
OCTA
Orange
County
Mobility
Indicators
2020

INTRODUCTION

While no sector has been left untouched by the coronavirus pandemic, the transportation sector has witnessed some significant shifts. In the wake of the stay-at-home order, which led to historic levels of unemployment and working from home, Orange County residents experienced free-flowing highways, empty buses, and local roads turned over to bicyclists and pedestrians. Since the initial application of social distancing orders in March 2020, some transportation metrics are returning to more familiar levels, but not all. The question for transportation planners is **what pandemic impacts will persist in some form or another after the pandemic resolves**?

In this year's Mobility Indicators Report, two tools are presented to help answer these questions. First, starting on page SF.1, a special feature on COVID-19 impacts explores available snapshots of real-time data from January through December 2020 to understand changes in employment, working from home, and sheltering in place. These changes, in turn, had substantial impacts on the transportation sector, including impacts to auto travel, transit ridership, air travel, and goods movement. Trend data for these key mobility metrics are provided in the special feature, providing records of real-time, actual impacts. Second, in the main body of the report, the mobility indicators are presented as usual to maintain consistency with prior reports. In many cases, there is a time lag in the traditional source data so the impact of COVID-19 will not be evident in the results yet. To help planners consider the expected impacts on these indicators, the main report includes projections of the anticipated level of impact of COVID-19 at three junctures – during the pandemic, early post-pandemic, and late post-pandemic. A more detailed description of this analysis, as well as a table summarizing all the projections, can be found on the page 2 of the executive summary.

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COVID-19 Special Feature: Snapshot of Real-Time Impacts

Using available data, the COVID-19 special feature provides an overview of the pandemic's impact on mobility, including auto travel, transit, and goods movement. The following provides a summary of the key drivers and impacts analyzed in the special feature using data collected between January and December 2020.

Drivers

The following trends have had the greatest impact on mobility:

- As of December 2020, **employment** rebounded somewhat from the most severe retraction in the spring, but the December 2020 unemployment rate remains more than twice what it was before the pandemic.
- Similarly, by the end of 2020, **sheltering in place** had fallen to a quarter of residents, down from half of residents in the spring, but above the pre-pandemic norm of 16 to 18 percent staying at home on a given day.
- Over this same period, mobile device data show that **working from home** rose to as high as 41.5 percent of workers in July 2020 and was down to 34.8 percent as of December 2020. This is still more than six times the pre-pandemic baseline level of 5.7 percent.
- OCTA survey data from July 2020 corroborates the widespread belief among transportation researchers and practitioners that some degree of **working from home will persist**.

Impacts

The most severe retractions occurred in the spring of 2020, but not all mobility indicators have bounced back since then:

- As more people go back to work and venture from their homes, and as many residents continue to avoid transit in favor of single-occupancy vehicles, Orange County has seen **vehicle miles traveled (VMT)** rebound from the dramatic drop in the spring to levels approaching pre-pandemic levels, but not yet realized by the end of 2020.
- Despite increasing of VMT, with more trips happening at non-peak hours, **average freeway speeds** have remained higher than pre-pandemic levels (e.g., 61.4 miles per hour the week of December 12, 2020, before the end-of-year holiday period when speeds typically go up, compared to approximately 59 miles per hour in January and February 2020).
- **Bus boardings** fell dramatically as a result of the pandemic and they have yet to recover, with ridership rates in December 2020 still 47 percent below the rates of December 2019.
- **Metrolink ridership** also fell dramatically and has yet to rebound.
- **Passenger air travel** nearly came to a stand-still in April 2020 and remain far below the pre-pandemic levels. As of December 2020, passenger counts were 74 percent below December 2019.
- **Cargo at the Port of Long Beach** was not trending in any particular direction until the second half of 2020, when inbound cargo grew steadily, ending the year 26 percent higher than the previous December.
- **Cargo at John Wayne Airport** has seen similar trends, although the year ended with cargo 3 percent below December 2019.

Technical Report: Historical Trends and COVID-19 Impact Projections

The Technical Report provides a retrospective of trends in mobility in Orange County. While a handful of the indicators have real-time data sources (and several of these were included in the COVID-19 special feature), many of the indicators in the Technical Report rely on historical data that are not available in real-time. Consequently, the data for these indicators will not yet show the impact of COVID-19.

Despite the lag in data and the unknowns about the future, regional transportation planners, researchers, and academics across the nation are actively using the data and information that they do have to imagine what those longer-term impacts will be. This year's Mobility Indicators Report relies on this professional expertise to include high-level projections of what the data are likely to tell us when 2020 data (and beyond) become available. The accuracy of these projections will depend in part on the degree to which the underlying assumptions about future conditions bear out. These assumptions are detailed on the next page. Below, the framework for the impact projections is outlined.

Impact Projections Framework

The high-level COVID-19 assessments are made for three periods:

- during the pandemic,
- early post-pandemic, and
- late post-pandemic.

Within each timeframe, the anticipated level of impact COVID-19 is assessed:

- low,
- moderate, or
- high.

The following describes and visualizes the assessment criteria:

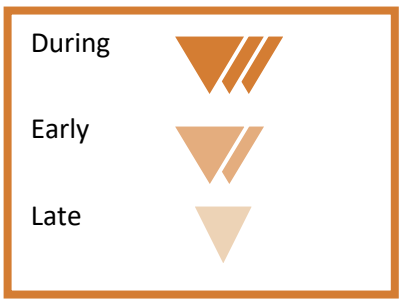
ANTICIPATED COVID-19 IMPACT

PERIOD OF ANALYSIS	**During** Through summer 2021 Under 1.5 years	**Early Post-Pandemic** Mid-2021 to Mid-2022 1.5-2.5 years	**Late Post-Pandemic** Mid-2022-2024 2.5 – 4 years

LEVEL OF IMPACT	**Low** 2-5% anticipated percent change over baseline	**Moderate** 6-9% anticipated percent change over baseline	**High** 10% or more anticipated percent change over baseline
Increase			
Decrease			
Little to no impact or return to baseline			
Unknown impact			

Example

In the example below, the impact is expected to be high during the coronavirus pandemic and the trend is anticipated to show a decrease. In the early post-pandemic period, the trend is still anticipated to be downward, but only moderately by this point, and the impact is anticipated to be low in the late post-pandemic period. Thus, in this example, we expect the impact to lessen over time.



Assumptions and Limitations

The following assumptions underly the assessments of the future impact of the coronavirus pandemic on the transportation metrics in the Mobility Indicators Report. These assumptions are based on the best estimates from many different sources, and they enable consistency in the assessments of future impact. However, as with all projections and the assumptions underlying them, the future reality may not align completely with these assumptions.

1. A vaccine will not be widely available until several months into 2021. But over the course of spring 2021 and into summer 2021, the increasing availability of vaccine will enable most businesses and schools to reopen, with some modifications retained as distribution of vaccines continue.[1]
2. The good fundamentals of the economy leading into the pandemic and the continuing economic expansion that began in mid-2020 bode well for an economy that will recover steadily in the post-pandemic period and more quickly than the Great Recession in the late post-pandemic period.[2] In addition, the substantial subsequent stimulus package passed by Congress in March 2021 is projected to help employment return to pre-pandemic employment levels by 2022, compared to 2024 if the stimulus was not passed.[3]
3. Survey data suggests the pandemic has made many people and companies more open to continuing to work at home than in the past. Leading into the pandemic, there was already a slow but steady annual increase in working at home. The pandemic accelerated this existing trend such that the anticipated proportion of commuters working from home from some or all of the week is likely to settle at 10-12 percent in the post-pandemic period. This is approximately double the Orange County pre-pandemic rate of working from home, but substantially less than at the height of the pandemic when it was estimated that as many as 50 percent of workers were working at home.[4]
4. The 2020 economic retraction will result in lower than usual tax receipts, which will impact local government's ability to fund transportation projects, but relatively rapid economic recovery will make this a short-term and temporary dip.[5]
5. The future is unclear for federal funding to support policies, practices, or infrastructure to reverse transit declines caused by the pandemic. However, for the purposes of the assessments, the assumption is that another round of federal pandemic-relief funds for transit agencies and airports is likely in 2021, but agencies can still expect to face shortfalls.[6]

[1] Dr. Anthony Fauci, US National Institute of Allergy and Infectious Diseases (www.cnn.com/2020/10/25/us/covid-vaccine-fauci/index.html); University of California News: COVID-19 Predictions for 2021 and Beyond (www.universityofcalifornia.edu/news/covid-19-predictions-2021-and-beyond)

[2] Bokat-Lindell, Spencer. "How Long Will it Take for the Economy to Recover?" New York Times, May 21, 2020
Sheiner, Louise; Yilla, Kadija. "The ABCs of the post-COVID economic recovery" Brookings (https://www.brookings.edu/blog/up-front/2020/05/04/the-abcs-of-the-post-covid-economic-recovery/)

[3] Prasad, Eswar; Chang, Darren; Wu, Ethan. "October 2020 update to TIGER: COVID-19 remains an impediment to the global recovery," Brookings Institute (www.brookings.edu/research/october-2020-update-to-tiger-covid-19-remains-an-impediment-to-the-global-recovery/); FactCheck.org (www.factcheck.org/2021/02/both-sides-spin-cbo-report-in-covid-19-relief-debate/); Bloomberg (www.bloomberg.com/news/articles/2021-02-07/yellen-says-u-s-shouldn-t-settle-for-a-long-slow-recovery)

[4] Eno Center webinar "Transportation Spending and Planning in the Time of COVID," September 2020, presentation by Alan Pisarki, Reason Foundation; Eno Center webinar "Telework During COVID and Beyond: Leveraging Behavioral Science to Improve Virtual Work and the Future of Community," survey presentation by Joseph Sherlock, Center for Advanced Hindsight; September 18, 2020 interview with Dr. Nico Larco, Director, Urbanism Next; OCTA Travel and Employment Survey, July 2020

[5] Louise Sheiner and Sophia Campbell, "How Much is COVID-19 Hurting State and Local Revenues?" Brookings Institute, September 24, 2020 (www.brookings.edu/blog/up-front/2020/09/24/how-much-is-covid-19-hurting-state-and-local-revenues/)

[6] American Public Transportation Association, "The Impact of the COVID-19 Pandemic on Public Transit Funding Needs in the U.S.," January 27, 2021 (https://www.apta.com/wp-content/uploads/APTA-COVID-19-Funding-Impact-2021-01-27.pdf); Washington Post, "Airlines, public transit agencies say $1.9 trillion relief plan would prevent deep cuts, job losses," March 8, 2021 (www.washingtonpost.com/local/trafficandcommuting/stimulus-transportation/2021/03/08/dceb4e00-802b-11eb-81db-b02f0398f49a_story.html)

INDICATORS AT A GLANCE

Demographics & Context

	During	Early	Late
Population Characteristics			
Proximity to Transit			
Employment & Income			
Employment, Unemployment and Jobs			
Income			
Housing			
Sales and Use Taxes			
Gasoline Prices			
Vehicle Registrations			

How Orange County Travels

	During	Early	Late
Intercounty Commuting Patterns			
Work Trip Mode Split (Ways get to Work)			
Highways And Arterials			
Vehicle Miles Traveled			
HOV Infrastructure			
Bus			
Bus: Fixed Route Service			
Ridership			
Costs			
Bus: High Quality Transit Corridors			
Infrastructure and Usage			
Bus: Demand Response Service			
Ridership			
Costs			
Rail			
Ridership			
Costs			
Active Transportation			
Bicycle Mode Share			
Pedestrian Mode Share			
Bikeways			
Bicycle Safety (Injuries/Deaths)			
Pedestrian Safety (Injuries/Deaths)			

System Performance

	During	Early	Late
Freeways And Managed Lanes			
Congestion			
Speed			
Travel Times			
Vehicle Flow			
Arterials			
Congestion			
Signal Synchronization			

System Sustainability

	During	Early	Late
Pavement Condition			
Freeways			
Arterial Pavement			
Bridges			
Greenhouse Gas Emissions			
Alternative Fuel Vehicle Registrations			

HOW HAS COVID-19 AFFECTED THE TRANSPORTATION SECTOR?

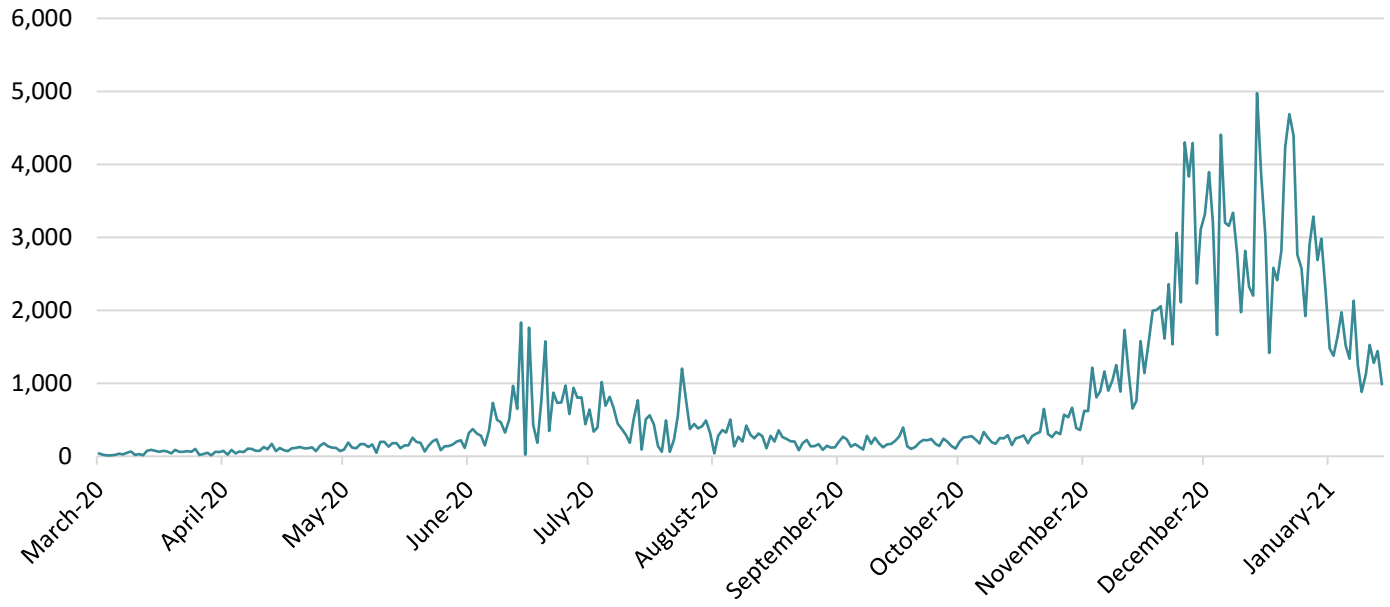
COVID-19 has had a domino-effect where, in an effort to reduce transmission of the virus, many places of business shuttered or shifted online and many people gave up their usual recreational activities, either by state mandate or by choice. These actions, in turn, spurred massive unemployment, high rates of working from home, and high rates of sheltering in place. These three factors are arguably the main drivers affecting mobility. To explore these impacts more deeply, the first section provides an assessment of these drivers, as well as a handful of indicators of current economic health. The second section displays data that show the impact these drivers have on key mobility sectors, including auto travel patterns, transit, and goods movement.

The following analysis of the impact of COVID-19 on the transportation sector relies on data that have been collected over the course of 2020, enabling an assessment of change from a pre-pandemic baseline. Sources include Caltrans freeway monitoring data, cell phone data, transportation agency data, OCTA survey data, and others.

COVID-19 CASES

- The number of new, positive COVID-19 cases peaked in December 2020 and early January 2021.
- The number of new cases appears to be on the decline.

COVID-19 case rate spiked in early winter 2020 and 2021

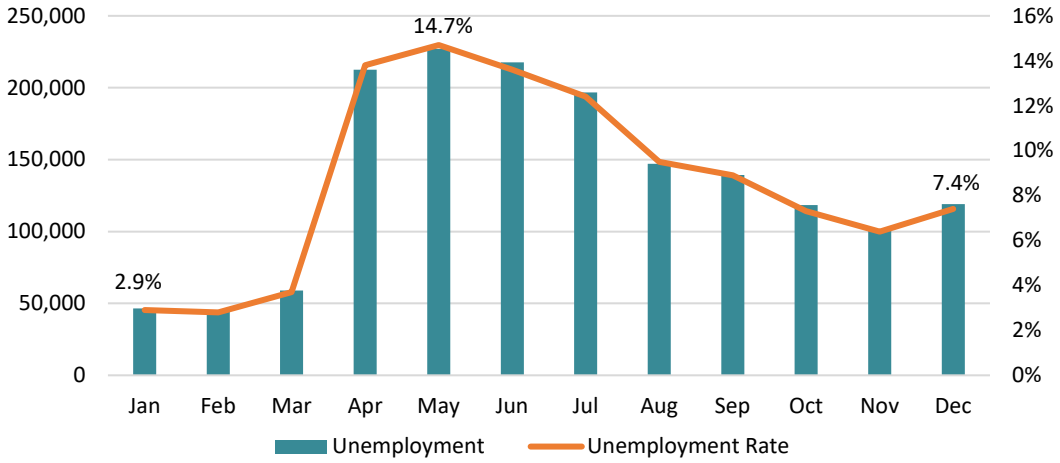


New Confirmed Positive Covid-19 Cases: Orange County, March 2020 Through January 2021
Source: California Department of Health

KEY DRIVERS

EMPLOYMENT

Unemployment has more than doubled since January

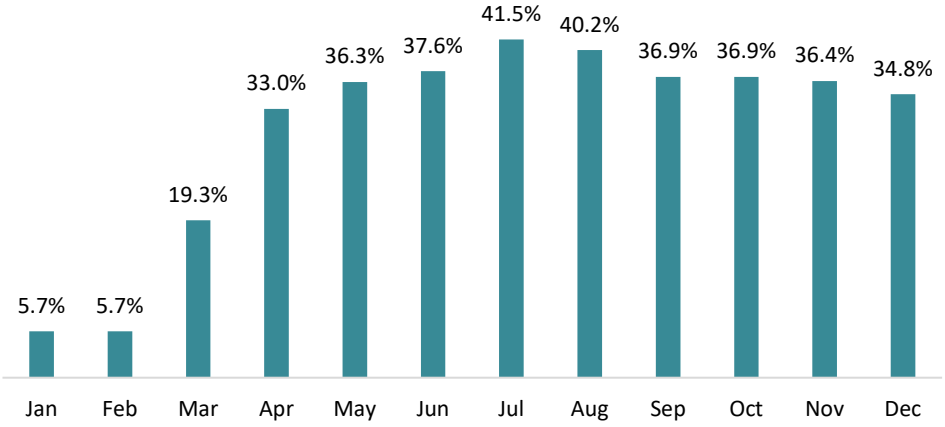


- Leisure and hospitality contracted the most, losing 75,400 jobs.
- Professional and business services decreased by 28,900 jobs over the year.
- Trade, transportation, and utilities posted a loss of 19,600 jobs.

Unemployment: Orange County: January Through December 2020
Source: California Employment Development Department

WORK FROM HOME

More people continue to work from home



- There was a seven-fold increase between January and July 2020 in the percentage of Orange County residents working from home.
- Since September, the percentage of people working from home has remained relatively, stable around 37 percent, with a slight dip in December to 35 percent.

Work from Home: Orange County, January Through December 2020
Source: Maryland Transportation Institute (2020). University of Maryland COVID-19 Impact Analysis Platform, accessed 2/2/2021

Before the pandemic, **76 percent** of survey respondents never worked at home in a given week; by June 2020, as many people transitioned to working at home, only **39 percent** of respondents said they never worked at home. When people who worked from home at least one day a week in June 2020 were asked what level of working at home they wanted after the pandemic resolved, a majority (51 percent) wanted to work at home at the same level they were in June 2020 and 13 percent wanted to work at home more. Just 35 percent wanted to work at home less than they were in June, suggesting that some level of working at home will persist.

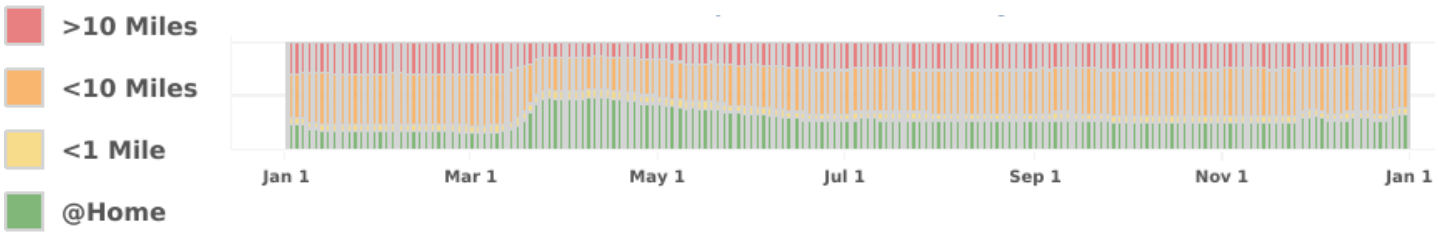
Source: OCTA Travel and Employment Survey, July 2020

SHELTER IN PLACE

In addition to working from home, residents curbed other types of travel as well. Mobile device data provides a glimpse of Orange County resident's travel patterns:

- As of December 31, 2020, 33 percent of Orange County residents were staying home.
- This is substantially fewer than the peak of 49 percent at the end of March 2020.
- The pre-pandemic baseline was about 16-18 percent of residents staying home daily.

Sheltering in place approaching pre-pandemic levels



Percentage of Orange County Population Sheltering In Place, Traveling Under One Mile, Under 10 Miles, Or More Than 10 Miles: 7-Day Daily Average From January 1, 2020 To December 31, 2020

Note: The Shelter-In-Place Analysis represents the percentage of devices staying at home in any given county. It is calculated daily by measuring how many devices moved less than 330 feet from home. In the 100% stacked area chart we also provide the percentage of devices traveling less than one mile, less than 10 miles, and more than 10 miles. Values presented are 7-day daily averages.

Source: CUEBIQ

Sheltering in place has changed people's consumption patterns, which has impacts on transportation. The percent change in consumer behavior between February to June 2020 includes…

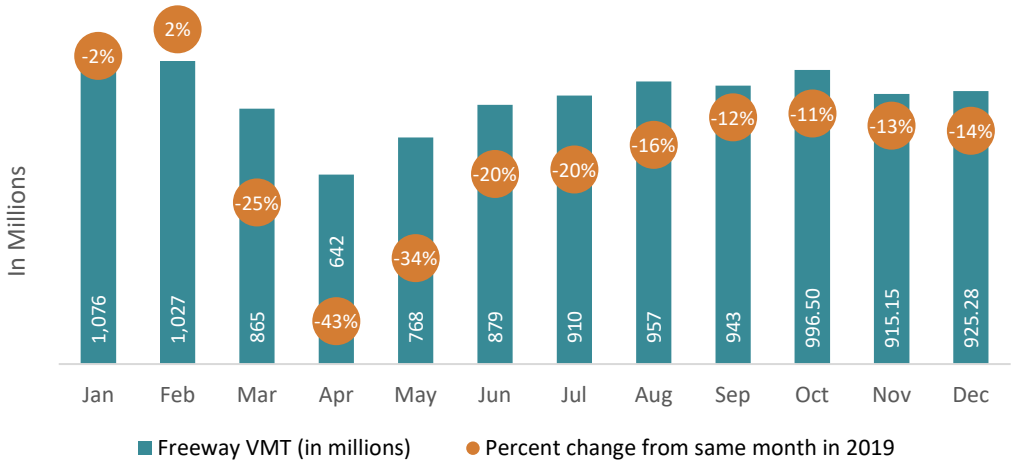
+111%	Increase in purchasing groceries online
+42%	Increase in ordering food for pick-up from restaurant
+40%	Increase in ordering food for delivery from restaurant
+26%	Increase in purchasing products online
-81%	Decrease in eating a meal at a restaurant

Source: OCTA Travel and Employment Survey, July 2020
Note: Survey collected 2,548 responses from randomly selected residents, representing a sample of all Orange County adults.

TRANSPORTATION IMPACTS

AUTO TRAVEL

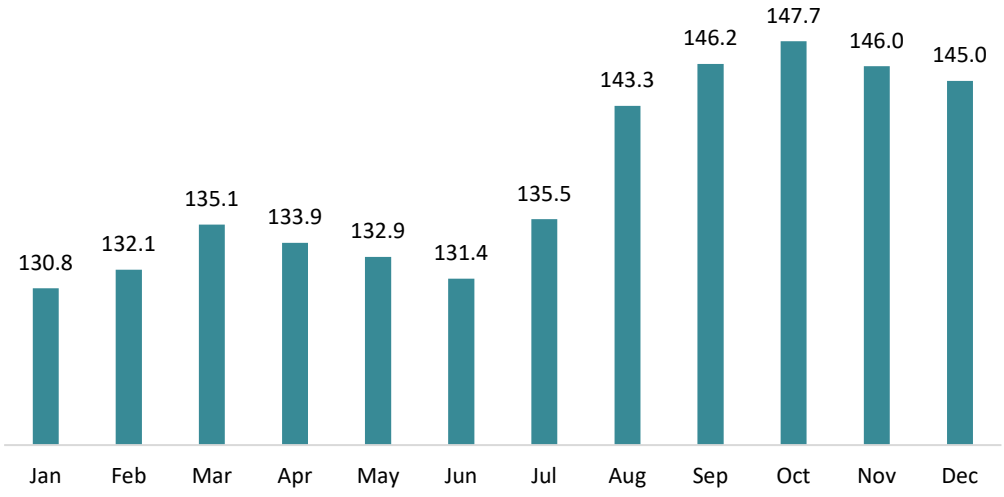
VMT rebounded after COVID-19 shut down, but remains below 2019 VMT



Monthly Freeway Vehicle Miles Traveled (VMT): Orange County, January Through December 2020
Source: Caltrans, PeMS

- Immediately following the COVID-19 stay at home orders, there was a massive drop in the number of vehicle miles traveled (VMT).
- While VMT has rebounded somewhat, by the end of 2020, it remained 14 percent below the pre-pandemic level in December of the year before. Additionally, travel is more evenly spread throughout the day, rather than concentrated in peak hours. The impact has been reduced delay.

Crimped production of new cars plus desire to self-isolate affordably drives up used car sales



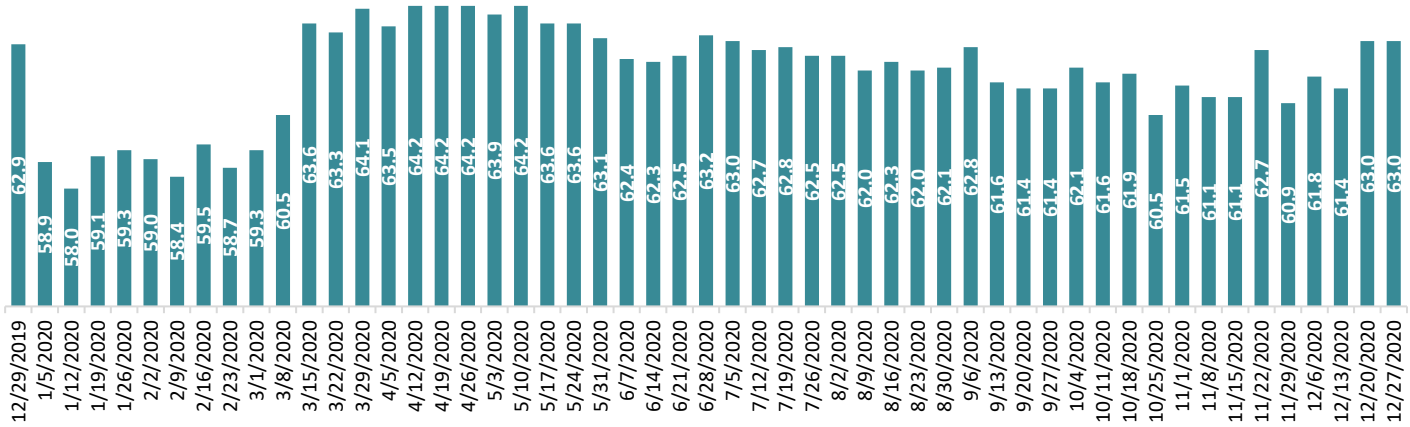
Used Car Consumer Price Index (Us West): January Through December 2020
Source: U.S. Bureau of Labor Statistics
* NBC News, "For the auto industry, 2020 was a horrible year – but it ended better than expected," (www.nbcnews.com/business/autos/auto-industry-2020-was-horrible-year-it-ended-better-expected-n1252892)

- Used car sales rose 11 percent between January and December 2020.
- The increase is attributed to the restricted supply of new cars due to lower than normal new car production and people seeking an affordable alternative to transit and ridesharing.*

66% and 43% decline
in people carpooling and vanpooling, respectively

Source: OCTA Travel and Employment Survey, July 2020 (change between February and June 2020)

Motorists experience a pandemic-induced decrease in freeway congestion

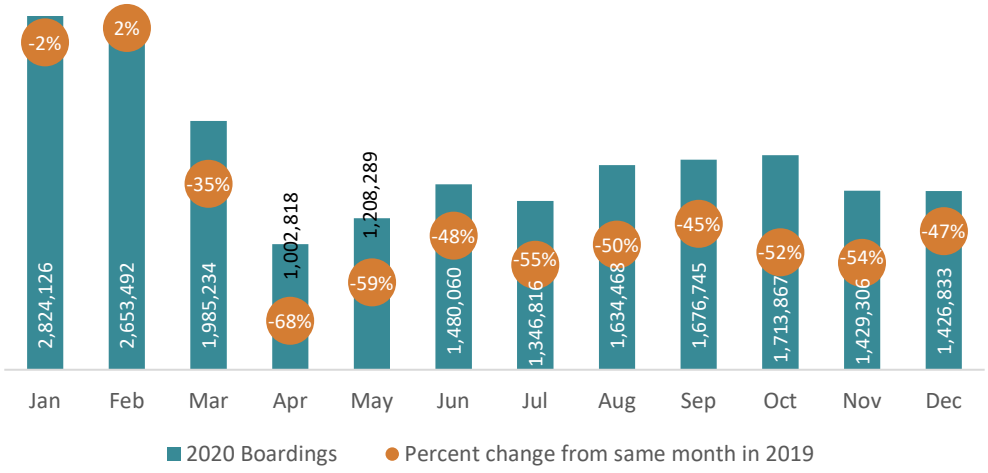


Average Freeway Speeds By Week: Orange County, December Through December 2020
Source: Caltrans, PeMS

- With the COVID-19 shutdown and stay at home orders, fewer vehicles were on Orange County freeways, leading to increased average speeds.
- While the average speed is gradually declining, it is still higher than pre-pandemic levels.

TRANSIT

Bus boardings decline and have yet to rebound



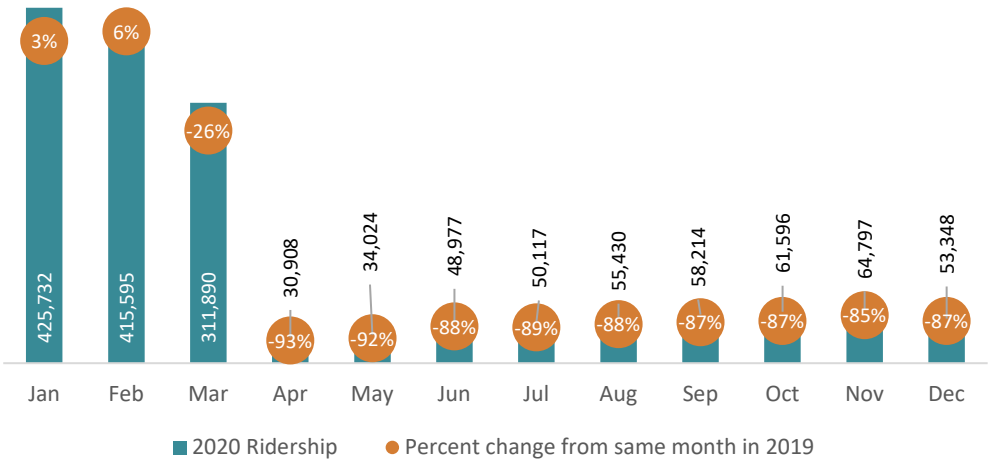
Monthly Bus Boardings: 2020 Boardings and Percent Change from 2019
Source: OCTA

- Since the COVID-19 shutdowns in March, bus boardings have dropped significantly – ranging from 47 percent to 68 percent drops from 2019 monthly averages.

72% decline
in people reporting that they are riding a bus

Source: OCTA Travel and Employment Survey, July 2020 (change between February and June 2020)

Rail ridership declines significantly



Orange County Serving Metrolink Lines: 2020 Ridership and Percent Change From 2019
Source: OCTA

- Similar to bus boardings, Metrolink train boards have also dropped drastically since the beginning of the COVID-19 pandemic.

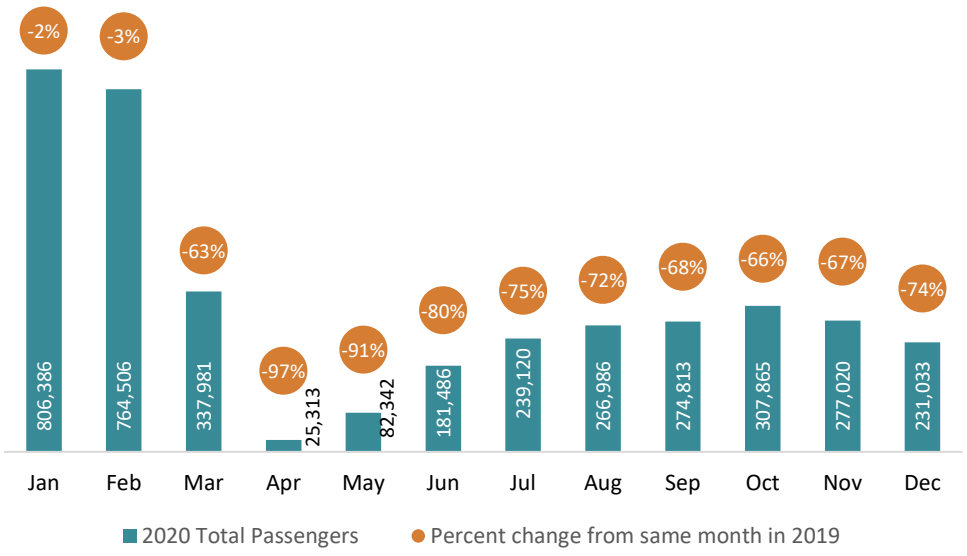
88% decline

in people reporting that they ride Metrolink or Amtrak Rail

Source: OCTA Travel and Employment Survey, July 2020 (change between February and June 2020)

PASSENGER AIR TRAVEL

Passengers in and out of John Wayne Airport remains significantly lower than pre-COVID-19

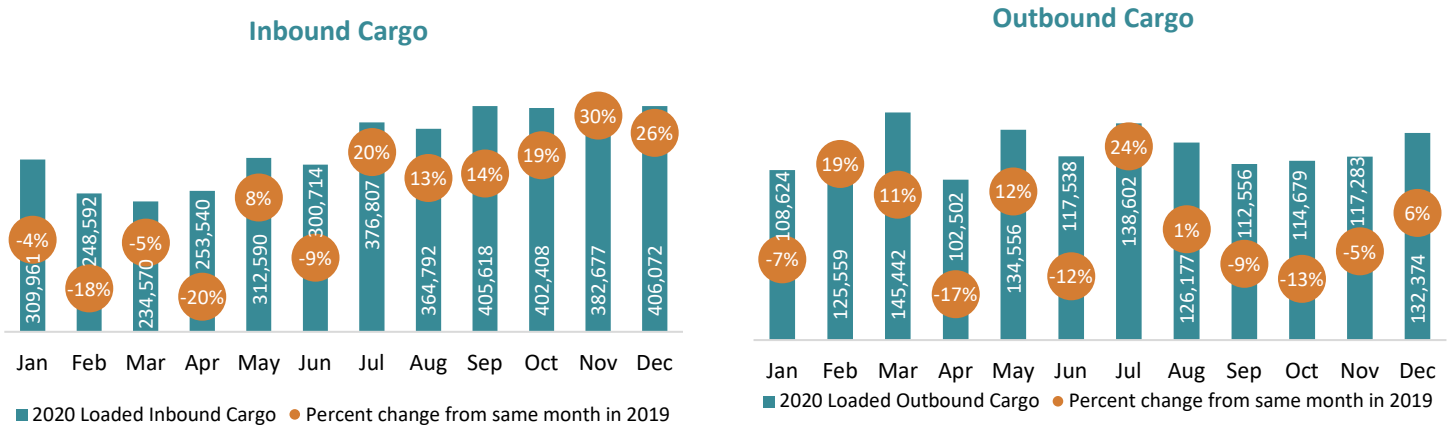


John Wayne Airport Total Passengers: 2020 Passengers and Percent Change From 2019
Source: John Wayne Airport, Orange County

- Fewer people are flying through John Wayne Airport.
- Comparing April 2019 and 2020, there was a 97 percent drop in passengers.
- The number of passengers flying using John Wayne airport continues to fluctuate but remains significantly less than in 2019.

GOODS MOVEMENT

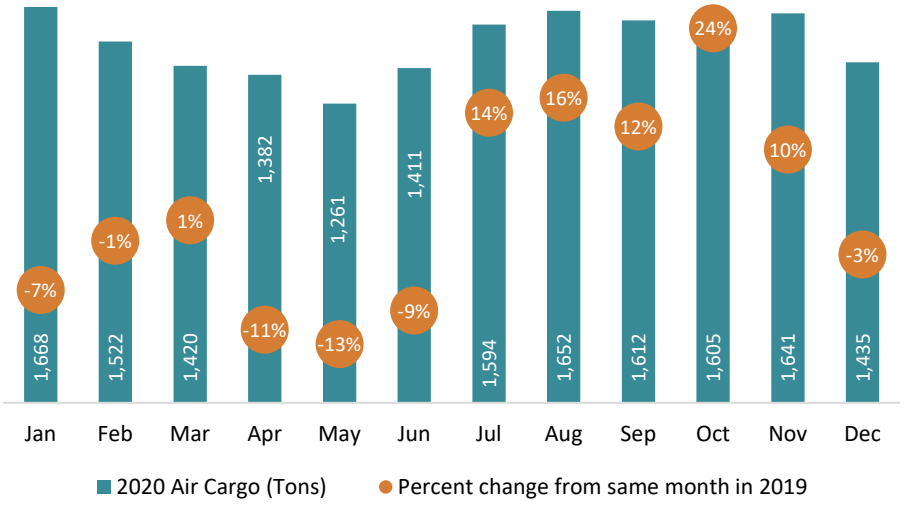
Steady inbound cargo growth in second half of 2020



Port of Long Beach Loaded Cargo (20 Foot Containers): 2020 Inbound and Outbound and Percent Change From 2019
Source: Port of Long Beach

- Following months of fluctuation, there has been a steady flow in inbound containers coming into the Port of Long Beach.
- In December 2020, there was 26 percent more cargo coming in than in December 2019.
- The number of outbound containers going out of the Port of Long Beach fluctuated throughout 2020, with no discernable trend emerging.
- However, the year ended on a positive note, with 6 percent more cargo going out in December 2020 than in December 2019.

Modest, short-term, air cargo declines immediately after shutdown



John Wayne Airport Air Cargo (Tons): 2020 Cargo and Percent Change From 2019
Source: John Wayne Airport, Orange County

- John Wayne Airport is seeing a similar trend in cargo passing through.
- In December 2020, there was 3 percent less cargo passing through John Wayne Airport than December 2019.

DEMOGRAPHICS & CONTEXT

Transportation systems are built, enhanced, used and maintained in a given environment. How these systems evolve over time depends on a variety of factors. For example, transportation systems are affected by growth and change in the population and development patterns, fluctuations in the local economy and tax base, and advances in technology related to mobility. To assess the performance of Orange County's transportation systems and their effectiveness at providing mobility for Orange County residents and visitors, it is important to understand the setting. The following profile provides background for, and insight into, the mobility indicators that follow.

