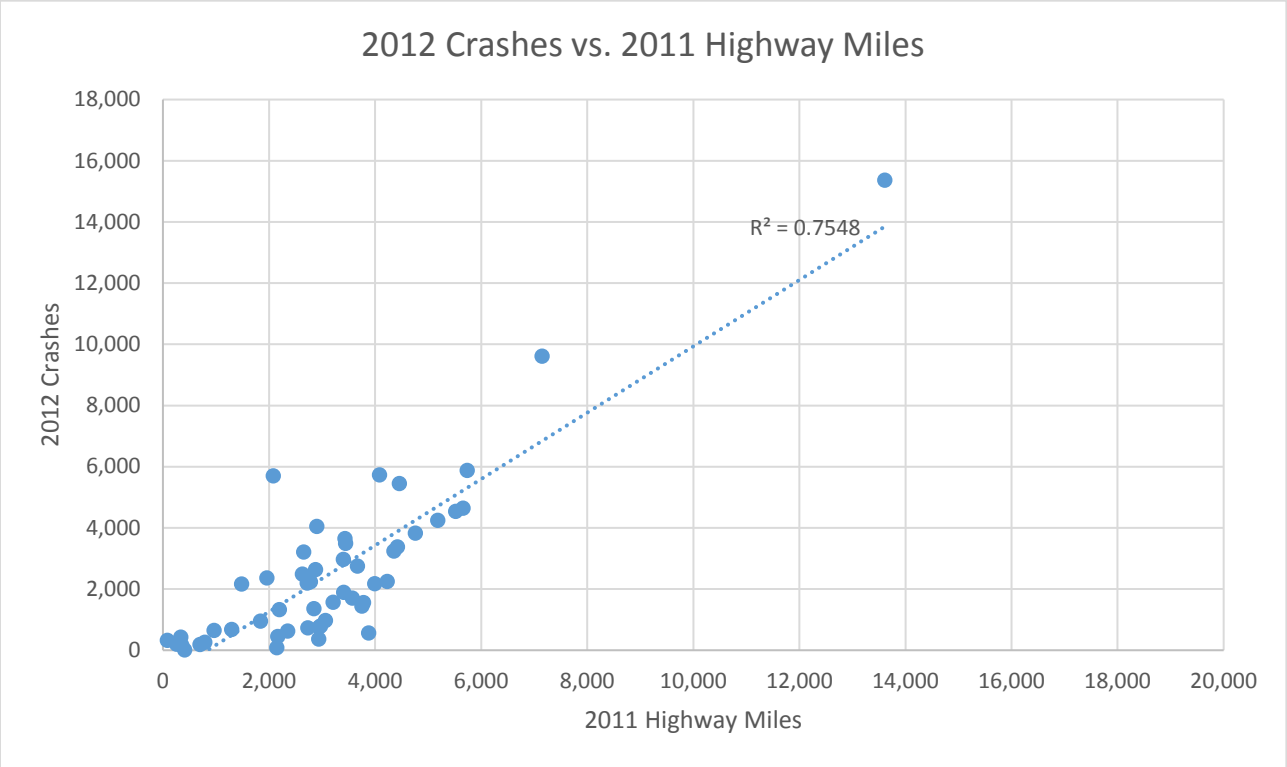

2013 Crashes vs. 2012 Population
2013 Crashes
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
R² = 0.764
0
5,000,000
10,000,000
15,000,000
20,000,000
25,000,000
30,000,000
35,000,000
40,000,000
2012 Population

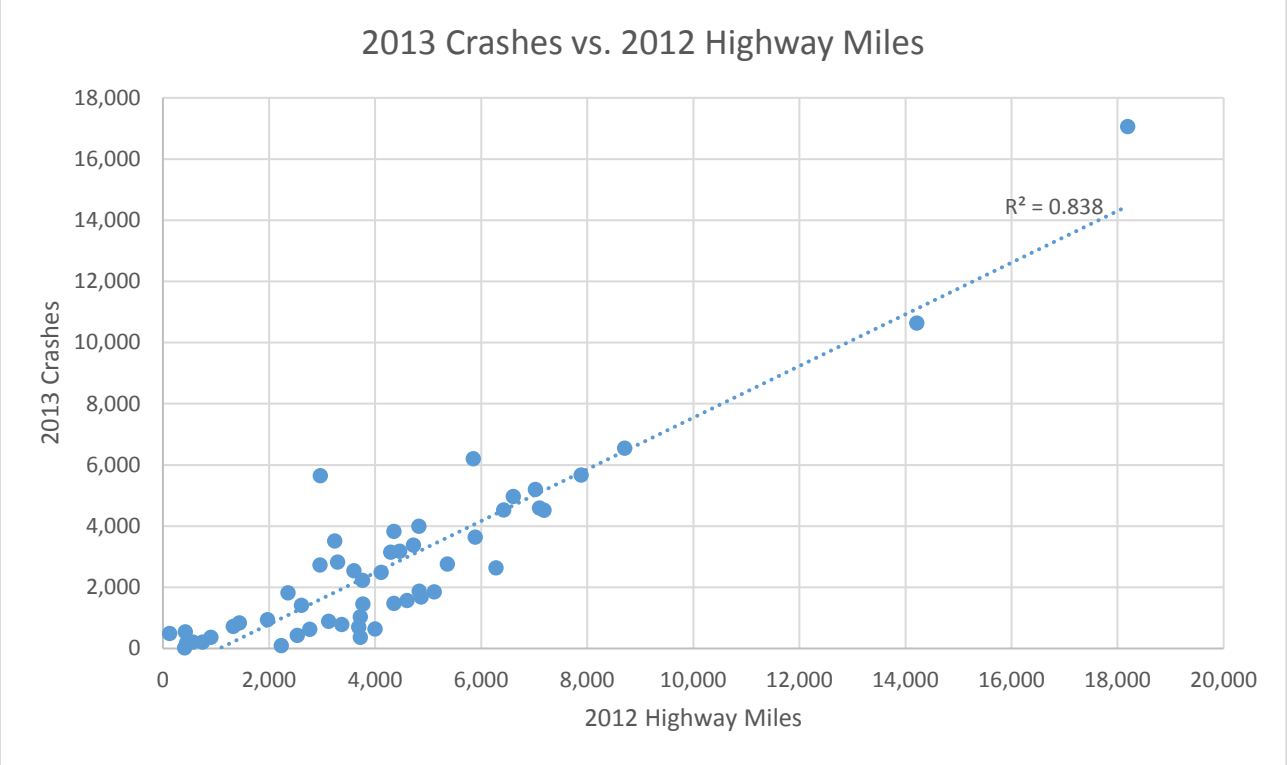

2014 Crashes vs. 2013 Population
2014 Crashes
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
R² = 0.7965
0
5,000,000
10,000,000
15,000,000
20,000,000
25,000,000
30,000,000
35,000,000
40,000,000
2013 Population

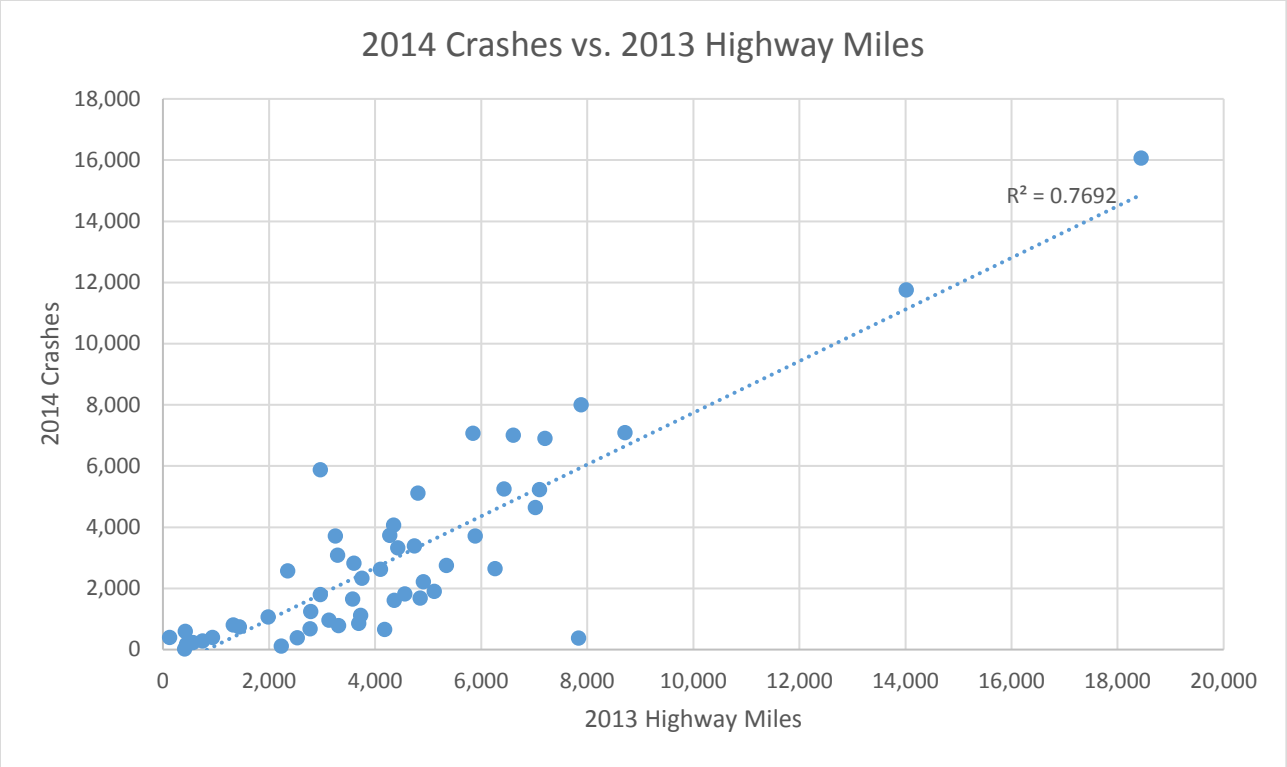

2015 Crashes vs. 2014 Population
2015 Crashes
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
R² = 0.809
0
5,000,000
10,000,000
15,000,000
20,000,000
25,000,000
30,000,000
35,000,000
40,000,000
2014 Population

