



MEMORANDUM

TO: TPB Technical Committee
FROM: Andrew Meese, TPB Systems Performance Planning Director
SUBJECT: Transportation Impacts of the COVID-19 Pandemic in the National Capital Region
DATE: September 3, 2020 (Revised)

INTRODUCTION

The COVID-19 pandemic and associated precautions since March 2020 have had profound impacts on travel and transportation systems in the National Capital Region. This memorandum compiles information from a variety of sources to provide snapshots of the magnitude and trends of these changes in the initial months of this disruptive pandemic period. Summary presentations are planned for the September 4, 2020 TPB Technical Committee meeting and at a future TPB meeting.

The purpose of this work activity is to examine the data availability on various aspects of travel, and to understand the fidelity and limitations of the data, to help assess the true nature/extent of change in travel and usage of the transportation service and infrastructure. At the present time, staff has not conducted any analysis to assess system performance and or draw conclusions to inform future planning and programming.

This work activity is the beginning of efforts towards better understanding the impacts with the intention of determining the aspects of transportation system that the region will need to address to be more resilient and more equitable in the future. A meaningful analysis of this unprecedented change in the supply and demand on transportation needs accurate, representative, comprehensive data on the demand and supply sides. For example, while the pandemic-related restrictions on movement have impacted travel demand, the personal and public health nature of the pandemic has affected the ability to provide transportation service – particularly public transportation. Regionally, fares contribute about 30% (ranging from 10% to 70% on different systems) of the operating costs of providing public transportation. Inability to collect these fares (on systems that have suspended fare collection due to pandemic social distancing precautions) and reduced travel (particularly on the rail systems) have impacted the financial viability of public transportation. At the same time, transit agencies have had to consider rider and employee health risks, and undertake both additional cleaning/disinfecting and equipment modification (e.g., driver shields) activities, while maintaining as much transit service as feasible. This comes at a time when these services have been most needed – especially the bus services.

Emergency orders in the District of Columbia, Maryland, and Virginia impacting travel were issued in the general time period of March 5 through 20, 2020. The COG website at www.mwcog.org/about-us/covid-19/ provides information about declarations as well as links to data sources about COVID-19 and its (non-transportation) impacts.

STRUCTURE OF THIS MEMORANDUM

TPB staff compiled data and information from a variety of sources to examine the COVID-19 pandemic's transportation impacts from several perspectives. These data differ in geography, time scales, and methodologies because of the variety of mostly non-COG/TPB sources, but individually and collectively provide insights (though not necessarily definitive conclusions) on regional impacts. Caveats include that the scope, timeliness, and consistent or continued availability of data from outside sources are beyond the control of TPB staff, potentially limiting further staff analysis. In some cases, anomalous information in data from external sources could not be explained, and for now, those sources have not been included in this memorandum. Additionally, a separate future effort is anticipated to examine transit impacts in more detail, especially for Metrobus and Metrorail.

Information is grouped into three main sections: Travel and Roadway Traffic Volumes Impacts; Transit and Walking; and Safety, Speeds, and Other Impacts. Each section contains multiple subsections with one or more information sources each, providing a variety of snapshots.

TRAVEL AND ROADWAY TRAFFIC VOLUME IMPACTS

1. ROADWAY TRAFFIC VOLUMES

Snapshot: Roadway traffic volumes in the National Capital Region, which in April 2020 had dipped below 50% of 2019 volumes, by July had recovered to over 80% of 2019 volumes. The magnitude of these trends varied among the core jurisdictions, inner suburbs, and outer suburbs.

Figure 1 shows traffic volumes at over 60 continuous count stations at locations around the TPB modeled region (larger than the TPB membership area itself). Volumes at these pinpoint locations were down generally almost 50% in the month of April 2020 compared to April 2019, but by July 2019, had risen to be just about 19% less than July 2019 levels. Visualizations of weekly average daily traffic and average hourly traffic by month are also shown.

Figures 2 through 4 show these traffic volumes summarized for three jurisdictional groupings in the modeled area: core, inner, and outer jurisdictions. Figure 2 shows that the central jurisdictions showed the largest decrease with a monthly average percent change in traffic of almost 60 percent from 2019 levels during April and still more than 30 percent off in July compared to the previous year. Figures 3 and 4 show that the inner jurisdictions and outer jurisdictions had changes in traffic volumes more consistent with regional levels, with the outer jurisdictions registering the smallest decrease in traffic volumes among the three jurisdictional groups.

Figure 1: Traffic Counts and Percentage Changes at Permanent County Stations in the TPB Modeled Region (Source: TPB)