POPULATION CHARACTERISTICS

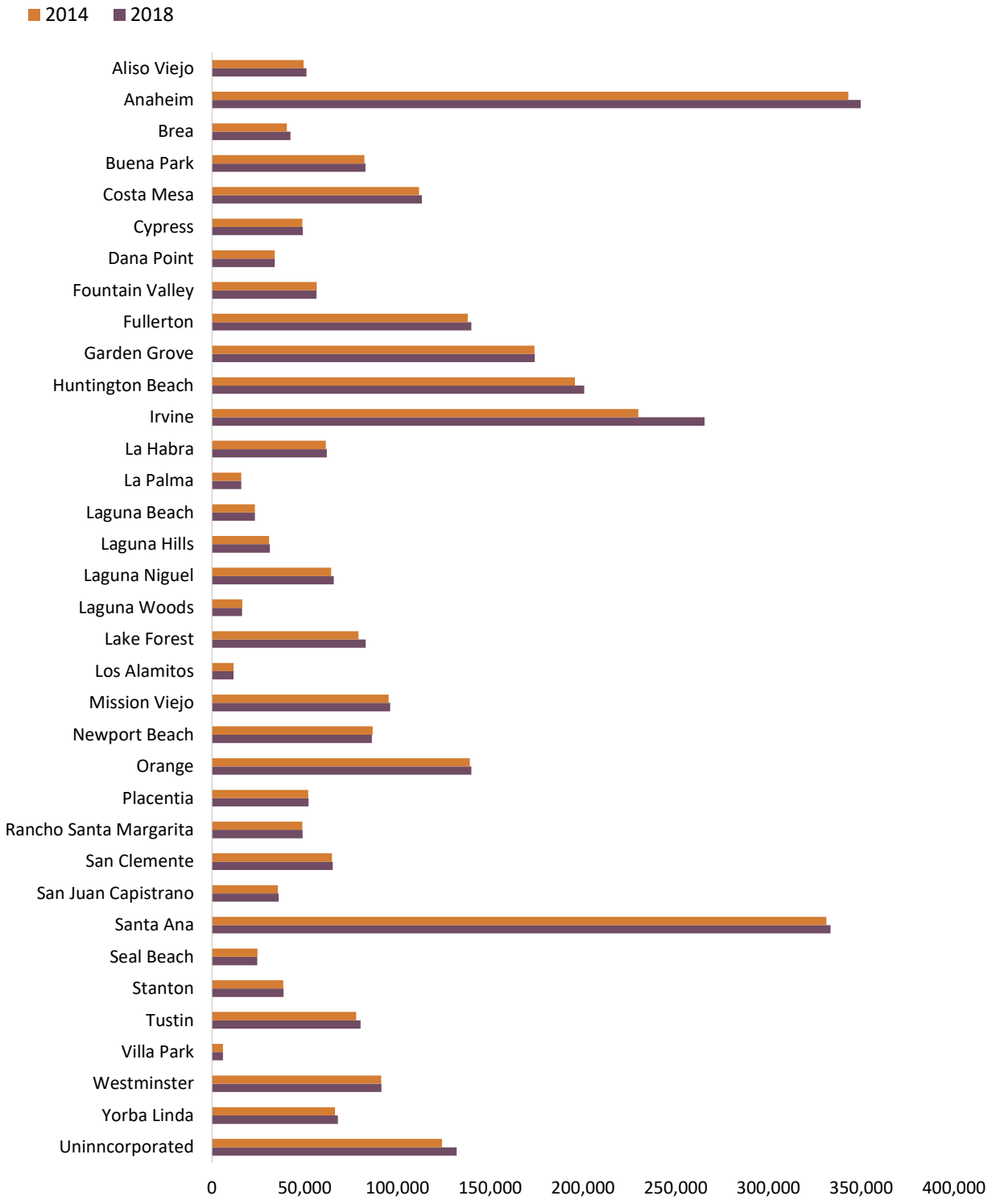
Size

Orange County is the third largest county in California and the sixth largest in the nation:

- With a population of 3,185,968 in 2018, Orange County falls behind Los Angeles (10,105,518) and San Diego (3,343,364) counties in terms of the counties with the largest populations in California.
- The population of Orange County grew one percent since 2014, when there were 3,145,515 people living in the county.
- Most growth in Orange County is through natural increase (births minus deaths) and a smaller proportion is due to migration, either from international immigration or people moving to Orange County from other states.[7]
- Between 2014 and 2018, the cities of Irvine and Lake Forest saw the largest increase in their populations – 16 percent and 5 percent, respectively.
- During that same period, however, the cities of Fountain Valley, Newport Beach, La Palma, Laguna Woods, and Seal Beach experienced slight decreases in population (less than 0.5 percent).

[7] California Department of Finance, Table E-2

FIGURE 1. POPULATION: ORANGE COUNTY, 2014 AND 2018



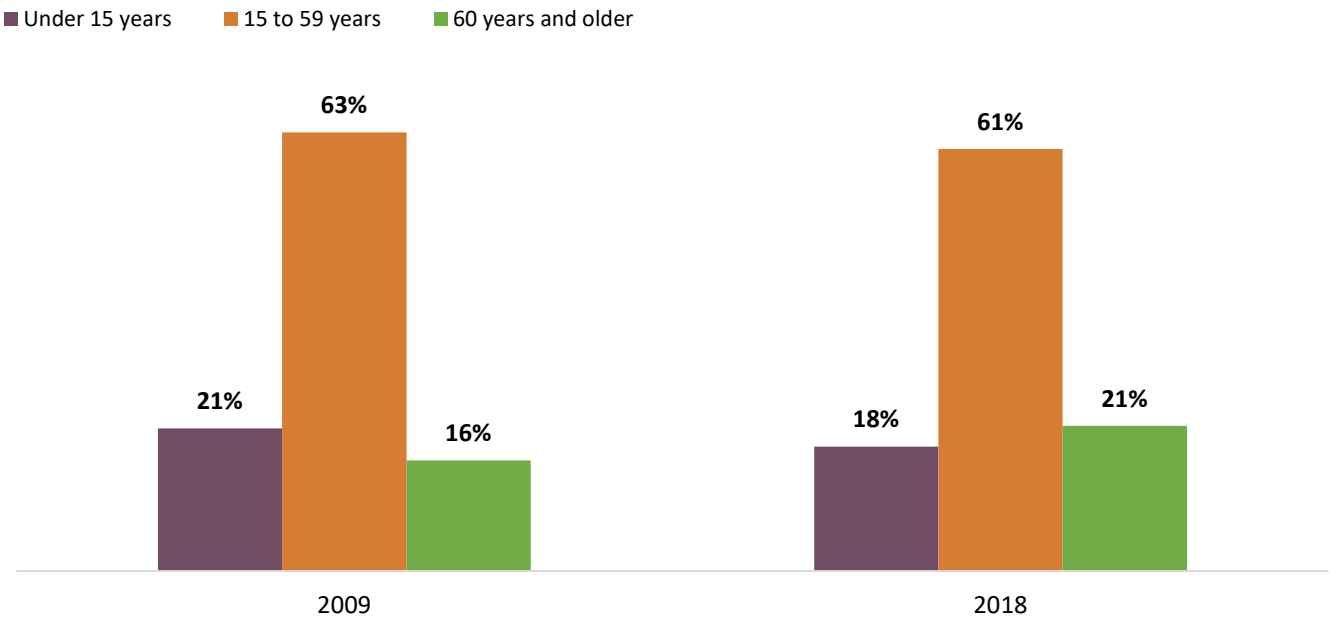
Source: U.S. Census Bureau, American Community Survey, 5-Year Estimates, Table S0101

Age

Orange County's population is growing older:

- Over the past 10 years, the county has experienced an increase in the older adult population and a decrease in the child population. The percentage of the population ages 15 to 59 has remained relatively constant and is currently 61 percent.
- In 2018, 18 percent of Orange County's population was under 15 years (compared to 21 percent in 2009) and 21 percent were 60 years and older (compared to 16 percent in 2009).
- Communities within Laguna Woods, Seal Beach, and Laguna Beach have the largest proportion of seniors.
- The median age has risen from 35.7 in 2009 to 38.3 in 2018.

FIGURE 2. POPULATION BY AGE: ORANGE COUNTY, 2009 AND 2018



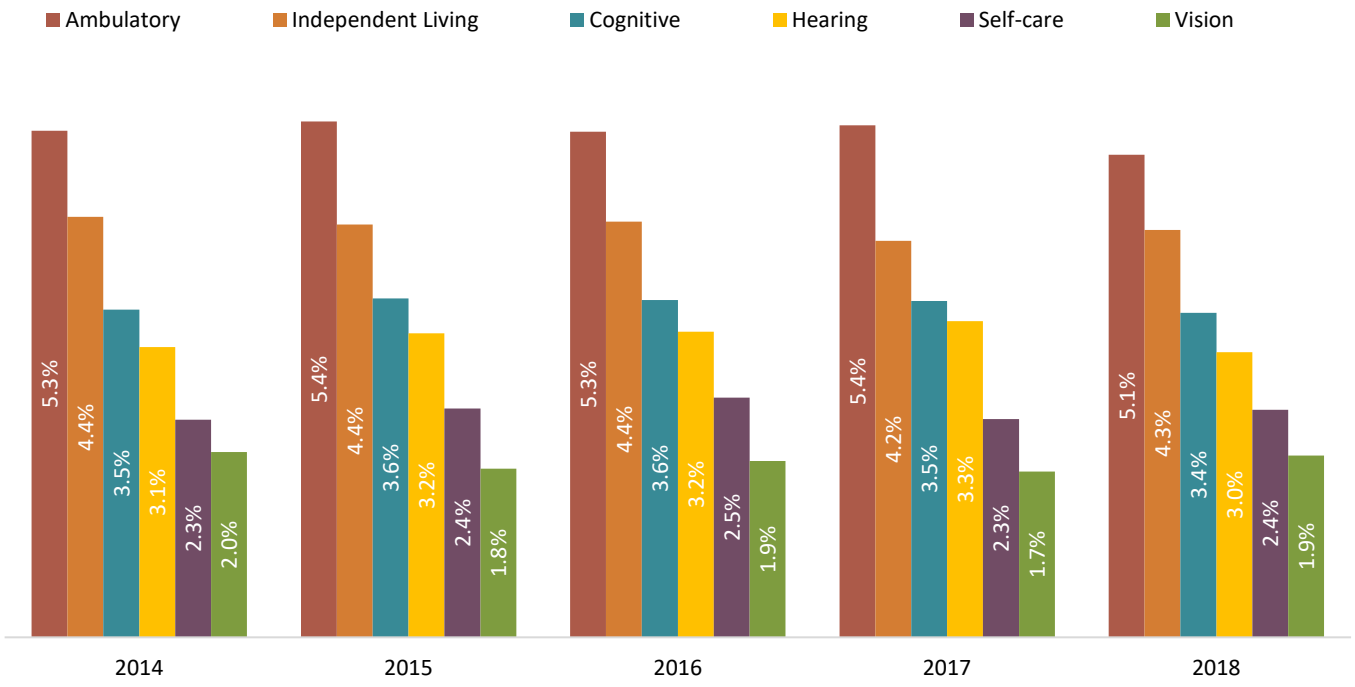
Source: U.S. Census Bureau, American Community Survey, 1-Year Estimates, Table S0101

Disability

The percentage of the adult population with a disability is remaining steady:

- In 2018, 243,421 adults ages 18 and older in Orange County had some type of disability. This is equivalent to 9.9 percent of the adult population.
- There was a two percent decrease since 2014, when there were 249,273 adults with a disability living in Orange County.
- Orange County's disability rate is lower than California (12.5 percent) and the nation (15.1 percent).
- Ambulatory disabilities are the most common types of disabilities, followed by independent living disabilities.

FIGURE 3. PERCENTAGE OF POPULATION AGES 18 AND OLDER WITH DISABILITY, BY TYPE: ORANGE COUNTY, 2014-2018



Source: U.S. Census Bureau, American Community Survey, 1-Year Estimates, Table S1810

Definitions

Ambulatory difficulty—serious difficulty walking or climbing stairs.

Independent living difficulty—having difficulty doing errands alone, such as visiting a doctor's office or shopping.

Cognitive difficulty—serious difficulty concentrating, remembering, or making decisions.

Hearing difficulty—deafness or serious difficulty hearing.

Self-care difficulty—difficulty bathing or dressing.

Vision difficulty—blindness or serious difficulty seeing even when wearing glasses.

Source: U.S. Census Bureau, https://www.census.gov/topics/health/disability/guidance/data-collection-acs.html

Language

The percentage of residents speaking a language other than English at home is relatively stable:

- Over the 10-year period between 2009 and 2018, the percentage of Orange County residents over age five who speak a language other than English at home has fluctuated between 45.0 percent and 46.2 percent. The latest estimate from 2018 falls in the middle of that range at 45.5 percent.
- The percentage of people reporting they speak English less than "very well" has declined from 22.2 percent in 2009 to 18.7 percent in 2018.
- Among the 24.8 percent of residents who speak Spanish at home, 9.5 percent speak English less than "very well."
- Among the 15.2 percent of residents who speak an Asian or Pacific Islander language at home, 7.8 percent speak English less than "very well."

FIGURE 4. LANGUAGE SPOKEN AT HOME AMONG POPULATION OVER AGE 5 AND PERCENTAGE THAT SPEAK ENGLISH LESS THAN "VERY WELL": ORANGE COUNTY, 2009-2018

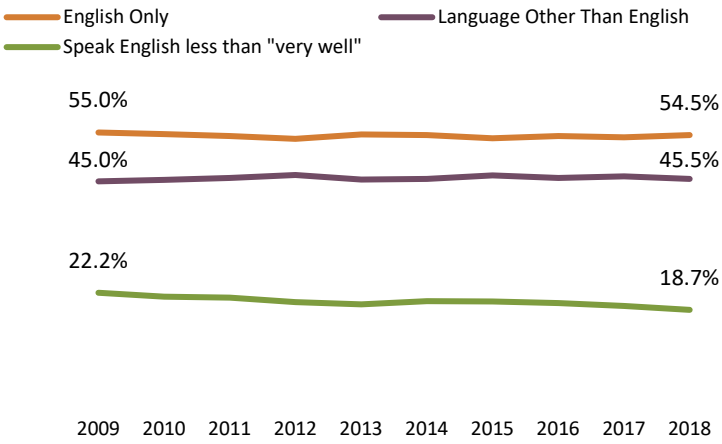
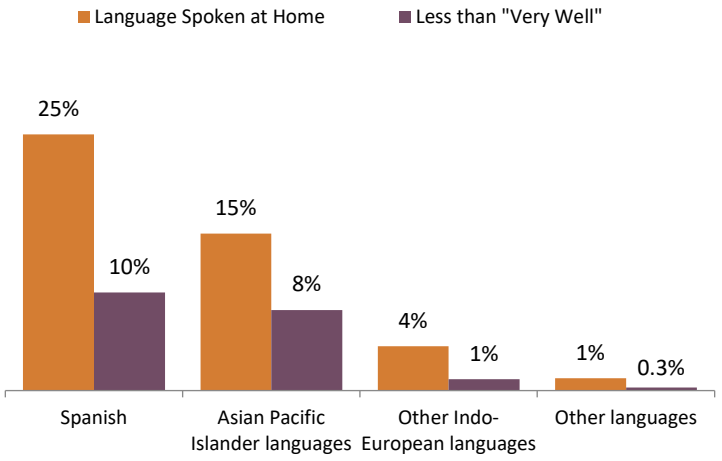


FIGURE 5. AMONG RESIDENTS OVER AGE 5, PERCENTAGE WHO SPEAK A LANGUAGE OTHER THAN ENGLISH AT HOME AND PERCENTAGE WHO SPEAK ENGLISH LESS THAN "VERY WELL": ORANGE COUNTY, 2018



Source: U.S. Census Bureau, 2018 American Community Survey, 1-Year Estimates, Table CP02

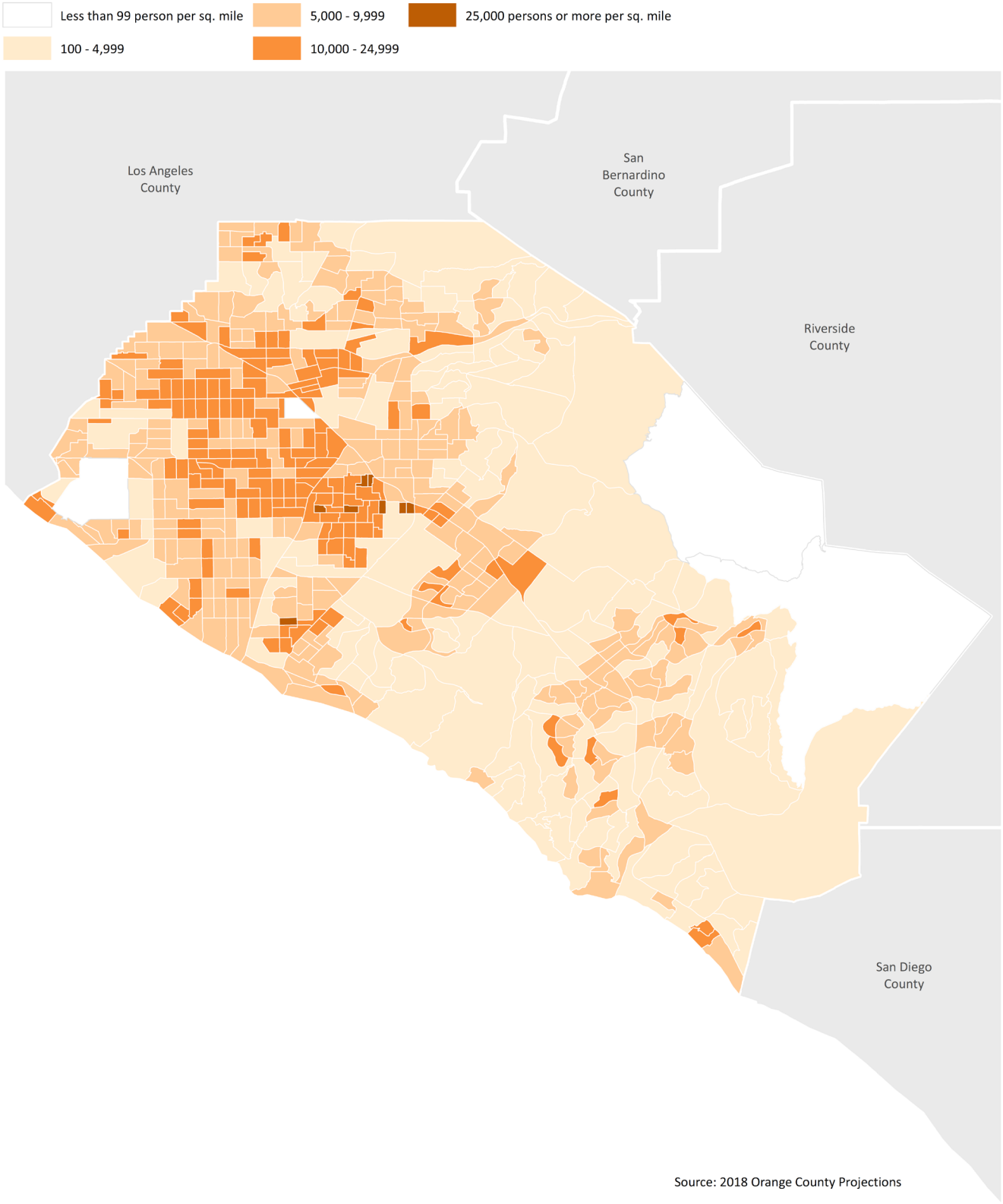
Population Density

Orange County is one of the most densely populated areas in the United States, ranked 19th out of over 3,000 counties in the nation:[8]

- Orange County's population density is 4,008 persons per square mile, an increase of 11 percent since 2000.
- Higher density areas, by definition, have more people living within walking distance of a transit stop than lower density areas, therefore increasing the potential for transit ridership.
- Communities within Santa Ana and Stanton have the highest population densities.
- Average household size in Orange County is 3.02 persons, with variation among cities, ranging from an average of 4.3 persons per household in Santa Ana to 1.45 in Laguna Woods.
- Orange County's average household size of 3.02 persons is larger than California (2.96) and the United States (2.63). Only 174 counties in the nation have a larger average household size than Orange County.

[8] Source: U.S. Census Bureau, 2018 American Community Survey, 1-Year Estimates, Table B25010

FIGURE 6. ORANGE COUNTY PROJECTED POPULATION DENSITY, BY CENSUS TRACT: PERSON PER SQUARE MILE, 2020



PROXIMITY TO TRANSIT

This indicator measures service accessibility, defined as a target of 90 percent or more of the population and jobs with access to a bus route within one-half mile (as the crow flies).

No anticipated impacts

In general, a smaller proportion of the population is living and/or working within one-half mile of bus routes:

- When looking at where people live, 85 percent of the Orange County population lives within one-half mile of bus routes. This percentage has not changed since 2017.
- For "minority" populations, as defined by the Federal Transit Administration, this figure is 95 percent.
- Minority persons include American Indian and Alaska Native, Asian, Black or African American, Hispanic or Latino, and Native Hawaiian and Other Pacific Islander.[9]
- When looking at where people work, 92 percent of Orange County employment is within one-half mile of bus routes, a decrease of one percentage point since 2017.
- Combined, the Orange County population within one-half mile of bus routes and Orange County employment within one-half mile of bus routes together make up 87 percent, a decrease of one percentage point since 2017.

[9] As defined by the Federal Transit Administration Title VI Circular (FTA C 4702.1B), "Title VI Requirements and Guidelines for Federal Transit Administration Recipients", October 1, 2012

FIGURE 7. POPULATION WITHIN ACCESSIBILITY AREA: ORANGE COUNTY, FEBRUARY 2017 BUS ROUTES

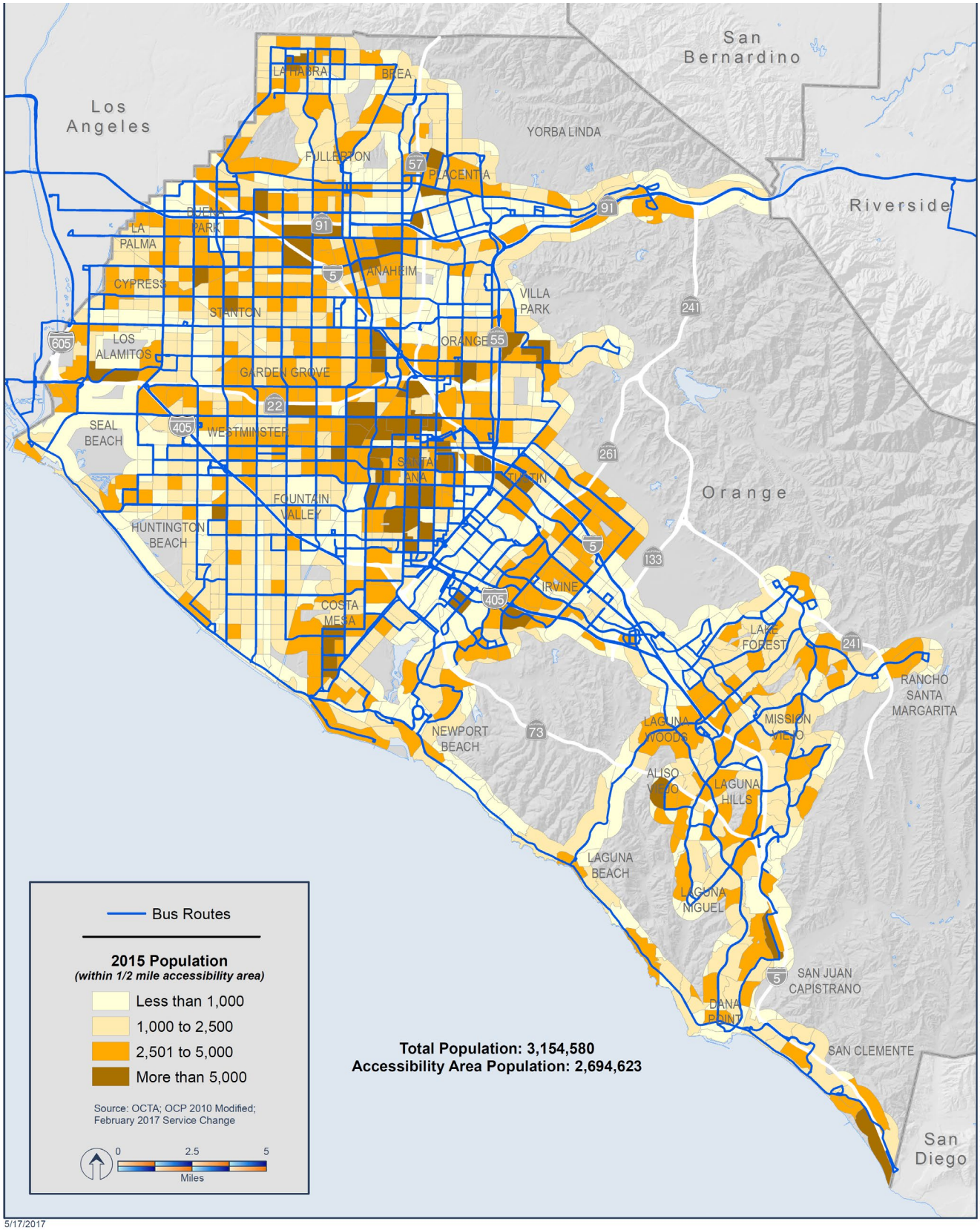
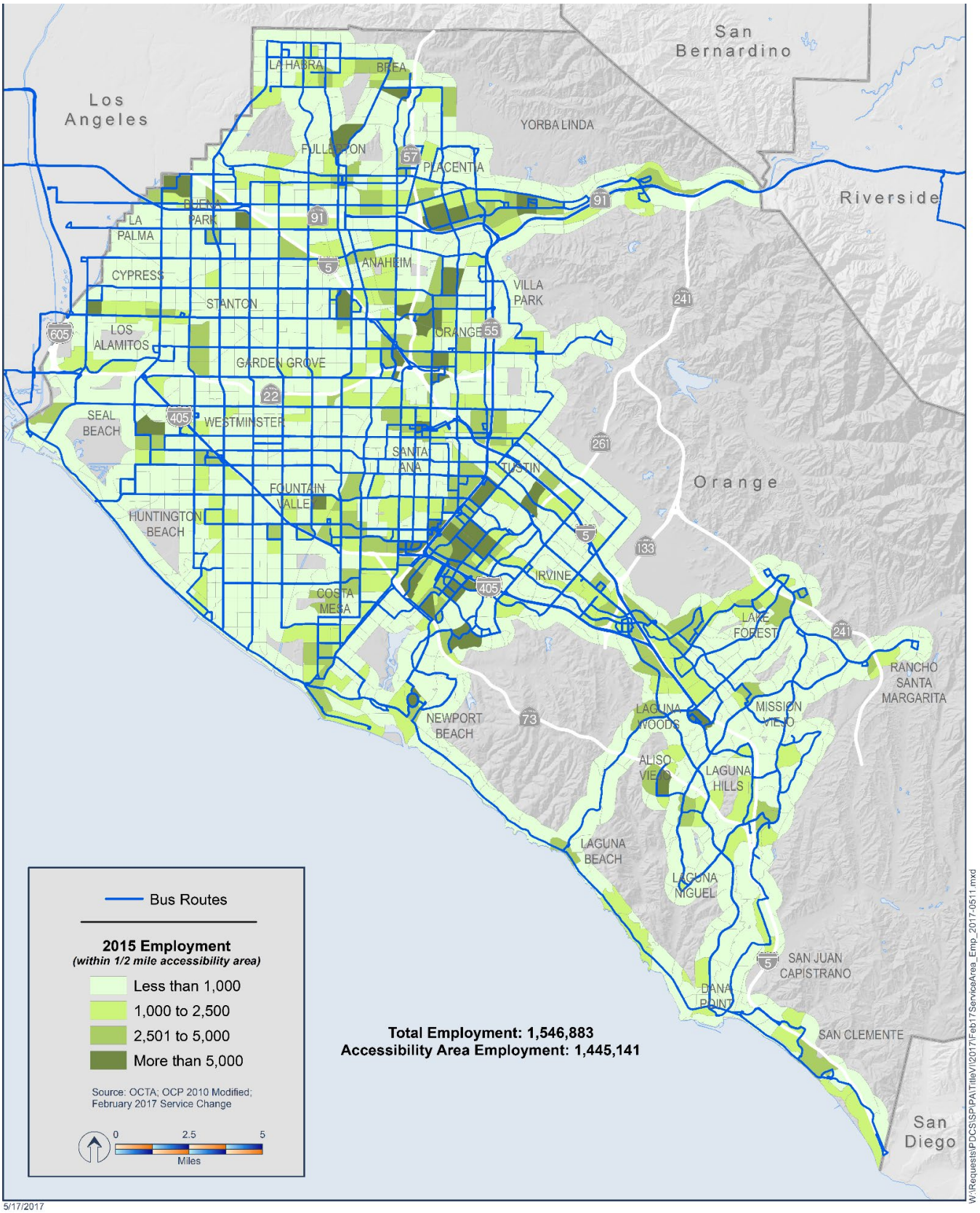


FIGURE 8. EMPLOYMENT WITHIN ACCESSIBILITY AREA: ORANGE COUNTY, FEBRUARY 2017 BUS ROUTES



EMPLOYMENT & INCOME

Employment, Unemployment, and Jobs

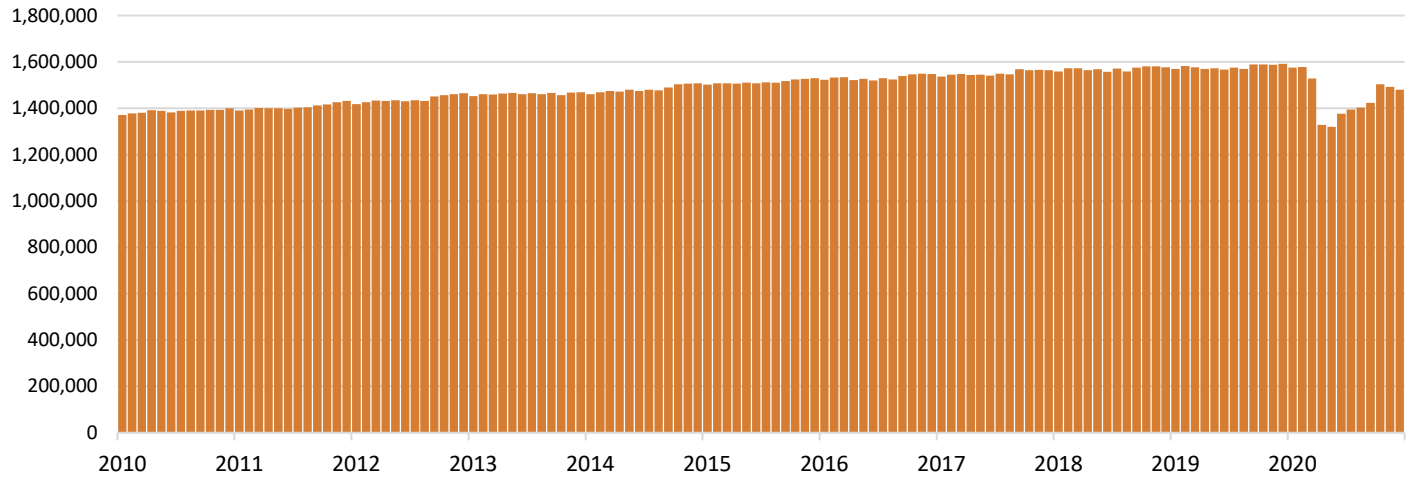
The number of people employed in Orange County has decreased in recent months, largely due to the coronavirus pandemic:

- In December 2020, 1,479,700 people living in Orange County were employed, a drop of 7 percent from a high of 1,589,000 people employed in December 2019.
- However, this is an increase of 12 percent from a low of 1,320,500 in May 2020.
- The unemployment rate in Orange County was 7.4 percent in December 2020, an improvement from April 2020 when the unemployment rate was 13.8 percent, following the stay-at-home orders.
- By contrast, the unemployment rate was 3.7 percent in March 2020.[10]
- The December 2020 unemployment rate compares with an unemployment rate of 8.8 percent for California and 6.7 percent for the nation during the same period.

According to projection data that has not yet incorporated the impact of the pandemic, jobs were on track to increase in 2020:

- In 2020, there were to be an estimated 1,773,571 jobs located in Orange County, a nine percent increase from 1,623,643 jobs in 2015.
- However, this figure will likely decrease when the impact of the coronavirus pandemic is in taken into account.
- Communities within Irvine and Santa Ana have the highest job density in the county.

FIGURE 9. NUMBER OF PEOPLE EMPLOYED: ORANGE COUNTY, JANUARY 2010 – AUGUST 2020

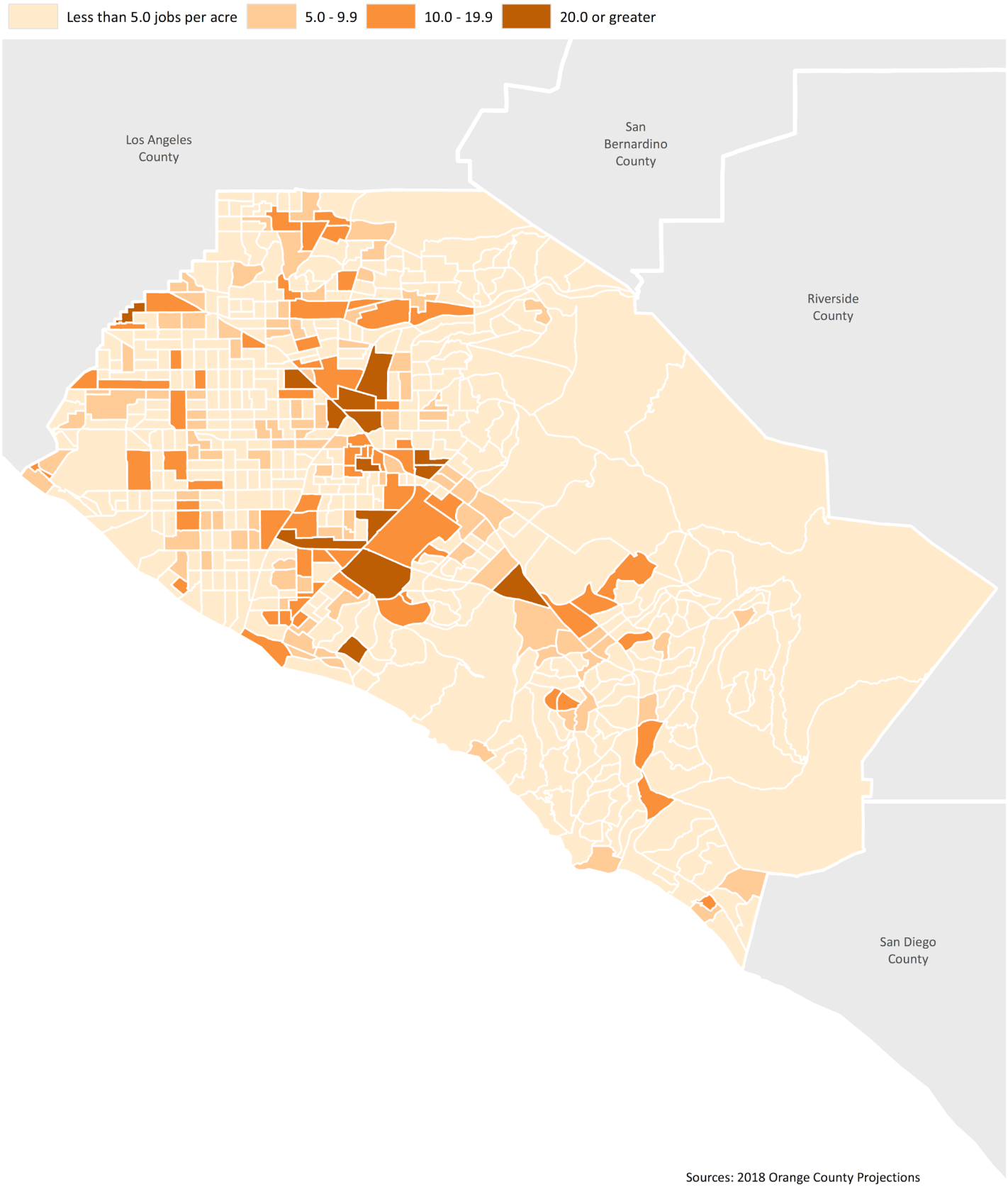


Source: State of California Employment Development Department (http://www.labormarketinfo.edd.ca.gov)

During Early Late	Employment took an immediate hit following the COVID-19 shutdowns. While the unemployment rate is steadily increasing, it is still more than two times higher than prior to the pandemic. Over time, as COVID-19 is contained and with new economic stimulus, employment will rebound.

[10] California Employment Development Department

FIGURE 10. ORANGE COUNTY PROJECTED JOB DENSITY, BY CENSUS TRACT: JOBS PER ACRE, 2020



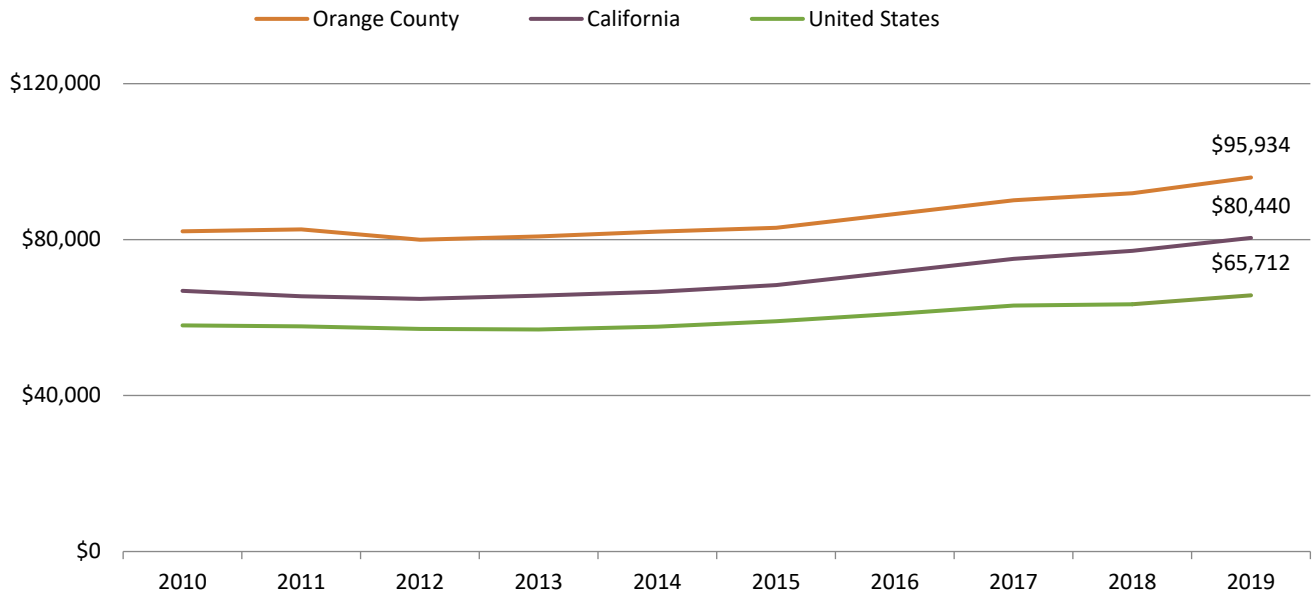
Sources: 2018 Orange County Projections

Income

Prior to the advent of the coronavirus pandemic, median household income posted its largest inflation-adjusted gain in many years and outpaced inflation:

- Median household income was $95,934 in 2019, which is higher than California's median ($80,440) and the United States' ($65,712).
- Income levels vary widely throughout the county, as depicted on page 13.