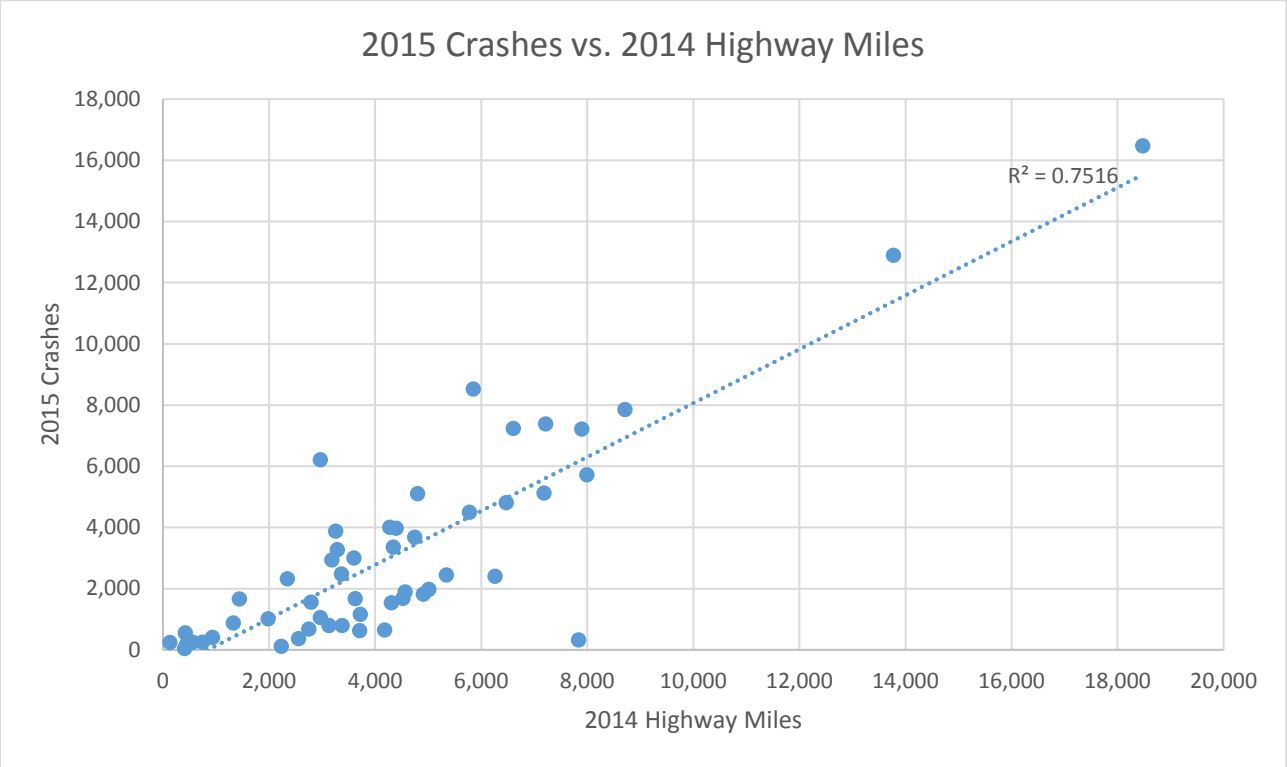

2016 Crashes vs. 2015 Population
2016 Crashes
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
R² = 0.8185
0
5,000,000
10,000,000
15,000,000
20,000,000
25,000,000
30,000,000
35,000,000
40,000,000
2015 Population

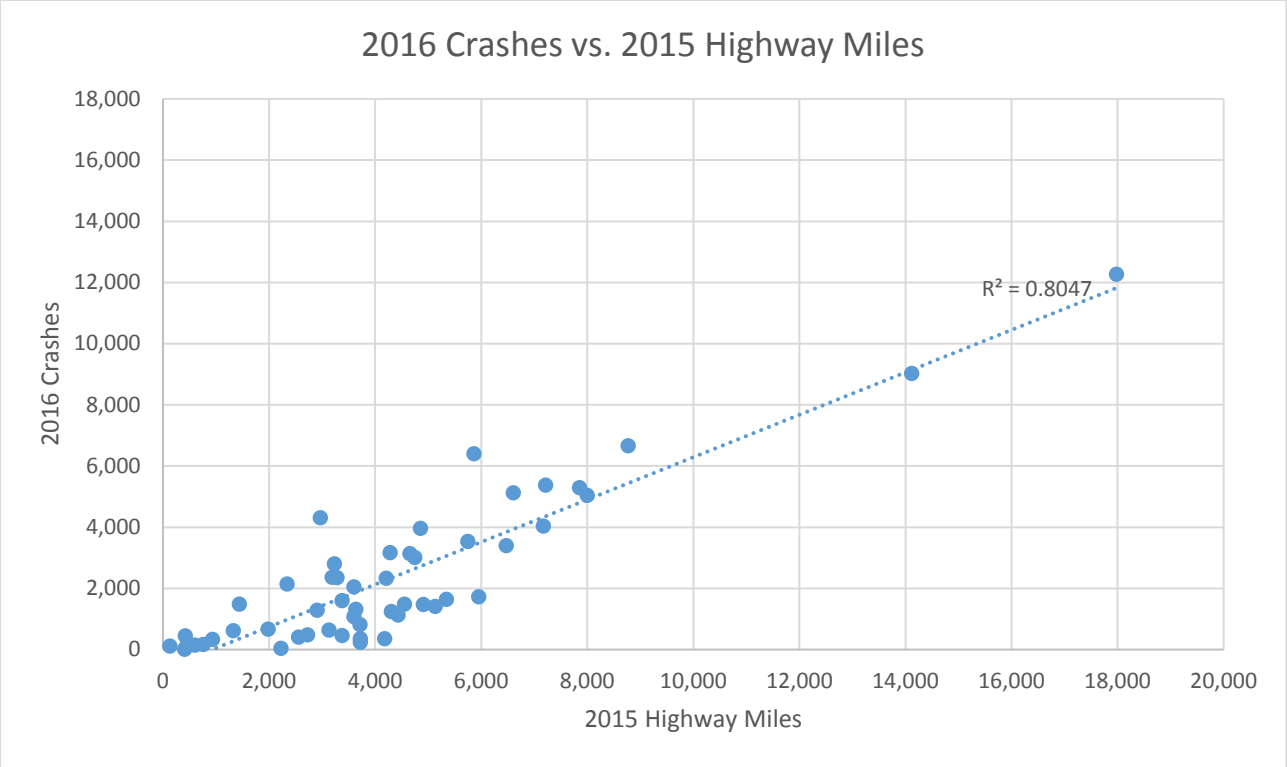
B. Highway Miles



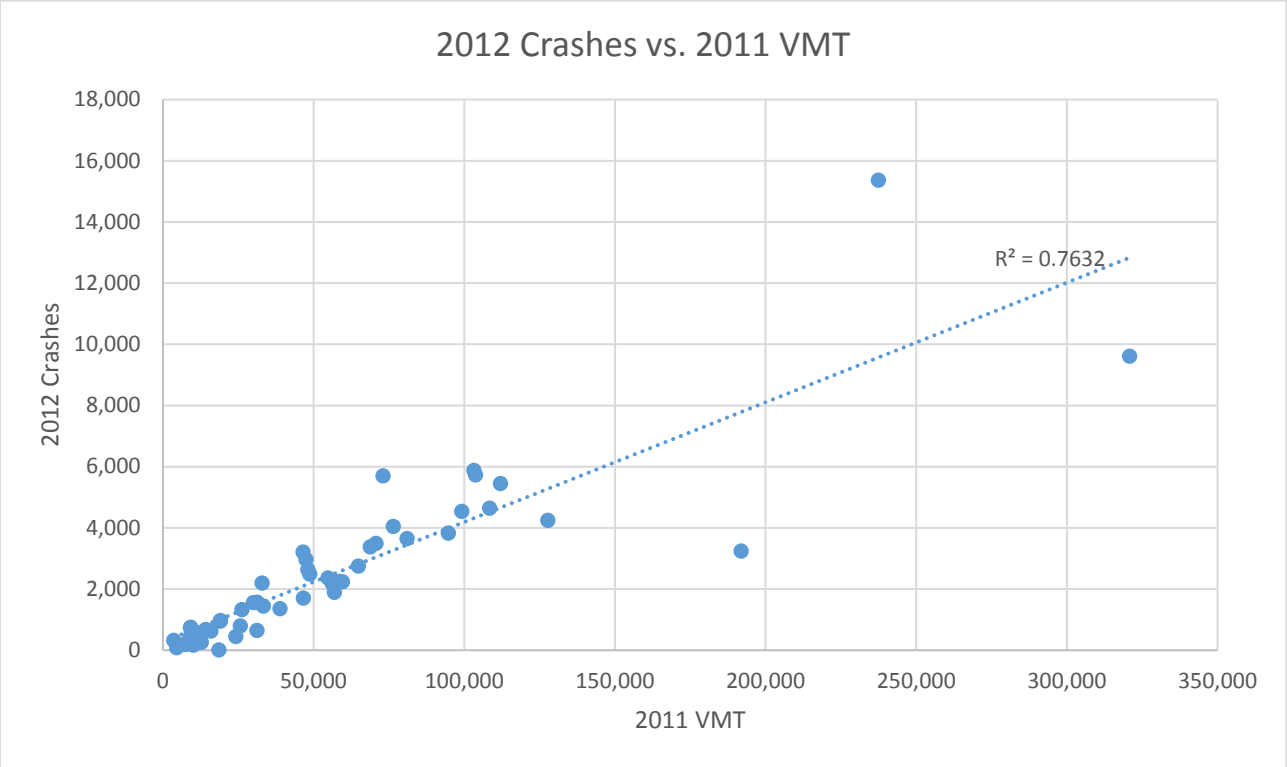


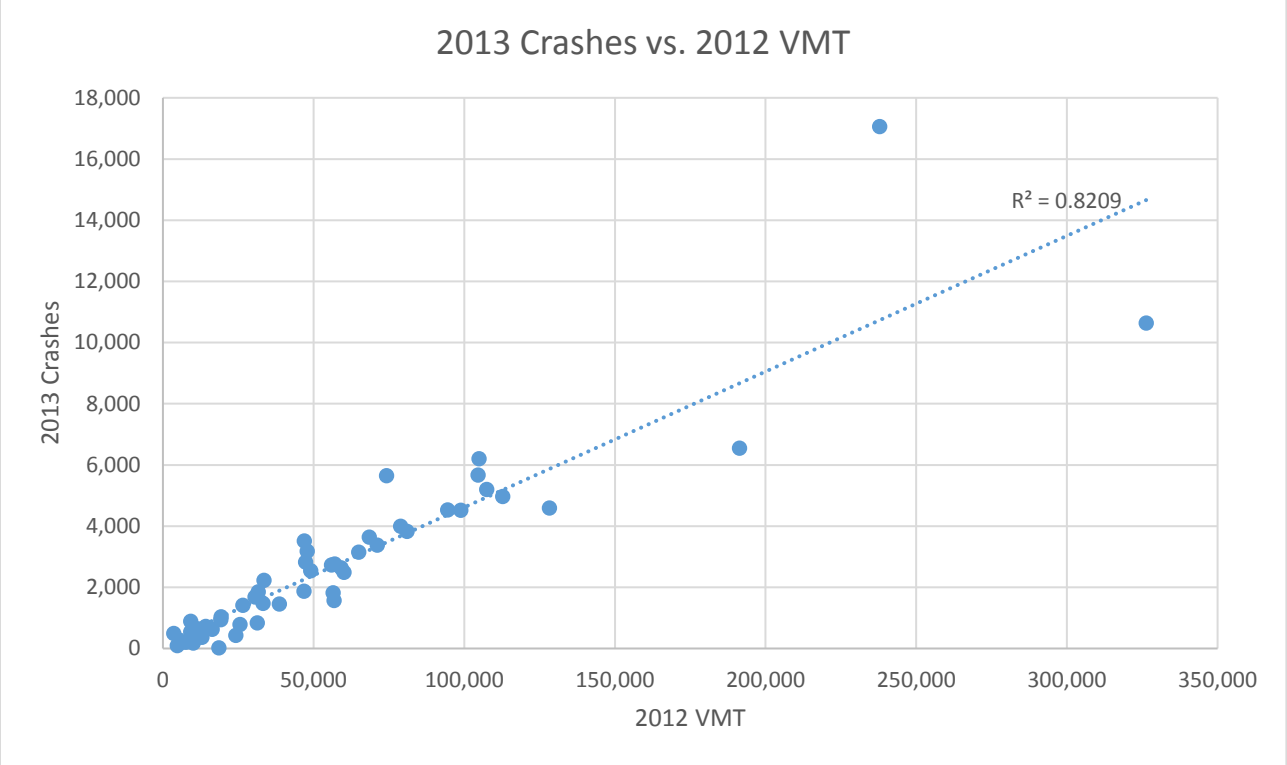

2014 Crashes vs. 2013 Highway Miles
2014 Crashes
2013 Highway Miles
R² = 0.7692
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
16,000
18,000
20,000

