

# Special Study of Response of Various Traffic Sectors to COVID Quarantine

March 3 through May 12, 2020 Data (10 Weeks)

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## Introduction

The purpose of this report is to present the results of several analyses that have been run subsequent to the COVID quarantine actions. The base week (Week 1 in the charts) is March 3-9, 2020, since this was the last week in which the traffic was considered to be “normal.” The questions to be answered relate to how the various types of crashes fell off with the decline in traffic after Week 1. This is given in the charts by Weeks 2, 3, ... 10, the last of which is May 6 to May 12.

Many reports, such as that of fatalities going up and pedestrians walking out in the roadways to maintain social distancing, could lead to erroneous conclusions that might be harmful if used to modify enforcement policies in the short term. We are not claiming that articles that draw conclusions at variance to those drawn here are in any way false; We expect they were just based on other data sources. These results could vary considerably from state to state. The data source for the results in this report are Alabama crashes as reported by eCrash, and thus the results obtained should only be applied within the state of Alabama.

How can metrics of extremely different values (e.g., all crashes and bicycle crashes) be compared on the same chart? The answer is that the numbers of crashes are not being compared. What is being compared is the *proportion* by which the particular metric increased or decreased in the weeks following the COVID quarantine. These proportions (e.g., 0.9, 0.8, ... etc.) are given on the Y axis.

All of the crash charts contain two lines representing fatal and all crashes in order to provide a common baseline for comparing how the various crash types changed with respect to all crashes and fatal crashes. In addition to all crashes and fatal crashes, which are in all of the charts, the following crash types are also compared (two per chart);

- Speeding Crashes and ID/DUI Crashes
- Pedestrian Crashes and Bicycle Crashes
- Motorcycle Crashes and Large Truck Crashes
- Aggressive Driving and Interstate Travel
- Young Driver Crashes and Federal/State Travel
- Rural Crashes and Urban Crashes.

All of these charts have a *Week 1*, which has a value of 1 for all crash types. Week 1 represents the level of crashes before the COVID quarantine took effect. It could be considered to be very close to the average of all of the weeks in 2020 prior to that week (March 3-9, 2020).

The Y axis measures how much the particular crash type either increased (greater than 1) or decreased (less than one) from Week 1. Multiply by 100 to turn these proportions into percentages.

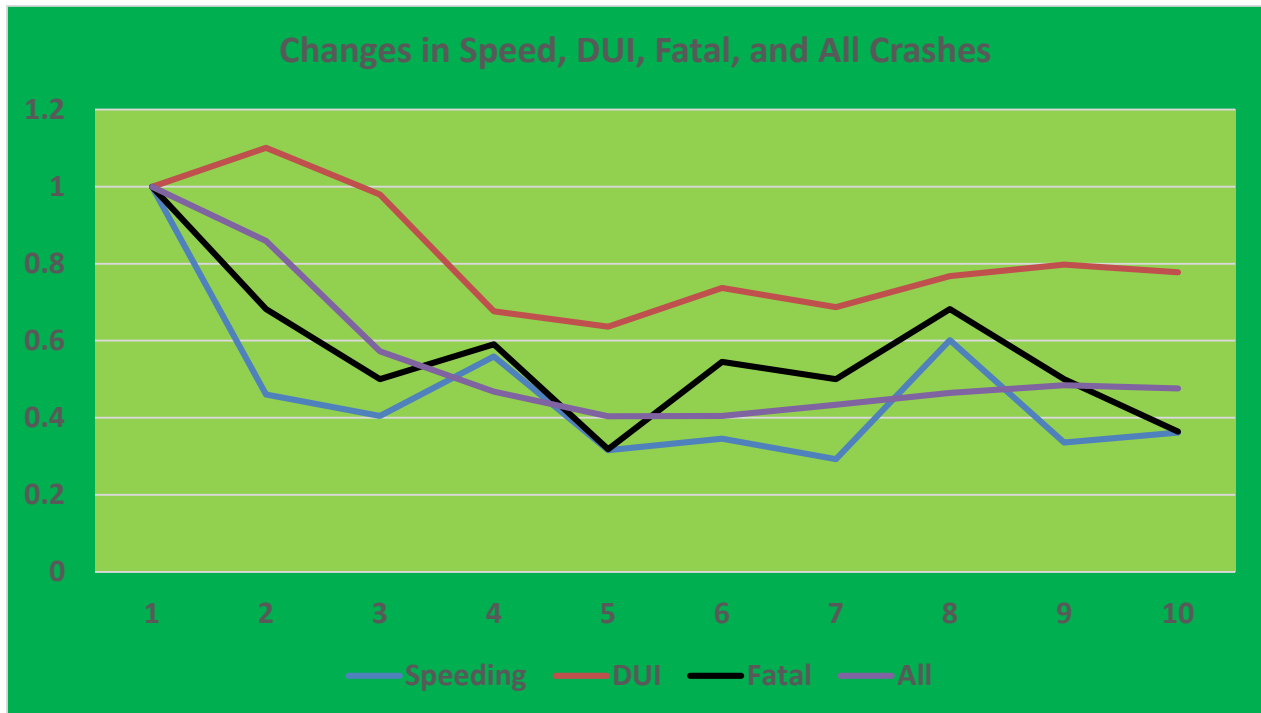
Comments are given beneath each of the charts.

