

COVID Follow-up: Comparing 2021 to 2019 Crashes
A Study of the Long-term Effects of the COVID Quarantine
First 25 Weeks of 2021 and 2019 Compared: January 7-June 24

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1.0 Introduction and Summary of Major Recent Findings

1.1 Introduction

This report presents the results of a research effort to establish the continued effects of the COVID pandemic, which had a significant effect on traffic safety. This major factor began approximately March 10, 2020 and lasted throughout the rest of 2020. The initial impact that the public reaction had to the pandemic in Alabama was studied in a series of reports that can be found on the SafeHomeAlabama.gov Special Studies page:

<http://www.safehomealabama.gov/caps-special-studies/>

To continue to study the longer term effects out into 2021, it was determined to compare the history of each of the crash types (that were considered in the original 2020 study) with those of identical times in 2019. If the pure comparison of the first 17 weeks of 2020 and 2021 is of interest, see the report on the Special Studies page (URL given above) entitled: “COVID Follow-up: 2021 to 2020 Crash Comparisons.” This current report should be viewed as an update to that, extending the number of months being compared from 17 to 25. As a convenience and for ease of visual comparison, the 17-week charts that were in that previous report have been retained below on the same pages as the corresponding to the updated 25 week changes.

In order to smooth out the weekly variations, the 25-week charts plot two-week averages of the week ending with the number on the X-axis of the chart. This makes the 25-week chart easier to draw conclusions from, but somewhat less accurate than the 17 week charts, all of which plotted individual week crash frequencies. For this reason, the charts may be inconsistent in some of the readings; however, we saw no cases in which the conclusions were affected.

Since the COVID pandemic had a considerable impact on the 2020 crash data, it was determined that little new information could be obtained by comparing 2021 weeks with the corresponding 2020 weeks. It was determined that the best control period would be the 2019 calendar year, since these data could not be affected by the COVID pandemic that had not started at that time. Thus, the 2019 weeks are being compared against the same weeks in 2021 in order to determine if the effects of COVID have continued, and if so, to what degree.

A possible complicating factor that should be taken into account is the change in the price of gasoline during the 2020-21-time frame portion of the study. According to https://ycharts.com/indicators/us_gas_price, the price of regular gas bottomed out in the middle of November 2020 at \$2.022 per gallon. By the end of February (March 1, 2021), the price had risen to an average of \$2.796, and this price rise has continued in Alabama (close to \$3.00/gallon) to the end of the 25 weeks under consideration. Such a rise can have a major effect on those with limited incomes, e.g., younger drivers and those with fixed incomes near the poverty level.

1.2 Findings from the 2019 to 2021 Comparisons

Considerable information can be obtained just by comparing the total number of crashes in each of the crash categories over the entire 25 weeks of 2019 and 2021. These results are given in Table 1 below. The conclusions that were drawn from these totals will be discussed as part of the itemized conclusions given in Section 1.4 for each crash category.

Table 1. Totals for Each Crash Type over the Entire 25 Weeks

CrashType	2019	2021	2021		Significant	
			Increase	Percent	Increase	Decrease
All Crashes	75,988	68,543	-7,445	-9.8%		***
Fatal Crashes	387	391	4	1.0%	Not	Not
Speeding Involved Crashes	4,246	4,470	224	5.3%	***	
DUI/ID Alcohol or Drugs	2,689	2,789	100	3.7%	***	
Pedestrian Crashes	386	322	-64	-16.6%		***
Bicycle Crashes	104	89	-15	-14.4%		***
Motorcycle Crashes	762	704	-58	-7.6%		***
Large Truck Caused Crash	1,762	1,397	-365	-20.7%		***
Aggressive Driving Crashes	1,355	1,407	52	3.8%	***	
Interstate Crashes	8,426	7,892	-534	-6.3%		***
Misjudged Stopping Dx	7,185	5,763	-1,422	-19.8%		***
Youth Caused Crashes	10,932	9,957	-975	-8.9%		***
Rural Crashes	16,804	17,394	590	3.5%	***	
Urban Crashes	58,234	50,642	-7,592	-13.0%		***

1.3 Attribution of Differences to the COVID Period (2020)

Consistent with the objective of this research project, the differences seen above, and in the charts of Section 2, need to be attributed to one of the following: (1) Driver habits established during the 2020 COVID period that seem to have fairly lasting effects; (2) Roadway and economic differences between 2019 and 2021; or (3) Unexplainable purely random variations. These will be divided into positive and negative effects according to Table 1 above.

First note that fatal crashes did not change significantly over the first 25 weeks of 2021 compared to the same in 2019. The expected reduction of fatal crashes during the COVID period in 2020 did not materialize. While overall traffic volume was down in 2020, the number of fatal crashes remained at previous levels, indicating an increase in the fatal crash rate. The general opinion of traffic safety officials nationally was that the fewer vehicles on the road resulted in higher speeds. There could have been other reasons for the higher speeds, but there is no doubt that the fatalities (if not the fatal crashes) were caused by higher speeds. These speed habits seem to be persisting into 2021. This section will continue by considering those crash types that had significant differences between 2019 and 2021.

Positive Effects (significant reductions):

- **General Crash Frequency.** There was an obvious reduction in crash frequency early in the COVID period. However, it would seem that increased fuel prices are more likely to be causing this continuing overall decline in driving, given that most of the restrictions of COVID have been relaxed.
- **Pedestrian Crashes.** These were down during 2020, contrary to the reported national trends. The favorable effect would seem to be a holdover from this time. We are encouraged by this trend away from distractions and toward honoring pedestrian safety rules.
- **Bicycle Crashes.** These were up during the COVID period, so this reduction cannot be attributed to habits attained during that time. On the other hand, the increase in the experience of the bicyclists currently on the road may have caused this reduction from 2019.
- **Motorcycle Crashes.** Very much like bicycle crashes, it appears that many took to the roads on this mode of transportation, and inexperience could have also been the cause of the dramatic increase in motorcycle crashes in 2020. Seeing the reduction from 2019 leads us to believe that, as with bicycles, the experience gained over the past year is quite favorable. Many novice motorcyclists may have returned to getting around in their cars.
- **Large Truck Caused Crashes.** The majority of the more severe large truck crashes are caused by the non-truck vehicle. Thus, the overall reduction of passenger vehicles on the road, which has continued into 2021, contributed heavily to this reduction in large truck caused crashes.
- **Interstate Crashes.** This also seems to be a continuation of what was established in 2020, mainly from the curtailing of long trips. There is also a clear correlation between large truck and Interstate traffic.

- Misjudged Stopping Distance. This cause can be reflective of two other crash types: youth caused and urban crashes, which are considered next.
- Youth Caused Crashes. These were reduced in 2020 because fewer young people were on the road at that time. The reduction over 2019 is not as great as seen in 2020, indicating a return of young people to the highways, but it is still not as great as it was in 2019.
- Urban Crashes. Urban crashes had the greatest reduction in 2020, and to some extent this trend has continued. Rural travelers have much less discretion over whether they can travel for work and other necessities. So this might be viewed as an extension of the COVID effects.

Negative Effects (significant increases):

- Speeding Involved Crashes. There can be little doubt that the speed habits established during the COVID period have not been reversed. As long as the higher speeds continue, so will the fatalities.
- DUI/Impaired Driving (Alcohol or Drugs). This was not a significant factor in a comparison of the first 17 weeks of 2021, so it cannot be considered as a carry-over from 2020. Perhaps the summer months and the increase in socializing has led to this unfortunate turn of events.
- Aggressive Driving. Aggressive Driving was up over the COVID period, and it was thought to be the result of drivers' frustration with the imposed restrictions. Now that those restrictions have been relaxed, it would be expected that this factor would diminish, but apparently it has not. So, this might also be considered a hold-over from the COVID period.
- Rural Crashes. See the discussion on the reduction of urban crashes above. Rural crashes increased relative to crashes in general over the COVID period because of the lack of discretion over their driving, i.e., obtaining their necessities as well as their occupational requirements.

1.4 Summary of Findings by Crash Type

Unless otherwise stated, the comparisons discussed below will be for the particular crash type in the first 25 weeks (generally January through most of June) of 2019 compared with the same weeks of 2021. The following presents a summary of the crash types referenced to the sections that contain the charts for each:

- **2.1 All Crashes.** All crashes showed a reduction in 2021 of 9.8% for the 25 weeks that were compared, which would indicate that the new somewhat reduced driving habits formed after March 10, 2020 to the end of the year have continued. In addition to many people preferring to drive less, there is also currently an issue of significantly higher gas prices discussed above. Certain weeks, e.g., 15 and 22, showed a near equivalence with 2019.
- **2.1 Fatal crashes.** As continued to be seen from the COVID period of 2020, fatal crashes did not diminish to the proportion that overall crashes did. In fact, fatal crashes were effectively the same in 2020 as in 2019, despite the obvious reduction in traffic volume. This indicates that the causes of the increase fatality rate of the COVID period is continuing. This has been given considerable national attention, and it has basically been attributed to the increased speed that, in turn, was supposedly caused by there being fewer vehicles on the road. As the number of vehicles increases, it would be expected that the fatality *rate* would decrease. However, this has not been the observed result during 2021, and at this point, the number of fatalities in 2021 exceeds the number in 2020 by about 12%. It cannot be disputed that speed is the root cause of fatalities in that Alabama crash data has confirmed repeatedly that the probability of a crash resulting in death doubles for every 10 MPH increase in impact speeds. The chart shows the expected variation off a small number per week, and there does not seem to be any discernible pattern. Other factors that contribute to fatalities will be discussed below.
- **2.2 Speeding Crashes.** Crashes that were caused by speeding according the Primary Contributing Circumstance (PCC) attribute, increased by 5.3%. This attribute measures the officer's opinion as to whether speed was the *primary cause* the crash. For any given crash, it is the speed at impact (and not the cause) that results in death. However, this attribute would certainly be correlated to speed at impact, and thus to fatality crashes. There are several other PCCs that are indicative of excessive speed (e.g., running off the road, aggressive driving, driving too fast for conditions, etc.). The monthly chart demonstrates a very high correlation over the months between 2019 and 2021.
- **2.3 Impaired Driving (DUI) Crashes.** The change in ID crashes was a significant 3.7%, which stands in sharp contrast to the very small change in the first 17 weeks. Perhaps the summer months have resulted in the greater use of alcohol and drugs. This increase in DUI crashes in 2021 when compared to 2019 is a factor which must be watched. Since ID drivers and their passengers are only properly restrained about 50% of the time, this can also be a cause of the fatal crashes introduced above. The monthly charts shows a high correlation over the months between 2019 and 2020, and very little can be inferred as to future ID crashes.