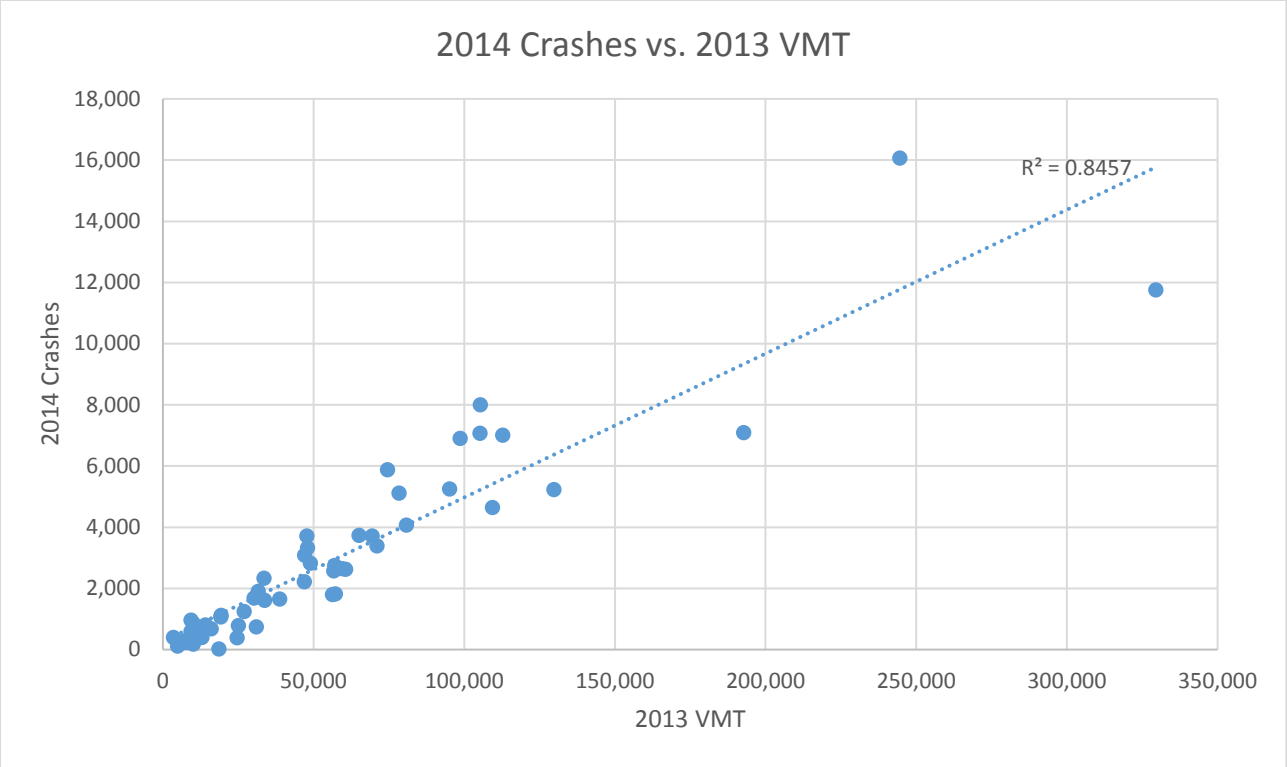

2015 Crashes vs. 2014 Highway Miles
2015 Crashes
2014 Highway Miles
R² = 0.7516
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
16,000
18,000
20,000

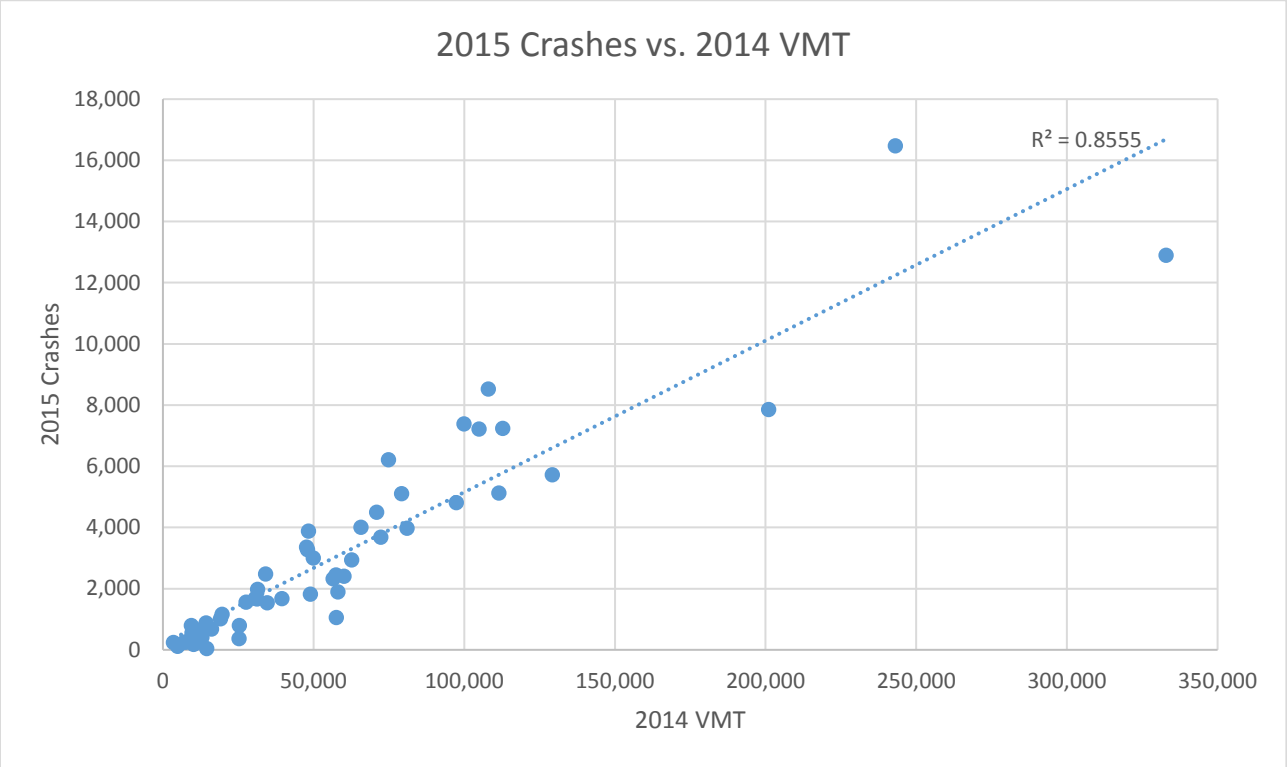

2016 Crashes vs. 2015 Highway Miles
2016 Crashes
2015 Highway Miles
R² = 0.8047
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
16,000
18,000
20,000