A final chart is dedicated to illustrating the very high correlation between traffic volume and crash frequency. This demonstrates that crash frequency is an excellent proxy measure for traffic volume, and thus the charts can be used to gauge the degree to which the drivers of the various vehicle types conformed to the COVID quarantine, assuming that their occupation did not demand that they stay on the road.

We appreciate the efforts of the Alabama Law Enforcement Agency (ALEA) and local law enforcement agencies in collecting these data, and ALEA's role in maintaining the crash records.

## First Ten Weeks Response Temporal Displays

### Speeding Crashes and Impaired Driving Crashes (ID/DUI)



How can crashes of different types be compared? Recognize that the charts do not measure absolute numbers of crashes for each type. Instead, they are being compared against their pre-COVID Week 1 baseline. The reason that dissimilar crash types can be compared is that they all measure proportions (up or down) from the base week (Week 1) as was described above.

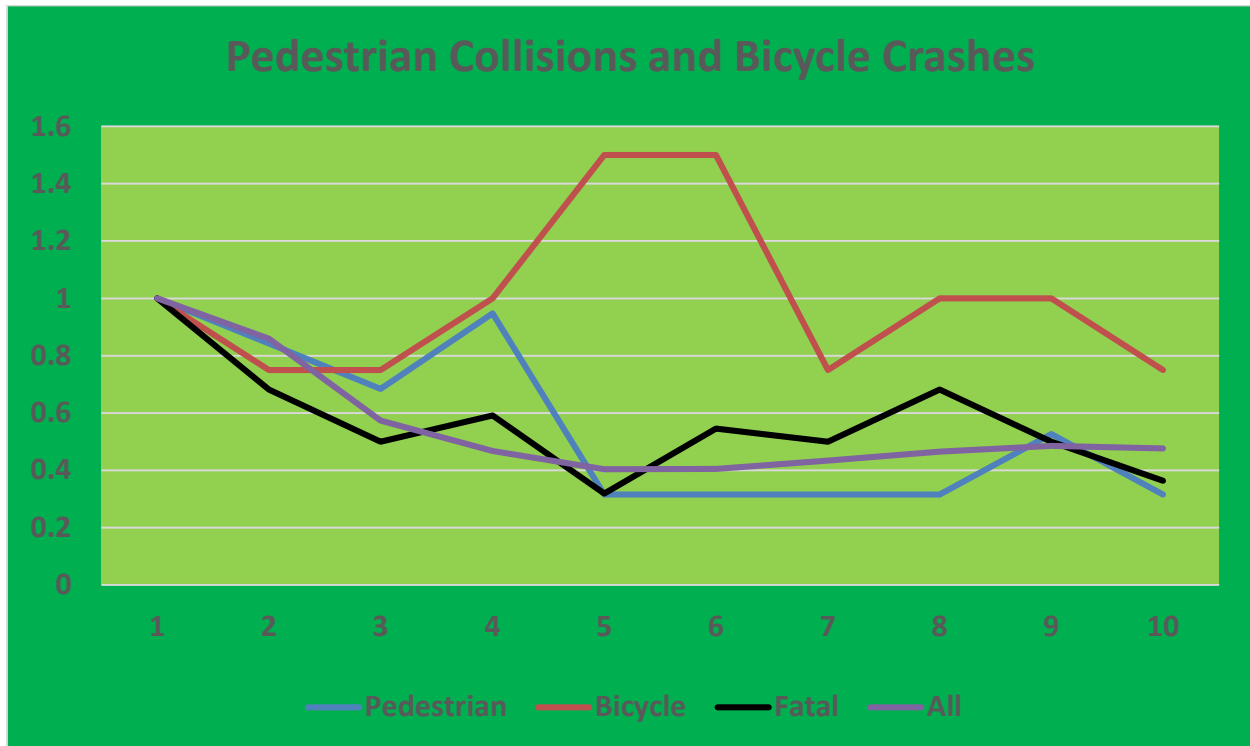
Consider the *All crashes* and the *Fatal crashes* lines first. Consistent with what has also been observed in most traffic counts, all crashes came down to about 40% of their pre-COVID level. They have now regressed, but only to about 50%.