- 2.4 Pedestrian Crashes.** Contrary to the continuing reported National trend of increasing pedestrian crashes, Alabama had a reduction in the after-COVID period of close to 16.6% as compared with 2019. This is not to say that pedestrian crashes are not a major problem in Alabama, and continuing and increased programs for pedestrians are justified. More detailed study of pedestrian crashes have found: (1) a large number caused by distracted walking (something that we all observe almost daily); (2) a significant number caused by walking while intoxicated; (3) over 50% of the more severe cases caused by pedestrian violations, which would also result from distraction and intoxication; and (4) a much higher fatality rate in those for which the above three items are true. This last item is attributed to the pedestrian not taking the normally expected defensive actions to prevent themselves from being killed when struck by a motor vehicle. The weekly chart showed that pedestrian collisions were higher in months 13 through 19, which tends to reduce the confidence that pedestrian crashes are generally in decline.
- 2.5 Bicycle Crashes.** Bicycle crashes were extremely high during the COVID period. The reduction from 2019 of 89 crashes in the 2021 period is quite significant. This would be consistent with the speculation that the increase during the early COVID period was due to a significant increase in the use of bicycles on the roadway, and the corresponding inexperience of many new bicyclists. At this point it would seem that they have attained the experience that will keep them from collisions with motor vehicles. The 2021 reduction in bicycle crashes is concentrated consistently after week 15, which may be a good indication going forward.
- 2.6 Motorcycle Involved Crashes.** Motorcycle crashes were a major problem over the pandemic, and this seems to be improving somewhat in 2021, with a reduction of 58 crashes (-7.6%) in the first 25 weeks of 2021. As with bicycles, we mainly attributed the relative increase in motorcycle crashes to be due to new motorcycle drivers who found the lighter traffic inviting. Motorcycle crashes seem to be returning to normal along with other factors, and while their reduction in 2021 is quite favorable, they still present a problem due to their relatively high fatality rate. No forecast like those for bicycles can be made from the monthly chart – there seems to be little monthly correlation, and both 2019 and 2021 show a general up-trend as the year unfolds.
- 2.7 Large Truck Caused Crashes.** Consistent with the 17-week findings, Large Truck caused crashes were found to be significantly fewer (-20.7%) in 2021 than in 2019. We expect this has to do with the continued reduction in heavy trucks and traffic in general on the roadway due to the economy and the overall price of fuel. This is shown to be consistent over the monthly comparison in the chart.
- 2.8 Aggressive Driving Crashes.** This attribute needs considerable work since it was found to have a significantly higher proportion than expected during the COVID period, and it was highly correlated with fatal crashes (one of the highest PCCs). This comparison shows a significant increase from 2019, which further establishes that it still needs to be watched carefully. The monthly chart shows a favorable trend in weeks 21-23, but it clearly did not continue, and this is expected to continue to be a problem going forward.
- 2.9 Interstate Crashes.** Interstate Crashes are highly correlated with All Crashes, both having reductions in the 5-10% order of magnitude. Interstate crashes were 6.3% fewer

in 2021 than in 2019. The overall reduction in traffic seems to have a greater impact on Interstate crashes, indicating a trend away from longer trips. The second half of the chart shows a very high correlation between 2019 and 2021, and we expect that the Interstate reductions are not going to continue during the rest of 2021.

- **2.10 Misjudged Stopping Distance Crashes.** The large improvement of 19.8% reduction from 2019 is probably be coming from the crash reductions in the urban areas. Generally Misjudging Stopping Distance (MSD) is more of a problem with younger drivers than with those who are more experienced, and the correlation here is obvious. The chart shows the favorable reduction is consistent throughout 2021, which is a good sign. Compare this chart with the urban chart (2.13) to see that MSD is largely an urban issue.
- **2.11 Young (16-20) Driver Caused Crashes.** Reductions in misjudged stopping distance and Young Driver Caused crashes remain highly correlated with the All-crashes reduction. However, the 8.9% reduction in this attribute is less than half that of misjudged stopping distance, so we can conclude that a significant MSD reduction is coming from older drivers as well. The reduction in young-driver crashes appear to be prior to Week 11 on the chart, so it appears that young people have resumed driving at about their pre-COVID levels.
- **2.12 Rural Crashes.** There was a 3.5% increase in the 2021 time period over 2019. Generally, rural travelers do not have as much latitude in their mileage as do the urban dwellers. Since the change here is quite small, we conclude that rural travel in 2021 has returned to about what it was in 2019. This is not true of urban crashes. We also see a very high correlation over the months in rural crashes.
- **2.13 Urban Crashes.** The comparison of urban and rural shows the urban crashes are about three times those of rural, and thus they explain a major part of the changes in crashes in general. This explains the reason that the Urban chart is almost a mirror image of that given for the total of all crashes, which reduced 9.8%. Since rural crashes increased, this decrease has to be in the urban crashes, which were down 13.0%. The chart shows that urban reduction is consistent over the months, and we conclude that this is likely a result of the COVID impact on the traffic mix.

As for the lasting effects of habits acquired over the 2020 COVID pandemic period, the most troubling of these seems to be in the persistence in speed-caused and speed-accompanied crashes, and the resulting increase in impact speeds even when speed is not the primary cause. This has resulted in a continuing increase in fatality crashes, which has shown no sign of abating. On the positive side, there appears to be significant reductions continuing in crashes in general, pedestrian, bicycle, motorcycle, large truck caused, Interstate, misjudged stopping distance, youth caused, and urban crashes.

2.0 Crash Temporal Displays for the First 25 Weeks of 2021

To facilitate a comparison of the 25-week charts against the previous 17-week charts, we have put the two charts over and under on the same pages. These 25-week comparisons were performed to determine if there have been lasting effects of the pandemic, and if so, to determine the magnitudes on the various crash types that we studied during the pandemic.

Obviously, it would not satisfy our goal if we used 2020 data after March 10, 2020, since those data would be corrupted by the pandemic itself. (Anyone interested in those data should view any of the comparative reports that were generated in 2020, which are available on the Special Studies page of SafeHomeAlabama.gov – see below.) We felt that the best control year to provide a good comparison and flush out the lingering effects of the pandemic was 2019. Thus, the 25-week comparison is one of comparing the same weeks in 2021 against 2019.

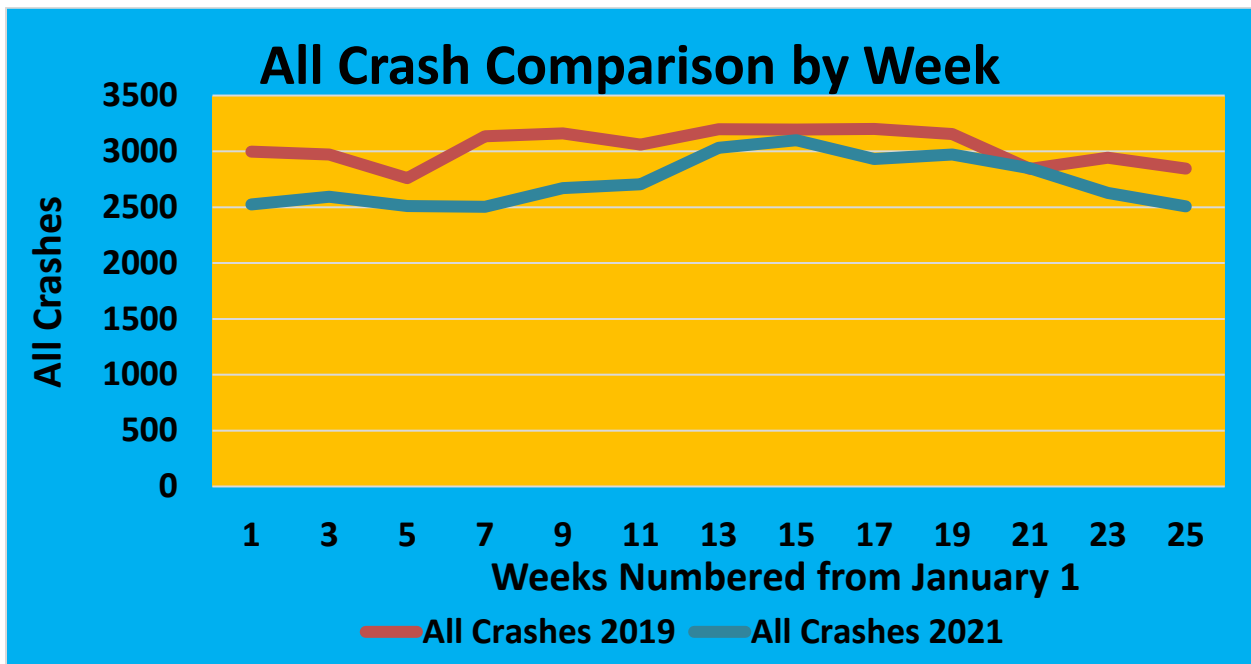
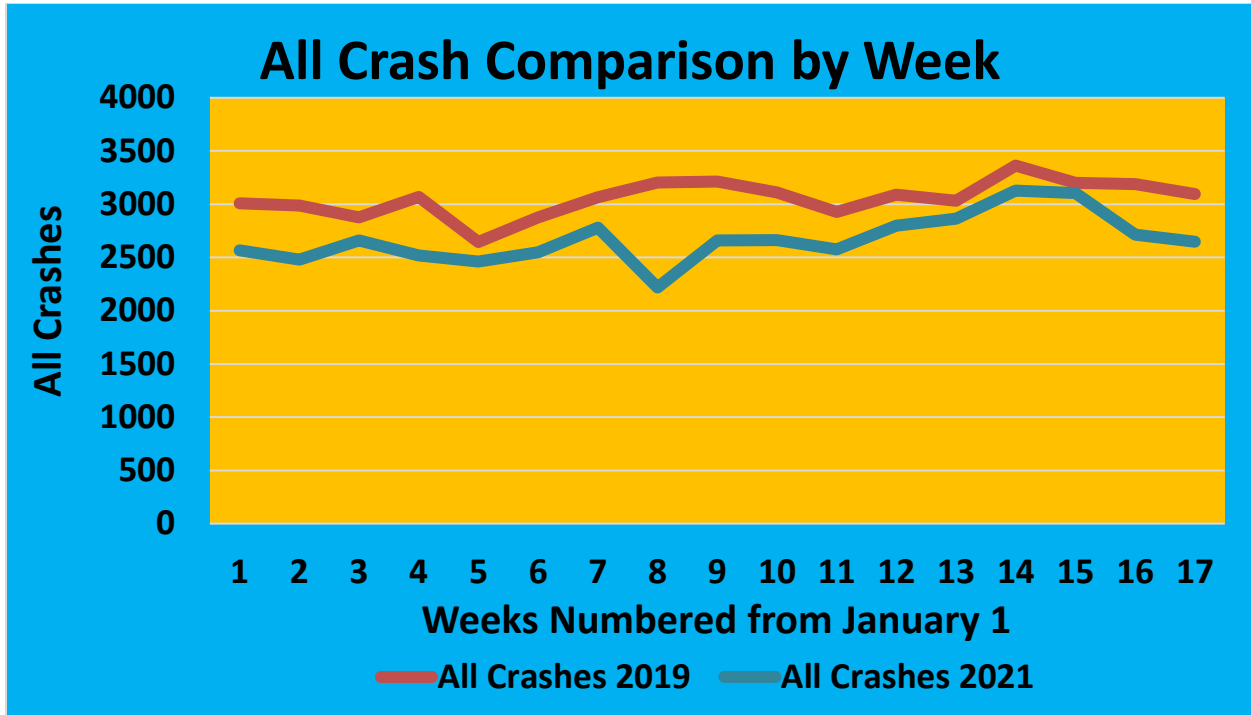
If it is of interest to compare the crash types that increased and decreased in a relative way over the 2020 43-week pandemic period, we recommend you review the entire report, which is here:

<http://www.safehomealabama.gov/wp-content/uploads/2021/01/CovidUpdateWK43.pdf>

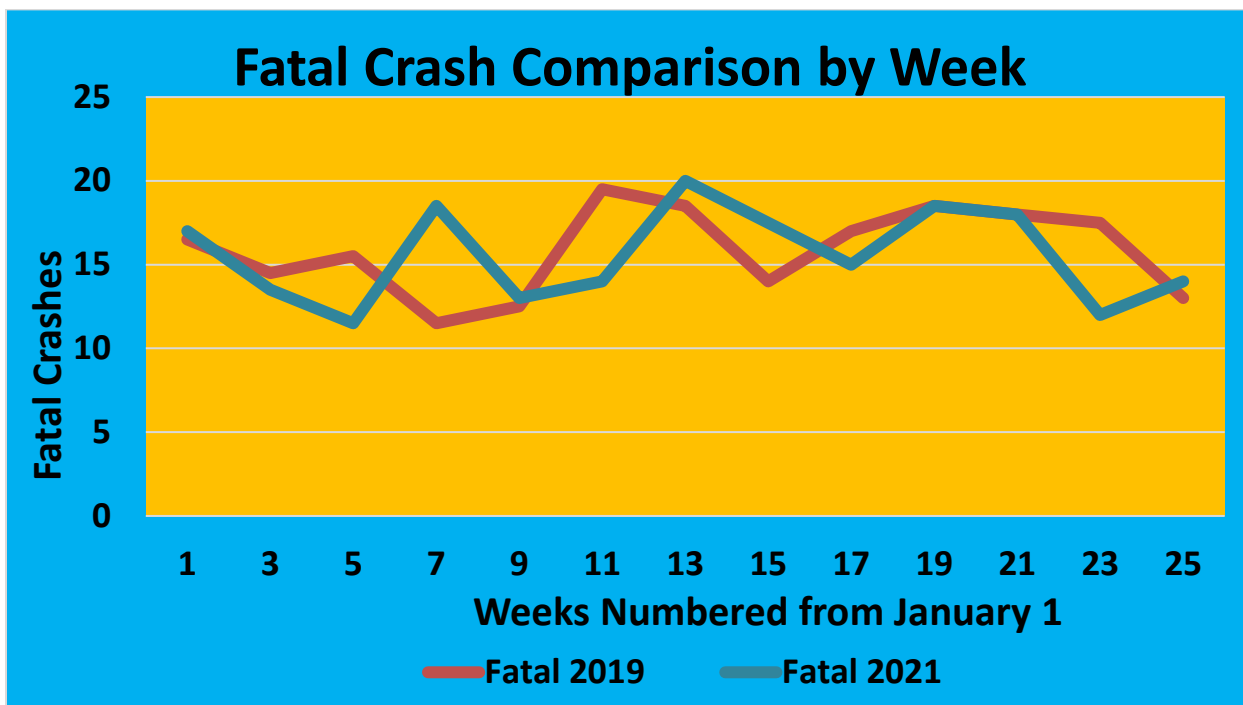
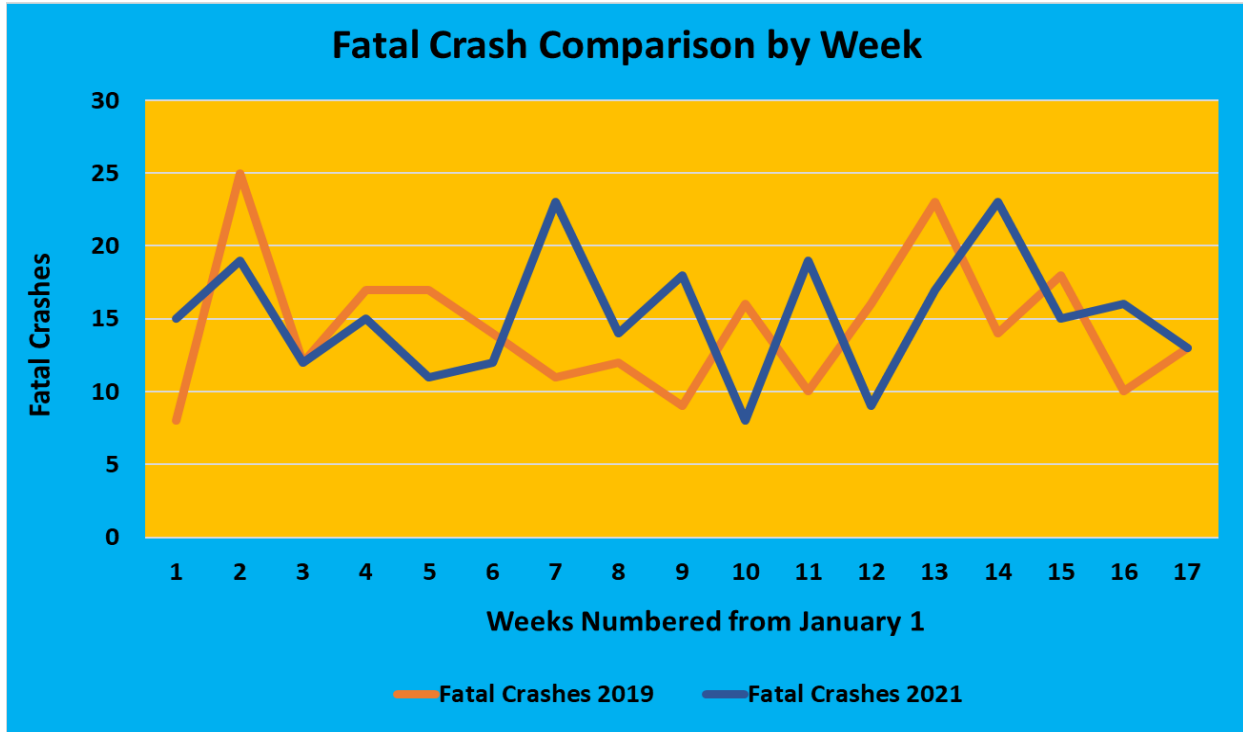
The major objective of the current study was to determine to what extent the reduction experienced in 2020 has continued into 2021. It is also to see in what crash types these increases or decreases may be continuing. We expected that some of the effects of the pandemic in 2020 would carry over into 2021. These difference by week are illustrated in the charts below, and were discussed in the summaries of findings given above.

2.1 All and Fatal Crashes Comparisons First 17 and 25 Weeks of 2019 and 2021

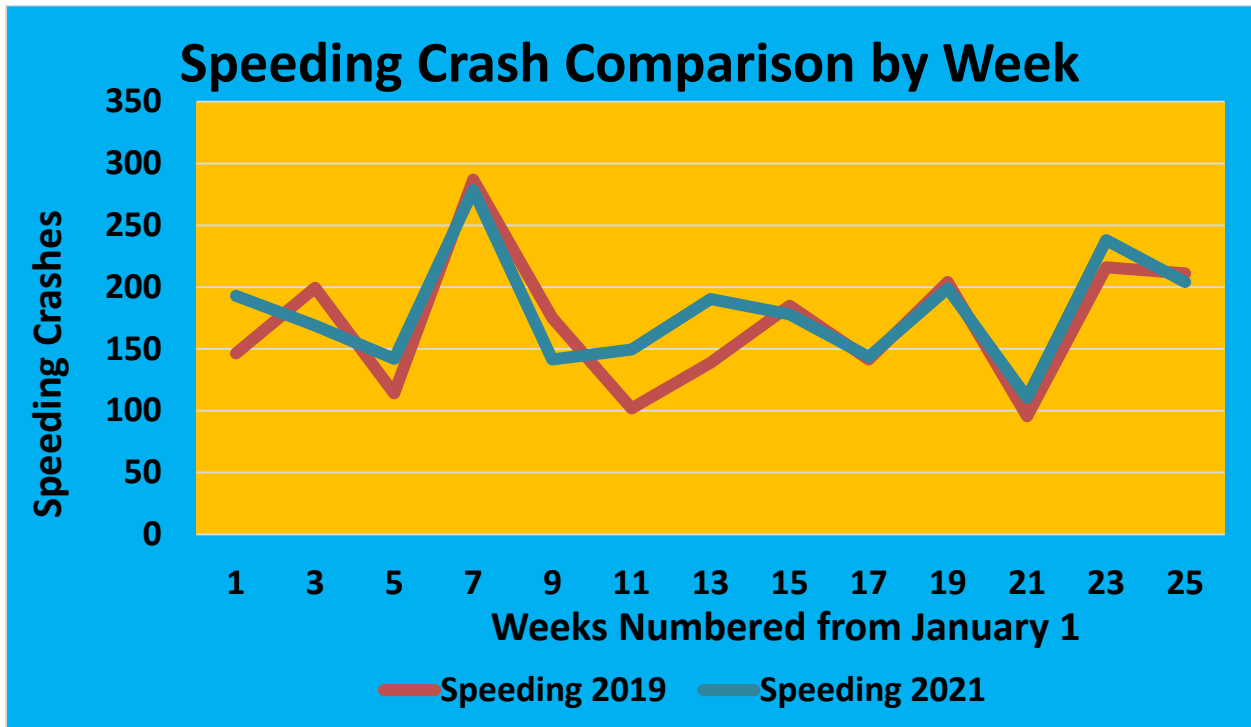
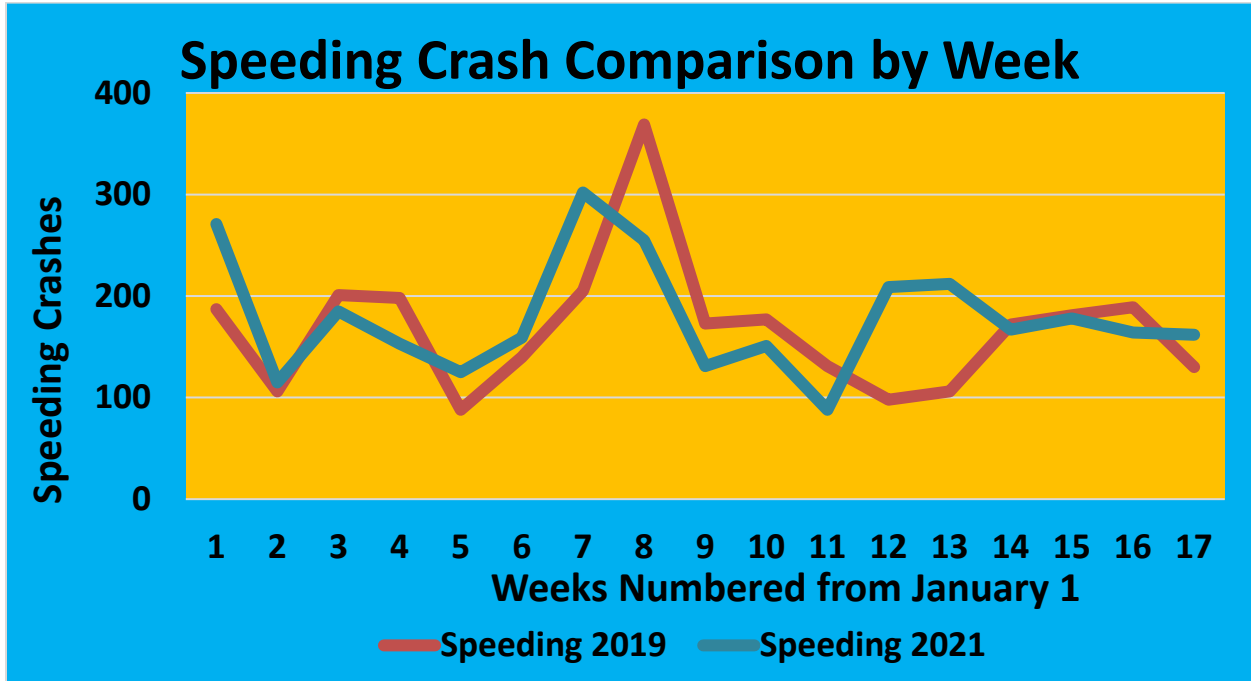
All Crashes