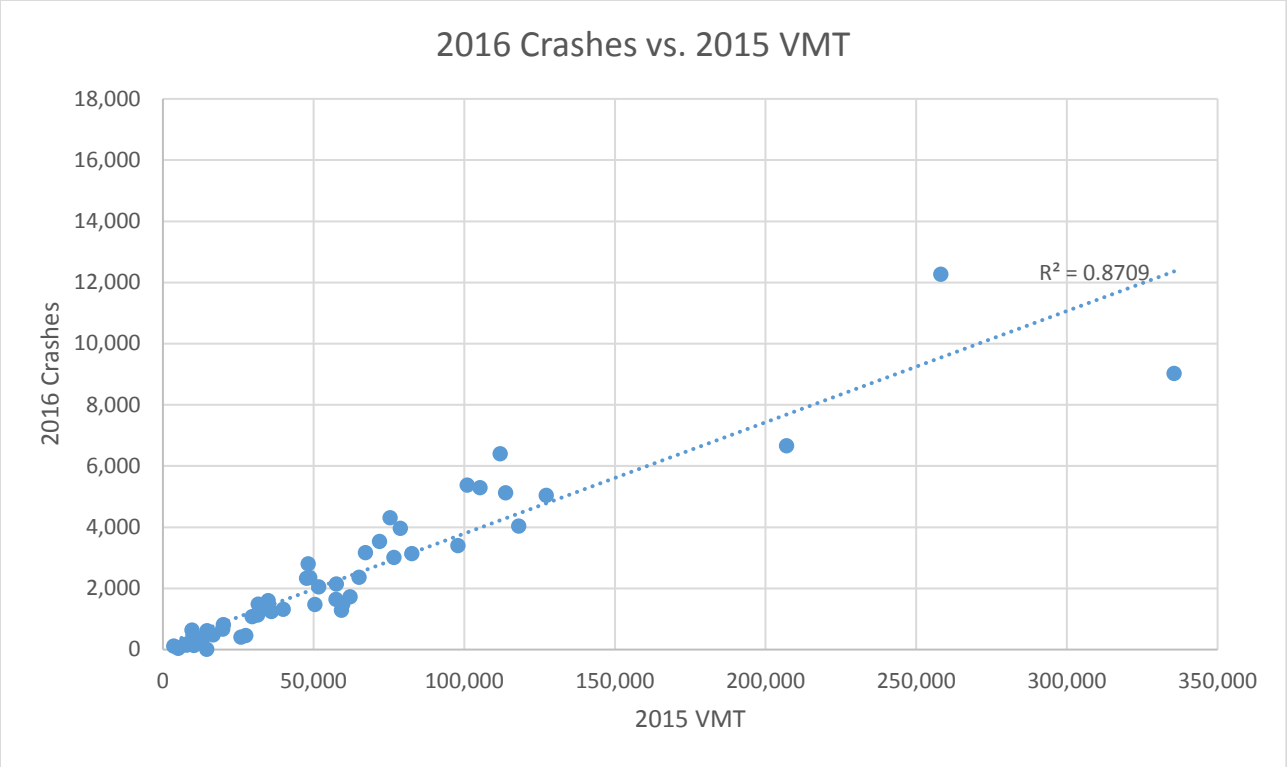
C. Vehicle Miles Traveled



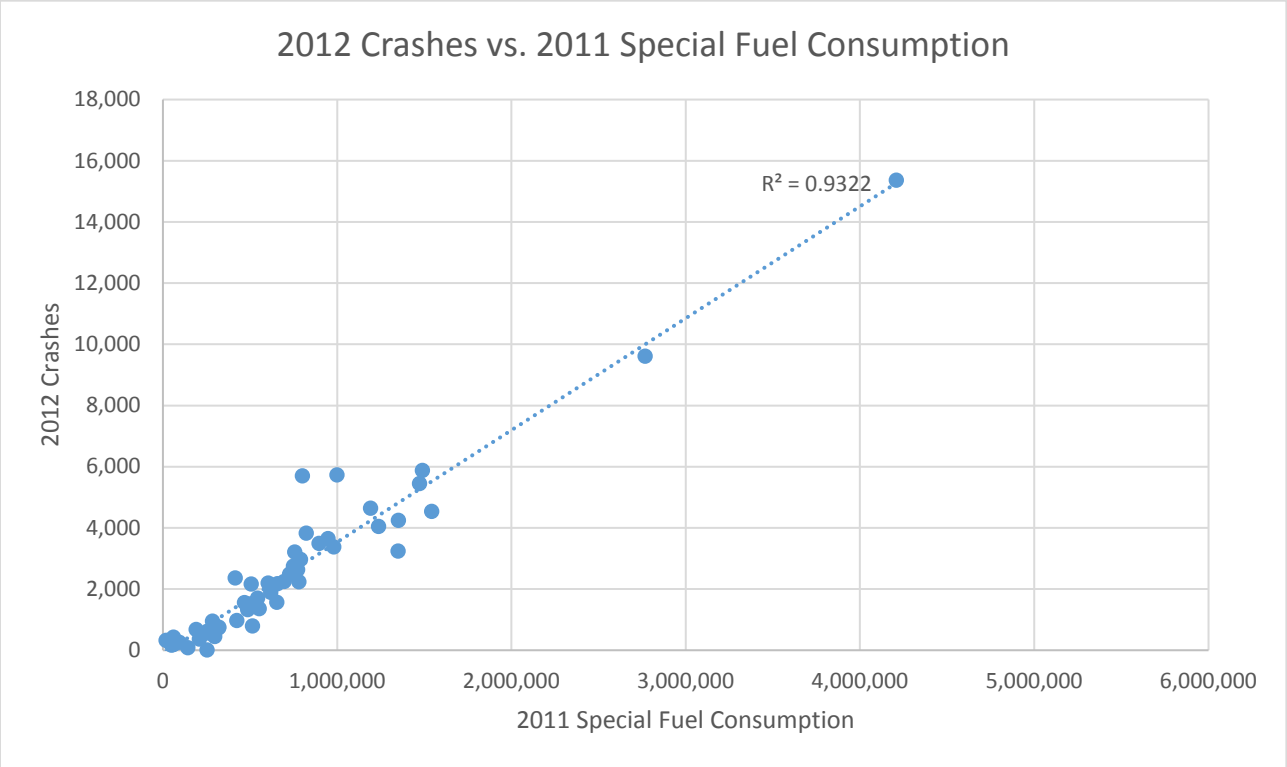


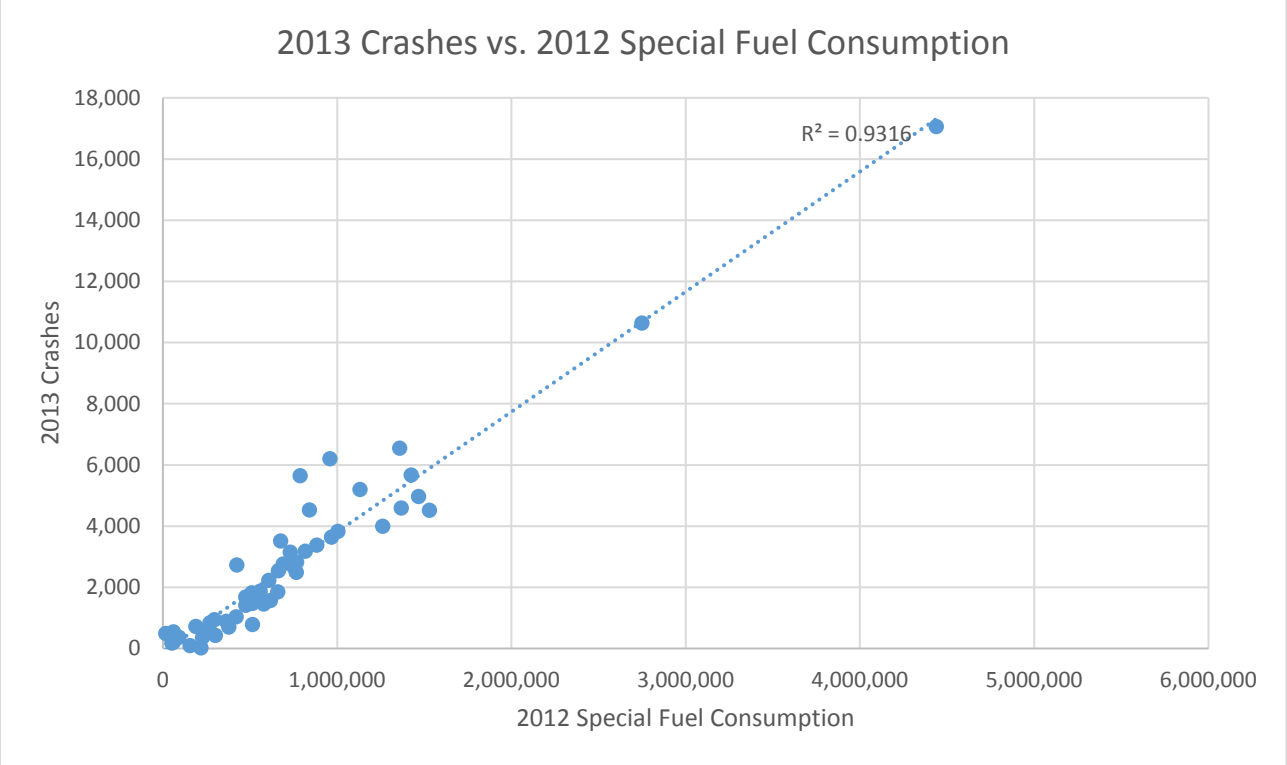

2014 Crashes vs. 2013 VMT
2014 Crashes
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
R² = 0.8457
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
2013 VMT

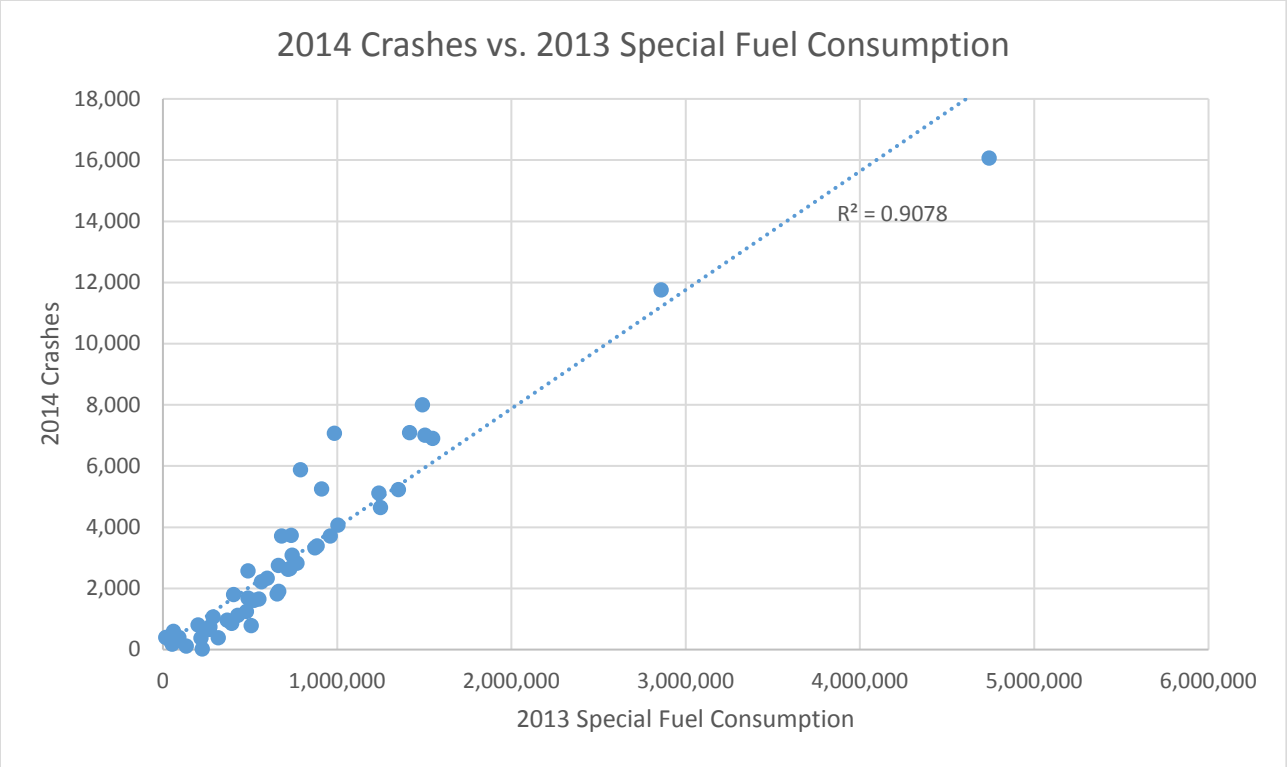

2015 Crashes vs. 2014 VMT
2015 Crashes
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
R² = 0.8555
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
2014 VMT