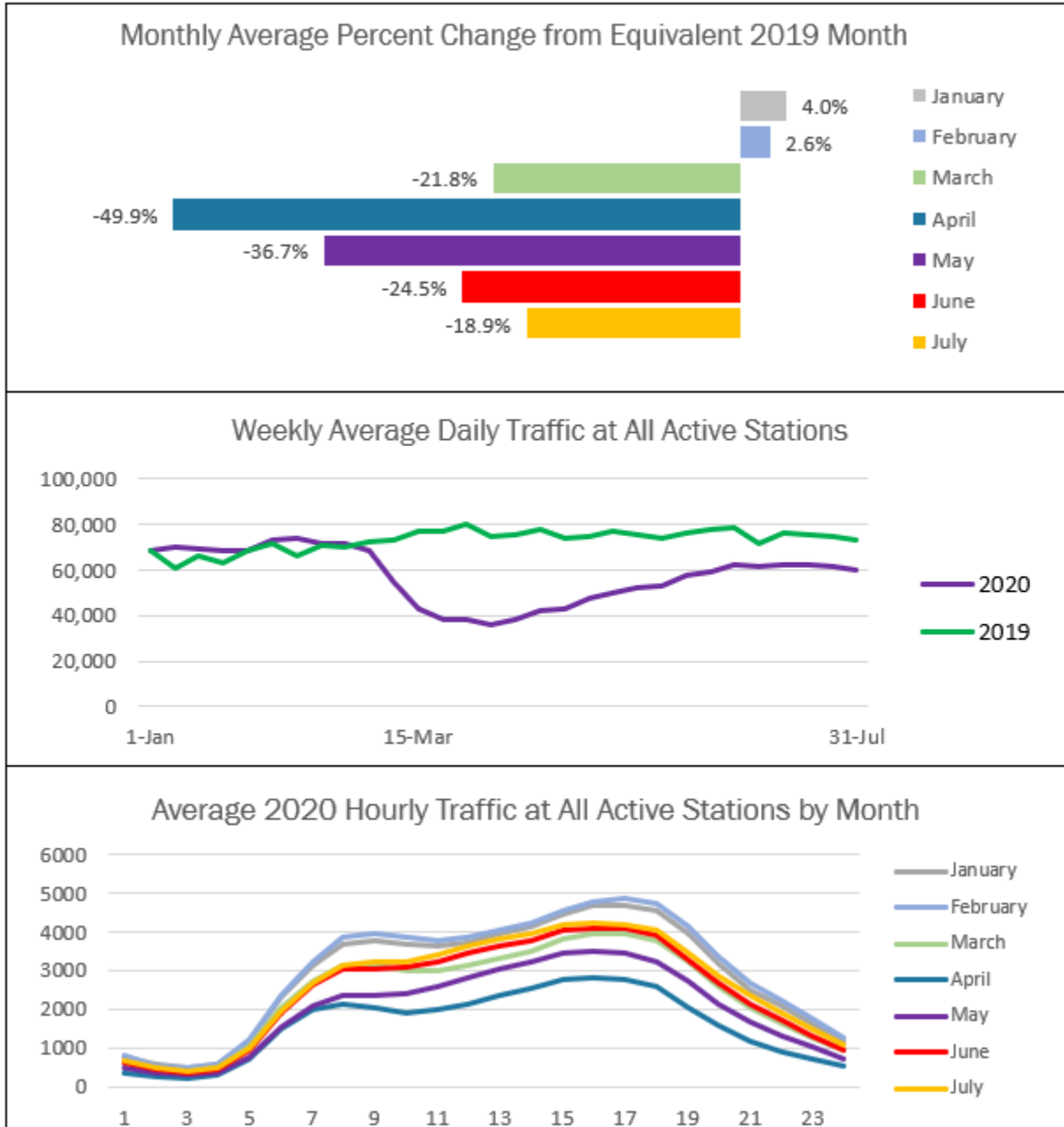
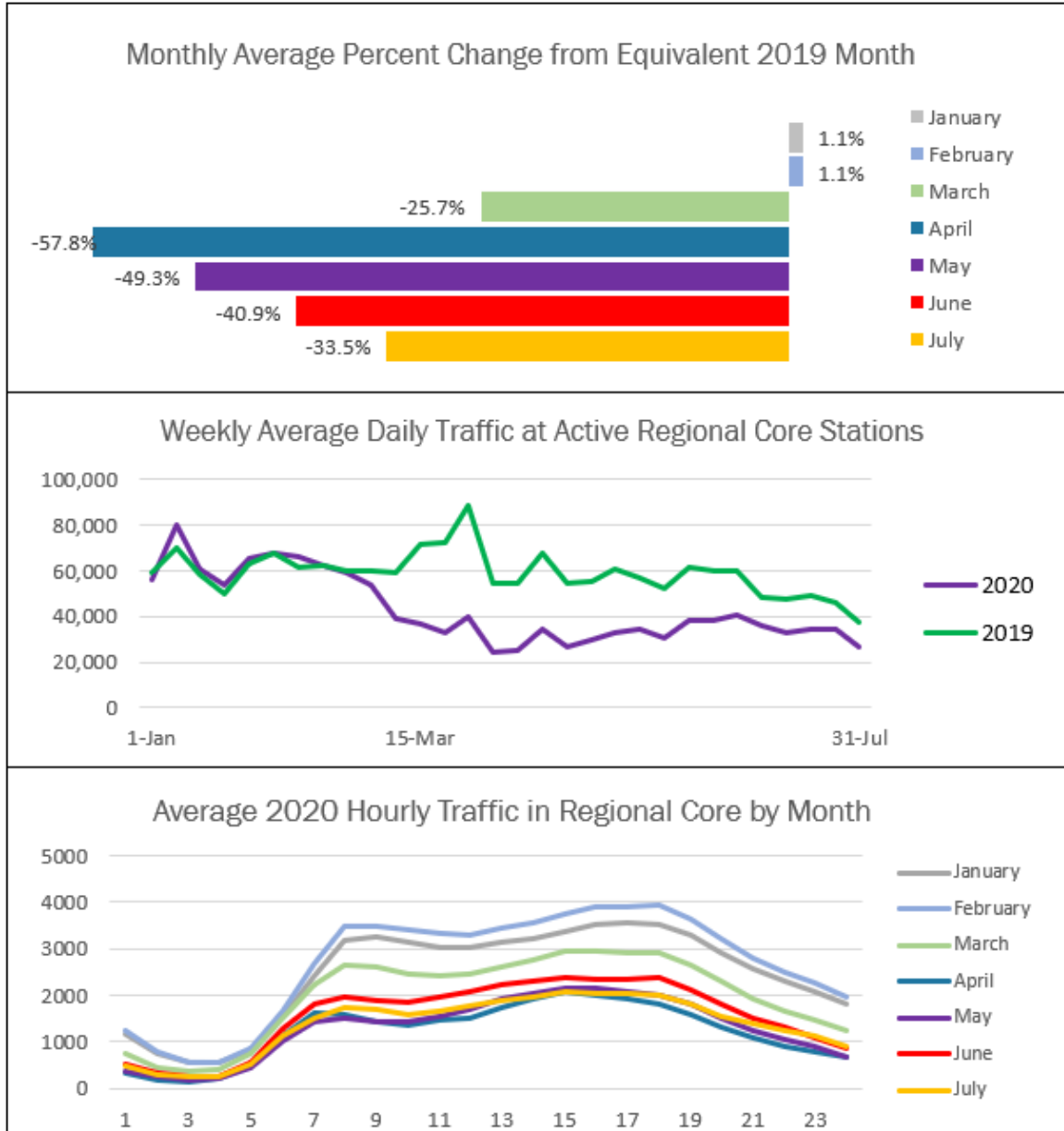
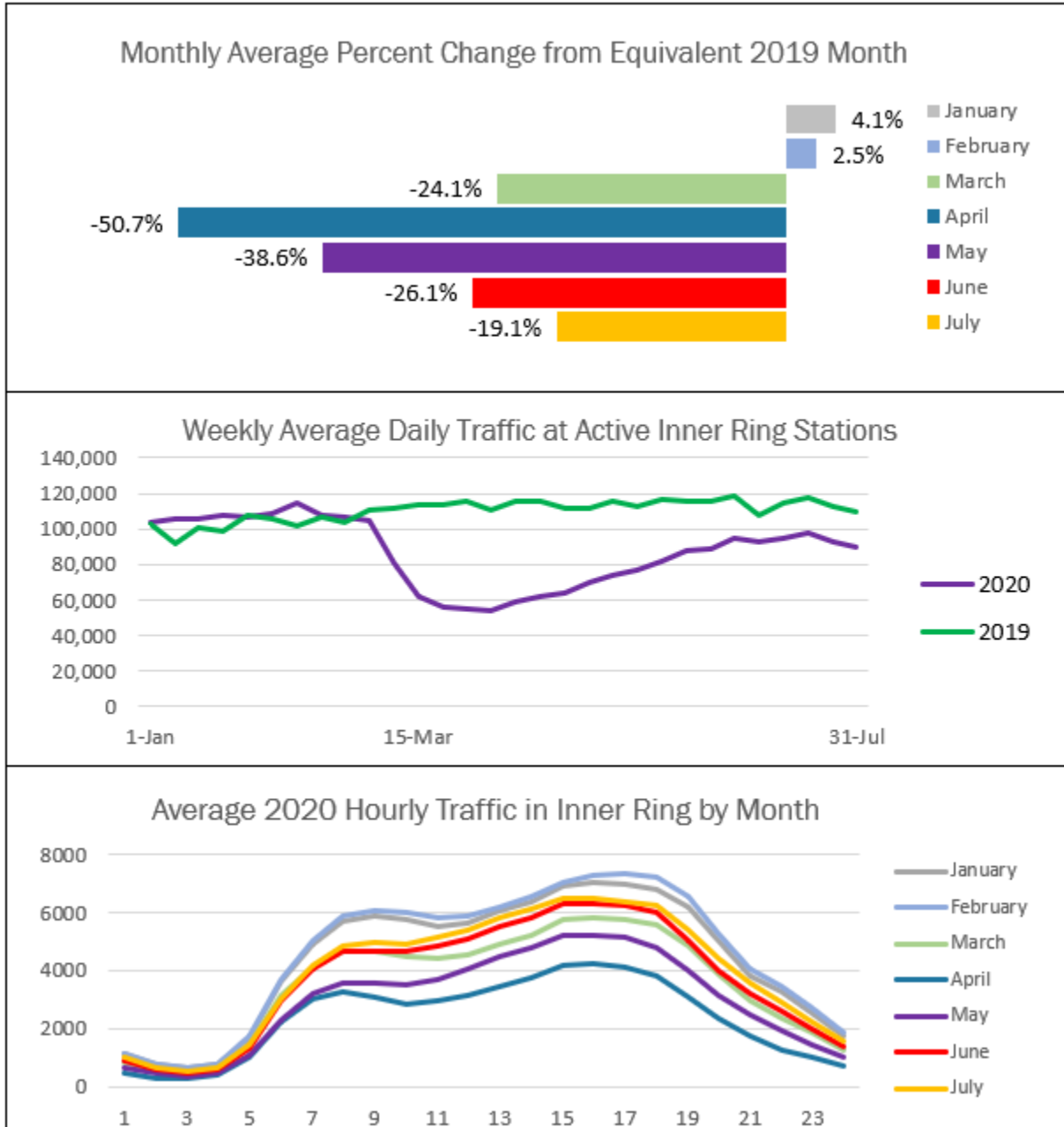


Figure 2: Traffic Counts and Percentage Changes at Permanent County Stations in the Core Jurisdictions (Source: TPB)



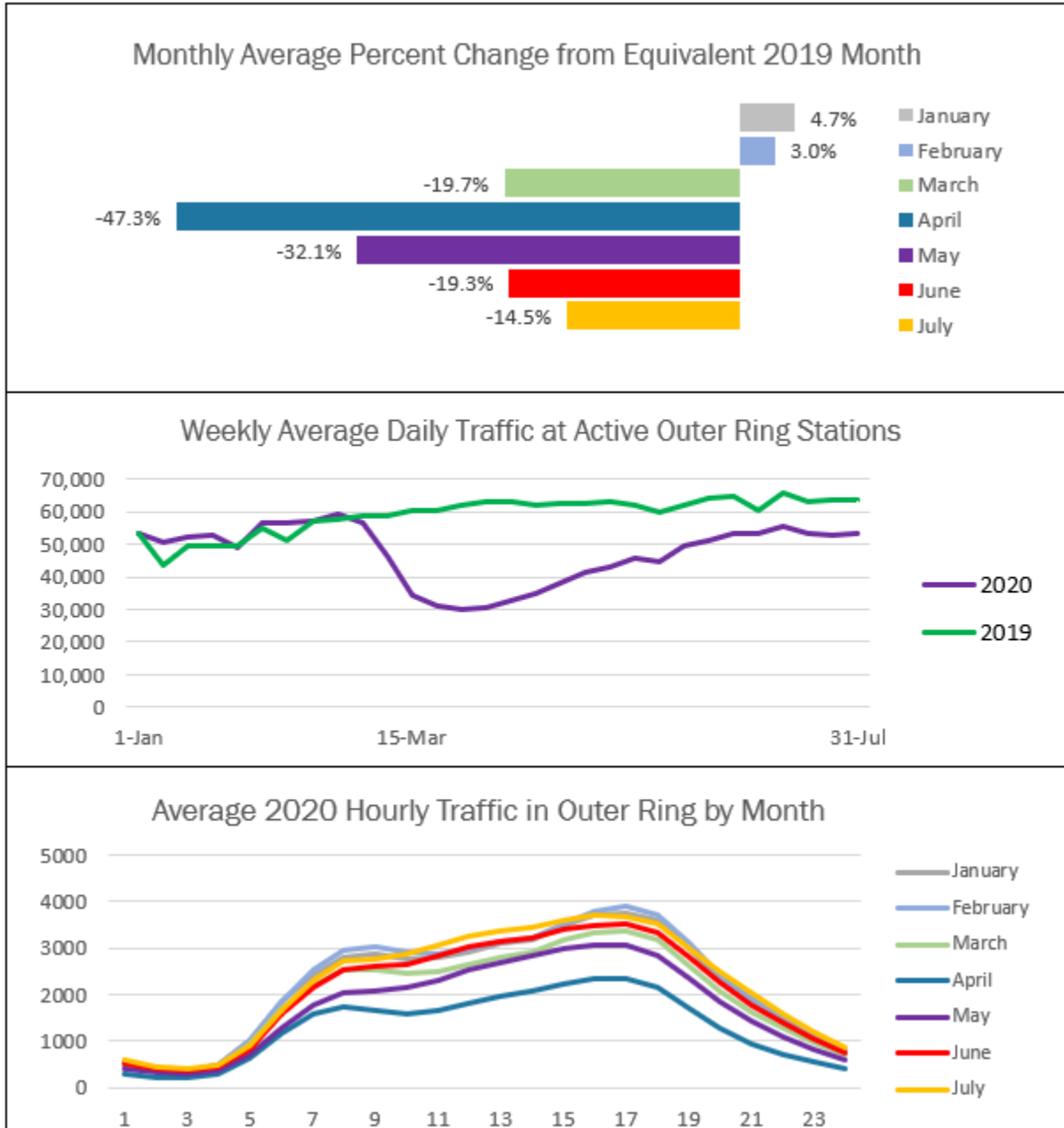
NOTE: Core jurisdictions include the District of Columbia and Arlington County and the City of Alexandria in Virginia.