FIGURE 11. MEDIAN HOUSEHOLD INCOME (INFLATION ADJUSTED TO 2019 DOLLARS): ORANGE COUNTY, CALIFORNIA, AND UNITED STATES, 2010-2019



Source: U.S. Census Bureau, American Community Survey, 1-Year Estimates; U.S. Inflation Calculator

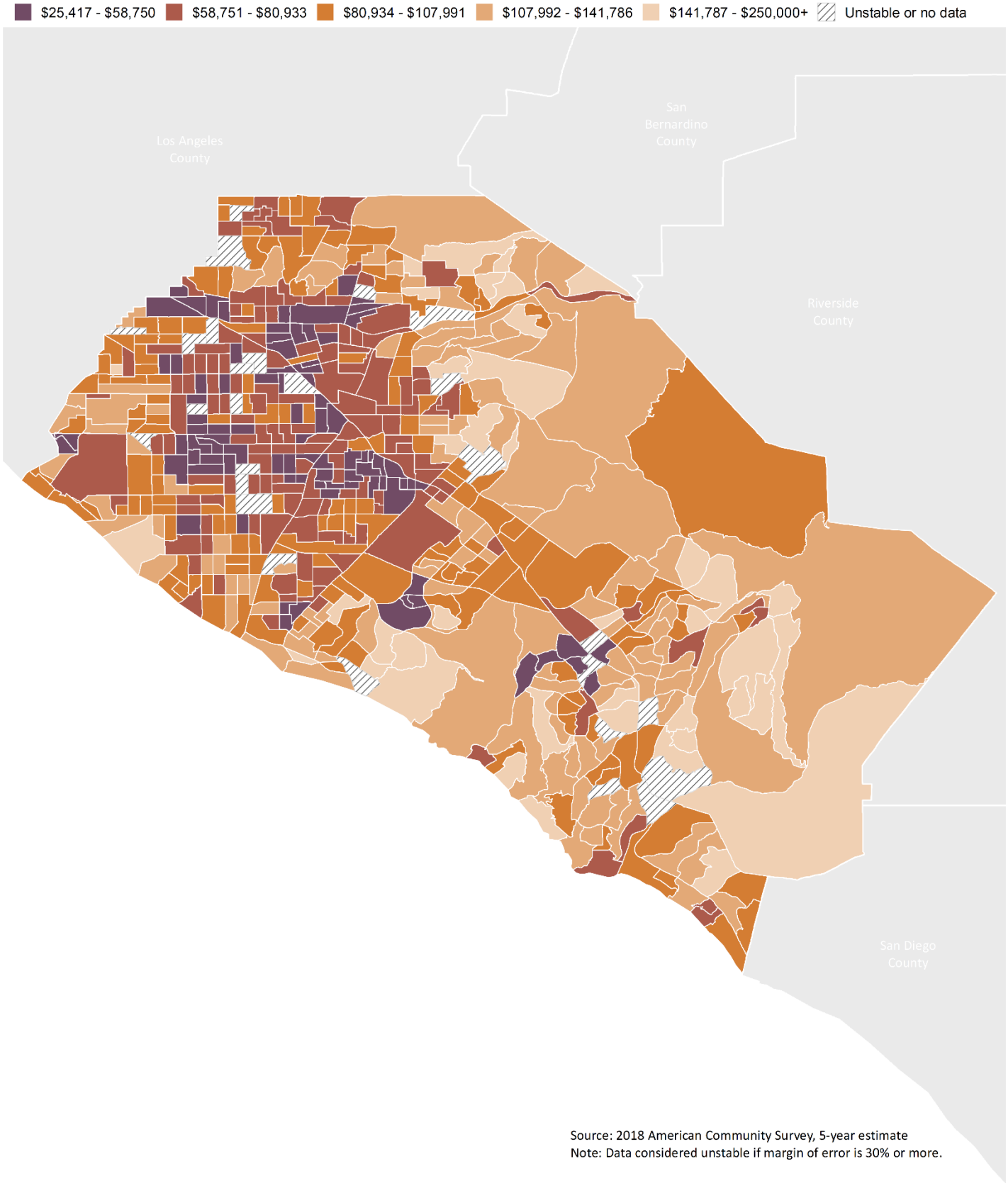
During

Early

Late

The impact of the pandemic on household income is highly dependent on federal aid packages, whether or not an individual lost their job, and how fast the economy recovers after the pandemic ends. This assessment of impact assumes that federal income support helped many people weather the immediate blow of the pandemic and late 2020 and early 2021 stimulus continue to offer support. As the economy slowly recovers, incomes will likely rise with rising employment. It is important to note, however, that this metric – median household income – may not show these effects, since the pandemic has had a "winner and loser" effect on income, with some people earning more or the same, and others unemployed or closing their business.

FIGURE 12. MEDIAN HOUSEHOLD INCOME, BY CENSUS TRACT: ORANGE COUNTY, 2018



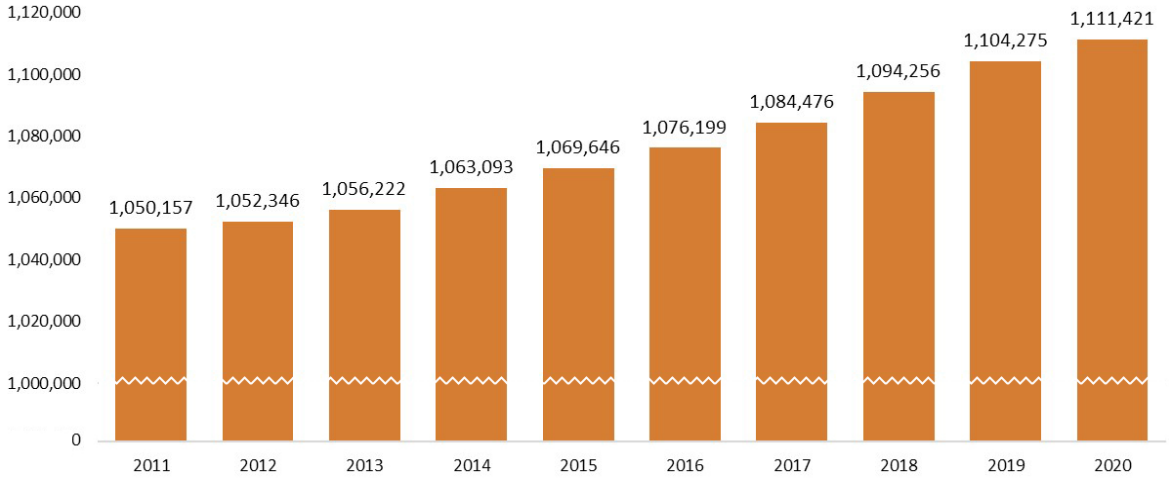
Source: 2018 American Community Survey, 5-year estimate
Note: Data considered unstable if margin of error is 30% or more.

HOUSING

The number of housing units is increasing:

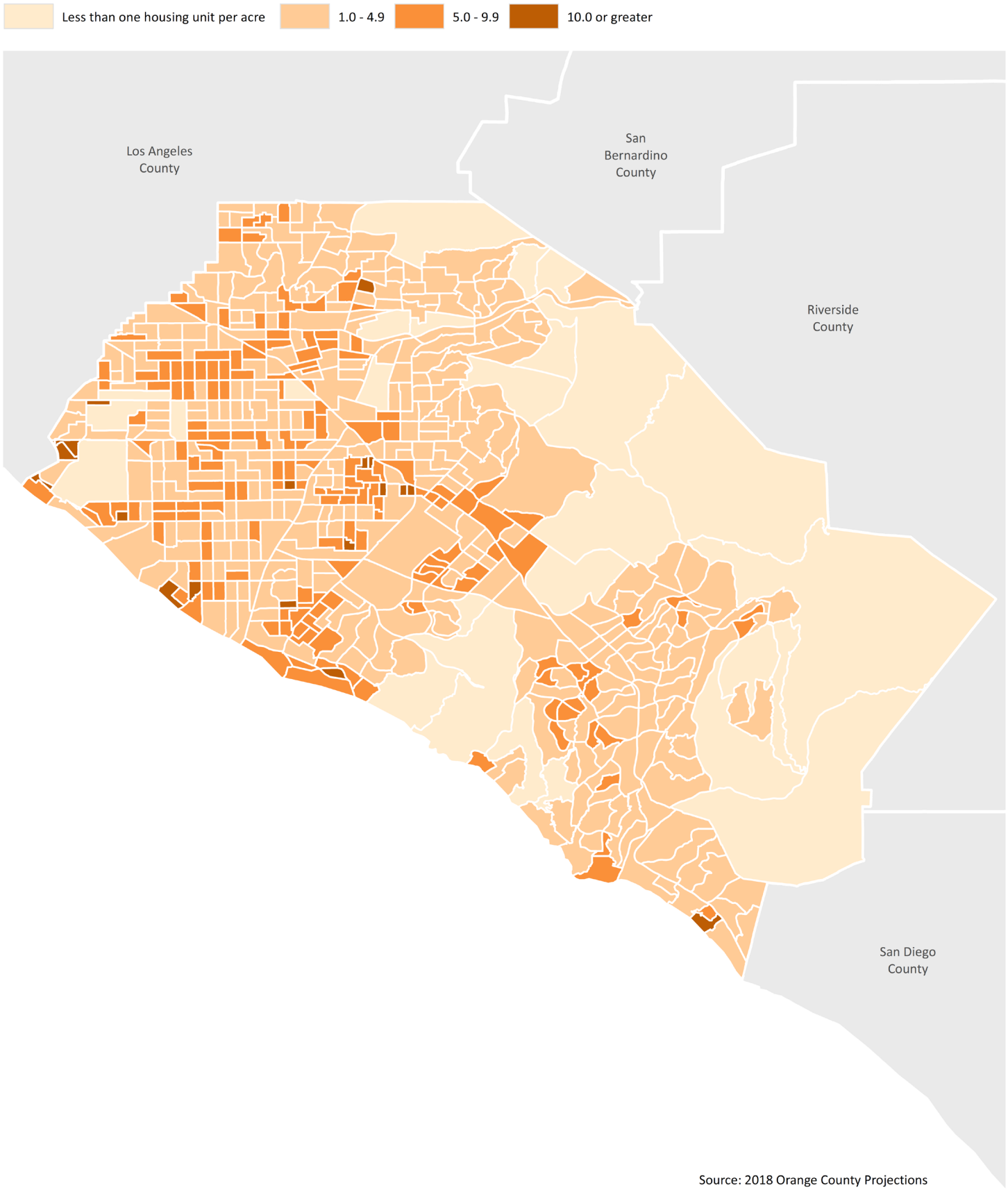
- In 2020, there were 1,111,421 housing units in Orange County. This marks a 6 percent increase from 1,050,157 housing units in 2011.
- Census tracts within Huntington Beach, Seal Beach (Leisure World), Santa Ana, and San Clemente have the highest density of housing units.

FIGURE 13. NUMBER OF HOUSING UNITS: ORANGE COUNTY, 2011-2020



Sources: State of California, Department of Finance, *E-5 Population and Housing Estimates for Cities, Counties and the State — January 1, 2011-2020*. Sacramento, California, May 2020.

FIGURE 14. ORANGE COUNTY PROJECTED HOUSING UNIT DENSITY, BY CENSUS TRACT: UNITS PER ACRE, 2020



Source: 2018 Orange County Projections

SALES AND USE TAXES

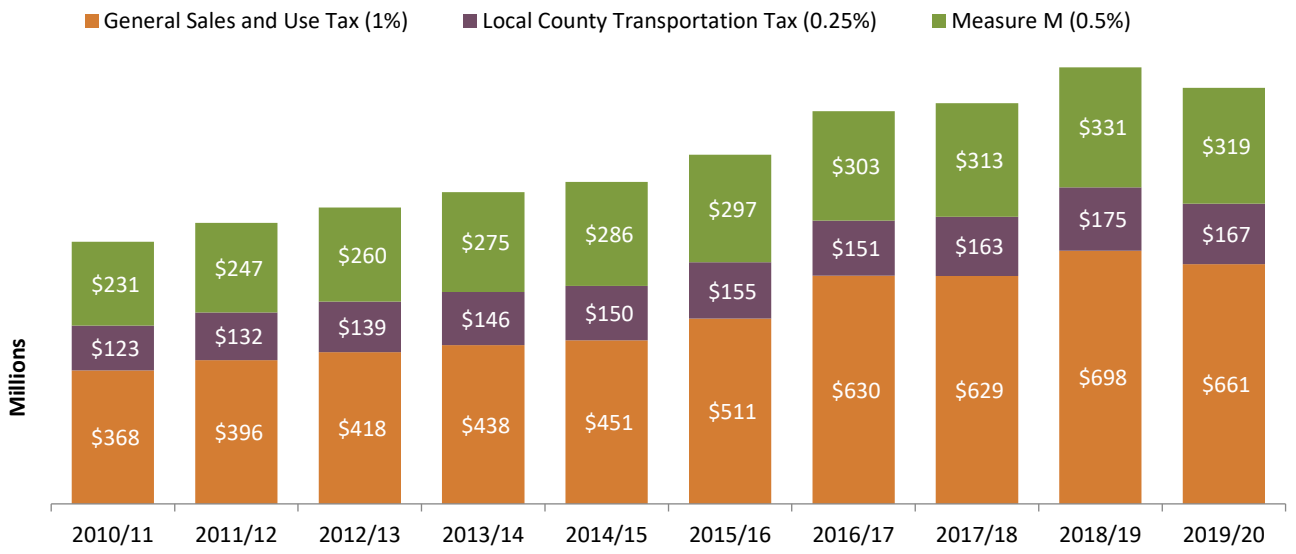
Sales and use tax revenue grew steadily over the past 10 years until 2019/20 – likely a result of the coronavirus pandemic:[11]

- Local sales and use tax distributions to Orange County jurisdictions, including the County, Orange County cities, and the OCTA, grew from a low of $722 million in 2010/11 to $1.15 billion in 2019/20.[12]
- The revenue reached a high of $1.20 billion in 2018/19 but slipped in 2019/20.
- On a per capita basis, Orange County's inflation-adjusted per capita revenue grew 30 percent over 10 years, from $276 per capita in 2010/11 to $359 per capita in 2019/20.

Orange County's sales tax is 7.75 percent and is allocated for specific uses:[13]

- A majority (6.0 percent) of the revenue earned in Orange County from sales tax goes to the state to fund statewide and local services; Orange County jurisdictions directly receive only 1.75 percent of the 7.75 percent total.
- That 1.75 percent is made up of the 0.5 percent voter-approved Measure M transportation tax, the 0.25 percent local county transportation tax, and the remaining 1.0 percent can go to fund any type of public need.
- Revenues from these taxes comprise 28 percent, 15 percent and 58 percent, respectively, of total sales tax revenue.

FIGURE 15. SALES AND USE TAX REVENUES DISTRIBUTED TO THE COUNTY OF ORANGE, ORANGE COUNTY CITIES, AND OCTA FROM LOCAL SALES, USE, AND TRANSPORTATION TAXES: 2011-2020



Note: The General Sales and Use Tax tallies do not include additional voter-approved sales tax levies enacted in several Orange County cities over this period, including La Habra (went into effect in 2009), Stanton (went into effect in 2015), Fountain Valley and Westminster (went into effect in 2017), and Placentia, Santa Ana, Seal Beach and Garden Grove (went into effect in 2019). Collectively, these additional revenues totaled $128 million in 2019/20.

Source: California Department of Tax and Fee Administration

[11] Sales tax applies to the sale of taxable merchandise in the state and use tax applies to the same type of merchandise purchased without tax from a business located outside the state but used, stored or consumed within California (Bureau of Equalization, www.boe.ca.gov/taxprograms/usetax/).

[12] These tallies do not include the additional, voter-approved sales tax levies in several Orange County cities over this period.

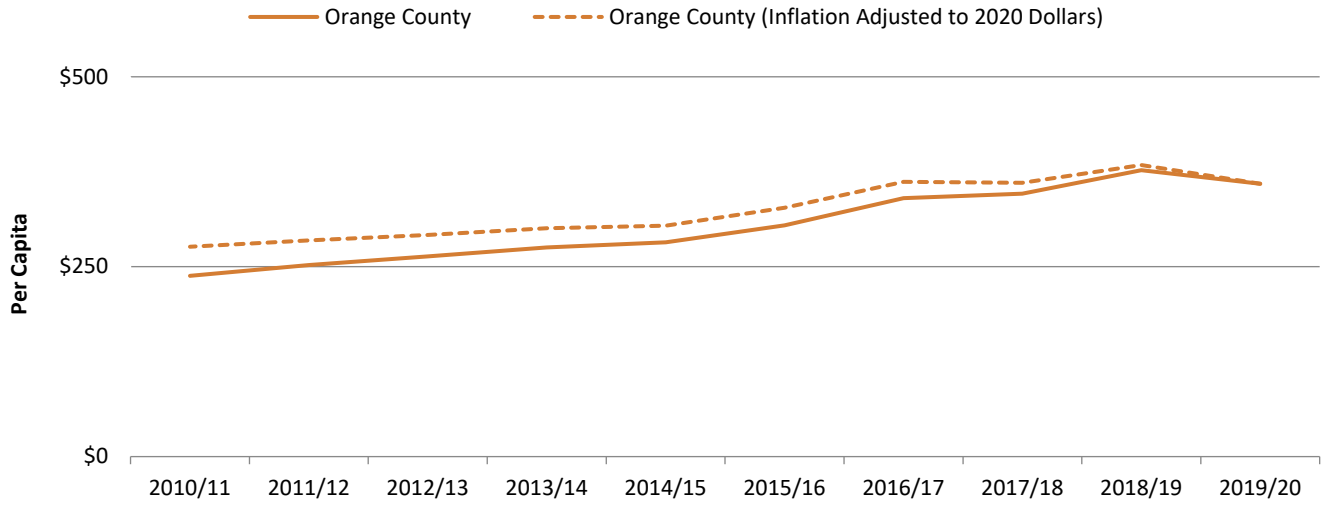
[13] The sales tax rate in several cities is higher due voter-approved, city-specific levies. See the chart note below.

During
Early
Late

Brookings Institute researchers project that in the United States, state and local government revenues will decline $155 billion in 2020, $167 billion in 2021, and $145 billion in 2022. While these estimates include income taxes, the biggest drivers behind the anticipated revenue decline are sales and other taxes and fees because consumption has fallen so sharply leading to plummeting revenues from taxes and fees on hotels, tolls, airports, and gasoline. In California alone, the revised budget proposal for 2020-21 projects a revenue decline of 22.3% and a $54.3 billion shortfall. Further, an examination of monthly distributions to OCTA in early 2020 show approximately $5 million less in revenue per month compared to the monthly distributions in early 2019.

Source: Louise Sheiner and Sophia Campbell, "How Much is COVID-19 Hurting State and Local Revenues?" Brookings Institute, September 24, 2020 (www.brookings.edu/blog/up-front/2020/09/24/how-much-is-covid-19-hurting-state-and-local-revenues/); State of California 2020-21 Budget (http://www.ebudget.ca.gov/2020-21/pdf/Enacted/BudgetSummary/Introduction.pdf); California Department of Tax and Fee Administration

FIGURE 16. PER CAPITA SALES AND USE TAX REVENUES DISTRIBUTED TO THE COUNTY OF ORANGE, ORANGE COUNTY CITIES, AND OCTA FROM LOCAL SALES, USE, AND TRANSPORTATION TAXES (NOMINAL AND ADJUSTED DOLLARS):
ORANGE COUNTY, 2011-2020



Sources: California Department of Tax and Fee Administration; California Department of Finance, Demographic Research Unit, Table E-4, Population Estimates for Cities, Counties, and the State; U.S. Inflation Calculator, Consumer Price Index (CPI-U) Data

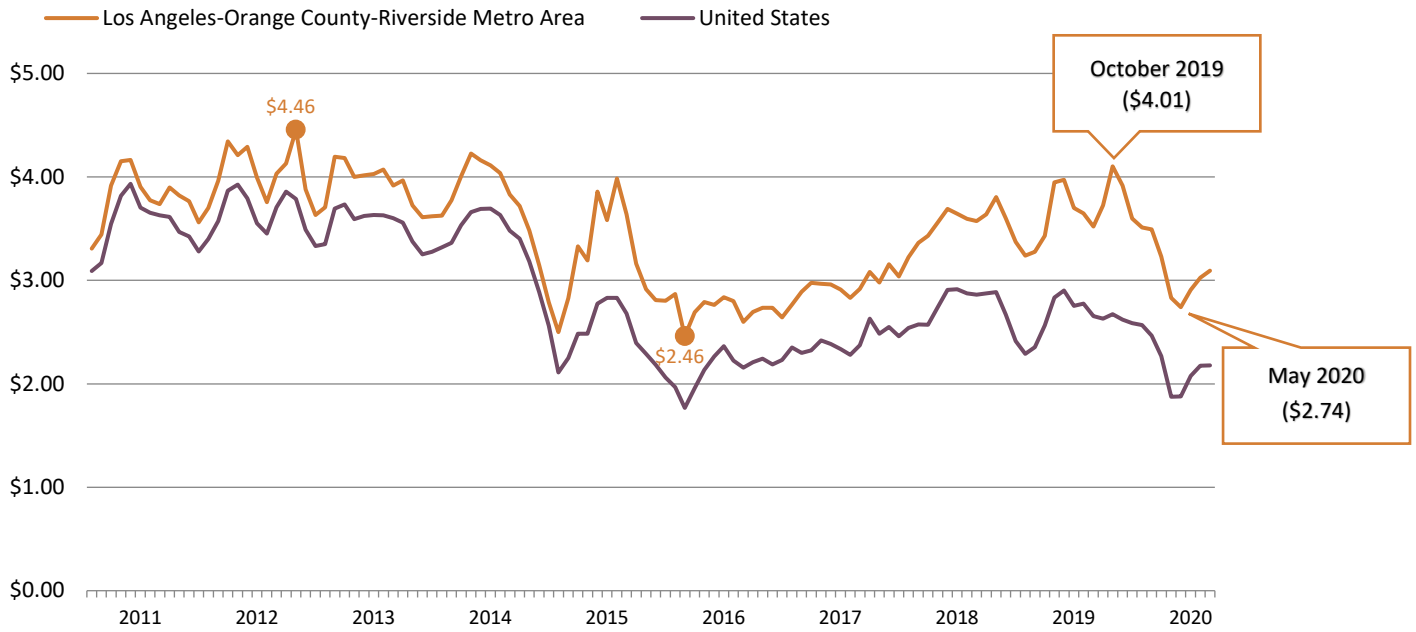
GASOLINE PRICES

Since 2011, gas prices have fluctuated from a 10-year high of $4.46 per gallon in October 2012 to a low of $2.46 per gallon in February 2016:

- More recently, in the past five years, gas prices were gradually increasing to a high of $4.01 per gallon in October 2019. This was followed by a steady decline until the low of $2.74 in May 2020. Since then, gas prices increased to the August 2020 level of $3.09.
- Prices are typically higher in the Los Angeles metro area compared to the nation as a whole, averaging 60 cents more over the 10-year period tracked.

Despite the immediate reduction in commuting, and the resulting decline in demand for fuel, stemming from the stay-at-home order, global macroeconomic factors influencing gas prices make it difficult to pinpoint the impacts of the pandemic on gas prices.

FIGURE 17. AVERAGE MONTHLY GASOLINE (UNLEADED REGULAR) PRICES PER GALLON: GREATER LOS ANGELES METRO AND UNITED STATES, 2011- AUGUST 2020

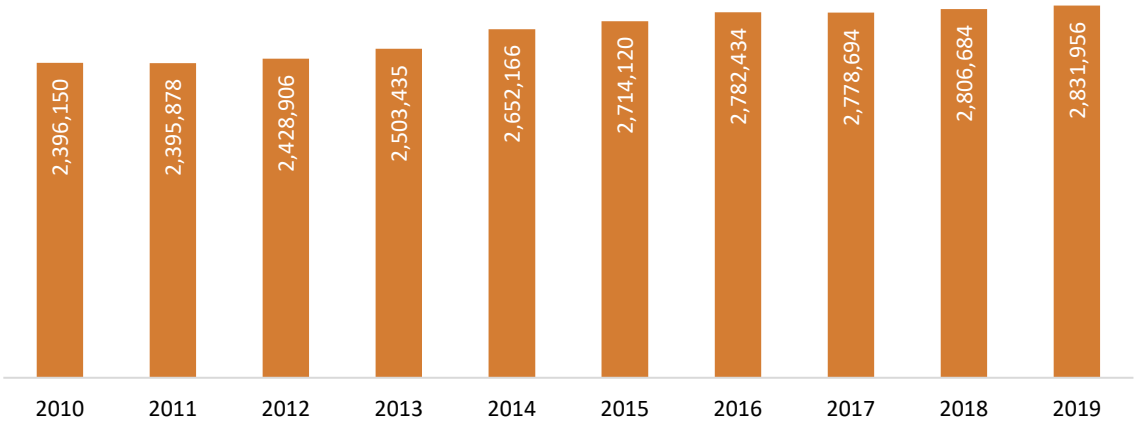


Source: U.S. Bureau of Labor Statistics, Consumer Price Index (https://www.bls.gov/data/#prices)

VEHICLE REGISTRATIONS

In the 10-year period between 2010 and 2019, the number of vehicles (autos, trucks, and motorcycles) registered annually in Orange County grew 18 percent, with the majority of that growth taking place between 2013 and 2016 and leveling off after that. Vehicle registration growth in Orange County was similar to the statewide 10-year growth rate of 16 percent. As of 2019, there were 2,831,956 vehicles registered in Orange County, which is approximately 436,000 registrations more than the 10-year low of 2,395,878 in 2011.

FIGURE 18. ANNUAL VEHICLE REGISTRATIONS: ORANGE COUNTY, 2010-2019



Source: California Department of Motor Vehicles, Forecasting Unit (www.dmv.ca.gov/portal/dmv/detail/pubs/media_center/statistics)

During  Early Late	The pandemic is having competing effects on vehicle purchases, with the net effect likely to cancel out any large impact over the long term. The pandemic and resulting economic slowdown had an immediate chilling impact on auto production and purchases, but new car sales were rebounding in late 2020 as workers who are returning to the office shun public transit and ridesharing in favor of a socially distant way to commute (driving alone).

INTERCOUNTY COMMUTING PATTERNS

This indicator measures commuting patterns of Orange County and neighboring county residents. Specifically, the indicator shows the number of people with jobs who live and work in Orange County, as well as those who live in Orange County, but travel out of the county for work (outflow). It also shows the number of people with jobs who live outside of Orange County, but travel to Orange County to work (inflow).

Trend

Most Orange County residents live and work within Orange County. In 2017, there were 944,394 workers living and working in Orange County. Another 518,851 workers live in Orange County but work in a neighboring county, and 711,470 workers are employed in Orange County but live outside of the county.

More people come to Orange County for work than go out. The net flow, defined as the number of people coming in to Orange County for work minus the number of people going out of Orange County for work, was 192,619. There has been a steady increase since 2009 in the net number of people coming to Orange County for work.

Most of the outflow and inflow occurs with Los Angeles County (22 percent and 21 percent, respectively, of all commuters).

FIGURE 19. NET COMMUTER INFLOW: ORANGE COUNTY, 2008- 2017

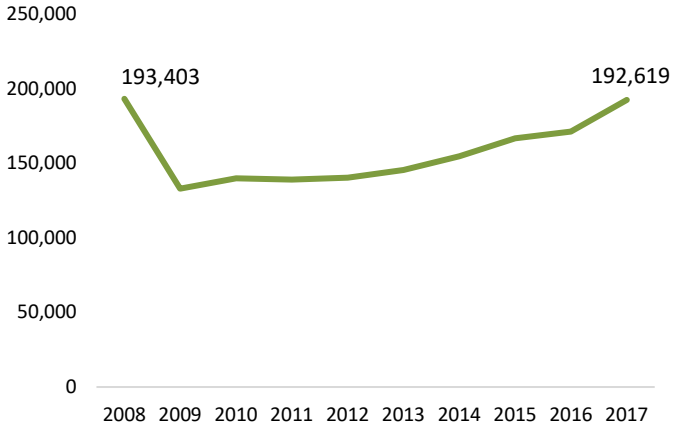


FIGURE 20. INTERCOUNTY COMMUTING PATTERNS: COUNTY COMPARISON, 2017

County	Outflow: Live in OC and Work in…		Inflow: Work in OC and Live in…	
	#	%	#	%
Orange	944,394	65%	944,394	57%
Los Angeles	321,536	22%	346,149	21%
Riverside	42,093	3%	113,591	7%
San Bernardino	41,536	3%	79,394	5%
San Diego	40,737	3%	66,547	4%
All Other	72,949	5%	105,789	6%
Total	**1,463,245**		**1,655,864**	

Source: U.S. Census Bureau, OnTheMap Application and LEHD Origin-Destination Employment Statistics (Beginning of Quarter Employment, 2nd Quarter of 2002-2017).

During

Early

Late

The shut down due to the coronavirus pandemic brought rapid job losses and, for those who could, a transition to working from home, which led to less commuting within and across county lines. As the economy opens up and jobs return, it is anticipated that there will be a gradual increase in inflow and outflow over time. However, patterns are likely to be somewhat different from the baseline / pre-pandemic period, if work from home persists for a proportion of the workforce.

FIGURE 21. INTERCOUNTY COMMUTING PATTERNS: COUNTY COMPARISON, 2017

U.S. Census Bureau, OnTheMap Application and LEHD Origin-Destination Employment Statistics (Beginning of Quarter Employment, 2nd Quarter of 2002-2017).

WORK TRIP MODE SPLIT

This indicator measures the mode of transportation workers age 16 and over use to get to work in Orange County compared to the state and nation and over the past 10 years. Data are also provided by city for the cities with the five highest and lowest proportions per mode.

Trend

Prior to the coronavirus pandemic, the percentage of commuters driving alone to work in a car, truck, or van had not changed appreciably in Orange County between 2009 and 2018, averaging 78 percent of commuters over this 10-year period, and resting at 78.2 percent in 2018. Commuting by carpool also has not changed significantly over 10 years, accounting for 9.8 percent of commuters in 2018. After these two most popular modes of travel, working at home is the third most common option for workers. Working at home has increased markedly from 4.9 percent of commuters in 2009 to 6.7 percent in 2018.

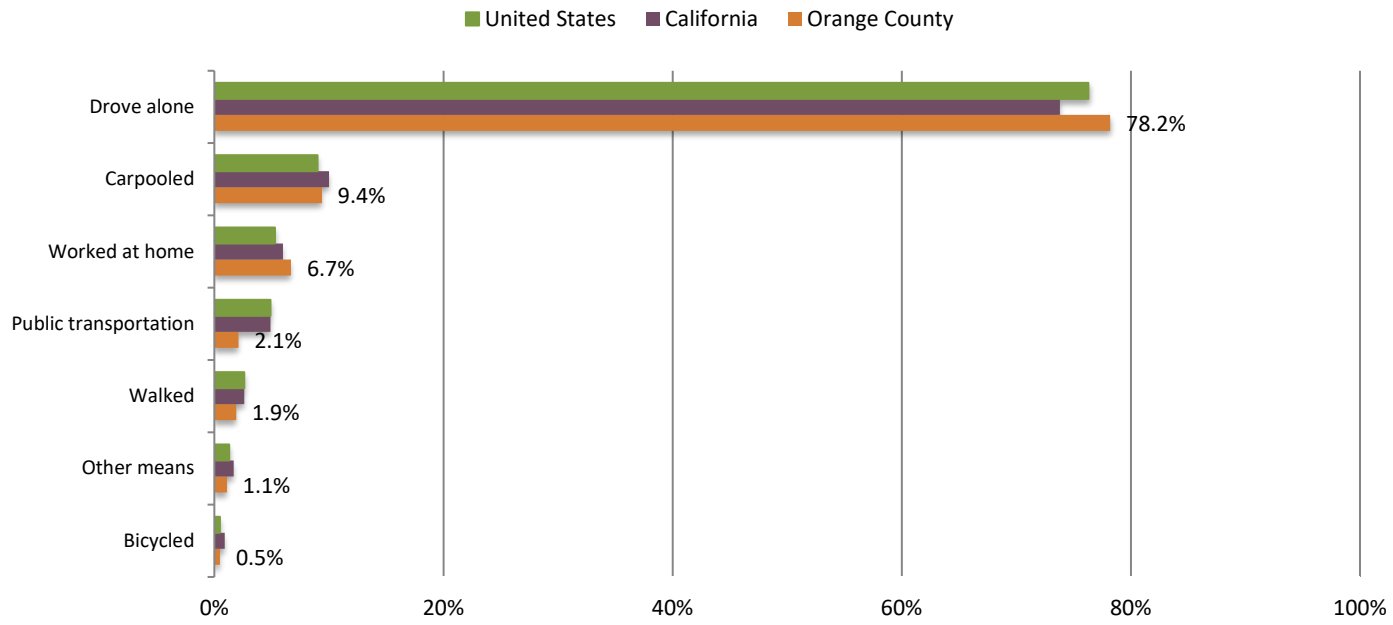
Commuting by public transit, the fourth most common mode, has declined in recent years, from a 10-year high of 3 percent of commuters in 2012 to the current (2018) level of 2.1 percent. Walking has remained relatively stable, with a 10-year average of 1.9 percent of commuters walking to work, ranging between 1.7 percent (in 2010 and 2016) and 2.2 percent (in 2009 and 2011).

The proportion of residents who bicycle to work has declined in recent years, from 1.1 percent of commuters in 2009 to only 0.5 percent 10 years later in 2018. Other means of commuting to work, such as by taxi or motorcycle, fluctuates slightly from year-to-year, falling at 1.1 percent of commuters in 2018.

Among cities, the proportion of workers driving alone ranges from 85 percent of all commuters in the unincorporated community of Rossmoor to 71 percent in Laguna Woods. Carpooling is most popular in the unincorporated community of Midway City (16 percent) and least popular in Laguna Woods (1 percent). Santa Ana residents are most likely to use public transit to go to work (5 percent) and more Irvine residents walk to work (4 percent) than the rest of the county. Laguna Woods residents have the highest rate of working at home (18 percent) while residents of Stanton have the lowest rate of working at home (1.5 percent).

During  Early  Late	Of all impacts of the coronavirus pandemic on mobility patterns, mode split has arguably undergone one of the sharpest changes. Due to stay-at-home orders, at its height, some estimates suggested that half of Orange County commuters were working from home compared to the pre-pandemic baseline. While most workers are likely to return to the office in some capacity after the pandemic resolves, experts predict, and survey data support, that the pandemic will contribute to higher rates of working from home compared to the pre-pandemic baseline.

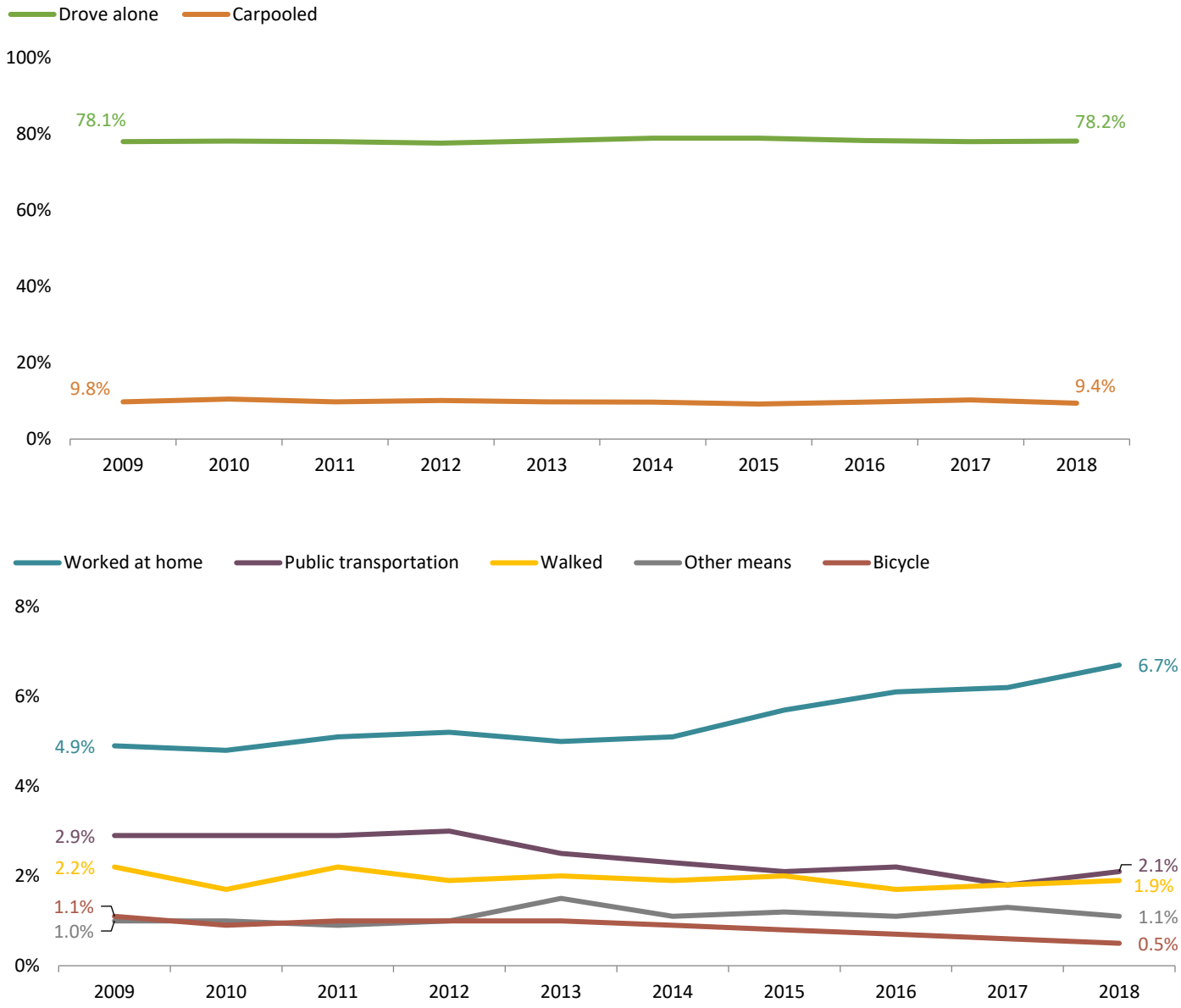
FIGURE 22. MODE OF TRAVEL TO WORK: ORANGE COUNTY, CALIFORNIA AND UNITED STATES, 2018



Note: Data reflect commute modes for workers age 16 and over. "Drove alone" and "Carpooled" include commuters using a car, truck, or van. "Other means" includes taxi, motorcycle, or other means of travel.