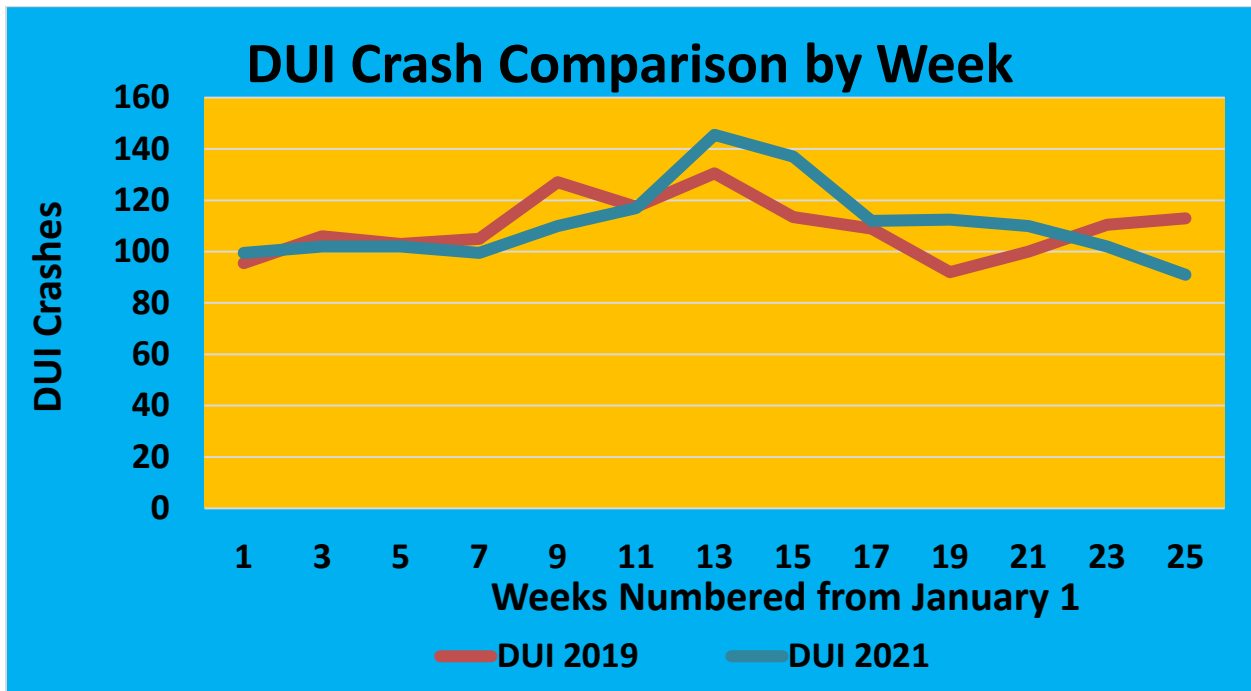
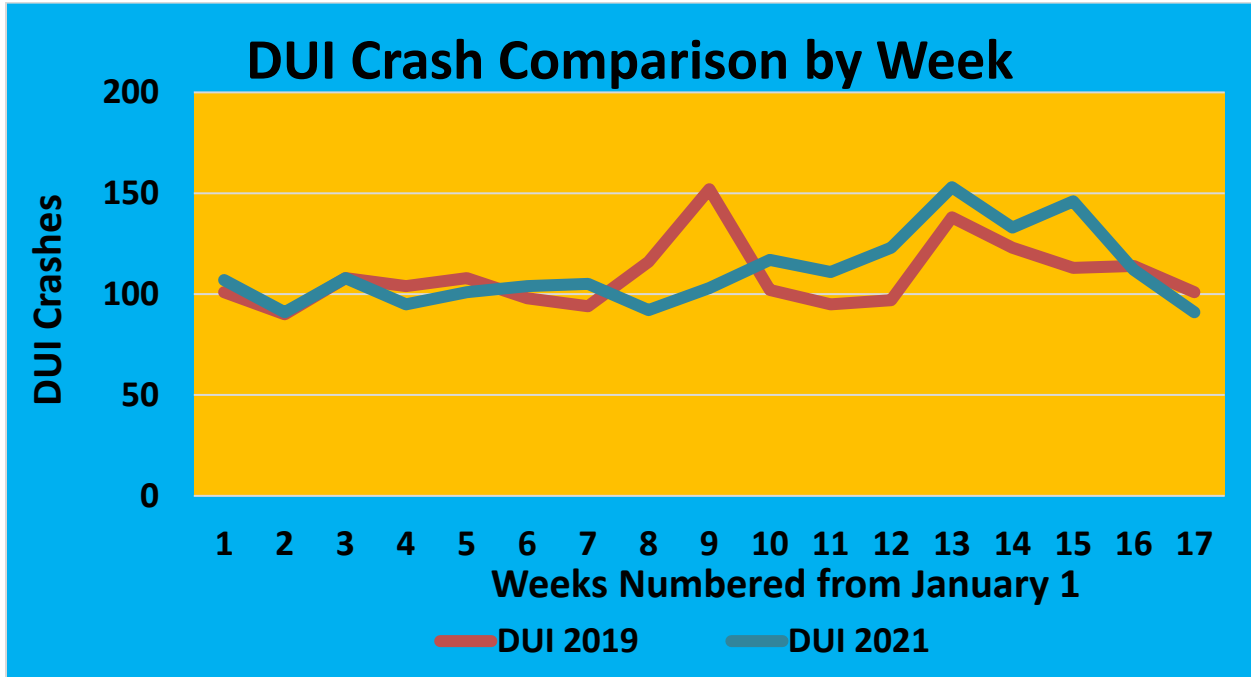
Fatal Crashes



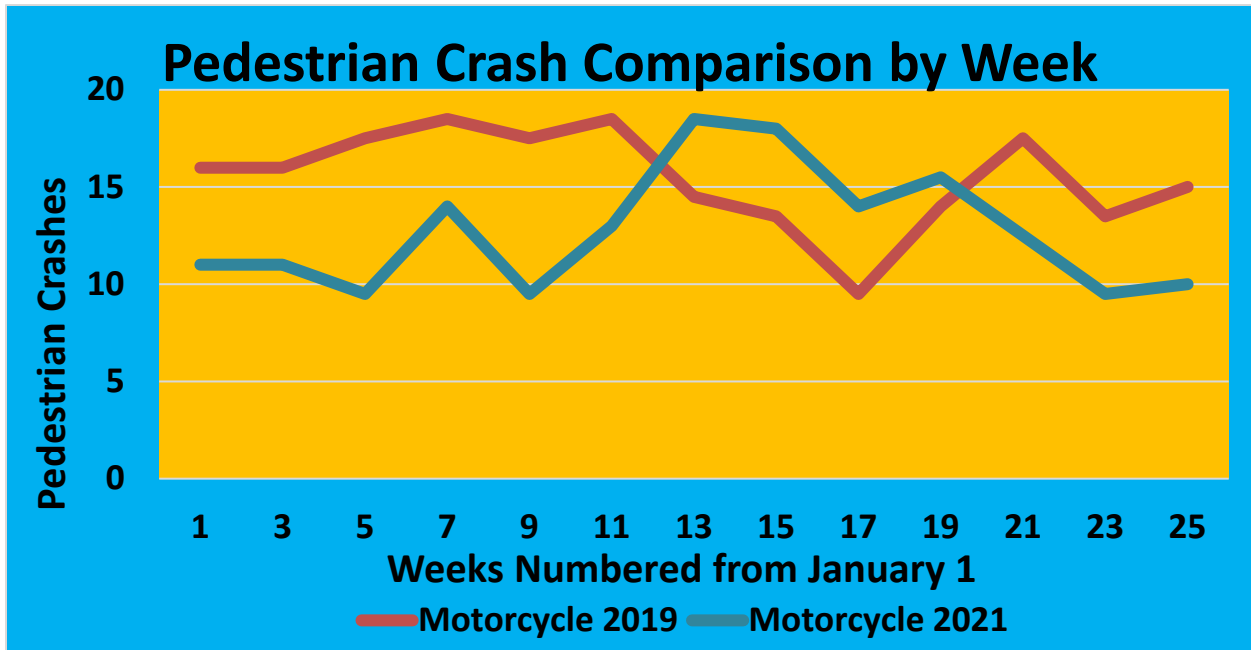
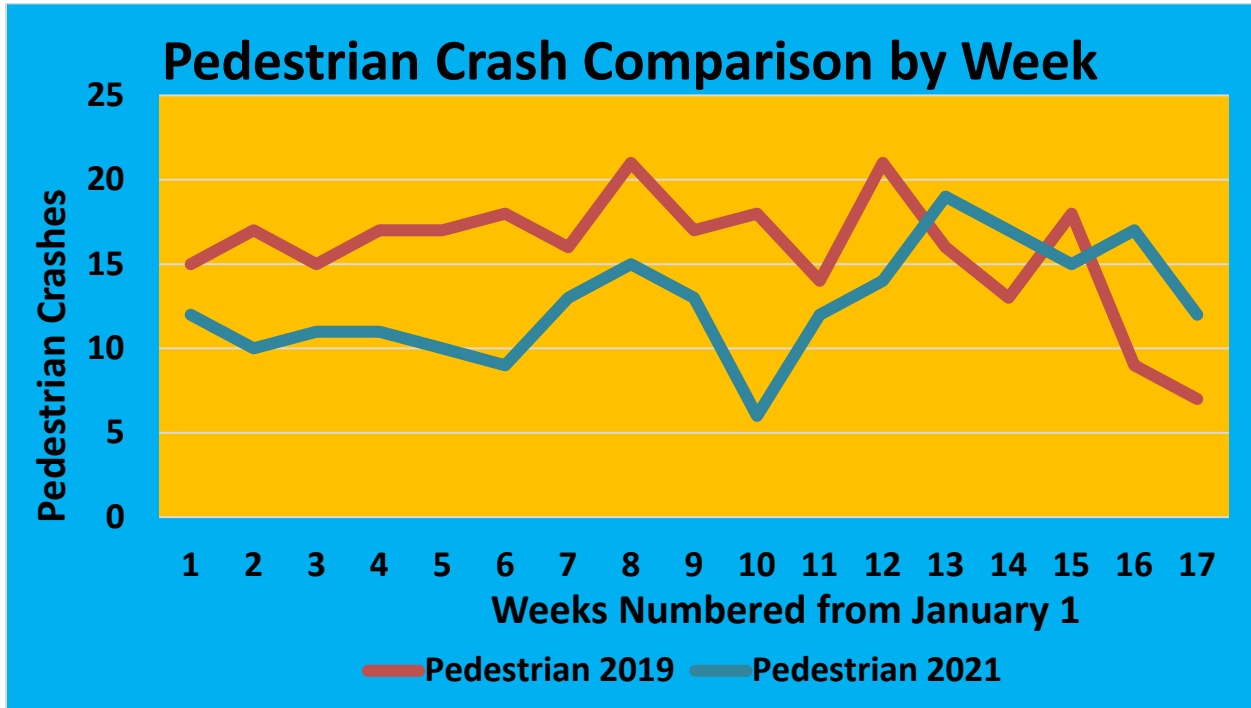
2.2 Speeding Crashes Compared First 17 and 25 Weeks 2019 and 2021