Figure 3: Traffic Counts and Percentage Changes at Permanent County Stations in the Inner Jurisdictions (Source: TPB)



NOTE: Inner jurisdictions include Montgomery County, and Prince George's County in Maryland and Fairfax County (including independent cities of Falls Church and Fairfax) in Virginia.

Figure 4: Traffic Counts and Percentage Changes at Permanent County Stations in the Outer Jurisdictions (Source: TPB)



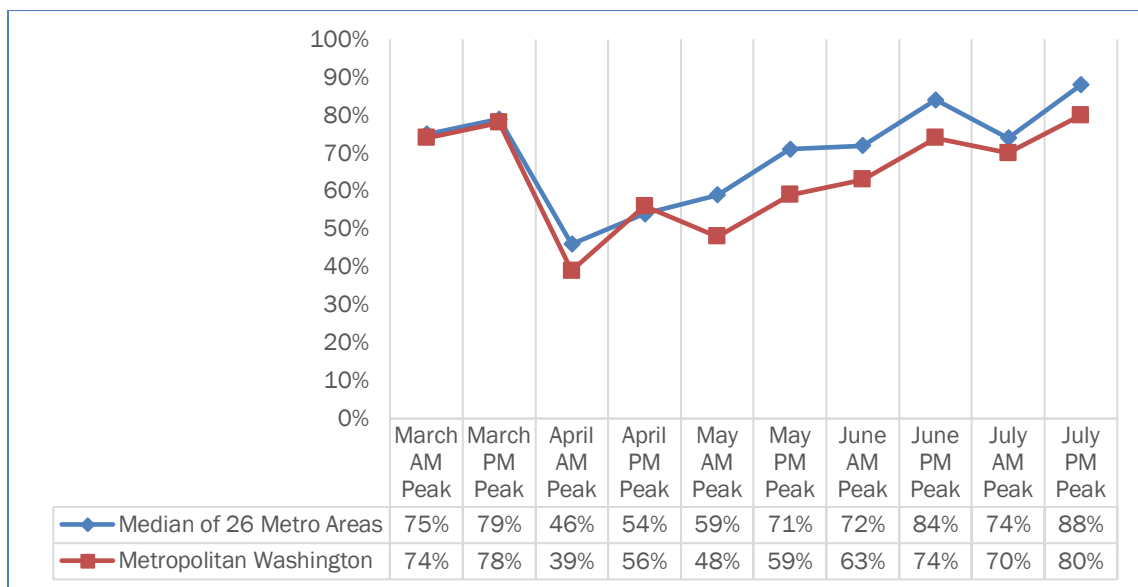
NOTE: Outer jurisdictions include Anne Arundel, Carroll, Charles, Frederick (including Frederick City), Howard, and St. Mary's counties in Maryland; Clarke, Fauquier, King George, Loudoun, Prince William (including Manassas and Manassas Park), Spotsylvania (portion), and Stafford counties in Virginia; and Jefferson County in West Virginia.

2. VEHICLE MILES OF TRAVEL

Snapshot: Regional vehicle miles of travel dipped most dramatically in April, but by July had recovered significantly, according to a post on the blog of big data provider INRIX¹.

Trends in vehicle miles of travel (VMT) in the region are informative, but not always readily available. Private sector big data provider INRIX², in an August 11, 2020 blog post, described morning and evening peak VMT trends for 26 major metropolitan areas³ around the country, including metropolitan Washington⁴. Figure 5 shows reported VMT for metropolitan Washington versus the median values for the full 26 metropolitan areas described in the blog post⁵. Monthly VMT was lowest in April both regionally and nationally, and has recovered somewhat since then through July; metropolitan Washington’s VMT has generally tracked a bit lower than the national median.

Figure 5: Vehicle Miles of Travel Trends (Percentage of Pre-pandemic VMT) Reported by INRIX, March through July 2020 (Source: INRIX <https://inrix.com/blog/2020/08/vmt-commute-us/>, August 11, 2020)



¹ <https://inrix.com/blog/2020/08/vmt-commute-us/>.

² At this time, TPB only has gratis access to some, not all, data sets vended by INRIX.

³ The metropolitan areas reported (as listed by INRIX) were: Atlanta, Austin, Baltimore, Boston, Charlotte, Chicago, Dallas, Denver, Detroit, Houston, Los Angeles, Miami, Minneapolis, New York, Orlando, Philadelphia, Phoenix, Portland, Sacramento, San Antonio, San Diego, San Francisco, Seattle, St. Louis, Tampa, and Washington, D.C.

⁴ Note that INRIX’s geographical definition of metropolitan Washington, D.C. is understood to be somewhat different from (is more expansive than) the TPB membership area.

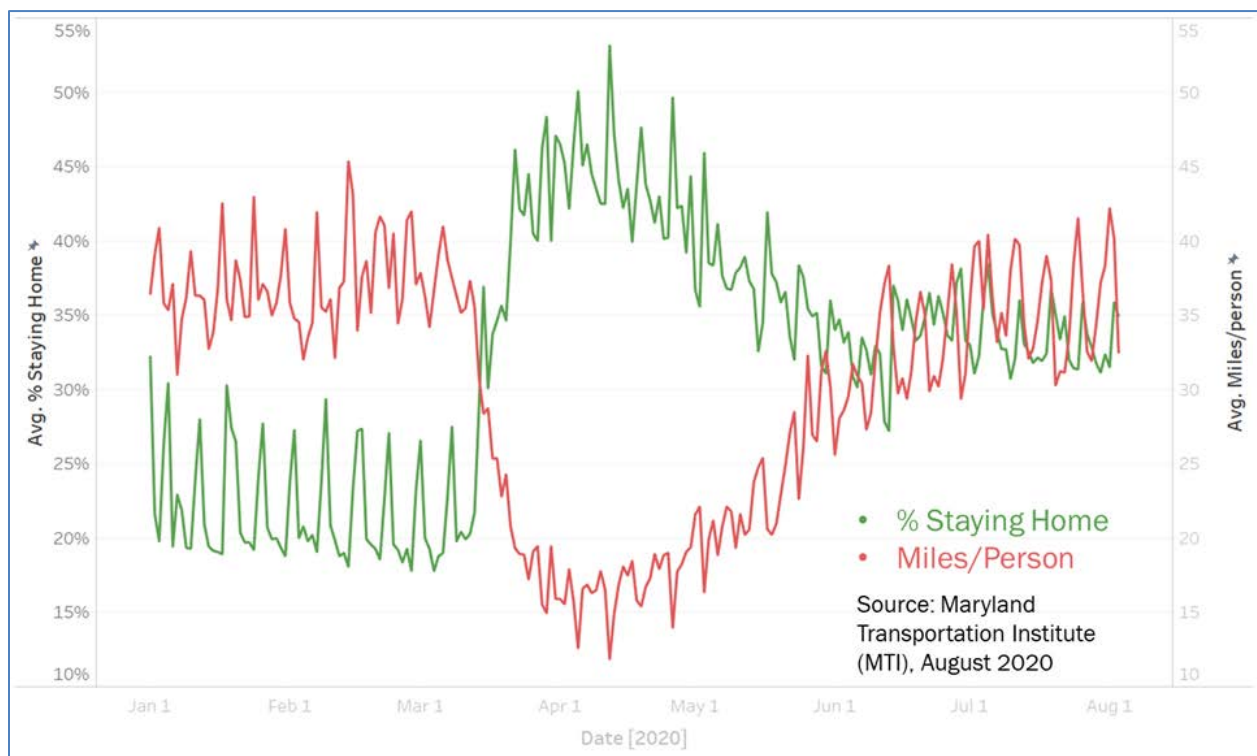
⁵ Medians for the 26 metropolitan areas were calculated by TPB staff based on the blog post, and were not provided by INRIX; there may be rounding error. All values should be considered approximate.

