2019 - 2020

REGIONAL TRAFFIC PATTERNS

December 2022

MAPA Omaha - Council Bluffs Metropolitan Area Planning Agency

Regional Traffic Patterns

2019 - 2020 | December 2022

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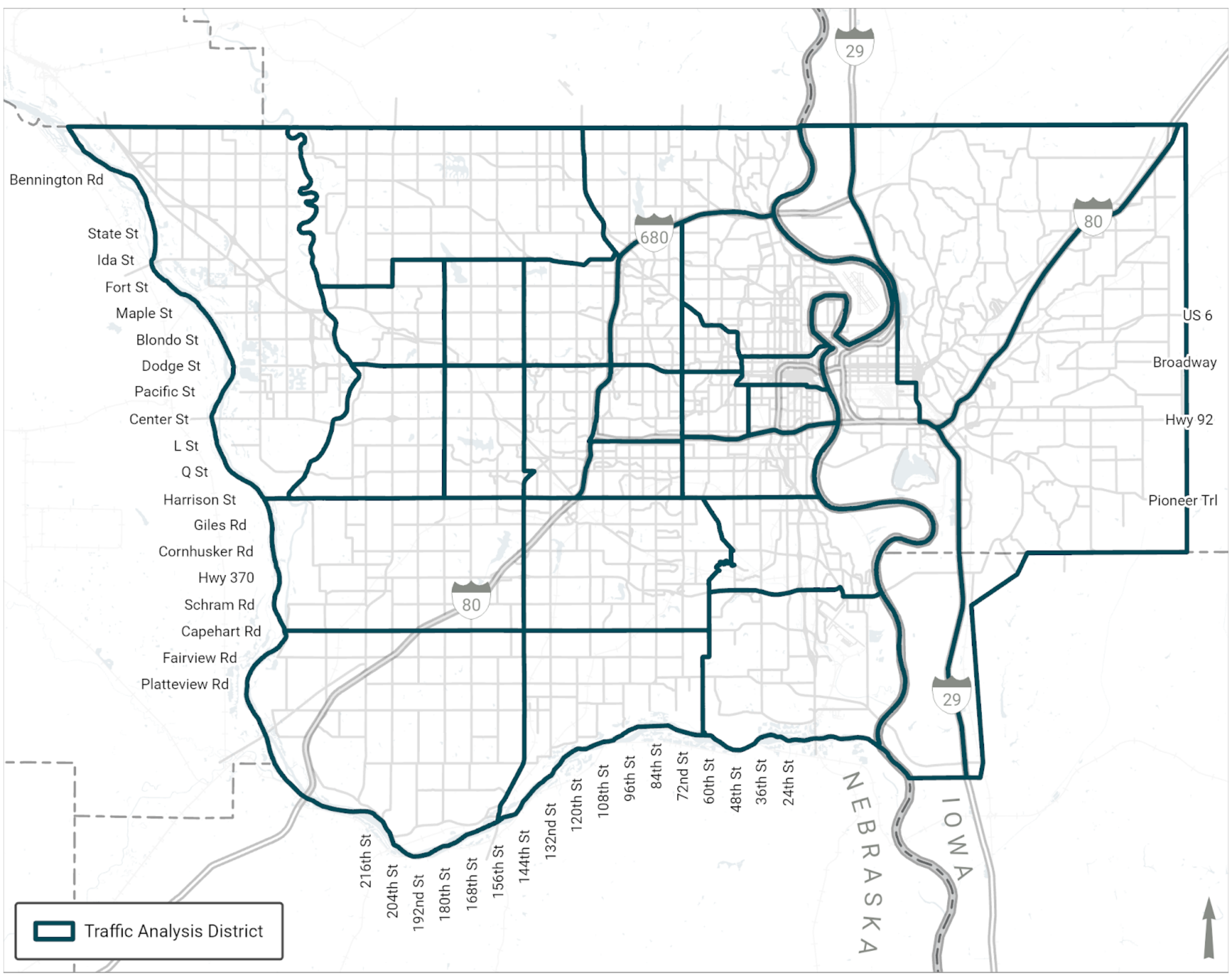
Introduction

The Metropolitan Area Planning Agency (MAPA) produces a biennial *Regional Traffic Patterns Report,* an analysis of regional and sub-regional traffic patterns, in conjunction with the *Traffic Flow Map*, the *Top Intersection Report*, and the *Top Interchange Report*. This report compares the regional traffic patterns for vehicular, freight, and multi-modal transportation through the pre- and post-COVID time periods.

Traffic Analysis Districts

This report measures the changes in traffic patterns at regional and sub-regional levels. Traffic count data for this report is aggregated to Traffic Analysis Districts (TADs) – small areas in each county that are bound by major roadways, depicted in Figure 1.

Figure 1: Traffic Analysis District Map



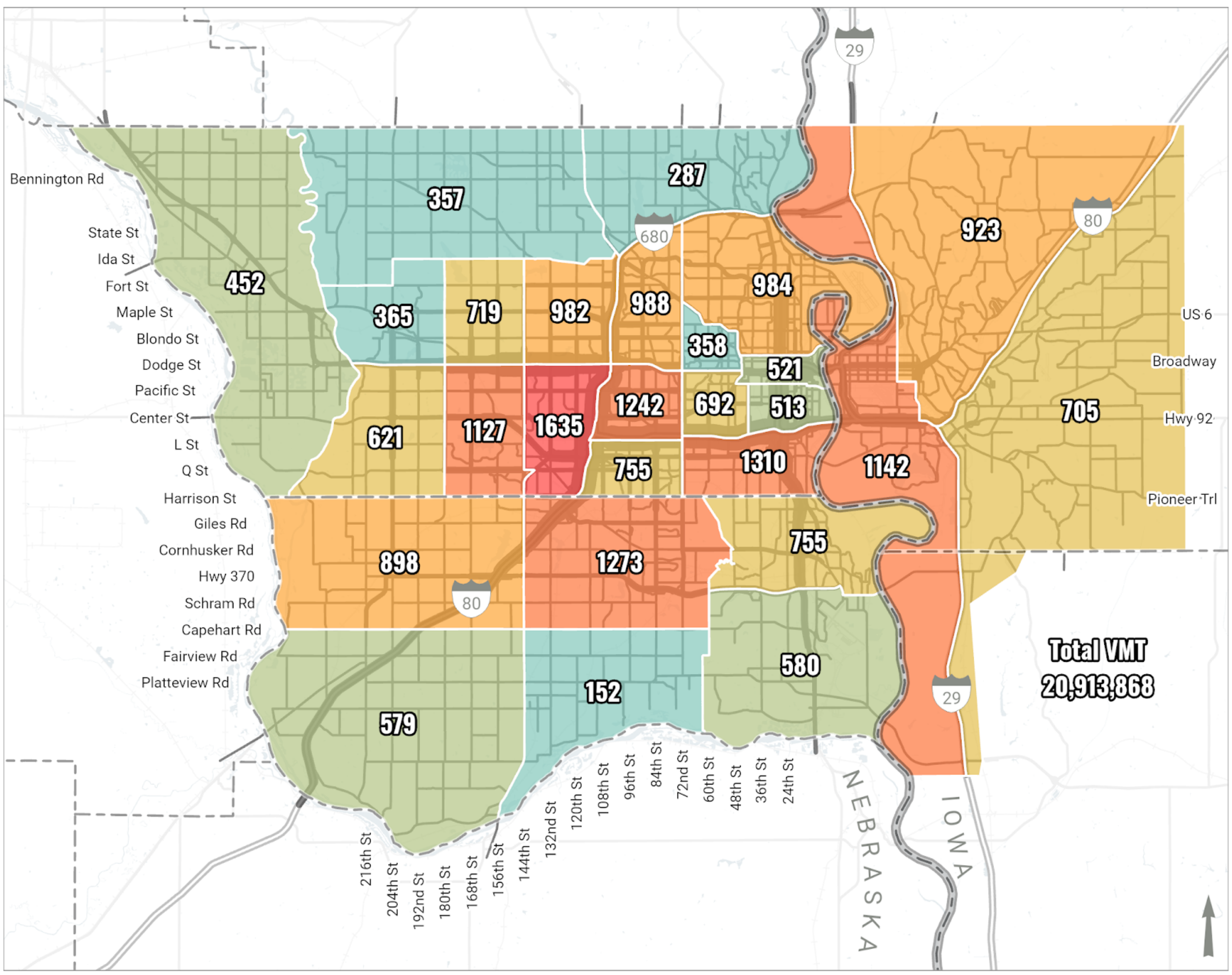
Observations 2018-2020

Traffic observations are displayed in terms of vehicle miles traveled (VMT), which is calculated by multiplying the length of a road segment in miles by the average annual daily traffic (AADT). Statistics in the *Regional Traffic Patterns Report* are primarily derived from volumes shown on the *2020 Traffic Flow Map*. For more specific information regarding traffic along or through particular streets or intersections, please consult the *2020 Traffic Flow Map*.

Average Daily Vehicle Miles Traveled

Total VMT is derived from the traffic count estimates that include new counts and older data that is factored and interpolated. Figure 2 illustrates average daily vehicle miles traveled.

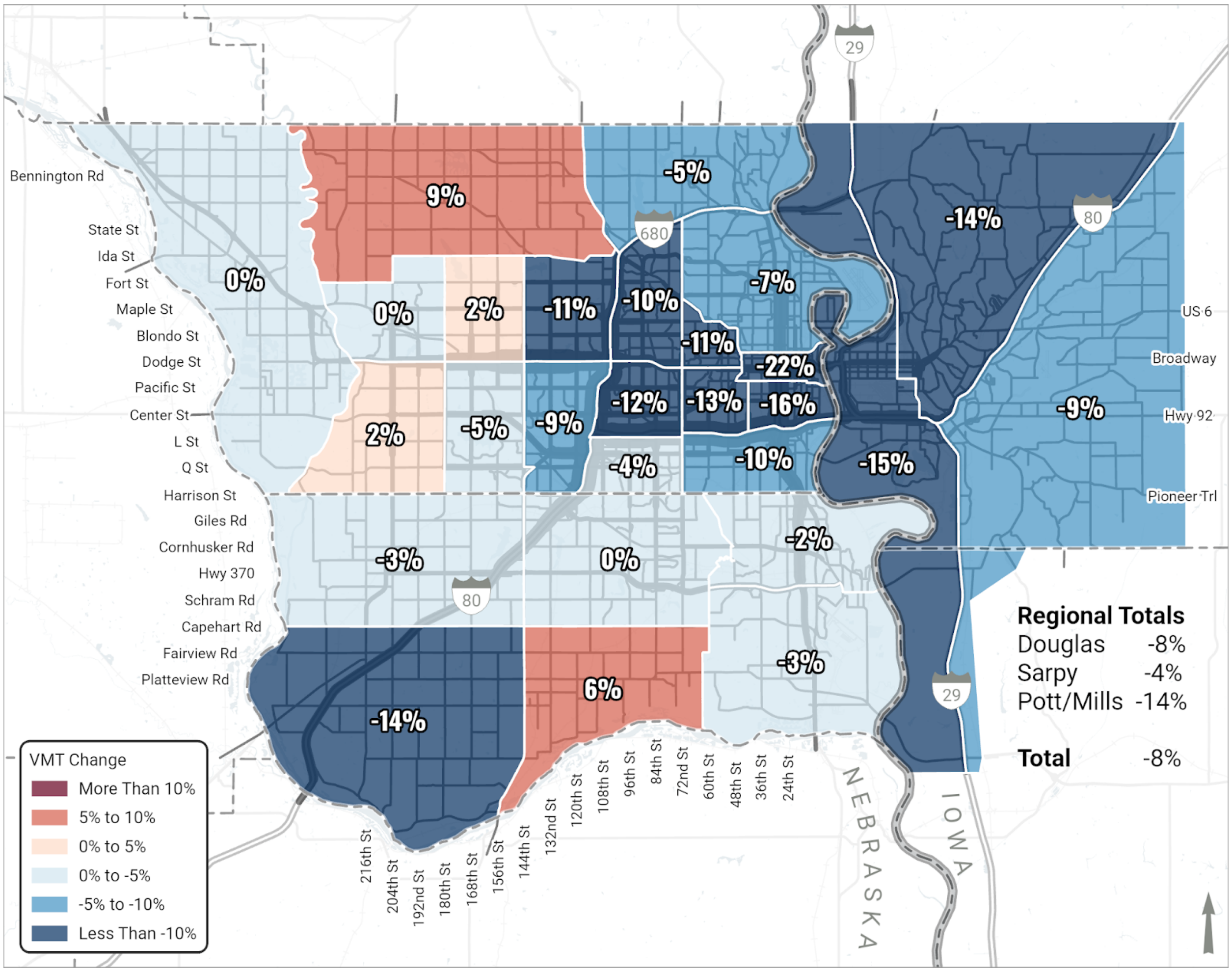
Figure 2: 2020 Average Daily Vehicle Miles Traveled (in thousands)



Change in Vehicle Miles Traveled

VMT is compared for each TAD between reporting years to come up with a rate of change. These rates of change by district are depicted in Figure 3 for the period of 2018-2020.

Figure 3: Estimated Percent Change in VMT 2018 - 2020



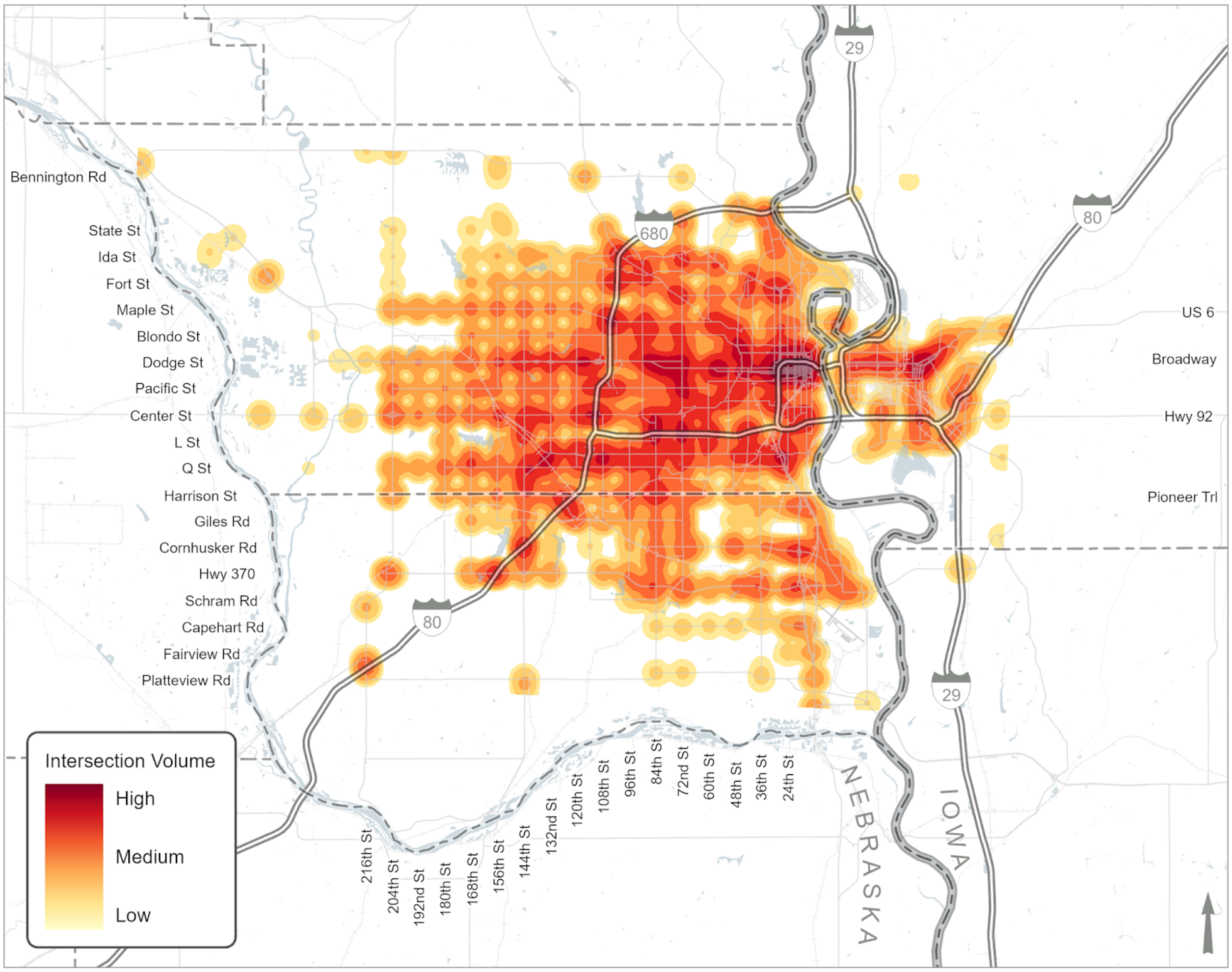
VMT is estimated to have fallen by 8% in Douglas County, 4% in Sarpy County and by 14% in Pottawattamie and Mills Counties with an overall regional decrease in VMT of 8% since 2018. VMT grew by roughly 2% from 2016 to 2018 by comparison.