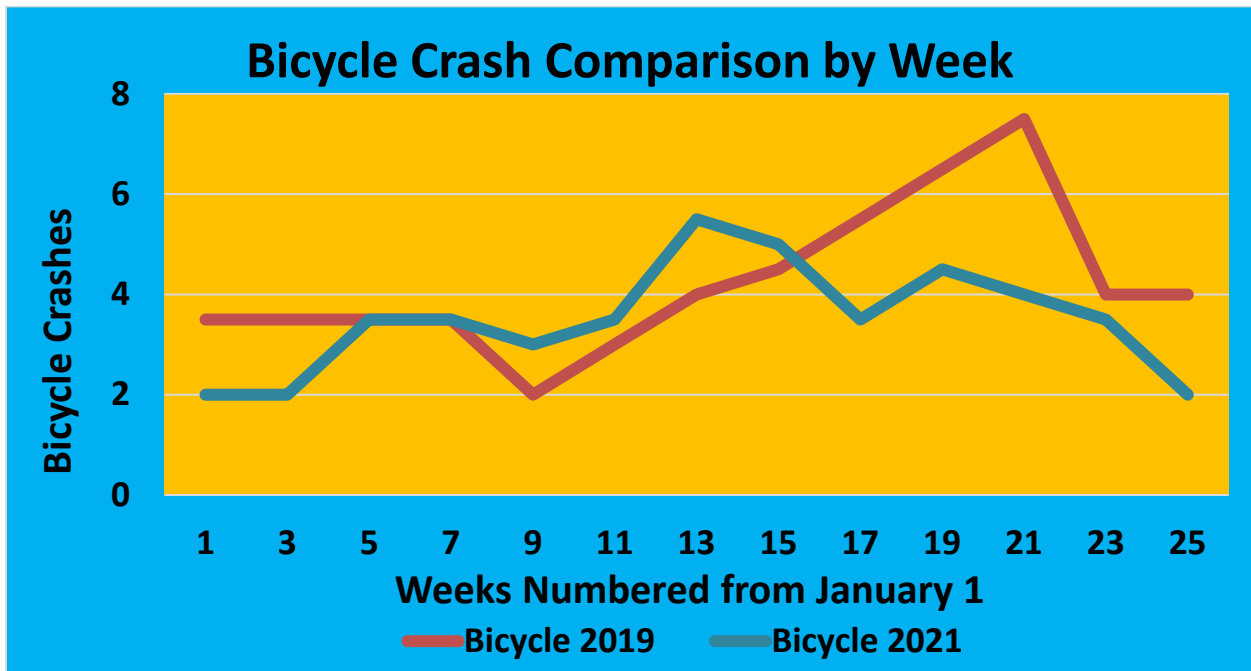
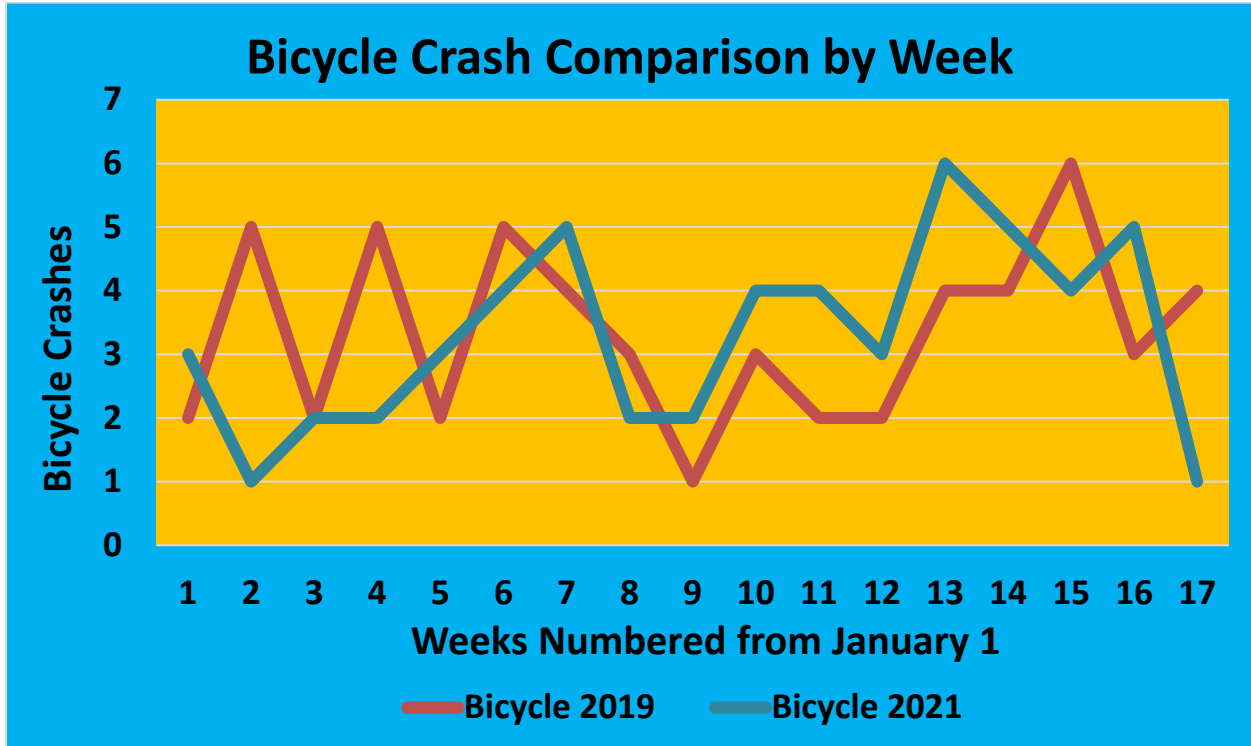
2.3 Impaired Driving (DUI) Crash Comparisons



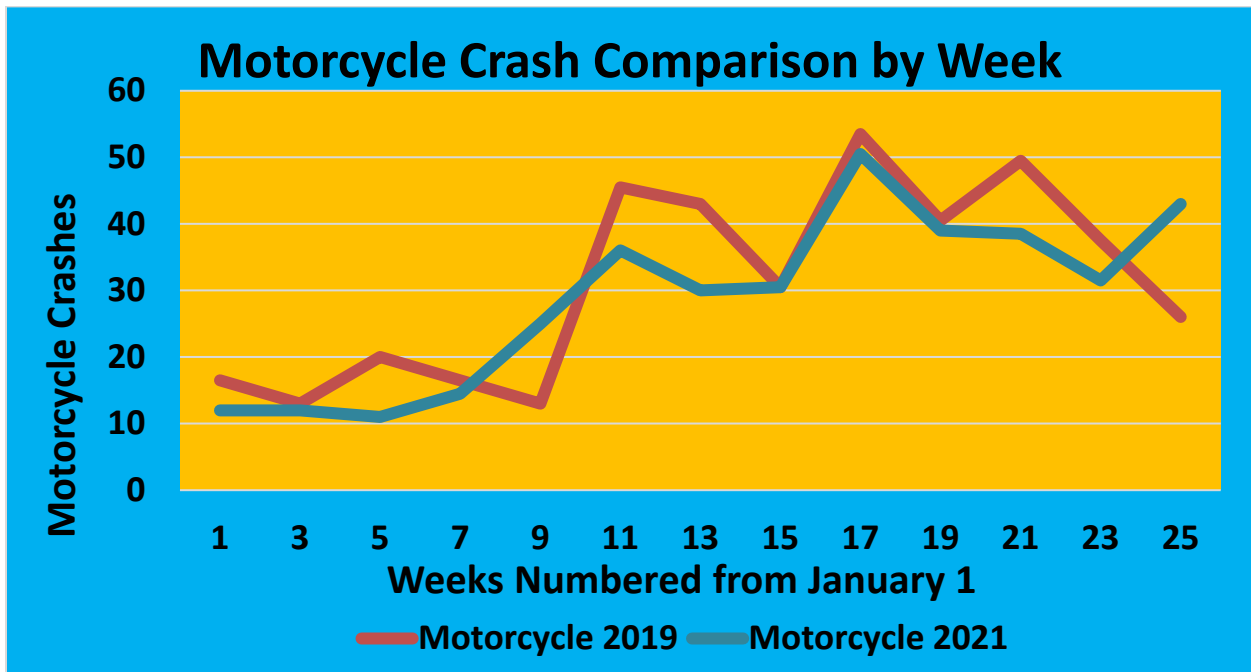
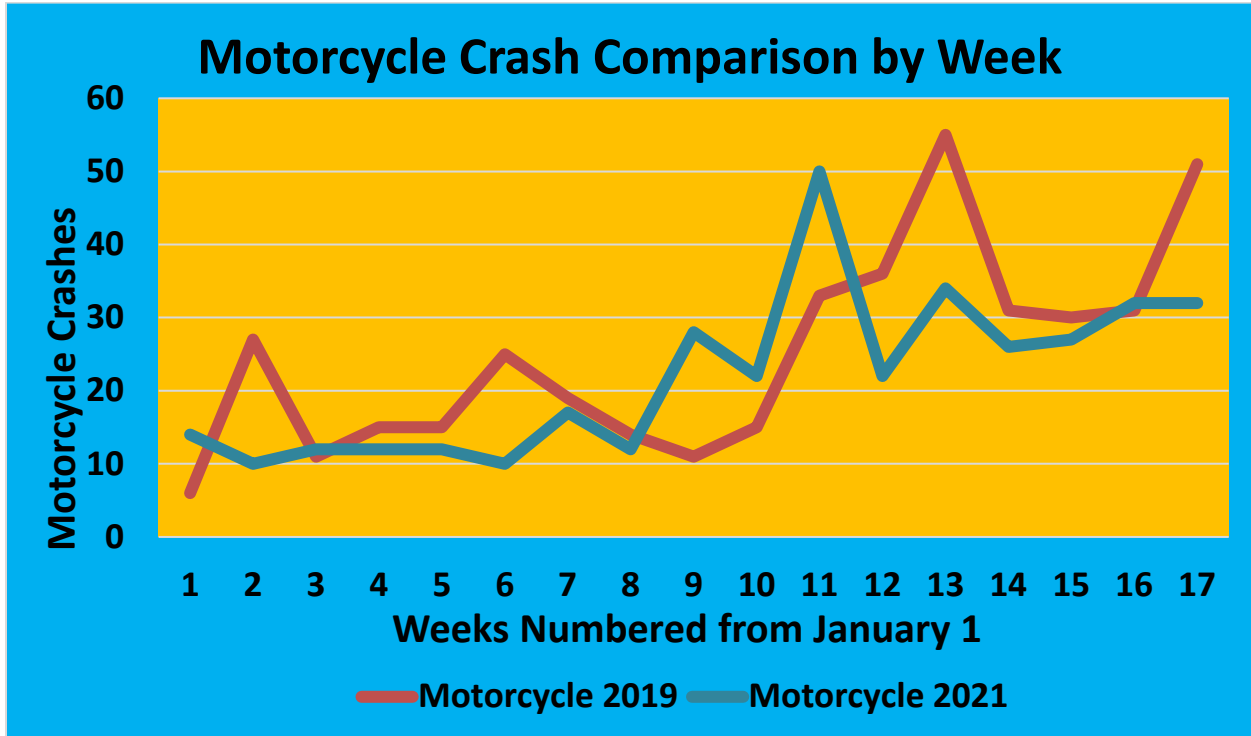
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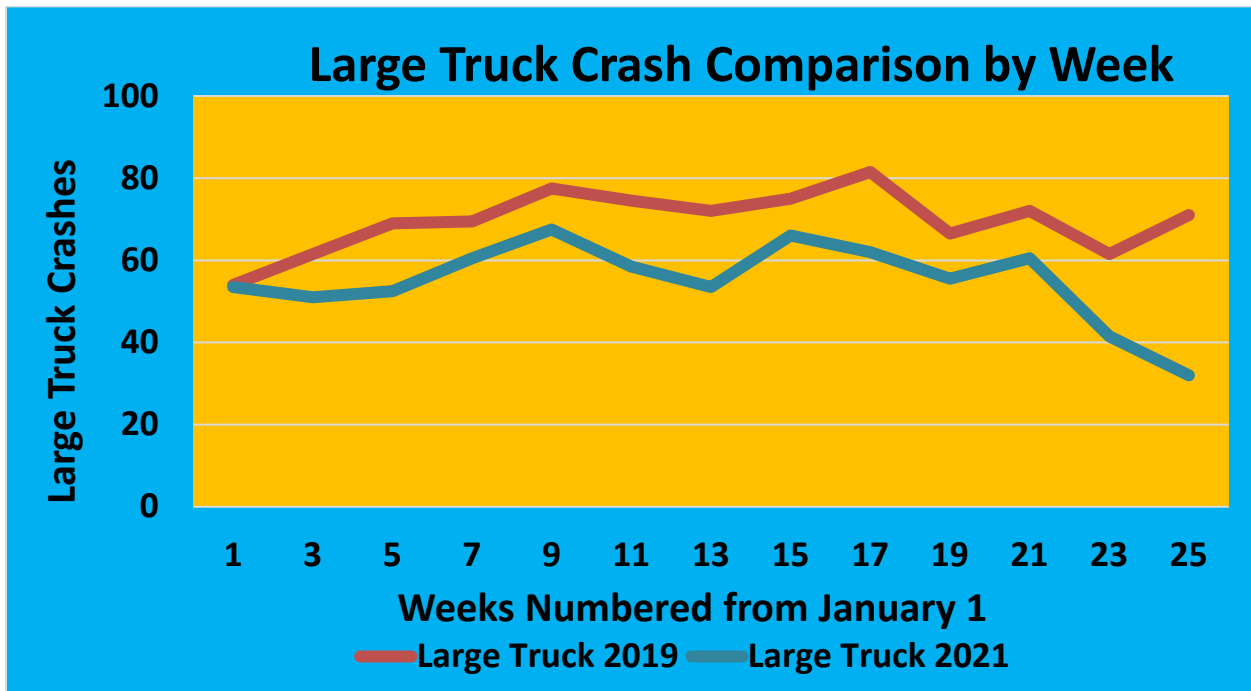
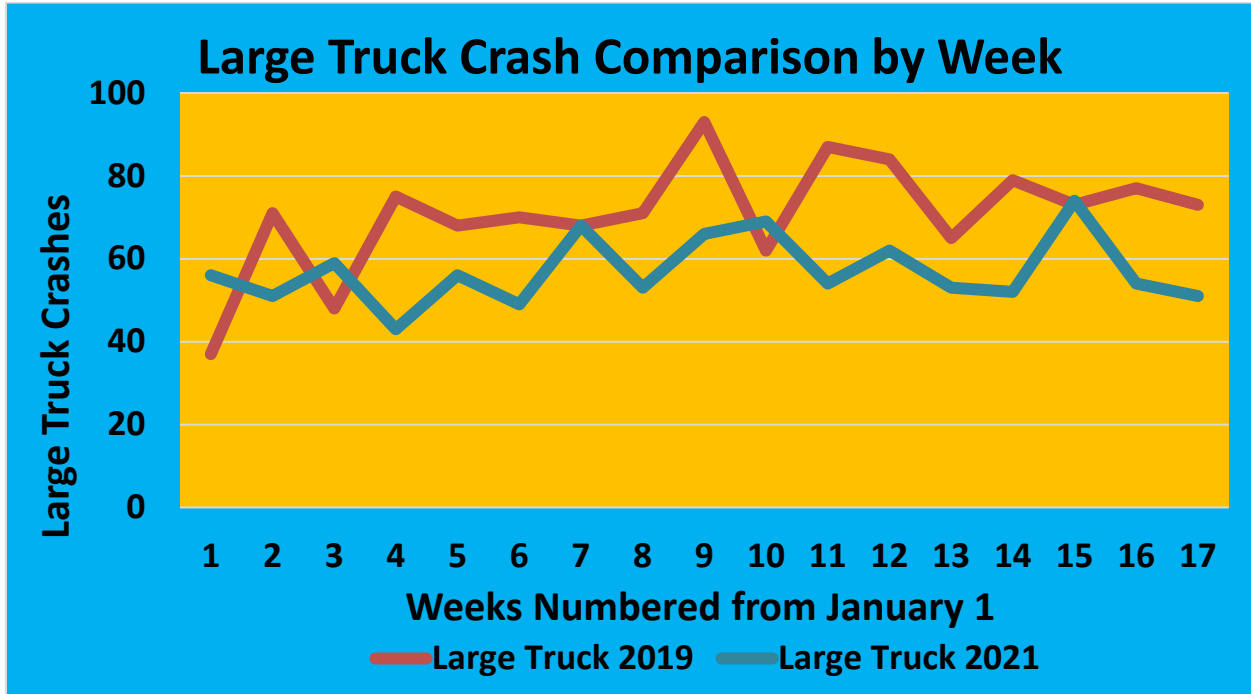
2.5 Bicycle Crash Comparisons