It has been reported in some states that fatal crashes did not come down by the same proportion as non-fatal crashes. While not a perfect fit, it can generally be seen that these two lines are fairly consistent so far for Alabama, as evidenced by their crossing four times. The fatal crash line is not as smooth because its values are much lower and thus subject to considerable relative variation from week to week. It is interesting to see the Speeding and Fatal crash line somewhat mirroring each other. Very few fatal crashes do not involve some degree of excessive speed.

Now consider speed-related crashes, the blue line, and see how it came down roughly the same as the All crashes and Fatal crashes. On the other hand, ID/DUI crashes actually increased in the first week, and while it decreased after that, it only got down to about the 0.6 line as opposed to the others that came down to 0.4. After that, it went back up again to about 0.8 of its pre-COVID level. This would indicate that ID/DUI crashes might need special consideration going forward.

The All crashes and Fatal crashes curves identical to those above will be maintained for reference purposes in the charts below.

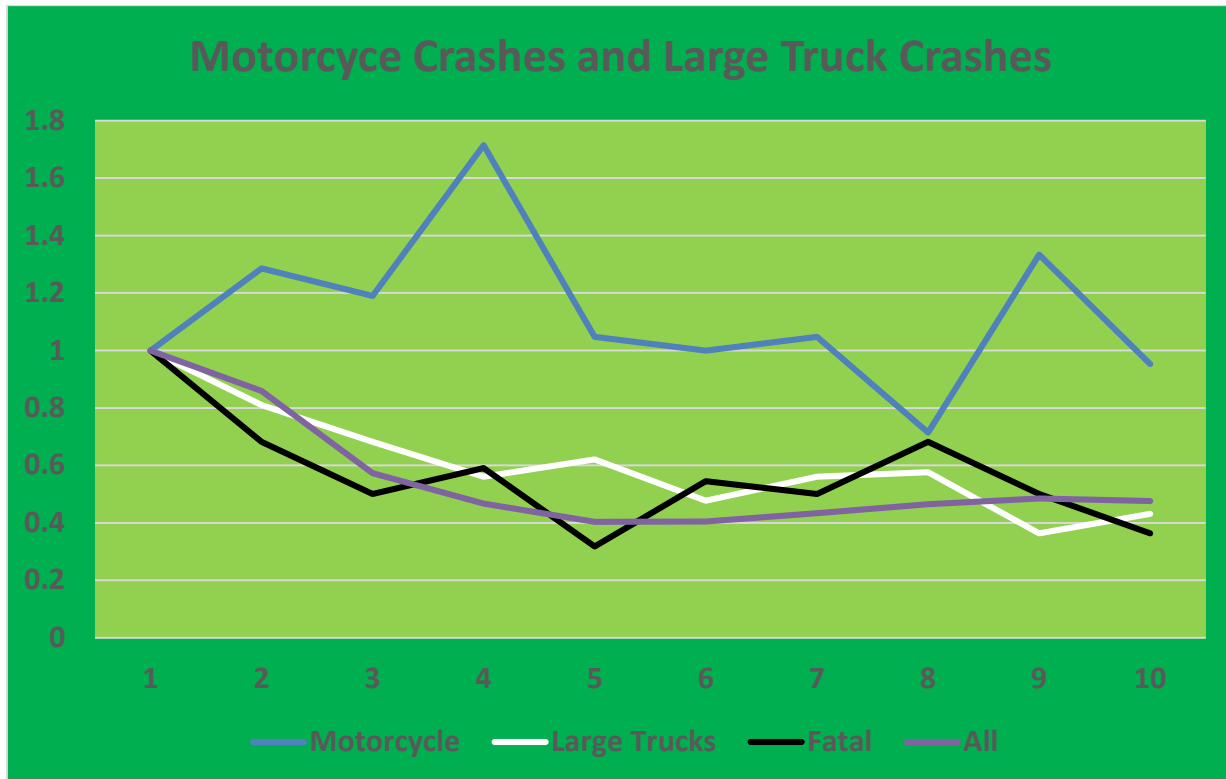