Source: U.S. Census Bureau, American Community Survey, 1-Year Estimates, S0801

FIGURE 23. MODE OF TRAVEL TO WORK: ORANGE COUNTY, 2009-2018

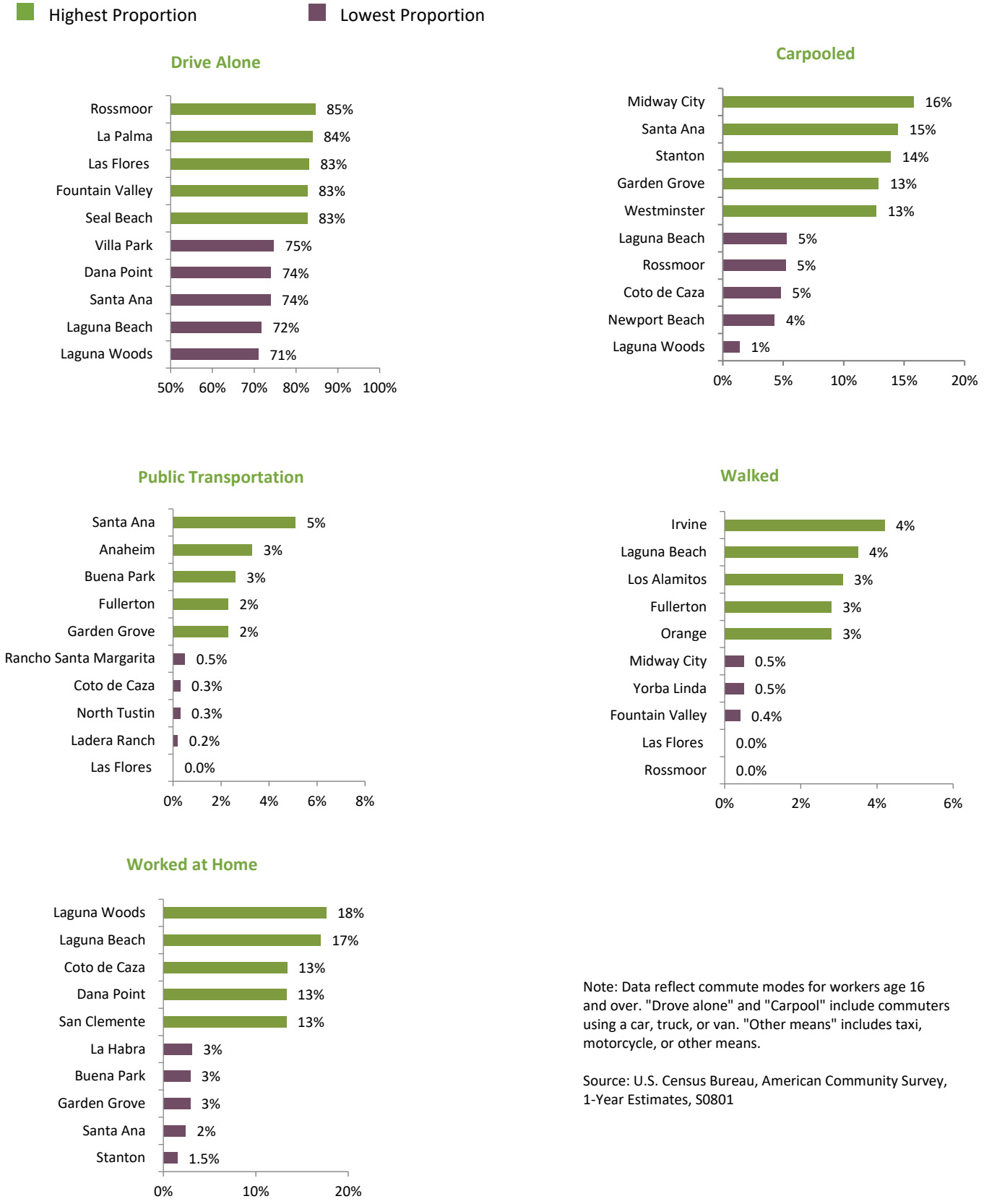


Note: Data reflect commute modes for workers age 16 and over. "Drove alone" and "Carpool" include commuters using a car, truck, or van. "Other means" includes taxi, motorcycle, or other means of travel.

Source: U.S. Census Bureau, American Community Survey, 1-Year Estimates, S0801

FIGURE 24. SELECTED MODES OF TRAVEL TO WORK BY CITY (FIVE HIGHEST AND LOWEST PROPORTIONS PER MODE):

ORANGE COUNTY CITIES AND MAJOR UNINCORPORATED AREAS, 2018



Note: Data reflect commute modes for workers age 16 and over. "Drove alone" and "Carpool" include commuters using a car, truck, or van. "Other means" includes taxi, motorcycle, or other means.

Source: U.S. Census Bureau, American Community Survey, 1-Year Estimates, S0801

HIGHWAYS AND ARTERIALS

Vehicle Miles Traveled

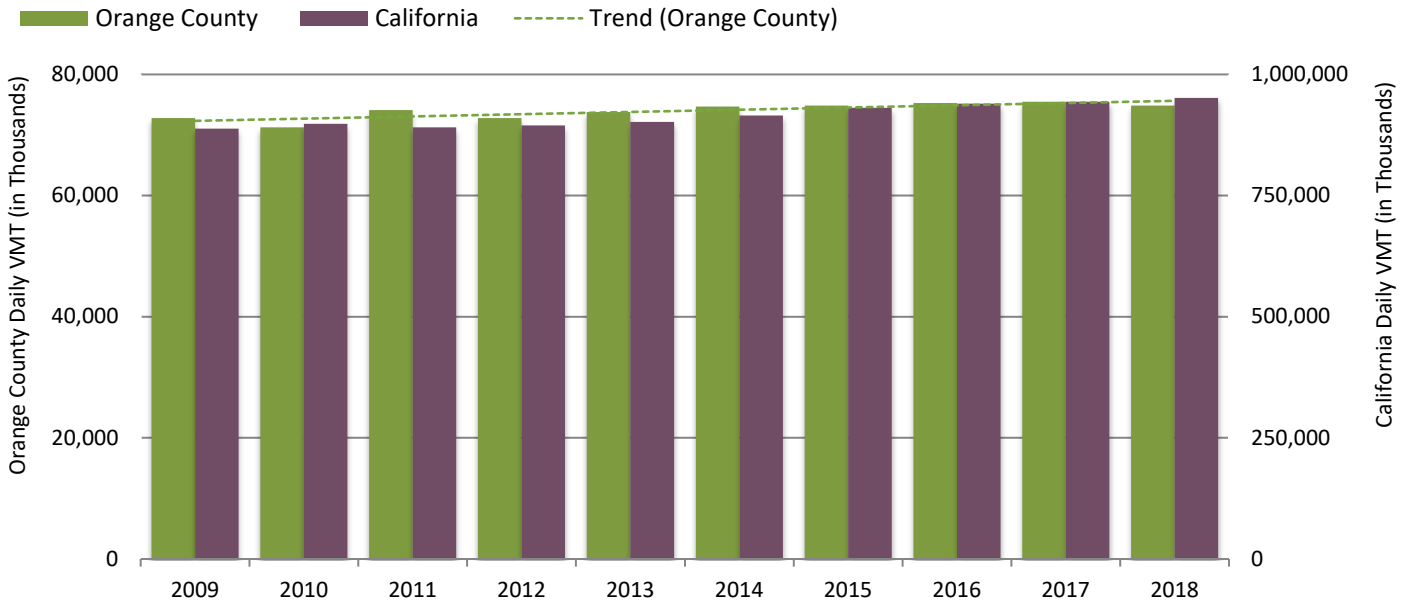
This indicator measures Vehicle Miles Traveled (VMT) in total and per capita on public roadways in Orange County and California overall. It also presents VMT data broken out by arterials/local roads and state highways. VMT is the amount of daily traffic on all lanes of roadways in a given geographical area. The average annual daily VMT is divided by the annual population estimate to arrive at the average daily number of miles traveled per person.

Trend

Prior to the pandemic, daily VMT in Orange County was gradually increasing. In the 10-year period between 2009 and 2018 VMT rose 6 percent, from 73 million to 75 million daily VMT. However, on a per capita basis during this period, VMT decreased 3 percent, from 24.4 to 23.6 daily VMT per person. Statewide, per capita VMT was unchanged over this 10-year period.

VMT for arterials and local roads has increased in the 10 years between 2009 and 2018, rising 7 percent. Meanwhile, VMT on state highways has decreased slightly, falling 1 percent.

FIGURE 25. DAILY VEHICLE MILES TRAVELED (IN THOUSANDS): ORANGE COUNTY AND CALIFORNIA, 2009-2018



Source: California Department of Transportation (Caltrans), Highway Performance Monitoring System, California Public Road Data, Table 6: Maintained Mileage & Daily Vehicle Miles of Travel Estimates by Jurisdiction (http://www.dot.ca.gov/hq/tsip/hpms/datalibrary.php)

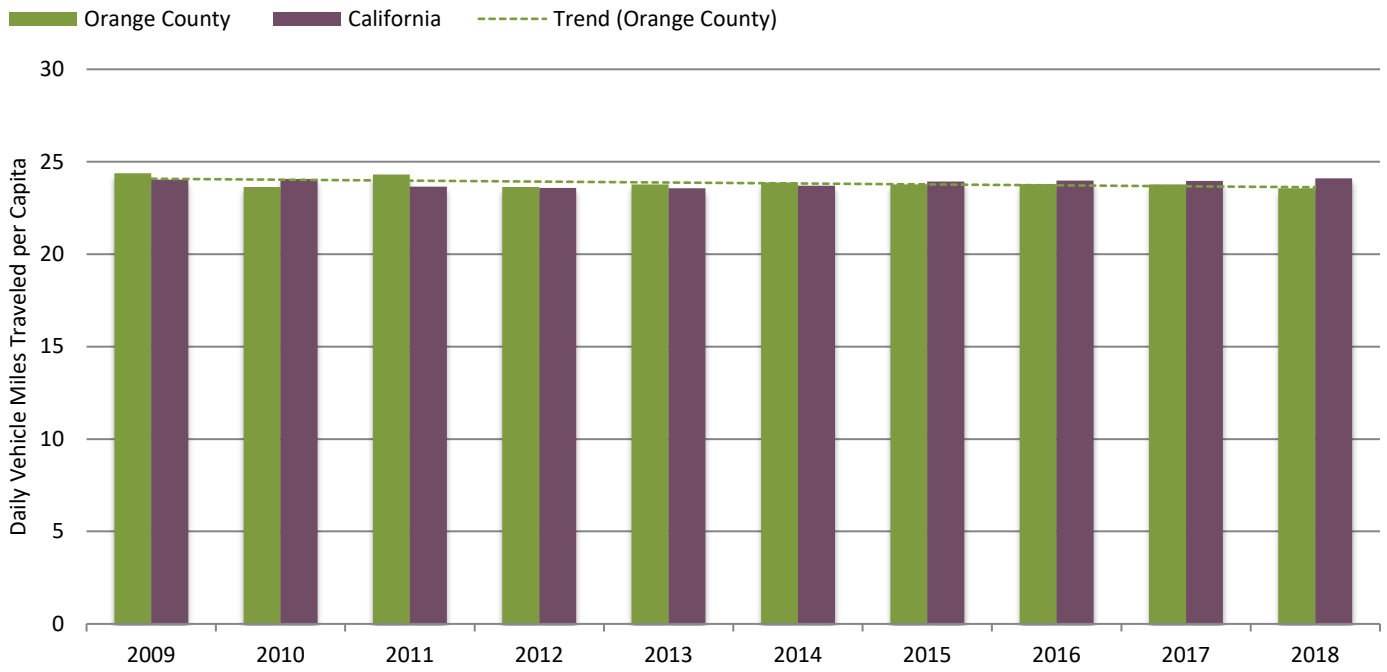
During

Early

Late

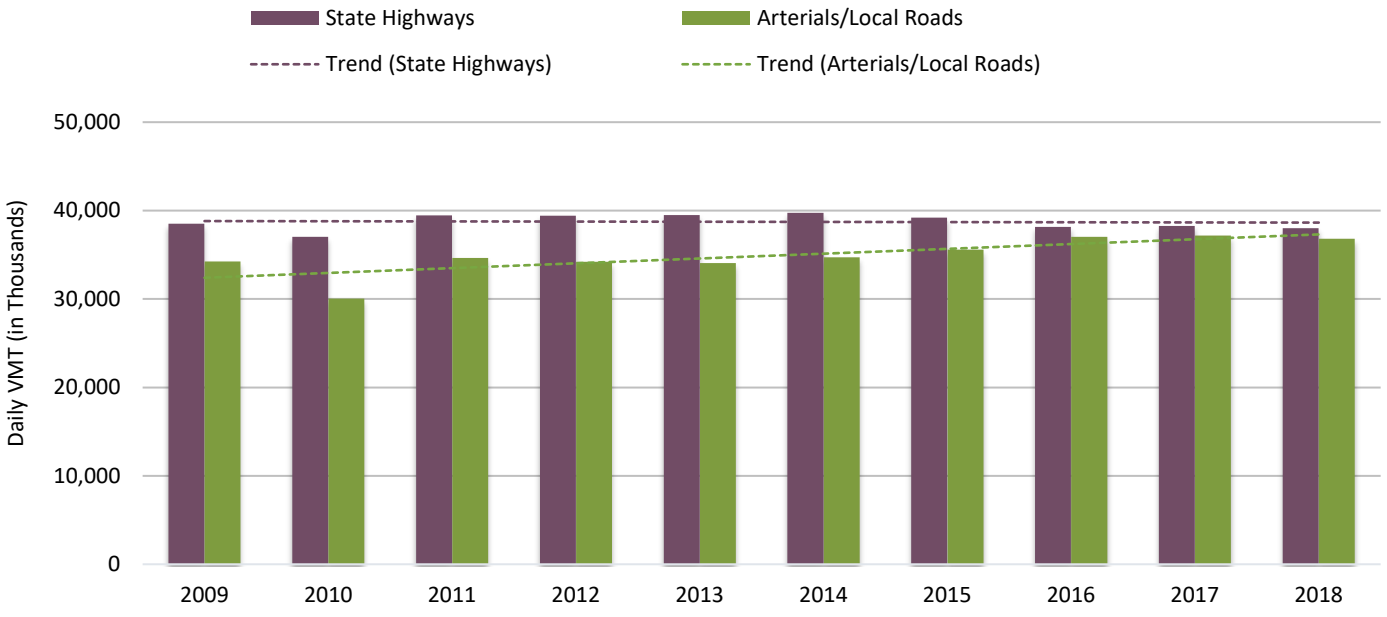
The immediate impact with stay-at-home orders was a substantial decline in VMT due to reduced commuting, but VMT began to rebound after April 2020. The question remains whether VMT will remain lower than the pre-pandemic baseline. Behaviors that may contribute to rising VMT include more people driving alone, less use of public transportation, and more reliance on goods and meal delivery. Behaviors that may contribute to declining VMT include ongoing working from home, sluggish economic activity, reduced ride hailing service use, reduced dining out, and increased bicycle use. Transportation policies or investments can also influence behaviors and, therefore, VMT.

FIGURE 26. DAILY VEHICLE MILES TRAVELED PER CAPITA: ORANGE COUNTY AND CALIFORNIA, 2009-2018



Source: California Department of Transportation (Caltrans), Highway Performance Monitoring System, California Public Road Data, Table 6: Maintained Mileage & Daily Vehicle Miles of Travel Estimates by Jurisdiction (http://www.dot.ca.gov/hq/tsip/hpms/datalibrary.php), U.S. Census Bureau, Population Estimates Program (http://www.census.gov/popest/)

FIGURE 27. DAILY VEHICLE MILES TRAVELED (IN THOUSANDS) ON ARTERIALS/LOCAL ROADS AND STATE HIGHWAYS: ORANGE COUNTY, 2009-2018



Source: California Department of Transportation (Caltrans), Highway Performance Monitoring System, California Public Road Data, Table 6: Maintained Mileage & Daily Vehicle Miles of Travel Estimates by Jurisdiction (http://www.dot.ca.gov/hq/tsip/hpms/datalibrary.php)

HOV Infrastructure

This indicator measures the growth in High Occupancy Vehicle (HOV) facilities in the Southern California regional network, which includes Los Angeles, Ventura, San Bernardino, Riverside, Orange, San Diego and Imperial counties. Measures include the number of HOV lane miles that are open, under construction or proposed in the greater Southern California region, and the proportion of Orange County freeway miles that have HOV (High-Occupancy Vehicle) lanes.

Trend

Nearly all (97.6 percent) of Orange County freeway miles have an HOV lane. This is an increase since 2014, when 90.3 percent of Orange County freeway miles had an HOV lane. Looking at all freeway lane miles, 19.6 percent of all lane miles are HOV lanes either for the entire day or part of the day. In spite of the addition of new HOV lanes since 2014, the addition of new general purpose lane miles resulted in little change in the proportion of all lane miles that are HOV lanes.

Orange County is at the center of a regional freeway network with an extensive HOV system that grew in recent years thanks to ongoing public support for Measure M. As of October 2020, in the Southern California region, there were nearly 1,000 lane miles of open HOV lanes and nearly another 1,000 lane miles under construction or proposed. Orange County's contribution to this regional network is 27 percent of the open HOV lane miles.

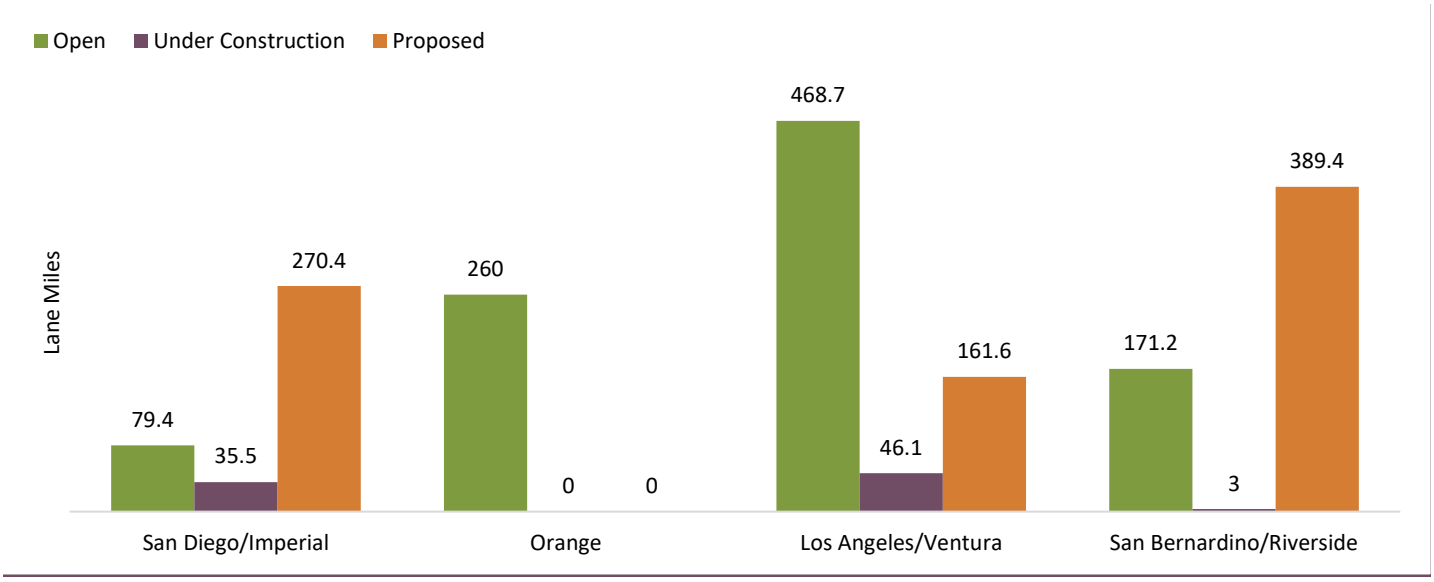
FIGURE 28. HOV/EXPRESS LANES IN ORANGE COUNTY: OCTOBER 2014, 2017 AND 2020

	2014	2017	2020
Proportion of Orange County Freeways that have an HOV lane	90.3%	92.7%	97.6%
Proportion of Orange County Freeway Lane Miles that are HOV Lanes (either 24-hours or part of the day)	19.1%	19.6%	19.6%

Note: Mileage counts include both directions (counted separately) for the Orange County portions of the following freeways: I5, I405, I605, SR1, SR22, SR55, SR57, SR91, and SR133.

Source: Caltrans, Performance Measurement System (PeMS)

FIGURE 29. HOV LANE MILES OPEN, UNDER CONSTRUCTION OR PROPOSED: SCAG REGION AND SAN DIEGO, OCTOBER 2020



Source: Caltrans, Performance Measurement System (PeMS), Managed Facilities Listing, accessed October 6, 2020.

BUS: FIXED ROUTE SERVICE

Ridership

This indicator measures ridership on OCTA's bus transit system, including the number of unlinked trips (total number of boardings on an individual vehicle).

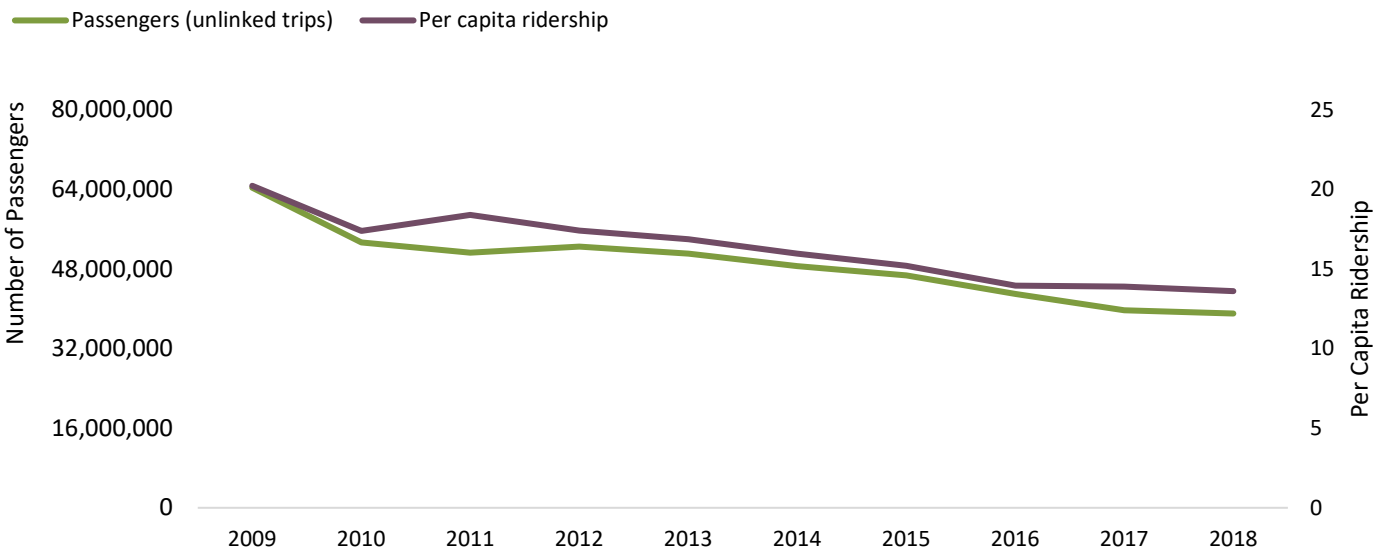
During | Early | Late

Over the past decade, there has been a steady decline in bus ridership. However, the stay-at-home orders and immediate loss of jobs caused by the coronavirus pandemic has exacerbated a decline in ridership. It is anticipated that with time, bus ridership will rebound as the job market improves. However, whether ridership returns to or exceeds pre-pandemic levels is dependent on many factors, including transit policy, funding and quality as well as rider preferences—making long-term projections difficult.

Trend

In FY 2018, there were 39,055,987 boardings on OCTA buses — a decrease of 39 percent from 2009 when 64,353,673 passengers boarded OCTA buses. There was a decrease of 33 percent in per capita ridership during the same period — from 20.23 passengers per capita in 2009 to 13.61 in 2018. In addition, passengers are riding buses for shorter trips, with a 24 percent decrease since 2009 in the average distance traveled by bus passengers. In 2018, the number of passengers per vehicle revenue mile was 2.082, down from 2.727 in 2009.[14]

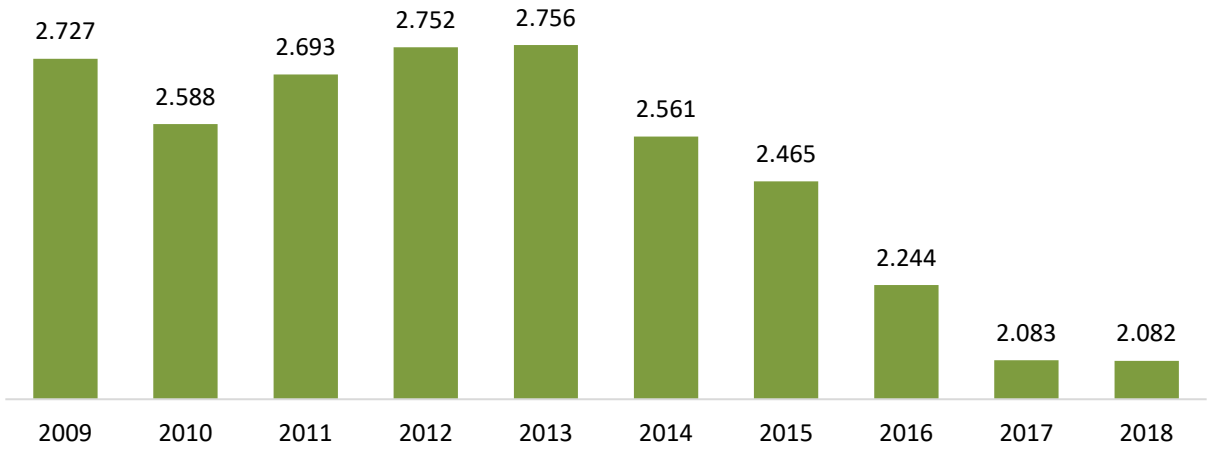
FIGURE 30. BUS TRANSIT RIDERSHIP: ORANGE COUNTY, 2009-2018



Source: National Transit Database (https://www.transit.dot.gov/ntd/transit-profiles-summary-reports)

[14] Vehicle Revenue Miles is defined as the number of miles traveled while in revenue service.

FIGURE 31. NUMBER OF PASSENGERS PER VEHICLE REVENUE MILE: ORANGE COUNTY BUSES, 2009-2018



Source: National Transit Database (https://www.transit.dot.gov/ntd/transit-profiles-summary-reports)

Costs

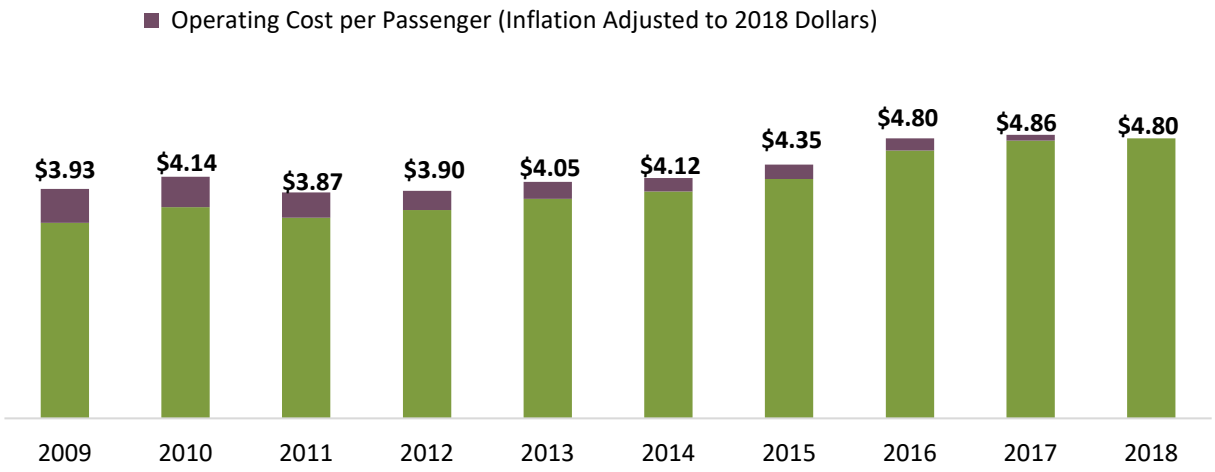
This indicator measures operating costs of OCTA's bus transit system.

Trend

In 2018, average operating cost per passenger was $4.80. This represents a 22 percent increase since 2009, when operating costs averaged $3.93 per passenger, when adjusted for inflation.

Unknown impacts

FIGURE 32. OPERATING COST PER PASSENGER (NOMINAL AND ADJUSTED DOLLARS): ORANGE COUNTY, 2009-2018



Note: Dollars adjusted using Consumer Price Index Inflation Calculator: https://data.bls.gov/cgi-bin/cpicalc.pl
Source: National Transit Database (https://www.transit.dot.gov/ntd/transit-profiles-summary-reports)

BUS: HIGH-QUALITY TRANSIT CORRIDORS

Infrastructure and Usage

This indicator tracks the infrastructure and usage of high-quality transit corridors (HQTC). HQTC are defined as routes with 15 minutes or better weekday peak hour headways.[15] Also measured is the percentage of the Orange County population living within one-half mile of HQTC (as the crow flies).

No anticipated impacts

Trend

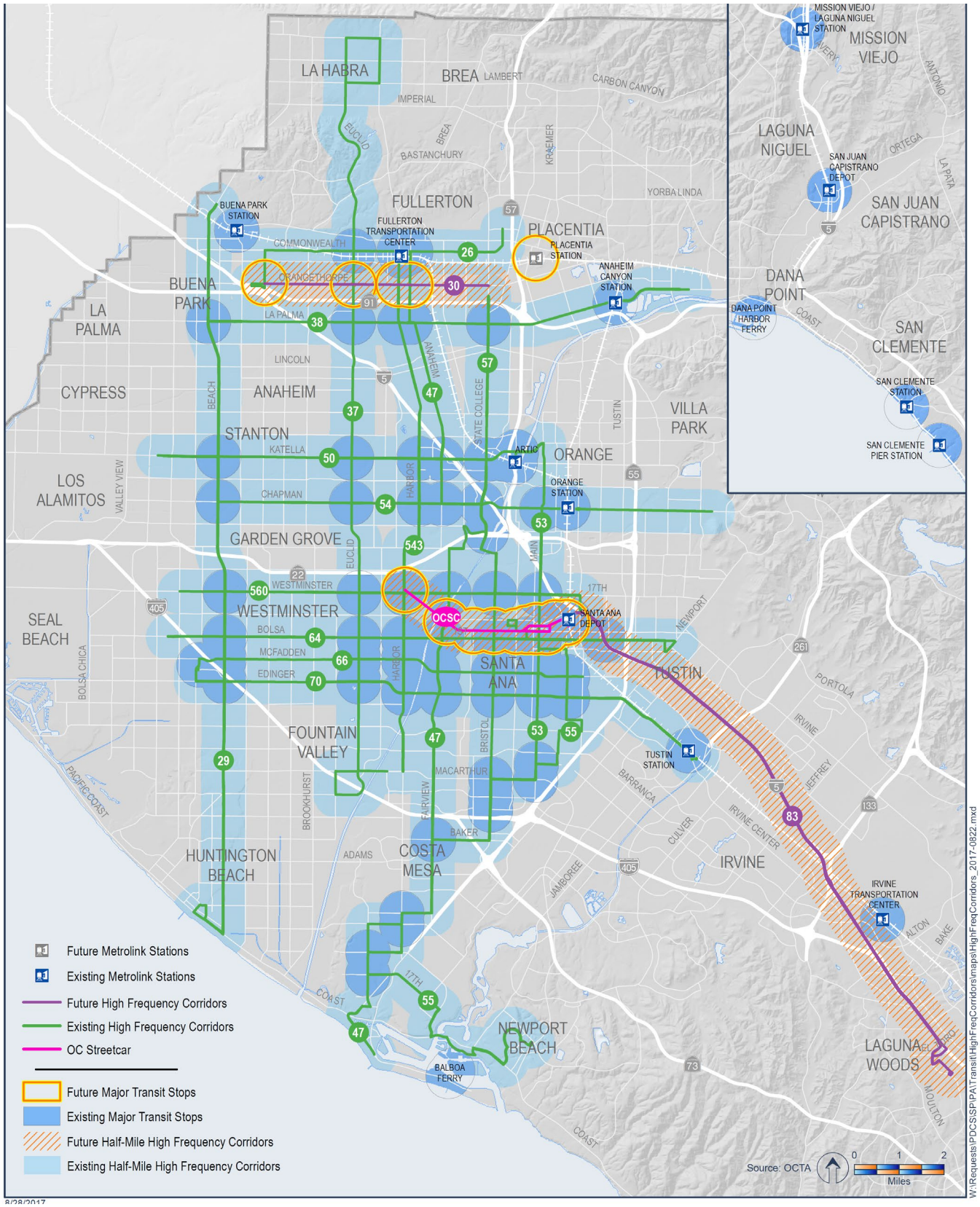
In 2020, 16 percent of the bus system miles in Orange County were HQTC miles, down from 2017 when 21 percent of the bus system miles were HQTC miles, but higher than 2014 when 12 percent were HQTC miles. This is equivalent to 334 HQTC directional route miles out of 2,21 total system-wide directional route miles. About half (48 percent) of the passenger boardings (18,253,149 boardings) were on buses serving HQTCs, a decrease from 2017 when 59 percent of the boardings were on buses serving HQTCs.[16]

Currently, 40 percent of Orange County's population lives within one-half mile of access to a HQTC. Another 6 percent live within one-half mile of future planned HQTCs. This is an increase from 2017, when the percentage of the population living within one-half mile of current and planned access to a HQTC was 39 percent and 2 percent, respectively.

[15] Headway is a measurement of the time between vehicles in a transit system.

[16] Due to limitation of data, it is not possible to tabulate HQTC at a stop level. Rather, boardings are for each entire route and not by segment of each route that qualifies as a HQTC.

FIGURE 33. HIGH-FREQUENCY CORRIDORS AND MAJOR TRANSIT STOPS



BUS: DEMAND RESPONSE SERVICE

Ridership

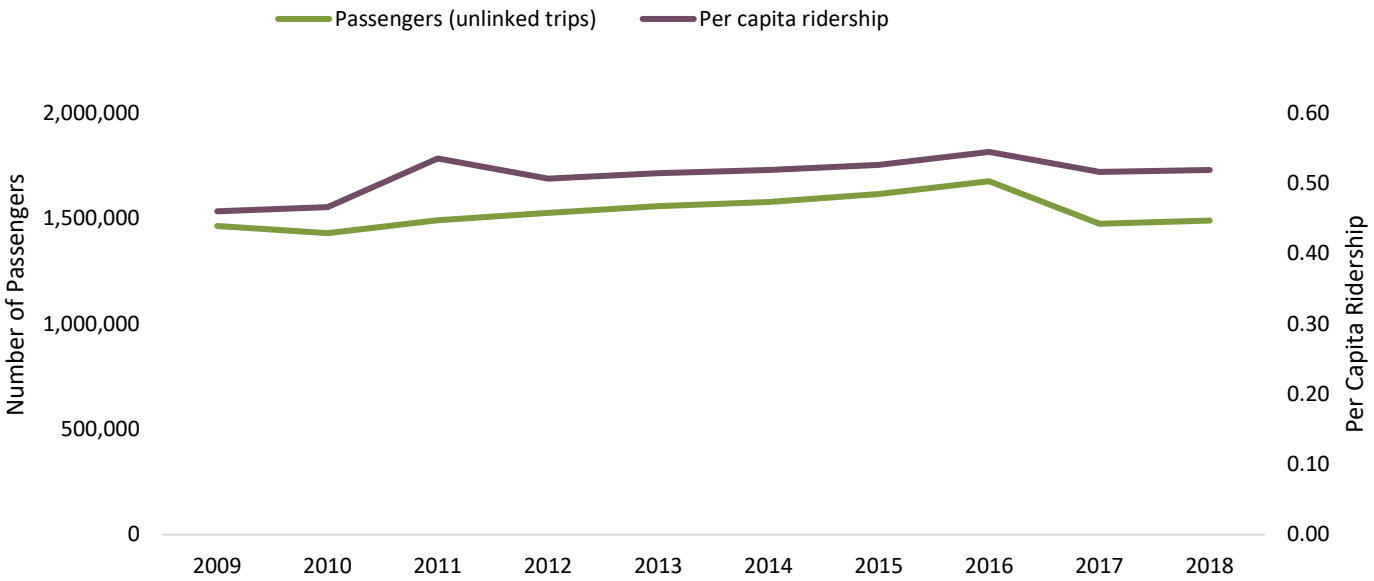
This indicator measures ridership on OCTA's ACCESS program as well as average trip length (number of ACCESS miles divided by the number of boardings). ACCESS eligibility is determined by three factors: an individual's ability to get to/from the bus stop; an individual's ability to board/exit the bus; and an individual's cognitive ability to navigate the regular bus system.

Unknown impacts

Trend

In FY 2018, there were 1,490,193 boardings on ACCESS service — an increase of 2 percent from 2009 when 1,464,730 passengers boarded ACCESS buses.[17] During this same period, there was also a 13 percent increase in the per capita ridership rate — from 0.46 passengers per capita in 2009 to 0.52 in 2018. The average trip length on ACCESS increased from 10.13 miles in 2009 to 11.12 in 2018.[18]

FIGURE 34. ACCESS RIDERSHIP: ORANGE COUNTY, 2009-2018



Source: National Transit Database (https://www.transit.dot.gov/ntd/transit-profiles-summary-reports)

[17] Data presented in this indicator do not include same day taxi service.

[18] Average Trip Length is calculated by number of annual passenger miles divided by number of passengers (unlinked trips)

FIGURE 35. AVERAGE TRIP LENGTH FOR ACCESS (IN MILES): ORANGE COUNTY ACCESS, 2009-2018

Source: National Transit Database (https://www.transit.dot.gov/ntd/transit-profiles-summary-reports)

Costs

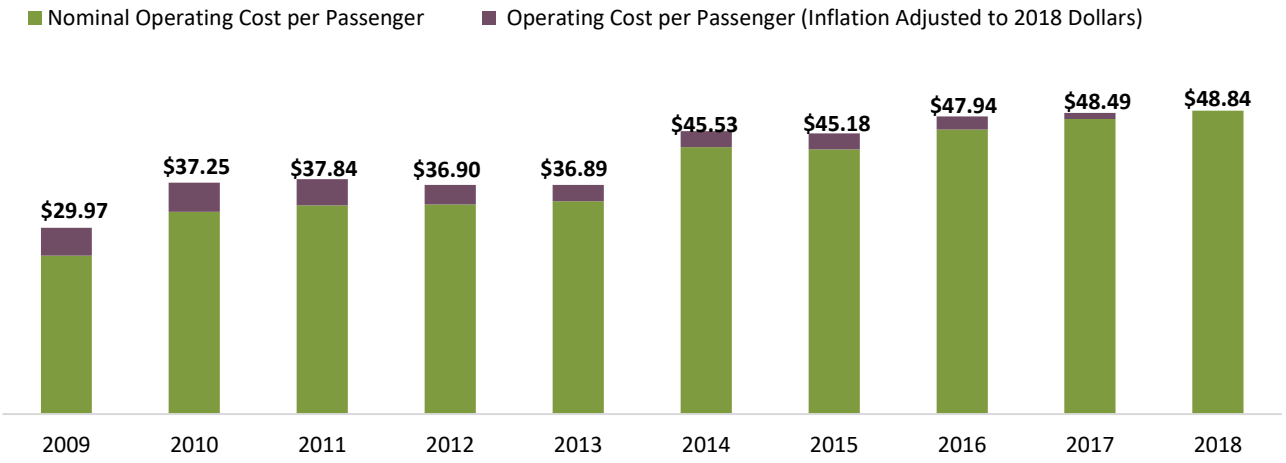
This indicator measures operating costs of OCTA's ACCESS program.

Unknown impacts

Trend

When adjusting for inflation, the operating cost per ACCESS passenger has increased 63 percent since 2009 when costs averaged $29.97 per passenger. In 2018, the average cost per passenger was $48.84.[19]

FIGURE 36. OPERATING COST PER PASSENGER (NOMINAL AND ADJUSTED DOLLARS): ORANGE COUNTY ACCESS, 2009-2018



Note: Dollars adjusted using Consumer Price Index Inflation Calculator (https://data.bls.gov/cgi-bin/cpicalc.pl)
Source: National Transit Database (https://www.transit.dot.gov/ntd/transit-profiles-summary-reports)

[19] Data presented in this indicator do not include same day taxi service.