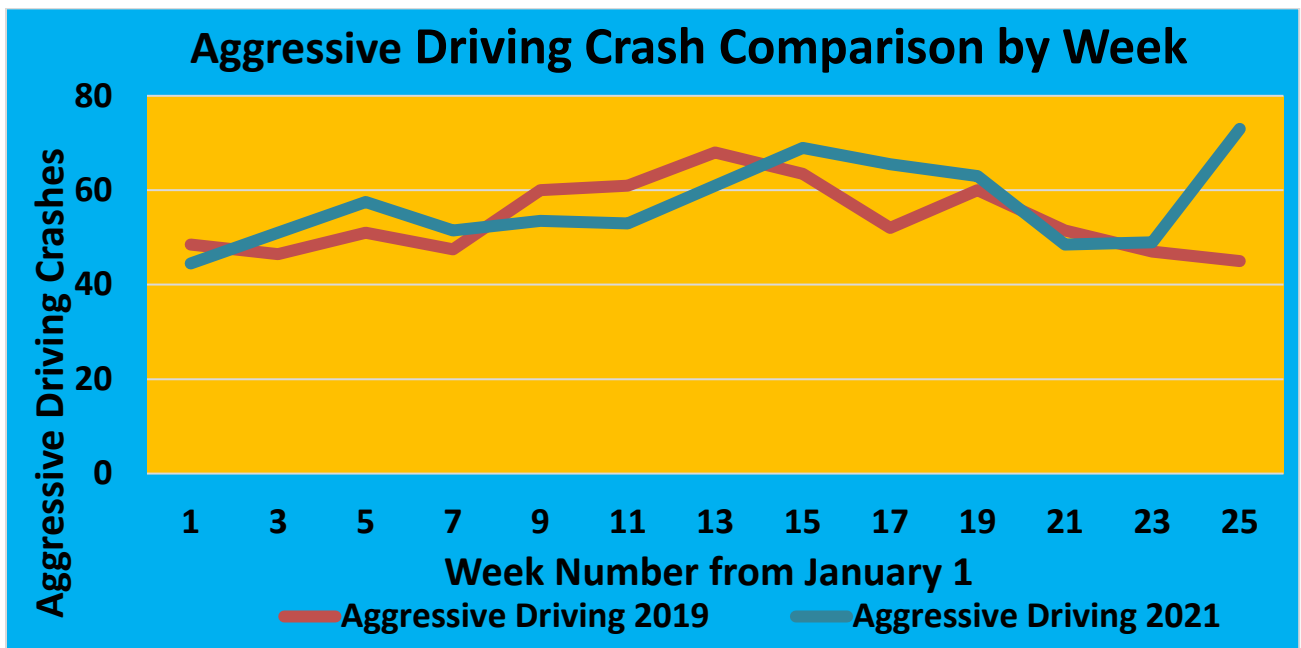
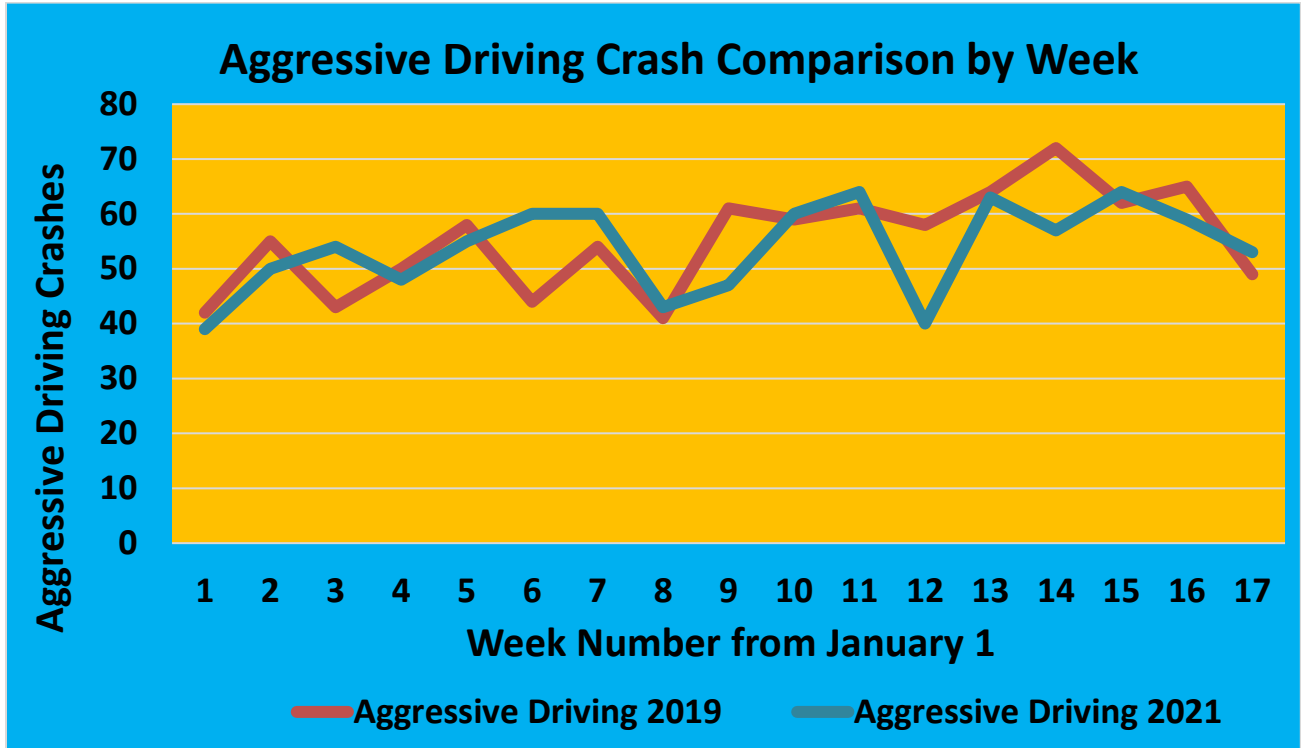
2.6 Motorcycle Crash Comparisons