## Pedestrian and Bicycles



Pedestrian collisions had a slight rise in the 4<sup>th</sup> week but then came down to the All and Fatal crash levels. This will bear watching as new data are added. In the addition of weeks 9 and 10, the pedestrian proportion remained about the same as all crashes.

Bicycles on the other hand had a dramatic increase in crashes relative to the other crash proportions, which might indicate that a large number of new bicyclists are engaging in this activity without the normal crash avoidance habits of more experienced bicyclists. While these came down in week 7, they went back up to the its pre-COVID level in weeks 8 and 9.

## Motorcycles and Large Trucks

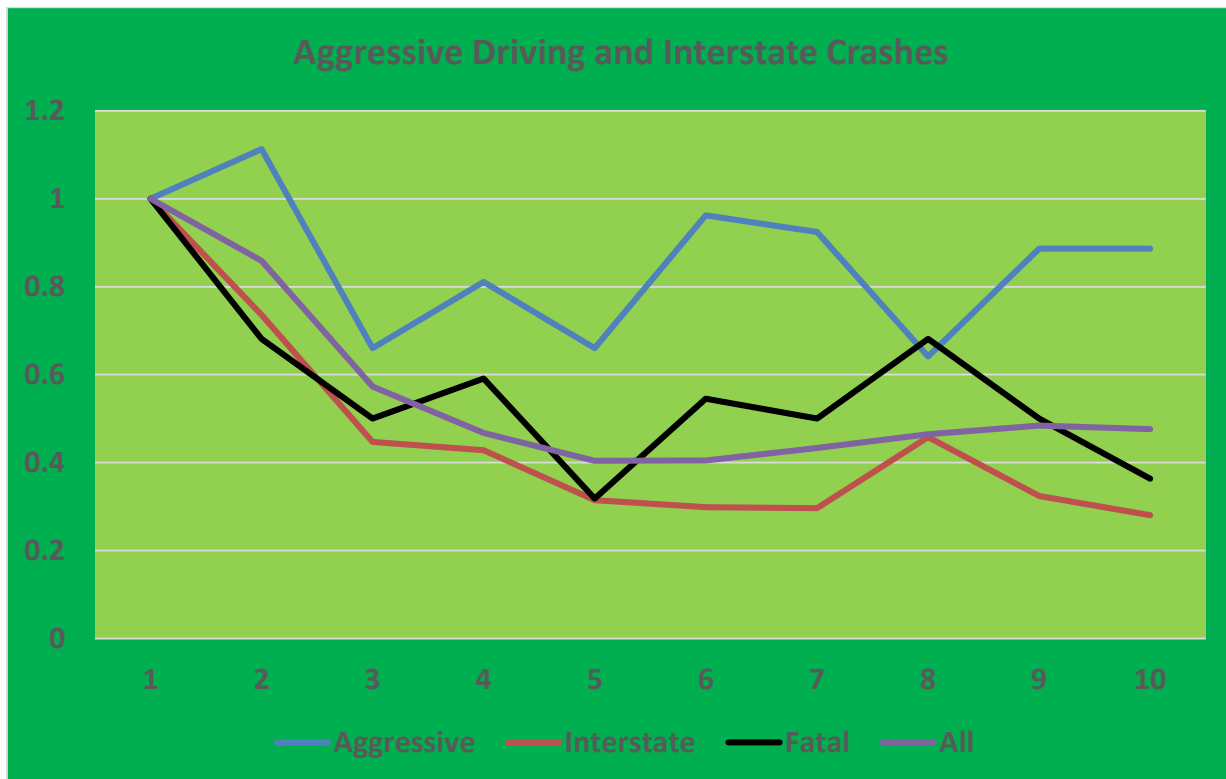


It was speculated that since the number of trucks on the road has not decreased nearly as much as passenger vehicles, that truck crashes might have relatively higher proportion. This has not been the case, as can be seen. It could be noted that a significant proportion of two-vehicle truck crashes have historically been caused by passenger cars, so fewer cars on the road what help to reduce truck crashes. For a study of causative vehicle types in disparate two-vehicle crashes for a large variety of vehicle types, please see:

<http://www.safehomealabama.gov/wp-content/uploads/2018/12/At-Fault-Analyses-Discussion-v04.pdf>

Clearly motorcycles have a much different pattern, and we suspect that the cause would be much the same as that of bicycles given above. There is a favorable point toward the end of the sequence in week 8, but a moderate rise in week 9. The general conclusion is the motorcycle crashes are at least as high as their pre-COVID levels.

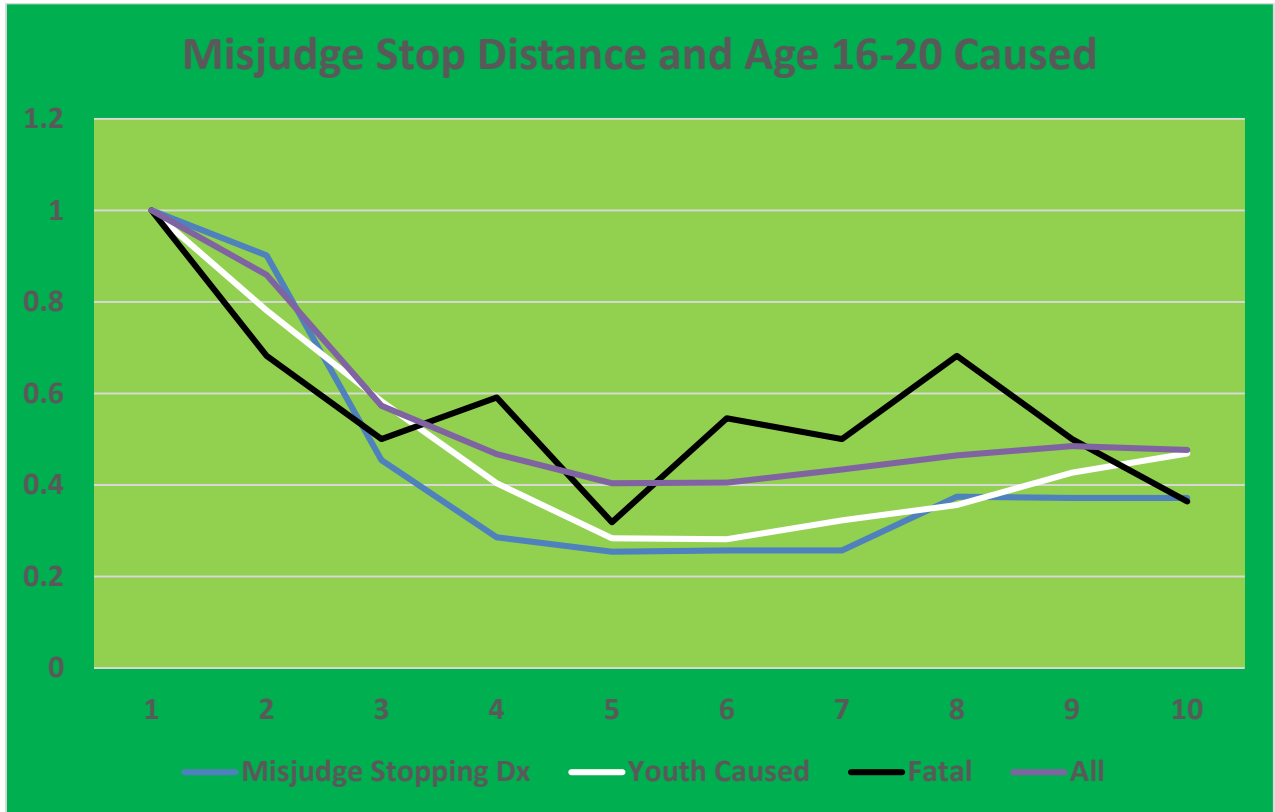
## Aggressive Driving and Interstate Travel



Interstate travel crashes apparently dropped off more than either fatal crashes or total crashes, which probably indicates that fewer longer trips are being taken.