RAIL

Ridership

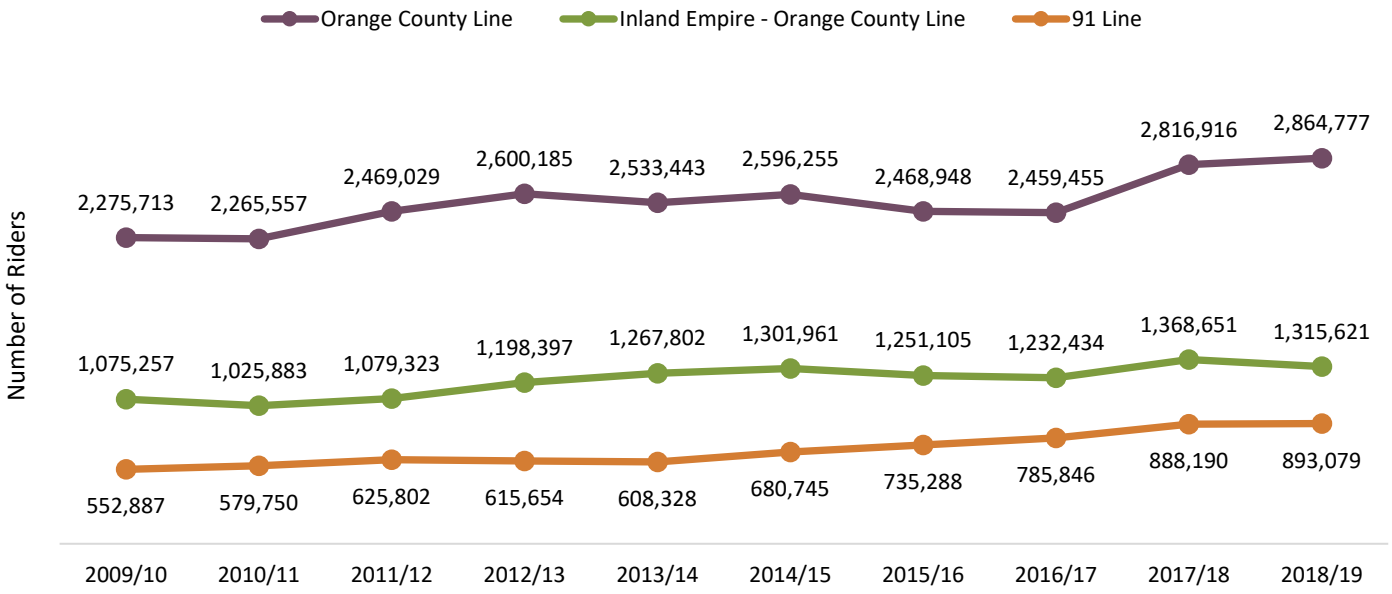
This indicator measures ridership on commuter rail lines serving Orange County, including the Orange County line, Inland Empire-Orange County line, and the 91 line. Information about the number of trains is also included.

Trend

Since 2010, overall ridership on the rail lines serving Orange County increased by 30 percent. All three commuter lines saw an increase in ridership between 2010 and 2019.

There has also been an increase in the number of trains serving Orange County. In 2020, there were 70 trains serving the county (54 trains on weekdays and 16 trains on weekends). This represents a 46 percent increase from 2011, when there were 48 trains serving the county (42 weekday trains and 6 weekend trains). At 35 weekday and weekend trains, the Orange County Line has the most trains serving the county.

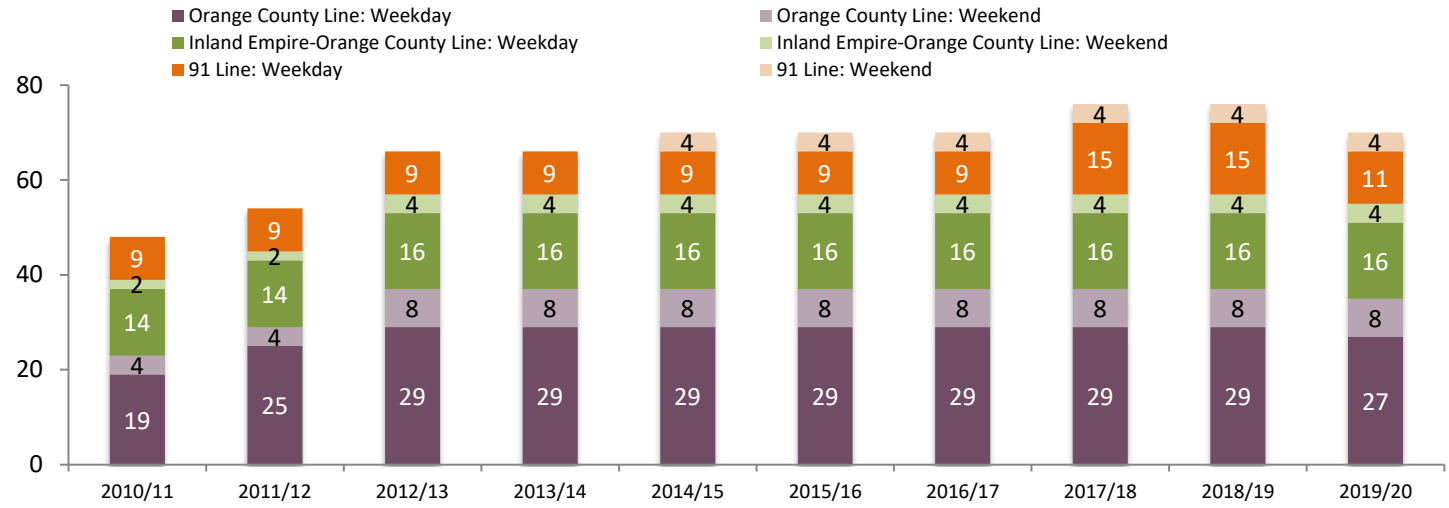
FIGURE 37. COMMUTER RAIL RIDERSHIP: ORANGE COUNTY LINE, INLAND EMPIRE-ORANGE COUNTY LINE, AND 91 LINE, 2010-2019



Sources: Southern California Regional Rail Authority, Orange County Transportation Authority

During Early Late	The number of people riding the train has steadily increased over the past ten years. However, with coronavirus pandemic closures, there was an immediate decline in rail ridership. With time and as the economy rebounds, ridership can expect to increase. However, rail riders tend to have higher incomes than other transit riders, which may mean they have jobs that are more conducive to working from home. As working from home continues post-pandemic, ridership may not reach pre-pandemic levels in the late-post pandemic period.

FIGURE 38. NUMBER OF TRAINS, BY LINE: ORANGE COUNTY LINE, INLAND EMPIRE-ORANGE COUNTY LINE, AND 91 LINE, 2011-2020



Source: Southern California Regional Rail Authority

Costs

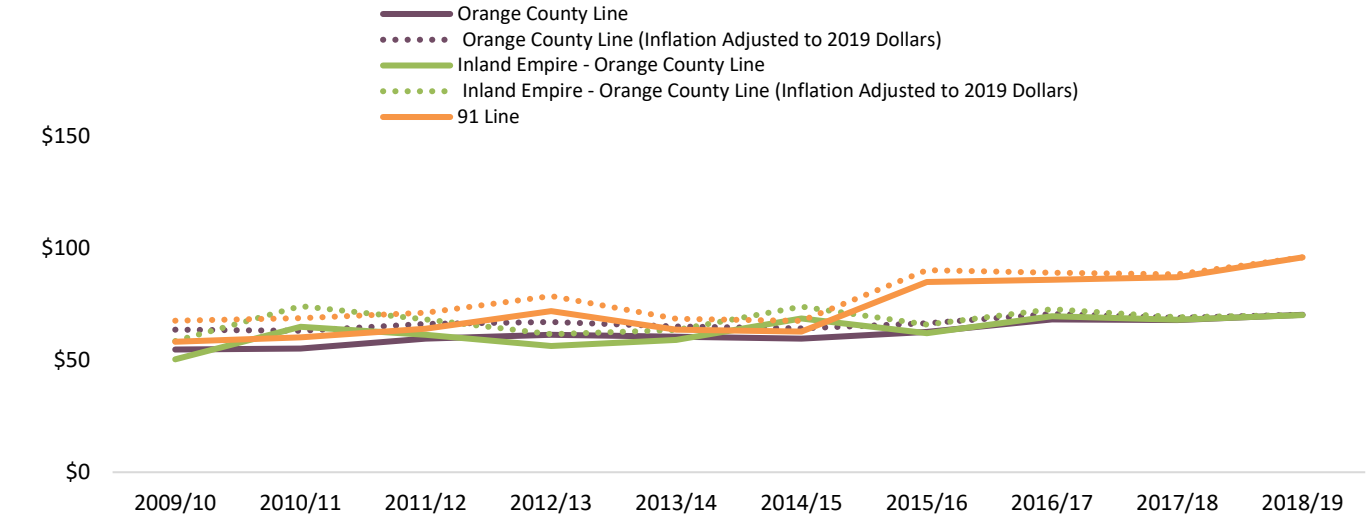
This indicator measures operating costs per train mile on commuter rail lines serving Orange County, including the Orange County line, Inland Empire-Orange County line, and the 91 lines.

Unknown impacts

Trend

All three commuter rail lines have seen an increase in operating costs per train mile when adjusting for inflation. During the past 10 years, the Orange County line had a 10 percent increase in operating costs per train mile, the Inland Empire-Orange County line saw a 20 percent increase, and the 91 line saw a 42 percent increase. The sharp increase in costs for the 91 Line in 2015/16 is due to the opening of the Perris Valley extension and the revised timing of the opening.

FIGURE 39. OPERATING COST PER TRAIN MILE (NOMINAL AND ADJUSTED DOLLARS): ORANGE COUNTY LINE, INLAND EMPIRE-ORANGE COUNTY LINE, AND 91 LINE, 2010-2019



Note: Dollars adjusted using Consumer Price Index Inflation Calculator: https://data.bls.gov/cgi-bin/cpicalc.pl
Source: Southern California Regional Rail Authority

FIGURE 40. METROLINK TRACKS AND STATIONS: ORANGE COUNTY, 2020

ACTIVE TRANSPORTATION

Bicycle Mode Share

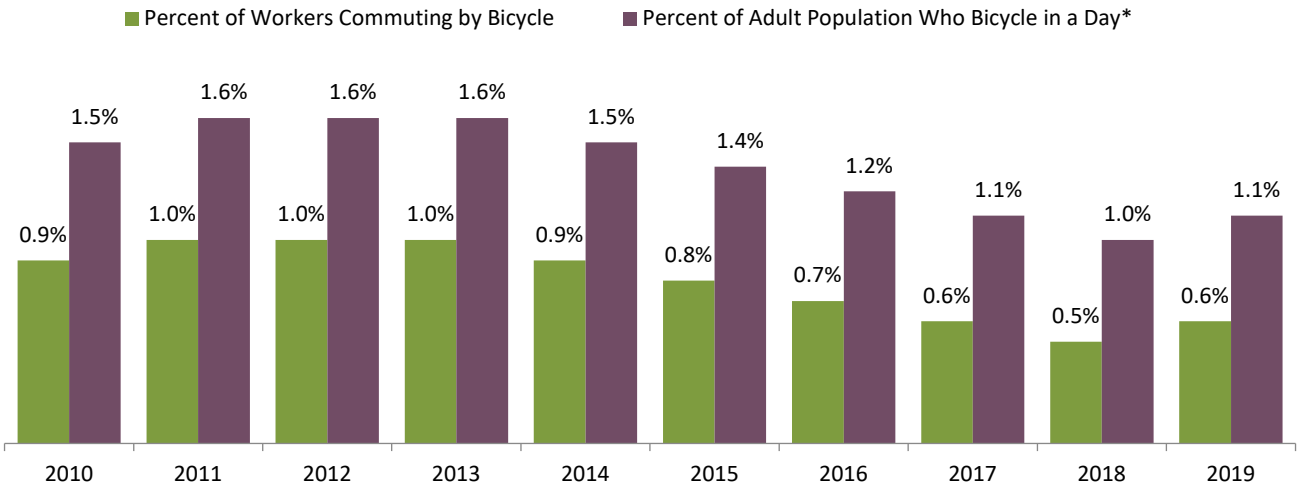
This indicator measures the change in the percentage of Orange County commuters who bicycle to work. It also presents an estimate of the percentage of adult residents who use a bicycle in a given day for either work or non-work trips. Current bicycle mode share data is also provided by city and large unincorporated area in Orange County.

Trend

Commuting by bicycle as a proportion of all other modes of commuting has been gradually declining over the past 10 years. In 2019, 0.6 percent of all commuters bicycled to get to work. This is equivalent to 9,013 bicycle commuters in Orange County, down from at 10-year high of 14,757 in 2014. The proportion and number of adults who use a bicycle in a given day (including both work and non-work trips) is estimated at 1.1 percent of all Orange County adults, or 27,843 adults, in 2019.

Levels of commuting by bicycle vary by city. The cities of Huntington Beach, Irvine, and Tustin have the largest proportion of cycling, ranging from 1.5 percent to 1.4 percent of residents commuting by bike. The cities of Rancho Santa Margarita, Laguna Woods, and Mission Viejo have the lowest proportion of bicycle commuters. Many factors contribute to these variations, including topography, proximity to job centers, land use, and availability of bicycle lanes and facilities.

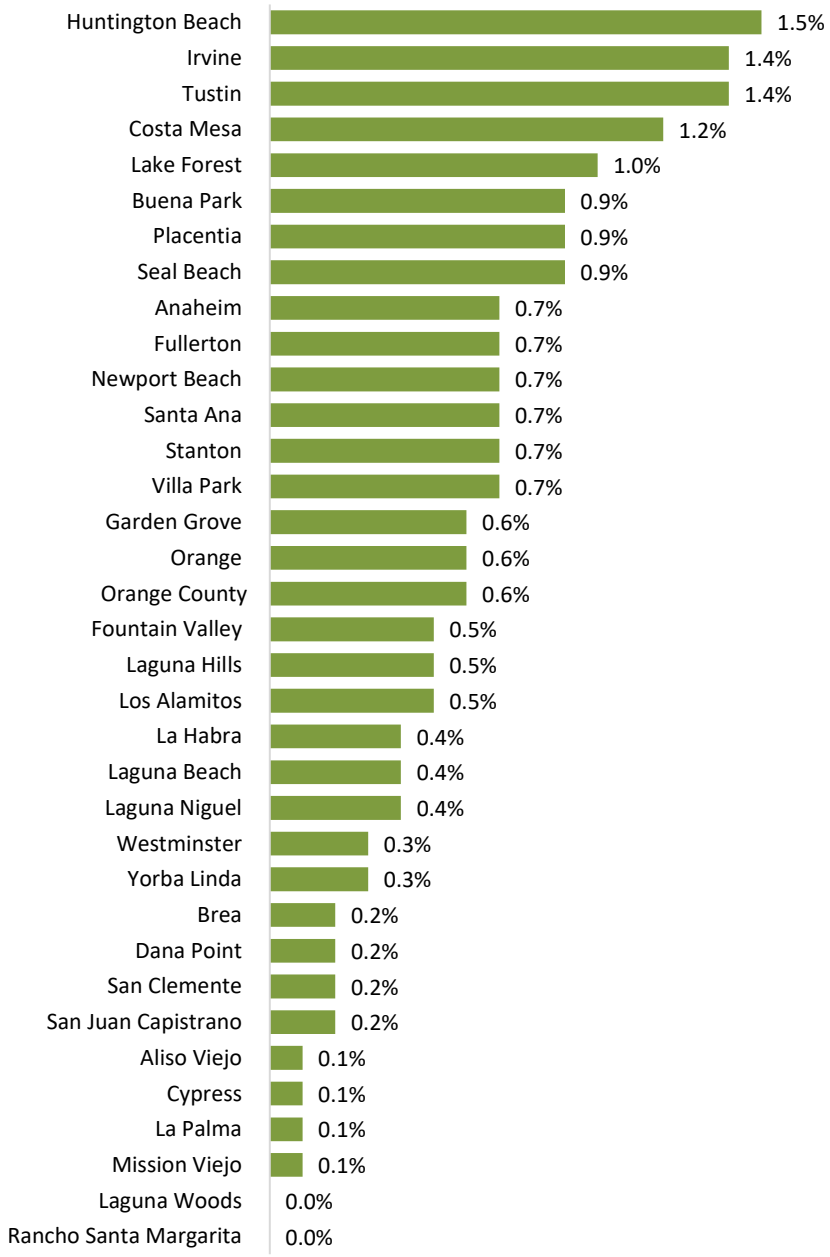
FIGURE 41. PERCENTAGE OF WORKERS COMMUTING BY BICYCLE AND PERCENTAGE OF ADULT POPULATION WHO BICYCLE IN A DAY: ORANGE COUNTY, 2010-2019



*The mode share percentage for both work and non-work trips is an estimate based on methodology presented in the Guidelines for Analysis of Investments in Bicycle Facilities (see source) and represented by the following formula: D=(0.4%)+(1.2 x C), where D represents the estimate of the percentage of the adult population who bicycle in a day and C represents the Census mode share percentage for commuting by bicycle.

Sources: U.S. Census Bureau, 2010-2019 American Community Survey, 1-Year Estimates; Transportation Research Board of the National Academies, National Cooperative Highway Research Program, Report 552: Guidelines for Analysis of Investments in Bicycle Facilities

FIGURE 42. PERCENTAGE OF WORKERS COMMUTING BY BICYCLE BY CITY: ORANGE COUNTY, 2018



Source: U.S. Census Bureau, American Community Survey 2018, 5-Year Estimates

During

Early

Late

Many regions reported higher rates of commuter and recreational cycling during the pandemic, with essential workers looking for a safe way to get to work and people looking for ways to entertain themselves and their families when other options were closed. Less auto traffic on local roads has contributed to the increase, validating a 2018 OC Active survey that indicated that auto speed and proximity was the greatest impediment to riding. As the pandemic resolves, bicycling rates are likely to return to pre-pandemic levels without efforts to retain some of the infrastructure conditions that encouraged the increase.

Pedestrian Mode Share

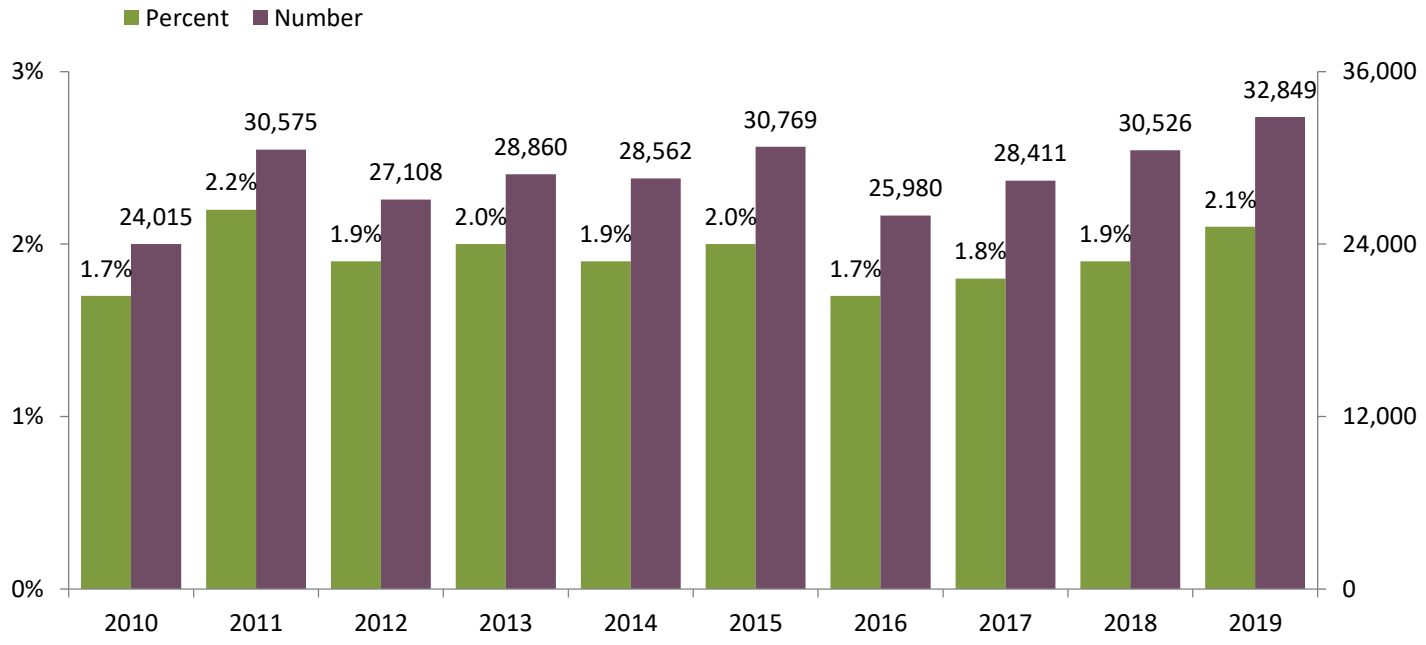
This indicator measures the change in the percentage and number of Orange County commuters who walk to work. Current pedestrian mode share data are also provided by city in Orange County.

Trend

In the 10-year period between 2010 and 2019, the proportion of workers over 16 years of age commuting by walking has fluctuated, from a low of 1.7 percent to a high of 2.2 percent. In 2019, 2.1 percent of workers commuted to work by walking, which is equivalent to 32,849 pedestrian commuters in Orange County in 2019.

Levels of commuting by walking vary by city. The cities of Irvine and Laguna Beach at 4.2 and 3.5 percent, respectively, posted the highest rates of commuting by walking. The cities of Fountain Valley, Yorba Linda and Lake Forest had the lowest proportion of walking commuters. Many factors contribute to these variations, including topography, proximity to job centers, land use, street connectivity, and availability of sidewalks and trails.

FIGURE 43. PERCENTAGE AND NUMBER OF WORKERS COMMUTING BY WALKING: ORANGE COUNTY, 2010-2019



Source: U.S. Census Bureau, 2010-2019 American Community Survey, 1-Year Estimates

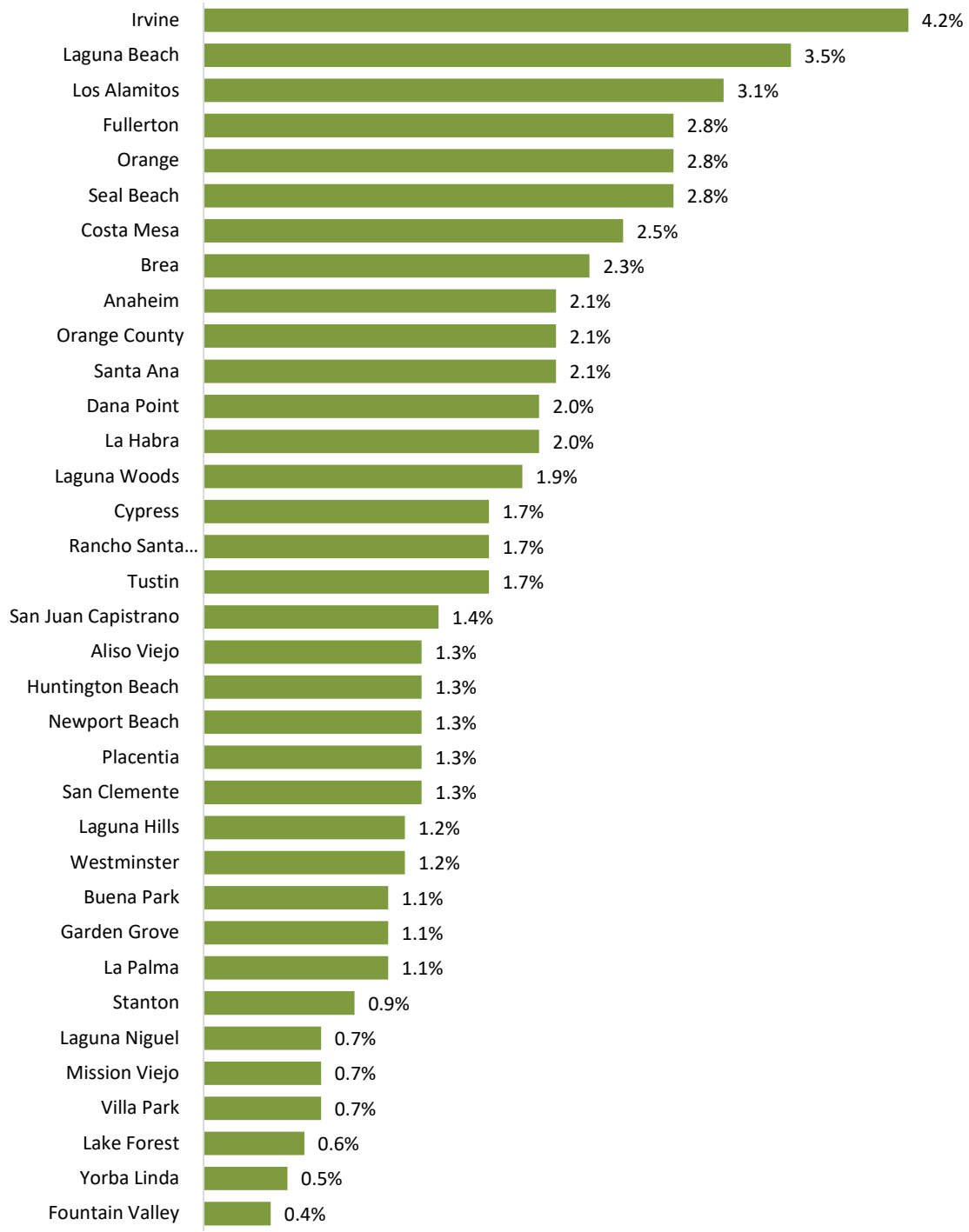
During

Early

Late

The data are likely to show a slight increase in commuting by walking as a result of the pandemic; however, the impact is likely to be temporary without interventions that make walking more attractive. According to the National Household Travel Survey, 5 percent of vehicle trips are less than half a mile and another 16 percent are less than one mile. These short trips are opportunities to transition travelers from cars to walking or cycling.

FIGURE 44. PERCENTAGE OF WORKERS COMMUTING BY WALKING BY CITY: ORANGE COUNTY, 2018



Source: U.S. Census Bureau, 2018 American Community Survey, 5-Year Estimates

Bikeways

This indicator measures the miles of bikeways by class and city in Orange County. It also measures the change in the number of miles of bikeways from 2001 to 2020. The classes of bikeways are defined as follows:

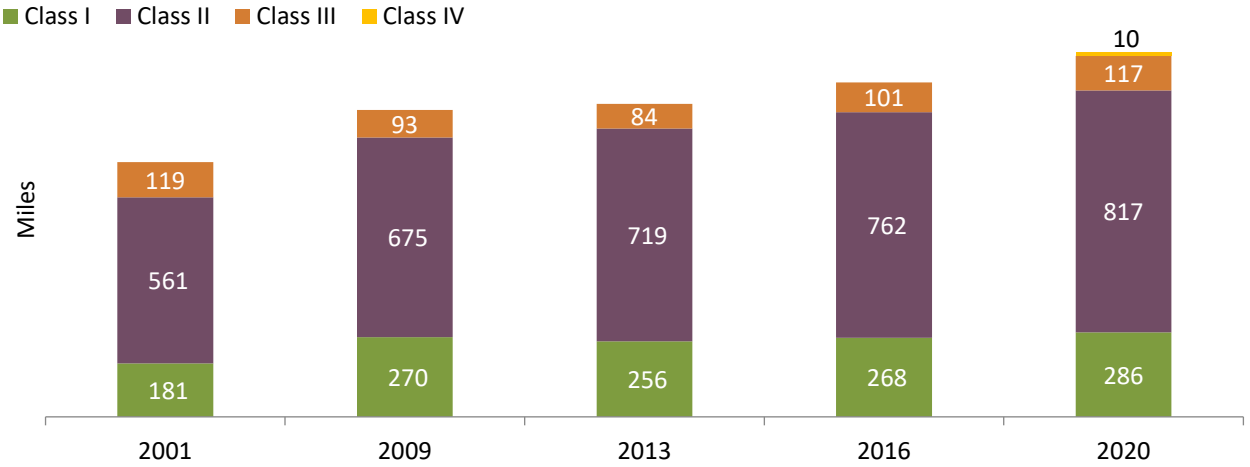
- Class I – off-street paved bike paths
- Class II – on-road striped and signed bicycle lanes
- Class III – on-road shared-lane signed bicycle routes
- Class IV – separated bikeways/cycle tracks

Trend

The number of miles of bikeways countywide increased between 2001 and 2020. In 2020, there were 1,231 miles of existing bikeways, an increase of 370 miles, or 43 percent, since 2001. Development of Class I and II bikeways drove this 19-year growth, increasing 58 and 46 percent, respectively. More recently, since 2016, 90 miles were added. Most (56 miles) were Class II, followed by 18 miles of Class 1 lanes and 16 miles of Class III lanes. New to the 2020 analysis are 10 miles of Class IV lanes, which are referred to as separated bikeways or cycle tracks. They are typically on-road lanes that are separated from vehicular traffic by grade separation, flexible posts, inflexible barriers, or on-street parking.

On a per capita basis, the 2020 bikeway count of 1,231 miles equates to 3.9 miles of bikeways for every 10,000 residents. San Juan Capistrano and Irvine have the most miles of Class I bikeways per 10,000 residents in those cities. Villa Park and Seal Beach have the most miles of Class II bikeways per 10,000 residents in those cities. As of 2020, the only city in Orange County with Class IV cycle tracks is Santa Ana.

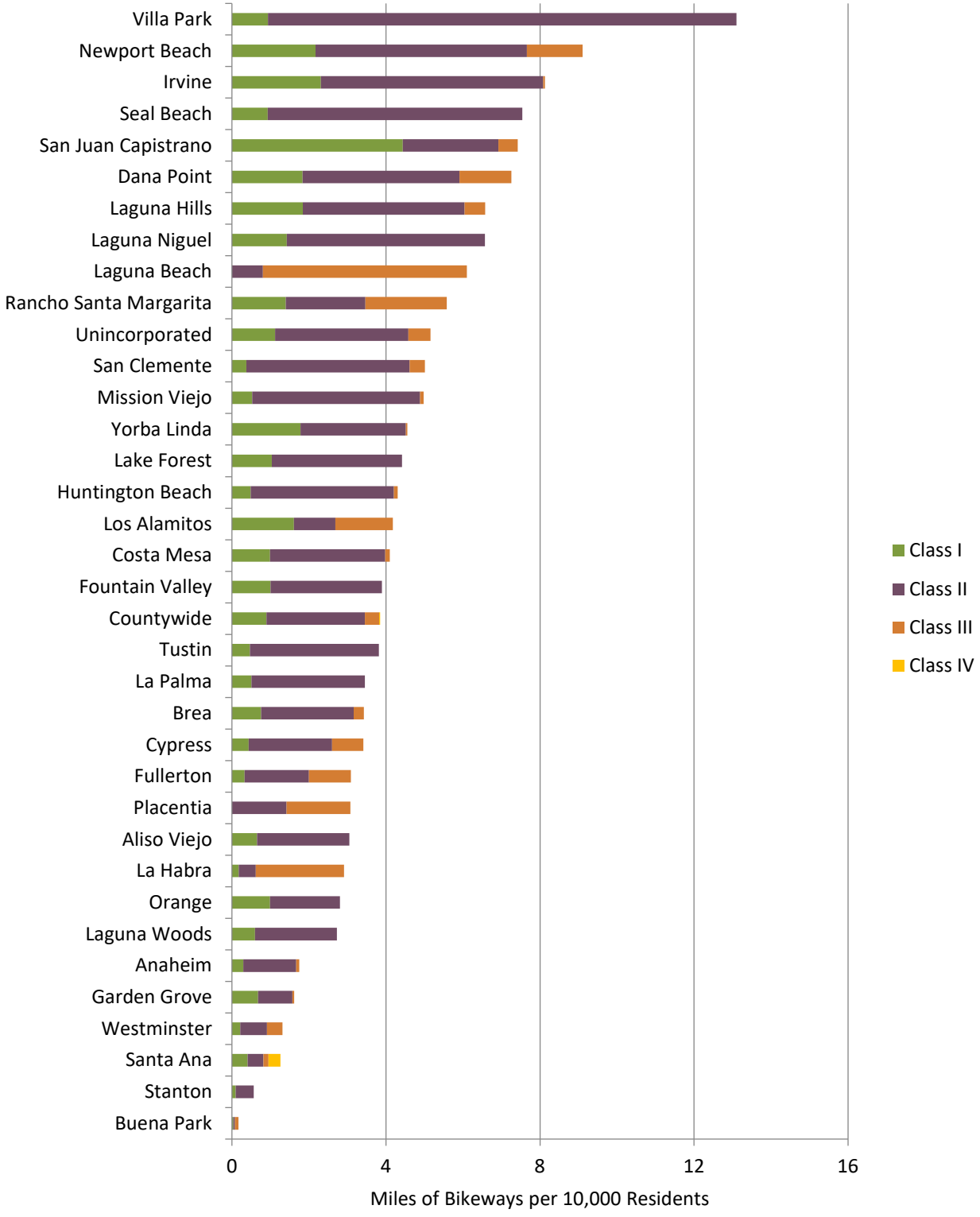
FIGURE 45. MILES OF BIKEWAYS BY BIKEWAY CLASS: ORANGE COUNTY, 2001, 2009, 2013, 2016 AND 2020



Source: Orange County Transportation Authority (2001 & 2009 Commuter Bikeways Strategic Plans, 2014 Long-Range Transportation Plan, and OCTA GIS database, October 2017 and September 2020)

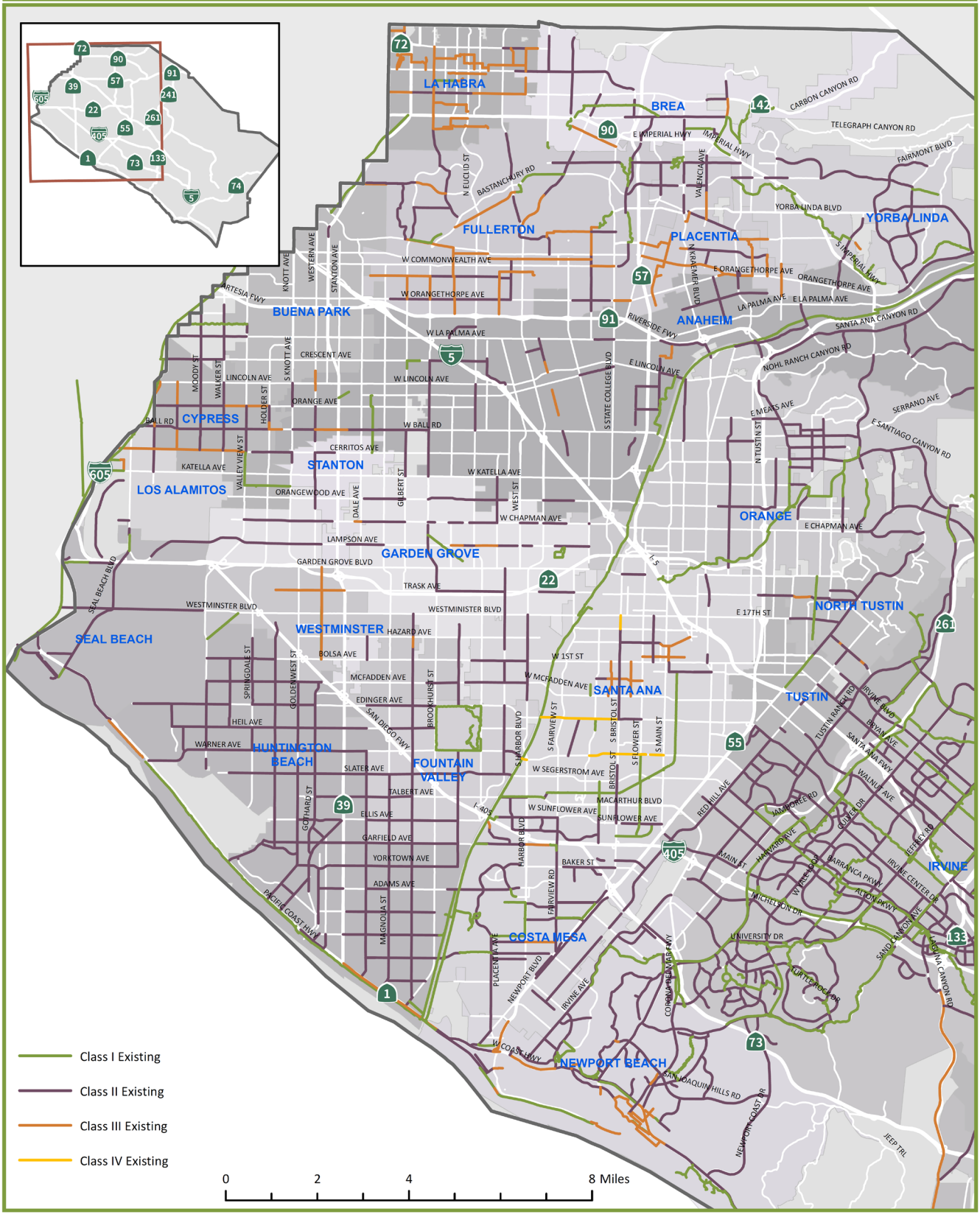
During ◀▶ Early ▼ Late ◀▶	Bicycle infrastructure projects in progress or with funds already allocated are likely to continue during the pandemic. If cities and transportation agencies experience budget shortfalls as a result of the pandemic, construction of some planned bikeways may be postponed.

FIGURE 46. MILES OF BIKEWAYS PER 10,000 RESIDENTS BY CITY AND BIKEWAY CLASS: ORANGE COUNTY, 2020

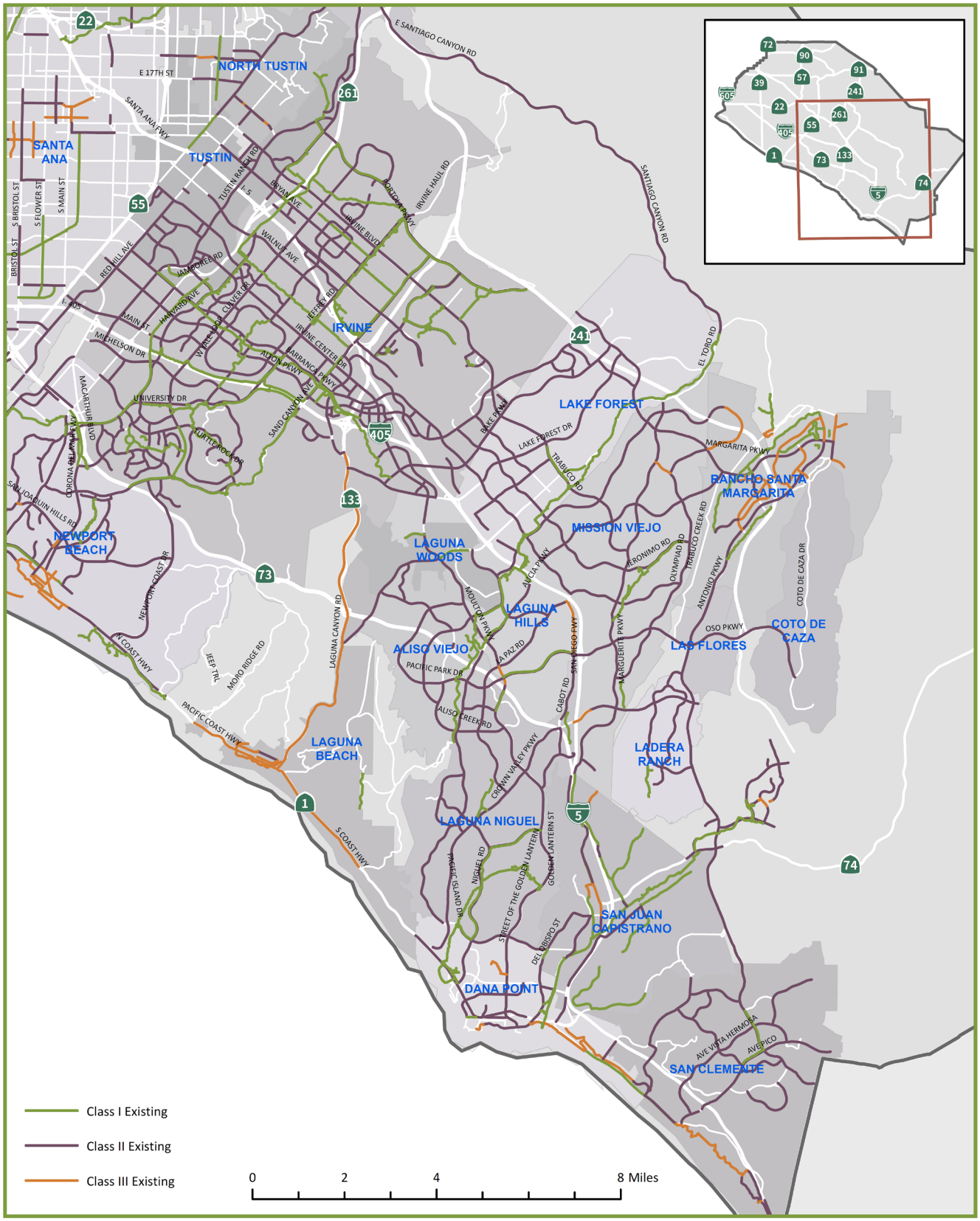


Source: Orange County Transportation Authority

Existing Bikeways - North County



Existing Bikeways - South County



Bicycle Safety

This indicator measures the count and rate per 100,000 residents of collisions involving bicyclists that resulted in an injury to any party involved in the collision in Orange County.