Exurban districts that experienced greenfield development appear to be less affected than the urban core, with the central business district of the City of Omaha experiencing a substantial decrease in VMT of more than 22% from 2018 to 2020. Traffic volumes across the region were greatly affected by significant regional flooding in 2019 and the COVID-19 pandemic in 2020.

Intersection Heat Map

The Intersection Heat Map was created using data compiled from the *Top Intersection Report*. Intersections were evaluated for network density relative to traffic volume and processed into a heat map that demonstrates intersection connectivity. This output provides insight into transportation network performance and traffic flow trends in the region.

Figure 4: Intersection Heat Map

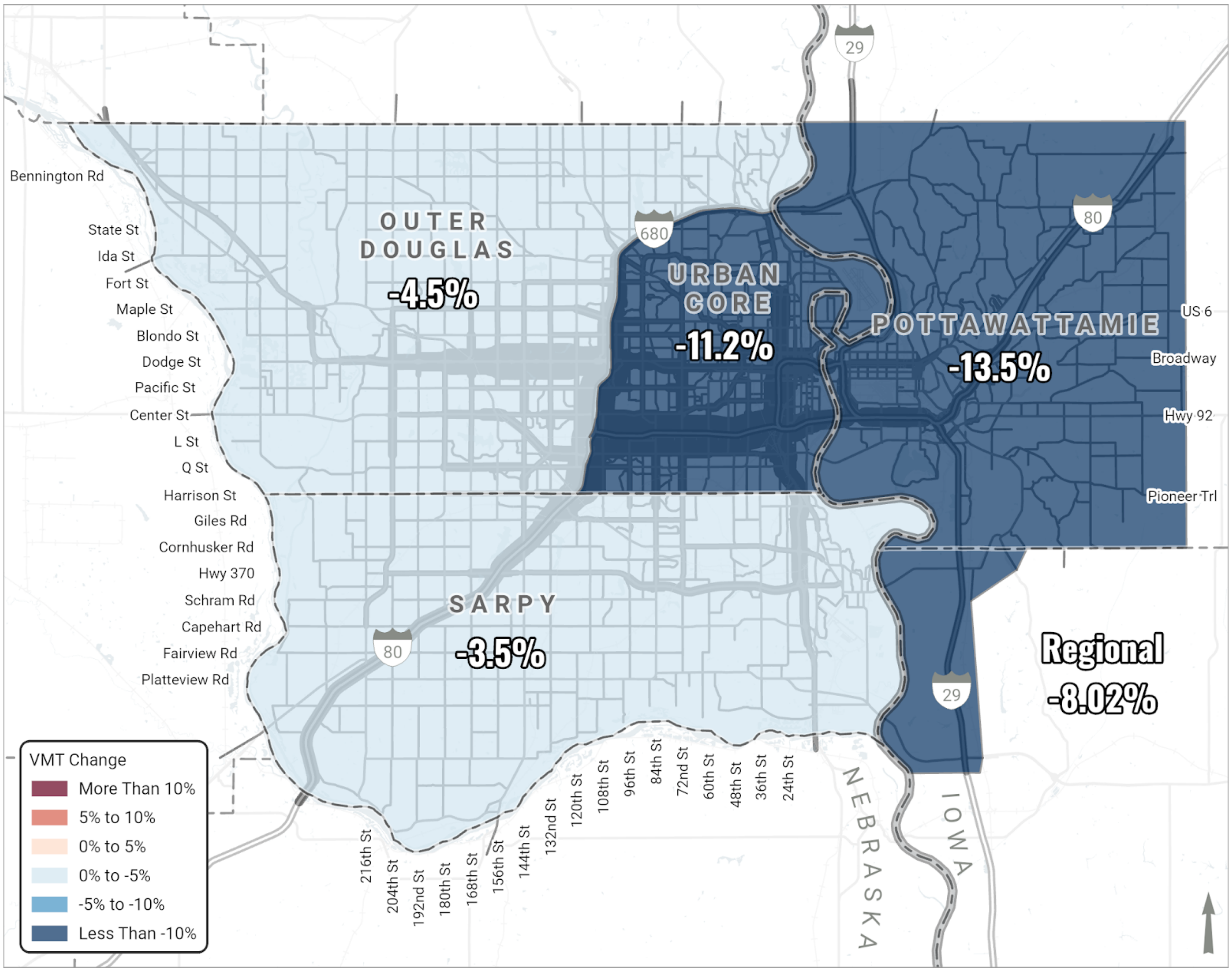


COVID-19 Impacts

To add context to the traffic data collected in the period of 2018 - 2020, additional analysis was done on traffic volumes through 2021. Annual traffic volumes for the period of 2019 - 2021 were interpolated from nearby observations and from their Federal Functional Classification (FFC) as depicted in Figure 7.

As depicted in Figure 5, regional VMT is estimated to have fallen by 8.02% from 2018 - 2020. When compared to suburban and exurban parts of Douglas and Sarpy Counties, the urban core of the region experienced significant impacts to VMT, decreasing by 11.2%. This area is a large employment center for the region and a shift to work from home policies spurred by the COVID-19 pandemic likely contributed to this reduction.

Figure 5: Regional Percent Change in VMT 2018 - 2020



Pottawattamie County also showed significant decreases in VMT but this is likely attributable to data availability. Another consequence of the pandemic was that the Iowa Department of Transportation (IowaDOT) was unable to complete regularly scheduled local traffic counting in the region. Volumes were only collected on the interstate system during this time period and interstate facilities were among the most affected by changes in travel behavior. This resulted in an over-representation of interstate volumes in the Iowa data.

Initial data comparing 2018 to 2019 showed modest growth in Douglas County, flat growth in Pottawattamie County, and faster growth in Sarpy County. Rates of recovery from 2020 have exceeded losses in suburban and exurban Douglas and Sarpy Counties while the recovery in the urban core has been slower, as depicted in Figure 6:

Figure 6: Annual Percent Change in VMT 2018 - 2021

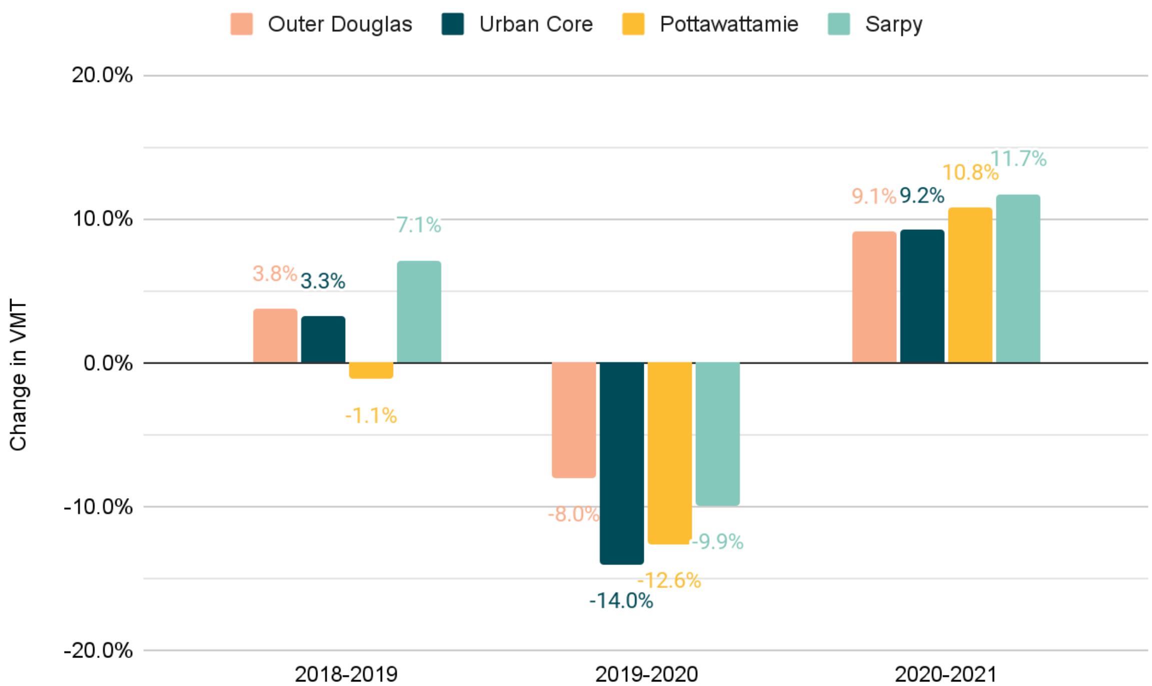


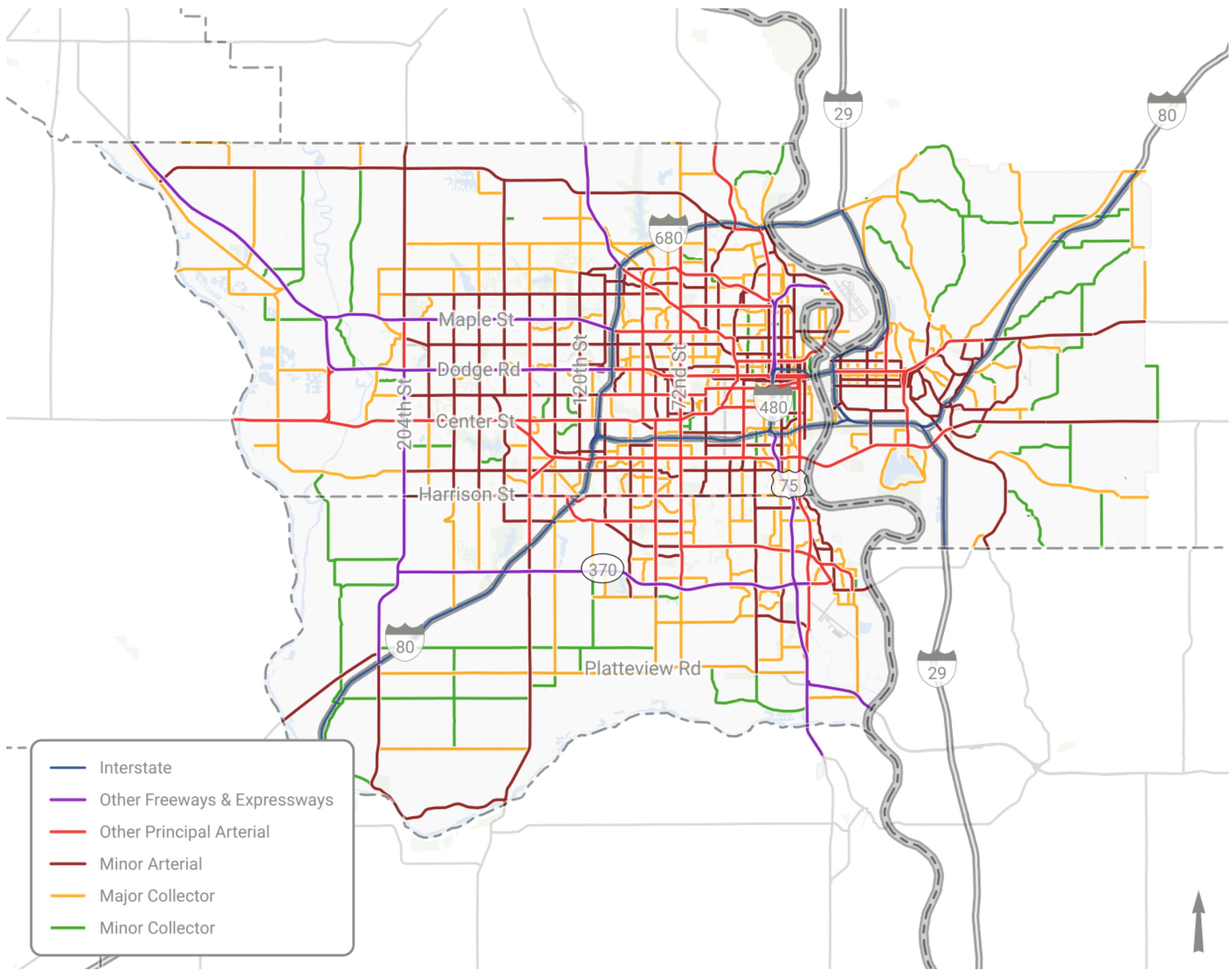
Table 1: Change in VMT by FFC 2018 - 2021

Federal Functional Classification	Centerline Miles	2018-2019	2019-2020	2020-2021
Interstate	189	2.0%	-16.3%	14.9%
Freeway	133	2.4%	-7.3%	11.4%
Major Arterial	182	3.1%	-11.7%	7.3%
Minor Arterial	391	4.9%	-9.0%	6.8%
Major Collector	375	14.8%	-10.8%	8.3%
Minor Collector	151	27.2%	-14.1%	8.4%
Local	554	-3.0%	-3.3%	3.1%

Table 1 shows the change in VMT by Federal Functional Classification (FFC). The functionality of a street is related to traffic mobility and land access. Higher level facilities such as freeways and expressways have lower access which allow for higher speeds and capacities. Conversely, lower level facilities such as local streets and minor collectors allow for greater access, but have reduced mobility due to lower speeds and capacities. Every classified road is represented in this analysis; however, only a selection of Local roadways are included as traffic data collection is limited on Local roadways.

These classifications are defined by the Federal Highway Administration (FHWA). Regional classifications are depicted in Figure 7 below:

Figure 7: Federal Functional Classification



MAPA Area Continuous Traffic Counts

Nebraska and Iowa both have traffic counting sites that count vehicles on a continuous basis, 365 days a year, in the Omaha-Council Bluffs metro area. These counters, called Automatic Traffic Recorders (ATRs) or Continuous Count Sites (CCS), provide an excellent source of traffic data for analysis. There are currently 15 active ATRs in the region, with 10 located in Nebraska and 5 located in Iowa. A summary of the counter locations is shown in Table 2.