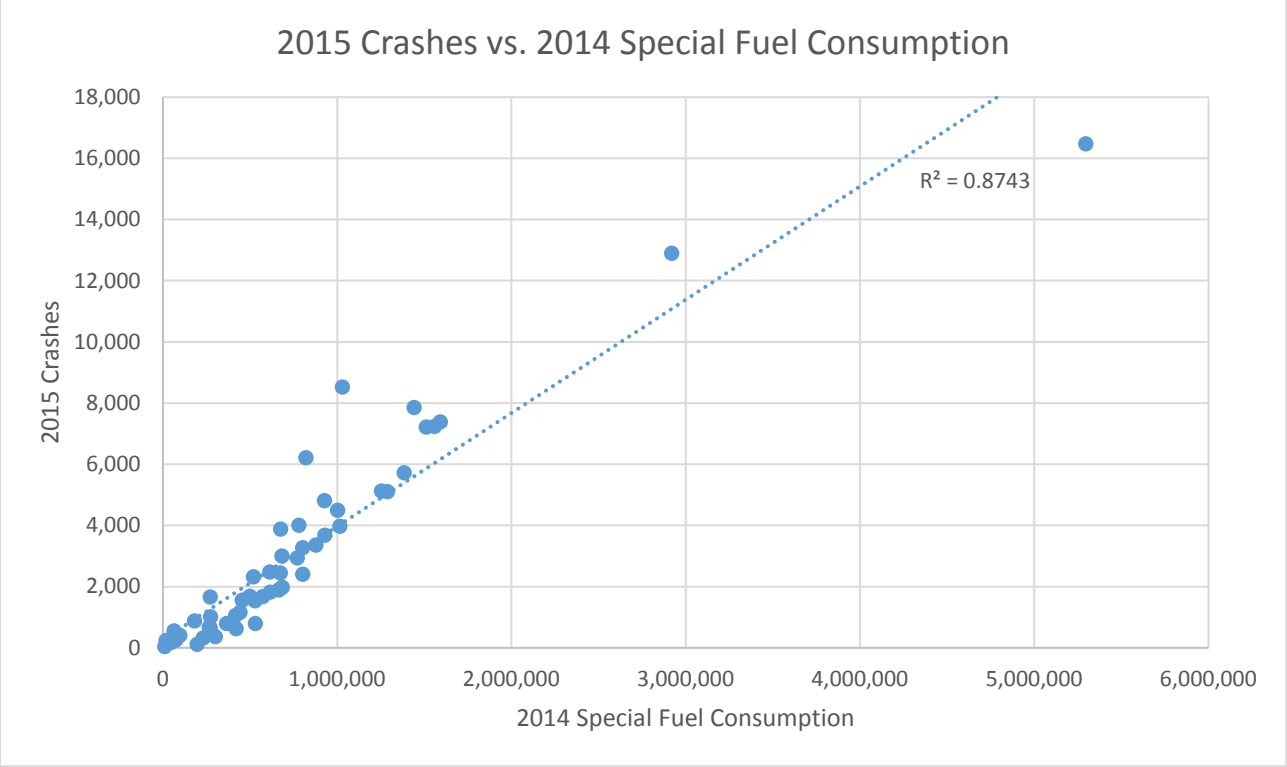

2016 Crashes vs. 2015 VMT
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
2016 Crashes
0
50,000
100,000
150,000
200,000
250,000
300,000
350,000
2015 VMT
R² = 0.8709

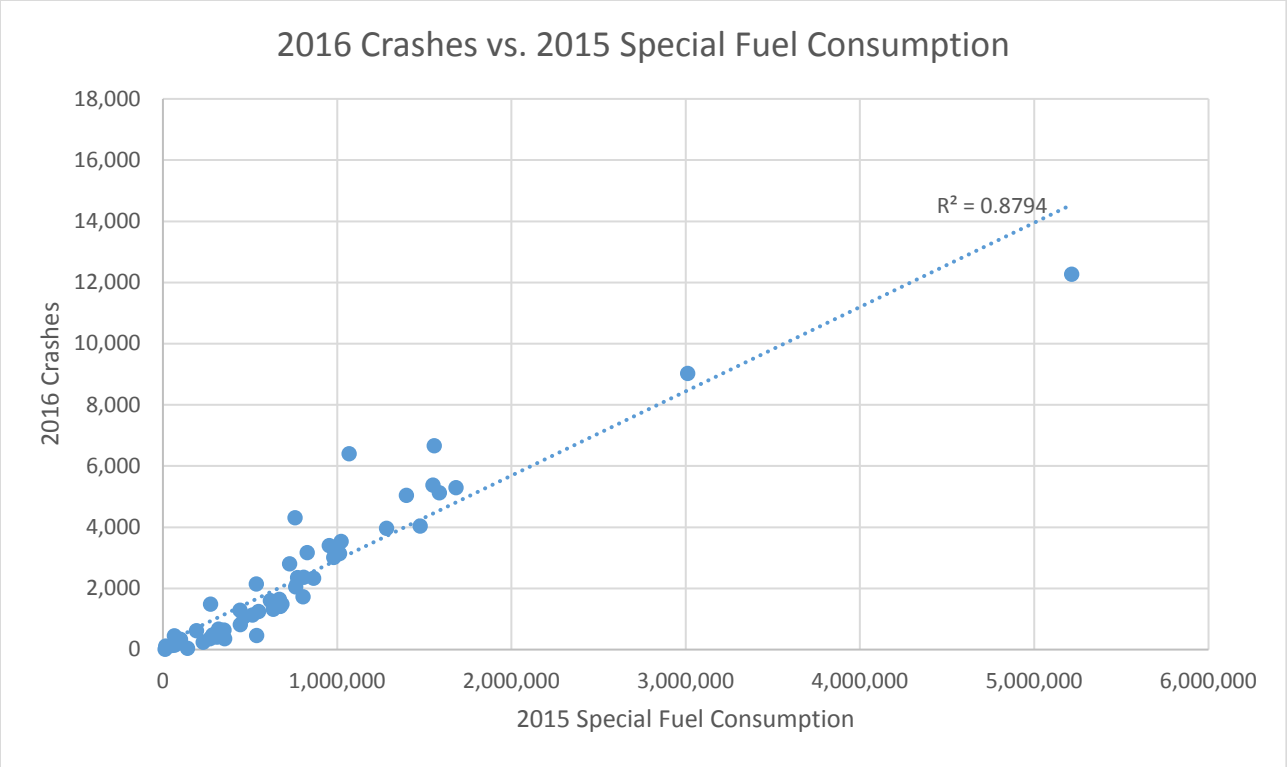
D. Special Fuel Consumption



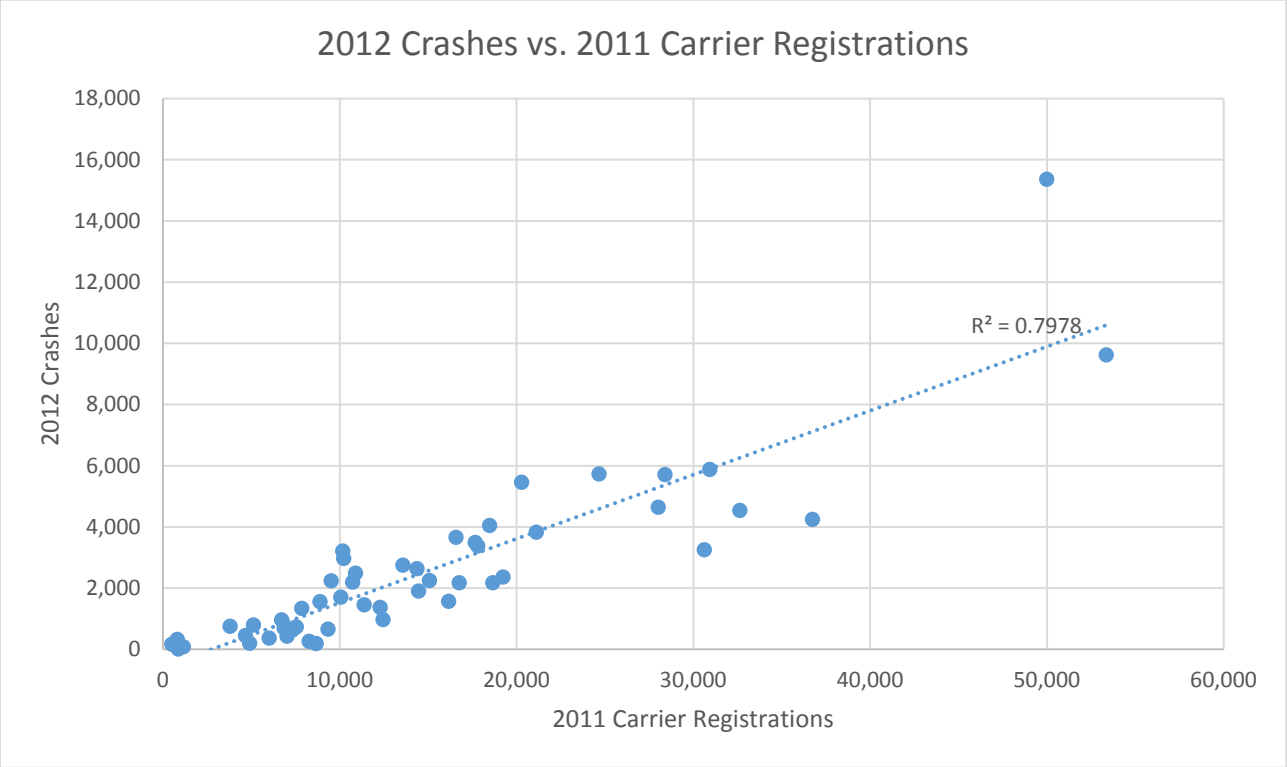


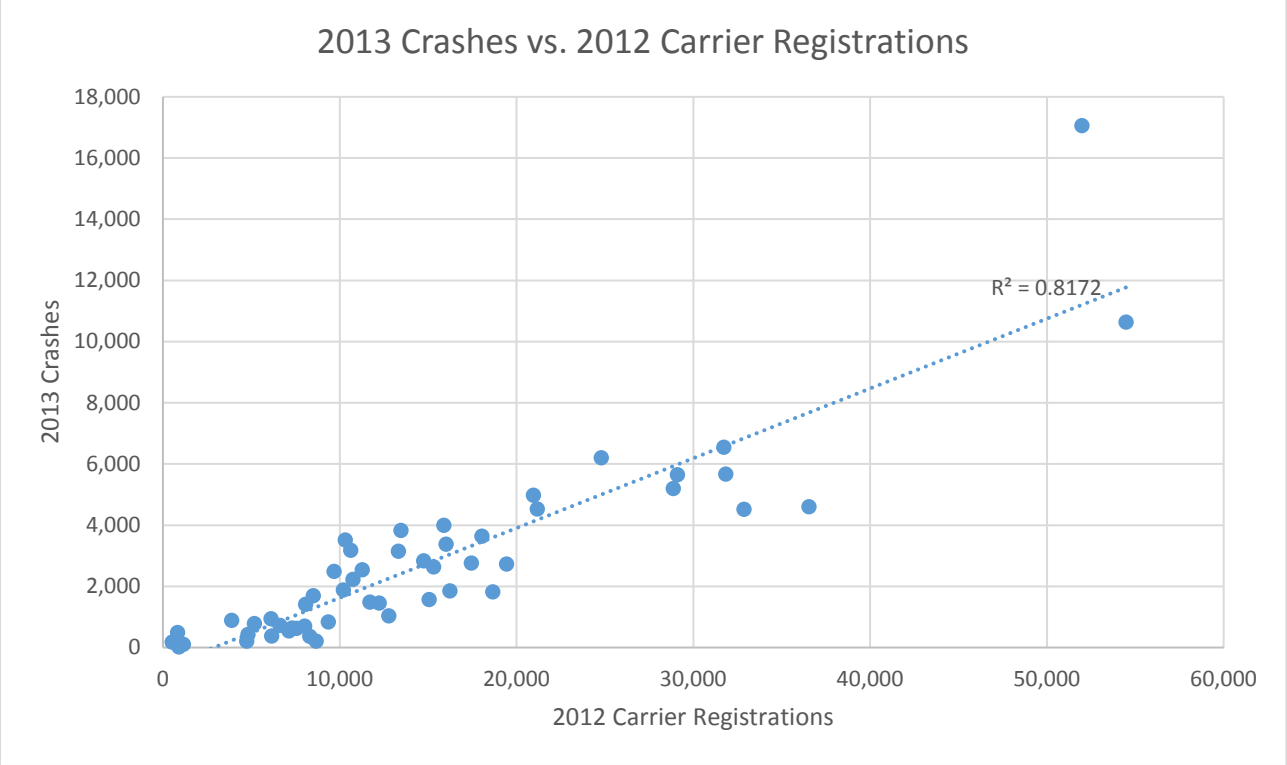

2014 Crashes vs. 2013 Special Fuel Consumption
2014 Crashes
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
R² = 0.9078
0
1,000,000
2,000,000
3,000,000
4,000,000
5,000,000
6,000,000
2013 Special Fuel Consumption