On the other hand, aggressive driving rose in Week 2, and then fell, but clearly not as much as crashes in general, and interstate crashes in particular. The aggressive driving line is choppy because of the relatively few crashes that typically fall into this category. It was good to see the reduction in Week 8, but it rose again in Week 9. We expect that there is considerable frustration on the roadways, and we appeal to everyone to be patient and have consideration for other drivers on the road.

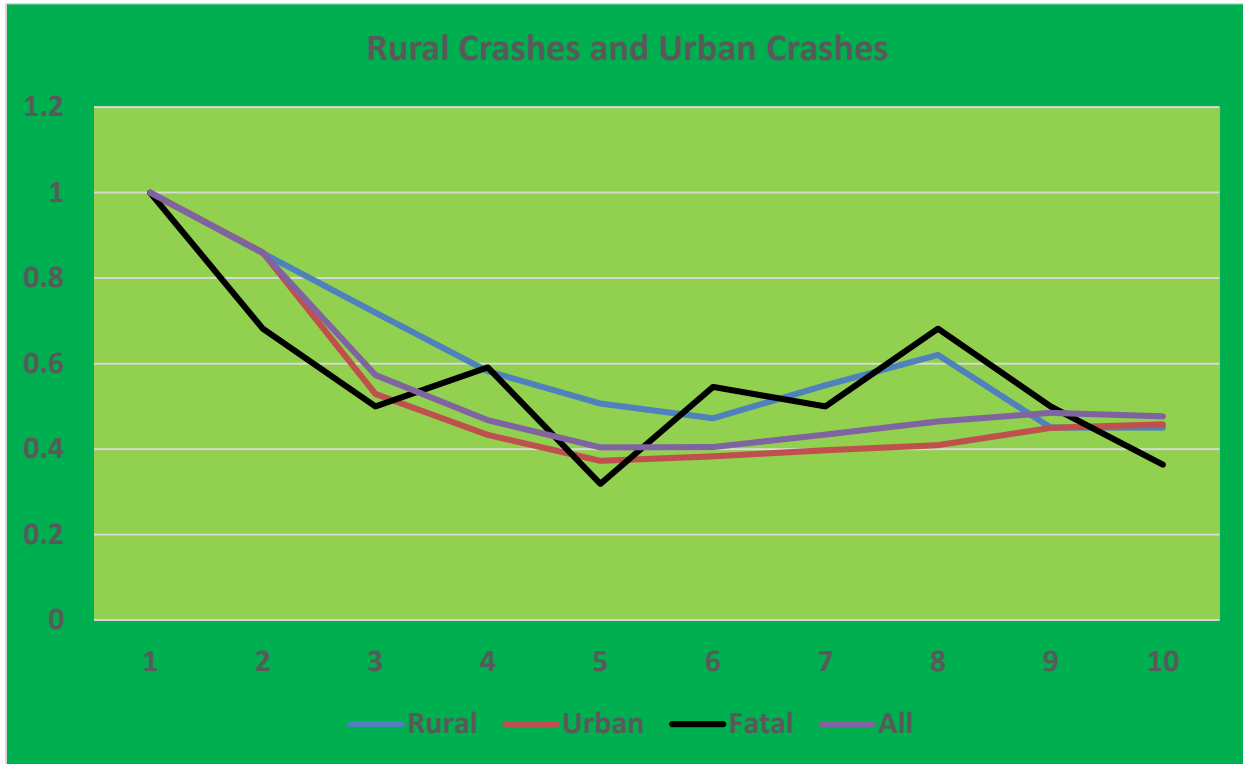
## Misjudge Stopping Distance and Young Driver Caused



Misjudging stopping distance and youth driver (aged 16-20) caused crashes both followed the general crash and fatal crash trends in their reductions.