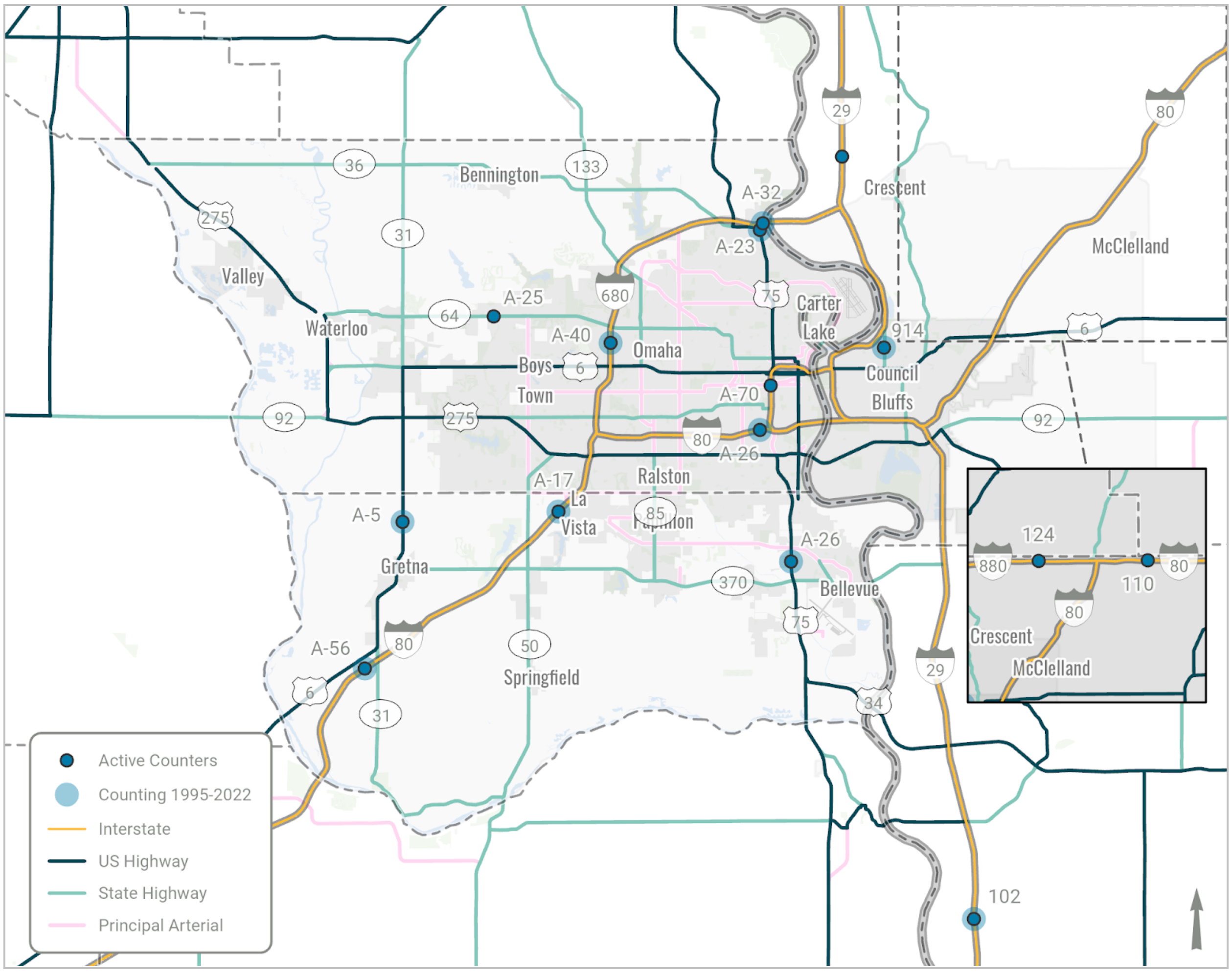
Table 2: MAPA Regional ATR Summary

State	ID	Route	Federal Functional Classification	Location
Iowa	100	I-29	Rural Interstate	2 Mi North of South I-680 Jct
	102	I-29	Rural Interstate	7 Mi South of US-34 Jct (Pacific)
	110	I-80	Rural Interstate	1.5 Mi West of Co M-16 (Shelby)
	124	I-880	Rural Interstate	6.4 Mi West of I-80 (Beebeetown)
	914	16th St	Municipal Streets	0.6 Mi West of IA-192
Nebraska	A-5	US 6	Principal Arterial	North of Gretna
	A-17	I-80	Urban Interstate	Just South of Douglas-Sarpy Line
	A-23	US 75	Principal Arterial	30th Street South of I-680 in Omaha
	A-24	I-80	Urban Interstate	I-80 at 36th Street in Omaha
	A-25	N-64	Principal Arterial	At 160th Street
	A-26	US 75	Principal Arterial	Just North of Jct. N-370 in Bellevue
	A-32	I-680	Urban Interstate	Mormon Bridge in Omaha
	A-40	I-680	Urban Interstate	I-680 North of Dodge Street
	A-56	I-80	Rural Interstate	West of Gretna Interchange
	A-70	I-480	Urban Interstate	At Leavenworth St in Omaha
Locations which have continuously counted since 1994				

Statewide, ATRs are located on all classes of roadways, from interstate and state highways to local primary and secondary roads. Located in both urban and rural areas, these counters are useful in understanding trends in growth or decline of traffic volumes.

Figure 8 on the following page shows the location of ATRs which are either within the MAPA Metropolitan Planning Organization (MPO) Traffic Management Area (TMA), or are in close enough proximity to add value in assessing traffic growth.

Figure 8: Automatic Traffic Recorder (ATR) Location Map



Seasonal Variation

Traffic volumes vary significantly throughout the year and are impacted by weather conditions, school sessions, road construction or detours, and holiday travel. This variation is measured both at the monthly and daily periods, and is used to seasonally adjust short duration traffic counts to be expressed in terms of AADT. The flooding in 2019 and the COVID-19 pandemic response resulted in significant variation in traffic flows. Additionally, flood damage removed several ATRs in Iowa from service. Traffic patterns are analyzed across road types, and for our region are binned within the four classifications shown in Figure 9 through Figure 12.

Figure 9. Monthly Average Daily Traffic (MADT) on Principal Arterials

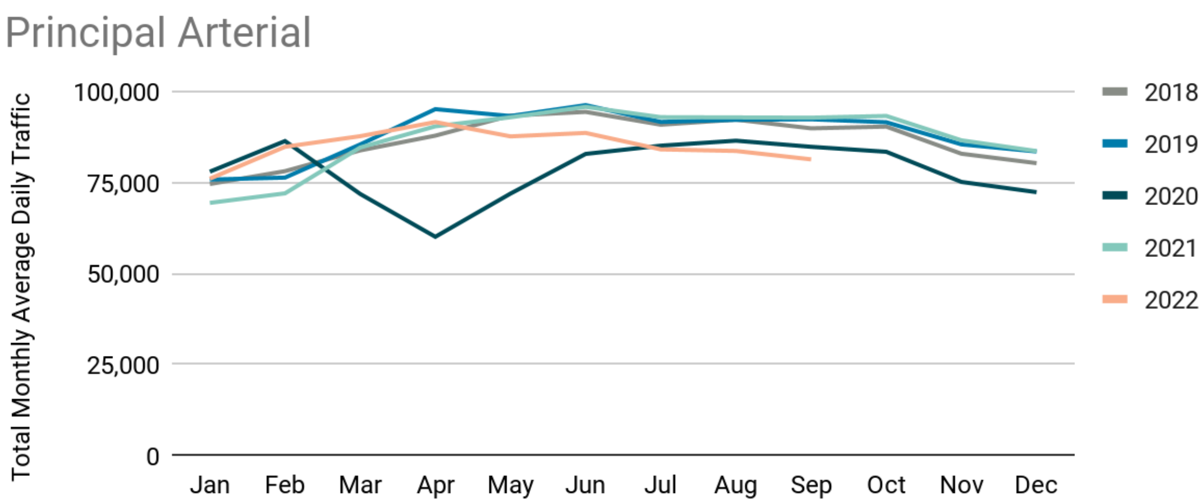


Figure 9 clearly shows the impacts of the pandemic on traffic volumes with the rapid drop in March and April of 2020, maintaining measurably lower than normal volumes throughout the remainder of 2020. The impact of bridge construction on US 75 in 2022 can also be seen, as traffic shifted onto other routes.

Figure 10. Monthly Average Daily Traffic (MADT) on Municipal Streets

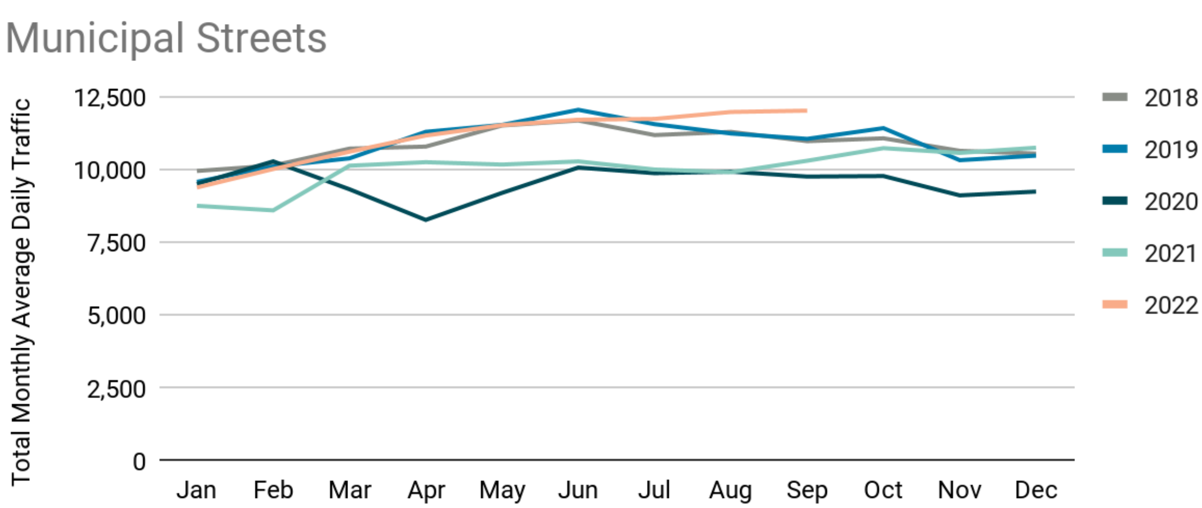


Figure 10 shows the monthly variation in traffic on 16th Street in Council Bluffs. These counts show the pandemic response on 16th Street in Council Bluffs. Unique to this location, 2021 counts remained lower than previous years until late in the year.

Figure 11. Monthly Average Daily Traffic (MADT) on Rural Interstate

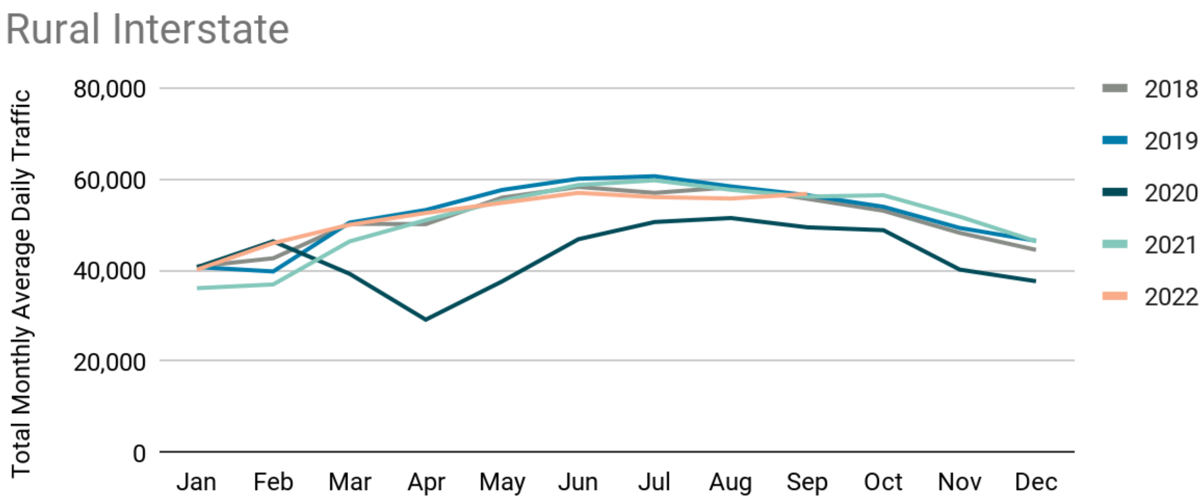


Figure 11 presents the monthly traffic variation along I-80 just west of the Gretna interchange. The impact of the pandemic response is very evident, with traffic not reaching pre-pandemic levels until the summer of 2021.

Figure 12. Monthly Average Daily Traffic (MADT) on Urban Interstate

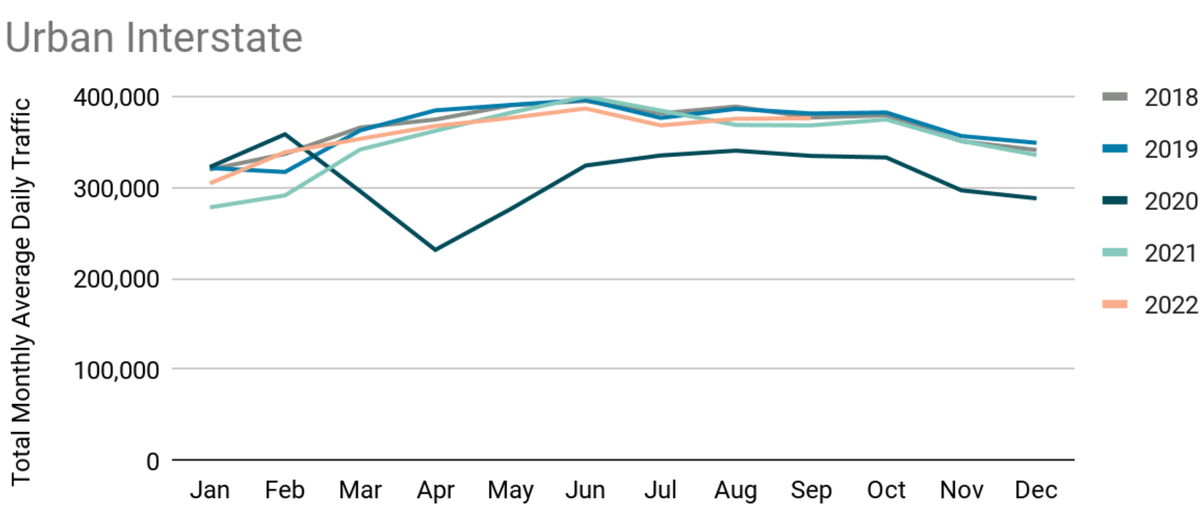
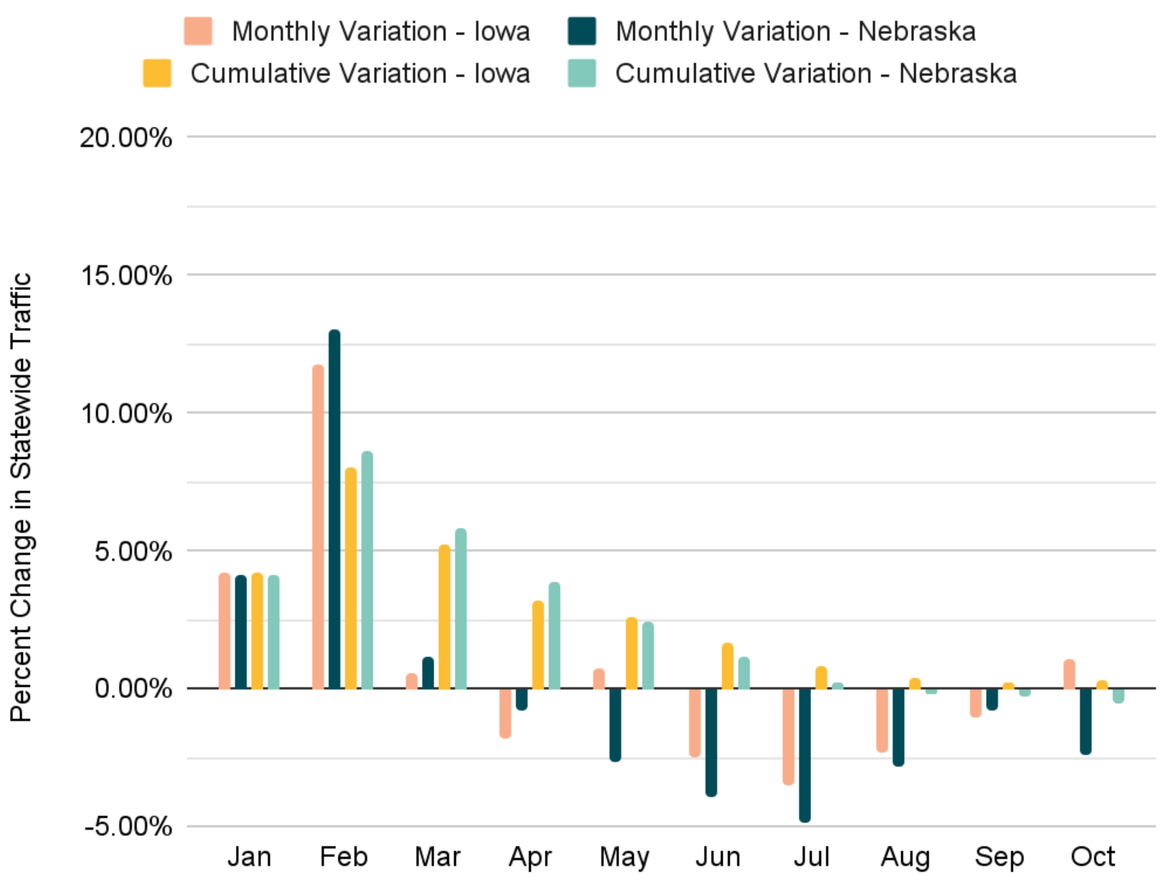


Figure 12 shows the combined monthly average daily traffic at two locations on I-80 and I-680 in the MAPA region. Although 2022 volumes started the year well above 2021 monthly values, traffic volumes have leveled out over the summer months—a consistent trend regionally (with the exception of the municipal street location from Figure 10) as well as across Nebraska and Iowa.