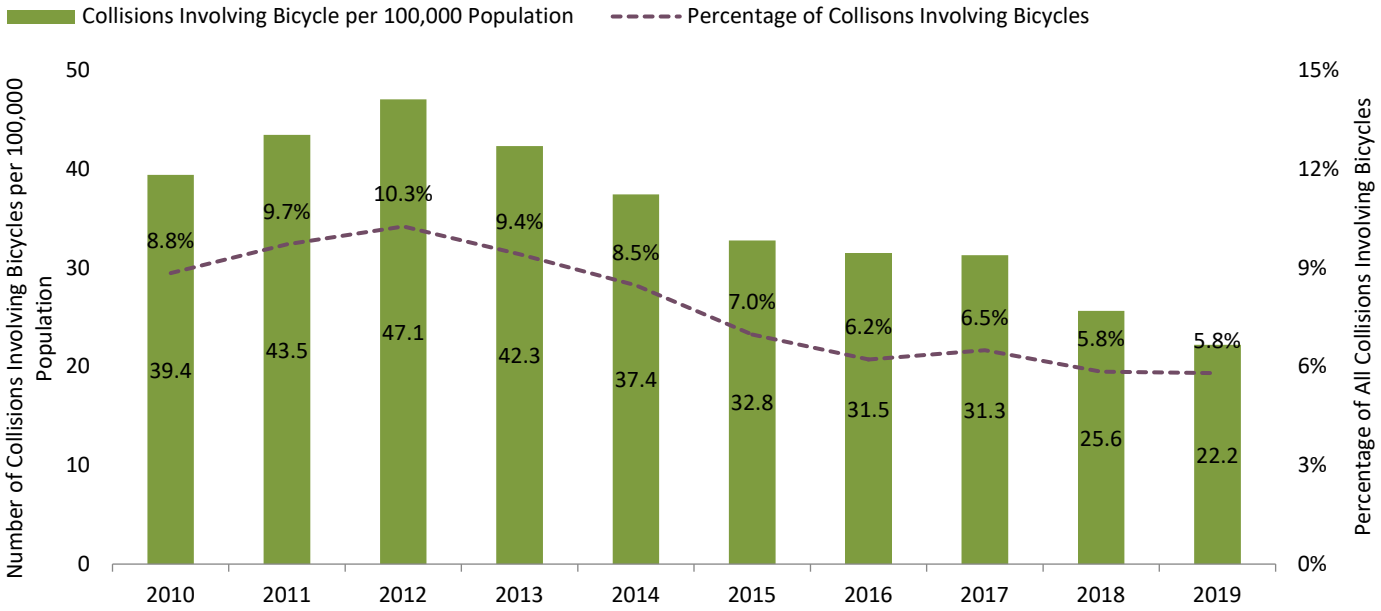
Trend

Over the past 10 years, the rate of injury bicycle collisions rose until 2012 and has fallen annually since then.[20] Between 2010 and 2019, the rate per 100,000 residents of bicycle-involved collisions fell 34 percent, from 39.4 per 100,000 to 22.2 per 100,000. Currently, bicycle-involved collisions comprise 6 percent of all collisions, down from a high of 10 percent in 2011 and 2012. The absolute number of bicycle-involved accidents has fallen over this period (down 41 percent, from 1,190 to 705). Meanwhile, the overall number of collisions has fallen 10 percent.

Between 2010 and 2019, the number of people commuting by bike fell 27 percent (see Figure 41) which likely contributed to the decline in bicycle-involved collisions over this period.

In 2019, there were 12 fatalities due to a bicycle-involved collision, down from the 10-year high of 17 fatalities in 2014 and 2015.

FIGURE 47. INJURY COLLISIONS INVOLVING BICYCLES: ORANGE COUNTY, 2010-2019



Source: California Highway Patrol, California Statewide Integrated Traffic Records System (SWITRS) via the Transportation Injury Mapping System portal managed by the University of California, Berkeley (http://tims.berkeley.edu/index.php)

During ▲ Early ▲ Late ●	The increase in cycling during the pandemic would suggest that accident rates would increase; however, lower levels of auto traffic may mitigate this potential trend.

[20] Data for 2019 are provisional and subject to change. Data for 2015 and 2016 were updated since the last report.

FIGURE 48. INJURY COLLISIONS INVOLVING BICYCLES HEAT MAP: NORTH ORANGE COUNTY, 2019

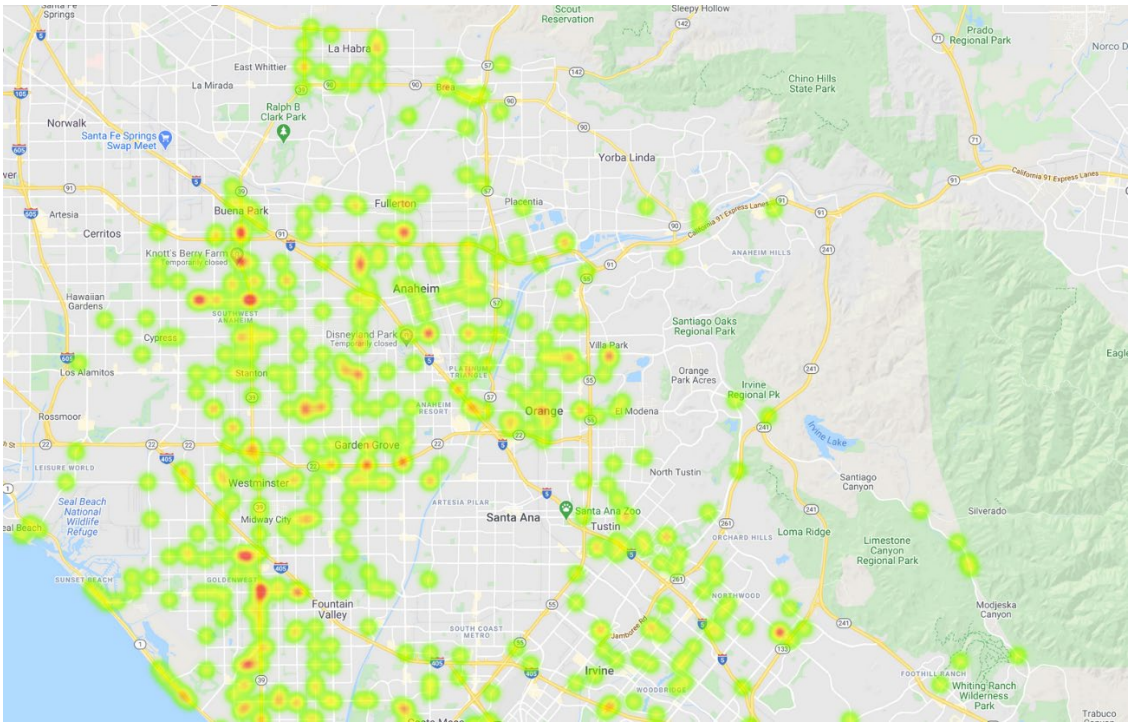
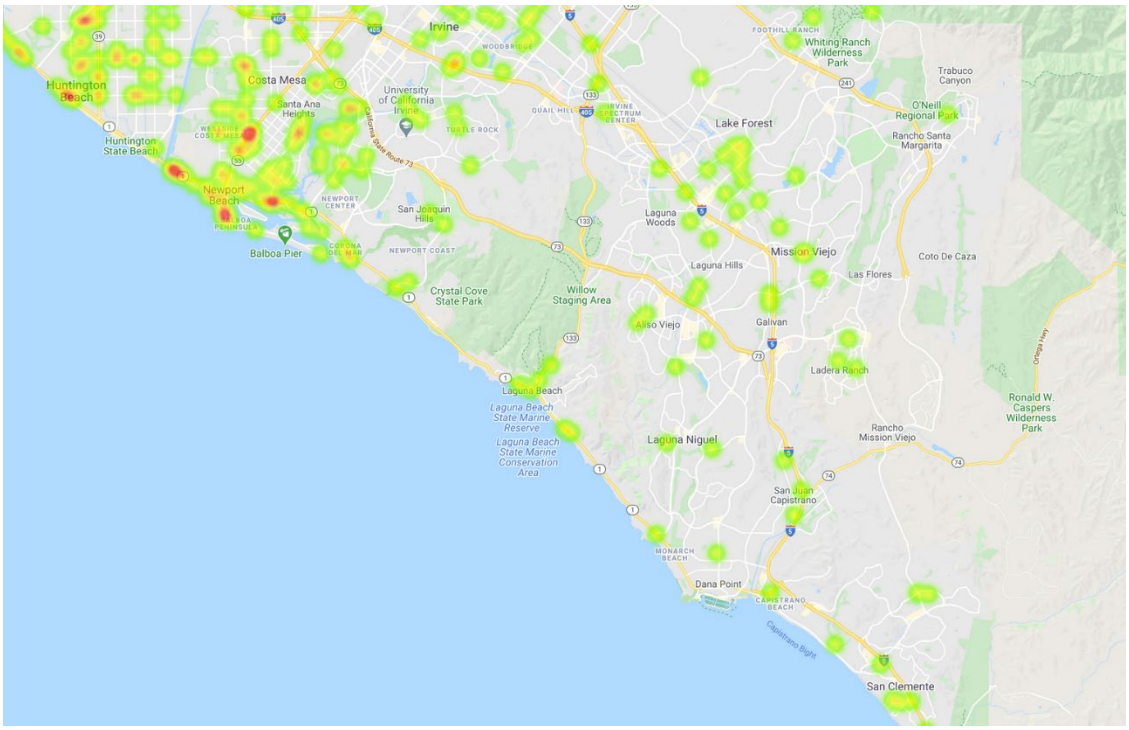


FIGURE 49. INJURY COLLISIONS INVOLVING BICYCLES HEAT MAP: SOUTH ORANGE COUNTY, 2019



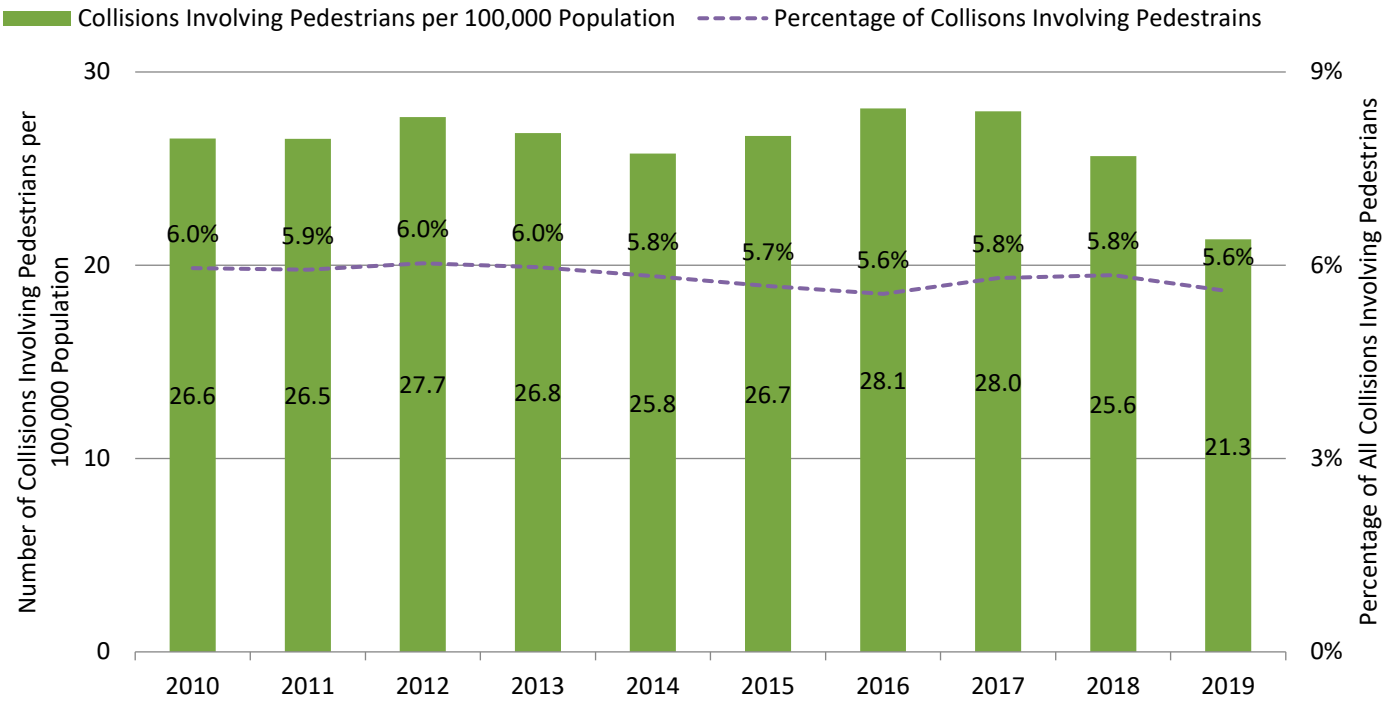
Pedestrian Safety

This indicator measures the count and rate per 100,000 residents of collisions involving pedestrians that resulted in an injury to any party involved in the collision in Orange County.

Trend

The per capita rate of injury pedestrian collisions with motor vehicles, motorcycles, or bicycles has fluctuated over the past 10 years.[21] Between 2010 and 2019, the rate of pedestrian-involved collisions averaged 26 per 100,000 residents annually, or an average of 824 annually over the past 10 years. Pedestrian-involved collisions currently account for 6 percent of all collisions. Between 2010 and 2019, the number and percent of people commuting by walking has remained relatively flat.

FIGURE 50. INJURY OR FATAL COLLISIONS INVOLVING PEDESTRIANS: ORANGE COUNTY, 2010-2019



Source: California Highway Patrol, California Statewide Integrated Traffic Records System (SWITRS) via the Transportation Injury Mapping System portal managed by the University of California, Berkeley (http://tims.berkeley.edu/index.php)

During

Early

Late

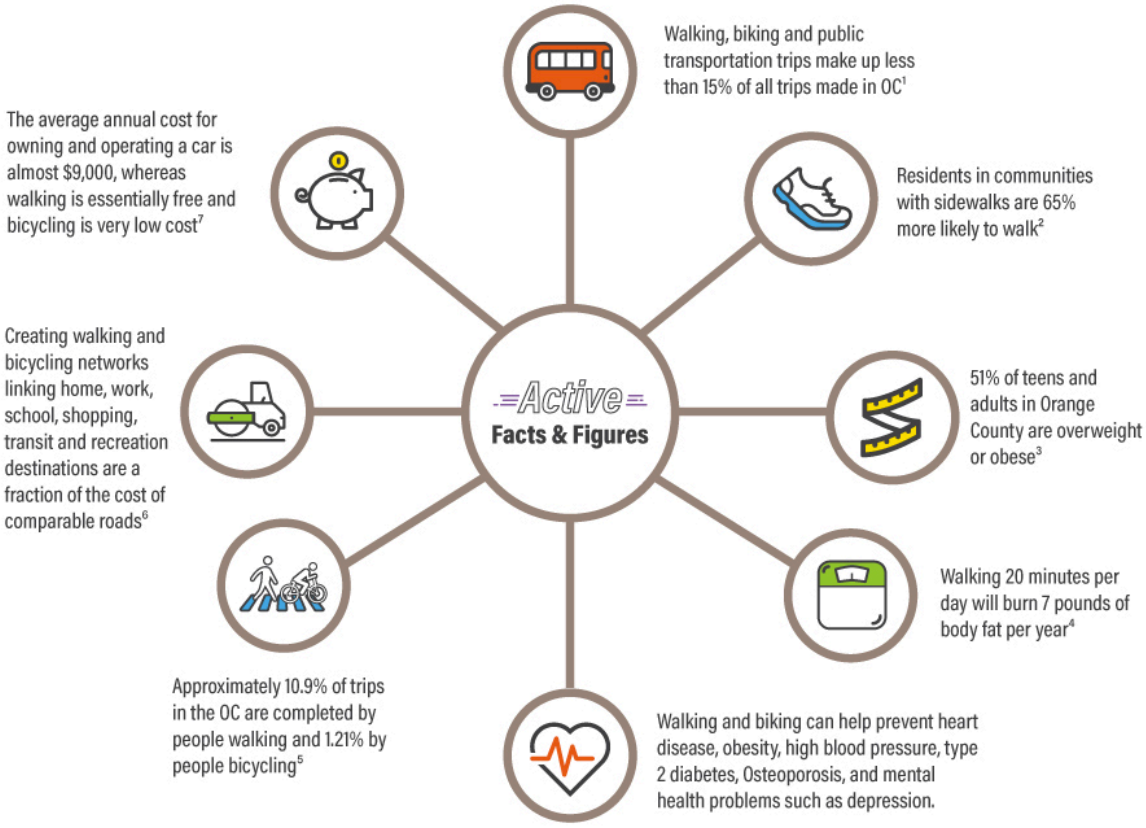
Given that 93 percent of pedestrian collisions involve autos, the decrease in local road and state highway traffic may result in fewer pedestrian collisions during the pandemic. Preliminary data from the Transportation Injury Mapping System seems to bear this out, although it is likely temporary decrease as traffic returns to pre-pandemic levels.

[21] Fully 93 percent of pedestrian collisions in 2019 involved a motor vehicle. Data for 2019 are provisional and subject to change. Data for 2015 and 2016 were updated since the last report.

Launched in May 2017, OC Active is Orange County's first comprehensive countywide effort to identify transportation needs and opportunities for both walking and bicycling. The resulting Active Transportation Plan, completed in December 2019, allows local cities and the County of Orange to use the plan as a foundation to apply for state funding for local bicycle and pedestrian projects.

OC Active Goals

1. Reduce pedestrian and cyclist collisions
2. Advance strategic walking and biking network
3. Enhance walking and biking access to transit
4. Improve high-need pedestrian areas
5. Strengthen stakeholder partnerships
6. Incorporate diverse community perspectives
7. Leverage funding opportunities



FREEWAYS AND MANAGED LANES

Congestion

This indicator measures the 10-year trend in morning and afternoon peak hours of delay per commuter, as well as off-peak hours of delay per capita, when freeway speeds have fallen below 60 miles per hour on freeways in Orange County (per commuter hours of delay are estimates for 2019 and 2020). Also measured is the 5-year trend in HOV lane congestion, which is measured as the percentage of freeway segments of approximately 5 miles in length that experience average weekday peak hour speeds under 45 miles per hour in excess of 10 percent of days for the period of analysis. Within this determination of congested (degradation) there are three classifications: slightly degraded (10-49 percent of the time, or two or less weekdays per month), very degraded (50-74 percent of the time, or 10-15 weekdays per month), and extremely degraded (75 percent or more of the time, or 16 or more weekdays per month).

Trend

The amount of delay that commuters experience on Orange County freeways varies from year-to-year, but the coronavirus pandemic contributed to a substantial decline in delay in early 2020. In 2019, the average Orange County traveler experienced an estimated 15.1 hours in freeway traffic congestion, up from 2018 when the average annual delay was 13.5 hours. Looking at the past 10 years of complete annual data, average hours of delay has fluctuated from a high of 18.5 hours of delay in 2015 to a low of 13.0 hours of delay in 2012. The first half of the year 2020 reduced the hours of delay to an unprecedented 4.2 hours in the first half of 2020. While this reflects just the first half of 2020, doubling this figure to approximate a full year of data still results in a substantial reduction in delay.

In 2017, 77 percent of Orange County HOV lane miles were congested compared to 72 percent statewide. Looking at 5-mile lane segments in Orange County, 42 percent were extremely degraded in 2017, compared to 19 percent in 2013. The percentage of HOV lane segments that were classified as very or slightly degraded also increased during this time frame, but less dramatically. The percent very degraded grew from 19 to 23 percent and the percent slightly degraded grew from 24 to 26 percent.

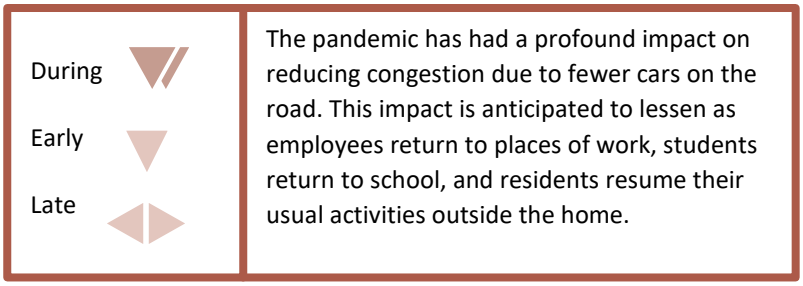
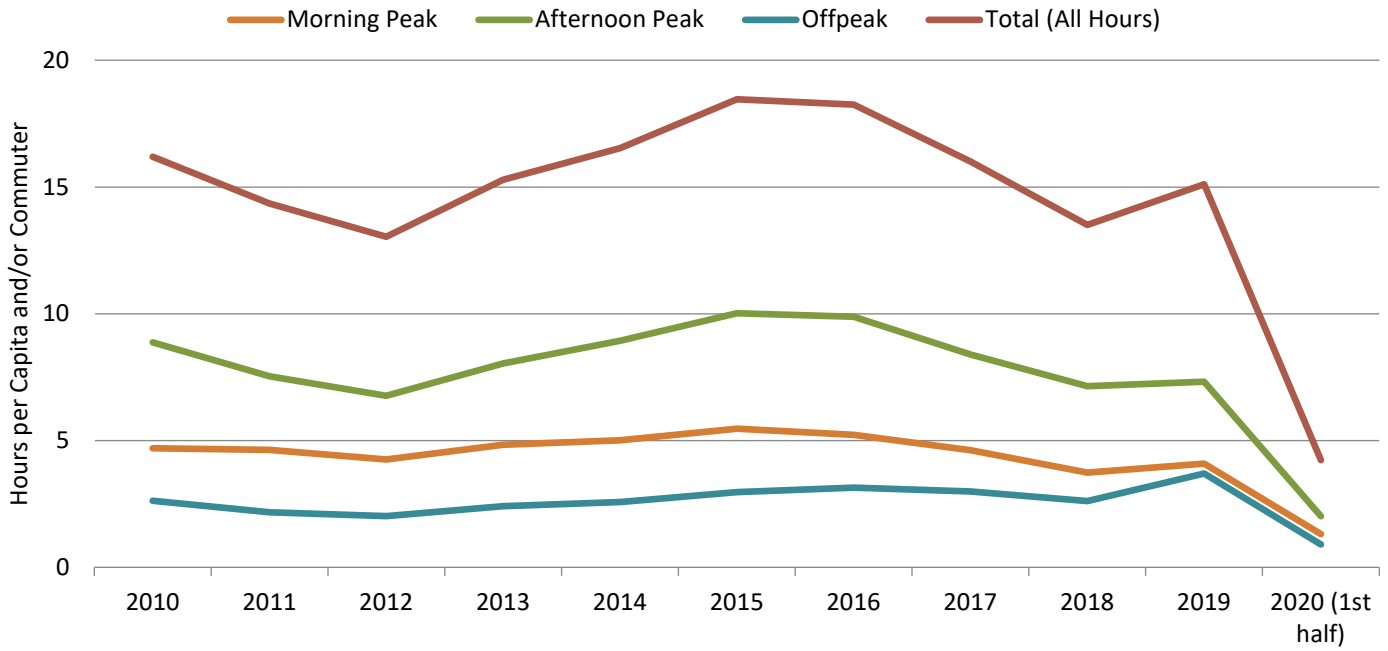


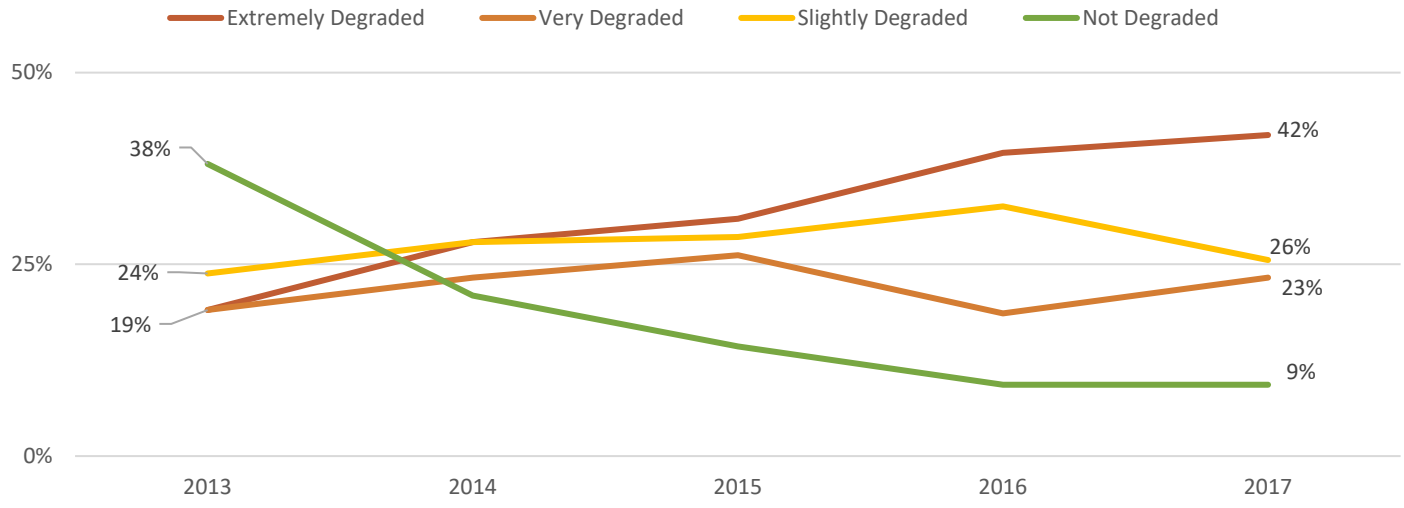
FIGURE 51. ANNUAL HOURS OF DELAY PER CAPITA OR PER COMMUTER AT SPEEDS LESS THAN 60 MILES PER HOUR ON FREEWAYS IN ORANGE COUNTY: 2010-2020 (1ST HALF)



Note: Data for peak hours reflect annual hours of delay per commuter at speeds less than 60 miles per hour on freeways in Orange County. Data for off-peak hours are per capita. Counts of commuters in 2019 and 2020 are projected estimates based on historical trends and change in vehicle miles traveled; consequently, morning and afternoon peak estimates of delay per commuter should be interpreted with caution.

Source: Caltrans, Performance Measurement System; U.S. Census Bureau, American Community Survey, 1-Year Estimates; California Department of Finance, Population Estimates, Tables E-2 & E-4

FIGURE 52: PERCENTAGE OF HOV SEGMENTS ON ORANGE COUNTY FREEWAYS THAT ARE (DEGRADED) CONGESTED, BY LEVEL OF DEGRADATION: 2013-2017



Note: Degradation reporting for State Route 91 express lanes in Orange County are not required due to federal codes and therefore not included in Caltrans reporting.

Source: Caltrans, 2017 California High-Occupancy Vehicle Facilities Degradation Report and Action Plan

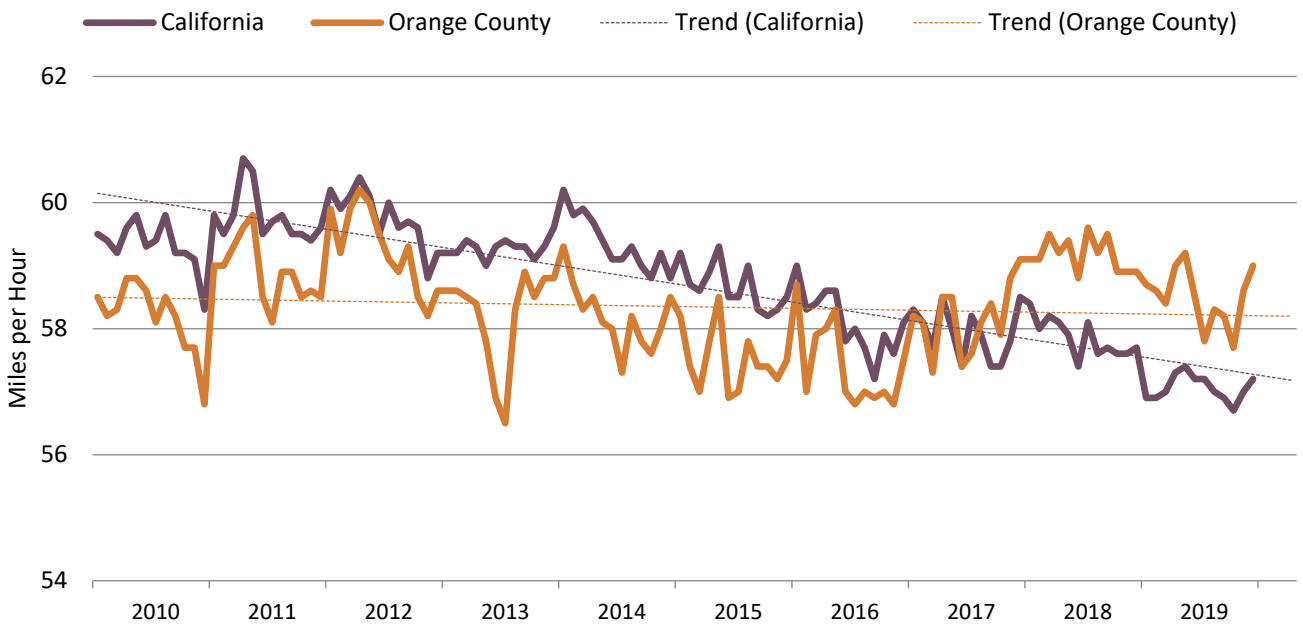
Speed

This indicator measures average monthly urban freeway speeds in Orange County compared to California over a 10-year period.

Trend

Prior to the coronavirus pandemic, average monthly Orange County freeway speeds were variable with no long-term trend emerging over the 10 years studied. Looking at the last five years, average speeds were slightly faster in 2018 and 2019 (59 miles per hour) than the three years prior to that (58 miles per hour). Meanwhile, speeds in California have steadily decreased.

FIGURE 53. AVERAGE MONTHLY URBAN FREEWAY SPEEDS: ORANGE COUNTY AND CALIFORNIA, 2010-2019



Source: Caltrans Performance Measurement System (PeMS)

During Early Late	The pandemic reduced the number of people traveling, which contributed to increased freeway speeds. The pandemic also shifted the time of day people are traveling, spreading their travel more evenly throughout the day, which virtually eliminated peak hour delays. Motorists can expect to see gradually decreasing speeds as residents return to normal activities, but with some level of working from home persisting after the pandemic, speeds may continue to be higher into the post-pandemic period.

Travel Times

This indicator measures average travel times on key mainline freeway segments in Orange County during morning and evening peak hours in the direction of the commute (the more congested direction), as well as the opposite commute. Travel times for morning peak hours are calculated using an 8:00 a.m. start time and for afternoon peak using a 5:00 p.m. start time. Data include travel on Tuesdays, Wednesdays and Thursdays only.

Trend

In 2019, few Orange County freeway segments experienced excessive travel time delays at peak hours of the commute. Northbound afternoon commuters on I-405 between SR-73 and the L.A. County line experience the most delay (2.3 minutes per mile, on average), followed by westbound commuters on SR-22 between SR-55 and the L.A. County line (1.9 minutes per mile). The segment with the greatest improvement in travel times between 2016 and 2019 was northbound SR-55 between I-405 and I-5, from 3.7 minutes per mile to 1.8 minutes per mile.

FIGURE 54. TRAVEL TIMES ON KEY FREEWAY CORRIDORS IN MORNING AND AFTERNOON PEAK HOURS (MAINLINE LANES): ORANGE COUNTY, 2019

Minutes per Mile: 2.5 or higher | 2.0 to 2.4 | 1.5 to 1.9 | 1.4 or lower

				COMMUTE			OPPOSITE COMMUTE		
FREEWAY	DIRECTION	SEGMENT	LENGTH	TIME OF DAY	MINUTES	MINUTES PER MILE	TIME OF DAY	MINUTES	MINUTES PER MILE
I-5	N	SD/OC countyline to I-405	14 mi.	AM	15	1.1	PM	13	0.9
	S	I-405 to SD/OC countyline		PM	16	1.2	AM	14	1.0
I-5	S	LA/OC countyline (Beach Blvd/SR-39) to I-405	23 mi.	AM	41	1.8	PM	30	1.3
	N	I-405 to LA/OC countyline (Beach Blvd/SR-39)		PM	31	1.3	AM	25	1.1
SR-22	E	LA/OC countyline (I-605) to SR-55	14 mi.	AM	22	1.6	PM	21	1.5
	W	SR-55 to LA/OC countyline (I-605)		PM	26	1.9	AM	20	1.4
SR-55	S	SR-91 to I-5	8 mi.	AM	11	1.4	PM	8	1.1
	N	I-5 to SR-91		PM	11	1.4	AM	8	1.1
SR-55	S	I-5 to I-405	4 mi.	AM	4	1.1	PM	4	1.1
	N	I-405 to I-5		PM	7	1.8	AM	4	1.1
SR-57	S	LA/OC countyline to SR-22	12 mi.	AM	17	1.4	PM	15	1.3
	N	SR-22 to LA/OC countyline		PM	17	1.4	AM	12	1.0
SR-91	W	Riv/OC countyline to SR-55	9 mi.	AM	10	1.1	PM	10	1.1
	E	SR-55 to Riv/OC countyline		PM	14	1.6	AM	8	0.9
SR-91	E	LA/OC countyline to SR-55	14 mi.	AM	13	0.9	PM	11	0.8
	W	SR-55 to LA/OC countyline		PM	14	1.0	AM	13	0.9
I-405	S	LA/OC countyline (I-605) to SR-73	15 mi.	AM	17	1.1	PM	12	0.8
	N	SR-73 to LA/OC countyline (I-605)		PM	35	2.3	AM	17	1.1
I-405	N	SR-73 to I-5	10 mi.	AM	14	1.4	PM	13	1.3
	S	I-5 to SR-73		PM	12	1.2	AM	11	1.1

Note: Results for part of the eastern segment of SR-91 is based on January through September data only; the results for the remaining freeway segments are based on 12 months of data.

Source: Caltrans, Performance Management System (PeMS)

During ▼▼ Early ▼ Late ◀▶

Even prior to the pandemic, mid-week travel times on many mainline freeway segments in Orange County were improving. The pandemic accelerated this trend, where travel times were halved on many segments. A gradual return to normal activities will contribute to increasing travel times in the post-pandemic period but continued working from home may slow the return to pre-pandemic travel times.

Vehicle Flow

This indicator measures the change in daily vehicle volume at 9 points on the Orange County freeway system before and after M2-funded improvements were made. Data reflect average daily traffic per lane on Tuesdays, Wednesdays, and Thursdays in the month of October in the years shown in general purpose lanes and managed lanes (HOV and toll express lanes). Points within each M2 project area were selected by the reliability of detector data. Data reflecting real-time observations of less than 50 percent were omitted from the charts; data reflecting 50-75 percent real-time observations were included if the data were consistent with years posting 75 percent or more real-time observations.[22]

Trend

Overall, among the 9 points measured, most show that average daily vehicle flow per lane decreased after M2 improvements were made, particularly where a new lane was added, which effectively spread vehicles across more lanes. Lower vehicle flow rates per lane are typically associated with higher speeds and less congestion. Meanwhile, for most points measured, vehicle flow in HOV lanes has increased. In absence of confounding conditions, such as poor weather, erratic driving, or a breakdown, free flow speeds can typically be maintained with increasing traffic volume until lanes reach or exceed their design capacity, at which point flow decreases with rising congestion.[23]

During  Early Late	The pandemic contributed to lower vehicle flow rates as fewer motorists were on the road. Vehicle flow is likely to gradually increase as VMT increases.

[22]The percent observed for any given period refers to the percentage of results that were recorded (observed) by the detector in the roadway vs. estimated (imputed) when the detector was not functioning. The point selected may not represent the flow rate for the entire segment; factors such as on and off ramps add or remove traffic along a given segment.