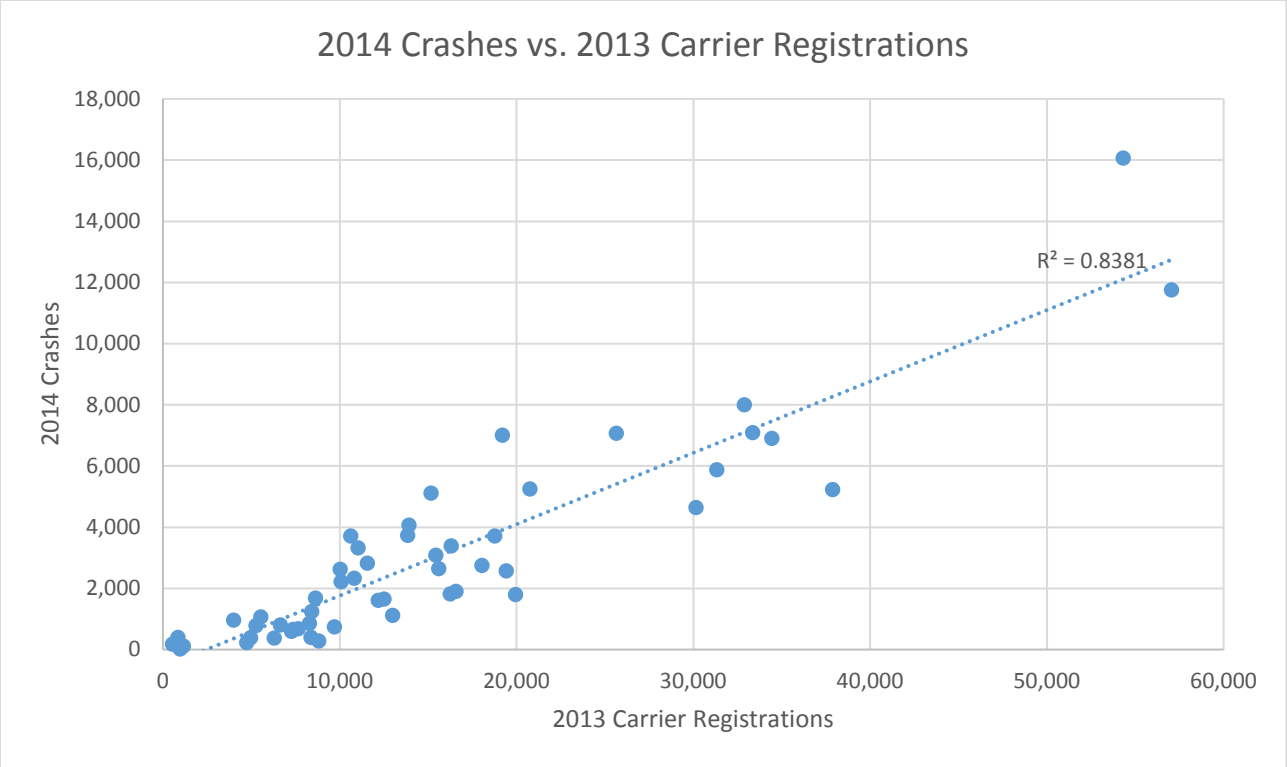

2015 Crashes vs. 2014 Special Fuel Consumption
2015 Crashes
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
R² = 0.8743
0
1,000,000
2,000,000
3,000,000
4,000,000
5,000,000
6,000,000
2014 Special Fuel Consumption

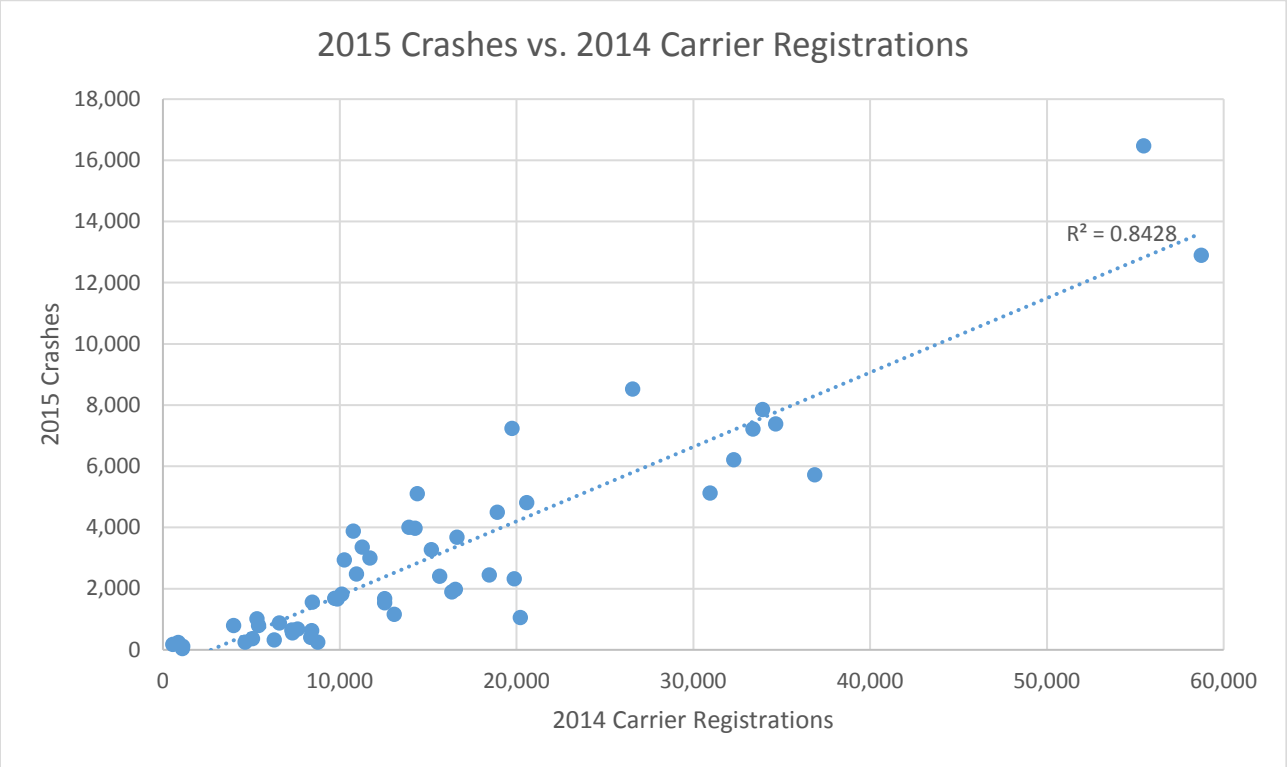

2016 Crashes vs. 2015 Special Fuel Consumption
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
2016 Crashes
R² = 0.8794
0
1,000,000
2,000,000
3,000,000
4,000,000
5,000,000
6,000,000
2015 Special Fuel Consumption

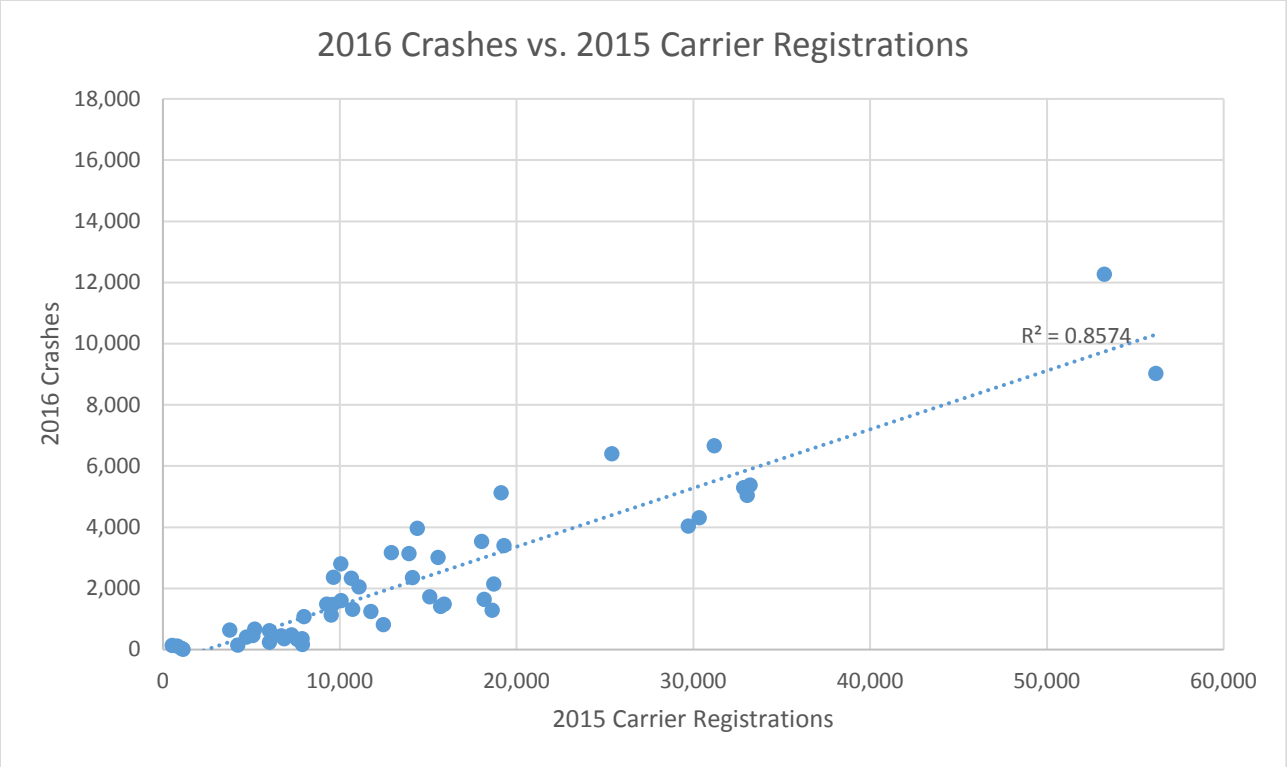
E. Carrier Registrations






2014 Crashes vs. 2013 Carrier Registrations
2014 Crashes
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
R² = 0.8381
0
10,000
20,000
30,000
40,000
50,000
60,000
2013 Carrier Registrations


2015 Crashes vs. 2014 Carrier Registrations
2015 Crashes
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
R² = 0.8428
0
10,000
20,000
30,000
40,000
50,000
60,000
2014 Carrier Registrations


2016 Crashes vs. 2015 Carrier Registrations
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
2016 Crashes
0
10,000
20,000
30,000
40,000
50,000
60,000
2015 Carrier Registrations
R² = 0.8574