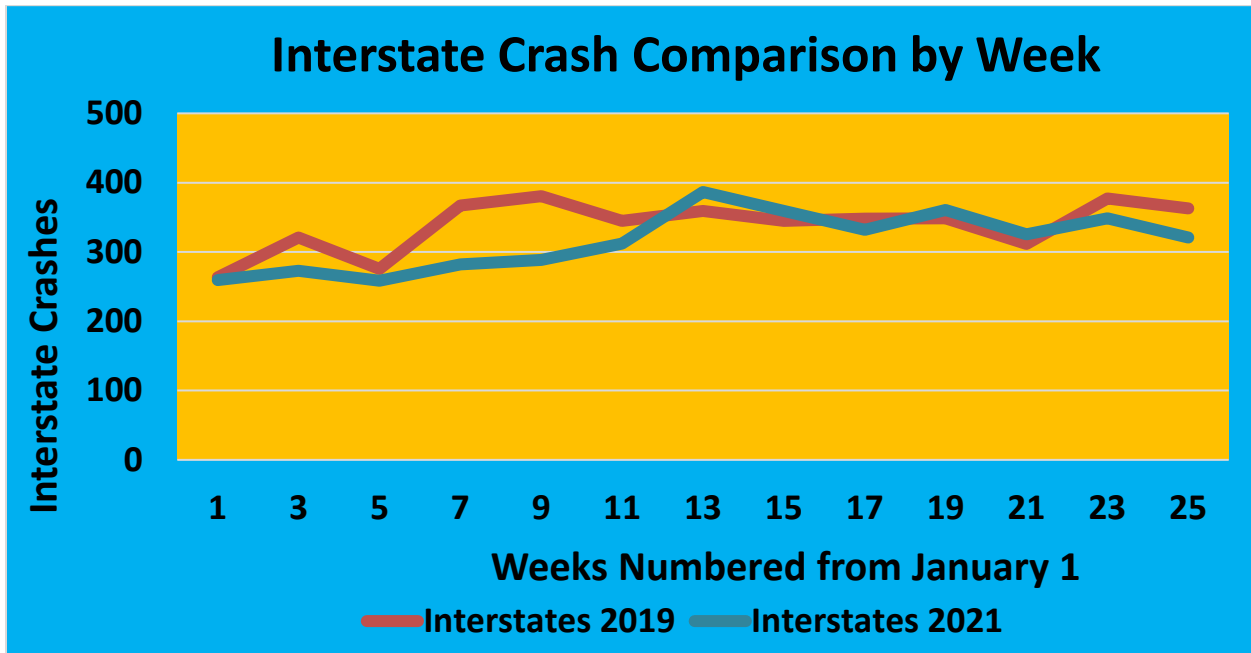
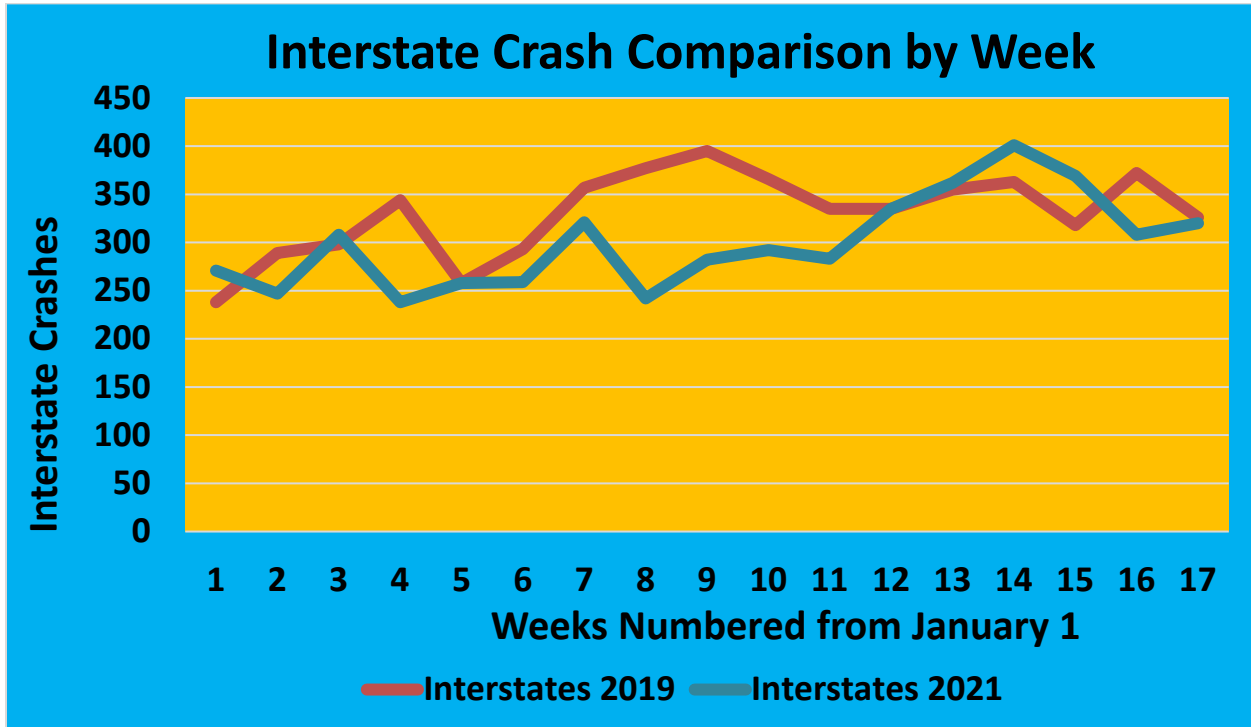
2.7 Large Truck Crash Comparisons



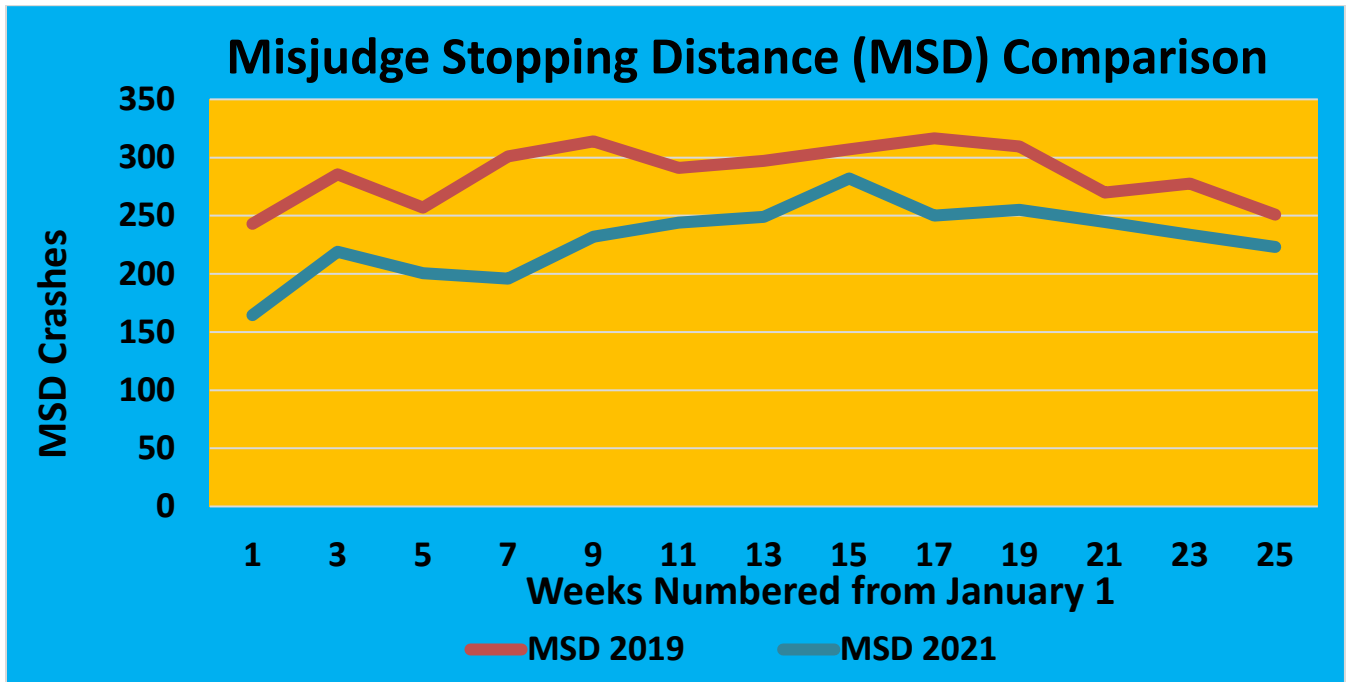
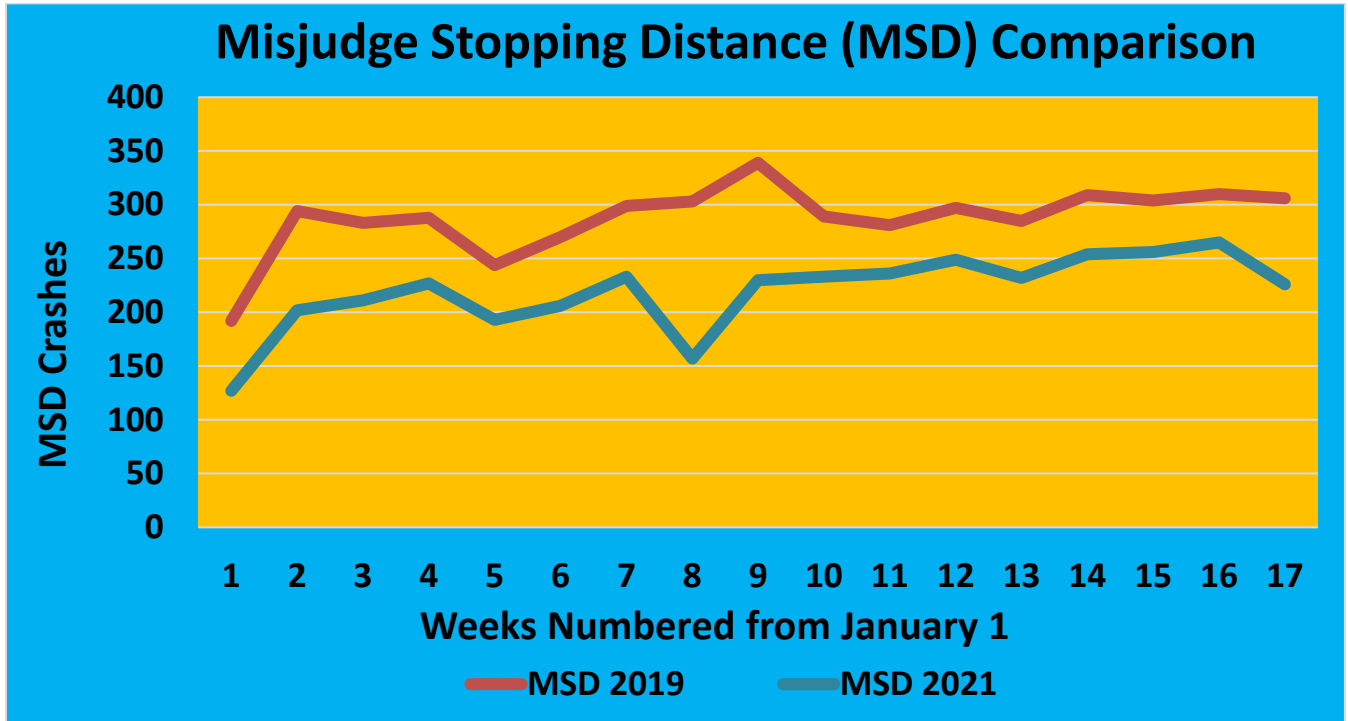
2.8 Aggressive Driving Crash Comparisons