Figure 13: Monthly and Cumulative Percent Change in Statewide Traffic 2021-2022

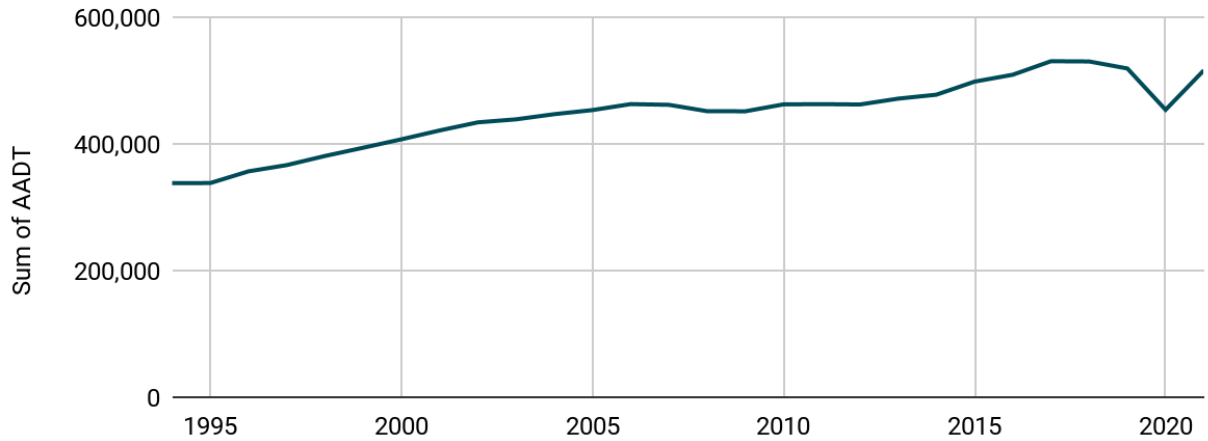


The data presented in Figure 13 was taken from the monthly Automatic Traffic Recorder reports through October 2022 from the NDOT and IowaDOT websites. This is preliminary data which is finalized at the end of year in each state's annual report.

Long Term Trends

Ten of the fifteen active regional ATRs have been in service and counting since 1994. Figure 14 shows the sum of AADT values for these counters annually. These counters provide historical data within Iowa and Nebraska, and provide coverage of urban and rural interstate, highway, and a municipal street.

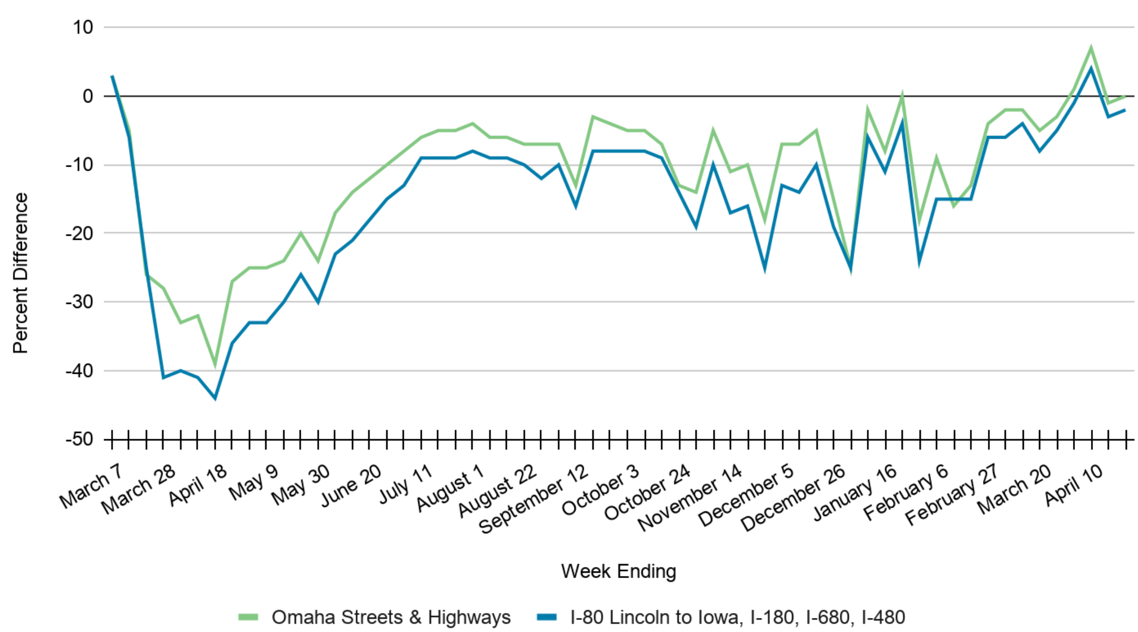
Figure 14: Total Historical ATR Annual Average Daily Traffic by Year



ATR COVID Reporting

The NDOT maintained a dashboard which provided summary statistics from ATR data throughout the pandemic. The summary graphic in Figure 15 below shows the Omaha area road network and interstate traffic including both the Omaha and Lincoln metro regions.

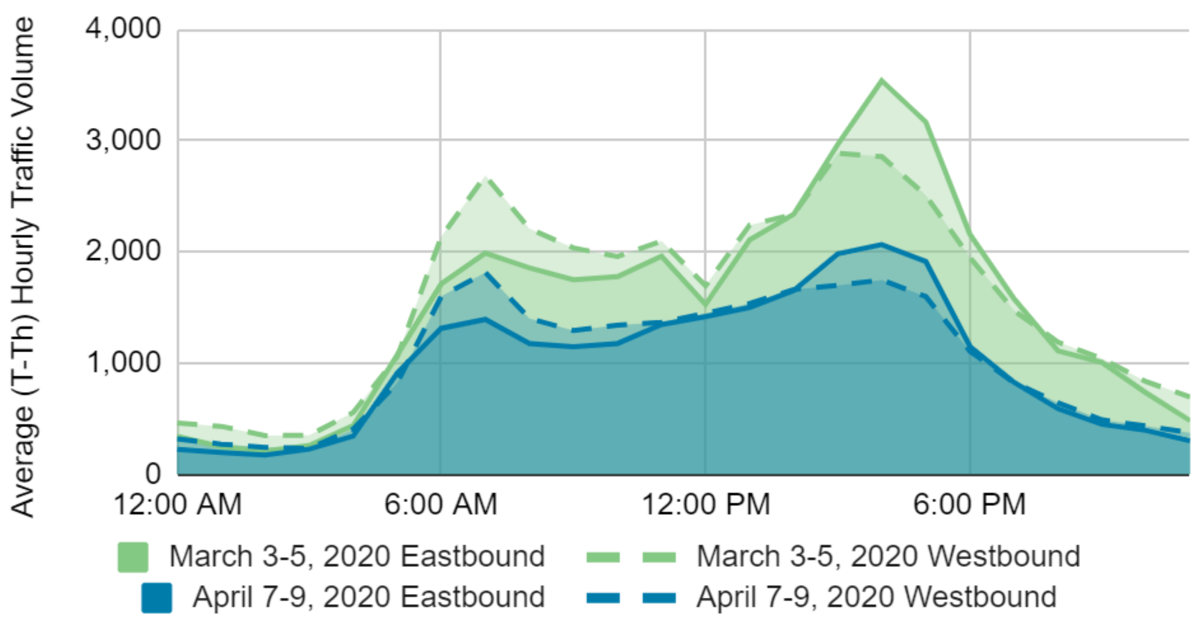
Figure 15: Percent Difference in Nebraska Weekly Traffic Volumes (March 2020 - April 2021)



The Iowa DOT also provided daily updates at the state level, in particular providing a summary of truck traffic, using the traditional ATR data. Additionally, temporary traffic counters used within the Council Bluffs Interstate System construction areas provided useful context for both overall change in traffic volume, and the change in hourly traffic patterns. Figure 16 and Figure 17 provide a snapshot of the hourly total vehicle and truck volumes during the initial pandemic response.

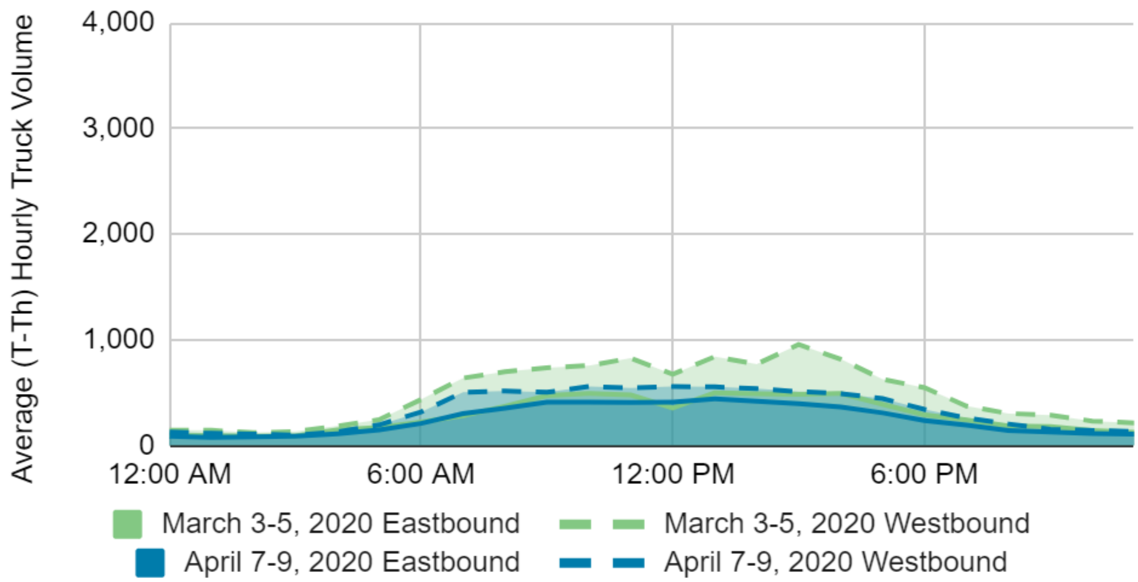
Notably, these temporary counters showed the reduction in traffic volumes during the traditional AM and PM peak periods. However, midday traffic volumes were relatively unchanged, or in some cases higher than pre-pandemic levels. Traffic signal retiming projects conducted by the City of Omaha during this period also captured these temporal variations, resulting in adjustments to signal phasing plans during the midday as well as the peak periods for more efficient travel times.

Figure 16: COVID-19 Pandemic Impact on Traffic Volumes (All Traffic at I-80 at Missouri River)



The traffic volumes shown in green represent normal traffic prior to the pandemic shutdown in March of 2020. The AM and PM peak traffic periods are shown in the dashed and solid lines.

Figure 17: COVID-19 Pandemic Impact on Traffic Volumes (Trucks at I-80 at Missouri River)



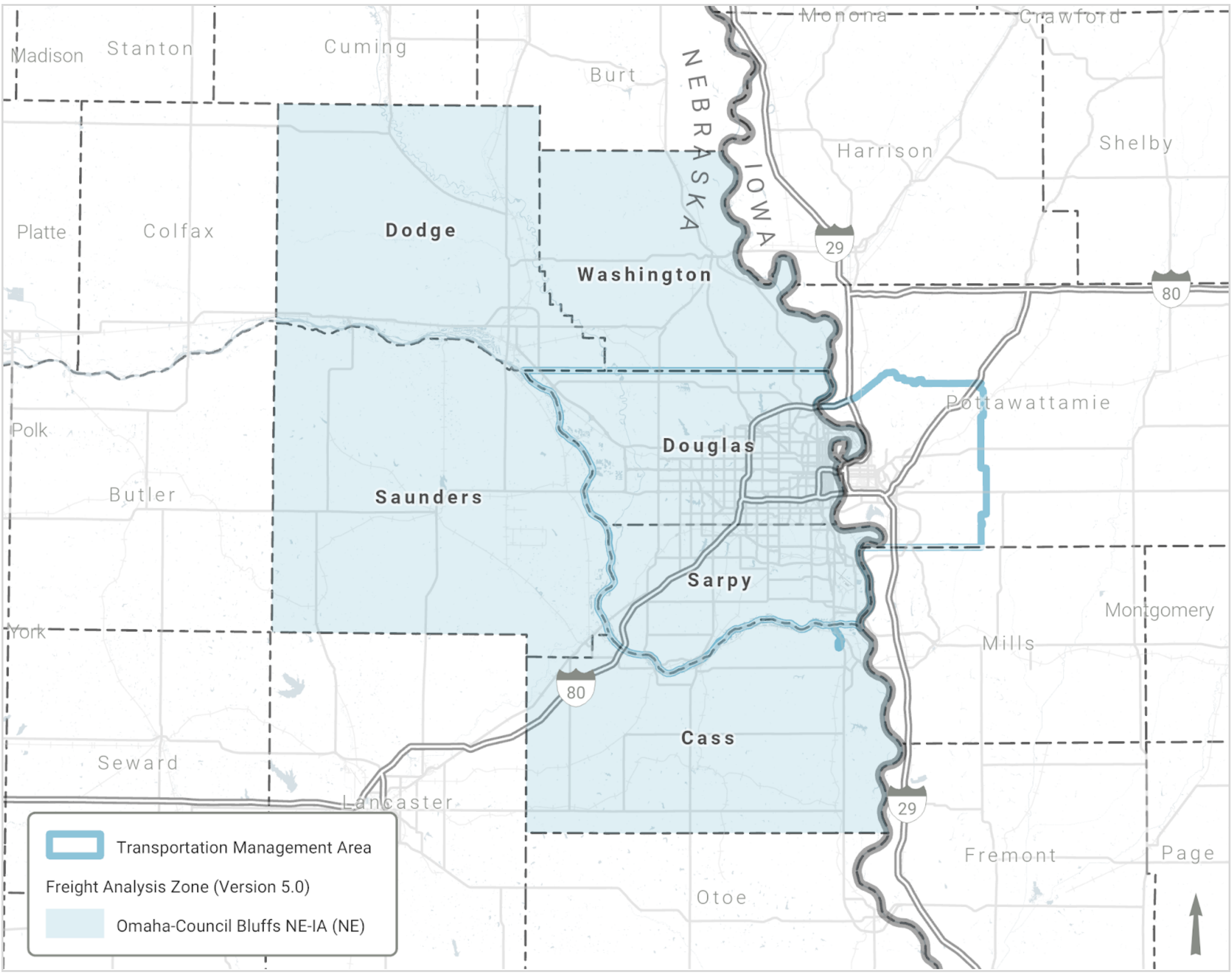
Freight

Produced through a partnership between the Bureau of Transportation Statistics (BTS) and the Federal Highway Administration (FHWA), the Freight Analysis Framework (FAF) uses a wide range of data sources to report and predict freight movement among states and metropolitan areas by all modes of transport. The latest version (FAF5) was released in 2021, and is based on data from the 2017 Commodity Flow Survey (CFS) and international trade data from the Census Bureau. Model output then provides estimates for tonnage and value, as well as rate (in ton-miles) for the following modes of transportation:

- Truck
- Rail
- Water
- Air (including truck-air)
- Multiple modes & mail
- Pipeline
- Other and unknown

The Nebraska portion of the TMA is contained within the "Omaha-Council Bluffs-Fremont, NE-IA CFS Area (NE Part)" FAF5 region, illustrated in Figure 18. Total freight movements are determined at the state or FAF region level. Truck flow data is available at the county level and will be further explored in future traffic reports.

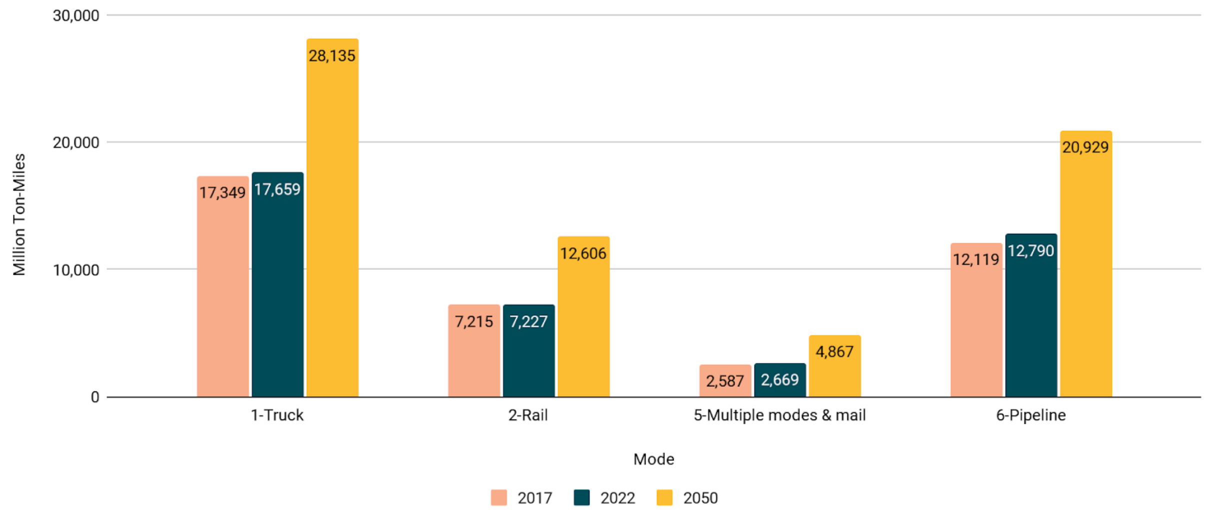
Figure 18. The Omaha-Council Bluffs-Fremont, NE-IA CFS Area (NE Part) FAF5 Region



Freight Analysis | Regional Flows

The FAF5 Data Tabulation Tool provides planners the ability to estimate the tonnage, value, and ton-miles by origin and destination by commodity type, mode, and evaluation year. Total flows include domestic, import, and export freight estimates to, from, and within a region. Figure 19 on the following page provides the baseline and predicted estimates for total freight ton-miles for the Omaha-Council Bluffs-Fremont, NE-IA CFS Area (NE Part) FAF5 Region (FAF Region 311).