Appendix F. Comparison of CMV Crashes vs. Proposed Funding Shares

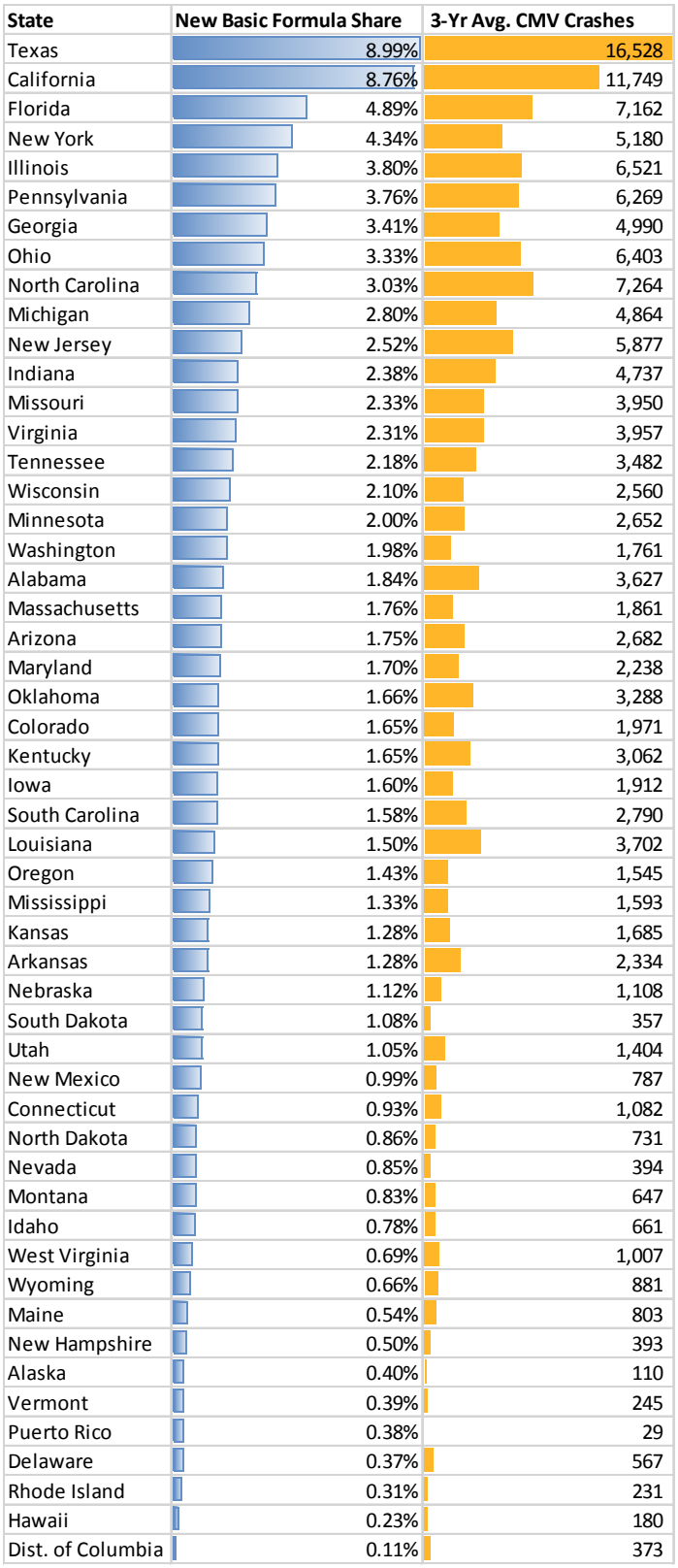
The Working Group requested an analysis of whether the allocation of funds through the proposed formula would align with crash risk. The results of this analysis show that the top crash States are also the States that receive the highest shares of funding using the proposed Basic Factor Component. Consider Texas through Missouri, States 1-13 in the table below and the top one-fourth of States by Basic Factor Component share rank.

Table 15. Comparison of States' Basic Factor Component share and 3-Year CMV crash average.

State	New Basic Factor Component Share	Basic Factor Component Share Rank	3-Yr Avg. CMV Crashes	Crash Rank
Texas	8.99%	1	16,528	1
California	8.76%	2	11,749	2
Florida	4.89%	3	7,162	4
New York	4.34%	4	5,180	9
Illinois	3.80%	5	6,521	5
Pennsylvania	3.76%	6	6,269	7
Georgia	3.41%	7	4,990	10
Ohio	3.33%	8	6,403	6
North Carolina	3.03%	9	7,264	3
Michigan	2.80%	10	4,864	11
New Jersey	2.52%	11	5,877	8
Indiana	2.38%	12	4,737	12
Missouri	2.33%	13	3,950	14
Virginia	2.31%	14	3,957	13
Tennessee	2.18%	15	3,482	17
Wisconsin	2.10%	16	2,560	23
Minnesota	2.00%	17	2,652	22
Washington	1.98%	18	1,761	29
Alabama	1.84%	19	3,627	16
Massachusetts	1.76%	20	1,861	28
Arizona	1.75%	21	2,682	21
Maryland	1.70%	22	2,238	25
Oklahoma	1.66%	23	3,288	18
Colorado	1.65%	24	1,971	26
Kentucky	1.65%	25	3,062	19
Iowa	1.60%	26	1,912	27
South Carolina	1.58%	27	2,790	20

State	New Basic Factor Component Share	Basic Factor Component Share Rank	3-Yr Avg. CMV Crashes	Crash Rank
Louisiana	1.50%	28	3,702	15
Oregon	1.43%	29	1,545	32
Mississippi	1.33%	30	1,593	31
Kansas	1.28%	31	1,685	30
Arkansas	1.28%	32	2,334	24
Nebraska	1.12%	33	1,108	34
South Dakota	1.08%	34	357	47
Utah	1.05%	35	1,404	33
New Mexico	0.99%	36	787	39
Connecticut	0.93%	37	1,082	35
North Dakota	0.86%	38	731	40
Nevada	0.85%	39	394	44
Montana	0.83%	40	647	42
Idaho	0.78%	41	661	41
West Virginia	0.69%	42	1,007	36
Wyoming	0.66%	43	881	37
Maine	0.54%	44	803	38
New Hampshire	0.50%	45	393	45
Alaska	0.40%	46	110	51
Vermont	0.39%	47	245	48
Puerto Rico	0.38%	48	29	52
Delaware	0.37%	49	567	43
Rhode Island	0.31%	50	231	49
Hawaii	0.23%	51	180	50
Dist. of Columbia	0.11%	52	373	46

Figure 2. This is a visual representation of table 15, above.



State	New Basic Formula Share	3-Yr Avg. CMV Crashes
Texas	8.99%	16,528
California	8.76%	11,749
Florida	4.89%	7,162
New York	4.34%	5,180
Illinois	3.80%	6,521
Pennsylvania	3.76%	6,269
Georgia	3.41%	4,990
Ohio	3.33%	6,403
North Carolina	3.03%	7,264
Michigan	2.80%	4,864
New Jersey	2.52%	5,877
Indiana	2.38%	4,737
Missouri	2.33%	3,950
Virginia	2.31%	3,957
Tennessee	2.18%	3,482
Wisconsin	2.10%	2,560
Minnesota	2.00%	2,652
Washington	1.98%	1,761
Alabama	1.84%	3,627
Massachusetts	1.76%	1,861
Arizona	1.75%	2,682
Maryland	1.70%	2,238
Oklahoma	1.66%	3,288
Colorado	1.65%	1,971
Kentucky	1.65%	3,062
Iowa	1.60%	1,912
South Carolina	1.58%	2,790
Louisiana	1.50%	3,702
Oregon	1.43%	1,545
Mississippi	1.33%	1,593
Kansas	1.28%	1,685
Arkansas	1.28%	2,334
Nebraska	1.12%	1,108
South Dakota	1.08%	357
Utah	1.05%	1,404
New Mexico	0.99%	787
Connecticut	0.93%	1,082
North Dakota	0.86%	731
Nevada	0.85%	394
Montana	0.83%	647
Idaho	0.78%	661
West Virginia	0.69%	1,007
Wyoming	0.66%	881
Maine	0.54%	803
New Hampshire	0.50%	393
Alaska	0.40%	110
Vermont	0.39%	245
Puerto Rico	0.38%	29
Delaware	0.37%	567
Rhode Island	0.31%	231
Hawaii	0.23%	180
Dist. of Columbia	0.11%	373

Table 16, below, shows hypothetical funding changes that occur at each step in the formula calculation. While these numbers are not an accurate reflection of MCSAP funding, the analysis here demonstrates the relative funding impacts of each element in the proposed formula.

The States in the table are listed in order of their three-year average number of CMV crashes. Moving left to right, the first allocation shown is based only on the five factors, then a maximum share of 4.944% is incorporated into the results, then a minimum share of 0.44% is included, and finally the Border Component is added.

Table 16. Step by step analysis of the new formula allocation with hypothetical funding amounts. At each step, each State's relative funding changes are noted.

State (In order of CMV crash rank)	Basic Factor Component Only ($)	Include a Maximum (4.944%) ($)	Changes due to Max	Include a Minimum (0.44%) ($)	Changes due to Min	Add Border Component (Final Simulation) ($)	Changes due to Border
Texas	23,270,484	12,802,863	-45%	12,802,863	0%	26,492,885	107%
California	22,687,452	12,802,863	-44%	12,802,863	0%	18,118,296	42%
North Carolina	7,849,850	8,641,332	10%	8,571,315	-1%	8,571,315	0%
Florida	12,651,320	12,802,863	1%	12,802,863	0%	12,802,863	0%
Illinois	9,848,575	10,841,584	10%	10,753,740	-1%	10,753,740	0%
Ohio	8,616,743	9,485,550	10%	9,408,693	-1%	9,408,693	0%
Pennsylvania	9,728,337	10,709,223	10%	10,622,451	-1%	10,622,451	0%
New Jersey	6,518,241	7,175,461	10%	7,117,321	-1%	7,117,321	0%
New York	11,237,658	12,370,725	10%	12,270,491	-1%	12,950,322	6%
Georgia	8,827,894	9,717,990	10%	9,639,250	-1%	9,639,250	0%
Michigan	7,241,926	7,972,113	10%	7,907,519	-1%	8,914,471	13%
Indiana	6,162,557	6,783,913	10%	6,728,946	-1%	6,728,946	0%
Virginia	5,992,095	6,596,264	10%	6,542,817	-1%	6,542,817	0%
Missouri	6,034,064	6,642,465	10%	6,588,644	-1%	6,588,644	0%
Louisiana	3,875,696	4,266,474	10%	4,231,905	-1%	4,231,905	0%
Alabama	4,766,918	5,247,556	10%	5,205,037	-1%	5,205,037	0%