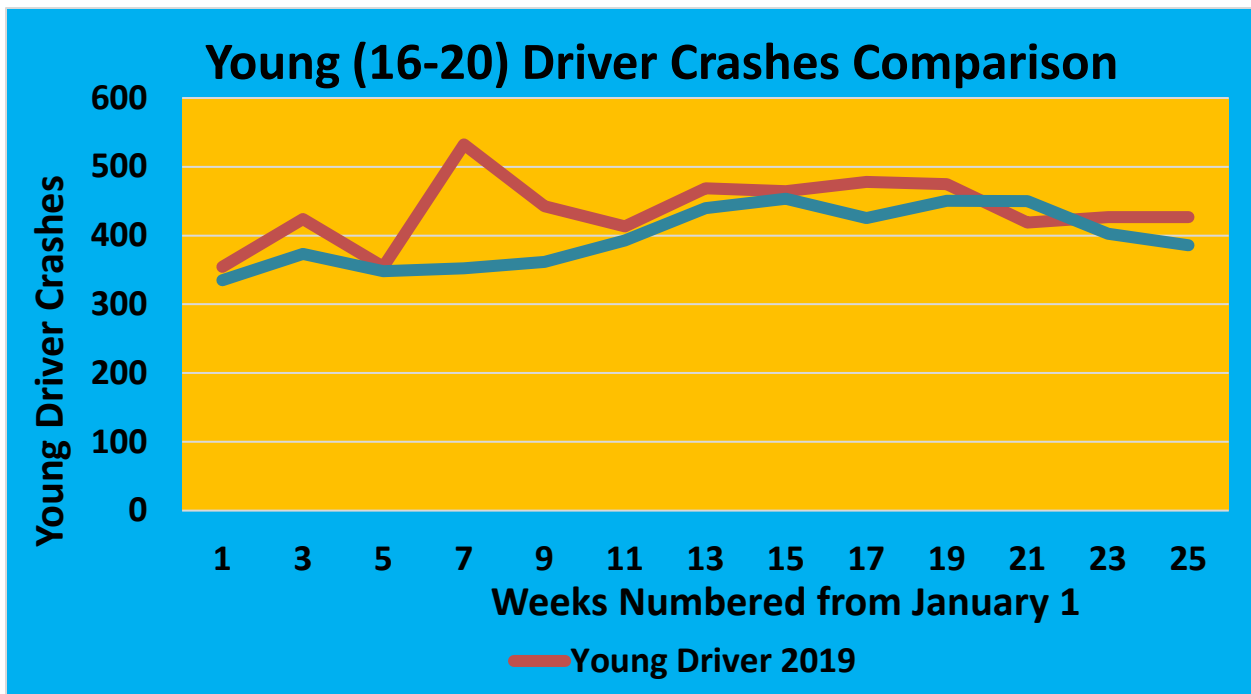
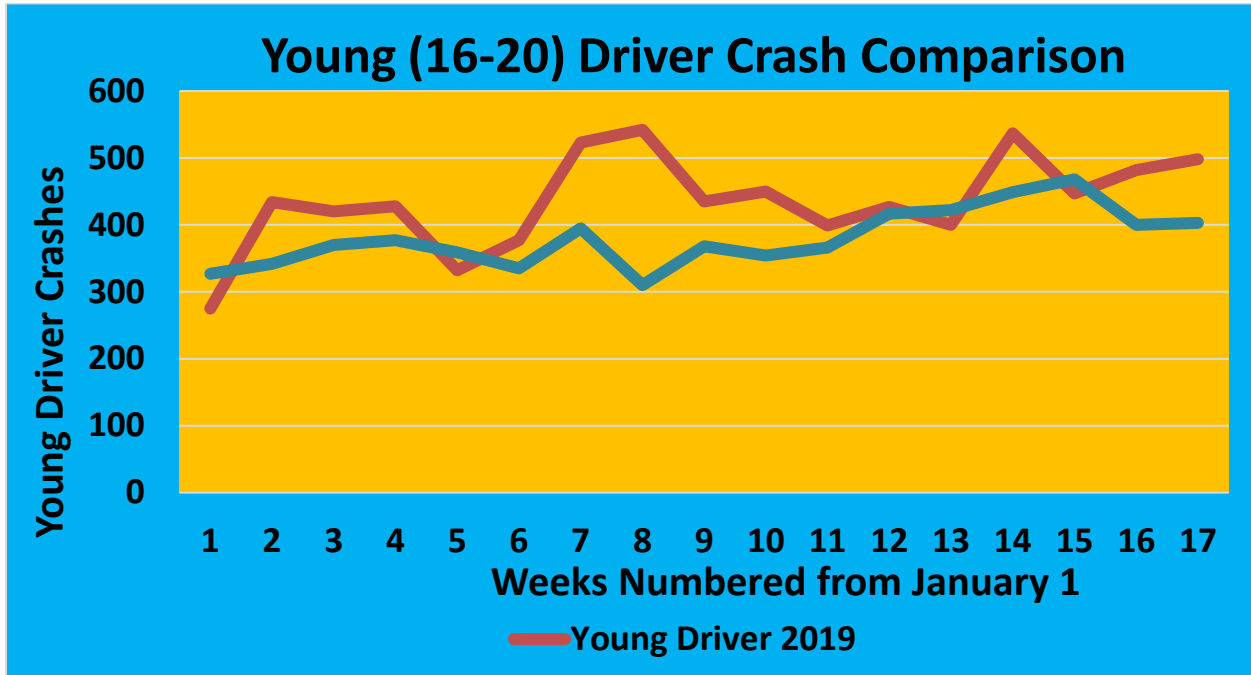
2.9 Interstate Crash Comparisons



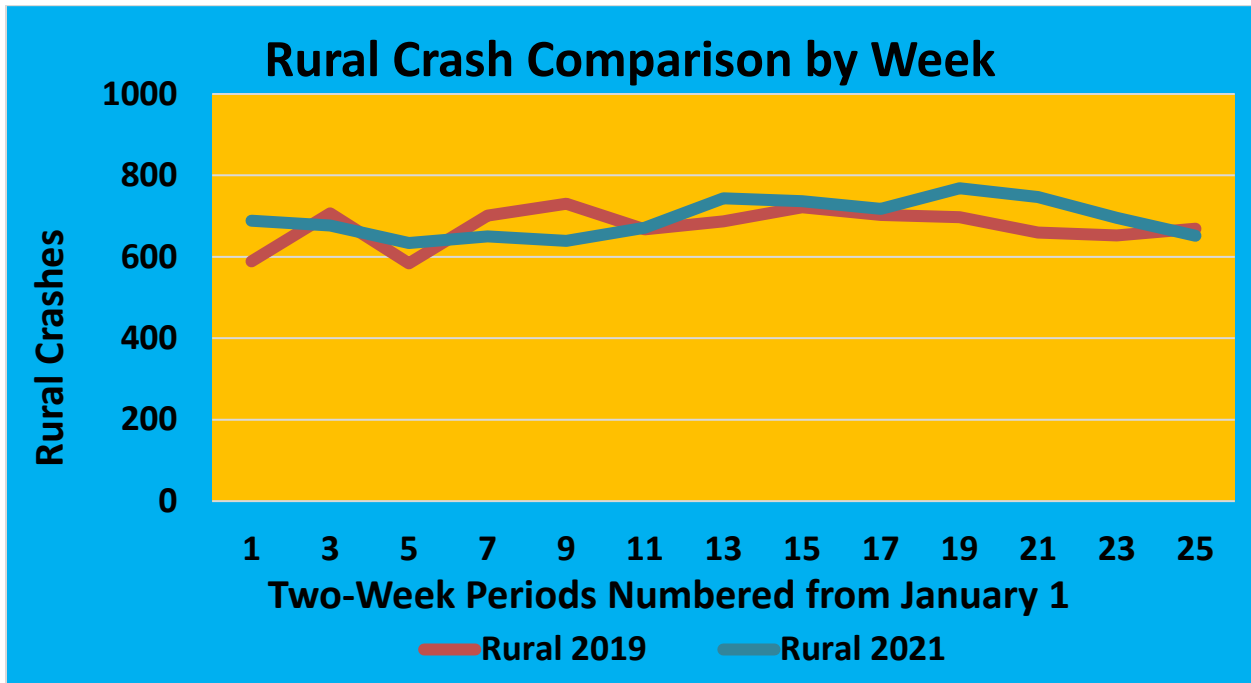
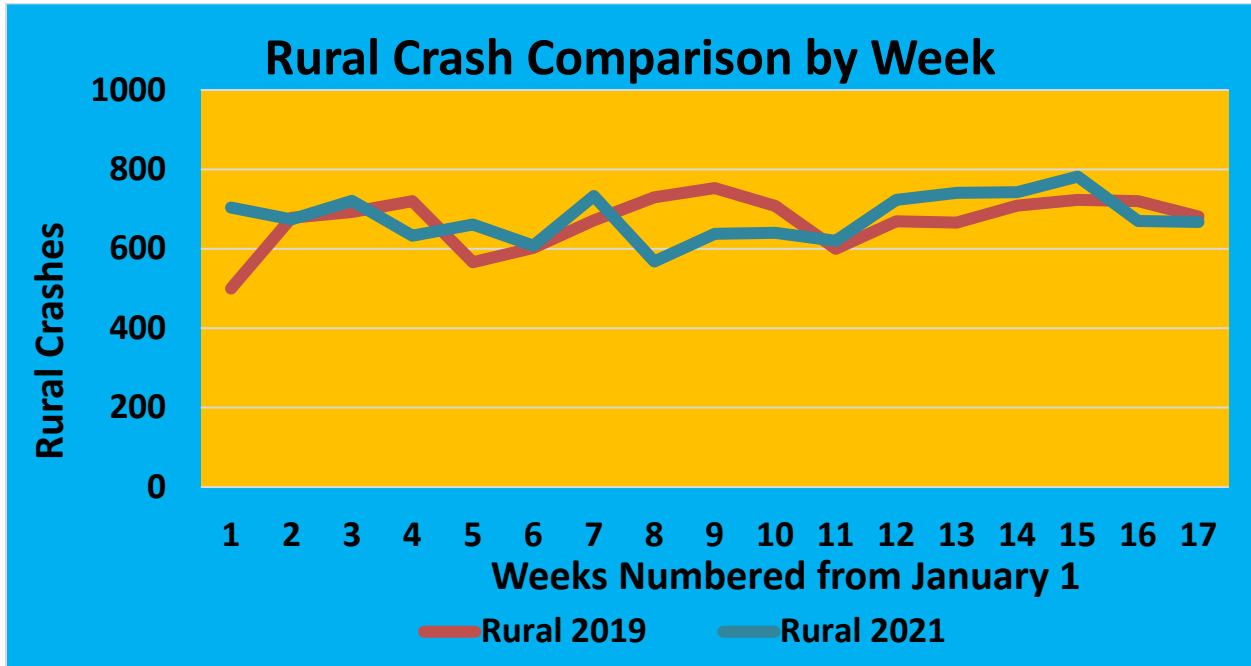
2.10 Misjudged Stopping Distance Crash Comparisons



2.11 Youth Crashes Comparisons



2.12 Rural Crash Comparisons



2.13 Urban Crash Comparisons