[23] U.S. Department of Transportation, Federal Highway Administration, Traffic Flow Theory, Chapter 2. Traffic Stream Characteristics (www.fhwa.dot.gov/publications/research/operations/tft/Toc.pdf) and Traffic Congestion and Reliability: Trends and Advanced Strategies for Congestion Mitigation (https://ops.fhwa.dot.gov/congestion_report/chapter2.htm)

FIGURE 55. M2 PROJECTS COMPLETED BETWEEN 2013 AND 2018

MAP KEY	PROJECT	YEAR COMPLETE	LOCATION ANALYZED			MAJOR CHANGE AT LOCATION ANALYZED
			DIRECTION	CROSS STREET	CITY	
1	I-5 Avenida Pico to San Juan Creek Road	2018	North	Ave. Vista Hermosa	San Clemente	One of five general purpose lanes converted to HOV use
2			South	Avenida Pico	San Clemente	
3	I-5 Ortega Interchange	2015	South and North	Ortega Highway Interchange	San Juan Capistrano	Relieved traffic congestion at choke points
4	SR-57 Northbound Widening Project (Katella Avenue to Lincoln Avenue)	2014	North	Douglass Road	Anaheim	Added on northbound general purpose lane
5	SR-57 Northbound Widening Project (Orangethorpe Avenue to Lambert Road)	2014	North	Yorba Linda Boulevard	Fullerton	Added one northbound general purpose lane
6	SR-91 Westbound Lane Addition Project (I-5 to SR-57)	2016	West	Brookhurst Road	Fullerton	Added one westbound general purpose lane
7	SR-91 Westbound Tustin Interchange to SR-55	2016	West	Tustin Avenue Interchange	Anaheim	Added Tustin Ave exit bypass lane; off-ramp reconfigured
8	SR-91 Lane Addition Project (SR-55 to SR-241	2013	East	East of Imperial Hwy	Anaheim	Added one general purpose lane
9		2013	West	Across from Yorba Linda Regional Park	Anaheim	Added two general purpose lanes

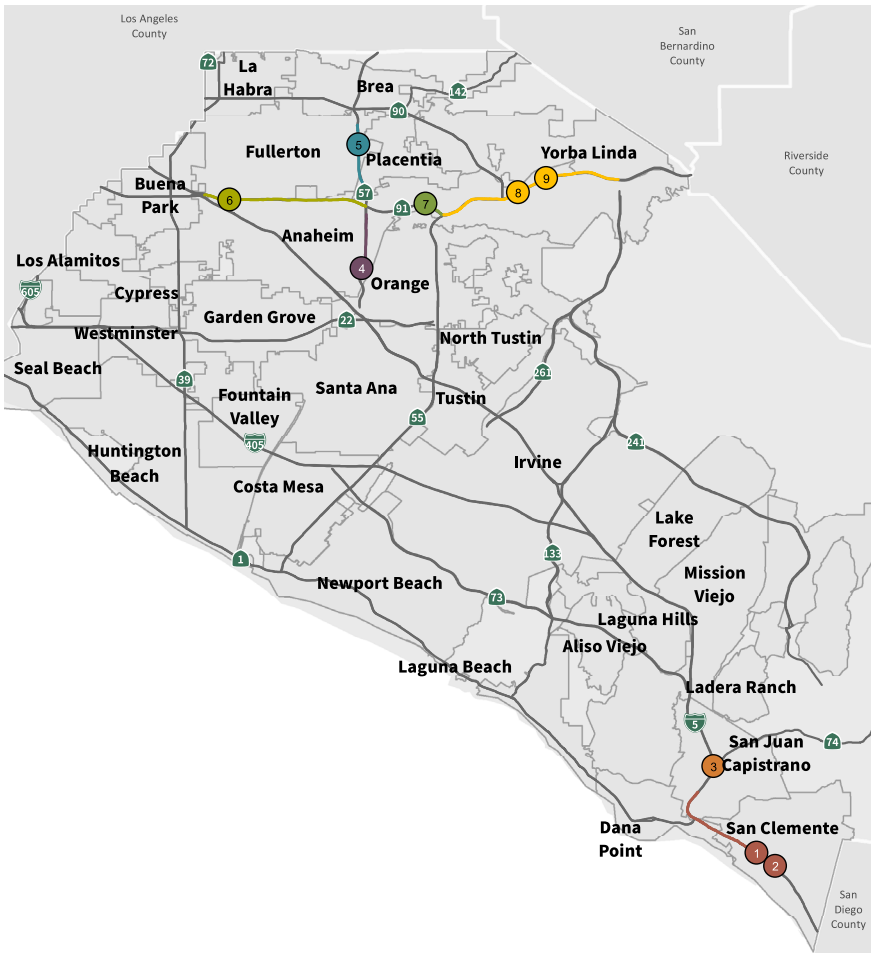
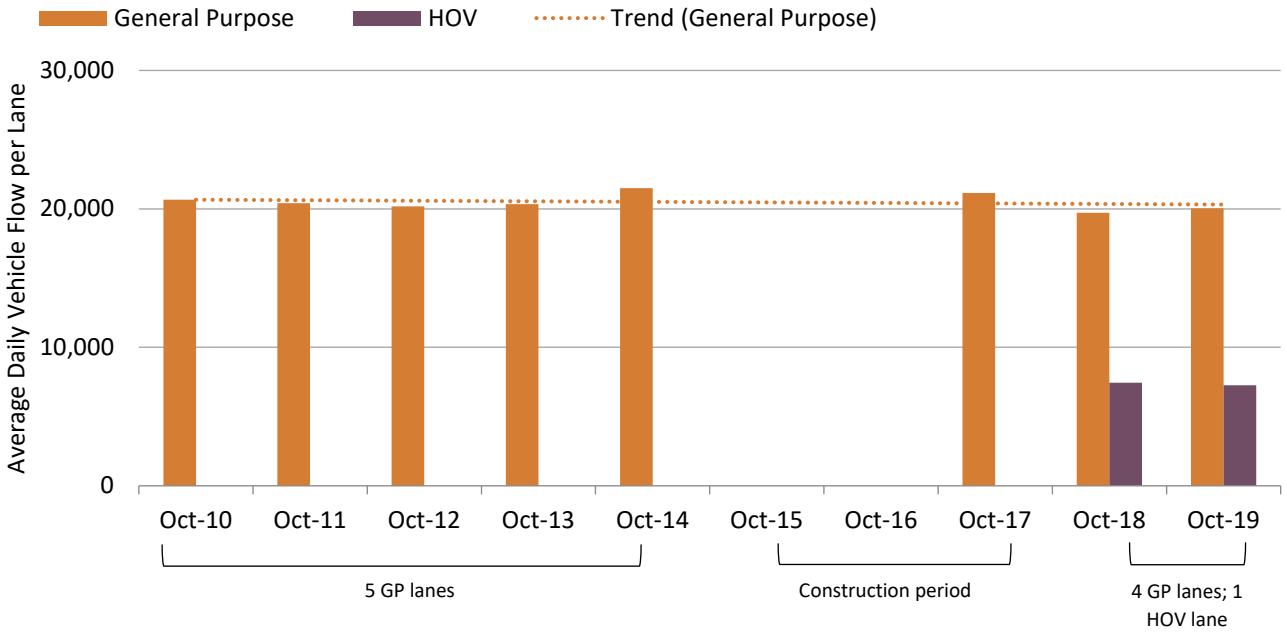


FIGURE 56. TOTAL VOLUME (GP + HOV) TREND—INTERSTATE 5 NORTHBOUND AT AVENIDA VISTA HERMOSA (SAN CLEMENTE): 2010-2019

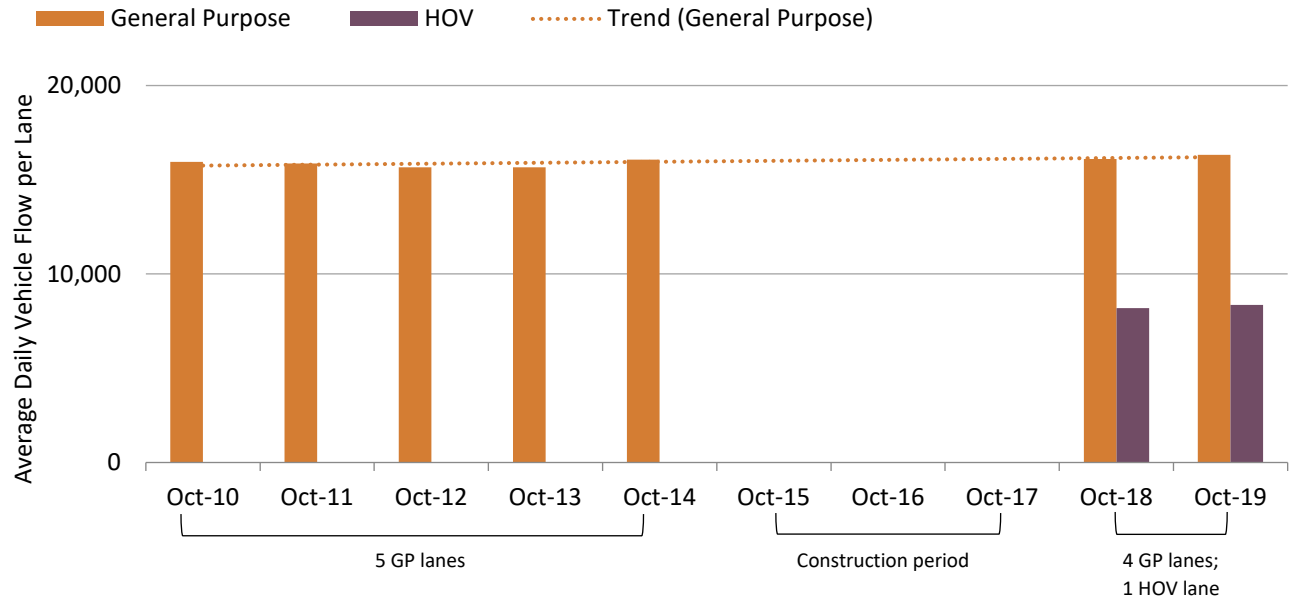
At this segment of northbound I-5, one of five general purpose lanes was converted to HOV use in 2018. Vehicle flow in the general purpose lanes remained relatively stable over the 10-year period.



Source: Caltrans Performance Measurement System (PeMS)

FIGURE 57. TOTAL VOLUME (GP + HOV) TREND—INTERSTATE 5 SOUTHBOUND AT AVENIDA PICO (SAN CLEMENTE): 2010-2019

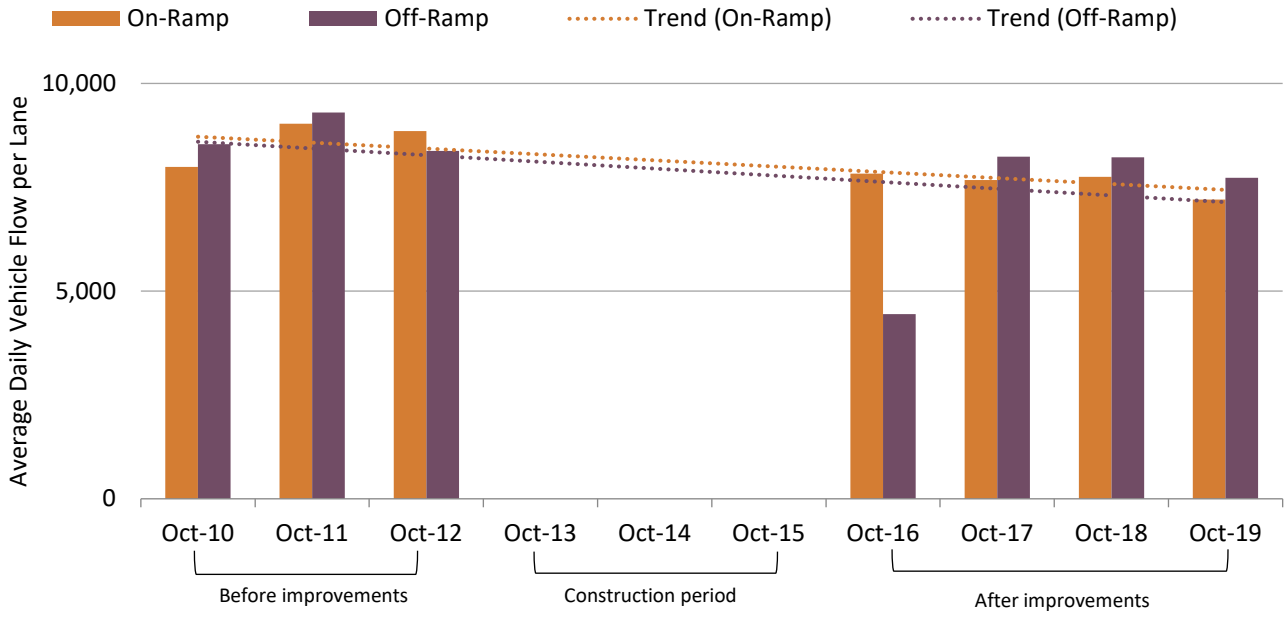
There has been little change in vehicle flow in general purpose lanes in this segment of southbound I-5 since the conversion of one of five general purpose lanes to HOV use in 2018.



Source: Caltrans Performance Measurement System (PeMS)

FIGURE 58. TOTAL VOLUME (GP + HOV) TREND— I-5 SOUTHBOUND ON-RAMP AND NORTHBOUND OFF-RAMP AT ORTEGA HWY INTERCHANGE: 2010-2019

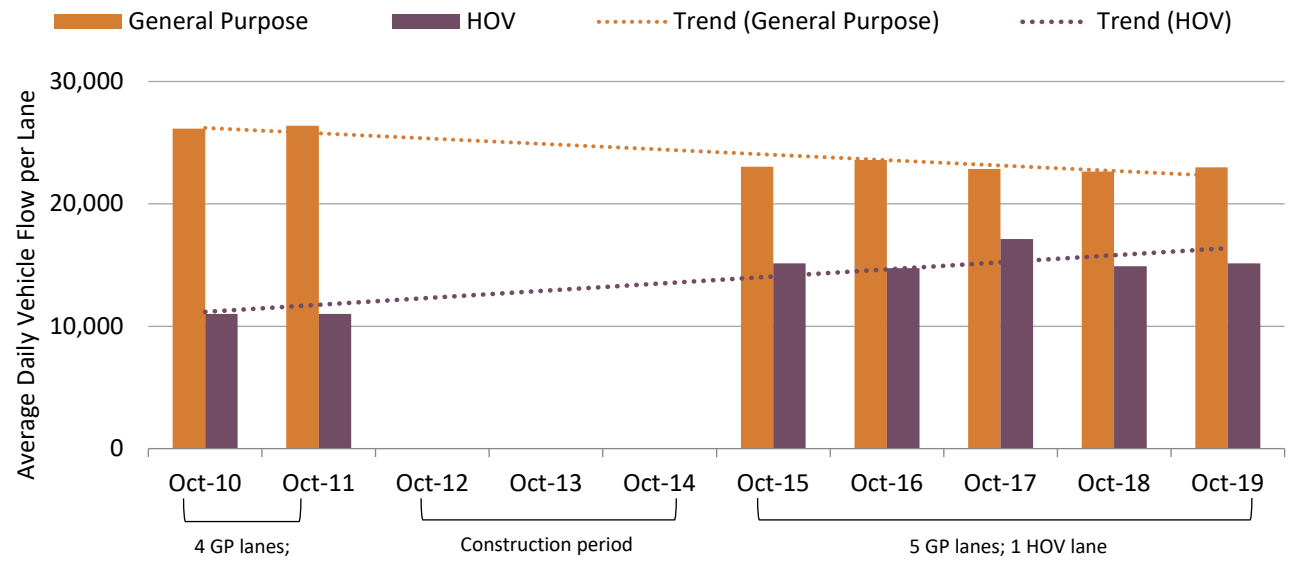
After improvements at the Ortega Highway interchange, average daily vehicle flow on the southbound on-ramp and the northbound off-ramp generally declined.



Source: Caltrans Performance Measurement System (PeMS)

FIGURE 59. TOTAL VOLUME (GP + HOV) TREND—STATE ROUTE 57 NORTHBOUND AT DOUGLASS ROAD (ANAHEIM): 2010-2019

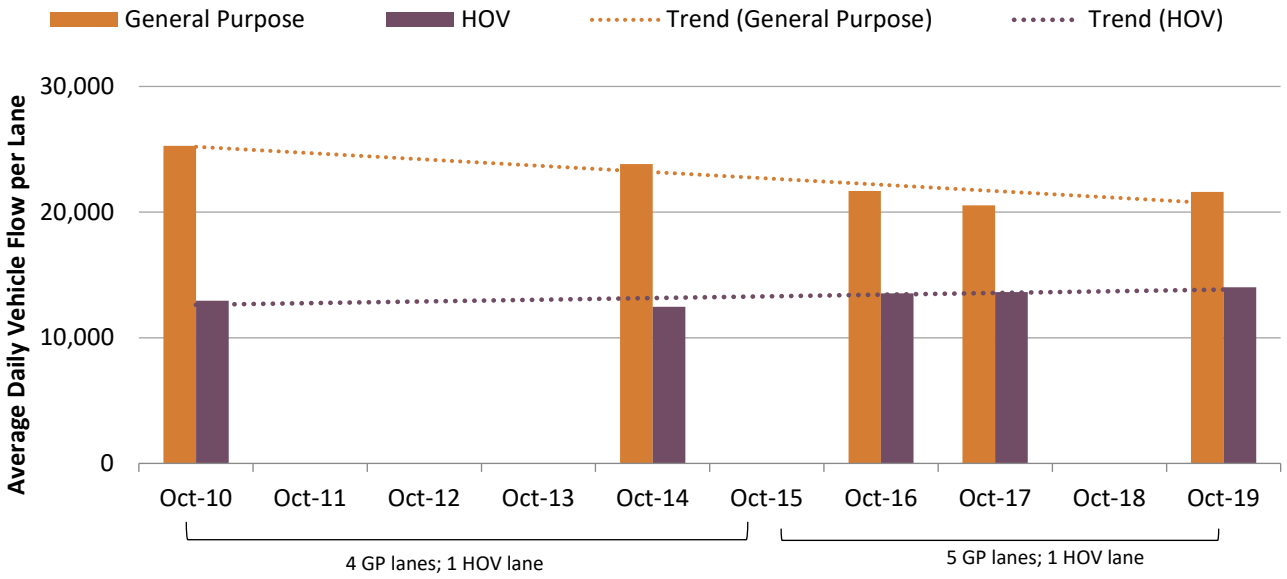
After the addition of one northbound general purpose lane, average daily vehicle flow per general purpose lane declined while flow in the HOV lane increased.



Source: Caltrans Performance Measurement System (PeMS)

FIGURE 60. TOTAL VOLUME (GP + HOV) TREND—STATE ROUTE 57 NORTHBOUND AT YORBA LINDA BOULEVARD (FULLERTON): 2010-2019

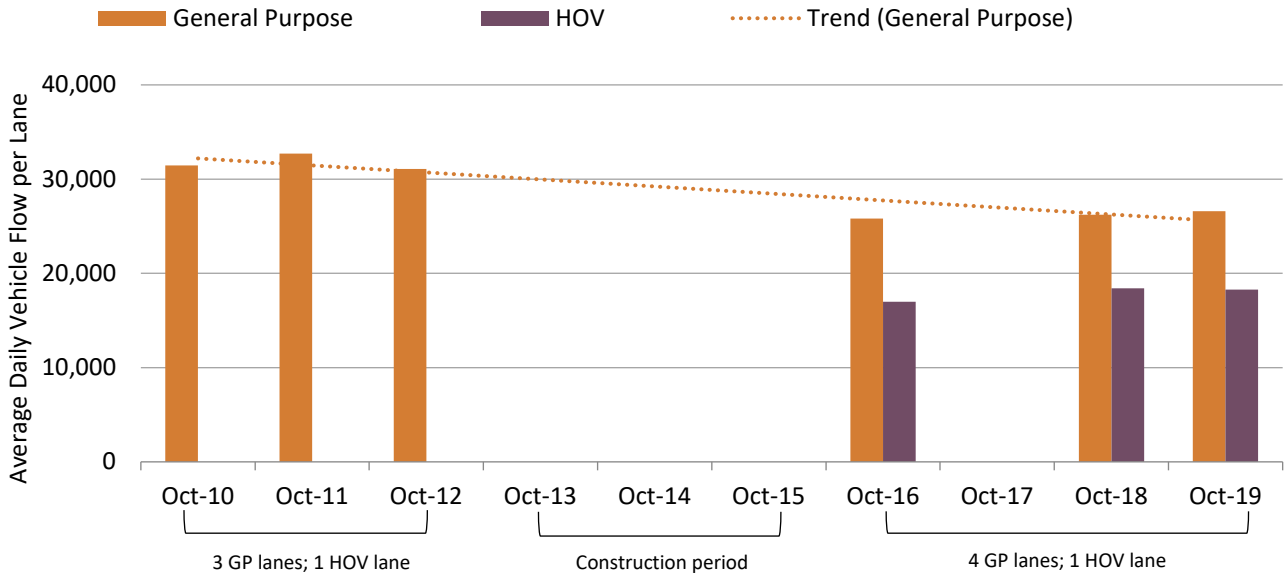
With the addition of a general purpose lane in 2015, average daily vehicle flow per lane was less than in prior years. Meanwhile, HOV lane vehicle flow has increased somewhat.



Source: Caltrans Performance Measurement System (PeMS)

FIGURE 61. TOTAL VOLUME (GP + HOV) TREND—STATE ROUTE 91 WESTBOUND AT BROOKHURST ROAD (FULLERTON): 2010-2019

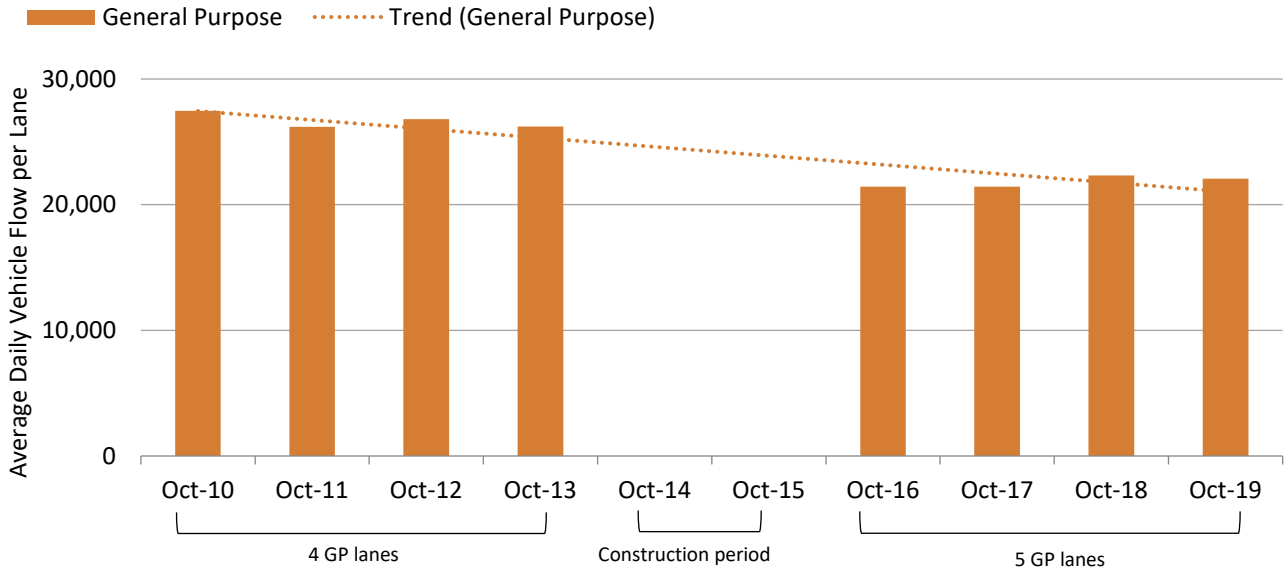
Daily average vehicle flow per lane decreased substantially with the addition of a new general purpose lane in 2016.



Note: HOV data prior to construction are poor quality and not shown.
Source: Caltrans Performance Measurement System (PeMS)

FIGURE 62. TOTAL VOLUME (GP + HOV) TREND—STATE ROUTE 91 WESTBOUND AT TUSTIN AVENUE INTERCHANGE (ANAHEIM): 2010-2019

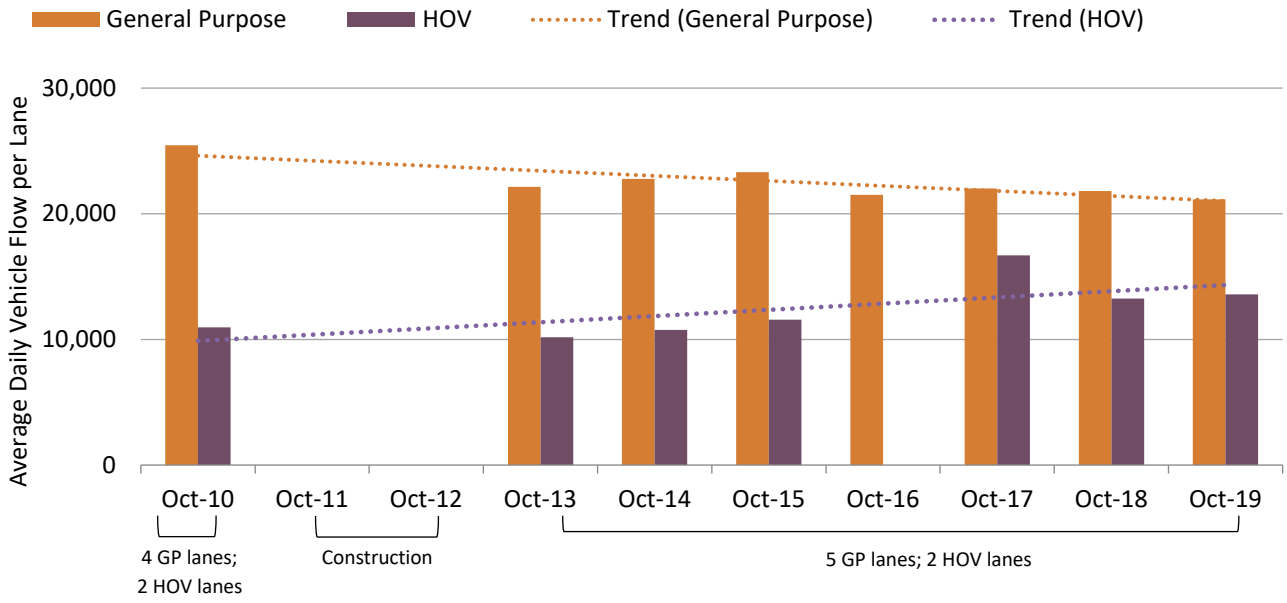
With the opening of the new Tustin Avenue exit bypass lane in 2016, average daily vehicle flow per lane declined from an average of nearly 27,000 vehicles daily per lane, to approximately 22,000 per lane.



Source: Caltrans Performance Measurement System (PeMS)

FIGURE 63. TOTAL VOLUME (GP + HOV) TREND—STATE ROUTE 91 EASTBOUND AT EAST OF IMPERIAL HIGWAY (ANAHEIM): 2010-2019

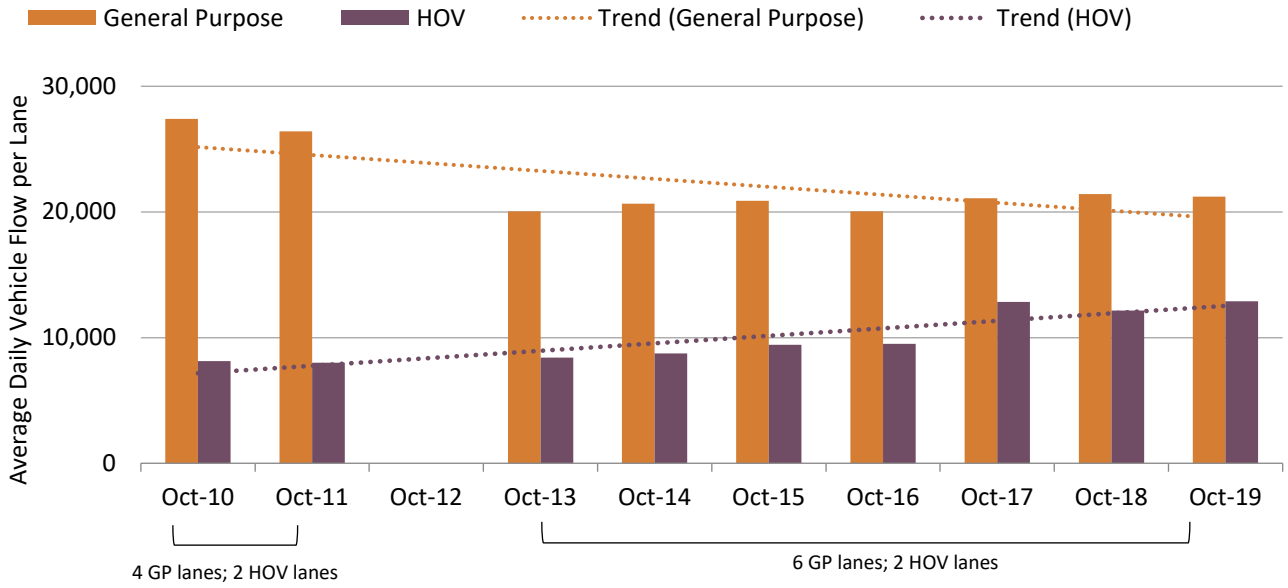
Prior to the addition of a general purpose eastbound lane, vehicle flow in general purpose lanes was higher. Meanwhile, since 2010, vehicle flow in the two HOV lanes has increased.



Source: Caltrans Performance Measurement System (PeMS)

FIGURE 64. TOTAL VOLUME (GP + HOV) TREND—STATE ROUTE 91 WESTBOUND ACROSS FROM YORBA LINDA REGIONAL PARK (ANAHEIM): 2010-2019

The addition of two general purpose lanes in 2013 resulted in dramatically decreased average daily vehicle flow per lane, from approximately 27,000 vehicles per lane per day to an average of approximately 21,000 between 2013 and 2019. Meanwhile, HOV lane vehicle flow has increased from approximately 8,000 vehicles per lane per day in 2010 to nearly 13,000 vehicles per lane per day in 2019.



Source: Caltrans Performance Measurement System (PeMS)

ARTERIALS

Congestion

This indicator tracks congestion at approximately 100 intersections on key arterials in Orange County identified through the county's Congestion Management Plan.[24] A level of service (LOS) ranking from A (best) to F (worst) is assigned to each intersection based on the ability of traffic to flow through the intersection, taking into account traffic volume, intersection capacity, turn movements and pedestrian activity.

Trend

Compared to the baseline in 1992, level of service at key Orange County intersections has improved markedly. In 2019, 93 intersections were performing relatively well (LOS A, B or C) in morning peak hours. Similarly, 94 intersections were performing well in evening peak hours. In 1992, only 76 and 64 intersections, respectively, were performing well at morning and evening peak hours.

Very few intersections are at the lowest levels of service in either morning or evening peak hours. In 2019, eight intersections were performing poorly (LOS D, E or F) in morning peak hours and seven were performing poorly in evening peak hours.

During Early Late	The arterial congestion data are likely to show that level of service improved dramatically during the pandemic. As residents gradually return to normal activities, level of service is likely to gradually return close of to pre-pandemic levels. The persistence of modified work schedules after the pandemic may lessen the impact on arterials during peak hours.

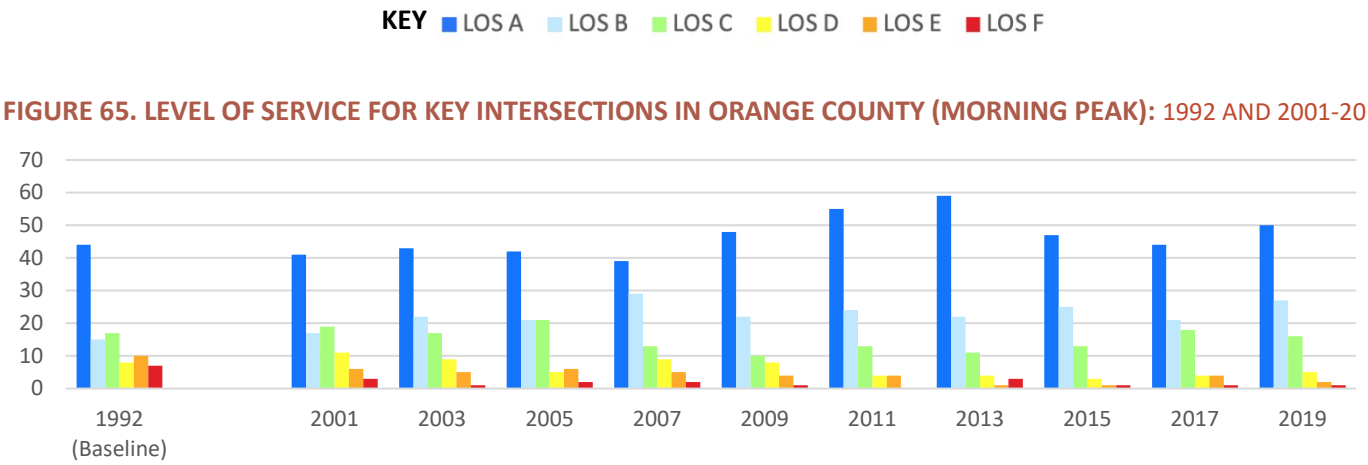
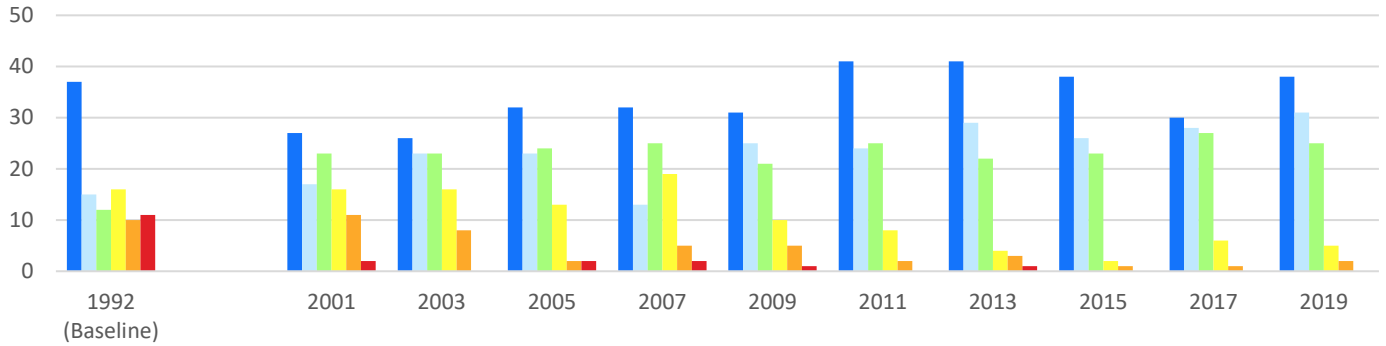


FIGURE 65. LEVEL OF SERVICE FOR KEY INTERSECTIONS IN ORANGE COUNTY (MORNING PEAK): 1992 AND 2001-2019

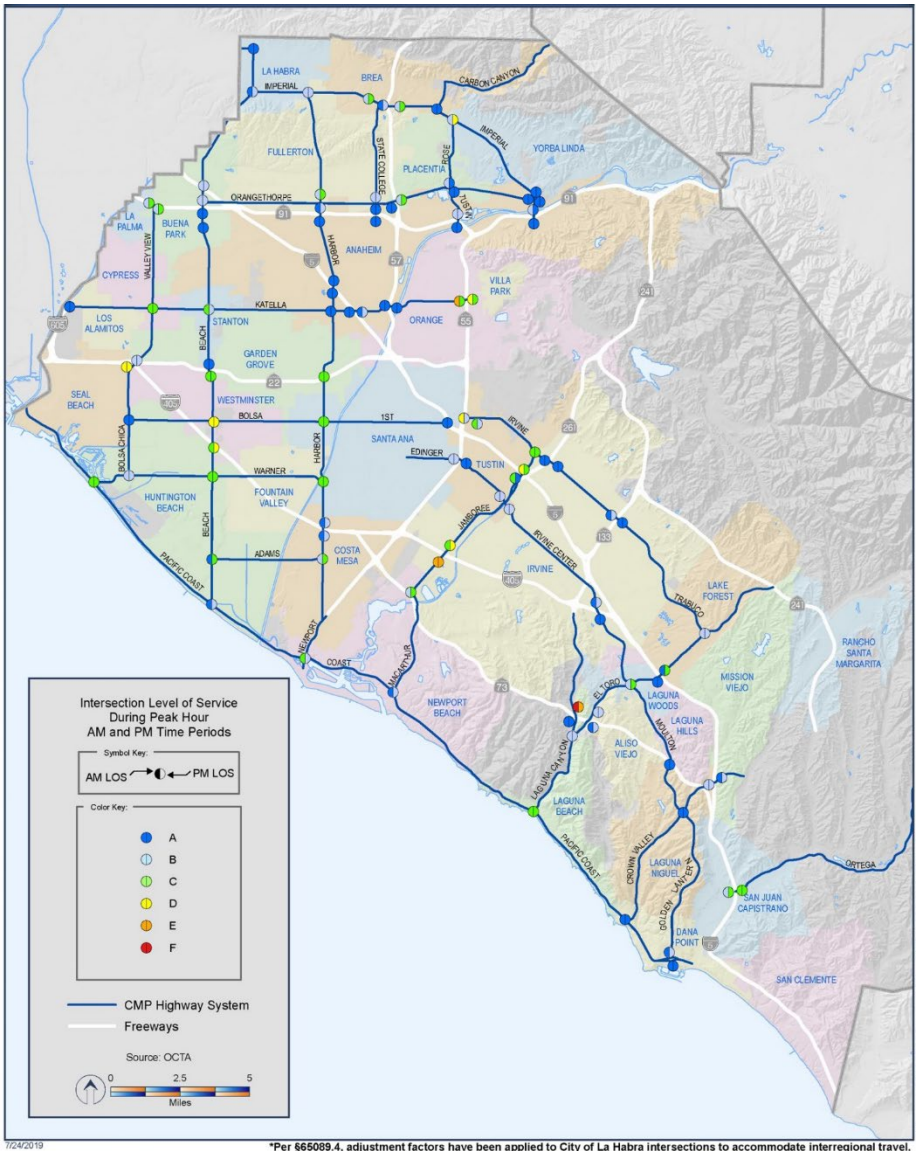
[24] A total of 101 intersections are included in the Congestion Management Plan. If an intersection is impacted by, or under, construction when the monitoring is being conducted it may not be included in that year due to skewed traffic volume counts. In 2019, all 101 intersections were monitored.

FIGURE 66. LEVEL OF SERVICE FOR KEY INTERSECTIONS IN ORANGE COUNTY (AFTERNOON PEAK): 1992 AND 2001-2019



Source: OCTA, Orange County Congestion Management Plans

FIGURE 67. INTERSECTION LEVEL OF SERVICE DURING A.M. AND P.M. PEAK HOURS: ORANGE COUNTY, 2019



Source: OCTA, Orange County Congestion Management Plans

Signal Synchronization

This indicator tracks the performance of signal synchronization in Orange County. The Measure M2 Regional Traffic Signal Synchronization Program targets signalized intersections for coordination along 770 miles of arterials. As of December 2020, more than 3,000 signalized intersections have been synchronized along 772 miles in Orange County. The program has resulted in 120 projects (89 completed) totaling more than $132.3 million, including $25.5 million in leveraged external funding.

Trend

One-quarter (25 percent) of centerline miles of corridors with signal synchronization were performing in the good range (Tiers I and II) in 2019. This is slightly better than 22 percent in 2017, but worse than 34 percent in 2015. At the other end of the rating scale, the proportion of centerline miles with poor performance (Tiers IV and V) has grown substantially since tracking began in 2011, from since 2013, increasing from 23 percent of corridors in the network in 2011 to 45 percent in 2019. It is important to note that daily vehicle miles traveled on Orange County arterials and local roads has increased 6 percent between 2011 and 2018.[25]

Measuring Signal Synchronization Performance

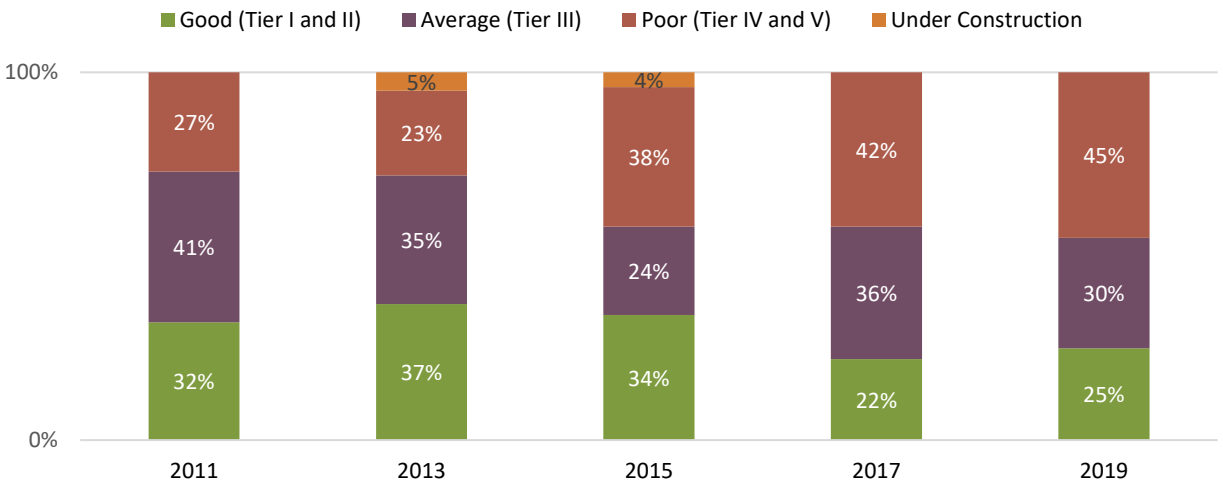
The performance of synchronized corridors is measured using the Corridor Synchronization Performance Index (CPSI), which is calculated based on three factors – average speed, the ratio of number of greens verses reds through signalized intersections, and the average number of stops per mile. The CPSI is categorized into five tiers, with Tier I being the best and Tier V being the worst. Corridor operational performance is tracked during three periods of the day: morning peak; evening peak; and midday. Corridor performance tracking began in 2011 and is measured biannually.