3. PERSON TRAVEL

Snapshot: Though miles of travel per person have returned to near pre-pandemic levels, people are still much more likely to be staying at home than pre-pandemic.

The University of Maryland’s COVID-19 Impact Analysis Platform⁶ contains a wealth of information nationally about COVID-19 impacts and travel. Figure 6 illustrates the dramatic decline in person travel in the late March and early April time frame of the pandemic, and the recovery in person travel since then, by the metrics of percentage of persons staying home and miles of travel per person. People are still “staying home” at higher rates than before the pandemic, though miles of travel are close to pre-pandemic levels, perhaps reflecting a preponderance of non-work (non-commute) travel and considerable increases in delivery trips (food, grocery, online shopping).

Figure 6: National Capital Region Percentage Staying at Home and Miles of Travel Per Person (Source: TPB staff analysis of information from COVID-19 Impact Analysis Platform, Maryland Transportation Institute, University of Maryland, August 2020)



⁶ <https://data.covid.umd.edu/>. The site does not provide details on source data or methodology.

4. TRUCK TRAVEL

Snapshot: Truck travel never declined as much as passenger travel did.

According to big data provider INRIX, travel nationally has continued to recover from reductions in the April 2020 time frame. Notable in Figure 7 below is that truck travel, especially long-distance truck travel, never declined to the extent that passenger travel did. Figure 8 on the next page shows a National Capital Region example on an I-95 continuous count station at Dumfries, Virginia, where truck travel remained at similar levels or actually increased, as general volumes declined, during the March/April peak of COVID-19 impacts.

Figure 7: Nationwide Trends in Tripmaking and Confirmed COVID-19 Cases (Source: INRIX Blog <https://inrix.com/covid-19-transportation-trends/>, retrieved August 27, 2020)

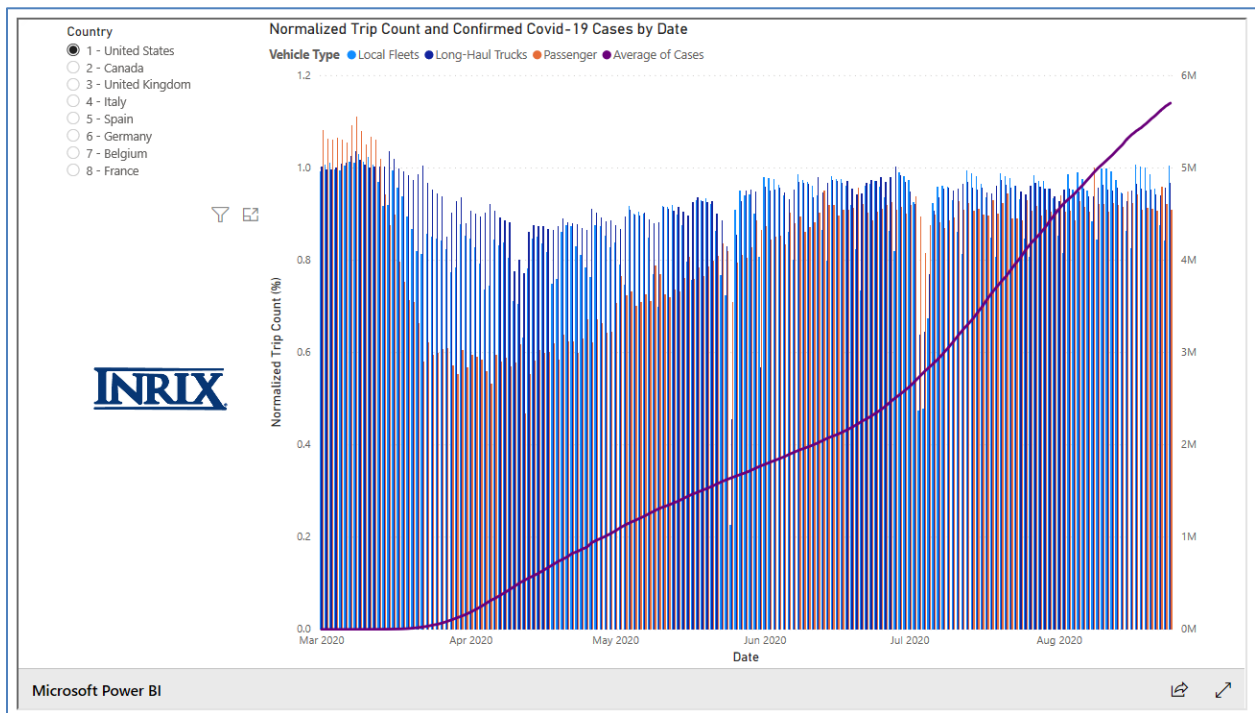
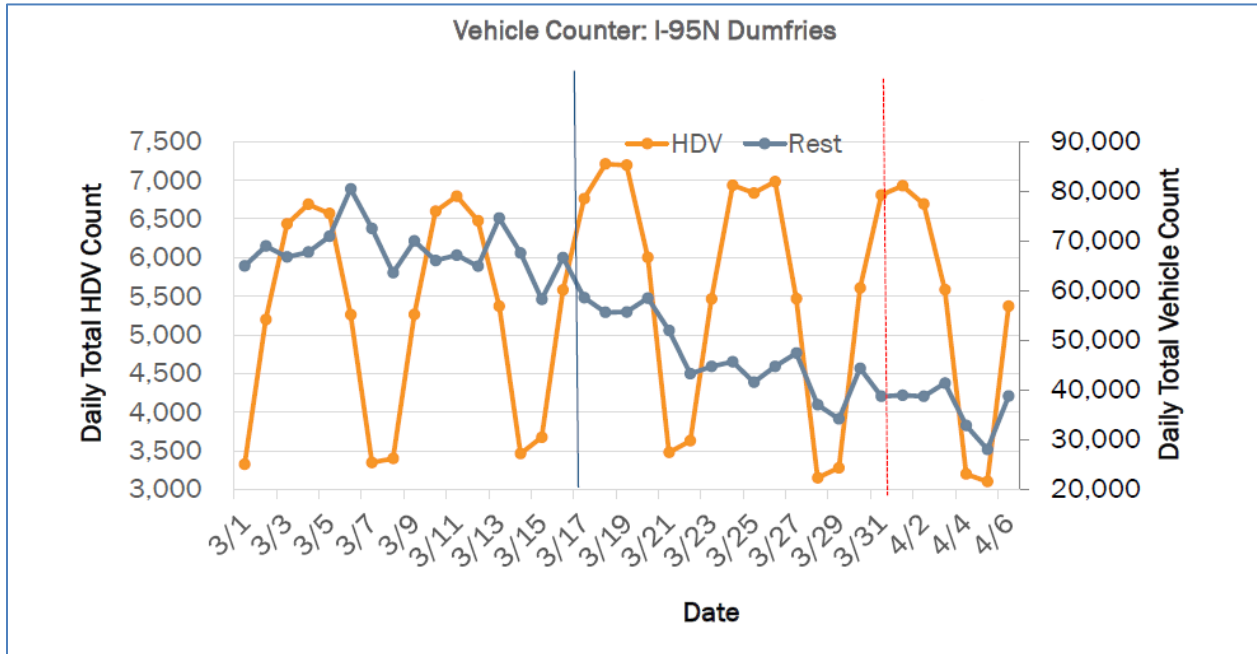


Figure 8: Heavy-Duty Vehicle (HDV) Volumes Compared to Non-HDV Volumes, I-95 Northbound at Dumfries, Virginia, March-April 2020 (Source: COG [Sunil Kumar] Analysis of Virginia Department of Transportation Data)



TRANSIT AND WALKING

5. TRANSIT RIDERSHIP: LOCAL TRANSIT AND COMMUTER SERVICES

Snapshot: Impacts to transit ridership have varied across the region, with longer-distance commuter services experiencing the biggest ridership declines, and local bus transit services experiencing declines of lesser magnitudes. While the ridership numbers reflect changes in usage, these reductions have to be viewed in relation to the reduction in service levels (capacity) due to pandemic-related challenges in operating transit. Preliminary data demonstrate that usage of available capacity has been significant, particularly on the bus system, which remains a lifeline for critical workers.

The region's local transit agencies and commuter services have experienced differing impacts to ridership. Figure 9 shows approximate ridership reductions for WMATA rail and bus⁷, and Figure 10 for a selected group of the region's transit providers as reported by an August 5, 2020 questionnaire of these agencies by TPB. As may be observed from Figure 9, WMATA's Metrobus system continued to carry a substantial portion of riders through this period, even with considerable reductions in service and limits on passenger capacity within the buses due to social distancing. The regional nature of Metrobus routes, and the destinations and population served, highlight how critical bus service has been especially to the workers essential in many aspects of the economy. While longer distance services such as MARC and Loudoun Commuter Bus services had the largest reported declines in ridership (likely result of greater share of patrons being able to work from home), as did services popular with visitors and tourists such as DC Circulator, local and WMATA bus transit services generally reported ridership declines of lesser magnitudes (given the nature of destinations served and greater dependence of the patrons on public transportation).

TPB staff plans to work with transit agencies on further analysis of the supply and usage of public transportation in general and WMATA in particular given that about 84% of the region's public transportation trips are made on the WMATA system.