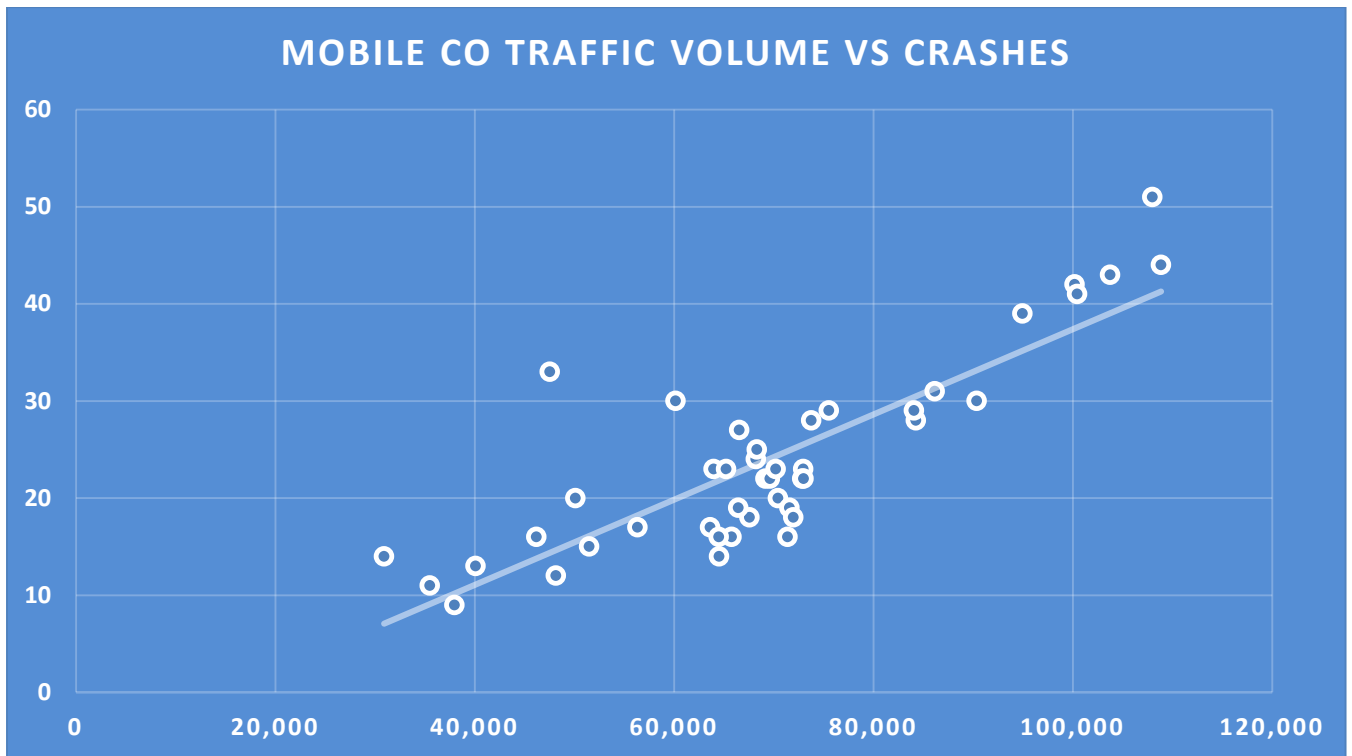


## Rural and Urban



Urban crashes fell off by approximately the same proportion as Fatal and ALL. The All crash and the Urban crash lines are nearly congruent, indicating the proportionate larger number of urban than rural crashes in the total. Rural crashes generally stayed slightly above all of the others, perhaps indicating that rural driving did not fall off as much as city driving, a fact that could be out of necessity for rural dwellers in securing the necessities of life.

## Correlation Analysis: Relationship between ADT and Crash Frequency



Correlation coefficient = 0.8430

The regression above indicates a nearly perfect relationship between Crashes and Average Daily Traffic (ADT). This analysis, which considered the identical roadway and a similar traffic mix, was performed where the differences in traffic volumes were due solely to the quarantine caused by COVID. Volume and crashes were compared over 43 days from 3/9/2020 to 4/23/2020, and the correlation coefficient of the resulting least-squares regression line was 0.8430, which indicates an extremely high correlation. The sample of traffic volume was obtained from I-10, Milepost 3.

The conclusion that can be drawn from this is that the major portion (virtually all) of the variations experienced after Week 1 (March 3-9) were due to the reduction in traffic volume. The only other cause of it could have been that the drivers remaining on the road (after the COVID quarantine went into effect) were of superior skill and experience. While we believe this is true, and that it had some effect, its effect would be relatively small compared to the reduction in traffic volume.