Corridor Synchronization Performance Criteria

Performance Level		Signal Synchronization Description	CPSI Score
Tier I		Very Good progression - traveling through signalized intersections with minimal stops and favorable travel speeds.	>=80
Tier II		Good progression - traveling through signalized intersections with few stops and good travel speeds.	70 to 80
Tier III		Fair progression - traveling through signalized intersections with moderate stops and fair travel speeds.	60 to 70
Tier IV		Limited progression - traveling through signalized intersections with moderately high stops and slower travel speeds.	50 to 60
Tier V		Very limited progression - traveling through signalized intersections with frequent stops and slow travel speeds.	<50

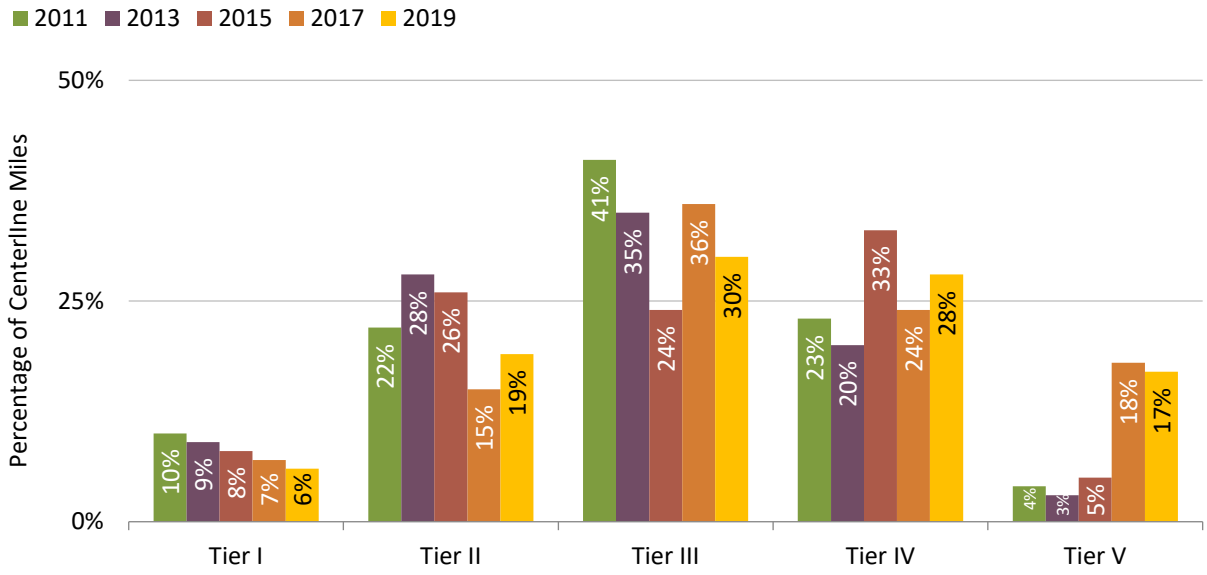
[25] Caltrans, Highway Performance Monitoring System Data

FIGURE 68. CHANGE IN CORRIDOR PERFORMANCE: ORANGE COUNTY, 2011-2019



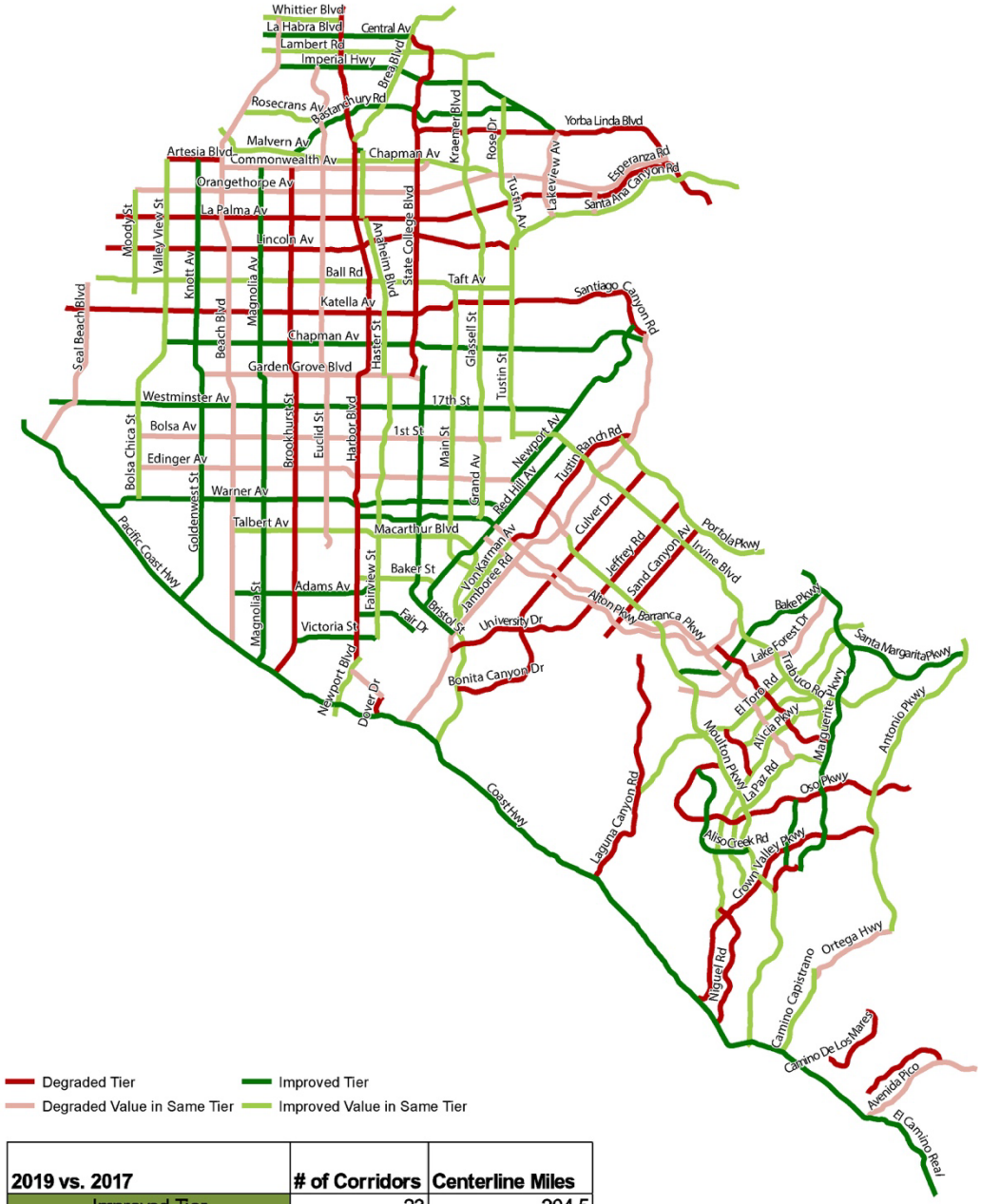
Source: OCTA Corridor Operational Performance Reports

FIGURE 69. CHANGE IN CORRIDOR PERFORMANCE, DAILY AVERAGE: ORANGE COUNTY, 2011-2019



Note: Vehicle miles traveled on a daily basis on Orange County arterials and local roads increased from 34,640,794 in 2011 to 36,798,930 in 2018.
Source: OCTA Corridor Operational Performance Reports

FIGURE 70. CHANGE IN CORRIDOR PERFORMANCE 2017 and 2019: ORANGE COUNTY



2019 vs. 2017	# of Corridors	Centerline Miles
Improved Tier	23	204.5
Improved Value in Same Tier	28	225.6
Degraded Tier	22	189.9
Degraded Value in Same Tier	17	157
Total	**90**	**777**

Source: OCTA Corridor Operational Performance Report

PAVEMENT CONDITION

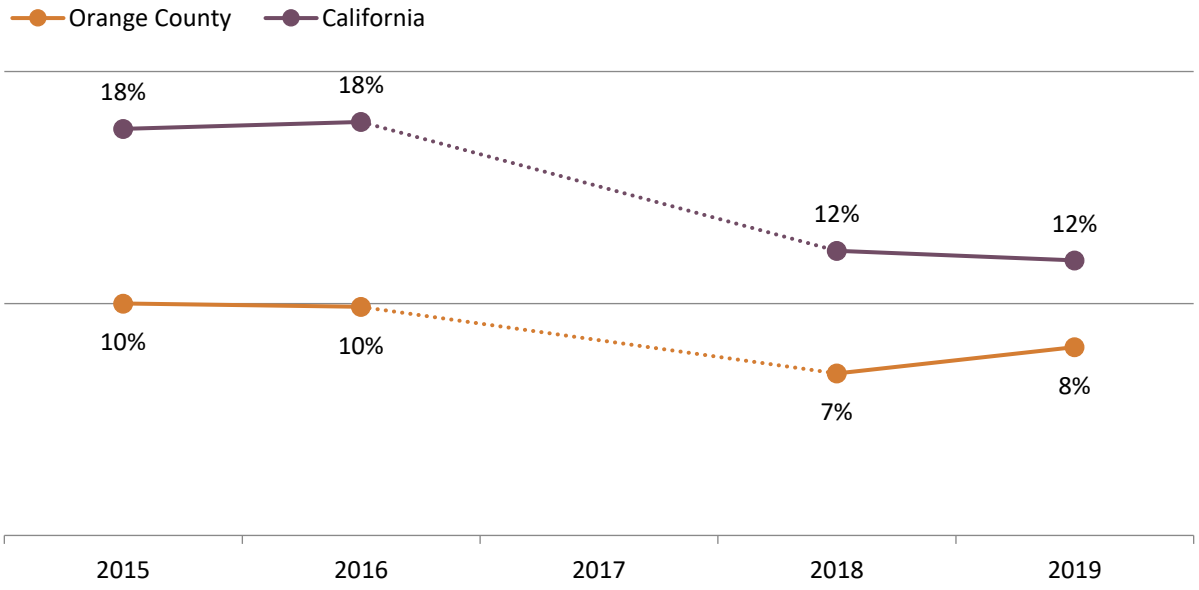
Freeways

This indicator tracks pavement conditions on state highways in Orange County compared to the state overall by showing the percentage and number of lane-miles of freeway that are considered distressed. Pavement is rated on a five-level scale with associated color coding: no distress (green), minor surface distress (yellow), poor ride only (blue), minor structural distress (orange), and major structural distress (red).

The October 2020 congressional extension of federal freeway transportation funding through 2021 provides some assurances of support for ongoing freeway maintenance.

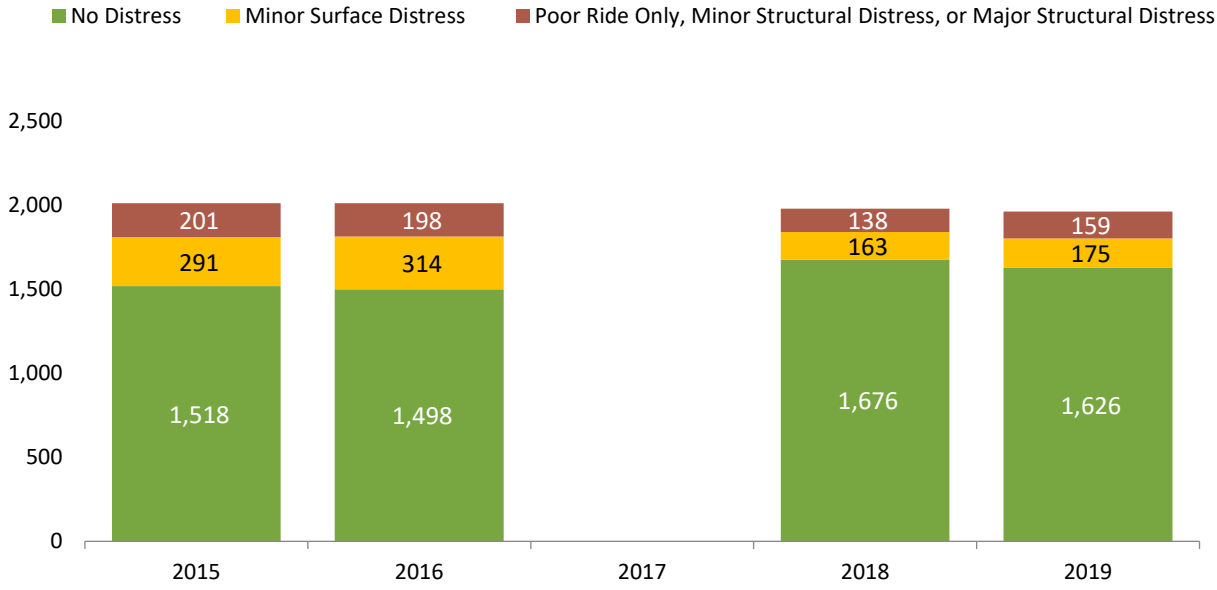
Sources: Schilling, F. "Special Report 3: Impact of COVID-19 Mitigation on Traffic, Fuel Use and Climate Change." UC Davis Road Ecology Center, April 30, 2020. American Association of State Highway and Transportation Officials (ASSHTO). "Continuing Resolution Secures Federal Funding." AASHTO Journal, October 2, 2020

FIGURE 71. PERCENTAGE OF STATE HIGHWAY SYSTEM PAVEMENT THAT IS DISTRESSED: ORANGE COUNTY AND CALIFORNIA, 2015-2019



Note: No data in 2017.
Source: Caltrans

FIGURE 72. NUMBER OF FREEWAY LANE-MILES BY CONDITION: ORANGE COUNTY, 2015-2019

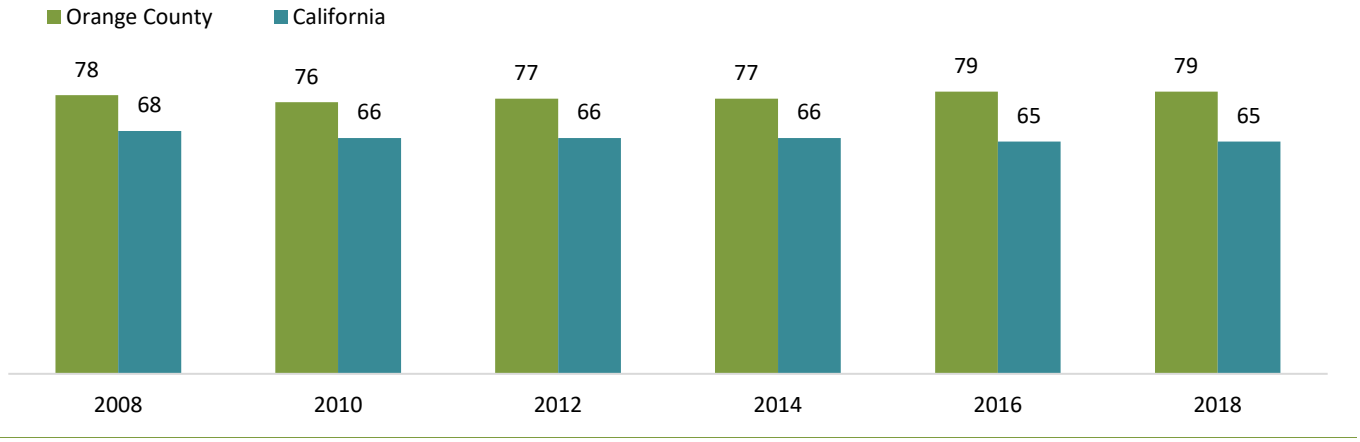


Note: No data in 2017.
Source: Caltrans

Arterial Pavement

This indicator tracks pavement conditions on streets and roads in Orange County compared to the state overall using the California Local Streets and Roads Needs Assessment. This assessment, which rates pavement condition on a scale of 0 (failed) to 100 (excellent), has been conducted biennially since 2008. The 2018 assessment included a total of 16,493 lane miles of pavement in Orange County that are maintained by local jurisdictions.

FIGURE 73. PAVEMENT CONDITION INDEX: ORANGE COUNTY AND CALIFORNIA, 2008-2018



Source: California Statewide Local Streets & Roads Needs Assessment

Pavement Condition Index Thresholds

A newly constructed road will have a Pavement Condition Index (PCI) or 100, while a failed road will have a PCI of 25 or less. The pavement condition is primarily affected by climate, traffic loads and volumes, construction materials and age. Pavement with a PCI below 49 is considered poor; between 50 and 70 is considered at risk; between 71 and 85 is considered good; and 86 and above is considered excellent.

Good to excellent pavements (PCI>70) are best suited for pavement preservation techniques. As pavements deteriorate, more intensive and expensive treatments that address structural adequacy are required. When the pavement has failed (PCI<25), reconstruction is typically required.

Source: California Statewide Local Streets Roads Needs Assessment 2018

During Early Late	The pandemic-induced economic slowdown may lead to lackluster tax receipts, which places funding for state and local road maintenance at risk. For example, a UC Davis study estimates a statewide loss of $1.3 billion in gas tax revenue, depending on the length of the shutdown. Gas taxes are used for county road maintenance, which could impact arterial pavement maintenance.

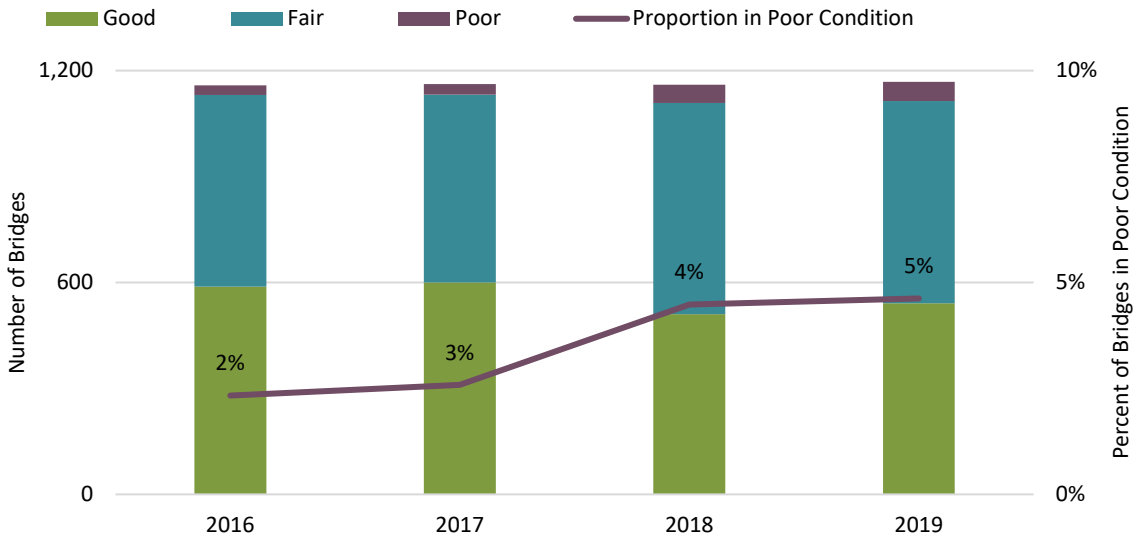
BRIDGES

This indicator tracks the structural condition of bridges in Orange County. In 2016, the Federal Highway Administration (FHWA) began rating bridge condition as Good, Fair, or Poor. Bridge condition is determined by the lowest rating of National Bridge Inventory (NBI) condition ratings for key structural elements of the bridge (e.g., deck, superstructure, substructure, and culvert). If the lowest rating is greater than or equal to 7, the bridge is classified as Good. Bridges rated 5 or 6 are classified as Fair. If the lowest rating for an element is less than or equal to 4, the classification is Poor. Poor condition is roughly equivalent to previous designations of "structurally deficient." A poor designation does not imply that a bridge is unsafe, but such bridges typically require significant maintenance and repair to remain in service and would eventually require major rehabilitation or replacement to address the underlying deficiency.

Trend

As of 2019, one in 20 bridges in Orange County were in poor condition, or 54 of the 1,168 bridges assessed. This is equivalent to 5 percent of the bridges and an increase since 2016, when 2 percent of Orange County bridges were in poor condition.

FIGURE 74. STRUCTURAL CONDITION OF BRIDGES: ORANGE COUNTY, 2016-2019



Source: U.S. Department of Transportation, Federal Highway Administration, Bridges & Structures, Bridge Condition by County (www.fhwa.dot.gov/bridge/nbi/no10/county.cfm)

During ▼ Early ▼ Late ◀▶	While state tax revenues may decline as a result of the pandemic, recent action by Congress to reauthorize highway transportation funding through 2021 bodes well for an ongoing commitment to support road and infrastructure maintenance.

GREENHOUSE GAS EMISSIONS

This indicator measures the trend in transportation sector greenhouse gas (GHG) emissions in California compared to other sectors. Emissions by source within the transportation sector are also shown. The unit of measure used is CO_2e, or carbon dioxide equivalent, which is the standard unit for measuring greenhouse gas emissions. The measure expresses the impact of each different greenhouse gas in terms of the amount of CO_2 that would create the same amount of warming.

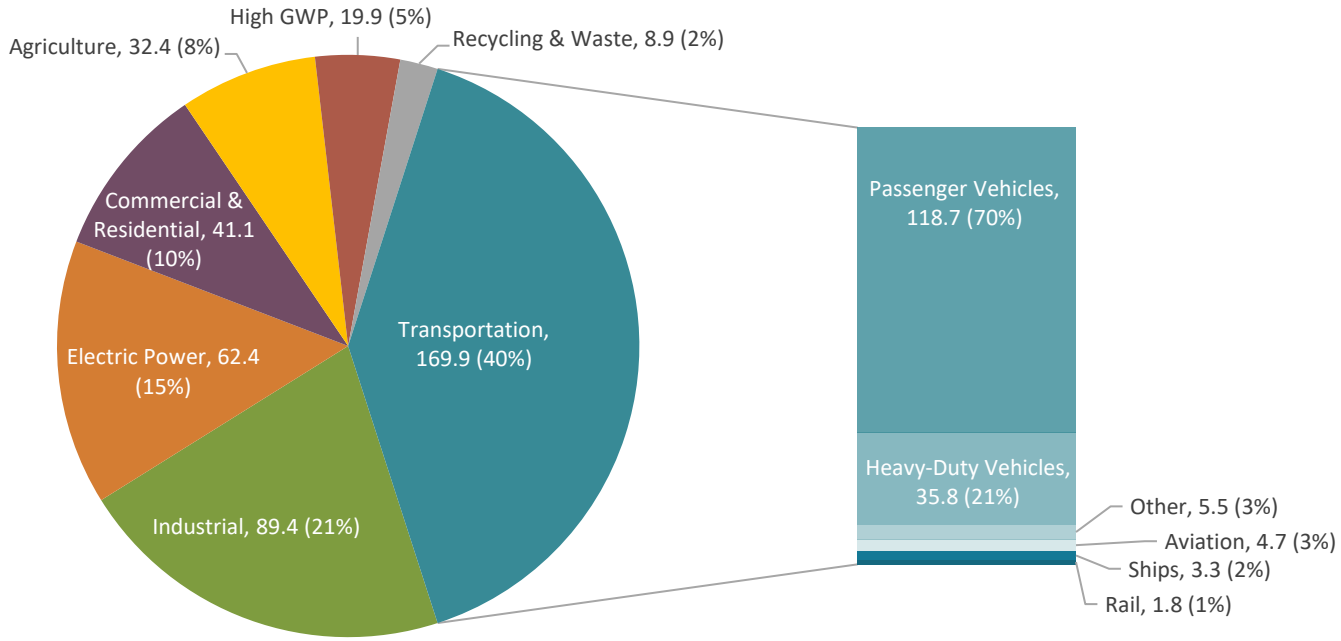
Trend

Compared to other sectors, the transportation sector is the largest contributor to statewide greenhouse gas emissions, comprising 40 percent of all emissions statewide. In 2017, on-road vehicles (passenger vehicles and heavy-duty vehicles) comprised 91 percent of all transportation sector emissions in California.

Statewide, total metric tons of transportation sector GHG emissions increased in the last four years of tracking (2014-2017). Despite the recent increase, transportation emissions are below the level in 2000 and the 17-year high in 2005. Metric tons of emissions in all other sectors fluctuated annually until 2012 when emissions began to decline steadily. On a per capita basis, total emissions, including all sectors, have fallen 23 percent since 2000.

An analysis of the modes of transportation within the transportation sector shows that the recent increase in emissions in the transportation sector was driven by increases in passenger vehicle emissions. Meanwhile, emissions from all other modes remained relatively steady in recent years.

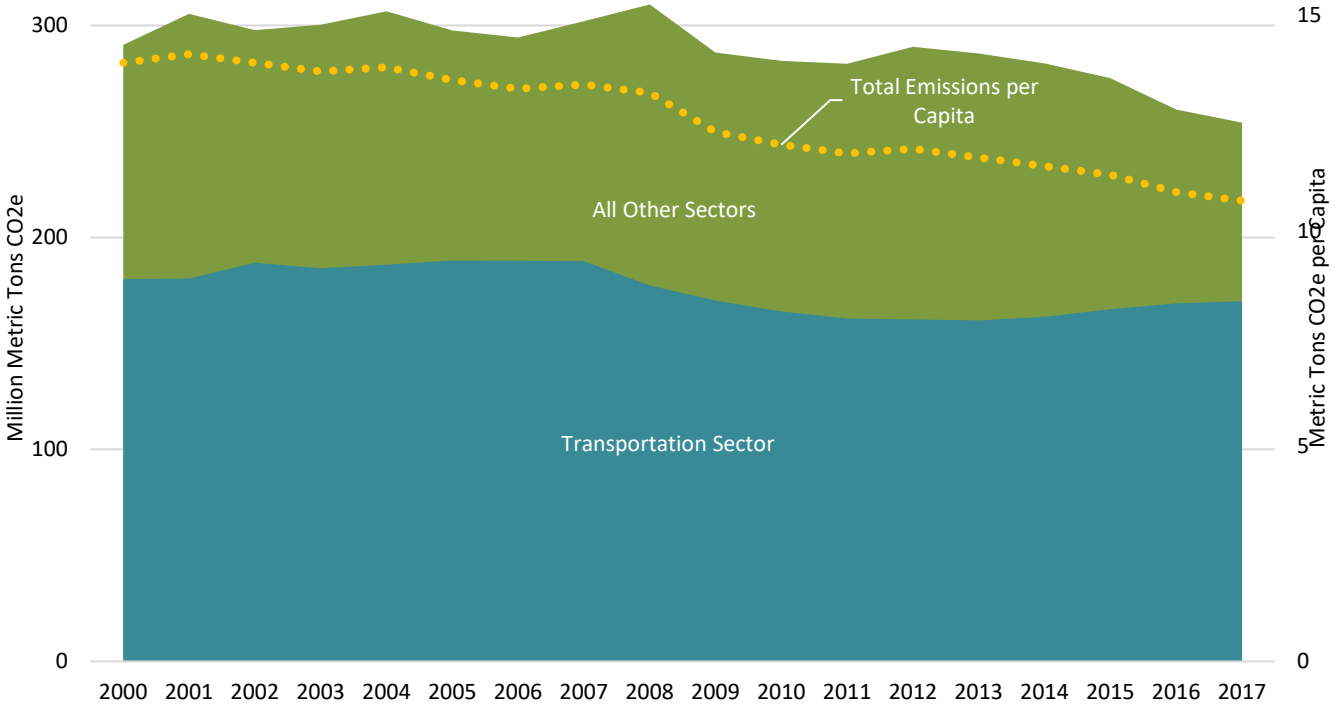
FIGURE 75. GHG EMISSIONS (MILLION METRIC TONS OF CO_2 EQUIVALENT) BY SCOPING PLAN SECTOR: CALIFORNIA, 2017



Note: The 2017 Scoping Plan identifies how the State of California can reach its 2030 climate target to reduce GHG emissions by 40 percent from 1990 levels, and substantially advance toward its 2050 climate goal to reduce GHG emissions by 80 percent below 1990 levels. "GWP" stands for Global Warming Potential and refers to other sources of emissions that have a high impact on climate change, including refrigerants.

Source: California Air Resources Board, California GHG Emission Inventory, 2000-2017 (2019 Edition)

FIGURE 76. TOTAL PER CAPITA GHG EMISSIONS (ALL SECTORS) AND GHG EMISSIONS FOR THE TRANSPORTATION SECTOR AND ALL OTHER SECTORS: CALIFORNIA, 2000-2017



Source: California Air Resources Board, California GHG Emission Inventory, 2000-2017 (2019 Edition)

During

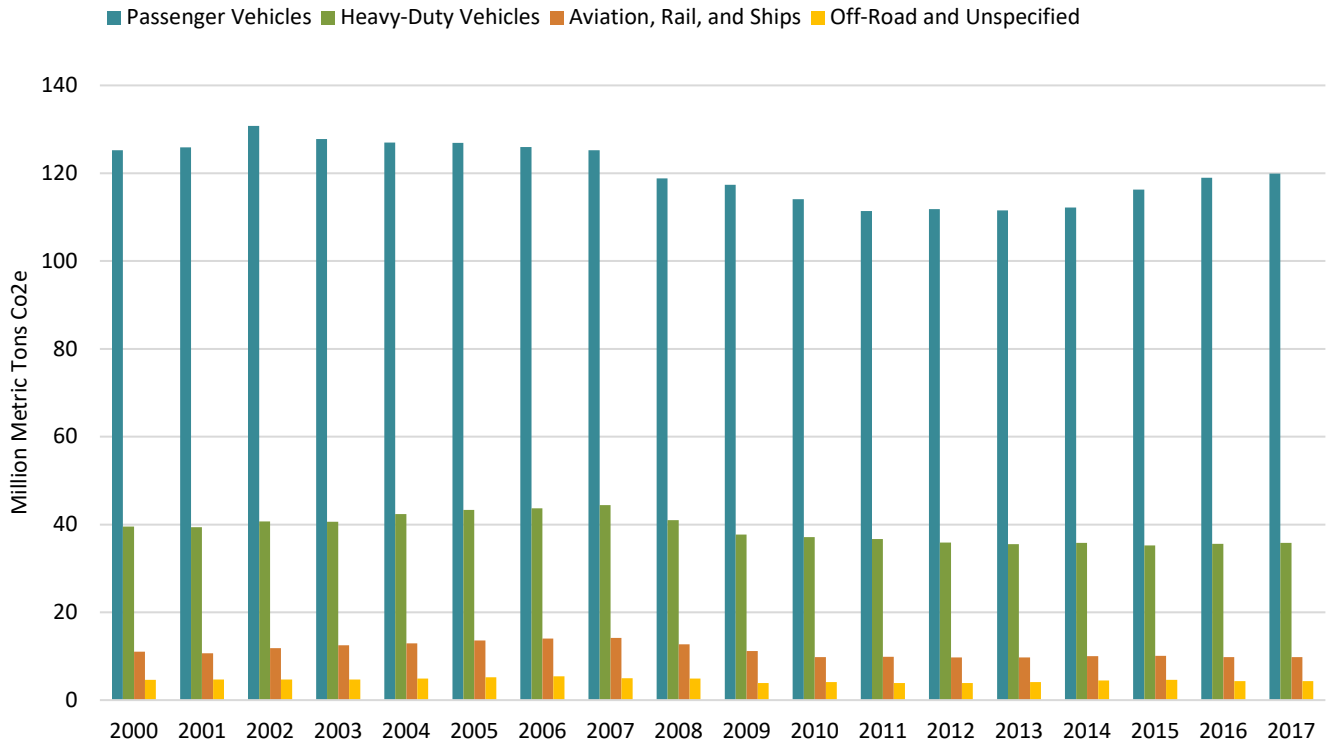
Early

Late

At the peak of the stay-at-home orders in April 2020, daily global CO_2 emissions decreased by 17 percent compared to average 2019 levels, with just under half of that decline from reduced surface transportation. Scientists estimate a global reduction of between 4 and 7 percent in carbon output in 2020 overall. However, without any structural changes, the emission decline caused by the pandemic is likely to be short-lived and rebound as the economy recovers.

Source: Le Quéré, C. Jackson, RB. Jones, MW. Smith, AJP. Abernethy, S. Andrew, RM. De-Gol, AJ. Willis, DR. Shan, Y. Canadell, JG. Friedlingstein, P. Creutzig, F. Peters, GP. "Temporary reduction in daily global CO_2 emissions during the COVID-19 forced confinement." Nature Climate Change. 10, 647-653, May 19, 2020

FIGURE 77. TRANSPORTATION SECTOR GHG EMISSIONS BY SOURCE: CALIFORNIA, 2000-2017



Source: California Air Resources Board, California GHG Emission Inventory, 2000-2017 (2019 Edition)

ALTERNATIVE FUEL VEHICLE REGISTRATIONS

This indicator measures selected alternative fuel vehicle registrations, including electric, hybrid, natural gas, and hydrogen fuel cell.[26] Information is presented on all vehicle registrations that are alternative fuel vehicles in Orange County compared to California overall. Registrations include private autos, commercial and private trucks, motorcycles, mopeds, and off-highway vehicles.

Trend

There were 132,796 hybrid vehicles and 41,638 electric vehicles registered in Orange County as of September 2019. These alternative fuel vehicles, combined with natural gas vehicles (5,395) and hydrogen fuel cell vehicles (1,552), comprise 5.0 percent of all vehicle registrations in the county. This proportion reflects growth since September 2016, when 3.3 percent of all registrations in Orange County were alternative fuel vehicles.

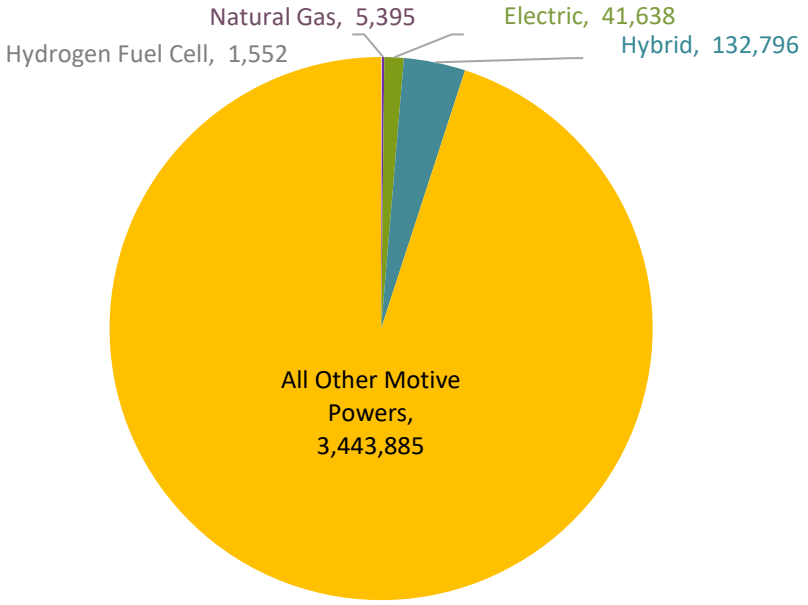
While hydrogen fuel cell vehicles are the smallest proportion of all registered vehicles, they grew the most between September 2016 and September 2019 (up 1,103 percent in Orange County). The county saw 156 percent growth in electric vehicle registrations over this period – a slightly faster rate of growth than California (135 percent growth). Overall, alternative fueled vehicle registrations increased 45 percent over this period in Orange County, while registrations of gasoline or other carbon-based fuel vehicles fell 7 percent.

Orange County has a higher level of adoption of alternative fuel vehicles than the rest of California overall. Out of all vehicles registered in Orange County, 3.7 percent are hybrids (compared to 3.0 percent statewide), and 1.1 percent are electric (compared to 0.7 percent statewide).

Prior to the pandemic, the Alternative Fuel Vehicle (AFV) market was growing, and it is projected to continue growing into 2025, despite being hit by the temporary pandemic-induced decline that affected both AFV and traditional fuel vehicle markets. The proportion of vehicle sales that are alternative fueled vehicles and the trajectory of the AFV market is unlikely to be directly impacted by the pandemic. Rather, the AFV market is more likely to be influenced by technology improvements, consumer demand, and government actions -- such as passing laws or offering credits to incentivize purchasing an AFV.

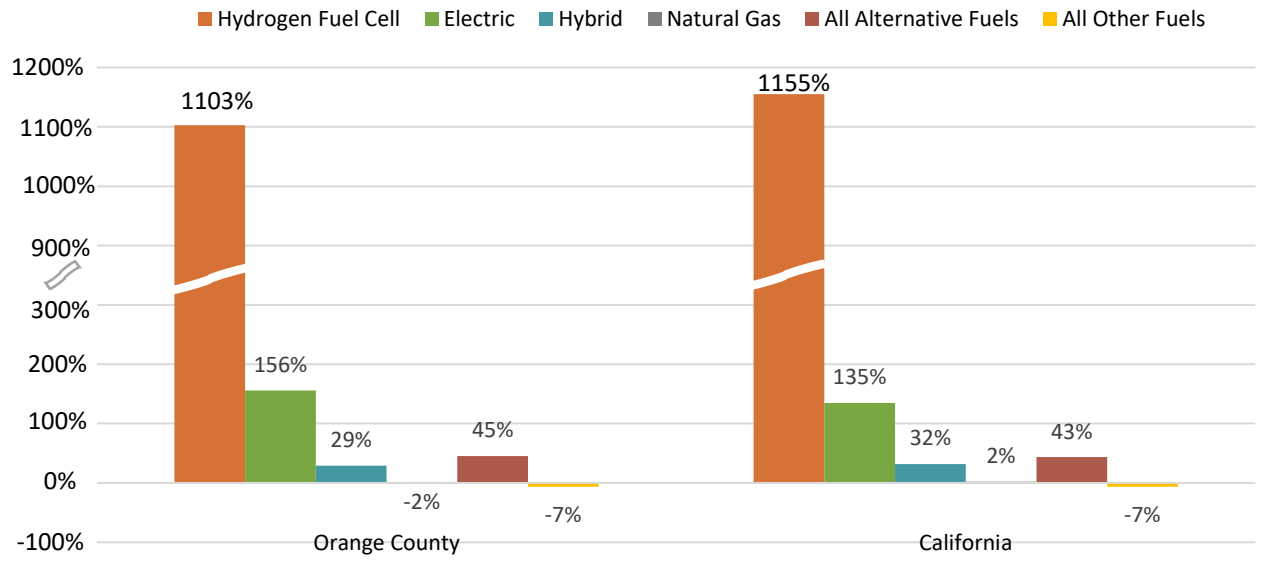
[26] Electric, hydrogen fuel cell, and natural gas fuel sources were selected due to their eligibility for Clean Air Vehicle (CAV) Decals that allow access for use in HOV lanes regardless of the number of passengers. Hybrids were included since some hybrids (plug-in only) are eligible for CAV Decals; plug-in versus non-plug-in hybrids are not broken out by the data source. CAV Decals are subject to restrictions; not all alternative fuel vehicles or owners are eligible.

FIGURE 78. COUNT OF VEHICLE REGISTRATIONS BY FUEL TYPE: ORANGE COUNTY, SEPTEMBER 2019



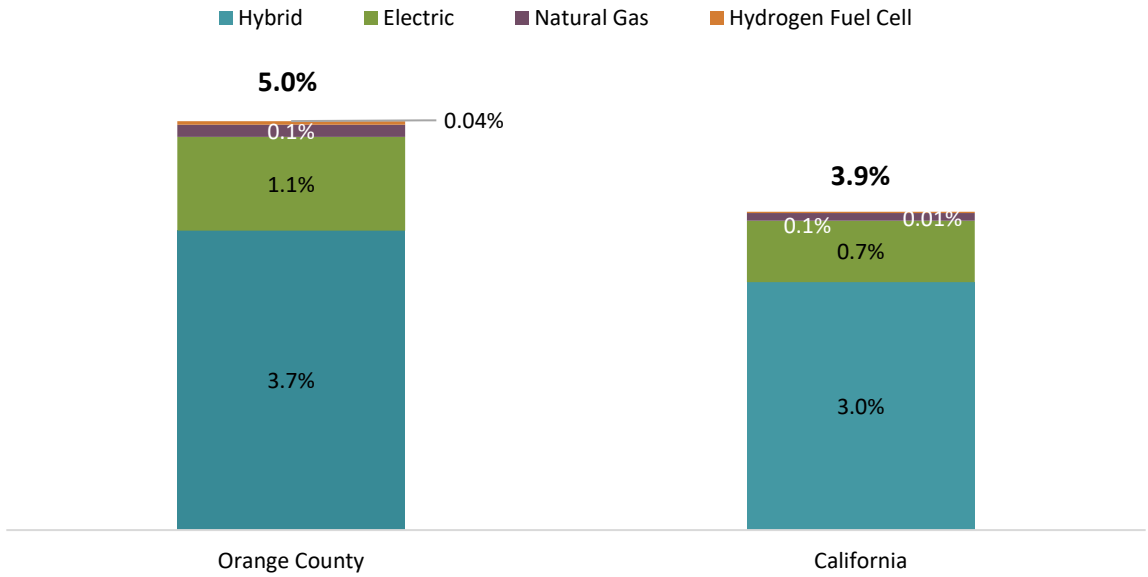
Source: California Department of Motor Vehicles

FIGURE 79. CHANGE IN VEHICLE REGISTRATIONS BETWEEN SEPTEMBER 2016 AND SEPTEMBER 2019, BY FUEL TYPE: ORANGE COUNTY AND CALIFORNIA



Source: California Department of Motor Vehicles

FIGURE 80. PERCENTAGE OF ALL VEHICLE REGISTRATIONS THAT ARE ELECTRIC, NATURAL GAS, HYDROGEN FUEL CELL OR HYBRID VEHICLES: ORANGE COUNTY AND CALIFORNIA, SEPTEMBER 2019



Source: California Department of Motor Vehicles

OC Bus Fleet
Zero-Emission by 2040

In line with statewide mandates, in June 2020, OCTA set a course to transition all buses to zero-emission technology by 2040. OCTA is in the process of testing both hydrogen fuel-cell electric buses and plug-in battery-electric buses to determine which technology best meets OCTA's needs related to operations, maintenance and cost, among other things.