⁷ Data obtained from WMATA Ridership Portal, <https://wmata.com/initiatives/ridership-portal/>.



Figure 9: Metrorail and Metrobus Year-to-Year Ridership Percentage Change, June/July/August 2020 Versus 2019 (Source: WMATA Data Portal)

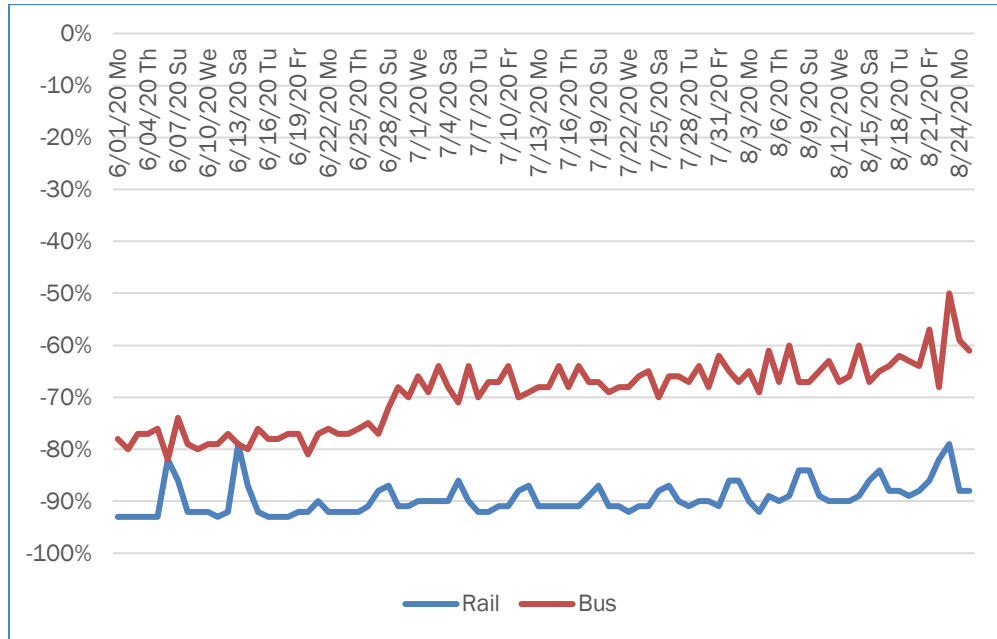
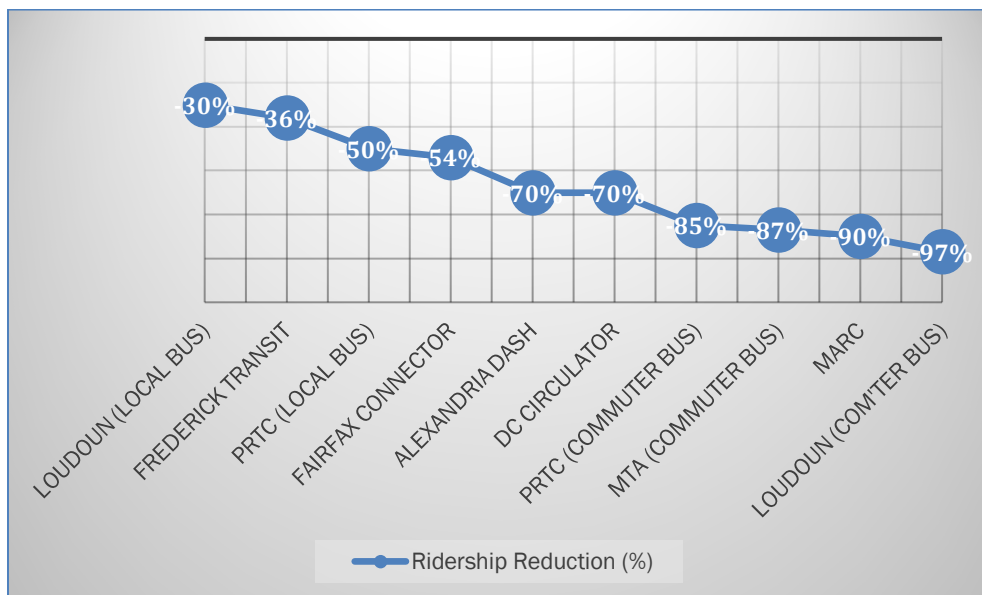


Figure 10: Transit Ridership Reductions on Selected Local Transit and Commuter Services (as reported in an August 5, 2020 TPB questionnaire to these agencies; all figures are approximate; Source: COG/TPB)

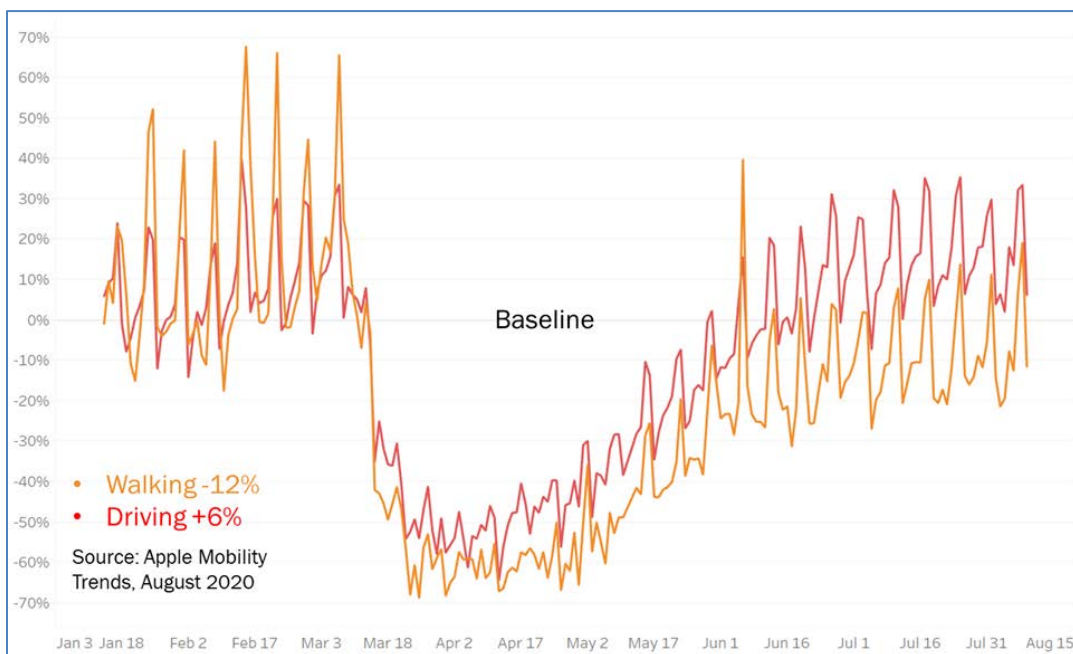


6. WALKING

Snapshot: App-based data provide an interesting but perhaps unproven insight into walking trends during the pandemic.

Data regarding walking in the region are of interest, but not always readily available. Apple Mobility made such data available for the District of Columbia⁸. These proprietary data compare mobile device usage associated with map direction requests on specific modes of travel⁹, and may not be consistent with other data sources; their inclusion here is illustrative. Figure 11 shows trends over time comparing driving and walking to a January 13, 2020 baseline. Both modes showed significant declines in the late March and early April time frame, and have recovered since then. Driving is even being reported to exceed the January 13 baseline, with walking still down somewhat. It must be noted that this dataset comes from a limited segment of probe data (only Apple devices) and further from a smaller segment of such probe users (only those using the Apple Maps app on those Apple devices). The representativeness of these data is unclear compared to the overall population's walking, and may be biased toward trips to destinations unfamiliar to the user. Nevertheless, the comparative trend line is of interest.

Figure 11: Apple Mobility Data for Walking Versus Driving, District of Columbia Only (Compared to a January 13, 2020 Baseline) Source: Apple Mobility Trends, August 2020



⁸ Apple Mobility data sets do not appear to be made available or summarized at the level of the National Capital Region geography, thus data for the District of Columbia only were used as illustrative.

⁹ The information is generated by counting the number of requests made to Apple Maps for directions. The data sets are then compared to reflect a change in volume of people driving, walking or taking public transit around the world. Data availability in a particular city, country, or region is subject to a number of factors, including minimum thresholds for direction requests made per day. See <https://www.apple.com/newsroom/2020/04/apple-makes-mobility-data-available-to-aid-covid-19-efforts/>.

SAFETY, SPEEDS, AND OTHER IMPACTS

7. ROADWAY SPEEDS

Snapshot: Roadway speeds in the National Capital Region generally remain at or near free-flow speeds, with slight declines since May.

Reductions of peak period delays have been a noted impact of COVID-19, with free-flow conditions even at “rush hour” in most of the region in the April time frame. By July, peak period speeds have shown some slowing, but still much higher than pre-pandemic levels. Figure 12 provides an example showing the 5:00 P.M. to 6:00 P.M. time period on Interstate highways in the National Capital Region for the January to July 2020 time frame, separately for passenger vehicles and trucks.