Figure 19. Baseline and Estimated Total Freight Flow by Mode for FAF Region 311

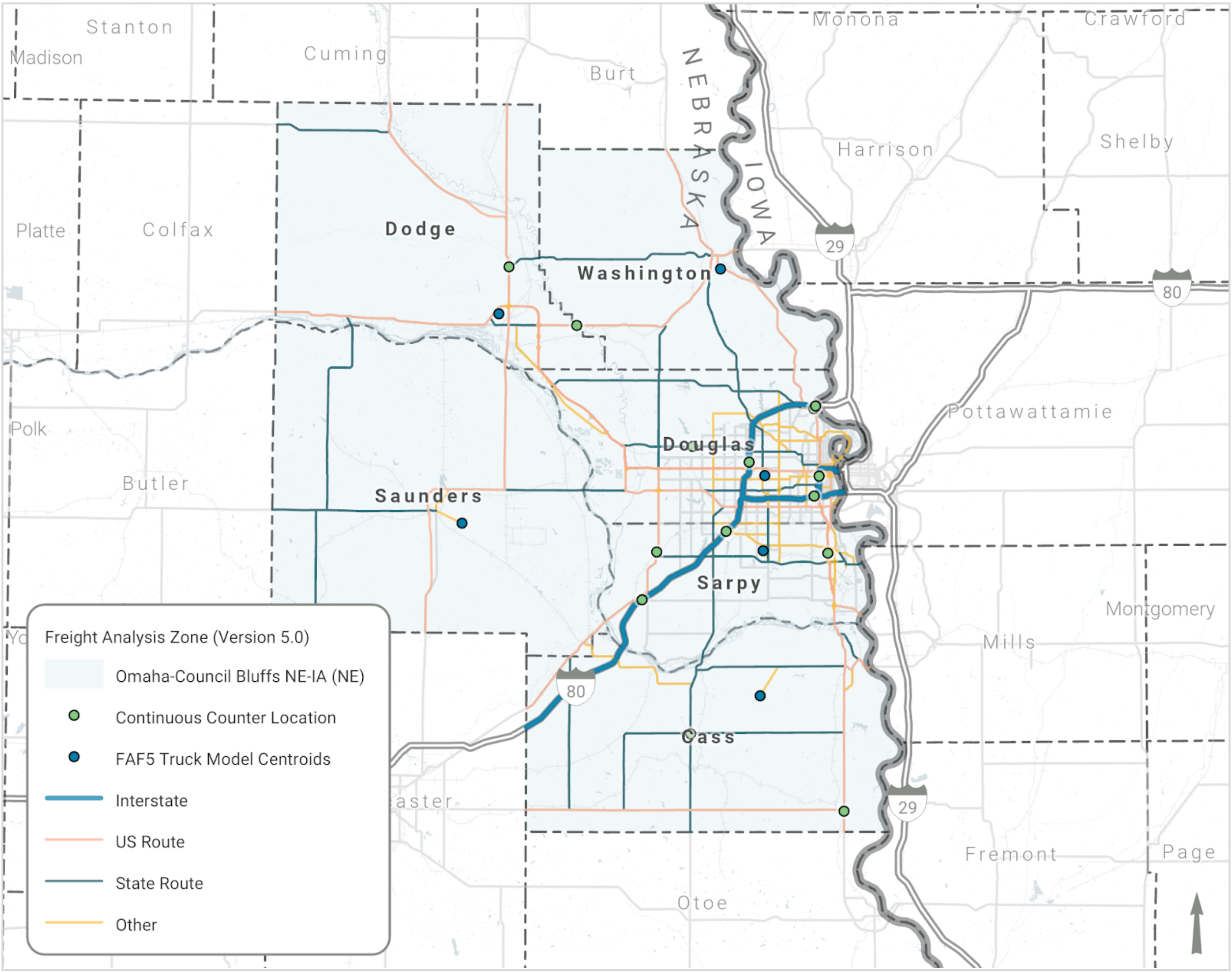


These estimates provide an opportunity to consider the regional impact to our transportation system and can help us anticipate projects and programs to handle this growth in traffic. It is important to note that the values in Figure 19 above do not include freight which passes through the region. The amount of freight which passes through the region is significant, and will feature in the next section discussing truck traffic.

Freight Analysis | Truck Flow Modeling

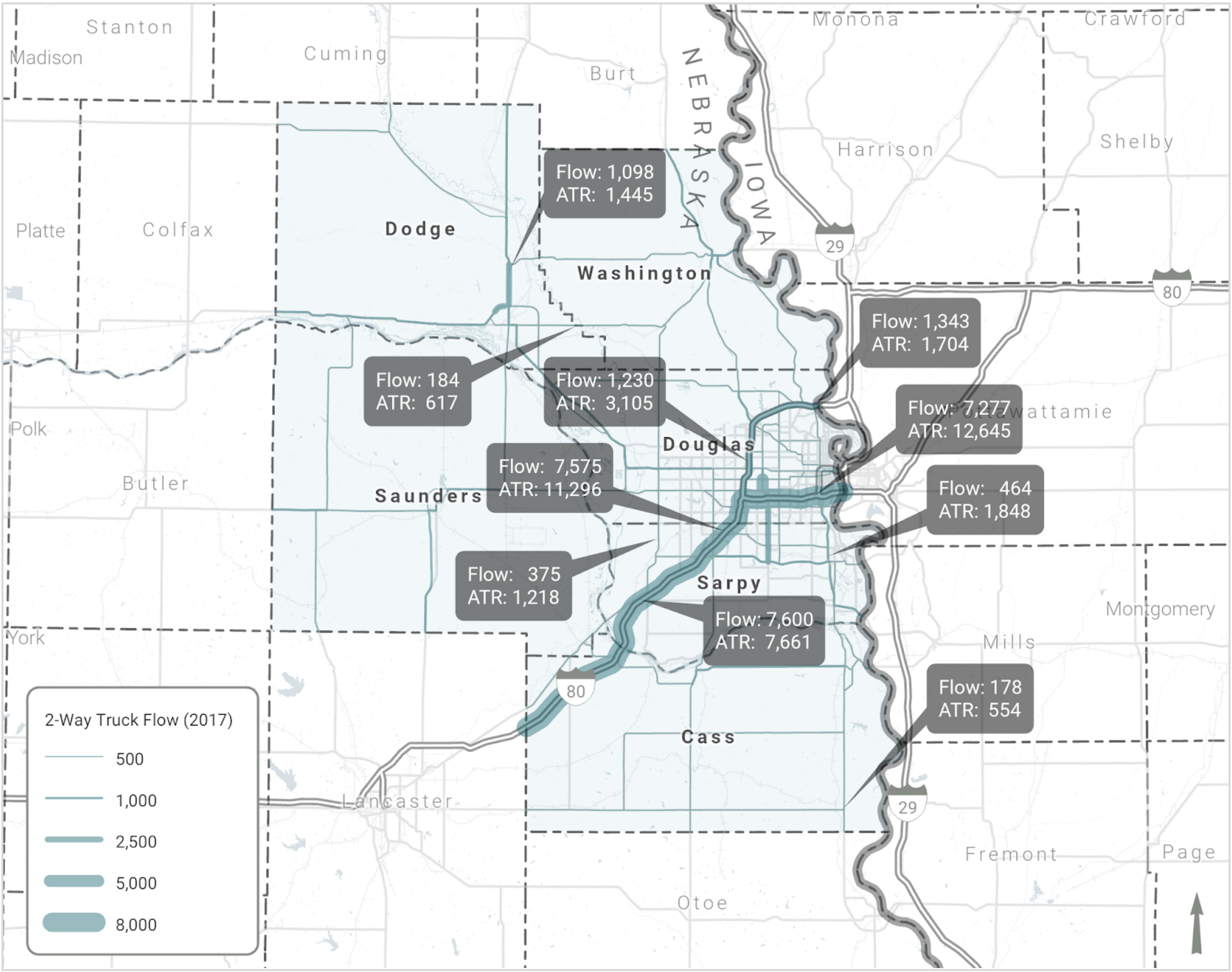
The Freight Analysis Framework also provides estimates of truck flows on the National Highway System (NHS) and the National Highway Freight Network (NHFN). These estimates break down total trips, and tonnage, as well as trips and tonnage by various commodity types. The model assigns flows to the network at the county level, with each county having a centroid location. These centroids and truck flow network links for FAF Region 311 are shown in Figure 20 below.

Figure 20. FAF5 Truck Segments and Centroid Locations for FAF Region 311



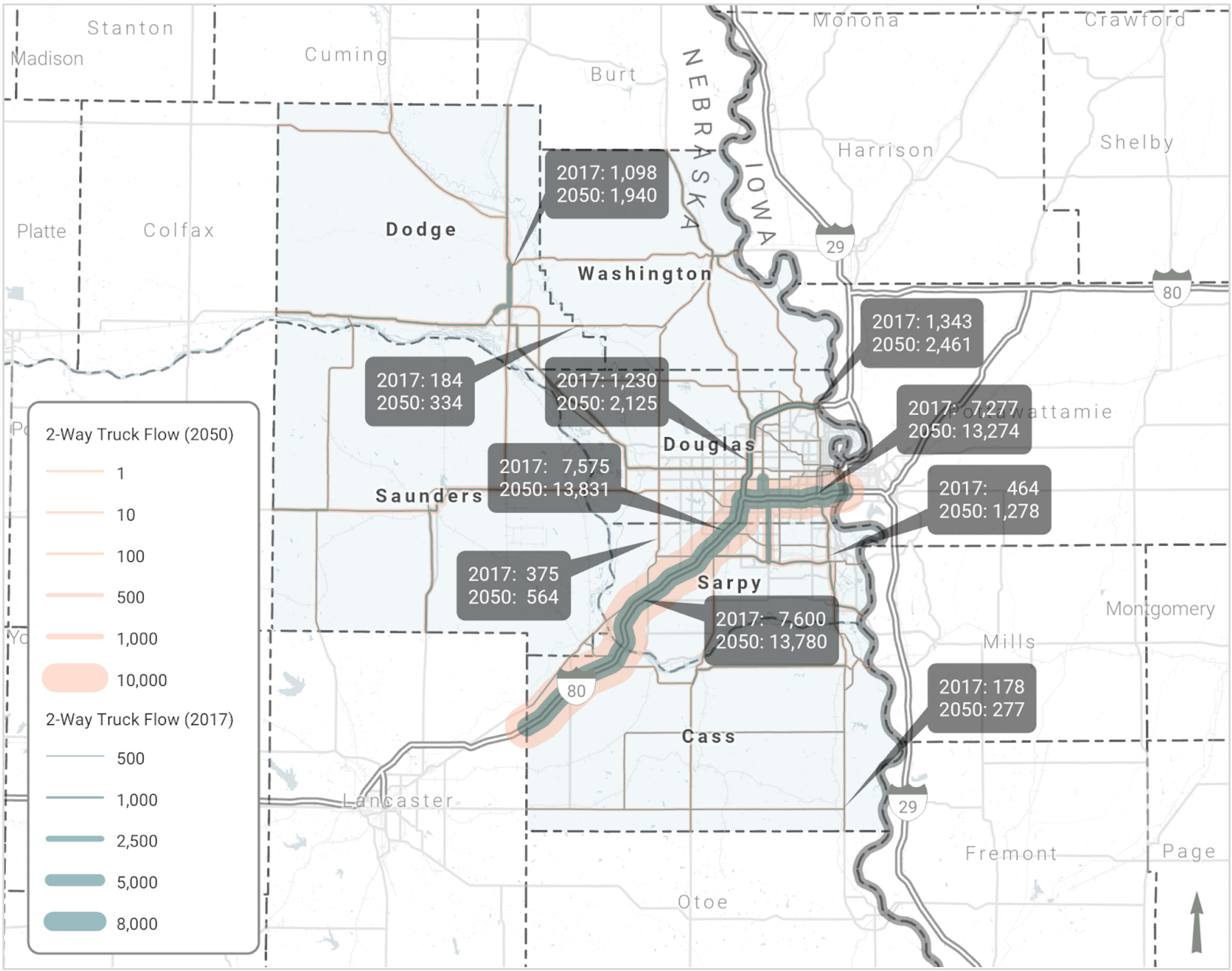
The baseline model flows for all trucks are shown in Figure 21 for 2017 freight on the highway network. These truck volumes represent all trucks traveling on the roadway regardless of their origin or destination. The 2017 truck network model shows 3,928,463 thousand tons of freight crossed the FAF region 311 network roads, while only 87,046 thousand tons (2.2%) of this freight originating from, destined to, or traveling within the region. The 2017 model flow values are compared against the measured Annual Average Daily Truck Traffic (AADTT) at ATR locations in the FAF 311 region. It is important to note that the network flow model is based upon responses to the 2017 Commodity Flow Survey, and that the subsequent flows have incorporated a quality check against actual truck paths in the route choice portion of the model, it is not dependent upon measured truck volumes. Additionally, the assigned routes shown in Figure 21 on the following page do not include all possible segments from Figure 20 above. Additional analysis is planned to better understand the truck model results and the appropriate application in future MAPA planning—for this report it is important to note all flow estimates are lower than the measured truck volumes at the ATR locations.

Figure 21. Daily Two-Way Truck Trips in the FAF Region



The 2050 Base truck model predicted flows are shown alongside the 2017 baseline in Figure 22 on the following page. In total, daily truck volumes are predicted to grow by 76% percent within the FAF 311 region by 2050.

Figure 22. Comparing 2017 to 2050 Daily Two-Way Truck Trips for the FAF Region



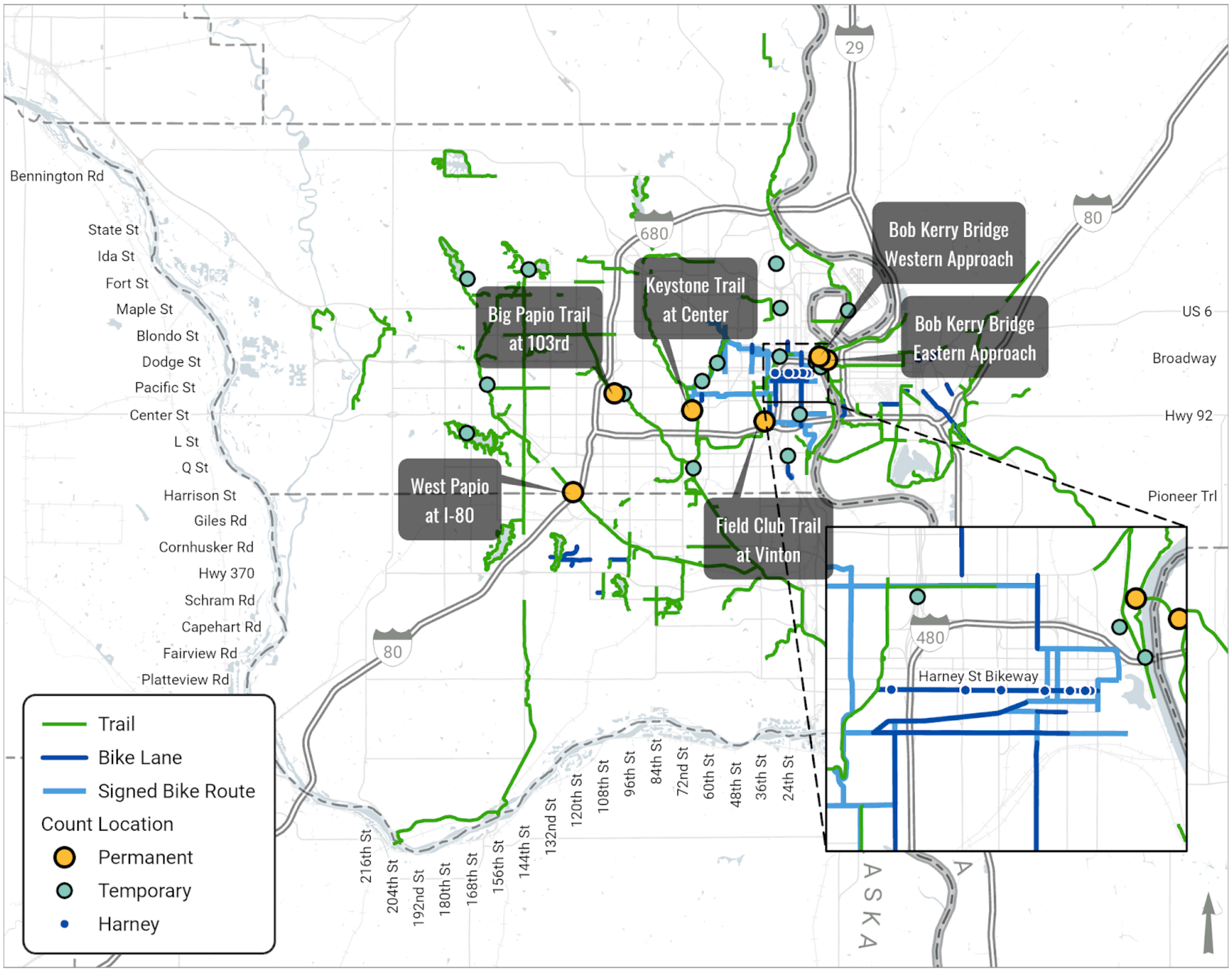
Multi-Modal Transportation

There are a variety of transportation options available in the metropolitan area that can often replace a typical automotive trip. Public transit, bicycling, walking and other trip types provide an economical and sustainable alternative to automobile usage.