State (In order of CMV crash rank)	Basic Factor Component Only ($)	Include a Maximum (4.944%) ($)	Changes due to Max	Include a Minimum (0.44%) ($)	Changes due to Min	Add Border Component (Final Simulation) ($)	Changes due to Border
Tennessee	5,639,581	6,208,207	10%	6,157,905	-1%	6,157,905	0%
Oklahoma	4,298,424	4,731,824	10%	4,693,485	-1%	4,693,485	0%
Kentucky	4,279,974	4,711,514	10%	4,673,338	-1%	4,673,338	0%
South Carolina	4,100,673	4,514,135	10%	4,477,559	-1%	4,477,559	0%
Arizona	4,543,472	5,001,580	10%	4,961,055	-1%	8,751,032	76%
Minnesota	5,189,430	5,712,668	10%	5,666,381	-1%	5,792,854	2%
Wisconsin	5,447,110	5,996,330	10%	5,947,744	-1%	5,947,744	0%
Arkansas	3,308,699	3,642,308	10%	3,612,796	-1%	3,612,796	0%
Maryland	4,407,566	4,851,970	10%	4,812,657	-1%	4,812,657	0%
Colorado	4,282,342	4,714,121	10%	4,675,925	-1%	4,675,925	0%
Iowa	4,141,512	4,559,091	10%	4,522,151	-1%	4,522,151	0%
Massachusetts	4,552,699	5,011,737	10%	4,971,130	-1%	4,971,130	0%
Washington	5,125,749	5,642,566	10%	5,596,847	-1%	5,967,882	7%
Kansas	3,320,701	3,655,520	10%	3,625,901	-1%	3,625,901	0%
Mississippi	3,455,781	3,804,220	10%	3,773,396	-1%	3,773,396	0%
Oregon	3,705,257	4,078,850	10%	4,045,801	-1%	4,045,801	0%
Utah	2,722,079	2,996,541	10%	2,972,261	-1%	2,972,261	0%
Nebraska	2,912,905	3,206,607	10%	3,180,625	-1%	3,180,625	0%
Connecticut	2,417,217	2,660,939	10%	2,639,379	-1%	2,639,379	0%
West Virginia	1,784,049	1,963,931	10%	1,948,018	-1%	1,948,018	0%
Wyoming	1,704,793	1,876,683	10%	1,861,478	-1%	1,861,478	0%
Maine	1,404,737	1,546,374	10%	1,533,844	-1%	1,780,892	16%
New Mexico	2,572,895	2,832,314	10%	2,809,365	-1%	4,158,415	48%

State (In order of CMV crash rank)	Basic Factor Component Only ($)	Include a Maximum (4.944%) ($)	Changes due to Max	Include a Minimum (0.44%) ($)	Changes due to Min	Add Border Component (Final Simulation) ($)	Changes due to Border
North Dakota	2,229,253	2,454,024	10%	2,434,140	-1%	2,777,906	14%
Idaho	2,010,343	2,213,041	10%	2,195,110	-1%	2,242,292	2%
Montana	2,147,063	2,363,547	10%	2,344,396	-1%	2,549,731	9%
Delaware	950,370	1,046,193	10%	1,139,413	9%	1,139,413	0%
Nevada	2,190,390	2,411,242	10%	2,391,705	-1%	2,391,705	0%
New Hampshire	1,290,772	1,420,918	10%	1,409,405	-1%	1,429,405	1%
District of Columbia	275,803	303,611	10%	1,139,413	275%	1,139,413	0%
South Dakota	2,794,354	3,076,102	10%	3,051,178	-1%	3,051,178	0%
Vermont	1,003,463	1,104,640	10%	1,139,413	3%	1,285,194	13%
Rhode Island	811,912	893,776	10%	1,139,413	27%	1,139,413	0%
Hawaii	601,853	662,537	10%	1,139,413	72%	1,139,413	0%
Alaska	1,037,121	1,141,692	10%	1,139,413	0%	1,181,571	4%
Puerto Rico	987,431	1,086,991	10%	1,139,413	5%	1,139,413	0%
TOTAL	**258,957,584**	**258,957,584**	**0%**	**258,957,584**	**0%**	**286,337,629**	**11%**

Figure 3. This is a visual representation of Table 16, above.

State (In order of CMV crash rank)	Basic Formula Only ($)	Include a Maximum (4.944%) ($)	Include a Minimum (0.44%) ($)	Add Border Component (Final Simulation) ($)
Texas	23,270,484	12,802,863	12,802,863	26,492,885
California	22,687,452	12,802,863	12,802,863	18,118,296
North Carolina	7,849,850	8,641,332	8,571,315	8,571,315
Florida	12,651,320	12,802,863	12,802,863	12,802,863
Illinois	9,848,575	10,841,584	10,753,740	10,753,740
Ohio	8,616,743	9,485,550	9,408,693	9,408,693
Pennsylvania	9,728,337	10,709,223	10,622,451	10,622,451
New Jersey	6,518,241	7,175,461	7,117,321	7,117,321
New York	11,237,658	12,370,725	12,270,491	12,950,322
Georgia	8,827,894	9,717,990	9,639,250	9,639,250
Michigan	7,241,926	7,972,113	7,907,519	8,914,471
Indiana	6,162,557	6,783,913	6,728,946	6,728,946
Virginia	5,992,095	6,596,264	6,542,817	6,542,817
Missouri	6,034,064	6,642,465	6,588,644	6,588,644
Louisiana	3,875,696	4,266,474	4,231,905	4,231,905
Alabama	4,766,918	5,247,556	5,205,037	5,205,037
Tennessee	5,639,581	6,208,207	6,157,905	6,157,905
Oklahoma	4,298,424	4,731,824	4,693,485	4,693,485
Kentucky	4,279,974	4,711,514	4,673,338	4,673,338
South Carolina	4,100,673	4,514,135	4,477,559	4,477,559
Arizona	4,543,472	5,001,580	4,961,055	8,751,032
Minnesota	5,189,430	5,712,668	5,666,381	5,792,854
Wisconsin	5,447,110	5,996,330	5,947,744	5,947,744
Arkansas	3,308,699	3,642,308	3,612,796	3,612,796
Maryland	4,407,566	4,851,970	4,812,657	4,812,657
Colorado	4,282,342	4,714,121	4,675,925	4,675,925
Iowa	4,141,512	4,559,091	4,522,151	4,522,151
Massachusetts	4,552,699	5,011,737	4,971,130	4,971,130
Washington	5,125,749	5,642,566	5,596,847	5,967,882
Kansas	3,320,701	3,655,520	3,625,901	3,625,901
Mississippi	3,455,781	3,804,220	3,773,396	3,773,396
Oregon	3,705,257	4,078,850	4,045,801	4,045,801
Utah	2,722,079	2,996,541	2,972,261	2,972,261
Nebraska	2,912,905	3,206,607	3,180,625	3,180,625
Connecticut	2,417,217	2,660,939	2,639,379	2,639,379
West Virginia	1,784,049	1,963,931	1,948,018	1,948,018
Wyoming	1,704,793	1,876,683	1,861,478	1,861,478
Maine	1,404,737	1,546,374	1,533,844	1,780,892
New Mexico	2,572,895	2,832,314	2,809,365	4,158,415
North Dakota	2,229,253	2,454,024	2,434,140	2,777,906
Idaho	2,010,343	2,213,041	2,195,110	2,242,292
Montana	2,147,063	2,363,547	2,344,396	2,549,731
Delaware	950,370	1,046,193	1,139,413	1,139,413
Nevada	2,190,390	2,411,242	2,391,705	2,391,705
New Hampshire	1,290,772	1,420,918	1,409,405	1,429,405
District of Columbia	275,803	303,611	1,139,413	1,139,413
South Dakota	2,794,354	3,076,102	3,051,178	3,051,178
Vermont	1,003,463	1,104,640	1,139,413	1,285,194
Rhode Island	811,912	893,776	1,139,413	1,139,413
Hawaii	601,853	662,537	1,139,413	1,139,413
Alaska	1,037,121	1,141,692	1,139,413	1,181,571
Puerto Rico	987,431	1,086,991	1,139,413	1,139,413

Appendix G. Calculation of Parameters for Border Component

Crossings per Full-Time Employee (FTE)

To calculate the crossings per FTE parameter, FTE data from CVSPs and crossing data from BTS were used. The table below shows how it was estimated for each State. The Trooper and Inspector FTEs in the CVSPs are counted. They are then divided by the Border Crossing volume of the same year. The average number of crossings per FTE was 204,712 for the Canadian border and 22,716 for the Mexican border. These were rounded to 200,000 and 25,000, for simplicity.

Table 17. Using CVSP data to estimate crossings per FTE. (1) Based on inspector and trooper FTE from State CVSPs for FY 2017. (2) Average annual crossings by trucks and buses, between 2013 and 2015.[19]

State	Border FTE (1)	CMV Crossings (2)	Crossings per FTE
Alaska	1.36	20,406	
Idaho	0.25	69,411	
Maine	1.85	312,445	
Michigan	0.19	2,380,629	
Minnesota	2.55	63,861	
Montana	10.34	175,477	
New Hampshire	0.29	0	
New York	7.50	1,541,938	
North Dakota	1.57	404,004	
Vermont	0.68	223,603	
Washington	2.00	657,589	
Northern Total	**28.57**	**5,849,362**	**204,712**
Arizona	29.00	395,865	
California	26.00	1,283,270	
New Mexico	12.10	105,151	
Texas	179.00	3,806,204	
Southern Total	**246.10**	**5,590,489**	**22,716**

Calculation – Minimum FTE per Port of Entry

For the Canadian border, the minimum number of FTE per port should be based on the FTE needed to provide for adequate strike-force-based enforcement at each port. Based on descriptions of border enforcement from FY 2017 CVSPs from all Northern border States, a typical strike force consists of 5 people for 48 hours each over several days, for a total of 240

[19] "Border Crossing/Entry Data." *U.S. Customs and Border Protection and the Bureau of Transportation Statistics*. https://transborder.bts.gov/programs/international/transborder/TBDR_BC/TBDR_BC_Index.html

man-hours. A minimum amount of coverage for one port is 2 strike forces per year – a total of 480 man-hours. That corresponds to 0.23 FTE, which is rounded to 0.25 FTE required per port at minimum.

For the Mexican border, the minimum number of FTE required per port should be based on the minimum number of FTE required to staff ports of entry during hours of operation. An average port of entry requires 4 shifts to cover it (open for 24 hours). Each shift requires 2 FTE, for safety reasons. Therefore, a typical port requires 8 FTE at minimum. Some ports have a lower minimum (not open for 24 hours), while others have a higher minimum (several separate facilities may fall within one port of entry).

When implementing this, the same definition of "port of entry" as the U.S. Customs and Border Protection dataset it is based on is used.

Calculation – Excluding Low-Volume Northern Ports

Enforcement focused on small ports would have small safety impact because of the small amount of traffic. Rather, a more efficient enforcement strategy is to inspect the traffic when they funnel in from the remote ports of entry towards corridors (major highways, etc.) closer to population centers.

These small ports account for a tiny amount of traffic – ~20 ports with ~8,000 annual crossings, compared to roughly 5.8 million annual crossings for the entire Canadian border. Rather than focus enforcement at these individual ports of entry, States typically perform strike forces or patrols along border corridors where multiple ports feed into. This is based on States' past border grant applications. Therefore, these ports should not be subject to the minimum FTE calculation, but their traffic can be converted to FTE using the crossings per FTE.

Conversely, small ports on the Mexican border require an enforcement presence while operating, so they should be subject to the minimum FTE limit.