As may be seen from the compiled data, speed increases have been of a greater magnitude than the magnitude of traffic volumes. While traffic volumes regionally recently have been about 20% below pre-pandemic levels, peak period speed data remain near free-flow. Traffic flow theory and longstanding empirical data have established that when demand exceeds capacity and traffic operations are in unstable or saturated conditions, a small reduction in demand results in a disproportionate improvement in speeds. As such, strategies to marginally reduce single occupant vehicle (SOV) demand during peak demand via flexible work schedules, pricing or ridesharing (including express bus service) are effective ways to address peak period congestion, conserve energy and reduce emissions.



Figure 12: Interstate System Car and Truck Mean Speeds by Week, Weekdays 5:00 P.M. to 6:00 P.M., National Capital Region (Source: TPB analysis of National Performance Management Research Data Set [NPMRDS])

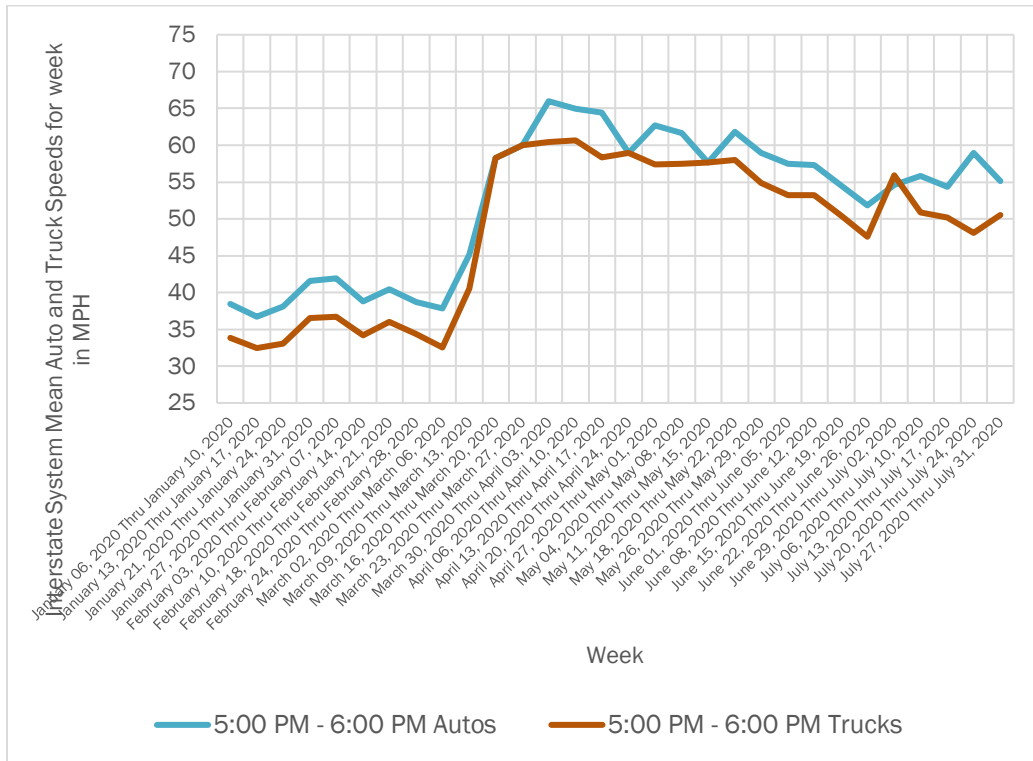
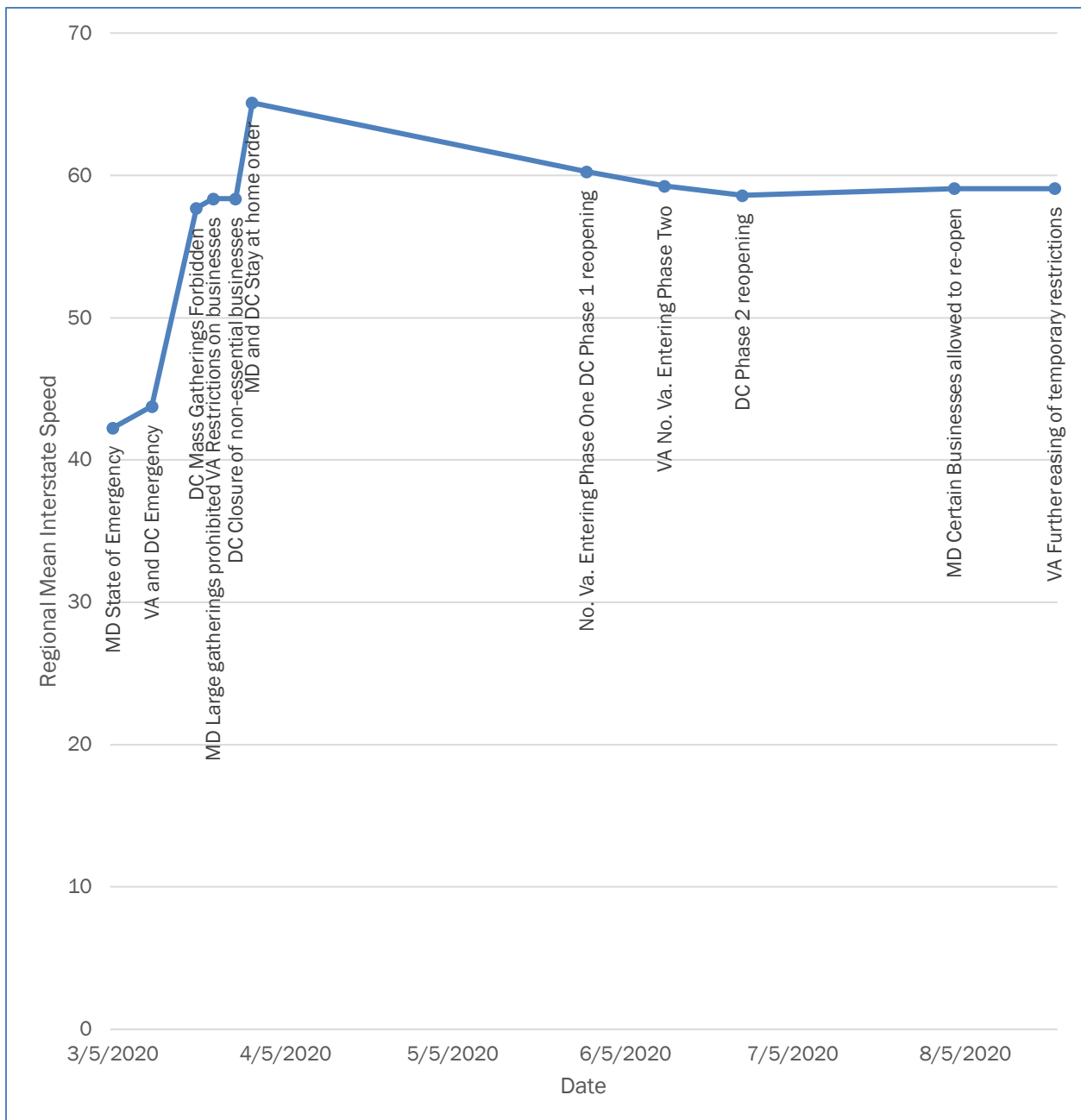


Figure 13 shows the chronology of COVID-related District of Columbia, Maryland, and Virginia emergency declarations since March, with the amalgamated mean speed trend of the region's Interstate highways shown in the same chronology. Regional Interstate Highway speed increases were dramatic in March, with modest reductions since then.

Figure 13: Chronology of Emergency Declarations and Regional Interstate Highways Mean Speed (Sources: COG regional COVID-19 resources web page (<https://www.mwcog.org/about-us/covid-19/>); National Performance Management Research Data Set)

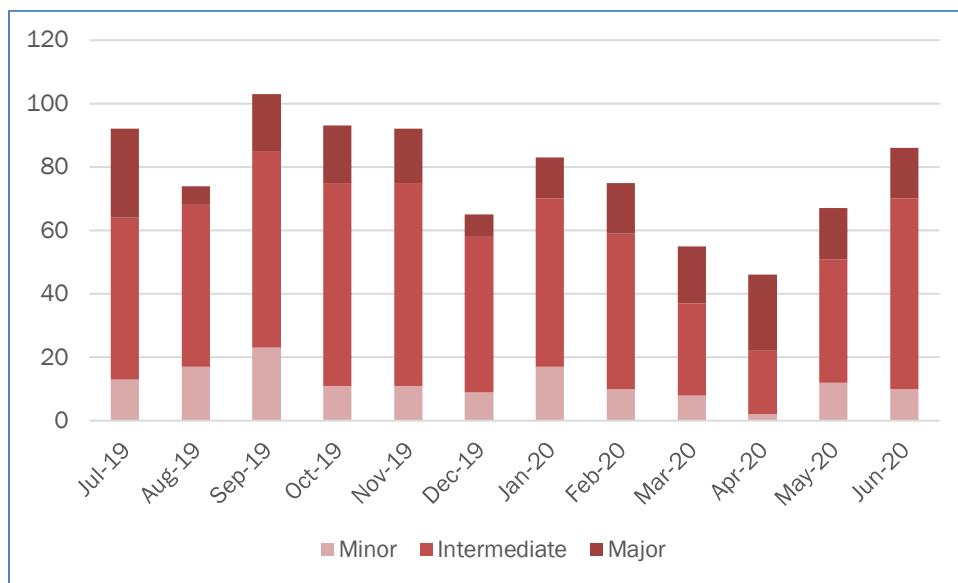


8. SAFETY

Snapshot: Though the overall number of crashes and incidents went down during the pandemic, the numbers of major incidents and fatal crashes have remained near pre-pandemic levels, despite reduced travel demand.