Bicycle and Pedestrian Activity

MAPA partners with the City of Omaha on the deployment of pedestrian and bicycle counters across the region. Permanent automated counters are installed at six locations to provide continuous monitoring of activity. These counters were installed beginning in 2016 with all six locations having coverage beginning in 2019.

Figure 23: Regional Bicycle and Pedestrian Counts



The City of Omaha prepares an annual *Automated Pedestrian and Bicycle Counter Program Report* that provides detailed analysis of bicycle and pedestrian traffic. Annual count totals are summarized and factored for seasonal biases to provide comparable activity from each location. Detailed count summaries and count information collected at temporary locations can be found in this report.

Figure 24 and Figure 25 below highlight estimated average daily traffic by mode at permanent, continuously counted locations deployed on the trail system.

Figure 24: Estimated Annual Average Daily Pedestrian Volume

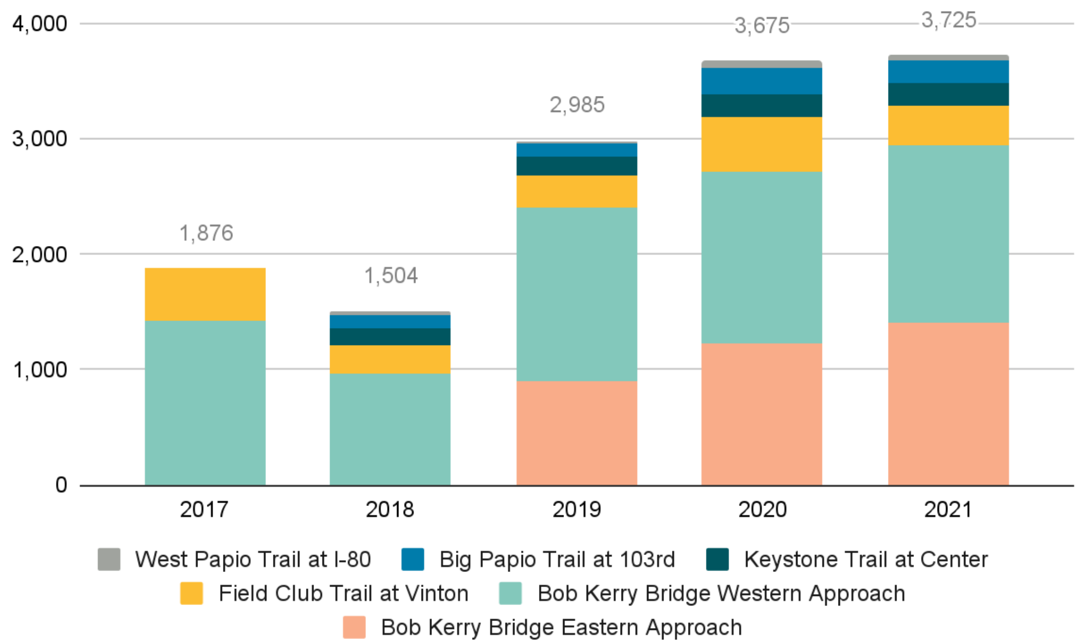
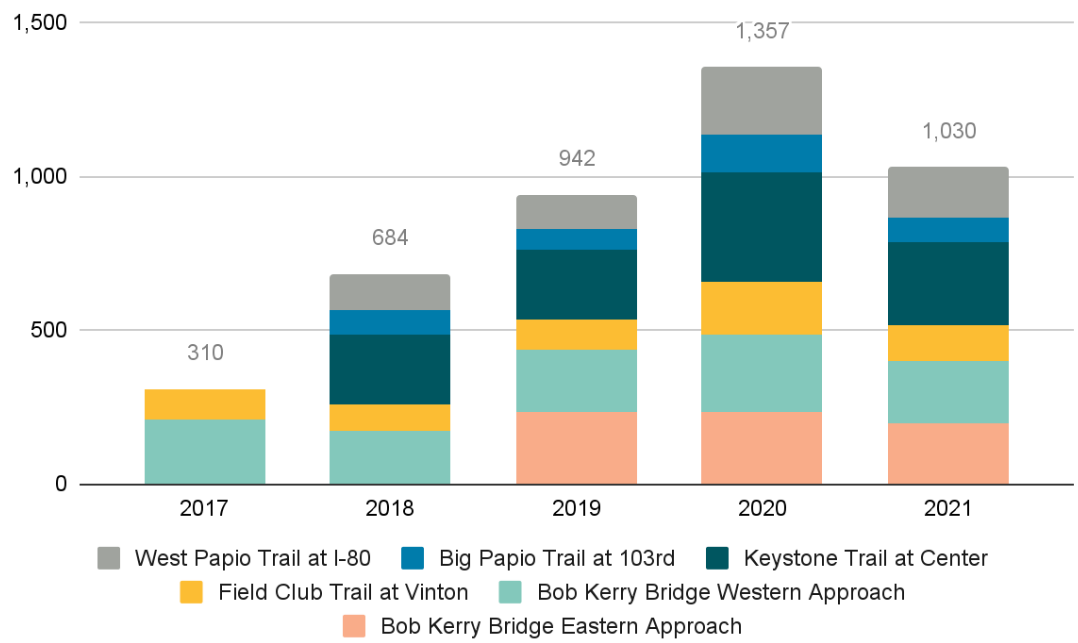


Figure 25: Estimated Annual Average Daily Bicycle Volume

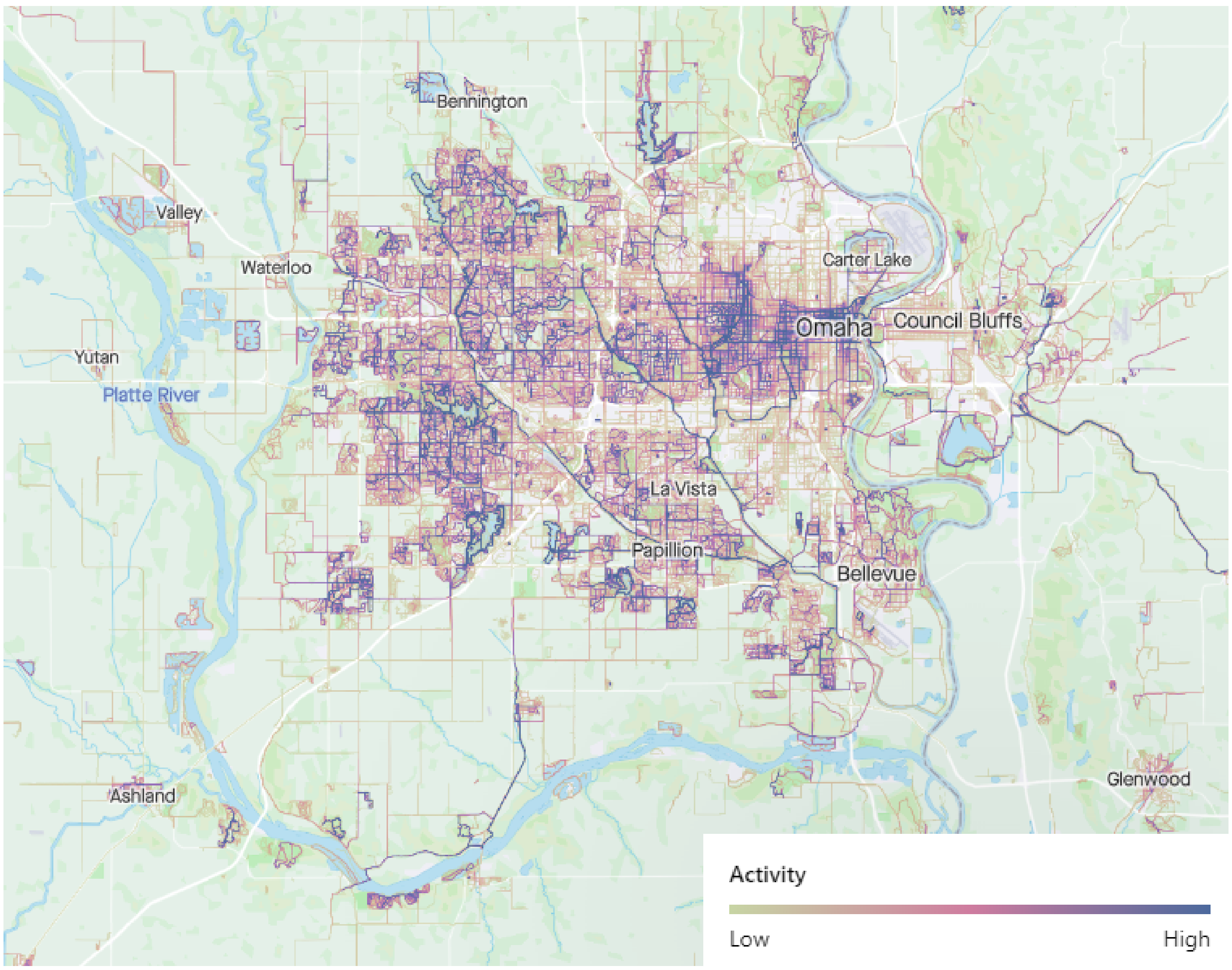


A general upward trend in counts at most of the permanent counter locations, with a pandemic-related spike in trail counts during 2020, is evident over the past five years. The growth in counts during 2020, followed by flattening or reductions in 2021, is similar to national trends in pedestrian and bicycle activity (particularly on multi-use trail and recreation-oriented facilities) since the onset of the COVID-19 pandemic in March 2020.

Strava Metroview

Another source of bicycle and pedestrian activity is the fitness app Strava. MAPA has access to publicly recorded activity data through the Strava Metroview platform. This dashboard visualizes user activity over time and provides tools for trend analysis. Activities are broken out between bicycling and run, walk, and hike trips.

Figure 26: Strava Activity Heat Map



This image contains aggregated and de-identified data from Strava Metro

The data collected by the app is a sample of total activity and it is biased towards the Strava userbase, who they call 'Athletes'. In 2020 approximately 5.3% of regional activities were flagged as commutes in the app with the vast majority of activity being collected for recreational purposes. That being said, it is still one of the largest sources of accessible bicycle and pedestrian activity data.

Figure 27 and Figure 28 depict regional activity recorded between 2019 and 2021.

Figure 27 : Public Run, Walk, Hike Activities Recorded on Strava

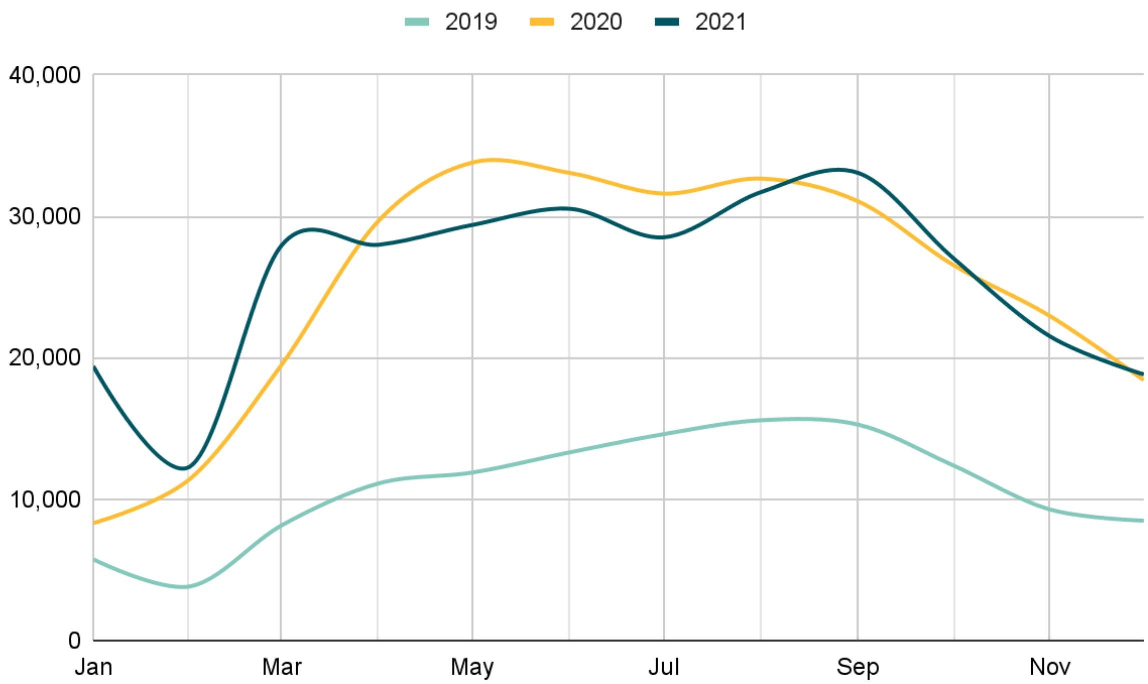
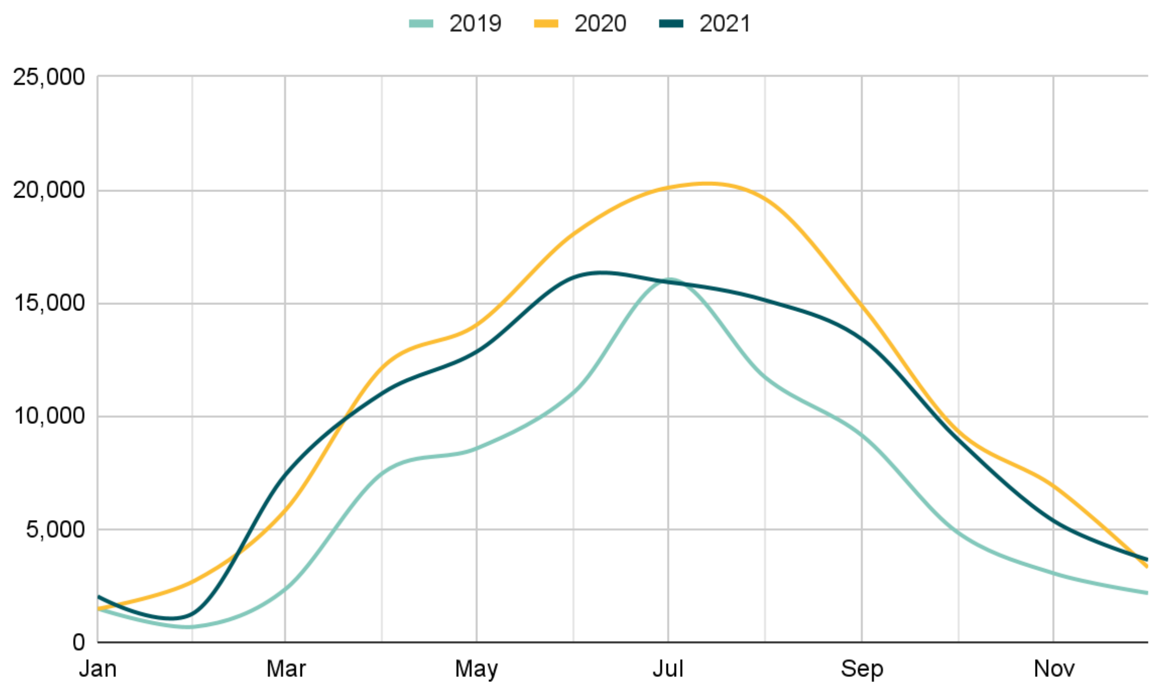