The Metropolitan Area Transportation Operations Coordination (MATOC) Program provides regional monitoring and situational awareness regarding incidents that have major impacts on traffic. MATOC's monthly records¹⁰ provide an indication of overall incident trends, summarized in Figure 14. Notable in this data set was the relatively high number of incidents classified by MATOC as major during the month of April, even as the number of minor incidents had declined significantly, and intermediate incidents had declined somewhat. However, by June, incident patterns were already returning to historical norms.

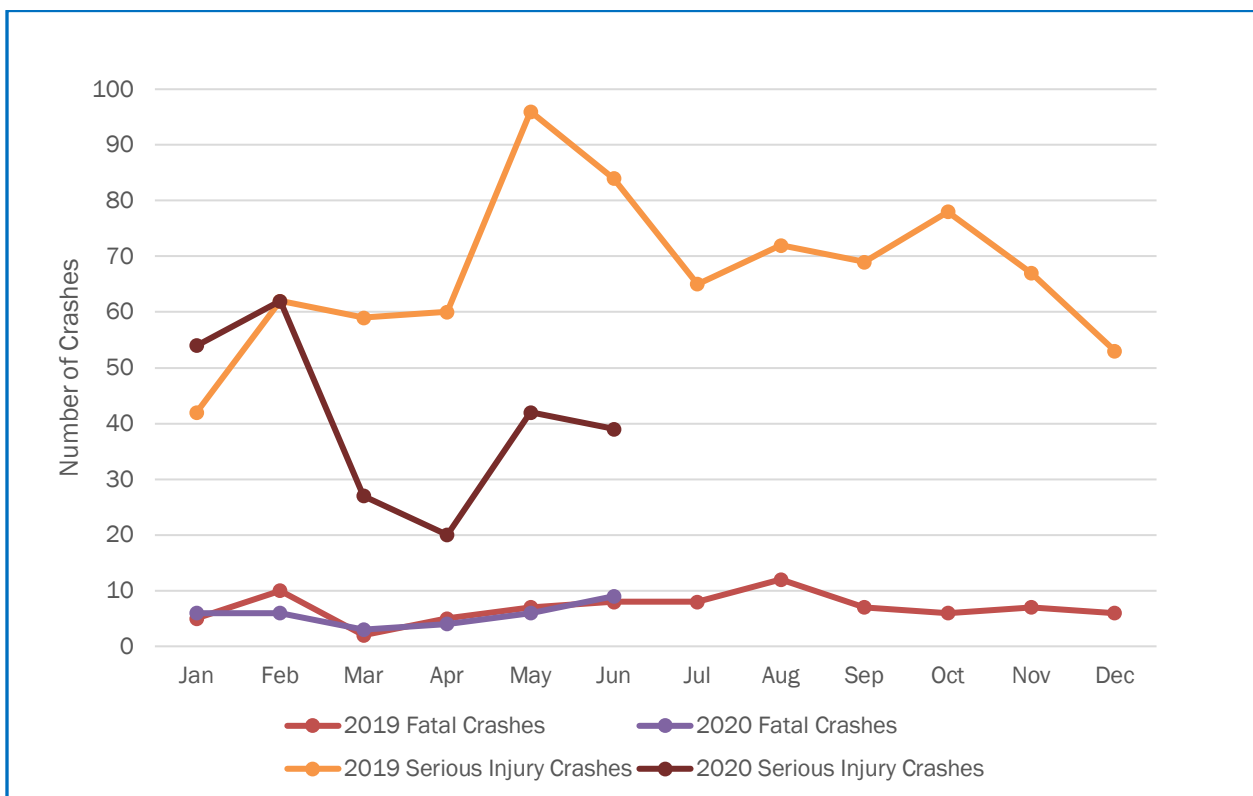
Figure 14: MATOC Roadway Incidents Summary, July 2019 to June 2020 (Source: MATOC)



¹⁰ Summary provided to TPB staff by MATOC staff August 2020. Note that MATOC documents incidents only during its official operating hours, generally Mondays through Fridays from 4:30 A.M. to 8:00 P.M., and for a specific set of major roadways defined in MATOC's standard operating procedures (SOPs). Any incidents outside those hours and/or not on roadways designated in MATOC's SOPs are not included in these data.

Although comprehensive, regionwide fatal and serious injury crash data will not be available until later dates (published annually after thorough reviews), preliminary data have been made available for the Northern Virginia portion of the region¹¹. Figure 15 shows fatal and serious injury crashes for all of 2019, and for 2020 through June. Post-COVID serious crash numbers have been significantly lower than their 2019 counterparts, but fatal crashes have remained at about the same level as 2019, even during months such as April with reduced traffic volumes.

Figure 15: Northern Virginia Fatal and Serious Injury Crashes: Preliminary 2019 and 2020 Data (Source: TPB staff analysis of Virginia Department of Motor Vehicles/Virginia Department of Transportation)



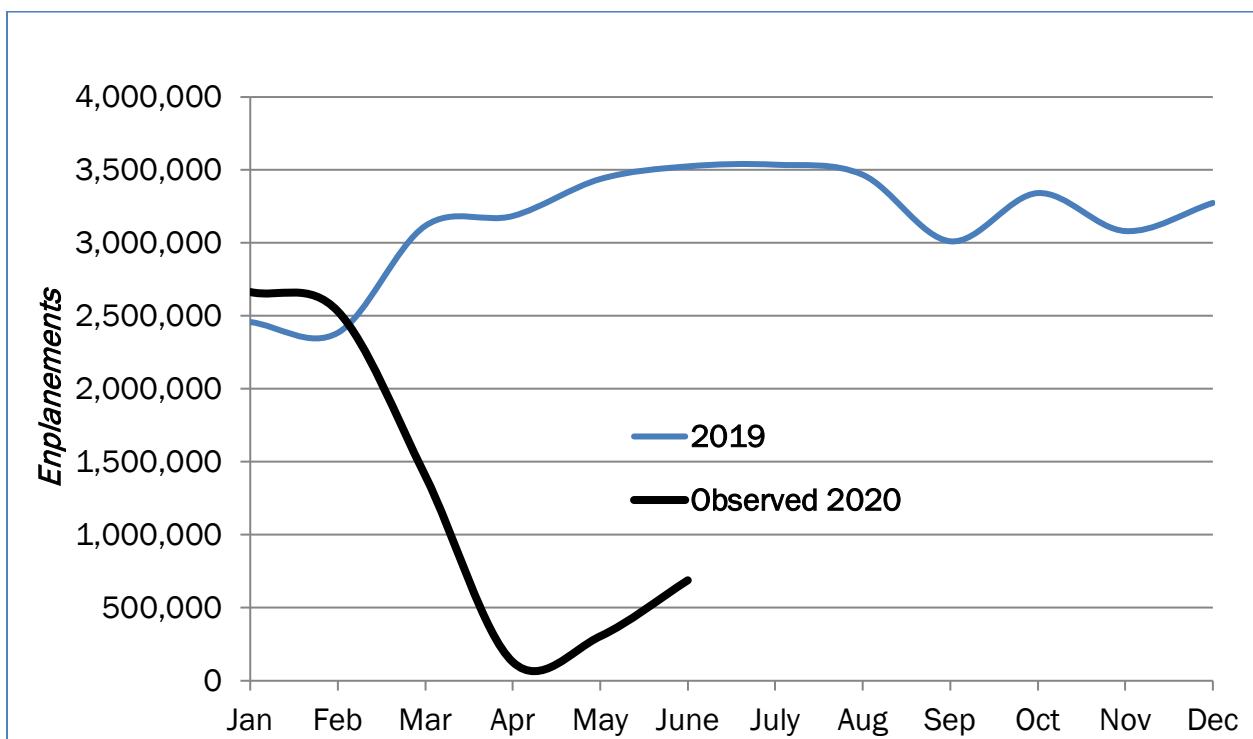
¹¹ Virginia Department of Motor Vehicles data accessed through the Virginia Department of Transportation Crash Analysis Tool website: <https://app.powerbigov.us/view?r=eyJrIjoieMjhZjFhZDA0NTIjMC00MDA1LWUyOTMtYWYwM2NiMmRiMmRkIiwidCI6IjYyMGFINWE5LTRYzEtNGZhMC04NjQxLTVkOWYzODZjNzMwOSJ9>.

9. AIR TRAVEL

Snapshot: Air travel has recovered somewhat at the region's three major airports since April, but remains much lower than 2019.

Figure 16 shows enplanements data for the area's three airports (Ronald Reagan Washington National Airport, Washington Dulles International Airport, and Baltimore-Washington Thurgood Marshall International Airport).

Figure 16: Washington/Baltimore Monthly Enplanements through June 2020 (Source: COG)



10. COVID-19 CASES

Figure 17, taken from the U.S. Centers for Disease Control, shows the number of newly reported COVID-19 cases nationally. Figure 18 shows cumulative cases of COVID-19 in the National Capital Region as reported by Johns Hopkins University.