Figure 28 : Public Bicycle Activities Recorded on Strava



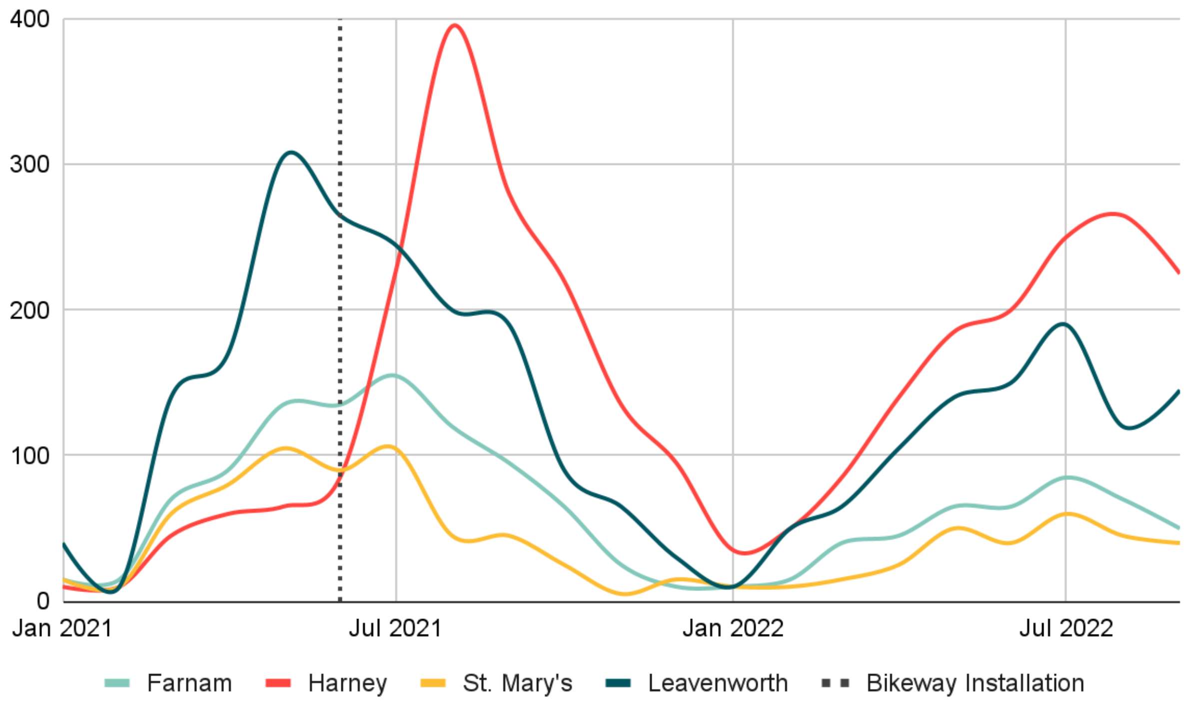
The trends visible in the Omaha automated counter data are reflected here, with an increase in both bicycle and pedestrian activity observed during the pandemic and a gradual decrease or flattening during 2021. Some of this can be attributed to changing behavior during the pandemic but some of it must be attributed to the Strava userbase. Between 2019 and 2021 Strava grew from 48 million to 95 million users worldwide. This growing sample improves data coverage but can make year to year comparisons difficult.

Market to Midtown Bikeway

Strava Metroview was essential to MAPA's assistance with the evaluation of the Market to Midtown Bikeway project. This pilot project installed a temporary protected bikeway on Harney Street connecting the urban core in the City of Omaha, as depicted in Figure 23. Bike Walk Nebraska and Metro Smart Cities were tasked with data collection along this corridor and released their *One Year Evaluation Report* in August of 2022.

To understand changes in rider behavior MAPA used Strava data to compare the bikeway to adjacent corridors. Figure 29 depicts the adjacent corridor response to the installation of the protected bikeway:

Figure 29: Public Bicycle Activities Recorded on Strava by Corridor at 20th Street



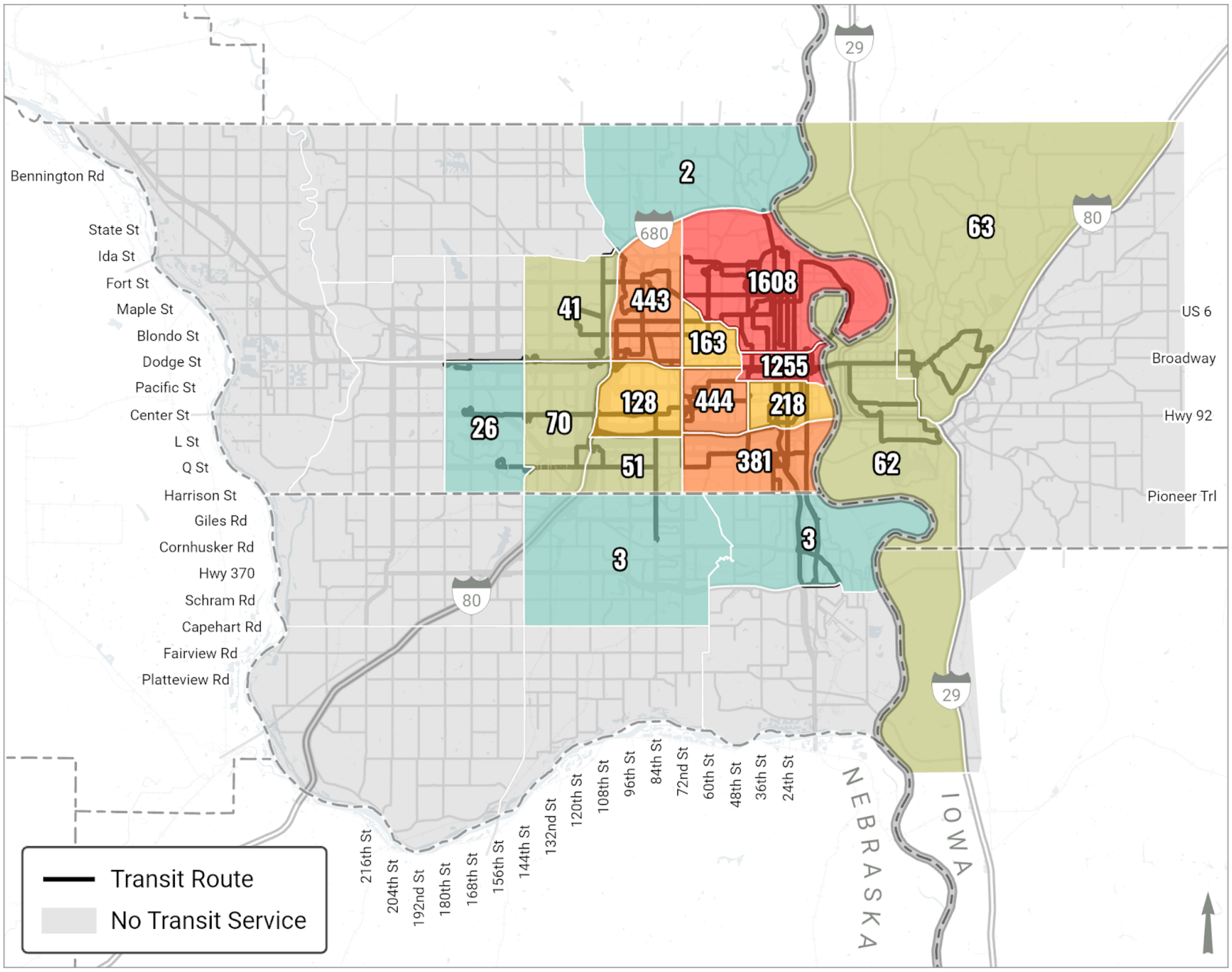
Prior to the installation of the bikeway users preferred the other adjacent corridors to Harney Street. Following installation in July of 2021 activities on Harney Street exceeded the adjacent corridors and this preference has continued for the duration of the pilot project.

Transit

Omaha's Transit Authority, Metro, offers fixed route, express/commuter, circulator and origin-to-destination paratransit bus services throughout the Omaha metro, serving a territory of approximately 100 square miles. Contracted commuter services are offered to four other contiguous cities in Nebraska — Bellevue, Ralston, La Vista and Papillion — as well as Council Bluffs, Iowa.

Beginning in 2020 Metro began collecting Automated Passenger Count (APC) data on all of its buses. Figure 30 depicts rider activity from February of 2020 summarized to Traffic Analysis Districts (TADs) in hundreds of rides:

Figure 30: Metro Ridership by Traffic Analysis District February 2020 (in hundreds of rides)

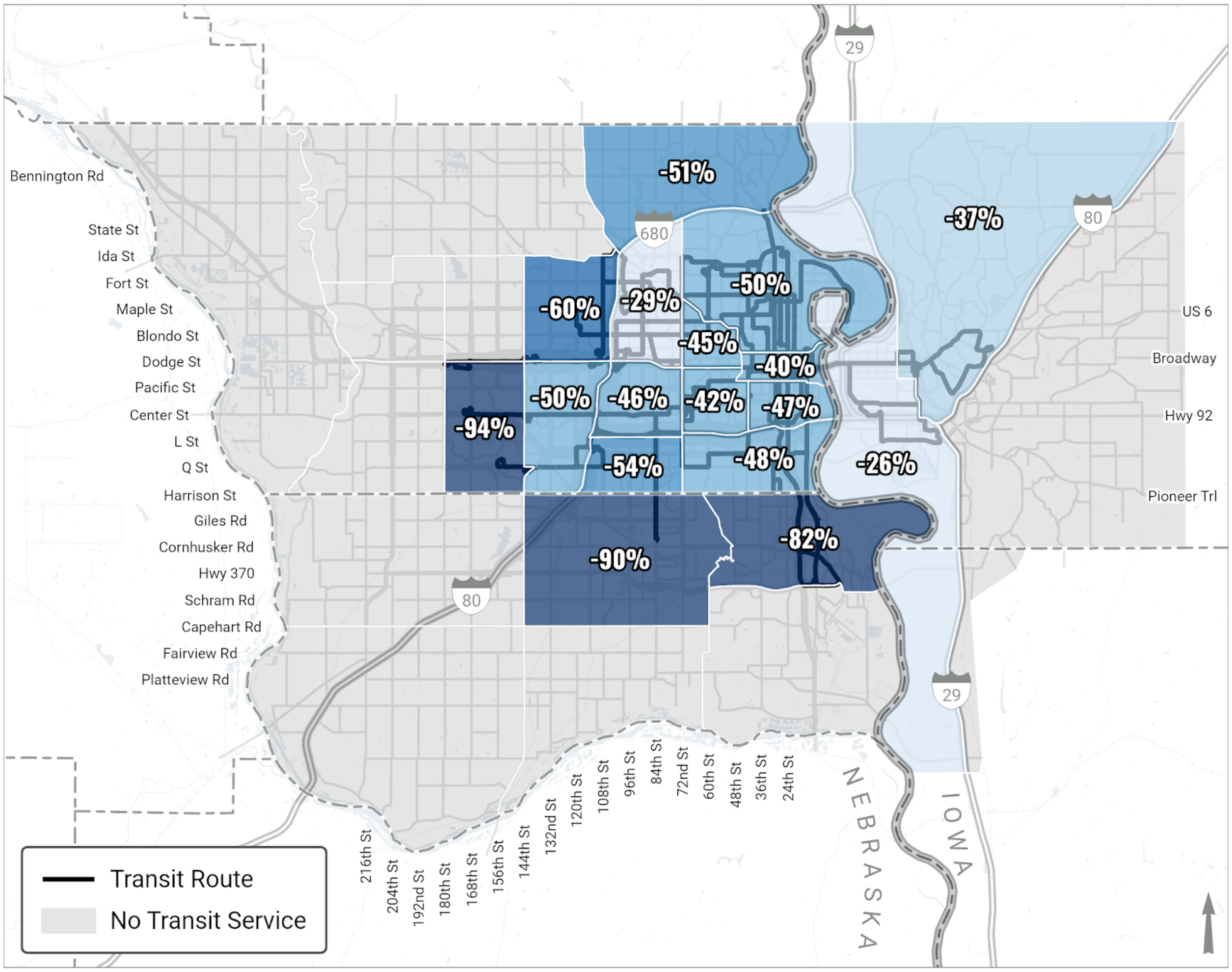


Ridership is higher in the urban core with North Omaha and the Central Business District seeing the most activity.

Transit service was affected significantly across the country by the COVID-19 pandemic. In the Omaha area ridership saw significant decreases on all routes with areas served by express service seeing the largest decreases.

Rider behavior was likely affected by a combination of work from home policies and social distancing requirements brought on by the pandemic. Figure 31 shows the change in ridership by TAD comparing February of 2020 to February of 2021:

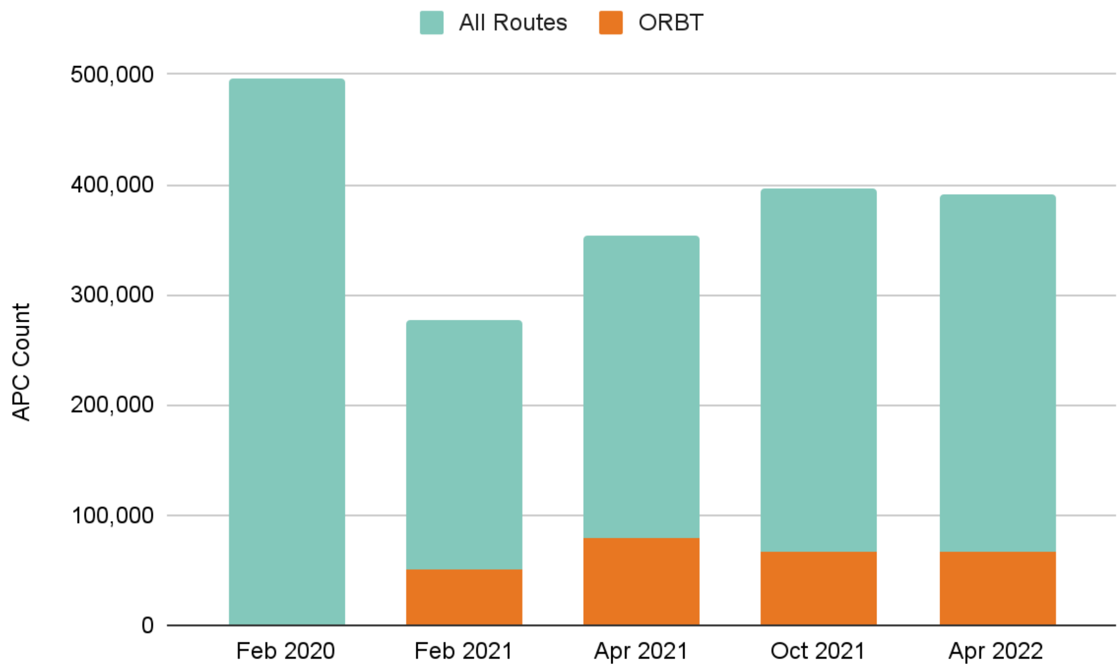
Figure 31: Change in Metro Ridership by Traffic Analysis District February 2020 and February 2021



Transit routes operating at the fringes of the Metro service area are often express services or operate at lower frequencies than those within the urban core. The population using these routes is less likely to be transit dependent and these areas saw the most significant decreases in ridership following the pandemic.