Figure 17: Nationwide New Reported COVID-19 Cases By Day (Source: <https://www.cdc.gov/coronavirus/2019-ncov/cases-updates/cases-in-us.html>, retrieved August 25, 2020)

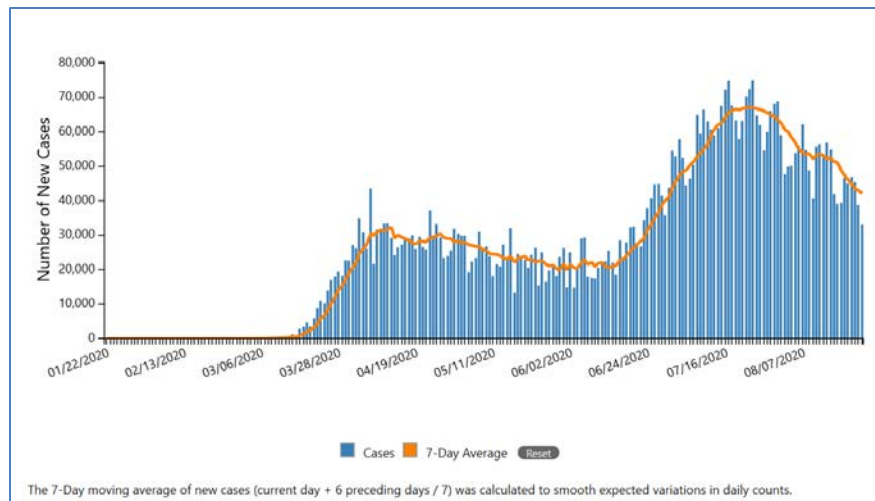
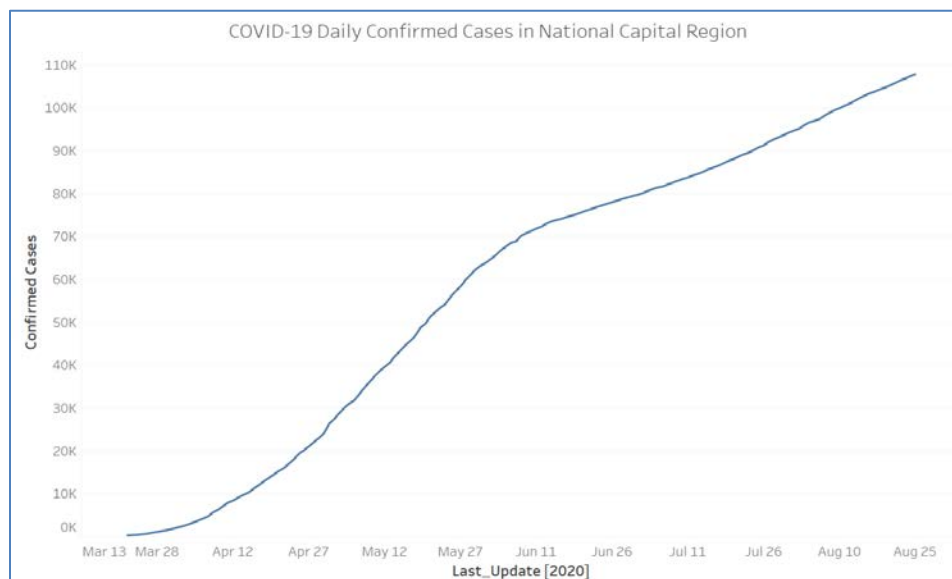


Figure 18: COVID-19 Cumulative Daily Confirmed Cases in the National Capital Region (Source: COVID-19 Data Repository by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University, <https://coronavirus.jhu.edu/map.html>)

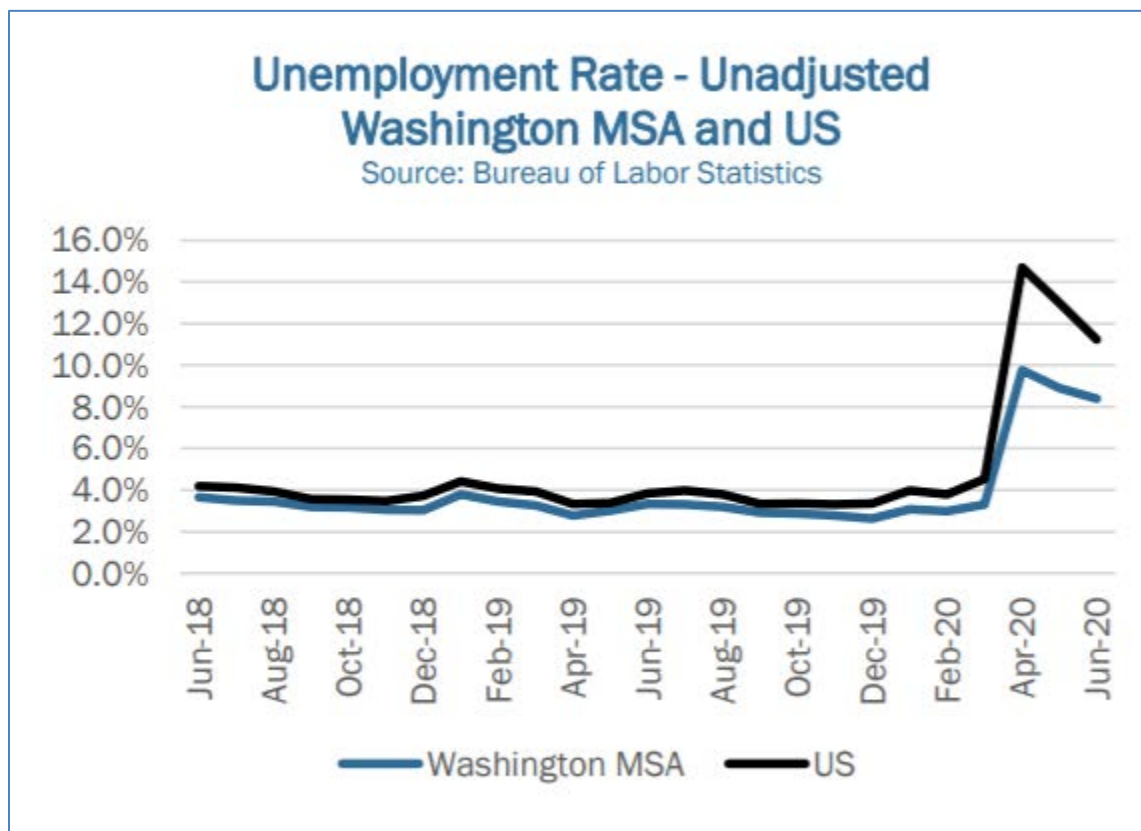


11. ECONOMIC IMPACTS

Figure 19, taken from COG's Regional Economic Monitoring System Report¹² for June 2020, shows the region's unemployment rate trend over time, compared to the national rate, as a comparator to travel demand.

Also according to the report, over-the-year employment decreased by 270,900 jobs or 8.0 percent in the Washington Metropolitan Statistical Area (MSA), while the national over-the-year employment decreased by about 13 million jobs or 8.7 percent. The Leisure & Hospitality Sector lost 131,700 jobs and the Trade Transportation, & Utilities Sector lost 35,400 jobs during the last year. (Most jobs were lost between March and April 2020) The number of unemployment insurance claims rose to a high of 96,406 for the week of April 4 and with a steady decline down to 20,679 for the week of June 27. The region's inflation decreased in May to -0.1 percent from a rate of 0.4 percent in March 2020. During June, the region's unemployment rate decreased to 8.4 percent, while the national rate decreased to 11.2 percent. The 2,432 new housing units authorized during June 2020 represent a 25.0 percent increase from June 2019, when 1,945 new units were started. For a list of jurisdictions in the MSA, visit www.mwcog.org/REMS.

Figure 19: Regional and National Unemployment Rate, June 2018 through June 2020 (Source: COG Regional Economic Monitoring System (REMS) Report, July 2020 REPORT - JULY 2020)



¹² <https://www.mwcog.org/documents/2020/07/01/regional-economic-monitoring-system-rems-report-economy/>.

SUMMARY

The COVID-19 pandemic has had a significant, quickly-changing, and still-evolving impact on travel and transportation in the National Capital Region and nationally. Notable among the snapshots of data examined by TPB staff include:

- Traffic volumes in the National Capital Region, which in April 2020 had dipped below 50% of 2019 volumes, by July had recovered to over 80% of 2019 volumes.
- Regional vehicle miles of travel dipped most dramatically in April to approximately 40% of January 2020 levels, but by July had recovered significantly.
- Though miles of travel per person have returned to near pre-pandemic levels, people are still much more likely to be staying at home than pre-pandemic.
- Truck travel never declined as much as passenger travel did.
- Impacts to transit ridership have varied across the region, with longer-distance commuter services experiencing the biggest ridership declines, and local bus transit services experiencing declines of lesser magnitudes. While the ridership numbers reflect changes in usage, these reductions have to be viewed in relation to the reduction in service levels (capacity) due to pandemic-related challenges in operating transit. Preliminary data demonstrates that usage of available capacity has been significant, particularly on the bus system, which remains a lifeline for critical workers.
- Though the overall number of crashes and incidents went down during the pandemic, the numbers of major incidents and fatal crashes remained near pre-pandemic levels, even during periods of reduced travel demand.
- Air travel has recovered somewhat at the region's three major airport since April, but remains much lower than 2019.

ACKNOWLEDGEMENTS

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