Figure 32 depicts the ongoing change in ridership based on Metro Automated Passenger Count data:

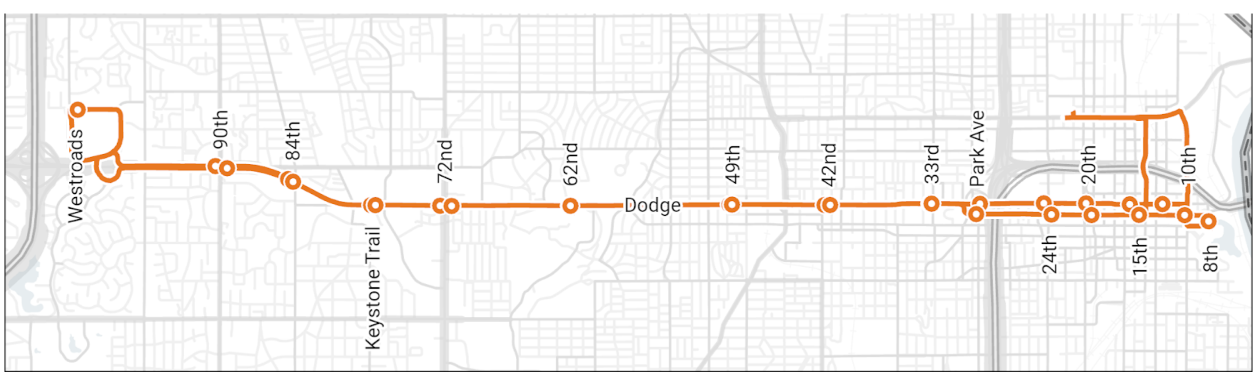
Figure 32: Automated Passenger Counts Over Time



Omaha Rapid Bus Transit

Metro launched the region's first Bus Rapid Transit (BRT) line, Omaha Rapid Bus Transit (ORBT), in November of 2020 with enhanced, rail-like stations and smart technology that is streamlined for faster, more frequent, and more reliable travel along Dodge and Douglas Streets. ORBT serves as the spine of the transit system, connecting Westroads Mall to downtown Omaha, running every 10 minutes on weekdays. ORBT accounts for approximately 1/5th of all Metro ridership.

Figure 33: Omaha Rapid Bus Transit (ORBT) System



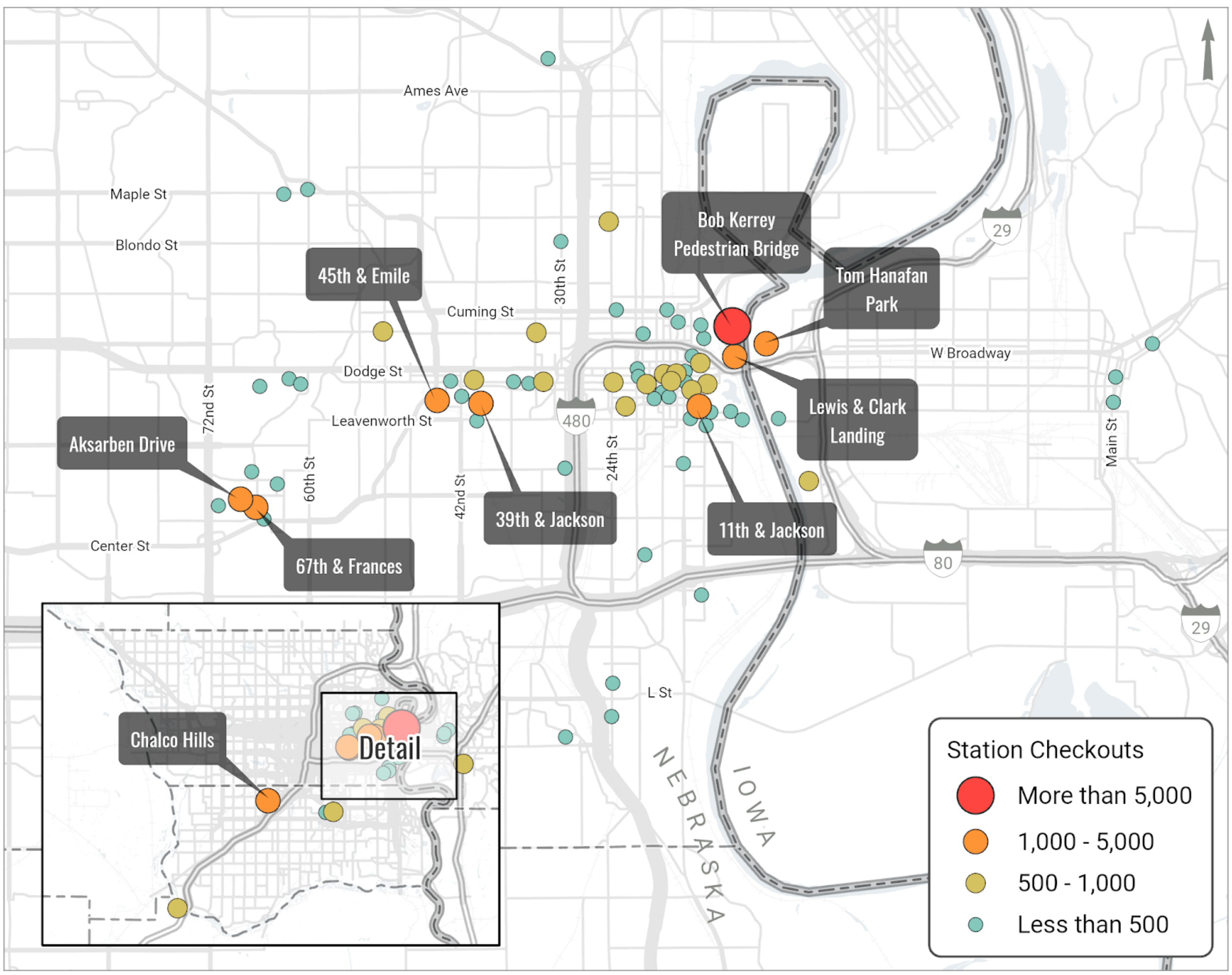
Other Modes

Regionally there is a growing diversity of travel options. Bike share and other micromobility platforms offer "last mile" travel options that are often paired with other modes to complete a trip. Ride-hailing services are substituted for typical automotive trips and may contribute to an increase in vehicle travel through deadheading, the additional miles required to travel between passenger pickups and dropoffs.

Heartland B-Cycle

Heartland B-Cycle operates a regional network of stations that contain shared bicycles that users can unlock to ride from station to station. The bicycles are designed to adapt to a variety of rider sizes and are available in human-powered and electrified options. In 2020, Heartland B-Cycle operated 74 stations in the Omaha Metro Area.

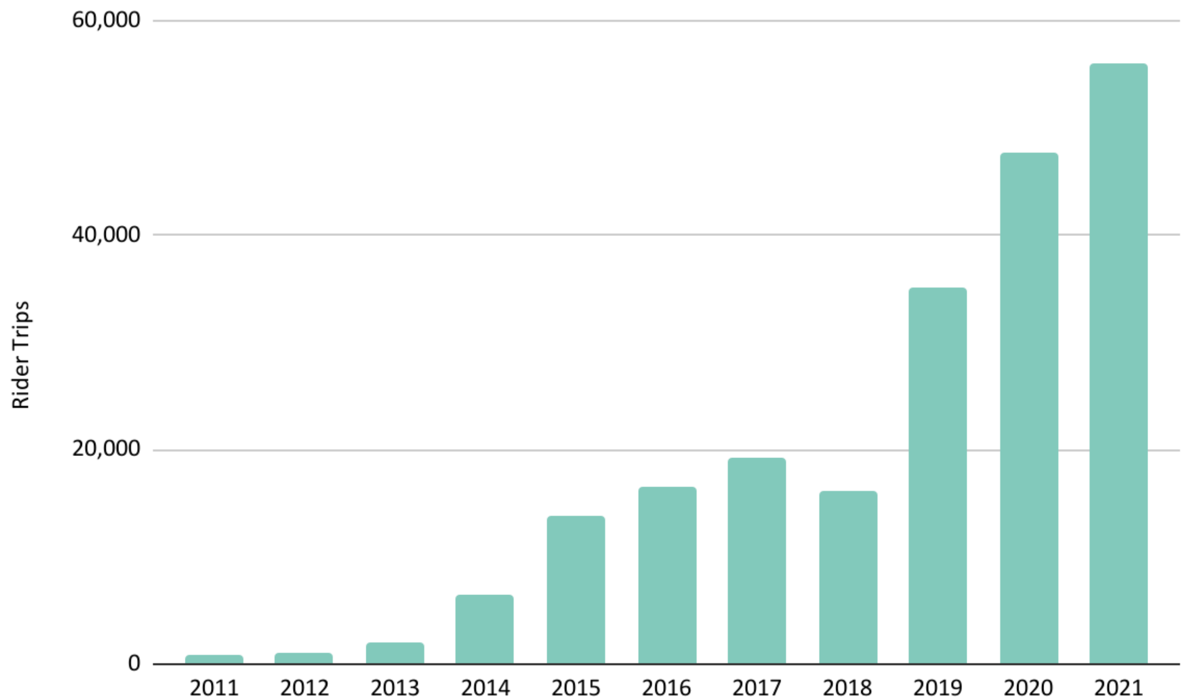
Figure 34: B-Cycle Station Checkouts in 2020



Station activity is highest at the Bob Kerrey Pedestrian bridge. Downtown, Midtown, and Aksarben stand out as nodes of activity. Newer stations deployed at regional parks such as Chalco Hills also see considerable usage.

Heartland B-Cycle has been operating in the metro area since 2011 and has experienced significant growth since inception. Rider activity saw a boost following the pandemic and continues to increase as depicted in Figure 35:

Figure 35: Heartland B-Cycle Rider Trips 2011 - 2021

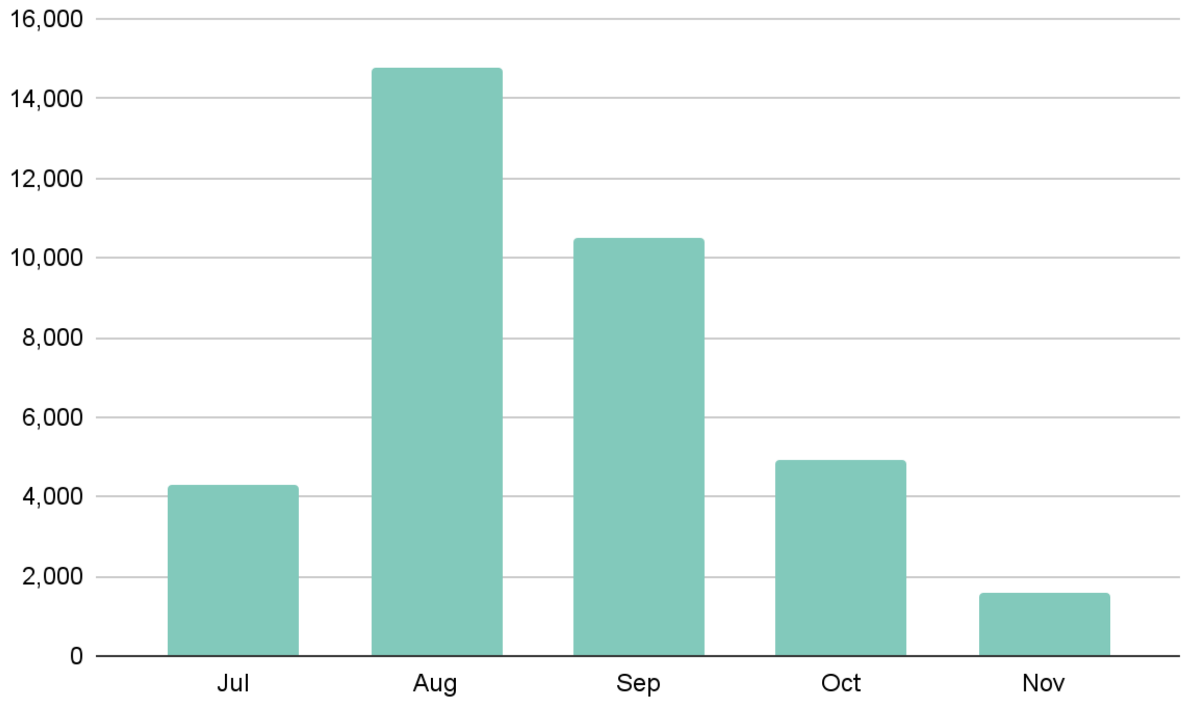


Micromobility Service Providers

Micromobility devices include bicycles, scooters, shared bicycle fleets and other devices that are typically human-powered or electric that operate at slow speeds for personal transport. Companies such as Lime, Spin, and Bird operate fleets of these devices across the country and the City of Omaha has been piloting e-scooter deployment since 2019. Park Omaha has prepared E-Scooter Reports for 2019 and 2020 that are available on the City of Omaha website.

In 2020 a total of 36,283 e-scooter trips were taken primarily in the Downtown, Midtown, Aksarben and Benson neighborhoods in Omaha.

Figure 36: Scooter Trips by Month 2020

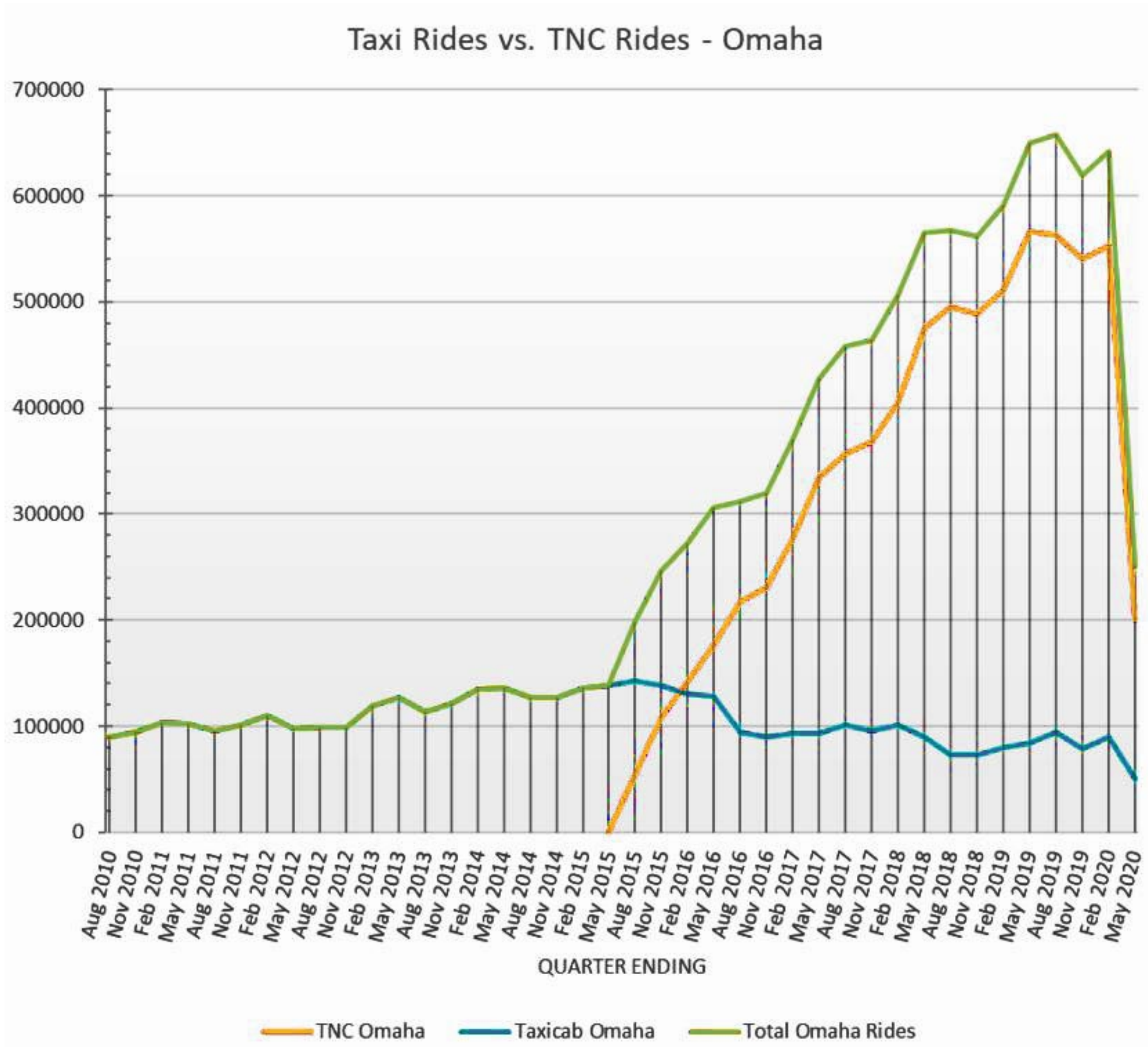


Transportation Network Companies

Transportation Network Companies (TNCs) operate ride-hailing systems such as Uber and Lyft in the metropolitan area. These systems offer point to point passenger transportation with arrangement and payment handled via smartphone apps. Taxicab carriers are regulated separately in the State of Nebraska.

The Nebraska Public Service Commission monitors the operation of taxicab carriers and TNCs across the state. The *2020 TNC Annual Report to the Legislature* provides detailed information about the operation of these carriers and can be found on the Public Service Commission's website.

Figure 37: Taxi Rides vs TNC Rides - Omaha



From 2014 to 2019 TNCs saw substantial increases in year over year usage in the Omaha area. Flooding events in 2019 and the pandemic in 2020 contributed to a drop off in TNC traffic. Taxicab carriers have seen continued decrease in utilization since 2015.